May 26, 1959 H. A. GLIDDEN 2,887,868

WALL STRUCTURE AND FORM UNIT THEREFOR

Filed Sept. 25, 1957 2 Sheets-Sheet 1

FIG_1

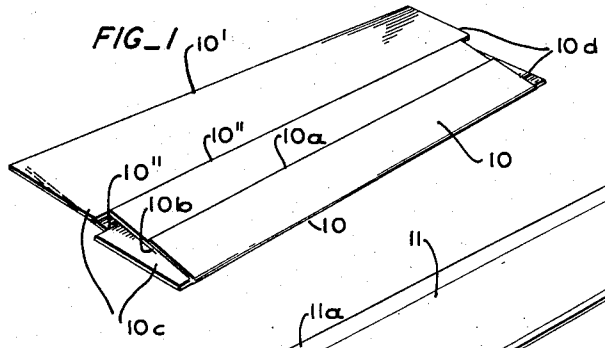


FIG_2

FIG_3

FIG_4

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FIG_5

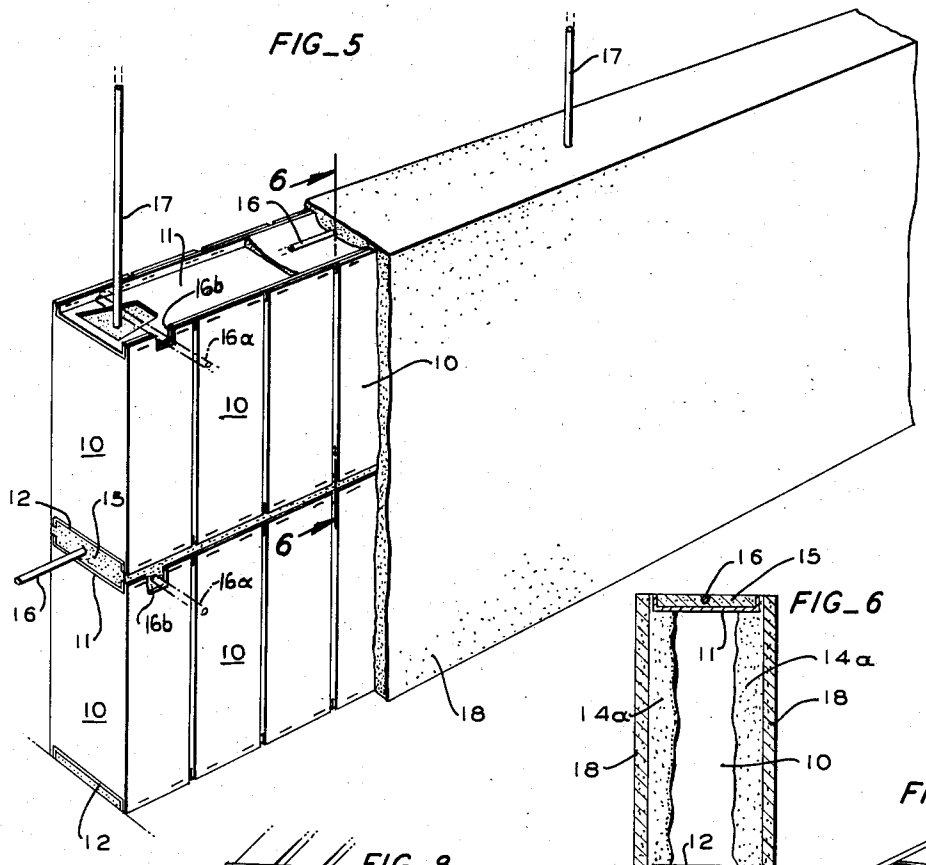


FIG_6

FIG_7

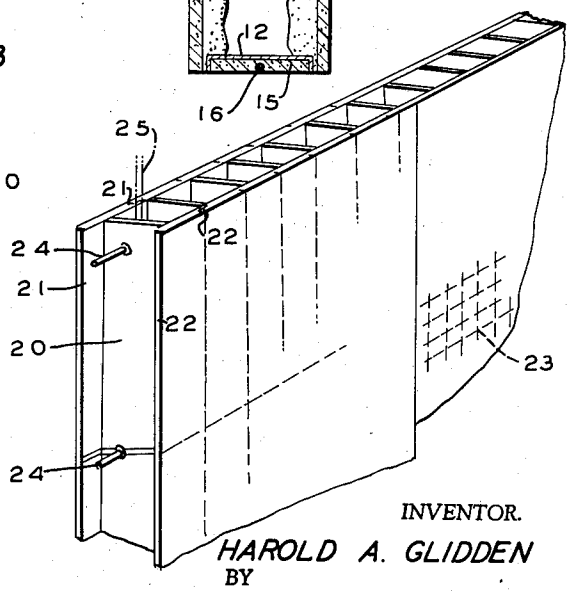


FIG_8

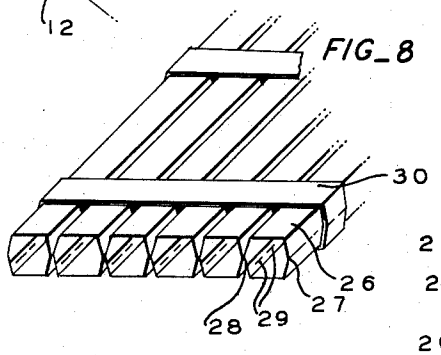
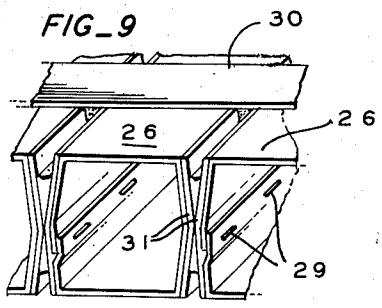


FIG_9



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WALL STRUCTURE AND FORM UNIT THEREFOR

Harold A. Glidden, Berkeley, Calif.

Application September 25, 1957, Serial No. 686,141

3 Claims. (Cl. 72—30)

This invention relates to a building wall unit that is adapted to be used as a base unit in a wall and over which concrete or plaster may be placed in the construction of the wall.

An object of this invention is to provide an improved building wall unit employing a plurality of paper forms.

Another object of this invention is to provide an improved building wall unit employing folded paper forms that may be shipped in collapsed condition and easily assembled on the building site.

Still another object of this invention is to provide a building wall unit that may be assembled into the wall by persons having relatively little skill in such construction.

A further object of this invention is to provide an improved building wall unit with a plurality of bonding spaces into which wall surfacing plaster or stucco is adapted to be pressed so as to produce a wall structure of increased strength.

Still another object of this invention is to provide an improved building wall unit in which the bonding spaces receiving the surface plaster or stucco allow the forming of partial webs which give strength to the wall.

Still another object of this invention is to provide an improved building wall unit to which wall faces may be placed with gunite type machines or plaster guns.

Still another object of this invention is to provide an improved building wall unit employing paper core blocks which may also be used to make the corners of a wall and which eliminate all mold and equipment ordinarily required for applying surfacing to wall corners.

Other and further objects of this invention will be apparent to those skilled in the art to which it relates from the following specification, claims and drawing.

In accordance with this invention there is provided an improved building wall unit that is made of paper such as common water proof building paper which is formed in rectangular or square cells that are arranged in the unit in parallel spaced relation so that plaster or stucco may be applied thereto and bonded to the building unit by webs formed by the plaster or stucco entering the spaces provided between the individual cells.

These cells are held together by means of channel members which are also formed of water proof building paper and which are adapted to receive mortar as well as reenforcing members in the channels thereof.

The building wall units of this invention are constructed so that the bottom channel of one unit may be placed upon the top channel of another unit and the mortar in these channels may be formed into an integral beam with reenforcing members lodged therein. The end cells of each of the wall units may be filled with mortar and vertical reenforcing members may be provided thereto so as to extend from one building wall unit to another on vertical alignment therewith.

Further details of this invention will be apparent to those skilled in the art to which it relates from the following specification, claims and drawing in which briefly:

Fig. 1 is a view showing one of the square or rectangular building paper box units of this invention in collapsed condition;

Fig. 2 is a view of one of the channel members such as are employed for holding the tops and bottoms of the square or rectangular box units of an embodiment of this invention in assembled relation;

Fig. 3 is a view showing a plurality of the box units assembled in parallel spaced relation and having the bottom ends thereof fastened to a channel member and showing the top portions thereof positioned to receive the top channel member;

Fig. 4 is a detail sectional view taken along the line 4—4 of Fig. 3;

Fig. 5 is a perspective view partially in section showing several of the assembled box units such as shown in Fig. 3 positioned side by side in a wall structure partially covered with plaster or stucco;

Fig. 6 is a sectional view taken along the line 6—6 of Fig. 5;

Fig. 7 is a view of a modified embodiment of this invention;

Fig. 8 is a view of a further modification of this invention; and

Fig. 9 is a view of a portion of the structure shown in Fig. 8 somewhat enlarged.

Referring to the drawing in detail there is shown in Fig. 1 an element **10** constructed of paper folded along the scores **10'** so as to form a box element or unit that is illustrated in collapsed condition. This box element is provided with additional scores **10''** along which it may be folded in order to erect the element and provide the box of hollow square shape. The end portions **10***a* and **10***b* of this element overlap and are joined together by glue, cement, wire clips and the like. Tabs **10***c* are provided to two of the panel members of the element at one of the ends of said panel members and tabs **10***d* are provided to corresponding panel members at the other ends thereof.

Fig. 2 illustrates a channel member **11** and a pair of such members is employed to hold a plurality of box units **10** assembled. This member is provided with side portions **11***a* and **11***b* which are adapted to be folded so as to extend at right angles with respect to the body portion of the channel member. Holes **11***c* and **11***d* are provided to the end portions of the channel member **11**. A channel member such as that shown in Fig. 2 is adapted to be employed to hold the top portions of a plurality of elements or boxes such as shown in Figure 1 in spaced relation. A similar channel member **12** which is identical to the member **11** is employed for a similar purpose at the bottom of the assembled elements.

The erected elements **10** are arranged with the side tabs **10***d* thereof extending over the outside of the side members **11***a* and **11***b* of the top channel **11** and the side tabs **10***c* at the bottoms of the elements **10** are similarly arranged with respect to the side walls **12***a* and **12***b* of the bottom channel **12**. The bottom tabs **10***c* are shown attached to the side walls of the channel **12** by means of wire clips **13** and similar clips are employed for attaching the tabs **10***d* to the side walls **11***a* and **11***b* of the top channel **11**. In this way the erected elements **10** are held in parallel spaced relation between the channel members **11** and **12** so that small spaces **14** are provided between adjacent units **10**. These spaces **14** are adapted to receive plaster or stucco whereby webs thereof are formed between the units **10** and these webs function to increase the tenacity with which the plaster or stucco grips the building unit.

After the elements **10** are assembled with the channel members **11** and **12** to form a building unit a small amount of mortar may be lodged in these channel mem-

bers **11** and **12** as shown in Figure 4 and this functions to increase the rigidity of the individual building unit particularly after the mortar is allowed to set slightly. The unit thus provided with mortar is easier to handle during the construction of a wall.

In Fig. 5 there is shown a building wall made by placing two of the assembled units of the type shown in Fig. 3 one above the other and coating these units with an outer layer **18** of mortar, such as, plaster or stucco. The mortar enters the slots **14** between the boxes **10** and because these boxes are of paper, such as, building paper, tar paper and the like, the mortar wedges itself in against the sides of the slots **14** which yield slightly so that the mortar entering these slots assumes a keystone shape and after it sets it is locked in position because of this feature. While only two of the units are shown in Figure 5 it is of course obvious that additional units may be placed one above the other as desired to make a wall of different heights. When these units are placed into position one upon the other the channels **11** and **12** are provided with additional mortar and a reenforcing rod **16** of steel or a plurality of such rods may be lodged into the mortar **15** to form a reenforced mortar beam. Similar reenforcing members of steel or the like may be placed into the end boxes of the building unit through the holes **11***c* and **11***d* provided in the end portions of the channel member **11** and through similar holes provided in the end portions of the channel member **12**. These end boxes are filled with mortar which surrounds the reenforcing members **17**, thereby forming reenforced vertical columns at spaced intervals in the wall structure. These vertical reenforced columns are of course made integral with the horizontal reenforced beams formed by the mortar **15** and horizontal reenforcing member **16**. In this way a wall structure having considerable strength is provided around the basic unit made up of the folded building paper elements described.

Where the wall structure shown in Fig. 5 is to form a corner of the wall or where another wall is to be joined thereto or abut therewith it may be desirable to join or tie the corner wall or abutting wall to that shown in Fig. 5 by means of reenforcing rods **16***a* which are positioned in the corner or abutting wall in the same manner as the rods **16** are positioned in the wall illustrated. The rods **16***a* enter the tops of the boxes **10** through cutaway portions **16***b* and the corner or abutting walls is constructed in the same way as the wall illustrated. A small mortar receiving slot such as the slot **14**, may be provided between the boxes **10** and the corner or abutting wall to receive some of the covering mortar.

From the above description it will be seen that the form unit as disclosed herein provides for a desirable wall construction of light weight where the form unit may be employed to initially support the wet concrete for a steel reenforced concrete beam as the load supporting structure of the wall or other structure and the form unit itself providing for a light weight structure when load supporting characteristics are required. The wall can be erected without exterior mortaring and with a minimum of skilled labor so that cost is materially reduced. If desirable the two faces of the form unit may be finished with different characteristics, for exampl, one surface which is to function as an outside wall may be colored or otherwise decorated and the inner surface which is to function as an inside wall may be scored or roughened to receive plaster. Also the inner face of the unit may be made of lighter construction and the outer face of the unit may be made heavier as desired or required for a particular construction.

In Fig. 7 there is illustrated another embodiment of this invention in which the box units **20** of tubular type are placed in a vertical positon similar to that shown in Fig. 5 and a number of these boxes are also placed side by side to receive concrete faces. However in this embodiment the boxes may be provided with a suitable aperture for placing of horizontal reenforcing rods **24** therein and preferably the faces project beyond one end of the box to provide a nesting of the form units with multiple boxes as shown. For this purpose each box is provided with lateral extensions **21** and **22** which overlap the next adjacent box so that the boxes may be joined by a cement or other bond that is applied to the inner surface of the overlapping portions or tabs **21** and **22** so as to bond the boxes together as a unit and provide a water proof layer on the face to be used in exposure to the weather. If desired, only one side of the boxes may be provided with such tabs or flanges so as to provide a weather proof layer on only one side of the unit which of course is the outer side of the wall. Furthermore, the units may be provided with a steel wire or net reenforcing **23**. Also if desired the openings provided by each box in this type of unit may be filled with concrete and one or more reenforcing members such as the rod **25** may be placed therein, so as to provide a concrete wall structure of full extent when completed. On the other hand only certain of these longitudinal openings may be filled as may be required by the type of wall construction.

In Figs. 8 and 9 there is illustrated another modified form of this nvention in which an assembled self-supporting unit of form boxes **26** of building paper, tar paper and the like, is provided, which includes a plurality of such open ended boxes. These boxes are square or rectangular in cross section when made but are compressed slightly to provide convex side walls **27**, one of which includes the stapled overlapping portions held together by wire staples **29** or the like. Additional strips **31** may be provided to the convex sides of the boxes and these strips may be attached to these sides by suitable cements.

The number of boxes to form an assembly, six in number, as shown in Figure 8, are placed side by side with a concrete bonding layer **33** interposed in the compressed condition of these boxes. Because of the convex side walls, it will be noted that V-shaped recesses are provided at each juncture of the boxes for future bonding to a face of concrete. The boxes are held together, in addition to the concrete bond therebetween, by a plurality of wrap around strips **30** preferably formed of asphalt coated fiberglass cloth. Each fiberglass strip is bonded to the boxes by concrete grouting **34** at each juncture that the strip overlies.

This assembled core unit or body unit provides a light easily transported member which can be laid flat on the job and have a cement face applied to one or more of its sides. Alternatively the cement face can be applied in the manufacture before shipment.

With respect to the various form of the box, it is seen that a form unit of standard size and construction is shown which in effect may be termed a "modular" unit so that a plurality of these may be employed in erecting a wall, or building a fence, etc. These "modular" units lend themselves to economical production and ease of assembly in erecting the wall structure at its site.

While the use of building paper and tar paper has been described, it is obvious that the boxes **10**, **20** and **26** may be made of sheet plastic, fiber board, corrugated paper, molded pulp sheet and any other sheet materials of light weight, and it is not desired to limit this invention solely to the use of building or tar paper.

This application is a continuation in part of my application, Serial No. 449,452, filed August 12, 1954.

While I have shown certain preferred forms of the invention, it will be apparent that the invention is capable of variation and modification from the form shown so that its scope should be limited only by the scope of the claims appended hereto.

What I claim is:

1. A building wall unit that is adapted to be used as a base unit over which concrete or plaster is to be placed in the construction of a wall, comprising a plurality of

substantially square tubular units, each of said units being formed of paper folded into shape and fastened along overlapping edge portions, top and bottom channel members, a plurality of said tubular units being positioned side by side and slightly spaced between a pair of said channel members so that corresponding ends of said plurality of tubular units engage one of said pair of channel members and the other corresponding ends of said plurality of tubular units engage the other of said pair of channel members to form an elongated base unit which may be inserted as a unit into the wall being built, each of said tubular units having a pair of tabs at each of the ends thereof, fastening means for fastening said tabs at each end to the sides of the adjacent one of said channel members, said channel members having the channels thereof open and exposed so that mortar and reenforcing members may be placed therein and so that the bottom channel of one base unit may be placed over the mortar in the top channel of another base unit, said tubular units being spaced so that mortar placed on the sides of said tubular units is adapted to enter the spaces therebetween.

2. A building wall unit that is made of folded paper forms that may be transported in collapsed condition and erected and assembled at the building site to be used in the erecting of a wall, comprising: a plurality of individual folded tubular elements made of substantially water proof building paper, said tubular elements being adapted to be collapsed along selected folds thereof into flat elements while being transported, each of said tubular elements having a pair of spaced tabs at each end thereof, a pair of elongated channel members also made of substantially water proof building paper, each of said channel members having a width commensurate with the distance between the aforesaid spaced tabs, said channel members being positoned in parallel spaced relation and said tubular elements being arranged in a row between said channel members with the tabs at each

end of each of said tubular elements embracing the adjacent one of said channel members and means for fastening said tabs to the embraced channel member.

3. A building wall unit that is made of folded paper forms that may be transported in collapsed condition and erected and assembled at the building site to be used in the erecting of a wall, comprising: a plurality of individual folded tubular elements made of substantially water proof building paper, said tubular elements being of substantially square cross-section to that they may be collapsed along diagonal folds thereof into flat elements while being transported, each of said tubular elements having a pair of oppositely disposed tabs at each end thereof, a pair of elongated channel members also made of substantially water proof building paper, each of said channel members having a width that is smaller than the distance between the aforesaid oppositely disposed tabs, said channel members being positioned in parallel spaced relation and said tubular elements being arranged in a row between said channel members with the tabs at each end of said tubular elements embracing the outside of the adjacent one of said channel members and means for fastening said tabs to the embraced channel member.

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