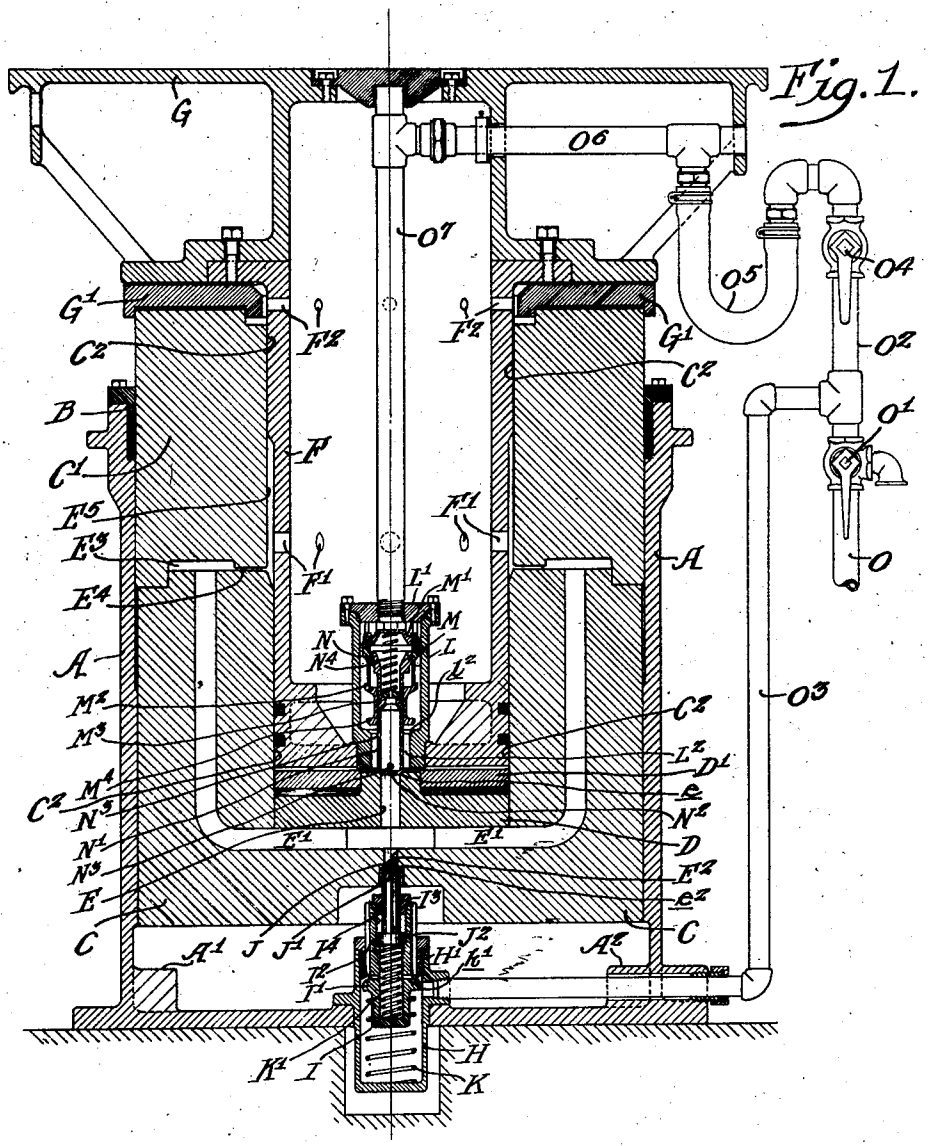
Sept. 13, 1927. 1,642,074

W. LEWIS

JAR MOLDING MACHINE

Filed May 17, 1922 2 Sheets-Sheet 1

Fig. 1.



Inventor.
Wilfred Lewis.
by Francis P. Chamberlain
his Attorney.

Sept. 13, 1927. 1,642,074

W. LEWIS

JAR MOLDING MACHINE

Filed May 17, 1922 2 Sheets-Sheet 2

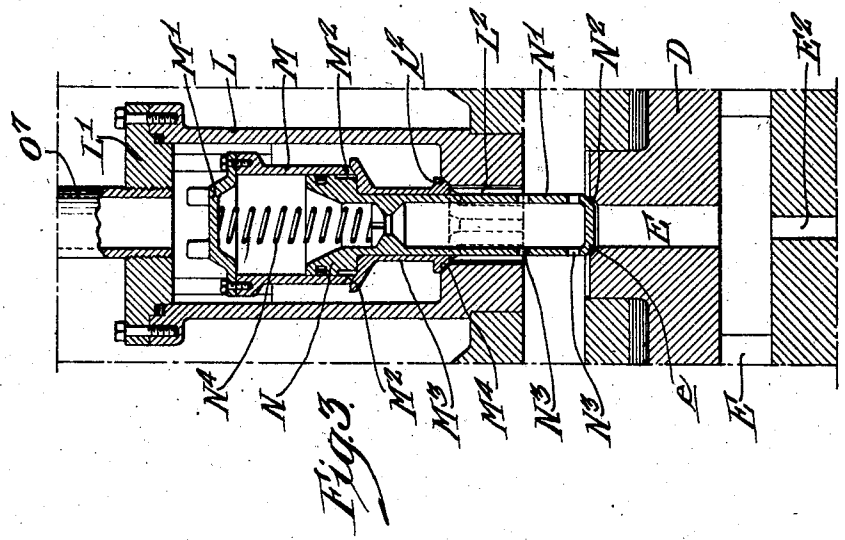


Fig. 3.

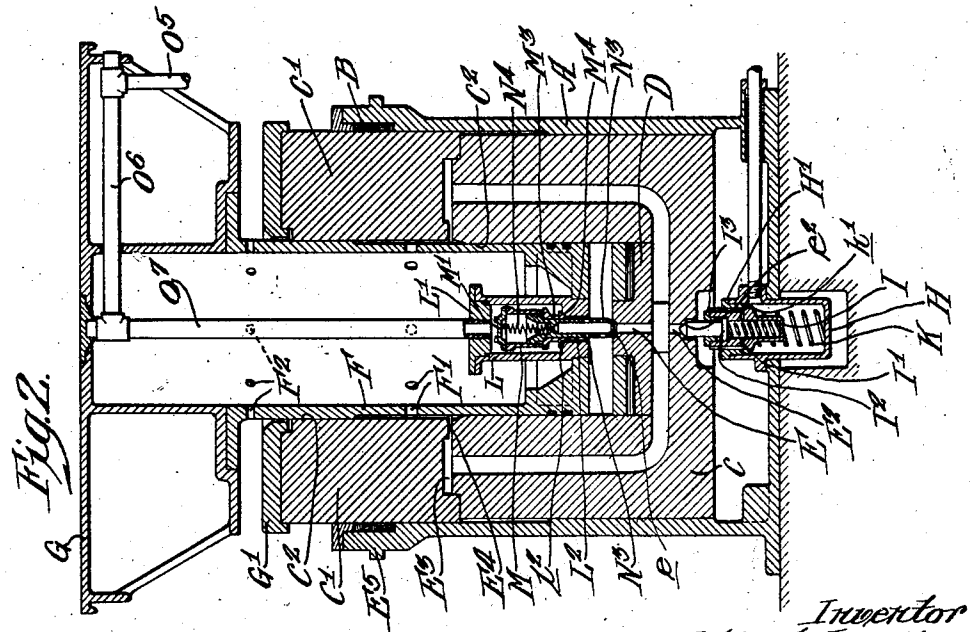


Fig. 2.

Inventor
Wilfred Lewis
by Francis J. Chamberlain
his Attorney.

Patented Sept. 13, 1927. 1,642,074

UNITED STATES PATENT OFFICE.

WILFRED LEWIS, OF HAVERFORD, PENNSYLVANIA, ASSIGNOR TO THE TABOR MANUFACTURING COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

JAR-MOLDING MACHINE.

Application filed May 17, 1922. Serial No. 561,690.

My invention relates to jar molding machines and particularly, though not in all of its features, exclusively, to the type of machine known as shockless jar molding machines. The objects of my invention are, in the first place, to provide improved means for supporting the anvil of a shockless machine on a cushion or spring of compressed air which is automatically maintained at such volume and pressure as to avoid all danger of forcing the anvil too far upward. The other object which I have in view and which, while especially adapted for use with shockless machines, can also be used with other types of machines in which the jarring table is actuated by compressed air through a cylinder and piston, is, to conduct the exhaust air through a passage formed in the anvil and connect it with a delivery port opening in the space between the anvil and the jarring table so that the constant throwing of air jets across the top of the anvil will keep it clean and prevent the collection of impacted sand and dirt on top of the anvil which is apt to occur when no means are employed to prevent it.

The nature of my improvements and the best mode in which I have planned to embody them in a machine will be best understood as described in connection with the drawings in which they are illustrated and in which

Figure 1 is a vertical sectional elevation through a shockless jarring machine embodying my improvement.

Figure 2 is a similar view on a smaller scale showing the jarring table in elevated position and the valves M^4 and N^2 in the positions they occupy when the table is so positioned and

Figure 3 is an enlarged scale view of the valves M^4 and N^2 and their coacting devices.

In the drawing, A is a fixed cylinder; A^1, A^2, being stools or shoulders in the bottom of this cylinder on which the anvil rests when air is exhausted from the cylinder; B, a stuffing box at the open top of the cylinder. C, an anvil piston working in the cylinder A and, as shown, and for convenience in construction of machine, made in two parts, C and C^1, these parts being firmly secured together by any convenient mechanism. C^2 is a cylindrical space formed in the center of the anvil piston and closed at bottom, as shown, by a block or head indicated at D and firmly secured in place to and at the bottom of cylindrical space C^2. E is an exhaust port leading from the cylindrical space C^2 through the head D and formed with a valve seat e at its top. This port E connects with exhaust passages indicated at E^1, E^1, formed in the anvil piston and connected, as shown, through passages E^3 and E^4 with an annular recess or chamber E^5 formed on the inside of the cylindrical space C^2. E^2 is an exhaust port leading into the exhaust passages E^1 through the bottom of the anvil piston, said port being formed with a valve seat e^2 at its lower end. F is a hollow piston fitting and vertically movable in the cylindrical space C^2 and forming a tight fit therewith at its lower end through packing rings, as shown. This hollow piston is formed with ports indicated at F^1 which keep its hollow center in communication with the chamber E^5 and is further provided with outlet ports indicated at F^2 which open into the space at the top of the anvil and the jarring table, and through this space exhaust to the atmosphere. G indicates the jarring table secured to the upper end of the piston F, as shown, and G^1 is the usual cushion employed between the anvil and the jarring table and constituting essentially the top of the anvil.

H is a valve casing located in the bottom of the fixed cylinder A and opening at top into this cylinder through a passage formed, as shown, in an annular gland nut H^1 having a valve seat h^1 at its lower edge. I is a hollow cylinder extending through the vertical opening in the valve casing H and formed with an annular valve I^1 adapted to seat itself on the seat h^1. The hollow cylinder I which constitutes the valve spindle is formed with a shoulder I^2 and provided at its top with a cylindrical nut I^3 which forms an upper shoulder for the cylindrical portion I^4 of the valve stem which extends between the shoulders I^2 and I^3. J is a valve normally seated on the seat e^2 of the exhaust port E^2 and formed at the top of a rod J^1 which extends into the hollow valve stem I and is provided with a head J^2 which is movable between the stops I^2 and I^3. K is a spring acting against the valve I, I^1, to press it upward and K^1 is a spring acting against the head J^2 to press in its stem J^1 and valve J upward.

L indicates a valve casing secured in the

bottom of the hollow piston F as shown, said casing being closed at top by block L^1 and opening at its lower end into the bottom of the cylindrical space C^2, the outlet passage L^2 being formed with a valve seat l^2, as shown. M is a casing guided in the casing L and vertically movable therein, the casing M being closed at top by a cap M^1 and having at bottom a sleeve M^3 at the bottom of which is formed a valve M^4 adapted to seat itself at proper times on the valve seat l^2. M^2 are openings through casing M. N is a piston vertically movable in the casing M, this piston being hollow and formed with the piston rod extension N^1 at the bottom of which extension is formed a valve N^2 adapted to seat itself on the seat e of the exhaust port E. N^3, N^3, indicate openings through the sides of the hollow piston rod N^1 and N^4 is a spring supported on the piston rod and acting against the cap N^1 of the cylindrical casing. This particular valve construction is shown simply as one well adapted for its purpose and forms in itself no part of my present invention.

O indicates a conduit from the source of air under pressure; O^1 a valve in said conduit leading to a conduit section O^2, from which in turn leads the pipe O^3 connecting, as shown, with the valve casing H. At the top of the conduit section O^2 is a valve O^4 through which the conduit is connected through a flexible section O^5, and sections O^6 and O^7 moving with the piston F, with the top of the valve casing L.

When it is desired to start the apparatus, the anvil C, it may be assumed is in its lowermost position, resting on the stools or ledges A^1 and A^2; in this position the piston rod J^1 is forced downward and through its head J^2 presses down the hollow valve stem I, maintaining the valve I^1 widely open while, of course, the valve J is firmly held against the valve seat e^2. The valve O^1 is then opened and air under pressure admitted through conduits O^2 and O^3 into the valve casing H from which it passes freely through the open valve port into the bottom of the cylinder A, moving upward the anvil piston C which, as it moves upward, permits the upward motion of the hollow valve stem I of the valve I^1 until said valve is seated, cutting off further admission of air to the cylinder A, and it will be obvious that after the closing of the valve I^1 the anvil piston C may still move farther upward for a distance corresponding to the distance between shoulders I^2 and I^3 before the contact of head J^2 of the valve stem J^1 with shoulder I^3 will arrest the upward motion of the valve J, after which an upward motion of the anvil piston will cause the valve J to leave its seat and permit the escape of pressure air through the port E^2 into the passages E^1 and thence through passages E^3 and E^4 to chamber E^5 from which it passes through ports F^1 into hollow piston F and through ports F^2 to exhaust over cushion G^1. It is also obvious that the anvil piston cannot be forced farther upward by the air under pressure as at the described height the port E^2 is always opened and the air permitted to exhaust. In moving as described the anvil C of course carries with it the hollow piston F.

The proper amount of air to form a resilient cushion or spring to support the anvil piston having been admitted, as described, and the anvil raised by the air to a proper height, the valve O^4 is opened and the air admitted under pressure to the valve casing L, the piston F carrying this valve casing being, of course, in its lowermost position, as shown in Fig. 1 of the drawing, with the valve N^2 closing the exhaust port E and the valve M^4 open, for the reason that the spring N^4 acts to press the cylindrical casing M to its uppermost position. The air will, therefore, flow through the casing L and the port l^2 into the lower end of the cylindrical space C^2 below the piston F with the result, of course, that the piston F is moved upward and while the piston F is moving upward the casing M and parts connected with it remain stationary and exhaust valve N^2 remains seated until the valve M^4 comes in contact with the seat l^2 cutting off the admission of air to the cylinder C^2. A further upward movement of the piston F lifts the valve N^2 from its seat on the exhaust port and at the same time through the openings N^3 permits the pressure air on the inside of the hollow valve stem and the top of the casing M to exhaust whereupon the pressure air which has entered the portion of the cylinder below the piston N through openings M^2 formed in the wall of the cylinder M forces the valve stem N^1 rapidly upward insuring the prompt opening of the exhaust port.

In Figs. 2 and 3 the jarring table is shown in its upper position, the valve M^4 seated on port l^2 and valve N^2 slightly lifted from seat e. Immediately after the parts reach their positions the pressure air in casing L entering cylinder M through ports M^2 forces piston N to the top of casing M so that as the table and piston F fall the air in cylindrical space C^2 escapes freely through port E until the parts again occupy the position shown in Fig. 1.

It will readily be understood how the admission and exhaust of air under pressure to and from the cylindrical space C^2 causes a reciprocating movement of the jarring table and of the air supported anvil and it will be obvious that in the construction shown the exhaust air is carried through the described ports and passages of the hollow piston F to the ports F^2 through which it passes into the

space between the anvil and the jarring table, constantly sweeping away any sand or dirt which may get into this space and keeping the contacting faces clean.

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

1. In a jar molding machine having an anvil and a jarring table operating therewith and actuated by compressed air through a cylinder and hollow piston, air exhaust passages leading from the cylinder and connected with the hollow piston and air exhaust passages leading from the hollow piston directed horizontally into the space between the anvil and the jarring table.

2. In a jar molding machine an anvil having a cylindrical space formed in it together with a chamber having openings connecting it with the upper portion of said cylindrical space and an exhaust passage leading from the base of the cylindrical space through the anvil to said chamber in combination with a hollow piston working in the cylindrical space, a jarring table supported on said piston, said hollow piston having two sets of ports opening through its walls, one set located to register with the chamber formed on the inside of the cylindrical space and the other set located to register with the space between the face of the anvil and the jarring table.

3. In a shockless jar molding machine comprising a fixed cylinder, an anvil moving therein and formed with a cylindrical space within it for the jarring table piston, a jarring table piston moving in said cylinder and a jarring table supported thereon, means for admitting and exhausting air under pressure to and from the fixed cylinder and the cylindrical space, exhaust ports one leading from the bottom of the cylindrical space in the anvil and the other formed in the bottom of the anvil opening into the fixed cylinder, an exhaust passage formed in the anvil into which said ports open, valve mechanism carried by the jarring table piston operating to alternately admit pressure air to the cylindrical space in the anvil and to open the exhaust port from said cylindrical space, a valve casing located in the fixed cylinder connected with a source of pressure air, said casing having a port leading into the fixed cylinder, a valve for opening and closing said port normally moved toward its seat by resilient means, means for opening said valve actuated by the downward movement of the anvil beyond a determined level, a valve normally held seated on the exhaust port in the bottom of the anvil by resilient means and a stop operating to prevent the upward movement of said valve beyond a determined height so as to open the exhaust port when the anvil moves above said point.

4. In a shockless jar molding machine comprising a fixed cylinder, an anvil moving therein and formed with a cylindrical space within it for the jarring table piston, a jarring table piston moving in said cylinder and a jarring table supported thereon, means for admitting and exhausting air under pressure to and from the fixed cylinder and the cylindrical space, exhaust ports one leading from the bottom of the cylindrical space in the anvil and the other formed in the bottom of the anvil opening into the fixed cylinder, an exhaust passage formed in the anvil into which said ports open, valve mechanism carried by the jarring table piston operating to alternately admit pressure air to the cylindrical space in the anvil and to open the exhaust port from said cylindrical space, a valve casing located in the fixed cylinder connected with a source of pressure air, said casing having a port leading into the fixed cylinder, a vertically movable valve for opening and closing said port normally pressed upward to close position by resilient means, a valve opening rod longitudinally movable between stops in the valve stem, resilient means acting to press said rod upward and a valve on the end of said rod normally seated on the exhaust port in the bottom of the anvil.

WILFRED LEWIS.