

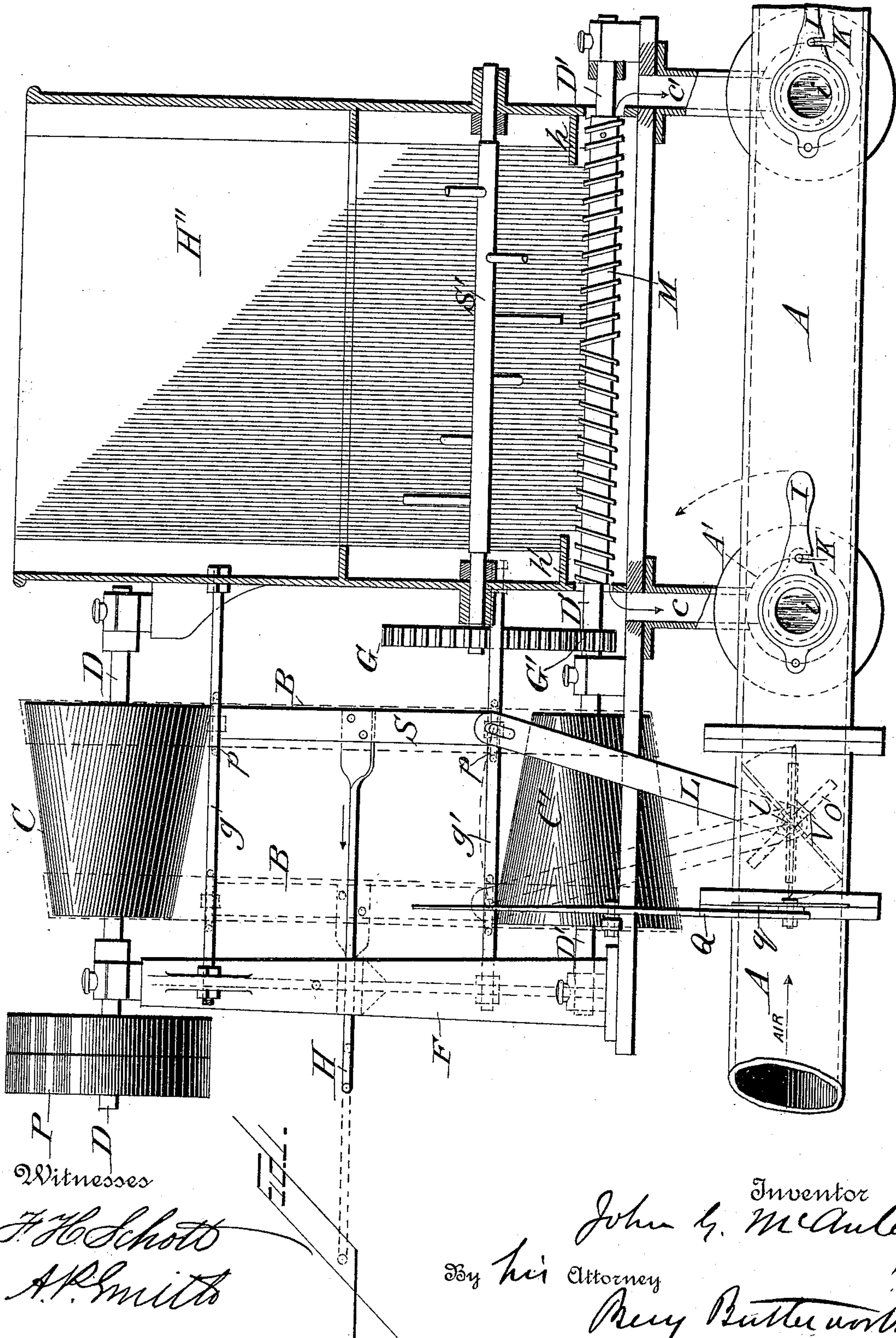
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3 Sheets—Sheet 1.

J. G. McAULEY.  
PULVERIZED FUEL FEEDER.

No. 441,688.

Patented Dec. 2, 1890.



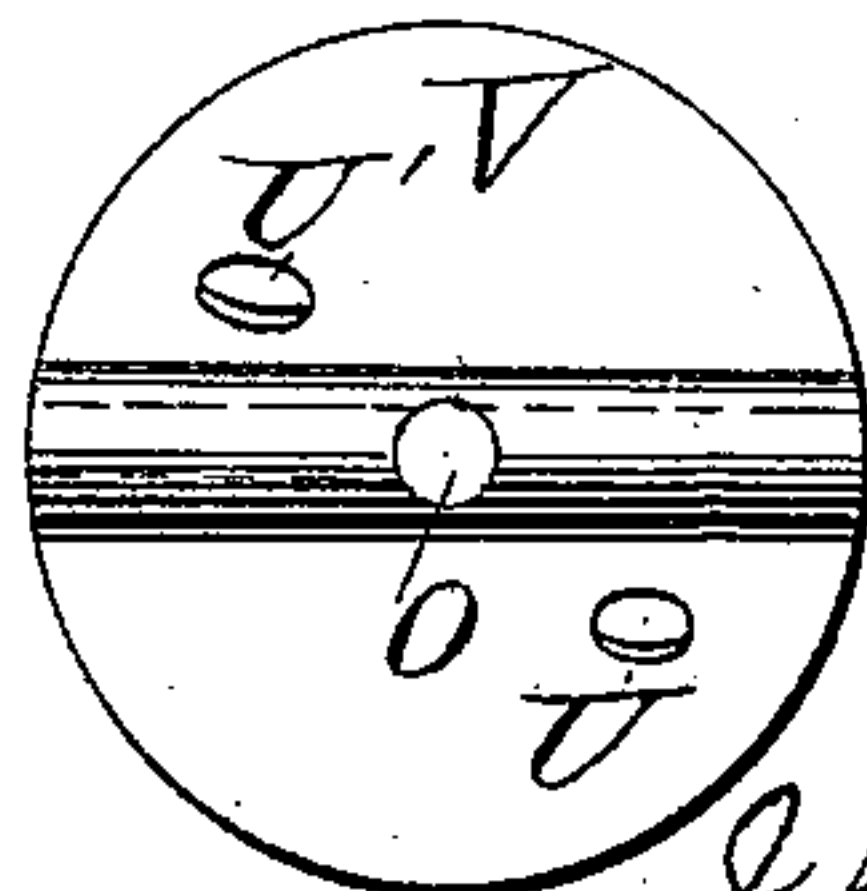
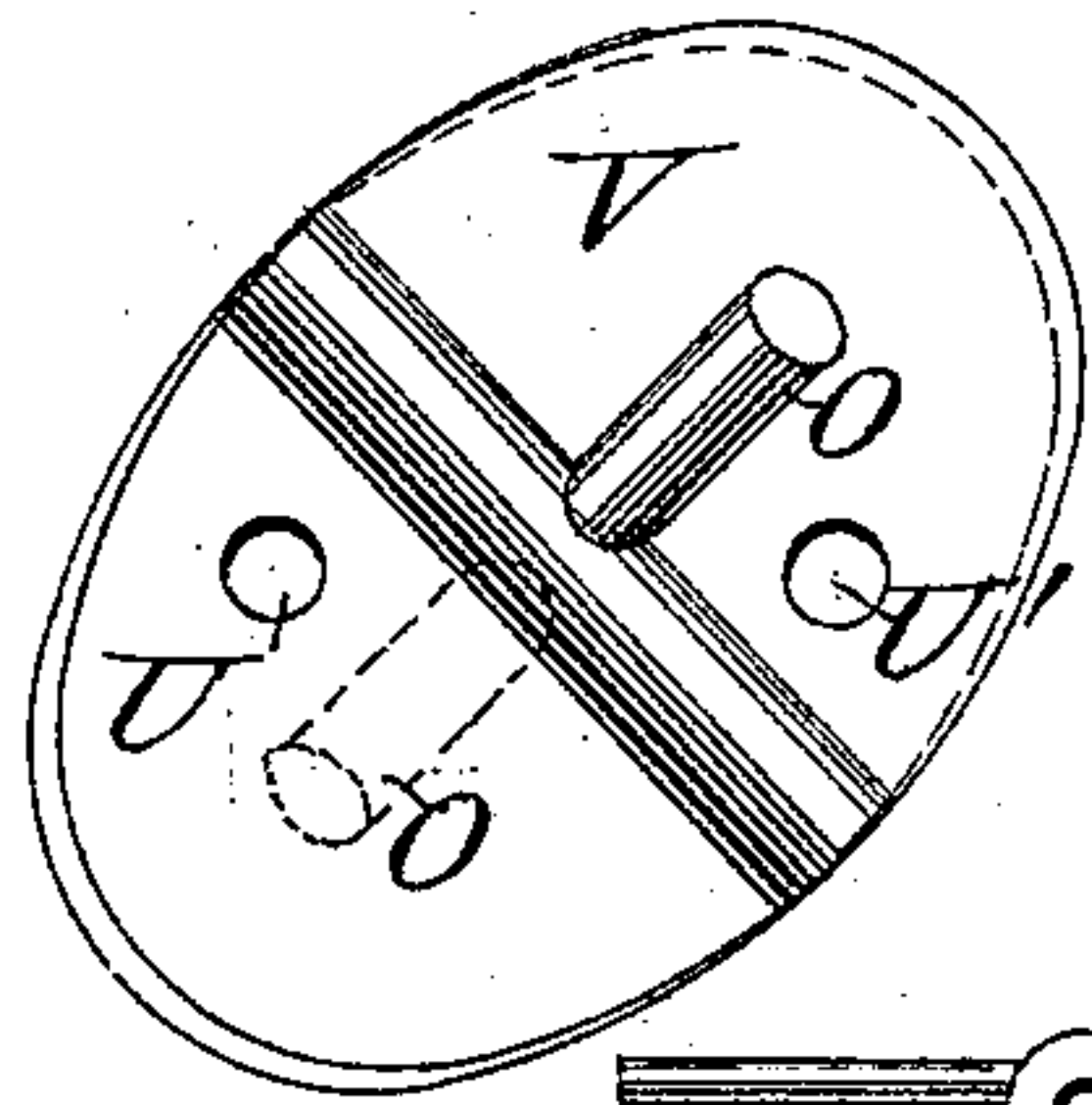
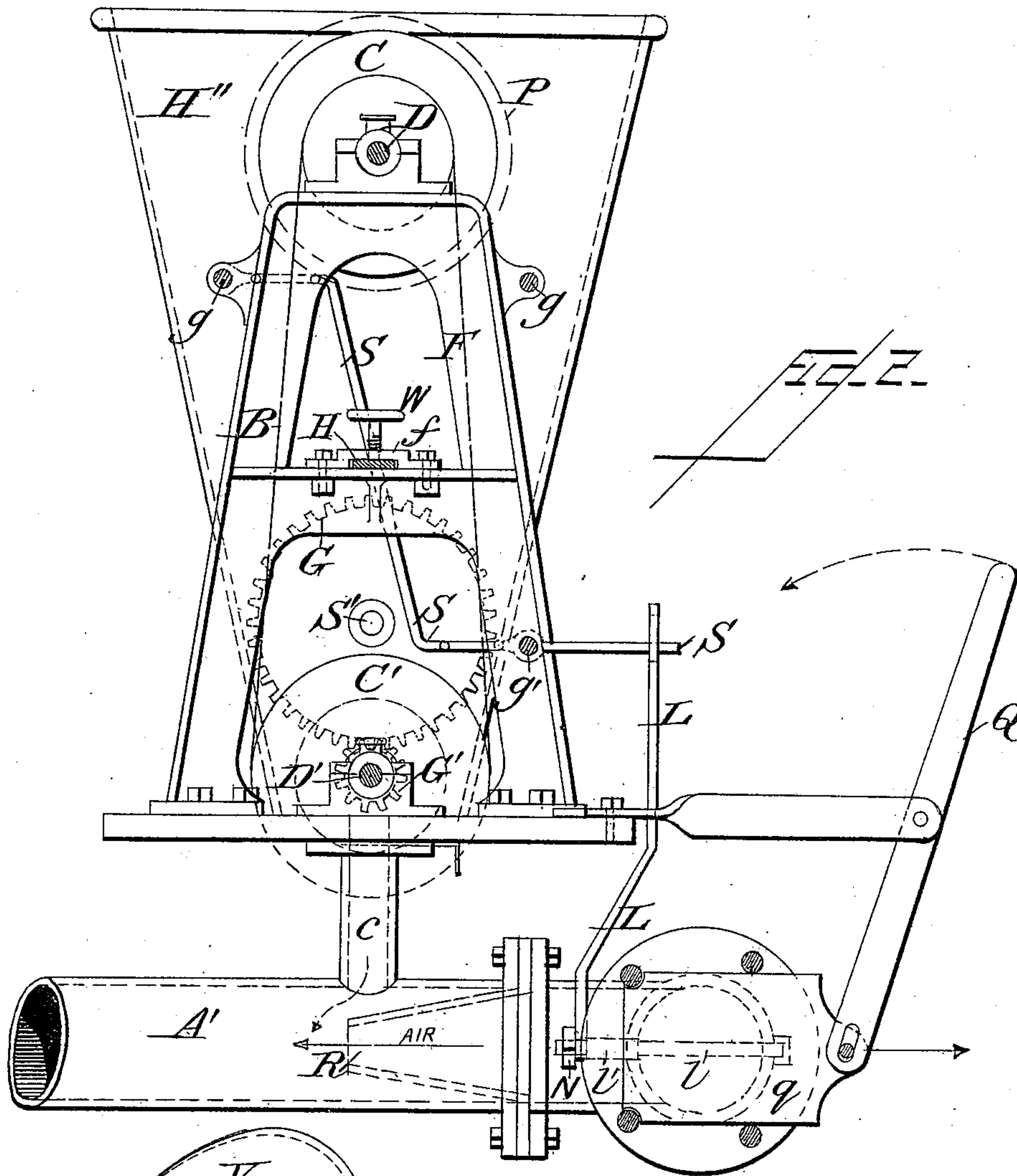
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Witnesses

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*A. P. Smith*

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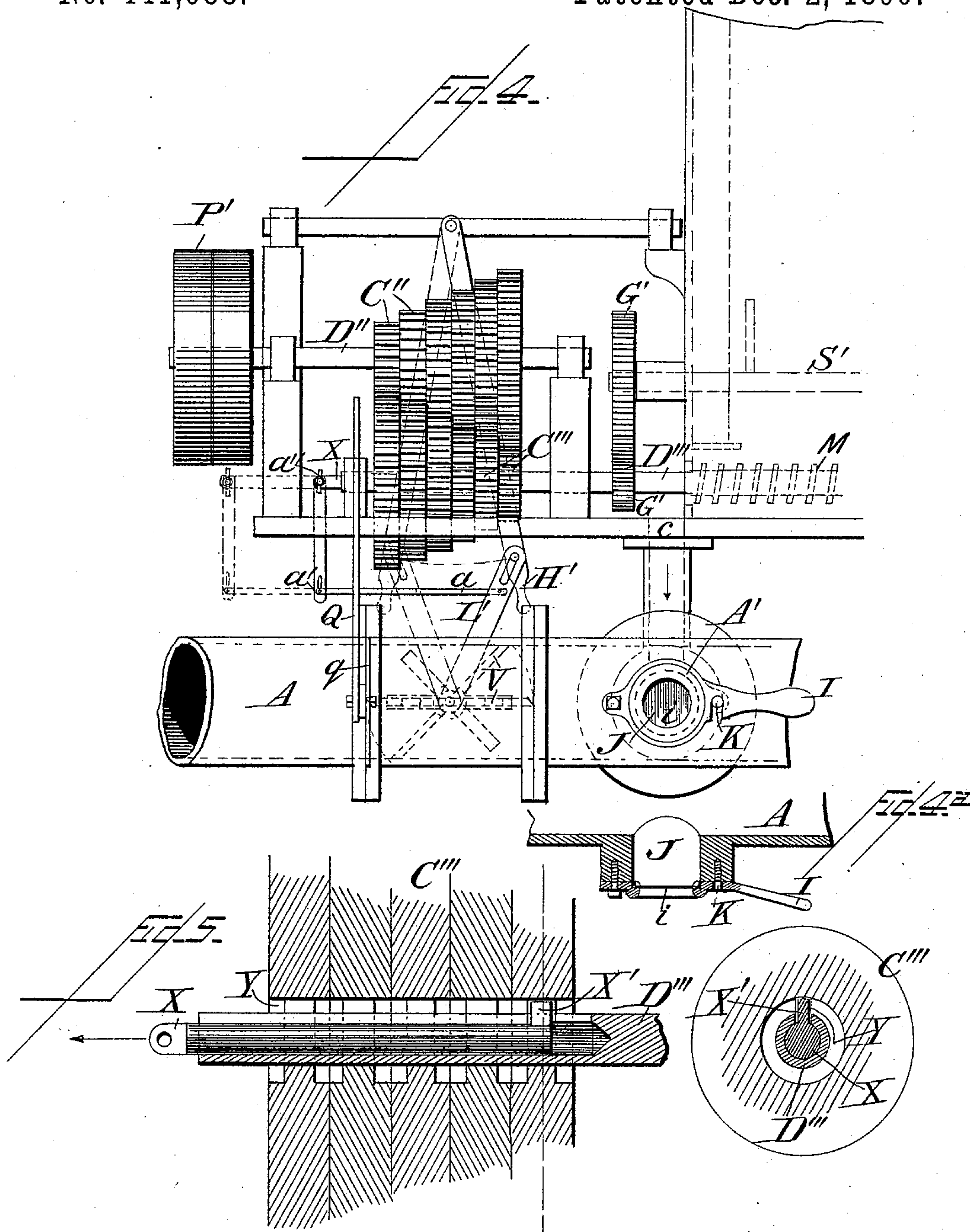
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*A. P. Smith*

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# UNITED STATES PATENT OFFICE.

JOHN G. MCAULEY, OF NEW YORK, N. Y.

## PULVERIZED-FUEL FEEDER.

SPECIFICATION forming part of Letters Patent No. 441,688, dated December 2, 1890.

Application filed March 21, 1888. Renewed May 3, 1890. Serial No. 350,514. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN G. MCAULEY, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Pulverized-Fuel Feeders; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention consists in the improvements in devices for feeding pulverized fuel, hereinafter to be described and claimed.

In the drawings, Figure 1 represents a partial side view and partial sectional view of my apparatus. Fig. 2 shows an end view of the same. Fig. 3 shows the details of my improved air-blast throttle-valve. Fig. 4 illustrates a modification, in which another form of speed-changing gear is employed. Fig. 4<sup>a</sup> is a section of my combined gate and peep-hole. Fig. 5 is a detail view of certain parts of the apparatus shown in Fig. 4.

The apparatus herein described and illustrated embodies certain improvements on that described in my application, Serial No. 251,822, filed October 8, 1887, and operates upon the same general principle.

H'' is the hopper, into which the pulverized fuel is dumped. This is stirred up by the arms upon the revolving stirrer-shaft S' and fed along by the double screw-thread M upon the shaft D' until it falls through the openings and conduits c c' down into the branch blast-pipe A' before the cone-shaped nozzle R, through which the air enters. The shelves h h' in the hopper protect the openings through which the fuel is forced by the screw M, and render the feed equable and prevent all leakage of the fuel when the machine is not running. The gear G upon the shaft S' meshes with the pinion G' upon the shaft D', so that motion is transmitted from one to the other.

The above is described and illustrated in my previous application before mentioned; and the main object of my present invention is to so connect the mechanism varying the speed of revolution of the screw-shaft D' with the mechanism controlling the amount of air-blast supplied that they shall operate simultaneously. My preferred apparatus for

accomplishing this is clearly shown in Figs. 1, 2, and 3.

P is the pulley about which the belt from the main line of shafting runs. This pulley is keyed upon the shaft D, which carries the cone-pulley C. The cone-pulley C' is similarly fixed upon the screw-shaft D', and the belt B runs over them both. The position of this belt upon the cone-pulleys is controlled by the belt-shifter S, clearly shown in Figs. 1 and 2. The belt-shifter S runs upon the guide-bars g g', and is moved by the handle H. This handle H moves in a guide formed by bolting the piece f to a cross-brace of the frame F, as shown in Fig. 2. The set-screw W holds the handle H, and consequently the belt-shifter S and belt B, in any desired position of adjustment. In the main air-supply pipe A is an elliptical valve V. (Shown in dotted lines in Fig. 1 and in detail in Fig. 3.) This valve oscillates upon a spindle l, as best shown in Fig. 2. The lever L is attached to the spindle l by compression between the shoulder l' upon the spindle l and the nut N. It is evident, therefore, that the lever L and the valve V may be set at any position of angular adjustment one to the other. The end of the belt-shifter S passes through the slot p in the end of the lever L, and as the belt-shifter is moved to and fro the lever L is oscillated and throttle-valve V opened or closed. It is evident, therefore, that as the belt-shifter moves to the left in Fig. 1 and the speed of revolution of the screw-shaft, and consequently the amount of fuel delivered into the conduits c c' diminish, the valve V will gradually close and the amount of air supplied through the nozzle R will be decreased proportionately.

In Fig. 3 the projection O constitutes a guard which will prevent the valve V from going beyond its central position of widest opening. The openings U U' in the valve are to admit of the passage of a small quantity of air, even when the valve is closed down upon its seat, since it is evident from Fig. 1 that the feeding apparatus will be running slowly when the valve V is in its position of closure, and consequently unless a small quantity of air is allowed to pass the valve the fuel slowly fed down into the branch pipe A' would accumulate there and clog the apparatus.

It is of course evident that any other speed-



changing gear might be substituted for the cone-pulleys and belt, hereinbefore described.

The modification, Fig. 4, shows the application to my apparatus of the ordinary speed-changing gear used upon machine-tools.

The construction of throttle-valve is in all respects similar to that previously described; but the speed-changing mechanism operates as follows: The power is applied to pulley P', which, together with the series of gear-wheels C'' of different diameters, are keyed upon the shaft D''. Upon the screw-shaft D''' are the corresponding gear-wheels C'''. These run freely upon the shaft D''', unless one or the other of them is keyed to it by the apparatus shown in detail in Fig. 5. The end of the shaft D''' is made hollow, and in it slides the spline X, upon which is the feather X'. The gear-wheels C''' have the keyway Y cut in each, and as the spline X is shoved in or drawn out the feather X' enters the keyway or slot in one or the other of the series of gear-wheels C''' and locks it to the shaft D''', thus determining the relative rates of revolution of shafts D'' and D''', and consequently the speed of the screw-feed. The lever L', controlling the throttle-valve, is attached to the handle H' by a pin and slot, as in the previously-described construction. A link a connects the lever L' with the projecting lug a', attached to the spline X. The angular adjustment of the lug a' is controlled by the set-screw a''. It is clear then that the movement of the lever H' will change the speed of the feed and open or close the air-blast throttle-valve simultaneously, and that the relation existing between the speed of the apparatus and the quantity of the blast is adjustable by means of the lug a' and the set-screw a''.

Fig. 4<sup>a</sup> shows a detail sectional view of my construction of gate for permitting access to the nozzle R and branch supply-pipe A' when necessary. The main air-supply pipe A has the port J opposite the branch supply-pipe A' and in line with the axis thereof. The pivoted gate having the handle I, and the panel of isinglass or other transparent material i, closes this port. This gate is kept from going too far by the pin K. Through the peep-hole thus formed the operator can discover whenever the branch pipe A' or nozzle R is becoming clogged, and by opening the gate may insert a rod and remove the obstruction. In the main air-pipe A is a gate g, of ordinary construction, controlled by the lever Q. By means of this the entire supply of air may be cut off when desirable.

Having therefore described my invention both in essence and detail, what I claim as new, and desire to protect by Letters Patent, is—

1. In an apparatus for feeding pulverized fuel by an air-blast, a combination of the air-blast throttle-valve, the speed-changing mechanism, and the reciprocating handle simultaneously operating the air-blast throttle-valve and the speed-changing mechanism, substantially as described.

2. In an apparatus for feeding pulverized fuel by an air-blast, the combination of an air-blast throttle-valve, the speed-changing mechanism, and the lever operating the air-blast throttle-valve and connected to one of the reciprocating parts of the speed-changing mechanism, substantially as described.

3. In an apparatus for feeding pulverized fuel by an air-blast, the combination of the air-blast throttle-valve, the speed-changing mechanism, and the adjustable lever operating the air-blast throttle-valve and connected to one of the reciprocating parts of the speed-changing mechanism, substantially as described.

4. In an apparatus for feeding pulverized fuel by an air-blast, the air-blast throttle-valve, the cone pulleys, the belt, the belt-shifter, and the lever operating the air-blast throttle-valve and connected to the belt-shifter, substantially as described.

5. In an apparatus for feeding pulverized fuel by an air-blast, the combination of an air-blast throttle-valve which has one or more perforations, whereby small quantities of air may pass through the valve, even when it rests firmly on its seat, the speed-changing mechanism, and the lever operating the air-blast throttle-valve and connected to one of the reciprocating parts of the speed-changing gear, substantially as described.

6. In an apparatus for feeding pulverized fuel by an air blast, the combination of the main air-supply-pipe, the branch air-supply pipe leading therefrom, the port in the main supply-pipe in line with the axis of the branch supply-pipe, and the gate opening and closing said port, consisting of a panel of transparent material set in a suitable frame, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN G. MCAULEY.

Witnesses:

EMIL S. ARNOLD,  
E. W. MORROW.