

Oct. 27, 1925.

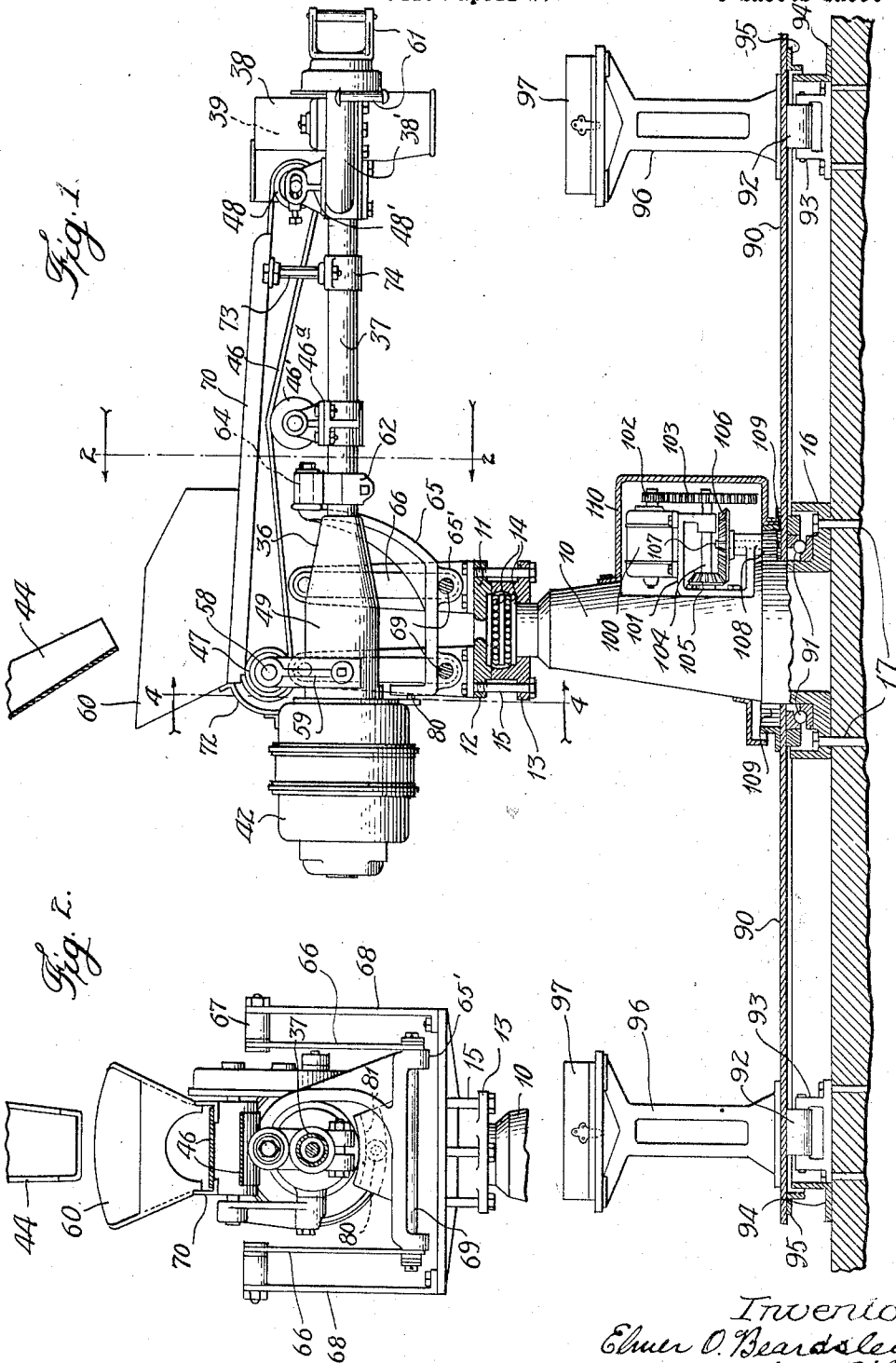
1,558,577

E. O. BEARDSLEY ET AL

MACHINE FOR FILLING MOLDS

Filed April 25, 1923

3 Sheets-Sheet 1



Inventors:
Elmer O. Beardsley and
Walter F. Piper
By Fred Gulack
their Atty.

Oct. 27, 1925.

1,558,577

E. O. BEARDSLEY ET AL

MACHINE FOR FILLING MOLDS

Filed April 25, 1923

3 Sheets-Sheet 2

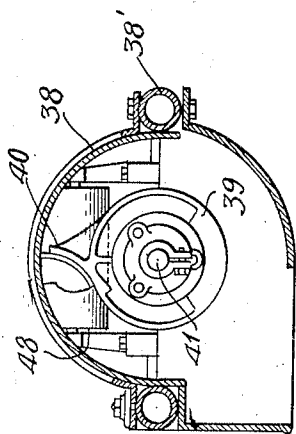


Fig. 5.

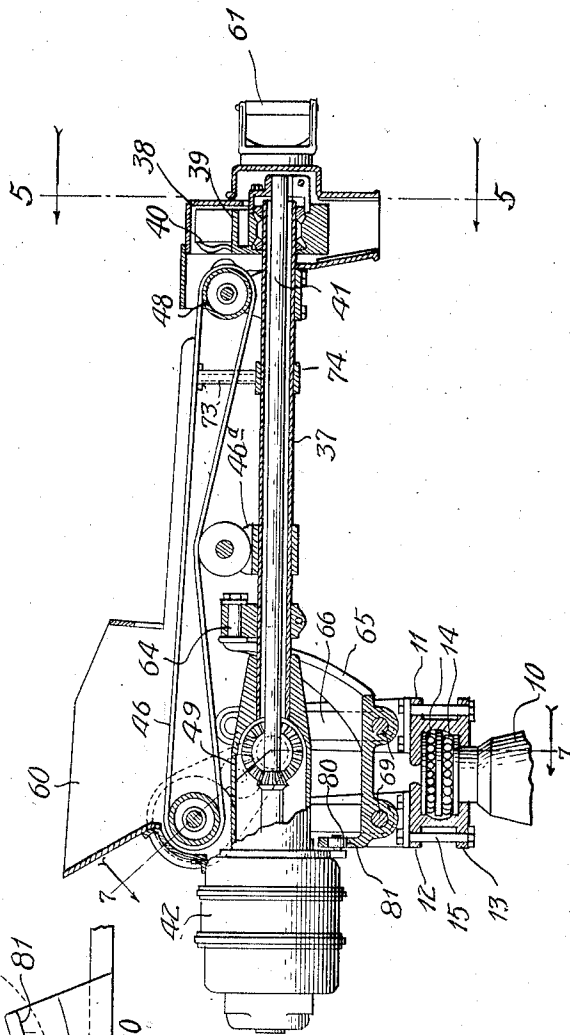


Fig. 3.

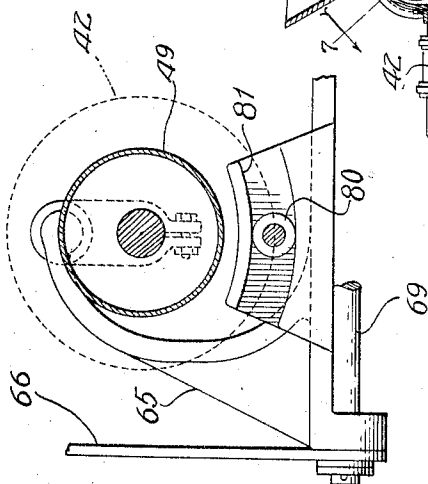


Fig. 4.

Inventors:
 Elmer O. Beardsley and
 Walter F. Papert
 By: Fred Gerlach
 their Atty.

Oct. 27, 1925.

1,558,577

E. O. BEARDSLEY ET AL

MACHINE FOR FILLING MOLDS

Filed April 25, 1923

3 Sheets-Sheet 3

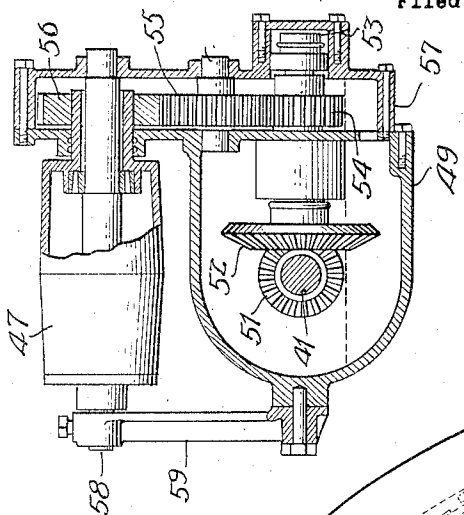
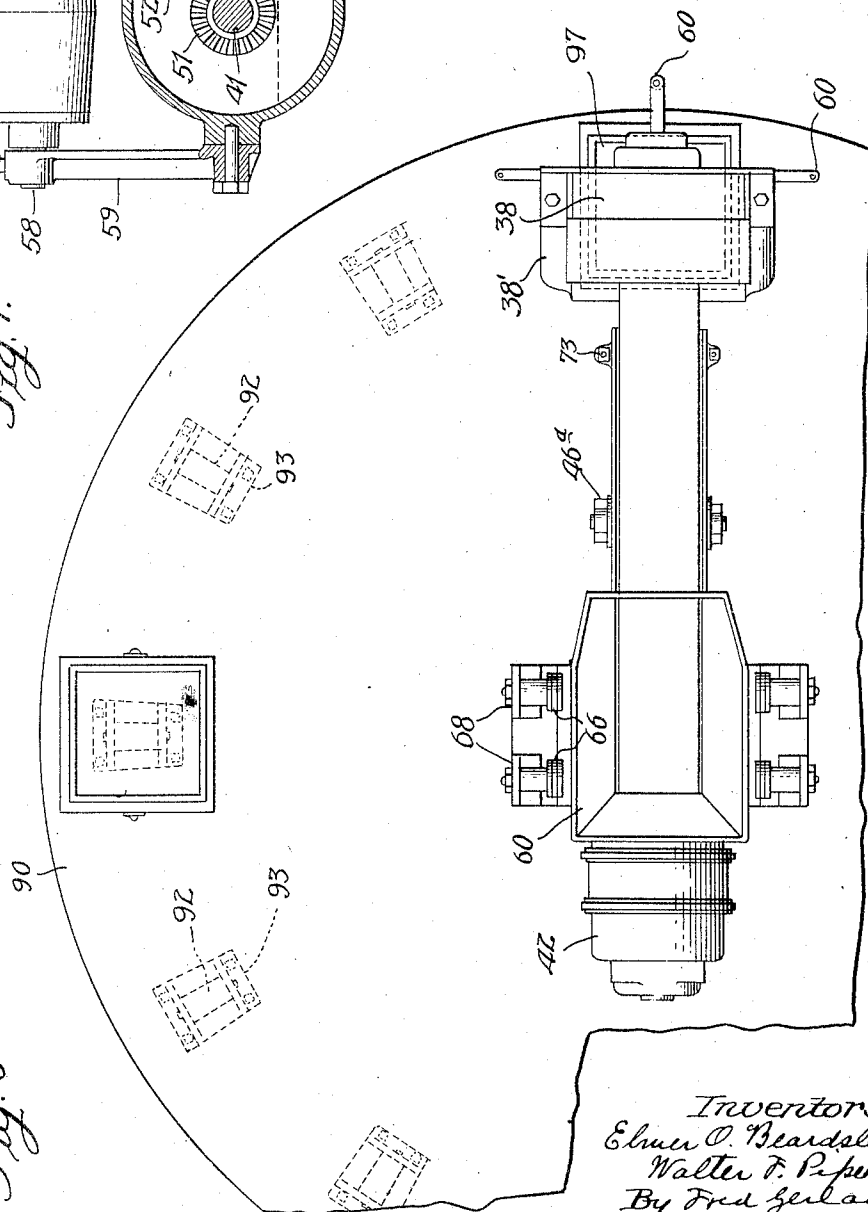


Fig. 7.

Fig. 6



Inventors:
 Elmer O. Beardsley
 Walter F. Papeh
 By Fred Ziebach
 their Atty.

UNITED STATES PATENT OFFICE.

ELMER O. BEARDSLEY AND WALTER F. PIPER, OF CHICAGO, ILLINOIS, ASSIGNORS TO
THE BEARDSLEY & PIPER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF
ILLINOIS.

MACHINE FOR FILLING MOLDS.

Application filed April 25, 1923. Serial No. 634,445.

To all whom it may concern:

Be it known that we, ELMER O. BEARDSLEY and WALTER F. PIPER, both citizens of the United States, and residents of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Machines for Filling Molds, of which the following is a full, clear, and exact description.

The invention relates to machines for filling molds and more particularly to that type in which sand is projected at high speed into the flasks.

One object of the invention is to provide improved means for supporting the sand projector or slinger, so that it can be easily moved over flasks and particularly in those instances where the longitudinal movement of the projector necessary to project sand into all portions of the mold, is comparatively short. Another object of the invention is to provide improved mechanism co-operatively arranged with the movable projector for carrying flasks to and from the projector. Other objects will appear from the following description:

The invention consists in the several novel features hereinafter set forth and more particularly defined by claims at the conclusion hereof.

In the drawings: Fig. 1 is a side elevation of a machine embodying the invention, parts being shown in section. Fig. 2 is a section taken on line 2—2 of Fig. 1. Fig. 3 is a longitudinal section through the projector and the supporting arm or jib. Fig. 4 is a transverse section taken on line 4—4 of Fig. 1. Fig. 5 is a transverse section through the projector. Fig. 6 is a plan. Figure 7 is a detail view, partly in section, of the drive mechanism for the sand pulley belt.

The machine illustrated comprises a hollow supporting column 10 on the upper end of which is pivotally mounted a supporting bracket 11. This bracket comprises an upper section 12 and a lower section 13 between which are confined suitable ball-bearings 14 forming an anti-friction bearing for supporting the bracket 11, so that it can be freely rotated in a horizontal plane. Sections 12 and 13 are secured together by bolts 15 and are formed so as to enclose

bearings 14 and the upper end of column 10 and to retain the bracket on the column. The base 16 on column 10 is fixedly secured to the molding room floor by bolts 17.

The machine comprises a jib or arm 36, a sand projector including a casing or stator 38 and a rotor 39 provided with a combined projector and shear-blade 40, a shaft 41, to which the rotor is secured, a tubular member 37 through which shaft 41 extends, and an electric motor 42, the casing of which is fixed to arm 36 and to the rotor of which (not shown) the projector 41 is secured.

An endless belt 46 is adapted to convey sand received from an overhead stationary chute 44 and to deliver it to the projector casing 38 and to the rotor 39. This belt 46 is carried by a drive-pulley 47 adjacent the electric-motor and an idler pulley 48 adjacent the projector casing. Both of these pulleys are mounted to move with arm 36. The idler pulley 48 is supported by bearings 48' which are fixed to a yoke 38' which rigidly connects the casing 38 and tubular arm-member 37. Drive-pulley 47 is mounted on a stationary shaft 58 which is supported by a bracket 59 and a gear-case 57, both of which are fixedly secured to the sides of a housing 49. The latter is fixedly secured to member 37 of arm 36 and to the casing of motor 42, so that the projector, motor and sand-feeding belt may be shifted together, as hereinafter more fully set forth. Pulley 47, which drives the sand-feeding belt 46, is driven by gearing comprising a pinion 51 in housing 49 and fixed to shaft 41; a gear 52 on a transverse shaft 53; a pinion 54 on shaft 53; an idler 55 meshing with pinion 54 and with a gear 56 fixed to the hub of pulley 47. Gear-case 57 encloses pinion 54 and gears 55 and 56. An upwardly flared chute 60 is supported over the inner end of belt 46 to direct sand from chute 44 onto belt 46 in all positions of arms 36. Chute 60 is secured to guide-bars 70 which are disposed over belt 46 and are supported by rods 73 which are supported by a clamp 71 on member 37 and a bracket 72, which is fixed to the casing of motor 42. The central portion of the lower reach of belt 46 is supported by an idler pulley 46' so that the belt will clear the supporting bracket

for the arm 36. Pulley 46' is supported by a bracket 46* which is fixedly secured to tubular member 37 of arm 36. Handles 61 are provided on the projector casing 38 whereby the operator may shift the arm or jib 36, together with all of the parts carried thereby.

The connection between arm 36 comprises a hanger 62 in which tubular member 37 and arm 36 are rigidly clamped; a stud 64, having its axis parallel with the axis of the projector-shaft, disposed above arm 36 and extending through hanger 62 so that the hanger and said arm will be pivotally sustained from said stud; a bracket 65 rigid with stud 64, bowed around arm 36 and extending under housing 49; two pairs of parallel suspension links 66, the upper end of each link being pivotally sustained by a bolt 67 which is supported in a standard 68 rising from and rigidly secured to the supporting bracket 11, which is pivoted to swing horizontally on the main supporting column 10; and cross-rods 69 carried by the lower ends of said pairs of links respectively and extending through lugs 65' on bracket 65, so that bracket 65 will be movably sustained by links 66. A roller 80 is mounted on housing 49 and is adapted to ride in an arcuate groove 81 formed at one end of bracket 65. This roller and groove connection permits the arm to be swung about the axis of stud 64 and prevents excessive strains on and breakage of said stud from which the arm and parts carried thereby are suspended.

Normally, arm 36 is suspended from bracket 65 and stud 64, so that the projector will be positioned to cause the sand to be projected vertically downward. In filling flasks with wide retaining bars, it is desirable to slightly angle the line of delivery to project the wads and pack sand under the bars or undercut spaces. The suspension hanger 62 permits the operator to rock arm 36 around the horizontal axis of stud 64 which is parallel with the axis of arm 36 and so that the projector casing, motor 42, housing 49, belt 46 and chute 60, all of which are cooperatively mounted on said arm, will be shifted in unison sufficiently to vary the line of delivery of the sand to cause it to be projected under the retaining bars in the flask. This rocking of the projector and its associated parts is accomplished by grasping and shifting the handles 61. When the handles are released, the arm will move by gravity to its normal position under stud 64, so that the wads of sand will be discharged vertically, except when the arm is rocked laterally by the operator. The roller 80 in groove 81 prevents excessive strains on the stud 64.

The projector supporting-arm 36, being supported by the horizontally rotatable

bracket 11, can be swung horizontally around the axis of column 10, so the operator can shift the projector laterally without varying the angle of delivery of the sand when desired and to project sand into different portions lengthwise of the flask, by grasping handle 61 and swinging the arm, bracket 65, suspension link 66 and bracket 11 horizontally around column 10.

In filling flasks in which the crosswise dimensions are comparatively short, it has been found possible to dispense with a jointed pair of horizontally swinging arms for supporting the projector, by providing suspension means, such as links 66, which permit the projector carrying arm 36 to be shifted longitudinally. In filling the flasks, the operator, by means of handle 61, can move the arm inwardly or outwardly to work the projector over and crosswise of the flask to fill all portions of the flask. This suspension linkage being composed of parallel pairs of links, permits the projector to be shifted crosswise of the flask without substantial variations in the angle of delivery of the sand. A further characteristic of this suspension linkage is that the projector, when it is normally positioned centrally over the flask, will, after it has been shifted radially inwardly or outwardly, automatically move back by gravity to its normal central position, thus relieving the operator of the necessity of retracting the projector to said position.

The mechanism thus far described exemplifies a structure in which the driven projector is supported by an arm which is supported so it may be moved laterally lengthwise of the flask and shifted longitudinally crosswise of the flask, while the sand is being projected at a substantially non-variant angle of delivery; also a structure of that character in which provision is made for slightly varying the angle of delivery when sand is to be projected in undercut places or cavities; also a construction in which a single arm-carrying the projector, driving mechanism for the projector and driven sand-feeding mechanism are all mounted on an arm which is pivotally movable in a horizontal plane and bodily movable longitudinally to permit the necessary movement of the projector to fill all portions of the flasks.

In filling flasks by the projector hereinbefore described, it is desirable that they be delivered so that the flasks will be approximately centrally disposed below the projector while the latter is in its normal position, so that in filling the flask it will be necessary to move the projector only from a point above the center of the flask to its longitudinal sides. It is also otherwise advantageous in a sand projector which is mounted on a stationary column to have

the flasks deliver at a substantially uniform point beneath the projector and to facilitate the bringing of the flasks into receiving position and their removal after they have been filled. For these purposes, a turn-
 5 table 90, preferably made of a sheet of boiler-plate, is mounted to rotate concentrically around the axis of column 10. A ball-bearing 91 supports the inner portion
 10 of this table and a series of rollers 92 mounted in brackets 93 respectively support the outer margin of the turn-table. A stationary angle iron ring 94 is fixed to the floor and an angle iron ring 95 is fixed to the
 15 underside of turn-table 90, so that the vertical flanges of these rings will lap one another to exclude sand from the space between the turn-table and the floor. Flask carriers 96 of any suitable construction and
 20 in desired number are secured to the turn-table and are rotatable therewith, so that as the turn-table is rotated, the flasks 97 on the carriers will be successively brought into position beneath the projector. The opera-
 25 tor can remain positioned at one point to fill the flasks. The flasks, after being filled, will be removed from the carriers 96 and replaced by empty flasks before they are again moved into position below the pro-
 30 jector.

Mechanism is provided for continuously rotating the turn-table to deliver flasks in rapid succession to the projector. This mechanism comprises an electric motor 100
 35 mounted on a bracket 101 fixed to column 10; a pinion 102 on the motor shaft; a gear 103 meshing with said pinion and fixed to a shaft 104 also mounted in said bracket; a bevel-pinion 105 fixed to shaft 104 and
 40 driven by gear 103; a bevel-gear 106 meshing with pinion 105 and fixed to a vertical shaft 107 which is also mounted in bracket 101; a pinion 108 fixed to the lower end of shaft 107; and an internally toothed gear-
 45 ring 109, which is fixed to the upper face of turn-table 90. A housing 110 encloses this gearing and motor and is also extended to cover the gear-ring 109 to ex-
 50 clude sand therefrom. This mechanism exemplifies an electric motor and reducing gearing for constantly driving the turn-table 90 for feeding flasks to the projector.

The operation of the projector, its driving mechanism and the sand-feeding belt, is substantially the same as set forth in
 55 Letters Patent No. 1,408,493 granted to us March 7, 1922.

In operation, the operator moves the projector laterally and longitudinally of the flask, the pivotal connection between bracket
 60 11 and column 10 permitting this to be done. The projector is movable radially inward or outward by the operator, the suspension linkage between brackets 11 and 65 permit-
 65 ting this to be done. When necessary, the

projector can be rocked laterally to slightly vary its angle of delivery, the hanger 62 and stud 64 permitting that to be done. In all of these movements, the motor 42, projector and sand-feeding belt remain in coopera-
 70 tive relation.

When the turn-table 90 is in operation, one operator will be stationed adjacent the projector and others will place empty flasks on the carriers 96 approaching the projector
 75 and will remove the filled flasks from the carriers. The operator at the projector will manipulate handle 61 to move the projector longitudinally and transversely of the flask, to fill all portions thereof, while the flasks
 80 are moving with the turn-table 90. The projector-supporting arm 36 and the turn-table are coaxial, so that the operator may easily move the projector back and forth length-
 85 wise of the mold. Arm 36, being horizontally movable around an axis coincident with the axis of the turn-table, can be shifted throughout a full circle, so that the projector may be positioned at any desired point
 90 where it is desired to fill the flasks. Furthermore, this arrangement permits the operator to keep the projector over the flask as long
 95 as may be necessary to properly fill it.

The invention exemplifies a molding machine of the sand-projector type, in which
 100 a single projector-carrying arm is movable pivotally and longitudinally so that, in some instances, a pair of pivotally connected arms may be dispensed with. Also a structure of this character in which the single arm is
 105 carried by suspension links which permit longitudinal shift of the arm and which are automatically restored by gravity to a central position. The invention also exemplifies a machine of this type in which the projector carrying arm swings concentrically
 110 with the flasks on a turn-table. The machine as a whole makes it possible to fill flasks by the projecting method with great facility and with a low labor cost.

The invention is not to be understood as restricted to the details set forth, since these may be modified within the scope of the
 115 appended claims, without departing from the spirit and scope of the invention.

Having thus described the invention, what we claim as new and desire to secure by Letters Patent, is:

1. In a molding machine, the combination of an arm, a sand projector mounted on and
 120 movable with said arm, a motor for driving the projector, means for conveying sand to the projector, and a link-suspension for the arm pivoted to permit longitudinal movement thereof.

2. In a molding machine, the combination of an arm, a sand projector mounted on and movable with said arm, a motor for
 125 driving the projector, means for conveying sand to the projector, and a suspension for

the arm comprising substantially parallel links pivoted to permit longitudinal movement of the arm.

3. In a molding machine, the combination of an arm, a sand projector mounted on and movable with said arm, a motor for driving the projector, means for conveying sand to the projector, and a suspension for the arm comprising vertically extending links pivoted to permit longitudinal movement of the arm.

4. In a molding machine, the combination of an arm, a sand projector mounted on and movable with said arm, a motor for driving the projector, means for conveying sand to the projector, and a suspension for the arm to permit longitudinal movement thereof, comprising vertical links pivoted to swing across their vertical centers so the arm will return by gravity to its normal position.

5. In a molding machine, the combination of an arm, a pivotal connection for permitting the arm to swing horizontally, a sand projector mounted on the distal end of and movable with said arm, a motor for driving the projector, means for feeding sand to the projector and a link-suspension for the arm pivoted to permit longitudinal movement thereof.

6. In a molding machine, the combination of an arm, a pivotal-connection for permitting the arm to swing horizontally, a sand projector mounted on the distal end of and movable with said arm, a motor for driving the projector, means for feeding sand to the projector, and a suspension for the arm comprising substantially parallel links pivoted to permit bodily longitudinal movement of the arm.

7. In a molding machine, the combination of an arm, a pivotal connection for permitting the arm to swing horizontally, a sand projector mounted on the distal end of and movable with said arm, a motor for driving the projector, means for feeding sand to the projector, and a suspension for the arm comprising vertically extending links pivoted to permit bodily longitudinal movement of the arm.

8. In a molding machine, the combination of an arm, a pivotal connection for permitting the arm to swing horizontally, a sand projector mounted on the distal end of and movable with said arm, a motor for driving the projector, means for feeding sand to the projector, and a suspension for the arm to permit bodily longitudinal movement thereof comprising vertical links pivoted to swing across their vertical centers so the arm will return by gravity to its normal position.

9. In a molding machine, the combination of an arm, a sand projector mounted on the distal end of and movable with said

arm, a motor for driving the projector, mounted on the other end of said arm, means for feeding sand to the projector also mounted on said arm, and a link suspension for the arm pivoted to permit bodily longitudinal movement thereof.

10. In a molding machine, the combination of an arm, a sand projector mounted on the distal end of and movable with said arm, a motor for driving the projector, means for feeding sand to the projector also mounted on said arm, and a suspension for the arm comprising substantially parallel links pivoted to permit bodily longitudinal movement of the arm.

11. In a molding machine, the combination of an arm, a sand projector mounted on the distal end of and movable with said arm, a motor for driving the projector, means for feeding sand to the projector also mounted on said arm, and a link suspension for the arm to permit bodily longitudinal movement thereof, comprising vertically extending links.

12. In a molding machine, the combination of an arm, a sand projector mounted on the distal end of and movable with said arm, a motor for driving the projector, means for feeding sand to the projector also mounted on said arm, and a suspension for the arm to permit bodily longitudinal movement thereof comprising vertical links pivoted to swing across their vertical centers so the arm will return by gravity to its normal position.

13. In a molding machine, the combination of a fixed support, an arm, a sand projector mounted on said arm, a pivotal connection on said fixed support to permit the arm to swing horizontally, a motor for driving the projector mounted on the arm, means for feeding sand longitudinally of the arm to the projector, driven by the motor, and a link suspension between the pivotal connection and the arm pivoted to permit bodily longitudinal movement thereof.

14. In a molding machine, the combination of a fixed support, an arm, a sand projector mounted on said arm, a pivotal connection on said fixed support to permit the arm to swing horizontally, a motor for driving the projector mounted on the arm, means for feeding sand longitudinally of the arm to the projector, driven by the motor, and a suspension between the pivotal connection and the arm to permit bodily longitudinal movement thereof, comprising vertical links pivoted to swing across their vertical centers so the arm will return by gravity to its normal position.

15. In a molding machine, the combination of a fixed support, an arm, a sand projector

mounted on said arm, a pivotal connection on said fixed support to permit the arm to swing horizontally, a motor for driving the projector mounted on the arm, means for feeding sand longitudinally of the arm to the projector, driven by the motor, and a suspension between the pivotal connection and the arm to permit bodily longitudinal movement thereof, comprising vertically extending links.

16. In a molding machine, the combination of a fixed support, an arm, a sand-projector mounted on said arm, a pivotal connection on said fixed support to permit the arm to swing horizontally, a motor for driving the projector mounted on the arm, means for feeding sand longitudinally of the arm to the projector, driven by the motor, and a link suspension between the pivotal connection and the arm to permit bodily longitudinal movement thereof, comprising vertical links pivoted to swing across their vertical centers so the arm will return by gravity to its normal position.

17. In a molding machine, the combination of an arm, a sand-projector mounted on said arm, a pivotal connection for the arm to permit it to swing horizontally, means to suspend the arm so it can be rocked laterally, a link suspension for supporting the arm to permit it to be moved longitudinally, a motor on the arm, for driving the projector, and means mounted on the arm and driven by said motor, for feeding sand to the projector.

18. In a molding machine, the combination of an arm, a sand projector mounted on said arm, a pivotal connection for the arm to permit it to swing horizontally, means to suspend the arm so it can be rocked laterally, a suspension for supporting the arm to permit it to be moved longitudinally, a motor on the arm, for driving the projector, and means mounted on the arm and driven by said motor, for feeding sand to the projector.

19. In a molding machine, the combination of an arm, a sand projector mounted on said arm, a pivotal connection for the arm to permit it to swing horizontally, means to suspend the arm so it can be rocked laterally, a suspension for supporting the arm to permit it to be moved longitudinally comprising substantially parallel links, a motor on the arm, for driving the projector, and means mounted on the arm and driven by said motor, for feeding sand to the projector.

20. In a molding machine, the combination of an arm, a sand projector mounted on said arm, a pivotal connection for the arm to permit it to swing horizontally, means to suspend the arm so it can be rocked laterally, a link suspension for supporting the arm to permit it to be moved longitudinally comprising vertically extending links, a motor

on the arm, for driving the projector, and means mounted on the arm and driven by said motor, for feeding sand to the projector.

21. In a molding machine, the combination of an arm, a sand projector mounted on said arm, a pivotal connection for the arm to permit it to swing horizontally, means to suspend the arm so it can be rocked laterally, a link suspension for supporting the arm to permit it to be moved longitudinally, a motor on the arm, for driving the projector, and means mounted on the arm and driven by said motor, for feeding sand to the projector, comprising vertical links pivoted to swing across their vertical centers so the arm will return by gravity to its normal position.

22. In a molding machine, the combination of a fixed column, an arm pivoted on and to swing around said column, a sand projector mounted on the distal end of said arm, a motor on the arm, for driving the projector, means to feed sand to the projector, and a flask-carrying turn-table mounted to rotate around said column on an axis substantially coincident with the axis around which the arm swings.

23. In a molding machine, the combination of a fixed column, an arm pivoted on and to swing around said column, a projector mounted on the distal end of said arm, means to permit longitudinal movement of the arm, a motor on the arm, for driving the projector, means to feed sand to the projector mounted on the arm, and a flask-carrying turn-table mounted to rotate around said column on an axis substantially coincident with the axis around which the arm swings.

24. In a molding machine, the combination of a fixed column, an arm pivoted on and to swing around said column, a projector mounted on the distal end of said arm, a link-suspension for said arm to permit it to be shifted longitudinally, a motor on the arm for driving the projector, means to feed sand to the projector, and a flask-carrying turn-table mounted to rotate around said column on an axis substantially coincident with the axis around which the arm swings.

25. In a molding machine, the combination of a fixed column, an arm pivoted on and to swing around said column, a sand-projector mounted on the distal end of said arm, means to permit the arm to be shifted longitudinally and rocked laterally, a motor on the arm for driving the projector, means to feed sand to the projector, and a flask-carrying turn-table mounted to rotate around said column on an axis substantially coincident with the axis around which the arm swings.

26. In a molding machine, the combination of a fixed column, an arm pivoted on and to swing around said column, a sand

projector mounted on the distal end of said arm, a motor on the arm for driving the projector, means to feed sand to the projector, a flask-carrying turn-table rotatable around the column on an axis substantially coincident with the axis around which the arm swings, and mechanism for driving the turn-table.

27. In a molding machine, the combination of a fixed column, an arm pivoted on and to swing around said column, a sand-projector mounted on the distal end of said arm, means to permit longitudinal movement of the arm, a motor on the arm for driving the projector, means to feed sand to the projector, a flask-carrying turn-table rotatable around the column on an axis substantially coincident with the axis around which the arm swings, and mechanism for driving the turn-table.

28. In a molding machine, the combination of a fixed column, an arm pivoted on and to swing around said column, a sand-projector mounted on the distal end of said arm, a link-suspension for the arm, a motor on the arm for driving the projector, means to feed sand to the projector, a flask-carrying turn-table rotatable around the column, on an axis substantially coincident with the axis around which the arm swings, and mechanism for driving the turn-table.

29. In a molding machine, the combination of a fixed column, an arm pivoted on

and to swing around said column, a sand-projector mounted on the distal end of said arm, means to permit the arm to be moved longitudinally and rocked laterally, a motor on the arm for driving the projector, means to feed sand to the projector, a flask-carrying turn-table rotatable around the column on an axis substantially coincident with the axis around which the arm swings, and mechanism for driving the turn-table.

30. In a molding machine, the combination of a sand-projector, a horizontally swinging arm, to the free end of which the projector is secured, means for feeding sand to the projector, a connection for pivotally supporting the arm to permit the projector to be shifted to incline the angle of delivery when desired, and means supplemental to said connection, to guide the arm.

31. In a molding machine, the combination of a sand projector, a horizontally swinging arm, to the free end of which the projector is secured, means for feeding sand to the projector, a connection for pivotally supporting the arm to permit the projector to be shifted to incline the angle of delivery when desired, and a stud-and-groove to guide the arm.

Signed at Chicago, Illinois, this 17th day of April, 1923.

ELMER O. BEARDSLEY.
WALTER F. PIPER.