T. B. ATKINS.

APPARATUS FOR MOLDING SILOS AND THE LIKE.

APPLICATION FILED AUG. 25, 1917.

1,272,886.

Patented July 16, 1918.

3 SHEETS—SHEET 1.

Fig. 15.



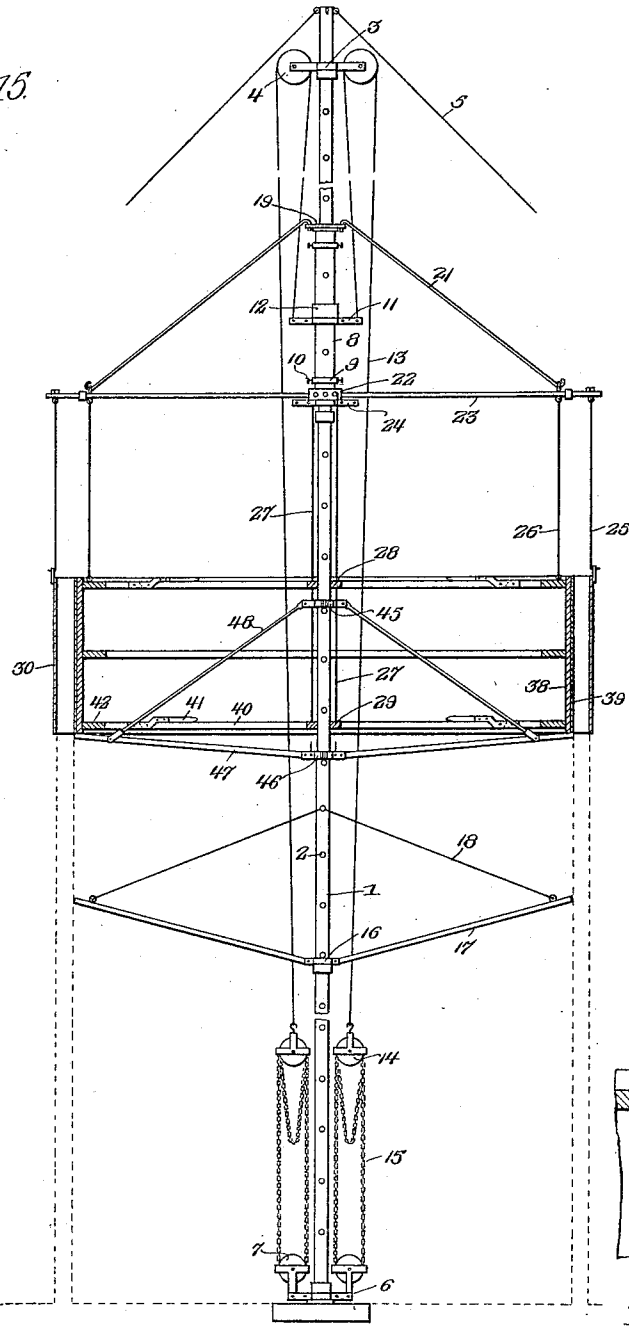
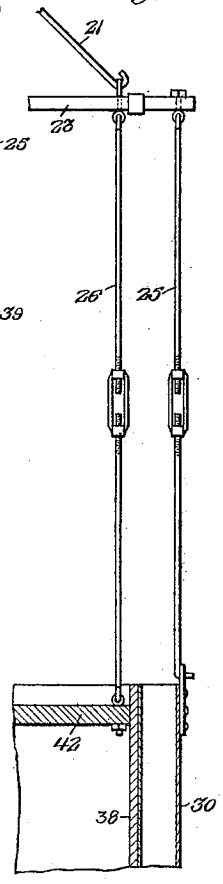


Fig. 7.



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Fig. 1.

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3 SHEETS—SHEET 2.

Fig. 2.

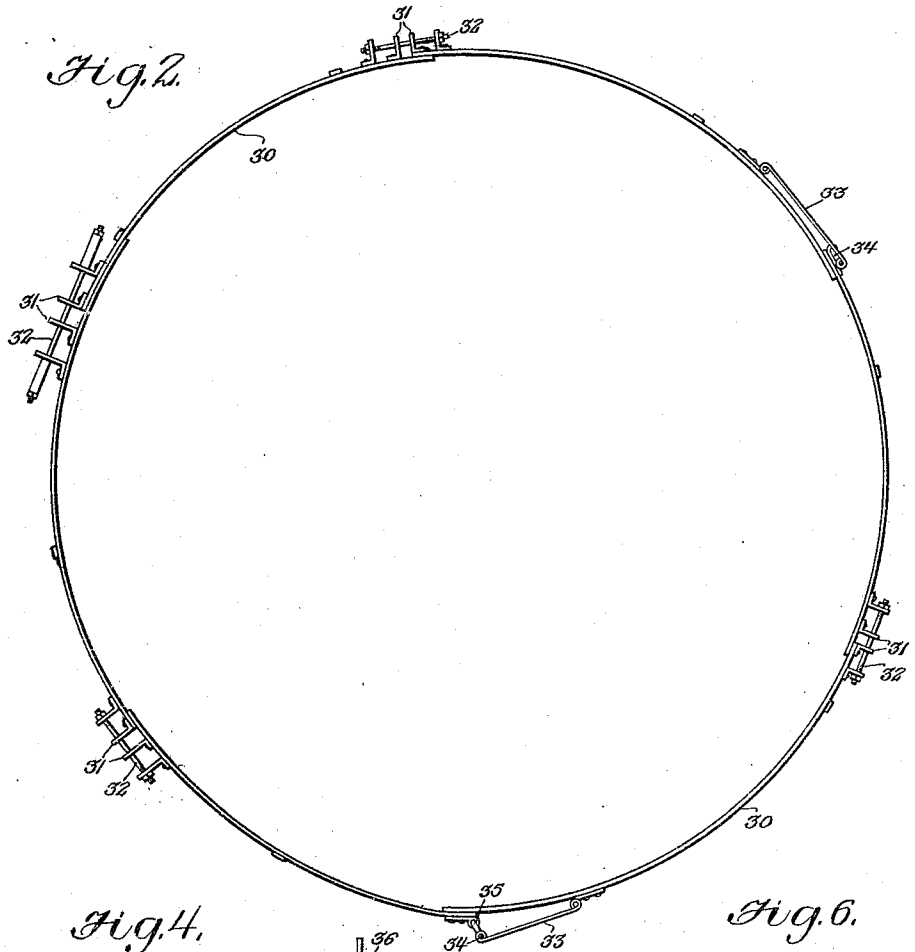


Fig. 4.

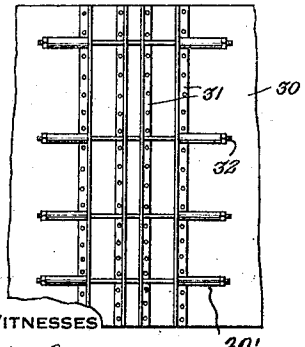


Fig. 5.

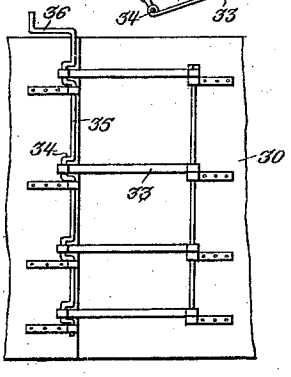
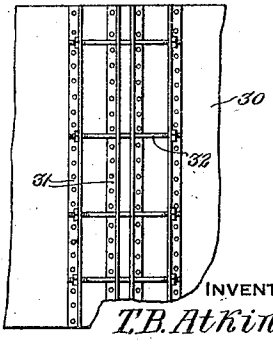


Fig. 6.



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3 SHEETS—SHEET 3.

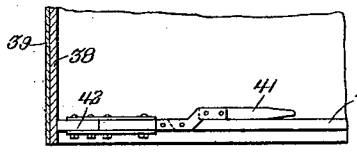


Fig. 8.

Fig. 3.

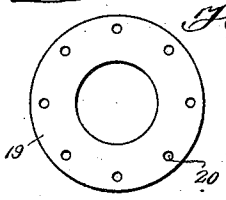


Fig. 9.

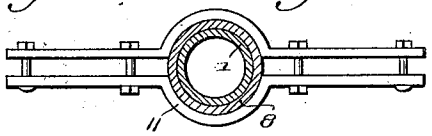


Fig. 11.

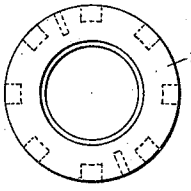


Fig. 13.

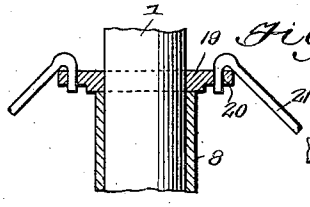


Fig. 10.

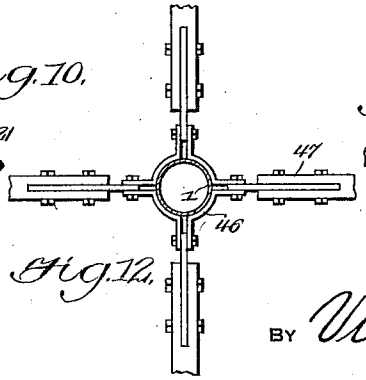


Fig. 12.

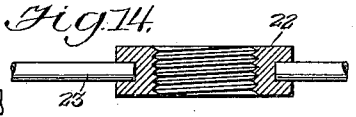


Fig. 14.

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UNITED STATES PATENT OFFICE.

THOMAS B. ATKINS, OF CANUTILLO, TEXAS.

APPARATUS FOR MOLDING SILOS AND THE LIKE.

1,272,886. Specification of Letters Patent. Patented July 16, 1918.

Application filed August 25, 1917. Serial No. 188,239.

To all whom it may concern:

Be it known that I, THOMAS B. ATKINS, a citizen of the United States, residing at Canutillo, in the county of El Paso and State of Texas, have invented new and useful Improvements in Apparatus for Molding Silos and the like, of which the following is a specification.

This invention relates to an apparatus adapted to be used for molding silos and similar structures from concrete cement material and it consists in the novel features hereinafter described and claimed.

An object of the invention is to provide an apparatus of the character stated which is of simple structural arrangement and which may be easily and quickly manipulated in order to properly adjust the parts for positioning them as the structure progresses.

With the above object in view the apparatus comprises a mast composed of sections which are connected with each other by means of suitable coupling members. The mast sections are provided with suitable ladder rungs. A head is mounted upon the uppermost mast section at the top end thereof and guy ropes or cables are employed for securing the head with relation to the ground whereby the mast is held in a vertical position. Pulleys are journaled upon the said head and cables are trained over the said pulleys. A sleeve is slidably mounted upon the mast and means are provided for holding the same at a fixed position with relation to the mast. A suspension bar is loosely fitted upon the sleeve and one end of the said cables is attached to the said bar at the opposite sides of the said mast. The other ends of the cables extend down along the mast and are connected with hoisting blocks located at the lower or base portion of the mast. Braces of special design are mounted upon the intermediate portion of the mast and are adapted to engage the inner surface of the completed portion of the structure whereby the mast is held in position during the course of erection of the building. A sleeve is slidably mounted upon the mast and set screw devices are provided for holding the said sleeve at adjusted positions upon the mast. Rings are mounted upon the sleeve and are provided with sockets which receive the inner ends of radially disposed arms. The outer end portions of the said arms are connected with the upper portion of the sleeve by means of hook members. Hangers depend from the outer portions of the said arms and are connected with their lower ends with form sections, the said sections being arranged in two sets, one set being adapted to be used at the outer surface of the wall of the structure and the other set at the inner surface thereof. Rings surround the mast at points below the first mentioned rings and are connected with the ring which is mounted upon the sleeve by means of hangers. The last mentioned rings support the inner ends of arms which in turn carry at their outer portion frames adapted to coöperate with the sections of the form which is used at the inner surface of the wall of the structure. The last mentioned arms are made in sections which are pivotally connected together and the said sections may be swung with relation to each other whereby the frames are forced in close contact with the sections of the wall form. Means are provided for connecting the adjacent ends of the sections of the said frames together whereby the wall form is securely held in position. The sections of the wall form which are used at the outer surface of the wall are connected together by means of a panel which is movable in order to expand or contract the sections of the said wall form with relation to each other in order that it may be readily removed from a completed portion of the wall. Still another ring is mounted upon the mast and is provided with arms adapted to project under the lower edge of the inner wall form whereby the said form is held in position while the frames are being adjusted.

In the accompanying drawings:—

Figure 1 is a vertical sectional view of the molding apparatus showing parts in side elevation;

Fig. 2 is a top plan view of part of the mold.

Fig. 3 is a horizontal sectional view of the inner portion of the mold.

Fig. 4 is a fragmentary side elevation of the outer part of the mold.

Fig. 5 is a similar view showing a ladder structure applied to the outer portion of the mold,

Fig. 6 is a similar view showing a slightly different arrangement from that illustrated in Fig. 4.

Fig. 7 is a fragmentary vertical sectional view of the mold.

Fig. 8 is a similar view of the lower part of the inner portion of the mold.

Fig. 9 is a plan view of a ring used upon the mold.

Fig. 10 is a transverse sectional view of the ring and adjacent parts.

Fig. 11 is a transverse sectional view of the mast of the mold showing parts mounted thereon.

Fig. 12 is a similar view showing arms connected with the mast.

Fig. 13 is a plan view of another ring used on the mast.

Fig. 14 is a transverse sectional view of the ring shown in Fig. 13.

Fig. 15 is a longitudinal view of hanger 27.

The apparatus for molding a silo or a like structure comprises a mast 1 which is composed of a series of pipe sections suitably connected together at their adjacent ends by means of usual coupling members. The mast 1 is provided with suitable detachable rungs 2 spaced at appropriate intervals apart and which may be used by operatives for ascending or descending the mast. A head member 3 is positioned at the top end of the mast and carries journaled pulleys 4. Cables 5 are connected at one end with the head member 3 and may be connected at their other ends with stakes or other objects planted in the ground whereby the masts may be held in vertical position while the apparatus is in use. A foot member 6 is mounted at the base of the mast and carries suitable pulleys 7. A sleeve 8 is slidably mounted upon the upper portion of the mast 1 and is provided with rings 9 having set screws 10 which may be turned into engagement with the mast whereby the sleeve 8 is held at an adjusted position thereon. A suspension bar 11 is loosely mounted upon the sleeve 8 and may engage a collar 12 fixed to the said sleeve. The external diameter of the collar 12 is greater than the internal diameter of the sleeve 8. One end of the cables 13 are attached to the end portions of the bar 11 and the intermediate portions of the said cables are trained over the pulleys 4. The said cables extend down along the mast and are connected at their lower ends with hoisting blocks 14 which in turn are provided with chains 15 trained around the pulleys 7 and which may be used in a usual manner for drawing the cables 13 when it is desired to move the sleeve 8 in an upward direction along the mast 1.

A ring 16 may be positioned upon the intermediate portion of the mast and rest upon one of the couplings which connect the adjacent sections of the mast together. Arms 17 are pivotally connected at their ends with the said ring and may bear at their outer ends against the inner surface of the wall of the structure whereby the intermediate portion of the mast is braced in a central position with relation to the structure. Cables 18 are connected at their outer ends with the outer portions of the arms 17 and may be lashed at their inner ends to the intermediate portion of the mast. When it is desired to disengage the outer end of the arms 17 from the inner surface of the structure the cables 18 are pulled in an inward direction and the ring 16 may be adjusted vertically along the mast. When the ring is at a desired elevation upon the mast the cables 18 may be released whereby the outer ends of the arm 17 will swing in an outward direction and engage the inner surface of the wall of the structure and brace the mast in position with relation to the same. A ring 19 is positioned at the upper end of the sleeve 8 and is provided with a series of openings 20 which receive the ends of hook members 21. A ring 22 is positioned at the lower end of the sleeve 8 and is provided at its edge with sockets which receive the inner ends of arms 23. The outer ends of the hook members 21 are connected with the outer end portions of the said arms 23.

A shifting clamp 24 is provided at the lower end portion of the sleeve 8. The ends of the cables 13 may be disengaged from the bar 11 and connected with the shifting clamp 24, and when so connected the cables may be used as hereinbefore described for shifting the sleeve 8.

Hangers 25 and 26 depend from the outer portions of the arms 23 and the hangers 25 support the outer wall form sections while the hangers 26 support inner wall form sections as hereinafter described. Hangers 27 depend from the ring 22 and the said hangers 27 are connected at points between their ends with a ring 28 and at their lower ends with a ring 29. Both of these rings 28 and 29 surround the mast 1 and are movable thereon. Outer wall form sections 30 of sheet metal are connected with the lower ends of the hangers 25 and the adjacent edge portions of these sections overlap each other. Strips of angle iron 31 are secured to the sections 30 in the vicinity of the overlapping edges thereof and bolts 32 pass transversely through the said strips 31 and serve to hold the sections 30 at adjusted positions with relation to each other when the form is in use. If desired tubular washers 32′ may be applied to the bolts 32 as shown in Fig. 4. Certain of the sections 30 are provided at their outer sides with pivoted links 33 which have end portions pivoted upon cranks 34 provided upon shafts 35 journaled upon the adjacent sections and the said shafts are provided with crank

handles 36 which may be used for turning the shaft whereby the links 33 are moved longitudinally and the adjacent sections 30 are expanded with relation to each other. This affords means for readily removing the sections 30 from a portion of the completed wall of the structure.

The inner wall form sections 38 are connected with the lower ends of the hangers 26 and these sections include vertical strips of lagging 39. Radially disposed arms 40 are carried by the rings 28 and 29 hereinbefore described and levers 41 are pivoted at the outer ends of the arms 40. The said levers carry frames 42 which are adapted to bear against the inner surfaces of the sections 37 and spread the same when the form is in position to receive the material against the same. Jacking devices 43 are provided at the adjacent edges of the frames 42 and may be used for spreading the said frames with relation to each other and after the said frames have been spread strips 44 may be inserted in the spacing between the edges thereof thereby providing a complete form for the inner surface of the wall of the structure. Collars 45 and 46 are slidably mounted upon the mast 1 and cables may be connected with the said collars for moving the same along the mast. Arms 47 are pivotally connected at their inner ends with the lower collar 46 and when the said collar is moved in an upward direction along the mast, the outer ends of the arms 47 are projected under the lower edges of the inner wall form sections 37 and support the said sections at adjusted positions. Rods 48 are pivotally connected with the collar 45 at their inner ends and at their outer ends the said rods are pivotally connected with the outer end portions of the arms 47. After a portion of the wall of the structure has been completed the collar 46 may be lowered along the mast 1 and then the collar 45 may be raised along the mast and hence the outer end of the arm 47 will be withdrawn from under the form section 37 and the said sections may be moved along the wall of the structure after they have been loosened or contracted with relation to the same.

In use, the inner and outer wall form sections are positioned at proper distances with relation to each other and the parts are secured at adjusted positions. The material is then filled in between the said wall form section and is permitted to set. When the material hardens, the wall form sections are elevated along the mast and again secured in position and another portion of the wall structure is filled in. This operation is repeated until the structure has arrived at the desired height. The apparatus is then removed from the structure and a roof is placed upon the same.

From the foregoing description taken in conjunction with the accompanying drawing, it will be seen that an apparatus for molding a silo or similar structure of simple and durable arrangement is provided and that the same may be economically used for erecting the silo and the apparatus may be used repeatedly, for this purpose.

Having described the invention what is claimed is:—

1. An apparatus of the character described comprising a mast, a sleeve slidably mounted thereon, means for moving the sleeve on the mast, means for securing the sleeve at an adjusted position upon the mast, radially disposed arms connected with the sleeve, hook members connecting the outer portions of the arms with the sleeve, hangers depending from the outer portions of the said arms, wall form sections connected with the said hangers, the outer wall form section having overlapping edge portions, means for expanding the outer wall form sections with relation to each other, hangers depending from the said sleeve, rings carried by the last mentioned hangers, arms carried by the said rings, levers mounted upon the arms, frames carried by the levers and adapted to bear against the inner wall form sections, jacking devices for spreading the said frames with relation to each other, filling strips adapted to be interposed between the frames and means for sustaining the inner wall form sections at adjusted positions along the structure.

2. An apparatus of the character described comprising a mast, a sleeve slidably mounted thereon, means for moving the sleeve along the mast, means for securing the sleeve at an adjusted position upon the mast, arms carried by the sleeve, hangers depending from the arms, wall form sections connected with said hangers, other hangers depending from the sleeve, rings connected with the last mentioned hangers, arms connected with the said rings, levers pivoted to the arms, frames carried by the levers and adapted to bear against the inner wall form sections, other rings movably mounted upon the mast, arms pivotally connected with one of the last mentioned rings and having end portions adapted to project under the lower edges of the inner wall form and rods pivotally connected with the outer portions of the last mentioned arms and pivotally connected with the other of the last mentioned rings.

3. An apparatus of the character described comprising a mast, a ring movably mounted upon the mast, arms pivotally connected with the said ring, cables attached to the arms and adapted to be lashed to the mast, the said arms adapted to bear against the inner surface of a structure whereby a mast is braced in position with relation to the same, a sleeve movably mounted upon the

mast, means for moving the sleeve, means for securing the sleeve at an adjusted position upon the mast, arms carried by the sleeve, hangers depending from the last mentioned arms, wall form sections supported by said hangers, other hangers depending from the sleeve, rings carried by the last mentioned hangers and adapted to move along the mast, arms attached to the last mentioned rings, levers fulcrumed to the last mentioned arms, frames carried by said levers and adapted to bear against the inner wall form sections, jacking means for spreading the said frames with relation to each other, and fillers adapted to be interposed in the space between the adjacent inner wall form frames.

In testimony whereof I affix my signature.

THOMAS B. ATKINS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."