

341

July

THE WISCONSIN ARCHITECT

THE OFFICIAL PUBLICATION OF
THE STATE ASSOCIATION OF WISCONSIN ARCHITECTS
WISCONSIN CHAPTER OF THE AMERICAN INSTITUTE
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Lime Mortar Code

1939 Wisconsin Architects' Exhibition

Condensation Problems (conclusion)

A. I. A. Report

Lime Mortar Under Wisconsin State Building Code

Allowable Unit Stress in Masonry where lime mortar is used, shall not exceed the following:

Brick and Solid Block—90 pounds per square inch.

Under the Code, a lime mortar may be used with brick and solid block in any location where the allowable unit stress above is not exceeded, with the following exceptions:

1. Where masonry has one or more face in contact with soil or other damp material.
2. In Parapet Walls.
3. In chimneys exposed to the weather.
4. In standard fire and division walls.

This rule *does not* mean that lime mortar *must* be used, thus permitting cement to be added to the mortar in any proportion if it is so desired. As an example: If a 2:1:9 lime-cement mortar is desired, it is permissible to use that mortar in any load bearing work where the above load limits are not exceeded, except below grade, in parapet walls, fire walls, division walls, chimneys, and with hollow block and tile.

Thus, in the design of a building, a Portland Cement mortar must be used up to the ground level. From that point up to the roof line a straight lime mortar may be used, with the exceptions noted. This applies to curtain walls in skeleton steel construction.

The Code also permits the use of lime or any proportion lime-cement mortar with hollow tile or hollow concrete blocks in non-load bearing work with the same exceptions as above.

It should be remembered, however, that if a 2:1:9 lime-cement mortar is desired, the specification should read: "2 parts of lime, one part of cement, and 9 parts of sand by volume." This wording is necessary, as, under the Wisconsin Code, a specification calling for a lime-cement mortar automatically means a 1:1:6 mortar. The above applies to any proportion of lime and cement higher than a 1:1:6.

In this connection, the Wisconsin Building Code, and these exceptions, are mandatory only in public buildings and places of employment.

Throughout the building profession there is apparently some misunderstanding as to the true meaning of the Wisconsin State Building Code with regard to the use of lime mortar.

This information was obtained by Mr. F. C. Welch, Chemist for the Western Lime & Cement, from Mr. O. T. Nelson, Building Engineer of the Wisconsin State Industrial Commission.

CLARENCE M. ASH

Executive Board Meeting of Wisconsin Chapter of A. I. A.

A meeting of the Executive Board of the Wisconsin Chapter A. I. A. was held on July 8 at the Plankinton Hotel and the following committee chairmen were chosen for the coming year:

Civics Advisory and City Planning . . . Peter Brust
Membership . . . S. Sutherland
Public Information . . . Leigh Hunt

Relation with Construction

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Large Scale Housing . . . G. J. DeGelleke
Specifications and Contracts . . . E. O. Kuenzli
W.P.A. - P.W.A. Special

Committee . . . R. O. Papenthien

As yet no Chapter members have been assigned to committees. Before this is done, the executive board would like to have some response from them concerning their first, second and third choice of committees on which they wish to serve.

It is the hope of the President that the Chapter will be unusually active in such work as will be helpful to the community in the coming year. Our Chapter is just what those of its members who are willing to work want to make it. You who are interested in participating in the affairs of our Chapter and Institute will be given every opportunity to work.

Yours very truly,

ALEXANDER H. BAUER, Pres.
Wisconsin Chapter, A.I.A.

1939 Wisconsin Architects' Exhibition

The following changes and additional instructions to exhibitors are being announced at this time by the exhibition committee.

Exhibitors will be permitted to send as many of their best exhibits as they wish but space allotments necessitate limiting the number of exhibits to three per exhibitor. Each mount shall be regarded as an exhibit.

Mounts shall be of two sizes only—20" x 28" and 28" x 40", and all photographs shall be no less than 11" x 14" in size. Each mount shall have a title indicating the name of the project, location and the name of the architect in proper lettering.

To correct an impression left by the announcement in the April issue of the WISCONSIN ARCHITECT, exhibits are not limited to residential architecture only, but will include all classes of buildings. However, exhibitors are limited to architects who are residents of the State of Wisconsin.

Exhibits are to be limited to work executed or under construction since Jan. 1st, 1930, and may include remodeled buildings.

Cost of transportation of exhibits to Milwaukee and from last point of exhibition will be borne by the exhibitor, but the State Association together with the Wisconsin Chapter A.I.A. will pay the costs of shipping from one district to the other.

In addition to the three mounted exhibits each architect will be permitted to submit one model of building, sculpture, etc. The cost of shipping models to other than the local district must be borne by the exhibitor.

(Continued on page 5)

Condensation Problems in Modern Buildings¹

By

L. V. Teesdale, Senior Engineer
Forest Products Laboratory², Forest Service
United States Department of Agriculture

(Continued from June)

Conditions did not become static in the case of No. 3, the moisture continuing to build up until the change in outside temperature raised the sheathing temperature above the dewpoint. After that time No. 3 began to dry out. This particular panel was quite badly blue stained whereas the other two panels were clean and bright. From these data and other observations it appears that for conventional frame walls with fill insulation the permeability of the vapor barrier should not exceed 0.600 grains per square foot per hour on a basis of the values given in table 1 for houses where humidities are maintained at or about 40 percent in normal winter weather having short periods of zero weather. Where exposed to extended periods of weather below zero the vapor barrier should have greater resistance. For walls having less insulation, less resistance is required in the vapor barrier other factors being alike. However, enough data are not available at this time to establish values for all wall types.

The barrier, when located as described on the warm side of the wall, resists the passage of moisture while it is in the form of vapor and therefore before it has a chance to condense into water. Hence there is no hazard of water forming behind the plaster or other interior wall finish. The barrier also prevents moisture from getting into the wall or attic space during the construction period, particularly during the plastering operation.

For new construction, vapor barriers of highly resistant paper are effective and economical. They should be applied vertically on the interior portion of exterior or exposed side walls with edges lapping on the studs after the insulation is installed and before lathing. Horizontal joints should be made only where backed up with a plate or header. The barrier should be brought up tight against electric fixture outlets, air registers, door and window frames, and other similar openings. If wood lath, metal lath, or other types requiring a plaster key are used the paper should be applied slightly loose so that the plaster can push the barrier back to form the key. Where the ceiling below the attic or roof are insulated the barrier should be applied in a similar manner.

Walls finished with such materials as plywood, fiber board, plaster board, and the like, should also have the barrier as described. Sheathing paper when used outside of the sheathing in combination with the moisture barriers described should be water resistant but not very vapor resistant so that the small amount of water vapor that may leak through the barrier can escape outward. We now believe that slaters felt meets this requirement very well.

Some kinds of mineral wool are relatively resistant

to water absorption, others are treated to make them resistant to wetting by water. This property, while desirable, does not make these materials resistant to the passage of vapor. Therefore, unless additional vapor-resistance be provided, they should not be considered a source of protection against condensation.

Some types of mineral wool have a vapor-resistant paper back attached to the bat. Tests to date indicate that these papers average somewhat below the resistance previously specified. They are sufficiently resistant, however, to be of definite help in keeping the insulation and the wall dry and to warrant proper care in installation. The wool bat is made to fit between standard stud, joist, and rafter spacing with tabs on the paper which extend out from the bat and are tacked to the studs or rafters. The bat may be cut or forced back to obtain the tabs at the end of the bat. Where the spaces are not standard between studs, such as occurs around windows, doors, and dormers, particular care should be taken to obtain good joists even if it is necessary to use one of the barriers previously described. As yet no suitable provision has been made for sealing the horizontal joints between adjacent bats in the individual stud spaces. Unfortunately we do not know at present just how much protection is needed at this point.

Blanket types of insulation are also available where the insulation is enclosed within a heavy paper covering treated with asphalt. Insulations of this type come in various thicknesses, and the vapor-resistance of the enclosing envelope can be built up to almost any desired point. It is important that this type of insulation be carefully installed so that vapor cannot work through around the edges. The tabs should be nailed to the face of the studs with the insulation looping loosely inward away from the inner face of the wall or if installed between studs it should be fastened in place with wood strips.

Fiber board sheathing is often used as a substitute for wood sheathing and it may be used either with or without other insulation. When used with other insulation the methods of protection suggested should be followed. When no other insulation is used the need of a moisture barrier is much less, just as with wood sheathing.

Materials embodying the principle of reflective insulation are in use but opportunity for observation and tests have been limited. One type having metal foil attached to both sides of a heavy sheet of paper is very resistant to vapor and another type composed of a strong paper faced on both sides with metal oxides is also very effective in resisting vapor transmission.

It is also possible to so construct walls that the vapor could pass outward through sheathing and sheathing paper and escape through openings in the outside wall covering or be carried away by ventilating the space between the sheathing and outside finish. Standard construction does not lend itself to this method of moisture elimination. One possible method for wood siding would be to place 1 by 2 inch furring strips over the sheathing, thus obtaining a vertical ventilating space approximately of $\frac{3}{4}$ of an inch which should be open to the outside at both the bottom and top of the wall so that air could enter at the bottom and

¹ Presented before Conference on Air Conditioning, University of Illinois, Urbana, Ill., March 8-9, 1939.

² Maintained at Madison, Wisconsin, in cooperation with the University of Wisconsin.

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Official Publication

The State Association of Wisconsin
Architects

Wisconsin Chapter, The American
Institute of Architects

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724 E. Mason St., Milwaukee

Published Monthly

Subscription, \$1.00 per year

Address all communications for publication
to Editor at 152 W. Wisconsin Ave.,
Milwaukee

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State Association of Wisconsin Architects Board Meeting

June 17, 1939

The regular monthly meeting of the Executive Board of the State Association of Wisconsin Architects was held at the executive offices of the Kohler Company at Kohler, Wisconsin.

The meeting was called to order by President Leigh Hunt at 11:00 A.M.

The following members were present: Messrs. Leigh Hunt, G. DeGelleke, C. Madsen, U. Peacock, B. H. Knobla, N. R. Safford, R. S. Chase, Wm. Mickelsen, Wallace Brown, Henry Auler, Emiel Klingler and A. L. Seidenschwartz.

Mr. William Oppenhamer was represented by proxy.

Mr. Gregory Lefebvre was absent.

Messrs. Ralph Kloppenburg, Clarence Gruhl, Frederick Rauber, and Ivar Lohman attended the Executive Board meeting.

The Minutes of the previous meeting were approved as printed.

COMMITTEE REPORTS

Publicity Committee:

President Leigh Hunt made a report on the program of the weekly Sunday advertising being run in the Milwaukee Journal and the Milwaukee Sentinel. Mr. Hunt stated that Mr. William Orr Ludlow, Chairman of the A.I.A. Committee on Public Information, recommends our method of advertising for national use by the chapters of the Institute.

Mr. Knobla inquired whether or not it would be possible to repeat the same ads in local city papers of the larger cities of the State of Wisconsin. The answer was yes.

Mr. Hunt further stated that, upon investigation, it was believed that weekly ads brought little or no results and that our advertising should be confined entirely to Sunday papers.

It was suggested that the committee for the collection of assessments, as adopted at the last regular board meeting, contact the Districts in order to speed up the collection for the cost of this advertising.

Small House Competition Committee:

Mr. Kloppenburg called the Board's attention to the fact that one of the contestants who had followed the rules of the small house competition was disappointed due to the fact that the competition had not been followed out to its fullest extent. Only this one contestant submitted plans and the committee decided to drop the competition and not go further with it at this time.

It was suggested that Mr. Lefebvre, chairman of this committee, make a complete report on the competition.

Legislative Committee:

Mr. Knobla, vice-chairman of this committee, stated that he had attended the hearing for tax on fuel oil and that he had submitted a negative vote. It was impossible for him to stay until the hearing was completed due to its length.

He further reported that the bills on labor and insurance were postponed.

Practice Committee:

Mr. Mickelsen, chairman of this committee, reported that he had received a letter from Mr. Charles Wurm making inquiry as to what disposition the Board had made in his particular case. Mr. Mickelsen was informed that the Executive Board could do nothing at this time to help his case.

Mr. DeGelleke reported that the Registration Board was working on the matter of men representing themselves as architects who are not properly registered, and also on other cases that had been referred to them by the Executive Board.

Mr. Mickelsen further stated that something should be done by the Executive Board in regard to violations of the State Registration Act in regard to the fifty-thousand cubic feet clause; also on the State School Board furnishing free plans.

After considerable discussion, it was decided that the Practice Committee contact the Industrial Commission and discuss with them the best method of clearing up this situation. It was moved by Mr. DeGelleke and seconded by Mr. Knobla that the Practice Committee have a meeting with the Industrial Commission in regard to this matter. Motion was adopted. (Since the meeting was held, Mr. Mickelsen has made arrangements for a meeting with the Industrial Commission to go into this matter on July 21 at which time there will be a meeting of the Board.

No further reports were had from committees.

Communication was received from the Wisconsin Registration Board asking that the State Association of Wisconsin Architects submit the names of three members as representatives on the Wisconsin Registration Board to fill the vacancy of Mr. Peter Brust whose term ends in September, 1939. It was moved by Mr. Mickelsen and seconded by Mr. Madsen that the names of Peter Brust, Edgar Berners, and Alex Eschweiler, Jr. be submitted. The motion was adopted.

NEW BUSINESS

There was considerable discussion as to where the next annual convention was to be held. Mr. Hunt stated that the Board was open for invitations. Mr. Seidenschwartz reported that he had received communication from Kerner's North Woods Resort inviting them to have their convention up in the North woods.

Mr. DeGelleke submitted a re-draft of resolution for deposit on plans and after considerable discussion on the matter, it was moved by Mr. Seidenschwartz and seconded by Mr. Safford that the re-draft be turned over to Mr. Wallace Brown for further study and that he submit same back to the Executive Board for adoption at a later meeting. Motion was adopted.

There being no further business to come before the meeting, same was adjourned upon motion of Mr. Knobla and seconded by Mr. Brown.

Meeting was adjourned at 1:15 P.M.

After the meeting, the members of the Executive Board and the several other architects who were present enjoyed a most wonderful luncheon served by the Kohler Company in their Club House. After the luncheon the architects gathered at the executive offices of the Kohler Company, inspected plumbing fixtures at the Kohler display, then made a tour of the City of Kohler and a visit to the Waelder Haus of Kohler, from which they went to the home of Mr. Walter Kohler at River Bend and enjoyed a most wonderful picnic and dinner in the evening.

Respectfully submitted,
ARTHUR L. SEIDENSCHWARTZ
Secretary.

(Continued from page 2)

Exhibitors are advised to collect their material early in order to have their exhibits ready for submission as all entries must be at the Milwaukee Art Institute, 772 N. Jefferson St., Milwaukee, before September 18th.

HARRY BOGNER
Chairman Exhibition Committee

(Continued from page 3)

pass out at the top. The openings could be concealed behind but not covered by mouldings or other treatment at the water table and cornice. Similar ventilation could be adapted to stucco, brick and stone exteriors. With this method the sheathing paper should be of a type that passes water vapor readily, such as slaters felt. During periods of protracted cold weather it is quite possible that moisture would accumulate in the wall faster than it could pass through and be removed by ventilation, hence the ventilation method might not assure complete protection. So far, the possibilities in this method have not been thoroughly investigated by the Forest Products Laboratory though tests are under way.

The practice of installing insulation in existing houses, some of which have been built for many years, is becoming general, adding both to summer and winter comfort of the occupants. The occurrence of moisture or condensation in these older houses after insulation is uncommon, largely because such houses are not so tight as new houses, windows fit less snugly and probably have no weather strips. Under such conditions the normal indoor humidity is low. Occasionally, however, these older homes will also show evidence of moisture accumulation and generally when the occupant has made an effort to increase the humidity above normal. Some of the companies that insulate existing houses take off a portion of the outer wall covering and cut a large number of openings in the sheathing through which the insulation is blown. The outer covering is replaced without filling the holes in the sheathing. These openings allow more or less ventilation and are perhaps helpful in allowing vapor to escape outward. Some companies include some form of attic or roof ventilation as a part of their contract.

Positive protection for existing buildings that have a moisture problem or where it is proposed to install winter air conditioning may require some type of barrier on the interior face of exterior walls and on the ceilings below the roof. Ordinary paints of the flat wall, or lead and oil types do not seem to offer the resistance desired but two coats of aluminum paint, particularly on smooth plaster, appear to offer reasonably good resistance and permit almost any subsequent method of decoration desired.

The conditions that cause condensation in side walls also occur in attics or under roofs, modified more or less by any ventilation that may be provided or that may occur naturally. Roof condensation is observed or reported far more frequently than side wall condensation since it is more in evidence. For example, in a pitched roof house condensation may develop on the roof sheathing during a severe cold spell, forming as frost or ice. During subsequent mild weather or under a bright sun the ice melts and water works back through the plaster and spots the ceiling.

The principles that apply to side wall protection also apply to attics, modified somewhat by the type of roof. In new construction it is easy to apply vapor barriers the same as for walls. However, many kinds of roof materials are highly vapor resistant and any vapor passing through the barrier, or otherwise reaching the space below the roof cannot escape readily through the roof covering. With pitched roofs, ventilation through louvered openings, windows, or other

means will usually take care of the situation. With flat roofs and hip roofs, and where the ceilings are bisected by roof rafters it is often difficult to provide adequate ventilation. Unless ventilation can be provided for such types of construction it is not safe to carry high winter humidities.

The question sometimes arises as to the possibility of summer cooling causing condensation in walls. This is very unlikely because the inside temperatures are seldom more than 15 degrees below outside temperatures so that the possibility of condensation would only occur during periods of extremely high humidity outside. Such a condition would be of rather short duration and would be unimportant.

GENERAL RECOMMENDATIONS

For all new houses especially north of the Ohio River, it is recommended that a suitable vapor barrier be installed on the interior of all exposed walls and in the ceiling below the attic and that some form of attic ventilation also be provided. Further, that any sheathing paper used should be water resistant but permeable

to vapor. The protection afforded will also prevent condensation that might otherwise develop during the construction period, particularly if the house is plastered during cold weather.

(Continued on next page)

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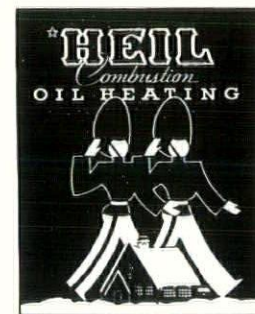
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(Continued from page 6)

For existing houses having no vapor barriers maintain humidities at such a point that condensation will not develop in walls and attics. Since conditions in walls cannot be readily determined, the attic, if tight and without ventilation, may be used for observation. In general, the safe humidity inside in relation to outside temperature will correspond roughly with the values given on figure 1. To maintain higher humidities safely some form of vapor barrier can be applied to the exposed walls and ceilings, such as 2 coats of aluminum paint. While not offering as much resistance as the more effective barrier this method should mean that humidities of about 30 percent could be maintained in normal winter weather having short periods of zero weather.

The suggestions offered are based upon tests made at the Forest Products Laboratory, part of which are still under way, combined with observation and experience in occupied houses. As further information becomes available additional recommendations and modifications of the present ones will be released.

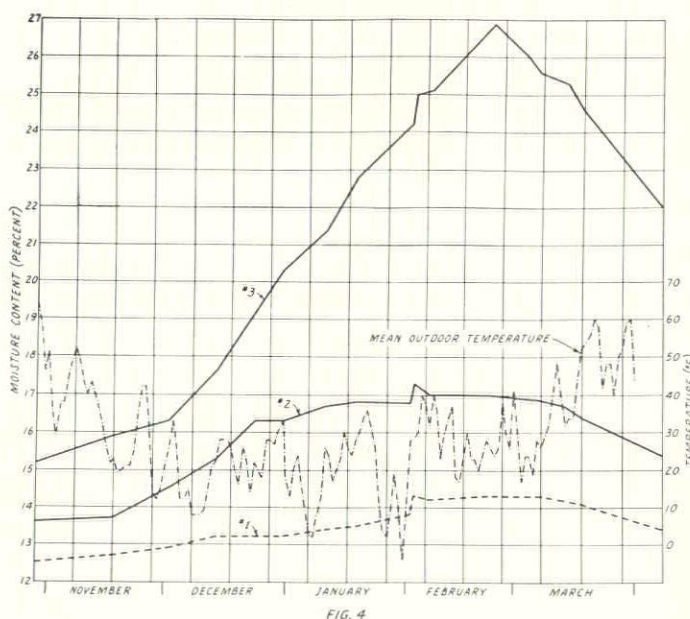


FIG. 4
Curve showing moisture content of wood sheathing during the winter of 1937-38 in laboratory test house with and without vapor barrier.



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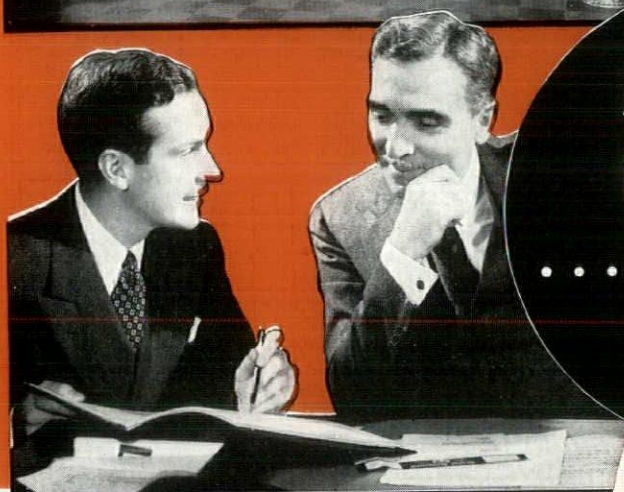
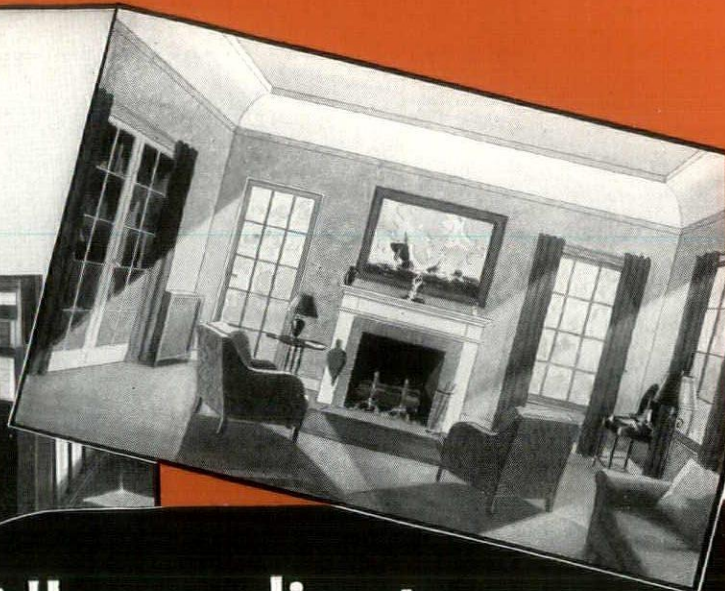
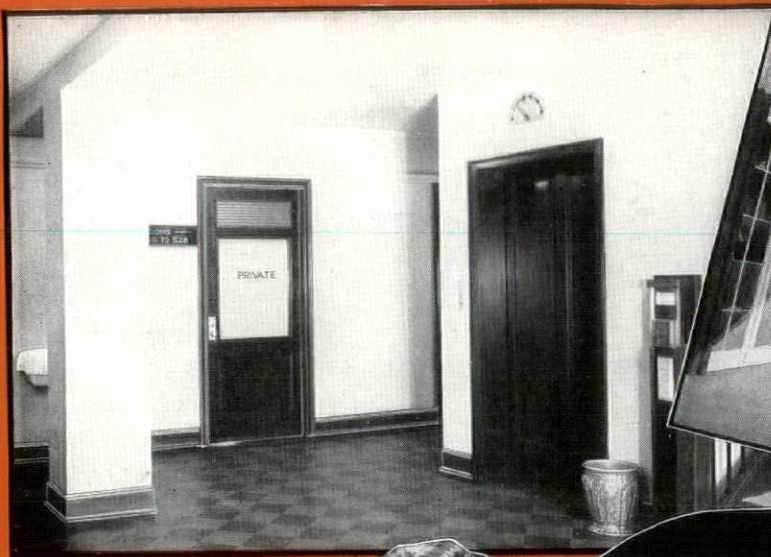
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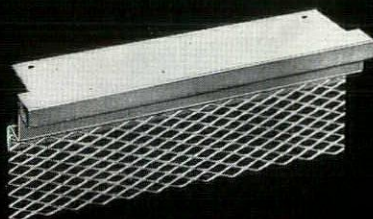
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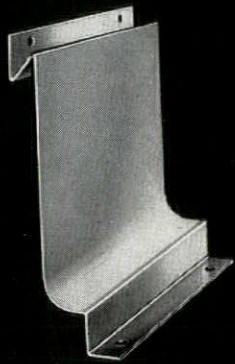
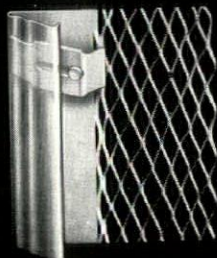


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