Oct. 31, 1933. J. E. RADIGAN 1,932,803

MOLD JOLTING AND RAMMING MACHINE

Filed Dec. 9, 1929 2 Sheets-Sheet 1

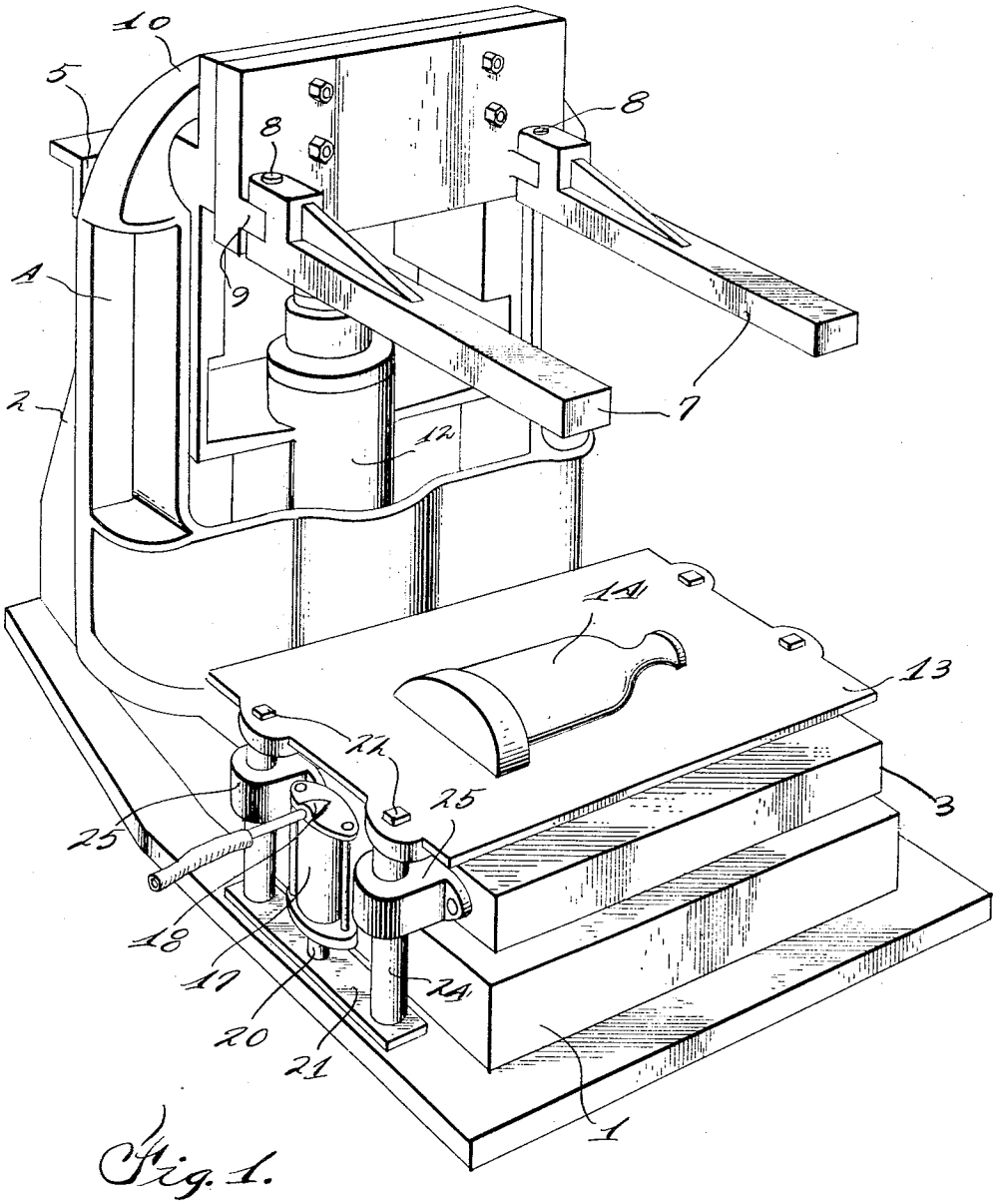


Fig. 1.

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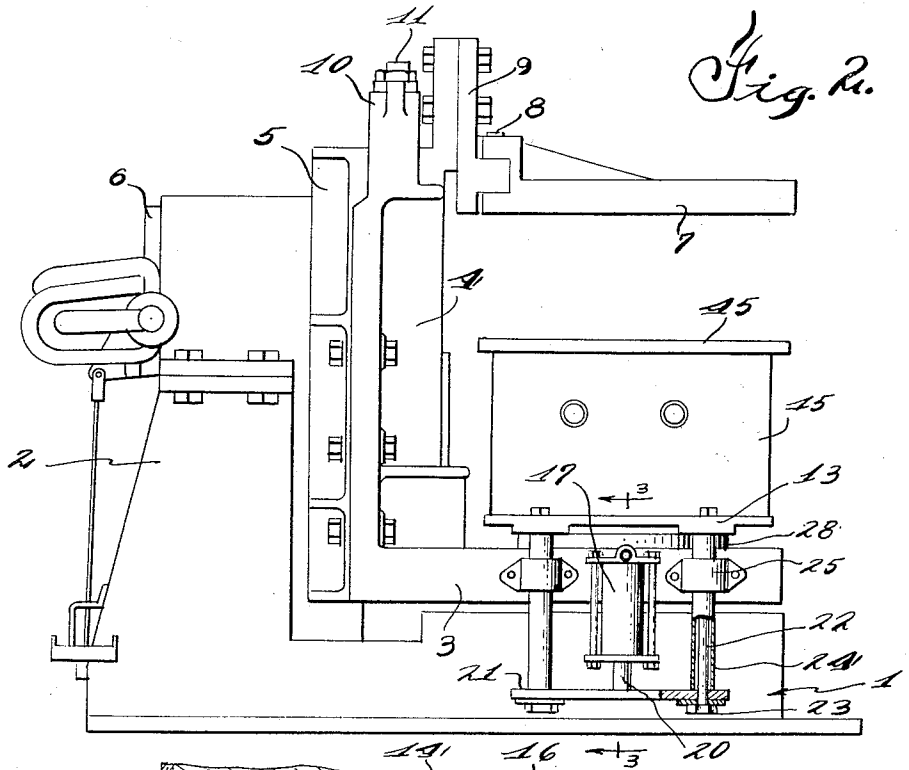


Fig. 2.

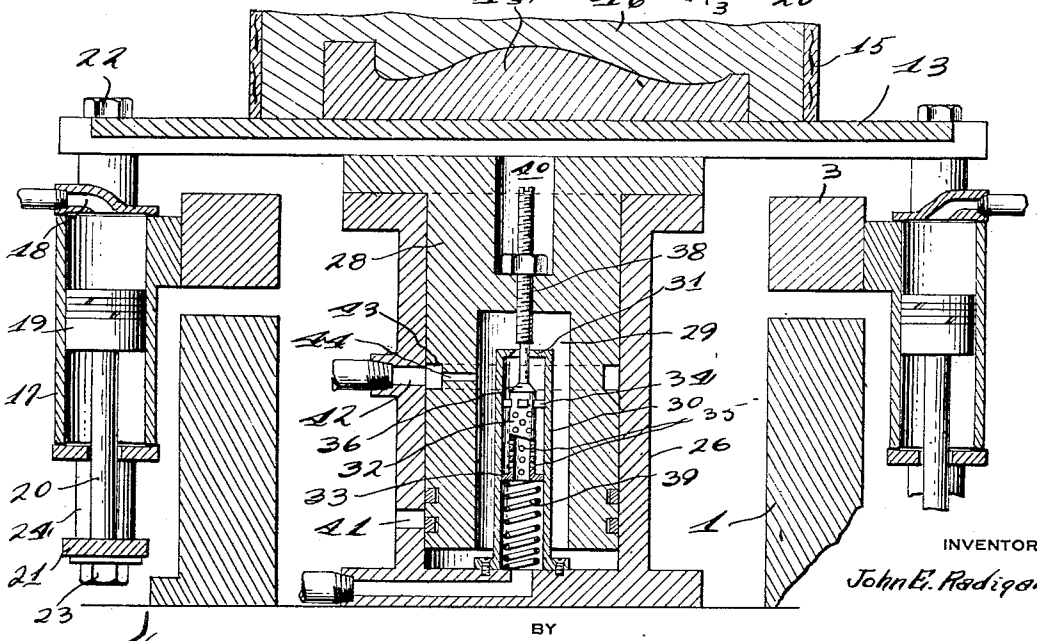


Fig. 3.

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MOLD JOLTING AND RAMMING MACHINE

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Application December 9, 1929. Serial No. 412,876

5 Claims. (Cl. 259—72)

The invention relates to jolting and ramming machines for molds of sand or the like. One of the objects of the invention is to provide an improved machine for subjecting the mold carrier to jolts to compact the sand or the like. Another object is to so construct the machine that the mold carrier is reciprocated without wearing the guides for the support for the carrier so that the carrier and the pattern secured thereto may be withdrawn from the formed mold without damaging the latter. A further object is to provide an improved means for guiding the carrier during its movement relative to the support and for securing the carrier to the support. With these as well as other objects in view, the invention resides in the novel features of construction and combinations and arrangements of parts as more fully hereinafter set forth.

In the drawings:—

Figure 1 is a perspective view of a mold vibrating machine embodying my invention;

Figure 2 is a side view thereof partly in section;

Figure 3 is a cross section on the line 3—3 of Figure 2.

In general, the mold jolting and ramming machine is of that type in which the carrier for the mold is vertically reciprocated and jolted to compact the mold material or sand. 1 is the base of the machine having at its rear side the column 2. 3 is the support above the base and having at its rear side the column 4 which slidably engages vertical guideways in the guide 5 secured to the horizontal shaft 6, which is journaled in the upper end of the column 2. 7 are horizontally movable arms connected by the vertical pivots 8 to the brackets 9 which in turn are secured to the upper end of the guide 5 and in front of the column 4. This latter column is in the nature of a yoke through which the upper end of the guide 5 extends and the cross bar 10 of this yoke has secured to it the rod 11 of a piston, which slidably engages the vertical cylinder 12 mounted in the column 2. For raising the piston and thereby raising the support 3 a suitable medium under pressure, such as compressed air, may be admitted to the lower end of the cylinder 12 to raise the piston therewithin, which through its rod raises the column 4 and consequently the support 3.

13 is a plate above the support 3 and adapted to have secured thereto the pattern 14 and to support the mold frame 15, which encircles the pattern and receives the mold material or sand 16. The plate is yieldably clamped upon the support 3 by means exerting substantially constant pressure upon the plate. This means comprises devices at opposite sides of the plate which are alike, so that but one will be described. 17 is a vertical cylinder secured to a side of the support 3 and depending therefrom laterally beyond the upper portion of the base 1. This cylinder has an upper closed end provided with the port 18 for the passage of a medium under pressure, which is preferably compressed air. 19 is a piston slidable within the cylinder 17 and having the depending rod 20 extending below the cylinder and abutting the cross bar 21. This cross bar is rigidly connected at its opposite ends at equal distances from the piston rod 20 to the plate 13, the connection comprising the threaded rods or bolts 22 and the nuts 23 tying the cross bar and plate together and the spacing sleeves 24 encircling the bolts and abutting the cross bar and plate and holding the same at fixed distances apart. The sleeves 24 slidably extend through the brackets 25 secured to the support 3 and thereby guide the plate during its vertical movements relative to the support.

For subjecting the plate 13 to a series of jolts to compact the molding material or sand, I have provided the stationary vertical cylinder 26 which is located centrally within the base 1 and has in its lower closed end the port 27 for the passage of a medium under pressure, which is preferably compressed air. 28 is a plunger slidably engaging the cylinder 26 and extending upwardly through its upper open end and having an enlarged upper end portion for engagement with the plate 13, and the upper end of the cylinder 26, the support 3 having an opening therethrough providing clearance for the cylinder and plunger. The portion of the plunger which extends within the cylinder is formed with the axially extending recess 29 which, when the plunger is in its lowermost position, encircles but is laterally spaced from the valve chamber 30, which is secured to the lower end of the cylinder 26 and extends vertically upward therefrom. This valve chamber has an open lower end registering with the port 27 and has at its upper end the port 31 opening into the recess 29 and providing for the passage of air from the port 27 to the recess so that this air may exert an upward pressure upon the upper end of the recess and the lower end of the plunger surrounding the recess. 32 is a cylindrical valve within the valve chamber 30 and having the annular flange 33 at its lower end slidably engaging the valve chamber and the lateral lugs 34 near its

upper end also slidably engaging the valve chamber. The wall of this valve is provided with the series of openings 35 for the passage of air through the valve into the valve chamber. The upper end of this valve is closed and has the annular shoulder 36 for closing the port 31 and further has the stem 37 extending vertically upward through the port 31 and spaced from its edges. 38 is a member extending axially of and threadedly engaging the plunger 28 and having its lower end engageable with the upper end of the stem 37 to control the operation of the valve 32 in closing or opening the port 31, there being the coil spring 39 within the valve chamber and abutting the annular flange 33 of the valve and the lower end of the cylinder 26 for tending to resiliently move the valve to closed position. The upper portion of the plunger 28 is preferably provided with the recess 40 for receiving the upper end portion of the threaded member 38 so that this threaded member cannot contact with the plate 13.

As thus far described, and with the parts in position as shown in Figure 3, the valve in the compressed air line is opened to permit the compressed air to enter the cylinders 17 through the ports 18. Then the valve in the compressed air line is opened to permit the passage of compressed air through the port 27 of the cylinder 26. This air passes upwardly through the lower portion of the valve chamber 30 into the valve 32 outwardly through its openings 35, through the upper portion of the valve chamber 30, through the port 31 and into the recess 29, some of the air passing to the lower end of the plunger 28. The pressure exerted by the compressed air upon the plunger 28 at the upper end of the recess 29 and at the lower end of the plunger surrounding the recess is greater than that of the compressed air exerted upon the pistons 19 so that the plunger 28 is raised and it in turn raises the plate 13 supported thereby. As the plunger 28 is being raised the spring 39 forces the valve 32 upwardly, as controlled by the threaded member 38, until this valve closes the port 31, at which time the air pressure is cut off and the plunger 28 has uncovered the exhaust port 41 in the wall of the cylinder 26. When the momentum of the mold carrier plate and the plunger has been overcome, they are lowered both by gravity and the force exerted by the compressed air upon the pistons to forcibly bring the enlarged upper end portion of the plunger against the upper end of the stationary cylinder 26, thereby jolting the mold material or sand to compact the same. During the lowering of the plate and plunger compressed air is forced outwardly through the exhaust port 41 and the threaded control member 38 finally forces the valve 32 downwardly to open position, again allowing compressed air to act upon the plunger to raise the same.

For the purpose of assisting in quickly raising the plunger, I have provided the cylinder 26 with the intake port 42 above the exhaust port 41 for receiving compressed air, the passage of which is controlled by the same valve that controls the passage of compressed air to the port 27. The plunger 28 is formed with the annular groove 43 and with the transverse ports 44 leading from this annular groove to the recess 29. The location of the port 42 and the groove 43 is such that when the plunger is in its lowermost position the two register to provide another means for the passage of compressed air to raise the plunger.

When the mold material or sand has been compacted the valve controlling the passage of compressed air to the ports 27 and 42 is closed and air is then admitted to the lower end of the cylinder 12 to raise the support 3 and the plate 13 clamped thereto by air pressure to force the board 45, which has been placed upon the mold frame, against the arms 7. The guide 5 and all the associated parts are then rotated to invert the same, after which air is admitted to the opposite end of the cylinder 12 to raise the plate 13 and the pattern 14 secured thereto. The completed mold may then be removed and the parts returned to their original positions.

With the construction as above described, it will be seen that the pattern and mold carrier is yieldably secured to the support by means exerting substantially constant pressure upon the carrier, since the pressure of the compressed air acting upon the clamping pistons is substantially constant, inasmuch as during the jolting operation the upward movement of the carrier and consequently the upward movement of the clamping pistons forces the air in the cylinders above these pistons back into the air line so that its pressure is not appreciably increased. It will also be seen that with this construction the pattern and mold carrier is effectively guided and the air pressure actuated devices for clamping this carrier to the support serve to facilitate the desired reciprocation of the carrier for compacting the mold material or sand.

What I claim as my invention is:

1. In a mold jolting and ramming machine, the combination with a support, a pattern and mold carrier above said support, and vertically reciprocable means for delivering a series of jolts to said carrier, of means between said support and carrier for yieldably securing said carrier to said support comprising cylinders on opposite sides of and secured to one of said members, pistons slidably engaging said cylinders and connected to the other of said members, and means for conducting air under pressure to said cylinders.

2. In a mold jolting and ramming machine, the combination with a support, a pattern and mold carrier above said support, and reciprocable means for delivering a series of impacts in a vertical direction to said carrier, of means between said support and carrier for yieldably securing said carrier to said support, comprising cylinders secured to opposite sides of said support and having ports for air under pressure at their upper ends, pistons slidably engaging said cylinders and having rods extending below their lower ends, and bars engaging said piston rods and connected to said carrier.

3. In a mold jolting and ramming machine, the combination with a support, a pattern and mold carrier above said support, and vertically reciprocable means periodically engageable with the carrier for delivering a series of impacts to the latter, of means between said support and carrier for yieldably securing the carrier to the support including, a cylinder connected to one of the latter members, a piston within said cylinder connected to the other of said last mentioned members, and means for conducting air under pressure to said cylinder tending to move the latter and piston therein relatively in a direction to yieldably clamp the carrier to the support.

4. In a mold jolting and ramming machine, the combination with a support, a mold supporting member positioned above the support, and means located below the mold supporting member for delivering a series of jolts to the under surface

thereof, of means between the support and mold carrying member for continuously exerting a pressure on the latter member to yieldably secure the same to said support.

5. In a mold jolting and ramming machine, the combination with a support, a mold supporting member positioned above the support, and means located below said member for delivering a series of impacts to the under surface thereof, of fluid pressure operated means between the support and mold carrying member for continuously exerting a pressure upon the latter member to yieldably secure the same to said support.

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