E. BLUMER.

SILO MOLD.

APPLICATION FILED JULY 21, 1911.

1,039,085.

Patented Sept. 24, 1912.

2 SHEETS—SHEET 1.

Fig. 4.

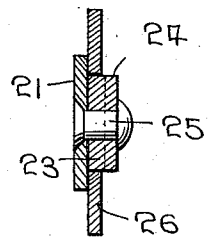


Fig. 1

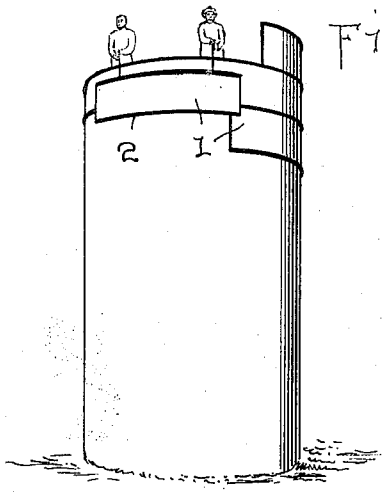


Fig. 5.

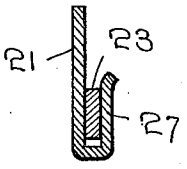


Fig. 2.

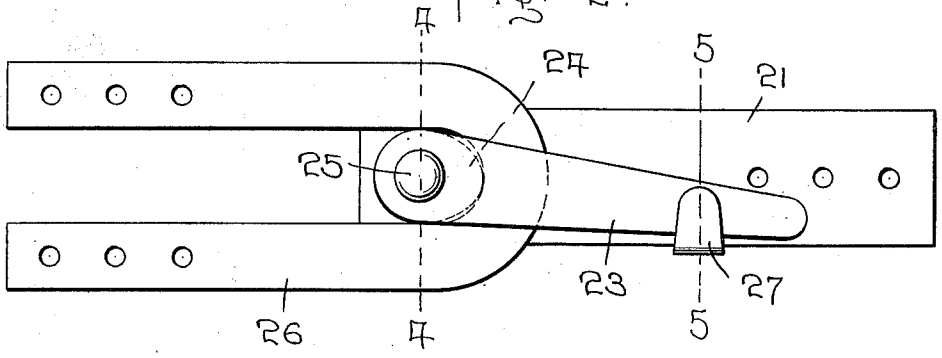
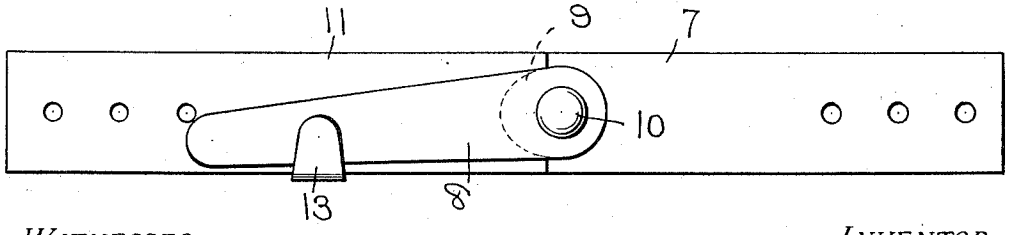


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 6.

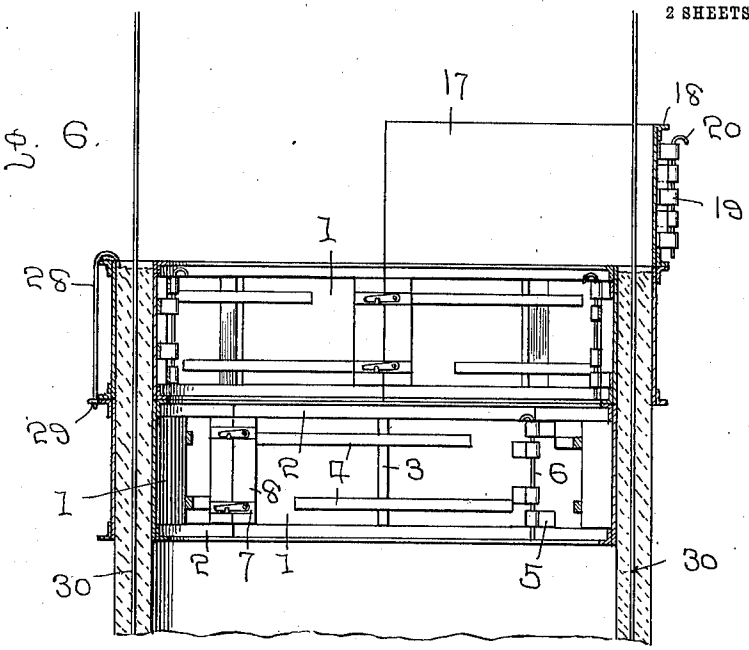
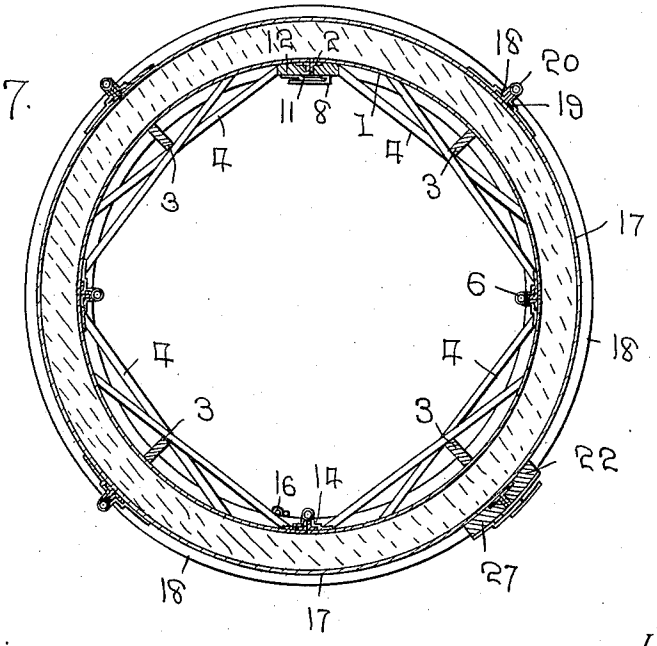


Fig. 7.



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UNITED STATES PATENT OFFICE.

EMIL BLUMER, OF ST. JACOB, ILLINOIS.

SILO-MOLD.

1,039,085. Specification of Letters Patent. Patented Sept. 24, 1912.

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To all whom it may concern:

Be it known that I, EMIL BLUMER, a citizen of the United States, residing at St. Jacob, in the county of Madison and State of Illinois, have invented certain new and useful Improvements in Silo-Molds; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to molds and more particularly to molds for constructing concrete silos or other circular structures.

An object of the invention is to provide a mold composed of sections and so formed that it is unnecessary to build a temporary scaffold around the silo while the latter is being built.

Another object is to provide a mold of the above stated character having several sections adapted to be temporarily locked together to form a circle, each section being adapted to be unlocked from the remaining sections and moved upwardly to increase the height of the structure, and, another object is to provide an inner form and an outer form, both forms being composed of sections, the sections of the inner form having bracing rods or boards, across which planks may be placed for the workmen to stand upon while drawing up the sections and placing them in position and while pouring the plastic material between the inner and outer forms.

Other objects and advantages will be hereinafter set forth and pointed out in the specification and claim.

In the accompanying drawings which are made a part of this application, Figure 1 is an elevational view of a circular structure, partly completed, showing the workmen drawing up a lower section to place the same in position upon an upper section. Fig. 2 is a detail view of the lock employed for locking together the outer sections. Fig. 3 shows the preferred form of lock used to lock the sections of the inner form together. Fig. 4 is a sectional view on the line 4—4 of Fig. 2. Fig. 5 is a similar view on the line 5—5 of Fig. 2. Fig. 6 is a vertical sectional view through a silo or other circular structure during the course of its construction, showing the sections in position, and Fig. 7 is a horizontal sectional view thereof.

Referring to the drawings in which similar reference numerals designate corresponding parts throughout the several views, 1 indicates the sections of the inner form, said sections comprising plates curved from end to end and having secured at their edges and upon their inner faces the strengthening angle irons 2, the purpose of which will be readily apparent. Secured also to the inner face of each section 1 is the vertical bracing-beam 3, to which are secured the horizontal brace rods 4. The upper brace rod has one end secured near an end of the section, while its opposite end is secured some distance from the opposite end of the section; and the lower brace rod 4 has one end secured near the opposite end of the section while its opposite end is secured some distance from the first mentioned end of the section. Both brace rods, however, are secured to the bracing-beam 3, which spaces said horizontal brace-rods from the central portion of the curved section and the brace rods cross each other at their respective points of contact with the vertical brace-beam, and thereby form a rigid truss which braces the section at its top and bottom and middle, and at points approximately equally spaced between its lateral ends and its middle.

All of the sections, except two, are provided with the eye straps 5 secured at their vertical edges in such position that the eye openings thereof will be one above another when the sections are placed end to end to allow the hinge pins 6 to be passed therethrough when the sections are in position, the hinge pins 6 having their upper ends suitably bent to prevent the pins from dropping through the eye straps. The remaining two sections are provided upon their opposite ends with eye straps 5 while their meeting ends are provided with cam locks, which will now be described.

The cam lock comprises a metallic plate 7 having secured thereto an arm 8 adjacent the angle iron 2 along the vertical edge of one of these sections to which the plate 7 is riveted, the arm 8 having the rigid cam 9 near the pivot pin 10, by means of which the arm 8 is pivoted to the plate 7, said cam being integral or secured to the arm 8 in any preferred manner. This cam is adapted for engagement against the end of the plate 11 secured to the block 12, fastened to the adjacent vertical edge of the other section,

near the angle iron 2 at this edge. The end of the plate 11, against which the cam 9 engages, is suitably curved to accommodate the cam when the arm 8 is in a substantially horizontal position. The pivotal movement of the arm 8 is limited by means of the stop ear 13, which is integral with the lower edge of the plate 11 and bent upwardly to receive the arm 8 and limit the movement thereof, retaining said arm in proper position when the sections are locked together. Thus it will be seen that the sections are hinged at all of their meeting ends except one and at this point the meeting ends of two of the sections are locked together, as just described, this locking mechanism serving to spread the sections at this point and force the hinged meeting ends of the sections tightly together.

The angle irons along the upper edges of the sections 1, each have secured thereto the outwardly directed staples 14 which are adapted to be engaged by the lower curved ends 15 of long suspending wires 16, which have their upper curved ends hooked over the upper edges of the sections directly above. These staples 14 and suspending wires 16 are for the purpose of suspending one circle or ring of sections below another and holding each lower section against the lower edge of the circle directly above. The outer sections 17 are curved similarly to the inner sections 1 and are of the same material, said sections 17 also having strengthening angle irons 18 along their edges. These sections are provided with eye straps 19, similar to the eye straps 5 of the sections 1 and positioned along the vertical edges of the sections 17 in a manner similar and positions corresponding to that of the first eye straps. It might be well to state at this time that the eye straps 5 and 19 are bent so as to avoid the angle irons along the vertical edges of the sections. Hinge rods 20 are passed through the alining openings of the eye straps 19 to hingedly connect the adjacent ends of the sections 17 together the same as the inner sections 1. The meeting ends of two of the outer sections, however, are locked together by means of a strap 21 secured to a block 22 carried at the vertical edge of one of these ends and a locking arm 23 pivoted to the plate 21 and having the cam 24 integral upon the under side of said arm and adjacent the pivot pin 25, by means of which the arm is secured to the strap 21, said cam working within the slot of the U-shaped locking bar 26 carried upon the block 27 secured to the adjacent vertical edge of the other section 17. The locking arm 23 is gripped when in its locked position by the ear 28, similar to the ear 13 and carried by the strap 21, said ear 27 also serving to limit the movement of the locking arm 23. This locking mechanism, as will be seen, draws the outer sections closer together, the cam 24 working within the U-shaped locking bar 26 and drawing the latter upon the strap 21, on account of the cam 24 working between the legs of the U-shaped member and against the inner surface of the curved portion connecting the legs. It will thus be seen that the outer form is also composed of curved sections which when locked together present a circular form the same as the inner sections and it will be readily understood that any number of circular forms may be employed, one above the other, for either the outer or inner forms.

Each circle of the outer form may be secured to the circle above by means of the curved suspending wires 28, the lower turned ends of which hook in the staples 29 carried upon the upper angle iron of each section, the upper ends of the suspending wires 28 being also curved and secured over the upper angle irons of the sections above, the suspending wires 28 of each section hooking in the eyes 29 of the sections immediately therebelow. It will be seen that the lower sections of the outer form may be readily disconnected and raised upwardly to be placed on the sections of the top circle.

In employing this mold for constructing concrete silos or other structures of circular form, I prefer to employ enough sections of both the inner and outer forms to use at least two circles to the outer form and two to the inner form, the object of which will presently appear. The plastic material is then poured between the outer and inner forms, suitable rods 30 or other reinforcing means being previously positioned between the forms to strengthen and reinforce the finished structure. The sections are preferably placed so as to avoid the joints of one circle being immediately above or below the joints of the adjacent circles.

After the material has set sufficiently the locking arms 8 and 23 of the lower circles are swung upon their pivots to unlock the circles at the lock joints and the hinge pins 6 and 26 are drawn out of their eye straps 5 and 19, respectively, to disconnect the sections of said lower circle. The suspending wires 16 and 28, engaged in the staples 14 and 29 respectively, of the disconnected sections, are grasped and these loose sections are then drawn upwardly and placed in proper position upon the sections of the top circles, where they are again hinged together and locked to form circles above the original top circles. Suitable planks may be placed with their ends upon the brace rods 4 of the upper inner sections to present a scaffold or platform, upon which the workmen may stand to draw up the lower sections and place them upon the upper ones and also while pouring the plastic material

between the inner and outer forms. It will be seen that as the lower sections are moved upwardly and placed upon the upper sections, the planks may also be changed and moved upwardly and rested upon the brace rods 4 of the new upper circles of the inner form. It will thus be seen that this interchanging or moving upward of the sections to change the lower circle to the upper circle, may be repeated time after time as the height of the structure increases, it being understood that these changes are made as rapidly as the material sets or hardens sufficiently to remove the lower circle and place it upon the upper circle, at which time the lower circle becomes the upper circle.

It will thus be seen that I have provided a mold for silos and other circular structures, which may be readily employed without the necessity of building a scaffold and which will serve to mold a structure of any desired height, said mold when not in use requiring only a small storage space and one which is capable of being used an indefinite number of times.

When it is desired to form a window or door in the silo being constructed, the frame work for the window or door may be placed between the inner and outer forms and the plastic material poured between the forms and around the frame, the latter being securely held in position by the material, as will be understood.

It will be seen that as this mold is composed of an extremely small number of parts of simple formation, it may be manufactured and marketed at an extremely low price, placing the mold within the reach of all having use for such device. It will also be evident that this mold is strong and durable and will be effective in use.

What I claim is:

In a silo-mold consisting of a cylindrical outer form and a cylindrical inner form, a number of curved plates forming the inner cylinder, each curved plate being held in its curved formation by means of a vertical brace-bar at the middle of the plate and extending from the bottom to the top thereof, an upper horizontal brace-rod having an end secured to the plate at a point near an end of the plate and having its other end secured to the plate medially between said vertical beam and an end of the plate, a lower horizontal brace-rod crossing the plane of the upper brace-rod and having its ends secured to said plate, said horizontal brace-rods being secured to said vertical brace beam at the intersection of the planes thereof, and thereby rigidly bracing said plate at its top and bottom and at several points intermediate of its ends.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EMIL BLUMER.

Witnesses:
KARL AEBISCHER,
FRANK P. SCHWARTZ.

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