No. 821,791. PATENTED MAY 29, 1906.

W. M. DUNCAN.

MOLDING MACHINE.

APPLICATION FILED MAR. 13, 1905.

2 SHEETS—SHEET 1.

Fig. II.

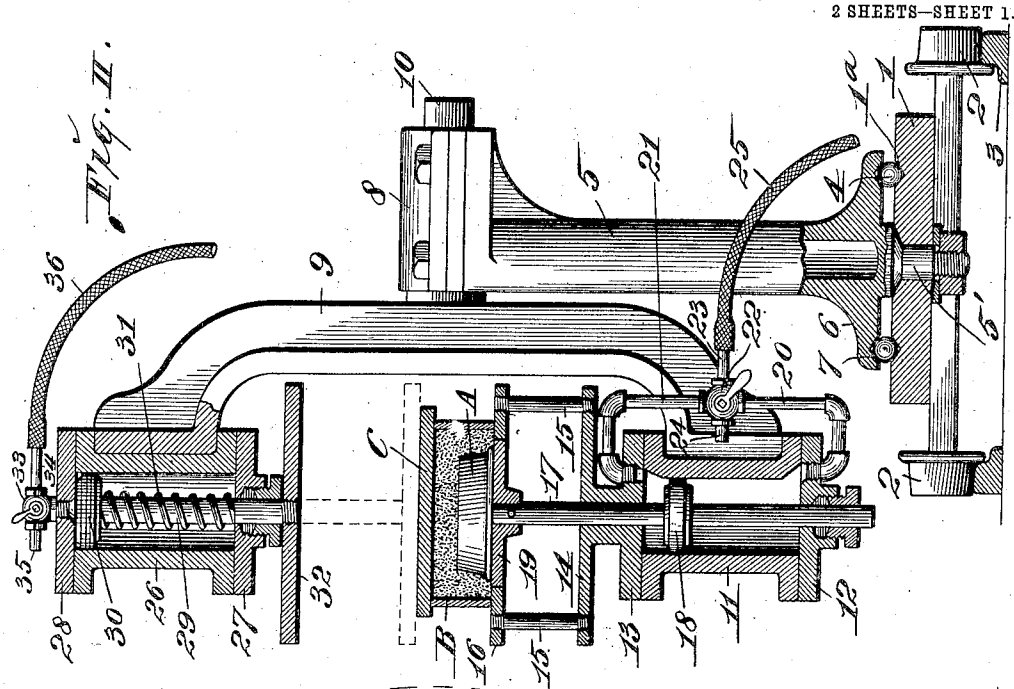
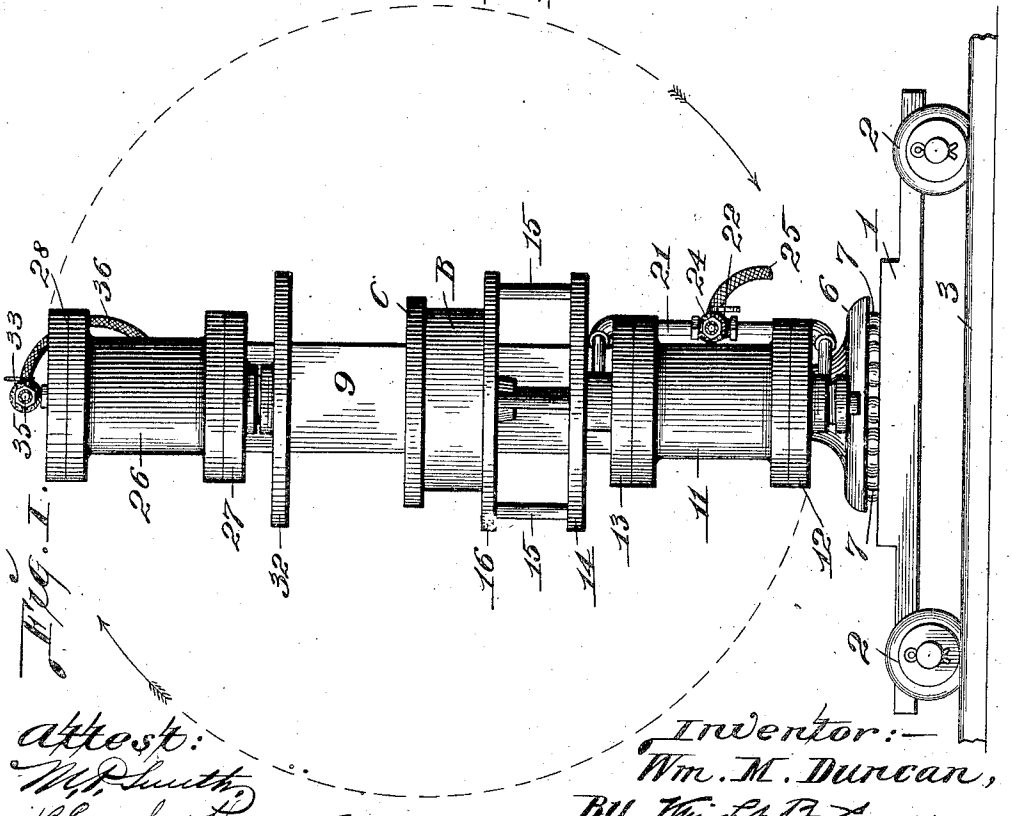


Fig. I.



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2 SHEETS—SHEET 2.

Fig. III.

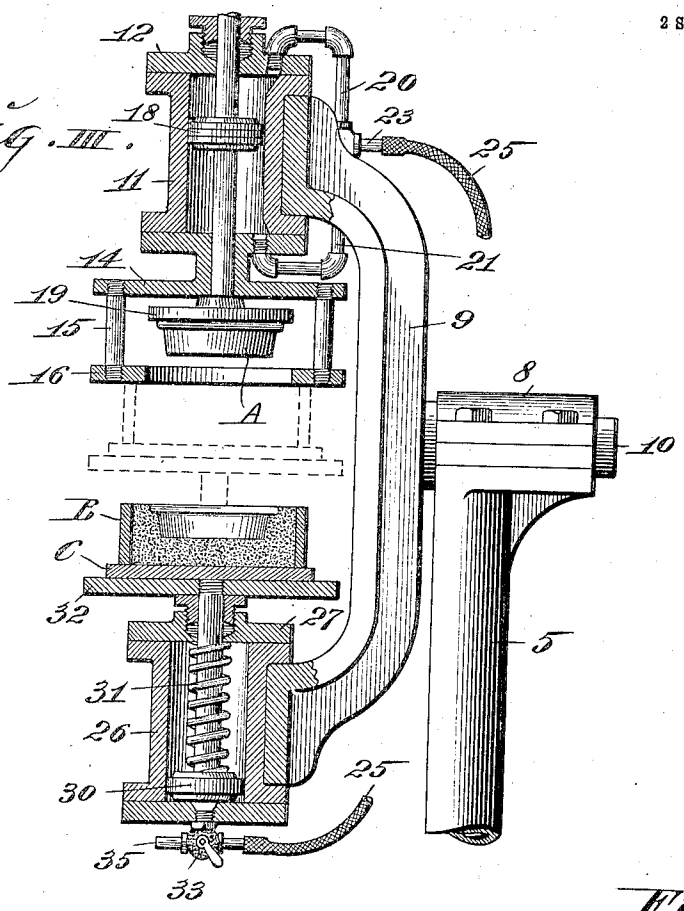


Fig. IV.

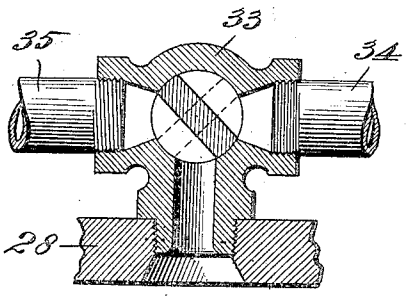
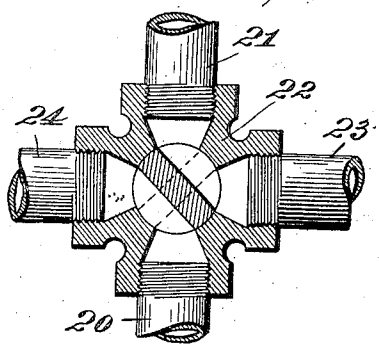


Fig. V.



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UNITED STATES PATENT OFFICE.

WILLIAM MILLEN DUNCAN, OF ALTON, ILLINOIS.

MOLDING-MACHINE.

No. 821,791. Specification of Letters Patent. Patented May 29, 1906.

Application filed March 13, 1905. Serial No. 249,886.

To all whom it may concern:

Be it known that I, WILLIAM MILLEN DUNCAN, a citizen of the United States, residing in Alton, in the county of Madison and State of Illinois, have invented certain new and useful Improvements in Molding-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a molding-machine of the character shown and described in United States Letters Patent issued to myself and James Duncan, July 15, 1902, No. 704,712, the object of the present improvement being to so construct a molding-machine of the type named that the mold-carrying members are supported by an open frame having a single pivotal support, whereby said frame may be rotated vertically and access obtained thereto at the front thereof and at both of its sides.

A further object of the present improvement is to provide for the horizontal rotation of the mold-carrying members and the frame by which they are supported, so that the mold may be moved in a circular path while supported by said members, thereby permitting of access being gained to the mold at any point around the machine.

Figure I is a front elevation of my machine. Fig. II is a side elevation with parts shown in vertical section. Fig. III is a view, partly in elevation and partly in vertical section, showing the swinging frame of the machine in inverted position, from which it is seen in Figs. I and II. Fig. IV is a section of a two-way valve through which the flow of fluid to the upper fluid-cylinder is controlled. Fig. V is a section of the four-way valve by which the flow of air to the lower fluid-cylinder is controlled.

1 designates the platform of a truck, having wheels 2, that are adapted to travel upon track-rails 3. In the platform 1 at its upper side is a raceway 1^a, in which antifriction-balls 4 travel.

5 designates a standard provided at its lower end with an enlargement in the form of a turn-table 6, that is provided with a raceway 7 in its lower side, in which the bearing-balls 4 operate, thereby providing for horizontal rotation of the standard 5. This standard is provided at its lower end with a stem 5′, that is rotatably secured in the platform 1. At the upper end of the standard 5 is a boxing 8.

9 designates a frame or yoke that is approximately of U shape and from the rear side of which projects an axle 10, that is loosely fitted to the boxing 8 to rotate therein and provide for rotation of the frame 9.

11 designates a lower fluid-cylinder attached to one of the arms of the rotatable frame 9 and having a bottom head 12 and a top head 13, the latter being provided with a bed-plate 14. The bed-plate 14 is surmounted by vertical posts 15, that support a table-ring 16.

17 designates a piston-rod that operates through the cylinder-heads 12 and 13 and which bears within the cylinder 11 a piston 18.

19 is a pattern-carrying plate secured to the upper end of the piston 17 and which is adapted to be moved into a position within the table-ring 16, as seen in Figs. I and II, and withdrawn from such position, as seen in Fig. III. This plate 19 is adapted to have attached to it a pattern, as seen at A, so that said pattern will be moved with the plate.

20 and 21 designate pipes leading, respectively, to the lower and upper ends of the fluid-cylinder 11 to convey fluid into said cylinder to actuate the piston 18 and impart reciprocation to the piston 17 and pattern-carrying plate 19. The flow of fluid to said pipes is controlled by a four-way valve 22 (shown most clearly in Fig. V) and through which the fluid passes to gain access to either of the pipes 20 and 21.

25 is a fluid-conducting pipe leading to and connected to the valve 22 through the medium of a nipple 23, and 24 is an exhaust-nipple through which fluid is discharged from either of the pipes 20 and 21 and from either end of the cylinder 11.

The table-ring 16 serves as a support for a flask B, into which the sand of the mold is rammed around the pattern A when said pattern is upheld in the position seen in Fig. II.

C is a sand-retaining board that is positioned upon the flask after the sand has been rammed therein.

26 designates an upper fluid-cylinder attached to the second arm of the frame 9 and having a bottom head 27 and a top head 28.

29 is a piston-rod that operates through the bottom cylinder-head 27 and which is equipped within the cylinder 26 with a piston 30.

31 is a retracting-spring surrounding the piston 29 and which acts to hold the piston 30 projected toward the upper or outer end of the cylinder 26.

32 is a platen fixed to the lower or inner end of the piston 29 exterior of the cylinder 26 and which is therefore susceptible of moving with said piston in a direction toward the table-ring 16 and the mold situated above said table-ring.

33 is a two-way valve fitted to the outer head 28 of the cylinder 26 and through which fluid is admitted to said cylinder. This valve is provided with a nipple 34, to which a fluid-conducting pipe 32 is connected, and an exhaust-nipple 35, through which fluid may be discharged from said cylinder.

In the practical use of my machine the four-way valve 22 is first so manipulated as to occasion a flow of fluid from the conducting-pipe 25 through said valve and into the pipe 20 to be delivered into the lower fluid-cylinder 11 to force the piston 18 upwardly in said cylinder and carry the pattern-plate 19 into the position seen in Figs. I and II, within the table-ring 16. At this time the frame 9 is in the vertical position (seen in the last-named figures) and the pattern A, being affixed to the plate 19, occupies a position above the level of the table-ring 16. The flask B is then placed upon the table-ring and sand introduced thereinto and rammed around the pattern to produce the mold. After the sand has been thoroughly rammed the retaining-board C is placed upon the flask, thereby covering the sand. Then by manipulating the two-way valve 33 fluid is permitted to flow from the conducting-pipe 36 into the upper end of the cylinder 26 and acts to force the piston 30 and piston-rod 29 downwardly against the action of the spring 31, thereby carrying the platen 32 to the sand-retaining board C, as seen in dotted lines, Fig. II. The frame 9, with all of the parts associated therewith, is then rotated, so that the parts will be inverted from the positions seen in Figs. I and II to the positions seen in Fig. III. The mold now rests upon the platen 32 with the sand-retaining board C located beneath the flask and the sand therein. The four-way valve 22 is then manipulated to permit exhaust of the fluid from the pipe 20 and the end of the cylinder 11 with which said pipe communicates, the fluid escaping from the valve through the exhaust-nipple 24. In such manipulation of the valve 22 communication is established for the flow of fluid from the conducting-pipe 25 through the valve into the pipe 21 and the end of the cylinder 11, with which said last-named pipe communicates, which end is at this time lowermost. The inflowing fluid acts within the cylinder against the piston 18 and forces said piston and the piston-rod 17 upwardly, thereby elevating the pattern-carrying plate 19 and withdrawing the pattern from the sand in the mold and through the table-ring 16. Fluid-pressure is then relieved from the cylinder 26 by manipulating the valve 33 so that the fluid will be exhausted from said cylinder through the nipple 35 of said valve and cut off from entering said cylinder. The piston 30 and piston-rod 29 are then forced downwardly by the retracting-spring 31, thereby causing the platen 32 to be lowered from the position seen in dotted lines to the position seen in full lines, Fig. III, thus separating the mold from the table-ring 16 and permitting of the removal of said mold in its finished condition, while resting upon the sand-retaining board C, after which a suitable cope-mold member is fitted to the mold formed in the machine, which constitutes the drag member of the mold. To place the machine in condition for operation in producing the next mold, the frame 9 is rotated so as to again invert it and bring the parts back to the positions seen in Figs. I and II, the fluid from the conducting-pipe 25 being at a suitable time again admitted to the lower end of the cylinder 11 through the pipe 20 to raise the pattern-carrying plate 19 to the table-ring 16, after which the operation of producing the mold to be next made is carried out in the same manner as before.

I claim as my invention—

1. In a molding-machine, the combination of a support, a rotatable frame pivoted to said support, a fluid-cylinder carried by said frame, a piston operating in said cylinder, a piston-rod by which said piston is carried, a pattern-carrying plate fixed to said piston, a table-ring carried by said cylinder and into which said pattern-carrying plate is adapted to move, a second cylinder carried by said frame, a piston operating in said second cylinder, a piston-rod carried by said piston, and a platen carried by said piston-rod and adapted to be moved toward said table-ring, substantially as set forth.

2. In a molding-machine, the combina-

tion of a support, a rotatable frame pivoted to said support, a fluid-cylinder carried by said frame, a piston operating in said cylinder, a piston-rod by which said piston is carried, a pattern-carrying plate fixed to said piston, a table-ring carried by said cylinder and into which said pattern-carrying plate is adapted to move, a second cylinder carried by said frame, a piston operating in said second cylinder, a piston-rod carried by said piston, a platen carried by said piston-rod and adapted to be moved toward said table-ring, and a retracting-spring surrounding said piston-rod within said second cylinder, substantially as set forth.

WILLIAM MILLEN DUNCAN.

In presence of—
J. N. CRAWFORD,
JOHN ANDERSON.