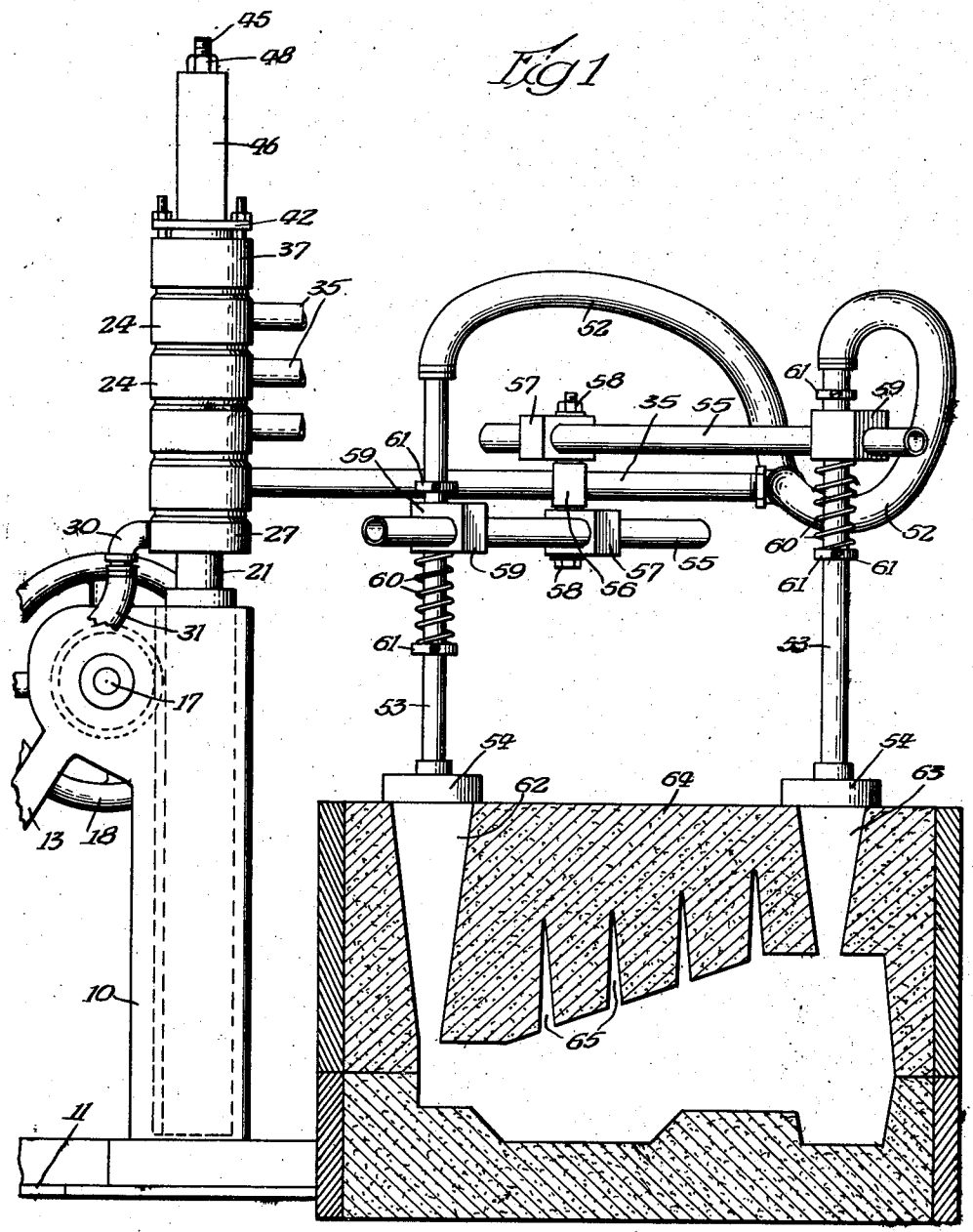
Aug. 27, 1946. E. O. JENSEN 2,406,333

MACHINE FOR APPLYING PNEUMATIC PRESSURE TO CAST METALS

Filed Oct. 20, 1943 4 Sheets-Sheet 1

Fig 1



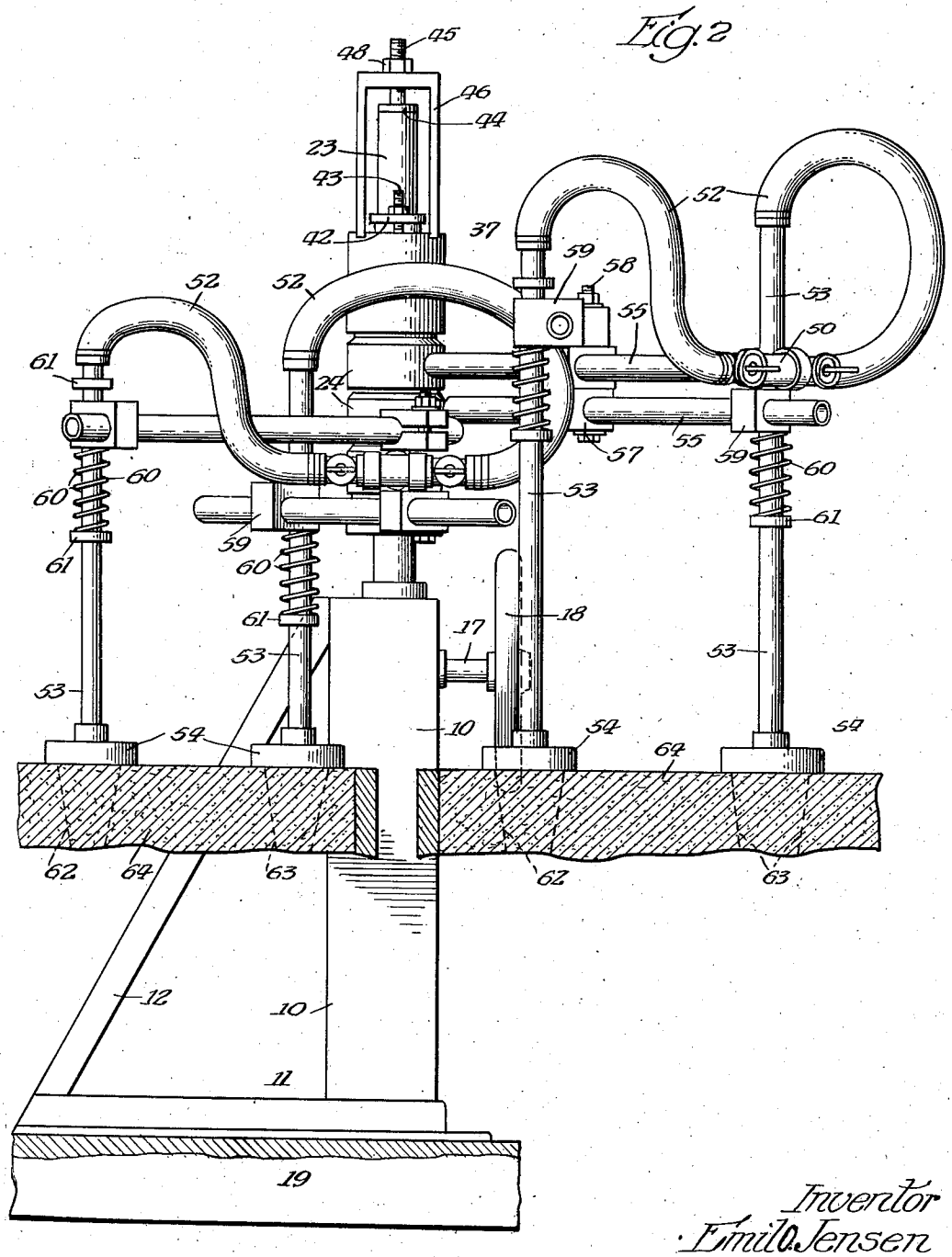
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MACHINE FOR APPLYING PNEUMATIC PRESSURE TO CAST METALS

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Fig. 2



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MACHINE FOR APPLYING PNEUMATIC PRESSURE TO CAST METALS

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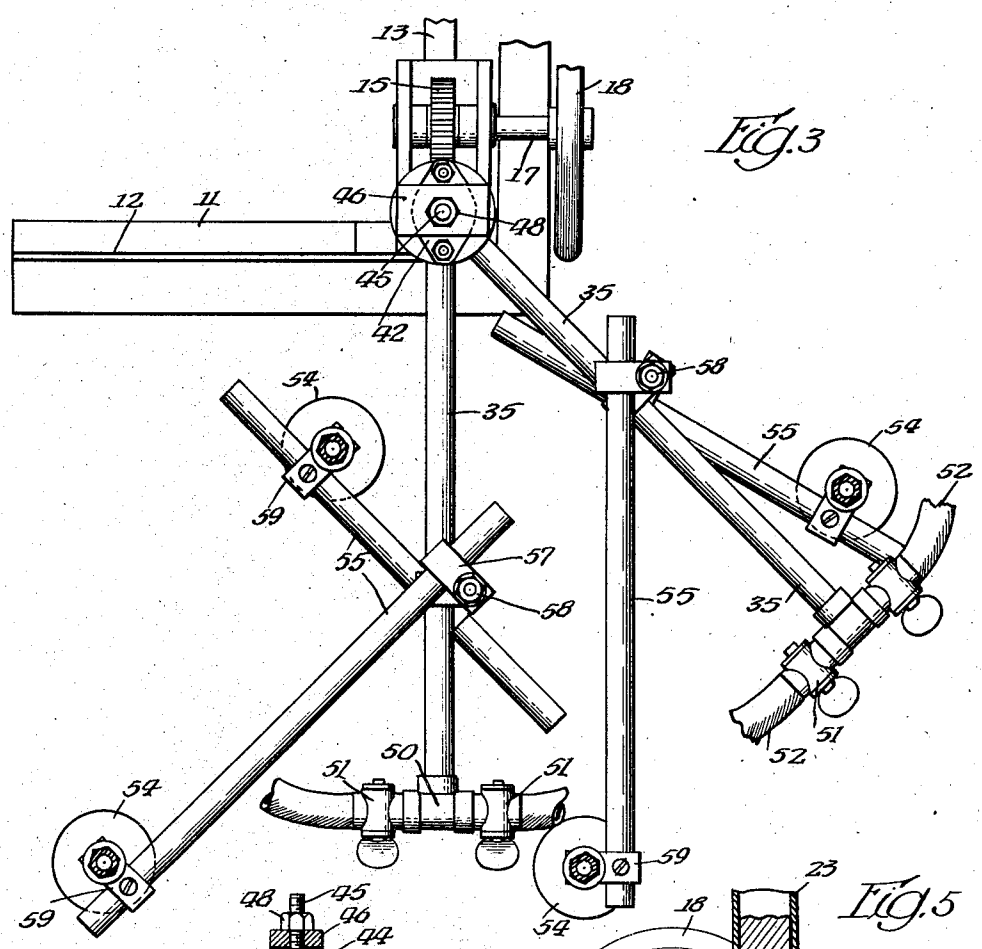


Fig. 3

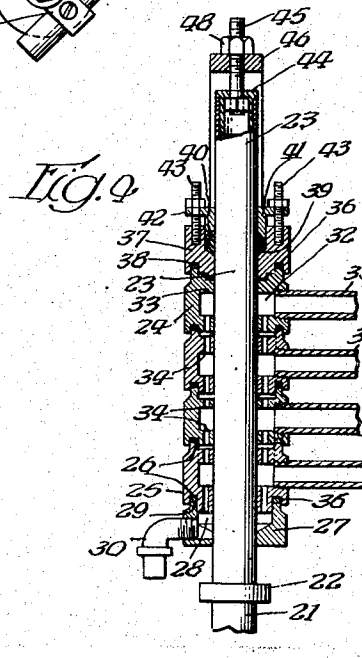


Fig. 4

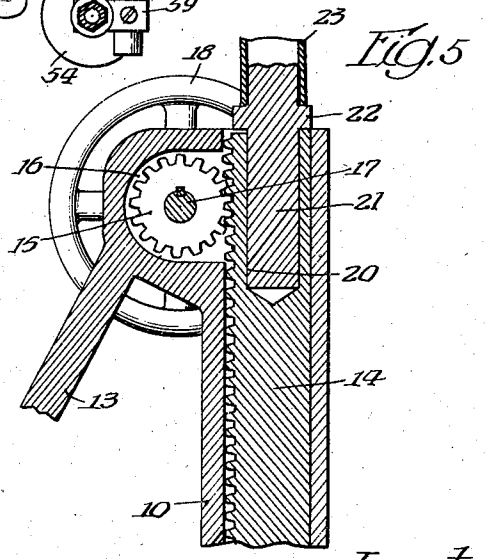


Fig. 5

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MACHINE FOR APPLYING PNEUMATIC PRESSURE TO CAST METALS

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Fig. 6

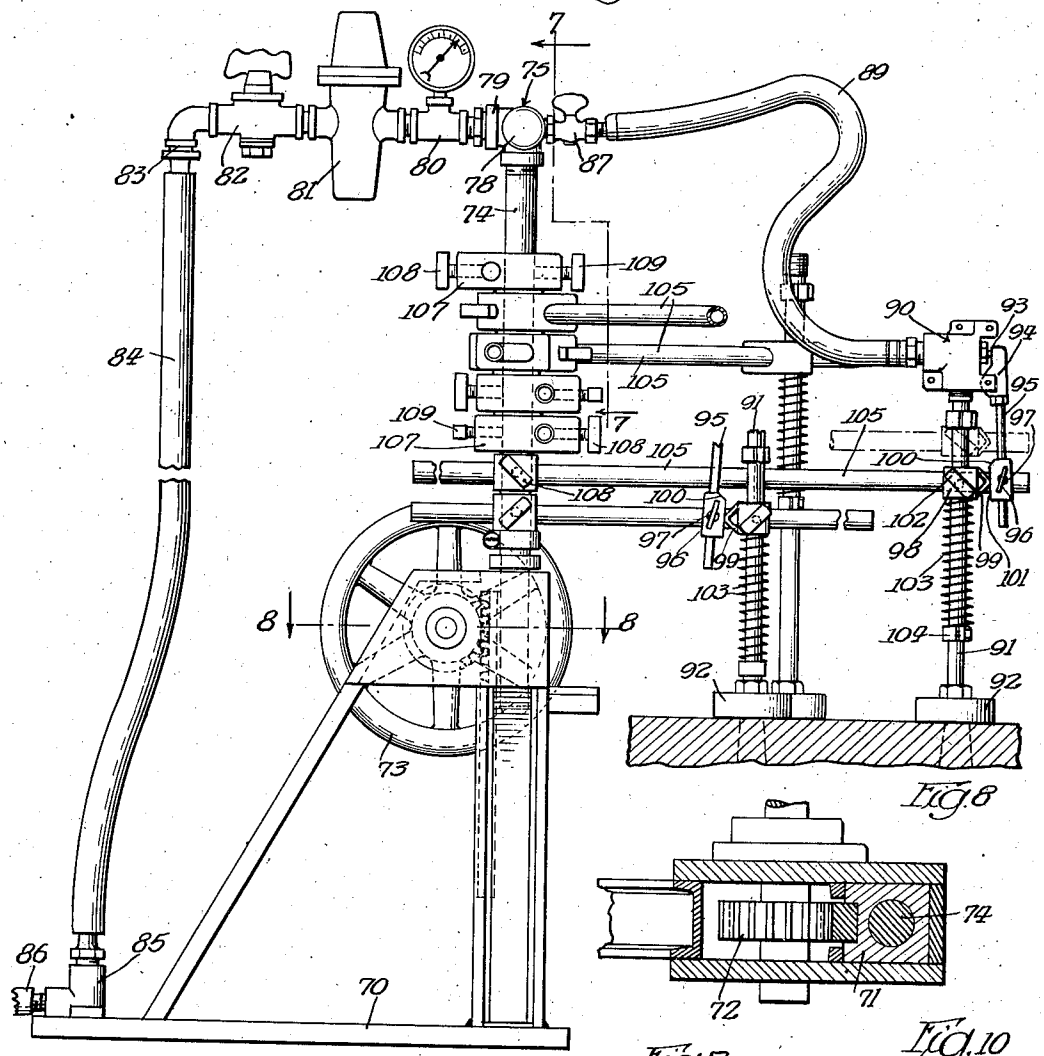


Fig. 8

Fig. 7

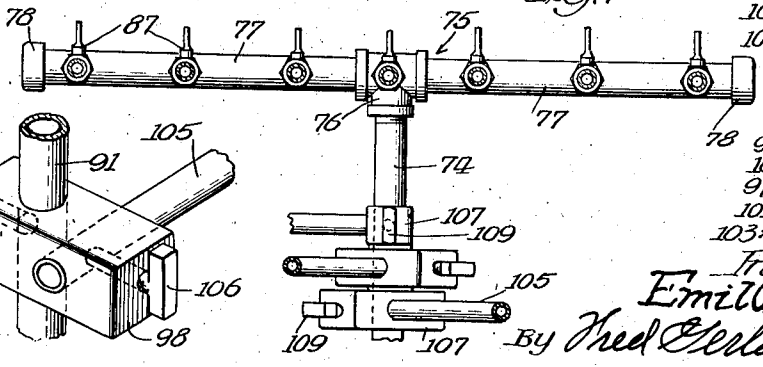


Fig. 10

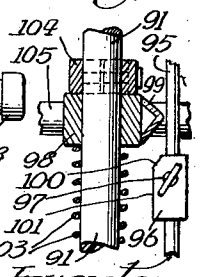


Fig. 9

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Patented Aug. 27, 1946

2,406,333

UNITED STATES PATENT OFFICE

2,406,333

MACHINE FOR APPLYING PNEUMATIC PRESSURE TO CAST METALS

Emil O. Jensen, Chicago, Ill.

Application October 20, 1943, Serial No. 506,973

17 Claims. (Cl. 22—72)

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The present invention relates generally to a pressure casting machine and is more particularly described as a low pressure sand casting machine. It comprises a portable support and a plurality of rotatable discharging heads which may be raised and lowered carrying extensions rotatable in different angular positions to reach or extend over a number of flasks in proximity thereto, the extensions supporting spring pressed pressure covers which are applied to sprue holes in molding flasks for applying air under pressure to molten material therein.

An important object of the invention is to provide a pressure casting machine having a plurality of pressure heads adjustable at angles from a central or main support which is adjustable in a vertical direction to quickly apply pressure covers.

A further object of the invention is to provide improved means for supporting various flask pressure conductors and to easily connect them for application to a single flask or a plurality of flasks to which the casting machine is applied.

A still further object of the invention is to provide pressure distributing means for a plurality of distributors having pressure connections and mounting means of new and improved construction characterized by simplicity of design as well as ease or facility of assembly and arrangement.

Other objects of the invention and various advantages and characteristics of the present pressure casting machine will be apparent from the drawings and from a consideration of the following detailed description.

The invention consists in the several novel features which are hereinafter described and more particularly defined at the conclusion hereof.

In the drawings which accompany and form a part of this specification or disclosure, and in which like letters and numerals of reference denote corresponding parts thereto the several features:

Figure 1 is a side elevation of a pressure casting machine as applied to a molding flask which is shown in section;

Figure 2 is an elevation of a casting machine similar to that in Figure 1, but showing the application of a plurality of the pressure lines;

Figure 3 is a top plan view of the mechanism shown in Figure 2 omitting the hose connections;

Figure 4 is a sectional view showing the construction of the distributor head;

Figure 5 is a detailed sectional view of the pressure head elevating means;

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Figure 6 illustrates a modification in which there is a single pressure distributing manifold with a plurality of pressure hose connections therefrom, and a plurality of connection supporting heads adjustable about a vertical support which is raised and lowered by the rack;

Figure 7 is a sectional detail of the manifold head taken on the line 7—7 of Figure 6;

Figure 8 is a section taken on the line 8—8 of Figure 6;

Figure 9 is a perspective of one of the supporting blocks; and

Figure 10 is a detail view of an automatic valve operator in closed position, shown in Figure 6 in open position.

In pressure casting machines as heretofore employed, provisions have not been made for application to a plurality of flasks or molds, and apparently no provision has been made for making such applications in a variety of positions radiating or extending outwardly from a central supporting member.

The present invention overcomes these objections by providing a portable support having rotatable supply heads which may be raised and lowered and pressure applied at any angle from them as a central source of pressure supply.

As a modification, a raisable manifold having a plurality of pressure hose connections may also be provided with a supporting stem upon which are adjustably mounted various supports adjustable at different angles for the mold engaging rings which are raised and lowered to apply them to a flask. In this case, a plurality of hose connections are provided from the manifold to any of the pressure clamping rings, and in addition, the admission of air to the flask may be controlled by automatic valve means.

Referring now more particularly to the drawings, a hollow vertical stand 10 is suitably secured to a base 11 and is reinforced by braces 12 and 13. In the hollow stand 10 is a movable support 14 having a rack 15 along one side meshing with a pinion 15 mounted in a recess 16 at the top of the stand 10 upon a shaft 17 which projects outwardly and is provided at the outside with a hand wheel 18 for rotating the pinion and thereby raising and lowering the support 14.

The entire casting machine is mounted for raising and lowering movement, and the entire base together with the casting machine is free for movement to any location upon a truck 19 or any other movable means.

In the upper end of rack support 14 is a bore 20 for receiving the lower end of a shaft or stem

21. This stem has a collar 22 which limits its insertion into the opening 20 and at the upper end is a hollow shaft or pipe 23 upon which a number of distributing heads 24 are mounted and rotatable.

Each head 24 has a circular packing groove 25 at one side and an opposite circular rib 26 which fits in the corresponding groove 25 of the next adjacent head.

A bottom ring 27 is secured to the shaft 23 having an inner chamber 28 sealed at the lower end by the shaft and with a circular rib 29 corresponding to the ribs 26 of the other heads adapted to be seated in the circular groove 25 of the lowermost head 24. Communicating through the outer wall of the bottom ring is a pipe fitting 30 which receives pressure therefor through a connecting hose 31.

Each head 24 has a hollow centrally space 32 and upper and lower walls 33 with perforations 34 therethrough to insure communication between the pressure heads, except the top wall of the uppermost head in which there are no perforations. Extending laterally from each head through the outer wall thereof is a supporting pipe 35 by means of which each head may be rotated to a different angular position.

Seated in each of the grooves 25 is a gasket or packing 36 which is engaged by the rib 26 and by rib 29 when the heads are pressed together to make an air-tight connection between them.

A top clamping ring 37 is movable upon the shaft 23 and has a groove 38 in its lower face engaged by the circular rib 26 of the uppermost distributing head. Surrounding the shaft from the upper side of the ring is a stuffing box 39 in which is a gasket or packing 40 engaged by a gland 41 and having projecting flanges 42 through which threaded fastening bolts 43 are inserted into the clamping ring to tighten the gland in place.

In order to hold the entire assembly of distributor heads against the bottom ring 27, a pipe end plug 44 is threaded into the end of the shaft 23 and the threaded extremity of a bolt 45 projects through the outer end of the plug. A U-shaped yoke 46 extends over the end of the shaft with the threaded portion of the bolt 45 extending through the connecting end of the member, with the parallel extremities of the yoke bearing against the upper end of the top ring member 37 intermediate the projections 42, and the yoke being pressed downwardly by a fastening nut 49 threaded against it on the upper end of the bolt 45.

With this construction, the pressure heads are assembled upon the shaft 23, they are rotatable entirely around the shaft between the end members 27 and 37, a fluid type connection is maintained between the pressure heads and the end members, but there is a free communication of pressure between the heads 24.

At the outer end of each distributing pipe 35 is a pipe T 50 with closely connected valves 51 for controlling flexible pressure to hose sections 42. At the outer end of each hose section is a connected pipe 53 having a sprue or riser cover 54 at the outer end thereof.

In order to support the covers 54 at the proper height, each of the distributor pipes 35 may also carry positioning bars or pipes 55 which are adjustably held by clamps 56 with respect to the pipe 35, the clamp including blocks 57 adjustably mounted upon the pipes 35 and held in place by fastening bolts 58. Sliding blocks 59 are also

mounted upon the bars 55 and the hollow pipes 53 inserted through them so that these pipes may be held in proper vertical position. A coil spring 60 surrounds each of the pipes 55, bearing at one end against one of the blocks 59 and at the other end against an adjustable collar 61, the collar being positioned so that the cover 54 will be pressed by the spring into engagement with a flask or other article to receive pressure therefrom. Another collar 61 is also adjustably mounted on each pipe 53 on the other side of the block 59 to limit the movement of the pipe with respect to the block 59 under the action of the spring 60.

With this construction any one or any pair of the covers 54 may be applied to a flask to receive pressure therefrom. As shown in Fig. 1, two covers 54 are applied to sprue and riser openings 62 and 63 in a sand mold 64 having recesses 65 in the cope which are difficult to fill with molten metal without the application of pressure.

In operation, the casting machine is brought closely adjacent to molding flask or group of such flasks, the extension pipes 35 are arranged outwardly in different directions rotating from the supporting shaft 23, by turning the pipes 35 in the proper direction the bars 55 may be adjusted by the clamps 56 to receive the blocks 59 in which the pipes 53 are slidable and at the proper height so that when the covers 54 engage the tops of the sand in the flasks surrounding the cope and riser openings, the covers will be under a slight pressure of the springs 60.

In practice, the heights of the flasks are usually at the same or predetermined levels so that after setting the arms, it is only necessary to raise and lower the rack support 14 in order to quickly position the covers for engagement with any flask or group of flasks. By having the outer edges of the cover slightly larger than the flask openings for which they are used, low pressure may be applied to the mold directly through the sand without blowing the sand out or distorting the mold. It will also be noted that a cover supported by one pipe extension 35 may be applied to one opening of a flask and a cover supported by another pipe extension may be applied to the other opening of the same flask, since each connecting hose 52 has its own controlling valve 51. In this way a multiple casting machine of this type may be more readily connected to a single flask or to a plurality of flasks. In order to repair or replace any of the pressure heads or to renew the gaskets thereof, it is necessary only to remove the yoke 46 by removing the fastening nut 43 and then removing the upper ring members and the pressure beads from the shaft 23.

In the form of the invention shown in Figures 6 to 10, the resultant operation is practically the same, but the actual structure varies slightly in providing a common pressure manifold at the top, in holding the laterally extending pipes at different angles with respect to the central shaft, and in providing valves in connection with the pressure supply pipes which are automatically opened and closed when the pressure pipes are raised and lowered. In this form of the invention, a portable base 70 has a rack 71 raised and lowered by an engaging pinion 72 operated by a hand wheel 73. A hollow or solid supporting shaft 74 extends upwardly from the rack which carries a pressure manifold 75 extending transversely at the top thereof. This manifold comprises a central T 76 threaded on the upper end of the shaft 74 with pipes 77 extending laterally

in both directions therefrom and each closed at the end by a cap 78.

A pressure supply line for the manifold comprises a fitting 79 extending therefrom, a pressure gauge 80, a pressure reducing valve 81 and a hand valve 82 being connected in the supply line and terminating in a fixture 83 to which a flexible hose 84 is connected, the other end of the hose being connected to an angle fitting 85 supported by the base 70 and provided with an opening for the connection of a pressure supply pipe 86.

At one side of the manifold are a plurality of hand valves 87 each to control the supply of air under pressure through a hose 89 to a valve 90 at the outer end thereof. Each valve 90 is mounted at the upper end of a pressure supply pipe 91 which carries a pressure cover 92 at its lower end. The valve 90 comprises a projecting valve operating stem 93 and an operating member 94 for engaging the stem pivoted on the valve housing and having a projecting arm 95 with a valve operating block 96 adjustable along the arm by means of a thumbscrew 97.

Intermediate the ends of each pipe 92 is a valve operating member 98, having an angular projection 99 for engaging an inclined surface 100 at one end of the block and moving thereon to a flat surface 101 which relatively moves the outer end of the arm and moves the member 94 inwardly and presses the valve stem 93 to open the valve. The operating member 98 may be set in any position along the pipe 91 and held in place by a set screw 102.

A spiral spring 103 surrounds each pipe 91, abuts the member 98 at its upper end and a collar 104 adjustably secured to the pipe 91 at the other end. Each pipe 91 is adjusted to the proper height and held in place by a horizontally extending bar or pipe 105 which extends through an opening in the member 98 where it is adjustably secured in place by a hand screw 106. Each horizontal supporting bar or pipe 105 extends through a supporting head 107 where it is adjustably clamped in place by a set screw 108 and this head has an opening by which it is angularly adjustable upon the vertical supporting shaft 74 and held in any adjusted position by a hand or set screw 109.

This pressure casting machine is applied to the sprue and riser holes in a flask or mold as described by raising the rack and the supporting shaft 74 above the mold or flask, in setting the particular pipes 91 and their covers 92 at such a height that when the covers are brought down against the flask or mold, the springs 103 will be partially compressed. The valve operating members 98 will then be held at such a height that when the pipes 91 are lowered, the engagement of the covers 92 with the mold will cause a relative raising movement of the free end of the valve operating arm 95 from a position as shown in Figure 10 to an open position as shown in Figure 6, whereupon air or other fluid under pressure may be admitted from the manifold 95 through one of the valves 87 and its supply hose 89. It will be apparent that the supporting heads 107 are adjustable angularly in any direction upon the vertical shaft 74 so that by having a plurality of heads and a plurality of different hose connections, air pressure may be applied to a number of flasks or molds extending at different angles from the shaft so that a number of simultaneous applications may be made by properly arranging the supports and pipes. By opening the fluid pressure supplied to the manifold and by opening the individual controlling valves 87, pressure is automatically applied to each of the flasks or molds after the covers engage the molds by the automatic operation of the valves 90.

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

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

1. A pressure casting machine comprising in combination a supporting member, a plurality of heads rotatively mounted on the member, an adjustable supporting pipe extending from each head, a valved distributing hose supported by each pipe, means for raising and lowering the supporting member and all of the distributing hoses, and a common source of pressure for separately distributing pressure to the different hoses with their supporting pipes at different angles to the said supporting member.

2. In a pressure casting machine a supporting member, a plurality of pressure heads rotatively mounted upon the supporting member having communicating openings between adjacent heads, means forming a fluid tight packing between the heads, a fixed pressure ring at one end of the heads for receiving fluid under pressure and communicating it to the several heads, a clamping ring at the other end of the heads secured to said member, and distributing pipes extending from each of the heads for separately distributing pressure therefrom.

3. In a pressure casting machine a supporting shaft, a plurality of pressure heads rotatively mounted upon the shaft having openings forming communications between the heads, a fixed ring at one end of the shaft for receiving pressure, a clamping ring at the other end of the heads, means to make fluid tight connection between the shaft and the clamping ring, gasket holding means between the end rings and the heads to provide a fluid tight connection and to allow the free rotation of the heads with respect to the shaft, and a pipe extending laterally from each head to distribute pressure therefrom in any direction.

4. In a pressure casting machine, a supporting shaft, a plurality of hollow communicating heads freely rotatable upon the shaft, a fixed ring for receiving pressure at one end of the heads, an adjustable clamping ring for engaging the heads at the other end, and means at the end of the shaft for engaging and holding the clamping ring.

5. In a pressure casting machine, a supporting shaft, a plurality of communicating pressure heads rotatively mounted on the shaft, a fixed pressure ring communicating with one adjacent head, a movable clamping ring engaging the opposite end head adjacent the outer end of the shaft, a packing gland adjustable on the clamping ring, a fastening stud projecting at the end of the shaft, and a clamping yoke extending over the end of the shaft and engaging the clamping ring at opposite sides of the packing gland and the connected end of the yoke engaged by the stud for holding the yoke in place.

6. A pressure casting machine comprising in combination a pressure head supporting member, a plurality of hollow communicating pressure

heads rotatively mounted upon the supporting member, means engaging the end heads for clamping them tightly together, a pipe extending from each of the heads, means for supplying fluid under pressure to the heads, flexible hose connections controlled by valves at the end of each pipe, and means for bodily raising and lowering the supporting member for applying the hose connections.

7. A pressure casting machine comprising in combination a portable base having a movable supporting member with a rack at one side, a pinion engaging the rack with a hand wheel for raising and lowering it, a shaft carried by the said supporting member, a plurality of communicating pressure heads rotatively mounted upon the shaft, means for engaging the end heads and holding them together for fluid tight connection, a pipe extension from each of the heads, means for supplying air under pressure to the heads, a plurality of flexible hose connections controlled by valves at the end of each pipe, and a pipe connected at the end of each hose having an enlarged cover for application to the opening of a casting flask.

8. In a pressure casting machine, a supporting shaft, a pressure head rotatable thereon, means for supplying fluid under pressure to the head and permitting its free rotation, a pipe extending laterally from the head, hose sections having valved connections with the pipe, a flask opening cover connected to the outer end of each hose section, and means including a supporting bar and a clamp for attaching the supporting bar to the pipe for holding the free end of the hose and the cover in adjusted position with respect to the pipe.

9. In a pressure casting machine, a hollow distributing head and means for supporting its free rotation, a supporting pipe extending therefrom, hose sections having separate valve connections with the pipe, an end pipe extending from the extremity of each hose section with a flask hole cover at the outer end thereof, a pair of supporting bars and an adjustabe clamp for connecting the bars at different angles to end pipes, and blocks mounted on the bars for engaging end pipes for holding them in adjustable position with respect to a flask for receiving pressure.

10. In a pressure casting machine, a hollow pressure head, means for mounting the head for free rotation, a supporting pipe extending from the head, a flexible hose section connected to the pipe, a supporting bar, and means for adjustably attaching it to the supporting pipe, a positioning block carried by the bar, an end pipe connected to the free end of the hose and extending through the block carried by the bar, a flask hole cover at the extremity of the end pipe, a spring surrounding the end pipe, a collar adjustable on the end pipe confining the spring between it and the block for pressing the cover away from the block to engage the cover with a flask.

11. In a pressure casting machine, a plurality of rotatable pressure heads, a common means to support the heads for free rotation, a supporting pipe extending from each head, a plurality of hose sections having valved connections with the pipes, an end pipe with a flask hole cover connected to each of the hose sections, a plurality of bars and adjustable clamps for positioning the bars with respect to any of the supporting pipes, blocks mounted on the bars through which the end pipes are slidable, and

resilient means for pressing each of the end pipes outwardly from its supporting block.

12. In a pressure casting machine, a movable pressure head having a supporting pipe extending therefrom, a flexible hose section having a valve connection with the pipe, a supporting bar and an adjustable clamp for connecting the bar at various positions with respect to the supporting pipe, an end pipe connected to the hose section having a flask hole cover at the outer end thereof, a positioning block on the bar through which the end pipe is slidable, collars adjustable on the end pipe at both sides of the block, a spring surrounding the pipe and extending between the block and one of the collars at the cover side of the pipe to flexibly apply the cover to a flask, and the other collar being positioned on the end pipe at the other side of the block at a distance to limit the extending movement of the spring when it is not partially compressed by application of the cover to a flask hole.

13. In a pressure casting machine, a supporting shaft, a plurality of heads freely rotatable upon the shaft, a manifold at the top of the shaft for receiving a fluid under pressure, a supporting pipe adjustable in each of the heads, a plurality of distributing hoses each having a valve connection with the manifold and supported by one of the pipes, and means for raising and lowering the supporting shaft and all of the said parts supported thereby.

14. A pressure casting machine comprising in combination a supporting shaft, a plurality of heads adjustable rotatably upon the shaft, a supporting pipe extending from each of the heads, a common pressure manifold at the top of the shaft, flexible hose connections connected to the manifold and supported by each of the pipes, means for bodily raising and lowering the supporting shaft for applying the hose connections, and a valve at the outer end of each hose having means for opening and closing the valve when the supporting shaft is lowered and raised.

15. In a pressure casting machine, a plurality of flexible hose connections, a plurality of pipes each supporting one of the hose connections, an end pipe extending from the extremity of each hose with a flask hole cover at the outer end thereof, a block through which the end pipe is moved, means for raising and lowering the supporting hoses and end pipes in applying the said covers to a flask, and a valve connecting the hose and its end pipe with an operating arm adapted to engage the said block for opening and closing the valve to control fluid under pressure to a flask when the hose connection is lowered and raised.

16. In a pressure casting machine, a plurality of rotatable heads, a common means to support the heads for free rotation, a supporting pipe extending from each head, a plurality of hose sections each connected to a common source of pressure at one end and having an end pipe with a flask hole cover connected at the other end, means supported by the heads for positioning the hose sections in different angular directions with respect to the common supporting means, blocks mounted on the supporting means to which the end pipes are slidable, resilient means tending to press each of the end pipes outwardly from its supporting block, and automatic pressure valves between each hose section and its end pipe having an extending arm adapted to engage the block for opening and closing the valve in ac-

cordance with the movement of the end pipes with respect to the blocks.

17. In a pressure casting machine, a vertical supporting shaft, a plurality of heads rotatably adjustable thereon, each having a supporting pipe extending therefrom, a common manifold at the top of the shaft for receiving fluid under pressure, a plurality of flexible hose sections each having a valve connection with the manifold, an automatic valve at the other end of each hose section supported by one of the said pipes, an end pipe connected to the outer end of each hose section through the said valve and having a flask

hole cover at the outer end thereof, a positioning block carried by one of the supporting pipes through which the end pipe is slidable, a spring surrounding the pipe and adapted to flexibly apply the cover to a flask, means for raising and lowering the shaft and the said parts supported thereby, and each valve at the end of a hose section having an arm adapted to engage the supporting block for opening and closing the valve depending upon the raising and lowering movement in applying and removing the flask hole covers with respect to a flask.

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