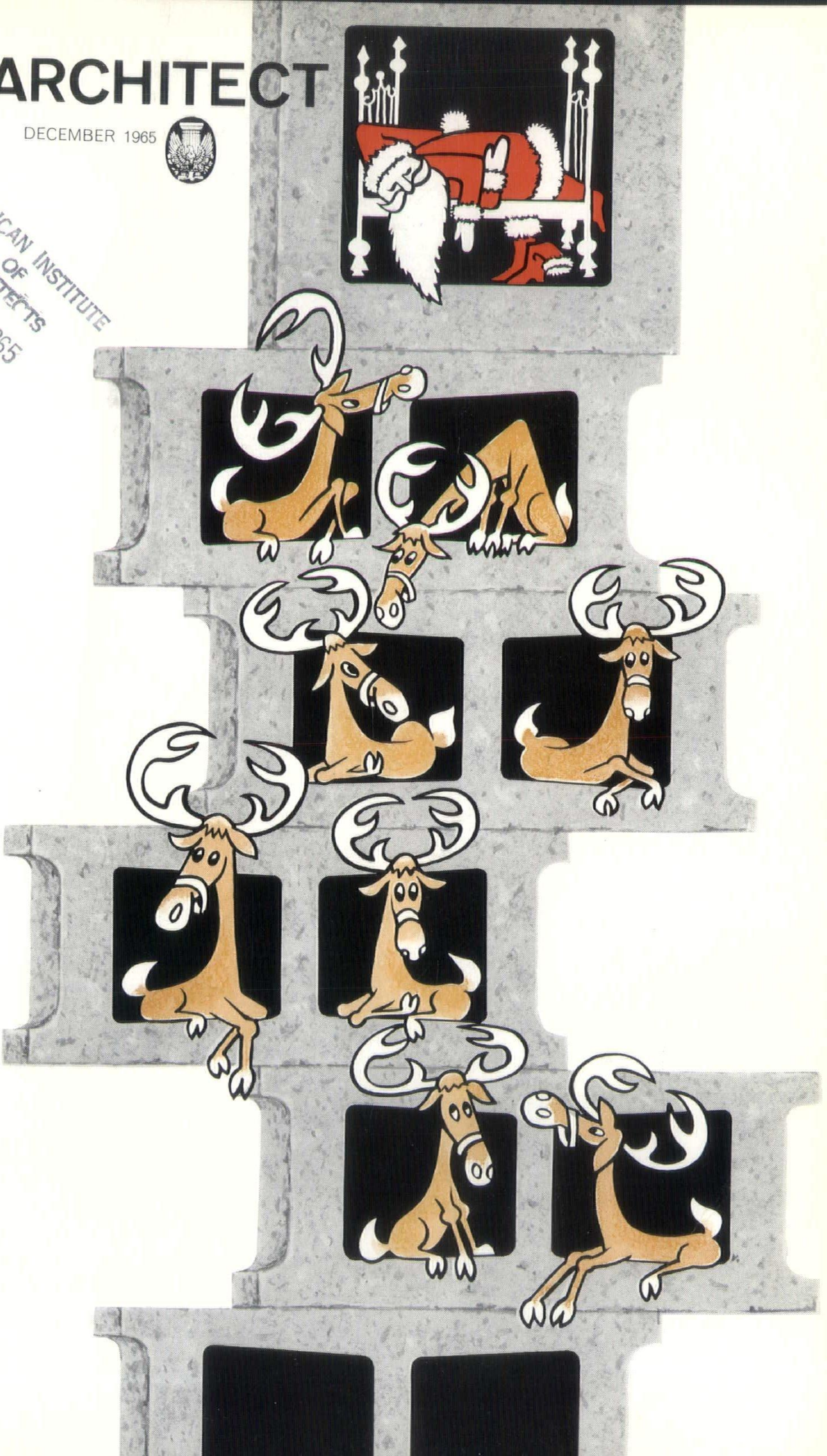
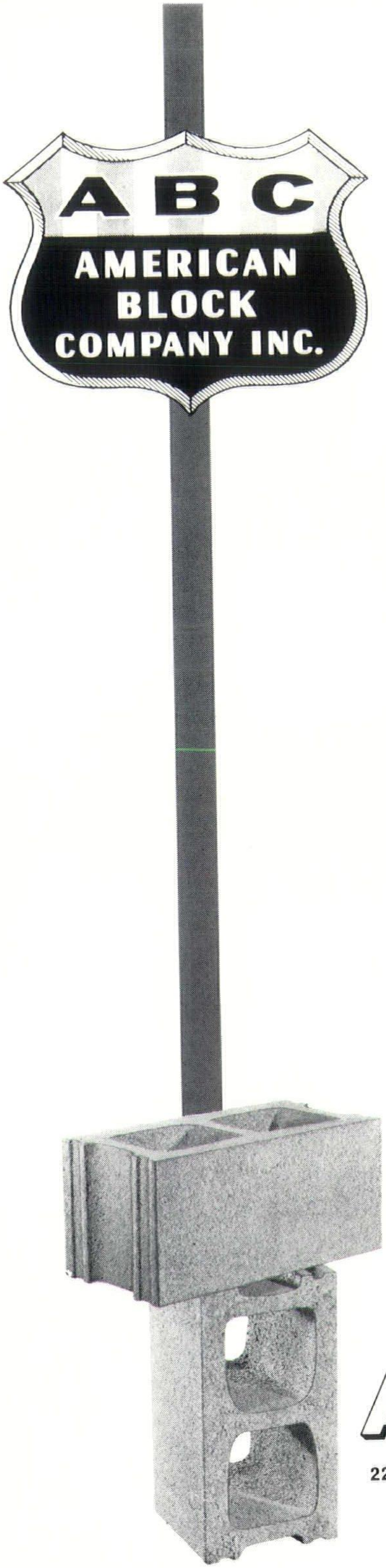
INDIANA ARCHITECT

DECEMBER 1965





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An organization to improve and extend the uses of concrete, made possible by the financial support of most competing cement manufacturers in the United States and Canada.

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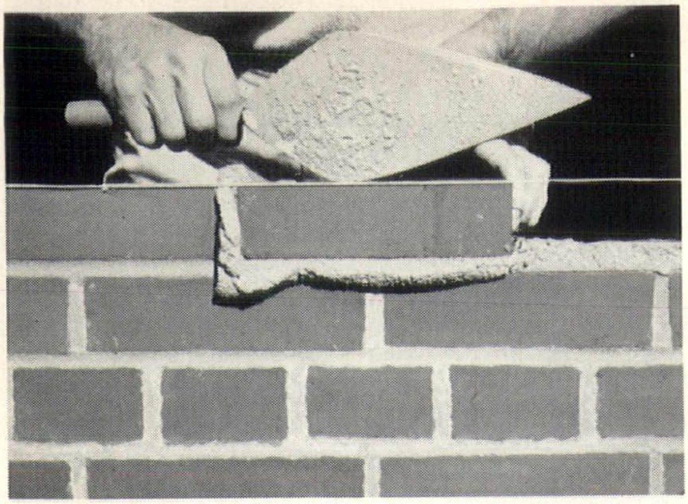

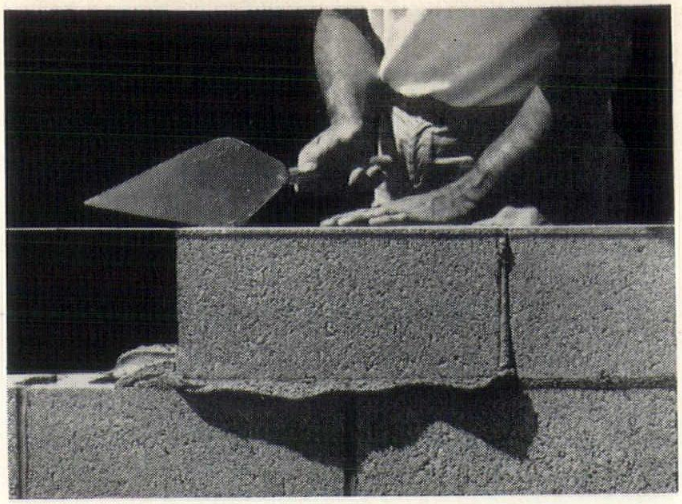

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provides ideal BALANCE of essential mortar properties

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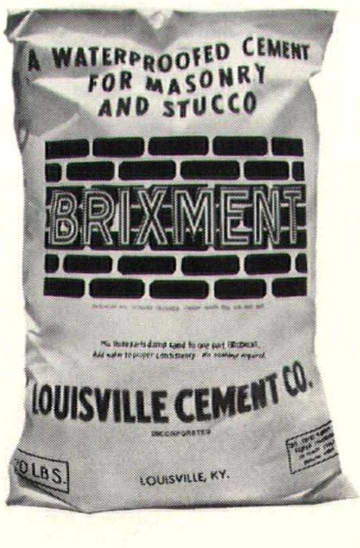
- **IMPERMEABILITY**
- **DURABILITY**
- **BOND**
- **STRENGTH**
- **LOW EFFLORESCENCE**
- **YIELD**

GOOD mortar requires a proper balance. Some mortars may be very strong, but lack other important properties such as workability. Other mortars may be very plastic, yet lack necessary qualities such as durability. *For good masonry construction at lowest cost, mortar must have a proper balance of ALL the characteristics listed above.*



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INDIANA ARCHITECT

Official Journal, The Indiana Society of Architects, The Northern Indiana Chapter and The Central-Southern Indiana Chapter, The American Institute of Architects

VOL. IX DECEMBER, 1965 No. 9

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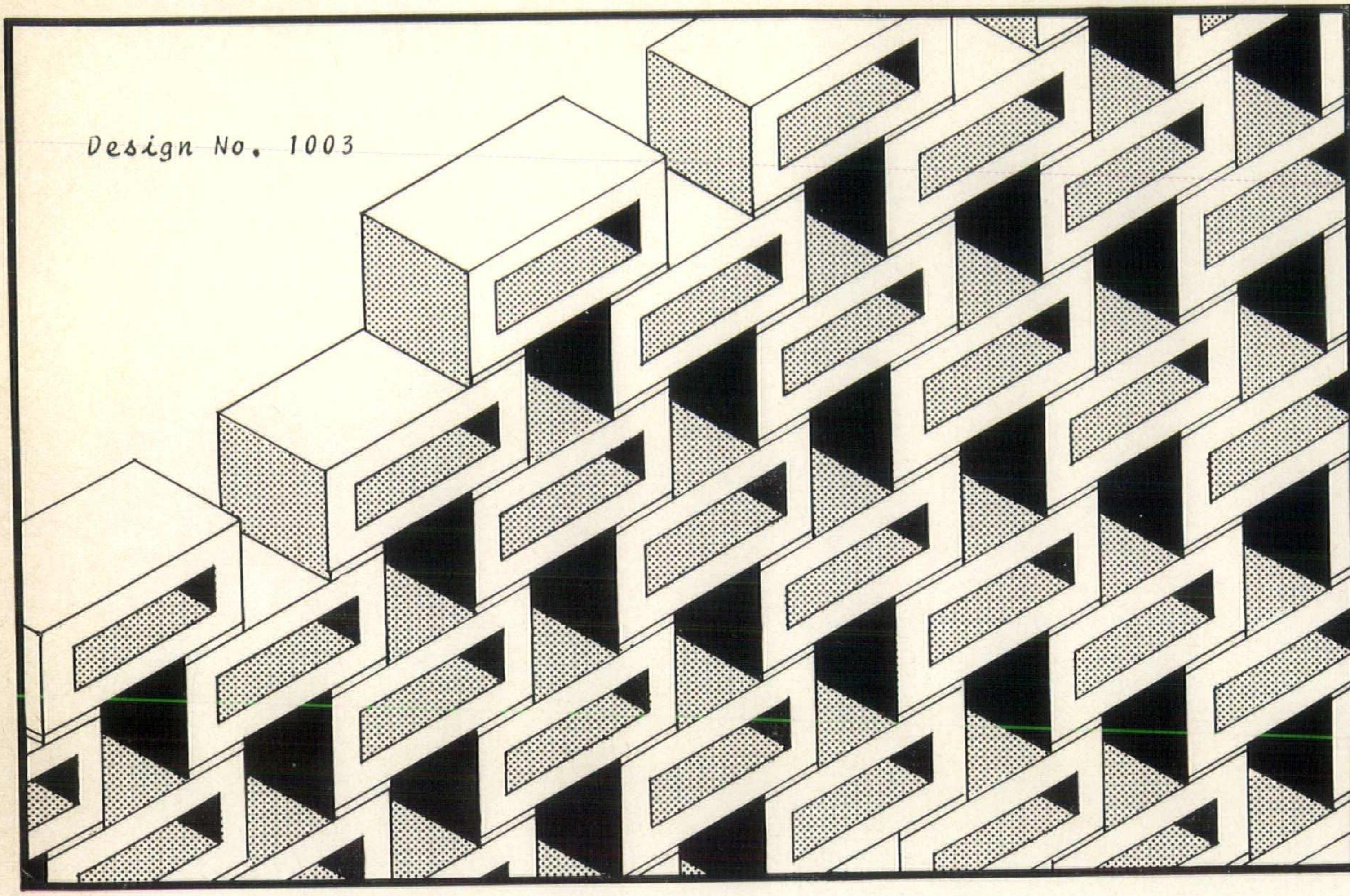
CONCERNING THE COVER

Our traditional light-hearted salute to the Christmas season is executed in masonry units again this year, with the help of Santa and his reindeer. The Jackson - Zender Studios of Indianapolis were the artistic creators.

I.C.M.A. Standard Unit Pierced Wall



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ICMA Plant Improvement Program

Most architectural offices are initially designed or have been remodeled to display the imagination and creativeness of the firm's members. This impression on a client contributes to his desire for professional services.

The Indiana Concrete Masonry Association recognizes that this philosophy is equally important to the concrete masonry industry. For years most manufacturers have been concerned with production and neglected the image of their product brought about by the condition of their plant.

In 1964, the ICMA Plant Improvement Program was established to recognize producers who do a good job of housekeeping and to provide an incentive for all products plants to improve. The program is sponsored by the Portland Cement Association.

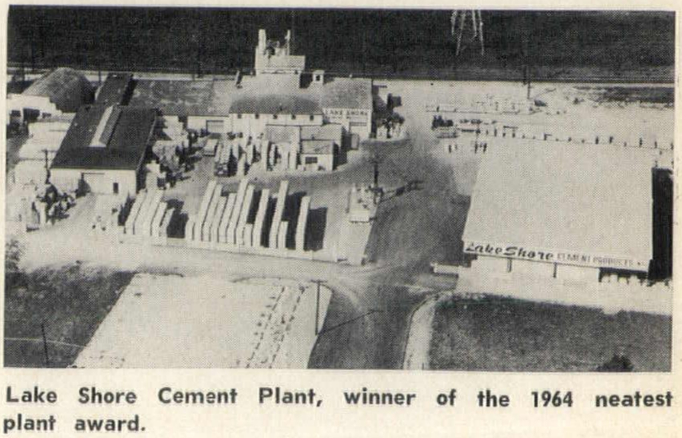
The first year's contest was judged by two prominent persons in the concrete masonry field. They were Tom Sirrine, Detroit, Mich., executive director of the Michigan Concrete Products Association and Harry Bevignani, Chicago, Ill., president of the Illinois Concrete Masonry Association.

Awards were made in three categories; Neatest Plant Appearance, Displays and Neatness of Delivery Equipment. The judging was based on the image created by the plant in each division rather than the size or cost of the facilities.

Lake Shore Cement Products, Michigan City, won dual awards for the neatest plant appearance and neatest delivery equipment. Schuster's, Indianapolis, won the award for the best displays and uses of literature. Awards were presented at the National Concrete Masonry Association Convention at Cleveland, Ohio, by NCMA President Ralph Walb, a block producer from Fort Wayne, Indiana.

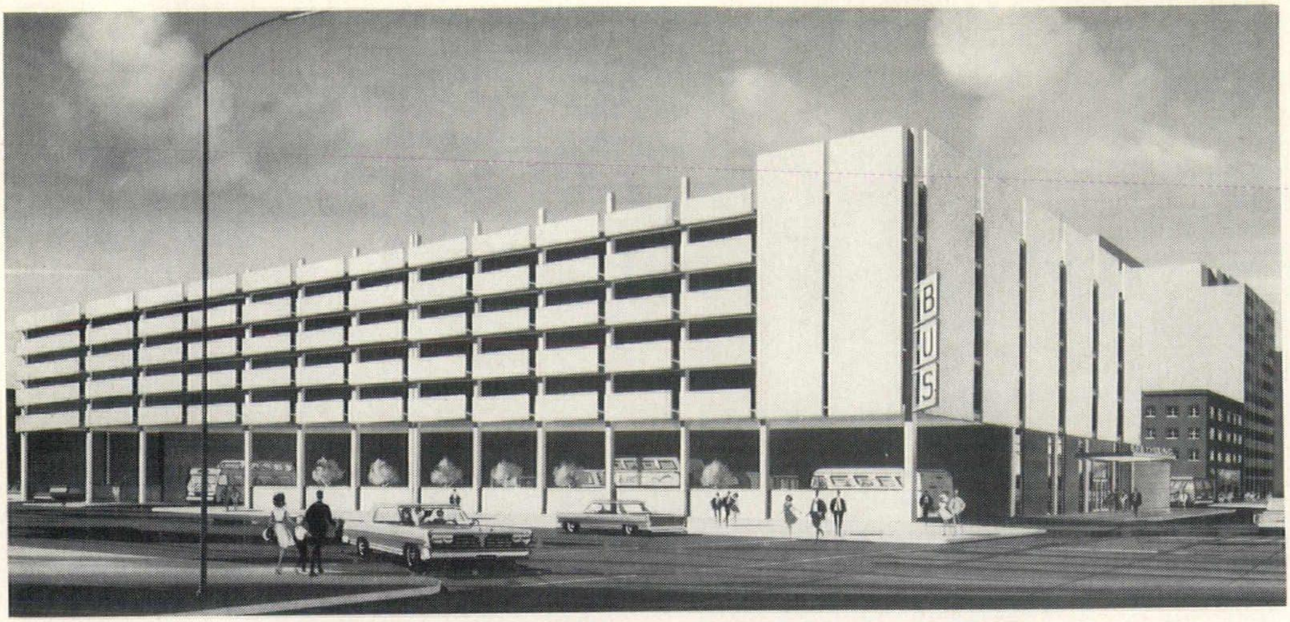
The program is now in its second year. Observers report substantial improvements have been made in many plants. The 1965 entries have been received and are in the process of being judged. This year's judges are the Indiana Society of Architects' Executive Director Don Gibson and C. L. Shidler, Executive Secretary of the Mid-West Ready-Mixed Concrete Association, Terre Haute, Indiana.

Each year the Indiana Concrete Masonry Association will conduct a contest of this type. While future committees may change the qualifications, the intend of the program will be the same — **to upgrade the image of concrete masonry** — to make the product more saleable from the manufacturer's standpoint and more acceptable from the standpoint of design.



Lake Shore Cement Plant, winner of the 1964 neatest plant award.

HAYDITE . . . FROM HEAD TO TOE



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3000, 4000 and 5000 are the magic numbers for the Haydite structural lightweight concrete in the Greyhound Bus Terminal. They signify the minimum compressive strengths specified for the different classes of the structural lightweight concrete. Because all of the concrete above ground was specified structural lightweight concrete, these magic numbers were used throughout the entire structure.

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A Concrete Finishing Quiz

1. Control joints should be cut to a depth of ¼ to 1/5 the slab thickness.

   True. This depth of cut will normally weaken the section sufficiently to cause shrinkage cracks to occur at this point.

2. Spreading dry cement on freshly placed concrete to take up excess water is good construction practice.

   False. Spreading dry cement on the surface of freshly placed concrete to blot up bleed water causes scaling and other surface defects.

3. The slump test is a measure of the finishability of concrete.

   False. Slump is only a measure of consistancy.

4. No finishing operations should be performed while there is bleed water on the surface.

   True. Working bleed water back into the concrete produces a weak and porous surface.

5. A jitterbug is a useful tool on any job and is primarily used to consolidate and compact concrete where a vibrator is not available.

   False. This tool should be used sparingly and only on very low slump concrete.

6. A darby is a tool which may be used in lieu of a hand float when high production is necessary.

   False. A darby is used for initial leveling after screeding in lieu of a bull float.

7. Aggregate gradation has a strong influence on the finishing characteristics of concrete.

   True. Poor aggregate gradation, especially a deficiency in the very fine sand particles, makes concrete difficult to finish — particularly with lean mixes.

8. Air-entrained concrete can be finished faster than non-air-entrained concrete.

   True. Entrained air (4 to 6% by volume) tends to prevent bleeding and therefore reduces waiting time between operations.

9. Reducing the size of coarse aggregate makes concrete finish easier and therefore reduces the cement requirement.

   False. Reducing the aggregate size increases the surface area to be coated, and for a given consistancy this increases the cement required. However, finishers generally express a preference for small coarse aggregate.

10. Any means used to reduce the water in concrete makes possible a corresponding reduction in cement without affecting finishing qualities.

    False. Finishability depends upon the amount of paste. Any reduction in the amount of paste results in a more harsh mix and affects the finishing qualities.

11. A capable finisher can produce a satisfactory finish on any concrete that has adequate strength to serve the purpose for which it is used.

    False. Finishability bears little direct relationship to strength. To produce a satisfactory finish, even a skilled mason must have a properly proportioned mix. Concrete designed solely on a strength basis quite often is too harsh or too lean.

12. Coarse aggregate must be forced down away from the surface of a slab in order to obtain a good finish.

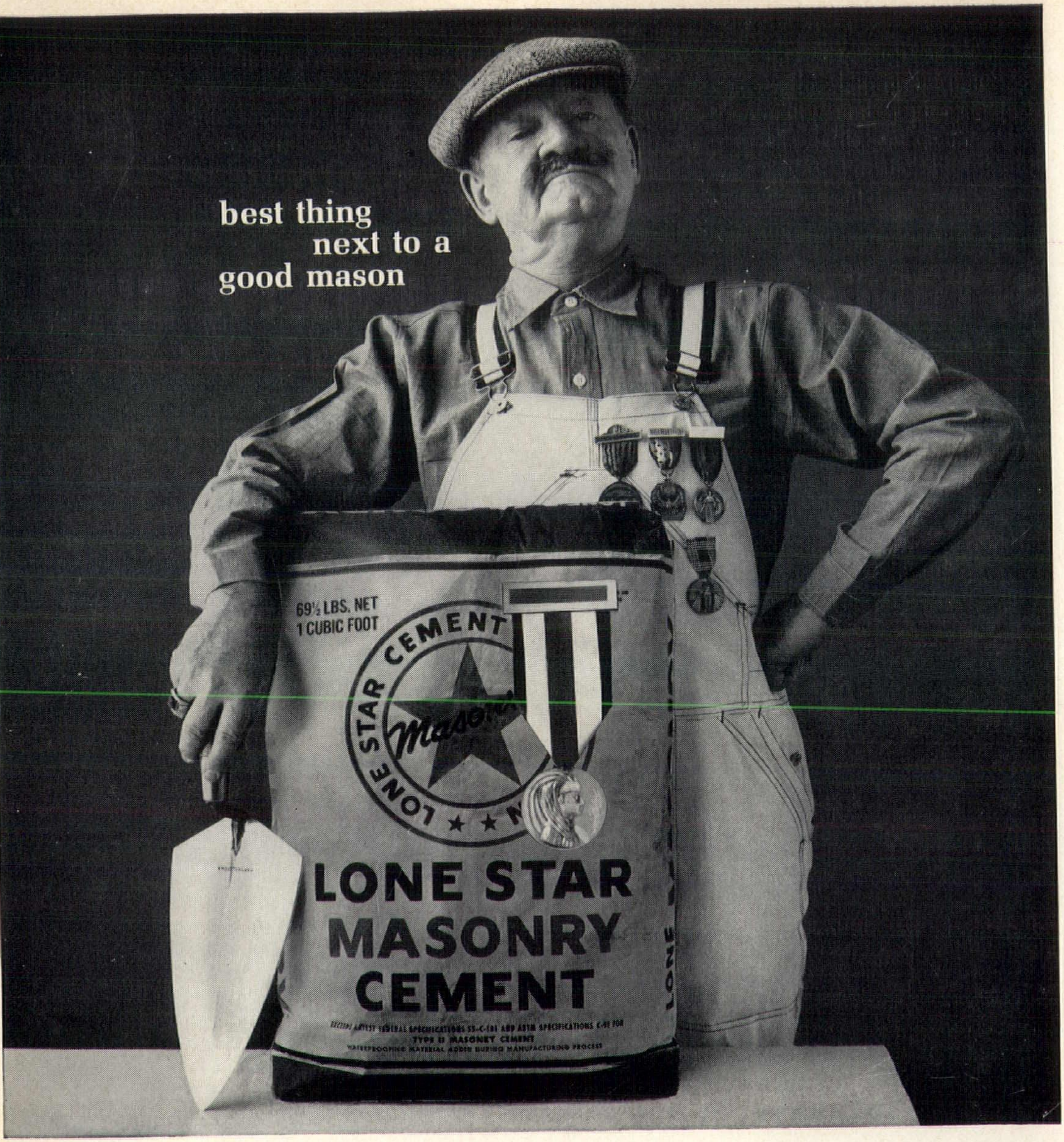
    False. Contrary to many specifications, some coarse aggregate should be directly beneath the surface of a slab. Any good concrete is homogeneous throughout. Displacing coarse aggregate from the surface causes unnecessary and undesirable laitance material to be brought to the top.

13. In a 4-in. thick concrete slab, raising the cement factor one bag per cu. yd. increases the cost of the concrete about 1½ cents or less per sq. ft. which is less than the cost of curing.

    True. Raising the cement content one bag costs only about $1.00. Spreading this over 80 sq. ft. means an increase of less than 1½ cents per sq. ft. Curing compound costs 2 cents per sq. ft.

14. Air-entrained concrete requires 3—5 gallons less water per cu. yd. than non-air-entrained concrete.

    True. Air-entrained concrete also requires about 100# less sand per cu. yd. These ingredients are displaced by the entrained air.



Good masons do finer work with greater precision when they use the best materials. That is why more architects are specifying Lone Star Masonry Cement. It combines all the necessary ingredients, except sand and water, in exactly the right proportion. Lone Star Masonry Cement provides *all* the properties of top-quality mortar plus complete uniformity from sack to sack. That's not all! It saves time, trouble and money...cuts mixing time, makes clean-up easier, assures more lasting beauty. For the finest quality mortar at the lowest possible cost, specify Lone Star Masonry Cement. Lone Star Cement Corporation, 1800 N. Meridian Street, Indianapolis 2, Indiana.

LONE STAR MASONRY CEMENT

Some Facts on Tuckpointing

Most literature published on the subject of masonry walls concerns new construction. Many architects doing remodeling jobs are faced with the restoration of old masonry. On such projects it is often necessary to tuckpoint old mortar joints to achieve a satisfactory appearance and prevent water penetration.

Tuckpointing is the act of replacing mortar joints. There are two basic reasons why tuckpointing may be necessary: (1) leaks in the mortar joints and (2) deterioration of joints. Tuckpointing will produce a weathertight wall and help to preserve the structural integrity and the appearance of the masonry.

If a wall is being tuckpointed to make it weathertight, it is recommended that all mortar joints be tuckpointed. Minute cracks that could pass a visual inspection might allow moisture to pass through the masonry. Before the start of any tuckpointing intended to produce weathertight masonry, a thorough inspection of all flashings, lintels, sills, and calked joints should be made. This is to ensure that water will not leak through into the masonry.

If it is obvious that the water is leaking through only one crack, it may be sufficient to tuckpoint only the mortar joints in the vicinity of the crack.

For weathertight construction, all mortar joints should be tooled to a concave or "V" shape (see Figs. 1 and 2). Tooling compacts the mortar to a dense surface with good durability. These shapes are recommended because they result in the mortar's being pressed toward both the lower and the upper masonry unit. This helps ensure maximum bond between the mortar and the masonry units.

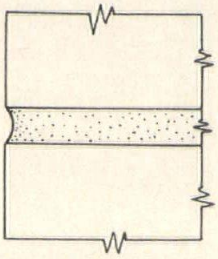


Fig. 1. Concave joint.

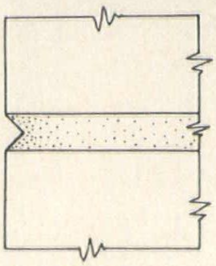


Fig. 2. "V" joint.

Jointing tools can be made from round or square bar stock. For horizontal joints, or vertical joints in stacked bond, the tool should be considerably longer than the masonry units to avoid a wavy joint.

Mortar joints should be cut out to a depth of at least ½-in. If the mortar is unsound the joint should be cut deeper until only sound material remains. Shallow (see Fig. 3) or furrow-shaped (see Fig. 4) joints will result in poor tuckpointing. A portable electric grinder with an abrasive wheel is usually more efficient than hand chiseling.

Prepared joints should be cut clean of unsound material (as illustrated in Fig. 5) where the depth is greater than the thickness of the joint.

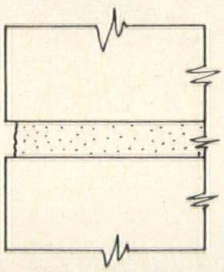


Fig. 3. Improperly prepared joint—too shallow.

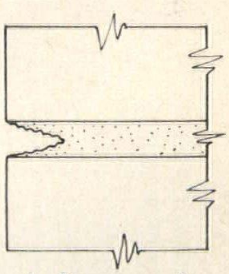


Fig. 4. Improperly prepared joint—furrow should be eliminated.

All loose material must be removed with an air jet or a water stream.

The joints should be dampened to prevent absorption of water from the freshly placed mortar. However, the joints should not be saturated just prior to filling the joints because free water on the surface will act as a lubricant and will impair bond.

The proportions for mortar mixes are shown in Table 1. A recommended procedure for mixing tuckpointing mortar is: (1) mix all of the dry material, thoroughly blending the ingredients;

(Continued on Page 19)

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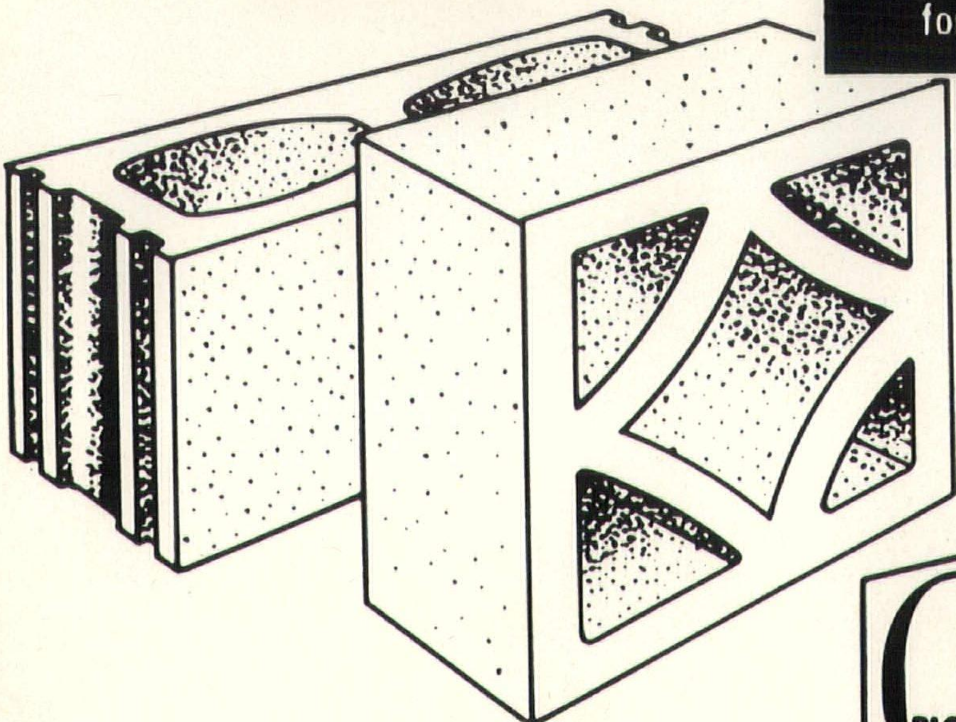

30
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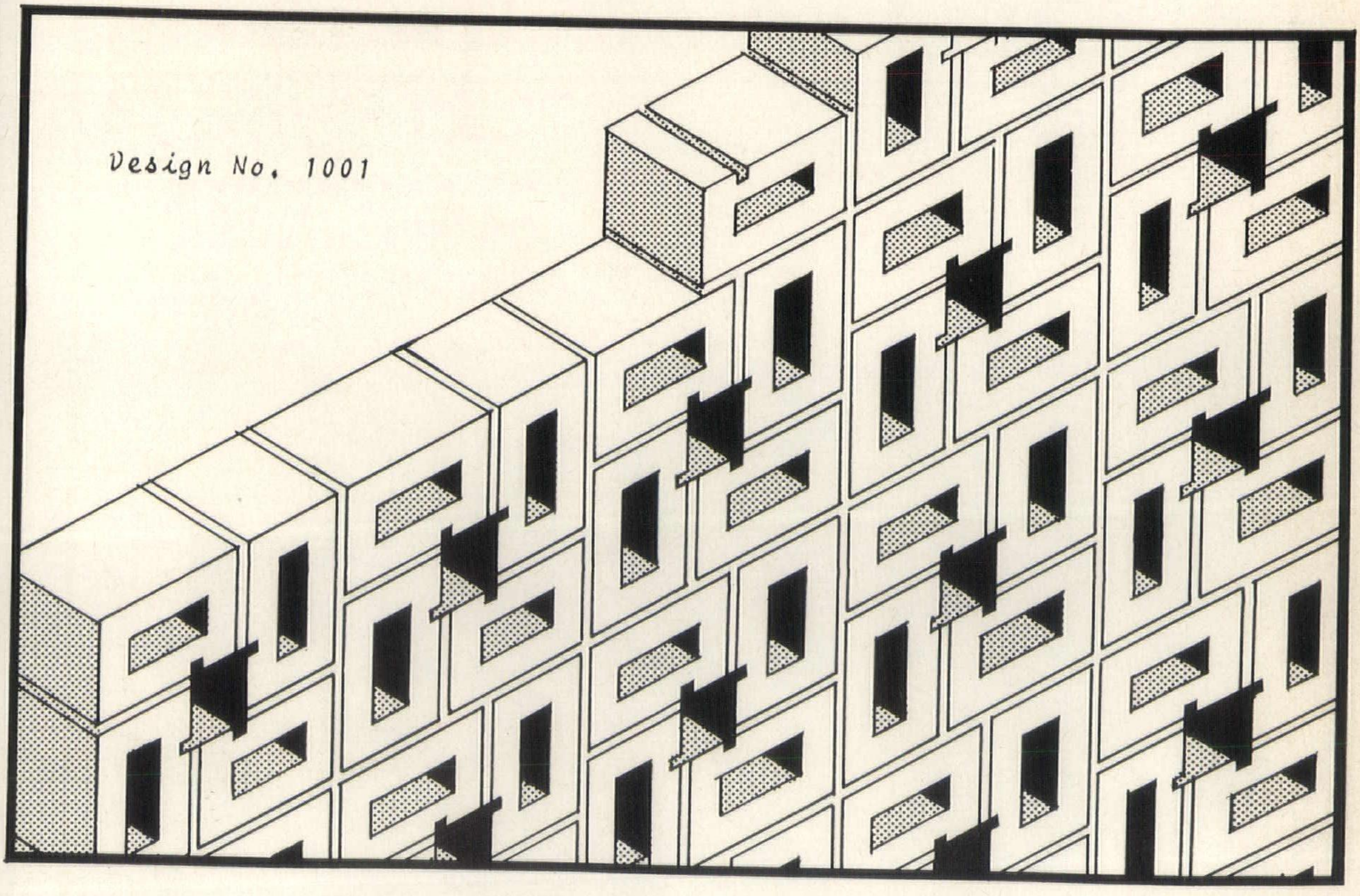
Pierced Walls With Standard Units

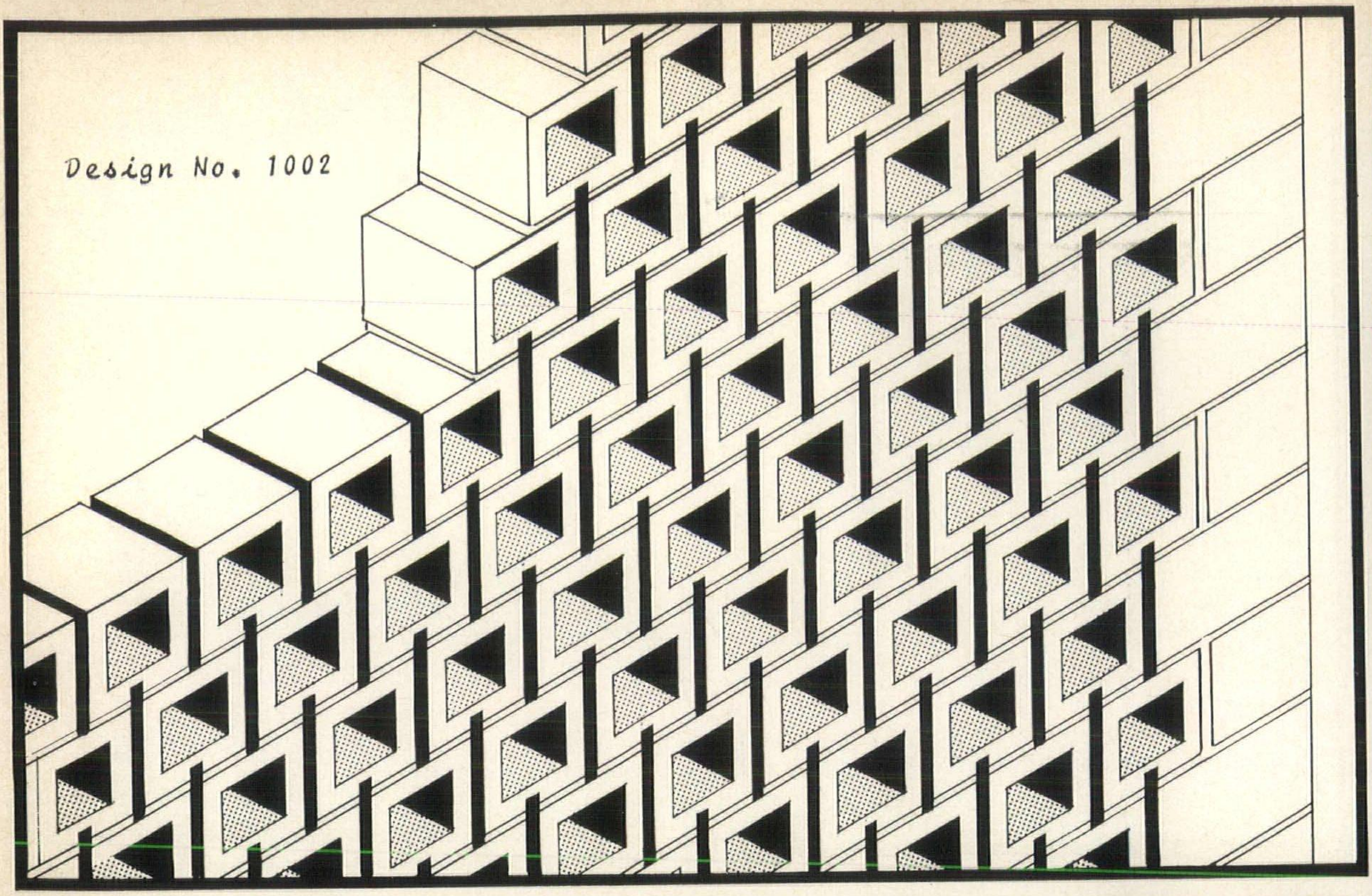
The creation of efficient and highly interesting decorative screen walls from masonry units has been a practice of the architectural profession for years. Normally the units are special decorative block, of which there are many types available.

Now for the architect who desires something more original in a pierced wall treatment, the Indiana Concrete Masonry Association has come up with some fascinating designs which employ only standard masonry units in their execution.

In addition to broadening the design possibilities, these "standard" screens make the task of locating special decorative units obsolete, as these units are readily available in all locales.

For our pictoral section this month, we have selected a few of the designs available for pierced walls with standard units.

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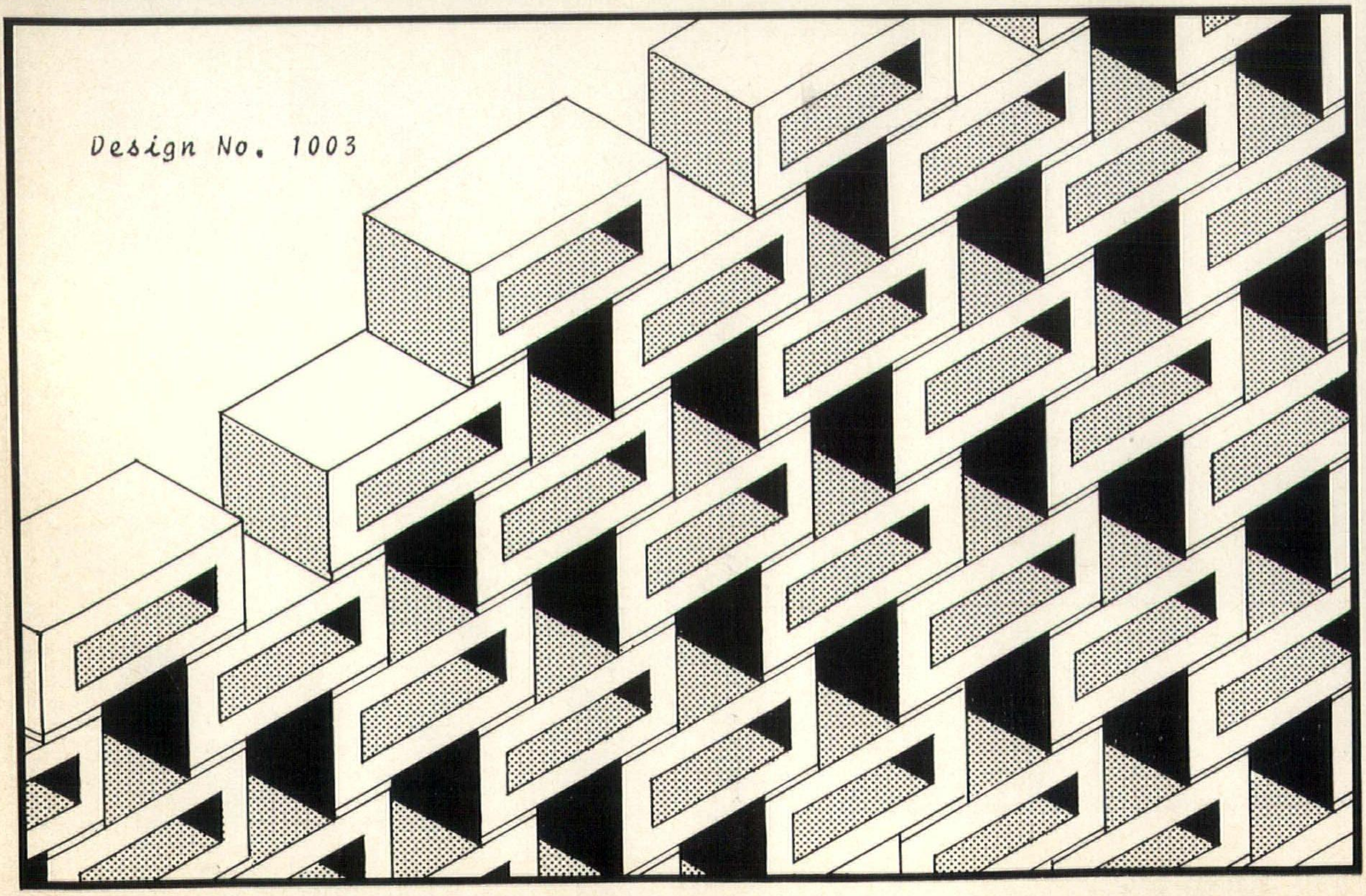
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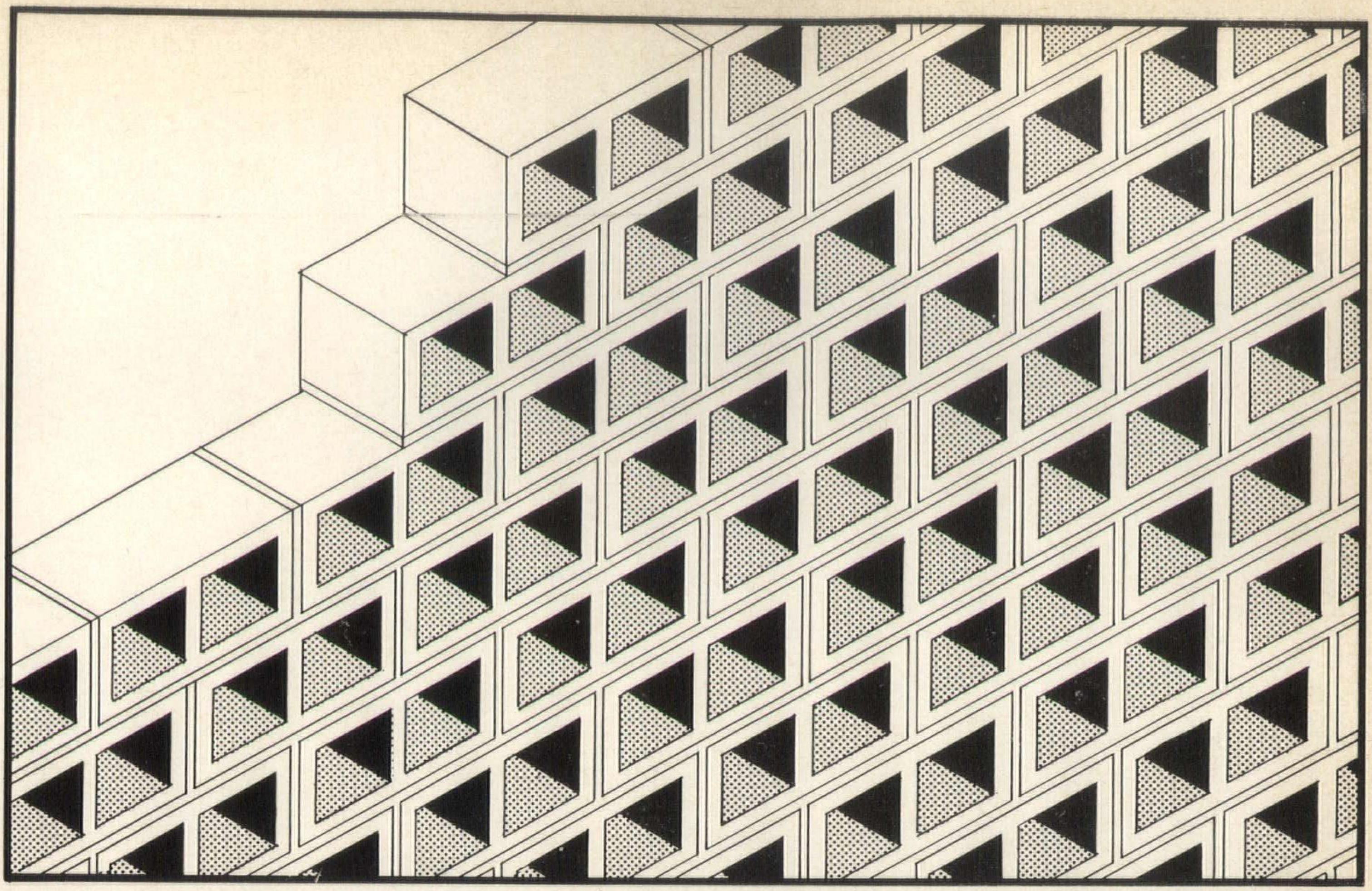
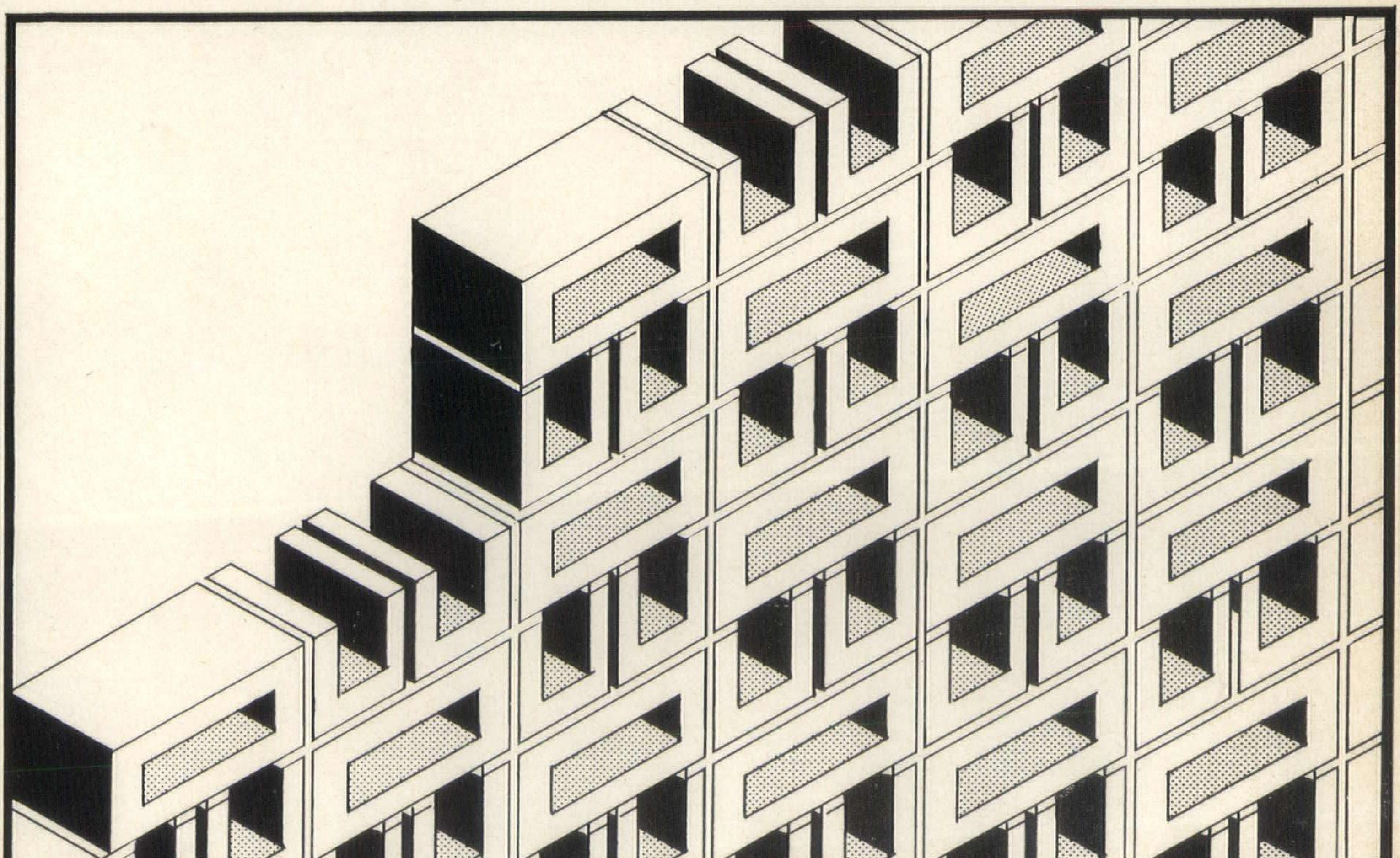

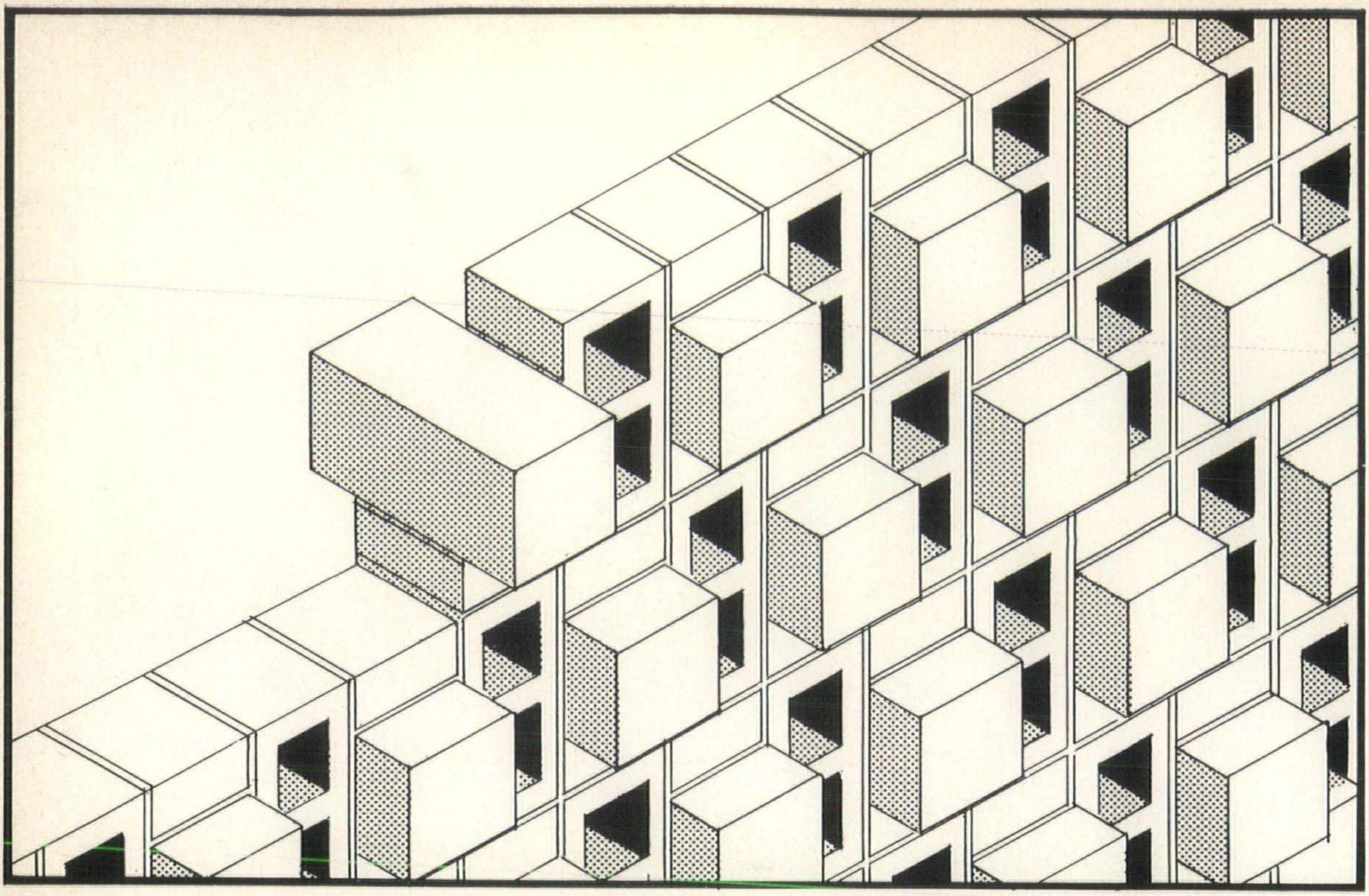

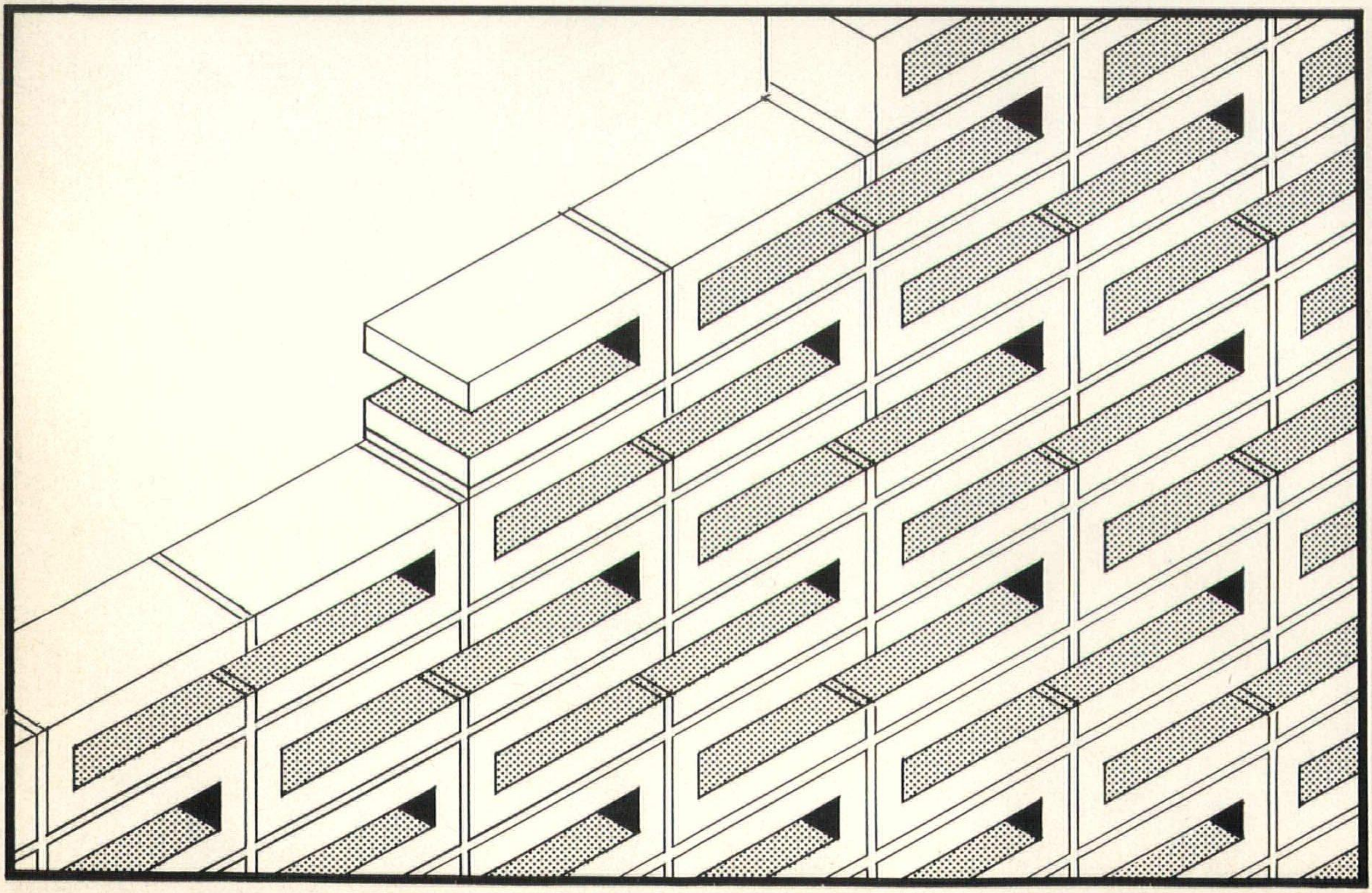

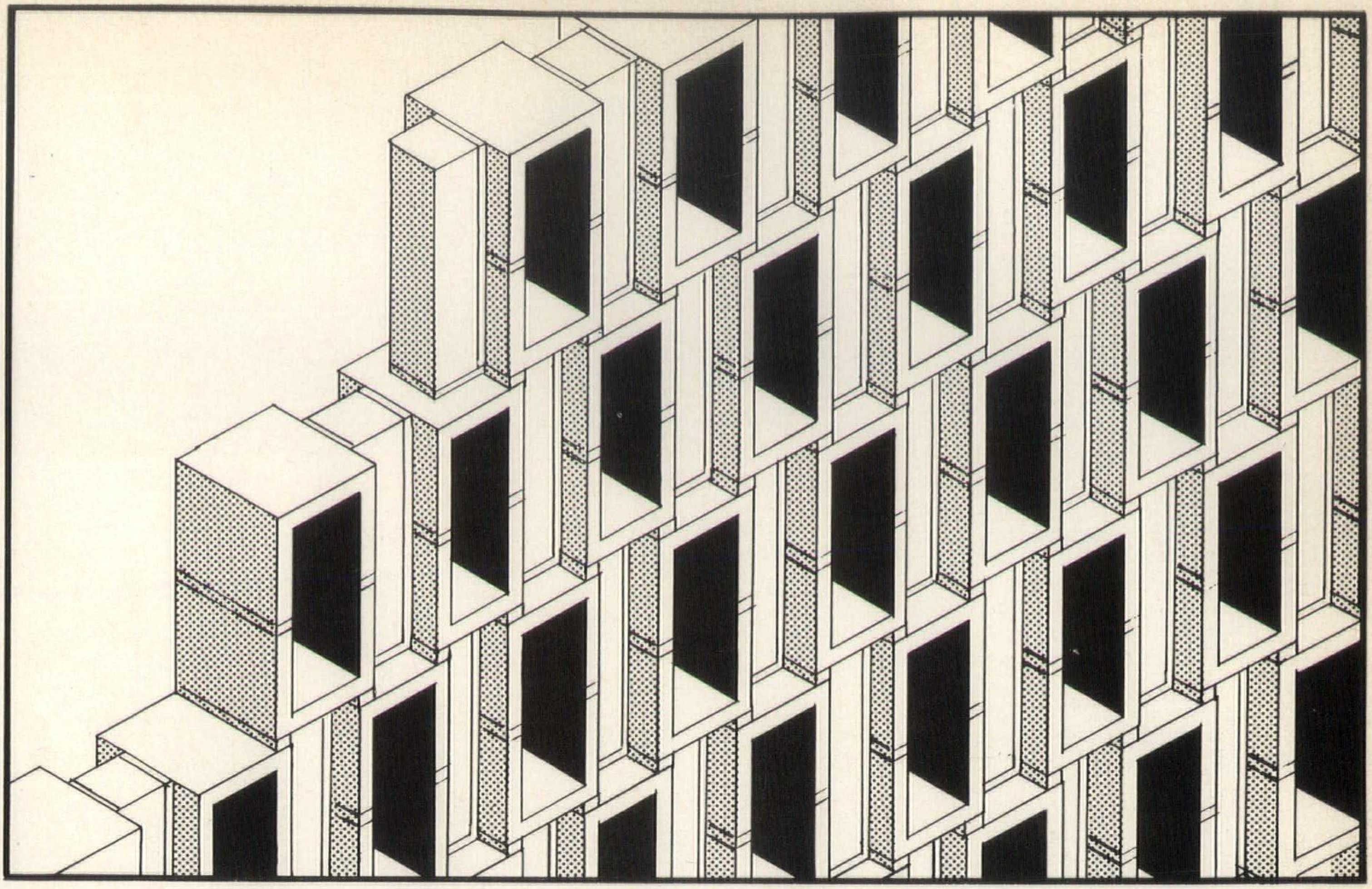

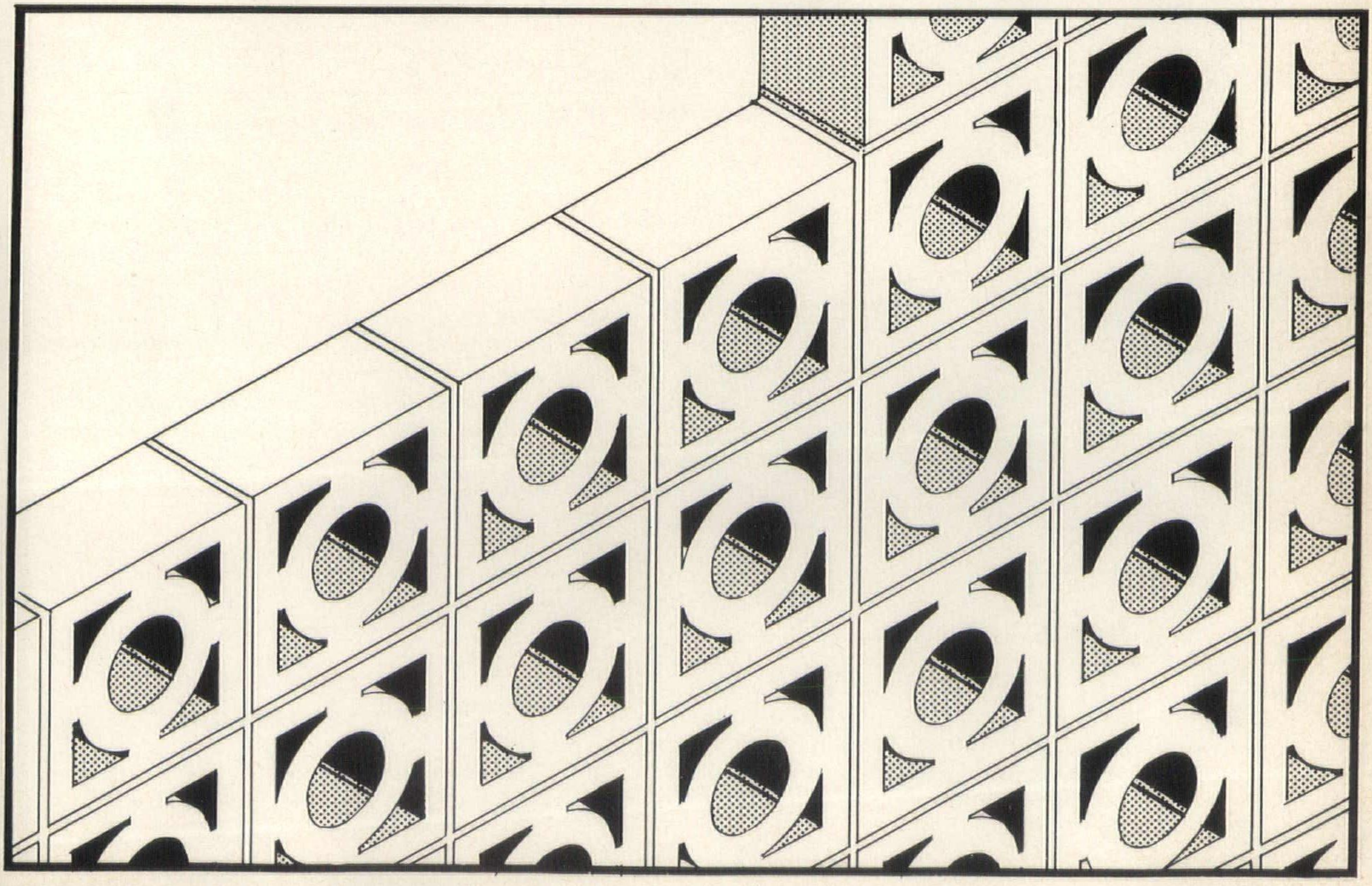

(2) mix in about half the water; and (3) about an hour later mix in the remaining water. The proper consistency is drier than conventional masonry mortar.

Table 1. Recommended Tuckpointing Mortar Mixes (proportions by volume)

Type of service	Cement	Mortar sand in damp, loose condition
Ordinary service	1 masonry cement	2¼ to 3
Service when subjected to extremely heavy loads, violent winds, or severe front action Isolated piers	1 masonry cement plus 1 portland cement	4½ to 6

The general method of applying mortar in joints that are to be tuckpointed is to use a hawk and a tuckpointing trowel. The hawk is to hold a supply of mortar; it also catches mortar droppings if held immediately adjacent to the wall just below the joint that is being filled.

A tuckpointing trowel should be narrower than the mortar joints that are being filled in order to obtain a proper degree of compaction. If the trowel cannot fit into the joints it is more difficult to obtain thoroughly compacted and completely filled joints.

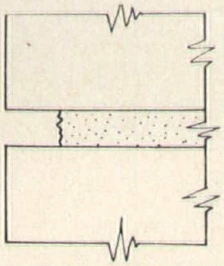

Fig. 5. Properly prepared joint.

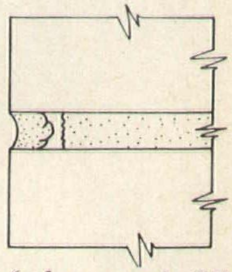

Fig. 6. Improperly filled joint.

Mortar should be spread into the joints in layers and firmly pressed in to form a fully packed joint. Firm compaction is necessary to prevent void spaces as shown in Fig. 6. The act of firmly compacting the mortar helps ensure bond to masonry units and to the old mortar. Void spaces may trap water which can freeze and move the new joint outward.

PERSONNEL NOTICE

There are many openings available throughout Indiana for experienced architectural draftsmen. Any qualified person is urged to contact the ISA office, Post Office Box 55594, Indianapolis, Indiana 46205, for further information.

Designing Concrete Masonry Basements

In designing a basement wall, there are four basic points to be remembered:

1. The maximum earth pressure that will be exerted against the wall, which varies with the depth of the basement wall below grade.
2. The weight of the vertical load which the basement must support; heavy load increase wall stability.
3. Wall thickness required by local building codes.
4. The length, or height, of the wall between lateral supports.

Normally, a hollow load-bearing masonry residential basement wall of 8″ units can only extend 5 feet below finished grade, a 10″ wall approximately six feet, and a 12″ wall seven feet below grade.

It is normally assumed that the stresses created in basement walls by earth pressures against their exterior face are resisted by bending of the walls in a vertical span. This means that the wall behaves like a simple beam supported at its top and bottom. Support at the top is furnished by the first floor construction. Dependence of the wall upon this support is the reason that backfilling should be delayed until the first floor is constructed. Support at the bottom of the wall is furnished by the footing and the basement floor slab.

A portion of the lateral earth load is carried by the wall acting as a beam in the horizontal span. The distribution of the total lateral load between the vertical and horizontal span depends upon: (1) wall height and length, and (2) stiffness of the wall in vertical and horizontal spans.

One can assume that the total lateral load against the face of a basement wall will be equally divided between horizontal and vertical spans if the length of the wall between supports is no greater than its height; the lateral load will be carried entirely in the vertical span when the length of the wall between supports approaches 3½ - 4 times the height; the distribution of lateral load will fall somewhere between these limits for intermediate ratios of wall length to height.

It is possible to increase the over-all stability of a basement wall by increasing its stiffness in either vertical or horizontal spans, or by reducing the length of the span, generally in the horizontal direction.

Lateral support in the horizontal span is furnished by the corner walls, intersecting partition walls, and pilasters or similar devices built into the wall. When a pilaster is used, it can be employed to support the heavy center beams for the building. A good pilaster should project from the wall about 1/12 of the wall height between supports, and its width should be about 1/10 of the horizontal span between supports. When a partition wall is used for lateral support, it can replace the center beam and divide the basement area into work and playrooms at the same time.

Although it is less common, wall stiffness in the vertical span can be increased by embedding vertical steel in the hollow cells with mortar or grout. Stiffness in the horizontal span can be increased by constructing a bond beam, or by placing steel joint reinforcement in the mortar bedding at some interval in the wall height.

The first course of concrete masonry should be laid in a full bed of mortar on cast-in-place concrete footings at least twice the width of the wall and, of course, resting below the frost line on undisturbed soil. Lay up the remaining courses with face-shell bedding of horizontal and vertical joints, preferably ⅜-in. in thickness. Tool joints firmly after mortar has stiffened unless wall is to be plastered or parged.

To insure adequate distribution of vertical loads, solidly construct the bearing (top) course by: (1) filling cores of hollow units with mortar or concrete, (2) using special solid-top masonry, or (3) providing a reinforced bond beam along the wall top.

Intersecting masonry walls should be anchored to basement walls with metal straps spaced not more than 32 inches vertically. The metal straps are 30 inches long, $\frac{1}{4}$-in. thick, and $1\frac{1}{4}$-in. wide. Rake out mortar at the intersection of the two walls and caulk to form a control joint. This provides for slight longitudinal movement in the construction.

Avoid backfilling the basement walls before the first floor is in place, or brace the walls by some means until the first floor is installed. Naturally, the finished grade should be sloped away from the basement walls for good surface drainage. Settlement of backfill material should be anticipated, and the operating of heavy equipment any closer to a wall than the distance equal to the height of this fill should be avoided.

To waterproof a masonry basement wall, it is best to clean the exterior side of the wall, then parge with a $\frac{1}{4}$-in. coat of portland cement-sand plaster, followed with a bituminous (tar asphalt) coating. The wall may be dampened to permit proper curing of the cement plaster. Allow plaster coat to cure and dry before the bituminous material is applied, since most bituminous coatings require a dry surface for proper adhesion.

It is important to see that pin holes and holidays in the bituminous cover are eliminated. Materials waterproofed are effective only to the extent that they form a continuous coating from a point above the finished grade to a point below the top of the footing.

Damp or wet conditions are often mistakenly attributed to leakage of water through the exterior of basement walls, when the trouble is actually due to condensation of moisture from the air inside the basement. Condensation is most frequently encountered in areas having a warm humid climate, but it can occur wherever the temperature and relatively humidity of the air in the basement are maintained at a high level, either artificially or due to atmospheric conditions. Condensations will occur anytime the surface temperature of the wall is below the dew-point temperature of the air in the basement.

Condensation can be minimized by regulating ventilation of the basement area. In general, basement windows should be kept closed at all times when the heating system is operating as well as in the Spring until warm weather has raised the temperature of the ground and the basement walls. Proper venting of gas hot water heaters, clothes driers and other appliances which tend to release moisture is also helpful in preventing condensation.

ISA Variable Retirement Plan

For most individuals, a well designed plan is necessary to achieve retirement objectives. For one thing, the secret of a successful plan is a convenient, systematic method of setting aside and wisely investing relatively small amounts over a period of time. Another secret is to employ competent investment management and thus avoid the psychological hazards which bedevil most private investors. Few have the temperment, experience, knowledge and patience to do an acceptable job. And it is the rare member of a profession who can devote enough time to the task.

An individual could set up a "do it yourself" split fund retirement plan. However, it is likely to prove difficult to inaugurate and expensive and time consuming to maintain.

First, he must either pay a custodian or be bothered himself with the safe keeping, clerical and bookkeeping functions involved.

Secondly, unless willing and able to make relatively large periodic payments on the variable dollar side, he must pay sales commission or "load" on his fund purchases. Experience shows that, because of the small size of their payments, most members will accumulate sizeable savings with a plan using a no load fund.

Thirdly, for the fixed dollar part of his plan, he must locate a company willing to write an insurance contract or annuity with a pension option and other desired features. This takes a bit of doing and will probably be more costly than obtaining the same contract through an association plan. In any event, more than one contract will usually be necessary, which is more expensive than adding benefits by rider as is done under the association plan.

In brief, it is unlikely that a member can duplicate the convenience, economy, and management of a good plan, or that strictly on his own, he will be as likely to reach his retirement income objective.

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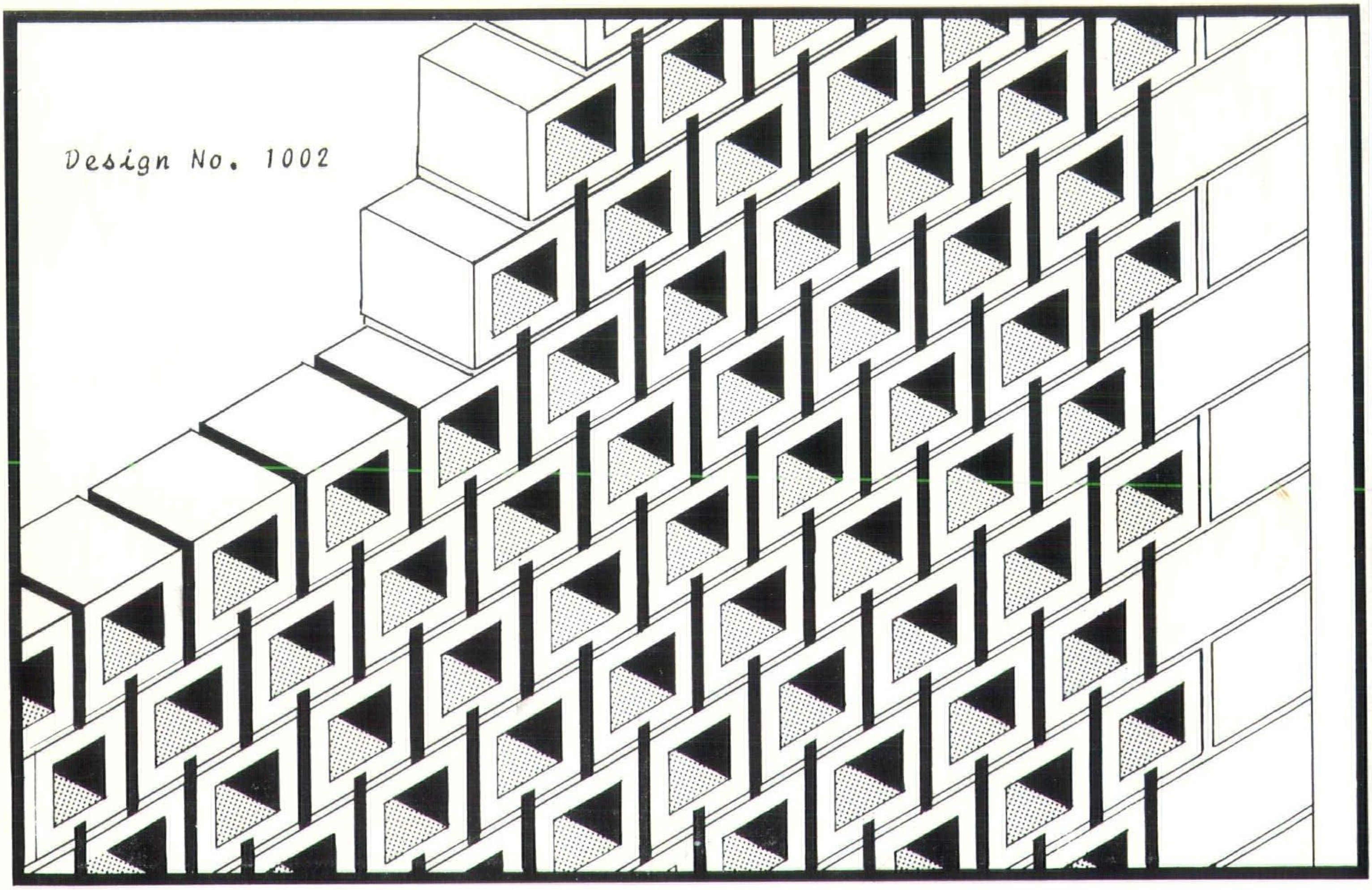

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