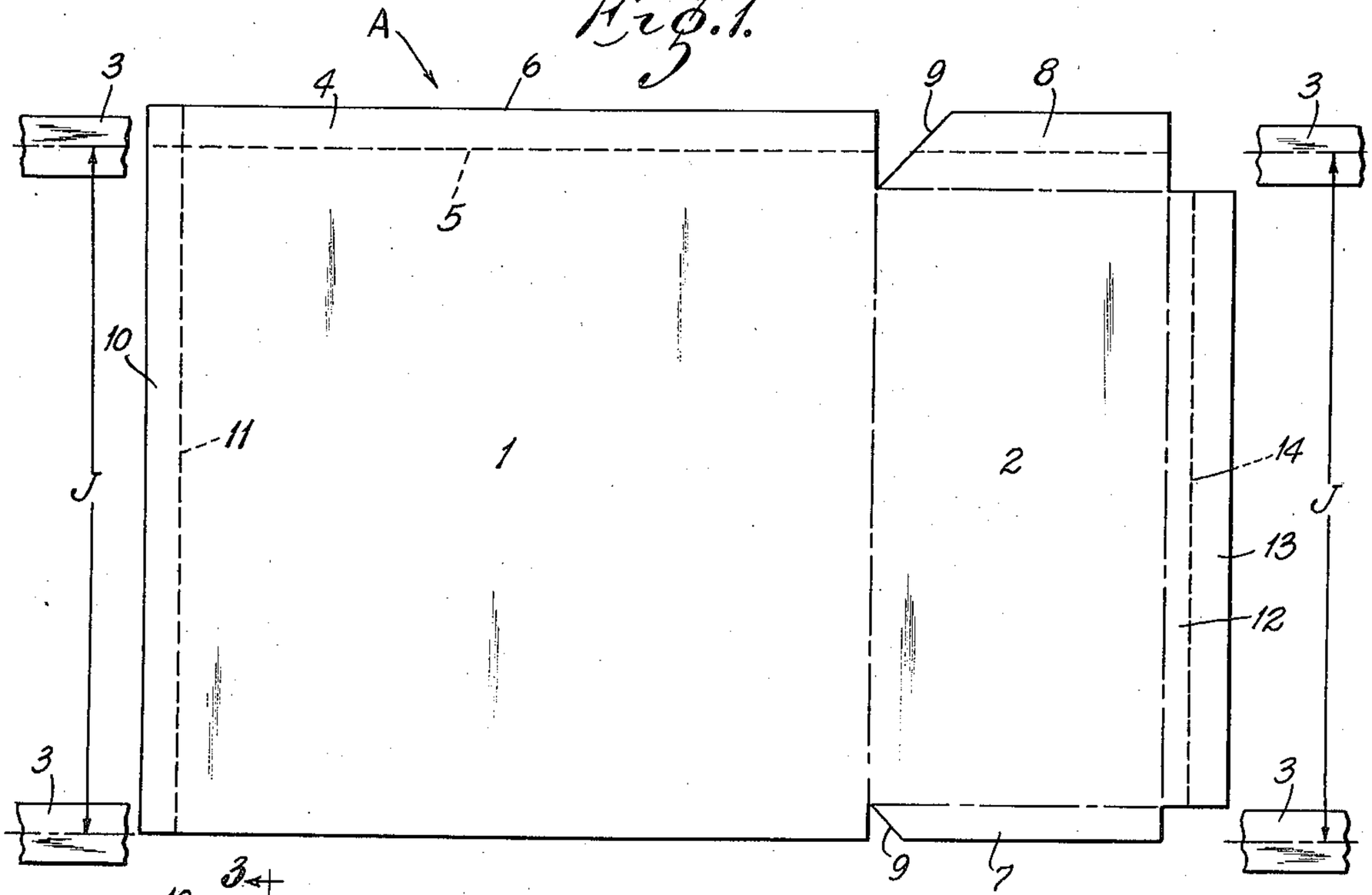
Aug. 20, 1935. M. C. OWINGS 2,012,019

INSULATING STRUCTURE AND MATERIAL

Filed May 29, 1933 3 Sheets-Sheet 1

Fig. 1.



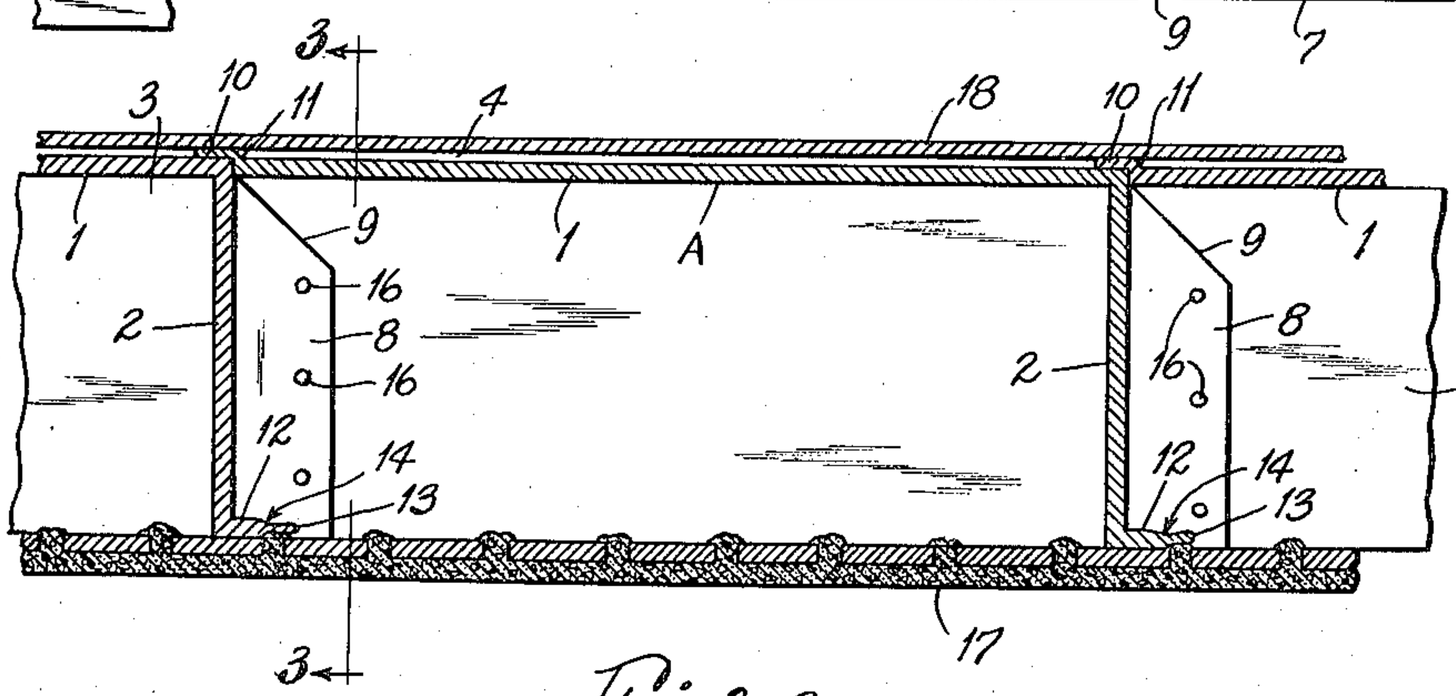
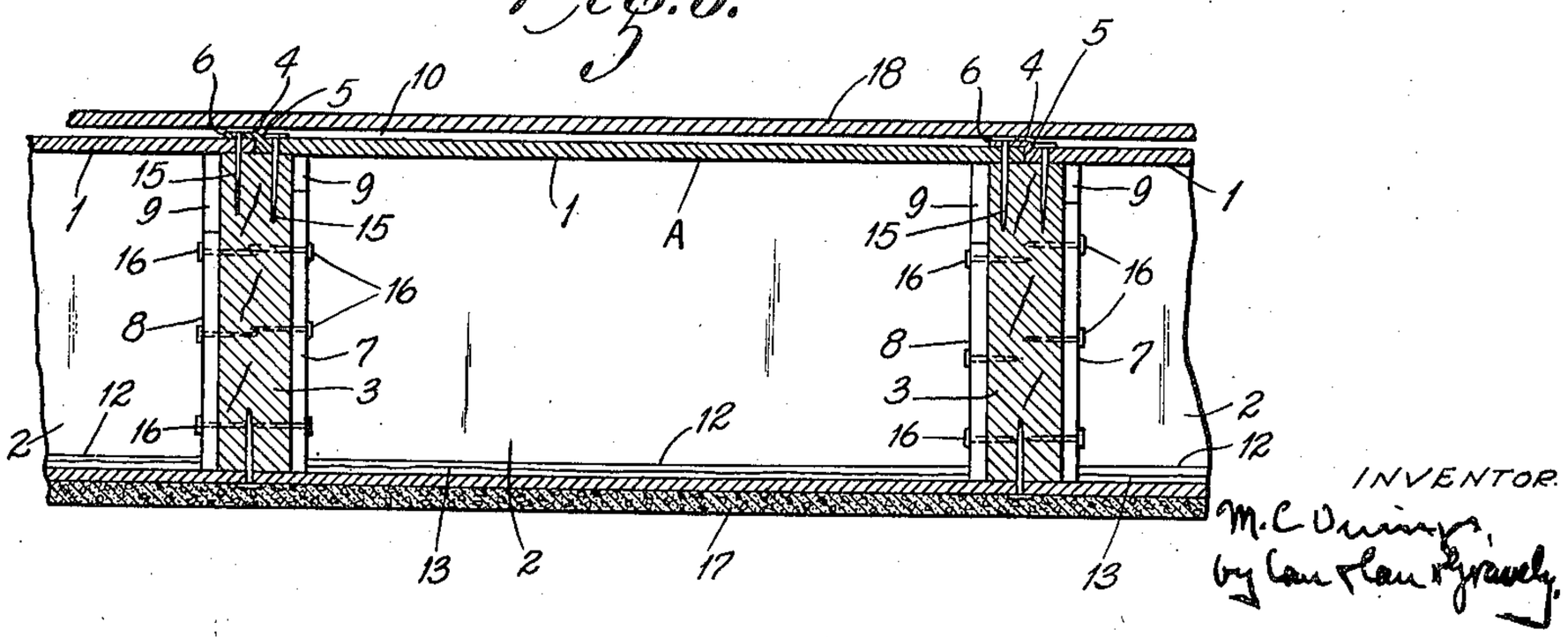


Fig. 2.

Fig. 3.



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Aug. 20, 1935. M. C. OWINGS 2,012,019

INSULATING STRUCTURE AND MATERIAL

Filed May 29, 1933 3 Sheets-Sheet 2

Fig. 4.

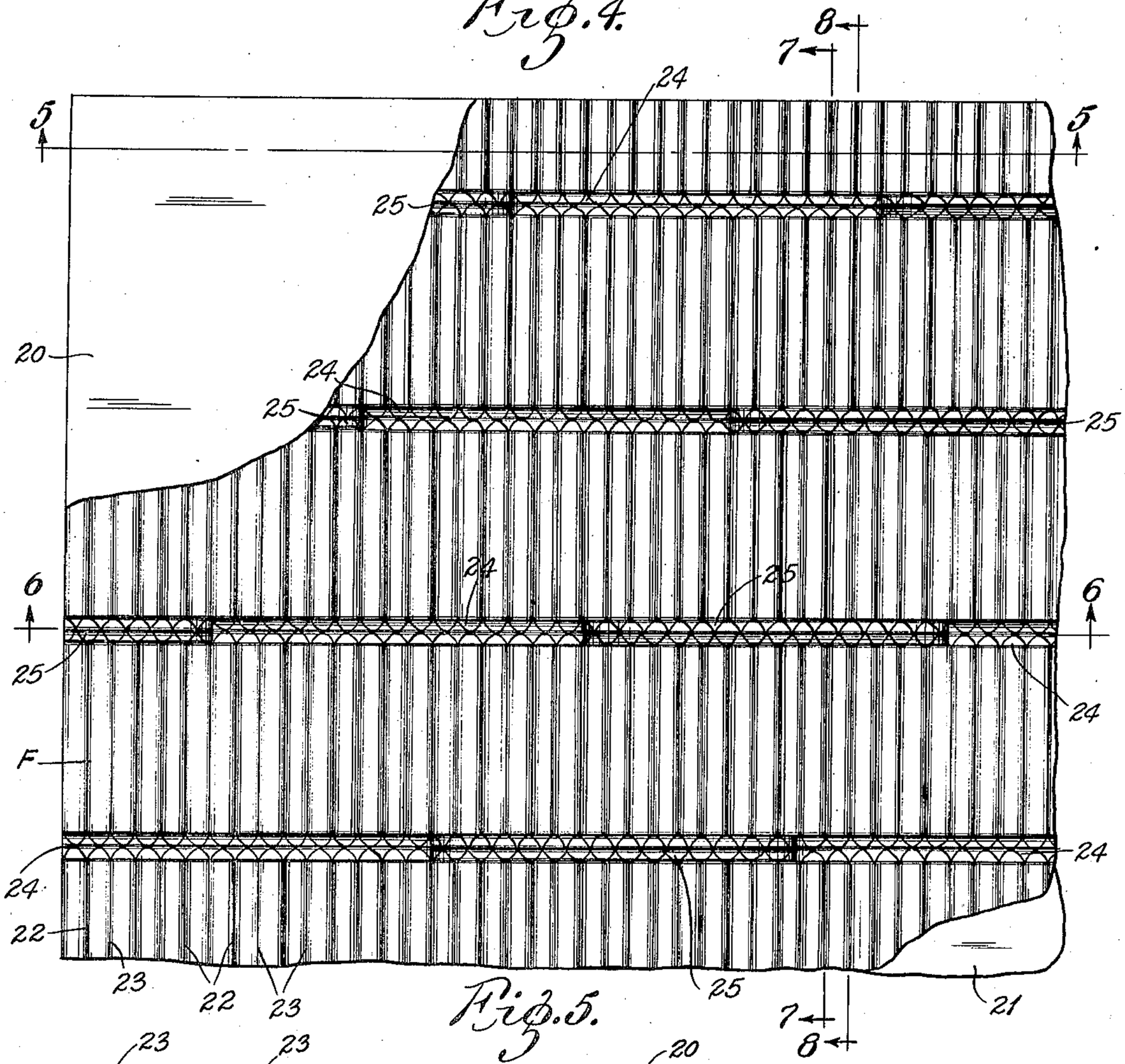


Fig. 5.

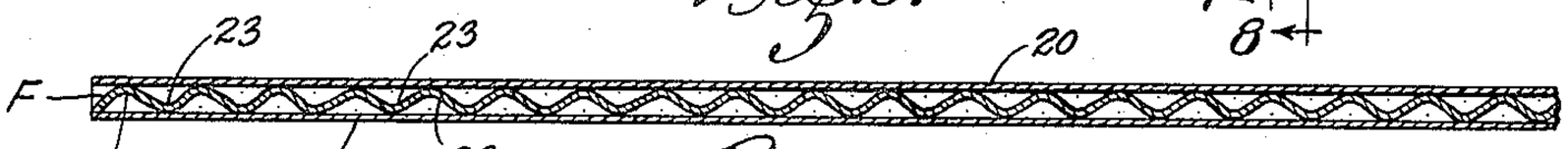


Fig. 6.

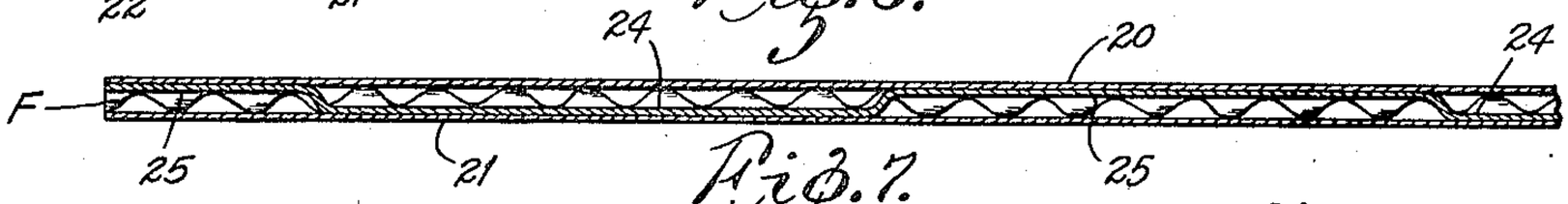


Fig. 7.

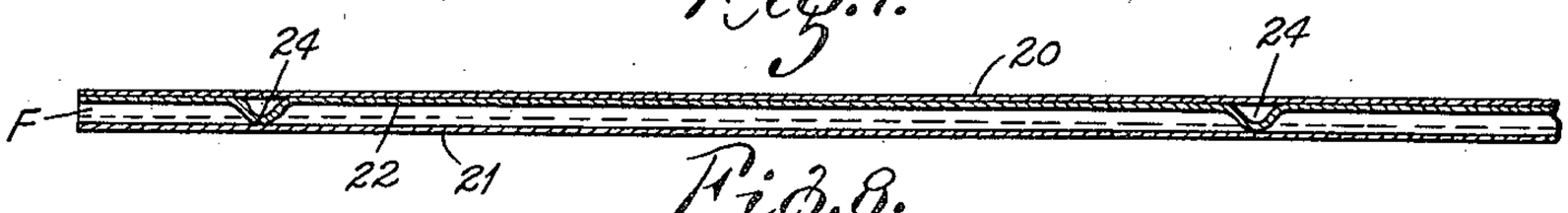
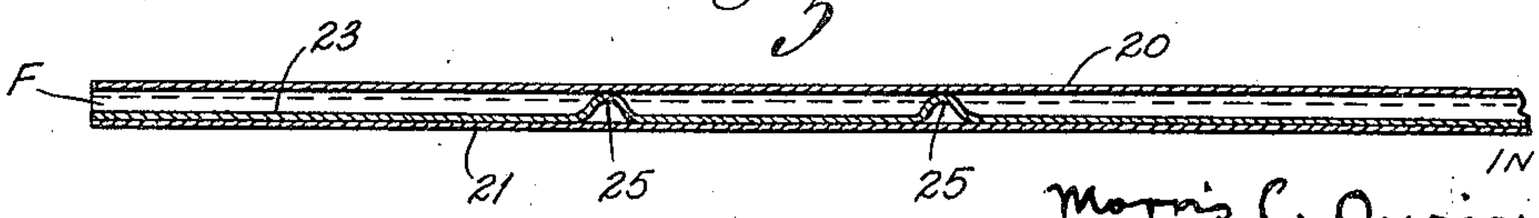


Fig. 8.



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Aug. 20, 1935. M. C. OWINGS 2,012,019

INSULATING STRUCTURE AND MATERIAL

Filed May 29, 1933 3 Sheets-Sheet 3

Fig. 9.

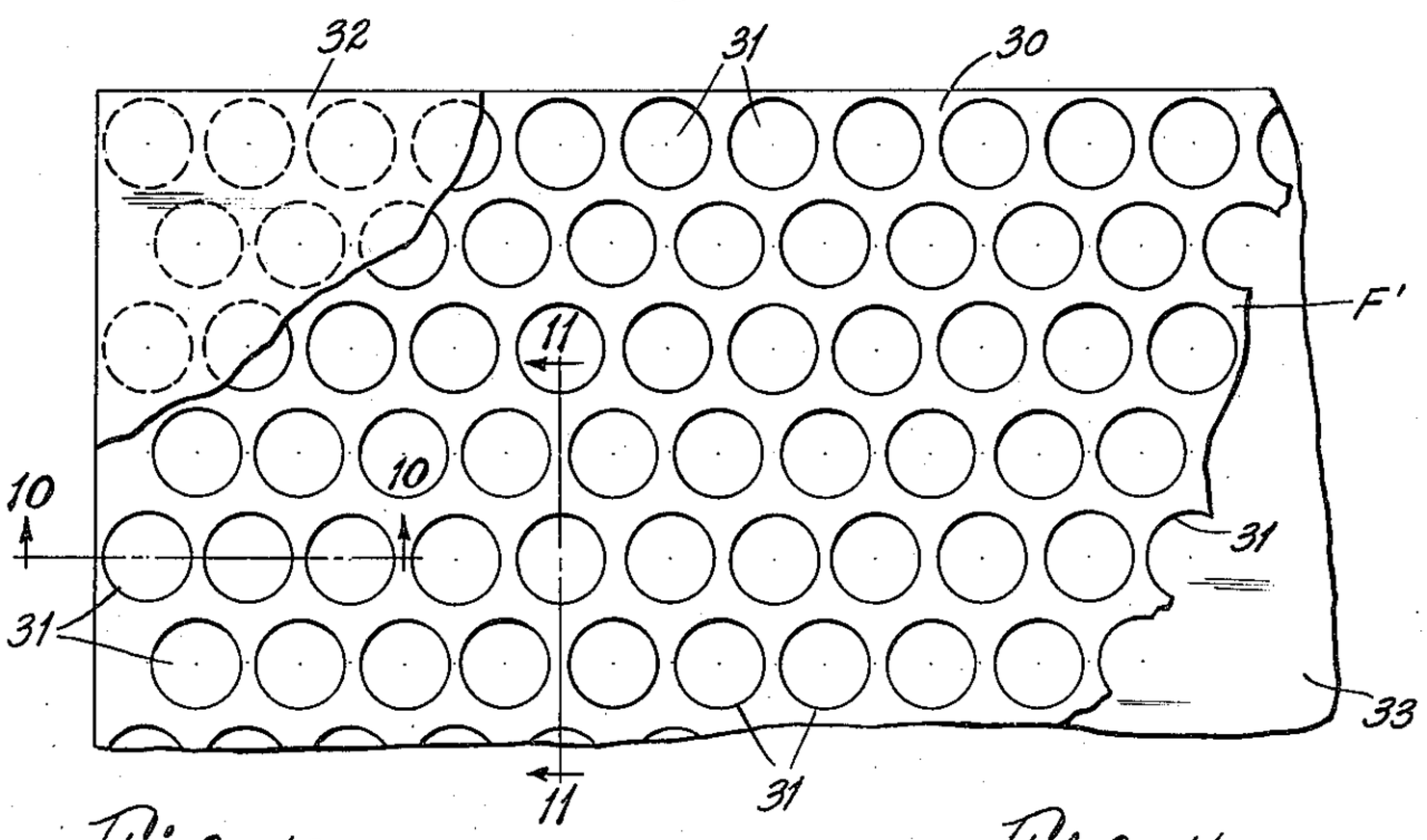


Fig. 10.

Fig. 11.

Fig. 12.

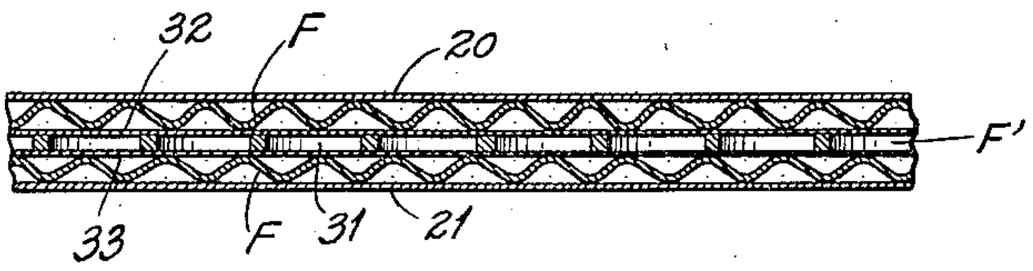


Fig. 13.

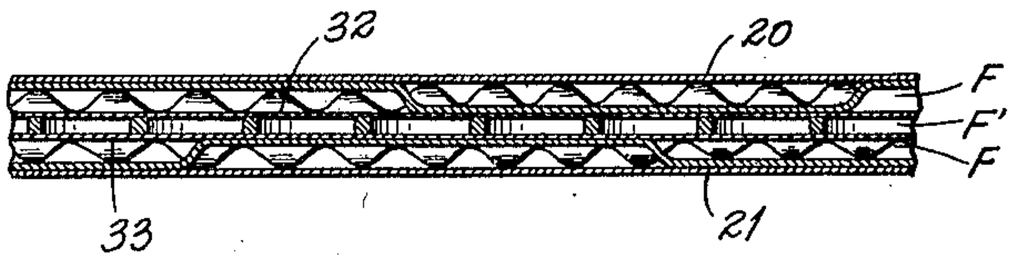
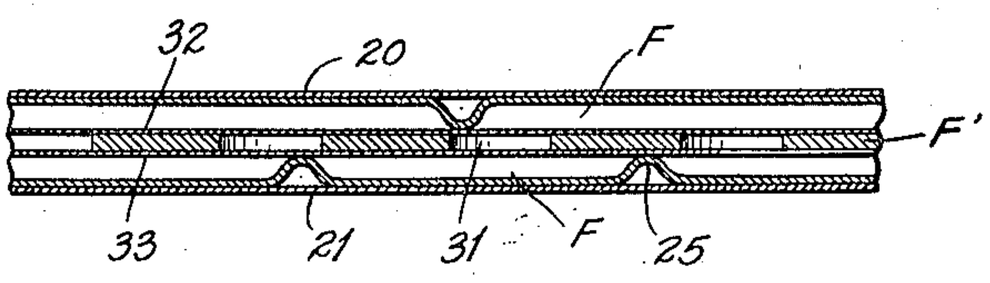


Fig. 14.



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Patented Aug. 20, 1935 2,012,019

UNITED STATES PATENT OFFICE

2,012,019

INSULATING STRUCTURE AND MATERIAL

Morris C. Owings, Webster Groves, Mo.

Application May 29, 1933, Serial No. 673,426

8 Claims. (Cl. 20—4)

My invention relates to the insulation of walls, roofs and ceilings, particularly to the insulation of unfinished attics or buildings, that is to say, an attic where the space between the ceiling joist above the lath and plaster has been left opened or the space between the roof rafters below the sheathing and roofing material has been left opened.

A principal object of the invention is to create a dead air space over the entire surface of a ceiling, roof or wall. Another principal object of the invention is to create a plurality of air cells or pockets over the surface to be insulated, and to use a light inexpensive material. A further object is to protect these air cells or pockets by means of a further insulation. Another object of the invention is an insulating material having a plurality of minute air cells or pockets and especially adapted for use as hereinafter described. Other objects and advantages will appear hereinafter.

The invention consists principally in the insulating material and in the parts and combinations of parts hereinafter described and claimed.

In the accompanying drawings, wherein like reference characters refer to like parts wherever they occur,

Fig. 1 is a plan view of an insulating member embodying my invention, with portions of joists indicated to show the position of the member with respect to said joist,

Fig. 2 is a sectional view of a ceiling insulating structure embodying my invention, the section being taken along a line parallel to the joist,

Fig. 3 is a section taken across the joist,

Fig. 4 is a plan view of a corrugated filler piece of an insulating material embodying my invention,

Fig. 5 is a sectional view along the line 5—5 in Fig. 4,

Fig. 6 is a sectional view along the line 6—6 in Fig. 4,

Fig. 7 is a sectional view along the line 7—7 in Fig. 4,

Fig. 8 is a sectional view along the line 8—8 in Fig. 4,

Fig. 9 is a plan view of a modified form of filler piece for an insulating material,

Fig. 10 is a sectional view along the line 10—10 in Fig. 9,

Fig. 11 is a sectional view along the line 11—11 in Fig. 9, and

Figs. 12, 13 and 14 are sectional views corresponding to Figs. 5, 6 and 7, respectively, showing an insulating material built up of the two forms of insulating material shown in Figs. 4 to 11, inclusive.

As shown in plan in Fig. 1, the blank of which the individual insulating members A are made includes a body portion 1 and an end portion 2, each having marginal portions for the purposes hereinafter set forth. Said member may be made of ordinary corrugated board, fibre board or the like.

Assuming that an attic ceiling is to be insulated, the width of the body 1 of the insulating member A is equal to the center to center distance J between joists 3, plus an allowance, as shown by the marginal portion 4 between the dotted line 5 and one side margin 6 of the body, to allow for variation in the distance between joist centers. Along one side, the end portion 2 of the insulating member A is provided with a marginal portion or flap 7 that is approximately equal to half the width of a joist and on the other side with a flap 8 of greater width. Thus, said end member 2 proper, exclusive of the flaps 7 and 8, has a width equal to the distance between the faces of the joists 3. For convenience in assembling, the margins 9 of these flaps adjacent to the main body of the blank preferably incline away therefrom. The greater width of the flap 8 is to compensate for variation in the distance between joists.

Along the front edge of the body is a marginal zone 10, extending from the dotted line 11 to the front of the member A. At the end of the end member 2 is a projecting flap 12 that has a marginal portion 13 extending between the dotted line 14 and the end of said flap.

When used as a ceiling insulation, the main body 1 of the member A rests on the joists 3 extending substantially from center line to center line, and may be secured to the joists by nails 15. The end member 2 is bent at right angles into the space between joists. The flaps 7 and 8 are bent to engage the faces of the joists and may be secured thereto as by nails 16. The flap 12 is bent to lie substantially parallel to the main body 1 of the member and in contact with the upper surface of the ceiling 17. In order to make close contact with the ceiling, the marginal portion 13 of said end flap 12 is crushed or worked in any suitable way so as to break down the structure, thus making it pliable and also providing minute air pockets and closing the ends of the spaces between corrugations. The front marginal portion 10 of the insulated member may be worked in the same way and also the side marginal portion 6.

If an extra insulating space is desired, suitable sheets 18 of insulating material may be placed over the structure just described, resting on the marginal portions 6 and 10.

It will be noted that the above described arrangement builds up a multiplicity of separate air cells or pockets. Notwithstanding the light material of which it may be made, the completed structure is quite substantial, by reason of the truss-like arrangement of the members A and

their interengagement with the side faces and tops of the joists 3.

When the structure is built up as a wall member or in any place where an ornamental finishing surface is desired, the portions 6 and 10 may be eliminated, so that all parts of the surface of the insulating structure lie in the same plane. Any finishing material may then be applied to the surface of the insulating members.

In Figs. 4 to 14 are illustrated forms of insulating material especially suitable for the above described insulating structure.

In Figs. 4 to 8 is illustrated an insulating board comprising a top layer 20 and a bottom layer 21 with an intermediate corrugated filler F. Starting with the usual undulating section, that is transversely extending convex portions 22 alternating with concave portions 23, said filler member has concave portions 24 and convex portions 25 running at right angles or crosswise to the usual concave and convex portions. These longitudinal curved portions 24 and 25 have the important effect of crushing across the transverse curved portions 22 and 23; thus closing the passages formed by said curved portions at intervals, eliminating the usual passageways that would otherwise extend from side to side of the filler. The longitudinal curved portions 24 and 25 are staggered with respect to each other, thus completely stopping the circulation of air in all directions.

In the construction shown in Figs. 9 to 11, inclusive, the filler member F' consists of a sheet 30 of suitable material having a multiplicity of openings 31, preferably circular, therethrough. In the assembled device, these openings are covered over by the top 32 and the bottom 33, thus becoming dead air cells or pockets.

As shown in Figs. 12, 13 and 14, the two modifications may be combined into a single structure. The perforated filler piece F' may have secured to its top 32 and bottom 33 a corrugated filler piece F shown in Figs. 4 to 8 and suitable top and bottom members 20 and 21 may be secured to said corrugated filler piece F. In this construction the top and bottom covers 32 and 33 for the perforated member F' may be of suitable light paper as kraft paper. The insulating material just described creates a very large number of minute air cells or pockets and entirely prevents the passage of air currents in any direction. Besides, it has a very considerable strength due to its being built up of numerous layers.

The above described constructions build up a very effective insulating structure from light and comparatively inexpensive materials. It may be readily built up out of standardized materials to fit any particular size of structure or any joist spacing. The insulating material is very light and inexpensive and it provides a number of minute air cells, thus greatly increasing the insulating effect of the finished structure. The structure is quite rigid, notwithstanding the light material from which it is made, so that it permits the use of inexpensive wall board or other flexible finish material requiring a firm support.

What I claim is:

1. In combination with the supporting members of ceilings, roofs, walls and the like, an insulating structure comprising members extending from support to support with its side marginal portions overlapping the respective supports and resting thereon, said member also having portions filling the space between supports, said last mentioned portions having flaps secured to said supports and the end of each member overlapping the adjacent member.

2. In combination with the supporting members of ceilings, roofs, walls and the like, an insulating structure comprising members extending from support to support and having portions filling the space between supports, said portions having flaps secured to said supports, each member having portions overlapping adjacent members.

3. In combination with the supporting members of ceilings, roofs, walls and the like, an insulating structure comprising members extending from support to support and having portions filling the space between supports, said portions having flaps secured to said supports, each member having portions overlapping adjacent members, and an insulating cover resting on said overlapping portions.

4. An insulating structure for ceilings having joists comprising members extending from joist to joist and each having an end portion bent into the space between joists and extending to the upper surface of the ceiling, said end portion having side flaps secured to said joists and a bottom flap resting on the surface of said ceiling.

5. An insulating structure for ceilings having joists comprising members extending from joist to joist and each having an end portion bent into the space between joists and extending to the upper surface of the ceiling, said end portion having side flaps secured to said joists and a bottom flap resting on the surface of said ceiling, the front portion of said member and one side portion each being flexible and overlapping adjacent portions of adjacent insulating members.

6. An insulating structure for ceilings having joists comprising corrugated board members extending from joist to joist, each of said corrugated members having an end portion fitting the space between joists and extending to the ceiling, each corrugated member having its front portion and one side portion crushed to close the spaces formed by the ends of said corrugations and to make said portions more flexible, said crushed portions overlapping the adjacent portions of adjacent insulating members.

7. An insulating structure for ceilings having joists comprising members extending from joist to joist, each having an end portion bent into the space between joists and extending to the upper surface of the ceiling, said end portion having side flaps secured to said joists and a bottom flap resting on the surface of said ceiling, and the other end portion having a marginal strip overlapping the adjacent member.

8. In combination with the supporting members of ceilings, roofs, walls and the like, an insulating structure comprising members extending from support to support with their side marginal portions resting on the respective supports, said members each having a portion at one end only bent into the space between supports and extending the full depth of said supports, the other end of each member overlapping the adjacent member.

MORRIS C. OWINGS.