The general object of the invention is to provide fastening devices for securing such wall units as above suggested and others, to the stud- ing or underlying surface of the building structure and/or to secure such units together, the fasteners being concealed relative to the exposed side of the wall.

The invention is exemplified in several embodiments each of which fulfills, in addition to the general object, certain specific objects peculiar to each.

One of the specific objects of the invention is to provide a fastener that shall penetrate through the mid-thickness of adjacent units and be securable to the underlying studding by a nail or the like, proceeding diagonally through that part of one unit lying beneath the fastener whereby said unit is pressed into intimate contact with the studding, and providing an inclined plane for drawing the adjacent unit into close contact with the studding.

Another object of the invention is the provision of a fastener consisting of two parts, one of which is securable to the studding and the other penetrating the back portions of adjacent sheets and being movable relative to the secured portion so that the wall as a whole may move responsive to the aggregate expansion and contraction of the unit which compose it without cracks opening between any of said units. This arrangement makes it possible to use wall paper over wall surfaces on which its use has hitherto been impracticable on account of the shrinkage of the units and opening of fissures between them, and also eliminates the use of metal tape, the countersinking of nails, putting the joints, and the use of furring strips over the joints.

Another object of the invention is the provision of pointed fasteners adapted to be employed in pairs, each having a portion adapted to under- lie the meeting edges of adjacent sheets and hav- ing oppositely directed pointed portions penet-rating thickness-wise of said adjacent edges, one member of said pair being secured directly to the underlying studding and the other member being held in place by the sheet which overlies it.

A still further object of the invention is the provision of a fastener of Z-shaped longitudi-
mon in building practice so that they meet in the
middle of a piece of studding. The fastener
comprises a metal spring 5 bent so as to have a
perpendicular web 6 and upper and lower pointed
portions 1 and 8. The pointed portion 7 is that
while the pointed portion 8 has an intermediate
bend as shown in Figure 2 defining a plane
18 inclined downwardly toward the bottom of the
web 6. The upper angle of fold, between
the pointed portion 7 and the web 6 is provided
with a hole 11 preferably on an inclined axis.
The pointed portions 7 and 8 may be barbed as
shown at 12 in Figure 3 or unbarbed as in that
form of the invention shown in Figure 4.

The fastener of Figures 3 and 4 is employed as
follows: The pointed portion 1 is stuck into the
side edge of the panel 2 as shown in Figure 2
intermediate the front and back surfaces. The
panel is laid against the stud and a nail is driven
diagonally through the hole 11 into the stud 3,
thus securing the fastener in place. It will be
observed that the nail penetrates that portion of
the panel 2 which lies below the embedded
portion of the fastener and thus draws the panel
into close contact with the stud 3. The presence
of muslin beneath the nail head prevents the nail
tearing into the edge of the panel which is a
particularly desirable feature where the panel
is of loosely pressed fibrous material such as
characterizes some insulation board. Since the
fastener lies intermediate the exposed and inner
surfaces of the wall, the nail head is concealed.
The adjacent panel is thrust sidewise upon the
pointed portion 8 until it has penetrated the
panel 1 to its full depth and the sides 4 of the
adjacent panels come into close contact. The
inclined plane 18 of the pointed portion 8 crowds
the material of the panel down into the restrict-
ated plane between the stud and said inclined plane
and thus holds the panel 1 into close contact with
the stud 3. In Figure 2 both pointed portions
of the fastener are provided with the barbs 12
which prevent the panels working away from
one another. Separation of the panels is how-
ever positively prevented by means of the nail
which secures the opposite edge of the panel 2
to the studding 3 which said opposite edge over-
laps.

The barbs 12 may be objectionable from the
standpoint of discomfort in handling through
injury to the workman’s fingers. Therefore, the
modification shown in Figure 4 has been de-
veloped which is similar to Figure 3 in all re-
spects excepting that the barbs 12 have been
omitted. This form of the invention is used in
exactly the same way as that form shown in the
first three figures and the two panels will stay
together by virtue of the nails which anchor
their corresponding edges.

In Figures 5 to 7, inclusive, a form of inven-
tion is shown in which the fastener comprises a
fixed base 13 adapted to be secured to the studd-
ing by nails driven through holes 14 and 15 in
said base. The base is stamped out so as to form
a bead trough or channel 16 bridged in a trans-
verse direction by a strip 17. A movable
clast 18 is slidably seated in the channel 16 and
passes beneath the strip 17 which normally holds
it inseparable with respect to the base 13. The
clast 18 is free to slide longitudinally or side-
ways in the channel 16. It is lightly held in position for application by the
formation of a bead 19, upstanding from the bot-
tom of the channel 16 and received within a
groove 20 on the bottom of the clast 18. The
clast has teeth 21 and 22 adapted to be driven
in the back surface of a panel or wall unit. The
teeth are preferably curved so that when driven
into the wall unit a component of the driving
force acts in a direction to deflect the teeth 21
and 22 which grip the material of the adjacent
sheets as indicated in Figure 6 on the left hand
side. The length of the teeth 21 and 22 is such
that when they are in fully interlocked position
with respect to the adjacent building sheet they
fall short of penetrating the exposed face of the
building unit and therefore remain concealed.
Between the teeth 21 and 22 is a small ribbed
prong 23 which not only penetrates the wall
board, but reinforces the bases of the teeth 21
and 22 so that the pressure is concentrated near their free ends ensuring the pen-
etration of the teeth to the proper depth in the
wall panel.

It is obvious from Figure 6 that due to expan-
sion and contraction of the wall, the sheets 21
and 22 can move as an unit either to the right or left
or up or down without developing a crack be-
tween them.

Certain wall board compositions contract and
expand under varying conditions of temperature
and atmospheric hygroscopicity to such an ex-
tent that cracks develop between the sheets when
the boards contract and bulge and warping de-
velops when the boards expand, walls construct-
ed from such units being unsuitable for decorat-
ing with wall paper. So universally is this lim-
itation recognized that the manufacturers of
certain composition wall boards advertise that
their product is not adapted for wall paper, thus
greatly restricting its field of usefulness. The
fastener of the present invention can be employed
in the manufacture of such boards to prevent the
opening of cracks and fissures in wall board of this description. In employing
the invention for this purpose, it is essential that a
side wall of a room be fixedly anchored to the
studding adjacent one corner of the room. This
is accomplished by disassembling several of the
expansion fasteners such as shown in Figure 7
by slipping the clast 13 from under the bridge
strip 17. This is made possible through the fact
that the bottom of the channel 15 is cut out on
opposite sides of the strip 17 forming a hole or
opening 23 of considerable width in the center
of the strip. When the clast 18 has been pushed as far
as possible either to the right or left, it may,
thanks to the opening 23 be rotated about the
bridge strip 17 as an axis and readily removed.
Several of these strips are nailed at vertical in-
tervals along a corner stud, one being shown in
Figure 5. The first panel is then laid against the
stud and the fasteners which have been affixed
thereto and hammer fixed on the front or exposed
side above said fasteners so as to make the teeth
21 and 22 penetrate the back side of said sheet and interlock with the substance of the sheet.
Now, it is clear that due to the fixation of the
clasts 18, the panel cannot shift either to the
right or left. Now, along the studding which
underlies the opposite edge of this first panel, a
plurality of the complete expansion fasteners are
secured in vertical relation and the studding of
the first sheet secured to the clasts 18 of the
complete expansion fasteners by hammering on
the exposed surface of the panel above said fas-
teners the invention shown, it is tightly held in position for application by the
formation of a bead 19, upstanding from the bot-
tom of the channel 16 and received within a
second sheet is then hammered to drive the teeth 21 and 22 through its back surface. The success-
sive sheets are laid in similar manner.

The base 13 is provided with transversely ex-
tending faces 17' lying flush in the plane of the
bridge piece 17, their particular value being to
afford a headerway for the second panel permitting
it to be brought into abutment with the adjac-
ent edge of the first panel without colliding
with the side of the bridge piece and thereby pre-
vented from making a close joint.

It is clear now that when expansion takes
place, the capacity of the units to shrink sepa-
rately has been eliminated and the entire
move relative to the edge which is anchored to
the studding by the separated cleats 18 shown on
the right hand side of Figure 5. This move-
ment makes a crack or fissure in the opposite
corner of the wall having a width equal to the
aggregate gap which would otherwise occur be-
tween the several sheets, but this may be effec-
tively concealed by a vertical corner bead or
molding secured to the side wall which is adja-
cent to and perpendicular to the edge of the wall
in which the fissure and crack develops, or by
allowing the free expanding and contracting end
of the wall to slide behind the adjacent wall at
the anchored end of the latter.

If the expansion fastener is constructed so as
to permit the cleat 18 to slide upwardly or down-
wardly as well as to the right and left, universal
expansion and contraction is provided for both in
the lateral and vertical directions.

Figures 8, 9 and 10 illustrate a form of the
invention adapted particularly for large sheets
having meeting edges which lie in planes per-
pendicular to the front and back faces of the wall.
These fasteners are used in pairs. A single
fastener is shown in Figure 10 and con-
ists of a sheet metal member 28 having a bay-
onet-shaped longitudinal cross section formed by
folding the metal so as to provide an intermediate
web 20, a securing lug 20 and a pointed embed-
ment portion 27. For the sake of facility in manu-
f acturing, all of the lugs 20 are provided with a
nail hole 26, but in only one of a pair of fast-
eners is a nail applied. The method of pro-
cedure is as follows: The pointed portion 27 of
one fastener is thrust into one edge of a wall
panel intermediate its front and back surfaces
and to the full depth of the pointed portion until
the web 20 rests against the edge of the panel.
The depth at which the pointed portion 27 is
thrust into the panel is determined so that the
lug 20 will be flush with the bottom surface of
the panel. The lug 20 is then nailed to the un-
derlying studding as is clearly shown at 20 in
Figure 8. The other fastener of a pair is then
thrust into the confronting edge of an adjacent
panel with the lug 20 flush with the bottom of
the panel and the panel is then pushed up into
close contact with the first panel which has al-
ready been fixed to the stud, the lug 20 of the
second panel sliding under the first panel, and
the second panel resting above the lug 20 which
projects from the first panel and concealing the
same. There may be, if desired, two or three
pairs of fasteners for each edge, the number used
being determined by the rigidity of the ma-
terial of the wall panel, and the height of the wall.

In Figure 10 this form of the invention is
shown without bars. It may however be pro-
vided with bars 12 as shown in Figure 11 and
the bars would have the same function as the
bars described in connection with Figure 3.

The group of Figures 12 to 14, inclusive, illus-
trates a form of the invention which is particu-
larly desirable for wall panels direct, one by
means of cooperating tongues and grooves such
as are shown respectively at 30 and 31, in Figure
13, in which 30 is the tongue and 31 the groove.
Tongue and groove units may be of any size, but
are customarily of small area and simulative of
tile. The fastener exemplifying this modification
is shown in Figure 14 and comprises a sheet
metal member 32 of longitudinal Z-shaped cross
section being folded to form dihedral angles 33
and 34 connected by a common inclined web 35.
The upper portion portion 36 of said member is
designed to be forced into the guide 37 of the
lower port of the tongue 31 along the apex of the tongue, the underlying por-
tion of the tongue being received in the dihedral
angle 32. The base portion 38 is provided with
a nail hole 37. The unit 30 thus impaled is nailed
to an underlying stud through the nail hole 37
as shown in Figure 13. The adjacent panel has
its grooved side brought into conjunction with
the tongue on the panel already laid, and over-
lying the base portion 36 and with the lower edge
of its groove received in the dihedral angle 34.

The above construction enables the adjacent units
to be laid close with the complete concealing of
the fastener and the second unit laid will be
maintained in close contact with the tongue of
the first unit by the fastener 40 at the opposite
side of said second unit and which is nailed to
the stud which underlies the said opposite edge
of said unit. In the laying of simulated tile, the
fasteners 32 are arranged on one horizontal and
one vertical edge of each unit.

While I have in the above description disclosed
what I believe to be a preferred and practical
embodiment of my invention, it will be under-
stood by those skilled in the art that the details of
construction as illustrated and described are
merely by way of example and not to be construed
as limiting the scope of the invention which is
to be determined only by a fair interpretation of
the appended claims.

What I claim is:
1. Concealed fastener for wall panels compris-
ing a sheet metal member having an inter-
mEDIATE web and upper and lower portions debouch-
ing from said web in opposite directions, one of
said portions being keen, for penetrating the sub-
stance of a panel from the edge surface thereof,
the other of said portions being adapted to co-
operate with an adjacent panel, said member
having a nail hole for securing it by a nail to an
underlying support.

2. Concealed fastener for wall panels compris-
ing a sheet metal member having an intermediate
web and upper and lower portions debouching
from said web in opposite directions, one of said
portions being keen, for penetrating the sub-
stance of a panel from the edge surface thereof,
the other of said portions being adapted to co-
operate with an adjacent panel, said member
having a nail hole for securing it by a nail to an
underlying support, the edges of said member
being provided with slits, and edges of said slits
being upset forming bars.

3. Concealed fastener for wall panels compris-
ing a sheet metal member having an intermediate
web, and upper and lower portions debouching
from said web in opposite directions, one of said
portions being keen, for penetrating the sub-
stance of adjacent panels from the edge sur-
faces thereof, said member having a nail hole
penetrating the apex of the angle between said
web and upper portion, for securing said member to an underlying support by a nail driven obliquely through said hole, and the margin of the panel beneath the upper portion of said fastener.

5 Concealed fastener as claimed in claim 3, edges of said member being barbed.

5 Concealed fastener for wall panels having interfitting tongue and groove edges comprising a sheet metal member having an intermediate web and upper and lower portions debouching from said web in opposite directions, one of said portions being keen for penetrating the substance of one panel from the edge surface thereof, the other of said portions being parallel to the first mentioned portion and being adapted to cooperate with an adjacent panel, said web being inclined so as to form acute dihedral angles with said portions each of which angles is adapted to receive a complementary part of the interfitting edges of said panels, said member having a nail hole for securing it by a nail to an underlying support.

6 Concealed fastener for wall panels comprising a sheet metal member having an intermediate web and upper and lower portions debouching angularly from said web in opposite directions, said portions being keen for penetrating the substance of adjacent panels from the edge surfaces thereof, said member having a nail hole by which it is adapted to be secured to an underlying support, one of said angularly debouching portions being formed with an intermediate part inclining downwardly from its free end toward said web whereby a panel driven on to said free end is forced against the underlying support.

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