

June 12, 1951

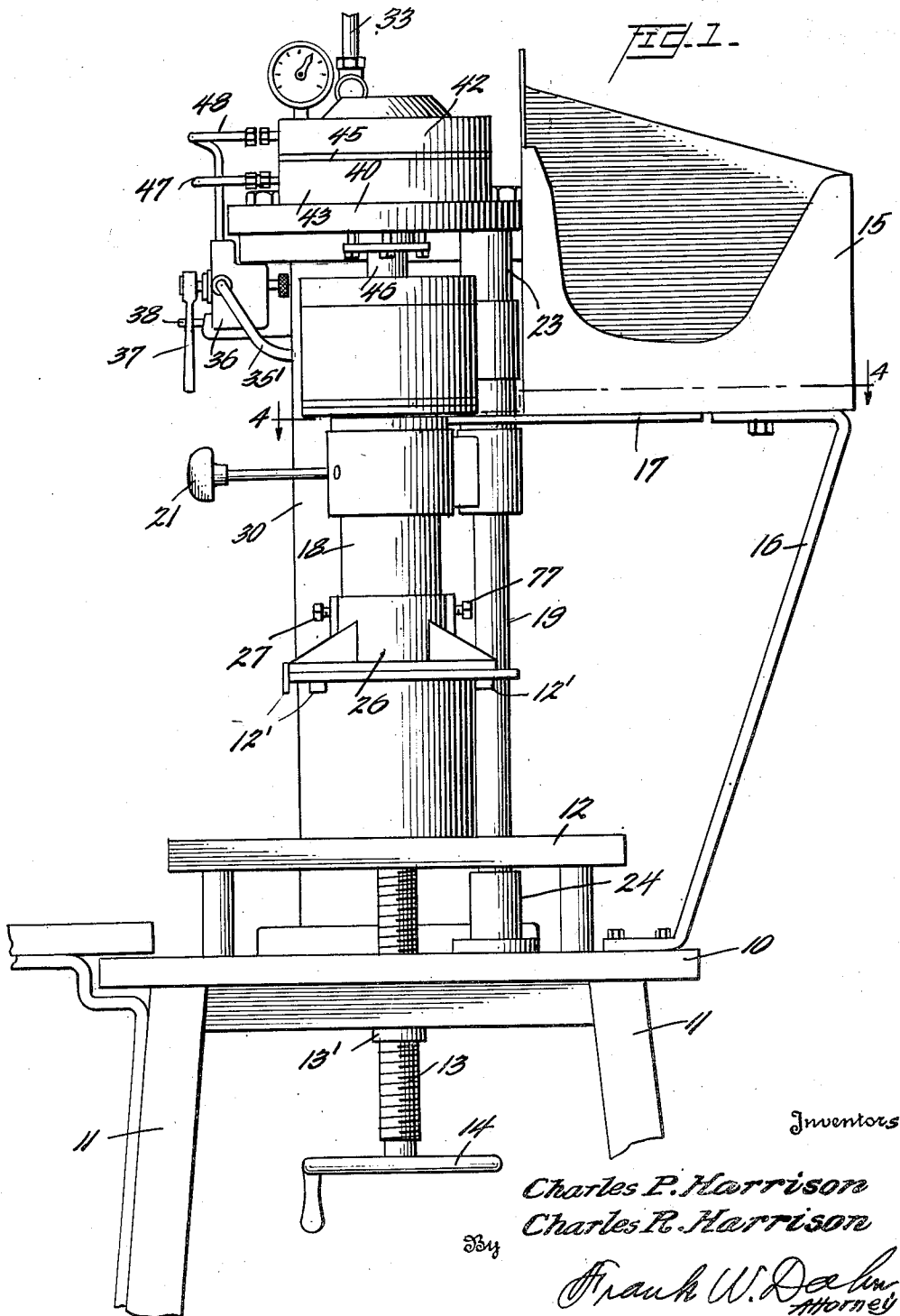
C. P. HARRISON ET AL

2,556,618

CORE BLOWER

Filed Aug. 18, 1948

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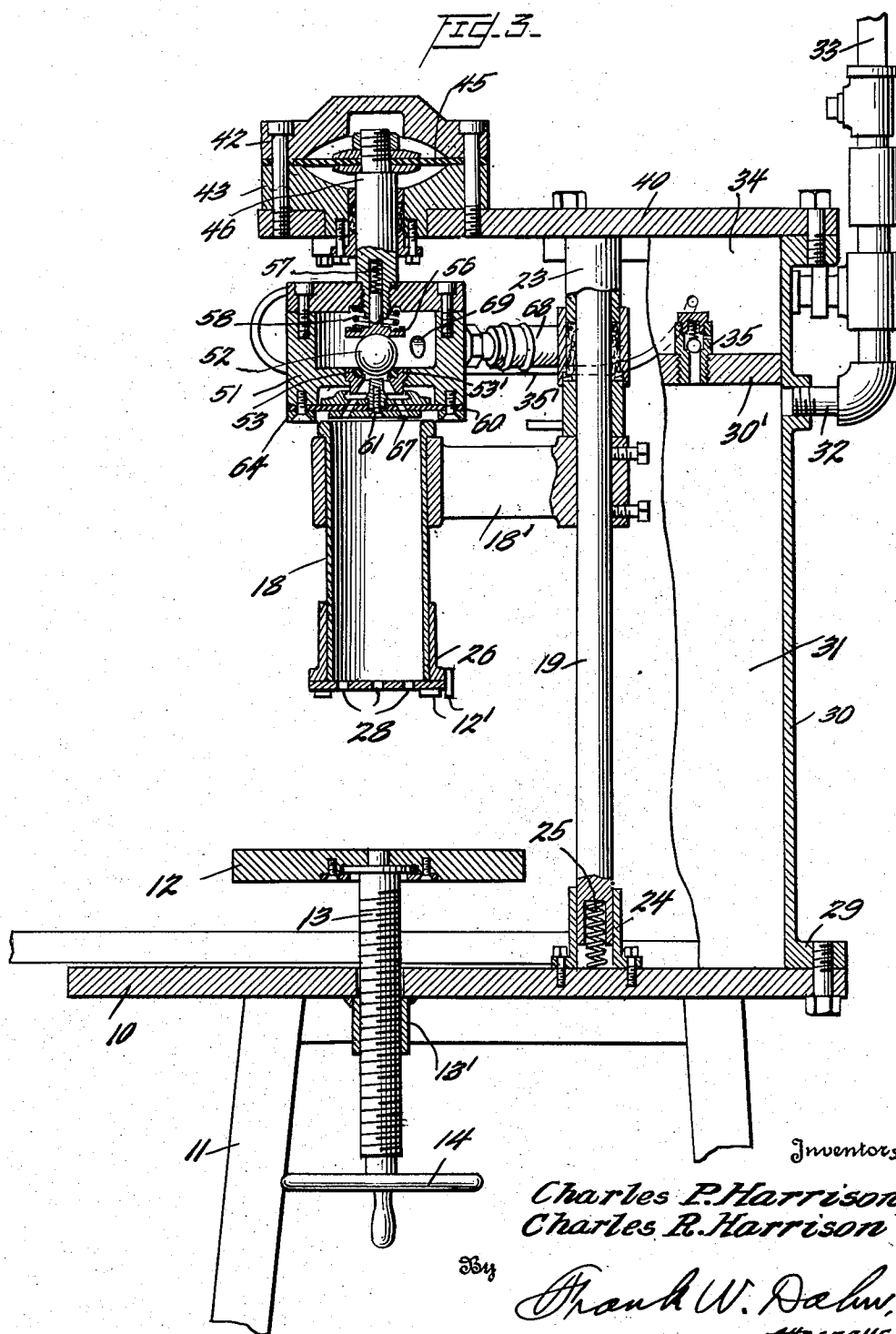
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CORE BLOWER

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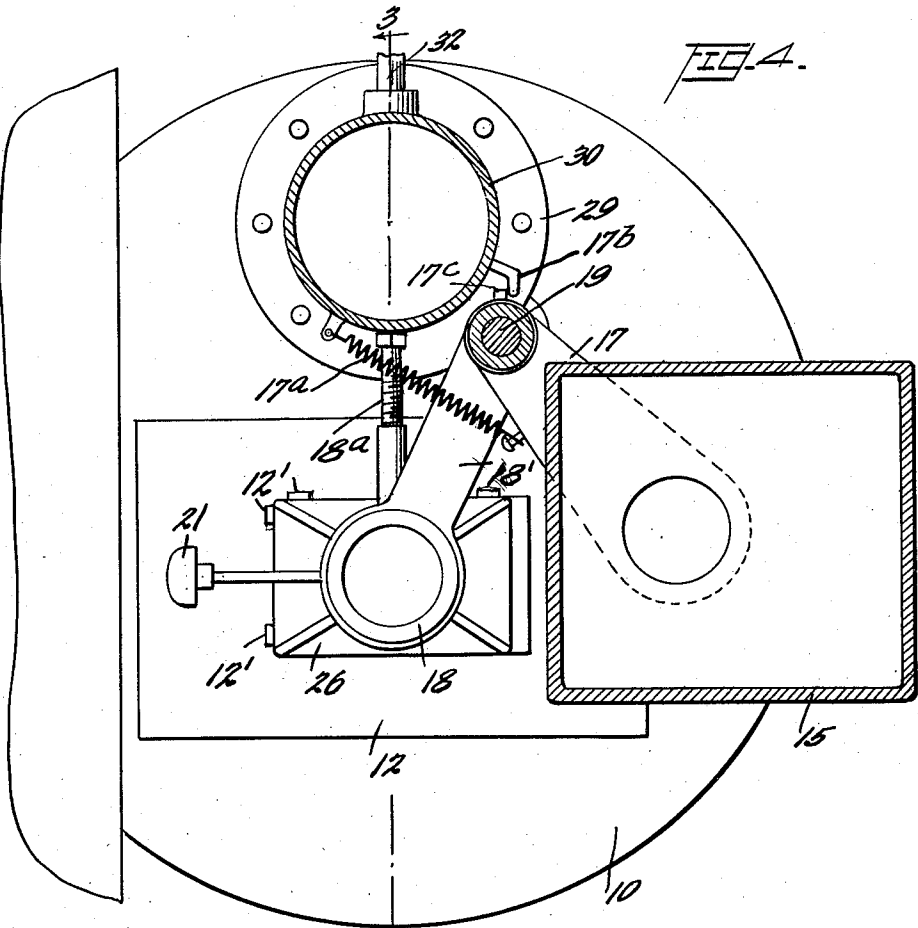
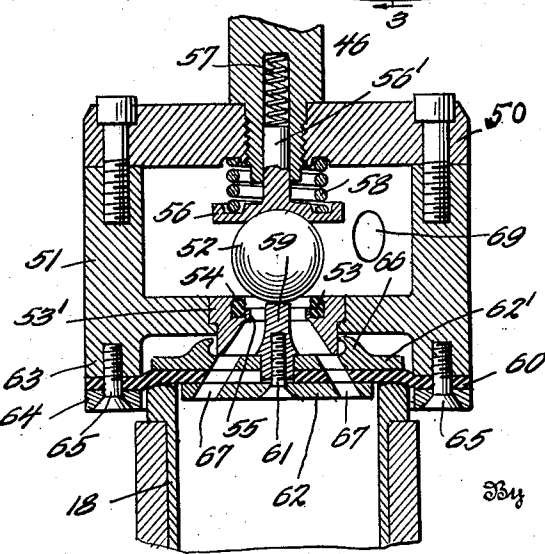
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CORE BLOWER

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CORE BLOWER

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8 Claims. (Cl. 22—10)

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Our invention relates to an improved core blower that saves hand labor and time, and it is an object of the same to avoid the blowing of holes in the sand tube which is positioned above the core box in the process of blowing a core, whereby also sand is left in the tube and the core box may not be completely filled in the blowing operation.

Another object is to improve the general construction and arrangement of the blow head, valve and blowing parts.

Another object is to provide improved supporting means for the sand tube.

Another object is to provide a double reservoir for air, whereby to improve the operation in that the auxiliary reservoir can maintain pressure for holding the blow head in desired position even though the pressure in the main reservoir falls, as because of the use of the air for blowing a core.

Another object is to provide improved means for raising and lowering the blow head.

Referring to the annexed drawings, which are made a part of this application and in which similar reference characters indicate similar parts:

Fig. 1 is a front elevation of the machine,

Fig. 2, a side elevation of the same,

Fig. 3, a vertical central section on line 3—3 of Fig. 4,

Fig. 4, a section on line 4—4 of Fig. 1, and

Fig. 5, an enlarged view of a valve shown in Fig. 3.

In the drawings, reference character 10 indicates a base supported by legs 11, the lower parts of which are omitted. A work table 12 for supporting a core box is mounted on a screw 13 threaded into the base 10, the screw being operated by means of a handwheel 14 fixed to the screw at the under side of the base and being held in adjusted position by a locknut 13'.

A sand hopper 15 is supported in elevated position by means of a bracket 16 secured at its lower end to the base 10, said hopper being provided with a gate 17 that can oscillate on a post 19, and which is pushed in known manner by the motion of the sand tube 18 into a position underneath the sand hopper so as to open a port in the bottom of the sand box and permit sand to be discharged into the tube. A spring 17a tends to close the gate, and its closing movement is limited by a stop 17b on a fixed part of the machine, against which a finger 17c on the gate strikes. The sand tube is mounted for oscillation upon the fixed post 19 and has a handle

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at 21 whereby it may be swung from replenishing position underneath the sand box to core blowing position above a core box (not shown) on table 12 and vice versa. The movement of the sand tube is limited by a stop 18a which is located at the back of the sand tube, so as to position the tube accurately under the blow head hereinafter described.

The shaft 19 is mounted in upper and lower bearings 23, 24, and a spring 25 urges it upward into an elevated position so that a core box can be slid into position upon the table 12 and under the sand tube preparatory to the blowing of a core in the core box. The sand tube is provided at its lower end with a suitable adapter head 26 held in place by setscrews 27, the bottom of this adapter head being perforated at one or more places, as shown at 28, to permit sand to pass through it into the core box upon which it rests during a blowing operation. The head of the adapter is of sufficient size to cover the core box and is provided with stops 12' for engagement with side faces of the core box so as to position the core box with reference to the head 26, which is of course shaped to fit the core box. The stops can be fixed to the table instead of the blow head if preferred. The lower face of the core box is larger in lateral area than the cross-section of the sand tube.

A ring 29 fixed to the base surrounds and positions a hollow column 30 that is divided internally by a partition 30' into two chambers for air under pressure, the main chamber 31 being connected to a source of supply by means of pipes 32, 33, while the upper auxiliary chamber 34 is connected to the main chamber by a check valve 35, and has a pipe 35' leading from chamber 34 to a valve having a casing 36, said valve controlling the movements of the blow head and related parts, as hereinafter described. The valve in casing 36 has a handle 37 that is held normally against a stop 38 by means of a spring 39.

A plate 40 is mounted on the upper end of column 30, and this plate carries a blow head and a diaphragm casing. The diaphragm casing includes mating members 42, 43, forming a two-part chamber for a diaphragm 45 clamped at its periphery between the outer rims of said members and having secured to its center portion the stem 46 of the blow head. The lower part of the chamber is connected by a pipe 47 to the valve casing 36, while the upper part is connected to said valve casing by a pipe 48, so that movement of the valve handle to the right in

Fig. 2 will admit air to the upper part of the diaphragm chamber to force the blow head down, while release of the handle permits the spring to move the valve to the position illustrated in said figure admitting air to the under side of the diaphragm to raise the blow head and hold it in raised position.

Stem 46 has a lower end threaded into a threaded opening in a disk 50 that coacts with a cup-shaped member 51 to form a valve chamber for a valve comprising a ball 52 of stainless steel (Figs. 3 and 5) that rests normally on a seat 53 of neoprene or like material, these materials being preferred because of their non-corrosive qualities. The seat 53 is held in place in a removable flanged holder 53' by spun-over fins 54, 55 respectively engaging the upper face and the inner face of the annular seat, thus preventing displacement of the seat member and also preventing leakage of air. The ball is held down by means of a retainer 56, having a plunger 56' which is pressed down by a spring 57 situated in an axially extending recess of the stem and by another spring 58 that is interposed between the upper face of the retainer head and the adjacent face of casing member 50, annular grooves being preferably formed in said parts to receive the opposite ends of the latter spring.

A valve lifter 59 is mounted on a diaphragm 60 by means of a screw 61 passing through a footpiece 62 at the under side of the diaphragm and upward into a threaded opening in the lifter. The lifter comprises an upwardly extending projection located centrally of the aperture in the valve seat and a radial flange 62' extending outward nearly to a depending annular flange 63 of the head, to which flange the diaphragm is secured by a ring 64 and screws 65, the disk-shaped portion having an upwardly extending annular flange 66 slightly spaced from the depending annular skirt of the holder 53'.

Air passages 67 are arranged about the lifter, these passages diverging radially outward from the axis of the lifter, and downward through the holder 53', the diaphragm 60, the flange 62' and the plate 62. The outwardly flaring arrangement is intended to cause the air coming to the flow head through an ever-open passage including pipe 33, a pipe 68 and a port 69 to spread out as it enters the sand tube 13 and so to act on the sand over its entire upper surface, but especially near the periphery of the sand tube where there is most danger of sticking on account of friction or for other reasons. Thus the entire contents of the tube are forced down equally, instead of possibly blowing holes through the sand in said tube, with the result that part of the sand may remain in the tube and so the core box may be incompletely filled.

Prior to the operation of the machine, the blow head is in raised position, the valve handle 37 being held in the position of Fig. 2 by spring 39 and admitting air under the diaphragm 45. Thus the sand tube is free to be swung under the hopper to be filled with properly mixed and prepared sand, the shutter 17 being opened against the pressure of a spring as the tube moves under it. The core sand now flows into the tube and the same is moved back under the blow head after first placing in proper position upon the table 12 a core box, it being understood that the table has previously been adjusted, if necessary, so as to hold the core box at the proper level, and that the stop 18a has been adjusted, if necessary, so that its end will strike column

30 in such manner as to position the head 26 in line with the sand tube and blow head.

Now valve lever 37 is pulled forward to blowing position, admitting air above the diaphragm 45. The flexing of that diaphragm forces the blow head down against the sand tube which may move downward under such pressure by reason of its support by spring 25, until it has taken up the clearance between the tube and the core box, after which the diaphragm 60 will yield, compressing the valve retainer springs 57 and 58 and causing the valve lifter 59 to move valve 52 off its seat and so permit a blast of air to enter instantly into the sand tube by reason of the constant pressure in pipe 68, blowing the body of sand uniformly into the core box.

When the blowing operation is completed, the air pressure on diaphragm 45 will be relieved by releasing valve handle 37, and the valve lifter 20 will immediately drop so as to permit the valve to close, due to the pressure of the valve retainer springs, such action preceding the release of downward pressure upon the sand tube and the core box.

It will be obvious to those skilled in the art that many changes may be made in the devices herein disclosed and in the manner of making them, all without departing from the spirit of the invention; and, therefore, I do not limit myself to what is shown in the drawings and described in the specification, but only as indicated in the appended claims.

Having thus fully described our invention, what we claim is:

1. In a molding machine, a base, a column thereon, an arm extending laterally from the column, a blow head on said arm, a sand hopper on said column, a sand tube movable from loading position under the hopper to discharge position under the blow head, means for supporting a mold box under the sand tube in its discharge position, said column being hollow and being divided into a main chamber and an auxiliary chamber for pressure fluid, a passage connecting said chambers, a check valve in said passage for preventing return of fluid from the auxiliary chamber to the main chamber, and connections from each of the chambers to the blow head, whereby the pressure in the blow head may be kept up independently of that in the main chamber.

2. In a molding machine, means for supporting a mold box, a hopper for sand, a sand tube movable from a loading position under the hopper to a discharge position between the blow head and the mold box, a main reservoir for pressure fluid, an auxiliary chamber, separate connections from said reservoirs to the blow head, a passage connecting said reservoirs, and a check valve in said passage, whereby pressure may keep up in the blow head independently of that in the main reservoir.

3. In a core blower having means to support a core box and means to hold a sand tube in alignment with the core box for discharge into the same, a blow head alined with the sand tube and resilient means for elevating the sand tube into a position spaced from the blow head and the core box, the combination of a transverse partition in the blow head providing an upper chamber, a port connected with a source of air under constant pressure, an outlet port in said partition, a ball closing said outlet port, a diaphragm closing the lower end of the head, a valve lifter movable through the outlet port for raising the ball from its seat, said lifter including plates above and

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below the diaphragm, means clamping the plates to the diaphragm, and diverging passages extending from said outlet port through said plates and said diaphragm to points close to the inner wall of the sand tube, the diaphragm being flexed by engagement with the upper end of the sand tube to open the outlet port when the blow head is lowered.

4. In a molding machine, a base, a column thereon, a plate extending laterally from the column over the base, a blow head carried by said plate, a sand hopper on the column remote from the blow head, means for supporting a core box below the blow head and in line with the same, an oscillatory upright shaft, an arm on said shaft, a sand tube on said arm in position to be swung under the sand hopper to be loaded and into another position between the blow head and the mold box to be discharged to the core box, a handle on the shaft at one side of the machine, fluid operated means on said plate for pushing the blow head downward to move the sand tube against the core box, a fluid pressure valve on the blow head which valve is lifted upon engagement of the head with the sand tube so as to admit air into the sand tube, a valve for controlling said fluid operated means, a handle on said valve adjacent the handle on said shaft, and spring means acting on said handles to move said shaft so as to align the sand tube with the blow head and the core box and to close said valve.

5. In a molding machine, a blow head having a cylindrical chamber, a flexible diaphragm closing one end of the chamber, a fixed transverse partition parallel to the chamber and spaced therefrom, said partition having a central opening, a valve seat about said opening, a ball valve closing said opening, a footpiece under the diaphragm, a valve lifter upon the diaphragm, a stem on the lifter extending into the opening in the partition for engagement with said ball valve, and downwardly inclined passages radiating from said opening and extending through said diaphragm and footpiece to points close to the inner periphery of a sand tube contacting the diaphragm.

6. A device as in claim 5, including an annular holder for the valve seat supported on a shoulder surrounding said valve seat, said valve lifter and footpiece being affixed on opposite faces of the diaphragm and the lifter having an upwardly extending annular flange surrounding the holder for guiding the lifter.

7. In a molding machine, a support for a core

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box, a sand tube adapted to be aligned with a core box on the support, a blow head having an air chamber, a transverse partition in said chamber, a flexible diaphragm closing the lower end of the head, radially arranged downwardly inclined passages diverging from said chamber and extending through said partition and said diaphragm toward the adjacent end of the sand tube, a valve for closing said passages, and a lifter carried on the diaphragm and extending through said partition for lifting the valve when the diaphragm contacts the sand tube and is flexed thereby.

8. In a molding machine, a support for a core box, a sand tube adapted to be aligned with a core box on said support, a blow head having an air chamber, radially arranged downwardly inclined passages diverging from said chamber toward the adjacent end of the sand tube, a valve for closing said passages, a transverse partition in said chamber said partition having a central opening, a seat surrounding said opening, a ball valve on the seat, a flexible diaphragm below the partition, a rod on the diaphragm extending upward through said opening, and means for moving the blow head toward the sand tube so as to flex the diaphragm and thus to open the valve.

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