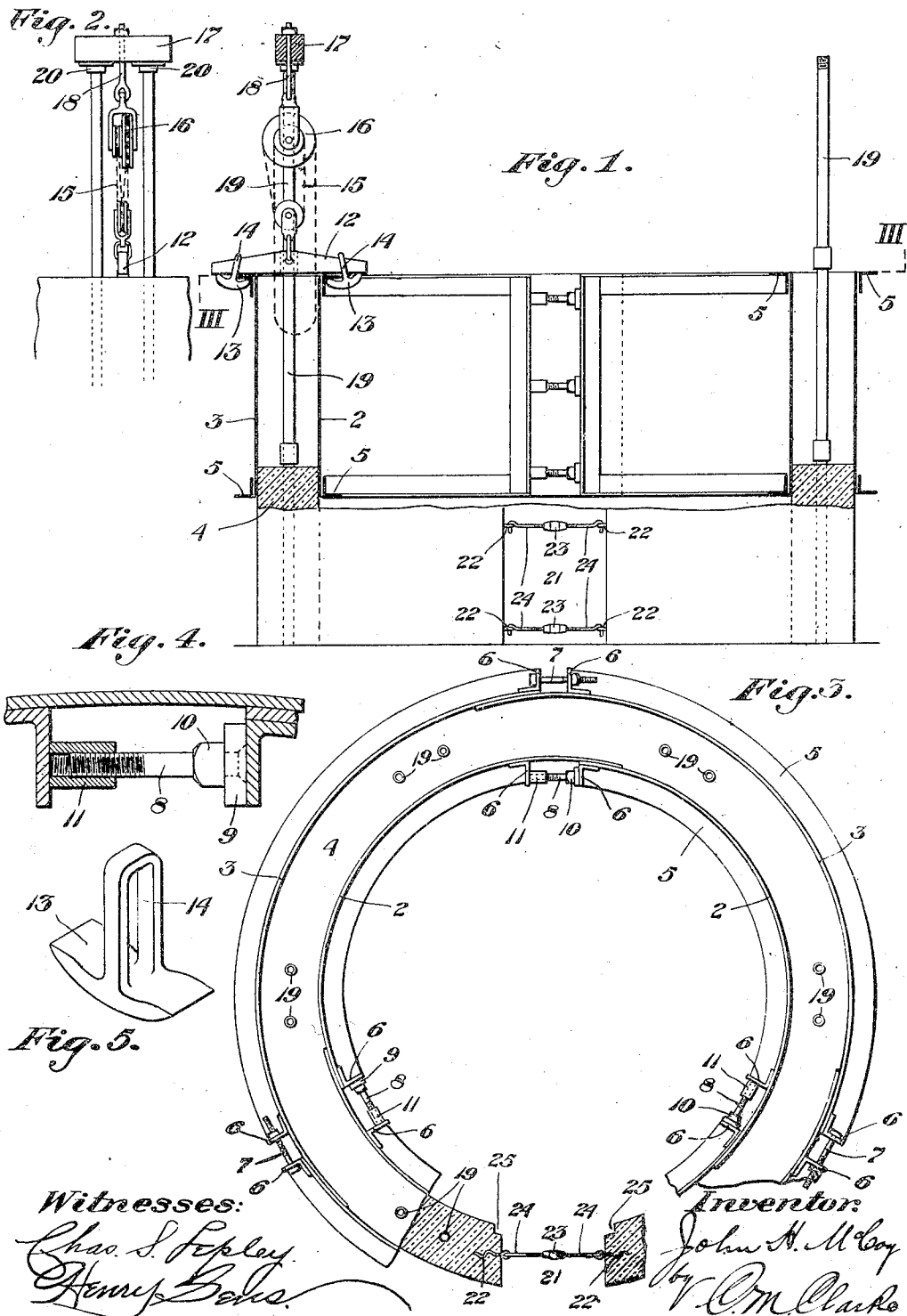


J. H. McCOY.
APPARATUS FOR BUILDING HOLLOW CONCRETE STRUCTURES.
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942,402.

Patented Dec. 7, 1909.



Witnesses:
Chas. S. Fepley
Henry Bone

Inventor:
John H. McCoy
V. C. M. Clarke
his attorney

UNITED STATES PATENT OFFICE.

JOHN H. MCCOY, OF HARRISVILLE, PENNSYLVANIA.

APPARATUS FOR BUILDING HOLLOW CONCRETE STRUCTURES.

942,402.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN H. MCCOY, a citizen of the United States, residing at Harrisville, in the county of Butler and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Building Hollow Concrete Structures, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention refers to apparatus for building hollow structures of concrete such as silos, cisterns, walls, etc., and is designed for the purpose of providing an adjustable mechanism by which the walls of such structure, preferably cylindrical, may be built up of any desired thickness or internal diameter as to the structure itself, in an economical, rapid and convenient manner, and also to an improved construction of silo having a continuous vertical passageway.

The particular object of the invention is to provide means for successively lifting the sectional molding walls or shells, utilizing the already-built wall for the purpose of supporting the lifting structure, and to various other features of improvement as shall be more fully hereinafter set forth.

In the drawings accompanying the application: Figure 1 is a vertical sectional transverse view through the upper portion of a silo in process, illustrating the wall molding apparatus and the supporting and raising mechanism therefor. Fig. 2 is a view in side elevation of the lifting mechanism. Fig. 3 is a horizontal plan view, partly in section, on the line III. III. of Fig. 1. Fig. 4 is a detail view, enlarged, of one of the interior bracing devices for the inner molding wall. Fig. 5 is a detail view in perspective of one of the securing dogs for the lifting bar.

In the drawings 2 and 3 represent the inner and outer boundary or molding walls or shells of the apparatus, between which the wall 4 is molded, said boundary walls consisting preferably of metal plates curved to the proper diameter and made in sections, adapted to be vertically adjusted for each successive section of wall. These molding

walls comprise an inner ring or shell 2 and an outer ring or shell 3 of sheet metal concentrically arranged with an intervening space of the thickness of the wall to be built and are of sufficient depth to provide for a considerable section of concrete being deposited between them. The molding walls are connected together in any suitable manner as by the joint construction shown in my prior patent No. 837101 dated November 27th, 1906 and are preferably provided along their upper, or upper and lower edges with bracing angles 5. The joints of the molding shells 2 and 3 may be located at any desired distance apart, the walls being preferably made in sections so as to considerably increase or decrease the diameter by adding or subtracting one or more sections, and are bounded by terminal flanges 6 at each end of the plates. The outer sections are connected by bolts 7 of sufficient length to provide considerable latitude of adjustment, while the inner molding sections are braced apart by jack screws 8 having at one end a swivel-mounted head 9, a wrench-engaging enlargement 10, and a bearing nut 11 at the other end, the jack being adapted to be inserted between the flanges 6 and to adjust them and the sections apart.

The sections 2, 3, are raised from time to time by means of cross arms 12 engaging flanges 5 by means of readily attached and detached dogs 13 having an eye or loop 14 adapted to be inserted over the ends of the arms 12, one end of the dog bearing against the outer end of said arm and by the inner end of the dog underneath flange 5, at each side, as clearly shown. Cross arm 12 is thus connected with both the molding sections and is lifted by a chain 15 engaging the cross arm at its middle portion, said chain being raised by any suitable mechanism, as hoisting gear 16 of well known construction; said hoisting gear being in turn supported downwardly from an upper cross bar 17 by bolt 18.

As the wall sections 4 are built upwardly, I build up within them vertical sections 19 of rod or pipe form, each additional section being connected as by a sleeve joint, with

the last adjacent section at or about the upper level of the wall, as clearly indicated in Fig. 1, such sections having portions extending upwardly sufficiently high to provide a bearing at each side for cross bar 17 which rests upon caps 20 so as to provide a good flat bearing at each side. Caps 20 are removed after each operation, and an additional section added, bars 17 raised, and the wall sections 2 and 3 being lifted, after having been loosened from the last preceding wall section and located in position for the next operation.

An additional feature of improvement consists in a continuous door-way opening through the entire length of the structure as indicated at 21. In forming such opening it is made by inserting spacing blocks in the proper position between the molding walls 2 and 3 and at intervals of any suitable distance, say, thirty inches apart, are embedded in the walls anchor bolts 22, 22, connected by turn buckles 23 and a hook and eye 24; 24. The object of this construction is that the walls will be connected continuously by such closely intermittent attachments and the spaces being closed by sectional doors laid along, the interior fitting into rabbets 25 at each side, will contain the contents of the silo when filled, retaining it against spreading, while permitting of the removal of the turn buckle connections successively from the top downwardly as the silo is gradually emptied of its contents. This latter feature is one of importance and advantage in that it greatly contributes to facilitating the operation and use of the complete structure, avoiding the necessity of any permanent cross arms or sections, so that a walk-way is provided through the wall at any point corresponding to the level of the contents without obstruction.

The construction and operation of my improved apparatus and the advantages of the resulting structure will be appreciated by all those familiar with this class of building construction. It will be understood that it is in no way limited as to diameter, number of lifting parts, size or other details, but that various changes or modifications may be made by the skilled mechanic within the scope of the following claims.

What I claim is:—

1. In the manufacture of annular concrete walls, the combination with supporting elements set in the wall, and continuous annular sectional molding shells adapted to embrace the wall cavity having means for adjusting their diameter; of hoisting mechanism supported on said elements and provided with cross arms having separable holding dogs each having a holding loop for connecting the cross arms with the molding shell, substantially as set forth.

2. In the manufacture of annular concrete walls, the combination with supporting elements set in the walls in pairs, and continuous annular sectional molding shells adapted to embrace the wall cavity having means for adjusting their diameters; of cross arms mounted on the tops of said elements, and holding mechanism depending from said bars and provided with cross arms and separable holding dogs each having loops embracing the terminals of the cross arms and engaging the molding shells, substantially as set forth.

3. The combination with molding shells having terminal flanges, of a cross arm, dogs each having a loop adapted to engage and connect said cross arm with one of said flanges, and means for exerting lifting power on the cross arm, substantially as set forth.

4. The combination with molding shells having terminal flanges, of a cross arm, dogs each having a loop adapted to engage and connect said cross arm with one of said flanges, and means embodying upwardly extending supporting devices and lifting mechanism supported thereby, for lifting the cross arm and said molding shells, substantially as set forth.

5. In the manufacture of annular concrete walls, the combination with upwardly extending vertical posts built in the wall having supporting terminal caps, and embracing annular adjustable molding shells having terminal flanges; of cross supporting bars set on said caps, hoisting mechanism depending from said bars each having a terminal cross arm, and separable securing dogs each having a link embracing the cross arm and a shoe portion adapted to engage one of said flanges and the under side of the cross arm, substantially as set forth.

6. In the manufacture of annular concrete walls, the combination with upwardly extending vertical posts built in the wall having supporting terminal caps at their tops and ends embracing annular adjusting molding shells having terminal flanges; of cross supporting bars set on said caps, hoisting mechanism depending from said bars each having a terminal cross arm, and separable securing dogs each having a link embracing the cross arms and a shoe portion adapted to engage one of said flanges and the under side of the cross arm, substantially as set forth.

7. In the manufacture of cylindrical silos composed of a solid annular wall; the combination with supporting post sections and coupling devices therefor set in and built upwardly with the wall in pairs, and continuous annular interior and exterior sectional molding shells adapted to embrace the wall cavity, and jack screws having station-

ary end members engaging the ends of the interior shells and bolts engaging the ends of the exterior shells for adjusting their diameters, of cross bars set upon the tops of said pairs of posts, hoisting mechanism depending therefrom, cross bars connected with said hoisting mechanism, and dogs each having a link engaging the ends of said cross

bars and the upper end of said molding shells, substantially as set forth. 10

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

JOHN H. McCOY.

Witnesses:

C. M. CLARKE,

CHAS. S. LEPLEY.