July 28, 1925. 1,547,221

C. R. LEHRACK

CONCRETE BUILDING FORM

Filed July 3, 1922 2 Sheets-Sheet 1

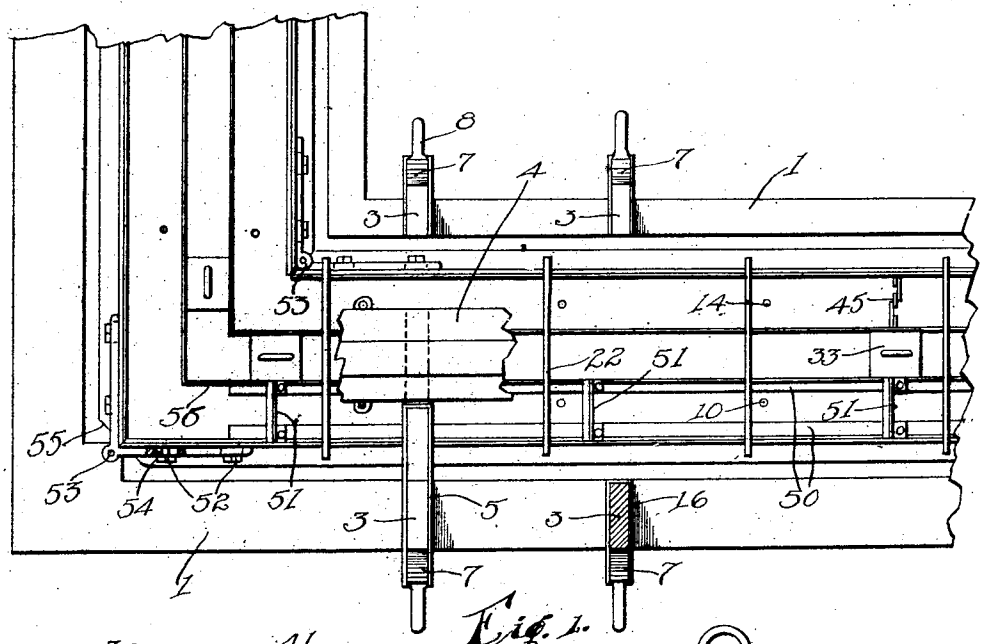


Fig. 1.

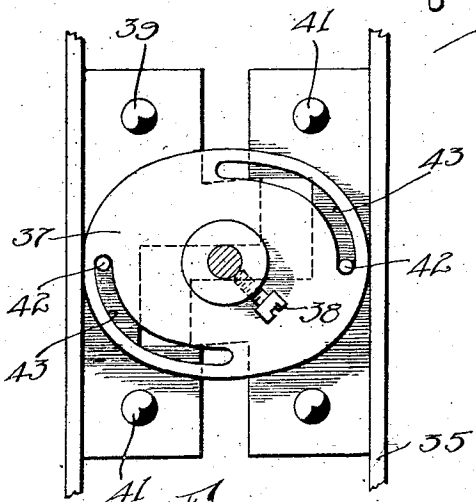


Fig. 3.

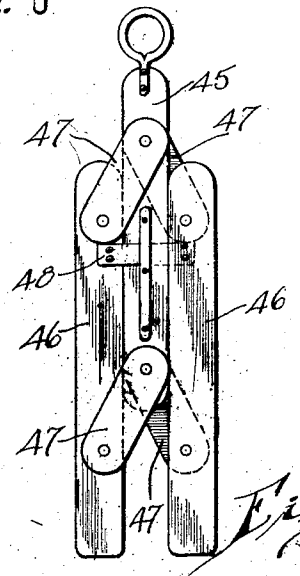


Fig. 4.

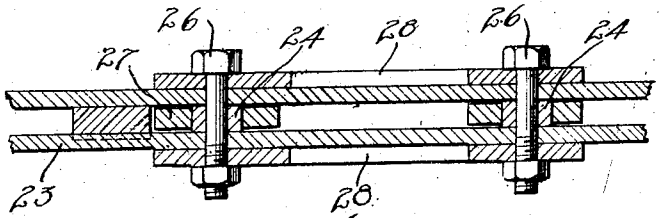


Fig. 5

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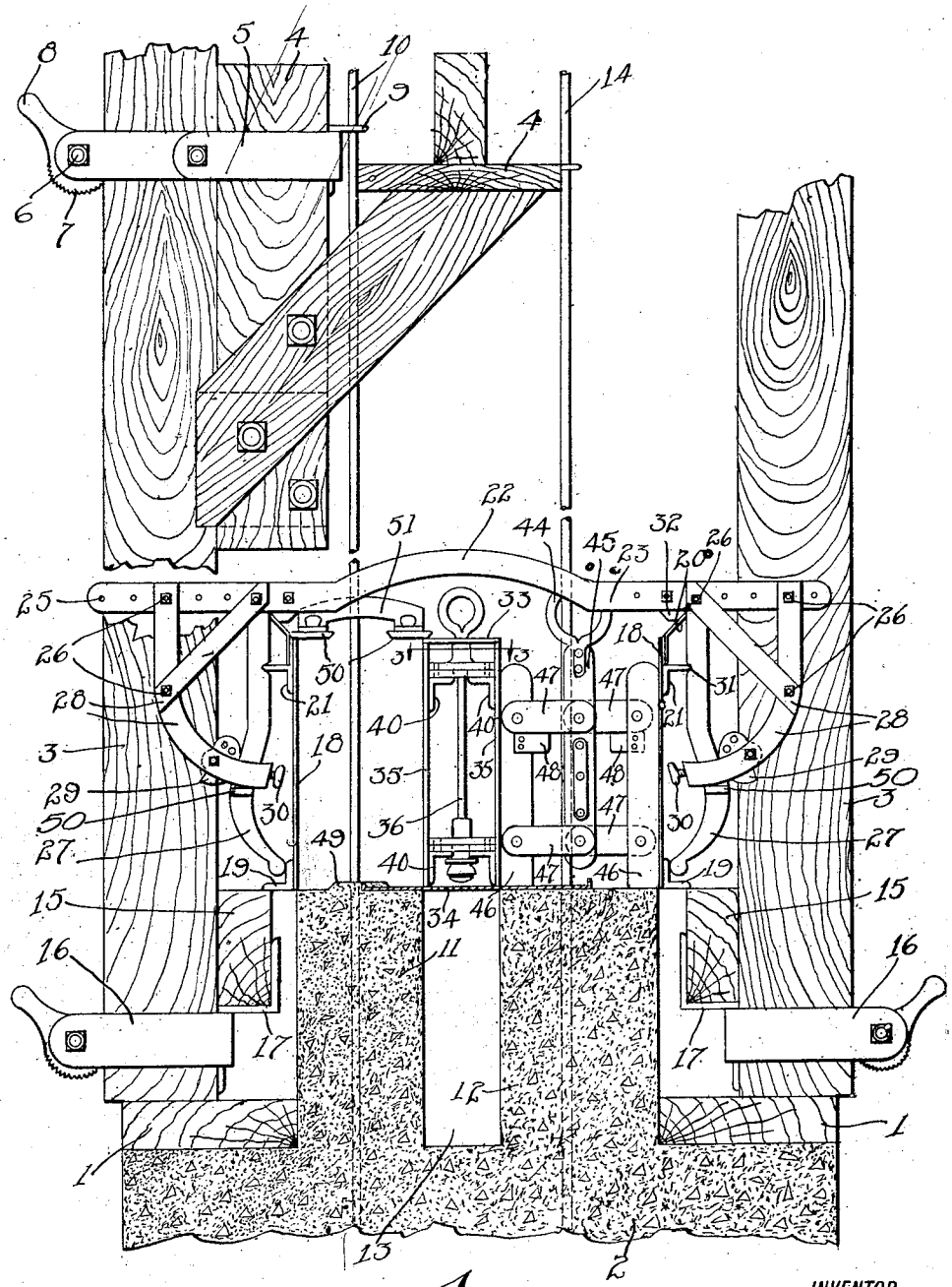


Fig. 2.

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UNITED STATES PATENT OFFICE.

CHARLES R. LEHRACK, OF KANSAS CITY, MISSOURI.

CONCRETE BUILDING FORM.

Application filed July 3, 1922. Serial No. 572,450.

To all whom it may concern:

Be it known that I, CHARLES R. LEHRACK, a citizen of the United States, and a resident of Kansas City, in the county of Jackson and State of Missouri, have invented a new and useful Improvement in Concrete Building Forms, of which the following is a full, clear, and exact description.

My invention relates to improvements in concrete building forms, and it consists in the combinations, constructions, and arrangements herein described and claimed.

An object of my invention is to provide concrete building forms which may be readily changed from one position of the wall to another position of the wall, whereby the same forms may be used for the construction of the wall.

A further object of my invention is to provide a device of the type described which will greatly expedite the construction of concrete walls.

A further object of my invention is to provide a device of the character described which is adapted to form walls that are rectangular, circular, curved, solid, plain, reenforced, or tapering.

A further object of my invention is to provide a device of the character described in which the forms for shaping the concrete wall include the necessary scaffolding.

A further object of my invention is to provide a device of the character described which has means for protecting the concrete while seasoning, thereby greatly improving the quality of concrete over the concrete made with the present forms.

A further object of my invention is to provide a device of the character described in which the forms are made of metal and are secured in place by frame work, whereby the same forms may be shifted from place to place, and be used again and again.

A further object of my invention is to provide a device of the character described in which the scaffolding is clamped in various positions as the walls are built, thereby obviating the necessity of constructing the scaffolding by nailing or the like, and reducing nailing to a minimum which requires a great amount of labor and waste of material when taking the lumber apart.

A further object of my invention is to provide a device of the character described, which is simple in construction, and which is durable and efficient for the purpose intended.

Other objects and advantages will appear in the following specification, and the novel features of the invention will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings, forming part of this application, in which—

Figure 1 is a diagrammatic plan view of the forms as shown operatively applied to a wall,

Figure 2 is an enlarged elevation of the device,

Figure 3 is a section along the line 3—3 of Figure 2,

Figure 4 is a front elevation of a portion of the device, and

Figure 5 is a plan view of a portion of the device.

In carrying out my invention, I dispose planks 1 upon the concrete footing 2 of a wall. In Figure 2 I have shown the wall as being partially built and have shown the forms in place, whereby the next layer of concrete may be disposed in place. The planks 1 support vertically extending beams 3, the beams being disposed at equal distances along the wall, as clearly shown in Figure 1. The beams 3 preferably extend the entire height of the wall which is to be built, and may consist of a plurality of pieces secured to each other in case the wall is of exceptional height. The beams 3, disposed along the outer side of the wall, carry brackets 4 which are secured thereto by clamps 5. The clamps are merely rectangular strips of metal which have their free ends secured to a bolt 6, the bolt in turn rotatably supporting an eccentric toothed pawl 7. The pawl 7 has a handle 8, whereby the clamp 5 may be instantly released from closed position. The clamp 5 may be provided with an eyelet 9 through which the upper end of the reinforcing rod 10, secured to bracket 4, may extend. It will be noted that the rod 10 extends down to the footings, which in turn can be spliced to bent-up rods extending out of the footings, thus insuring the proper reinforcement for the concrete.

In the present form of the device I have shown the wall as being composed of two partitions 11 and 12 which define a space 13. The wall built in this manner is insulated and provides an efficient protection

to the building from extremes in temperature.

The bracket 4 also carries the second rod 14 which extends through the partition 12 and to the footing 2. It is obvious that the rods 10 and 14 may be disposed as close to each other as is required for the proper reinforcement of the walls for any building.

The forms for the concrete are carried by horizontally disposed beams 15, which are secured to the beams 3 by means of clamps 16. The clamps 16 rigidly secure Z irons 17 to the uprights 3, the Z irons in turn supporting the beams 15. The forms comprise metal plates 18, (see Figure 2) which are preferably about five feet long, although I do not wish to be confined to this length. The plates may be of any length to meet every building design. The plates 18 have angle irons 19 rigidly secured thereto at the lower edges thereof, the plates being supported by the upper surfaces of the beams 15. Hopper plates 20 are secured to the upper edges of the plates 18 and are adapted to guide the concrete between the plates 18. The plates 18 also carry angle irons 21 which are disposed adjacent to the hopper plates 20.

The plates 18 are connected to each other by cross arms 22. It will be noted from Figure 5 that the cross arms 22 consist of two rectangular bars 23, which are spaced from each other by pipe sleeves 24, the bars being held together by bolts. The outer ends of the bars 23 are provided with a plurality of openings 25, through which bolts 26 are adapted to be disposed for regulating different wall thicknesses. Vertical clamps 27 are secured to the cross arm 22 and have their lower ends abutting the angle irons 19, whereby outward movement of the angle irons is prevented.

In this manner, the plates 18 are held in adjusted position with respect to the wall. The clamps 27 are held in position by braces 28, the lower end between the cam 29, and the set screw 30 forming a knee-joint. The brace 28 is adapted to rest on a stop 50, which is secured to the clamp 27, the brace being secured to the cross arms 22 and having means whereby the clamps 27 may be adjusted with respect thereto. The means for adjusting the clamps 27 with respect to the braces 28 is clearly shown in Figure 2, and comprises a cam member 29 which bears against the other side of the clamp.

By adjusting the set screw 30 and rotating the cam member 29, the clamps 27 may be swung inwardly or outwardly. In this manner, the lower ends of the plates 18 are positioned.

The angle irons 21 bear against slots 31 in the clamps 27 and prevent the upper ends of the plates 18 from moving outwardly. The upper ends of the plates 18 are prevented from swinging inwardly by stops 32 which are carried by the bars 23 (see Figure 2).

From this construction it will be apparent that the plates 18 are securely locked in position and form the outer sides of the wall.

The stiff plastic concrete is rammed between the plates and is kept in position by the plates until one or more sections of plates, either single, or duplicate plates coupled in position are completed ready for instant removal to the next position where the same operation is repeated.

It is obvious that by swinging the clamps 27, the outer sides of the wall may be tapered at will.

In the present form of the device, as heretofore stated, I have shown the wall as being hollow, and in this case a core, indicated generally at 33, is used.

After one layer of concrete is completed, connecting plates or wall ties 34 are disposed on top of the completed wall and act as means for securing the two wall partitions 11 and 12 together. The ties 34 also support the cores 33. The cores 33 have form plates 35 (see Figures 2 and 3), which are positioned at the required distance from each other so as to make the space 13 between the partitions. The plates 35 are of the same height as the plates 18; they are of similar length which may be of any size for meeting the requirements of short wall sections between openings of various lengths.

The plates 35 are operatively connected to each other and are adapted to be moved toward and away from each other at will. Means for accomplishing this is clearly shown and comprises a vertically extending actuating rod 36 which is disposed adjacent to each end of the plates 35, midway between the plates, or any other location. The rod 36 extends through a cam member 37 which is rigidly secured to the rod 36 by a set screw 38. The rod 36 has a cam member 37 adjacent to each end thereof (see Figure 2). The cam member rests upon brackets 39, which in turn are disposed above angle irons 40. The brackets 39 are secured to the angle irons 40 by means of rivets 41 (see Figure 3), and also have upwardly extending pins 42.

The pins are slidably received in eccentric grooves 43 in the cam member 37. It will be obvious from this construction that when the rod 36 is rotated, it will move the plates 35 toward or away from each other. As heretofore stated, the core 33 is supported by the tie plates 34, and the plates 35 thereof may be moved into the required position by merely rotating the rods 36.

A metal core spacer 44 is used in connection with the core 33 when a hollow wall is built. This core spacer is clearly shown in Figures 2 and 4 and comprises a central vertically extending bar 45 which is con-

nected to vertical bars 46 by links 47 so as to draw the bars 46 toward the bar 45 (see Figure 4). The bars 46 carry stops 48 which determine the movement of the bars 45 in an inward direction. I have shown the core spacer 44 disposed in position in Figure 2, and it will be noted that the bars 46 bear against the plates 18 and 35 so as to hold the core 33 in adjusted position. With this arrangement the concrete is adapted to be rammed between the plates 18 and 35 which are disposed above the partition 11.

The upper surface of each layer of concrete on outside partition wall 11 is provided with projections 49 which are adapted to extend into the layer positioned thereabove, whereby the various layers of the wall are locked in place. The adjacent surfaces of the layers are therefore not smooth.

In Figure 2 I have shown a device which forms the projections 49. This device comprises horizontally extending plates 50 which have bevelled edges. The plates are held together by an arm 51. The plates 50 are supported by the core 33 and by the top edge of the plate 18.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood. In building a wall, the footings are first set and permitted to harden before the partitions 11 and 12 are formed. The beams 3 and 15 are then disposed upon the footings in the manner heretofore described and support the structure which carries the plates 18. The cores 33 are then disposed on the tie plates 34 and form the space 13 between the partitions 11 and 12. Two spacers of the cross arms 22 are secured to each set of plates 18. The core spacer 44 is disposed between the plates 18 and 35, while the concrete is being rammed between the other plates 18 and 35.

The plates 50 form the top of the stiff concrete into the necessary projections 49. The concrete is rammed in the meantime on the other side of core 33, after sufficient material is placed to hold core 33 firmly in position. The core spacer 44 is then removed for completion of the partition. When the concrete has set the core 33 is removed to the adjacent or any other form section, whereby the two partitions 11 and 12 of the wall are molded. The core 33 is readily removed by rotating the rods 36. The entire device, which includes the form plates 18 and 35 is then moved horizontally after the release of form clamps 22 for further operation at the next section where the same process again takes place in forming the concrete walls.

In providing corners to the wall, the plates 18, adjacent to the corners, have bolts 52 which secure sliding hinges to the plates. The hinges 53 have slots 54 in their arms, whereby the plates 18 may be moved with respect to the hinges. The ends of the angle irons 19 are mitered as at 55, to permit the plates 18 to be swung so as to form the outer or inner surface of the wall. The hinges also connect cross partitions located anywhere on or in the building, to the main walls.

In Figure 1, I have shown two sets of hinges 53, one being disposed on the outer surface of the wall, and the other being disposed on the inner surface. In this manner, the ends of the plates 18 disposed adjacent to the corners, are firmly held in place by the hinges 53.

On completion of any wall section after removal of forms, a canvas can be stretched or laid across horizontal lumber guides 15 placed in new position for the next wall section above, so as to protect the concrete from drying out before it sets. In this manner, the fresh concrete is protected on all sides from the sun. The hinges 53 are adapted to be secured to the form plates which fashion the inner or outer surfaces of all walls.

An angle plate 56 is disposed at the corner of the wall and is adapted to abut the adjacent ends of the outer plates 35 (see Figure 1).

I claim:

1. A device of the type described comprising a supporting frame adapted to be disposed in suitable proximity to a wall, form plates adjustably carried by said frame and adapted to fashion the outer surfaces of said wall, means for securing said plates in adjusted position, means for securing said plates together at the corners of the walls, cores adapted to be disposed between said form plates for forming walls of two partitions, spacers adapted to be disposed between one of said form plates and said cores, and means disposed between said cores and the other form plates for forming a projection on the upper surface of the soft cement.

2. A collapsible core spacer comprising a central bar, two bars disposed parallel with respect to said central bar, links operatively connecting said last named bars to said central bar, and stops carried by said last named bars and being adapted to engage with said central bar.

3. In a concrete building form, a supporting frame, form plates adjustably carried by said frame, and means comprising two adjustable plates, disposed between said form plates, said means being adapted to form a raised portion on the upper surface of the cement held by the two plates.

4. A collapsible core comprising two plates disposed parallel with respect to each other, brackets carried by said plates and

having tongues and slots adapted to engage with one another, said tongues being fashioned so as to engage with the slots at only one point, a disc having eccentric slots therein, pins carried by said brackets and being slidably received in said slots, whereby oscillation of said disc will move said plates toward or away from each other.

5. In a device of the type described, means for supporting two form plates, cross bars extending transversely across the tops of said plates, arms adjustably and pivotally secured to said cross bars, angle irons secured to the tops of said plates and bearing against said arms, said angle irons constituting a trough to guide the cement between the plates, additional angle irons disposed at the top and bottom of said plates, said arms being adapted to engage with the bottom angle irons, and means for locking said arms against further movement after they have been swung into the desired position.

6. In a concrete building form, two form plates, a crossbar extending transversely across the tops of said plates, arms adjustably and pivotally secured to said crossbar, said arms being adapted to engage with the bottom of said plates, braces rigidly carried by said crossbar, a cam carried by each brace for moving said arms, and a set screw carried by said braces for locking said arm in adjusted position.

CHARLES R. LEHRACK.