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2,186,953

METALLIC WALL STRUCTURE

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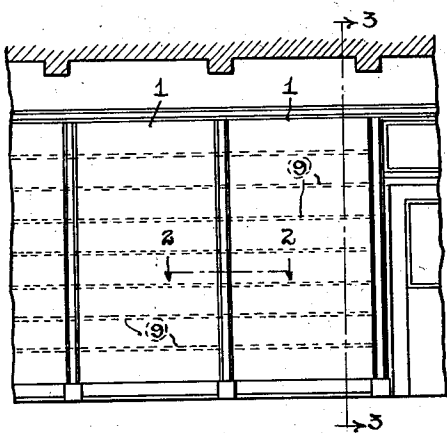


Fig. 1.

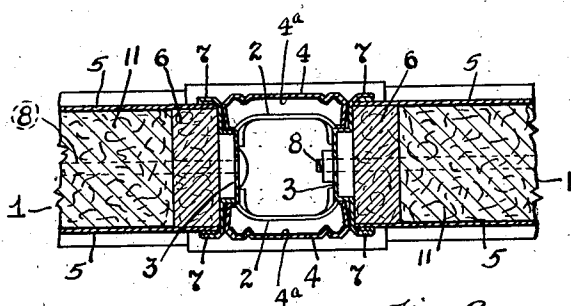
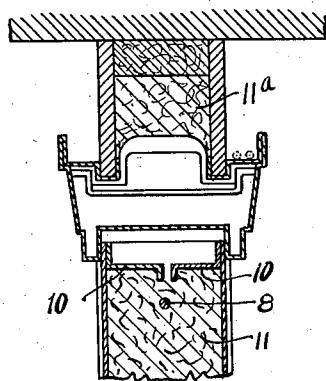


Fig. 2

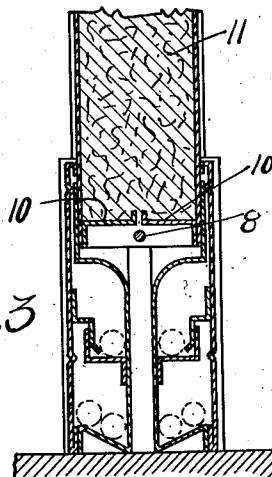
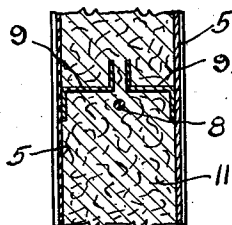


Fig. 3

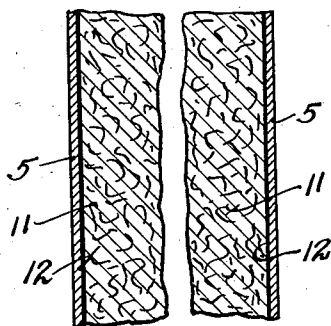


Fig. 4

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METALLIC WALL STRUCTURE

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3 Claims. (Cl. 189—34)

This invention relates, as indicated, to metallic partitions, but has reference more particularly to partitions of a sound-proof character.

It has heretofore been customary in the manu-
5 facture of insulated metal-faced partitions, to ad-
hesively secure the metal facing or plates directly
to a soft filler of insulating material, as by ce-
menting or gluing under pressure, but due to tem-
0 perature changes, the lack of structural strength
of such insulating material and buckles which in-
here in the metal, the adhesion between the metal
plates and insulating material frequently breaks
down and such plates become warped or buckled,
with the result that the attractiveness of the par-
5 tition is seriously impaired.

To overcome such buckling or warping and
maintain the flat outer surfaces of such partitions,
it has been proposed to provide the insulating
filler with structural reinforcing members or to
employ a structurally strong or rigid filler, but in
both cases the sound insulating characteristics of
the partition are materially lower than in the case
where a soft, nonreinforced filler of insulating
material is used.

It is a primary object of the present invention
to provide a partition in which buckling and
warping of the panel plates is avoided, without
impairment of the sound insulating qualities.

More specifically, it is an object of the inven-
tion, to provide a two-faced panel unit, the oppo-
site faces of which are securely supported and
maintained in a flat condition, but which are not
acoustically connected in any substantial degree.

To the accomplishment of the foregoing and
related ends, said invention, then, consists of the
means hereinafter fully described and particu-
larly pointed out in the claims; the annexed draw-
ing and the following description setting forth in
detail certain structure embodying the invention,
such disclosed means constituting, however, but
one of various structural forms in which the prin-
ciple of the invention may be used:

In said annexed drawing:

Fig. 1 is a front elevational view of a metallic
partition embodying the novel features of the in-
vention; Fig. 2 is a fragmentary horizontal cross-
sectional view of the partition, taken on the line
2—2 of Fig. 1; Fig. 3 is a vertical cross-sectional
view of the partition, taken on the line 3—3 of
Fig. 1; and Fig. 4 is an enlarged view of a frag-
ment of the partition shown in Fig. 3.

Referring to the drawing, it will be seen that
the partition consists of panel units 1 which are
secured together in spaced relation as by means
of clips 2 which engage the webs of the verticals

3 of the adjacent panel units, the joint between
adjacent units being covered by pilasters 4.

Each of the panel units consists of spaced
plates 5 of steel, which are spaced apart at their
vertical edges as by means of vertically extending
5 strips 6 of a molded or compressed insulating ma-
terial, preferably of a soft fibrous nature, the
spacing being such that the plates 5 are engaged
by the side flanges 7 of the verticals 3. If desired,
metal or wood spacers may be employed for the
10 panels instead of spacers of insulating material.
The verticals 3, which are a part of the panel
units are secured to the vertical edges thereof
by means of horizontally-extending vertically-
spaced tie rods 8, a number of such tie rods be-
15 ing provided for each panel unit.

Each of the metal plates 5 is provided at its rear
surface with a series of longitudinally-extending
vertically-spaced metal reinforcements 9 and 10,
each of which comprises a Z-bar, one of the
20 flanges of which is welded directly to the plate.
The inner flanges of the bars 10 adjacent the
upper and lower edges of the respective plates are
almost but not quite in abutment with each other
so as to provide in effect a substantially closed
25 panel unit. The inner flanges of the interme-
diate bars 9 of the respective plates are spaced
apart as shown in Fig. 3. The space between
the panel plates is packed or filled with suitable
insulating material 11, preferably exploded mica
30 or mineral wool in the form of loose fibre or small
wads, bats or pads, which provides maximum in-
sulation for sound and heat transmission.

The reinforcements 9 may be secured to the
metal plates 5 by welding or soldering. Although
35 box type reinforcements, either of the usual or
inverted type, may be used instead of Z-bars,
it is preferred to use Z-bars, and preferably Z-
bars having as narrow a flange as is practicable
40 in contact with the metal plates so that when
the metal plate is flexed during handling or as-
sembly, there is minimum danger of pulling dim-
ples in the metal plates. Since it is essential that
the exposed surfaces of the panel plates appear
45 smooth and unblemished, and it is desirable to
attain this smooth and unblemished appearance
with a minimum amount of grinding or filing and
a minimum application of warp-producing heat,
it has been found best to spot weld the reinforce-
50 ments to the plates. In the spot-welding opera-
tions, a large flat point is used on the exposed
surface of the plate and a small point on the
flanges of the reinforcements and the current is
55 accurately controlled by an automatic timing

devices thereby producing a strong weld without blemish on the exposed surfaces of the plates.

If desired, the plates 5 may be provided on their rear or unexposed surfaces with a coating 12 (Fig. 4) of a material commonly known as "dum-dum", which is a mastic substance carrying an undissolved fibre content and which serves to eliminate any ring in the plates and is also effective in the elimination of rattles. The pillars 4 may likewise be coated on their unexposed surfaces with a layer 4a of "dum-dum" or a thin layer of felt may be glued to such unexposed surface for the purpose of eliminating metallic ring or rattle. Any fillers at ceiling or walls 15 should also be insulated to have the same sound-proofing value as the panel units, such insulation, designated as 11a, being generally employed in blanket form.

Due to the spacing of the intermediate reinforcing members 9 from each other, through metallic connection between the plates is avoided at these points and a highly sound-proof partition is provided, in which transmitted vibrations are eliminated or reduced to a minimum. The construction, furthermore, is such as to provide a partition having a high degree of heat insulation, and in which buckling and warping of the panel plates is avoided without impairment of the sound insulating qualities. The reinforcements, further, serve to prevent sagging of the insulating material.

A panel of the construction described has unusual resistance to the transmission of sound. Any sound which passes through the central portion of the panel is trapped between the rigid panel plates and its energy is absorbed by repeated reflection through the soft filler material. A piston-like motion of a panel plate on one side of the partition may be caused by the impact of sound waves, but due to the peripheral spacing and insulation of the plates and the insulation, such piston-head motion of the panel plate is not transmitted to the other plate to thus make the latter a new source of sound. The verticals and other structural members possess great rigidity in proportion to their exposed area and tests have proven that there is very little leakage through sound transmission at these points.

The partition as a whole, although it weighs only from eight to ten pounds per square foot, has a resistance to sound transmission equal to that of a wall of any homogeneous material, such as masonry, weighing fifty pounds per square foot.

Other modes of applying the principle of our invention may be employed instead of the one explained, change being made as regards the structure herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

We, therefore, particularly point out and distinctly claim as our invention:

1. A panel unit for partitions, comprising spaced metal plates, means secured to and rendering said plates rigid, strips of insulating material spacing said plates at the vertical edges thereof, channel members embracing said plates at the vertical edges thereof, and in engagement with said strips, and a filling of loosely compacted heat and sound insulating material between said plates.

2. A panel unit for partitions, comprising spaced metal plates, each having a plurality of vertically-spaced horizontally extending Z-bars secured to the unexposed surfaces of said plates, strips of insulating material spacing said plates at the vertical edges thereof, channel members embracing said plates at the vertical edges thereof, tie-rods interconnecting said channel members, and a loose packing of heat and sound insulating material between said plates.

3. A panel unit for partitions, comprising spaced metal plates, each having a plurality of vertically-spaced horizontally extending Z-bars secured to the unexposed surfaces of said plates, the bars of one plate being spaced from the bars of the other plate, strips of insulating material spacing said plates at the vertical edges thereof, channel members having flanges engaging the outer surfaces of the plates adjacent the vertical edges thereof, tie-rods interconnecting said channel members, and a packing of heat and sound insulating material between said plates.

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