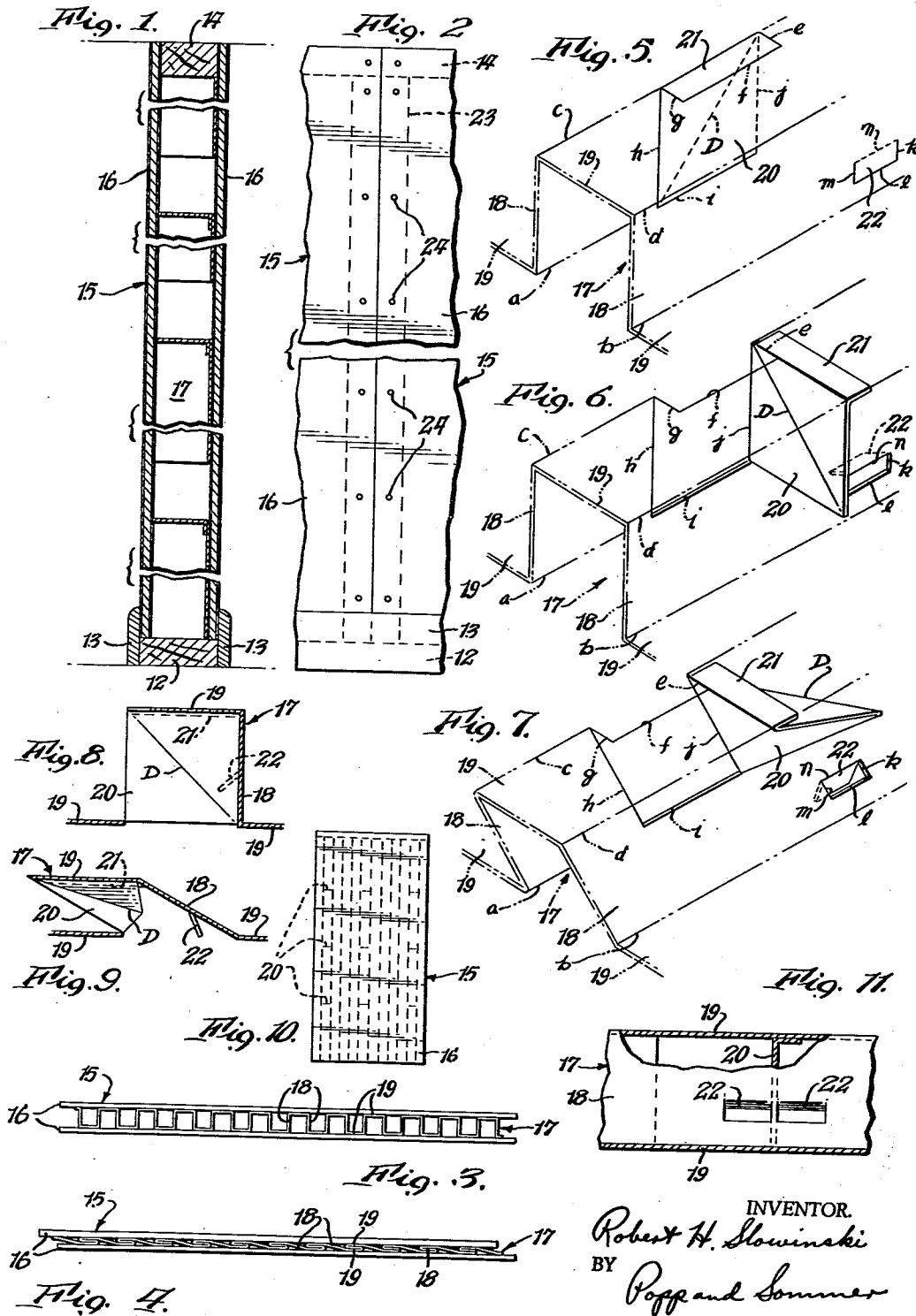


Dec. 3, 1963

R. H. SLOWINSKI
EXPANDABLE WALL PANEL

3,112,532

Filed Jan. 14, 1959



INVENTOR.
Robert H. Slowinski
BY
Popp and Sommer
Attorneys.

1

3,112,532

EXPANDABLE WALL PANEL

Robert H. Slowinski, Tonawanda, N.Y., assignor to National Gypsum Company, Buffalo, N.Y., a corporation of Delaware

Filed Jan. 14, 1959, Ser. No. 786,823
6 Claims. (Cl. 20-15)

This invention relates to an expandable wall panel, and more particularly to an expandable partition panel for use in forming interior walls.

At present, in the construction of interior partition walls for residential or commercial buildings, it is common practice to connect vertically aligned floor and ceiling runners by a plurality of studs spaced on 16 inch centers, and to nail plaster board over the studs in order to provide the basic wall surfaces for plastering or other finishing. As will be apparent, this type of construction involves high material costs because of the large number of studs, as well as nails, required. Furthermore, labor costs are high because of the considerable amount of hand labor necessary in cutting the studs to size, and in nailing the studs and plaster board in place. In addition, shipping costs are high because the various wall forming materials must be transported unassembled to the construction site.

Accordingly, it is an object of this invention to provide an improved wall structure adapted to substantially reduce the high material, labor and shipping costs prevalent in present construction practice.

It is another object of this invention to provide an expandable partition panel adapted to eliminate many of the studs and nails employed in conventional practice, thereby substantially reducing material costs.

It is a further object of this invention to provide an expandable partition panel adapted to eliminate many of the stud cutting and nailing operations required in conventional practice, thereby substantially reducing labor costs.

It is another object of this invention to provide an expandable partition panel adapted to be completely assembled and collapsed for substantially reducing storage and shipping costs.

It is a further object of this invention to provide an expandable partition panel adapted to be easily installed.

It is another object of this invention to provide an expandable partition panel adapted to be economically produced, as well as efficient and effective in operation.

It is a further object of this invention to provide an expandable partition panel adapted to incorporate wall facing means, to readily expand for spacing the wall facing means apart, and to lock the wall facing means in spaced apart relationship upon expansion.

Other objects and advantages of the invention will become apparent upon a consideration of the following specification and claims, when read in conjunction with the accompanying drawing wherein:

FIG. 1 is a partial elevational cross sectional view of an expandable partition panel constituting a preferred embodiment of the invention as installed between floor and ceiling runners;

FIG. 2 is a partial facial elevational view illustrating how adjacent panels are joined at a stud;

FIG. 3 is a top view, on a reduced scale, of a panel with its preferred core in expanded position;

FIG. 4 is a top view of the panel shown in FIG. 3 with its preferred core in collapsed position;

FIG. 5 is a partial perspective view, on an enlarged scale, illustrating a fully expanded core portion in phantom lines, and the larger web and smaller tab forming a preferred locking means in solid lines, but prior to the complete formation and positioning of the latter;

2

FIG. 6 is a view similar to FIG. 5, but illustrating the completely formed web and tab in locking engagement;

FIG. 7 is a view similar to FIG. 6 but illustrating the core portion as partially expanded, and the web and tab when disengaged;

FIG. 8 is an end view of a fully expanded core portion illustrating the relationship between the web and tab in locking engagement;

FIG. 9 is a view similar to FIG. 8, but illustrating a partially expanded core portion and the relationship between the web and tab when disengaged;

FIG. 10 is an elevational facial view, on a reduced scale, of an entire panel and illustrating the preferred number and location of the locking means, and

FIG. 11 is a partial longitudinal sectional view of a fully expanded core portion, with parts broken away to illustrate a modified locking means incorporating two tabs engageable with the web.

Referring to the drawing, wherein like numerals identify like parts, FIG. 1 illustrates a conventional partition wall structure including a floor plate or runner 12, baseboards 13 and a ceiling plate or runner 14. Resting on plate 12 between baseboards 13 and overlapping plate 14 is an expandable partition panel 15, which constitutes a preferred embodiment of the invention.

As also seen in FIGS. 3 and 10, panel 15 comprises a pair of wall facing members or sheets 16 and an expandable and continuous, corrugated core 17 interposed between and secured to sheets 16. The latter are preferably made of gypsum board, which as is well known, comprises a layer of plaster laminated between fibrous sheets, while core 17 is preferably formed from a relatively rigid foldable fibrous sheet in a manner to be explained more fully below. However, any other suitable type of wall facing sheets or wallboards may be used in place of the paper-covered gypsum wallboards 16 shown.

Core 17 is composed of a plurality of spaced cross ribs 18 which are hinged to sheets 16 and together by a plurality of longitudinal ribs 19 to produce the corrugated configuration shown in FIG. 3 with ribs 19 abutting and adhesively or otherwise suitably secured to sheets 16.

It will be apparent that core 17 is illustrated in expanded position in FIG. 3, wherein cross ribs 18 extend transversely of sheets 16 substantially at right angles thereto, while longitudinal ribs 19 extend substantially parallel to the sheets. Referring to FIG. 4, core 17 is shown in collapsed position, wherein ribs 18 are folded so that they extend substantially parallel and adjacent to sheets 16 and ribs 19, to provide a compact unit for shipping.

Referring now to FIGS. 1 and 8-10 particularly, core 17 is provided with means for locking sheets 16 in spaced apart relationship upon expansion of the core. This locking means comprises a plurality of foldable, substantially square webs 20 and a plurality of substantially rectangular tabs 22 severally engageable with webs 20. As seen in FIGS. 1 and 8-10, webs 20 have certain edges severally hinged to certain cross ribs 18 and adjacent edges severally hinged to certain longitudinal ribs 19 which are hinged to said certain cross ribs 18. More specifically, each web 20 has one edge hinged to a cross rib 18 and an adjacent edge hinged to the adjacent longitudinal rib 19 by means of the lip 21, and each web extends transversely of the channel formed by these ribs. As shown, each web 20 is struck out of the body of a cross rib 18 with the integral lip 21 being struck out of the body of the longitudinal rib 19. Tabs 22 are preferably formed by striking the same out of the cross ribs 18 opposite those from which the webs 20 are struck, and which cross ribs are also hinged to said certain longitudinal ribs 19.

Referring to FIG. 9, it will be noted that each web 20 is also unfoldable along a diagonal line D between

its hinged edges from a collapsed position substantially parallel and adjacent to ribs 18, 19 and sheets 16 to the expanded position of FIG. 8. Furthermore, each tab 22 can be folded back into the plane of its rib 18 when core 17 is collapsed as shown in FIG. 4. Thus, the locking means does not interfere with the collapsing of panel 15 for storage or shipment.

As seen in FIGS. 1 and 10 particularly, panel 15 is substantially rectangular in shape, being typically 8 feet high, 4 feet wide and approximately 2 inches thick (measured between sheets 16). These are substantially the dimensions required for the conventional interior partition wall. To insure rigidity upon expansion of panel 15, preferably nine locking means (only webs 20 being shown in FIG. 10) are provided for each panel 15, the locking means being spaced in three rows of three about two feet apart longitudinally of the panel, and about a foot and a half apart widthwise of the panel.

As shown in FIG. 1, core 17 extends to the bottom of sheets 16, but stops short at the top, so that the sheets may snugly overlap ceiling runner 14. In addition, core 17 stops short at the sides of sheets 16, as illustrated in FIG. 3, so that when two panels 15 are joined, as shown in FIG. 2, the adjacent side edges of sheets 16 will overlap and abut each other centrally along stud 23 (shown in dotted lines). As will be apparent, the adjacent panels 15 may be rigidly secured to the stud by nails 24 passing through sheets 16.

Referring to FIGS. 5-7, the fabrication of core 17 and its locking means will now be described in detail. Core 17 is preferably formed from a single sheet of relatively rigid, foldable fibrous material, which sheet is preferably passed between scoring and cutting rolls (not shown) to provide the proper folds between cross ribs 18 and longitudinal ribs 19, as well as the proper cuts and folds to produce webs 20, lips 21 and tabs 22. Referring to FIG. 5, the sheet forming core 17 is scored on its upper surface along fold lines *a* and *b* and on its lower surface along fold lines *c* and *d* to produce the desired foldable connections between cross ribs 18 and longitudinal ribs 19. In addition, the sheet is cut along lines *e*, *f*, *g*, *h*, and *i* to form web 20 and lip 21, scored on its lower surface along fold line *j* to form the hinged connection between web 20 and rib 18, and scored on its lower surface to form the diagonal fold line *D* on web 20. At the same time, the sheet is cut along lines *k*, *l* and *m*, and scored on its lower surface along fold line *n*, to form tab 22. The cut line *m* is in transverse alignment with fold line *j*.

As ribs 18 and 19 are folded relatively to each other to form core 17 into its corrugated shape, web 20 is folded 90 degrees along line *j* to extend transversely of the ribs 18 and intermediate rib 19, with integral lip 21 abutting the inner surface of rib 19. It is preferred that lip 21 be adhesively or otherwise suitably secured to rib 19 to assure a stable hinged connection with web 20.

Thereafter ribs 18 and 19 are folded relatively to each other toward the collapsed position, as shown in FIG. 7, thus folding web 20 along its diagonal line *D*. Tab 22 is then folded inwardly into operative position along its fold line *n* through an acute angle. It will be noted from FIG. 6 that when folded into operative position tab 22 is adapted to engage the back or the scored side of web 20, or that which was formerly adjacent ribs 18 and 19 in collapsed position, to lock the unfolded web 20 in place. However, when unfolding ribs 18 and 19 toward the expanded position, tab 22 is readily biased back toward its supporting rib 18 by the unfolding web 20, especially since tab 22 stops short of diagonal fold line *D* (FIG. 6). Then, after web 20 is unfolded past tab 22, the bias of fold line *n* returns the tab to its operative position.

If desired, a modified locking means may be employed, as shown in FIG. 11, wherein a second tab 22a is adapted to engage the opposite side of unfolded web 20. While the second tab 22a is not absolutely necessary for effective

operation, it does provide additional support for locking the unfolded web 20 in place, the spaced tabs 22 and 22a forming, in effect, a slot for receiving web 20. Thus, web 20 is not only prevented from retrogressively folding back into the collapsed position of FIG. 7, but also from progressively folding into a reverse collapsed position past tab 22a. Otherwise, the operation is identical to that previously described.

Following collapsing of core 17 and its locking means, wall facing sheets 16 are adhesively or otherwise suitably secured to longitudinal ribs 19, whereupon the collapsed panel 15 is ready for storage or shipment, in pre-cut, assembled condition, as illustrated in FIG. 4. Upon arrival at the job site, panels 15 may be readily expanded merely by utilizing the weight of sheets 16. For example, if panel 15 is stood on the right end of lower sheet 16 in FIG. 4, the weight of upper sheet 16 will automatically expand core 17 and unfold locking web 20 over tab 22 and into engagement therewith, or also into engagement with a second tab 22a, if the latter is used.

The expanded panel 15 is now made ready for installation merely by turning it to its upright position, as shown in FIG. 10, whereupon it is slid into place between runners 12 and 14. Then, a stud 23 is nailed between runners 12 and 14, the stud fitting between and projecting beyond sheets 16 at the end of the panel adjacent the next succeeding panel. When the required number of panels 15 are in place, they are nailed to the studs as shown in FIG. 2, to complete the installation, and to provide the basic wall surfaces for plastering or other finishing.

Since only one stud 23 is required for each four foot wide panel 15 (the panel overlapping 1/2 of a stud at each end) as compared to the three studs required for every four feet in the conventional construction, and since the only nails required are those for securing the joints between adjacent panels, as compared to the much larger number formerly needed, this invention results in a considerable savings in material costs. Likewise, the use of a pre-cut panel 15, already provided with wall facing sheets 16 together with the lesser number of studs 23 and nails 24 required, as contrasted with conventional construction, results in a considerable savings in hand labor operations, thereby substantially reducing labor costs. In addition, the collapsible feature of completely assembled panel 15 contributes greatly to reduced storage and shipping costs, while its readily expandable and locking features facilitate installation thereof. Thus, it is apparent that the present invention, in accomplishing its objects, provides numerous advantages over the prior art.

While the invention has been illustrated and described in certain preferred forms, it is to be understood that various changes and modifications may be made therein by those skilled in the art, without departing from the spirit of the invention, as defined in the appended claims. For example, core 17 need not be continuous, but composed of a plurality of spaced core portions, such as shown in FIGS. 8 and 9; neither must the corrugations of core 17 run lengthwise of panel 15 as shown in FIG. 10, as the same could readily run diagonally or widthwise. Moreover, while the invention is primarily directed to interior partition walls, it is also applicable to exterior walls.

What is claimed is:

1. An expandable wall panel comprising a pair of wall facing members, and an expandable core interposed between and secured to said members, said core including a pair of spaced cross ribs hinged to said members and being unfoldable from a collapsed position adjacent to said members to an expanded position transverse thereto for spacing said members apart, first foldable means having one edge hinged to one of said ribs and another edge hinged to one of said members, said first means being automatically unfoldable from a collapsed position adjacent to said ribs to an expanded position

5

transverse thereto upon unfolding of said cross ribs, and second means on the other of said ribs and engageable with the unfolded first means for locking said members in spaced apart relationship upon expansion of said core.

2. An expandable wall panel comprising a pair of wall facing members, and an expandable and continuous corrugated core interposed between and secured to said members, said core including a pair of spaced cross ribs hinged to one of said members and hinged to the other of said members and together by a longitudinal rib abutting and secured to said other member, said cross ribs being unfoldable from a collapsed position adjacent said members to an expanded position transverse thereto for spacing said members apart, a foldable polygonal web having one edge hinged to one of said cross ribs and another edge hinged to said longitudinal rib, said web being automatically unfoldable along a line between said edges from a collapsed position with one side adjacent to said ribs to an expanded position transverse thereto upon unfolding of said cross ribs, and a tab on the other of said cross ribs and engageable with said one side of the unfolded web for locking said members in spaced apart relationship upon expansion of said core.

3. An expandable wall panel comprising a pair of wall facing members, and an expandable and continuous corrugated core interposed between and secured to said members, said core including a pair of spaced cross ribs hinged to one of said members and hinged to the other of said members and together by a longitudinal rib abutting and secured to said other member, said cross ribs being unfoldable from a collapsed position adjacent said members to an expanded position transverse thereto for spacing said members apart, a foldable rectangular web having one edge hinged to one of said cross ribs and an adjacent edge hinged to said longitudinal rib, said web being automatically unfoldable along a diagonal line between said edges from a collapsed position with one side adjacent to said ribs to an expanded position transverse thereto upon unfolding of said cross ribs, and a pair of tabs on the other of said cross ribs, one of said tabs being engageable with said one side and the other of said tabs being engageable with the other side of the unfolded web for locking said members in spaced apart relationship upon expansion of said core.

4. An expandable wall panel comprising a pair of wall facing members, and an expandable and continuous corrugated core interposed between and secured to said members, said core including a plurality of spaced cross ribs hinged to said members and together by a plurality of longitudinal ribs abutting and secured to said members, said cross ribs being unfoldable from a collapsed position adjacent to said members to an expanded position transverse thereto for spacing said members apart, a plurality of foldable first means having certain edges severally hinged to certain cross ribs and other edges severally hinged to certain longitudinal ribs hinged to said certain cross ribs, said first means being automatically unfoldable from a collapsed position adjacent to said ribs to an expanded position transverse thereto upon unfolding of said cross ribs, and a plurality of second means on other cross ribs also hinged to said certain longitudinal ribs and severally being engageable

6

with the unfolded first means for locking said members in spaced apart relationship upon expansion of said core.

5. An expandable wall panel comprising a pair of wall facing members, and an expandable and continuous corrugated core interposed between and secured to said members, said core including a plurality of spaced cross ribs hinged to said members and together by a plurality of longitudinal ribs abutting and secured to said members, said cross ribs being unfoldable from a collapsed position adjacent to said members to an expanded position transverse thereto for spacing said members apart, a plurality of foldable polygonal webs having certain edges severally hinged to certain cross ribs and other edges severally hinged to certain longitudinal ribs hinged to said certain cross ribs, said webs severally being automatically unfoldable along lines between said edges from a collapsed position with certain sides adjacent to said ribs to an expanded position transverse thereto upon unfolding of said cross ribs, and a plurality of tabs on other cross ribs also hinged to said certain longitudinal ribs and severally being engageable with said certain sides of the unfolded webs for locking said members in spaced apart relationship upon expansion of said core.

6. An expandable wall panel comprising a pair of wall facing members, and an expandable and continuous corrugated core interposed between and secured to said members, said core including a plurality of spaced cross ribs hinged to said members and together by a plurality of longitudinal ribs abutting and secured to said members, said cross ribs being unfoldable from a collapsed position adjacent to said members to an expanded position transverse thereto for spacing said members apart, a plurality of foldable rectangular webs having certain edges severally hinged to certain cross ribs and adjacent edges severally hinged to certain longitudinal ribs hinged to said certain cross ribs, said webs severally being automatically unfoldable along diagonal lines between said edges from a collapsed position with certain sides adjacent to said ribs to an expanded position transverse thereto upon unfolding of said cross ribs, and a plurality of pairs of tabs on other cross ribs also hinged to said certain longitudinal ribs, certain tabs of said pairs severally being engageable with said certain sides and the other tabs of said pairs severally being engageable with the other sides of the unfolded webs for locking said members in spaced apart relationship upon expansion of said core.

References Cited in the file of this patent

UNITED STATES PATENTS

2,332,287	Zalkind	Oct. 19, 1943
2,534,011	Frye	Dec. 12, 1950
2,556,778	Ringler	June 12, 1951
2,597,309	Finck	May 20, 1952
2,808,978	Wright	Oct. 8, 1957

FOREIGN PATENTS

22,607	Finland	June 30, 1948
61,816	Netherlands	Oct. 15, 1948
757,418	Great Britain	Sept. 19, 1956