CORE MAKING MACHINE

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This invention relates to machines for making sand cores, and more especially to machines of that type in which the sand that forms the core is blown into the core-box or mold by air under pressure. These machines are usually provided with an air chamber and a movable sand transfer member which carries a charge of sand at least sufficient to make the core from a supply hopper to a position in alignment with and between the air chamber and the core-box or mold. The core-box or mold is usually supported on a table or platform that is raised by a pneumatic lift to carry the core-box into tight engagement with the lower end of the sand transfer member and force the upper end of the latter into tight engagement with the air discharge port of the air chamber. From the sand transfer member the sand is blown into the core-box and packed therein by the air and sand under pressure. The jack is then lowered, and the core-box and core removed.

An important object of this invention is to provide an improved air operating and control system for a machine of this character by which, through the manipulation of a pair of hand levers, the machine is first primed for the sand blowing operation, and then the several valves which admit and shut off air used in the sand blowing and lift operating operations and certain controls for said valves are all automatically operated in correctly timed order.

Another object, auxiliary to the above, is to provide, as an element of the said air operating and control system, an improved device for both distributing and timing the flow of air in correct order and sequence to the several air operated parts of the system.

After the sand has been blown and the main blow valve closed, considerable residual air pressure remains in the air chamber, sand transfer member, and core-box and core; and another object of the invention has been to provide an automatic device for venting this residual air pressure to atmosphere to prevent possible injury from flying sand to both the sand core and the operator, when the core is drawn.

In pneumatic jacks heretofore used, when the jack is lowered to permit removal of the core, the compressed air used to elevate the jack has been vented to atmosphere and wasted. Still another object of the invention has been to provide an improved pneumatic lift or jack for machines of this character by which this waste can be largely prevented; this being particularly useful and saving of air when using one-piece core-boxes, and, to a lesser extent, when using divided or two-piece core-boxes of different heights.

Still other objects and attendant advantages of the invention will be apparent to persons skilled in the art from the following detailed description of an approved embodiment of the invention shown in the accompanying drawings, in which—

Fig. 1 is a front elevation of the machine, showing the pneumatic core box support in fully lowered position.

Fig. 2 is a vertical section.

Fig. 3 is a vertical section through the pneumatic lifting device, a divided or two-part core box, the sand transfer member, and the sand blower, showing the parts in working position.

Fig. 4 is a vertical section through the pneumatic lifting device, a one-piece core box, and the lower portion of the sand transfer member.

Fig. 5 is a vertical section through an air distributor and timer, three pneumatically operated air flow control devices respectively associated with the main blow valve and its chamber, the air chamber, and the core box lift, and operated in succession by the air distributor and timer, and a manually operated air flow control device that controls the flow of fluid pressure to and from the motor of the air distributor and timer.

Fig. 6 is a fragmentary elevation of the upper end portion of the air distributor and timer, viewed on line 6—6 of Fig. 5.

Referring to the drawings, the frame of the machine comprises mainly a pair of side frames 10 of the general type of a punch press frame spaced substantially mid-height by a transverse inverted U-shaped bar 11 (Fig. 2), one side wall of which merges into the top plate 12 of a base platform 13 that constitutes a support for the core box lifting and lowering device, later described. Surrounding the side frames 10 and bolted to the latter is a hood 14 that extends rearwardly somewhat beyond the rear of the side frames 10, and itself constitutes a support for a sand hopper 15 and the casing 16 of the sand blow valve and its associated parts. In the lower portion of the casing 16 is formed an air chamber 17 having in its top wall a port 18, with which cooperates the main sand blow valve 19 disposed in a valve chamber 20 located directly above the air chamber 17. The air chamber 17 is of such width as to uniformly distribute the air over the top of the underlying column of sand to be blown. The stem of the main blow valve 19 includes a piston 21 slidably mounted in the upper reduced portion 22 of the casing 16. The upper end of the
casing 15 is closed by a cap 23, and between this cap and the top of the piston 21 is a thrust spring 24 that urges the valve 19 to closed position. The bottom wall of the air chamber 17 is formed as a grid 28, and encirling the latter is an annular washer 26 of rubber or other flexible material designed to effect an air-tight joint during the sand blowing operation. 

Slightly mounted on rollers 27 that are journaled on the inner sides of the side walls of the hood 14 is a plate 28 having therein an opening 29 adapted, in one position of the plate, to register with the lower end of the hopper 15, as shown in Fig. 2, and in another position to register with the opening in the bottom wall of the air chamber 17 that is occupied by the grid 28, as shown in Fig. 3. The plate 28 slightly engages with the lower side of the washer ring 26 and also with the lower edge of a sealing collar 30 that encircles the discharge end of the hopper 15. Secured to the underside of the plate 28 is a depending tubular member 31 that forms a movable sand transfer member or carrier which, when in the position shown in Fig. 2, receives from the hopper 15 a charge of sand more than sufficient to make the core, and, when in the position shown in Fig. 3, discharges a part of its load of sand under the pressure of an air blast into the underlying core-box. As best shown in Fig. 3, the bottom wall 32 of the sand carrier 31 is formed as a grid, the openings of which register with ducts 33 formed through the top member 34 of a divided core-box attached to the grid 32. The ducts 33 lead into a semi-cylindrical chamber 35 in the member 34, and this chamber registers with a mating semi-cylindrical chamber 36 in the upper portion of the lower section 37 of the core-box. As is usual in core-boxes of this type that are filled by sand introduced under air pressure, the walls of the lower section and the lower portions of the walls of the upper section contain fine ducts 38 that are too fine to pass the sand but permit the escape of most of the air, these ducts, of course, being finer than the sand admission ducts 33.

The lower section 37 of the core box rests on a platform 39 that, in turn, is mounted on and secured to the top wall of a cylinder 40. This cylinder 40 telescopes over a piston 41 that is mounted on the upper end of a piston rod 42, substantially the lower half of this rod having a screw thread 43. The rod 42 is slidably mounted in a central sleeve 44 of a stationary cylinder 45 that is mounted on and attached to the top wall of the base platform 13. Between the lower end of the cylinder 45 and the top wall 12 of the platform 13 is the flange 46 of a depending wall 47, with which the lower end of the threaded portion 43 of rod 42 slidably engages. The flange 46 is attached by cap-screws 48 to the lower end of the cylinder 45, and the latter and the flange 46 are both attached to the top plate 12 of the platform by machine screws 49. Mounted on the thread 43 of the rod 42 is a nut 50 carrying a worm-wheel 51 engaged and driven by a worm 52 on a cross-shaft 53, and keyed on the outer end of the latter is a hand-wheel 54, by turning which the piston 41 may be raised or lowered relatively to the cylinder 45. A pin 55 in the piston 41 extends through a hole in the top wall of the stationary cylinder 45, to prevent rotation of the piston 41 when the worm-wheel 52 is rotated to raise or lower the piston. The lower portion of cylinder 45 is filled with oil, as indicated in Figs. 3 and 4. To steady the up and down movements of the cylinder 40, opposite sides of the latter are preferably equipped with longitudinal tubular guides 56 (Fig. 1) slidingly engaged with upstanding rods or pins 57 mounted on the bottom flange of the cylinder 45.

For shifting the sand transfer member 31 back and forth between the sand hopper 15 and the blow chamber 17, there is employed an air cylinder 58 that is pivotally mounted substantially mid-length thereof on a bracket 59 attached to the rear end of the hood 14. Within the cylinder 58 is a piston 60, the rod 61 of which is pivoted connected at 62 to a depending web or flange 63 on the top plate or head 31' of the sand carrier 31. By reference to Fig. 2 it will be observed that the plate 28 is long enough to close the discharge from the hopper when the sand carrier 31 is shifted to blowing position. The means for operating this sand carrier motor will be described later in connection with the description of the pneumatic operating system.

Describing next the pneumatic operating system of the apparatus, 64 designates a main air supply pipe leading from a source of compressed air and communicating through a port 65 (Fig. 3) with the valve chamber 20. 66 designates a branch air pipe connected at its upper end into pipe 64 and at its lower end into a tank 67 (Fig. 2) conveniently mounted on the base of the machine frame or on the floor beneath the cross connecting member 11, and suitably secured to the latter by hoops or straps 68. This tank 67 contains a supply of compressed air for operating the core box lift previously described. A conveniently located cock 69 in pipe 64 turns the air, usually at about 130 pounds pressure on and off the entire apparatus.

Describing the air supply to the sand carrier motor 58, 70 designates a rotary valve mounted in a casing 71 and formed in its periphery with a chamber 72 that is constantly open to compressed air in the valve chamber 20 through a pipe 73, 74 and pipe 75. Connected into the lower side of the valve casing 71 is a pipe 76 (Fig. 1) and hose 77 through which air is admitted to the inner end of cylinder 58 to shift the sand carrier 31 into register with the hopper 15. Connected into the upper end of the valve casing 71 is a pipe 78 and hose 79 leading into the outer end of cylinder 58 for returning the loaded sand carrier 31 to blowing position. On the valve 70 is a handle 80 which places the valve in neutral when in the idle position shown in Fig. 1. When the handle 80 is swung upward as shown in Fig. 2, the sand carrier 31 is shifted into register with the sand hopper. When the handle 80 is swung down to the position shown in Fig. 3, the loaded sand carrier 31 is shifted to blowing position beneath the air chamber 17. When the cock 69 has been opened, manipulation of the valve 70 thus brings a charge of sand into position for the sand blowing operation.

Associated with the core box lift is an air flow control unit designated as an entirety by 81 that performs the function of alternately admitting air from tank 67 to, and exhausting it from, the lift cylinder 40. Associated with the air chamber 17 is a generally similar unit designated as an entirety by 82 that has the function of maintaining the air chamber 17 sealed to the atmosphere during the blowing operation, and venting it to the atmosphere at the completion of the blowing operation. And associated with the motor of the main blow valve 19 is a third generally similar unit designated as an entirety by 83, which
has the function of alternately venting pressure from the space in the casing 22 above the piston 21 to permit the valve 19 to open and admitting pressure to said space to close the valve. These three air flow controlling units 81, 82 and 83 are pneumatically operated, first in the order in which they are above mentioned and then in the reverse order by a pneumatically operated air distributing and timing device best shown in Fig. 7. This device comprises a upper supply cylinder 84, an intermediate motor cylinder 85, and a lower dash-pot cylinder 86 all disposed coaxially. Extending through the cylinder 85 and into the lower end of cylinder 84 and upper end of cylinder 86 is a rod 87, keyed on which the piston 88. On the lower end of rod 87 is a piston valve 89 forming through the dash-pot cylinder 86 and on the upper end of rod 87 a piston valve formed with upper and lower heads 90 and 91 slidably engaged with the cylinder 84 and an intermediate narrow body member 92. Connected into the cylinder 84 at a point such that all at times communicates with the annular space encircling the valve body 92 is an air supply pipe 93 that, as shown in Fig. 6, draws its supply of compressed air from the pipe line 78. As the upper head 90 of the piston valve rises from its lowest point it successively opens to pressure fluid from pipe 93 four vertically spaced ports 84, 85, 86 and 87 in the upper valve cylinder 84; and as it descends it successively overruns and opens to atmosphere the same ports in reverse order. Communicating with the port 95 is a pipe 100, the other end of which leads into a similar diaphragm chamber 101 of the control unit 81. Communicating with the port 97 is a pipe line 102, the other end of which leads into a similar diaphragm chamber 103 of the control unit 83. Communicating with the port 97 is a pipe line 104, the other end of which communicates with a port 95 which in turn is connected to a chamber 105, hereinafter referred to. Formed as a lateral extension of the dash-pot cylinder 86 is an oil chamber 106 containing a body of oil 107 that fills the cylinder 86 through upper and lower ports 108 and 109 that are controlled as to their extent of flow by screws 110 and 111. By turning the screws 110 and 111 inwardly or outwardly, the speed of movement of the piston valve 90 may obviously be regulated.

Fig. 6 illustrates a duplex arrangement of ports such as 84, 85, 86 and 87 by which the time interval between the opening of two successive ports may be varied. This consists in providing, in addition to the row of ports already described, a second row of similar ports 94, 95, 96 and 97 in staggered relation to the ports 94, 95, 96 and 97. The idle ports are normally closed by plugs as indicated with the ports 94 and 95 and are opened at a time when the oil chamber 106 is actuated by fluid from the valve chamber 20 with compressed air, a portion of the air flowing through pipe 73, T 74 and pipe 123 into the flow control unit 83. This unit 83 includes a short pipe section 124, the bore of which is bridged at 225 and has radial ports 25 and 27 in the opposite side of the chamber 125 and the port portion of the pipe section 124 is encircled by an annular chambered valve 126 that is pressed to the position shown in Fig. 5 by a spring 128, and is moved in the reverse direction by air pressure in the chamber 125 acting through a diaphragm 130 and a pair of rods 131 connect-
ing the diaphragm to the valve 128. Hence, with the last described parts in the positions shown in Fig. 5, the air from pipe 123 flows through the pipe section 124, by-passing the bridge 125 by flowing through the ports 126, the chamber of the valve 128 and the ports 127, and then through a curved duct 132 and the pipe 122 into the space above the valve piston 21. This air pressure above piston 21 balances the pressure beneath piston 21 and the spring 24 closes the blow valve 18.

In one side of the unit 93 is an air port 133 to atmosphere. The valve handle 80 is then swung upwardly, which effects an outward movement of the sand transfer device 31 into register with the hopper 18. As soon as the latter has received its charge of sand, the valve handle 80 is swung down, and this reverses the motor 59 and shifts the sand transfer member back to its blowing position shown in Fig. 3.

The lower core member 31, having been positioned on the platform 35, is then raised into engagement with the upper core member 34 by the following operations. The handle lever 116 is pushed in. The unit 114 includes two bridged and ported pipe sections and cooperating annular chambered valves located side by side each like that described in connection with the air control unit 83, and a central flow duct 134 that connects supply pipe 117 with chamber 135. In lieu of the spring 129, the two chambered valves are connected to and simultaneously moved in opposite directions by the lever 116 through rods 136. When handle lever 116 is pushed inwardly, air from pipe 117 is directed through line 119 beneath piston 88, and as the latter rises, port 94 is first overrun by piston valve 90. This, through pilot line 98, admits pressure to diaphragm chamber 99 of flow control unit 81, which unit is similar to that described in connection with flow control unit 83. This admits pressure fluid from tank 67 through unit 81 and hose 113 into cylinder 40, which causes the latter to rise, and close the core box sections on each other, and force the sand carrier 31 hard against the ring washer 26, making an air tight joint.

At this time the flow control unit 82, which has the same internal valve mechanism as the unit 81, is in the position shown in Fig. 5 in which it vents the air chamber 17 to atmosphere through duct 121, pipe 120 and a side vent 133 in unit 82. As piston valve 90 next overruns port 95, the unit 82 closes the air chamber 17 to exhaust. The machine is now primed for the blowing operation.

Further rise of piston valve 90 overruns port 96, which, through pipe line 102 and flow control unit 83, vents the pressure above valve piston 21 to atmosphere through exhaust port 135, and the pressure on the under side of valve piston 21 overcomes the spring 24 and quickly opens the blow valve 18, as shown in Fig. 3. Sand in the sand carrier 31 is blown through the grid bottom of the latter and the ducts 33 of the core box until the cylindrical chamber of the latter is completely filled with closely packed sand, most of the air entering with the sand finding vent through the fine ducts 38. As the top port 97 is overrun by the final part of the rising movement of piston valve 90, the plunger 115 is forced outwardly, returning handle lever 116 and the flow control parts 80, 83, and 114 to the position shown in Fig. 5. This admits pressure above piston 88 and simultaneously vents said pressure beneath the piston to atmosphere through a vent opening 137 in the base wall of the unit 114, so that the piston 88 begins its return travel. As port 97 is uncovered on the down travel of piston valve 90, plunger chamber 105 is vented to atmosphere through line 104. As port 96 is next uncovered, diaphragm chamber 106 is vented through line 102, and this returns the chambered valve 128 to the position shown in Fig. 5. This restores air pressure from pipe 123 to the chamber above valve piston 21, closing blow valve 19.

As port 95 is next uncovered, this vents diaphragm chamber 101 through line 100 restoring the parts of flow of control unit 82 to the position shown in Fig. 5, in which the vent of air chamber 17 to atmosphere through exhaust port 133 is restored. This enables residual air pressure in the air chamber 17, said carrier 31, and core-box and core to be vented to atmosphere before the core-box is opened. Finally, as port 94 is uncovered, diaphragm chamber 99 is vented, and the chambered valve of flow control unit 81 is shifted by its spring back to the position shown in Fig. 5, venting the lift cylinder 40 to atmosphere through lever 116 venting the ports of control line 82 restoring the parts of flow control unit 82 to the position shown in Fig. 5, venting the lift cylinder 40 to atmosphere through lever 116 venting the ports 95, 97, and 98. This leaves the core-box in its initial condition and completes the cycle, leaving the apparatus in condition to repeat the described cycle on the next core-box. It may here be noted that the flow control unit 82 keeps the air chamber 17 closed to exhaust at all times except when the apparatus is idle and when the cycle is being started, to prevent the blowing of residual sand from the core, core-box, sand carrier and air chamber into the room when the core box is drawn.

The employment of the described core-box lifting and lowering device as illustrated in Figs. 2, 3 and 4, wherein the piston 41 is manually adjustable vertically to provide an air cylinder space of varying heights is of particular advantage when employing a one-piece core-box such as is typically shown at 189 in Fig. 1. When using such a core-box it is necessary to raise the latter only a fraction of an inch far enough to make air tight seals at both ends of the sand carrier 31, and consequently there is only a correspondingly slight raising and lowering of the lift cylinder 40. Comparing Figs. 3 and 4, it will be seen that the volume of compressed air used in the lift when the latter has been adjusted to the position shown in Fig. 4 is a very small fraction of that used when the lift has been adjusted to the position shown in Fig. 5, when handling a divided core-box; and since compressed air is expensive, the resulting economy is considerable. Also, a lesser comparative saving of compressed air can be effected when using divided core-boxes of less height than that indicated in Fig. 3, by adjusting the piston 41 upwardly to an extent corresponding to the lesser height of the core-box. Of course, when using a divided core-box, there must be sufficient vertical movement of the cylinder 40 to enable the lower section of the core-box to be lowered at least sufficiently to clear the finished core from the upper section. Thus, we regard the improvement in the core-box lifting and lowering device as of substantial value.

In Fig. 1 show the pipe lines 100, 102 and 104 equipped with normally open hand valves 140, 141 and 142, respectively, which may be
closed when preliminarily adjusting the core-box lifting and lowering device to the particular core-box used.

Another feature of improvement in the core-box lifting and lowering device resides in its manner and means of attachment to the frame base. By merely backing out the attaching screws 49, the entire assembly as a unit can be lifted out of the platform for cleaning, oiling, and repairs or renewal of parts when necessary, and then restored to working position by reclamping it on the platform and resupplying the fastening screws 49.

From the foregoing it will be seen that the present invention substantially simplifies the operation of this type of sand blower for making cores by reducing the manual operations required to the mere manipulation of valve 69 and the hand levers 80 and 116, even the return or outward movement of the latter being effected automatically. We are aware that it is broadly old and known to manipulate a sand transfer device in a manner as is described, but, so far as we are aware, the use of a pneumatically-motivated air distributing and timing device such as the cylinders 84, 85 and 86 and their associated parts to automatically effect in properly timed relation and at a suitable speed the several operations involved in blowing and drawing the core, is new, as well as the described structural improvements in the core-box lifting and lowering device. We also believe that a core blowing machine using a combination draw cylinder with an adjusting piston, which enables a machine used for drawing cores to be used also as a clamp device for vertical boxes without excessive air consumption, due to the adjusting piston, is new in the form shown and described. Hence, we do not limit the invention to the specific mechanisms herein presented but reserve all such variations, modifications and mechanical equivalents as fall within the spirit and purview of the claims.

We claim:

1. In a core making machine of the class described, the combination of an air chamber having a port in its top wall, a valve chamber above said air chamber, a sand carrier registering at one end with said valve chamber and connected into the other end of said pneumatic motor, an air flow control unit including an air motor for operating the same and having both supply and vent functions connected into said core-box raising and lowering device, and an air distributing and timing device pipe-connected to the air motors of said air flow control units and having a single valve successively admitting air to the air motors of said air flow control units and exhausting it from said air motors in the reverse order.

2. In a core making machine of the class described, the combination of an air chamber having a port in its top wall, a valve chamber above said air chamber, a sand blow valve in said valve chamber controlling said port, a compressed air supply pipe communicating with said valve chamber, a pneumatic motor for both opening and closing said blow valve communicating at one end with said valve chamber, a sand carrier registering at one end with said air chamber and at its other end with a core-box, a pneumatic core-box raising and lowering device, an air flow control unit including an air motor for operating the same and having both supply and vent functions connected into said core-box raising and lowering device, and an air distributing and timing device pipe-connected to the air motors of said air flow control units and having a single valve successively admitting air to the air motors of said air flow control units and exhausting it from said air motors in the reverse order.
device, an air distributing and timing device pipe-connected to the air motors of said air flow control units and having a single sliding valve successively admitting air to the air motors of said air flow control units and exhausting it from said air motors in the reverse order, said air distributing and timing device including a motor for operating said sliding valve, and a manually operated device controlling the supply and exhaust of motive fluid to and from said last named motor.

5. In a core making machine of the class described, the combination of an air chamber having a port in its top wall, a valve chamber above said air chamber, a sand blow valve in said valve chamber controlling said port, a compressed air supply pipe communicating with said valve chamber, a pneumatic motor for both opening and closing said blow valve communicating at one end with said valve chamber, a sand carrier registering at one end with said air chamber and at its other end with a core-box, an air flow control unit including an air motor for operating the same and having both supply and vent functions communicating with said valve chamber and connected into the other end of said pneumatic motor, an air flow control unit including an air motor for operating the same connected into said air chamber maintaining the latter sealed during the blowing operation and venting it to atmosphere at the conclusion of the blowing operation, an air flow control unit including an air motor for operating the same and having both supply and vent functions connected into said core-box raising and lowering device, an air distributing and timing device pipe-connected to the air motors of said air flow control units and having a single sliding valve successively admitting air to the air motors of said air flow control units and exhausting it from said air motors in the reverse order, said air distributing and timing device including a pneumatic motor for operating said sliding valve, and an air flow control unit having both supply and vent functions pipe-connected to said last named motor and to a source of compressed air and including a hand lever for operating the same.

6. An embodiment of the subject matter defined in claim 5, wherein the last named air flow controlling device includes a sliding plunger for returning the hand lever to starting position, and the air distributing and timing device includes a pipe connection to the plunger chamber for actuating the plunger in a direction to force the hand lever to starting position.

7. In a core making machine of the class described, sand blowing means comprising a valve chamber, an air chamber underlying and having a port communicating with said valve chamber and adapted to register with a vessel containing sand to be blown into a core-box, a blow valve in said valve chamber cooperating with said port, a compressed air supply pipe communicating with said valve chamber, a cylinder above and open at its lower end to said valve chamber, a piston in said cylinder connected to said blow valve, and means for alternately supplying air delivered by said supply pipe to, and venting it from, the cylinder space above said piston.

8. In a core making machine of the class described, sand blowing means comprising a valve chamber, an air chamber underlying and having a port communicating with said valve chamber and adapted to register with a vessel containing sand to be blown into a core-box, a blow valve in said valve chamber cooperating with said port, a compressed air supply pipe communicating with said valve chamber, a cylinder above and open at its lower end to said valve chamber, a piston of uniform diameter in said cylinder connected to said blow valve, pneumatically operated means for alternately supplying air from said valve chamber to and venting it from, the cylinder space above said piston, and a spring in said cylinder constantly urging said piston downwardly to close said blow valve.

9. A core-box raising and lowering device for core making machines, comprising a piston, a depending threaded piston stem, a fixed cylinder of the same external diameter as said piston underlying the latter and having a depending tubular guide for said piston stem, a movable cylinder telescoping over said piston and fixed cylinder and having a head adapted to seat a core-box, a nut engaged with said piston stem, a worm wheel on said nut, a manually operable shaft carrying a worm drivingly engaged with said worm wheel, means for locking said piston stem and piston against rotation, and means for supplying motive fluid to, and exhausting it from, said cylinder.

10. A core raising and lowering device for core making machines, comprising a piston, a depending threaded piston stem, a fixed cylinder of the same external diameter as said piston underlying the latter and having a depending tubular guide for said piston stem, a movable cylinder telescoping over said piston and fixed cylinder and having a head adapted to seat a core box, a well underlying said tubular guide and receiving the lower end of said threaded stem, said well formed with an annular flange underlying and fastened to the lower end of said fixed cylinder, a nut engaged with said piston stem, manually operable means for rotating said nut, means for locking said piston stem and piston against rotation, and means for supplying motive fluid to, and exhausting it from, said cylinder.

11. In combination with the subject matter defined in claim 10, a machine frame platform, and fastening means securing said fixed cylinder thereto, said fixed cylinder, movable cylinder, piston, and piston adjusting parts being bodily removable as a unit from said platform on removal of said fastening means.

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