No. 896,194. PATENTED AUG. 18, 1908.

J. BENSING.

MOLD FORMING MACHINE.

APPLICATION FILED NOV. 2, 1907.

2 SHEETS—SHEET 1.

Fig. 1.

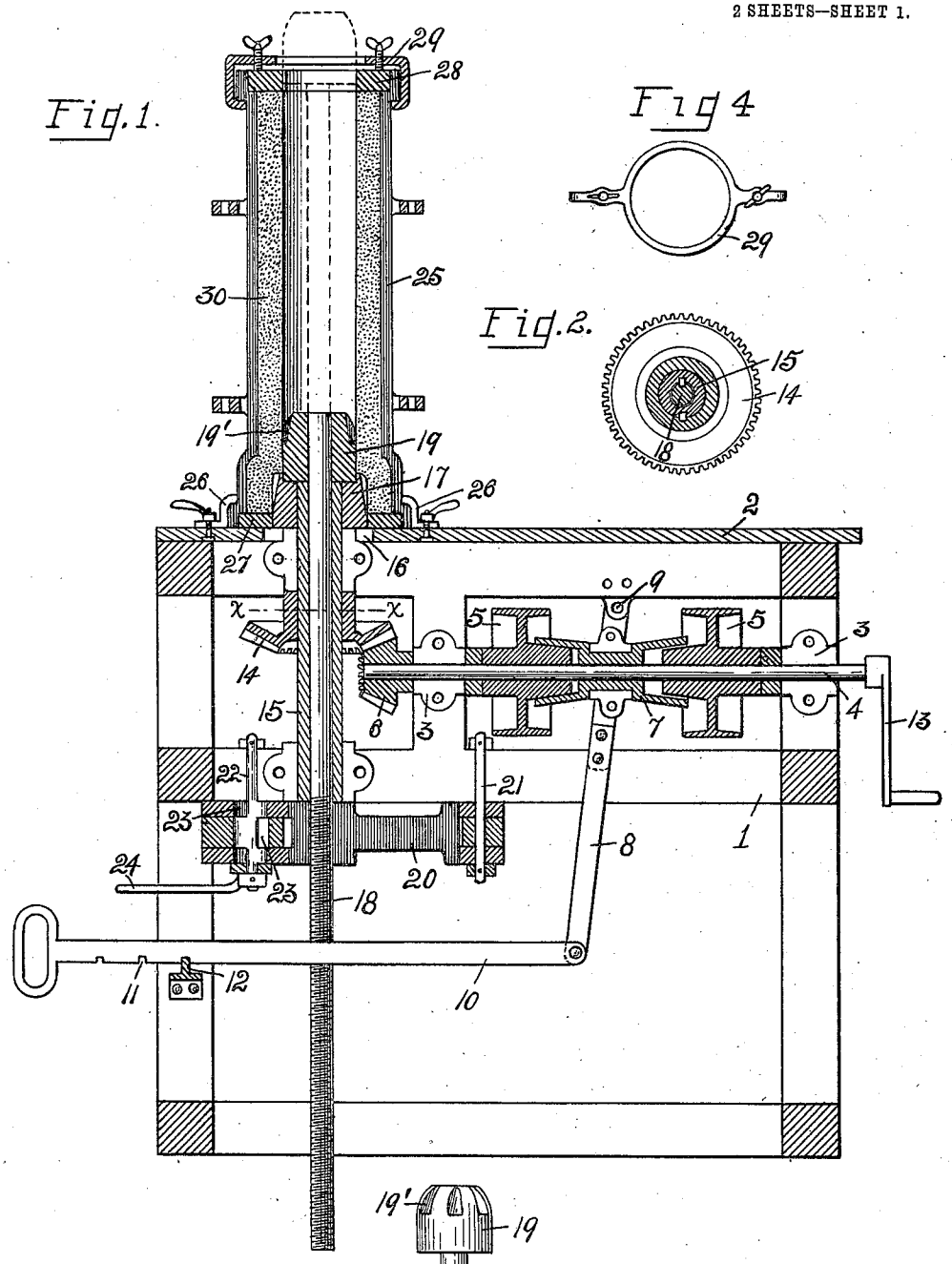
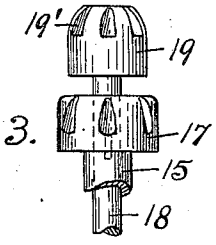


Fig 4

Fig. 2.

Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 5.

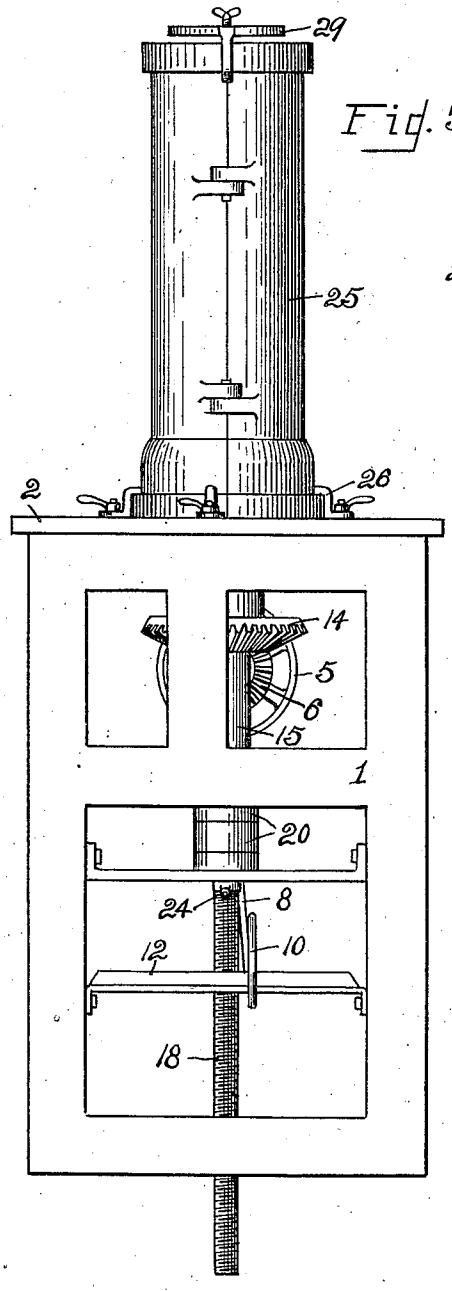


Fig. 7.

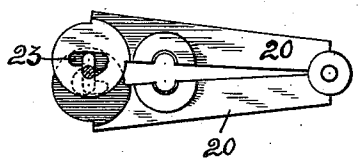


Fig. 8.

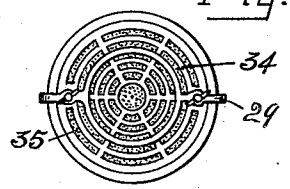
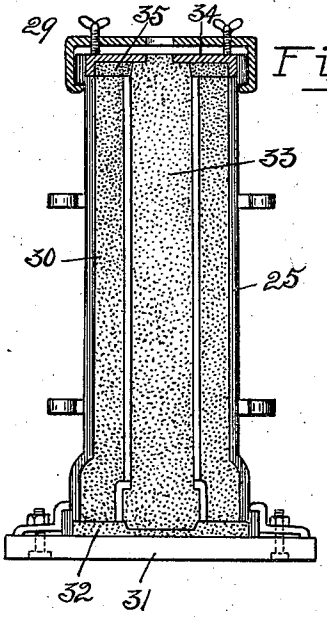


Fig. 6.



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UNITED STATES PATENT OFFICE.

JACOB BENSING, OF MALINTA, OHIO.

MOLD-FORMING MACHINE.

No. 896,194. Specification of Letters Patent. Patented Aug. 18, 1908.

Application filed November 2, 1907. Serial No. 400,399.

To all whom it may concern:

Be it known that I, JACOB BENSING, a citizen of the United States, and a resident of Malinta, in the county of Henry and State of Ohio, have invented a certain new and useful Mold-Forming Machine; 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to mold-making machinery, and has particular reference to a machine adapted for the formation of molds used for the casting of soil-pipe or other similar cylindrical articles.

The object of my invention is the provision of a simple machine of this class which is intended to combine with a mold flask to form the outer mold-wall for the article to be cast in a more rapid, durable and efficient manner than the same is done in practice by hand and with the uniformity and precision incident to machine work.

The operation, construction and arrangement of the parts of the invention are fully described in the following specification and illustrated in the accompanying drawings, in which,—

Figure 1 is a central, vertical, longitudinal section of the machine embodying my invention. Fig. 2 is a section on the line *x x* in Fig. 1. Fig. 3 is a detail of the mold-forming heads of the machine. Fig. 4 is a plan of the top clamping-member of the flask. Fig. 5 is an end elevation of the machine. Fig. 6 is a central vertical section of the flask with the mold and its core in position therein and in condition for casting. Fig. 7 is a top plan view of the split-nut which engages the screw shank of the upper mold-forming head, and Fig. 8 is a top plan view of Fig. 6.

Referring to the drawings, 1 designates the frame of the machine, which may be of any suitable or convenient form and construction, and 2 the top thereof, which is preferably made flat in the form of a table.

Journaled in suitable bearings 3 longitudinally of the frame and beneath the top thereof is a shaft 4, which carries the two loose pulleys 5, 5 intermediate its bearings and the bevel-gear 6 at the inner end thereof. The pulleys 5, 5 are intended to be driven in opposite directions by belts or other suitable means, and have their contiguous hub ends fashioned to be engaged by the conically socketed ends of the movable friction-clutch member 7, which is feathered on the shaft 4 between the pulleys, as shown in Fig. 1. The clutch-member 7 is actuated to slide on its shaft to throw it into engagement with one or the other of the pulleys by a movement in the proper direction of the lever 8, which is attached to said member and has its upper end fulcrumed beneath the frame top, as at 9, and its lower end pivotally attached to a push-rod 10, which extends without one end of the frame and is shown as being provided with a series of notches 11 for locking with a transverse frame-piece 12. A crank-handle 13 is carried at the outer end of the shaft 4 to enable it to be turned by hand if desired.

Meshing with the bevel-gear 6 is a bevel-gear 14, which is keyed to a vertical sleeve 15. This sleeve is mounted in suitable bearings in the frame and has its upper end projected through an opening 16 in the frame top and carries a circular mold-forming head 17, as shown, which is intended to form the enlarged end portion of a pipe. Feathered within the sleeve 15 to adapt it to turn therewith but to have relative longitudinal movement thereof is a stem or rod 18, which has its upper end projected above the upper sleeve end and carrying a circular mold-forming head 19 of less diameter than the head 17, to adapt it to form the body portion of a pipe mold. The outer side of the head 19 is contracted in a curved line at its top to adapt it to have a wedge-like action when moving upwardly through the green sand, as hereinafter described, and to further facilitate such action is provided at its upper end portion with a plurality of longitudinally disposed grooves 19′ which incline outwardly from their upper ends, as shown. The head 17 may also be provided with these grooves if desired. The lower end portion of the stem is screw-threaded and extended beyond the lower end of the sleeve as the length of the mold to be formed may require.

Mounted beneath the lower end of the sleeve 15 in position to embrace the threaded portion of the stem or rod 18 are the two jaws 20, 20, which are pivotally joined at one end by the suspending bolt or pin 21 and are provided with coöperating threaded concavities forming together a nut for the

threaded portion of the stem or rod 18. The outer ends of the jaws 20 are connected by a winged suspending pin 22, the wings of which work in reversely arranged openings 23 in the jaw ends in such manner that a turning of the pin in one direction forces the jaws open, as shown in Fig. 7, and a turning of the pin in the opposite direction effects a closing of the jaws. The pin 22 is provided at its lower end with a crank-arm 24 to facilitate a turning thereof.

25 designates a two-part mold flask of the kind ordinarily used in connection with the formation of soil pipe molds or the like, and, as will be apparent, may be of any size, shape or construction suitable for such work, but is preferably of cylindrical form, as shown. This flask is intended to be placed in upright position over the table opening 16 in concentric relation to the forming-heads 17 and 19 and is secured in position by clamps 26 engaging a flange or ledge on the flask, as shown, or in any other suitable manner. A base-piece 27 closely encompasses the forming head 17 and combines therewith to close the lower end of the flask, as shown. The upper end of the flask is fitted with a ring-like top-piece 28, which is held to its seat by a clamping-member 29 and has its opening approximately the diameter of the forming-head 19 to permit the latter to freely pass therethrough. The clamp 29 may be of any suitable construction to adapt it to retain the member 28 to its seat.

In the operation of my invention, a flask, being secured in position on the table 2, is filled or partially filled with green molding-sand and the clutch-member 7 then moved into engagement with the pulley 5 which drives the shaft 4 in the proper direction to effect a rotation of the sleeve 15 to the left, should the threads on the stem or rod 18 be right-handed. The rotation imparted to the sleeve 15 causes the attached forming-head 17 to rotate in the lower or enlarged portion of the flask to pack the green sand between it and the flask casing to form the outer molding-wall for the enlarged end portion of a pipe, the head 17 being suitably shaped for such purpose. The rotation of the sleeve also causes the stem or rod 18 to turn therewith and to have a resultant vertical movement relative thereto due to the threaded portion of the stem or rod working in the closed threaded jaws or nut members 20, 20. The vertical spiral movement thus imparted to the mold-forming head 19 causes the green sand to be uniformly packed radially against the flask-casing and to form a cylindrical molding-wall 30 the inner diameter of which is that of the head 19. As the head 19 nears the top of the flask the surplus sand is ejected therefrom through the opening in the top-piece 28, thus freeing the flask of all sand except that which forms the wall 30 of the mold. When the forming-head 19 has reached the top of the flask as shown in dotted lines in Fig. 1, the clutch-member 7 is released from one and thrown into engagement with the other pulley 5 to effect a reversal of the rotation of the sleeve and attached parts to return the stem or rod 18 and head 19 to their normal positions, or, if desired, this may be more quickly accomplished by opening the jaws 20, 20 from engagement with the screw threads on the stem and then pushing the stem down by hand, as the close fitting of the head within the mold 30 will prevent its dropping by gravity. The mold having been formed as thus described, the flask is removed from the table to be replaced by another and is preferably clamped to a base or other suitable supporting-member 31 after first inserting a base piece 32 in its lower end in place of the base piece 27, which is positioned therein during the forming operation. A core-piece 33 is then positioned within the mold and centered by reason of its lower end seating in a central socket in the upper face of the base-piece 32, and its upper end being held by a cap-piece 34. This cap-piece is of skeleton or other suitable construction and is preferably provided with an inner molding-face 35 and the usual pouring and vent openings. The cap piece having been secured in place by a clamping-member 29 or in any other suitable manner, the mold is in condition for pouring.

It is apparent in the use of my machine that a mold will be more evenly and perfectly formed thereby than is possible by hand, and will eliminate the soft spots in the mold-wall incident to the uneven tamping of the sand by hand, thus enabling the forming of more perfect castings and also facilitating and expediting the making of pipe molds.

I wish it understood that while I have shown and described a particular construction and arrangement of the parts of my invention, I do not desire to be restricted to such construction or arrangement, as obvious modifications will be apparent to persons skilled in the art.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is,—

1. In a mold-forming machine, the combination with a flask, of a shaft having its upper end provided with a mold-forming head and normally disposed at the lower end of the flask, and means for imparting a spiral movement to said shaft and head whereby the head is forced through the flask from bottom to top thereof, said head and shaft being adapted to be returned to normal position to permit a removal of the molded body.

2. In a mold-forming machine, the combination with a flask, of a threaded stem having its upper end provided with a mold-forming head and projected within the lower end

of the flask, a nut coacting with the stem to cause the head to be forced through the flask when the stem is rotated, said head and stem being adapted to be returned to their normal positions at the lower end of the flask, and mechanism for rotating the stem.

3. In a mold-forming machine, the combination with a flask, of a rotary mold-forming head fixed against longitudinal movement relative to the flask, a second mold-forming head mounted for spiral movement relative to the flask, said heads when rotated being adapted to coöperate to form a cylindrical mold wall within the flask from material deposited therein, and mechanism for simultaneously imparting rotation to one and spiral movement to the other of said heads.

4. In a mold-forming machine, the combination with a flask, of a rotary head operative within the flask to form the enlarged end portion of a soil pipe mold, a rotary head longitudinally operative within the flask to form the body portion of a pipe mold, and mechanism for simultaneously imparting the respective movements to said heads.

5. In a mold-forming machine, the combination with a flask, of a rotary sleeve carrying a mold-forming head within an end of the flask, a stem feathered within the sleeve and having an end projected beyond the headed end of the sleeve and provided with a mold-forming head, mechanism for rotating the sleeve to cause the two heads to rotate within the flask; and means for imparting a longitudinal movement to the stem as it is rotated.

6. In a mold-forming machine, the combination with a flask open at its ends, of a sleeve having an end projecting within an end of the flask and provided with a mold-forming head, a threaded stem feathered in said sleeve and having an end projected beyond the headed end of the sleeve and carrying a mold-forming head of less diameter than the other head and having its outer end contracted, mechanism for driving the sleeve in either direction, and a pair of jaws having threaded surfaces adapted to coöperate with the threaded portion of the stem to impart longitudinal movement thereto when turned and operative to engage or release the stem.

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

JACOB BENSING.

Witnesses:
C. W. OWEN,
HAZEL B. HIETT.