C. M. HENDERSON.

VALVE FOR IMPACT MOLDING MACHINES.

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1,048,692.

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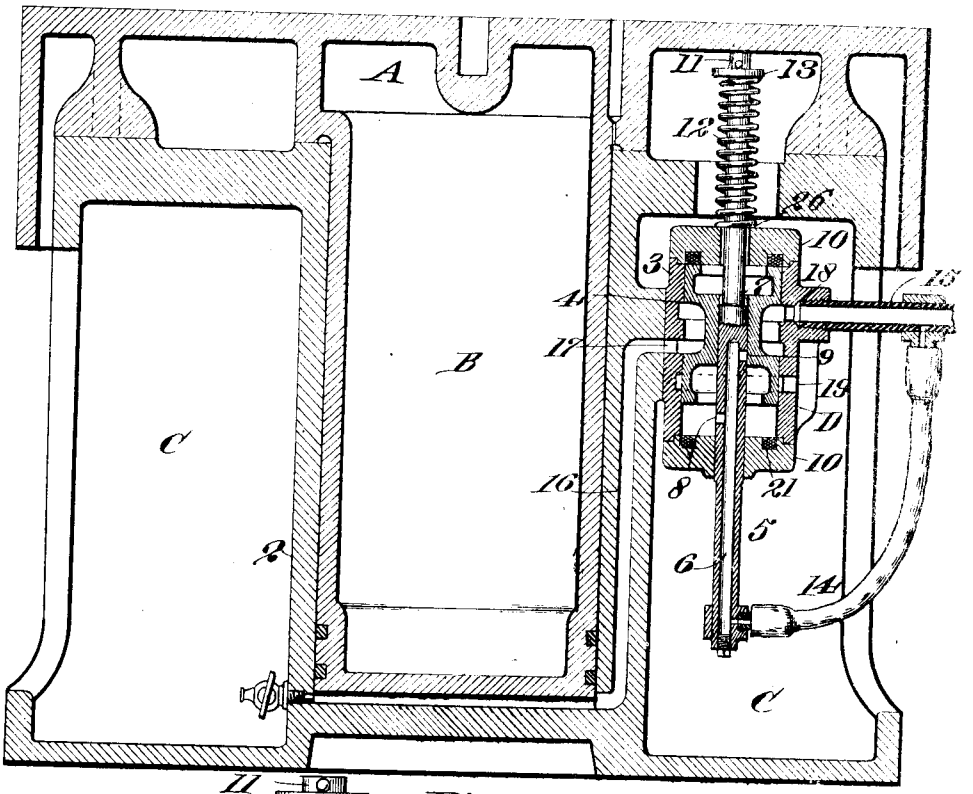

Fig. 1.

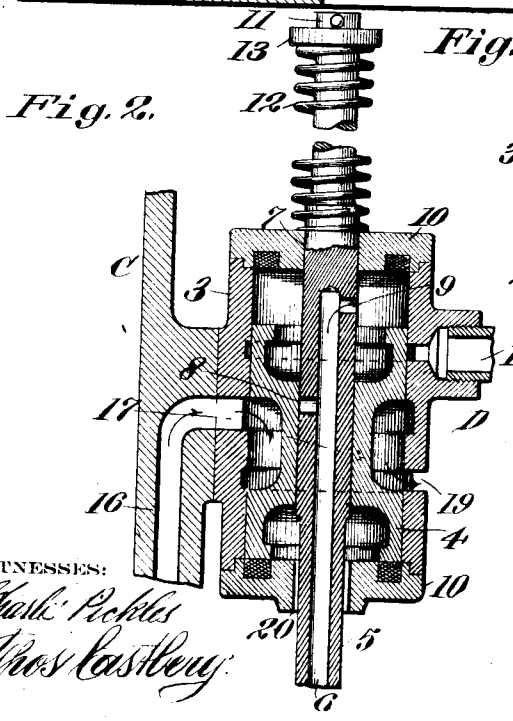

Fig. 2.

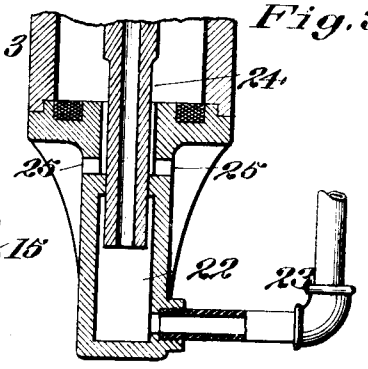

Fig. 3.

WITNESSES:

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VALVE FOR IMPACT MOLDING-MACHINES.

1,048,692. Specification of Letters Patent. Patented Dec. 31, 1912.

Application filed July 22, 1912. Serial No. 710,807.

To all whom it may concern:

Be it known that I, CLARENCE M. HENDERSON, a citizen of the United States, residing at Berkeley, in the county of Alameda and State of California, have invented new and useful Improvements in Valves for Impact Molding-Machines, of which the following is a specification.

This invention relates to a pneumatic valve, here shown and designed for application to impact or jarring molding machines.

The object of the invention is to construct a simple, substantial and reliable valve mechanism which may be used in conjunction with any pneumatic, reciprocable piston-driven machine, for the purpose of controlling the inlet and exhaust of the fluid under pressure to the cylinder and also for the purpose of controlling the length of the stroke of the driven piston.

A further object of the invention is generally to improve this class of valve mechanism so as to increase the utility, durability and efficiency of same.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a vertical section through the device. Fig. 2 is an enlarged detail vertical section of the valve. Fig. 3 is a detail section of a modification.

It is the object of my invention to provide a durable and reliable valve mechanism for quickly or rapidly and economically changing the direction of travel of a reciprocating piston within a cylinder.

In the present case I have shown my valve mechanism as designed to operate in conjunction with the piston of a jarring or impact molding machine, in which A indicates the table plate, B the piston, and C the main supporting frame containing the cylinder 2 in which the piston C is mounted for reciprocation.

D indicates in general the valve mechanism controlling the admission and exhaust of air to the cylinder to operate the piston, which piston lifts and drops the table plate in such a manner that suitable impact or jarring motion is produced.

3 indicates the valve casing secured to the cylinder in any suitable manner, in which is reciprocally mounted a piston valve 4 and a pilot valve 5. The pilot valve 5 consists of a stem or rod having a hollow portion 6, an enlarged portion 7, and two ports 8 and 9. Both ends of the valve 5 extend through the heads 10 of the valve casing; one end, as 11, contacting with the table plate being held in contact with the plate by the pressure of a helical spring 12 surrounding the rod and acting against a collar 13 secured to the rod. The opposite or lower hollow end of the pilot valve 5 is connected by suitable connections, as a flexible tube 14, with the main air supply pipe 15.

The piston valve 4 controls and regulates the air supply and exhaust of the cylinder 2, which takes place through a passage 16 registering with a port 17 in the valve casing, and is provided for the purpose of registering or providing communication between the main supply port 18 of the valve casing and the port 17 to admit air to the cylinder to lift the piston, or to form communication between the port 17 and exhaust port 19 in the valve casing to allow the exhaust of air from the cylinder to drop the piston. The position of the piston valve 4, which controls the intake or exhaust of air to the cylinder, is controlled by the pilot valve 5.

The operation will be as follows: Referring to Fig. 1, the piston valve is shown in the upper position; the annular groove or pocket being in such a position that it will form communication between the main air supply pipe connecting with the port 18. This position allows the air under pressure to enter through the port 16 and supply air to the cylinder to lift the piston. The piston valve is held in this position by air pressure which is admitted through port 8 in the pilot valve to the lower side of the piston valve; air pressure being admitted through the flexible tube and the hollow portion of the pilot valve. The moment air from port 16 enters under the main piston B, it is lifted to a predetermined height, which height will be controlled, as later described, by the position of the ports 8 and 9 in the pilot valve. The piston having lifted the table plate to a predetermined height, it will be seen that the pilot valve will follow the table plate, by reason of its being held in contact with the table plate through the pressure of the helical spring 12. The upward movement of the pilot valve, produced by

the movement of the table plate, will bring the port 9 into communication with the upper side of the piston valve 4 and will allow air pressure to enter and force the piston valve into its lower position, as shown in Fig. 2; exhaust of the air pressure contained in the lower portion of the valve casing taking place through an annular passage 20 in the valve casing head produced by the narrow portion of the valve stem. The upper head of the valve casing is air-tight, by reason of the fact that the enlarged portion of the pilot valve 5 enters the guide portion of the head and stops leakage in this direction. Air pressure having entered through the port 9 and forced the piston valve 4 into its lower position, as shown in Fig. 2, brings the annular groove or pocket into such a position that it will form communication between the port 17 and the exhaust port 19 in the casing, allowing the air in the cylinder to exhaust. This will release the piston and allow it to drop to its lower position, producing the desired jar to the table plate. At the same time the piston and table plate drop, the pilot valve is depressed against the pressure of the helical spring 12, and port 8 in the pilot valve is again brought into communication with the lower side of the piston valve 4, admitting the air which will again raise the piston valve to its uppermost position where it connects the supply port with the port 17, permitting air under pressure to again enter the cylinder and raise the piston.

The valve heads 10 in the valve casing are shown as provided with resilient cushions or bumpers for the purpose of reducing any jar or damage to the piston valve 4, when this is reciprocated from one position to the other. This also assists in making the valve practically noiseless.

In Fig. 3 a slight modification of the lower portion of the valve structure is shown. The lower or hollow portion of the pilot valve is here shown as communicating with an air supply chamber 22 connected with the main supply pipe through suitable connections, as the pipes 23. The supply chamber 22 is always in communication with the main supply pipe through the pipes 23 and will supply air to the hollow portion of the pilot valve for the purpose of operating the piston valve 4, as before described: exhaust from the lower portion of the valve casing taking place around the narrow portion of the pilot valve stem, as shown at 24, and escaping through ports 25. Exhaust in the upper portion of the valve casing, when the valve is moved from its lower position to its upper position, also takes place around the narrow portion of the pilot valve stem, as shown at 26.

I wish it understood that the pilot valve stem may be connected with the table plate in any suitable manner, and that I do not wish to limit myself to the specific construction here shown. It is also obvious that the valve mechanism here shown may operate in conjunction with any pneumatic, reciprocal piston-driven machine. It can be seen that the length of the stroke of the main driven piston is controlled by the position of the pilot valve ports 8 and 9, as these practically follow the reciprocal movement of a driven piston.

The valve mechanism is neat in appearance, simple in construction, reliable in its action, and takes no more space, (and probably less) than similar valve mechanism heretofore constructed.

The material and finish of the several parts of the valve mechanism are such as experience and judgment of the manufacturer may dictate.

I wish it understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claims, and that I do not wish to limit myself to the specific design and construction here shown.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. In a pneumatic valve, a valve casing, a main pipe connecting the casing with a source of air supply, a valve within said casing controlling the inlet and exhaust of air to actuate a driving piston within a cylinder, a pilot valve slidable through the central portion of the air-controlling valve having upper and lower end portions extending through and guided by heads in the valve casing, a pipe connecting the pilot valve with the main air pipe at a point exterior of the valve casing, and means actuated by the movement of the driven piston to control the position of the pilot valve within the casing.

2. In a pneumatic valve, a valve casing, a main pipe connecting the casing with a source of air supply, a valve within said casing controlling the inlet and exhaust of air to actuate a driving piston within a cylinder, a pilot valve slidable through the central portion of the air-controlling valve having upper and lower end portions extending through and guided by heads in the valve casing, a pipe connecting the pilot valve with the main air pipe at a point exterior of the valve casing, means for transmitting positive movement between the driven piston and the pilot valve so that these will operate in conjunction, and means for discharging air under pressure through the pilot valve to one side or the other of the air-controlling valve to control the position of same.

3. In a pneumatic valve, a valve casing, a main pipe connecting the casing with a

source of air supply, a valve within said casing controlling the inlet and exhaust of air to actuate a driving piston within a cylinder, a pilot valve slidable through the central portion of the air-controlling valve having upper and lower end portions extending through and guided by heads in the valve casing, a pipe connecting the pilot valve with the main air pipe at a point exterior of the valve casing, means for transmitting positive movement between the driven piston and the pilot valve so that these will operate in conjunction, and means for discharging air under pressure through the pilot valve to one side or the other of the air-controlling valve to control the position of same.

4. In a pneumatic valve, a valve casing, a main pipe connecting the casing with a source of air supply, a valve within said casing controlling the inlet and exhaust of air to actuate a driving piston within a cylinder, a pilot valve slidable through the central portion of the air-controlling valve having upper and lower end portions extending through and guided by heads in the valve casing, a pipe connecting the pilot valve with the main air pipe at a point exterior of the valve casing, means actuated by the movement of the driven piston to control the position of the pilot valve within the casing, and means in the pilot valve for controlling the position of the main air-controlling valve.

5. In a pneumatic valve, a valve casing, a main pipe connecting the casing with a source of air supply, a valve within said casing controlling the inlet and exhaust of air to actuate a piston within a cylinder, a pilot valve slidable through the central portion of the air-controlling valve having a hollow stem portion extending through and guided by the lower valve casing head, an air pipe for connecting the hollow stem with the source of air supply at a point exterior of the valve casing, said pilot valve having one or more ports adapted to register with one side or the other of the main air-controlling valve to admit air under pressure into the valve casing for the purpose of moving the main air-controlling valve and controlling position of same, and means for transmitting positive movement between the driven piston and the pilot valve so that these will operate in conjunction and control the position of the main air-controlling valve.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CLARENCE M. HENDERSON.

Witnesses:

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