W. LEWIS.

JAR MOLDING MACHINE.

APPLICATION FILED DEC. 30, 1919.

1,343,836. **Patented June 15, 1920.**

Fig. 1.

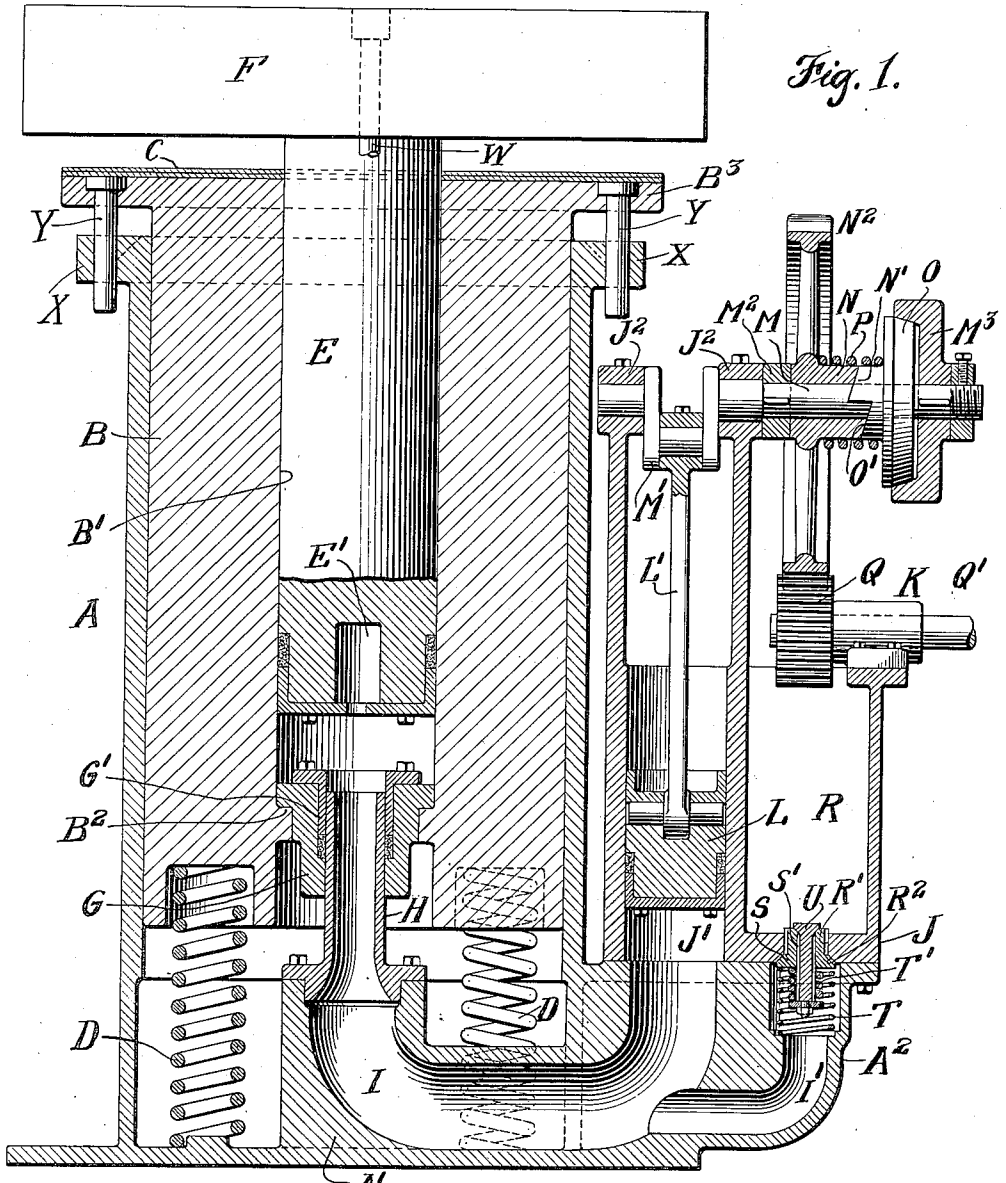
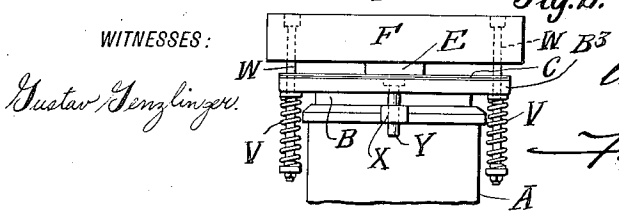


Fig. 2.



WITNESSES:

Gustav Genzlinger.

INVENTOR

Wilfred Lewis

BY

Francis C. Lambert

his ATTORNEY

UNITED STATES PATENT OFFICE.

WILFRED LEWIS, OF HAVERFORD, PENNSYLVANIA.

JAR-MOLDING MACHINE.

1,343,836. Specification of Letters Patent. Patented June 15, 1920.

Application filed December 30, 1919. Serial No. 348,284.

To all whom it may concern:

Be it known that I, WILFRED LEWIS, a citizen of the United States of America, residing in Haverford, county of Montgomery, and State of Pennsylvania, have invented a certain new and useful Improvement in Jar-Molding Machines, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to jar molding machines, either of the kind known as shockless jarring machines or of the more ordinary kind. Heretofore jar molding machines have been generally operated by compressed air though said machines have also been actuated by cams on a driven shaft. The use of compressed air involves considerable expense as well as extensive and more or less complicated mechanism. On the other hand, the use of cams to actuate the jarring machine is open to many objections; especially where large and heavy machines are involved the wear and tear is great, time is lost in picking up the load, and the speed of the machine must be kept within limits which will avoid the cam being struck by the falling table, or parts connected therewith. The object of my invention is to provide a simple and comparatively inexpensive machine which will be free from the objections which have hindered the development of cam driven machines as heretofore constructed, and, broadly speaking, my invention consists in using as the actuating device for alternately raising and permitting the fall of the piston supported work holding table, a liquid containing chamber in communication with the cylinder in which the table supporting piston works, a piston working in said liquid containing chamber and means for actuating this piston, which is operative during its working stroke and inoperative during its return movement under the driving force of the falling table, and, by preference, and as an important part of my perfected invention, I use a driving shaft for actuating the piston in the liquid containing chamber; a driving wheel journaled on this shaft, and a powerful friction clutch arranged to automatically engage and disengage the driving wheel with the shaft, the engagement being effected when resistance is encountered in driving the piston and disengagement occurring when, during the return stroke of the piston, it tends to move faster than the driving shaft.

The nature of my invention, and the various features of improvement involved in it, will be best understood as described in connection with the drawing in which it is illustrated and in which Figure 1 is a sectional elevation taken through the center of a shockless jarring machine and of the mechanism which I have devised for actuating it, and Fig. 2 is a side elevation on a reduced scale taken at right angles to Fig. 1 and showing a detail.

In the drawings A indicates a cylinder serving to aline and guide the floating anvil B, having, as shown, layers of some compressible material secured to its top, as indicated at C, and supported on springs, as indicated at D. A cylinder B is formed in the anvil, and, as shown, an annular shoulder B^2 projects inwardly into the lower part of the cylinder bore. E is a piston working in the cylinder B′ and supporting the work holding table F. E′ is a chamber formed in the end of the piston E, which may be partly or wholly filled with some elastic compressible material such as cork, or may simply contain compressed air. The function of this chamber is to serve simply as a cushion and it is only necessary that some such chamber or some mass of compressible elastic material should communicate with some part of the liquid containing chamber, though it is most convenient to form it or locate it in the end of the piston, as shown. Broadly speaking, any elastic compressible element interposed in the driving mechanism between the driving shaft and table supporting piston is the manifest equivalent for the chamber E′. G is a head supported on the shoulder B^2, and provided, as shown, with a stuffing box, as indicated at G′, so as to form a tight joint with the tube H which connects the lower part of the cylinder B′ with a passage I, formed, as shown and preferably, in the same casting with the cylinder A, the base of which, in which this passage is

formed, is indicated at A'. I' indicates a by-pass from the channel or passage I, the use of which will be explained. J is a casting secured, as shown, to a lateral extension A^2 of the base A' and having formed in it a cylinder J' and an oil reservoir R, and on an upwardly extending portion of this casting are formed the bearings J^2, J^2, for the driving crank shaft indicated at M M' indicates the crank, and L' a connecting rod connecting the crank with the piston L, which reciprocates in the cylinder J'. M^2 is a collar secured on the shaft M and M^3 a clutch member secured on the end of the crank shaft, as shown, and working in connection with the clutch member O, which is journaled on the crank shaft and has a hub formed with inclined or helical cam surfaces as indicated at O'. N^2 is the driving wheel having its hub N journaled on the shaft M and formed with cam surfaces N' which lie in operative contact with the cam surfaces on the hub of the clutch member O. P indicates a light spring acting between the driving wheel and the clutch member O. Q' is a power shaft journaled on the bearing K and driving the gear wheel Q which engages the driven gear wheel N^2.

The oil reservoir R communicates through a passage R', having a valve seat R^2 at its bottom, with the by-pass I' and the passage R' is normally closed by the valve S, having a port S' formed through it, which is closed by a valve U, held in place by a spring T'. Y, Y, are pins secured to a flange B^3 of the anvil B and passing through perforated lugs X, X, of cylinder A. These pins are provided simply to prevent a rotative movement of the anvil in the cylinder. W, W, are rods depending from the table F and passing through the flange B^3 of the anvil, the lower ends of the rods supporting compression springs V, V, the upper ends of which rest against the flange B^3, as shown in Fig. 2.

In operation the gear Q, on the driving shaft Q', actuates the driven gear N^2 in the direction which presses the cam surfaces N' on its hub against the cam surfaces O' on the hub of the clutch member O, pressing this clutch member against the member M^3 and driving the shaft M with its crank M', and through this crank to the piston L. The up stroke of this piston will draw oil from the reservoir R through the by-pass I' into the passage I and when the lower part of the cylinder J', passage I, and the lower part of the cylinder B' are filled with oil, the down stroke of the piston L will force the oil up against the end of the piston E, raising the table F, and, at the same time, where a spring supported anvil, such as is shown in the drawing, is used the pressure on the head G will force the anvil down against the springs D. On the completion of the down stroke of the piston L the weight of and on the table F, and the weight of the piston E, causes these parts to move downward with accelerated speed, which soon becomes greater than the speed of the upward movement of the piston L. As a result of this the cam surfaces N' and O' tend to disengage and the clutch member O being no longer pressed into the clutch M^3, can and does release its friction grip on the clutch member M^3, permitting it to turn faster than the gear wheel N^2, as a result of which the table F can and does fall with accelerated speed on the cushion C of the anvil B, which anvil, in the case of the shockless machine illustrated in the drawing, rises to meet the downwardly moving table.

The cushion chamber E' has the usual function of such chambers in eliminating water hammer, and the valve U has the function of permitting the escape of oil when the pressure in the passage I, and its connections, exceeds a determined amount, and thereby prevents injurious strains in the machine.

The springs V, V, are provided to supplement the force of gravity and increase the speed of the fall of the table. Their value lies in that they provide means tending to overcome the frictional resistance, weight, and inertia of parts opposing the gravital fall, and while springs or equivalent devices, may obviously be located in many positions to accomplish the same result I believe their location, as shown, is the best. In adjusting these springs care must be taken that they shall not increase the speed of downward movement of the table to a point which would exceed the speed of gravital fall.

While I have illustrated my invention in what I believe to be its best practical form it is obviously capable of useful applications in many modifications, and it will be understood that I do not intend to limit myself to the constructions illustrated in any greater degree than is specifically indicated in the claims.

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

1. In a jarring machine having a cylinder and piston for actuating the work holding table, the combination with said cylinder of a liquid containing chamber in communication therewith, a piston working in said chamber and means for actuating said piston operative during its working stroke and inoperative during its return movement under the driving force of the falling table.

2. In a jarring machine having a cylinder and piston for actuating the work holding table, the combination with said cylinder of a chamber containing compressible material, a liquid containing chamber in communication therewith, a piston working in said

chamber and means for actuating said piston operative during its working stroke and inoperative during its return movement under the driving force of the falling table.

3. In a jarring machine having a cylinder and piston for actuating the work holding table, the combination with said cylinder of a liquid containing chamber in communication therewith, a relief valve opening under determined pressure communicating with said chamber, a piston working in said chamber and means for actuating said piston operative during its working stroke and inoperative during its return movement under the driving force of the falling table.

4. In a jarring machine having a cylinder and piston for actuating the work holding table, the combination with said cylinder of a chamber containing compressible material, a liquid containing chamber in combination therewith, a relief valve opening under determined pressure communicating with said chamber, a piston working in said chamber and means for actuating said piston operative during its working stroke and inoperative during its return movement under the driving force of the falling table.

5. In a jarring machine a spring supported floating anvil having a cylinder formed therein, in combination with a piston working in said cylinder and supporting a work holding table, a liquid containing chamber in communication with the cylinder in the anvil, a piston working in said chamber and means for actuating said piston operative during its working stroke and inoperative during its return movement under the driving force of the falling table.

6. In a jarring machine having a cylinder and piston for actuating the work holding table, the combination with said cylinder of a liquid containing chamber, a piston working in said chamber, a driving shaft connected to actuate said piston, and means for driving said shaft, including a clutch operative during the working stroke of the piston and inoperative during its return stroke.

7. In a jarring machine having a cylinder and piston for actuating the work holding table, the combination with said cylinder of a liquid containing chamber, a piston working in said chamber, a driving shaft connected to actuate said piston, means for driving said shaft, including a clutch operative during the working stroke of the piston and inoperative during its return stroke, and an elastic element interposed in the driving connection between the shaft and table supporting piston to eliminate excessive strains.

8. In a jarring machine having a cylinder and piston for actuating the work holding table, the combination with said cylinder of a liquid containing chamber in communication therewith, a piston working in said chamber, a crank and crank shaft connected to said piston, a driving wheel journaled on said shaft, a clutch having a fixed member secured to said shaft, and a movable member journaled thereon, and clutch actuating mechanism operative when the driving wheel is actuating the crank shaft and piston.

9. In a jarring machine having a cylinder and piston for actuating the work holding table, the combination with said cylinder of a liquid containing chamber in communication therewith, a piston working in said chamber, a crank and crank shaft connected to said piston, a driving wheel journaled on said shaft, a clutch having a fixed member secured to said shaft, and a movable member journaled thereon, and clutch actuating cams formed on contacting ends of the hubs of the driving wheel, and movable clutch member whereby the clutch is made operative when the driving wheel is actuating the shaft and piston.

10. In a jarring machine having a cylinder and piston for actuating the work holding table, the combination with said cylinder of a liquid containing chamber in communication therewith, a liquid reservoir, a port connecting said reservoir with the liquid containing chamber, a check valve in said port opening toward the said chamber, a piston working in the liquid containing chamber and means for actuating said piston operative during its working stroke and inoperative during its return movement under the driving force of the falling table.

11. In a jarring machine having a cylinder and piston for actuating the work holding table, the combination with said cylinder of a liquid containing chamber in communication therewith, a liquid reservoir, a port connecting said reservoir with the liquid containing chamber, a check valve in said port opening toward the said chamber, said valve having a port formed in it, a relief valve seated on said port, a piston working in the liquid containing chamber and means for actuating said piston operative during its working stroke and inoperative during its return movement under the driving force of the falling table.

12. In a jarring machine having a cylinder and piston for actuating the work holding table, the combination with said cylinder of a liquid containing chamber in communication therewith, a piston working in said chamber, means for actuating said piston operative during its working stroke and inoperative during its return movement under the driving force of the falling table and elastic means for storing energy during the upward movement of the table and giving it up during its downward movement acting to overcome resistance to the downward movement of the table.

13. In a jarring machine having a cylinder and piston for actuating the work holding

table, the combination with said cylinder of a liquid containing chamber in communication therewith, a piston working in said chamber, means for actuating said piston operative during its working stroke and inoperative during its return movement under the driving force of the falling table and elastic means for storing energy during the upward movement of the table and giving it up during its downward movement acting on the table tc overcome resistance to the downward movement of the table.

WILFRED LEWIS.