H. L. DEMMLER.

AUTOMATIC VALVE MECHANISM FOR BUMPING MACHINES.

APPLICATION FILED AUG. 30, 1909.

1,042,094. Patented Oct. 22, 1912.

Fig. 1.

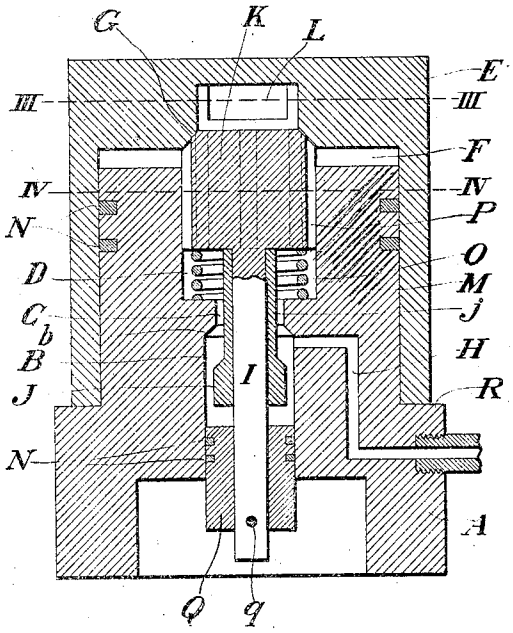


Fig. 2.

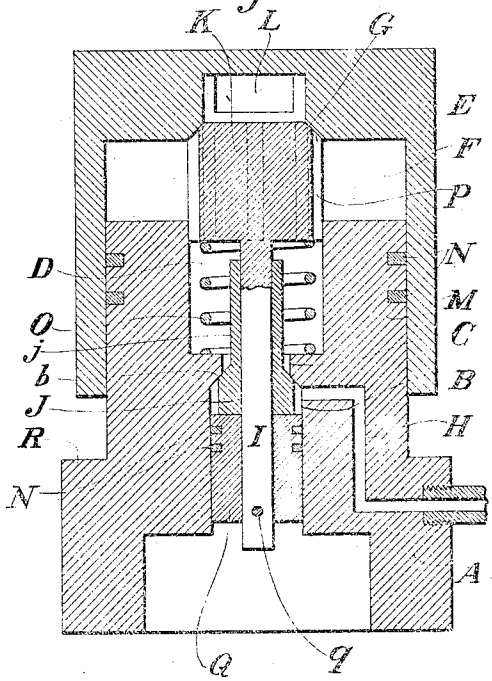


Fig. 3.

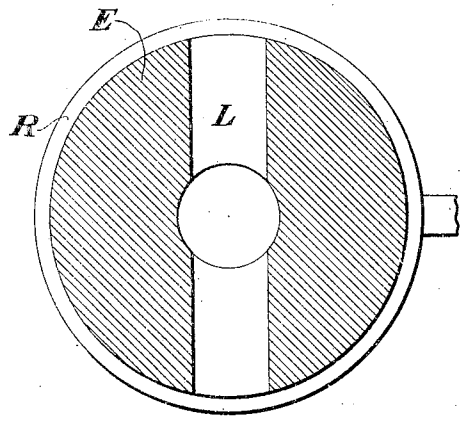
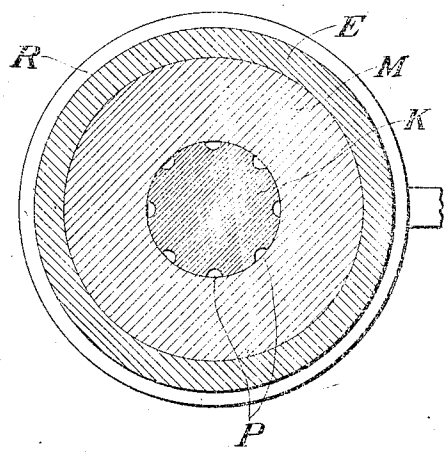


Fig. 4.



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UNITED STATES PATENT OFFICE.

HENRY L. DEMMLER, OF KEWANEE, ILLINOIS.

AUTOMATIC VALVE MECHANISM FOR BUMPING-MACHINES.

1,042,694. Specification of Letters Patent. Patented Oct. 22, 1912.

Application filed August 30, 1909. Serial No. 515,255.

To all whom it may concern:

Be it known that I, HENRY L. DEMMLER, a citizen of the United States, residing at Kewanee, in the county of Henry and State of Illinois, have invented a new and useful Automatic Valve Mechanism for Bumping-Machines.

My invention has for its object to provide an improvement in bumping machines of the class used in molding operations, for imparting a series of reciprocating strokes or impulses to the flask to pack the sand around the pattern. The invention particularly refers to the fluid controlling valve mechanism for such machine or similar reciprocating apparatus, and to the incorporated structure, whereby a fluid pressure is utilized to impart an upward stroke to the bumping or vibrating element, and gravity is utilized for accomplishing the return or downward stroke, in connection with positive lowering of the exhaust valve by fluid pressure.

One form of the apparatus is illustrated in the accompanying drawings in which—

Figure 1 is a vertical sectional view through the valve and the superimposed bumping element, showing the parts in normal position. Fig. 2 is a similar view showing the bumper raised. Fig. 3 is a horizontal sectional view, indicated by the line III. III. of Fig. 1. Fig. 4 is a similar view on the line IV. IV. of Fig. 1.

Mounted upon any suitable support, as the base of the bumping machine, not shown, is a main pedestal A comprising a valve casing for the operative fluid controlling valve mechanism, having at its upper portion an extended head M of reduced diameter extending above an annular abutment or shoulder R, and having packing rings N.

Slidingly mounted on the pressure head M is the reciprocating head or bumper E, suitably chambered in its interior to fit over the head M and providing, when seated on the annular abutment R, a space F between the upper end of the head M and the inner upper end of its cavity. The flask is to be set upon the top of bumper E.

Arranged centrally of base A and its head M is a primary valve chamber B having a valve seat *b* and a secondary or upper chamber D connected by a circulating port C above valve seat *b*. Constant fluid pressure is supplied to primary chamber B by a port H connected with any suitable source of pressure.

A piston Q is reciprocably mounted in the lower portion of chamber B and is provided with suitable packing rings N. Mounted in the upper chamber D is a valve K adapted to seat on valve seat G controlling circulation to the exhaust port L and provided lengthwise of its exterior body portion with a series of fluid circulation grooves P.

A cushion spring O is located in the secondary chamber D, seated on the bottom thereof and bearing underneath the bottom of valve K, tending to hold it to its seat, as in Figs. 1 and 2.

Extending downwardly from exhaust valve K is a central stem I to which is secured the piston Q by any suitable means, as a pin *q*, so as to positively lower the exhaust valve K from its seat by fluid pressure acting on the upper side of piston Q, when the bumper E is raised, as in Fig. 2.

For the purpose of controlling the flow of fluid pressure through port C to chamber D and through grooves P to space F, to shut off the flow when the bumper is raised, and to open circulation through said ports when it is lowered, a valve J is slidingly mounted on stem I of the exhaust valve K. Said valve is provided with an upwardly extending sleeve *j* adapted to be engaged by the bottom of exhaust valve K on downward travel of the bumper whereby to unseat valve J and allow of circulation being renewed through port C to again raise the bumper.

Spring O is of sufficient strength to hold exhaust valve K to its seat when the bumper is raised to almost the limit of its travel, as in Fig. 2, and to partly resist the downward action of piston Q to allow said piston to quickly unseat valve K, when the bumper is clear up, but not to lower it sufficiently to strike the top of sleeve *j* prematurely. This latter operation is not intended to occur until, the fluid in space F having exhausted through ports L, the bumper falls by gravity, pressing valve K down with it, and unseating valve J for the next lifting operation.

It will be observed that the area of exhaust valve K is greater than that of piston

Q, but piston K being suddenly arrested in its upward movement by seating of valve J, the head E tends to raise slightly beyond exhaust valve K, thereby slightly opening the exhaust and assisting the valve Q in its lowering action.

The action of the device will be clear from the foregoing description. In its normal lowered position, exhaust port L is closed and valve J is depressed, opening pressure circulation to space F, whereby the bumper is raised to the limit of its movement. This action raises piston Q and likewise valve J, closing the port C, as in Fig. 2. Thereupon pressure through H acts on piston Q and by its connection with stem I, exhaust valve K is quickly and slightly lowered from its seat, against pressure of spring O, allowing exhaust, whereupon the head E falls to its seat on annular abutment R, closing exhaust L on its way down by bringing seat G against valve K. This operation will continue alternately as long as pressure is admitted, and at a speed dependent on the pressure or amount of supply.

It will be understood that the proportions, arrangement and design of the device may be changed or varied by the skilled mechanic, and I do not desire to be limited to the exact construction as shown and described but to include all such changes as within the scope of the following claims.

What I claim is:

1. In a reciprocating device, a casing having a primary chamber and an auxiliary chamber, a valve-seated port connecting said chambers, a supply port for said primary chamber, a head slidingly engaging said casing and provided with a suitable exhaust port, a valve in said primary chamber for controlling said valve-seated port, a valve in said auxiliary chamber for controlling said exhaust port, and fluid actuated means for operating said valves.

2. In a reciprocating device, a casing having a primary chamber and an auxiliary chamber, a valve-seated port connecting said chambers, a supply port for said primary chamber, a head slidingly engaging said casing and provided with a suitable exhaust port, a valve in said primary chamber for controlling said valve-seated port, a valve in said auxiliary chamber for controlling said exhaust port, fluid actuated means for operating said valves, and means for checking said exhaust valve on its return stroke.

3. In a reciprocating device, a casing having a primary chamber and an auxiliary chamber, a valve-seated port connecting said chambers, a supply port for said primary chamber, a vertically reciprocable head slidingly engaging said casing and provided with a suitable exhaust port, a valve in said primary chamber for controlling said valve-seated port, a valve in said auxiliary chamber for controlling said exhaust port, fluid actuated means for operating said valves, and means for arresting said slidingly engaging head at the limit of its downward travel.

4. In a reciprocating device, a casing having a primary chamber and an auxiliary chamber, a valve-seated port connecting said chambers, a supply port for said primary chamber, a vertically reciprocable head slidingly engaging said casing and provided with a suitable exhaust port, a valve in said primary chamber for controlling said valve-seated port, a valve in said auxiliary chamber for controlling said exhaust port, fluid actuated means for actuating said valves, means for checking said exhaust valve on its return stroke, and means on the casing for arresting the sliding head at the limit of its downward travel.

5. The combination with a stationary base provided with a telescoping reciprocable head having a valve controlled exhaust port, of a valve controlling said port adapted to reciprocate with said head, and valve and piston mechanism in the base operable to admit pressure to said head and to open said exhaust port respectively, substantially as set forth.

6. The combination with a stationary base provided with a reciprocable head having a valve controlled exhaust port, of a valve controlling said port adapted to reciprocate with said head, a cushioning spring therefor, and valve and piston mechanism in the base operable to admit pressure to said head and to open said exhaust port respectively, substantially as set forth.

7. The combination with a stationary base provided with a reciprocable head having a valve controlled exhaust port, a centrally arranged valve and piston chamber, a secondary exhaust valve chamber, and a communicating valve seated port; of an exhaust valve in said secondary chamber having a downwardly extending stem, a piston secured thereto, and a valve slidingly mounted on said stem between the exhaust valve and piston and operable to open and close said communicating port, substantially as set forth.

8. The combination with a stationary base provided with a reciprocable head having a valve controlled exhaust port, a centrally arranged valve and piston chamber, a secondary exhaust valve chamber, and a communicating valve seated port; of an exhaust valve in said secondary chamber having a downwardly extending stem, a piston secured thereto, and a valve slidingly mounted on said stem between the exhaust valve and piston having an extended sleeve adapted to contact with the exhaust valve, substantially as set forth.

9. The combination with a stationary base provided with a reciprocable head having a

valve controlled exhaust port, a centrally arranged valve and piston chamber, a secondary exhaust valve chamber, and a communicating valve seated port; of an exhaust valve in said secondary chamber having a downwardly extending stem, a cushion spring therefor, a piston secured thereto, and a valve slidingly mounted on said stem between the exhaust valve and piston and operable to open and close said communicating port, substantially as set forth.

10. In a reciprocable bumping machine, the combination of a cylinder and a piston, a valve casing, an exhaust valve adapted to be locked in sealed position by fluid pressure in said cylinder, an independent inlet controlling valve, and means for controlling said inlet valve.

11. In a reciprocating device, a casing having a primary chamber and an auxiliary chamber, a contracted opening connecting said chambers, a supply port for said primary chamber, a head slidingly engaging said casing and provided with an exhaust port, a valve in said auxiliary chamber for controlling said exhaust port, and fluid actuated means in said primary chamber for actuating said exhaust valve.

12. In a reciprocating device, a casing having a primary chamber and an auxiliary chamber, a supply port for said primary chamber, a slidingly engaging head for said auxiliary chamber, a suitable exhaust port for said auxiliary chamber, an inlet valve in said primary chamber, and means for exhausting fluid pressure from said auxiliary chamber.

13. In a reciprocating device, a casing having a primary chamber communicating with an auxiliary chamber, a supply port for said primary chamber, a head slidingly engaging said casing, a suitable valve-seated exhaust port for said auxiliary chamber, a valve in said auxiliary chamber adapted to be sealed by fluid pressure in said auxiliary chamber, and fluid actuated means for actuating said exhaust valve.

14. In a reciprocating device, a casing having a slidingly engaging head, means for supplying fluid pressure to said casing, a suitable exhaust port for said casing, a valve in said casing for controlling said exhaust port, and fluid actuated means for operating said exhaust valve.

15. In a reciprocating device, a casing having a slidingly engaging head, means for supplying fluid pressure to said casing, a suitable exhaust port for said casing, a valve in said casing for controlling said exhaust port, fluid actuated means for actuating said exhaust valve, and means for supporting said slidingly engaging head at the lower terminal of its stroke.

16. In a reciprocating device, a casing having a slidingly engaging head and provided with a suitable exhaust port, means for supplying fluid pressure to said casing, a valve in said casing for controlling said exhaust port, fluid actuated means for actuating said exhaust valve, and an anvil to support said slidingly engaging head on its return stroke.

17. In a reciprocating device, a casing having a slidingly engaging head, means for supplying fluid pressure to said casing, a suitable exhaust port in said casing, an exhaust valve adapted to be locked in sealed position by fluid pressure, and means for operating said exhaust valve.

18. In a reciprocating device, a casing having a slidingly engaging head, means for supplying fluid pressure to said casing, a suitable exhaust port for said casing, an exhaust valve adapted to be locked in sealed position by fluid pressure, means for operating said exhaust valve, and means for supporting said slidingly engaging head at the terminal of its return stroke.

19. In a reciprocating device, a casing having a primary chamber communicating with an auxiliary chamber, a supply port for said primary chamber, a slidingly engaging head for said casing, a suitable exhaust port for said auxiliary chamber, an exhaust valve adapted to be locked in sealed position by fluid pressure in said auxiliary chamber, and means for actuating said exhaust valve.

20. In a reciprocating device, a casing having a primary chamber and an auxiliary chamber, a supply port for said primary chamber, a slidingly engaging head for said auxiliary chamber, a suitable exhaust port for said auxiliary chamber, an inlet controlling valve in said primary chamber, means for exhausting fluid pressure from said auxiliary chamber, and means for supporting said slidingly engaging head at the terminal of its return stroke.

21. In a reciprocating device, a casing having a primary chamber and an auxiliary chamber, a supply port for said primary chamber, a slidingly engaging head for said auxiliary chamber, a suitable exhaust port for said auxiliary chamber, an inlet controlling valve in said primary chamber, and fluid actuated means for exhausting fluid pressure from said auxiliary chamber.

22. In a reciprocating device, a casing having a primary chamber and an auxiliary chamber, a supply port for said primary chamber, a slidingly engaging head for said auxiliary chamber, a suitable exhaust port for said auxiliary chamber, an inlet controlling valve in said primary chamber, fluid actuated means for exhausting fluid pressure from said auxiliary chamber, and means for supporting said slidingly engaging head at the terminal of its return stroke.

23. In a reciprocating device, the combi-

nation of a cylinder and a piston, a valve casing, an exhaust valve adapted to be locked in sealed position by fluid pressure in said cylinder, an independent inlet controlling valve and fluid actuated means for actuating said valves.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY L. DEMMLER.

Witnesses:
LEONARD D. QUINN,
LESTER J. LOWE.