March 29, 1932. D. F. MILLER 1,851,399

FORM FOR CONCRETE WALLS

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Fig. 1.

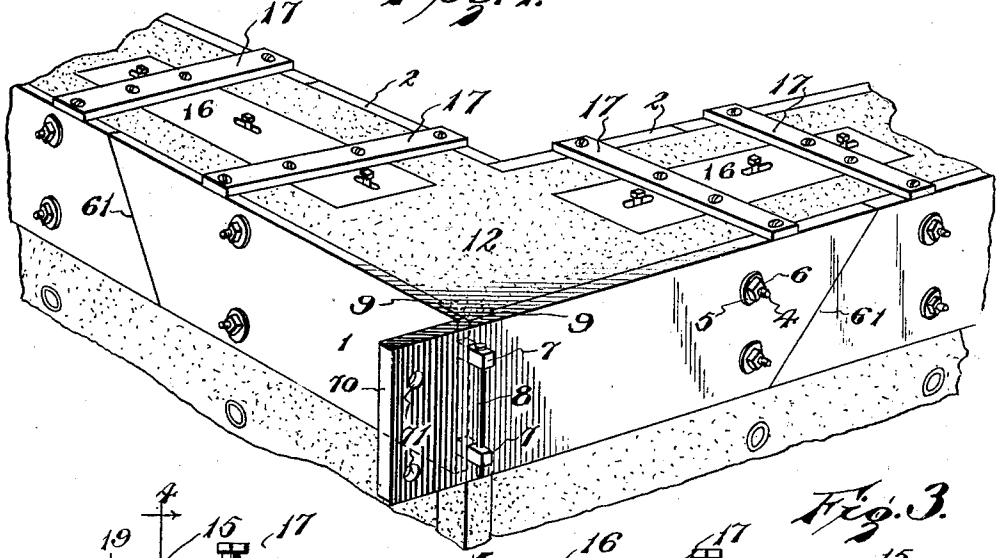


Fig. 3.

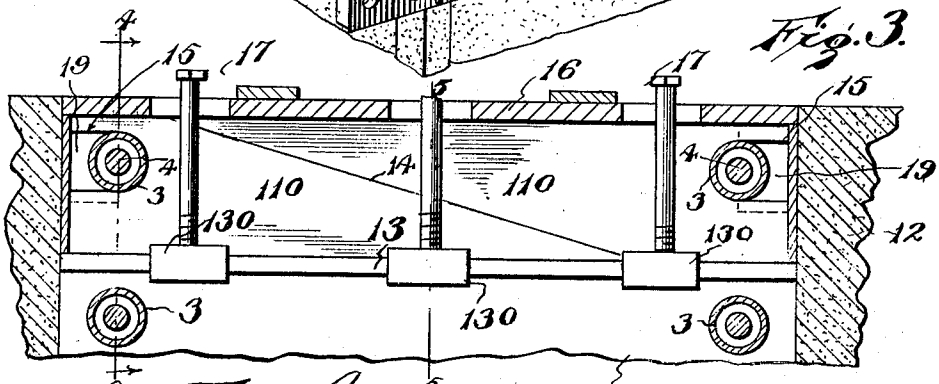


Fig. 4.

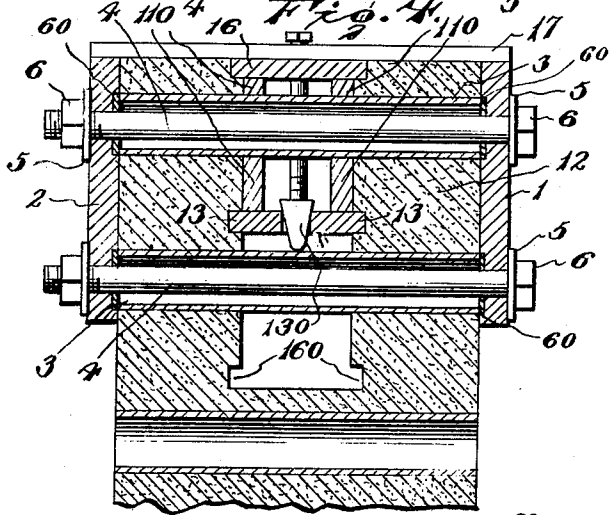
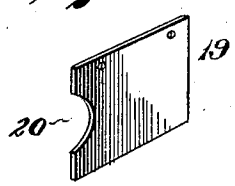


Fig. 9.



Inventor
D. F. Miller

By Lacey & Lacey Attorneys

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FORM FOR CONCRETE WALLS

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Fig. 2.

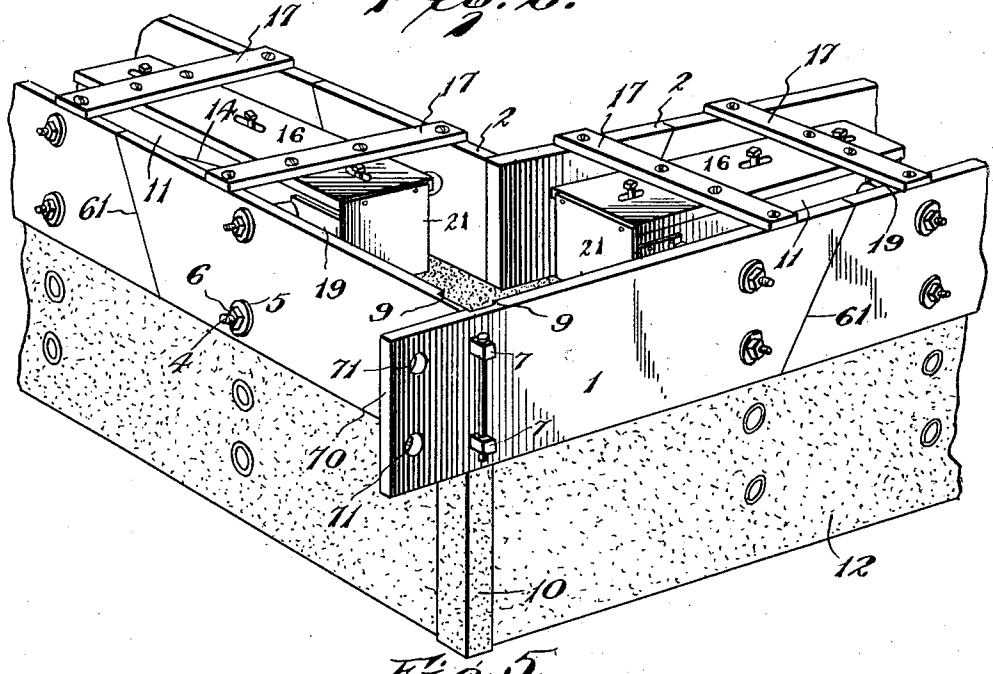


Fig. 5.

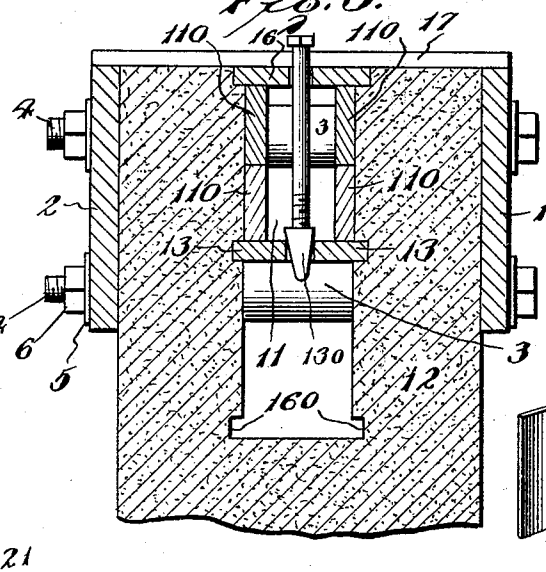


Fig. 10.

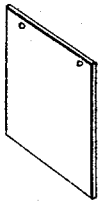
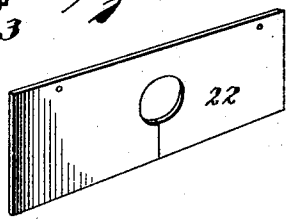


Fig. 11.



Inventor
D. F. Miller

By Lacey & Lacey, Attorneys

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Fig. 6.

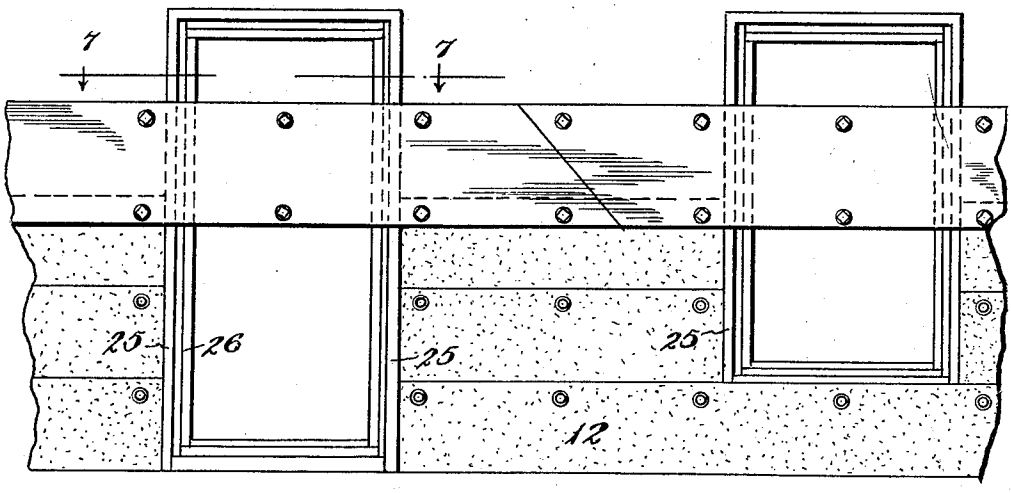
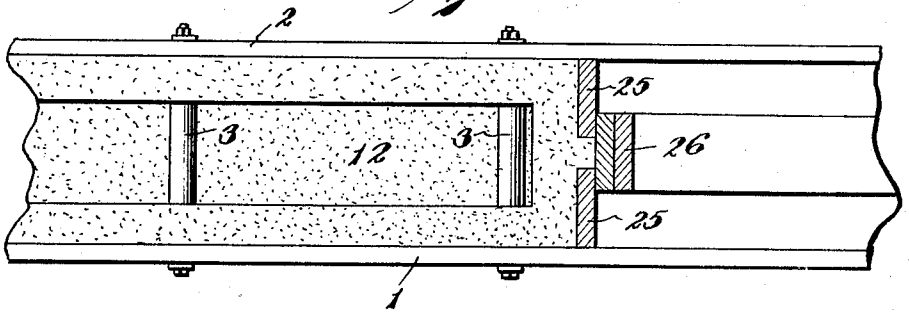


Fig. 7.



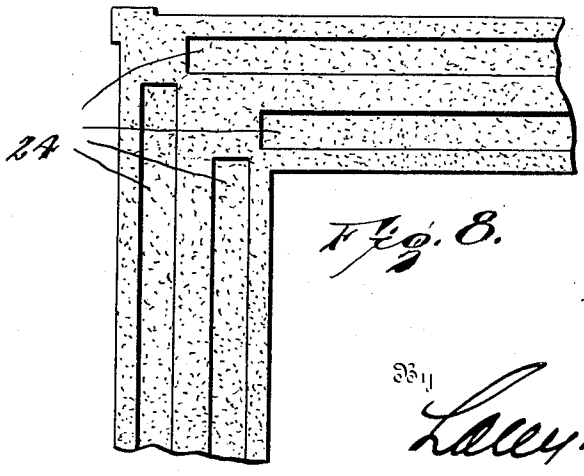


Fig. 8.

Inventor
D. F. Miller

By
Lacey & Lacey, Attorneys

Patented Mar. 29, 1932 1,851,399

UNITED STATES PATENT OFFICE

DELBERT F. MILLER, OF BAYLOR, MONTANA

FORM FOR CONCRETE WALLS

Application filed November 23, 1928. Serial No. 321,393.

This invention relates to means for erecting walls of concrete and has for its object the provision of very simple and inexpensive forms whereby a hollow wall of concrete or similar material may be readily erected at a comparatively low cost. The invention is illustrated in the accompanying drawings and consists in certain novel features which will be hereinafter fully set forth and defined.

In the drawings:

Figure 1 is a perspective view showing the forms in position within and about a completed course of a wall,

Fig. 2 is a similar view showing a partly completed wall with the forms arranged to shape an upper course,

Fig. 3 is a sectional elevation taken longitudinally of one of the cores,

Fig. 4 is a transverse section on the line 4—4 of Fig. 3,

Fig. 5 is a transverse section on the line 5—5 of Fig. 3,

Fig. 6 is an elevation showing door and window frames in place,

Fig. 7 is a section on the line 7—7 of Fig. 6,

Fig. 8 is a plan view of a corner showing a slight modification, and

Figs. 9, 10 and 11 are details showing caps which may be applied to the cores.

In carrying out the present invention, there are provided outer and inner side form members 1 and 2 which may conveniently be planks of suitable dimensions and having flat opposed surfaces. These form members are set on edge in parallel relation and metal tubes 3 are disposed between them at intervals, retaining bolts 4 being inserted through the tubes and having washers 5 and nuts 6 fitted upon their ends against the outer sides of the form members so that by turning the nuts home the several parts will be secured, as will be understood upon reference to Fig. 4. Washers or plates 60 are countersunk in the inner faces of the side forms and the tubes 3 abut the same, as shown in Fig. 4, so that their ends will be flush with the walls and tubes equal in length to the thickness of the wall may be used, subsequent cutting of the ends of the tubes being thereby made unnecessary. The arrangement also holds the forms rigid against lateral movement either inwardly or outwardly. At the inner side of the wall to be erected, the inner members 2 form a butt joint at a corner but at the outer sides one form member 1 has openings through which lugs 7 on the meeting member may project and suitable fastening devices, as 8, are inserted through the lugs so that the form members will be held together to retain the concrete while it is setting. On the inner surfaces of the form members 1 at the meeting points thereof, recesses 9 may be formed whereby an offset 10 will be produced in the finished wall to impart strength and an attractive appearance to the corner of the wall. The outer form may also be more extended or elongated than the inner form, as shown at 70, and provided with openings 71 for use in extending the wall to add a room to existing structure, the retaining bolts being inserted through said openings 71 and through the openings left in the previously erected wall. The form members may be as long as the wall to be erected but they may be more readily handled if cut obliquely between their ends, as indicated at 61.

The forms set up as thus described are sufficient if a solid wall is to be erected, and the green concrete is poured into the space between the forms and tamped according to the usual practice. After the concrete has set, the washers 5, nuts 6 and bolts 4 are withdrawn, leaving the tubes 3 within the wall. The forms are then raised and placed in position for a second course, and the operation is repeated until the wall has reached the desired height, as will be understood. In setting the forms for an upper course, the lower bolts 4 are inserted through the upper tubes 3 left in the poured wall, the lower tubes being withdrawn and again used between the side forms. If the tubes be coated with paraffin or some similar substance before being placed in the forms, they may be easily withdrawn after the concrete has set, the openings formed through the wall by the tubes being closed by grouting or otherwise as will be understood. The foundation may be laid in a trench provided therefor, and will generally be solid. The solid wall, also, may be

built in as many courses as necessary to produce a basement of a desired height when the building is to have a basement, the solid wall, of course, forming a base for the superstructure.

The walls of the superstructure will preferably have dead-air spaces or chambers therein to obtain the benefit of heat insulation which a hollow wall or a wall with dead-air chambers possesses, and, for, this purpose, I provide cores 11 which are supported by and between the form members 1 and 2, so that, when the concrete is poured into the space between the members 1 and 2, some part of that space will be found to be occupied by the cores and, consequently, hollow portions or chambers will be formed in the concrete, the concrete wall being indicated in the accompanying drawings by the numeral 12. The cores include bottom plates 13, the edges of which project somewhat beyond the sides of the core side members to which they are secured, as shown in Figs. 4 and 5. The two side members of a core each comprises two nearly right triangular sections 110 having their meeting faces disposed diagonally, as shown at 14, and provided in their ends with notches 15 whereby they may be engaged over upper tubes 3, as will be understood upon reference to Fig. 3. A plate 16 is disposed over the top edges of the core sections and extends the full length of the core, and upon the upper side of this plate 16 are secured cross bars 17 which project beyond the sides of the plate and are adapted to rest upon the edges of the form members 1 and 2 and may be removably secured thereto in any approved manner. The plate 16 should be arranged symmetrically upon the core with its edges projecting beyond the sides of the core and alined vertically with the edges of the plate 13. The concrete is tamped around the cores between the side form members and will fit close to the sides of the cores between the projecting edges of the plates 13 and 16 and when the concrete has set and the cores removed, it will be found that not only is a hollow chamber present in the wall but at the top of said chamber is a rabbeted or shouldered structure 160 adapted to receive and support the plates 13 when a succeeding course is to be formed. After the core members have been disposed between the side forms and engaged with the tubes 3, the plates 13 carrying the core members 110 are forced outward by spreaders, as wedges 130, so as to abut the sides of the recess 160. The wedges may extend upward through slots in the top plate 16, but a more convenient arrangement is to suspend the wedges on lag screws mounted in the top plates 16. To prevent relative displacement of the sections 110, lag screws 133 are then driven vertically through the cross bars 17, the top plates 16 and the members 110, and the ends of the cross bars are secured to the side form members 1 and 2.

Some concrete will tend to enter the notches in the ends of the core and fill the same so that removal of the core from about the tubes 3 within the notches will be made somewhat difficult. To prevent or overcome this condition, I provide caps 19 of any light material, such as cardboard, or linoleum, tacked to the core member, a notch 20 being provided in one end to the cap to fit to the tube 3. The space between the ends of the core sections is covered by a cap 21 of similar material and of proper shape and dimensions to entirely cover the end of the core. It will, of course, be understood that two or more cores may be arranged end to end to produce a dead-air space extending approximately the full length of the wall, and caps 22 are provided to cover the alined notches in the meeting ends of adjacent cores. If a glazed material be used for these caps, the glazed side being placed outward they may be removed and used many times.

After a course has set and the cores are to be removed, the several screws are withdrawn and the cross bars 17 and the covers 16 are removed. The several members of the core may then be successively moved inward and then endwise to be freed of the respective tubes and easily withdrawn. The side forms are then raised and all the parts reset for the formation of another course.

In erecting the wall, door and window openings will, of course, be provided. For this purpose, I provide forms consisting of planks 25 set between the side forms 1 and 2 at the points where the door and window openings are to be located. These form members have a combined width less than the thickness of the wall being erected but they are so arranged that their outer edges abut the members 1 and 2, as shown in Fig. 7. Over the inner edges of the members 25 are secured strips 26 forming a groove which the concrete fills to key the parts in position, as shown in Fig. 7. The elements 26 form a shoulder to which the ordinary door or window frame may be readily attached.

The dead-air chambers may, of course, be provided only in the side lengths of the wall and terminate short of the corners, as shown in Fig. 1, but, as shown in Fig. 8, there may be a plurality of ventilating spaces or chambers 24 which are disposed in parallelism within the respective branches of the wall and extend into the corners of the same, thereby obtaining perfect insulation at the corners as well as in the length of the wall.

Having thus described the invention, I claim:

1. In forms for concrete work, side form members, tubes disposed between said side form members, means cooperating with said tubes to maintain the side form mem-

bers in parallelism, cores supported by and between the side form members and provided at their ends with notches to engage said tubes, and caps fitted over the ends of the cores to cover said notches.

2. In forms for concrete work, a core comprising side members, rests therefor supported in seats provided in a finished course, means for locking the rests in the seats, and a cover extending over the upper edges of the side members and projecting beyond the same to form seats in a second course.

3. A frame for concrete work including spaced form members having registering openings, connecting and spacing means at intervals in the length of the form members, and coacting core members between two adjacent connecting and spacing means and provided at their ends with notches seating around said spacing and connecting means, each core member comprising two similar sections diagonally jointed.

4. A frame for concrete work including spaced form members, a sectional core therebetween comprising side members and a cap plate extending over the side members and projecting beyond the ends thereof, and cross bars in the length of the core extending over the cap plate and the form members and secured at their ends to the form members and intermediate their ends to the said cap plate and core side members.

5. A frame for concrete work including spaced form members, a sectional core therebetween comprising side members, a top plate and a bottom plate, the top plate and bottom plate projecting at their side edges beyond the side members and the bottom plate consisting of similar sections, and wedges disposed between said sections and operable from above through the top plate to cause the bottom plate sections to firmly engage in a previously formed seat.

In testimony whereof I affix my signature.

DELBERT F. MILLER. [L. S.]