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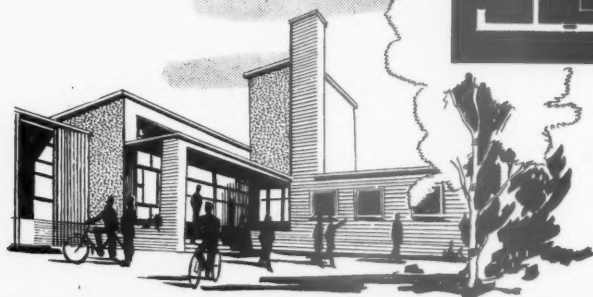
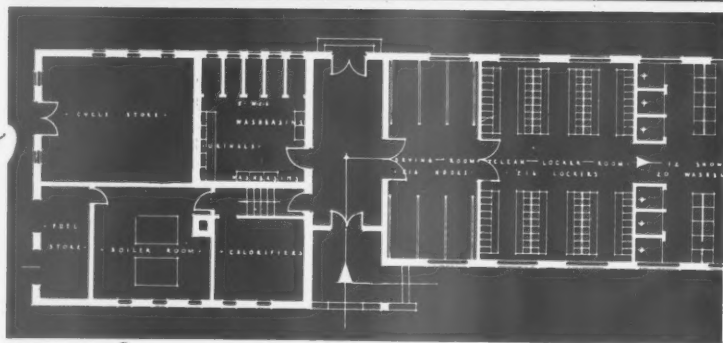
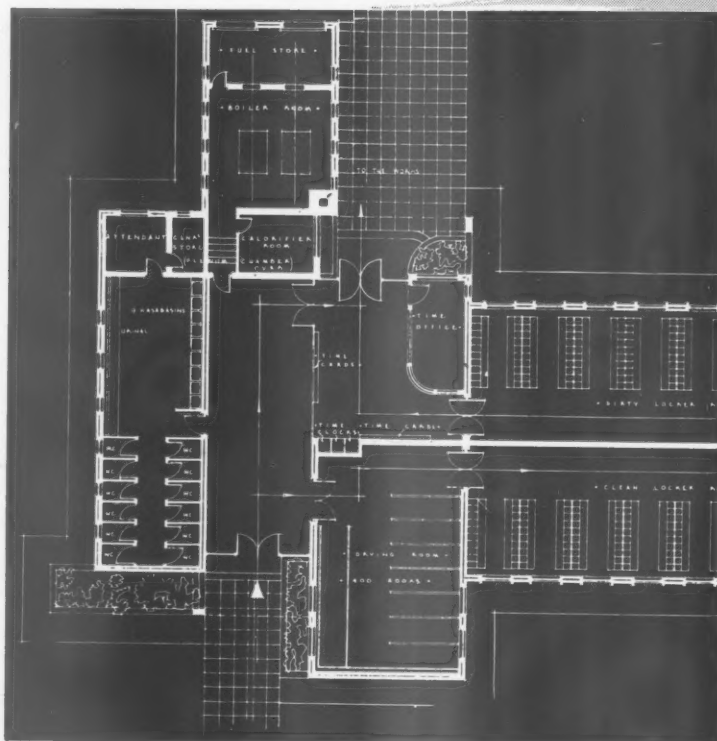
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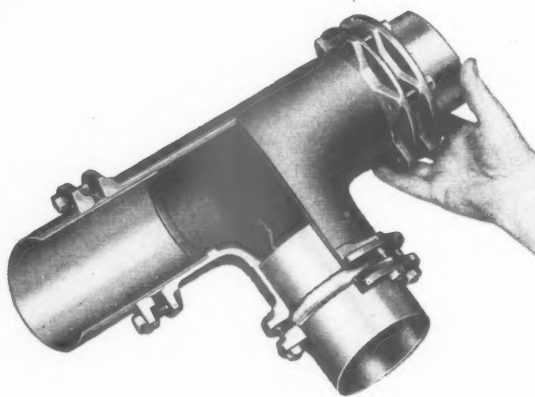
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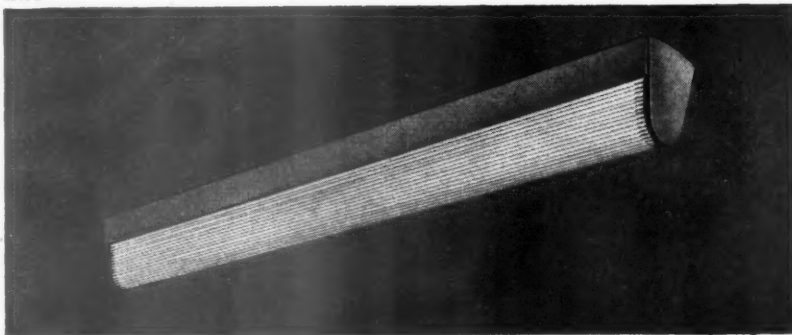
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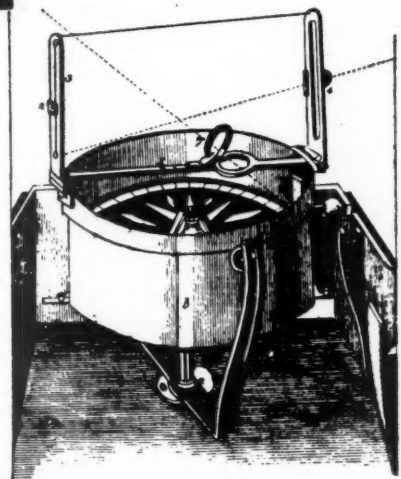


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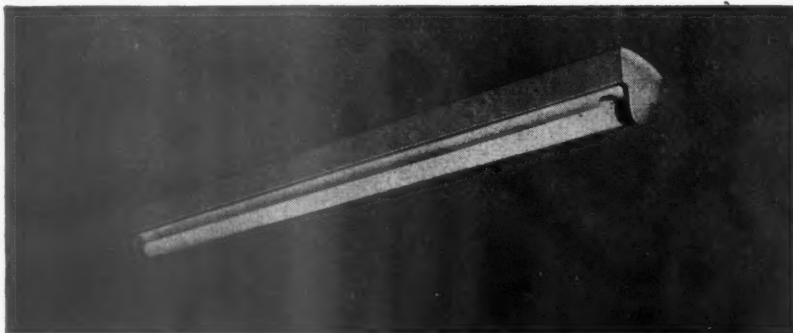
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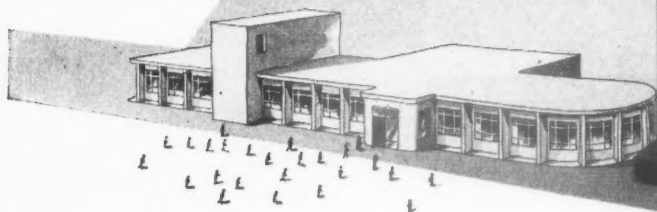
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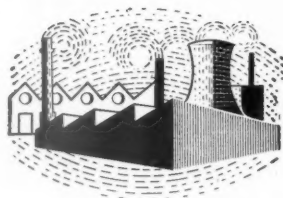


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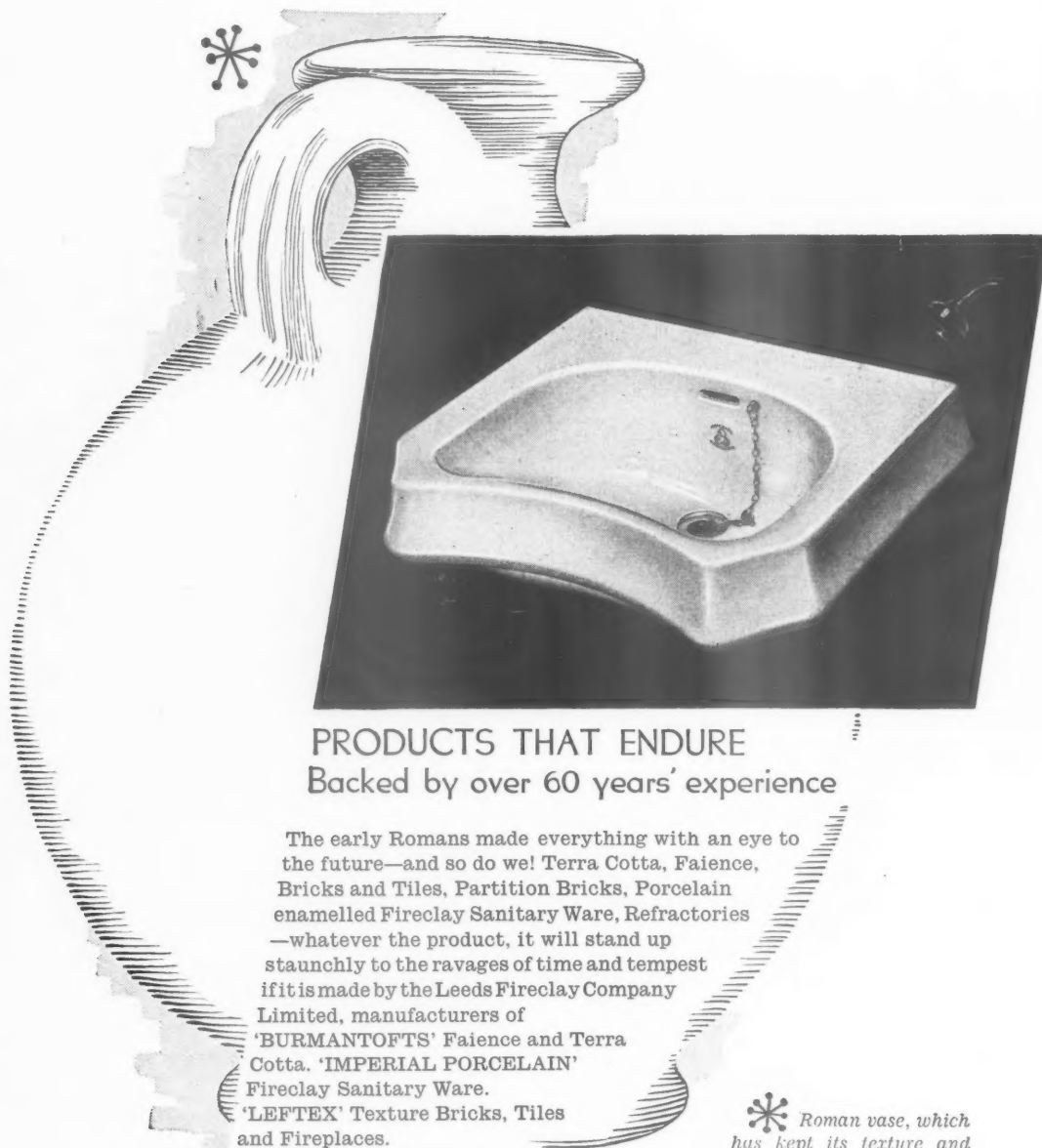
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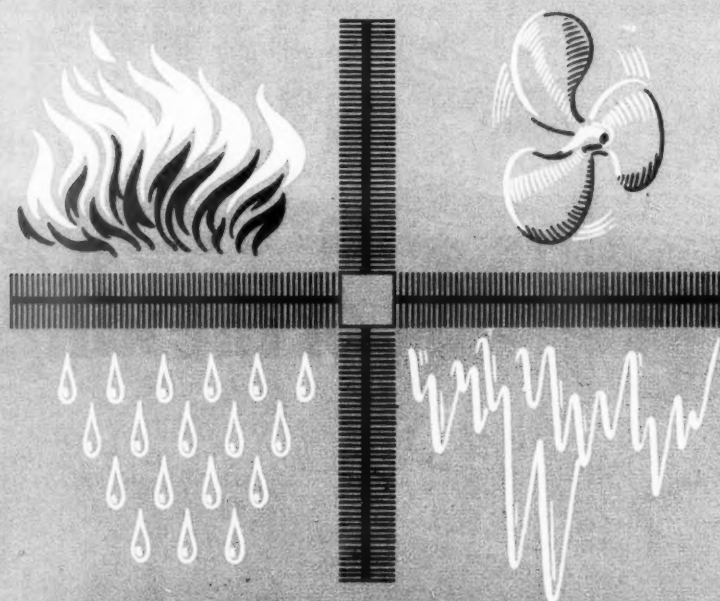
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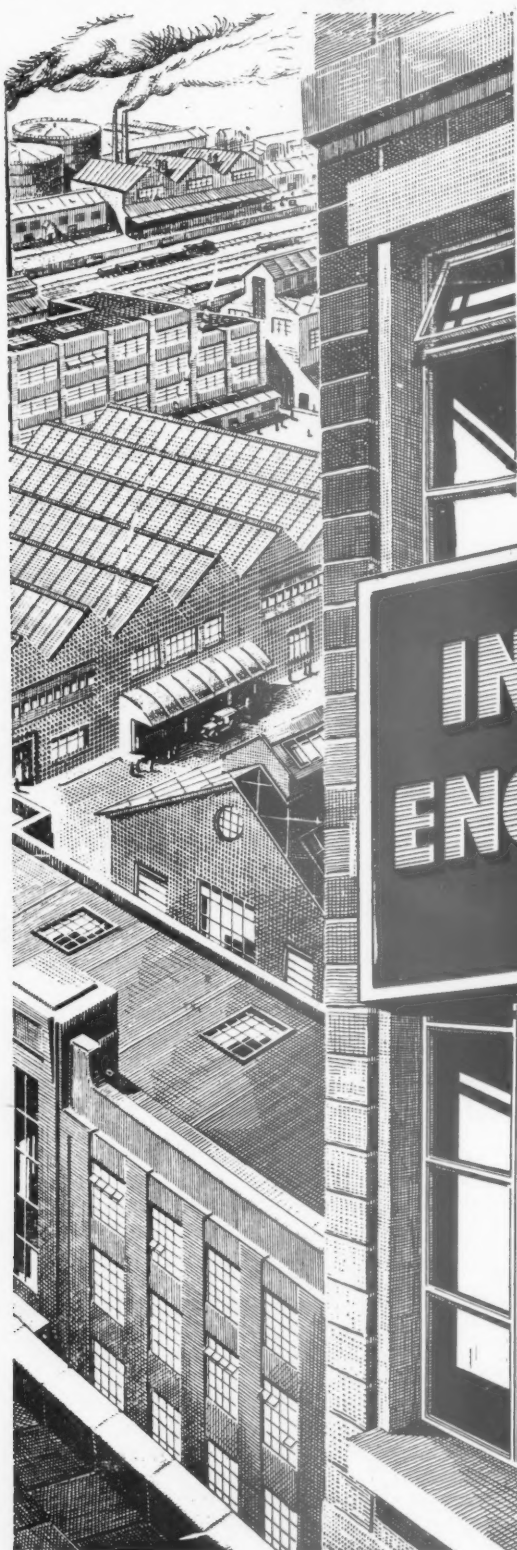
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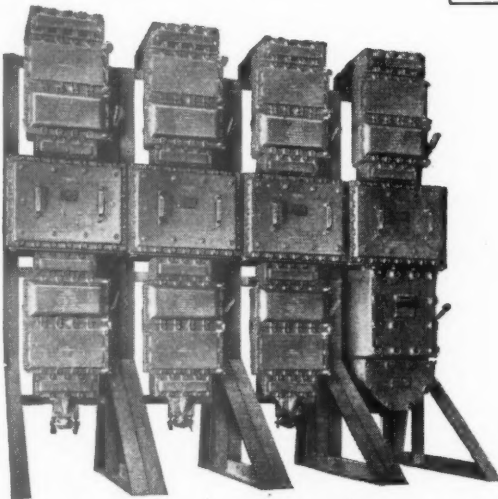
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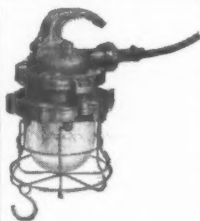
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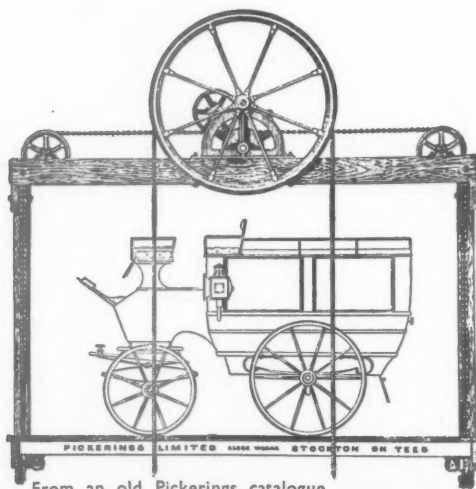
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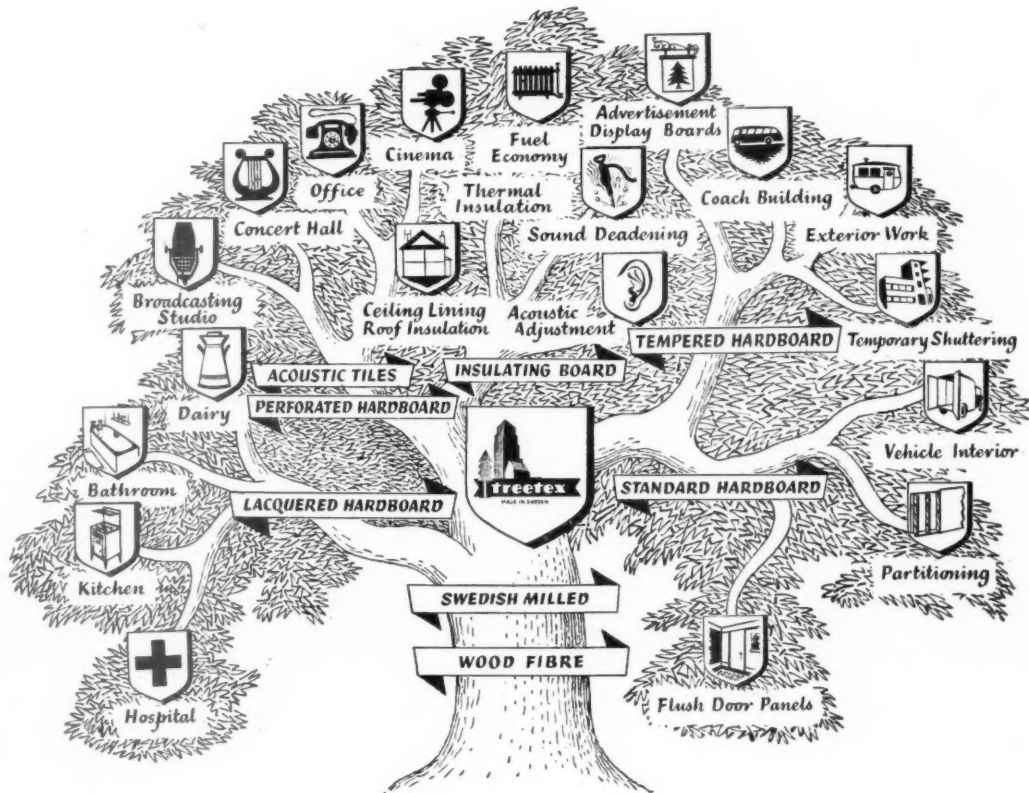


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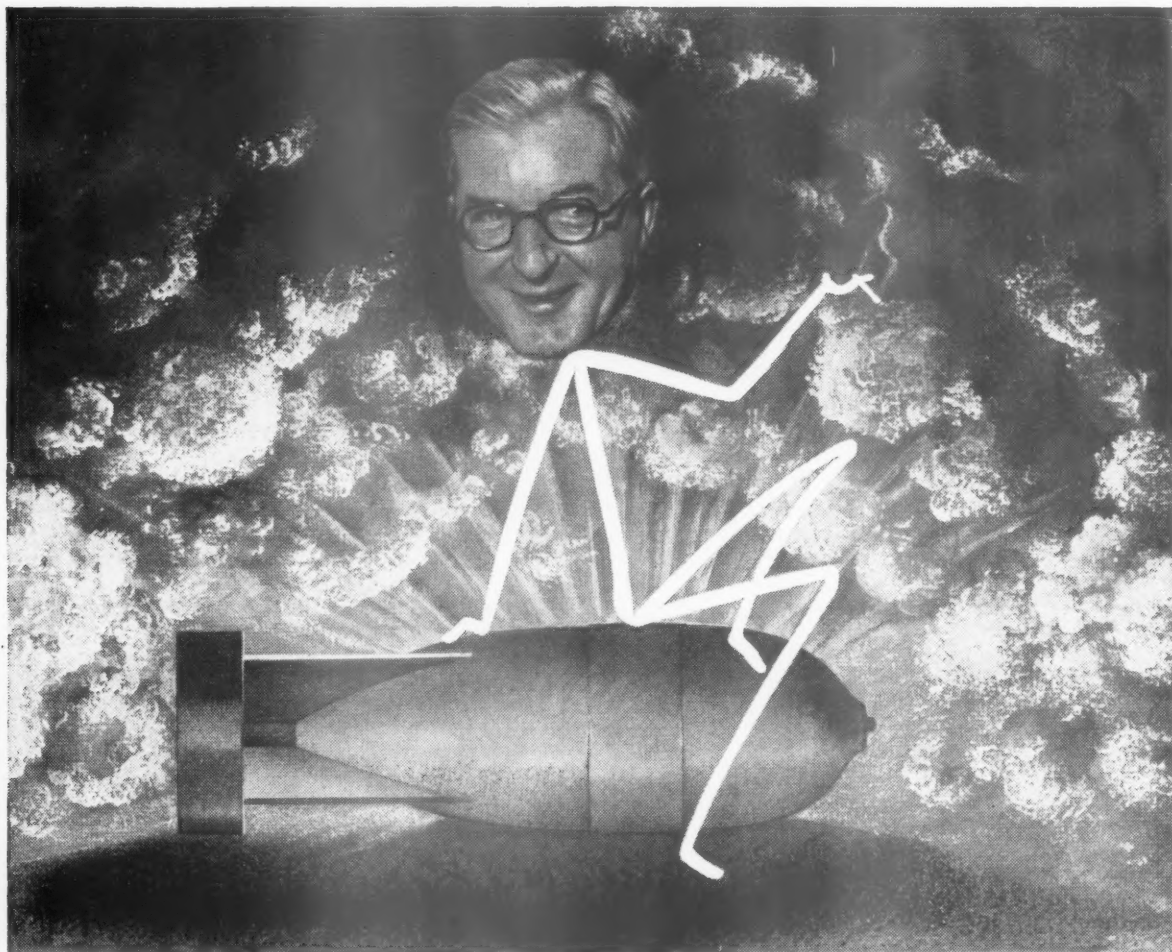


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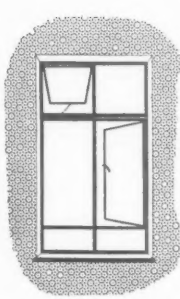
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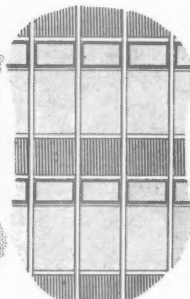
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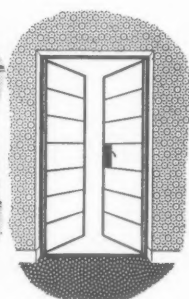
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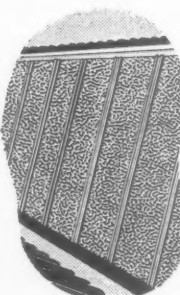
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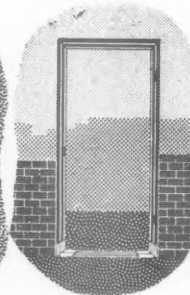
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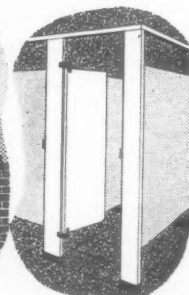
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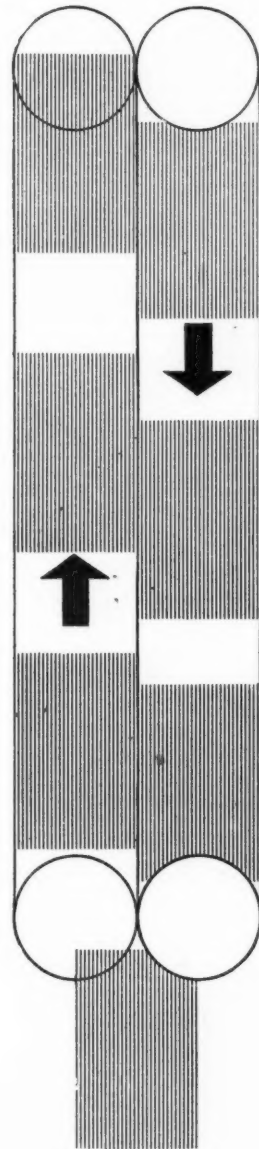
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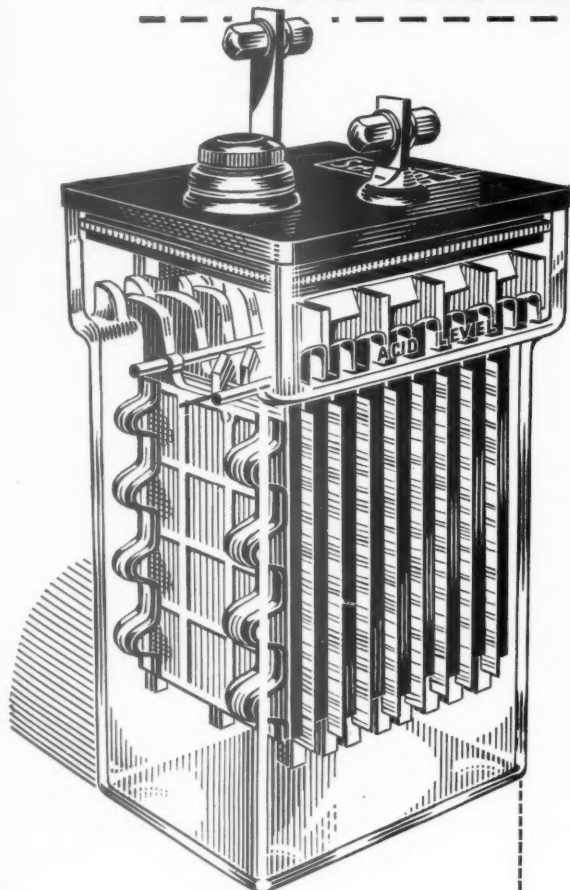
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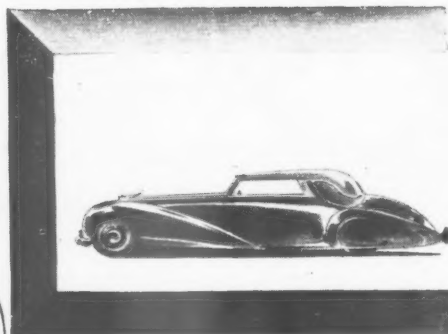
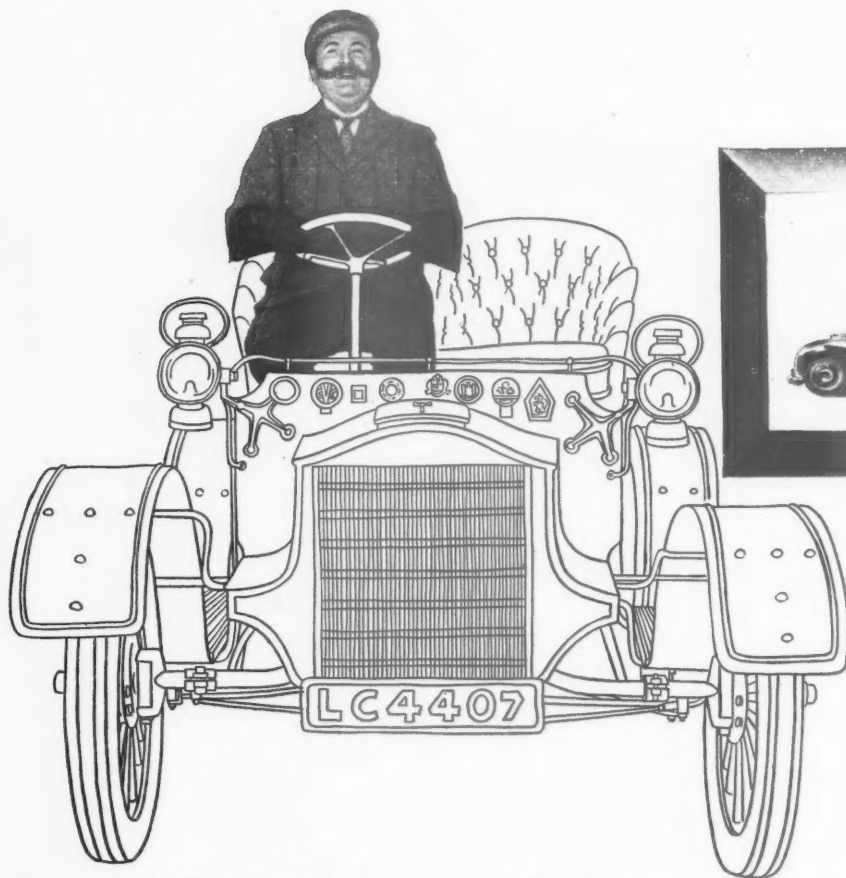
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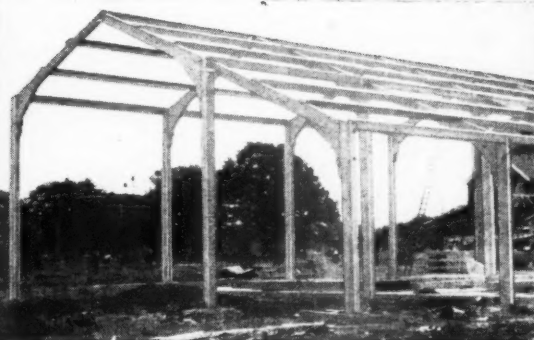
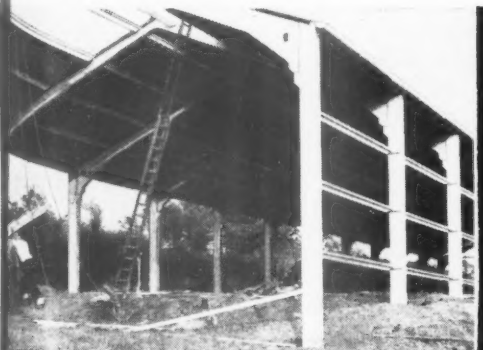
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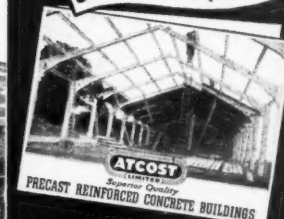
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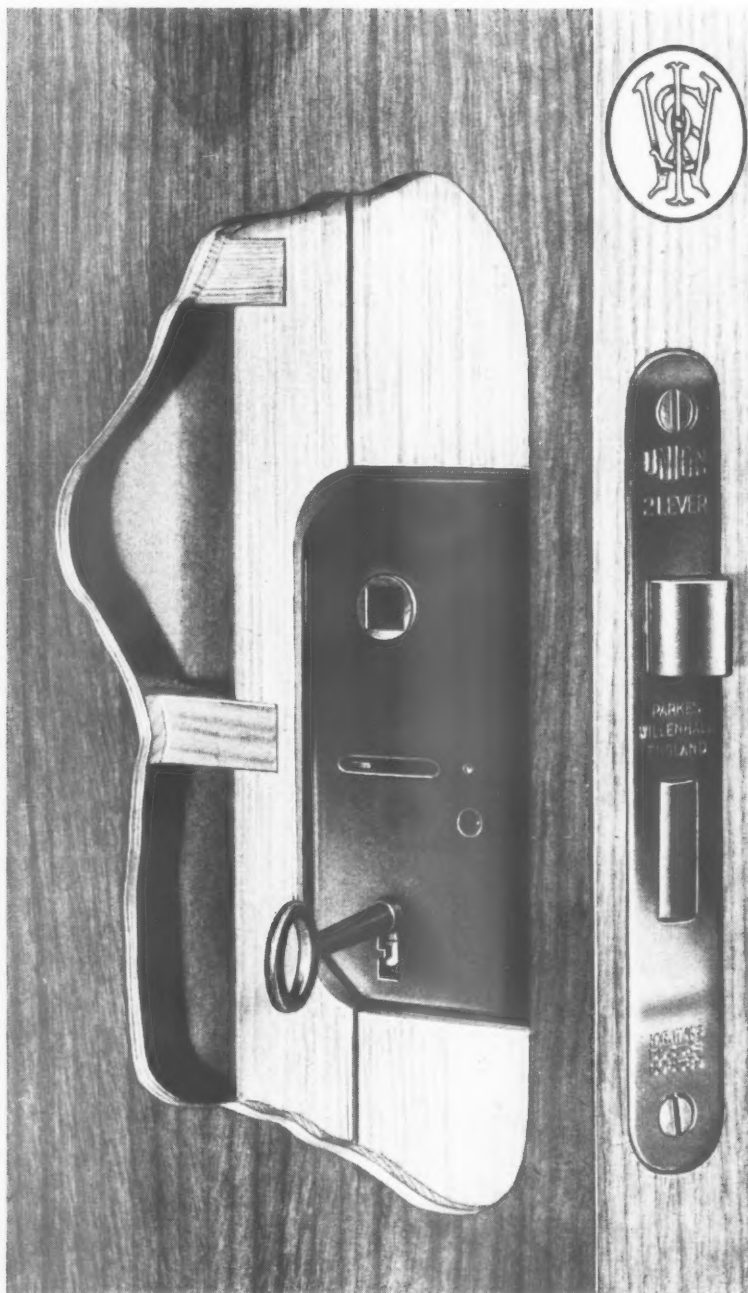


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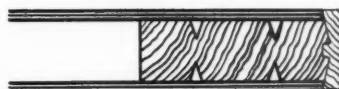
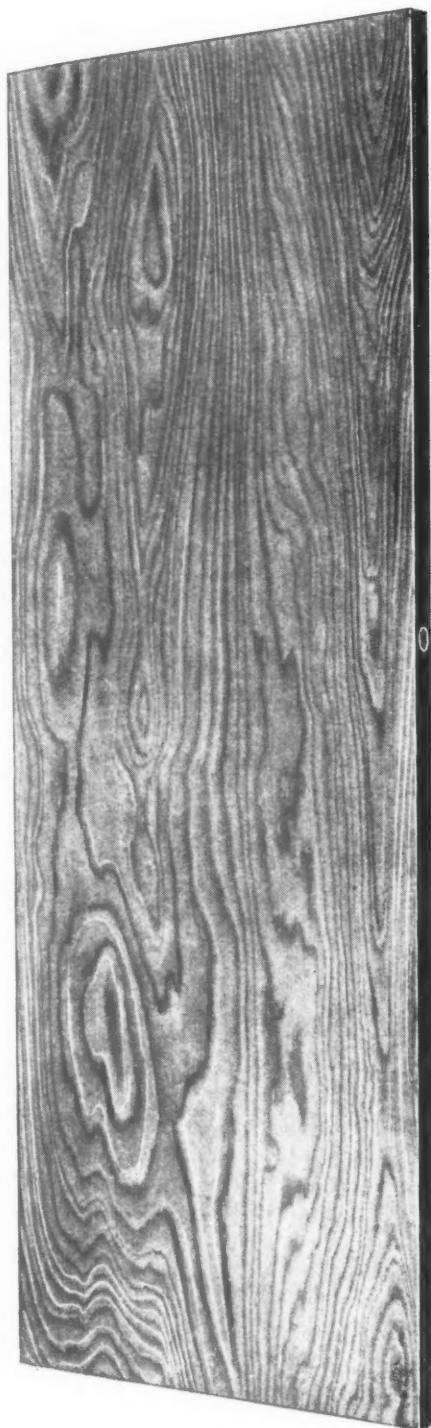
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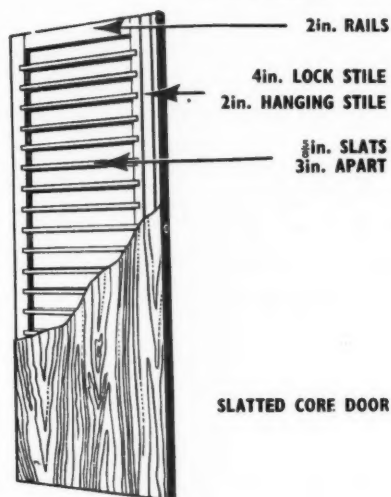
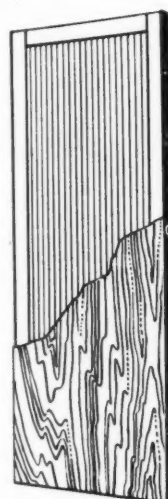
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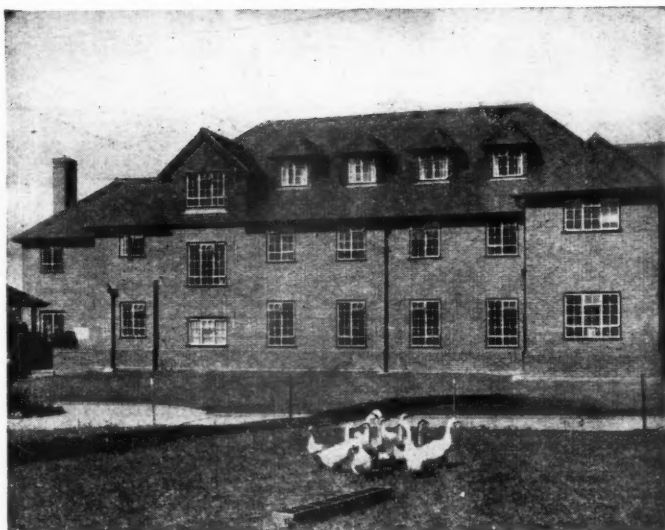
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Architect: Leslie B. Bryan, A.R.I.B.A.



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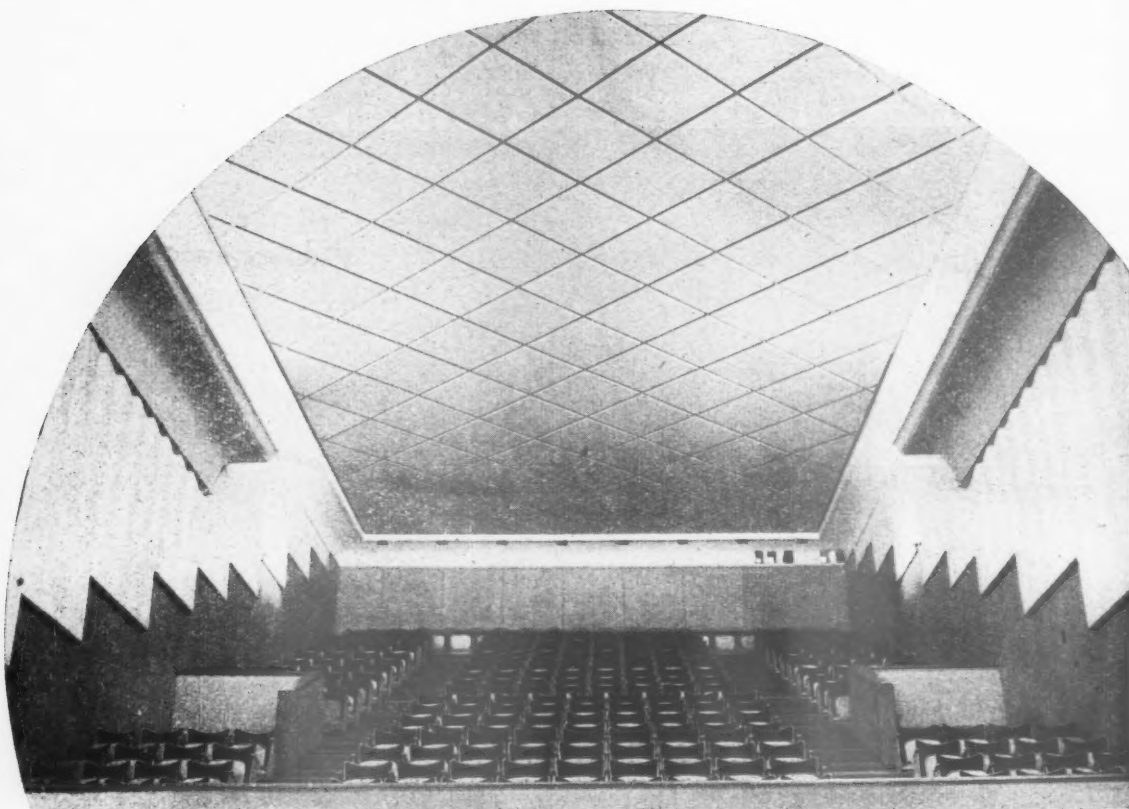
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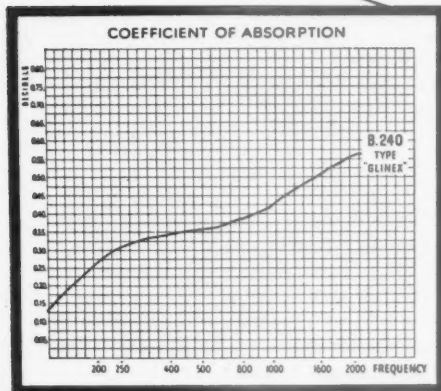
The illustration shows the use of "Glinex" in a cinema in Antwerp.

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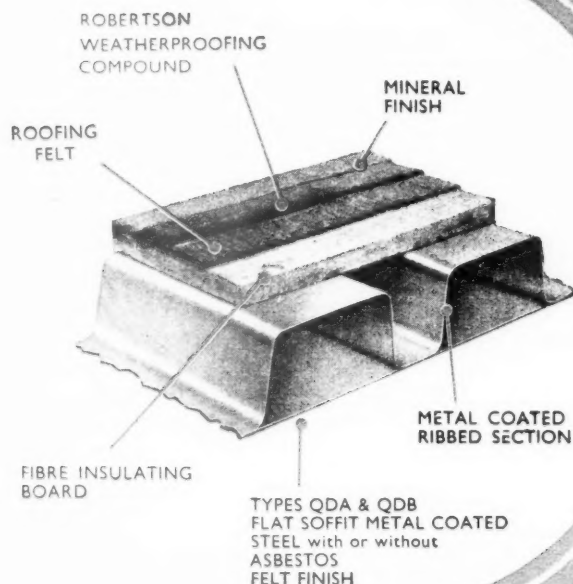
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be supplied with holes counter-bored through to the aluminium bases, these holes being fitted with plastic plugs after the treads have been fixed.

WOOD STAIRS Care should be taken to ensure that the stairtreads bed down evenly. Where the steps are badly worn it may be advisable to

chisel out and fit the tread flush with the remainder of the step. Where the step is only partly worn it may be built up level and the tread fitted to the top. **CONCRETE STAIRS** With new stairs the treads may be cast in when making the steps or, alternatively, timber fillets may be cased in to take the fixing screws. With existing stairs the steps can be drilled and plugged to take the screws. **METAL STAIRS** The treads should be fixed with $\frac{3}{16}$ "

brass counter-sunk screws and steel nuts with washers, the steps being drilled accordingly



PHOTOGRAPH DON Plastic-filled Stairtreads in use on the staircase of a Government Department in Bristol. The ribbed surface of the plastic

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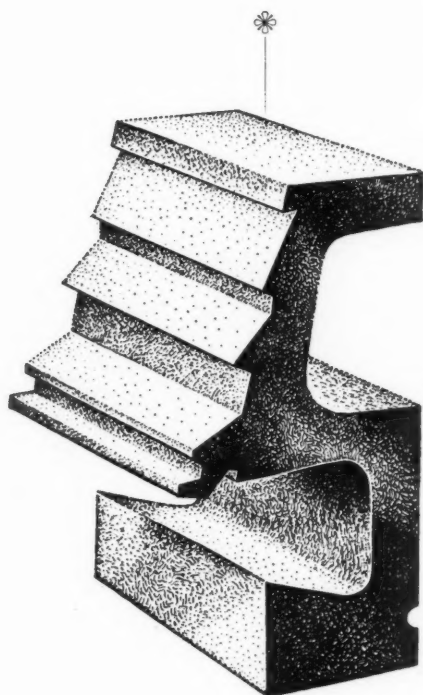
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What is it?

- A** *An Egyptian Plinth-piece*
(Isakhumen Dynasty)?
- B** *Pre-fabricated Rocker-Chock?*
- C** *Unexploded Political Pensioner?*
- D** *Manufactured Meteorite?*
- E** *Woozel Grommet-Block?*
- F** *An hallucination?*
- G** *Polynesian Plonka-Plectrum?*
- H** *Finlock Sprocket Block?*
- I** *Contemporary bust of Garibaldi?*
- J** *A Bricklesham's Bi-furbicated Bed-brick?*
- K** *An Easter Island Sculpture?*

Whodunit?

- A** *The Complicated Concrete Company?*
- B** *An eggbound Pterodactyl?*
- C** *A Sculptor of ill repute?*
- D** *An eaves specialist of good repute?*
- E** *M.I.5?*
- F** *The Pimlico Jigsaw Puzzle Co.?*
- G** *Muckleberry Urban District Council?*
- H** *An extrovert bricklayer's labourer*
who wishes to remain anonymous?

Why?

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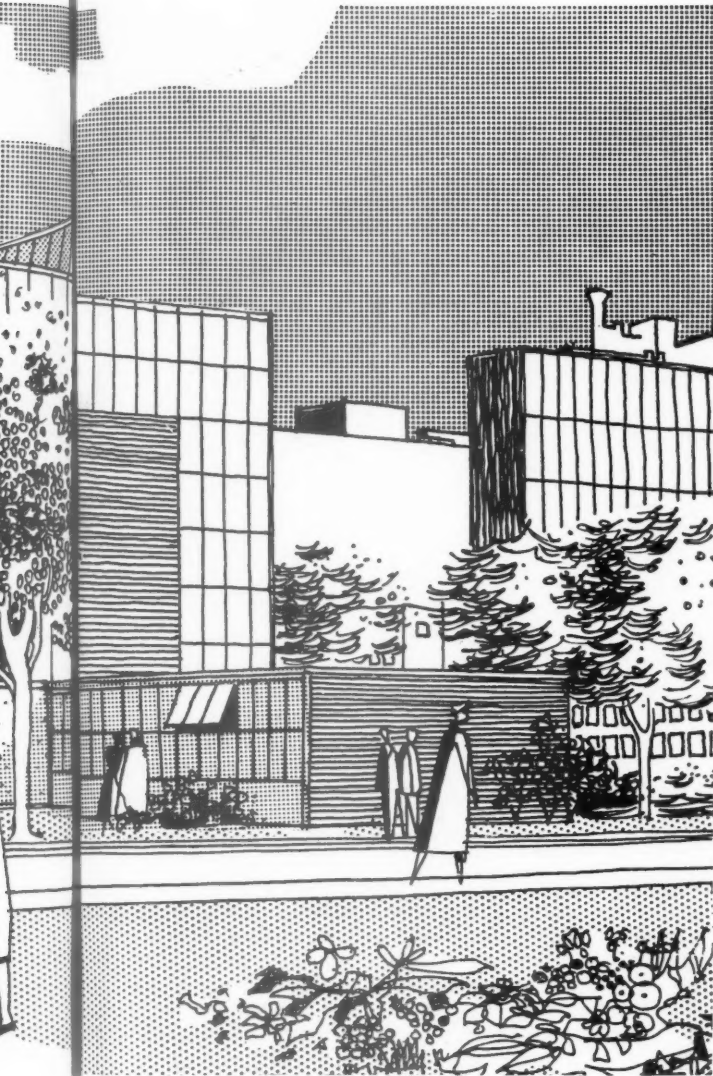
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PATENT GLAZING S



From a design by Edward D. Mills, F.R.I.B.A.

G SPECIFICATIONS



4. MUNICIPAL GARAGE

The increase of road passenger transport necessitates the construction of repair and maintenance garages for motor vehicles. The design illustrated shows such a building planned to accommodate a large number of double decker buses, and to give facilities for maintenance and repair work.

One of the important features in such a building is the provision of adequate daylight so that work may be carried out under the most comfortable conditions. This has been provided by side wall glazing using patent glazing bars glazed with wired cast glass with opening lights, operated by hand or electrically controlled gearing.

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For all facts about patent glazing,
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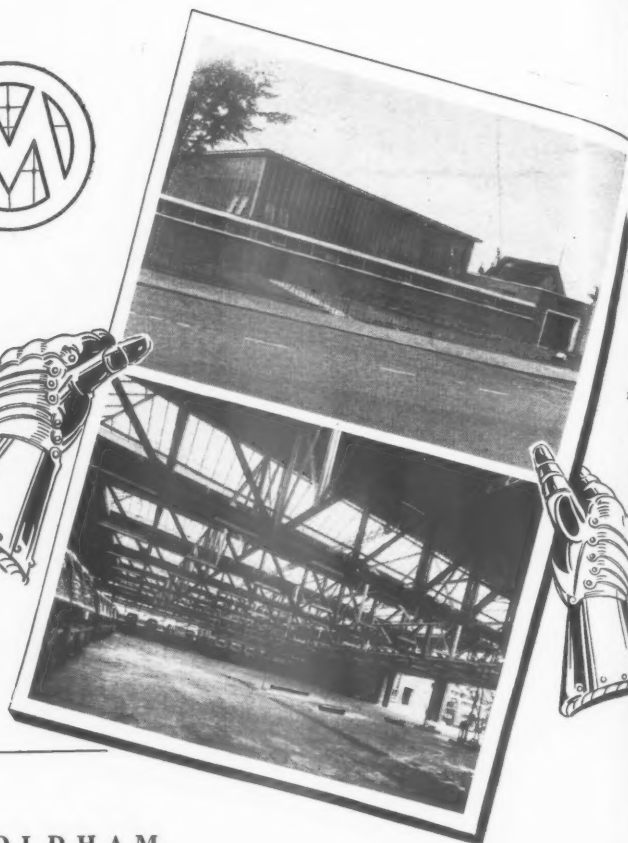
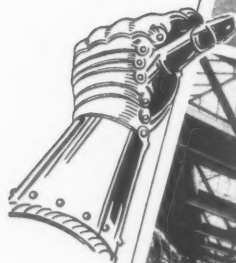
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ARCHITECTS:
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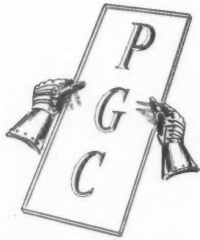


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(BS.1010/53 Pattern).

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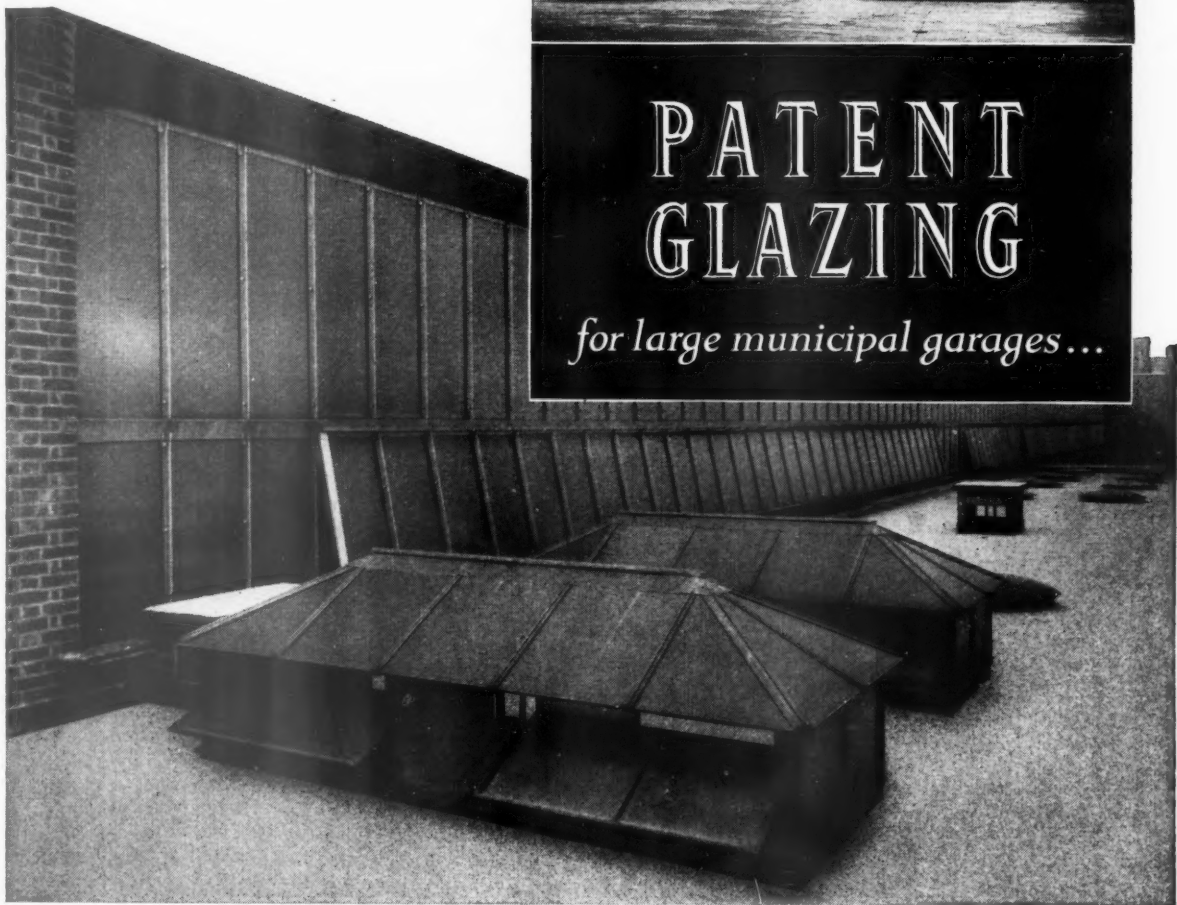
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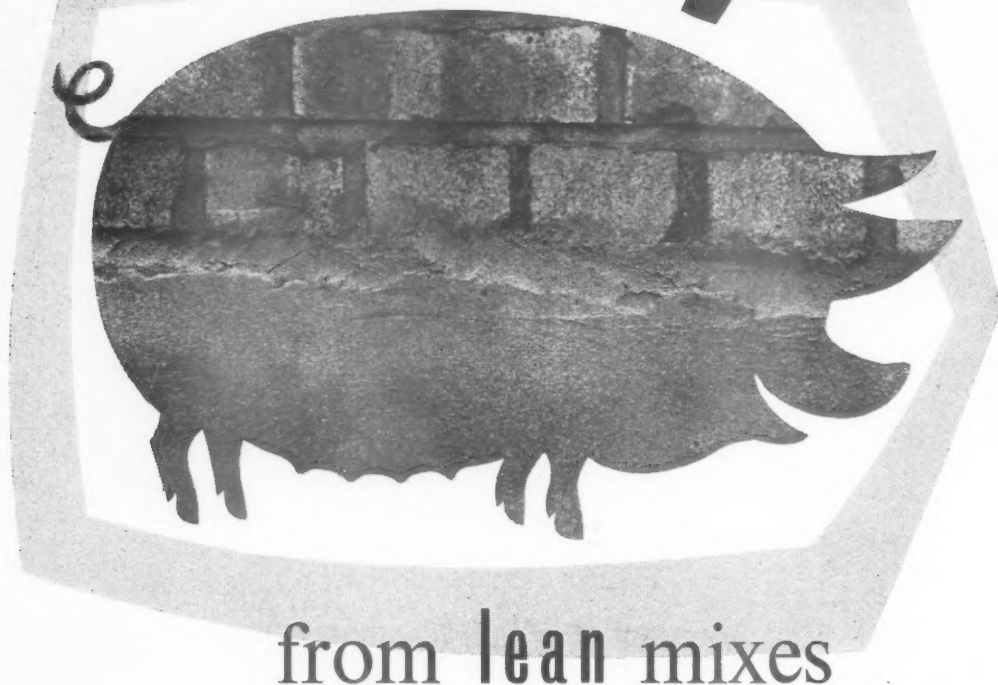


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* Official Publications relevant are *National Building Studies Bulletin* Nos. 8 and 10. See also *BS Specifications* BS 1198, 1199, 1200 for Sands.

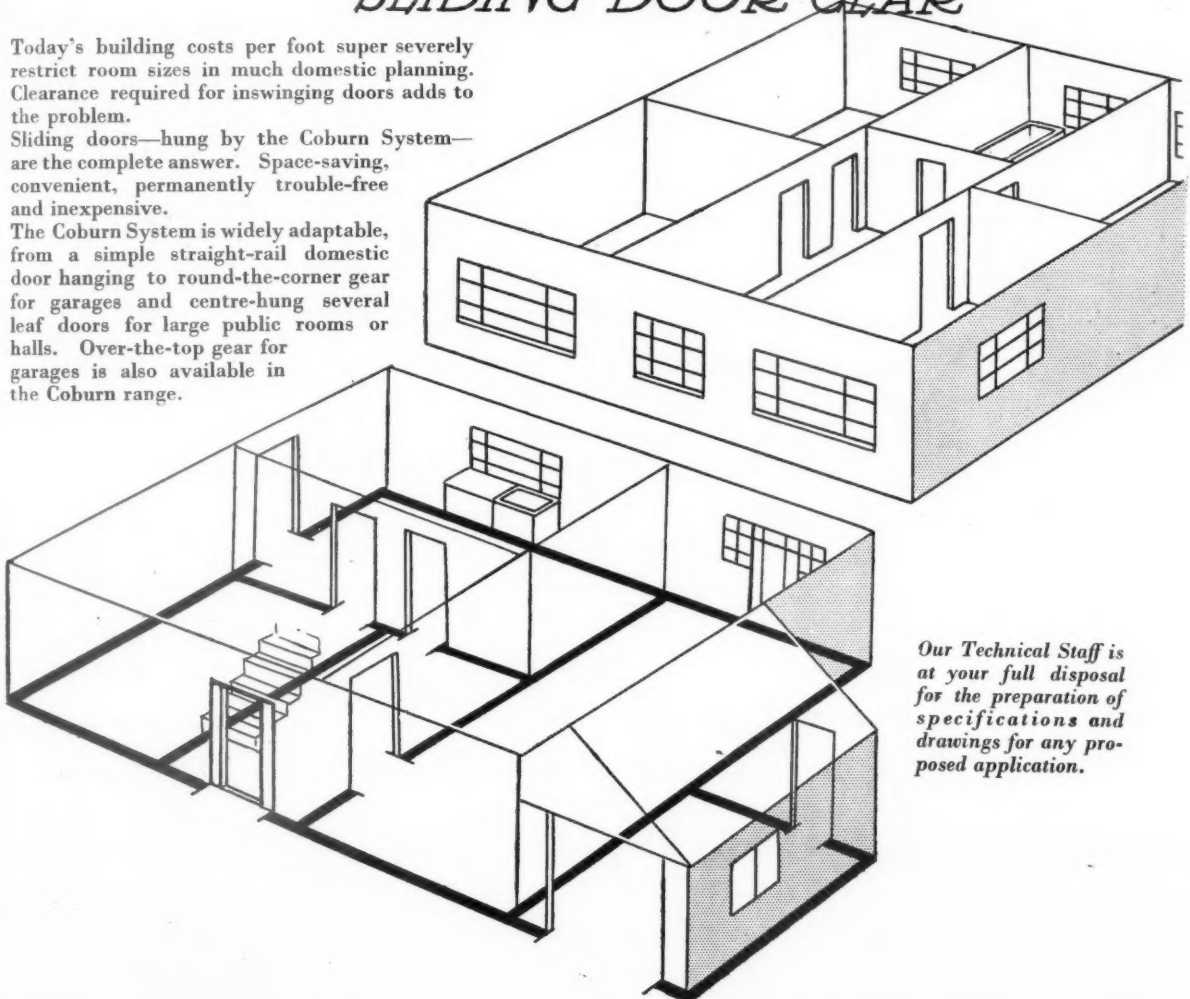


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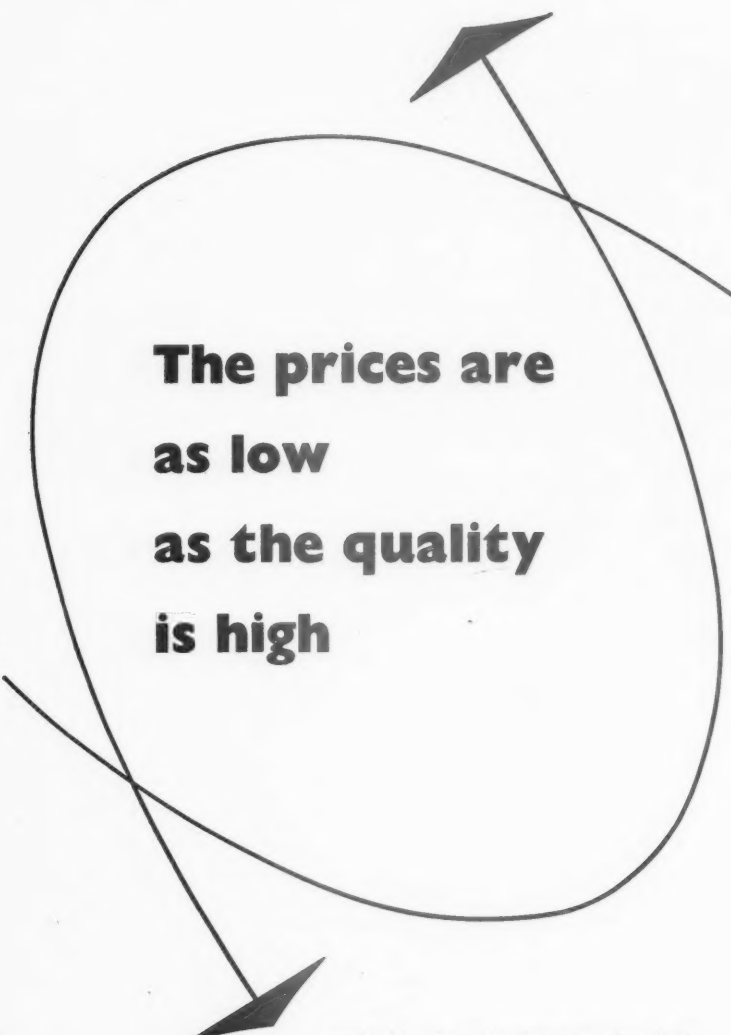
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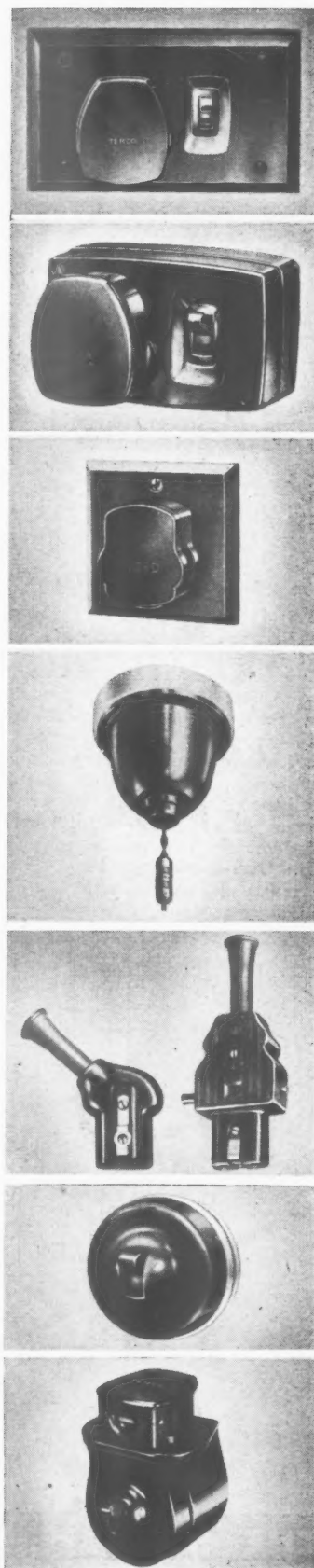
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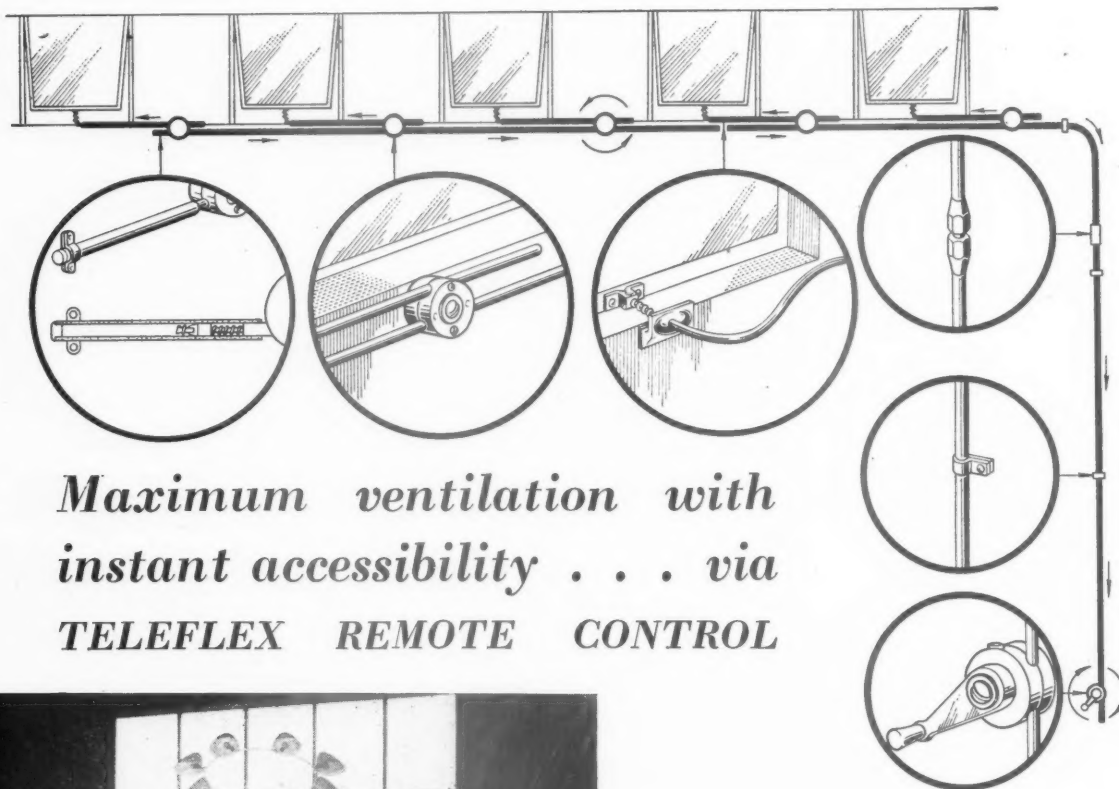
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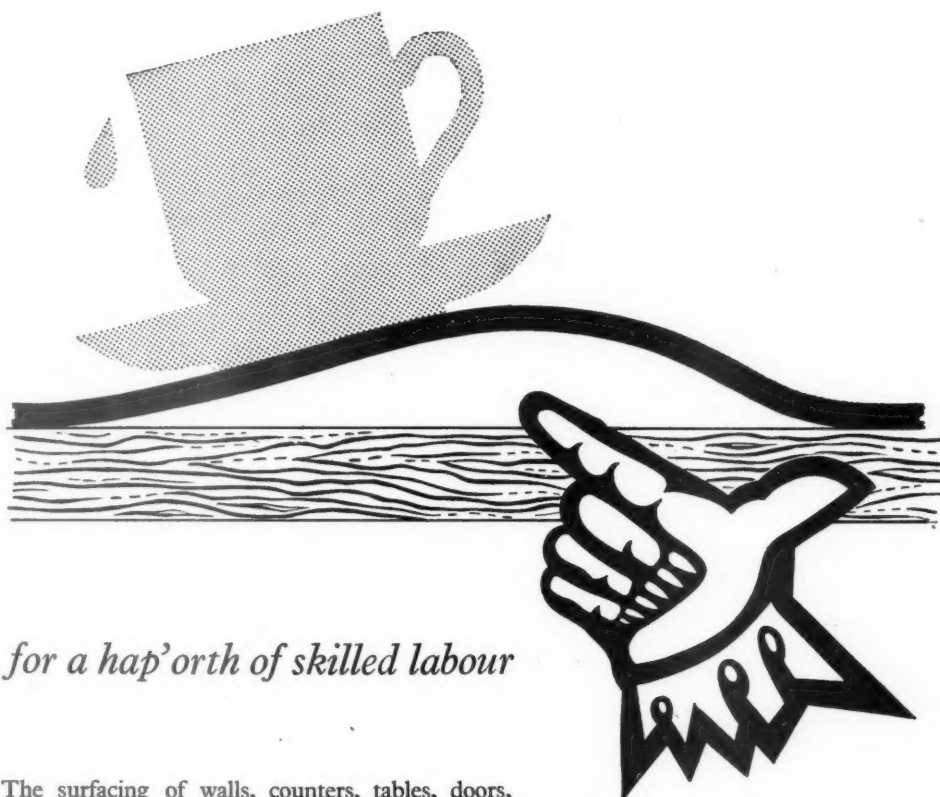
*Teleflex Remote Control Installation by
Messrs. Williams & Williams Ltd. at
Tulse Hill Primary School.
Architect: J. L. Martin, M.A.,
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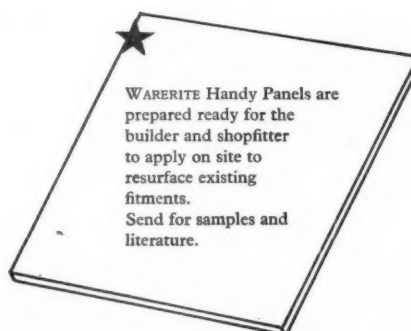
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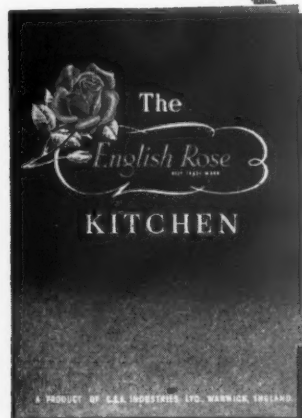


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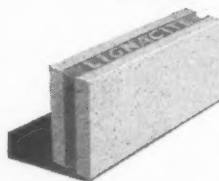
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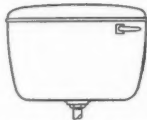
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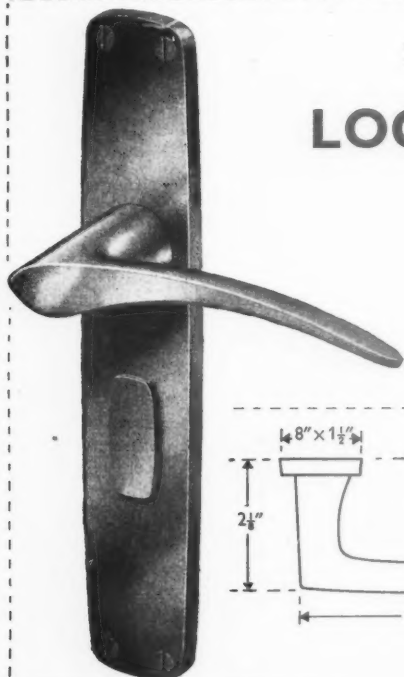


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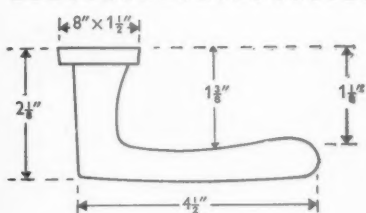
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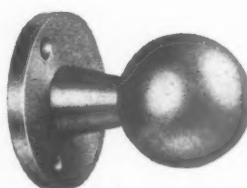
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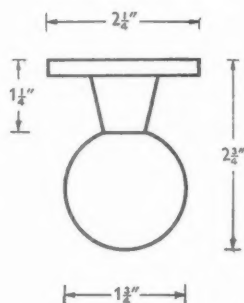
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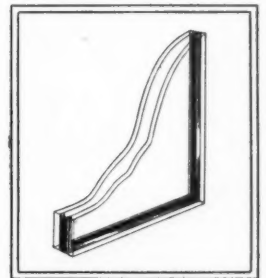
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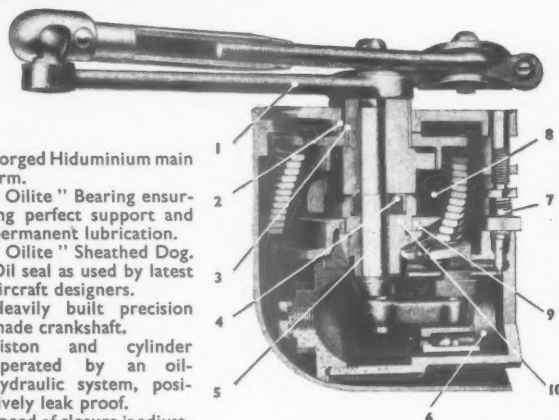
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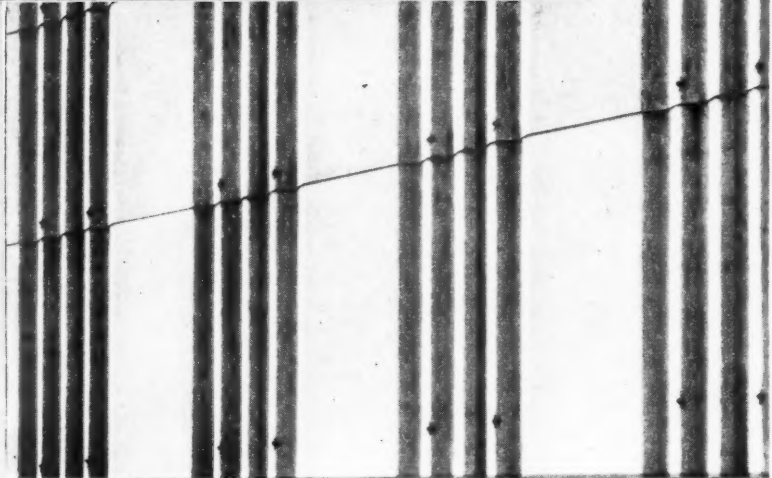
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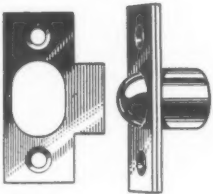
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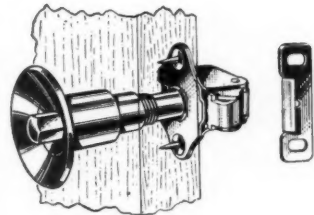


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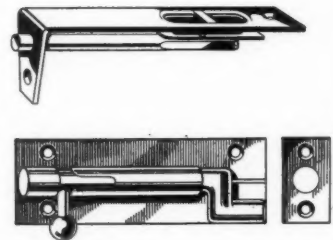


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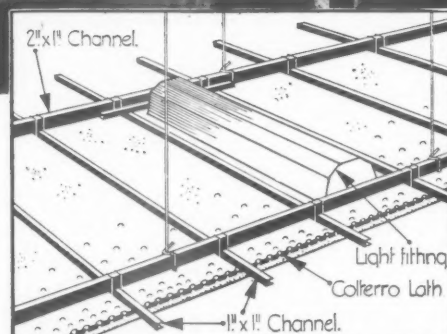


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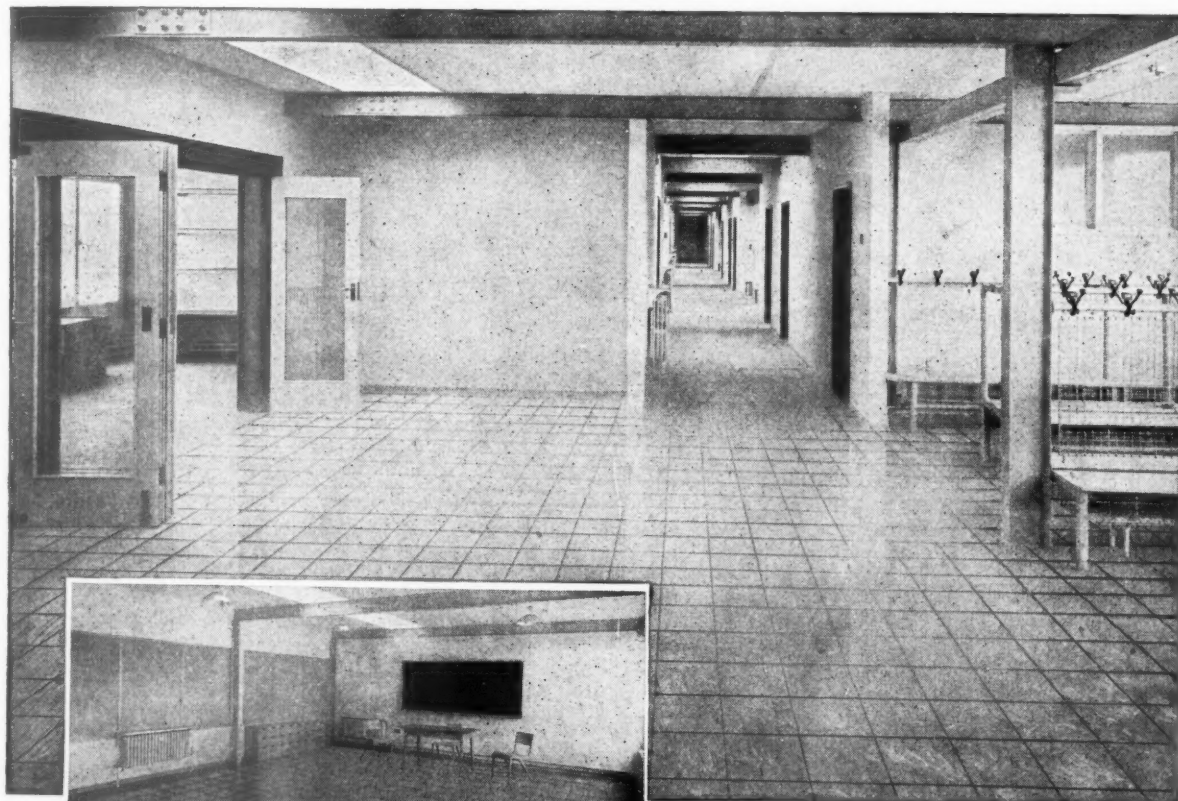
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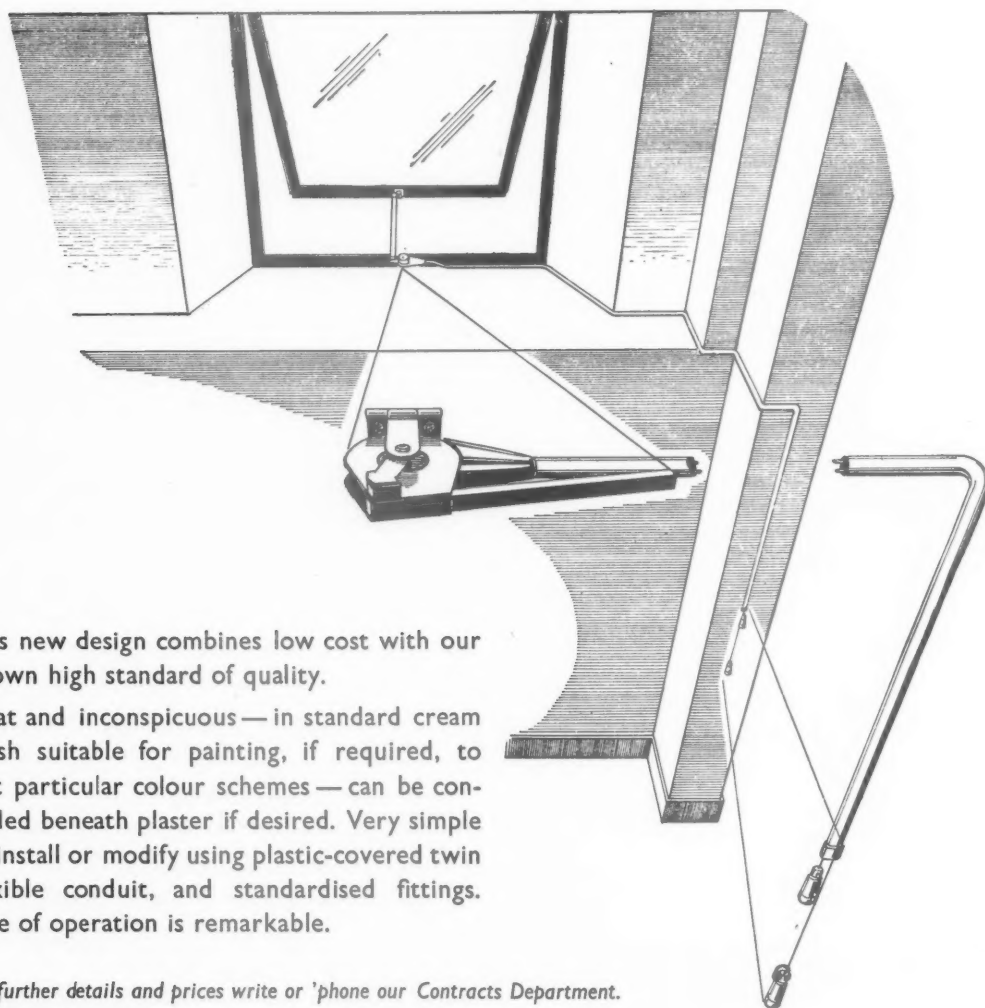
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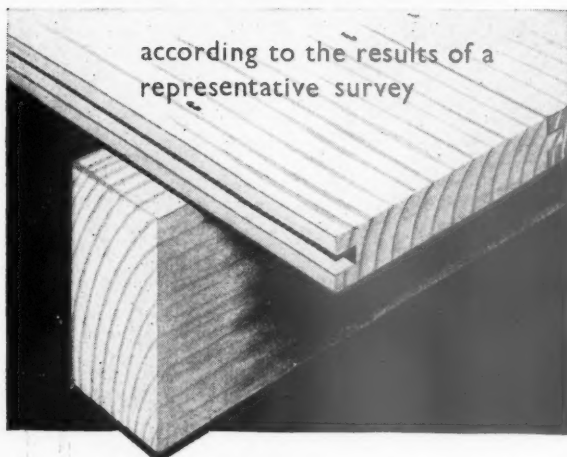
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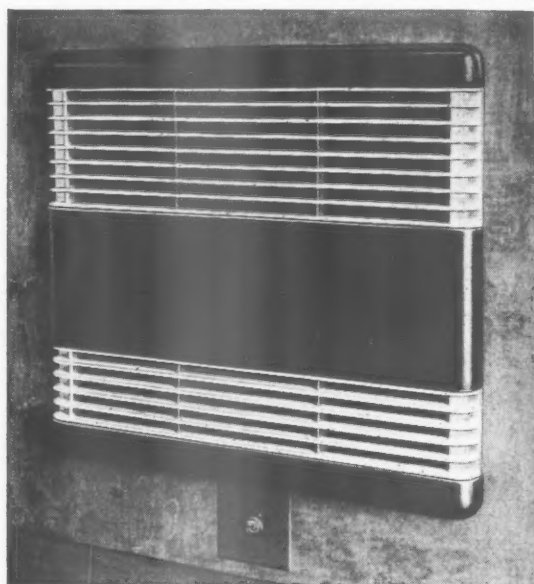


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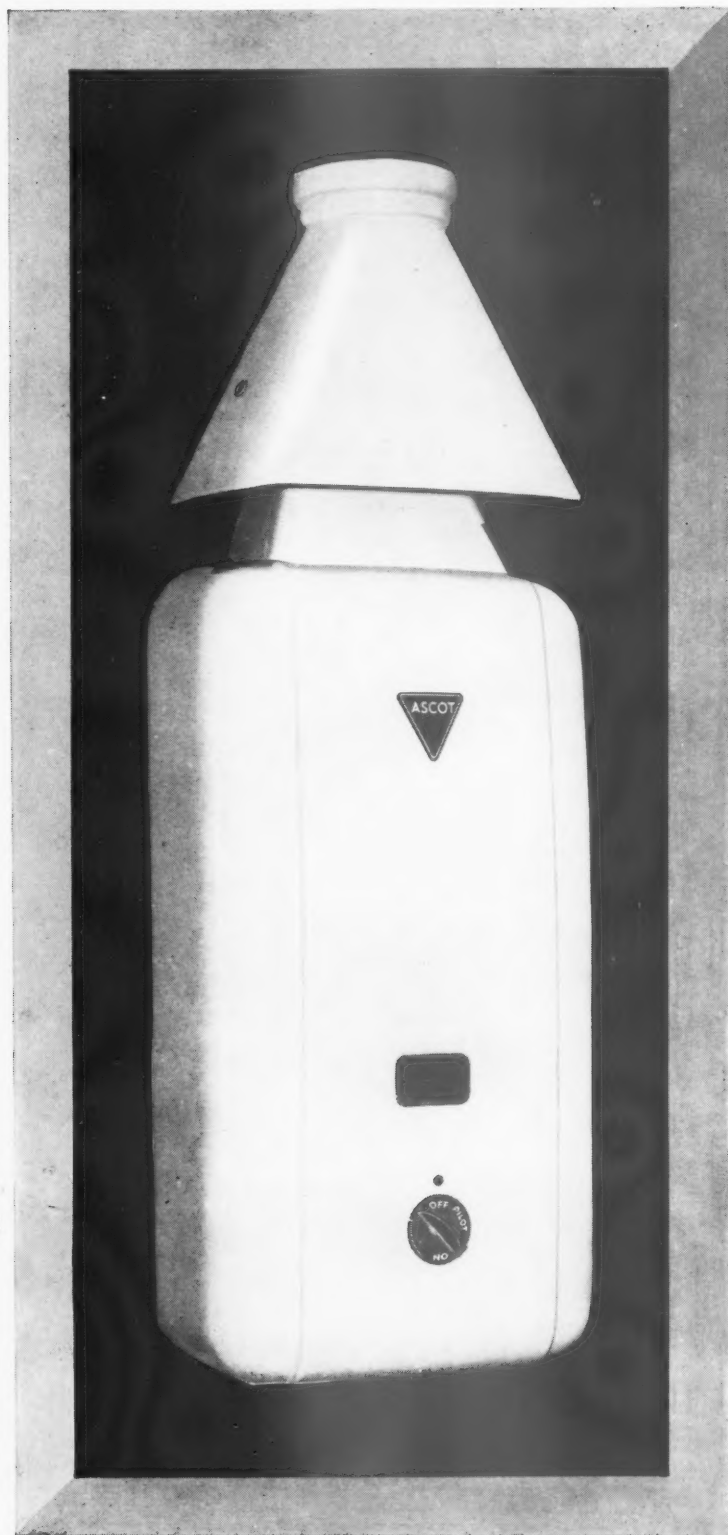
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An elegant one-piece case with a panelled front now gives greater dignity to the famous Ascot 709 and 709B multipoint water heaters. The new case is also easier to keep shining bright, for it is of deep-drawn steel without any joins, and is vitreous enamelled all over to present an unbroken surface that time cannot tarnish. The change is only to appearance; mechanism, operation and high efficiency are unaltered. An advantage that fitters will appreciate is that removal of the one-piece case gives free access to all parts of the heating body.

*

A similarly panelled one-piece case is now also fitted to the Ascot SG32/1 bath water heater.

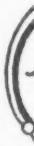


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THE ARCHITECTS' JOURNAL

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TYPE HOUSE PLANS

The plea in the JOURNAL's leading article of two weeks ago for collaboration between the RIBA and the Allied Societies, the MOHLG, the FRHB and the BSA (use the AJ cover if you're stuck) to produce a wide selection of house designs for different regions at a cost of a few guineas to the client has been anticipated, in part, by the RIBA.

*

It is very encouraging to learn that the RIBA Council have approved in principle a recommendation of the Public Relations Committee that the Royal Institute should "initiate a scheme

whereby designs for small houses can be purchased at a reduced fee." Apparently an *ad hoc* committee of representatives of the Practice Committee, Public Relations Committee and the Town and Country Planning and Housing Committee has been set up to "consider ways and means of implementing and administering the scheme and to report back to the Council.

*

Well, there you are—the slow but sure wheels, propelled by voluntary labour, are beginning to turn. It's only to be hoped that they turn fast enough to engage with the wheels of the other bodies mentioned above so as to ensure that something happens in time, and with sufficient publicity, to attract the general house-building public before they are all inhabitants of Macmillan's villa-land.

COMPETITION

Competitions have been certain trouble-makers recently, and if rumour is right the latest—the design for a church at Clonskeagh, Co. Dublin—will be no exception. The contemporary design chosen by the assessors has been set aside by the church authorities, it is rumoured, and a Byzantine design selected for actual building.

COID . . .

The annual reports of both COID and DIA reflect (of course in impeccable typography—the DIA book would appear to have been produced by half the staff of the *Architectural Press* in what was, we hope, their spare time) the respective functions and character

of each organization. The COID Report looks ten times better than most Government publications and is well worth study. In spite of COID's many activities, and they make an impressive list, one cannot help thinking—to judge by the photographs of work—that the most useful of all is the introduction of designers to clients. The Government Grant in Aid to COID is £100,000. It would be interesting to know by how many times COID has, indirectly, multiplied this sum in the national export account. It is a pity that it can never be known; a pity, too, that organizations of this kind cannot be given offices in some Crown building somewhere. The inroads made by rent upon the grant are fantastic.

. . . AND DIA

DIA, in their Year Book, can afford to be a little livelier, a little less staid than COID. The consequent Quiz, however, in which well-known critics give their preferences for certain tables, cookers, etc., is—with its biographical notes of the "prefers French food, conchologist and loves gardening" type—just a little on the cheap side. The cookers and tables, of course, are admirable. Best of all is Marghanita Laski's article: "What Shall I Like Next?" As the Editor of the Year Book says, it is a "disturbing" article and DIA are to be congratulated on publishing it. "It was as sudden as falling out of love. . . Suddenly, contemporary furnishings totally ceased to have any emotional effect on me at all. I found them dull and rather ugly."

WHY NOT?

Passing recently through old and familiar haunts in the Windrush Valley,

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ASTRAGAL, in his naïve and innocent way, was shocked and surprised to find such a forest of TV aerials out-topping the oolitic chimney stacks. Have Parish Councils nothing to do, and no pride? If a block of a hundred flats in London can run all their TV sets off one aerial, then why not fifty cottages in Great Barrington or Little Rissington? It would, surely, be technically simple and not very expensive. To put it at its lowest it would also be sound "tourism."

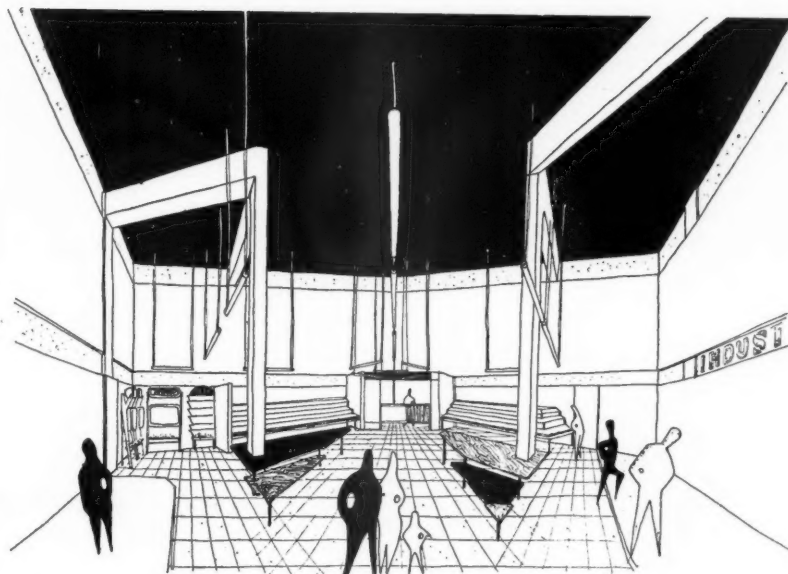
NOT THE LAST OF WRENCOTE

Several references have been made in this column to the attempts to destroy or deface Wrencote, the Georgian house in Croydon High Street. The latest account seems, at first sight, a satisfactory one. The owners of Wrencote and the adjoining property are to renovate the property and use it as offices and showrooms, and also build a four-storey office building at the rear. The flanking properties will be rebuilt "to a design in keeping with the character of Wrencote." With which cryptic remark it is, perhaps, best to leave the subject.

IAN COLQUHOUN

The obituary of a great man may be a proud but familiar recital of achievement, that of a young man of promise must be shorter but also sadder. To anyone connected with the AA since the war, Ian Colquhoun, who died suddenly a few days before his thirty-second birthday, was known both as a student and as a young architect of sensitivity and scholarship. The latter quality, rather rare in these days, was shown in a collection of old architectural books and of good paintings, also in the practical form of a season's digging at Leptis Magna in North Africa, a subject upon which Colquhoun read a sessional paper at the AA. Since qualifying at the AA, with honours, he had done excellent work, under F. F. C. Curtis, in raising standards of design—more particularly in textiles and fabrics—for the Railway Executive. He had also undertaken voluntary teaching in the AA Evening School. Two months ago he was appointed as architect in charge of a newly-formed architect's department for the Wall Paper Manufacturers Ltd. He married Josephine Butler, also an AA student; they had two children.

ASTRAGAL



Although there was no official British participation in the Milan Triennale, there is a U.K. Pavilion at the Bari Fair, which opens from today until September 27. The sketch above shows the design by the architect for the British Chamber of Commerce for Italy, R. Orsini, for the U.K. Pavilion. ASTRAGAL comments: "Full of praise though we so often are for Italian designers, and correspondingly full of shame for our own, in this instance it is not hard to think up the names of several British architects whose work could fully match this—if not improve upon it. It is to be wondered at that a British architect was not asked to design a British stand."

NEWS

BURMA

Buildings by British Architects

James Cubitt & Partners have designed a 250,000 square foot factory for the Burma pharmaceutical industry. This, together with mechanical and electrical installations will cost about £2m. The contract for the construction has been given to Holland & Hannen and Cubbitts.

Raglan Squire and Partner's designs for university and school buildings in Rangoon have been accepted by the Burmese Government and the £2½m. contract has been placed with Taylor Woodrow Ltd. Their design for an engineer's college for the university was illustrated in the JOURNAL of April 29.

COID

Show House in Northern Ireland

The COID announce that a central feature of the Ideal Home Exhibition in Belfast, which opened on September 1, is a house erected by J. & R. W. Taggart, a firm of builders. No architect is named; but Mrs. J. Patrick was appointed by the COID to choose the furnishings and colour schemes.

AA

Visit to Portsmouth

A visit to Portsmouth to inspect eighteenth century and other buildings in the Dockyard, and also H.M.S. Victory and the Victory Museum has been arranged by the AA

for Saturday, September 25.

The party will travel to Portsmouth by train from Waterloo Station at 10.50 a.m. and arrive back there at 7 p.m. The cost, to include rail tickets (3rd class), lunch and tea will be 30s. 0d. Application for tickets should be made as soon as possible.

H.M. Dockyard Authorities require that the members of the party shall be British subjects.

EXHIBITION

Convention Display

The Second National Display Convention and Exhibition, sponsored by "Display" magazine, will be held from September 20 to 23, at the Old Horticultural Hall, Westminster.

Among the speakers at the Convention will be Misha Black (on "Whither Shop Design"), Sir Gerald Barry (on "Design, Display and the Public"), and James Gardner (on "From My Studio Window").

It is said that the exhibition to be held in conjunction with the Conference will be the largest and most comprehensive show of display equipment, materials and services ever staged in Britain.

CDA

Lectures on Copper

The use of copper in building, for roofing and for water, gas and sanitation services, in all parts of the country, has resulted in increased demands for lectures and demonstrations by the CDA building engineer, Dr. E. Carr, and his assistants. These lectures can be illustrated with sound films or lantern slides where projection facilities are available. Principals of technical colleges and secretaries of masters' and operatives' organizations, etc., wishing to take advantage of this service, which is free, are advised to make early application to the C.D.A.

ARCHITECTURAL

The Editors

TO CLOSE A GAP

IRONMONGERY occupies an unobtrusive and hence, too often, a forgotten place among the techniques which serve building. Confident that they will be able to find fittings for every purpose, architects have been accustomed to leave consideration of ironmongery to the last moment, only to find too often that their joinery detailing has posed some problem which cannot be solved by using the components on the market.

This architect trouble seems to arise chiefly from two causes. The first is educational : the architect having been taught to think of ironmongery solely from the point of view of appearances. The second is practical : the impossibility namely, of finding any source describing the different types of component available and giving the precise function each serves. Almost the only current literature is Messrs. Josiah Parkes' classic book *Locks and Builders Hardware*.^{*} This volume, which must surely be accounted a model of trade literature, has been heavily drawn on for the compilation of this issue, as we gratefully acknowledge. Nevertheless, it does not set out, for instance, to describe the new components which are coming in from the Continent and which are likely to prove such a valuable addition to our hardware repertoire.

The first object of this issue, therefore, is to attempt to supply a general reference to the principal varieties of ironmongery components now available. It has been found necessary to limit the subject to door and window furniture and to exclude from this definition even such items as coat hooks which *can* on occasion be fixed to a door. Even so, there are doubtless a large number of variations which have been omitted ; and we wish to take this opportunity

^{*} *Locks and Builders Hardware. Glossary, Design, Manufacture and History, 1948. Josiah Parkes and Sons, Ltd.*

L IRONWORK

of asking our readers to let us know of any interesting components which have been left out so that we can make good the omission in later issues.

Bearing in mind the architect's proneness to regard ironmongery as only a visual, and not equally as a mechanical problem, we have attempted to describe the mechanical operations of fittings as far as possible. This will not, cannot, enable the architect to do without specialist advice: but it will at least enable him to understand what the specialist is talking about and to describe his own requirements with greater precision.



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GENERAL CONSIDERATIONS



The main purpose of ironmongery is to be able to regulate the opening and closing of doors and windows easily and quickly and with the requisite degree of security. The type of fittings required obviously depends on the type of door or window, for example whether single, double, sliding, one of the swinging types and so on. The various types of door and window and fittings for them are discussed later but it is important to emphasize that to meet certain requirements for safety, etc., particular types of locks and other fittings may be required. It is not always easy and it may be impossible to meet certain requirements with particular types of door. This can raise very awkward problems if the door type has been decided in advance without consideration of the ironmongery. For example, a pair of swing doors in a corridor may be shown on plans and even detailed for manufacture and only later found to raise difficulties because the building owner requires them to be locked on certain occasions, while fire regulations demand that they be readily openable and that the only type of ironmongery suited to both requirements will not fit the doors as detailed.

The only safe method is to decide what the door and window is required to do, from the occupiers' point of view, to check that no further requirements arise from the needs of fire authorities and insurance companies and then to list all the appropriate items of ironmongery before detailing the joinery. When choosing the fittings a note must be made of any special requirements such as width of stiles and width of rebate to suit a lock, which usually should be $\frac{1}{2}$ in. The ironmonger can often find a way out of

awkward situations but it helps a great deal if problems can be avoided rather than overcome and design and cost are likely to benefit for the makeshift "get out" is apt to be both costly and inelegant. It is safe to say that all ironmongery in some measure controls the design of the door or window to which it is fitted.

Materials

Materials used in the mechanical parts of furniture such as in latches and locks are many, owing to the different stresses that different parts have to withstand. In early work wrought iron and sometimes bronze and brass were used. Then cast iron became common. Today malleable cast iron, mild steel, stainless steel and various copper and zinc alloys are all used. This means that it is extremely difficult for an architect to judge fairly the quality of the mechanical parts of the ironmongery he specifies and consequently it makes fair comparison between competitive tenders a tricky business. Finishes fall into two main categories: (a) basic materials, which may be finished in a variety of ways, (b) finishes superimposed by means of electro-plating, lacquering or enamelling.

The basic materials have a longer life aesthetically and should normally be used for all exterior exposures, but care should be exercised in the use of aluminium in external positions as it can be damaged by corrosive pitting in polluted atmospheres. Glass and china, while sometimes used internally are usually regarded as too fragile for external use.

With both the basic materials and the superimposed finish types there is a very

wide range of variations, for example the widely used term B.M.A. (bronze metal antique) can cover a range of colours, "anodized aluminium" again is not in itself a sufficient description as it can be either plain anodized or dyed, and most of the metal finishes are obtainable in a variety of textures. It is usually necessary, therefore, to confirm by inspection of samples that the finish desired has been obtained. In the case of superimposed finishes the basic metals used are iron, steel, brass or zinc alloys and the purpose of covering them is to rust-proof the core or to provide a cheaper article while retaining a better looking finish. Electro deposits on brass last longer than on the ferrous metals and once the covering on the latter begins to peel off there is no means of arresting the rust. Where handles or push plates are used the constant rubbing will result in shabbiness unless a suitably resistant finish has been chosen.

The best finishes are those which need little maintenance, but people in the trade stress that renewal of fittings is necessary because of incorrect cleaning or no cleaning at all. Metal polishes should never be used, nor should emery paper. Most firms advocate cleaning regularly with soap and water and polishing with a soft cloth. Chromium plate seems particularly susceptible to damage hence, perhaps, its decline in popularity. This material and stainless steel are improved with a little fine oil. If stainless steel is allowed to collect a layer of dirt it will deteriorate. Bronze finishes may be treated with furniture polish.

Appearance

Architects usually give reasonable attention to the design of those items which appear in the finished building, though perhaps showing less interest in the more mundane but quite important items such as door closers, window handles and stays and not least, lock mechanism. Where designs so often break down, however, is in neatness and coherence of the ensemble. This may be because of insufficient thought about the way the individual articles fit into the whole or because a complete "family" of fittings is not available from one manufacturer.

Architects, too, must confess to the wall having to be hacked out to receive a forgotten door closer or to the inadequate placing of door stops. The only answer, of course, is to consider the ironmongery, and all its implications, at an early stage in the design, and to encourage still further the collaboration of manufacturers, merchants and builders.

Security

Apart from any special client requirements which may arise in certain types of building the two main groups of regulations which must be considered are those relating to safety and security. Experience shows that local authorities and fire officers have strong views about the means of ensuring safety in case of fire or panic and their requirements in terms of fittings to doors on exit routes are sometimes difficult to

reconcile with normal user requirements in a building. Sometimes it is found necessary to alter the type of door, or even the disposition of doors, to meet the various needs. Local authorities should be consulted early as it will usually be found unwise to make assumptions about their attitude. Escape from buildings is a complicated matter involving the consideration of numbers of occupants, type of building and other factors affecting risk so that often a particular point has to be judged on its merits.

Fire and panic requirements will be less likely to affect window fittings but there are special cases where it is necessary to have means of quick opening for escape of fumes or means for entry of firemen. Roof vents over stages in theatres are a well known example but special problems sometimes arise in factories and a note should always be made to consider whether any such matter needs investigation.

Providing adequate security is less a matter of law than one of commonsense and economics. There are certain Home Office recommendations which are not mandatory but are based on police experience and should be noted. In the main they deal with housing where they recommend a mortice dead lock on front doors in addition to the cylinder night latch which is the usual form of lock on external doors to houses. The type of security equipment provided may appreciably affect insurance rates, especially in large buildings. Companies have fairly definite views about the types of lock they consider suitable for various situations. Early consultation is again worth while, for the ironmongery may affect the joinery detailing and embarrassing situations for the architect have arisen when it has been necessary to replace a finished door by one of heavier construction in order to accommodate the ironmongery, demanded by insurance companies.

Some of the special fittings required to meet the needs for security and safety are discussed in a later section of this paper.

Cost

How much to pay and how to ensure getting a good price for ironmongery is a difficult

problem. The normal method of going to several firms for competitive estimates is not really satisfactory unless tenders are for precisely the same article, both in type and quality. Too often the ironmongery is decided late in a job when the architect is painfully aware of extras which have crept in elsewhere. There is then, of course, the temptation to skim—especially on the parts out of sight—the working parts and therefore the things likely to go wrong and cause annoyance and maintenance costs. Really cheap locks are almost always a bad investment but a sensible assessment of real requirements as against common usage can sometimes show possible economies. A good deal of the cost of ironmongery goes in its fitting into position, and reduction in joiner man-hours would compensate the extra cost for more robust fittings. Continental manufacturers seem particularly alive to the fixing problem.

In general, therefore, it can only be said that so far as cost is concerned, the first thing to do is to examine clearly the real requirements, then to choose the type of fitting and type of material and finish which reasonably meets them. Having done this one can say that on the whole one gets what one pays for but to obtain a real comparison between rival suppliers is very difficult. Often it seems that the only sensible course is to go to a reputable firm, give them full details of the requirements, preferably in the form of an ironmongery schedule and ask for alternative suggestions and prices, then to decide by discussion with them. The schedule also enables the Quantity Surveyor or builder to price for fixing of ironmongery. The only alternative would seem to be a very much greater degree of standardization in both quality and design than there is at the moment and this would have some very obvious drawbacks, not the least of which might be an even greater tendency than there is at the moment to avoid the development of new ideas. Nevertheless there is room for some rationalization.

In these days of mass production it is an interesting fact that provided stock articles are used there seems no advantage in price in standardizing to a particular type or design throughout a job.

TYPES OF DOOR AND WINDOW AND METHOD OF DESCRIPTION

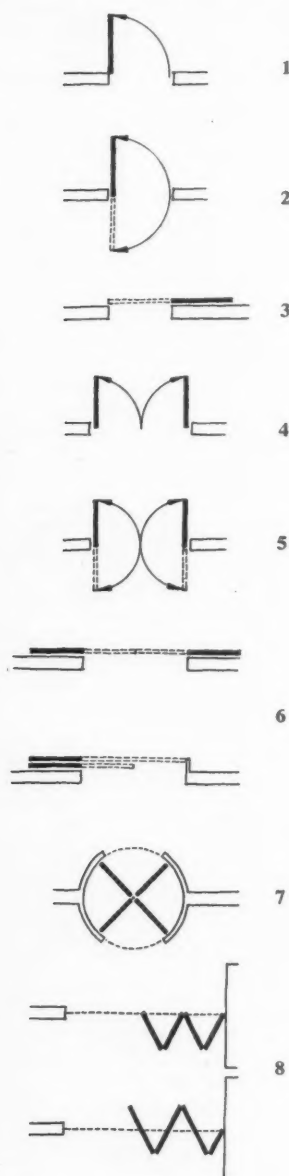
Unless each job is given to the ironmongery specialist for specification of the fittings it is essential to be clear about descriptions of the doors and windows themselves.

Handing

To describe the way a door swings and which way a lock or handle is required to face would appear to be a simple matter but, in fact, is often confusing. The British Standards Institution have been trying to obtain a definition but the position is made complex by the number of trades involved. No system is universally accepted but it is believed that the following method is relatively easy to understand and is acceptable to the ironmongery trade.

1. First determine which is the outside of the door or window.
2. Next describe the direction of opening as clockwise or anti-clockwise, and as inward or outward opening.
3. Lastly describe the fittings.

1. *Determine the outside:* The lock trade over a good number of years has established that the outside of a door can be determined in all cases except that of a door in the middle of a corridor. For this door the terms "leading" and "trailing" face should be employed, "leading" meaning the face in the direction of opening. For all other doors the outside of a door is taken as being one of the following:



- (a) The external side of a door in an external wall.
 (b) The corridor side of a room door.
 (c) The side of a communicating door on which the hinge knuckles are not seen when the door is closed.
 (d) The space between them in the case of twin doors.
 (e) The room side of a cupboard or wardrobe door.

2. Determine direction of opening: No system is generally adopted but one that may be safely used is to describe the door or casement as opening clockwise or anti-clockwise, and as inwards or outwards.

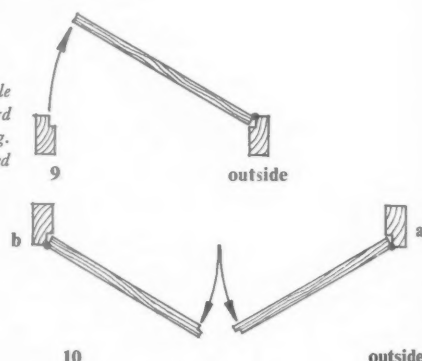
3. Describe the fittings: Door locks. The door

1, Single outward or inward opening. 2, Single swing. 3, Single sliding. 4, Double outward or inward opening. 5, Double swing. 6, Double sliding. 7, Revolving. 8, Sliding folding. 9, Single hinged doors. 10, Pair of folded hinged doors.

should be viewed from the outside. If the lock is to go on the lefthand side it is a lefthand lock and *vice versa*. It should be noted that if the door opens outwards a lock with a reverse bolt is required. An ordinary mortice lock, with reversible bolt can be converted to the opposite hand; but some rim locks cannot.

Lever handles and casement fasteners. If when viewed the handle projects to the right of the shank it is a righthanded fitting and *vice versa*. Thus on any door with lever handles both sides one will be right hand, the other left.

The following examples illustrate two types of door with a list of supposed fittings and their hands.



List of typical fittings and hands : (a) for single hinged door (Fig. 9). (b) for pair of folded doors (Fig. 10).

OUTSIDE		OUTSIDE	
Fittings	Hands	Fittings	Hands
Door	Opening C.W. inwards	Door A	Opening A.C. outwards
Door lock	L.H.	Door B	Opening C.W. outwards
Lever handle and lock set plate	L.H. inside ; R.H. outside	Entrance or room door mortice lock for B	L.H. or R.H. reverse bolt
Hinges	For door casement opening C.W.	Entrance or room door rim lock for B	R.H. reverse bolt
Door spring	For door opening C.W.	Cupboard or wardrobe lock for B	R.H.
Floor spring	For door opening C.W.	Lever handle and lock set plate	R.H. to outside A, inside B
Casement fastener, inside	L.H.	Hinges	Handed
Casement lock	For casement opening C.W. inwards	Door spring	door opening C.W.
All other casement fittings	For casement opening C.W. inwards	Floor spring for B	Door opening C.W.
		Casement fastener inside for B	R.H.
		Casement lock and all other casement fittings for A	For casement opening A.C. outwards
		Casement lock and all other casement fittings for B	Casement opening C.W. outwards

C.W. = Clockwise
 A.C. = Anti-clockwise
 L.H. = Left hand
 R.H. = Right hand



IRONMONGERY FOR DOORS

LOCKS: Historical

Locks as we know them today are all types which have been developed during the last hundred years, but locks were made and used in Egypt 4,000 years ago.

There are two principles involved in key-operated locks (a) to have fixed obstructions, so that a strange key or object either cannot enter or turn if it enters and (b) to have movable detainers which must be arranged in certain positions before the bolt will move. It was the second principle which the Egyptians used for their primitive locks. The one illustrated (Fig. 11) was for

fixing to the outside of a door and was made of wood. Metal was not generally used until Roman times. The horizontal beam acted as the bolt and the vertical pins, fitted to the body of the lock, dropped by gravity into their respective holes in the beam, so locking it. To free the bolt the pins had to be lifted by corresponding pegs on a long wooden key. This lock is very similar to the modern pin tumbler cylinder lock which has a number of pins which must be raised by the key in order to release the bolt.

The next step was to put the lock on the

inside of the door, and therefore a keyhole was needed. The Greeks followed on from the Egyptians and the Odyssey mentions in detail the type of lock in Fig. 12. A key is passed through a long slit in the door, given a quarter turn to engage in the holes in the two pegs, which are raised and so release the bar to slide to and fro on the strap. Archaeological investigation has revealed several of these keys, see Fig. 13.

A development of the Homeric lock is to be seen in the Roman lock, Fig. 14. It is a rim lock with staple. The bolt is shot through the end link of a chain. It is secured by pins the ends of which fit into a series of perforations in the bolt and are kept down by a spring. The bolt was released by a key fitted with corresponding teeth, lifting the pins out of the holes and taking their place. The key was moved along the horizontal slit and the bolt drawn with it.

Keys were large and had previously been carried about on the owner's back. It was the Romans who were responsible for bringing in smaller keys, made of metal. Although the Romans used the "falling pin" principle they also introduced the "fixed obstruction" lock, and many warded locks were made, as "differing" keys (Fig. 15) have been found at Pompeii and Herculaneum. They also introduced springs as a method of releasing the bolt.

From Roman times to the end of the 17th century, reliance was placed chiefly on the fixed obstruction principle, *i.e.*, warded lock. One fine example is the Beddington lock (Fig. 16) a wrought iron gilt rim lock of beautiful craftsmanship. It was 14 in. \times 8 in. and it is said that Henry VIII had it screwed to his bedroom door wherever he slept. The varied complications which had to be introduced in order to bring about adequate differing of locks using the one system resulted in fine and intricate craftsmanship. This 17th century lock (Fig. 16a) originally was on the Treasury doors at Aix-la-Chapelle. It is 17½ in. \times 9½ in. and has five bolts.

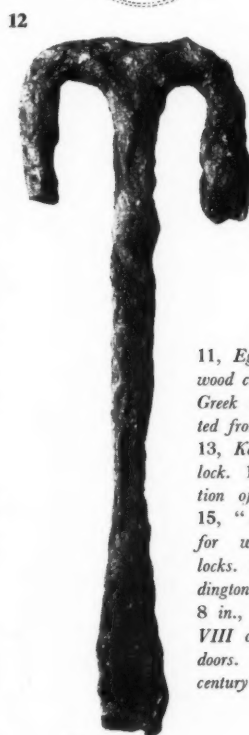
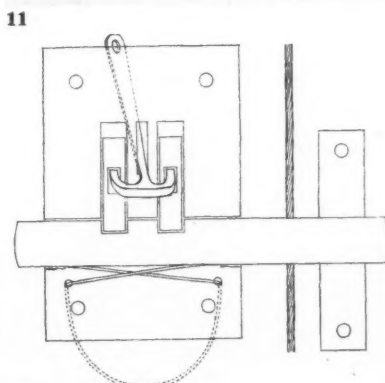
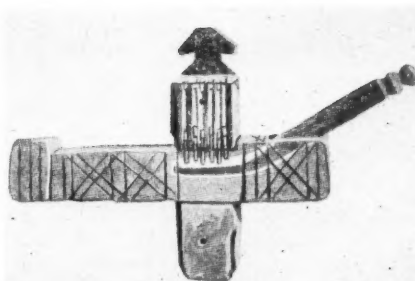
The lever lock evolved from inventions of Robert Barron and Jeremiah Chubb. In 1818 Jeremiah and Charles Chubb invented their "detector" lock—the present-day example of which will be described later. Following this came the simple lever lock, most normally used today.

The pin tumbler cylinder lock, developed the Egyptian idea, and was invented by Linus Yale in 1848 in Connecticut, U.S.A. Safe deposit and time locks are the products of the last four generations. A few firms such as Messrs. Chubb & Sons, Messrs. Hobbs Hart, Ltd., and Messrs. Chatwood Safe Company, having almost a monopoly.

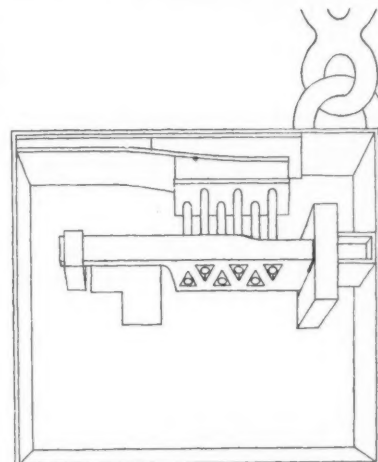
Definitions

Locks vary from one another in two ways, by means of operation, and the way in which they are fixed. Means of operation are as follows:

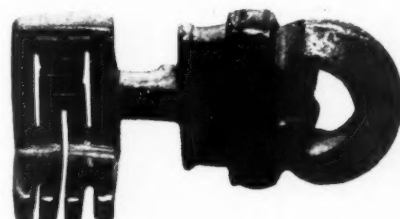
(a) *The latch with spring bolt*, operated by means of a handle (Fig. 17). This keeps the door shut but gives no security and is normally used only on internal doors. It might well be more generally used for the



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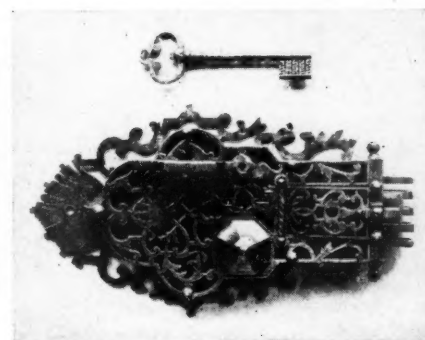
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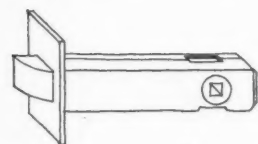
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11, Egyptian lock of wood construction. 12, Greek lock reconstructed from the Odyssey. 13, Key for Homeric lock. 14, Reconstruction of Roman lock. 15, "Differing" key for warded Roman locks. 16, The Beddington lock, 14 in. by 8 in., used by Henry VIII on his bedroom doors. 16a, 17th century lock.

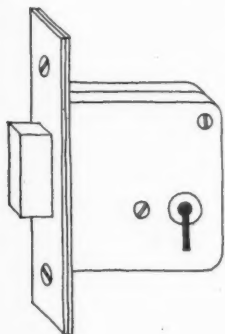
sake of economy in place of the more expensive two bolt lock which in many cases, especially in houses, no longer seems to be required. For outhouse doors there is of course the well-known Norfolk latch (see opposite page).

(b) *The dead lock* is a bolt which is shot by means of turning a key (Fig. 18). It is used in conjunction with other fittings for added security and also for cellars, or store doors, and on double folding or double swing doors in addition to barrel bolts. It is suitable also for external doors to houses

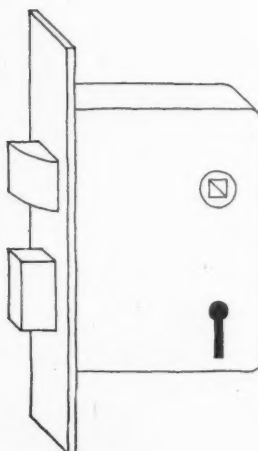
in addition to the common night latch though it is sometimes omitted on modern housing. (c) *Two bolt locks* are locks having a spring bolt operated by handles and in addition a dead bolt operated by a key (Fig. 19). This type is the most commonly used, and if no qualification is given to the term "mortice lock" or "rim lock" this type is assumed. (d) *Night latches* have a spring bolt which can be operated by a key from the outside and a knob from the inside. This type is used on exterior doors which it is convenient to close by slamming and without the use



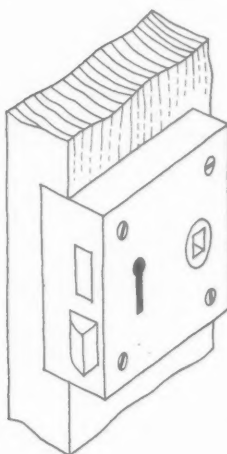
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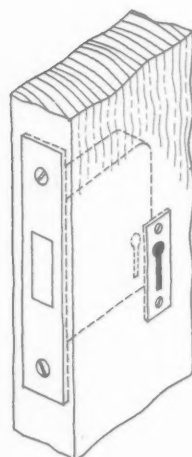
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17, Latch with spring bolt, operated by means of a handle. 18, Deadlock. 19, Two bolt lock. Handle operated spring bolt and key operated deadbolt. 20, Rimlock. Used where security is less important or the door too thin for a mortice lock. 21, Mortice lock. Providing greater security and requiring more labour in fixing than the rimlock. 22, Flush fitting lock—basically a sunk rimlock, used for thin woodwork. 23, Budget lock. Used for access panels or small doors. 24, Clutch or hook bolt. Used mainly for sliding doors.

of a key, domestic front doors being the obvious example. It is also possible to get a combination of the dead lock and night latch in the same fitting.

Locks varying from one another by means of fixing are as follows:

(i) A rim lock which is fixed to the inside of a door, no cutting away of the door or frame is necessary (except for the forend plate fixing) as the lock box is fixed to the face of the door by means of four screws and the staple to the frame (Fig. 20). This is used where the door is of insufficient thickness or unsuitable construction to take a

mortice lock or more usually on account of cheapness in positions of less importance aesthetically. Brass rim locks with drop ring handles are still made and are sometimes wanted for matching up locks in old buildings.

(ii) A mortice lock is a lock fitted in the thickness of the door. The door and frame being cut away to receive the lock and striking plate (Fig. 21). All fixing screws are inaccessible when the door is closed. The bolts in mortice locks are usually reversible and the lock itself can be obtained rebated and with bevelled forends if required. Re-

bated locks are made for a $\frac{1}{2}$ in. rebate unless otherwise specified.

(iii) A flush fitting lock is the type of lock used on cupboards and drawers, where although the lock is let into the door, the back plate is flush with the inside, fixing screws again being inaccessible when locked (Fig. 22). This type is used because the woodwork is not thick enough to take a full mortice lock and often a projecting rim lock is undesirable.

The padlock is a portable lock used in conjunction with a hasp and staple. In the better types the fixing screws are concealed when the door is locked—for greater security. A sash lock is a mortice lock of upright pattern, with the handle and keyhole in the same vertical line. It is 2 in., 2½ in., 3 in., 3½ in., or 4 in. wide as against an ordinary mortice lock which is usually 4 in., 5 in., or 6 in. wide. It is used on doors with narrow stiles. Narrow sash locks bring the centre of the handle spindle close to the edge of the door so care is needed in selecting the type of handle to go with this type of lock. Failure to realize this point in time may involve using lever handles where it had been intended to use knobs.

A snib bolt, otherwise called a "jumbo" bolt or "thumb" bolt is a bolt operated by means of a sliding action of the thumb. It is used in connection with a rim latch, usually for bathroom doors.

A budget lock is a lock which has a tongue instead of a bolt which is operated by means of a square key, and is turned 90 deg. (Fig. 23). A useful lock for access panels and small doors, but providing very little security as it can be opened with any square key or indeed with a screwdriver.

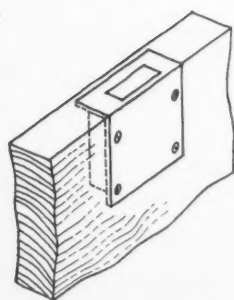
A clutch bolt and a hook bolt are used for sliding doors (Fig. 24). A clutch bolt is a spring bolt which can be moved upwards and sideways and after engaging the striking plate springs back into position. The hook bolt is a dead bolt usually curved or "L" shape to prevent the door sliding away when engaged in the locking plate.

Security of Locks: Methods

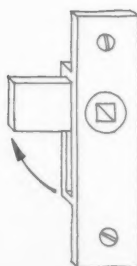
The purpose of fitting a lock on a door is to obtain a certain measure of security. Security depends on the strength of the door, the fit of the door, the strength of the ironmongery and the accessibility and strength of the fixing screws. Various degrees of security are obtained in employing the following devices

Wards, which are the fixed obstructions inside the lock and around the keyhole, for which the key has to be cut away (Fig. 25); Bullets, which really behave like wards, are grooves or projections on the key (Fig. 26); Tumblers, either pin or flat tumblers, are the spring-loaded members, in a cylinder night latch, for example, that have all to be raised by the key until in line, then the key can turn a plug which has connection with the spring bolt (Fig. 27). Levers again all have to be raised by the key until the gating is in line with the bolt stump and allows it to pass through (Fig. 28). The barrel and curtain and detector are also used as added means of security and will be dealt with specifically.

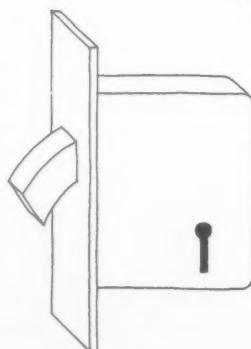
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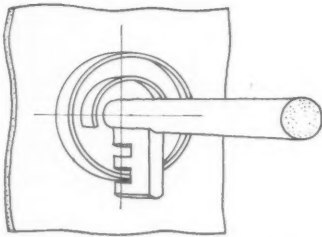


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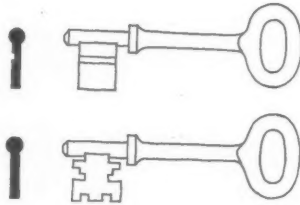


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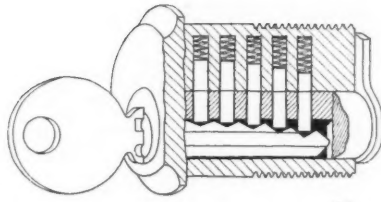




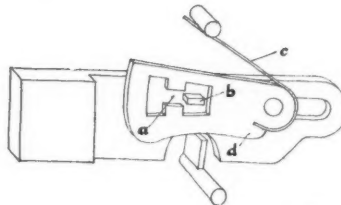
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25, Wards: fixed obstructions inside the lock to be cleared by the key in turning. 26, Bullets: grooves or projections on the key having the same purpose as wards. 27, Tumblers: small "pistons" which have to be held by the key at the correct height for the cylinder to turn. 28, Levers: (a) gating, (b) bolt stump, (c) lever spring (d) lever.

Security of Locks

Variations or "Differ's": Locks using a simple ward or tumbler system only are not capable of many variations and in fact in some only three differs are possible; whereas many thousands of differs can be obtained with six or more levers, or two bullets and five pin tumblers. The greater the number of differs in one type of lock the less the chance is that any key not its own will be able to open it; and hence the more secure it will be. Its mechanism will also be more complex and more difficult to "pick." As regards the use of wards alone, they do not afford much security from the

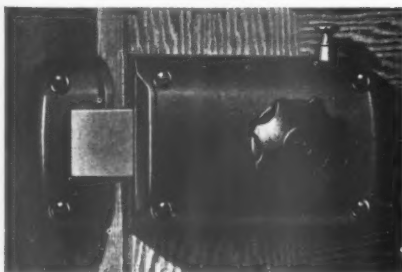
intruder as all he has to do is to cut the metal of his key right out at the base, and it will then avoid obstruction. Skeleton keys, however, are useless against lever or cylinder locks. Rim locks and mortice locks are made to "differ" in essentially the same way but rim locks usually differ in dozens, although it is possible to get up to 50 differs at a higher price. A 2 or 4 lever mortice lock also usually differs 12 at a time, but can go up to 500 differs. A 5 lever lock, which is generally considered to be acceptable to insurance companies is capable of very many more differs. Locks which incorporate two or more of the de-

vices already described increase the range still further, and locks can be produced with thousands of differs. A greater number of differs can be obtained if the key operates one side of the lock only, for example on many front doors, as the levers have not then to be symmetrical. This will provide greater security and is recommended.

Burglar Protection: The methods which burglars use are well known to locksmiths who specialize in locks acceptable to insurance companies, and their observations have rather surprisingly established that nearly always the burglar will try the front door first. If he fails there but gets in elsewhere, e.g., by smashing a window, he will then try the front door again from the inside so that he has an easy and quick method of retreat should he be disturbed. It is, however, obvious that leaving the back door with only a cheap lock would be folly. In housing it is convenient to use a pin tumbler cylinder night latch on the front door. Greater security in this fitting can be obtained if a dead-locking action is incorporated (Fig. 29). The knob in this example, which is a newcomer to the ironmongery market, is given a quarter turn with the key and when the door is slammed the knob is locked and the latch cannot be withdrawn until operated by the key. This acts as a foil in glass panelled front doors and to the intruder who is inside already. Another type (Fig. 31) with handle which can be dead locked, is a rim type in which the fixing screws are all hidden when the door is locked. A lever lock "front door" fitting widely used (Fig. 30) locks the lever handle and consequently the latch from either one or both sides of the door. In addition to night latch fittings, insurance companies will often insist on a security mortice dead lock. These locks are made by firms specializing in defeating "professional" intrusion and the following are the various methods introduced either singly or together to form different degrees of security.

(1) *A longer throw.* Experts differ in their opinions about the best length of throw for a dead bolt. The average throw is $\frac{1}{2}$ in. but on an ill-fitting door or one with a badly worn frame this would present no obstacle to anyone attempting entry. On the other hand if a door is fitting well a long throw is considered by some people to be easier to force than a short one. One specialist firm recommends $\frac{3}{4}$ in. as a minimum and as adequate whereas others say that at least 1 in. is desirable. It seems that this is just another of those subjects on which the architect can get as many views as the number of experts he cares to consult.

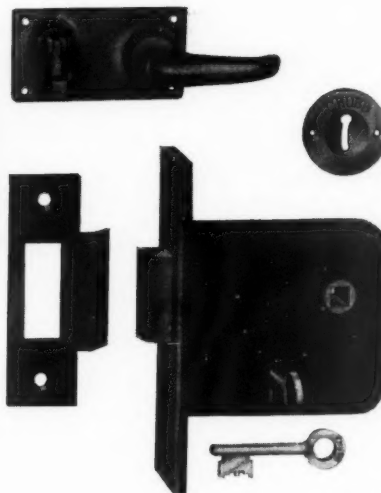
(2) *Close gating.* One of the simplest ways of opening a lock is by means of an identical key. If the owner has left his key lying about a wax impression has been taken and a new key made, it ought to fit the lock. It is therefore important, and only possible with extreme accuracy in manufacture, that clearances be brought to such a minimum that the copy key will not operate the lock. The clearance allowed between the bolt stump and the gating is said to be as little



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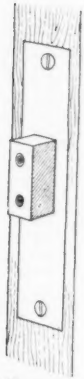


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29, Cylinder night latch with deadlocking action. 30, Mortice locking latch. This and the one above have handles which can be deadlocked. The fixing screws are hidden when the door is locked. 31, Rim automatic deadlock.



32, Steel rollers in the bolt to defeat the burglar's hacksaw.

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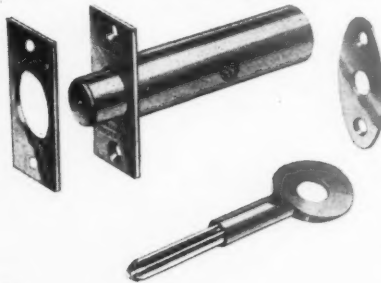
as .0015 in. with one manufacturer. This kind of refinement has to be paid for and good security locks are therefore expensive and cannot easily be selected on the normal price comparison basis.

(3) *Monitor lever.* If the locking action has not been properly completed, due to tampering or wear in the lock, a lever will obstruct the keyhole and prevent the key being withdrawn.

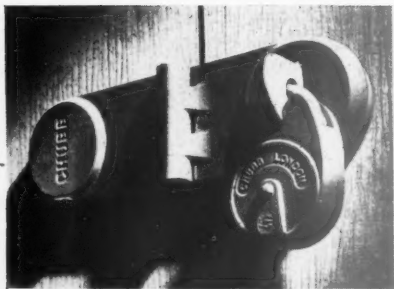
(4) *Steel rollers.* Bolts can be made of hardened steel but by introducing steel rollers into the bolt if an attack with a hacksaw is made the rollers rotate and afford no grip for the saw teeth (Fig. 32).

(5) *Patent Detector.* The object of the detector is two-fold. Firstly, it tells the owner if the lock has been tampered with, as the owner's key will not open the lock in the ordinary way. Secondly, the detector lever, if lifted too high when an attempt at picking is made, will be held in the uplifted position and will not line up with the rest. This lever can only be released by the correct key.

For still greater degrees of security safe locks and time locks are appropriate but



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33, Mortice security bolt with adjustable throw, for either windows or doors. 34, Security padlock. The fixing screws are accessible from inside only.

these are beyond the province of this article.

Security with regard to windows will be dealt with in that section (page 329), but a neat fitting which applies equally to windows and internal doors is shown in Fig. 33. This bolt has an adjustable throw. Security padlocks in conjunction with locking bars (Fig. 34), are recommended for industrial buildings. The important points in these are the fixing screws which allow tightening only; the shackle of the padlock which bears on a metal block inside and so resists brute force, the fixing plate behind, and the lock of the padlock which incorporates many of the devices, already described.

35, "Mastering" of locks.

The "master" key will open all locks; the sub-masters will each open those on one floor only, and each room has its room key. Hotels are the obvious case for systems of this kind.

Mastering of locks: Mastering is the system whereby a number of different locks each having their own key which can only operate one lock, can all be operated by one "master" key. It can be taken a step further when the individual locks are mastered by a sub-master which is in turn mastered (Fig. 35). This system is used, for example, in hotels where the guest has his room key, the maids for the different floors each have one key which opens all the rooms on that floor, and the Manager has a key which operates all locks. Similar arrangements are often required in other types of building. The more complicated the mastering system, the more ingenuity has to be put into the problem, and the more expensive it is likely to be. Details should be thought out before locks are ordered, and any future extensions, or existing locks should be considered at the same time. Lock manufacturers are unanimous in stressing that not enough attention is paid to the possible future needs. However, to overstate the case can be as bad as to understate it. The security value is usually decreased in a master keyed system, and differing has usually to be obtained by other means than levers; but this can be arranged by a good lock manufacturer however complicated the mastering system. Ward and lever locks are usually used for mastering with the mastering being dependent upon the wards. While this retains reasonable security against outsiders it is open to some criticism in that it does not give a high degree of protection against the use of skele-

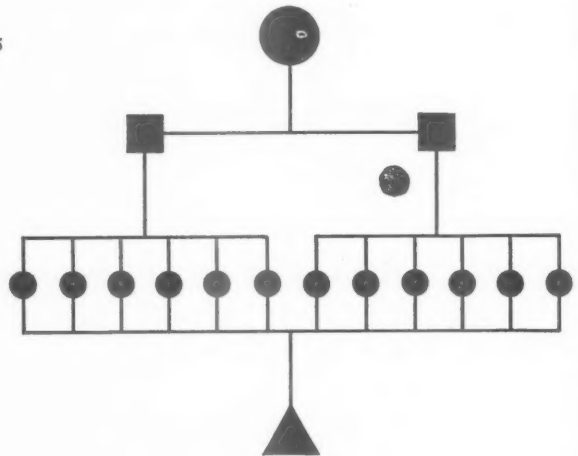
ton keys made from another key in the same set. One firm, however, has a mastering system on levers, which gives more security than the usual method and is still reasonably priced (Fig. 36).

The joint mastering of locks for metal doors and timber doors is possible, but the thickness of the metal door largely dictates the type of lock. The mastering of tubular mortice locks is not always possible. Pin tumbler cylinder night latches and locks can also be mastered.

Cost of Locks

The cost of locks is dependent on their type and quality and for an ordinary mortice lock can range from about 2s. 9d. to 10s.

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The 2s. 9d. lock is a 2-lever mortice lock which is usually used for internal doors in low cost housing and is installed more for privacy than security. A lever lock costing approximately 7s. 6d. to 10s. is also used very widely for all classes of building and is adequate for general purpose work. Tubular locks, although usually cheaper, are not favoured, as the whole of the mechanism is cramped into a small volume, and consequently not as robust. Tubular locks have been used in the past because it is obviously much easier to form a hole in the door with a brace and bit than form a proper mortice, and the lock itself requires less room. The American practice of having the lock in the handle (as in car doors) also necessitates a small lock, although it produces a neat result and avoids the separate escutcheon. (Fig. 37.) A pin tumbler cylinder night latch with dished fitting on the outside of the door is a great advantage in darkness (or inebriation) as it is so much easier to find the keyhole. This refinement means an increase in cost, but one that seems worth while. It is sometimes used on plain escutcheons. (Fig. 38.)

Fixing and maintenance of locks

By using a lock of B.S. size (B.S.S. 455) a door can be prepared to receive a lock in the factory. This is much easier, quicker and produces a better looking job than site fixing, and one would think would be cheaper if it became regular practice. One firm in fact do build in to British Standard

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flush doors a British Standard 2-lever mortice lock. The disadvantage of factory fixing is that it is largely limited in its application to standard items. It still means that a joiner on site has to fix the striking plate to a timber frame although with metal frames this is eliminated. There does now seem to be a need for the joinery and ironmongery manufacturers to get together and reconsider the whole question of fixing methods; to keep pace with other similar changes that the building industry is now experiencing.

A lock should never be fixed upside down unless it is made as a double hand lock, as the springs have to work against a much greater weight. The striking plate on the frame should always be set a fraction lower

than the lock in new work so as to allow the door to drop. Omission of this nicety of workmanship soon results in unsightly cutting away on finished work as even with adequate hinges doors always tend to drop to some extent.

A lock is usually expected to last as long as the building itself, given normal usage, and little or no maintenance. The causes of failure in locks of reasonably good quality are rust and dirt, resulting in stiffness and consequent breakage. Springs can be replaced, but if the bolt breaks a new lock is required. If an ordinary lock is in a damp position the bolt and key should be lubricated with thin oil. A pin tumbler cylinder lock however, should be lubricated with graphite; never with oil.

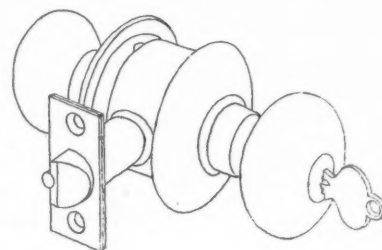
Locks and fire regulations

Fire regulations for public buildings do not permit the use of ordinary locks in exit doors, and to overcome this a panic latch or panic bolt is used. Panic latches are used on single doors, and consist of a crossbar which when pushed against, releases a latch. A locking knob can be fixed to the outside of the door to enable two-way traffic to operate. A single panic bolt is virtually the same but pushing on the crossbar operates a vertical bolt which engages with a striking plate at the top and bottom of the door, so holding it in three places as against the latch's centre point. The choice between the panic latch and the more expensive panic bolt seems to depend upon the desire for this greater security. The locking mechanism on either type can be mastered with the rest of the building.

Where double doors are required for emergency exit they may be needed solely as exit doors in which case two sets of single door panic latches or bolts can be used. If required for entry as well as exit probably one only would have the addition of a locking knob. Where double exit doors are required to be rebated, usually because of draughts, a set of furniture comprising one vertical locking bolt and two crossbars can be used. The door leaf which opens first has the panic bar and vertical bar fixed to it while the second leaf has only a crossbar which pushes against the panic bar. This arrangement is neater and cheaper than the use of a separate set of panic gear to each door of a double door exit, and therefore is the one normally used, but it is only applicable to rebated doors so must be decided on before joinery detailing is done.

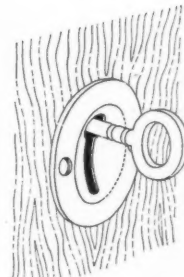
A type of panic bolt used on square edged cinema doors which open on to side streets, is the automatic locking type. It consists of a crossbar and the top half only of a vertical bolt which has a spring bevelled head. One set of gear is needed for each door, and is used in conjunction with an overhead door closer which when the door is released pulls it shut, the bolt engaging a striking plate and so preventing entry from the outside.

The height of crossbars is regulated by most of the responsible authorities and is generally standardized at 3 ft. 6 in. above floor. Panic bolts can be obtained in a number of finishes, the cheapest being cast iron, with



37

37, A typical American lockset. Installation is easier than with the mortice lock. One hole is drilled through the stile and another into the edge of the stile, to meet it. Makers usually supply the correct size drill bits. 38, Dished escutcheon, for finding the keyhole in the dark.



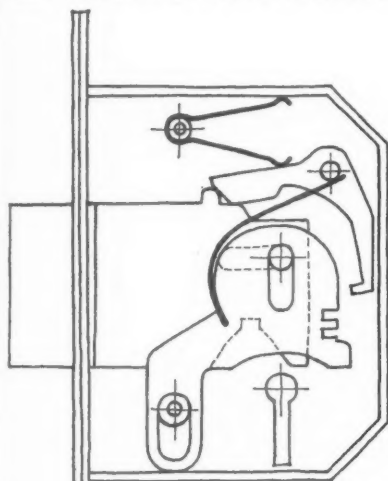
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a painted, cellulosed or spray metal finish. The main point about a panic bolt from the architect's view is that it is inevitably rather obtrusive and it is worth taking some trouble to get a design which is as neat and inconspicuous as possible. (Fig. 39.)

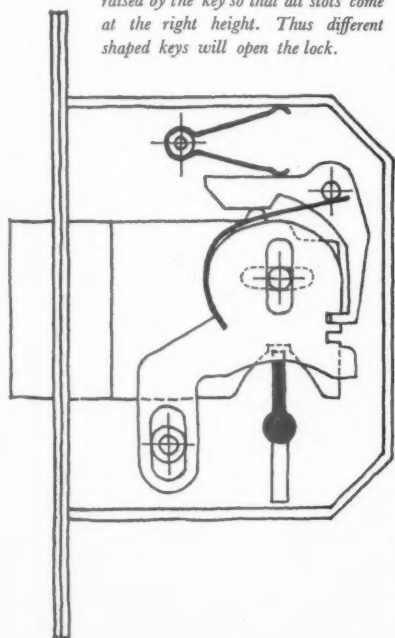
The selection of locks

The architect may well be appalled at the variety of locking devices open to choice. But many of the items in the bewildering variety of the catalogues have only limited use for special purposes. While he should go to the specialist for final discussion and advice a general knowledge of what variations may be available seems to be necessary as a background for intelligent discussion. Experience suggests that this means a large stock of catalogues, for one can never be sure that "some other manufacturer" does not produce the needed article. The processes which have to be gone through are, in order:

1. Decide on occupier's requirements.
2. Confirm local authority requirements for escape.
3. Confirm insurance company requirements.
4. Discuss with ironmongery suppliers the simplest means of satisfying the above requirements and obtain approximate ideas of relative costs of possible alternatives.
5. Joinery details can now be completed with confidence.
6. Obtain samples to decide precisely on types of finish for exposed fittings.
7. Specify full requirements, preferably in the form of a door schedule and send out for pricing.
8. If local authority requirements were based on preliminary discussions only, remember to check against the full detailed consent to plans when this arrives—especially in the case of large authorities such as the LCC who will often stipulate their requirements in detail and will inspect the building on completion to see that everything is in order.



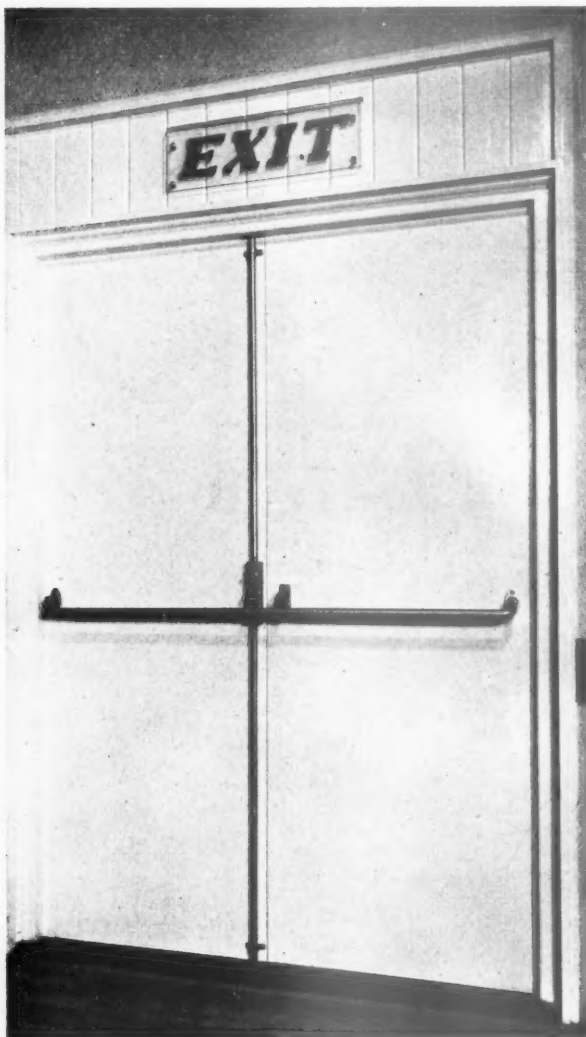
36, One system of mastering: The pivoted crank (topmost member) must clear the nib on the top of the bolt. This it can only do if the lip at its lower end engages with one of the slots (drawing below). There is more than one slotted member and these must be raised by the key so that all slots come at the right height. Thus different shaped keys will open the lock.



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BOLTS AND CABIN HOOKS

Bolts are used for securing doors either by themselves or used in conjunction with locks. They can provide a top and bottom fixing.

A bolt should always be provided with its own socket or plate, and not just a hole in the step, floor or head of frame. The length of a bolt is no indication of its strength, apart from the advantages of providing more screw fixings. The diameter and metal of the shoot, and the screw fixings, particularly on the socket, are the indications of strength. The size is regulated more by its position, for example, a long bolt is more convenient than a short when fitted to the head of a door.

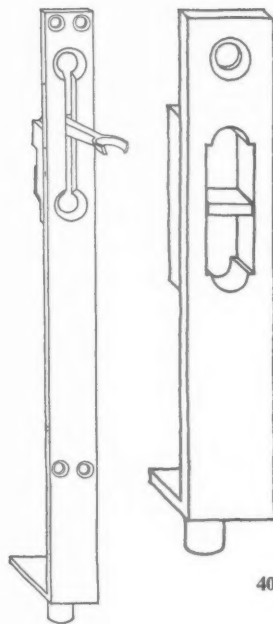
Flush bolts on a pair of doors are best let into the rebated edge of the meeting stiles, they can then only be operated after the lock has been freed.

Bolts are also used as door stays, in that doors can be bolted back and kept permanently open. If the door is an external one, the step will usually be laid to a fall, and the bolt should have a long enough throw. If this is not practicable, a cabin hook and eye can be used to hold doors open. To avoid the

hook wearing away the paint in swinging against the door, it is always advisable to fix the eye to the door and the hook to the wall. This is particularly important with metal doors where rusting could set in when paint is worn away.

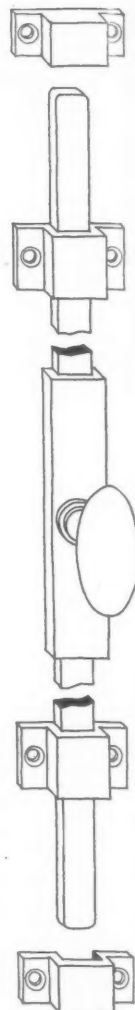
The two most common forms of bolt are the barrel bolt and flush bolt. The barrel bolt has a round shoot running in a guide which is attached to a backplate. The backplate is screwed to the face of the door and no cutting away of the door is required. It is also the cheapest form of bolt obtainable. The flush bolt which is often used for better class work, is neater but more expensive both in its own and fixing cost. It is recessed into the door until the face plate is flush with the door and is operated either by a thumb slide or if near the ground by lever action (Fig. 40) for convenience. Many other patterns of bolt are obtainable, e.g., tower bolts, foot bolts and and spring bolts; for different uses and they can be very elaborate affairs.

One bolt which should be mentioned is the "Cremone" bolt (Fig. 41) which is a bolt extending the full length of door or window so that when the handle is turned the top bolt slides upwards and the bottom downwards. This fitting helps to prevent twisting.



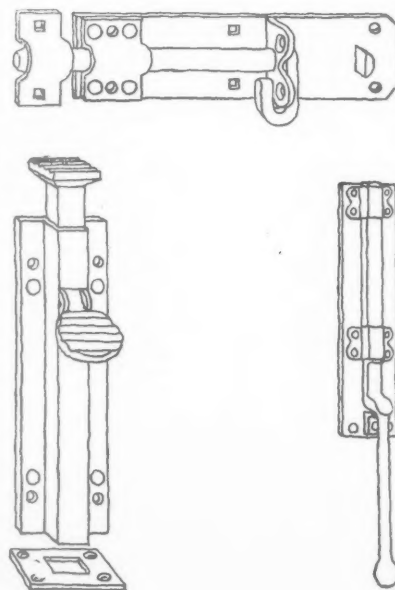
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39, One of the neater types of panic bolt. 40, Flush bolts. 41, Cremone bolt: widely used on the Continent but not here. The door or window is held shut more firmly and is less inclined to twist out of alignment, than with the English practice. 42, Barrel bolt, Monkey tail bolt, foot bolt. The monkey tail for the tops of doors too high to reach, the foot bolt for the bottoms of doors, to avoid stooping down.



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A development on this bolt is the "Espagnolette" fitting very widely used in Scandinavia (Fig. 43) although available in this country. It provides centre fixing in addition to top and bottom and sometimes the fixing is of a hook type instead of a simple bolt. The advantage of this latter point is that it pulls a door or window tight. In the Espagnolette fitting a lock is also

sometimes incorporated.

These fittings can be surface fitted or flush fitted into the edge of the door with the handle projecting from the front but this increases the labour of fixing and consequently is more expensive. When ordering this fitting, correct door dimensions are necessary and if not specifically stated, the handle will be centrally set.

DOOR HANDLES

There are five types of handle (a) the knob, (b) the lever, (c) the pull or push, (d) the drop ring and (e) the purpose made special. The handle is the means of opening the door once it is unlocked, and apart from group (c) and (e) operates the latch or spring bolt.

Knob and lever handles

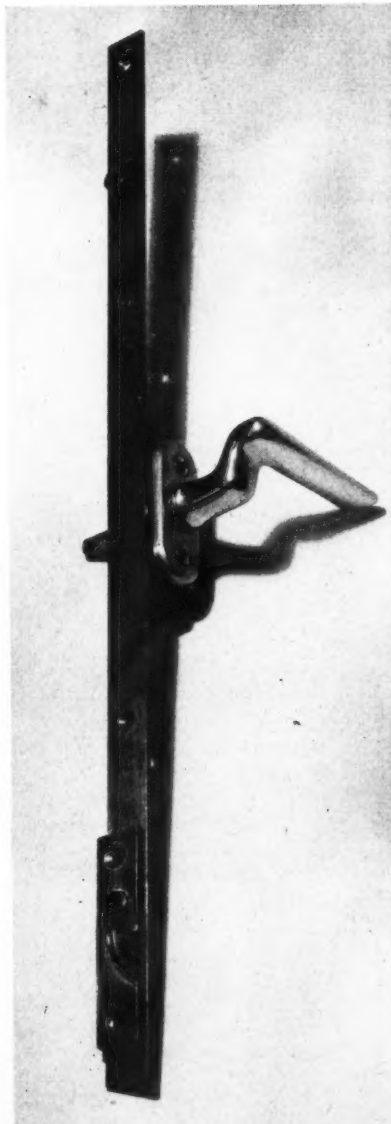
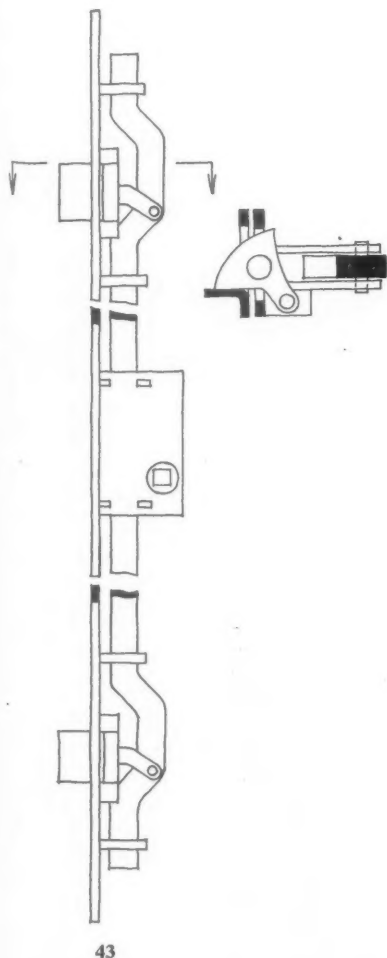
In housing, particularly, it is desirable to be

able to open and close internal doors with the minimum of effort, and a short bolt shoot, $\frac{7}{8}$ in. is recommended, with the bevelled face slightly rounded which will reduce friction on the striking plate. The thickness of the bit should preferably be greater than the length of shoot. The striking plate itself should always have its lip bent at about 30 deg. (Fig. 45) to avoid its

biting into the spring bolt. Lips on striking plates are not always bevelled when they arrive on site, as they are made for either hand of lock, and the joiner does not always remember to bend the lip. The other important characteristic required to obtain easy action is correct springing for lever handles. For convenience a lever handle should not have to be operated through an angle greater than 40 deg., and 25 deg-30 deg. is comfortable, but a knob can be turned through an angle of 60 deg. quite easily. The B.S.I. has decided on 40 deg. for sash locks, so that either a pair of lever handles can be used or a knob one side and a lever handle the other. Knobs should never be used on the "outside" of doors opening inwards in conjunction with narrow sash locks as the knuckles will be grazed on the frame when a person opens the door from the outside. A pair of lever handles is preferable to one knob and one lever handle, as the stronger springing necessary to operate the handle often makes it very difficult to operate the knob. If the lever handle is not separately sprung then the knob will operate easily, but the lever handle may sag after a time, and look unpleasant. On the Continent lever handles are not, as a rule, sprung, a stronger lock spring being used to do the work. In this country the lock trade say that this is an unnecessary strain on the lock; and it is better to have a pair of separately sprung lever handles. For a well-balanced lock and handle set it is an obvious advantage for the same manufacturer to make both, then he can ensure a good performance from his latches.

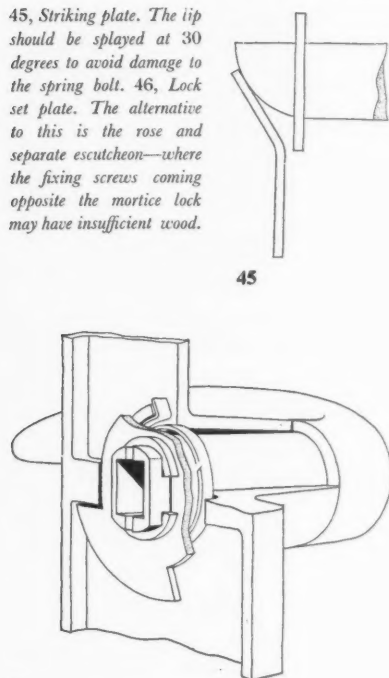
A handle is fixed to the lock and operates the latch by means of a spindle, of square section (Fig. 46) and follower. There are two methods of fixing handles and both have their uses: (a) where both handles are fixed to the spindle and the spindle takes the pull when the door is opened; (b) (Fig. 47) where the spindle floats and the handles take the pull through the roses which are screwed to the door (Fig. 48). The second method is generally considered better practice for normal work as it eliminates any excess play there might be between the handle and the door. The first method is used on doors which will have to withstand rough usage, as the screws holding the rose to the door cannot be wrenched out. On a $1\frac{1}{2}$ in. thickness door and preferably on a $1\frac{1}{2}$ in. thickness also, when using a mortice lock, there is very often insufficient thickness of wood either side into which to screw the rose securely enough for a lever handle. A knob could probably be fixed satisfactorily, but with a set of lever handles a full lock plate set (Fig. 46) is recommended as this enables the screws to be fixed clear of the mortice lock.

Roses are not there purely for decoration as they help in keeping a proper bearing for handles, particularly lever handles. Knobs without roses fitted to rim locks will probably work satisfactorily, as the knob is close up to the lock and the leverage therefore is short. Lever handles should never be used with rim locks because of the long leverage on the "outside" of the door. Lever handles are best kept fairly



Espagnolette bolts. 43, A Swedish example, available in this country. 44, A German example also available in this country. This fitting pulls the door tight against the frame rebate when the handle is raised.

45, Striking plate. The tip should be splayed at 30 degrees to avoid damage to the spring bolt. 46, Lock set plate. The alternative to this is the rose and separate escutcheon—where the fixing screws coming opposite the mortice lock may have insufficient wood.



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47, Fixed spindle.

48, Floating spindle.

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short, usually 4 in. from the centre of the shank to the end, otherwise if the rose should fail to take the stress the lock will become distorted. Lock plate sets are preferable to roses for this reason. Some people prefer lever handles with a returned end (Fig. 49) on the grounds that they are less likely to catch on jacket sleeves. On the other hand, there have been objections to the returned end type of lever because it is said that people tend to grasp them with the hand in such a position that a ring on the finger rubs against the door face. One building is known where polished flush doors suffered in this way. On the fixed spindle type of handle, very often the grub screws in the neck work loose and fall out. Spindles as well as handles should be tapped and not just drilled, but a better method of fixing is

illustrated (Fig. 47) using "Mace's rose" and "Duce's spindle." One knob is fixed to the spindle. The roses form a sleeve into which the neck of the knob fits. The loose knob is tapped to suit the spindle, and has a tapped hole in the neck for the grub screw. After the grub screw has been tightened in the neck of the handle the rose can be turned to cover the head, and so prevent its falling out.

Knob furniture is 20 per cent. cheaper, at least, than the same quality lever handle furniture. There is usually no difference in cost between round and oval knobs. Oval knobs are rather easier to open but this is largely a matter of personal choice. (Fig. 50.)

Push and pull handles

Push plates or pull handles are made in

very many sizes to different patterns and in a wide range of materials.

There does not seem to be any recognized practice in deciding which side of double swing doors each should be fixed. If traffic is obviously going to be greater in one direction then push plates should be used on the approaching side of the door, as they are more quickly operated. Pull handles can be used both sides where traffic is even and they do at least afford the chance of being chivalrous should the occasion demand it. Another point is that handles can be pushed quite easily without the door being marked, but with push plates marking around the plate usually takes place because the plate is too small.

On metal doors handles are in fact used both sides as metal stiles are too narrow for vertical push plates. Attention should be given to the choice of finish, particularly with push plates which tend to show uneven wear and can look very shabby in a short time if an inferior electro-plated finish has been selected.

Drop ring handles

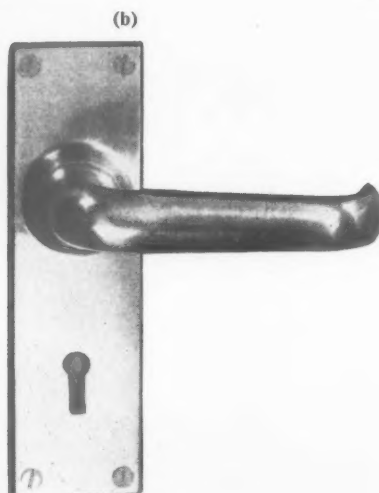
Drop ring handles have a limited use. They are not so convenient to manipulate as the other types. It is possible to have them made to match existing patterns, and they are available in most of the recognized finishes. A particular form of drop ring handle is the flush handle (Fig. 53) used for doors or wickets in sliding folding partitions. They are used in this case to avoid any projection which would prevent the doors folding close together, or being scratched. They are also used for floor access panels, or trap doors, and are available in very small sizes.

Purpose-made handles

Purpose-made handles are usually required for shops or showrooms. One manufacturer of armour-plate glass doors provides the doors complete with top and bottom locking rail, floor springs and hinges, and will provide drilled holes for a handle to the architect's design if requested, but the manufacturers must be consulted to ensure the practicability of fixing.



(a)



(b)

(c)



(d)



49 Lever handles.

(a, b, c: English examples.
d: German examples).

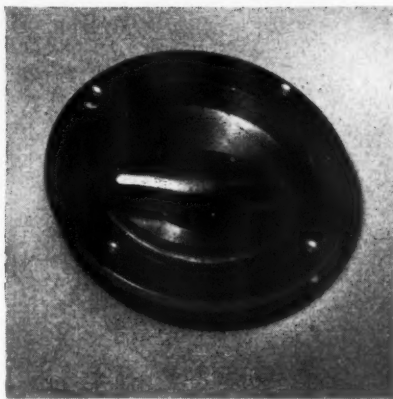


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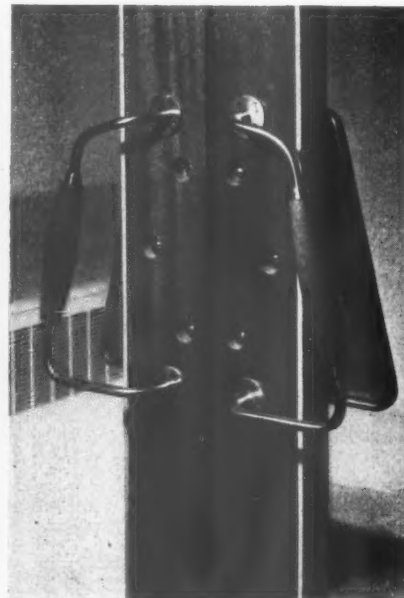
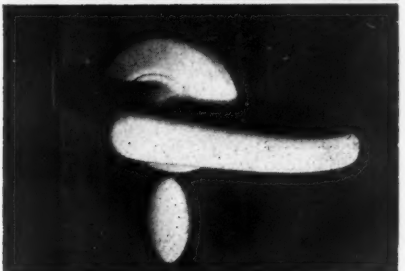
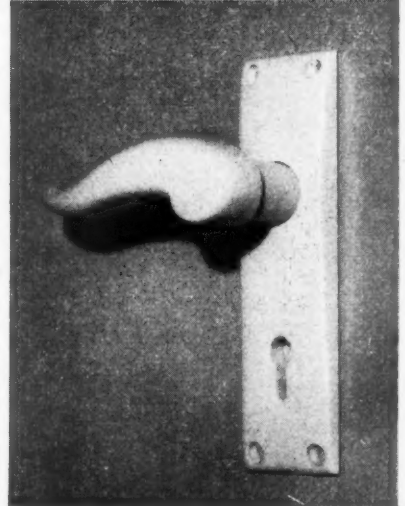
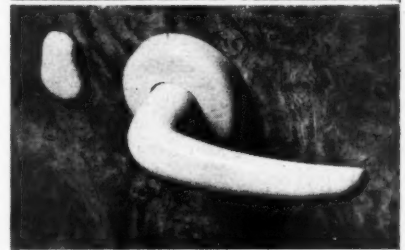


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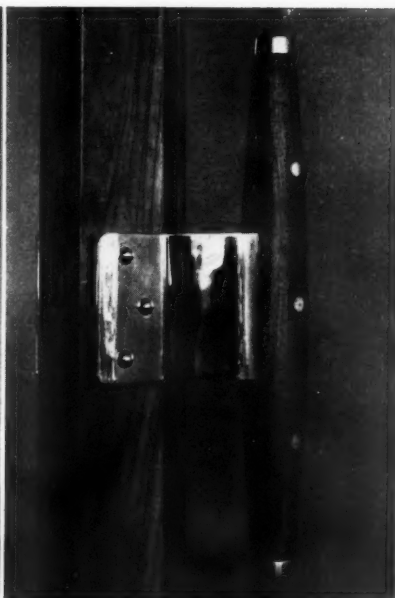
50, Oval knob. 51, Push or pull handle, a German example available in this country in aluminium. 52, Drop ring handle and night latch combined. 53, Flush drop ring handle. A German example available in this country. 54, 55, Purpose made handles for the Royal Festival Hall (architect: R. H. Matthew).



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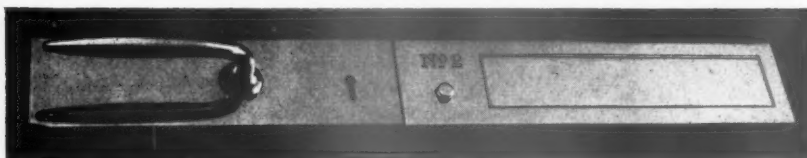
Plastic door handles, etc.

It is probably for handles that plastic is used most. Push plates and finger plates if unreinforced are large thin surfaces which are prone to splitting. Reinforced plastic is used successfully and has a much longer life. Lever handles in plastic should always have a metal core, and although the cost is more than doubled, being approximately 4s. 6d.

unreinforced as against 10s. 6d. reinforced, the handle is still comparatively cheap. The disfavour that plastic door furniture has gathered round itself is probably due to the many cheap examples of appallingly bad design which flooded the market just after the war. There are, however, several firms which produce good simple designs in many colours. (Figs. 57-59.)

56, 57, 58, 59

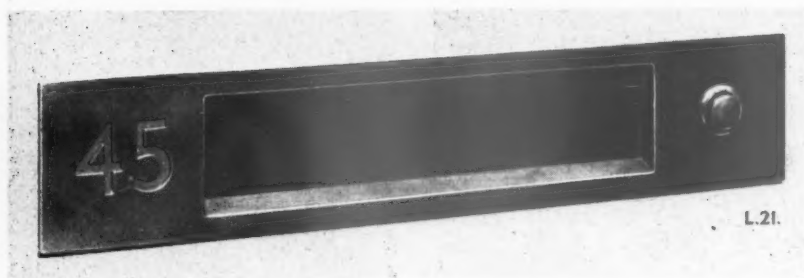
56, Turned wood knobs. 57, 58, 59, Plastic lever handles.

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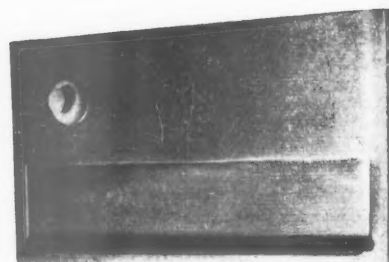
60, Letter plate, handle and bell push fitting designed by Powell and Moya. 61, Letter plate and handle assembly designed by Norman and Dawbarn. 62, Letter plates are more commonly spring loaded but this one is weighted to fall shut. 63, Letter plate and bell push, a German example available in aluminium in this country. 64, Two kinds of door holder, one with door stop. 65, Metal weatherstripping to windows in phosphor bronze.



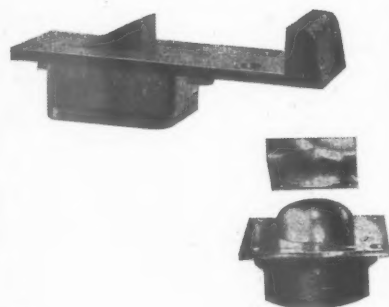
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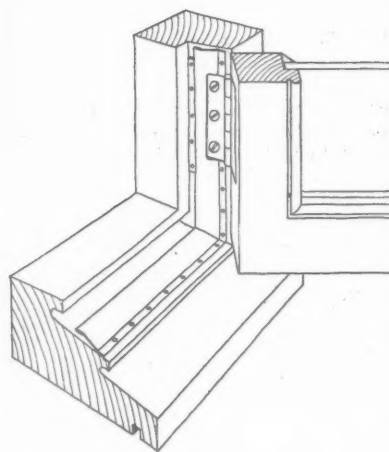
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DOOR FITTINGS

Kicking plates

To be of any value, kicking plates should be at least 9 in. deep and preferably more. The width is usually determined on site when the door and frame are fitted, and should clear the rebates. Materials for kicking plates can be matched to the rest of the door furniture, but on the lighter finishes, black streaks from rubber soled shoes are bound to show up.

Letter plates and postal knockers

The combination of letter plate, postal knocker and sometimes also a card frame in one unit is becoming more widely used, but the difference in available letter plate sizes is phenomenal. The General Post Office recommend an opening size 8 in. x 14 in. for housing. Still larger sizes are commonly required for offices and factories. Letter plate flaps are usually held shut by

means of a small steel spring along the back. This spring prevents "chattering" in the wind but can be difficult to operate if the postman has his hands full, and is inclined to nip fingers. One firm has produced a dead weight letter plate flap (Fig. 62) which has a cast iron bar along the bottom edge, which causes it to close by gravity. The weight of the bar can be increased or decreased as desired, so as to withstand wind chatter. This box also has a side fixing, as opposed to back fixing and this obviates unsightly screws and nuts showing on the inside.

Door stops and door holders

Various examples of door holders incorporate the principle of the spring latch, spring-ball catch, hook catch and spring knob and some of them are hideous in appearance. Door stops are rubber cushions

either fixed to wall or floor. The disadvantage of floor fixing is the obstruction caused, especially to carpets but they are also a nuisance when cleaning any type of floor and can also get in the way generally. Wall fixing is probably better but still suffers from unsightliness.

Draught exclusion

Weatherstripping on external doors and windows is rapidly becoming recognized for its value in reducing draughts and heat loss. Methods of application are fairly well known but it hardly comes under the normal heading of ironmongery, briefly, however, there are two basic methods of weatherstripping wood doors and windows. The first is to use a strip of phosphor bronze alloy which is a material with a lasting natural spring and rust-proof qualities. It is a specialist article obtainable from a limited

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number of suppliers, some of whom prefer to carry out the installation themselves. The cost is rather high. It can be applied to casement sash or pivoted windows and internal or external doors (Fig. 65). While there are good reasons for using such weatherstripping on new buildings it is also particularly useful for treating ill fitting

doors and windows in old buildings as it does not call for structural alteration. Another method of draught-proofing is the fixing of a metal tongue to the frame and forming a groove in the window sash. Under door cracks can be dealt with more cheaply by a planted fitting with a drop seal or by recessing the drop seal into the bottom rail.

DOOR HANGING

Door hinges

Spring hinges will be dealt with under the "Door Closer and Floor Spring" section. The simplest type of hinge on which to hang a standard 2 ft. 6 in. x 6 ft. 6 in. door is a cast iron or steel butt. One pair of 4 in. butts to each door is normally used, and, for pressed steel door frames this conforms to the B.S.S., but if the door is in hardwood, non-ferrous metal butts should be used to avoid acid attack from the hardwood, particularly oak, corroding the steel and also because the doors are not painted. One and a half pairs (*i.e.*, 3 hinges) of 4-in. butts are usually recommended for external entrance doors because they are often wider and heavier. Heavy doors elsewhere should also have hinges increased in size and number. Hinges of the ball and pin, *i.e.*, lift-off type, do not seem to be commonly used in this country. The reason for this is not clear for they would seem to have advantages on internal doors in making it easy to hang the doors and take them off for adjustments such as the arrival of a thicker carpet and for the frantic clearance of the house by father for weddings and parties. The type illustrated (Fig. 66) is Finnish and not yet available over here. The leaves are circular so that sinking in the door edge may be made with a rotating tool, only one such sinking being necessary, for one leaf is recessed into the other when the door is closed.

A hinge on the English market which requires less fixing labour is illustrated (Fig. 67)—when the door is closed the two leaves of the hinge are in the same plane.

Two very useful hinges are the rising and falling butt hinge. (Fig. 68.) The rising, probably the better known of the two, is used

to raise the door on opening in order to clear a carpet, and yet remain reasonably draught-proof when the door is closed, the full rise is actually about $\frac{1}{4}$ in. It also means that the door will always tend to close itself, and it may be necessary to provide some means of keeping the door open when required. The self closing action of rising butts is put to use on fire resisting doors and the doors of switch cupboards. Fire regulations require that some device be fitted to such cupboards to keep them closed, so that in the event of an outbreak the fumes will be kept inside the cupboard.

The falling butt hinge tends to keep the door open, and is used extensively for w.c. compartments in conjunction with an indicator bolt, and for swimming bath cubicles. The hand of rising and falling butts should always be stated when ordering. Other hinges are reversible.

A Parliament hinge (Fig. 69) is a hinge with a wide butt and projecting knuckle and is used to enable a door to fold 180 deg. It is important to determine the degree of offset required to enable the door to miss all obstructions such as architraves, skirtings or reveals. Although very useful this type of hinge is apt to look rather clumsy.

A "centre" or "pivot" hinge is the type used on double action doors at the head and foot, in conjunction with a floor spring. A counter flap hinge is one which presents a flat surface on top when the flap is in position, and has an intermediate jointing piece (Fig. 70). For ledged and braced doors which require considerable support and where edge of matching or end of ledge are not suitable for butt hinge fixing, and for wide doors such as garage and shed types, there is a variety of designs usually

of the tee hinge type. The architect would be well advised to take advice about size and weight to meet particular requirements. The "Soss" hinge is an American product which is unfortunately not being made in this country at the moment, and its importation has not been allowed for some years. It is a "secret" hinge, the two sides interlocking with each other in the edge of the door (Fig. 71) and not showing any part of the hinge when the door is closed. It could be used with great aesthetic advantage for sliding folding partitions, and would seem to be the proper answer for doors in squash courts. In small sizes it is also a neat fitting for use on doors in various types of furniture.

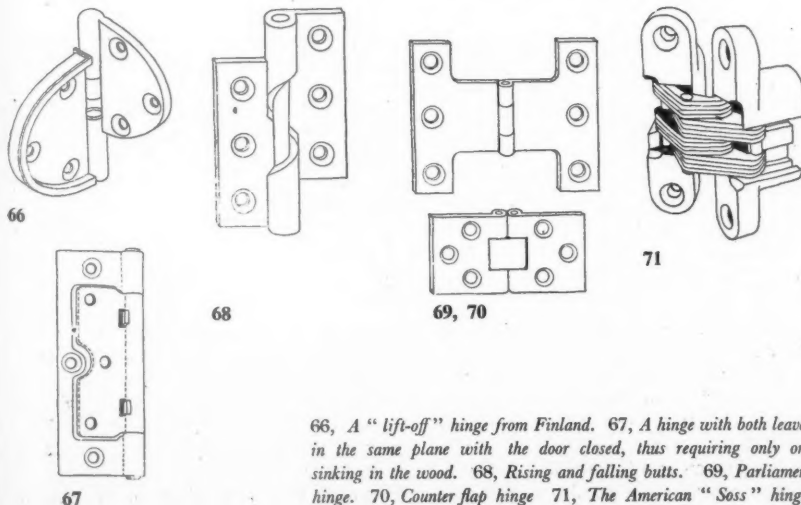
FLOOR SPRINGS AND DOOR CLOSERS

Apart from rising butts, or the cord and counterweight, the simplest and cheapest method of producing a self-closing door is to fit it with a roller helical spring; but these are unsightly and the door, increasing its momentum as it closes, does so with a bang which tends to shatter the plaster round the door frame. This fitting is sometimes used in conjunction with a "dictator" door closer which introduces the check action before finally closing the door.

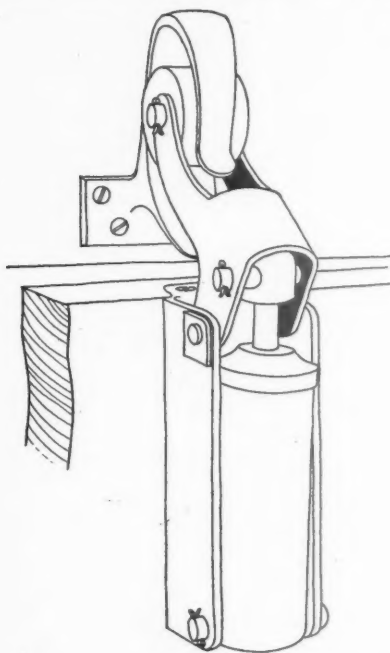
The "dictator" (Fig. 72) is sometimes used by itself, for instance in hospitals where on account of wheeling trolleys, a door closer or floor spring would be a nuisance. If a dictator is fitted the door can be pushed open, the trolley wheeled through and the door pushed shut, and the slamming action will be checked by the dictator. A combined spring hinge and check (Fig. 73) has a limited use. It consists of a tube with a spring in the top hinge and a check in the bottom one. It will not stand up to very heavy traffic. It can be a useful fitting for places such as Board Rooms where traffic is light and a neat though simple type of door closer is required.

Overhead hydraulic door closers and floor springs are most commonly used to achieve a self-closing door. The floor spring is preferable from an aesthetic view as most of it is hidden in the floor. Door closers are mounted on the door, and are comparatively large in size, but they are very much cheaper.

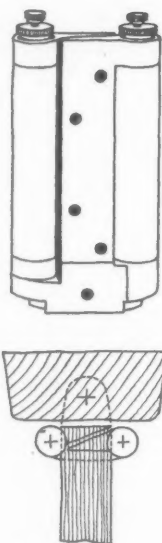
Floor springs can be either single or double action, that is for swinging in one direction or both, and with non-check, or check action, which with a one-way swing door avoids slamming. A double action, check action floor spring (Fig. 74) has two springs which are connected to a centre pivot which projects above the floor and fits into the bottom rail of the door. Both single and double action floor springs can be arranged to leave the door open at 90° with release merely by pushing the door. The spring box depth is 2 in.—3 in. and can have either a metal cover plate or a recessed tray into which the surrounding floor finish can be fixed; so hiding most of the spring box. The better quality springs usually have two cases, so that when embedded in a solid floor the inner case can be taken out if necessary for repairs. Boxes should be



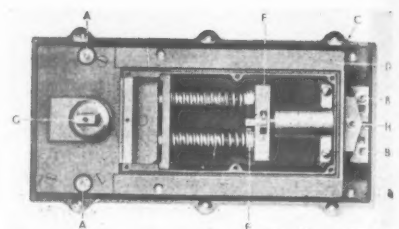
66, A "lift-off" hinge from Finland. 67, A hinge with both leaves in the same plane with the door closed, thus requiring only one sinking in the wood. 68, Rising and falling butts. 69, Parliament hinge. 70, Counter flap hinge. 71, The American "Soss" hinge.



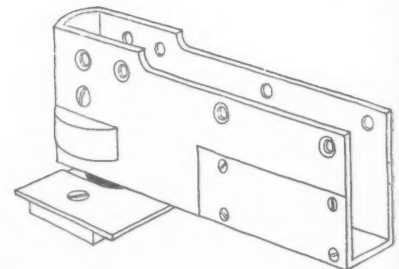
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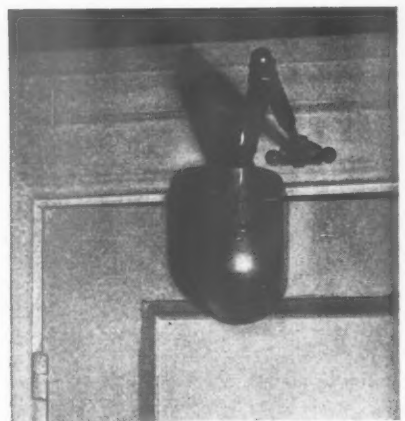
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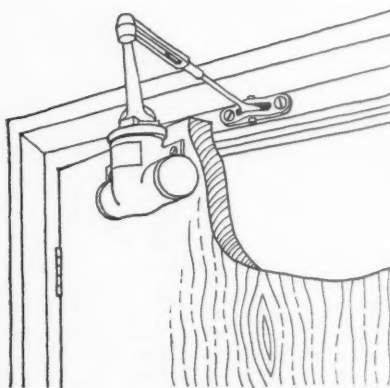
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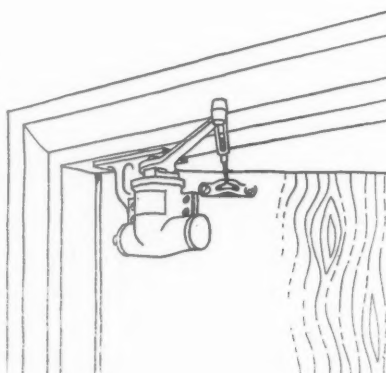
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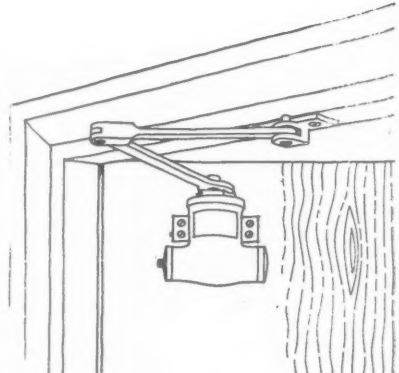
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72, A device which "catches hold" of the door when it is slammed and closes it quietly. 73, Spring closer and check hinge. Two of these are used. The top hinge is the closer and the bottom one provides the check action. 74, Mechanism of double action check action floor spring. The door will stay open at 90 deg. 75, Shoe spring. The mechanism is housed in the bottom rail of the door. This is sometimes used where there is not room for the floor spring in the floor thickness. 76, A more recent type of door closer. 77, Door closer on the inside of the top rail of the door. 78, Door closer on the outside of the door—by the use of a bracket. 79, Alternative to the above: A plate fixed to the frame and the closer on the door for outside fixing.

accessible for cleaning and lubricating. Floor springs should be oil tight and waterproof if used in semi-exposed positions. In lavatories, where washing down is very frequent, their use is not recommended. Single action floor springs sometimes necessitate the cutting away of the frame, in order to leave room for the knuckle on the shoe.

This is undesirable, and a number of metal door manufacturers have made use of a pattern where this is not necessary. When ordering floor springs the weight, or failing that the size, together with the thickness of the door and the hand should be given.

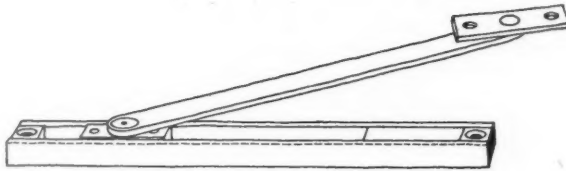
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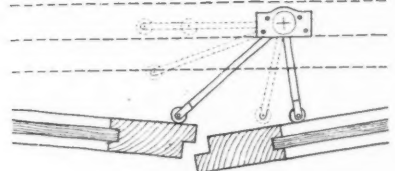
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80, American spring-loaded lever stay.

81, Selector: When the two leaves are slammed shut this device ensures that the door rebates engage the right way round.



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81

tions which state that doors to smoke lobbies must close automatically, as most floor springs are normally designed to stay open at 90° and therefore might not be acceptable.

There are positions where a floor spring cannot be used; for instance if a structural member or a damp-proof membrane in the floor beneath the door does not allow the required 2 in.-3 in. depth. A shoe spring can be used (Fig. 75) and this is fitted into the bottom rail of the door, with a spindle attached to a thin plate fitted flush with the floor surface. It can be a nuisance if combined with a kicking plate, as the kicking plate has to be cut away in order to get to the mechanism. This type of spring could be used as an alternative to a floor spring in cases such as lavatories and swimming baths or where frequent washing down is likely to take place.

The design of overhead door closers which has for so long been so hideous shows signs of improvement (Fig. 76) but if not properly considered by the architect their position and fixing can produce an eyesore. Firstly, a door closer is never fitted externally, open to the weather. The usual method is to mount the closer on the inside of the top rail of the door and the arm on the frame above (Fig. 77). If required on the outside of a door a bracket has to be used in addition (Fig. 78) and one is liable to bump one's head if the door is a standard 6 ft. 6 in. high. A plate can be fixed to the frame and the closer on the door for outside fixing (Fig. 79) but this is usually more expensive.

The very neat American type of lever closer (Fig. 80), fixed into the top rail, is not in fact hydraulically controlled and is used more as a lever stay with a spring, which on release shuts the door with no check action and cannot, therefore, be considered as a real alternative to our types.

Where using door closers or floor springs in conjunction with external double doors, a difficult situation can arise. External doors are best rebated in order to keep out draughts and weather, but if rebated and fitted with door closers the wrong leaf might shut first and so leave the door open. This situation can be overcome either by (a) fitting a "selector" which automatically holds back the second leaf until the first has closed (Fig. 81) or (b) by bolting one leaf and using only one half of the door for the majority of occasions, or (c) having square edged doors. This problem is perhaps less serious with metal doors as they do not shrink. One firm of metal door manufacturers have designed a double folding door with "automatic sealing edges."

Sliding door gear

The manufacturers of sliding door gear cater for numerous combinations of door movements (Fig. 82): (a) straight sliding, (b) sliding two doors in one direction, (c) sliding a series of doors round a corner, (d) sliding and folding a series of doors held on the edge, (e) sliding and folding a series of doors held at the centres, (f) lifting a door up and over.

There are two methods of supporting a sliding door: (1) by hanging it from the top and providing guides at floor level or (2) by allowing the door to rest on a track on the cill with guides only at the top. Different arrangements are suitable for different conditions, and some manufacturers definitely prefer one method rather than the other for their own particular equipment.

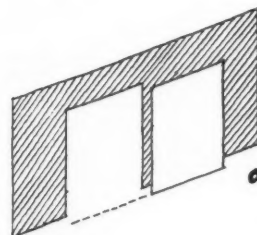
Only on the very simplest type of single sliding door is it possible to avoid some form of track across the bottom of the door opening. This can be done by keeping the guides to the side of the door opening. Bottom tracks are basically of two types, either a recessed channel in which run

guides fixed to the bottom of the doors or a projecting rail which takes wheel bearers fixed to the doors. The disadvantage of the latter is that it forms an obstruction, usually about $\frac{1}{4}$ in. high. This is a nuisance for pedestrians and may be damaged by wheeled traffic. A possible alternative is to sink a channel which has a projecting guide incorporated in it so that the top of the guide comes flush with the floor. This, however, leads to problems similar to those with the ordinary recessed channel which suffers from getting choked with dirt, holds water and, in the latter case, may in exposed positions freeze up and make it impossible to open the door as some car owners have discovered to their annoyance.

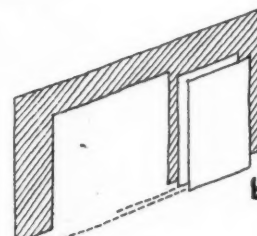
One method of avoiding the bottom channel problem is the use of a rubber cover (Fig. 83) which is stretched across the groove and is depressed as the wheels travel along. The wheel bearing is taken on a hardwood block. The rubber lasts reasonably well and can easily be replaced when worn. This arrangement is only suitable for

82, Sliding door arrangements:

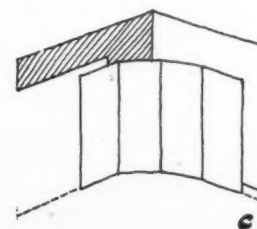
- (a) straight sliding.
- (b) two doors in one direction.
- (c) a series of doors sliding round a corner.
- (d) sliding and folding doors held at the edge.
- (e) sliding and folding doors held at the centres.
- (f) lifting a door up and over.



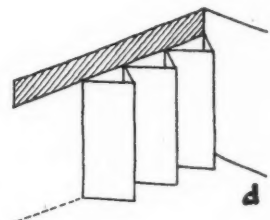
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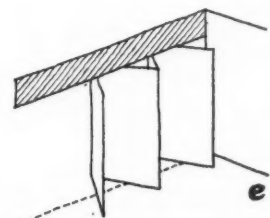
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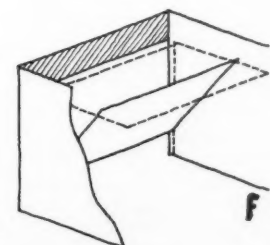
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83, Rubber covered bottom channel guide. This avoids the obstructive rail or channel that can become blocked, but it is only suitable for light doors. 84, Track hood. 85, Locking clips to hold folding doors (or windows) in the open position. This is a Swedish example, available in this country. The clips are sunk flush in the stiles. 86, Ball bearing door track. 87, Cupboard door gear. 88, Domestic door gear. 89, Gear for heavy doors. 90, Fibre track for cupboard doors, silent in operation.

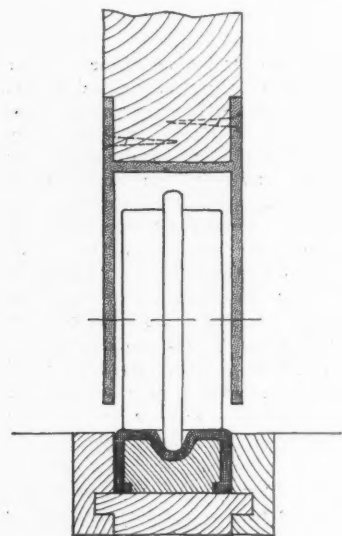
wheel type bottom bearings and is only satisfactory for fairly light doors. The design of the door is absolutely dependent on the choice of gear for its own particular weight and usage. Limitations on the number of leaves, height and width of door, thickness and rebates are all usually specified by the manufacturers of the gear. Centre and end stops should be provided with the track.

For doors in external positions, wind pressure should be considered, and for any track gearing placed externally it is import-

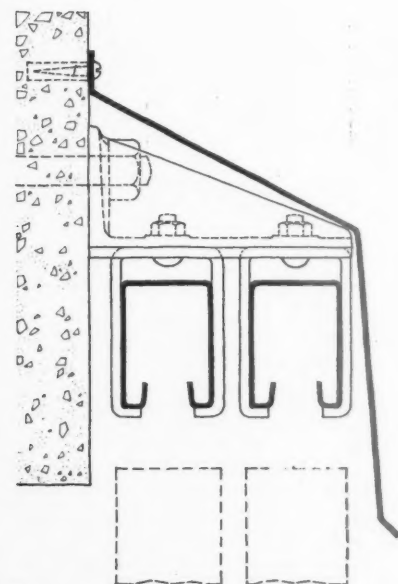
ant that it be protected with a hood (Fig. 84). Mention has already been made of the use of the "secret" hinge for this type of door; and of flush handles. A neat fitting for folding doors is the use of a locking clip to fasten the leaves firmly together whilst open (Fig. 85).

Instead of the more usual wheel gearing, ball-bearings have been used by some firms (Fig. 86) and result in a very smooth running door.

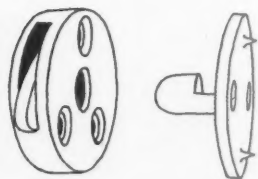
Sliding door gear is made in all sizes from cupboards (Fig. 87), domestic doors (Fig.



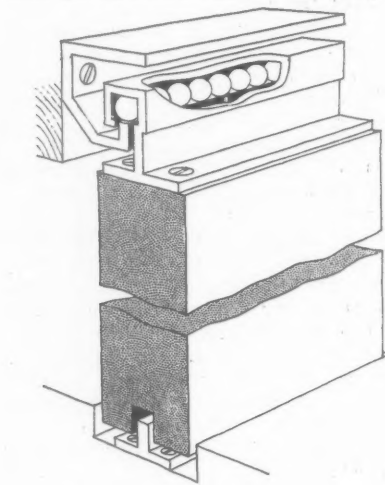
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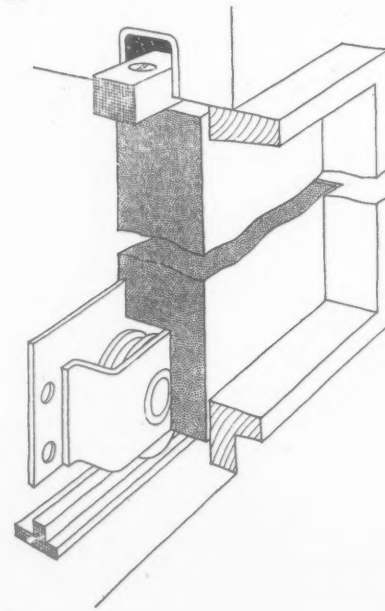
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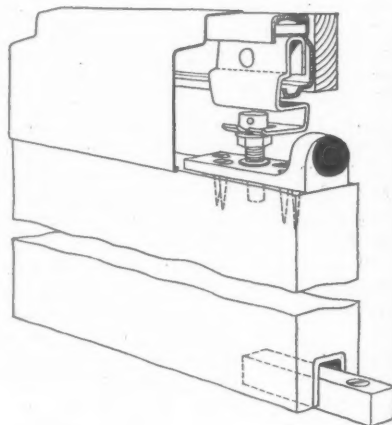
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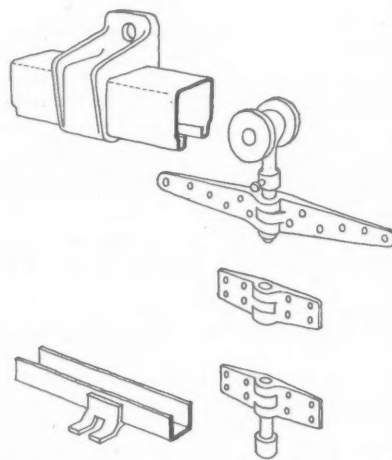
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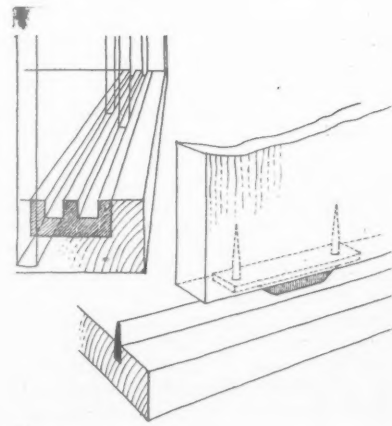
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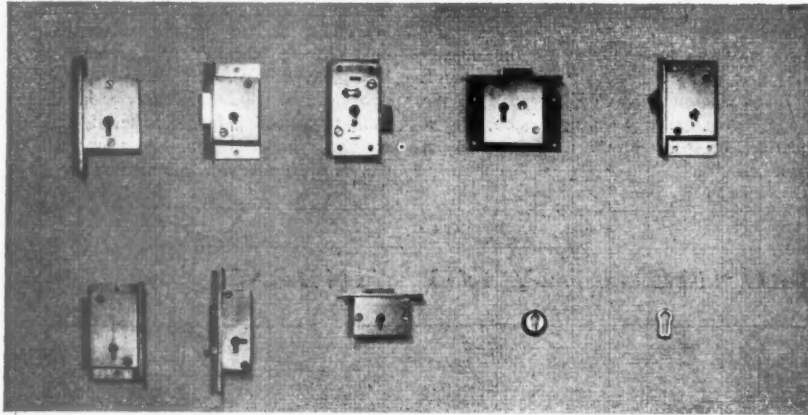
88), office and school doors to garage and very large factory doors (Fig. 89). In buildings where sliding doors are likely to be used frequently and where noise needs to be kept to a minimum, consideration should be given to the relative merits of various systems. Even in private houses kitchen cupboards can be sufficiently noisy to be a real nuisance. For small sliding doors to cupboards the fibre track type seems to be very satisfactory and to avoid any noise nuisance (Fig. 90). "Up and over" doors and revolving doors are specialist items best dealt with by a specialist.

CUPBOARD FITTINGS

These usually include locks, handles, catches and hinges.

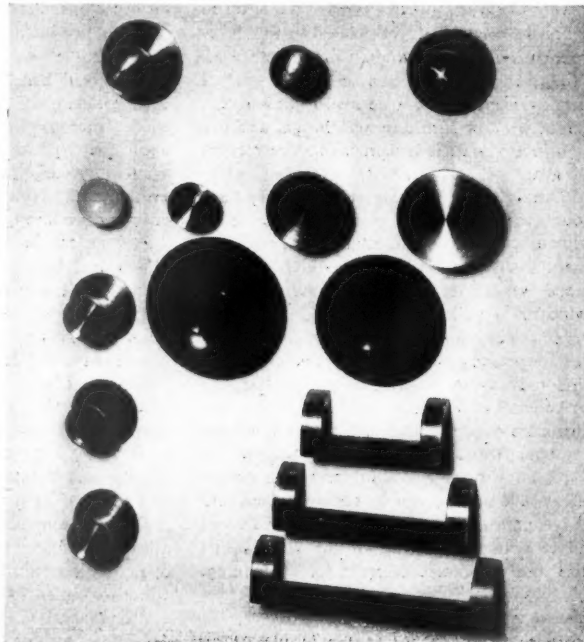
Cupboard locks are usually flush fitting as previously described, when they are known as cut cupboard locks, or of rim type, screwed direct to the inside face of the door, when they are known as straight cupboard locks. When ordering, the hand of cut cupboard locks should be stated, but straight cupboard locks are suitable for either hand. "Security" locks, i.e., 5 lever are made in

cupboard lock form. Cupboard locks are usually made reversible for either hand. Most cupboard locks are made in brass but cheaper types in steel can also be used. Handles are many and varied. It is a great help with a cupboard to have the type of handle and catch that is easy to open when the person has his hands full. Plain "D" handles are good from this point of view, and they are also useful for mounting at the base of high cupboard doors. A neat

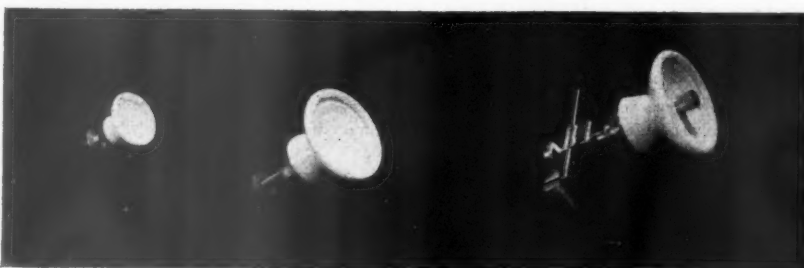


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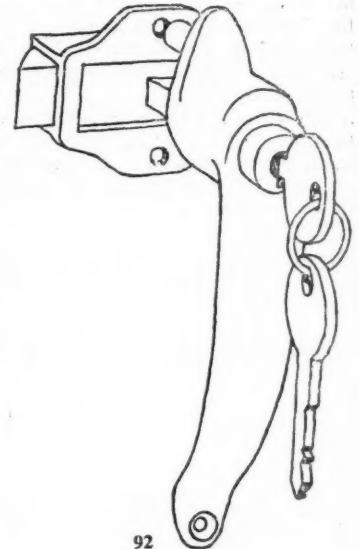
91, Locks for cupboards and drawers. 92, A "D" handle with press button latch. 93, Knobs and drawer pulls, in metal and plastic. 94, Plastic cupboard knobs, one with press-button latch. 95, Spring ball and spring roller catches. 96, Spring catch suitable for larger doors. The projection of the bolt is adjusted by screwing forwards or backwards with a penny, inserted in the slot.



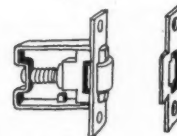
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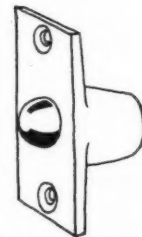
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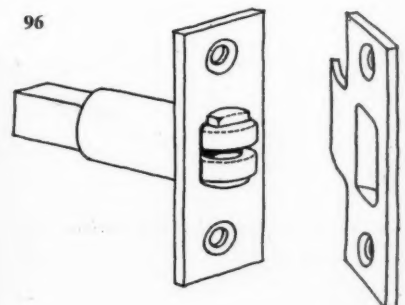
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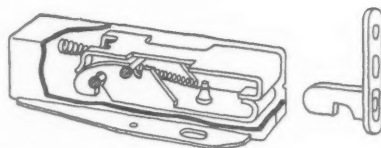
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"D" handle with push button operation which can also be locked through the button, is shown (Fig. 92). Knobs are also used a great deal. Dished knobs (Fig. 93) are easy to operate and pleasing in appearance. Knobs and handles particularly in kitchens should not have mouldings and inset lines as they fill with grease and dirt and are very difficult to clean.

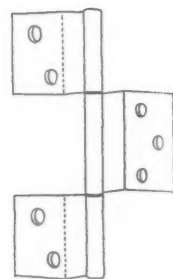
Catches should preferably be arranged one top and one bottom rather than in the middle, as cupboard doors are usually of light construction and tend to warp and bend easily. Spring ball catches, or on a larger door a roller bolt are catches with an easy though noisy action. One type of ball catch has adjustable projection of the ball (Fig. 96). The steel spring catch tends to be stiff at first and useless quite soon after, and if mounted out of centre will pull the door unevenly.

Spring catches operated with knobs seem to have a habit of getting very tired after constant use, but possibly this is because



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97, This device is fixed inside the door. If the door is pressed when shut, it springs open, but when slammed again it shuts. Only a finger plate is required. 98, Rebated cupboard hinge.



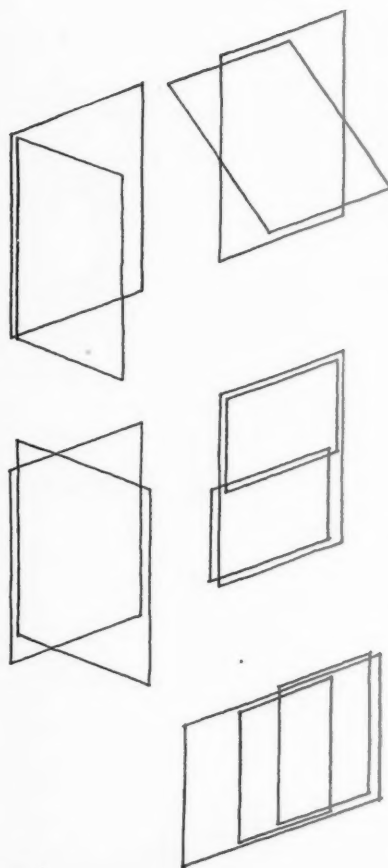
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poor quality fittings tend to be used on cupboards.

One neat cupboard fitting on the market (Fig. 97) can be operated with the hands full, an obvious advantage. A push on the door will cause it to spring open, and a gentle slam will close it. No furniture is needed.

Hinges for cupboards are usually ordinary brass butts and rebated hinges are inexplicably difficult to obtain. The rebated hinge has great uses in this field, as cupboard doors can be constructed very economically using a projecting facing material, and any shrinkage between door and frame will be less conspicuous with this method.

IRONMONGERY FOR WINDOWS



99

99, The various ways of opening windows.

Fittings for windows are somewhat less complicated than for doors and for the most part follow fairly well established customs. Developments which have taken place have tended to be related to the developments in metal window manufacture, although there is now some sign of a general improvement and of a desire to think afresh about window furniture and design, and this is bringing with it a demand for new types of gear.

Materials for window ironmongery are much the same as for doors but it must be remembered that some fittings, notably casement fasteners and peg-stays have to withstand very hard usage, because of both wind-stress and violent operation. For this reason aluminium is not to be recommended for peg-stays and casement fasteners and this may cause annoyance to the architect or client who wishes to use aluminium furniture on doors and also to get a matching effect throughout.

With all windows it is important to design them so that they can be easily cleaned and if cleaning is to be from the inside this will affect both the placing of the window, its size and the choice of methods of opening.

Casement windows

With side hung windows the requirements, apart from access for cleaning are to be able to open the window to any desired extent and to keep it safely fixed in position in a high wind and to be able to shut it so that it makes a draught free barrier. With small windows the problems are not so difficult. Windows of 5 ft. high or more certainly need special arrangements to ensure adequate closing and this point may become critical with windows less than 5 ft. height in timber especially if poor quality material or flimsy sections are used. Even with windows up to

5 ft. high it is important to arrange the fixing point at not more than 2 ft. 9 in. from either top or bottom. This requirement can, on occasions, conflict with the most suitable position for handles for ease of operation, for example on windows which occur behind fixed benches.

The problem of side hung windows on windy sites is to some extent dependent upon the type of stay which is used but again very large, and especially very wide sashes make things difficult. For most ordinary ironmongery windows wider than 2 ft. 9 in. can lead to trouble but common-sense must be used in judging the risk in relation to the degree of exposure. What is suitable for a sheltered town site will be quite useless in an exposed seaside situation. Also the type of user needs to be considered. The normal fastener (Figs. 102, 103) consists of a handle with a nib which slides under a hook plate mounted on the frame or into a striking plate let into the frame. The handle should fasten with a wedging action to ensure as tight a fit as possible. It is also a great convenience to have a handle which allows for fixing the window very slightly open as is normal practice on metal windows but there does not seem to be such a fitting available for wood casements. In designing purpose made wood windows it is very important to be sure that detailing allows adequate width on which to fit the morticed plates. There can also be some very awkward problems if the frame is splayed and it is most unwise to finalise joinery details without confirming that fittings of an acceptable design are available.

It is perhaps not out of place here to refer to the unpleasant designs of so many of the stock casement handles. Progress here seems very backward compared with that in the field

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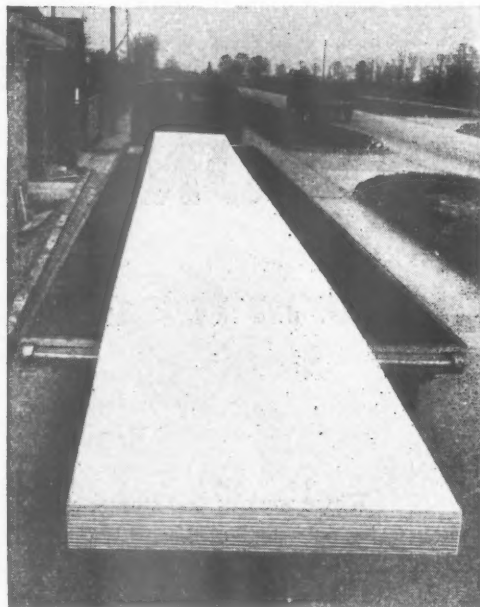
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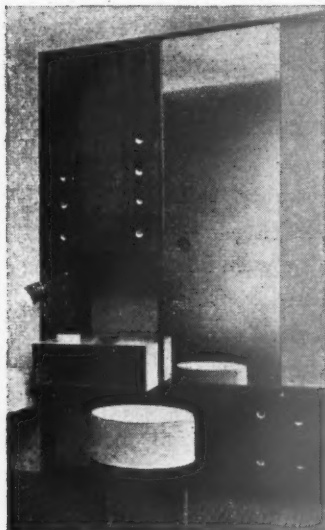
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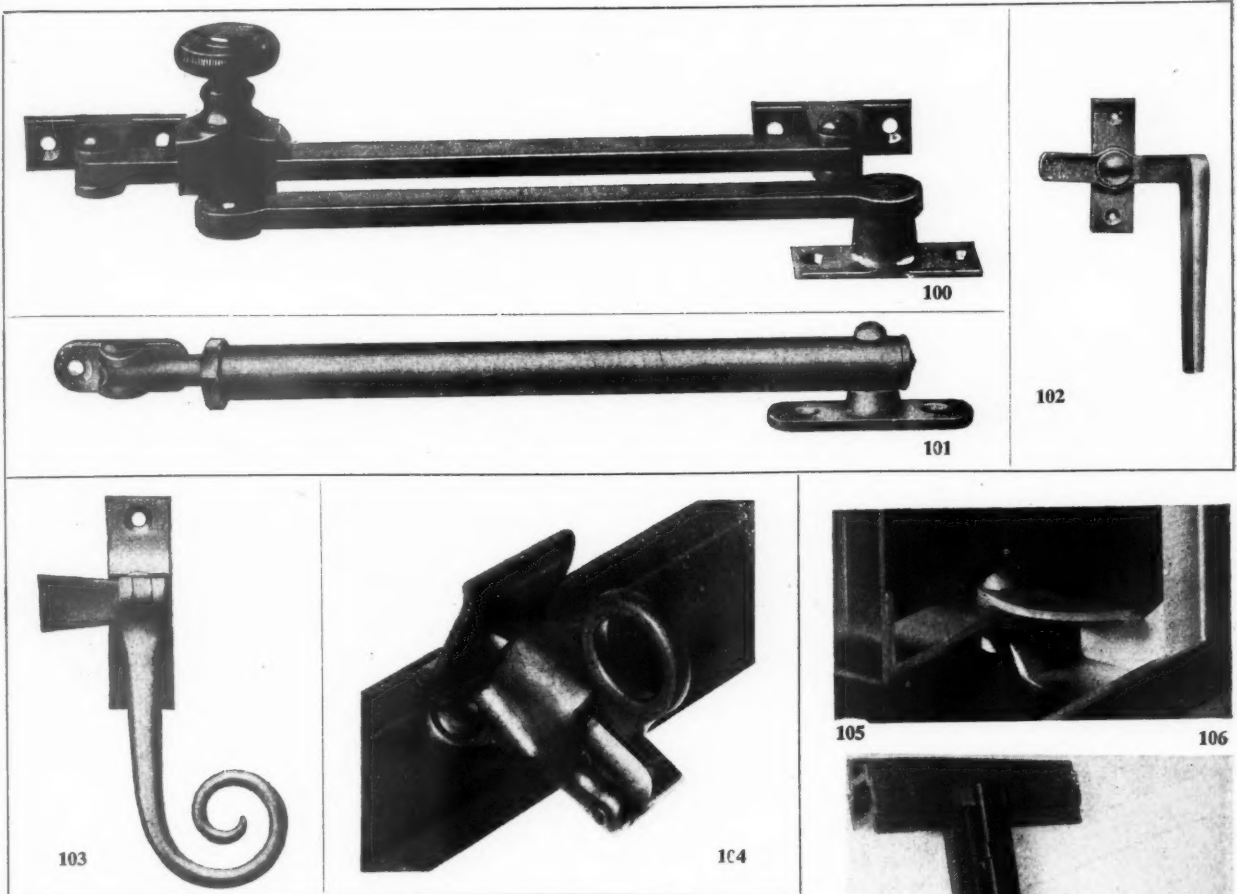
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100, Screw-down sliding casement stay. 101, Telescopic friction casement stay. 102, Casement fastener for side-hung windows. 103, "Antique" casement fastener. 104, Spring catch for bottom-hung "fall-in" windows. 105, Easy-clean friction hinge for metal windows. 106, Espagnolette bolt for metal windows.

of door handles though there is just emerging some sign of slight improvement. Architects ought really to take a firm line about these fittings and refuse to continue to be fobbed off with unpleasant handles.

Wedge action fasteners of a special type to withstand extreme vibration such as signal boxes or some factory conditions are obtainable.

For the high window where a single point fixing is not adequate the choice is between two fasteners with connecting arm or the Cremona or Espagnolette bolt already described. The Espagnolette bolt is not a very pretty object but can, at a price, be recessed into the edge of the casement.

Casement stays are used in conjunction with fasteners and are of the following types:

(a) The normal peg-stay. This can be used with one or two pins, the latter having the advantage of providing a greater choice of opening positions. This type of stay tends to jump off the peg in a wind, or to be knocked off accidentally.

There is a type of peg-stay known as the cage stay in which a metal projection on the peg bracket prevents the end of the stay from jumping off. There is also a

spring loaded peg-stay which achieves somewhat the same result.

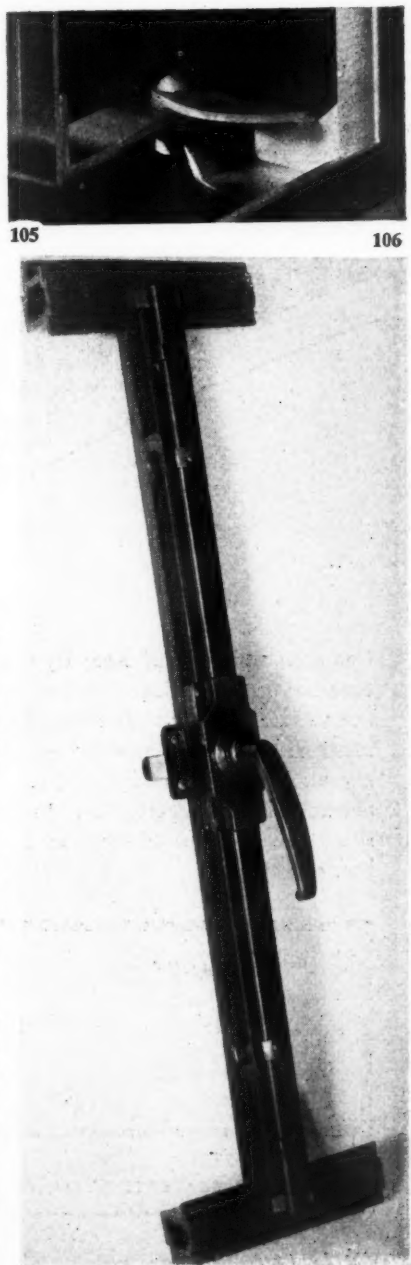
(b) The sliding stay in which the stay itself is completely prevented from jumping off. Fastening is by a screw down knob which tightens against the stay. A butterfly nut is better for this than a round knob. The sliding stay of course gives a fixing at any point along its length.

(c) The friction type sliding stay also permits opening of the window to any degree and is a very neat fitting; in some types the amount of friction can be adjusted. A fairly rigid casement is needed to resist bending when the window is opened.

As an alternative means of controlling the opening of side hung casements the friction hinge is an attractive idea and is in use on some standard metal windows combined with the usual "easy-clean" projecting hinge (Fig. 105). Discretion seems to be needed in using it on large windows. Incidentally it is considered advisable, and some housing authorities insist that screws on easy-clean hinges be inaccessible to intruders.

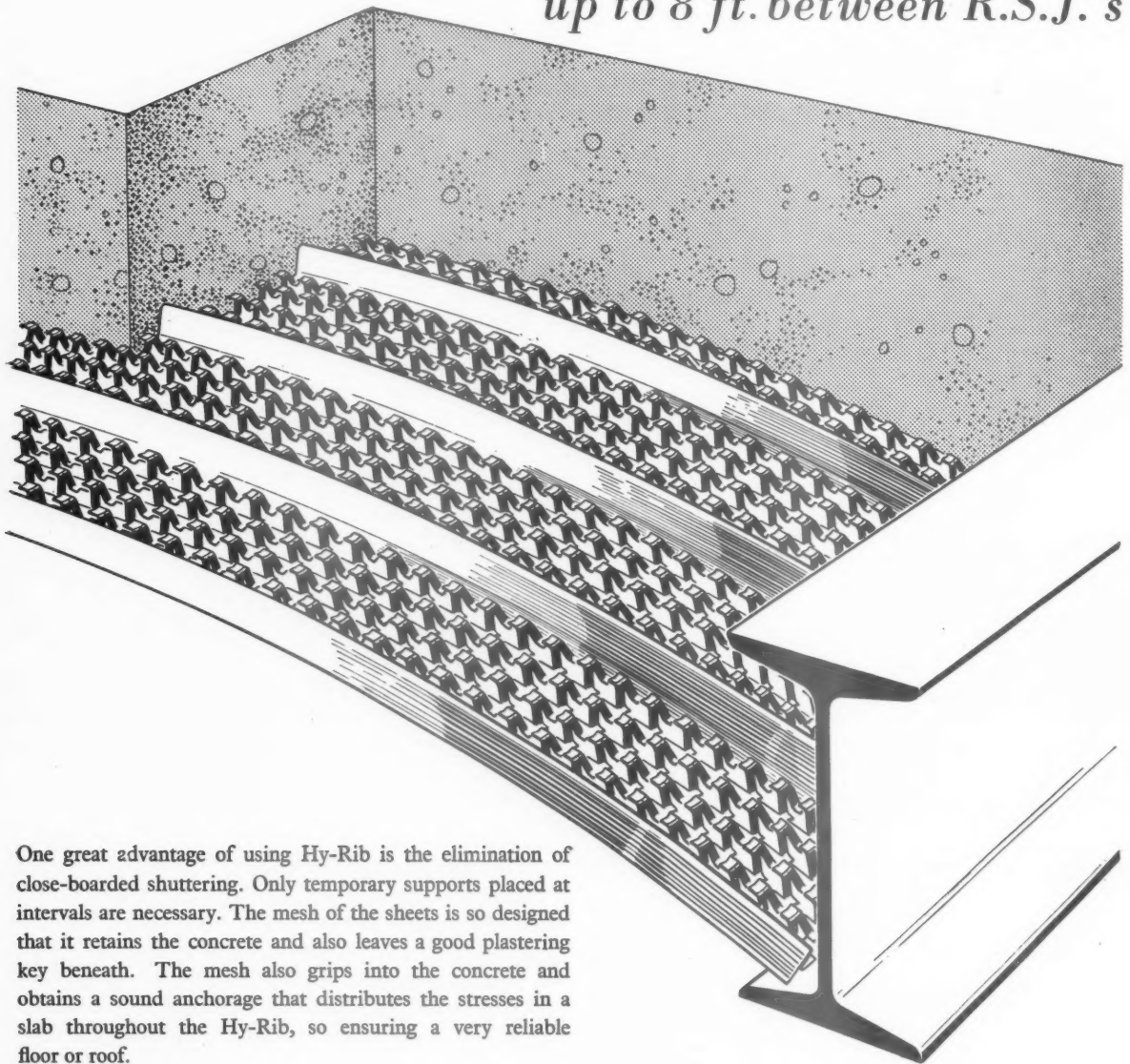
For wood windows there is an easy-clean hinge available which has unequal legs, for use on double rebated frames.

A special problem on casement stays arises

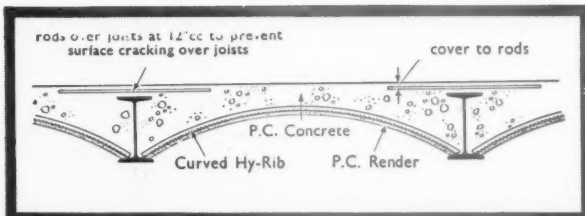


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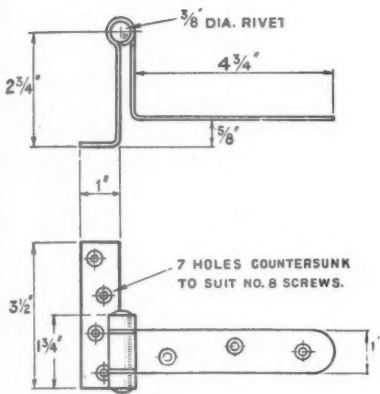


One great advantage of using Hy-Rib is the elimination of close-boarded shuttering. Only temporary supports placed at intervals are necessary. The mesh of the sheets is so designed that it retains the concrete and also leaves a good plastering key beneath. The mesh also grips into the concrete and obtains a sound anchorage that distributes the stresses in a slab throughout the Hy-Rib, so ensuring a very reliable floor or roof.

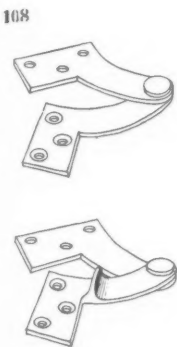


Hy-Rib will not "ride-up" into the concrete during construction. Its position is assured at the bottom of the slab where the maximum reinforcing value is developed. The use of Hy-Rib is a guarantee of safety, for the builder cannot fail to produce a properly reinforced slab.

THE TRUSSED CONCRETE STEEL CO. LTD., TRUSCON HOUSE, LOWER MARSH, LONDON, S.E.1. Tel: WATerloo 6922



107



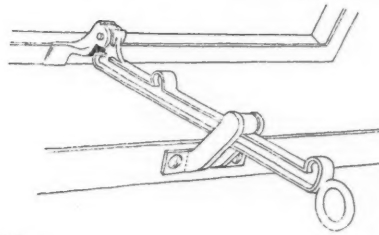
108

107, Easy clean hinge for double rebated windows. 108, An easy-clean hinge. 109, Opening gear for window with flyscreen (metal windows).

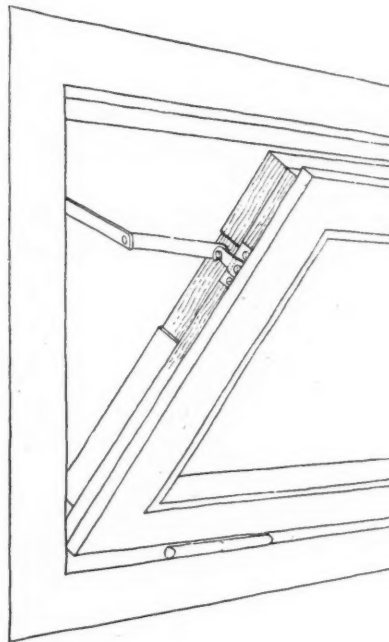


109

where an outward opening window is covered internally by a fly screen. In this country larder windows are probably the only normal example. A composite metal window using standard sections but with special furniture is available, Fig. 109. Top hung casements present no difficulty if they are at a convenient height for operating by hand. If they are high then "Cam" openers are usually required (Fig. 110). Although quite a neat fitting in itself, a row of top hung casements fitted with Cam openers can present an untidy appearance owing to the different angles at which the fasteners can remain set. The bottom hung window opening casement used to be fitted with quadrant stays or fan-light stays which were cumbersome fittings, and which with cord and gear took some time to operate. They also required continuous maintenance. They could however con-

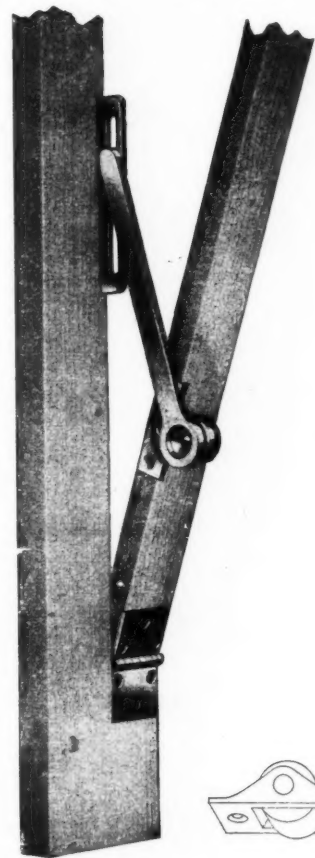


110



111

110, Cam opener for metal windows. 111, Concealed stay for bottom hung, fall in windows. This is a Swedish example available in this country. 112, Sliding stay for bottom hung windows. 113, Housed rollers suitable for horizontal sliding sash windows.



112



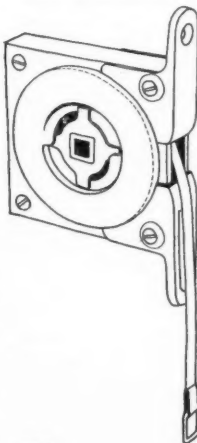
113

trol the degree of opening. Concealed lever arms are more universally used now, as they disappear into the side frame when the window is shut, providing a great improvement aesthetically. (Fig. 111.)

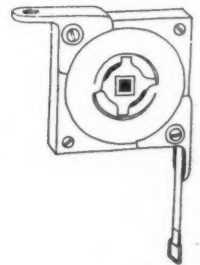
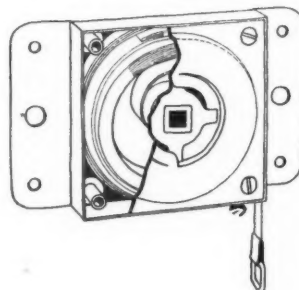
Sliding sash windows

Probably because of the complicated design, which involved expensive construction and awkward maintenance, the vertical double

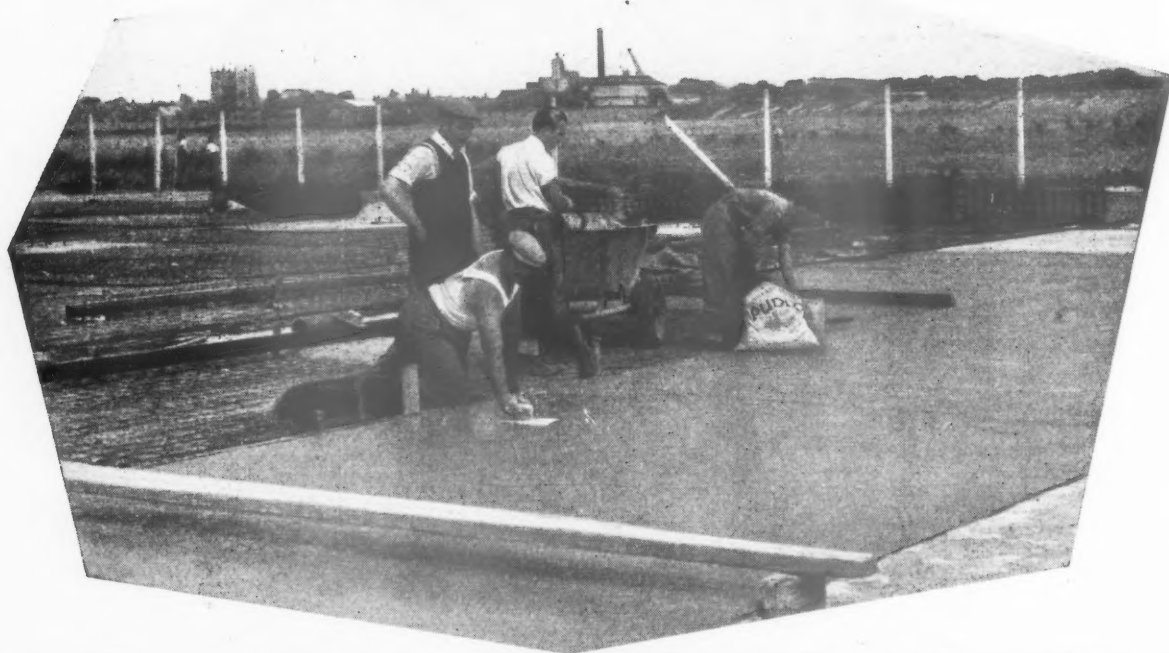
hung sash window has rather gone out of use, but with the fairly recent introduction of simpler balancing arrangements there are signs of a revival of interest. The great point in favour of the double hung sash is good control of ventilation. The disadvantages, other than operative, are that the total window area cannot normally be fully opened; there is no possibility of arranging for a set of windows to open in alternative direc-



114



114, Spring tape sash balance. This type is used on motor vehicles and can be obtained with the brackets in various positions.



PUDLO GUARDS AGAINST RISING DAMPNESS AFTER THE WORST FLOODS FOR YEARS

In January 1953, the defence wall holding back the tidal waters of the River Great Ouse was breached by the high tides.

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3/4 parts coarse, washed sand.	5 lbs. 'PUDLO' Brand Powder to each 100 lbs. cement.

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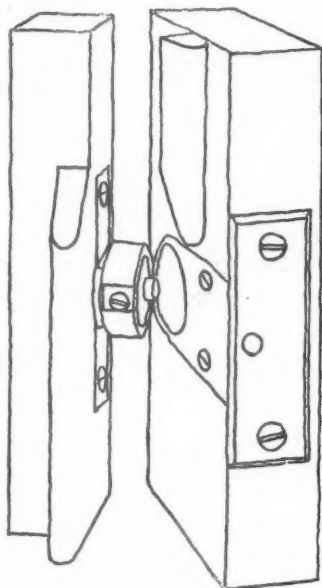
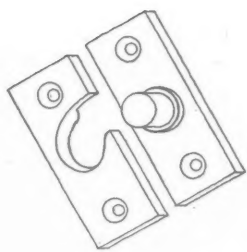
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115

tions to give protection against driving rain or strong wind, and the difficulty of avoiding "rattle."

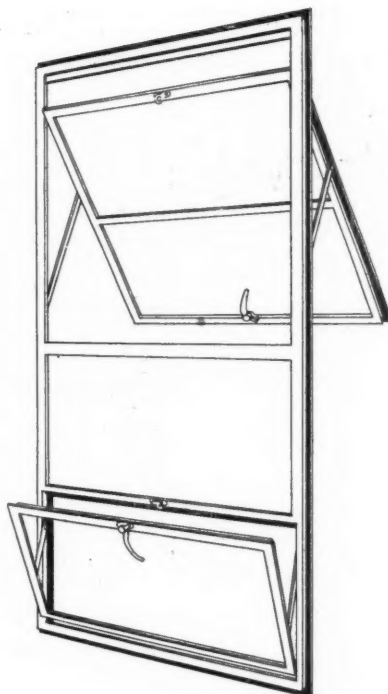
The traditional mechanism of sash weights and chains is still advocated for large windows, i.e., 10 ft. high \times 4 ft. wide, but spring sash balances seem to work very satisfactorily for smaller windows. One firm produce a spring tape sash balance (Fig. 114) in which the spring tension is adjustable, and the fitting itself is neat, takes up very little room, and it is claimed that this needs no maintenance.

Pivoted windows

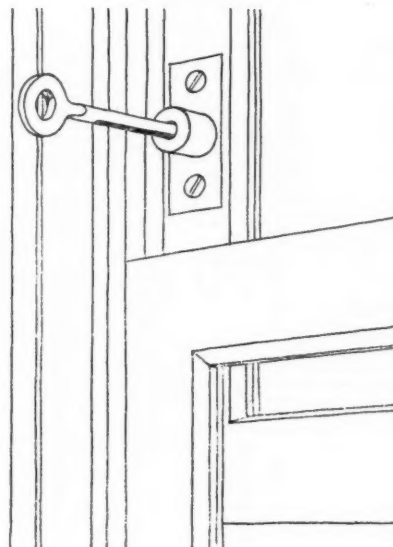
Both horizontally and vertically pivoted windows seem to be growing in popularity, possibly because of the desire for large opening units which can be more easily controlled in pivoted types than in sash hung, and also because of comparative ease of control for windows high up or otherwise rather inaccessible.

The choice of fittings for pivoted windows is not a wide one and comparatively few problems arise. A difficulty with timber windows is that the necessary cutting away to house the fitting may require fairly large wood sections (Fig. 115).

Weatherproofing of pivoted windows is automatically looked after in standard metal types, but designers need to be careful about this when detailing for timber. In high windows it is fairly common to link two or more horizontally pivoted windows so that



116



117

115, Slotted pivot and friction pivot for horizontal centre hung windows.

116, "Projected" metal window. The arms are concealed when the window is closed.

117, Locking stop for sliding sash windows.

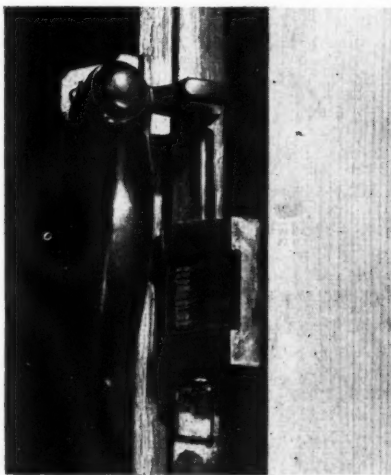
they operate jointly. For horizontally pivoted windows the usual device is a spring ring catch, often out of easy reach and operated by long arm. A point of detail which needs watching is that if windows go right up to ceiling level the striking bolt of the fastener is apt to foul the plaster. Care must also be taken to avoid fouling of curtain tracks and, as with any inward opening window there is a possibility of the window fouling curtains or blinds, for example black-out blinds, in schools and laboratories.

Special windows

Sliding and folding windows are usually specially designed. The chief points to keep

in mind are the need to be able to open part of the window only, the need for considerable care in weatherproofing and, most important, the need for extreme care in handling and fixing. Sliding metal windows, especially, are very easily damaged by carelessness on site while awaiting fixing and such damage is not always easy to put right.

Specialist windows such as the "Carda" are not dealt with here because the window and fittings are supplied complete by the manufacturer. One firm in this country is producing a "projected" window (Fig. 116) where the ventilators are balanced on steel arms, housed within the side section of the



118

118, Lock for metal casement fastener.

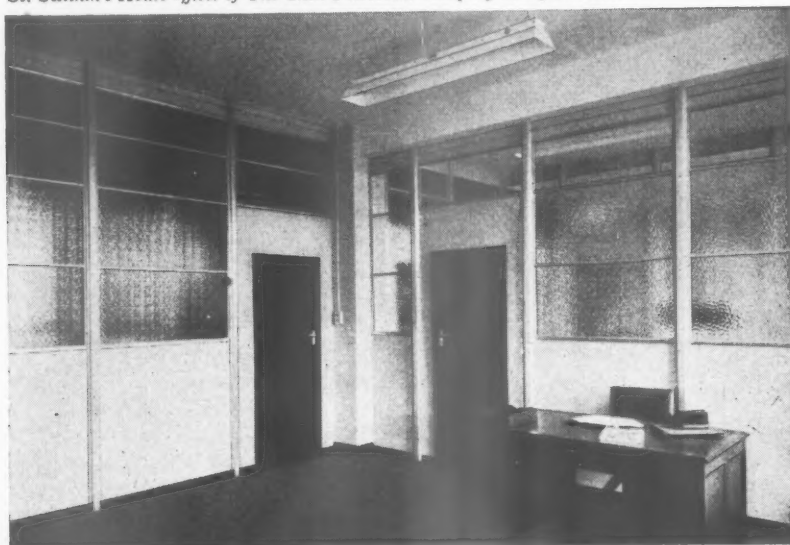


119

119, Casement fastener with cylinder lock.

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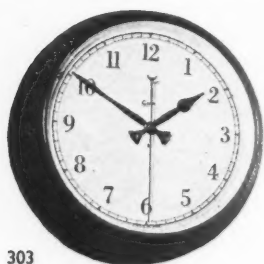
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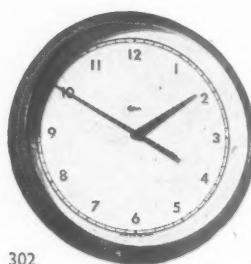
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303



749



302



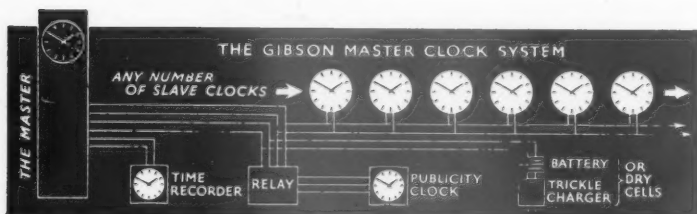
421

THE CLOCK ON THE WALL

No longer an afterthought, the clock on the wall is often planned with the wall itself, as integral a part of a new building as, say, its lighting system.

As one clock on one wall, or as a hundred 'Slave' clocks on a hundred walls, synchronized to a 'Master', Gibson clocks are specified at the blueprint stage, for hospitals, schools, factories, or wherever accurate time-recording is a necessity.

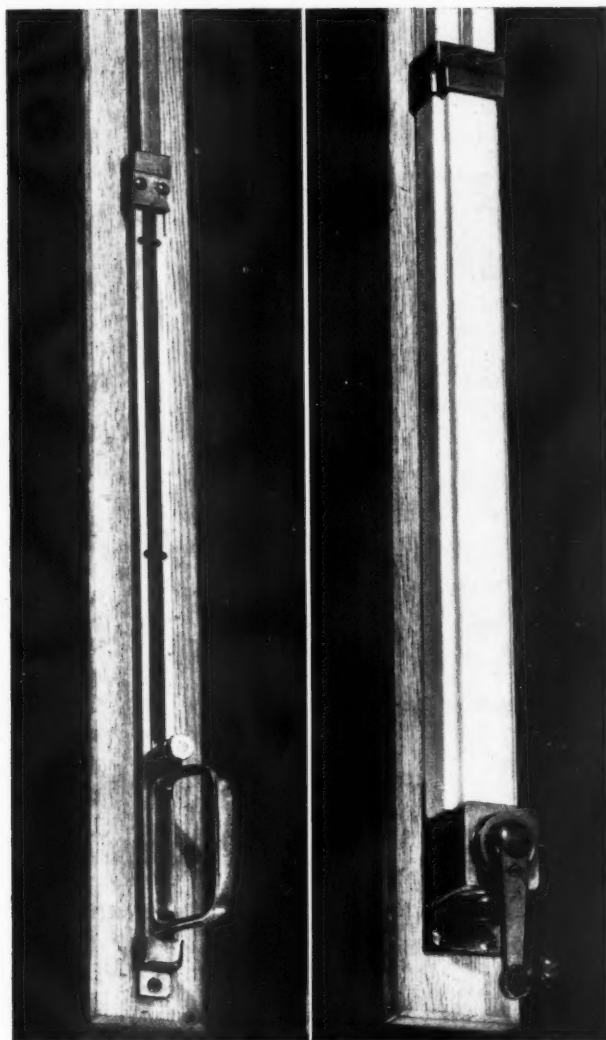
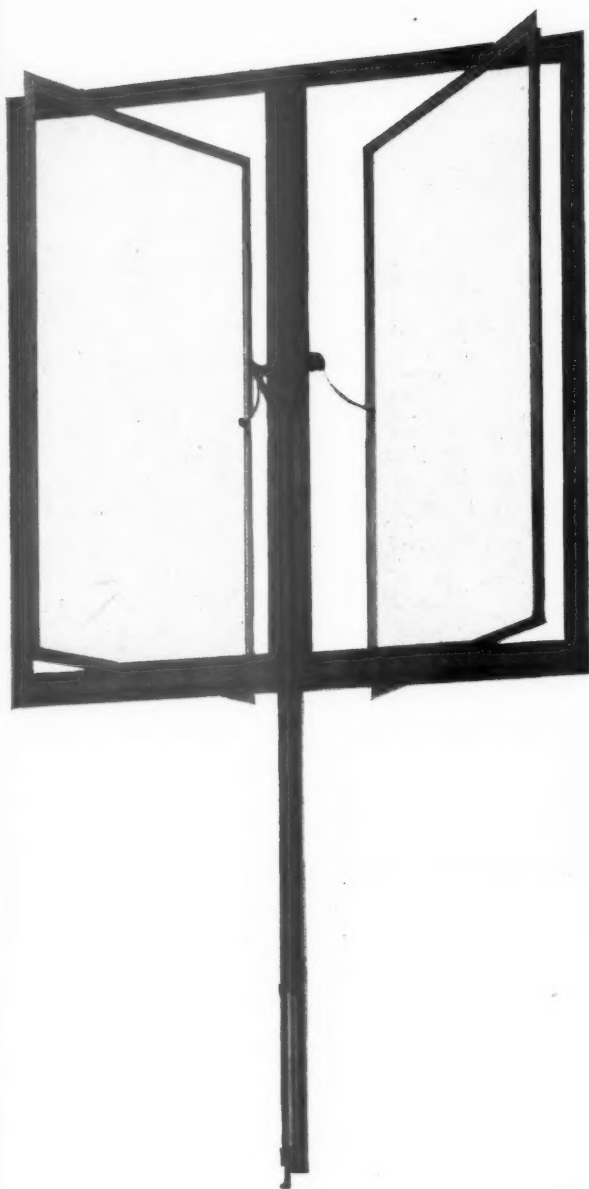
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121

122

120, Remote control for window opening. 121, Cable control gear for single casement. 122, Cable control gear for casements gauged together.

120

frame. The arms are pivoted at the ventilator connection and are concealed when the window is closed. Spring loaded brass shoes are fitted to the top of the "projected-out" portion which run in brass guides fixed in the side framing. Operating handles are in the form of a ring fanlight spring catch for the top and lever handle for the bottom. This system can be used where obstructions prevent the normal way of opening.

Security of windows

Security of windows is more a matter of discouragement than actual prevention. The ordinary casement fastener or other type of window fastener is normally considered adequate but locks can be provided. The type and size of lock which can be used on a normal sash will prove no serious

obstacle to anyone determined to break in. For timber windows the mortice security bolt (Fig. 33) is equally suited to internal doors and casement and pivoted windows. For sliding sash windows a sash screw in a chain can be used or a locking stop (Fig. 117). For metal windows the same firm supplies a lock which is mounted on the frame, operated by turning the catch with the thumb, but needing a key to unlock it. Metal window manufacturers provide their own types of lock (Fig. 118). The handle incorporating cylinder lock (Fig. 119) is more expensive than the attached lock.

Remote control window gearing

All remote control gearing is purpose-made and schemes are worked out by specialist firms. Most gearing is surface mounted, but

it can be obtained for concealment behind panelling or in plaster, but in such cases maintenance may be difficult. To avoid too many bends in the cable, depths of reveal should be small and internal obstructions few. There are three main forms of control, the first is the system of rods and levers control. The second introduces a steel Bowden type cable which is capable of bending at $2\frac{1}{2}$ in. radius. The maximum cable length is about 20 ft. 0 in. The third form is electrically or hydraulically controlled and used mainly for big industrial buildings for operating long ranges of windows. When electric control is used the motor may be at any distance from the window. A fusible link gearing has been installed in one building for fire purposes, but this is very unusual.

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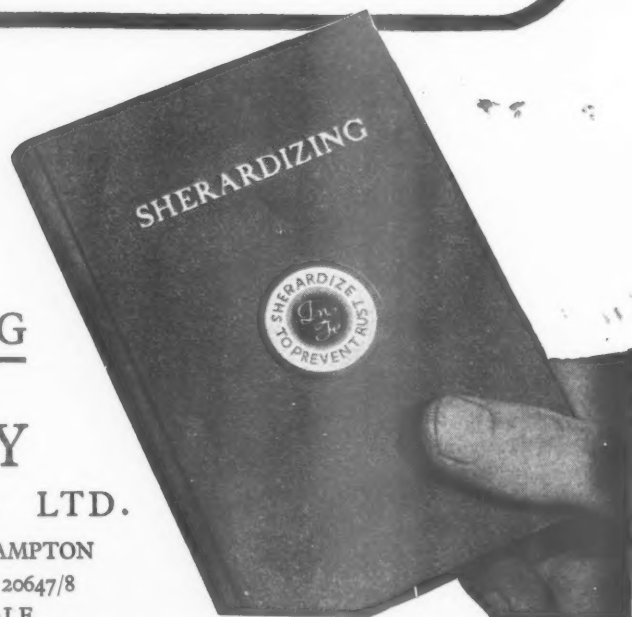
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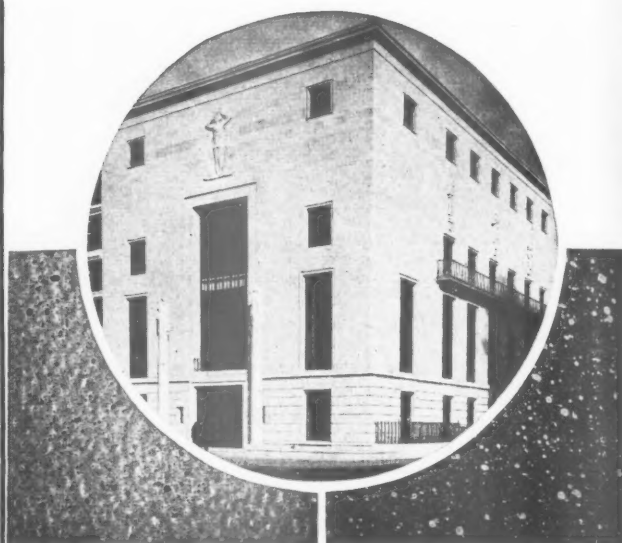
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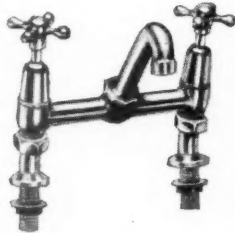
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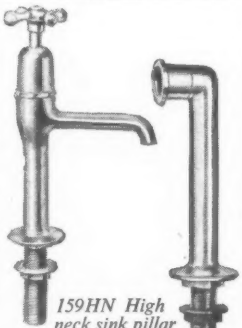
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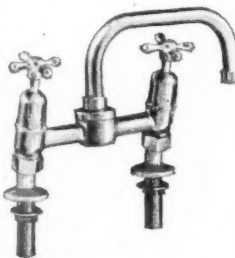
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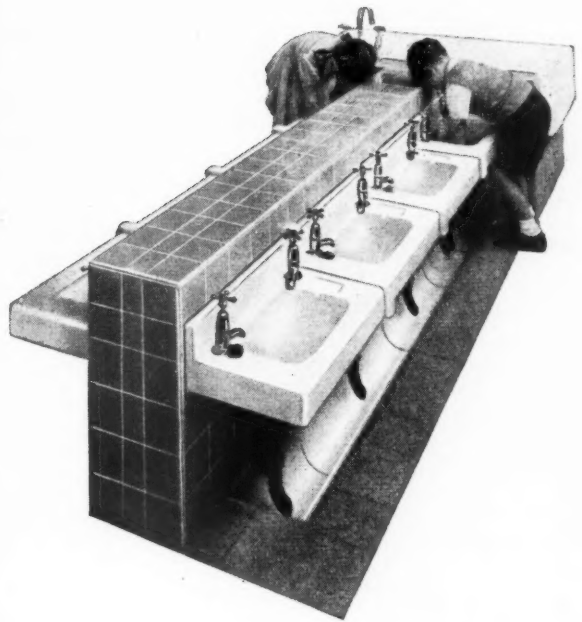
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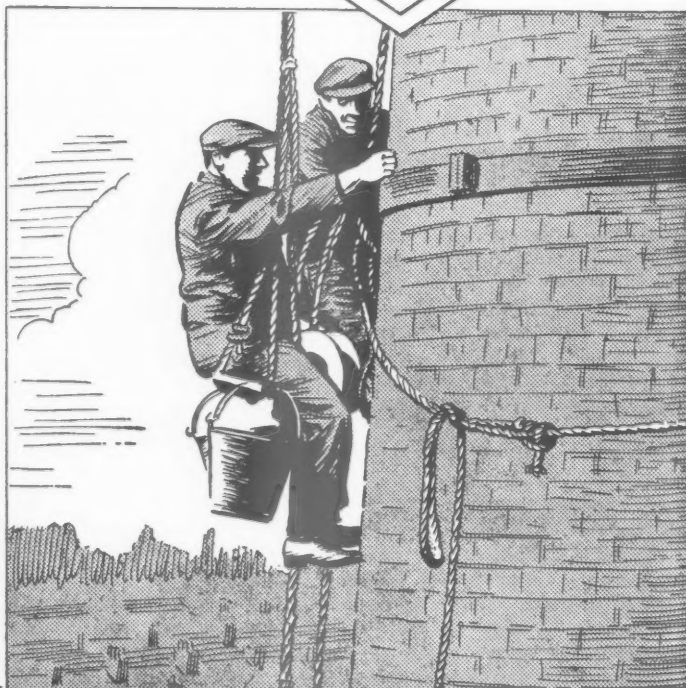


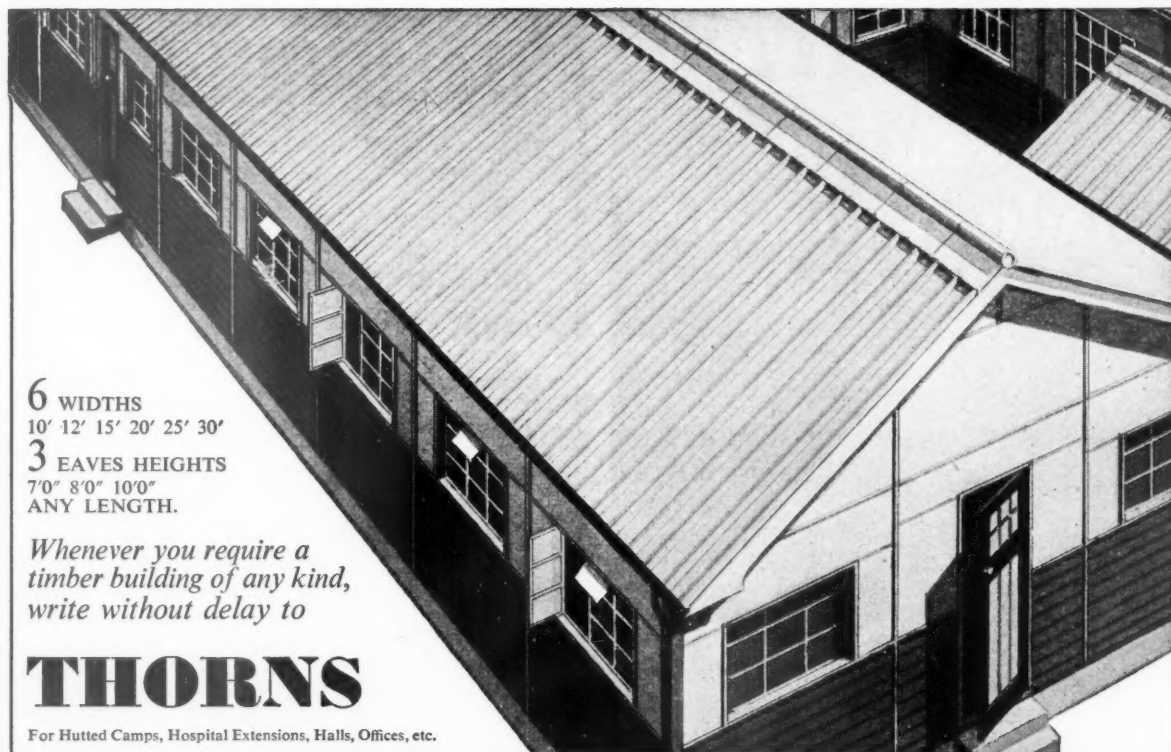
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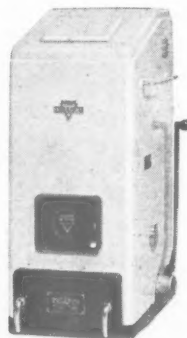


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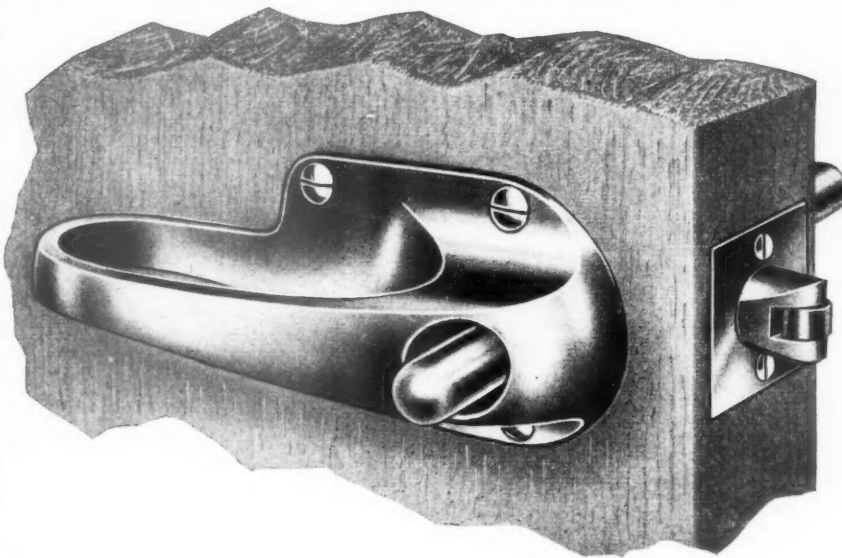


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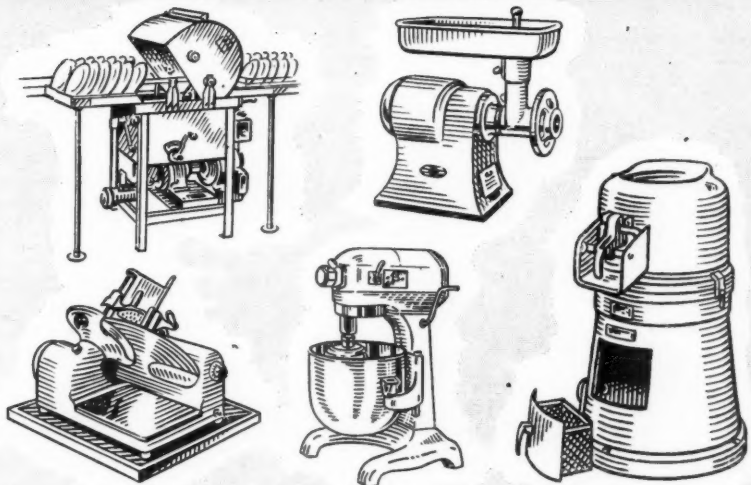
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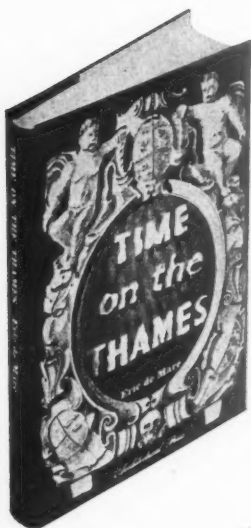
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by ERIC DE MARÉ

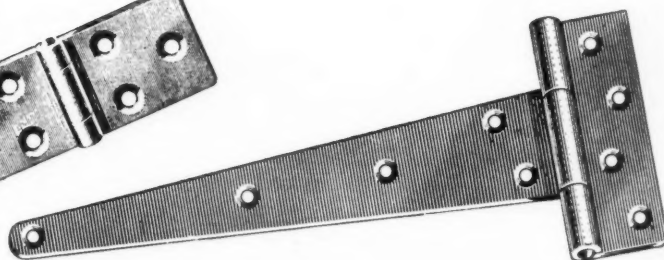
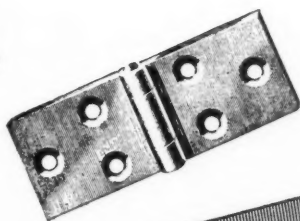


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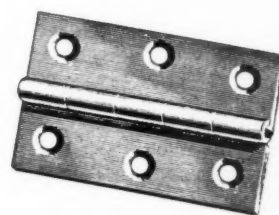
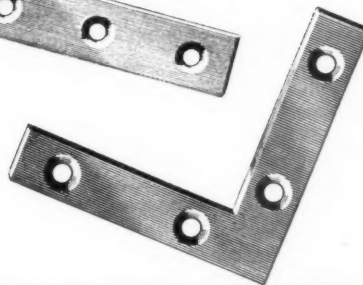
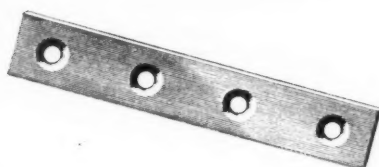
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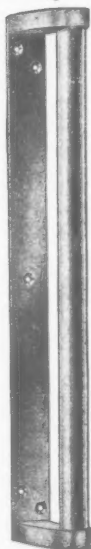
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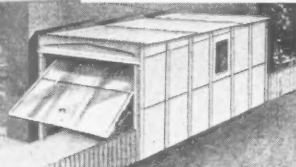
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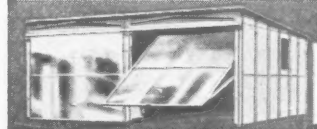
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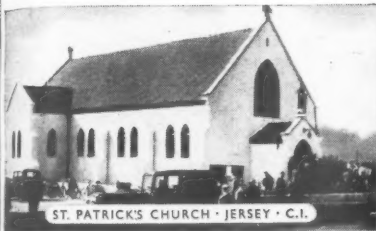
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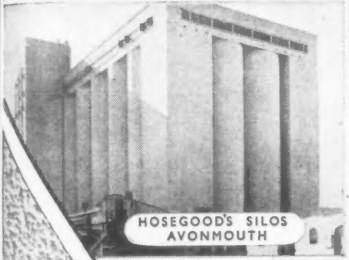
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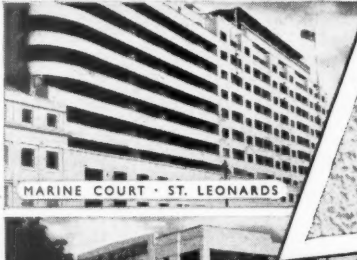
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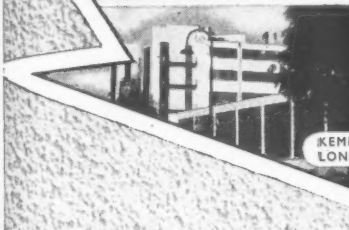
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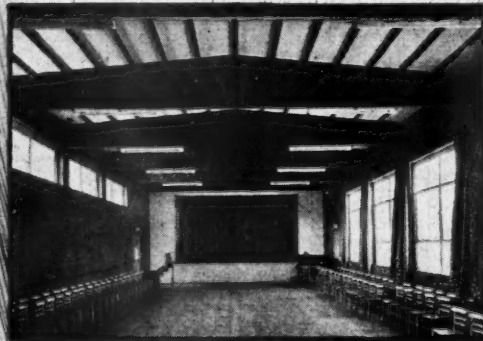
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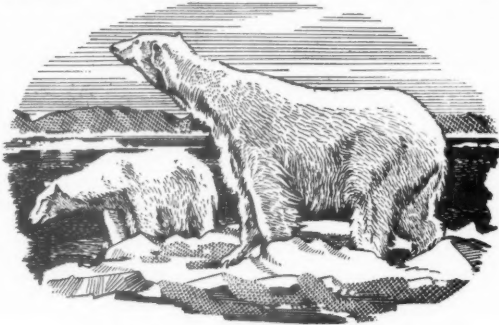
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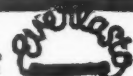
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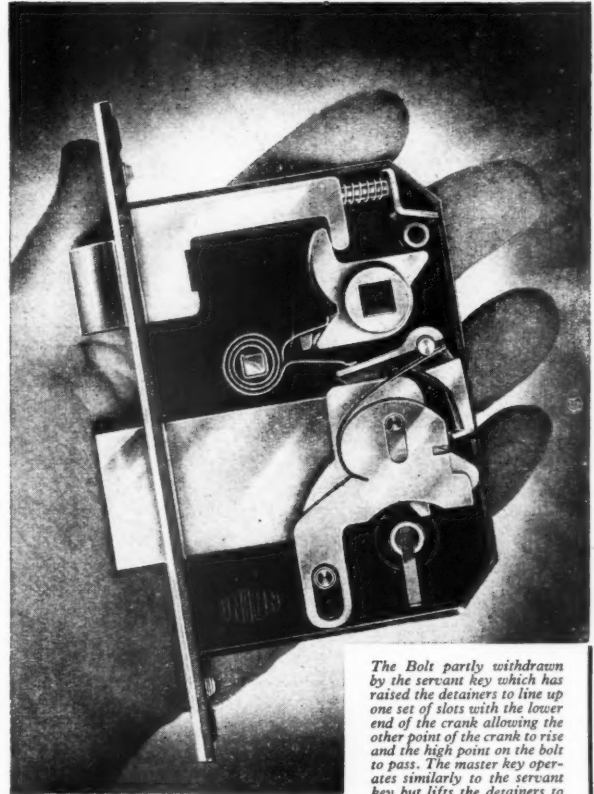
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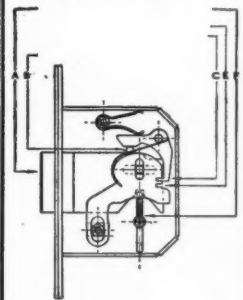
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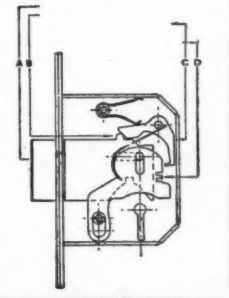
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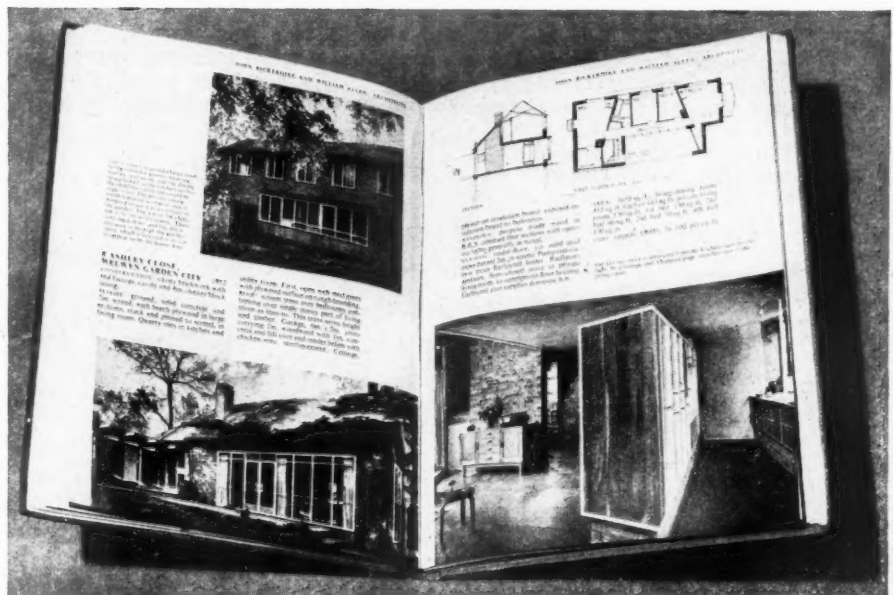
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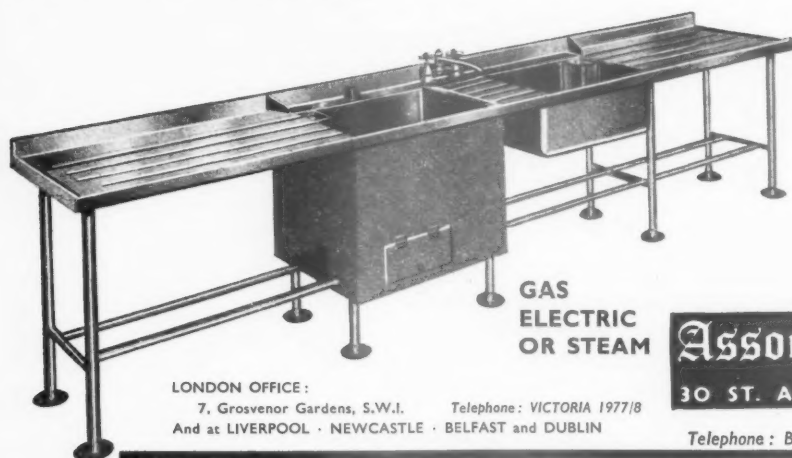
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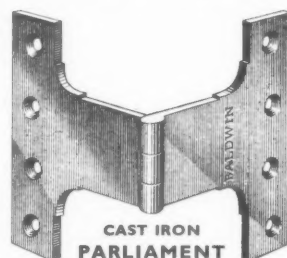
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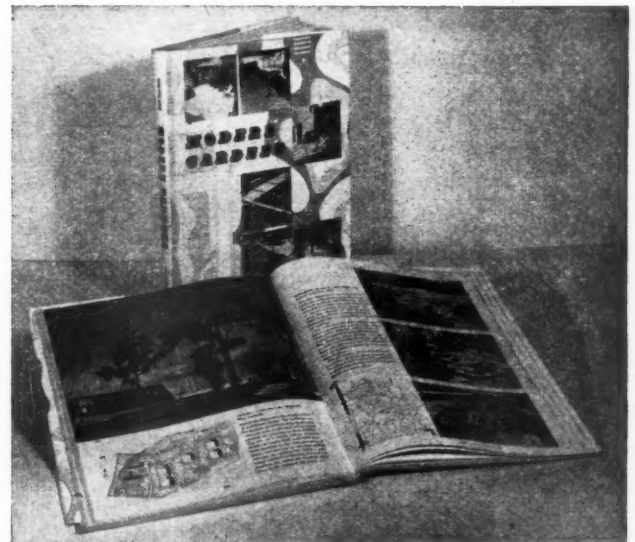
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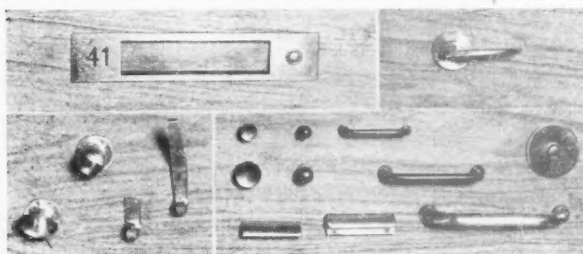
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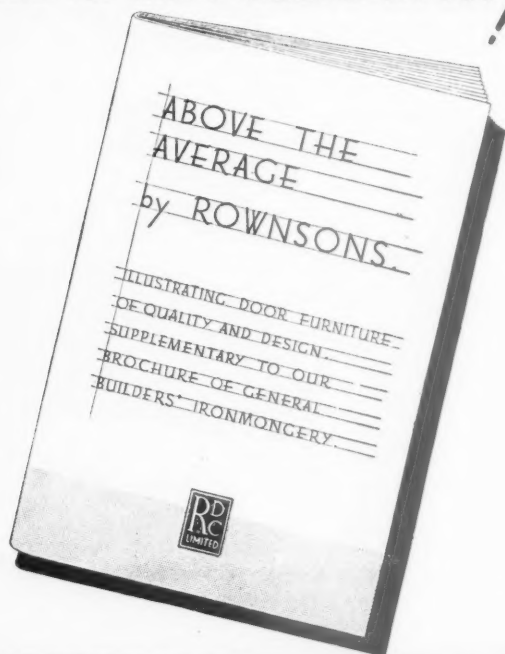
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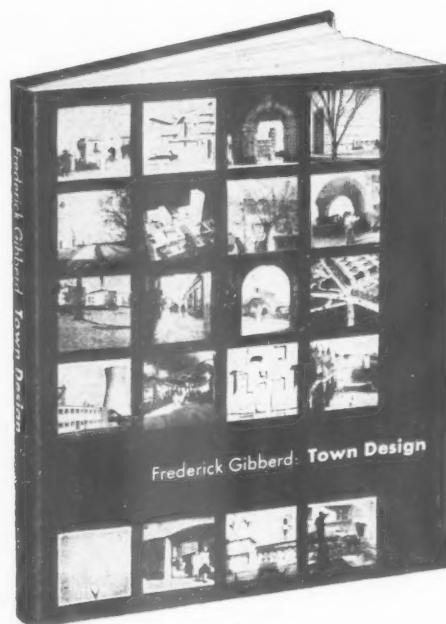
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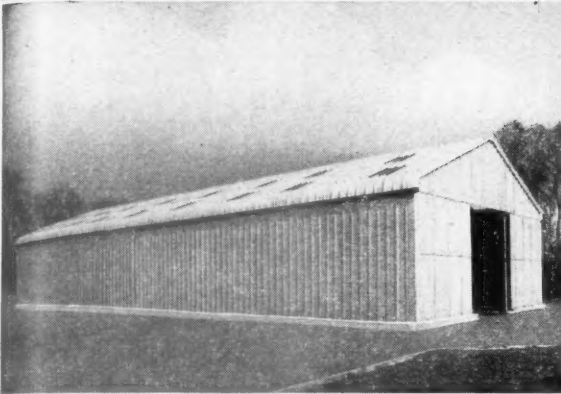
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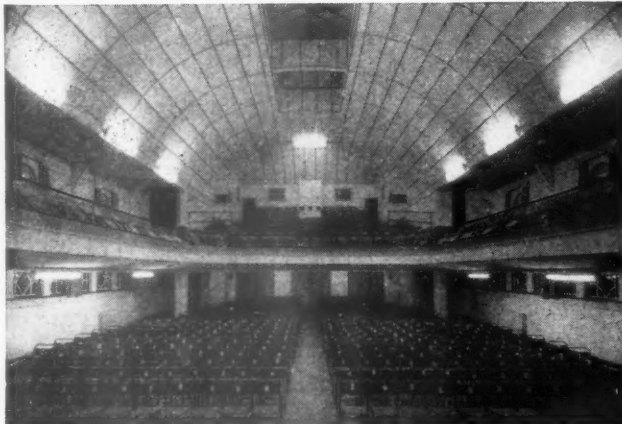
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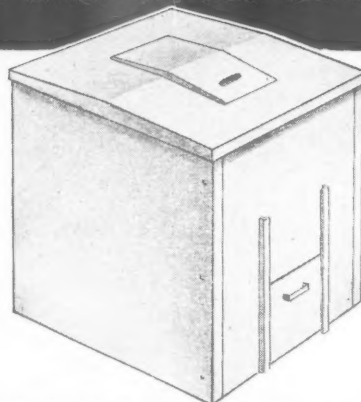
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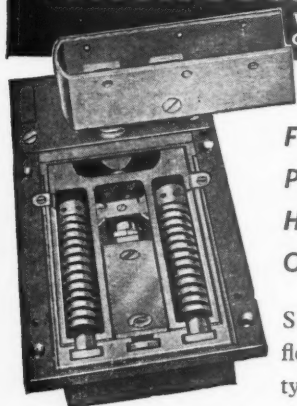
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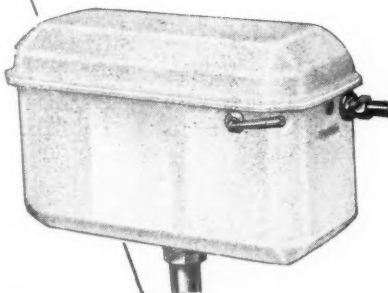
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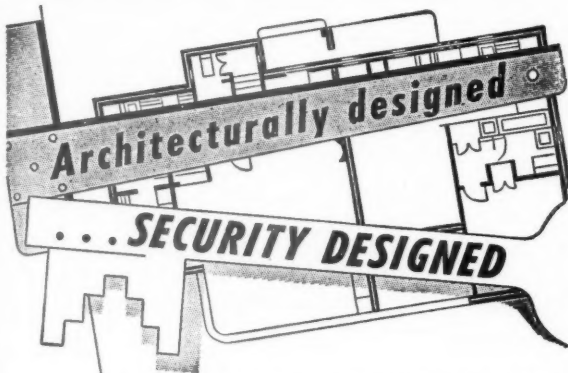
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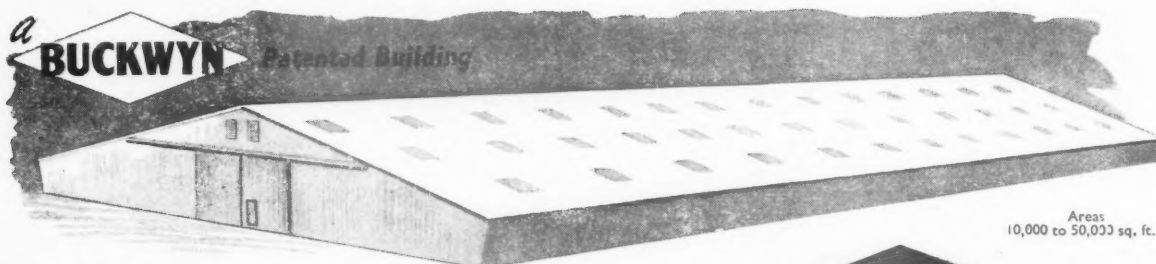
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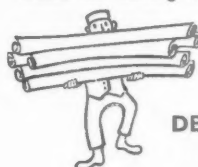
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Housing accommodation may be made available to the successful candidate.

Applications, stating date of birth, particulars of training and experience, with copies of two recent testimonials, should be received by J. R. Pigott, T.D., F.R.I.B.A., City Architect, Kingsway, Stoke-on-Trent, endorsed with the title of the appointment, not later than Monday, 20th September, 1954.

HARRY TAYLOR.

Town Clerk.

3807

CO-OPERATIVE WHOLESALE SOCIETY, LTD.

ARCHITECT'S DEPARTMENT, MANCHESTER.

Applications are invited for the appointment of ASSISTANT ARCHITECTS.

Candidates must have had several years' experience, preferably of commercial or industrial projects, possess a sound knowledge of construction, and be able to prepare working drawings and details from preliminary sketches.

The appointments are permanent, with prospects of promotion. Successful applicants will be required to undergo a medical examination for entry into a compulsory Superannuation Scheme.

Applications, stating age, experience, qualifications and salary required, to be addressed to G. S. Hay, A.R.I.B.A., Chief Architect, Co-operative Wholesale Society, Ltd., 1, Ballion Street, Manchester.

3657

WORCESTERSHIRE COUNTY COUNCIL. COUNTY ARCHITECT'S DEPARTMENT.

Applications are invited for two posts of SENIOR ASSISTANT ARCHITECTS, Grade A.P.T., Grades V-Va, of National Joint Scheme, dealing with major building works.

Experience in Local Authority work will be an advantage.

Application forms may be obtained from L. C. Lomas, F.R.I.B.A., County Architect, 14, Castle Street, Worcester. (R.119) 3617

ZETLAND COUNTY COUNCIL.

Applications are invited for the following appointments in the County Architect's Department:—

(1) ARCHITECTURAL ASSISTANT. Salary in A.P.T. Grade V-Va, of National Joint Scheme. Candidates should be Associates of the Royal Institute of British Architects, and have had experience in the preparation of sketch plans and working drawings for housing, schools, and other local authority projects.

(2) ARCHITECTURAL DRAUGHTSMAN. Salary in General Division of National Joint Scheme. Candidates should preferably have passed the Intermediate Examination of the Royal Institute of British Architects, and have had experience in the preparation of sketch plans, working drawings and details.

Written applications, giving particulars of age, qualifications and experience, and stating when applicants can take up duty, should be lodged with the Subscriber by 30th September, 1954. One copy of not more than three recent testimonials should be enclosed. Canvassing in any form will disqualify.

JOHN N. SINCLAIR.

County Clerk..

County Buildings, Lerwick.

25th August, 1954.

3820

COUNTY BOROUGH OF WEST BROMWICH. BOROUGH ENGINEER AND SURVEYOR'S DEPARTMENT.

Applications are invited for the following permanent appointments:—

(a) SENIOR ASSISTANT ARCHITECT, Grade A.P.T.VII (£735-£810).

(b) ASSISTANT ARCHITECT, Grade A.P.T.V. (£620-£670).

(c) ARCHITECTURAL ASSISTANT, Grade A.P.T.IV (£580-£625).

N.J.C. Conditions of Service.

Applications, naming two referees, to Borough Surveyor, Town Hall, West Bromwich, by 16th September, 1954.

3857

SOUTHERN ELECTRICITY BOARD.

DRAUGHTSMAN (CIVIL ENGINEERING).

No. 2 (Newbury) Sub-Area Office. Salary: N.J.B. Schedule D, Grade 6 (£433-£567 per annum).

N.J.B. Conditions of Service.

Applicants should be capable of preparing drawings and making calculations, and have knowledge of building construction, steel-work and reinforced concrete structures.

The successful candidate for the above appointment will be required to contribute to the B.E.A. and Area Boards' Superannuation Scheme, if eligible.

Applications, on forms obtainable from the Sub-Area Secretary, 7, Oxford Road, Newbury, and returned to him in envelopes suitably endorsed not later than 25th September, 1954.

3862

COVENTRY CORPORATION require CHIEF

PLANNING ASSISTANT, A.P.T., IX (£840-£960).

A.M.T.P.I. plus another professional qualification essential. Responsible, under Principal Planning Assistant, for all planning work other than Development Control. Candidates should be experienced in preparation of development plan, central area reconstruction, and planning administration; knowledge of landscape design desirable. Housing accommodation may be available in approved circumstances. Application forms and conditions from D. E. Gibson, Bull Yard, Coventry, returnable by 16th September.

3864

CORPORATION OF GLASGOW.

ARCHITECTURAL AND PLANNING

DEPARTMENT.

PRINCIPAL ASSISTANT ARCHITECT.

Applications are invited for the above position from suitably qualified persons who have had wide housing experience and have administrative ability. Applicants must be Members of R.I.B.A. Salary scale: £685 to £960 per annum. The appointment will be superannuable, subject to medical examination.

Particulars of appointment and form of application may be obtained from the Principal Administrative Officer, 20, Trongate, Glasgow, C.1.

A. G. JURY.

City Architect and Planning Officer.

3865

BRITISH ELECTRICITY AUTHORITY.

EAST MIDLANDS DIVISION.

Applications are invited for the following position within the Division:—

DRAUGHTSMAN, Transmission Department, Divisional Headquarters. (Vacancy No. 140/54/AJ.) A Draughtsman is required in the Transmission Department at this Divisional Headquarters. Experience on the design and construction of H.V. Sub-stations or overhead transmission lines an advantage.

Salary in accordance with Schedule D of the National Joint Board Agreement, Grade 6 (£433-£567 per annum) for Engineering Draughtsman, or Grade 5 (£567-£671 per annum) for Senior Draughtsman, according to experience and ability.

Closing date for receipt of applications: 21st September, 1954.

This appointment will be pensionable within the terms and provisions of the British Electricity Authority and Area Boards Superannuation Scheme.

Applications should be submitted on the official form AE6/ACT, which may be obtained from the Divisional Establishments Officer, British Electricity Authority, P.O. Box 25, Barker Gate, Nottingham, and should be returned to the undersigned by the date stated. Please quote Vacancy Number.

L. F. JEFFREY.

Divisional Controller.

3863

SURREY COUNTY COUNCIL.

COUNTY PLANNING DEPARTMENT.

Applications are invited for the appointment of ONE PLANNING ASSISTANT on A.P.T., Grade V, and ONE DRAUGHTSMAN, on A.P.T., Grade I. The Officers appointed will be based in the North-West Surrey Area Planning Office at Woking.

Applicants for senior appointment should be suitably qualified, and have had experience with a Local Planning Authority.

Applications, with full particulars of age, qualifications, present employment and experience, with the names of two referees, must reach the Clerk, Surrey County Council, County Hall, Kingston-upon-Thames, not later than 30th September, 1954.

3870

COUNTY BOROUGH OF BOURNEMOUTH.

BOROUGH ARCHITECT'S DEPARTMENT.

Applications are invited for the established post of ASSISTANT ARCHITECT. Salary Grade A.P.T. Va (£650-£710 p.a.). Applicants must be Registered Architects, Members of the R.I.B.A., and have knowledge of requirements Education, 1944, Act.

Successful candidate will be appointed at present salary if within the above incremental scale.

Application forms and further particulars from Borough Architect, Town Hall, Bournemouth. Completed applications, with copies of three recent testimonials, must reach me by 10 a.m., 18th September, 1954.

A. LINDSAY CLEGG.

Town Clerk.

3871

CITY OF BIRMINGHAM.

CITY ARCHITECT'S DEPARTMENT.

Applications are invited for the following appointments:—

(a) QUANTITY SURVEYOR, Grade A.P.T., VIII (£785-£860 per annum).

(b) ASSISTANT QUANTITY SURVEYORS, Grade A.P.T., VI (£695-£760 per annum).

(c) ASSISTANT QUANTITY SURVEYOR, Grade A.P.T., V (£620-£670 per annum).

(d) ASSISTANT QUANTITY SURVEYORS, Grade A.P.T., II (£520-£565 per annum).

For appointments

(a), (b), (c)

Applicants must be Associate Members of the Royal Institute of Chartered Surveyors (Quantity Section) or hold an equivalent qualification and, in addition, for (a) have had extensive experience in a Quantity Surveyor's Office.

(d) Applicants must have passed the Intermediate Examination of the R.I.C.S. (Quantity section) or hold an equivalent qualification.

The posts are permanent, superannuable, subject to a medical examination, and to one month's notice on either side.

Applications, endorsed with the heading of the post, stating age, qualifications and experience, together with the names of two persons to whom reference can be made, should reach the undersigned not later than 20th September, 1954.

Canvassing disqualified.

A. G. SHEPPARD FIDLER.

City Architect.

3878

Civic Centre, Birmingham, 1.

CARDIGANSHIRE COUNTY COUNCIL.

APPOINTMENT OF ASSISTANT ARCHITECT.

Applications are invited for the post of ASSISTANT ARCHITECT, Grade A.P.T. VI, (£695-£760, in the County Architect's Department, Aberystwyth.

Applicants should be members of the R.I.B.A., and must disclose whether to their knowledge they are related to any Member or Chief Officer of the Council.

Forms of application may be obtained from the County Architect, County Hall, Aberystwyth.

Applications are to be returned to the undersigned by not later than 12 noon on the 18th September, 1954.

J. E. R. CARSON.

Clerk of the County Council.

3904

County Office, Aberystwyth.

MIDDLESEX COUNTY COUNCIL—COUNTY ARCHITECT'S DEPARTMENT.
DEPUTY COUNTY ARCHITECT required. Salary £1,800 p.a. £50–£120 p.a. Must be registered Architect. Established and pensionable subject to medical assessment and prescribed conditions. Application forms (stamped addressed foolscap envelope) from County Architect, 1, Queen Anne's Gate Bldgs., Dartmouth Street, Westminster, S.W.1, returnable by 27th September (Quote P.35 A.J.). Canvassing disqualifies.
CLIFFORD RADCLIFFE,
Clerk of the County Council.
 Guildhall, Westminster, S.W.1. 3884

KINGSTON UPON HULL EDUCATION COMMITTEE.
CLERK OF WORKS.
 Applications are invited for the appointment of Temporary Clerk of Works to Supervise the completion works of the workshop block of the new Technical College. The foundations and reinforced concrete framework will be already completed. The value of the work remaining to be done is approximately £170,000.
 Applicants must possess a thorough knowledge of the building trade and have relevant experience on similar works. The appointment will be for a period of about nine months, subject to satisfactory service, with a month's notice on either side.
 Salary will be fixed between £650 and £750 per annum, according to experience and qualifications.
 Applications, stating age, qualifications, present and previous appointments and experience, together with names of two persons to whom reference may be made, must reach the Chief Education Officer, Guildhall, Kingston upon Hull, by the 30th September, 1954. 3945

EAST SUFFOLK COUNTY COUNCIL.
 Applications are invited for the appointment of **ASSISTANT ARCHITECT** in the County Architect's Department on A.P.T. Grade V (£595–£645 according to qualifications and experience).
 Applicants should be members of the R.I.B.A., quick and accurate draughtsmen, capable of carrying jobs through all stages. They should have a sound knowledge of design and building construction and should be capable of writing specifications.
 The appointment, which is superannuable and subject to a medical examination, will be subject to one month's notice on either side. Applications, giving age, qualifications and previous experience, with copies of three recent testimonials, to E. J. Symcox, F.R.I.B.A., County Architect, County Hall, Ipswich, not later than 18th September, 1954. 3890

MIDDLESBROUGH EDUCATION COMMITTEE.
 Applications are invited from suitably qualified persons for the following appointments in the Education Architect's office:—
 (a) One **SENIOR ASSISTANT ARCHITECT**, A.P.T. Grade VI (£735–£810).
 (b) Three **ASSISTANT ARCHITECTS**, A.P.T. Grade V (£620–£670).
 (c) **JUNIOR DRAUGHTSMAN or DRAUGHTSWOMAN**, Misc. Grade III (£395–£460).
 Housing Accommodation is available for post (a) and for one of the posts (b) above.
 Forms and particulars obtainable from Director of Education, Education Offices, Woodlands Road, Middlesbrough, to whom completed forms should be returned not later than 23rd September, 1954. 3895

COMMONWEALTH OF AUSTRALIA.
DEPARTMENT OF WORKS, CANBERRA.
VACANCIES FOR ARCHITECTS.
 Applications are invited for employment as **ARCHITECT** Grade 3 (8 positions) and Grade 2 (4 positions) at Canberra, Australian Capital Territory.
 The salary range in Australian currency for Architect Grade 3 is £1,178/1,262 and for Grade 2 is £1,106/£1,154.
 Duties—in connection with design and/or execution of building works including the supervision where necessary of Architects and Draughtsmen.
 Qualifications required—applicants must be registered Architects by examination or registered Architects who since registration have passed any professional examination in Architecture recognised by the Architects Registration Council of the U.K. as qualifying for registration under the Architects Registration Act.
 Accommodation will be available for successful applicants and their dependants.
 Applications stating full name, date and place of birth, marital status, qualifications and experience, should be forwarded to Works Representative, Australia House, Strand, London, W.C.2, by 30th September, 1954. 3889

COUNTY BOROUGH OF BOURNEMOUTH.
BOROUGH ARCHITECT'S DEPARTMENT.
 Applications are invited for the established post of **ARCHITECTURAL ASSISTANT—Salary Grade A.P.T. III (£550–595 p.a.)**. Applicants must have had one year's experience after passing R.I.B.A. Inter. Exam. Successful candidates will be appointed at present salary if within the above incremental scale.
 Application forms and further particulars from Borough Architect, Town Hall, Bournemouth. Completed applications, with copies of three recent testimonials, must reach me by 10 a.m., 25th September, 1954.
A. LINDSAY CLEGG,
Town Clerk.
 3901

STAFFORDSHIRE COUNTY COUNCIL.
EDUCATION COMMITTEE.
 Applications are invited for **ELECTRICAL ENGINEERING ASSISTANTS** within the salary Grade A.P.T. I to IV (£490 to £625 per annum).
 Applicants should have passed Part I of the I.E.E. Associate Membership Examination or hold equivalent qualifications.
 Form of Application and further particulars can be obtained from:—
 The County Education Architect,
 Green Hall, Lichfield Road, Stafford,
 and should be returned within 10 days of this advertisement. 3927

AIR MINISTRY require in London, Provinces and overseas, **ARCHITECTURAL ASSISTANTS** in Works Department Design Branch experienced in planning/preparation of working drawings and details for permanent and semi-permanent buildings. Salaries up to £780 p.a. for men, £665 for women. Starting pay dependent upon age, qualifications and experience. Extra duty allowance or overtime payable. Promotion prospects. Posts non-pensionable with long term possibilities. Natural born British subjects only. Write stating age, qualifications, employment details, including type of work done to Ministry of Labour, 236, Walworth Road, London, S.E.17, quoting Order 81. AC. 3836

CITY OF LEEDS.
CITY ARCHITECT'S DEPARTMENT.
 Applications are invited for the following appointments:—
 (a) **ASSISTANT ARCHITECTS**. Salaries ranging between £520–£760, according to qualifications and experience.
 (b) **ARCHITECTURAL ASSISTANTS**. Salaries ranging between £490–£595, according to experience and ability.
 (c) **ASSISTANT QUANTITY SURVEYOR**. A.P.T. VII. £785–£860.
 (d) **ASSISTANT QUANTITY SURVEYORS**. A.P.T. V. £620–£670.
 (e) **ASSISTANT QUANTITY SURVEYOR**. A.P.T. III. £550–£595.
 (f) **ASSISTANT QUANTITY SURVEYOR**. A.P.T. I. £490–£535.
 (g) **ASSISTANT LAND SURVEYOR**. A.P.T. VI. £695–£760.
 (h) **ASSISTANT LAND SURVEYOR**. A.P.T. V. £620–£670.
 (i) **ASSISTANT LAND SURVEYOR**. A.P.T. IV. £580–£625.
 The payment of salary increments will be subject to satisfactory service and will be granted normally with effect from the 1st April following the completion of six months service.
 The appointments are subject to the Local Government Superannuation Acts 1937–1953, and the successful applicants will be required to pass a medical examination.
 Application forms may be obtained from the City Architect, Priestley House, Quarry Hill, Leeds 9, to whom they should be returned together with copies of three testimonials by 12 noon on Saturday, 18th September, 1954.
 Canvassing in any form, either directly or indirectly, will be a disqualification.
R. A. H. LIVETT, O.B.E., A.R.I.B.A.,
City Architect.
 Priestley House,
 Quarry Hill, Leeds, 9.
 28th August, 1954. 3914

MINISTRY OF WORKS.
ARCHITECTURAL ASSISTANTS are required for drawing office work in London and various Scottish and Regional Offices.
 Candidates must have had at least three years architectural training, some experience in an Architect's office, and be of intermediate R.I.B.A. standard.
 London salaries £420 (at age 21) to £670 per annum. Starting pay according to age and experience. Rates in the provinces slightly less. Prospects of promotion and establishment.
 State age, nationality and full details of training and experience to W.G.10(C.A.6(F), Ministry of Works, Abell House, John Islip Street, London, S.W.1. 3928

OXFORDSHIRE COUNTY COUNCIL.
 Applications are invited from suitably qualified persons for the following appointments in the County Architect's Department:—
 (a) **ASSISTANT QUANTITY SURVEYOR—A.P. & T. Grade VI/VII (£695–£810).**
 (b) **ASSISTANT QUANTITY SURVEYOR—A.P. & T. Grade IV/V (£580–£670).**
 (c) **QUANTITY SURVEYOR'S ASSISTANT—Misc. Division II (£350–£410).**
 (d) **QUANTITY SURVEYOR'S ASSISTANT—Misc. Division I (£320–£365).**
 Candidates for (a) should be Associate Members of the R.I.C.S. (Quantities) or possess similar qualifications.
 Preference will be given to candidates for post (b) who have passed the Intermediate Examination of the R.I.C.S. and applicants should have experience in the preparation of Bills of Quantities, interim valuations and final accounts.
 The appointments are subject to the provisions of the Local Government Superannuation Act 1937/53 and to medical examination.
 Forms of application may be obtained from the County Architect, Park End Street Offices, Oxford, and should be completed and returned to him not later than the 18th September, 1954.
GERALD GALE BURKITT,
Clerk of the Council.
 County Hall, Oxford.
 31st August, 1954. 3919

ISLE OF ELY COUNTY COUNCIL.
COUNTY ARCHITECT'S DEPARTMENT.
 Applications are invited for the following appointments on the staff of the County Architect:—
 (a) **FIRST ASSISTANT ARCHITECT**, Grade A.P.T. VI (£695–£750 p.a.).
 (b) **PRINCIPAL ENGINEERING ASSISTANT** Grade A.P.T. V/Va (£620–£710 p.a.), according to qualifications and experience.
 The posts are permanent, subject to the National Scheme of Conditions of Service, Local Government Superannuation Act and to a medical examination.
 Forms of application may be obtained from the County Architect, County Hall, March, to whom they must be returned not later than the 30th September, 1954.
R. F. G. THURLOW,
Clerk of the County Council.
 3906

SALOP COUNTY ARCHITECT'S DEPARTMENT.
SENIOR ASSISTANT ARCHITECT required on Established staff. Salary Grade A.P.T. VIII (£785 to £860 p.a.). Applicants must be Registered Architects, preferably Members of the R.I.B.A.
 It may be possible to assist the successful candidate with housing; alternatively, a separation allowance of not exceeding 30s. a week will be paid to a married officer, plus third class return railway fare to visit his family once each month, for a maximum period of six months.
 Conditions of appointment and forms of application may be obtained from The County Architect, Column House, London Road, Shrewsbury, returnable with three testimonials by 24th September, 1954. 3920

WARWICKSHIRE COUNTY COUNCIL.
ARCHITECT'S DEPARTMENT.
 Applications are invited for the appointment of **BUILDING CLERK OF WORKS** for Nuneaton area, salary £12 a week. Applicants should have had experience in supervising the erection of large buildings preferably in non-traditional construction. The successful applicants will, where possible, be transferred to other projects in the area on the completion of the initial contract.
 Applications to be on forms obtainable from G. R. Barnsley, F.R.I.B.A. County Architect, Shire Hall, Warwick.
L. EDGAR STEPHENS,
Clerk of the Council.
 Shire Hall, Warwick.
 September, 1954. 3934

MINISTRY OF WORKS.
ARCHITECTURAL ASSISTANTS required in London for work relating to the preservation of ancient monuments and historic buildings.
 Candidates must have had at least three years architectural training and be of intermediate R.I.B.A. standard. They must also have experience of building and site surveying, a sound knowledge of construction and a live interest in historic architecture. Theodolite and levelling knowledge are desirable.
 Salary scale £420 (age 21) to £670 per annum. Starting pay according to age and experience. Prospects of promotion and establishment.
 State age, nationality and full details of training and experience to W.G.10(C.A.7(D), Ministry of Works, Abell House, John Islip Street, London, S.W.1. 3929

STAFFORDSHIRE COUNTY COUNCIL.
COUNTY ARCHITECT'S DEPARTMENT.
APPOINTMENT OF ARCHITECTURAL STAFF.
 Applications are invited for experienced and capable **ASSISTANTS** at N.J.C. Salary Grades IV to VI (within the range of £580 p.a. to £760 p.a.). Applicants should give full details of experience, qualifications, age, present salary and position, and should state salary required. Applications, together with copies of three recent testimonials, should be forwarded as soon as possible to C. M. Combes, F.R.I.B.A., County Architect, County Buildings, Martin Street, Stafford.
T. H. EVANS,
Clerk of the County Council.
 County Buildings,
 Stafford. 3936

BOROUGH OF WIDNES.
BOROUGH ARCHITECT'S DEPARTMENT.
 Applications are invited for the appointment of an **ARCHITECTURAL ASSISTANT**, at a salary in accordance with A.P.T. Grade IV to V of the National Scale of Salaries.
 Applicants must be student R.I.B.A. and have worked in an Architectural Office for at least two years subsequent to having passed the Intermediate Examination. Preference will be given to applicants having experience on municipal housing.
 The appointment will be subject to the National Scheme of Conditions of Service as adopted by the Council and to the Local Government Superannuation Act, October, 1937, and to the successful candidate passing a medical examination.
 Housing accommodation may be provided.
 Applications stating full particulars of age, experience and qualifications, etc., together with names and addresses of two referees, to be sent to the Borough Architect, Brendan House, Widnes, not later than 10 a.m. Friday, 24th September, 1954.
 Canvassing directly or indirectly will disqualify.
FRANK HOWARTH,
Town Clerk.
 Town Hall, Widnes. 3887

Architectural Appointments Vacant

4 lines or under, 7s. 6d.; each additional line, 2s.
The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she or the employment is exempted from the provisions of the Notification of Vacancies Order, 1952.

REQUIRED for Architects' office, Central London area, young qualified ASSISTANTS interested in design and construction. Write, stating experience and salary required. Box 3235.

SENIOR ASSISTANT required in Architect's Department of large London Building Acts and By-Laws an advantage. Good prospects; pension scheme. State age, experience, and salary required. Reply Box 3753.

APPLEBY-FRODINGHAM Steel Company, Scunthorpe, Lincs., have a vacancy for an **ARCHITECTURAL DRAUGHTSMAN**. Applicants must be capable draughtsmen with a good knowledge of modern building construction and finishes. Staff Pension Scheme and welfare facilities available. Applicants should apply in writing, giving age, full details of previous experience, and salary required, to the Works Employment Office. 3705

LONDON Architect, A.R.I.B.A., dealing with houses, flats and shops requires two **ARCHITECTURAL ASSISTANTS**, with office experience. Inter R.I.B.A. standard or above, capable of designing and preparing working drawings and specifications. Salary £650-£750 according to qualifications. Box 3805.

SENIOR ARCHITECTURAL ASSISTANT required, full experience in preparation of Working Drawings, Details, and supervision of office and Industrial Buildings in the London Area. Good knowledge of construction and design essential. Apply in writing giving full particulars of qualifications, age, experience and salary required to Box 9829.

ASSISTANT ARCHITECT.
COURTAULDS LIMITED require two **ASSISTANT ARCHITECTS** in Coventry to work on own initiative on a wide variety of industrial buildings. Age 25/40. Candidates should write for a detailed form of application to the Director of Personnel, Courtaulds Limited, 16, St. Martin's-le-Grand, London, E.C.1, quoting the reference number, B.18. 3695

ARCHITECTURAL ASSISTANTS required of intermediate and final standard, preferably with office experience. Write stating age, experience and salary required. Box 3771.

ASSISTANT of R.I.B.A., Inter. standard or over, required in Architect's Department in City of London. Should be between 25 and 30, with several years' office experience. Secure future and interesting good class work. Write, giving particulars of experience, age, and salary required. Box 3842.

ARCHITECTURAL ASSISTANTS required for Bristol office, with large and varied practice. Applicants should have recently qualified or have passed R.I.B.A. Intermediate and be studying for Final. Apply in writing, giving age, experience, and salary required, to W. H. Watkins, Gray, F.R.I.B.A. and Partners, 1, Clare Street, Bristol, 1. 3841

YOUNG ASSISTANTS wanted urgently, with architectural interests and good educational background. Experience in Architect's office desirable. Further training encouraged where necessary, but both qualified and younger men are asked to apply. Successful applicants will be given all the responsibility they can undertake, and intelligence, design sense, flexible outlook and interest in modern building techniques and organisation will be well rewarded. Starting salary according to experience and capability. All applications will be answered. Details to the Company Architect, Vic Hallam, Ltd., Valley Works, Langley Mill, near Nottingham. 3847

ARCHITECTURAL ASSISTANT (Junior) required within next few weeks for private office in Edinburgh. Must be enthusiastic and have good experience. Salary by arrangement. Write to Messrs. David Carr & Stuart Matthew, 14, Lynedoch Place, Edinburgh. 3856

SENIOR ARCHITECTURAL ASSISTANT required immediately. Salary by arrangement. Write Messrs. Carr & Howard, 14, Lynedoch Place, Edinburgh. 3855

ARCHITECT'S ASSISTANT required (Senior) for West End office. Write stating full particulars and salary required to Box 3546.

SENIOR, INTERMEDIATE & JUNIOR Architectural ASSISTANTS required in West End Office engaged on housing, churches, offices, schools, etc. Write giving age, experience and training with salary required to Box 3799. All applications will be answered.

SENIOR ARCHITECTURAL ASSISTANT required with full experience in the preparation of working drawings and details for both domestic and industrial buildings on a large scale. Good knowledge of construction and design essential. Permanent position with Pension scheme in operation. Midlands area. Apply in writing, giving full particulars of qualifications, age, experience, marital status and present salary to Box 3804.

EXPERIENCED SENIOR and **INTERMEDIATE ARCHITECTURAL ASSISTANTS** required, preferably with experience in industrial work. Write or phone to Hasker & Hall, Architects, 13, Welbeck Street, London, W.1 (Welbeck 0061) 3774

ARCHITECTURAL AND SURVEYING ASSISTANT, experienced in the preparation of full working drawings and making of surveys, required by London Estate Developers. Apply, giving details of past employment and salary required, to Box 3815.

ARCHITECTURAL ASSISTANT (JUNIOR) required for North Devon office. State experience, age, and salary required. Box 3817.

SUITABLY qualified person required immediately as **SENIOR CLERK OF WORKS**, to supervise the erection of a large heavy engineering factory in Northern Ireland, the construction of which is expected to last approximately three years. Applicants must have experience of handling large building contracts, and particularly progressing of work. Salary offered is £800 per annum, subject to qualifications and experience. Applications, with full details of experience, present and previous appointments, and when available, should be addressed to Box 1332, T. & G., 167, High Holborn, London, W.C.1. 3818

ARCHITECTS' ASSISTANT required in small Central London office. Up to or over Intermediate standard. Working drawings, details, etc. Office experience necessary. Box 3833.

LIVERPOOL—SENIOR AND JUNIOR ASSISTANTS required for all stages of work on Stores and Office buildings. Salaries in region of £700, and £350 on experience and ability. Details at once to G. de C. Fraser, Son & Gearey, 27, Dale Street, Liverpool. 3851

SENIOR ARCHITECTURAL ASSISTANT required by a major oil company undergoing rapid expansion, for its London Head Office. Applicants must be capable of supervising and carrying out work on the design and remodelling of service stations. Pension and Life Assurance, generous sickness benefits, luncheon voucher scheme, social club. Write giving full details stating age, experience, and salary required, quoting reference SAA 258 to Box 3829.

INTERMEDIATE STANDARD ASSISTANT, office trained, accurate draughtsman, contemporary outlook, urgently required, Brighton/Hove area office. 3932

VINCENT BURR & Partners require two **ARCHITECTURAL ASSISTANTS** immediately, approaching Inter R.I.B.A. Standard. Experience in the preparation of working and detail drawings. Flats, Houses, Large Commercial Buildings, etc. Good Salary according to experience. Write 85, Gower Street, W.C.1. 3923

NAIROBI, for active, energetic office **ARCHITECT** with confidence in his ability. Principals will meet fare out and pay £80 per month for three months. At conclusion, successful applicant will be assessed and salary increased, retrospectively, or, if unsatisfactory, discharged. Apply, quoting Box 74/1, to Overseas Technical Service, 5, Welldon Crescent, Harrow. 3922

NORTHERN RHODESIA, for friendly, important practice, **ASSISTANT ARCHITECT** with some experience. Salary approx. £720 p.a. Free passage, inexpensive accommodation, U.K. interviews with Partner for selected candidate. Apply, quoting Box 37/1, to Overseas Technical Service, 5, Welldon Crescent, Harrow. 3921

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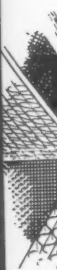
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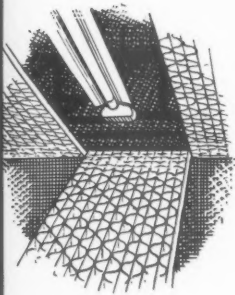


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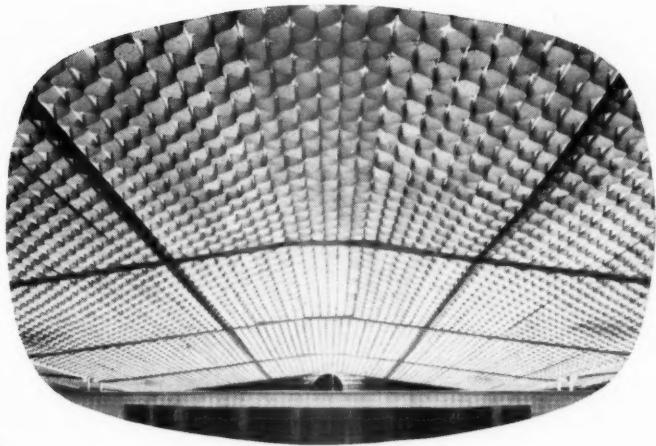
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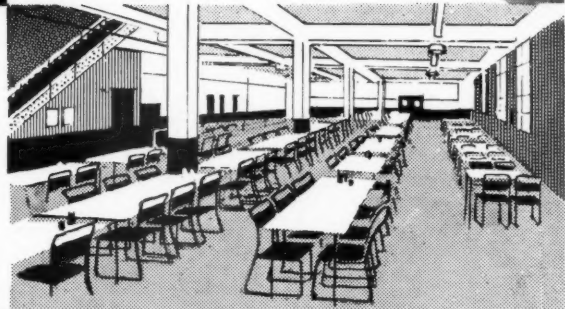
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