J. J. FITZSIMMONS.

MOLDING MACHINE.

APPLICATION FILED APR. 11, 1907.

989,593.

Patented Apr. 18, 1911.

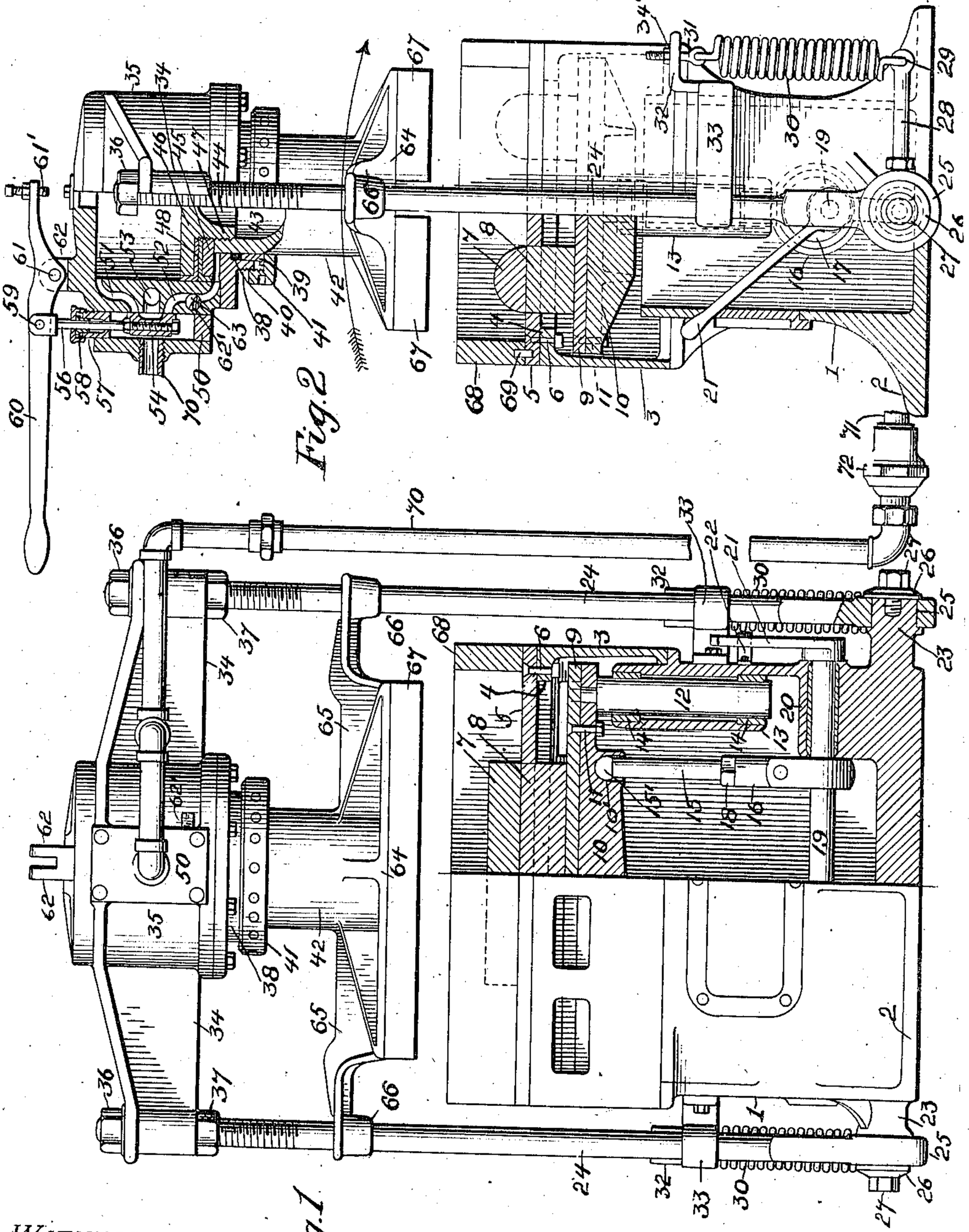

Fig. 2

Fig. 1

WITNESSES:

Wm. F. Hoge.

L. Hines

INVENTOR

James J. Fitzsimmons

BY

Connolly Bros.

Attorneys

UNITED STATES PATENT OFFICE.

JAMES J. FITZSIMMONS, OF BALTIMORE, MARYLAND, ASSIGNOR TO CENTRAL FOUNDRY COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

MOLDING-MACHINE.

989,593. Specification of Letters Patent. **Patented Apr. 18, 1911.**

Application filed April 11, 1907. Serial No. 367,534.

To all whom it may concern:

Be it known that I, JAMES J. FITZSIMMONS, a citizen of the United States, residing at Highlandtown, in the city of Baltimore and State of Maryland, have invented certain new and useful Improvements in Molding-Machines, of which the following is a specification.

This invention has relation to molding machines, and relates in particular to machines for making green sand molds.

The object of the invention is to provide a machine of novel and comparatively simple construction by means of which green sand molds of uniform size and substantially uniform density may be rapidly formed and finished at a single operation, by comparatively unskilled workmen.

The invention consists in the novel construction, combination and arrangement of parts hereinafter described and claimed.

I have illustrated my invention in the accompanying drawing, wherein:

Figure 1, is a front elevation of the complete machine with one half in section. Fig. 2, is an end elevation of the same with one half also in section.

The main base of the machine is designated 1 and is formed with the base flange 2, that rests upon the floor of the molding room. The base 1 is of rectangular form in plan and is hollow and contains a portion of the operating mechanism and serves to sustain all the movable mechanism and stationary parts of the machine, as will be hereinafter described.

Upon the base 1, and firmly secured in position thereon, is the stripping plate frame 3 which is of rectangular form and is open at top and bottom and is formed with an inwardly projecting flange 4 at its upper edge, to which flange the stripping plate 5 is secured by bolts 6. The stripping plate 5 is formed with holes through which the patterns 7 project, these patterns being attached to pattern chairs 8 and the latter being mounted upon and attached to a chair plate 9 that rests upon top of the pattern head 10, and is attached thereto by bolts 11. The pattern head 10, carries depending guide rods 12, which slide in guiding brackets 13, preferably formed integral with the base 1, these brackets being provided at suitable points with anti-friction collars 14, of Babbitt metal or other suitable material, to provide a smooth and even bearing for the guide rods 12. The lower side of the pattern head 10 is formed with concave sockets 10′ in which are seated the ball-heads 15′ of eccentric rods 15. The eccentric rods 15 are screwed into eccentric straps 16 which surround eccentrics 17 and jam nuts 18 are arranged on the eccentric rods to secure them in proper adjustment relative to the eccentric straps 16 and the pattern head 10. The eccentrics 17 are mounted on a horizontal rock shaft 19 that is mounted in bearings 20 carried by base 1, this shaft projecting through the outer wall of the base and carrying on its outer end a handle 21 by means of which the shaft may be rocked and the pattern head raised and lowered. A bracket 22 is attached to the end of base 1, and this bracket serves as a stop to limit the movement of handle 21 to its proper range of motion.

The base 1 is formed with projecting stub shafts 23, and upon these stub shafts are mounted the swinging standards 24, these standards having eyes 25 at their lower ends which surround the stub shafts 23, and the eyes being maintained in position on the stub shafts by means of washers 26 and bolts 27. The lower end of each of the swinging standards 24 carries a laterally projecting arm 28, having an eye 29 at its end and in the eye 29 of each arm is fitted the lower end of a spiral spring 30, the upper end of which is attached to a bolt 31 that passes through an arm 32 projecting from a bracket 33 mounted on the end of base 1. A nut 34′ screws on the bolt 31 and serves to adjust the bolt so as to regulate the tension of the spring 30. The brackets 33 are slotted longitudinally and the swinging standards 24 pass through the slots in the brackets, the latter serving to guide the standards and the ends of the slots serving to limit the movement of the standards to their proper range of motion. The upper ends of the swinging standards 24 are threaded and pass through the ends of arms 34 projecting laterally from a cylinder 35, that is arranged above the base 1, nuts 36 and 37 being screwed on the standards to provide for adjustment of the cylinder relatively to the parts below the same.

The cylinder 35 is formed with a stuffing box 38 into which is fitted a gland 39 that is forced into the packing space 40 by a

collar 41 that screws over the gland as shown. A piston rod or plunger 42, passes through the gland and stuffing box and is of comparatively large size, being of a diameter about two thirds that of the bore of the cylinder, and being made of such large diameter to reduce proportionately the working surface of one side of the piston. The piston rod or plunger 42 is made hollow as at 43 to reduce its weight and the piston is hollowed out as at 44 so as to reduce its weight also. The piston is composed of the annular section 45 and the circular section 46, which latter section is formed with a neck 47 that is screw threaded exteriorly and screws into the cavity 43 of the piston rod or plunger, while the annular section 45 is screw threaded interiorly and screws upon the neck 47, a packing 48 being interposed between the circular section 46 and the annular section 45 and extending around the peripheries of both sections as shown in Fig. 2.

A valve chest 50 is mounted on the cylinder 35 and the wall of the cylinder adjacent the valve chest is formed with inlet ports 51, 52, leading respectively to the opposite ends of the bore of the cylinder, and with an exhaust port 53. A slide valve 54 is arranged within the valve chest and is mounted on a valve stem 56 that passes through a stuffing box 57 and gland 58 and is pivotally attached at its upper end by a pivot 59 to a hand lever 60 which is pivoted at 61 in lugs 62 projecting from the upper side of the cylinder head. The hand lever 60 extends inwardly to about the center of the cylinder head and is provided with an adjustable stop 61′ by which the downward movement of the inner end of the hand lever and, consequently the upward movement of the slide valve 54 is adjusted and regulated. A screw plug 62′ passes through the wall of the cylinder at such point as to intercept the lower inlet port 52, and the screw is cut away on one side as at 63, so that by turning the screw the port 52 may be "choked" or opened more or less at will to regulate the amount of expansible fluid (air or steam) passing into the cylinder below the piston.

The piston rod or plunger 42 is provided with a rammer head 64 which has laterally extending arms 65, which have sleeves 66, that embrace and slide on the swinging standards 24. The rammer head 64 carries tucker blocks 67, on its lower side and these tucker blocks serve to ram and pack the sand into a mold box 68, which, when the molding operation is to be performed, is set upon top of the stripping plate 5, being sustained against horizontal movement by pins 69 in the lower edge of the mold box.

An expansible fluid, preferably compressed air, is supplied to the valve chest 50 through a pipe 70, which is connected to a supply pipe 71 leading from a suitable source of supply (not shown) by a union 72, the supply pipe 71, and the union being in alinement with the stub shaft 23 at one end of the base 1, so that the pipe can swing backward and forward with the swinging standards while the supply pipe 71 remains stationary.

Operation: The cylinder and its appurtenant parts being swung back in the direction of the arrow in Fig. 2, leaves the mold box 68 uncovered. The pattern head being in the position shown in the drawing with the patterns projecting above the stripping plate, sand is then put into the mold box and piled up somewhat above the upper edge of the box, and the cylinder is then swung back to its original position. The operator then moves the hand lever 60 downwardly and thus opens port 51 and admits compressed air into the upper end of the cylinder. The air thus admitted drives the piston down and the sand is rammed down in the mold box over and around the patterns 7. The operator then moves the hand lever 60 upwardly and by this movement places port 51 in communication with the exhaust port 53 and simultaneously opens port 52 and admits air into the lower end of the cylinder, below the piston. The air which is admitted below the piston will, by reason of the smaller area of the lower side of the piston, exert less force on the piston than the air admitted above the same, and this construction not only effects an economy in the consumption of compressed air, but obviates the danger of the cylinder head being knocked off as would be the case if the area of the lower side of the piston was the same as that of the upper side, it being borne in mind that there is no resistance to the upward movement of the piston other than friction and the weight of the attached parts. The amount of air which is admitted under the piston can be nicely regulated by means of the stop 61′ by means of which the upward travel of the slide valve 54 can be regulated so as to uncover more or less of the port 52. Further regulation of the area of the port 52 may be secured by turning the screw 62 so that its solid portion will more or less choke the port and the two expedients mentioned *i. e.*, the stop 61′ and the screw 62 may be both employed or either one dispensed with without materially affecting the desired result of regulating the opening of port 52 so as to admit more or less air to the lower end of the cylinder, such regulation being very desirable under certain circumstances as, for instance, when the packing of the piston rod or plunger has been tightened up, or the air pressure is higher or lower than usual. The operation of driving down the rammer on the sand and then

raising the same is repeated as often as may be necessary until the sand is rammed and packed to the required degree, three or four strokes or blows of the rammer usually being sufficient for the purpose and these strokes or blows being administered to the sand in rapid succession by a rapid movement up and down of the hand lever 60. In this operation it is possible with a little easily acquired skill in the manipulation of hand lever 60 to catch the piston in its upward movement and cause it to descend before it has reached the extremity of such upward movement, this operation being effected by pulling down hand lever 60 before the piston has completed its upward stroke and the result of this operation being that a series of short sharp strokes or blows are given in rapid succession and this operation having a good effect in securing proper density and evenness to the molded sand. After the ramming has been accomplished the cylinder is swung back, being balanced and sustained during this movement by the springs 30, and the handle 21 being pulled forward the shaft 19 is rocked and by the movement of the eccentrics 17, the rods 15 are drawn down, thus permitting the pattern head 10 to descend by its own weight and this movement of the pattern head drawing the patterns 7 out of the sand and through the stripping plate 5, and leaving the completed pattern in the mold box 68, which latter, with the molded sand, is then lifted off the stripping plate and laid on the molding room floor.

I claim:

1. In a molding machine, the combination with an air cylinder having a piston and a rammer head carried by the piston, of a valve governing the movement of the piston and means for regulating the capacity of one of the ports in said cylinder and an adjustable stop for limiting the movement of the valve.

2. In a molding apparatus, ramming mechanism comprising a cylinder, a piston mounted therein, a valve for governing the admission of air to both sides of the piston and means independent of said valve for regulating the amount of air admitted to one side of the piston and a ramming device carried by said piston.

In testimony whereof I have affixed my signature, in presence of two witnesses.

JAMES J. FITZSIMMONS.

Witnesses:
JOHN A. BOYD,
CHRISTIAN KERBER.