

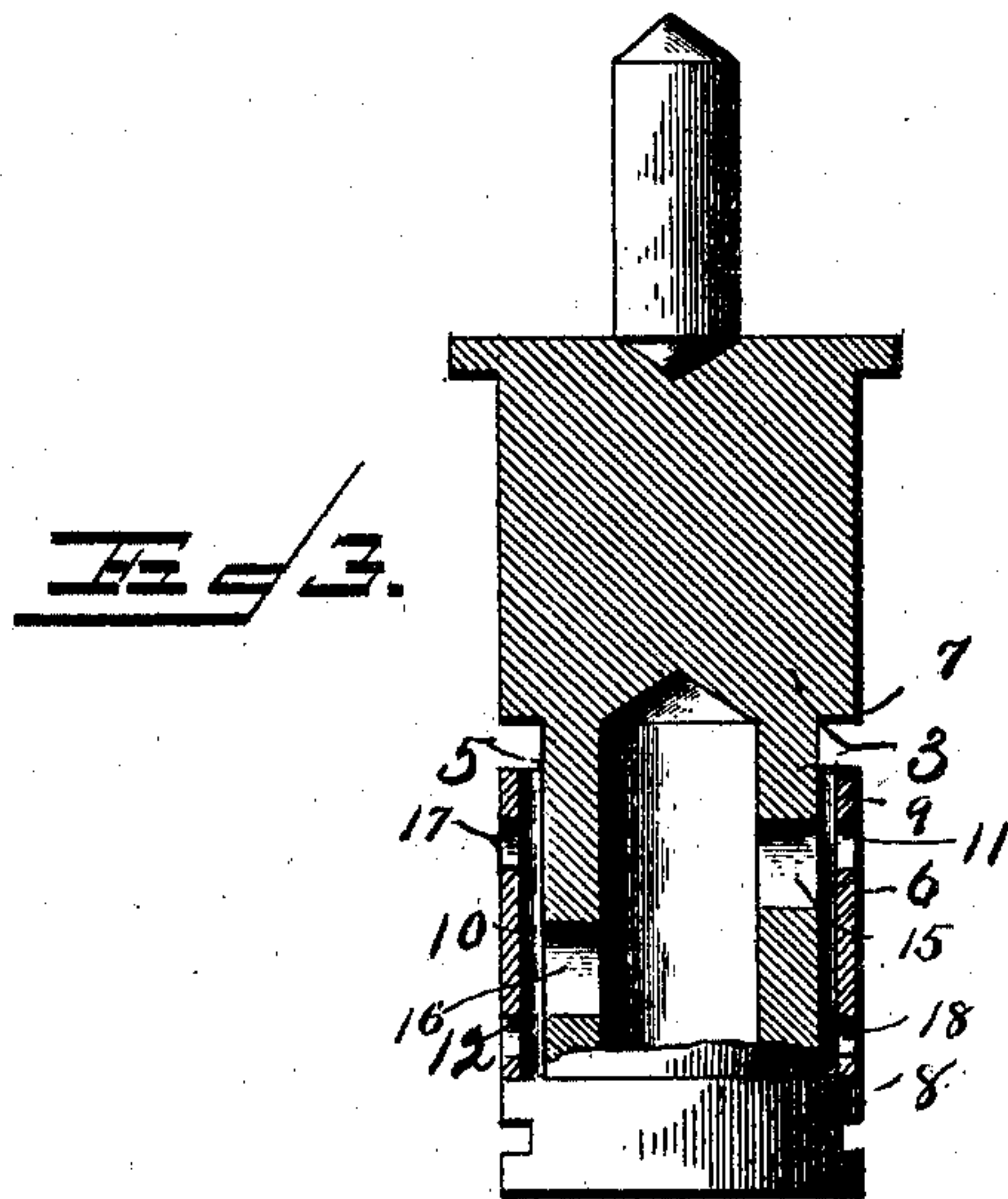
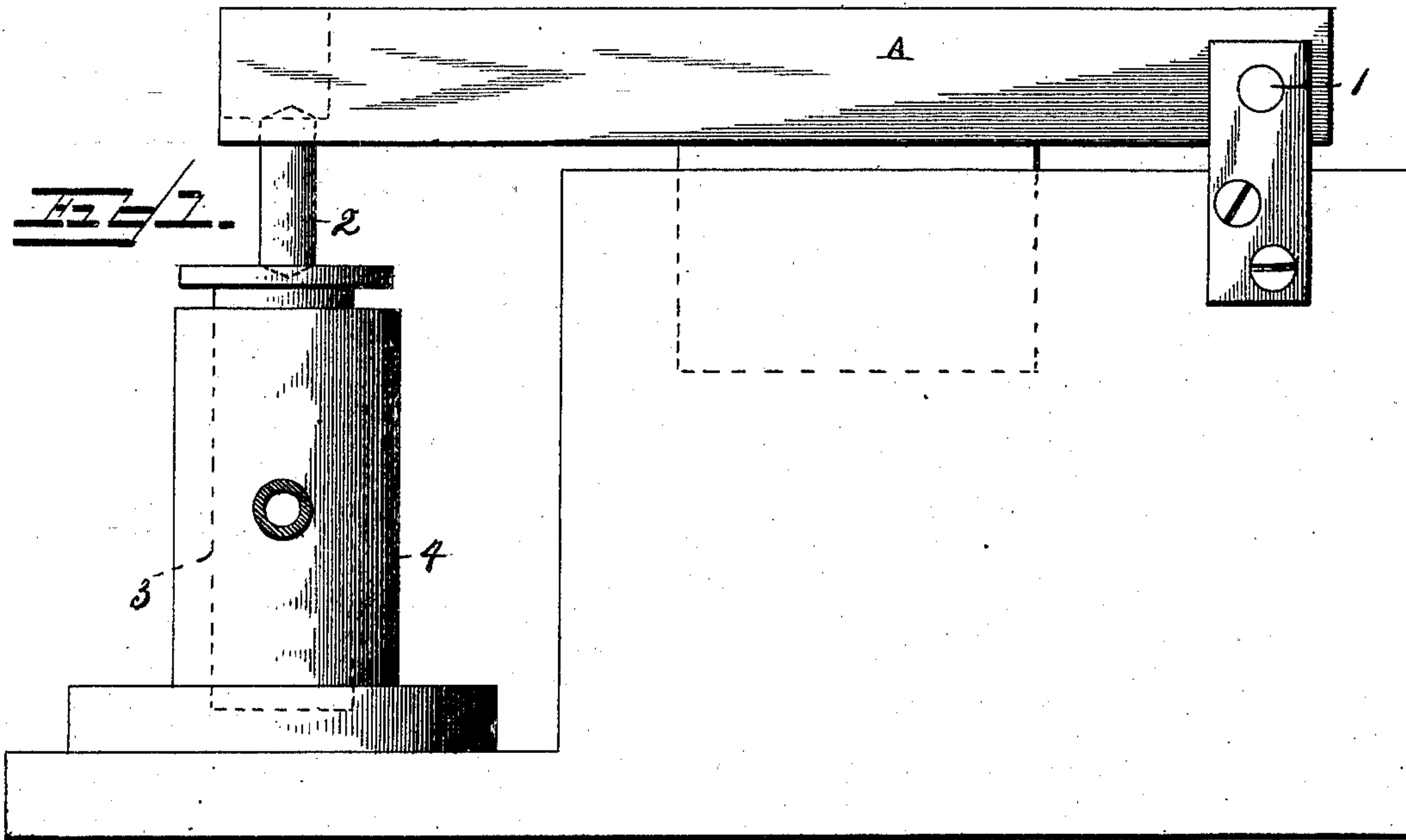
(No Model.)

2 Sheets—Sheet 1.

W. H. & M. R. RUST.  
DIRECT ACTING ENGINE.

No. 502,502.

Patented Aug. 1, 1893.



Witnesses

W. C. Schneider

*W. C. Schneider*

By their Attorneys,

*C. A. Snow & Co.*

Inventors

W. H. Rust.  
M. R. Rust.

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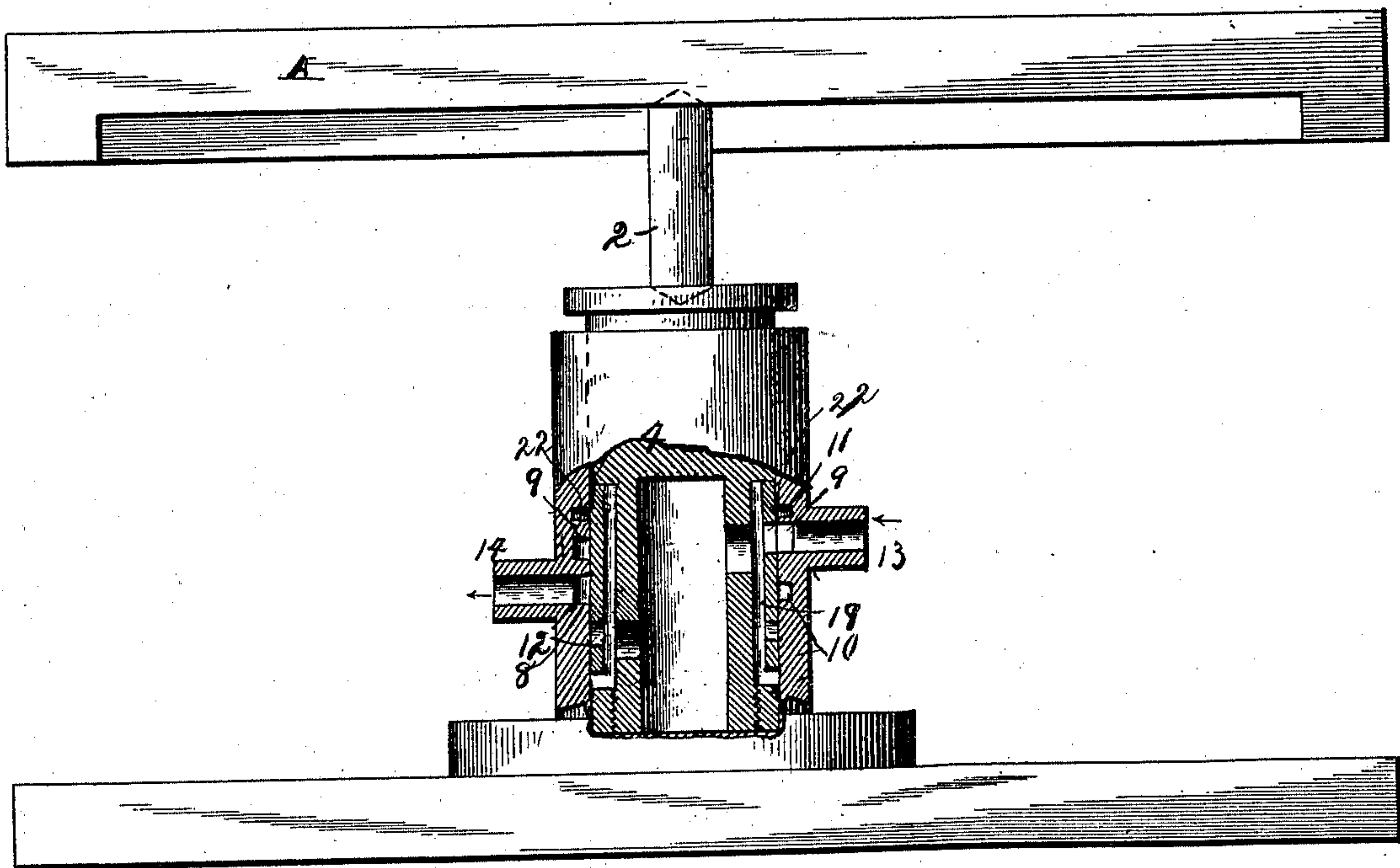
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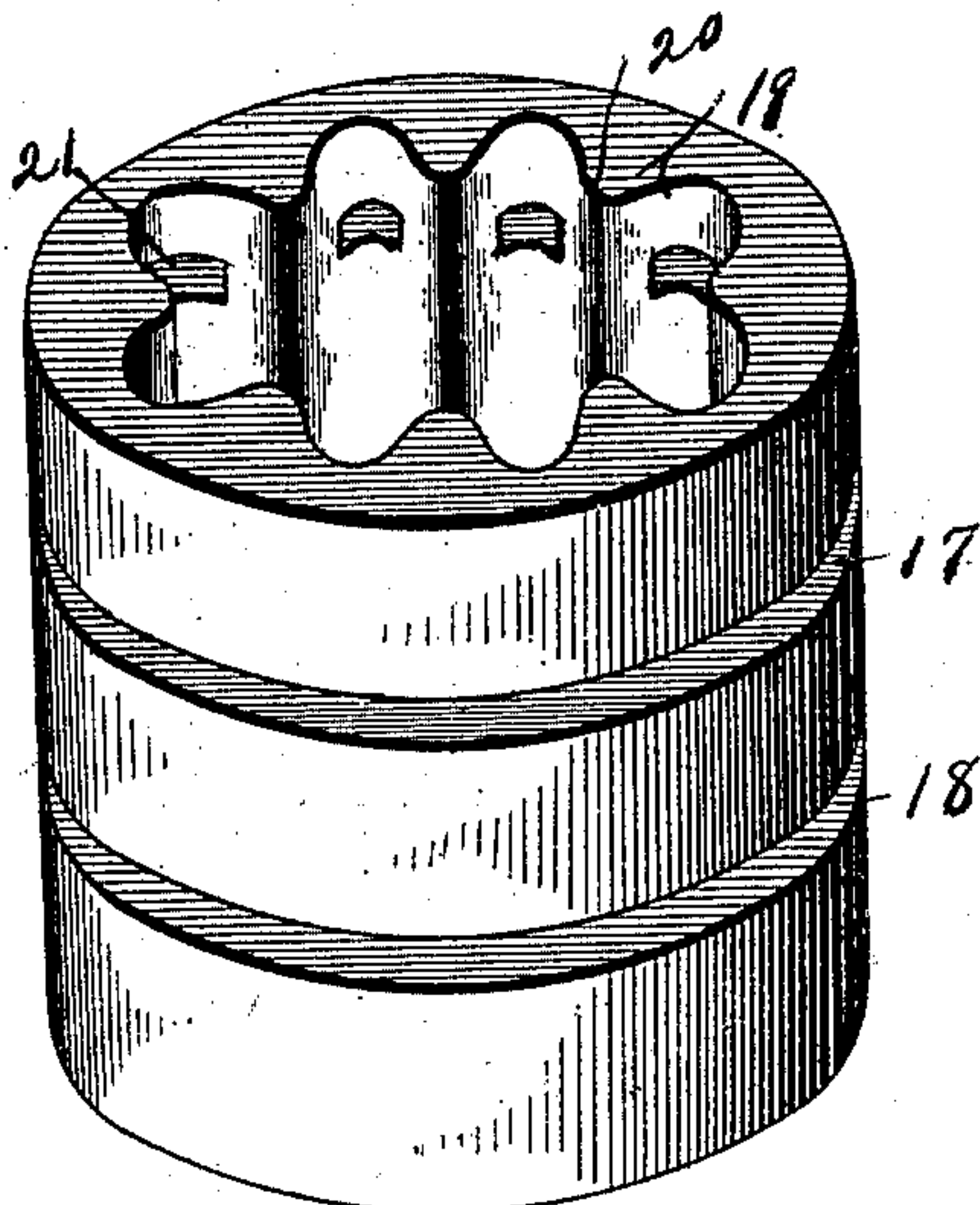
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# UNITED STATES PATENT OFFICE.

WALTER H. RUST AND MORTIMER R. RUST, OF FULTON, NEW YORK.

## DIRECT-ACTING ENGINE.

SPECIFICATION forming part of Letters Patent No. 502,502, dated August 1, 1893.

Application filed July 29, 1892. Serial No. 441,604. (No model.)

*To all whom it may concern:*

Be it known that we, WALTER H. RUST and MORTIMER R. RUST, citizens of the United States, residing at Fulton, in the county of Oswego and State of New York, have invented new and useful Improvements in Direct-Acting Engines, of which the following is a specification.

Our invention relates to improvements in direct acting steam engines of the type known as "single-acting."

It is our object to provide an engine especially adapted for use in operating paper-pulp screens, such as are employed in paper-mills for screening the pulp preparatory to making the same into sheets, such an adaptation requiring a rapid and decided agitation or vibration of the screens, but it will be understood that the improved engine may be used in other relations and for other purposes, where the same movement is required.

Our invention is described in detail in connection with the accompanying drawings, and the novel features thereof are clearly pointed out in the appended claims.

In the drawings: Figure 1 is a side view of our improved engine applied in the operative position to a paper-pulp screen. Fig. 2 is a front view of the same, showing the cylinder in section. Fig. 3 is a vertical sectional view of the piston or plunger. Fig. 4 is a detail view of the ring-valve.

A represents the screen, which is pivoted at its rear edge or side, as shown at 1, the plunger-stem 2 being connected to the front side of the screen and being provided at its lower end with the piston or plunger 3, which operates in the cylinder 4. The piston or plunger is turned to fit the cylinder, being reduced at its lower portion, as shown at 5, to receive a vertically-sliding ring-valve 6. A shoulder 7 is formed at the upper end of this reduced portion, and a piston-head 8 turned to fit the cylinder and fastened to the lower end of said reduced portion forming a shoulder, the same as 7, said shoulders to control the movement of the piston by operating the ring-valve. The inner surface of the cylinder is provided with two horizontal encircling steam-channels 9 and 10, which communicate with the steam-ports 11 and 12, respectively,

said ports being in communication with the inlet-pipe 13, and the exhaust 14.

The piston or plunger is provided with a central bore or recess, which terminates near the upper end thereof, said recess being designed to receive the steam when admitted through the supply-pipe, ports 15 and 16 being provided in the sides of the piston for the passage of the steam into and from the same. The sliding valve, which encircles the reduced portion of the piston or plunger, is provided with annular grooves 17 and 18, in its outer surface, the inner surface of the same being vertically grooved or fluted, as shown at 19, to provide inwardly-projecting ribs 20, between which the annular grooves in the outer side of the valve are cut through to form ports 21.

The parts of the invention being in the position shown in Fig. 2, the operation thereof is as follows: The steam being admitted through the inlet-ports, enters the cylinder, and passing through the upper steam-channel of the ring-valve, enters the piston or plunger and elevates the same until the piston-head which is connected to the lower end of the piston comes in contact with the lower end of the valve and raises the same, thereby cutting off the upper or inlet port and opening the exhaust port, whereupon the weight of the screen, acting vertically upon the stem of the piston, depresses the latter until the inlet-port is again opened for the admission of steam.

The operation of the piston, when the steam is admitted, is rapid and decided, and the depression of the piston by the weight of the screen is sufficiently rapid to avoid an undue loss of time.

The combination and arrangement of the parts are simple, and we have found the result with regard to the screening operation to be more satisfactory than can be obtained by the use of springs, cams, &c., for the reason that the upward motion is more suddenly accomplished.

Small springs 22, shown in the drawings, are employed to bear against the sides of the ring-valve, being attached to the cylinder, to hold the valve in either its elevated or depressed position by frictional contact. The valve



slides in the cylinder, being changed from one position to the other by contact of the shoulders of the piston.

Although we have described our invention in connection with mechanism for screening paper pulp we desire it to be understood that our invention resides in the construction of the operating parts which may be used in connection with any device requiring the motion which we have described will be attained thereby. It will also be understood that changes in the form, proportion and minor details of construction rendered necessary by the application of the device to other machines may be resorted to without departing from the principle of the invention or sacrificing any of the advantages thereof.

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

1. In combination with a cylindrical piston or plunger provided with inlet and exhaust ports, of a longitudinally slidable ring-valve embracing the piston or plunger and provided in its inner surface with longitudinal grooves or channels, and in its outer surface with annular channels which communicate at intervals with the interior grooves of the channels, substantially as specified.

2. A cylindrical or ring-shaped valve adapted to fit a shouldered and ported piston or plunger and provided with interior longitudinal grooves or flutes and exterior intersecting steam channels, substantially as specified.

3. The combination of a cylinder provided with interior annular steam channels con-

nected, respectively, with inlet and exhaust ports, the piston or plunger provided with an interior cavity, and inlet and exhaust ports, and a sliding ring-valve mounted upon the piston, provided with exterior inlet and exhaust channels, and ports which communicate with the interior of the piston, substantially as specified.

4. The combination of a cylinder provided with interior steam-channels and inlet and exhaust ports, the piston having an interior cavity and provided with a reduced portion having a shoulder at its upper end and a piston-head forming a shoulder at its lower end, and the sliding ring-valve mounted on the reduced portion of the piston and provided with annular exterior steam channels communicating with the interior of the piston through ports, substantially as specified.

5. The combination with a cylinder provided with inlet and exhaust ports, and annular steam channels, of a ported piston or plunger having a reduced portion terminating at opposite ends in shoulders or stops, a slidable ring-valve fitting said reduced portion and provided with steam-ports, and pressure-springs attached to the inner walls of the cylinder to bear against the outer surface of said ring-valve.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

WALTER H. RUST.  
MORTIMER R. RUST.

Witnesses:

GILES S. PIPER,  
SIDNEY J. KELLY.