

No. 718,474.

PATENTED JAN. 13, 1903.

M. O. KASSON.
GRINDING MACHINE.

APPLICATION FILED MAY 12, 1902.

NO. MODEL.

Fig. 1.

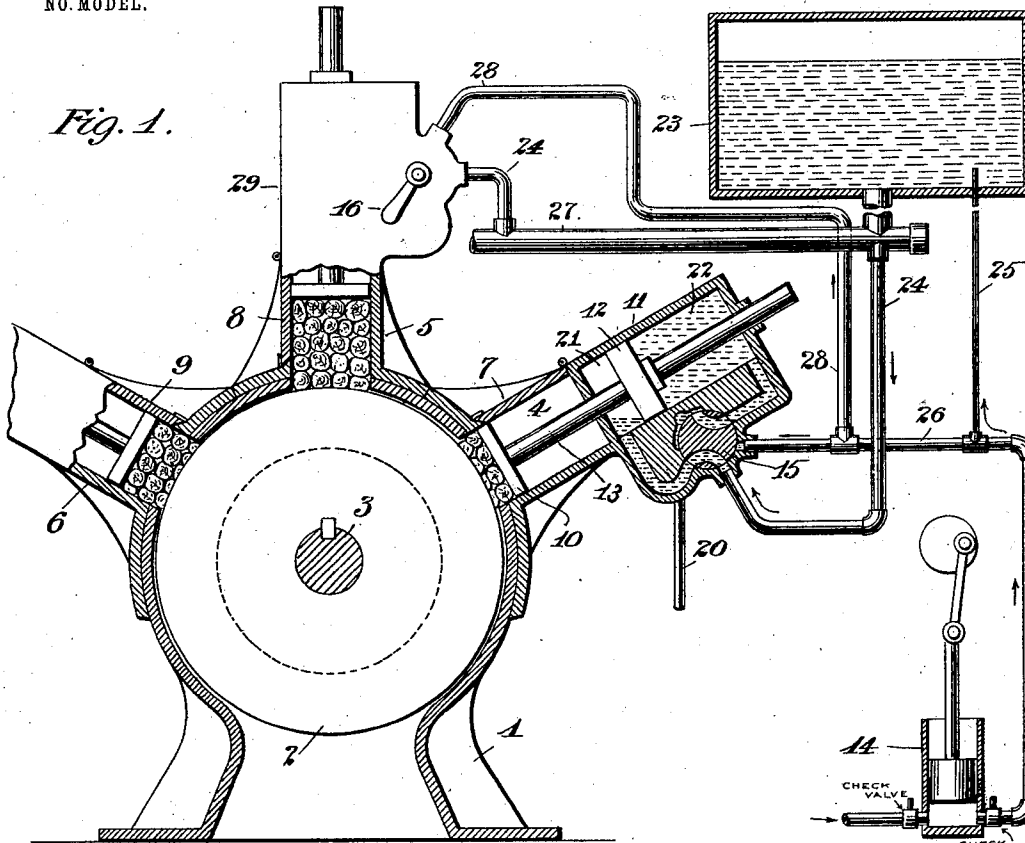
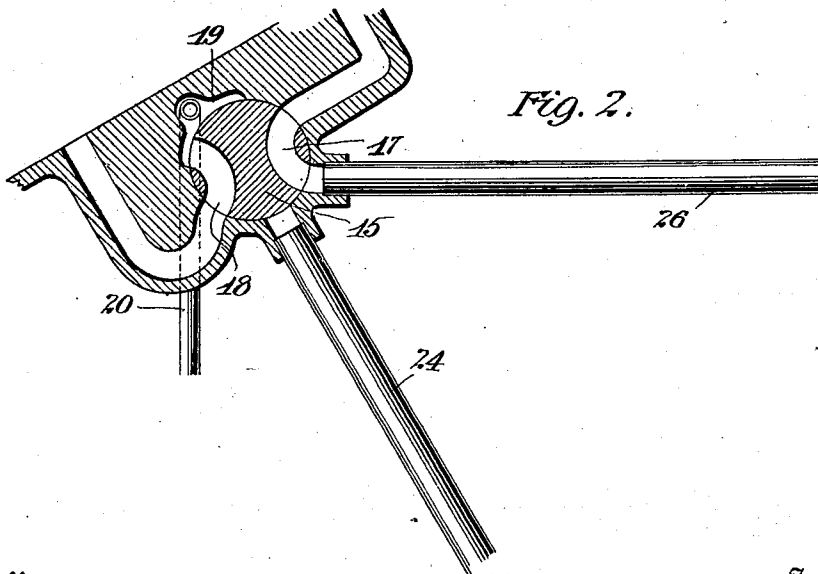


Fig. 2.



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BAG & PAPER COMPANY, A CORPORATION OF NEW JERSEY.

GRINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 718,474, dated January 13, 1903.

Application filed May 12, 1902. Serial No. 106,919. (No model.)

To all whom it may concern:

Be it known that I, MAHLON O. KASSON, a citizen of the United States, residing at Sandyhill, New York, have invented certain new and useful Improvements in Grinding-Machines, of which the following is a clear, full, and exact description.

My invention relates to a fluid-controlled device, and in the present embodiment I have shown it as applied to a grinding device, preferably one adapted for grinding wood-pulp.

My invention will be defined in the claims.

In the drawings, showing the preferred embodiment of my invention, Figure 1 is a side elevation, the greater part of the machine being shown in central vertical section, and Fig. 2 is an enlarged section of the rotary valve.

In the above preferred embodiment, 1 is the casing of the machine, in which rotates a grinding device, such as a grindstone 2, which is keyed to a driving-shaft 3.

4, 5, and 6 are compartments or "boxes," open at their ends next the stone, through doors 7, 8, and 9, in which billets of wood may be inserted. This general construction has been used heretofore in the art, and a hydraulic ram has also been provided with a piston-head in each box to force the wood against the stone, and when the wood in one of the boxes (as box 4, for example) has been nearly exhausted the hydraulic pump has been used to force the piston in the opposite direction in order to allow the insertion of a fresh load of wood. As, however, the pump only forces a small quantity of water into the piston-cylinder at each stroke, it takes a comparatively long time to return the piston to its outer position in this way, and much time has consequently been lost in the use of the machines of the prior art; but in the embodiment of my invention shown in the drawings I have provided a construction which relieves the hydraulic pressure on the pistons and returns it quickly to its outer position, thus avoiding the slow outward movement thereof made necessary in prior machines, and consequently saving much time and allowing one man to attend to more machines.

In the illustrated preferred embodiment of my machine I have provided three boxes,

each of which has a follower 10, which is adapted to be independently forced toward the stone. Only two of these devices are normally in use, the third being thrown on to prevent the stone from racing when one of the other followers is withdrawn in order to insert a fresh supply of wood. I prefer to employ a fluid-pressure to force the followers inward, and in the drawings have shown the follower as operated by hydraulic pressure, but I do not limit myself to such a construction.

In the present embodiment of my invention I have provided a water-cylinder 11, in which a head 12 reciprocates, which head may be attached to a piston-rod 13, passing through both ends of the cylinder and carrying the follower 10 on the inner end thereof. The portion of the cylinder at either side of the head 12 therefore forms a separate fluid-chamber, and when water is forced into one of these chambers the head and follower will be moved in one direction or the other. The head 12 therefore is virtually a separate head for each chamber and is the equivalent of two independent heads. In the present embodiment the two chambers at the opposite sides of the head are formed by a single cylinder; but by the words "a cylinder" and "a head" I do not limit myself to a construction which has a single cylinder and a single head therein. The device for supplying the fluid-pressure may be a hydraulic pump 14, and suitable valve devices may be provided to lead the water into the chamber. In the machine illustrated in the drawings I have provided a rotary four-way valve 15 for making the desired connections, and this may be operated by a hand-lever 16. The two positions of the valve are shown in the different figures, and when the valve is in the position shown in Fig. 2 the water is forced from the pump through port 17 and into the chamber 22 behind the piston-head 12, forcing the piston and follower to the left or inward and pressing the wood against the stone. The chamber 21 at the left of head 12 is in Fig. 2 connected through port 18 in the valve with a common port 19, from which leads an open waste-pipe 20. This constitutes one form of a relieving device to relieve the pressure of

the water in the chambers and allow it to pass away, and when the valve is thrown to the position shown in Fig. 1 port 17 connects chamber 22 with the waste-pipe and relieves the pressure therein.

In order to return the follower—that is, to move it away from the stone—I have provided a construction which, preferably, returns the piston and follower at a greater rate of speed than it is moved toward the stone. In the present embodiment of my invention this consists of a tank 23, preferably of a considerably greater capacity than that of chamber 21, even when the piston has reached the limit of its movement to the right or outward. This tank may be located at a point sufficiently higher than the machine to give a suitable pressure. I prefer to have this tank air-tight, but to leave a quantity of air in the same. The tank may be connected by pipe 24 with the rotary valve. If now water is forced into this tank, it will compress the air therein, and this air pressing on the surface of the water gives an elastic pressure thereon. I prefer to force the water into the tank by connecting it with the pump 14 by an open pipe 25, which is smaller than pipe 26, but large enough to maintain the necessary pressure in the tank, and while the pump is forcing water directly into chamber 22 and driving the piston toward the stone a small quantity of water is forced into the tank until the air-pressure therein nearly equals the force exerted by the pump. The tank and air therein therefore constitute one form of an elastic pressure device. The boxes 5 and 6 and their pistons and water-cylinders may be similarly constructed and cross-connected to tank 23 by pipe 27, as shown, and the similar supply pipe 28 may be connected to pump 14 or to another separate pump, as desired.

If the attendant wishes to reload box 4, he by lever 16 throws the valve of cylinder 29 to the position shown in Fig. 2, thus forcing the piston of cylinder 29 downward and throws valve 15 to the position shown in Fig. 1. This will relieve the pressure in chamber 22 by disconnecting it from the pump and connecting it with the waste-port. The valve will also connect the chamber 21 with pipe 24 and the tank, and the air-pressure therein will suddenly fill said chamber with water under a pressure equal to that of the air in the tank, and this will force the piston outward. As the quantity of water in tank 23 is preferably several times greater than that in chamber 21, even when the piston is at the limit of its outward travel, the column of water in the tank will be only slightly reduced in forcing the piston to the end of its throw, and consequently the air-pressure in the tank will be only very slightly reduced and will exert, through the column of water in pipe 24, a substantially constant pressure on head 12 during its entire travel. As the air-pressure is comparatively great and there is no resistance to the outward travel of the piston, except

the expulsion of part of the water in chamber 22, the piston will be forced outward at a much greater rate of speed than it would be if pump 14 were directly connected with chamber 21. The water in chamber 22 acts as a buffer and prevents the piston from coming against the end of the cylinder with a jar.

The upper half of the rotary valve 15 (shown in Fig. 1 of the drawings) obviously constitutes the valve mechanism which is adapted to close the passage from the chamber 22 of the cylinder and connect the pipe leading from the pump with said chamber, and the lower half of said rotary valve in said figure constitutes a valve mechanism which is adapted to close the water connection between the tank and the chamber 21 and discharge the water from this chamber 21. While in the present embodiment I have formed these two valve mechanisms in one piece—that is, out of the single rotary valve-plug 15—it will be obvious that the valves need not be formed in this way, and I do not limit myself to such a construction.

When the attendant has filled box 4, he throws off the operation of the piston in cylinder 29 and throws valve 15 back to the position shown in Fig. 2, thus connecting cylinder 21 with the waste-pipe and allowing the pump to again force piston 12 inward.

I am aware that many variations from the embodiment shown in the drawings may be made without departing from my invention as claimed, and I therefore do not desire to be limited to the construction herein illustrated and described.

What I claim is—

1. A grinder, a follower adapted to move toward and away from the same, a piston-cylinder, a piston-head therein and connected to said follower to move the same, a pressure device capable of supplying water under pressure, a discharge-exit from said cylinder on one side of said head, valve mechanism adapted to close said exit and connect said pressure device with said side of said cylinder whereby water is forced into said cylinder to move said follower inward toward said grinder, a closed tank of greater capacity than that part of said cylinder on the other side of said head when said head is moved outward, a body of water held in said tank under elastic pressure, and a water connection therefrom to said cylinder on said other side of said head, and valve mechanism adapted to close said water connection and discharge the water from said other side of said cylinder.

2. A grinder, a follower adapted to move toward and away from the same, a piston-cylinder, a piston-head therein and connected to said follower to move the same, a pressure device capable of supplying water under pressure, a discharge-exit from said cylinder on one side of said head, valve mechanism adapted to close said exit and connect said pressure device with said side of said cylinder whereby water is forced into said cylinder to move said

5 follower inward toward said grinder, a closed tank of greater capacity than that part of said cylinder on the other side of said head when said head is moved outward, a body of water
10 held in said tank under compressed air therein, and a water connection therefrom to said cylinder on said other side of said head, and valve mechanism adapted to close said water connection and discharge the water from said
15 other side of said cylinder.

3. A grinder, a follower adapted to move toward and away from the same, a piston-cylinder, a piston-head therein and connected to said follower to move the same, a pressure device capable of supplying water under pressure, a discharge-exit from said cylinder on one side of said head, valve mechanism adapted to close said exit and connect said pressure device with said side of said cylinder
20 whereby water is forced into said cylinder to move said follower inward toward said grinder, a closed tank of greater capacity than that part of said cylinder on the other side of said head when said head is moved outward, a body of water held in said tank under elastic pressure, and a water connection therefrom to said cylinder on said other side of said head, valve mechanism adapted to close said water connection and discharge the water
25 from said other side of said cylinder, and a water-passage from said pressure device to said tank through which water is forced into said tank against the pressure of the air therein.

35 4. A grinder, a follower adapted to move toward and away from the same, a piston-cylinder, a piston-head therein and connected to said follower to move the same, a pressure device capable of supplying water under pressure, a discharge-exit from said cylinder on one side of said head, valve mechanism adapted to close said exit and connect said pressure device with said side of said cylinder whereby water is forced into said cylinder to move said
40 follower inward toward said grinder, a closed tank of greater capacity than that part of

said cylinder on the other side of said head when said head is moved outward, a body of water held in said tank under elastic pressure, and a water connection therefrom to said
50 cylinder on said other side of said head, valve mechanism adapted to close said water connection and discharge the water from said other side of said cylinder, and a water-passage from said pressure device to said tank
55 through which water is forced into said tank against the pressure of the air therein, said water-passage being normally open and being of smaller diameter than that from said tank to said cylinder.

5. A grinder, a follower adapted to move toward and away from the same, a piston-cylinder, a piston-head therein and connected to said follower to move the same, a pressure device capable of supplying water under pressure, a discharge-exit from said cylinder on one side of said head, valve mechanism adapted to close said exit and connect said pressure device with said side of said cylinder whereby water is forced into said cylinder to move said
60 follower inward toward said grinder, a closed tank of greater capacity than that part of said cylinder on the other side of said head when said head is moved outward, a body of water held in said tank under elastic pressure, and
65 a water connection therefrom to said cylinder on said other side of said head, valve mechanism adapted to close said water connection and discharge the water from said other side of said cylinder, a second similar cylinder, head, follower and valve mechanism, and similar connections from said pressure device and tank to said second valve mechanism, the valve mechanism of said first cylinder being operative independently of the valve mechanism of said second cylinder.

Signed at Sandyhill, New York, this 5th day of May, 1902.

MAHLON O. KASSON.

Witnesses:

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E. A. GETTEN.