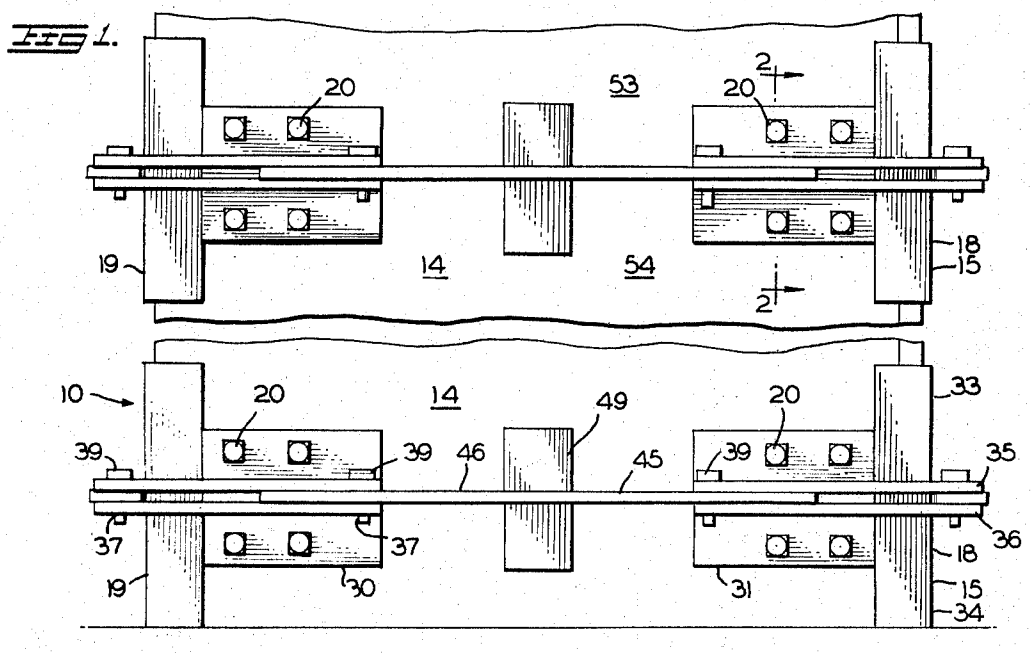
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FORM FOR CONCRETE COLUMNS

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Fig 1.



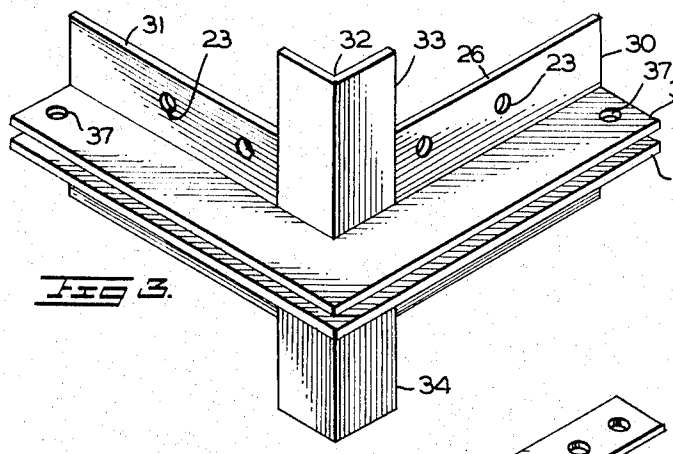


Fig 3.

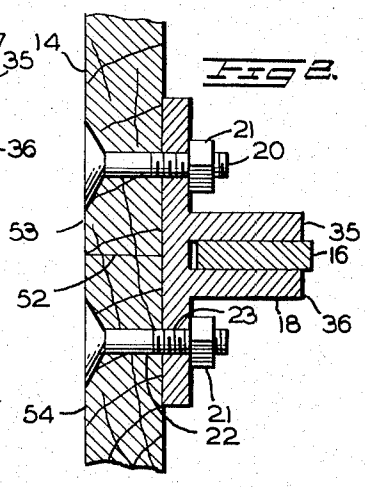


Fig 2.

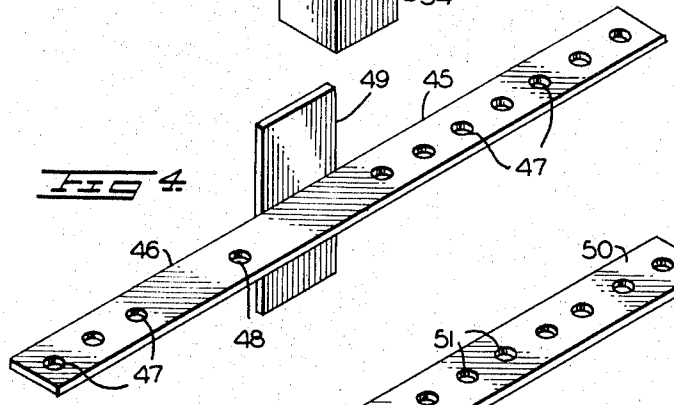


Fig 4.

Fig 5.

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Fig 6.

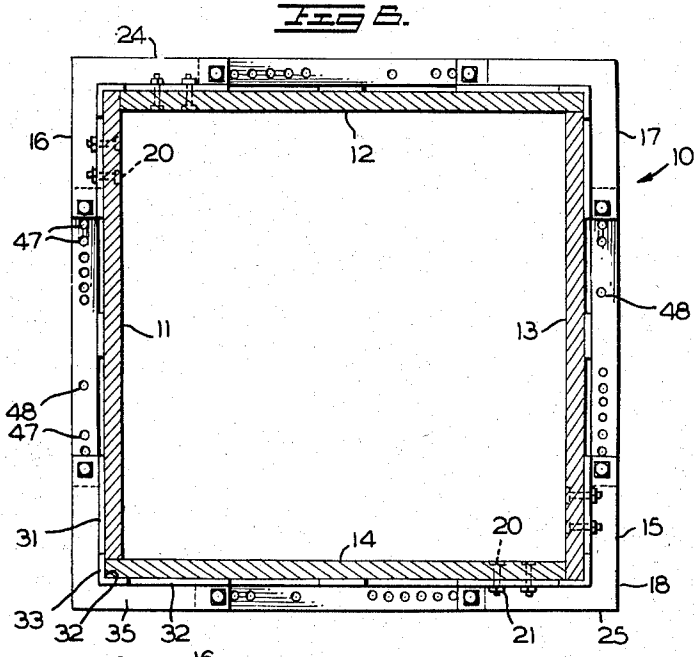


Fig 7.

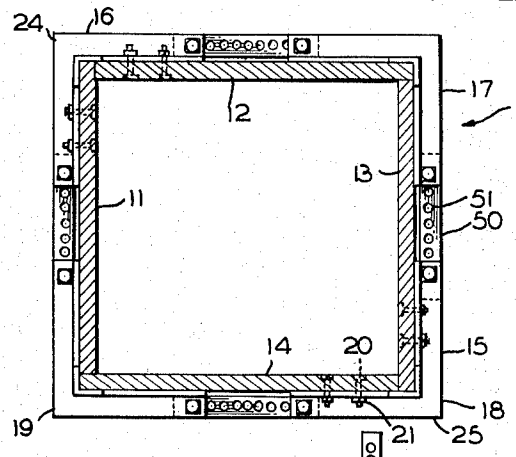
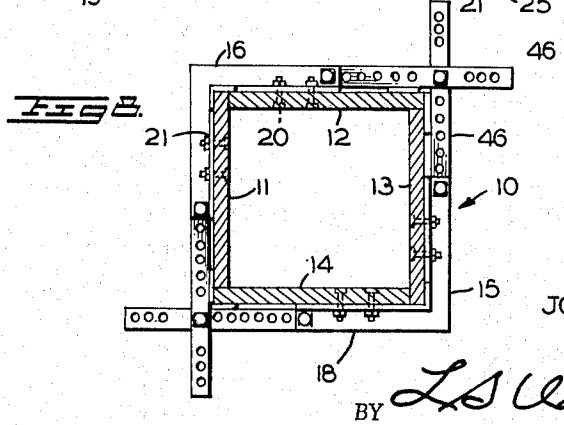


Fig 8.



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FORM FOR CONCRETE COLUMNS

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8 Claims. (Cl. 249—48)

This invention relates to an improved form for concrete columns and to components therefor. The invention further relates to a novel method of constructing column forms and pouring concrete columns.

This invention is primarily concerned with forms for square or rectangular concrete columns of the types commonly used in the construction of high rise office buildings and apartment buildings. The columns usually are progressively reduced in size as the construction proceeds from the bottom to the top of the building due to the decreasing strength requirements, and thus the prior art forms used for the lower floors cannot be used for the smaller columns on the higher floors. As a general rule, about five percent of the columns are less than twelve inches in the maximum dimension, about ten percent are larger than twenty-four inches in the maximum dimension, and about eighty-five percent have maximum dimensions varying between twelve and twenty-four inches. This further complicates the problem of preparing the large number of column forms which are required in a large development in an efficient and economical manner.

Some of the more successful approaches to the problem prior to the present invention include the common practices of constructing the panel members for the column form from plywood, and retaining the panel members in place in the completed form by banding or with clamps. In either instance, it is necessary that expensive and time consuming battens of wood or studding be applied to the completed form, and it is almost impossible to construct the column form along the entire length to the exact desired dimensions. As a result, when the concrete is poured, it follows the imperfections in the form and the concrete column thus produced is not square, straight, plumb and true along its entire length.

Another important disadvantage of the above practices is that the prior art banded or clamped column forms can not be stripped from the poured columns intact. The forms must be broken down into their numerous component parts for movement to and reassembly at a new location, and gang construction or movement is not feasible. Also, the forms must be rebuilt entirely in instances where the size of the column is changed on a higher floor level. The foregoing unnecessarily increases the amount of labor and material required and causes a very substantial increase in the construction costs.

It is an object of the present invention to provide an improved self squaring form for concrete columns which may be gang formed, and which may be reused for pouring a number of concrete columns of the same size or a smaller size or sizes, and to provide components therefor.

It is a further object of the invention to provide a novel and more economical method of constructing concrete column forms and pouring concrete columns therewith.

Still other objects and advantages of the invention will be apparent from the following detailed description and the accompanying drawings, wherein:

FIGURE 1 is a side view in elevation, with portions thereof broken away, illustrating an improved form for a concrete column which is constructed in accordance with the invention;

FIGURE 2 is a sectional view in elevation taken along the line 2—2 of FIGURE 1;

FIGURE 3 is a perspective view of the column clamp of the invention;

FIGURE 4 is a perspective view of the long joining bar of the invention;

FIGURE 5 is a perspective view of the short joining bar of the invention;

FIGURE 6 is a top view of the large column form of FIGURE 1, illustrating the use therein of four column clamps and four long joining bars of the invention;

FIGURE 7 is a top view of a form similar to that of FIGURE 6, but of reduced dimensions, illustrating the use therein of four column clamps and four short joining bars of the invention; and

FIGURE 8 is a top view of a form similar to those of FIGURES 6 and 7, but of still further reduced dimensions, illustrating the use of only two of the column clamps and four of the long joining bars of the invention.

Referring now to the drawings, the column form of the invention generally designated as **10** includes elongated, vertically arranged plywood panels **11**, **12**, **13** and **14** which are fastened to and held in an exact desired spaced relationship by a plurality of vertically spaced clamping assemblies **15**. The clamping assemblies **15** may include similar corner clamps **16**, **17**, **18** and **19**, at least two of which are mounted on oppositely disposed corners and are fastened to the plywood panels **11–14** by means of bolts **20** inserted through aligned openings **22** and **23** and provided with nuts **21**. As is best seen in FIGURES 6 and 7, preferably only two of the corner clamps, i.e., corner clamps **16** and **18**, are attached to the oppositely disposed corners **24** and **25**. However, all four of the corner clamps **16–19** may be attached to panels **11–14** when desired, as is best seen in FIGURE 1.

As is best seen in FIGURE 3, the corner clamp **26** of the invention has a pair of substantially flat, horizontally extending portions **30** and **31**, each of which is provided with a plurality of the openings **23** for attaching the same to the panels **11–14**. The portions **30** and **31** lay in upright, intersecting planes which form a 90° internal angle **32** at the point of intersection. Additionally, angle portions **33** and **34** extend upward and downward, respectively, from the portions **30** and **31** in the general vicinity of the point of intersection thereof. The portions **30** and **31** and the angle portions **33** and **34** are preferably integrally constructed by welding so that the angle portions **33** and **34** merely form an extension of the 90° internal angle **32** and further strengthen and support the edges of the plywood panels **11–14**, as is best seen in FIGURE 1.

The clamp **26** is further strengthened, and the portions **30** and **31** retained in completely rigid positions which form the 90° internal angle **32**, by means of a pair of spaced, substantially flat, outwardly extending reinforcing portions **35** and **36**. The portions **35** and **36** embrace the outer surfaces of the portions **30** and **31** and extend completely around the outside of the clamp **26**, thereby greatly strengthening it. Aligned openings **37** are provided near the ends of the reinforcing portions **35** and **36**, as is best seen in FIGURES 1 and 3, for receiving pins **39**.

The long joining bar **45** of the invention is best seen in FIGURES 1 and 4. The substantially flat bar portion **46** is provided with a plurality of openings **47** at regularly occurring intervals at each end, and an additional opening **48**. The openings **47** are preferably located on one-inch centers, and the opening **48** is located as will be described more fully hereinafter. An upright, substantially flat supporting member **49** having substantially the same thickness as portions **30** and **31** is attached to bar **46** by welding.

The long bar **45** has several important functions. As is best seen in FIGURES 1 and 6, when the four corner clamps **16–19** are placed on the plywood panels **11–14**

at the corners and used in preparing a large column form, the ends of the bar 45 are inserted in the spaces between the members 35 and 36, openings 37 and 47 nearest the ends are aligned, and pins or bolts 39 are inserted through the aligned openings to thereby connect the component parts of the clamping assemblies 15 together. The members 49 are located on the faces of the panels and support the same. If it is later desired to prepare a smaller form, the form may be disassembled, the width of the panels may be reduced a desired amount; openings 37 and selected openings 47 remote from the ends are aligned and the pins 39 are reinserted.

When it is desired to prepare a much smaller column such as illustrated in FIGURE 8, only two oppositely disposed column clamps 16 and 18 are used with the long bars 45. It may be noted that the supporting members 49 are positioned on the outer edges of the panels forming the remaining two corners so as to retain them at 90° angles to each other and to maintain the corners square. The openings 48 in the long bars 46 are aligned and the pins 39 are inserted therethrough so as to connect the assembly. As may be seen from FIGURE 8, the openings 48 are located at a sufficient distance from the ends of the long bars 45 to compensate for the thickness of the materials and thereby allow the supporting members 49 to rest at the edges of the panels 11–14.

The short joining bar 50 illustrated in FIGURES 5 and 7 is also provided with a plurality of regularly spaced openings 51 along its length. The openings 51 are preferably on one-inch centers. The bar 50 is especially useful in preparing column forms of intermediate size, as illustrated in FIGURE 7, and it is used in a manner analogous to the long bar in the discussion above for FIGURE 6.

In instances where one length of the plywood is too short for the column form, the present invention has further important advantages as two lengths of plywood may be joined at their ends. The column clamps 16–18 are positioned so as to bridge the joint 52 formed by the upper and lower plywood panels 53 and 54, respectively, as illustrated in FIGURE 2, and the bolts 20 are positioned as shown near the edges of the plywood. This assures a strong joint which is trouble free in the field, and allows a concrete column form of substantially any desired length to be prepared from relatively short plywood panels.

When the panels 11–14 are jointed only to clamps 16 and 18 at the oppositely disposed corners 24 and 25 as shown in FIGURES 6 and 7, the forms may be easily stripped by simply removing the retaining pins 39 and the corner clamps 17 and 19 at the remaining two corners and pulling outward on the resulting two longitudinal sections of the form. The two form sections then may be transported intact to a new location and reassembled simply by replacing the pins 39 in aligned openings 37 and 47 and corner clamps 17 and 19 which were removed in stripping, thereby effecting a great saving in labor.

When it is desired to reduce the size of the column form, this may be done in a few minutes by using a power saw to remove a strip of a desired width from the fly edges of the plywood panels of the two disassembled form sections, and the resulting two smaller form sections may be reassembled by replacing the clamps 17 and 19 and the pins 39 in selected desired aligned openings 37 and 47. This procedure may be repeated a large number of times in view of the highly adjustable nature of the clamping assemblies 15, thereby allowing the same plywood panels to be used for preparing a series of smaller forms of a wide variety, thereby effecting a large saving in materials. This is accomplished without having to remove the panels from the corner clamps 16 and 18 and thus a further substantial saving in costly labor is effected.

The foregoing detailed description and the illustrative drawings are for the purposes of illustration only, and are not intended to be limiting to the spirit or scope of the appended claims.

What is claimed is:

1. A form for pouring a concrete column comprising four upwardly extending substantially flat panels, the panels being arranged whereby they enclose an upwardly extending four sided cavity for receiving unset concrete mix with adjacent panels being at approximately right angles to each other to thereby provide four substantially 90° corners at the edges thereof, first and second column clamps, one of the clamps being retained on the outer surface of a first of said corners and the other being retained on the outer surface of a second of said corners, the first and second corners being oppositely disposed, each of the clamps including a pair of elongated, substantially flat transversely extending portions, the transversely extending portions being substantially shorter than the width of the panels and lying in upright intersecting planes which form an approximately 90° internal angle at the intersection, the internal surfaces of the transversely extending portions conforming with and being positioned on the outer surfaces of the said oppositely disposed corners whereby one horizontally extending portion is on an edge portion of each of the four panels, means for securely attaching hte horizontally extending portions to the panels whereby the panels forming the first and second corners are retained at right angles to each other and the first and second corners are maintained substantially square, a pair of spaced substantially flat reinforcing portions extending outwardly from the external surfaces of the pair of horizontally extending portions of each clamp, the pair of spaced reinforcing portions extending longitudinally along and embracing the pair of horizontally extending portions and forming an approximately 90° angle therewith, the spaced reinforcing portions having aligned openings therein alongside each of the horizontally extending portions, means for retaining the edges of the panels forming the third and fourth corners at right angles to each other and thereby maintaining the third and fourth corners substantially square, and means for connecting the retaining means for the edges of the panels forming the third and fourth corners to each of the column clamps, the connecting means including elongated members which are inserted between the spaced reinforcing members, the said elongated members having openings therein aligned with the openings in the spaced reinforcing members, and fastening means inserted through the aligned openings in the spaced reinforcing members and the openings in the said elongated members.

2. The column form of claim 1 wherein the panels are attached only to the horizontally extending portions of the two clamps, whereby the column form may be readily separated at the third and fourth corners into two longitudinally extending sections upon removing the retaining means for the edges of the panels forming the third and fourth corners.

3. The column form of claim 1 wherein the means for connecting the column clamps and the retaining means for the edges of the panels forming the third and fourth corners is adjustable over a plurality of lengths, thereby allowing a plurality of column forms of reduced dimensions to be prepared from the same materials by successively reducing the width of the panels.

4. The column form of claim 3 wherein the panels are attached only to the horizontally extending portions of the two clamps, whereby the column form may be readily separated at the third and fourth corners into two longitudinally extending sections upon removing the retaining means for the edges of the panels forming the third and fourth corners and the panels may be reduced in width by removing a portion along the edges of the panels forming the third and fourth corners.

5. The column form of claim 1 wherein the retaining means for the edges of the panels forming the third and fourth corners include third and fourth column clamps which are similar to the first and second clamps, and

the connecting means is elongated joining bars having a plurality of openings along the length thereof whereby the effective length may be adjusted.

6. The column form of claim 5 wherein the joining bars are provided with substantially flat members remote from the ends thereof for strengthening the panels, the said flat strengthening members being positioned between the outer surfaces of the panel members and the joining bars and having substantially the same thickness as the horizontally extending members on the clamps.

7. The column form of claim 6 wherein the said strengthening members of the joining bars are positioned near the edges of the panels forming the third and fourth corners, the ends of the joining bars adjacent the third and fourth corners are provided with aligned openings and fastening means is inserted through the aligned openings in the joining bars whereby the third and fourth corners are maintained substantially square.

8. The column form of claim 1 wherein the transversely extending portions of the column clamps intersect to form a 90° internal angle at the intersection, and angle portions having a 90° internal angle extend above and below the intersection to thereby further strengthen the corners.

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