R. W. FULLER.

CONCRETE BUILDING APPARATUS.

APPLICATION FILED SEPT. 15, 1911.

1,028,013.

Patented May 28, 1912.

3 SHEETS—SHEET 1.

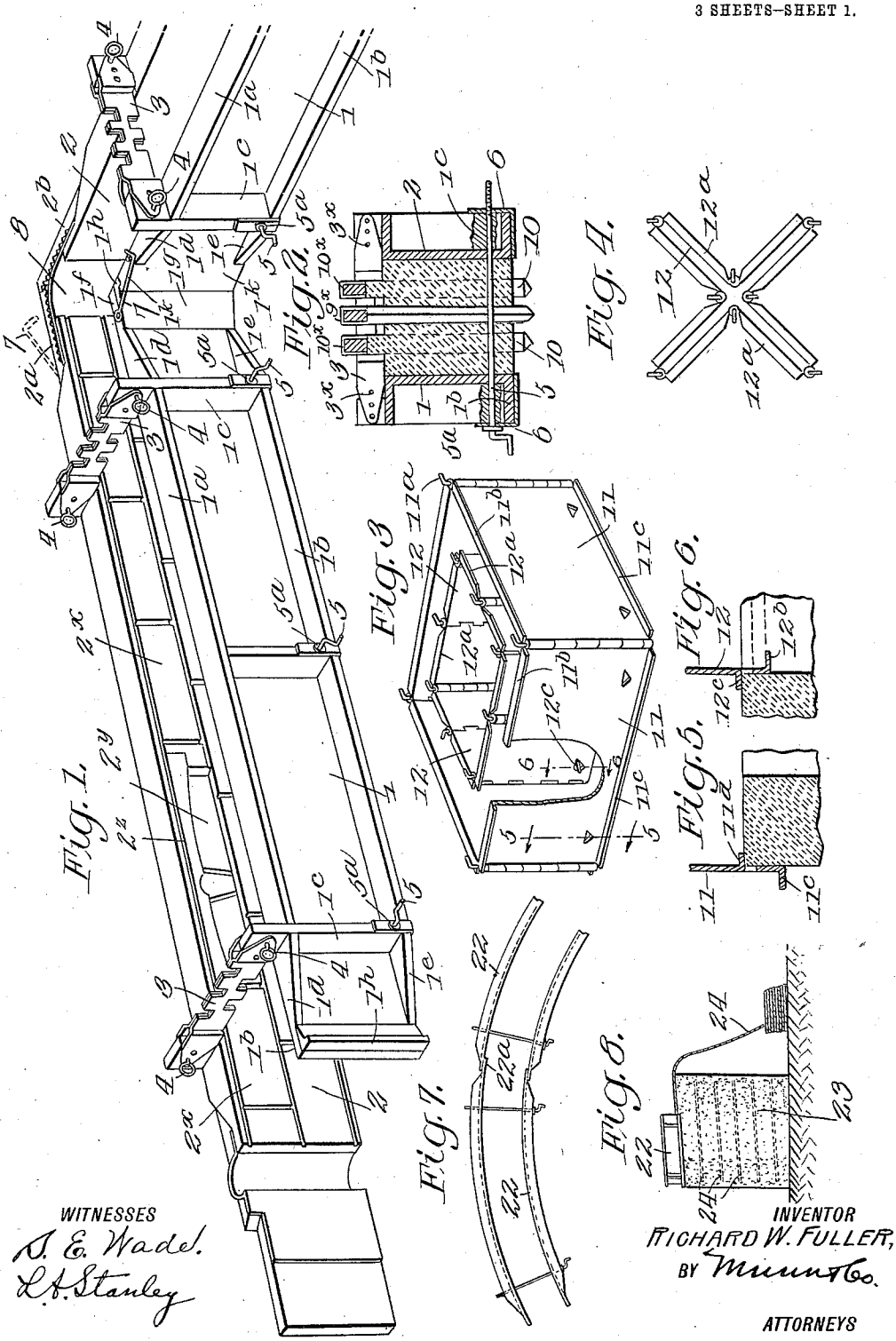

Fig. 1.

Fig. 2.

Fig. 4.

Fig. 3

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

WITNESSES

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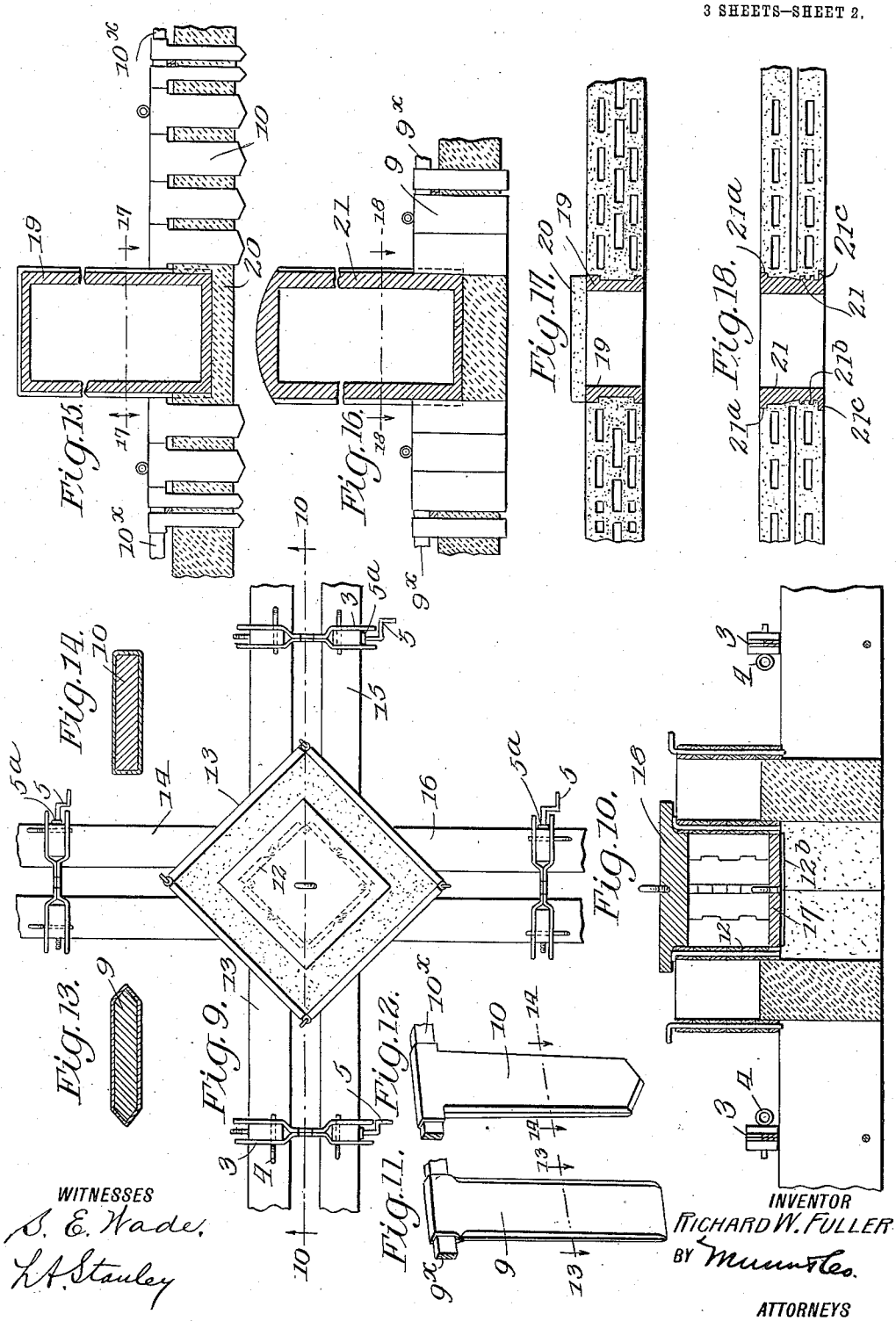

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3 SHEETS—SHEET 3.

Fig. 19.

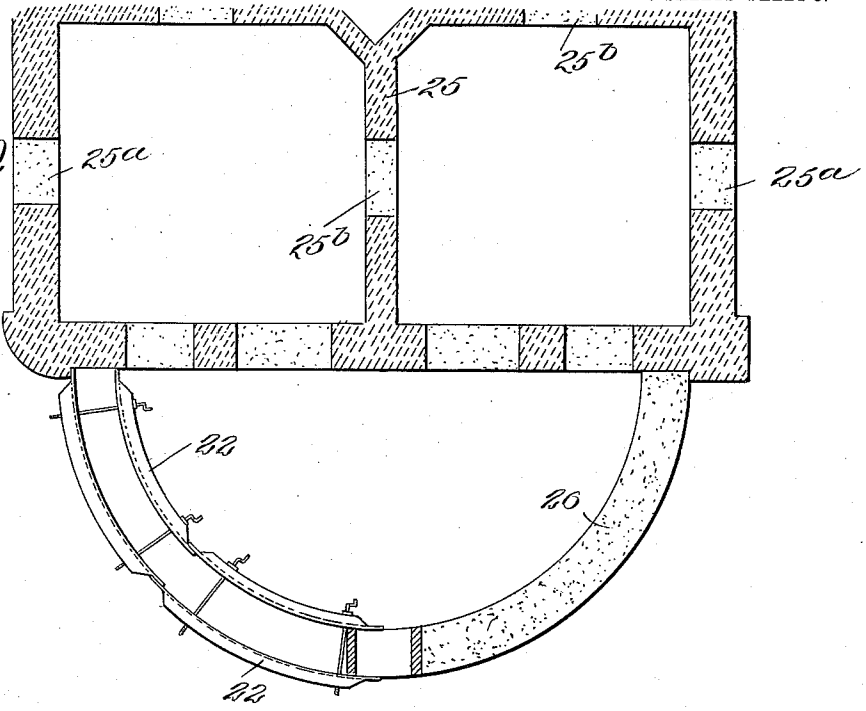
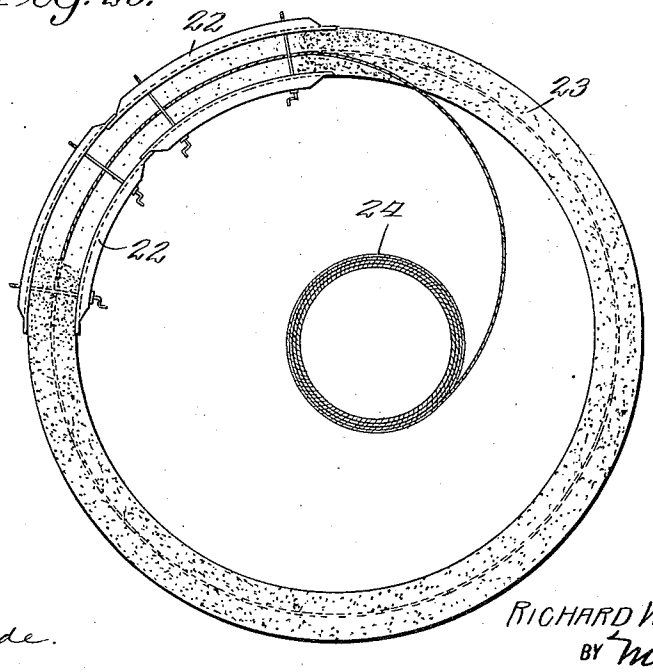


Fig. 20.



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CONCRETE-BUILDING APPARATUS.

1,028,013. Specification of Letters Patent. **Patented May 28, 1912.**

Application filed September 15, 1911. Serial No. 649,483.

To all whom it may concern:

Be it known that I, RICHARD W. FULLER, a citizen of the United States, and a resident of Webster township, in the county of Woodward and State of Oklahoma, have made certain new and useful Improvements in Combined Adjustable Concrete-Building Apparatus, of which the following is a specification.

My invention relates to improvements in adjustable molding devices for concrete buildings, and it consists in the combinations, constructions and arrangements herein described and claimed.

An object of my invention is to provide an improved device over that shown in my prior application, Serial Number 556,464, filed April 20, 1910. These improvements consist mainly in the means for fastening the corners of the mold members together, improvements in the shape of the core blocks, the simplifying of the construction of the adjustable molds, and other new features which will be set forth in the specification.

My invention is illustrated in the accompanying drawing forming part of this application in which similar reference characters indicate like parts in the several views, and in which—

Figure 1 is a perspective view showing the mold members in position for forming a portion of the wall including the corner, Fig. 2 is a transverse section through the mold and wall showing the core blocks and dividing plate in position, Fig. 3 is a perspective view showing the collapsible chimney mold, Fig. 4 is a plan view showing the folded position of the chimney mold, Fig. 5 is a section along the line 5—5 of Fig. 3, looking in the direction of the arrows, Fig. 6 is a section along the line 6—6 of Fig. 3, looking in the direction of the arrows, Fig. 7 is a plan view of a portion of the circular mold for making cylindrical structures, or curved walls, Fig. 8 is a side view of a silo showing the use of the circular mold sections, Fig. 9 is a plan view of the apparatus for constructing the chimney and the adjoining partition walls, Fig. 10 is a section along the line 10—10 of Fig. 9, looking in the direction of the arrows, Fig. 11 is a perspective view of one of the spacing plates, Fig. 12 is a perspective view of one of the core blocks, Fig. 13 is a section along the line 13—13 of Fig. 11, Fig. 14 is a section along the line 14—14 of Fig. 12, Fig. 15 is a section through a wall showing a door mold, Fig. 16 is a section through the wall showing a window mold, Fig. 17 is a section along the line 17—17 of Fig. 15, Fig. 18 is a section along the line 18—18 of Fig. 16, Fig. 19 is a plan view showing a portion of the wall of a building with a circular wall for a bow-window, porch, gallery or any other addition to the house, and Fig. 20 is a plan view showing the manner in which the curved molds are used for building cylindrical structures such as silos or the like.

In carrying out my invention I provide mold members for the walls, such as those shown at 1 and 2 in Fig. 1. Each of these mold members is provided with an upper and a lower outwardly extending flange, like those shown at 1^a and 1^b, while at intervals between the flanges are braces, such as those shown at 1^c. The end braces are extended to form attaching means for the core supports 3, the latter being pivotally connected to the upright braces by means of the removable pins 4. As shown in Fig. 2 the core supports 3 are provided with a series of holes 3^x, each of which is adapted to receive the pivot pins 4, thus permitting the adjustment of the molds toward or away from each other. These core supports are reversible. In the figure I have shown them as being provided with three sockets or slots on the upper side and two on the lower, but it will be understood that any other number of sockets, such as five on the upper side and four on the lower, might be used without departing from the spirit of the invention.

The inner surface of the mold member 2 is grooved to form blocks such as those shown at 2^x to give the appearance of concrete blocks when the wall is finished. At 2^y I have shown a cut-away portion with a curved insert 2^z above it. The cut-away portion is for the purpose of forming a window cap. This is given as an illustration of the means by which the window caps, win-

dow sills, and door sills are formed, the two latter varying merely in the shape of the cut-away portion 2^y.

Extending through the braces 1^c and through the walls 1 and 2 of the mold, near the bottom part, are the tapering threaded crank bolts, such as those shown at 5 for clamping the molds in position. These bolts, as clearly shown in Fig. 2, are threaded at the ends to engage L-shaped plates 6, and are provided with collars such as that shown at 5^a to engage similar plates on the opposite mold member.

The means for joining the corners of the molds is different from that in my prior application referred to. It will be noticed that the flanges 1^a and 1^b are beveled from the end brace member 1^c toward the wall 1, as clearly shown at 1^d and 1^e, respectively. One of these mold members is formed with an extension 1^f, to which is secured a wedge-shaped block 1^g, having a flange 1^h arranged to enter a socket in the extension 1^k of the companion wall member. A hook 7 is arranged to join these two wall members together. The outer mold members have extensions, such as those shown at 2^a and 2^b, which are serrated on the inner sides so as to give the corner block a serrated finish. Where a round corner is desired, a plate 8 may be placed between the extensions 2^a and 2^b and the main wall 1, as shown in Fig. 1.

The dividing plates 9, which are used when it is desired to construct a double wall, and the core blocks 10, which are used for making air spaces in the wall, are shown in Figs. 11 and 12, respectively. These dividing plates and core blocks are arranged on bars 9^x and 10^x. The shape of the dividing strips is shown in Fig. 13. It will be noticed that these strips are beveled at their sides. The core blocks 10 are tapered slightly from their upper to their lower ends, and are pointed to permit their ready withdrawal or insertion. As will be seen from Fig. 15, the core blocks are of a T-shape, and are spaced from each other, while in Fig. 16 it will be apparent that the dividing plates are arranged close together. The suspension bars 9^x and 10^x are placed in the sockets in the core support 3. Fig. 2 represents a double wall with a single air space in each wall. A horizontal section of such a wall is shown in Fig. 18.

In Figs. 3 to 6 inclusive, I have shown the chimney core or mold members. This consists of an outer rectangular member having four walls 11 of sheet metal pivotally connected together at their ends by the removable pins 11^a. The outer wall members 11 have upper outwardly extending flanges 11^b and lower outwardly extending flanges 11^c. At intervals near the bottom of the walls, triangular flange members 11^d are struck inwardly from the metal in order to provide a support for the outer walls 11, as will be hereinafter described. The inner member of the chimney core consists of eight parts 12, hinged together in such a manner that the structure can be folded in the position shown in Fig. 4, alternate hinges being on opposite sides of the walls. Each of these parts 12 has an outwardly turned upper flange 12^a, and an inwardly turned flange 12^b (see Figs. 6 and 10), and outwardly struck triangular flanges 12^c.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood.

In beginning the foundation of the building, the parts are set up as illustrated in Fig. 1. The cement or concrete is placed between the walls and is tamped down solidly. Before the concrete has set the crank bolts 5 are removed and the hook 7 is unfastened. Consider the wall portion at the right of Fig. 1. It may be swung inwardly when the crank bolts 5 are removed, this operation being permitted by the tongue and groove connection with the adjacent wall member. The right hand mold member may now be lifted out of the way by any suitable hoisting means, such as that shown in my prior patent above mentioned. The other mold section may be similarly moved. The foundation wall is now laid. In building the remainder of the wall the operation is as follows: If it is desired to make a double wall, with an air space in each wall, the core blocks are arranged on each side of the dividing plates in the manner shown in Fig. 2. If it is desired to build a single wall with three air spaces, a row of core blocks may be substituted for the middle dividing plate, and it is preferable that the core blocks be staggered, as shown in Fig. 17. It is obvious that any number of air spaces might be provided or any number of separate walls by the use of the appropriate number of rows of core blocks or dividing plates. The core blocks or dividing plates are removed by lifting them vertically. The tapering form of the core blocks permits their withdrawal with ease. After an additional section or wall has been built and the core blocks are lowered their pointed bottoms will facilitate the guiding of the core blocks into place so as to make the air spaces register.

In Fig. 9 I have shown the means by which the chimney is made. In this figure, it will be seen that the four partition walls are made by the four mold members 13, 14, 15 and 16, the ends of these mold members being beveled to fit the corners of the chimney, which is molded one course ahead of the partition walls, as shown in Fig. 10. After the foundation block the chimney core

is set up, as shown in Fig. 3. A spacing plate 17 (see Fig. 10) is lowered into the interior of the mold member 12 and rests on the inwardly turned flange 12^b. A top spacing member or plate 18 is placed in the opening and rests on the flanges 11^b. This prevents the collapsing of the inner mold member 12. The concrete is now filled in between the members 11 and 12, and when it is set the spacing members 18 and 17 are withdrawn, the inner member is collapsed, as shown in Fig. 4 and withdrawn, one of the pins 11^a is taken out of a corner of the outer mold member, and the outer member is opened up. When building the subsequent layers of the chimney, the outer mold member 11 is suspended on the foundation wall by means of the struck-in flanges 11^d (see Fig. 5) while the inner mold member rests on the foundation wall by means of the outwardly struck flanges 12^c (see Fig. 6). The partition walls are built similar to the outer walls, but in this case it is desirable to have only a single air space, as shown by the single socket in the core suspending member 3.

In Figs. 15 to 18 inclusive, I have shown the means for forming the door and window openings where the building is designed to be entirely fire-proof. Thus in Figs. 15 and 17, 19 designates the core for the door opening. It will be seen that this core rests on a sill 20, which is constructed precisely in the same manner as the window cap described in connection with Fig. 1. The door core may be taken apart when the cement is set hard enough to permit its removal, so as to leave a casing made of concrete, as shown in Fig. 17. In Figs. 16 and 18, I have shown a window core 21. This window core may be removed in the same manner described in connection with the door core, and when removed provides a recess 21^a for blinds, grooves 21^b for the window sash and a recess 21^c for a screen.

It will be obvious that my molding device may be used for building cylindrical structures such as silos or the like. In Fig. 7, I have shown an arc-shaped section 22 of the inner and outer mold members for the wall. These members overlap, as shown at 22^a, one having extensions entering between the extensions on the other. In building a silo, such as that shown at 23 in Fig. 8, the mold members are placed together and the concrete is filled between. Starting from the ground, the mold members are inclined, so that when a portion of the wall has sufficiently set the mold members may be shifted and joined to the end, the operation proceeding in a spiral direction. Between the adjacent layers a strengthening cable 24 is placed so that when the concrete hardens the cable will form a spiral strengthening band to reinforce the wall. When the top of the silo is reached, concrete can be filled in, thus tapering the wall off to a level.

In Fig. 19 I have shown a portion of the rectangular walls 25 of a building which have been constructed by the use of the mold members such as those shown in Fig. 1, the walls being provided with the window openings 25^a and the door openings 25^b. At 26 is shown a portion of a circular wall which is being erected by the use of the curved mold forms 22, such as those already described in connection with the making of the silo. It will be apparent that these forms may not only be used for silos, but for making curved walls of any description.

In Fig. 20 I have shown a plan view of a silo, such as that described in connection with Fig. 8. In this figure the wall is shown at 23, the curved mold members at 22 and the strengthening cable is wound in a spiral form and is disposed between the layers of concrete, so that when the concrete hardens the cable will reinforce the wall.

I claim:—

1. In a device for molding concrete walls, a pair of opposed mold members, each of said mold members being provided with lower and upper flanges, the flanges of one of said mold members tapering at the ends, an integral extension adjacent said tapered end provided with a tongue, a second pair of similar mold members disposed at right-angles to the first-mentioned mold members, one of said second pair of mold members being provided with an extension having a groove arranged to receive said tongue, and a hook for securing said tongue and grooved members together.

2. In a device for molding concrete walls, a pair of opposed mold members, each of said mold members being provided with lower and upper flanges, the flanges of one of said mold members tapering at the ends, an integral extension adjacent said tapered end provided with a tongue, a second pair of similar mold members disposed at right-angles to the first-mentioned mold members, one of said second pair of mold members being provided with an extension having a groove arranged to receive said tongue, a hook for securing said tongue and grooved members together, and abutting extensions on the other two mold members, said extensions being serrated on one side.

3. In a device for molding concrete walls, a pair of opposed mold members, each of said mold members being provided with lower and upper flanges, the flanges of one of said mold members tapering outwardly at the ends, an integral extension adjacent said tapered end and provided with a tongue extending at right angles to the direction of length of the mold member, a second pair of similar mold members disposed at right

angles to the first mentioned mold members, one of said second pair of mold members being provided with an extension in the direction of its length having a groove arranged to receive the tongue of one of the first mentioned mold members, a hook carried by one of the first mentioned mold members for holding the grooved mold member in position, and means for spacing each pair of mold members apart.

RICHARD W. FULLER.

Witnesses:
L. A. STANLEY,
SOLON C. KEMON.