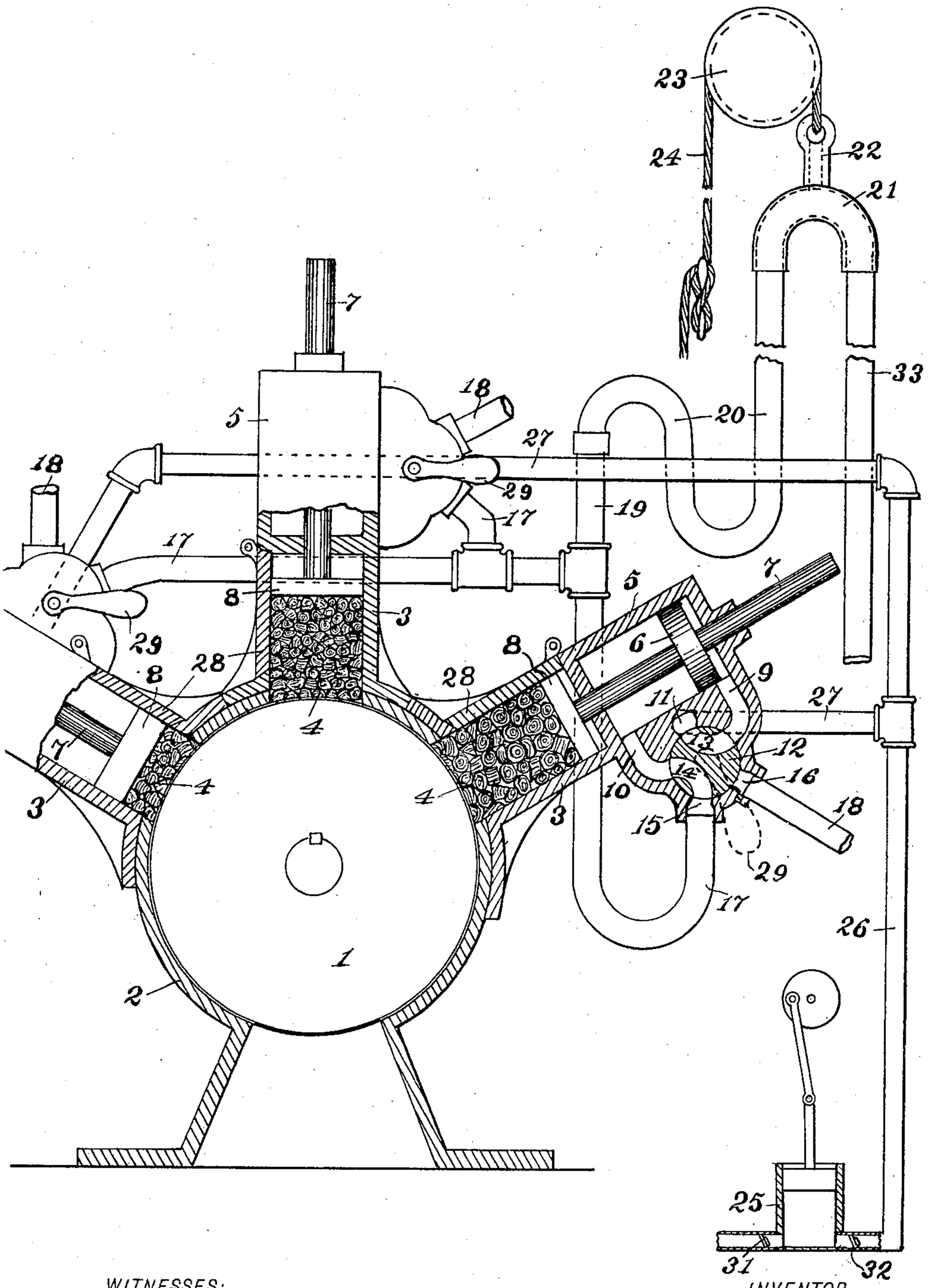
No. 754,071. PATENTED MAR. 8, 1904.

M. O. KASSON.

PULP GRINDER.

APPLICATION FILED MAY 28, 1903.

NO MODEL.



WITNESSES:

H. L. Reynolds.

Beatrice Mirick.

INVENTOR

Mahlon O. Kasson.

BY

Edmund R. Ewell

His ATTORNEY

No. 754,071. Patented March 8, 1904.

UNITED STATES PATENT OFFICE.

MAHLON O. KASSON, OF SANDY HILL, NEW YORK, ASSIGNOR TO UNION BAG AND PAPER COMPANY, A CORPORATION OF NEW JERSEY.

PULP-GRINDER.

SPECIFICATION forming part of Letters Patent No. 754,071, dated March 8, 1904.

Application filed May 28, 1903. Serial No. 159,113. (No model.)

To all whom it may concern:

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

My invention relates to an improvement in pulp-grinders.

My invention comprises certain features which will be hereinafter described and will be defined by the claims.

The drawing accompanying herewith represents a preferred embodiment of my invention, said drawing consisting of a side elevation partially in section.

In the preparation of wood-pulp one process consists in grinding the wood upon a suitable grinder, the same ordinarily containing a stone which is turned upon its axis, a series of boxes or receptacles for the wood open to said stone, and pistons acting to force the wood in said boxes down upon the stone. Such an apparatus is illustrated in Patent No. 718,474, granted to me January 13, 1903.

My present invention relates to apparatus of the above type. The object of my invention is to improve and simplify said apparatus.

The apparatus as herein shown contains a stone 1, mounted to turn upon its axis, to which power is applied by any suitable means, a plurality of boxes 3, radially placed with reference to said stone, and a cylinder 5 for each of said boxes, each cylinder having therein a piston 6, which is connected by means of a rod 7 with a plunger 8 in its respective box, whereby the wood 4 is held upon the surface of the grinder. These parts are common to pulp-grinders of the type to which my invention pertains. In the use of such pulp-grinders the revolving stone 1 wears down and if used a sufficient length of time will become materially reduced in diameter. Such a reduction in diameter reduces the leverage at which the wood or other material being ground acts upon the stone to retard it, and consequently necessitates either varying the pressure upon said wood if the stone is to be run at constant speed under the action of a constant power applied thereto or necessitates varying the amount of power applied to the stone to maintain a constant speed.

In carrying out my present invention I employ actuating means for said pistons to hold the material being ground upon the grinder, which produce upon said pistons a substantially uniform and constant effect and vary the pressure delivered to the grinder by interposing a variable resistance against the action of said pistons. I am thus able to employ a common source of pressure for operating all of a group of such machines and control its effect upon the individual machines by separate means.

In carrying out my invention I prefer, as has been herein shown, to operate the pistons by hydraulic means and to employ the same means for producing the variable resistance. Any other suitable means may, however, be employed. In describing the device herein illustrated as being hydraulically operated I am not to be understood as limiting myself to such mode of operation.

One of the cylinders containing a piston is shown in section in the drawing. This cylinder is provided with two ports 9 and 10, one located at each end of the cylinder, the port 9 admitting the water back of the piston to force the wood down upon the stone and the port 10 admitting water in front of the piston to withdraw it from the stone. A supply-port is provided and means by which it may be conneeted with each of the ports 9 and 10. Such a supply-port is shown at 11 as being located between the ports 9 and 10 and receiving its supply from a pipe 27, which connects with a pipe 26, from which all of the cylinders receive their supply. The necessary supply at the required pressure may be delivered by any suitable means. I have herein indicated a pump 25, supplied with check-valves 31 and 32, for securing said pressure.

The means herein shown for controlling the flow of water to and from the cylinders consist of a separate valve 12 for each cylinder, said valve having therein two ports 13 and 14. The seat containing said valve is of circular outline, and the valve is circular to fit

the same. This seat is provided with openings or ports, one connecting with the supply-port 11, two others connecting, respectively, with the ports 9 and 10, leading to opposite ends of the cylinder, and two other or discharge ports 15 and 16, one for each end of the cylinder.

The ports 13 and 14 in the valve are designed to connect two of the adjacent ports in the seat. In the position shown in the drawing port 13 connects the supply-port 11 through the port 9 with the outer end of the cylinder, in which position the water under pressure acts upon the piston 6 to force it toward the grinder. In the same position of the valve the port 14 connects the piston or inner end of the cylinder with the discharge-pipe 17.

The various discharge-pipes 17, leading from the different cylinders, join in a common discharge-pipe 19, to which is connected a hose 20 or other discharge member so constituted that it may be raised and lowered to vary the hydraulic head under which said discharge operates. A hose is preferred because such a result may be more readily secured by such means.

Means are provided whereby the hose may be raised or lowered to thereby regulate the discharge-pressure. Such means, as herein shown, consist of a rope 24 or other convenient means for supporting the hose, said rope being carried over an elevated pulley or guide 23, so that the hose may be conveniently placed at any elevation desired. This hose is not shown as freely discharging at such elevated point, but is provided with a terminal depending section 33, by which the discharge may be conducted to any convenient point. The parts 20 and 33 of the hose are shown as connecting with a metal bend 21, which is provided at its uppermost point with an air-inlet opening 22, so that the depending leg 33 cannot act as a siphon. In this manner the elevation of the discharge, which is effective for controlling the hydraulic head against which the piston 6 acts, is the elevation of the bend 21.

In the operation of my device the bend 21 will be lowered as the stone is reduced in size by use. The pressure of the supply for the cylinders should be such as to supply the required pressure upon the material being ground for stones of the smallest diameter which it is desired to use. With stones in their original condition or maximum size the pressure applied to hold the material upon the stone should be lessened. To secure this, the bend 21, carrying the discharge-pipe, is gradually lowered as the radius of the stone decreases, so as to make the cylinders discharge under a hydraulic head equivalent to the elevation of said bend. By this means an adjustable exhaust-pressure may be obtained which will counterbalance a sufficient amount of the working pressure, so that the net or effective pressure will be that which is desired. Consequently the pressure at which the material is held upon the stone may be readily varied by adjustment for any particular machine and time and yet be uniform during the permanency of any adjustment, and the means for securing such adjustment are exceedingly simple, understandable by any one, and not likely to become disarranged.

In the mechanism herein shown each box 3 is provided with a hinged door 28, upon one side which may be raised for the insertion of the material to be ground. The valves 12 are provided with a means by which they may be turned, said means, as shown, consisting of a handle 29 for each of said valves. This valve may be turned from the position shown in the drawing to a position in which the port 13 of the valve connects ports 9 and 16, by which the discharge from the outermost or pressure end of the cylinder is discharged through the pipe 18, said discharge being a free discharge or one having as little hydraulic resistance as feasible. The other port, 13, in the same position of the valve will connect the port 10 with the supply-port 11, which will admit water to the inner end of the cylinder and force the piston outward, for the supply of material to be ground may be supplied to its respective box 3.

It is evident that other means may be employed for securing the results contemplated in this invention—that is, for producing a variable resistance to the operation of the piston. I do not, therefore, wish to be limited to the use of the particular means herein shown.

What I claim is—

1. In a pulp-grinder, in combination, a rotary grinder, a piston adapted to hold the material to be ground against said grinder, means for forcing said piston against said material, a water column acting in opposition to said piston, and means for varying the height of said water column.

2. A rotary grindstone, a piston and means for actuating said piston to force the material to be ground against the stone, means for exerting a substantially uniform resistance in opposition to said piston during its movement toward the stone, and means to lessen the amount of said resistance as said stone becomes smaller.

3. A rotary grinder, a piston-cylinder, a piston therein adapted to hold the material to be ground against said grinder, means to force said piston toward said grinder, means to force water into said cylinder to return said piston, and a free discharge-passage for said water from the return end thereof and extending above said return end whereby a column of water is formed which opposes the forward movement of said piston, and means to vary the height of said water column.

4. A pulp-grinder having a hydraulic cylinder and piston for forcing the wood upon the grinder, separate discharge-ports for op-

posite ends of the cylinder and means for varying the level of the discharge from the return end of the cylinder.

5. A pulp-grinder having a hydraulic cylinder and piston for holding the wood upon the grinder, separate discharge-ports for opposite ends of the cylinder, a flexible discharge-pipe for the return end of the cylinder extending above said cylinder, and means for raising and lowering said pipe to vary the head against which said end of the cylinder discharges.

6. A pulp-grinder having a hydraulic cylinder and piston for holding the wood upon the grinder, separate discharge-ports for opposite ends of the cylinder, a discharge-pipe for the return end of the cylinder having an elevated loop provided with an air-inlet at its upper part and means for raising and lowering said loop for varying the resistance upon the piston.

7. A pulp-grinder having a hydraulic cylinder and piston for holding the wood upon the grinder, a supply-pipe, a separate discharge-pipe for each end of the cylinder, a valve having two ports therein each adapted to connect its end of the cylinder alternately with the supply and with its respective discharge and means for varying the pressure of discharge for one of said ports.

8. In a pulp-grinder, in combination, a rotary grinder, a casing for said grinder having pockets adapted to receive the material to be ground, a cylinder having a piston therein, a discharge-pipe connected with the end of said cylinder next the grinder, and means for varying the height of the discharge from said pipe.

9. A pulp-grinding machine comprising a rotary grinder, a plurality of pockets disposed about said grinder and adapted to receive the material to be ground, a piston for each pocket adapted to hold the material against the grinder, a common fluid-supply for operating said pistons, means for producing an adjustable but substantially uniform resistance against the movement of the pistons toward the grinder, and means for independently controlling the application of each of said pistons.

Signed at Sandy Hill, New York, this 18th day of May, 1903.

MAHLON O. KASSON.

Witnesses:
W. B. HALLOCK,
FRED E. EARLE.