J. H. MAGDIEL.

MOLD FOR CONCRETE COLUMNS.

APPLICATION FILED OCT. 19, 1908.

929,148. **Patented July 27, 1909.**

Fig. 1.

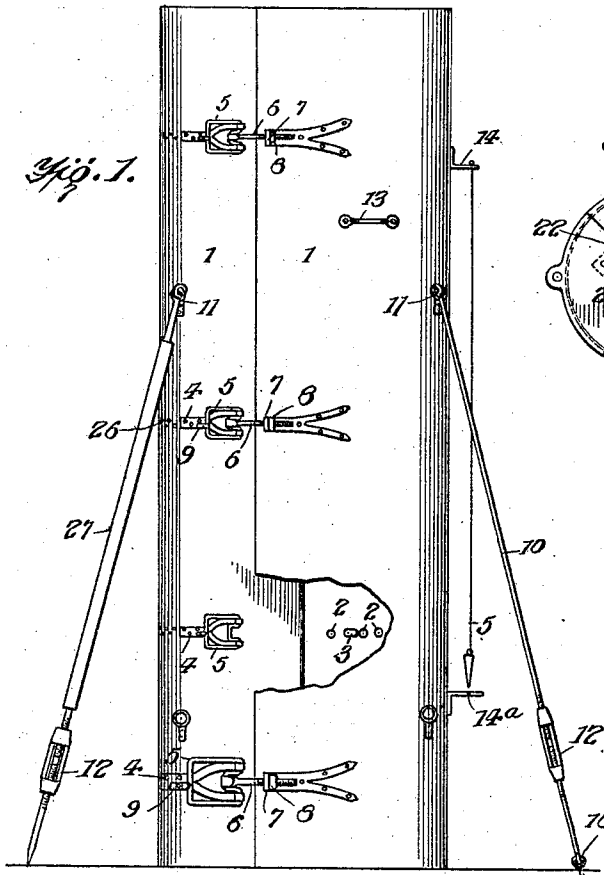


Fig. 4.

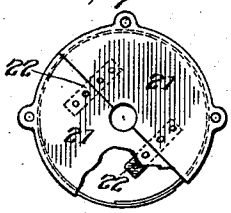


Fig. 3.

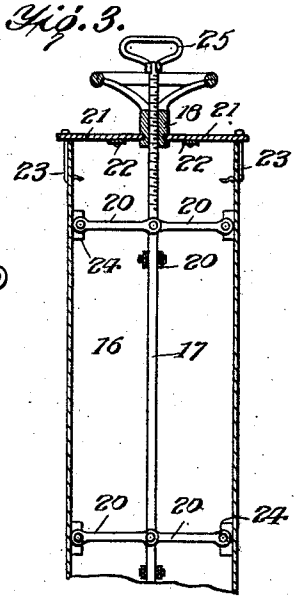


Fig. 1a

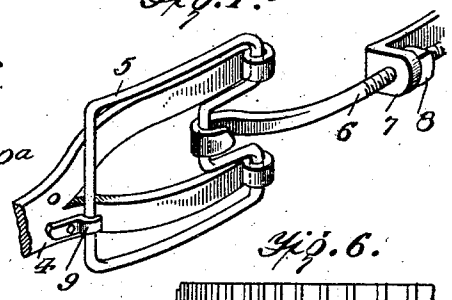


Fig. 2.

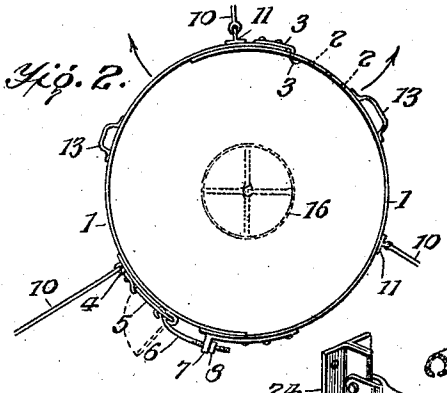


Fig. 5.

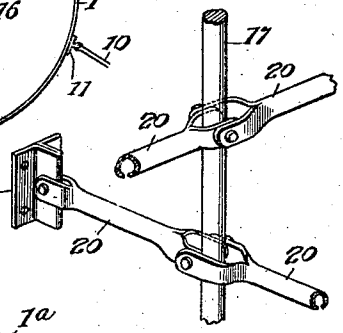


Fig. 6.

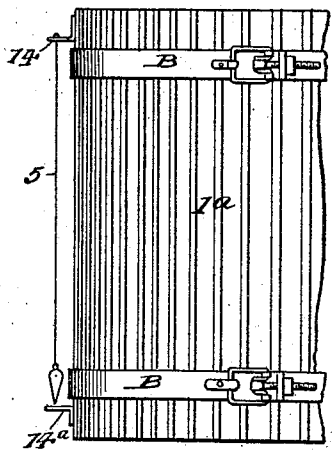
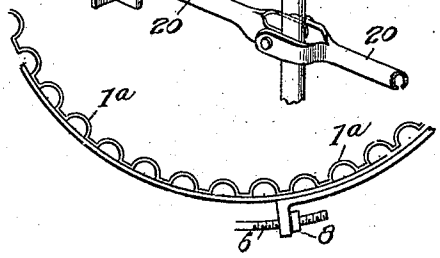


Fig. 7.



WITNESSES

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MOLD FOR CONCRETE COLUMNS.

No. 929,148. Specification of Letters Patent. Patented July 27, 1909.

Application filed October 19, 1908. Serial No. 458,352.

To all whom it may concern:

Be it known that I, JOHN H. MAGDIEL, a subject of the King of Norway, residing at Salt Lake City, in the county of Salt Lake and State of Utah, have invented certain new and useful Improvements in Molds for Concrete Columns, of which the following is a specification.

My invention is in the nature of a new form of mold for building hollow or solid columns and footings in concrete construction, in a simple, practical and expeditious manner.

It relates to that form of mold in which an expansible metal sheet is provided with locking devices for securing the edges, and an adjustable core within is formed of an expansible sheet with a central rod having toggle arms for expanding and contracting the same.

My invention consists in the improved construction and arrangement of a column mold operating on the above general principle, as will be hereinafter more fully described with reference to the drawing, in which—

Figure 1, is a side elevation, partly broken away, of my column mold, Fig. 1ª, is a perspective detail of the locking devices for the same, Fig. 2, is a top plan view of the column mold, Fig. 3, is a vertical section of the expansible core, Fig. 4, is a top plan view of the lid of the same, partly broken away, Fig. 5, is a detail in perspective view of the special form of toggle arms, Fig. 6, is a partial side elevation and Fig. 7, a partial horizontal section of a modification of the column mold for making fluted columns.

In the drawing Figs. 1 and 2, the numerals 1, 1, represent two sheet metal mold sections forming the outside casing for a round column. These sections are in cross section a little more than a half circle and lap past each other, as seen in Fig. 2. On one side of the mold they are connected detachably and adjustably by a transverse series of holes 2—2 adapted to be engaged by hooks 3 riveted to the outside surface of the adjacent edge of the other section. These hooks are first bent inwardly a distance sufficient to enable their reversely curved points to pass through to the inner side of the interior lapping section, as seen in Fig. 2. These edges are separated quickly and conveniently by an upward hinging movement in the direction of the arrows, the reverse curve of the points of the hooks permitting them to turn and come out of the holes 2, while, when joined together to form a round mold, the inner shoulder of the hook resists any outward expansive strain from the concrete within. There are any desired number of these connections according to the height of the column mold and the series of holes 2 allow for variation of the size of the column.

On the opposite edges of the two semicircular mold sections are clamping and locking devices, seen in Figs. 1 and 2, and in detail in Fig. 1ª. These consist of the following parts: A strap 4 of steel is screwed or bolted to the outer surface of one edge of one section of the mold, the strap being adjustably connected by a series of holes 26 to provide for an increased cross section of the mold. This strap is split at its free end and the split sections are separated from each other and their ends curled around to form two bearings for the double crank link 5 which forms an operating handle. This link is made as a continuous unbroken link, the outer crank portions of which are journaled in the terminal bearings of the strap 4. The middle crank loop, which is bent at a different angle from the outer portions, is caught within the hooked end of a screw threaded stem 6, which passes through an out-turned lug 7 on the end of a strap whose opposite end is split, spread and riveted to the exterior face of the adjacent edge of the other half of the mold. A screw nut 8 is arranged on the threaded stem 6 behind the lug 7. When the handle link 5 is thrown to a position parallel to the side of the mold, the middle crank portion draws on the stem 6 and holds the edges of the mold together, the link being held in this position by a turn-button 9 but when the handle link is turned out, as shown in dotted lines, the edges of the mold are separated and the mold expanded and relaxed. When so relaxed the hook on stem 6 is easily lifted away from its co-operating crank loop to separate the parts. To compensate for small variations or looseness, the nut 8 will serve to tighten or loosen the locking device as may be desired.

To form the central cavity of the hollow column a core mold or inner wall 16 is located concentrically within the outer casing. This is made of a circular, elliptical, or other form of cross section and consists of a thin sheet of metal lapped at its edge and provided with means for its expansion and contraction by the general principle of toggle arms already known. This core mold is shown by dotted lines in Fig. 2 and is illustrated in detail in Figs. 3, 4 and 5. The casing 16 has riveted to its interior face at suitable points folded lugs 24, Fig. 5, to which are pivoted the outer ends of toggle arms 20, the inner ends of the toggle arms being pivoted to a bolt passing through the central operating rod 17. As this core mold has to be lifted into the mold and out of the hollow column when formed, it is desirable that it should be as light as possible and for this reason the toggle arms 20 are made of thin tubes and the ends are split and spread apart to form forks that embrace the lugs 24 at one end and the central rod 17 at the other. By raising or lowering the rod 17, it will be seen that the casing 16 may be expanded or contracted in the well known way. On the top of the casing 16, is a cover lid formed of two semi-circular sections 21, 21, Figs. 3 and 4, each formed with a half-round hole in the center of its diametrical edge. These two halves are fastened detachably together by metal splice straps 22, 22. A wheeled nut 18 is screw threaded on its inner side to mesh with a correspondingly screw threaded end of the rod 17 and this nut is formed with a peripheral groove into which the edges of the half-round holes in the sections of the lid enter, forming a swiveling joint after the sections 21 are connected by the straps 22. The lid has around its edges four, more or less, holes formed in lugs overlapping the casing 16 and in these holes are arranged pendent hooks 23 which pass down the outer side of the casing and enter holes formed in the upper edge of the same to resist the upward strain on the lid when the handle nut 18 is turned to operate the toggle arms. This lid, it will be seen, fully covers and protects the upper end of the casing 16, so that concrete cannot fall into the same and the lid is connected by these hooks to the casing for a quick and easy detachability and a simple and strong construction. On the upper end of the operating rod 17 is formed a handle 25 and on the side of the outer casing 1 Fig. 1, are attached handles 13 for the manipulation and adjustment of the mold.

The operation of an upright mold for forming columns of considerable height is attended with considerable difficulty owing to its height, the difficulty being in plumbing the same and holding it plumb while filling, and the cumulative lateral pressure of the concrete on the lower part of the mold. I provide for these contingencies in a simple and practical way. To insure the vertical position of the mold, I attach near the upper part of the casing a horizontally projecting bracket 14 and near the bottom a similar bracket or plate 14^a with a center hole to register with a plumb-bob 5 whose cord is suspended from the upper bracket 14. This plumb-bob, extending through the greater part of the length of the mold, forms an accurate means for adjusting the central axis of the column to the vertical, without regard to any localized variations in the periphery of the mold due to bulging, which it will be understood on a tall mold, like a column mold, would quickly falsify a spirit level attached to the side, for the slightest bulging at or near a spirit level would so change the position of the bubble that if the tall column mold were adjusted to it the column might be built at an incline, even though the bubble of the spirit level would read plumb. This tall mold with a laterally projecting support near its upper end and a registering plate near the lower end prevents such falsification of its reading. To straighten up or adjust and hold the column mold to its vertical axis, eyes 11 are secured to the exterior of the casing around the same at suitable points above the middle line and into these are hooked three or more inclined rods 10 having turn-buckles 12 in their length. These turn-buckles have a screw threaded connection at their ends with the screw threaded ends of the rod, whereby, when the turn buckles are turned, said rods are positively elongated or shortened to tilt the top of the tall column mold until the plumb-bob indicates a true vertical position for the mold. By shortening or lengthening these rods 10 the mold may be shifted in position until its plumb line shows its central axis to be vertical, these rods for tension purposes are secured to anchors 10^a in the floor. The rods may be made of iron, as shown at 10, or they may be made of wood, as shown at 27, and where it is not convenient to insert an anchor 10^a the lower end of the rod may be pointed as seen at the bottom of the prop 27. In filling a tall mold for building a column, it will be understood that it is dumped in and tamped in layers, but as the superimposed strata increase in height, the concrete from cumulative lateral pressure at the bottom requires to be specially provided for. With this in view, I make the lower locking devices much heavier and stronger, as shown in Fig. 1. It will be understood that these inclined adjusting rods or props have a coactive relation in securing the plumbing of the tall mold, and, as a prime and fundamental requisite of a column is that it shall be plumb, it will be seen that the devices just described form

with the mold a unitary organization accomplishing this very necessary result in a simple, practical and accurate way.

For modifying my invention to build fluted columns, I employ the construction shown in Figs. 6 and 7. The outer mold casing is formed of a plurality of overlapping fluted sections 1^a each made of a single sheet of corrugated metal adapted to nest or interlock with each other at the edges. These sections are arranged in a circle and are embraced by any desired number of hoops or bands B, each provided with the clamping and locking devices shown in Fig. 1^a. When the fluted sections are lapped at the edges they interlock and hold together against the compression strain of the encompassing hoops. In making the outer casing shown in Figs. 1 and 2, I have shown it made in two sections. In some instances I may use but one section, or may use two or more sections.

I claim—

1. A mold for building upright columns, consisting of an outer upright casing made separable and having two lateral projections, one above and the other below, and a suspended plumb-bob connected to the upper lateral projection and registering with the lower lateral projection, in combination with inclined rods loosely connected with the outer casing and provided with screw turnbuckles in their length to render the rods positively and rigidly adjustable in length to tilt the column mold to true vertical position.

2. A mold for building upright columns, consisting of two overlapping sheet metal sections of semi-circular cross sections, one section being provided with transverse holes on one edge, and the other section being provided with an interlocking but separable hook adapted to enter any one of said holes to form one separable longitudinal joint, and a lever locking device connecting the other edges of the sections to form the other longitudinal joint.

3. A mold for building upright columns, consisting of two overlapping sheet metal sections of semi-circular cross sections, one section being provided with transverse holes on one edge, and the other section being provided with an interlocking but separable hook adapted to enter any one of said holes to form one separable longitudinal joint, and a lever locking device connecting the other edges of the sections to form the other longitudinal joint, said lever locking device consisting of a strap with bifurcated ends provided with bearings, a double-cranked handle link having its outer crank portions arranged in the bearings of said strap, a screw threaded rod having a hook adapted to catch over the middle crank of the handle link, a strap with an out turned lug perforated and receiving the screw threaded rod and a nut for the same.

4. A mold, consisting of a casing of sheet metal with overlapping edges and a locking device for said edges, consisting of two bearings, attached to one edge, a crank handle made as a continuous closed link having at one end two crank loops arranged in the two bearings of the mold casing and an intermediate crank loop between them projecting in the opposite direction and a tension rod having a screw threaded end adjustably connected to the opposite edge of the mold casing and the other end encompassing the middle crank loop of the link.

5. The combination with the column mold casing and means for clamping and locking it; of a core mold consisting of a casing with a central rod screw threaded at its upper end, toggle arms pivoted to the rod and also to the casing, a lid extending over the top of the casing and having pendent hooks engaging with the upper part of said casing, and a handle nut swiveling in the lid and engaging with the screw threads of the rod.

6. A core mold consisting of a casing with a central rod screw threaded at its upper end, toggle arms pivoted to the rod and also to the casing, a lid extending over the top of the casing and having pendent hooks engaging with the upper part of said casing, a handle nut having a peripheral groove and a screw threaded interior engaging the threads of the rod, said lid being made in two separable parts with swiveling bearing seats entering the peripheral groove and means for connecting the sections together.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN H. MAGDIEL.

Witnesses:

HARRY A. HEGARTY,

C. M. FORREST.