July 30, 1963 C. BAUER 3,099,062

MOLD FORM FOR COLUMNS MADE OF CASTING MATERIAL

Filed Feb. 13, 1957 5 Sheets-Sheet 1

FIG. 1.

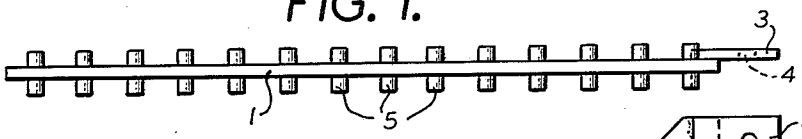


FIG. 2.

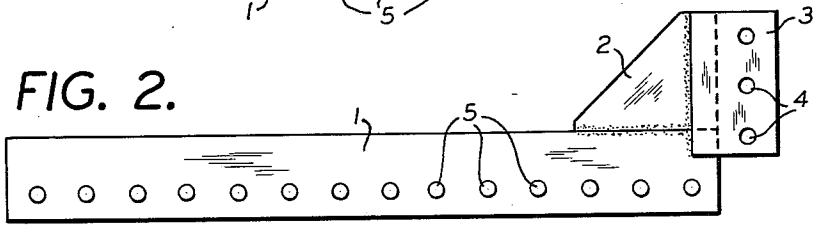


FIG. 3.

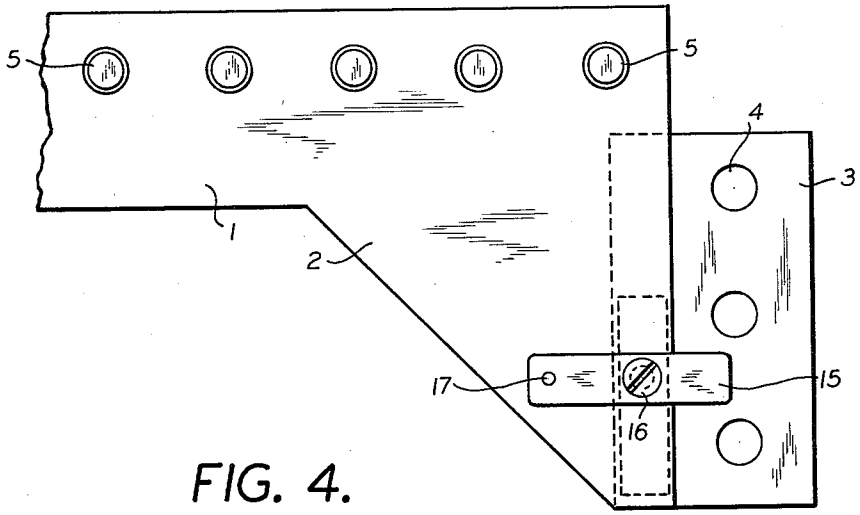


FIG. 4.

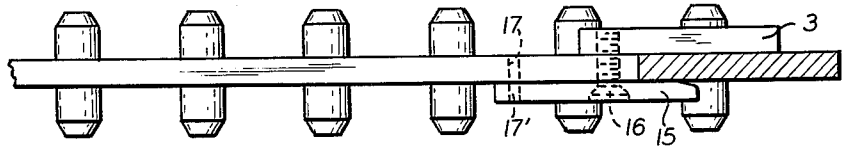
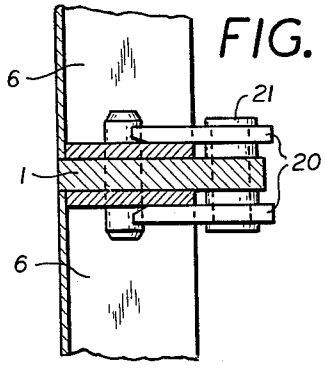


FIG. 5.



INVENTOR
CHARLES BAUER
BY Prescott J. Montague
ATTORNEY.

July 30, 1963 C. BAUER 3,099,062

MOLD FORM FOR COLUMNS MADE OF CASTING MATERIAL

Filed Feb. 13, 1957 5 Sheets-Sheet 2

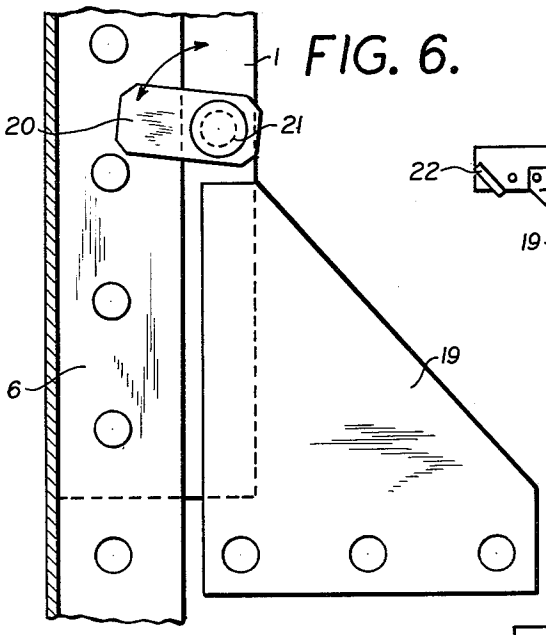


FIG. 6.

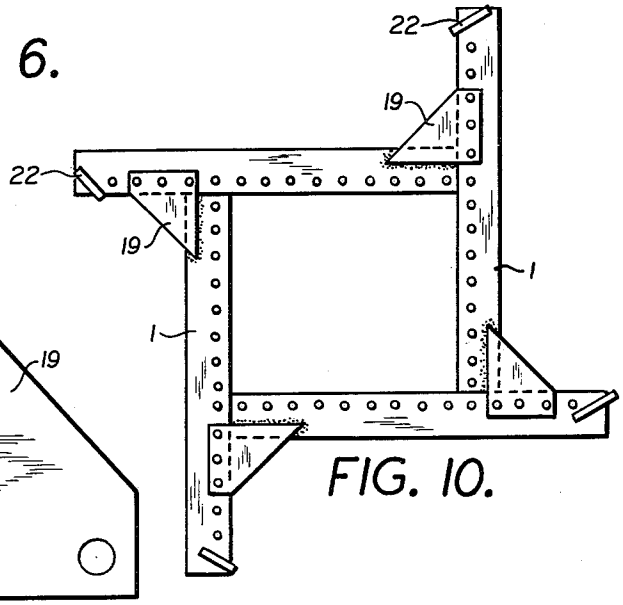


FIG. 10.

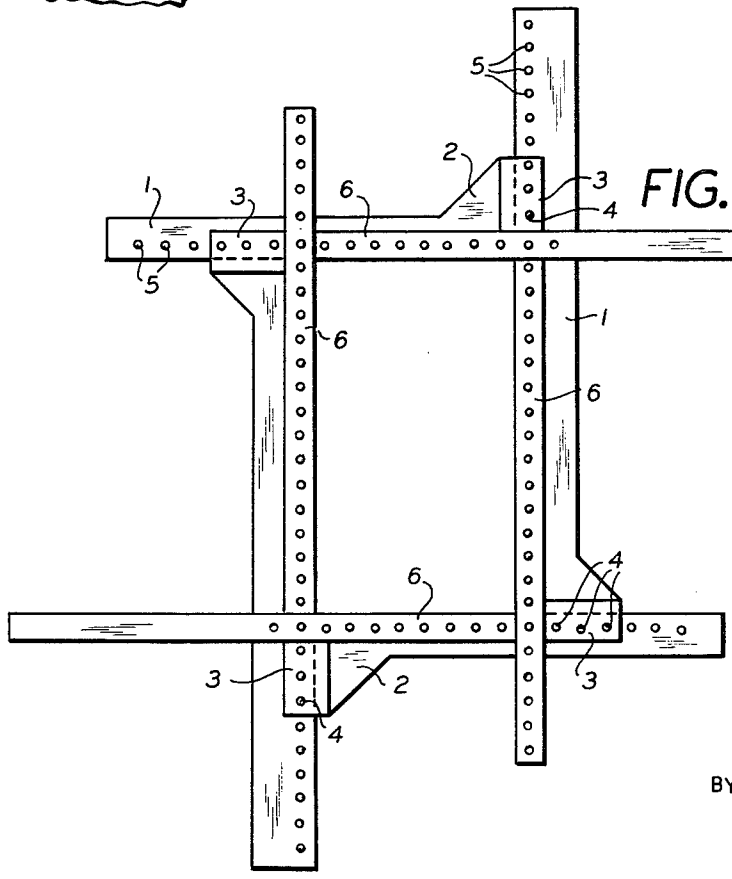


FIG. 7.

INVENTOR
CHARLES BAUER
BY
ATTORNEY.

July 30, 1963 C. BAUER 3,099,062

MOLD FORM FOR COLUMNS MADE OF CASTING MATERIAL

Filed Feb. 13, 1957 5 Sheets-Sheet 3

FIG. 8.

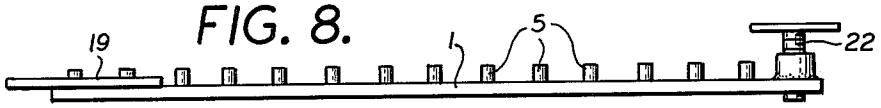


FIG. 9.

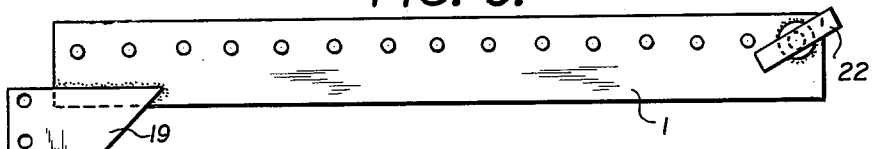


FIG. 11.

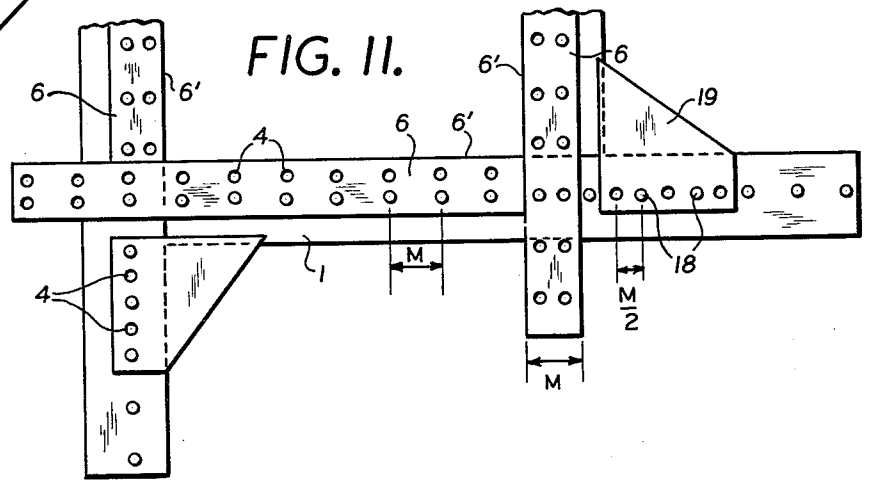


FIG. 12.

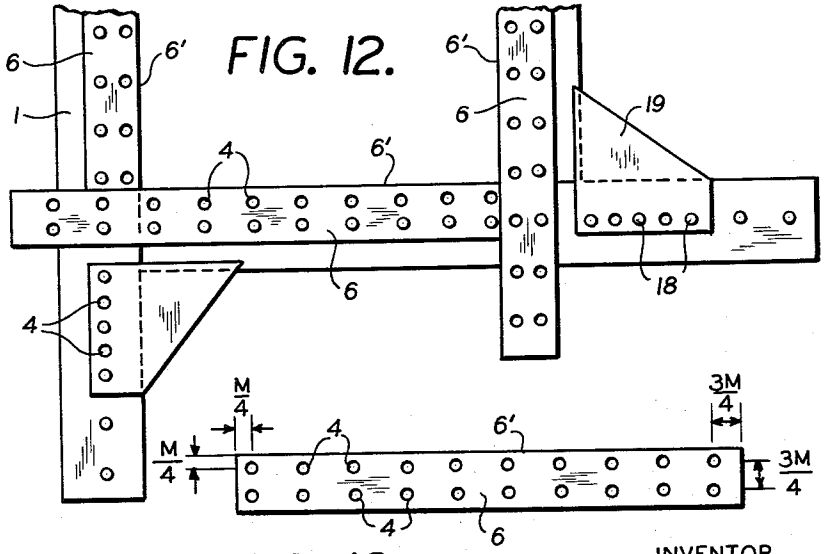


FIG. 13.

INVENTOR
CHARLES BAUER
BY
ATTORNEY.

July 30, 1963 C. BAUER 3,099,062

MOLD FORM FOR COLUMNS MADE OF CASTING MATERIAL

Filed Feb. 13, 1957 5 Sheets-Sheet 4

FIG. 14.

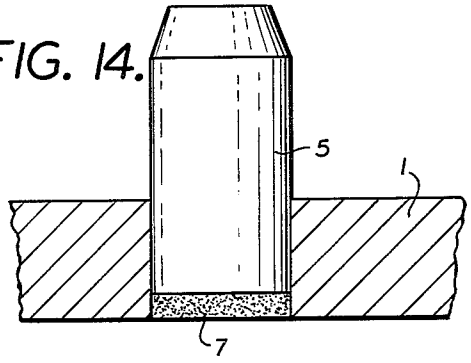


FIG. 15.

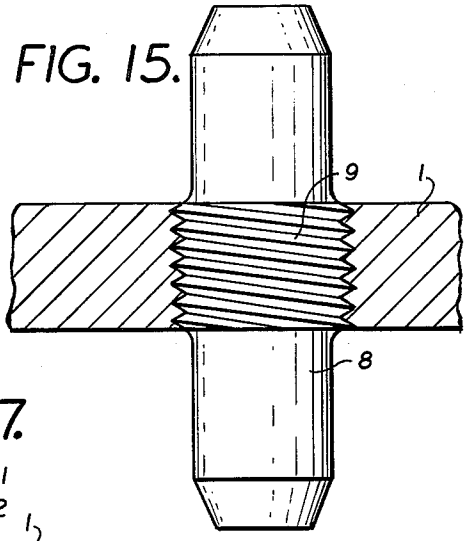


FIG. 16.

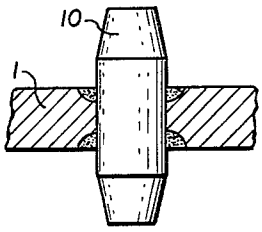
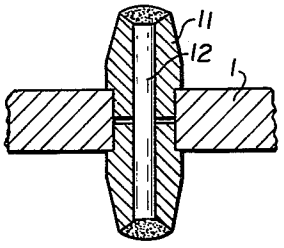


FIG. 17.



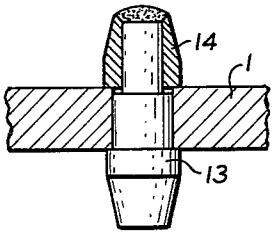
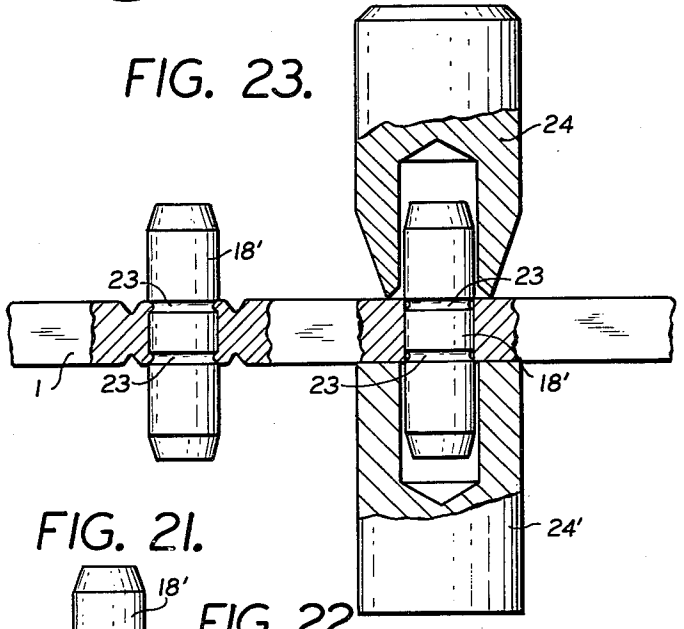


FIG. 18.

FIG. 23.



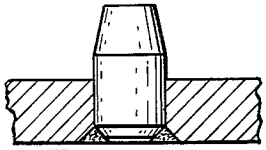


FIG. 19.

FIG. 21.

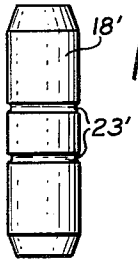
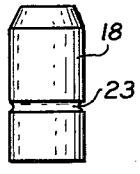


FIG. 22.



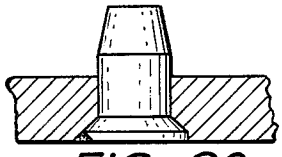


FIG. 20.

INVENTOR
CHARLES BAUER
BY
ATTORNEY.

July 30, 1963 C. BAUER 3,099,062

MOLD FORM FOR COLUMNS MADE OF CASTING MATERIAL

Filed Feb. 13, 1957 5 Sheets-Sheet 5

FIG. 25.

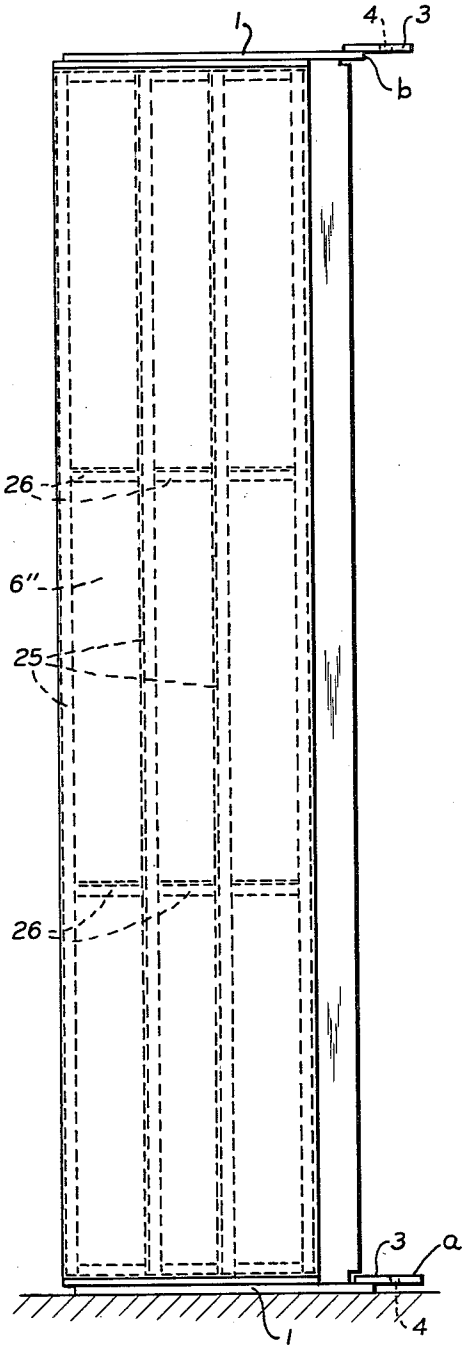
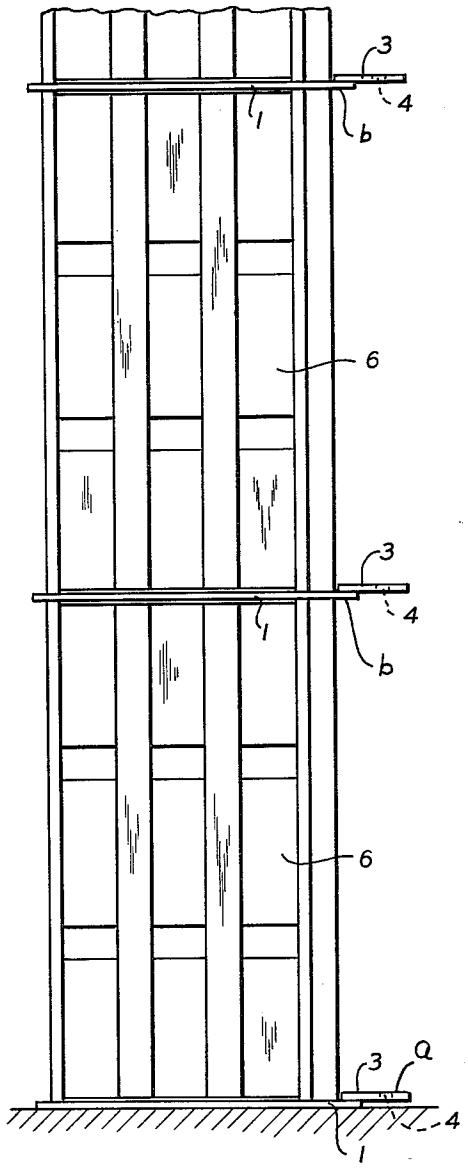


FIG. 24.



INVENTOR
CHARLES BAUER
BY

ATTORNEY.

United States Patent Office 3,099,062 Patented July 30, 1963

3,099,062
MOLD FORM FOR COLUMNS MADE OF CASTING MATERIAL

Charles Bauer, 6 Rue Ovigneur, Lille, Nord, France

Filed Feb. 13, 1957, Ser. No. 640,042
Claims priority, application France Feb. 14, 1956
3 Claims. (Cl. 25—131)

The present invention relates to a mold form for columns made of casting material.

It is one object of the present invention to provide a mold form which allows casting concrete or generally speaking any material which permits to be molded in order to produce columns of any size and height.

The mold form comprises in conventional manner a plurality of panels and of assembling elements which serve the purpose to secure the panels together and to absorb the thrust caused during casting of the material.

It is another object of the present invention to provide a mold form for the casting which comprises a plurality of assembling elements provided with studs and a plurality of panels provided with openings corresponding and complementary to the studs so as to arrive at an assembly obtained by fitting the studs of the assembling elements to the opening of the panels. For the casting of posts, the assembly elements are associated to form frames which are preferably identical with each other and each of which comprises generally four such elements which are also preferably identical with each other. When assembling the frames with the panels through interengagement, it is possible to give them any desired variable cross-sections in predetermined manner, in order to bring about the desired result. The whole arrangement forms a sort of a box into which the concrete or the like material is poured to form the post.

It is yet another object of the present invention to provide a mold form which comprises elements which form the frame and which are made of flat iron members and it is of a major importance for said structural members to be assembled in such manner that perfect rigidity is obtained and that the panels cannot change position, for instance under the pressure of the poured material. To this end, each element of the flat iron frame includes at least at one end an assembly plate provided with ports adapted to engage the studs of the adjacent frame element, the successive frame elements being set at a predetermined angle, preferably an angle of 90° relative to each other. This assembly plate may be secured to the associated flat iron member of the frame by means of a stay-plate preferably of a triangular shape or it may form a unit with the stay-plate, the different parts being advantageously secured together by a welding operation. The stay plate is in an off-set position relative to the flat iron element, so that it may engage flush the adjacent element and allow all the elements of the frame to be located in the same plane. Lastly, the stay-plate is located in a receding position with reference to the row of studs of the frame element to which it is secured, the amount of receding being such that its narrow front edge does not interfere with the panel which is to be fitted over said row of studs.

Two types of panel-carrying frames are provided, namely, a carrier frame in which the assembly studs project only beyond one surface of the frame elements and an intermediate frame in which the studs project to either side of the elements.

With these and other objects in view, which will become apparent in the following detailed description, the present invention will be clearly understood in connection with the accompanying drawings, in which:

FIGURES 1 and 2 are an elevational and a plan view,

respectively, of an element of a flat iron for the molding of posts;

FIGS. 3 and 4 are a bottom plan view and an elevational view, respectively, of a modification of the frame element, disclosed in FIGS. 1 and 2, which is provided with locking means;

FIGS. 5 and 6 are a vertical cross-section and a plan view, respectively, of a further modification of the frame element which includes improved locking means;

FIG. 7 is a top plan view of a mold for posts;

FIGS. 8 and 9 are an elevation and a top plan view, respectively, of a frame element with means for levelling the latter;

FIG. 10 is a top plan view of such frame element in assembled position;

FIGS. 11 to 13 are top plan views and an elevation, respectively, of further embodiments of the frame elements;

FIGS. 14 to 20 are elevations and axial sections, respectively, of differently arranged studs of the frame element;

FIGS. 21 to 23 are elevations of further embodiments of studs;

FIG. 24 is a front elevation of a mold form for posts; and

FIG. 25 is a front elevation of a mold form for posts including means for increasing the rigidity of the posts.

Referring now to the drawings, and in particular to FIGS. 1 and 2, which disclose a first embodiment of a flat iron frame element serving as a connecting means for a mold form for posts, a plurality of such elements, preferably four, are used, to form together a frame which is easily assembled and dismantled, respectively.

As can be readily seen the flat iron frame element comprises a longitudinal body **1** to one end of which is attached a triangular stay-plate **2** and an assembly plate **3** is secured to the same end of the longitudinal body **1**. The assembly plate **3** projects at an angle of about 90° from the longitudinal body **1**. Openings **4** are provided in the assembly plate **3** and a plurality of studs **5** are fitted equally spaced apart in the longitudinal body **1** of the element.

In the embodiment disclosed in FIGS. 3 and 4, the flat iron element comprises the same parts as in FIGS. 1 and 2 and there is provided additionally a screw **16** screwed into the underside of the longitudinal body **1** of the frame element to serve as a pivot for a latch **15** which may be angularly set in the releasing position, shown in dotted lines. After assembling together two successive frame elements by means of the studs **5** of one of the elements, in the openings **4** of the other element, the latch **15** is turned for an angle of 90° into the position shown in solid lines, so as to lock together the two adjacent interengaging elements which are thus held in operative position. To prevent any undesired release, a pin or nail **17'** may be inserted inside the opening **17** in the latch **15** to secure the latter in the last mentioned position.

In the embodiment disclosed in FIGS. 5 and 6, there is provided a locking system for the frame elements which secures rigidly, by means of a single operation, a lower carrier frame with the panels **6** carried above it or again an intermediate frame *b* with the lower and upper panels **6**, which frame is to interconnect in vertical relationship, the frames being shown more clearly in FIG. 24.

The improved locking means include a single bolt for the lower frame and a double bolt including two latches **20** which have the same pivotal axis **21** and lie, respectively, above and below the longitudinal body **1** forming one of the horizontal frame elements. Such a single or double locking member **20** is positioned advantageously in proximity of the assembly plate for the frame element. In FIGS. 5 and 6, the plate **19** forms in its turn a sim-

plified modification of the plate 3 of the embodiment of FIGS. 1 to 4 and forms a unit which comprises the assembly plate and the stay-plate, described hereinabove. As it is apparent from an inspection of FIG. 6, it is sufficient to turn the double latch 20 upon its axis 21 in order to obtain a permanent connection between the panels 6 and the body 1 of the frame element above which or underneath which these panels extend. The locking in the present embodiment amounts to a duplication of that illustrated in FIGS. 3 and 4 for interconnecting the frame elements.

FIG. 7 is a top plan view of a mold form for posts at the upper end of a row of panels 6 and it shows how it is possible for four flat iron frame elements designed in the manner described hereinabove to form an exceedingly rigid, retaining mold form. The four elements form a rectangle the size of which corresponds with that of the post to be cast and they are assembled in such a manner that the assembly plate 3 of one element lies over the body 1 of the adjacent element, which is at 90° with reference to the former element, the openings 4 in one element engaging the studs 5 of the second element. Over the frame thus formed are positioned the panels 6 of the mold and the interconnection is provided by the studs 5 of the frame engaging the openings formed in the panels, the front edges of the plates 3 having a sufficiently receded position to leave enough room for the panel 6.

Since it is comparatively difficult to set the lowermost frame at a uniform level on an uneven ground, it is of advantage to resort to the embodiment disclosed in FIGS. 8 to 10 for providing levelling of the lowermost frame. To this end, there is provided at a suitable point of the flat iron member a frame element and, preferably, near the end of the flat iron facing away from the assembly plate 19 and in alignment with the stud 5, a screw jack 22 which allows obtaining speadily, without any strain and with a high accuracy, the levelling of the lowermost frame so as to adjust the mold and to set it in a vertical position.

FIGS. 11 to 13 disclose a modification of the panels and of the frames with a view to increase the range of sizes which may be given to the cross-section of the post to be formed. In the preceding embodiments, the modification of the cross-section depends upon the distances M between the axes of the studs, which distances M are in practice generally equal to 50 mm. or thereabout. To allow a reduction in the difference between two successive sizes of the cross-section to be obtained with the system of the present invention, the panels 6 are provided at their upper and lower ends with two rows of openings 4 instead of a single row and the openings in each row have their axes spaced at the same distance M as the studs of the frame and, furthermore, these openings are shifted longitudinally on the panels towards their vertical edges; thus the distance between the first openings 4 in the two rows and the nearest vertical edge of the panel is equal to one-quarter of the distance between the axes, while the distance between the last openings 4 in said rows and the nearest vertical edge of the panel is equal to three-quarters of the distance between the axes. On the other hand, the openings 4 in the assembly plate 19 of the frame element are provided with spacings disposed between them, equal to one-half of the distance between the axes of the studs, which allows engaging the plate on the studs in positions varying by said half-distance $M/2$. FIG. 11 shows in a plan view the assembling of a mold form, the useful transverse cross-section of which between the surfaces 6' of the lateral panels 6 is equal to x times M. To obtain a useful transverse cross-section between the opposite surfaces 6' of the lateral panels 6 which is equal to (x times M)$+M/2$, it is sufficient to shift the frame irons 1 by $M/2$ and to turn around the transverse panels 6 so as to benefit by the shifting of the openings 4 in a longitudinal direction. FIG. 13 is a plan view of a panel 6 showing the distribution of the openings which are thus shifted with reference to the transverse plane of symmetry of the panel.

Concerning the securing of the studs 5 inside the bodies 1 of the frames, various modifications are also possible. In the case of the elements forming the lowermost frame, the studs 5 may form mere tenons fitted inside the body 1 of the element and held therein by a layer of welding or soldering material 7 filling the bottom of the opening which is to receive the stud 5 (FIG. 14). In the elements forming the intermediate frames, the studs projecting to either side of the body 1 of the element may comprise pins 8 having a central threaded enlarged section 9 which screws into the body 1 (FIG. 15). In other embodiments there are provided simple tenons 10 secured by welding seams (FIG. 16) or again nipples 11 fitted to either side in the body 1 and interconnected by the simple rod 12 extending through the nipples throughout and secured thereto through terminal welding sections (FIG. 17). It is also possible to resort to stepped pins 13 passing through the body 1 and the shape of such pins is on one side of the body 1 that of the actual stud, while its opposite end is capped by a ring 14, the outer shape of which is that of a stud (FIG. 18). FIGS. 19 and 20 show two further modified studs and their securing means to be used for the lowermost frame.

FIGS. 21 to 23 show lastly a further embodiment applicable both to the studs of the lowermost frame and to those of the intermediate frames. In the first case (FIG. 22), the stud 18 is provided with a single groove 23 and in the second case the stud 18' is provided with two grooves 23' and these grooves assume a position substantially flush with the surface of the body 1 when the stud is fitted preferably with a forced fit inside the latter. Setting tools such as a chisel 24 and a head cup 24' drive the material forming the body 1 into the grooves 23 of the studs 18, 18', respectively, and provide for their secure anchoring inside the corresponding opening.

FIG. 24 shows a mold form for posts, incorporating the elements described in the preceding figures. FIG. 24 shows how the successive stories may be erected starting from a lowest frame a with the interposition, between every pair of adjacent stories formed by panels 6, of an intermediate frame b.

It is apparent from the above that with a single type of flat iron members and of panels 6, it is possible to provide mold forms and consequently molds, the cross-sections and sizes of which may be varied to a considerable extent.

However, since it may often be desirable in practice to form in a single operation posts of a height of 2.50 to 3 meters, it is possible to use in such cases the modifications disclosed in FIG. 25, which is an elevational view of a high panel. Panels 6'' are provided which are clamped only between a single lower frame a and a single upper frame b. The weight of the concrete formed over such heights produces then a substantial flexional torque acting on the panels. It is, therefore, necessary to equip such panels with a sufficient rigidity so that they may resist the lateral thrust of the concrete.

In FIG. 25, the panels 6'' are self-supporting and comprise a sheet iron box, the inside of which is reinforced by shaped metal members 25 extending preferably throughout the height of the panel and between which extend transversely further shaped metal elements 26.

Although the above described mold forms are intended more particularly for the construction of posts having a square or rectangular transverse cross-section and of straight walls with corners at 90°, it is possible to adapt them, through modifications of a mere structural nature, for the construction of posts and walls the angles and corners of which differ from 90°.

While I have disclosed several embodiments of the present invention, it is to be understood that these embodiments are given by example only and not in a lim-

iting sense, the scope of the present invention being determined by the objects and the claims.

I claim:

1. A mold form for columns made of casting material comprising four panels disposed relative to each other in such position to define a space to be filled with said casting material, and four connecting elements connecting each pair of said panels disposed adjacent each other, each pair of said connecting elements connecting each other, each of said connecting elements comprising a stay-plate, a body and an assembly plate, each of said bodies and each of said stay-plates having a plurality of studs disposed longitudinally and equally spaced apart from each other, and each of said assembly plates and each of said panels having a plurality of openings equally spaced apart from each other at the same distance as that of said studs of said bodies and of said stay-plates, so that upon insertion of each of said studs of said connecting elements into the corresponding openings of said assembly plates and of said panels, said connecting elements are releasably and mutually connected to each other and to said panels, to form a frame, a latch engaging said stay-plate, and a screw bolt extending through said stay-plate and through said latch to provide a pivot for said latch, so that upon turning the latter for about 90° from inoperative position after providing a second stay-plate adjacent said previously mentioned stay-plate, said second stay-plate is retained between said assembly plate and said latch.

2. The mold form, as set forth in claim 1, wherein each of said panels has two rows of openings equally spaced apart from each other, the distance between each pair of adjacent openings being equal to that of said studs of said connecting elements.

3. The mold form, as set forth in claim 1, wherein said studs are of conical shape and are inserted into said connecting elements.

References Cited in the file of this patent

UNITED STATES PATENTS

1,142,887	Keenan	June 15, 1915
1,235,542	Bagby	Aug. 7, 1917
1,567,210	Trester	Dec. 29, 1925
1,630,795	Keller	May 31, 1927
1,644,584	Heltzel	Oct. 4, 1927
1,644,585	Heltzel	Oct. 4, 1927
1,717,579	Pape	June 18, 1929
2,017,553	Troiel	Oct. 15, 1935
2,228,123	McMurray	Jan. 7, 1941
2,229,317	Van Cleef	Jan. 21, 1941
2,314,866	Bosco	Mar. 30, 1941
2,236,616	Bosco	Apr. 1, 1941
2,335,236	Colt	Nov. 30, 1943
2,493,264	Records	Jan. 3, 1950
2,669,000	Seemann	Feb. 16, 1954

FOREIGN PATENTS

3,994	Great Britain	1874
860,490	France	Sept. 30, 1940
807,995	Germany	July 9, 1951
1,031,069	France	Mar. 19, 1953
880,057	Germany	June 18, 1953
1,061,425	France	Nov. 25, 1953
1,099,057	France	Mar. 16, 1955
693,572	France	Sept. 1, 1930