

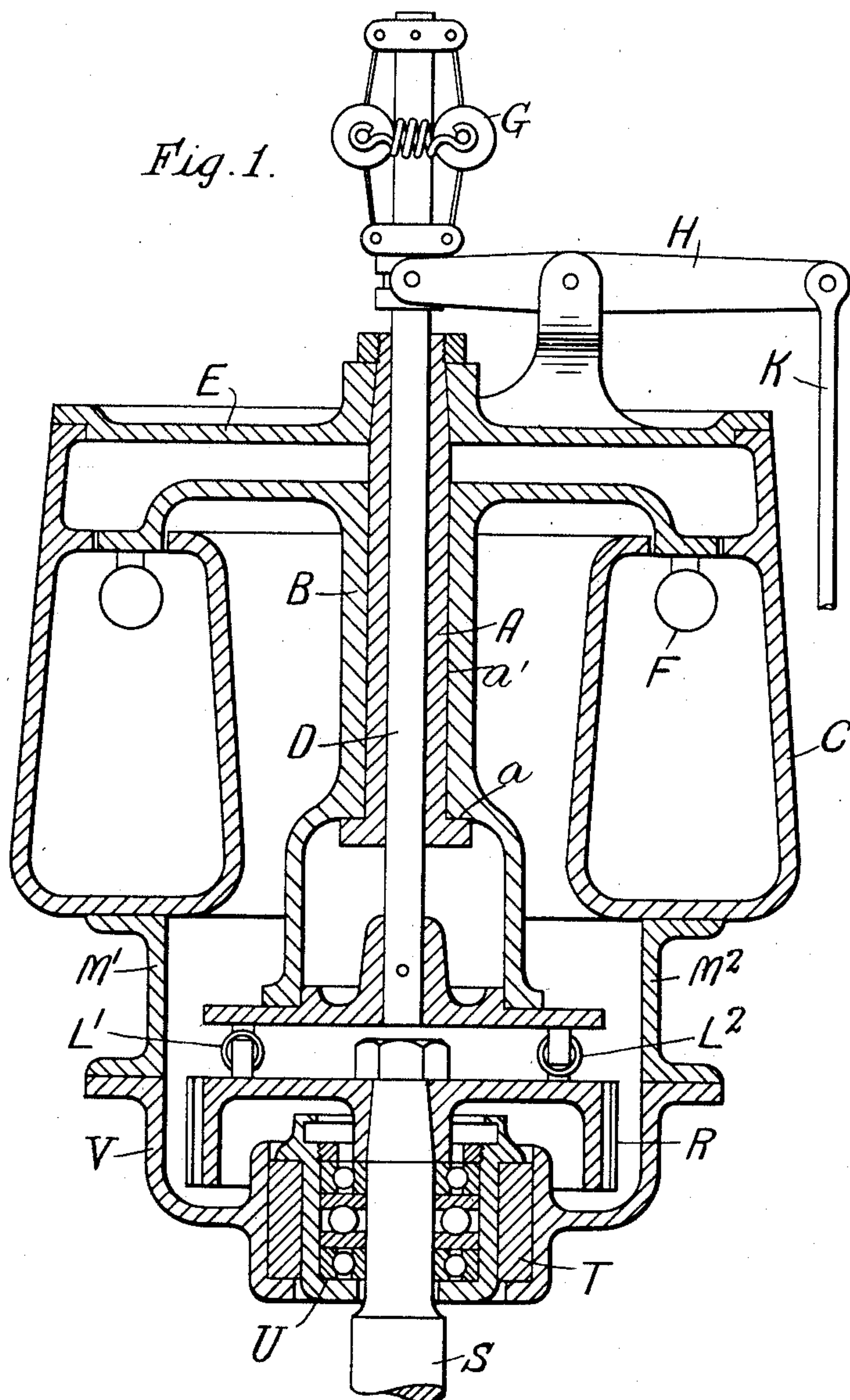
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PATENTED JAN. 14, 1908.

W. A. MACFARLANE.  
APPARATUS FOR DRIVING CENTRIFUGAL MACHINES.

APPLICATION FILED APR. 13, 1907.

5 SHEETS—SHEET 1.



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No. 876,368.

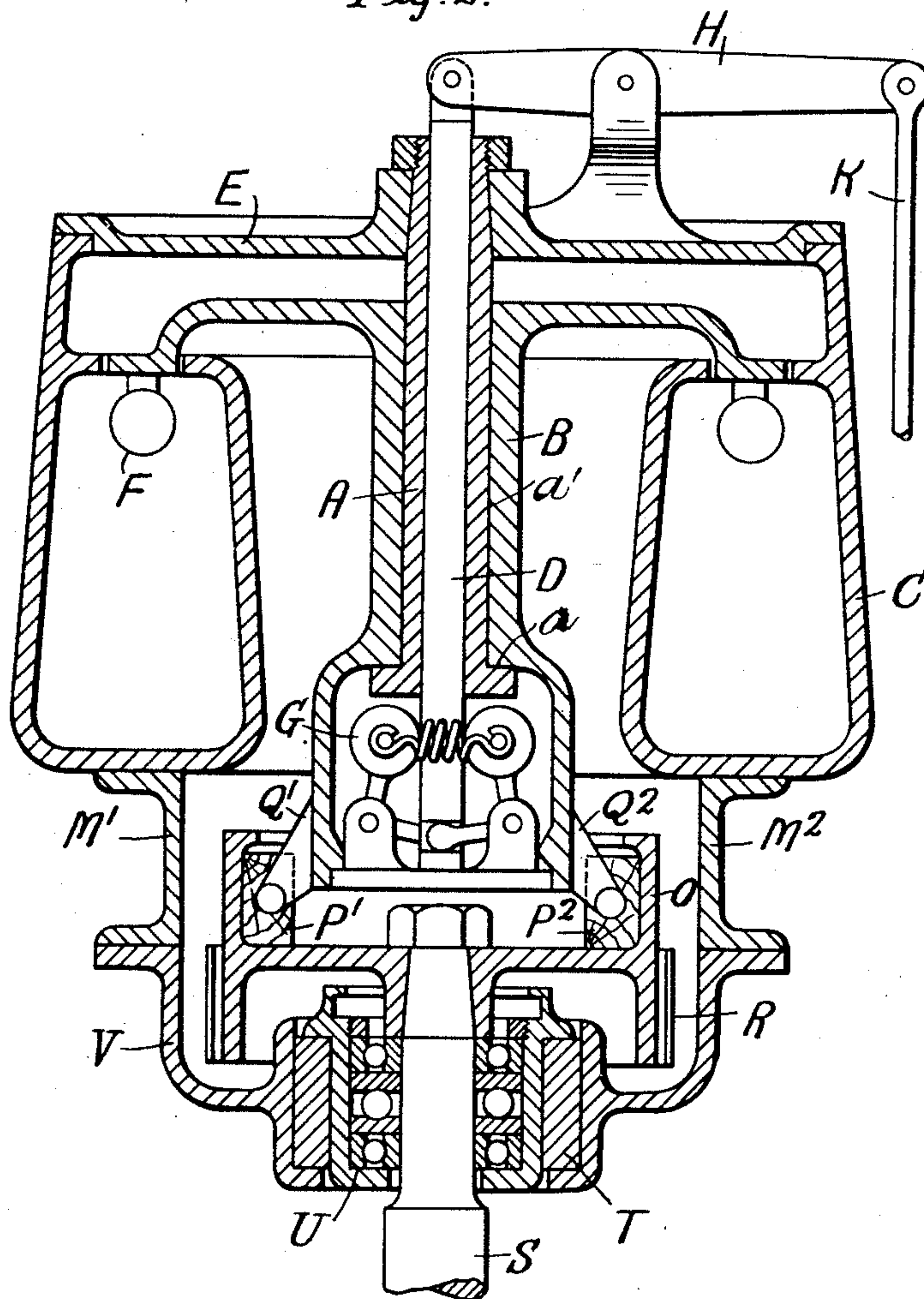
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Fig. 2.



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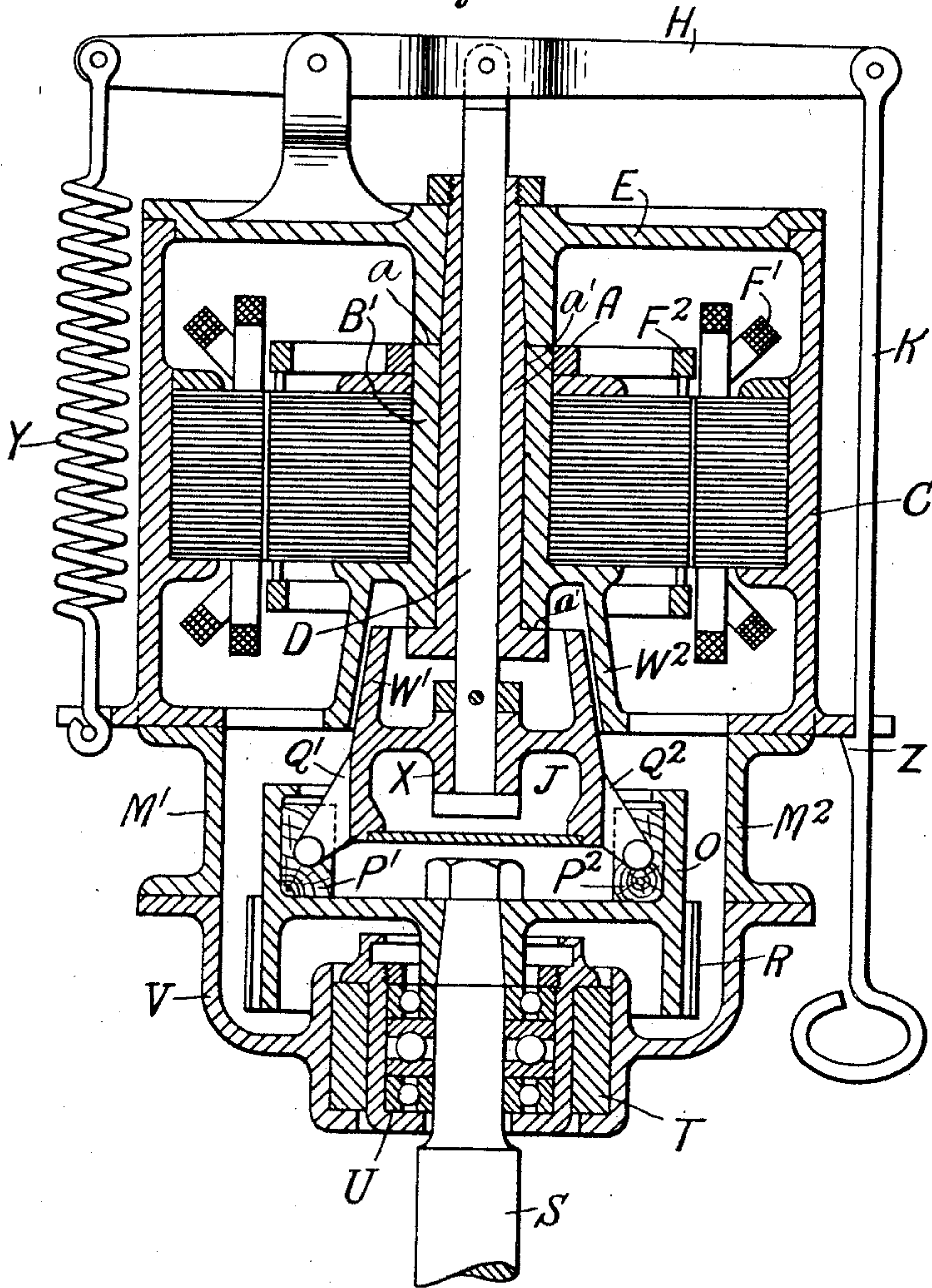
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5 SHEETS—SHEET 3.

Fig. 3.



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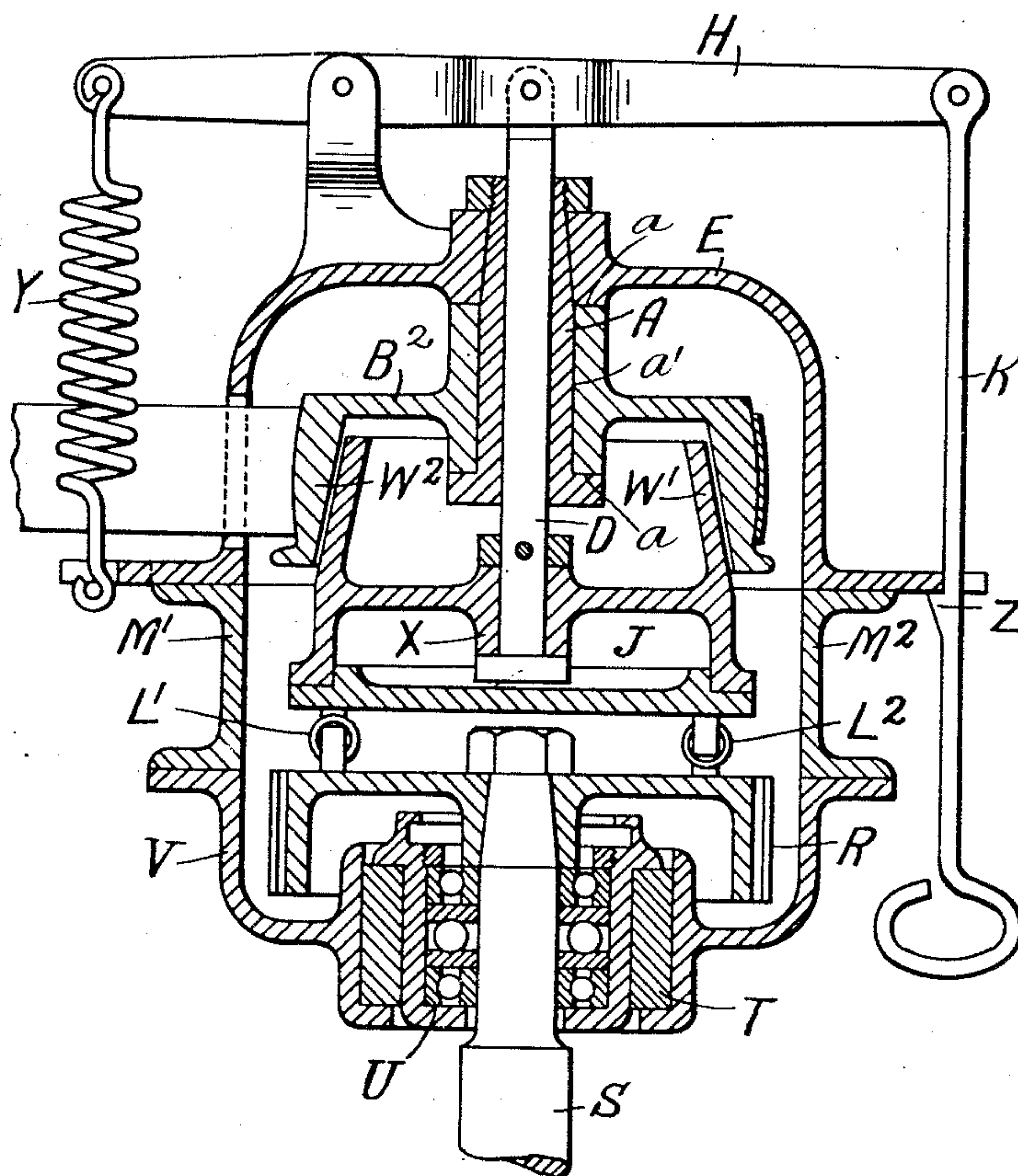
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Fig. 4.



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5 SHEETS—SHEET 5.

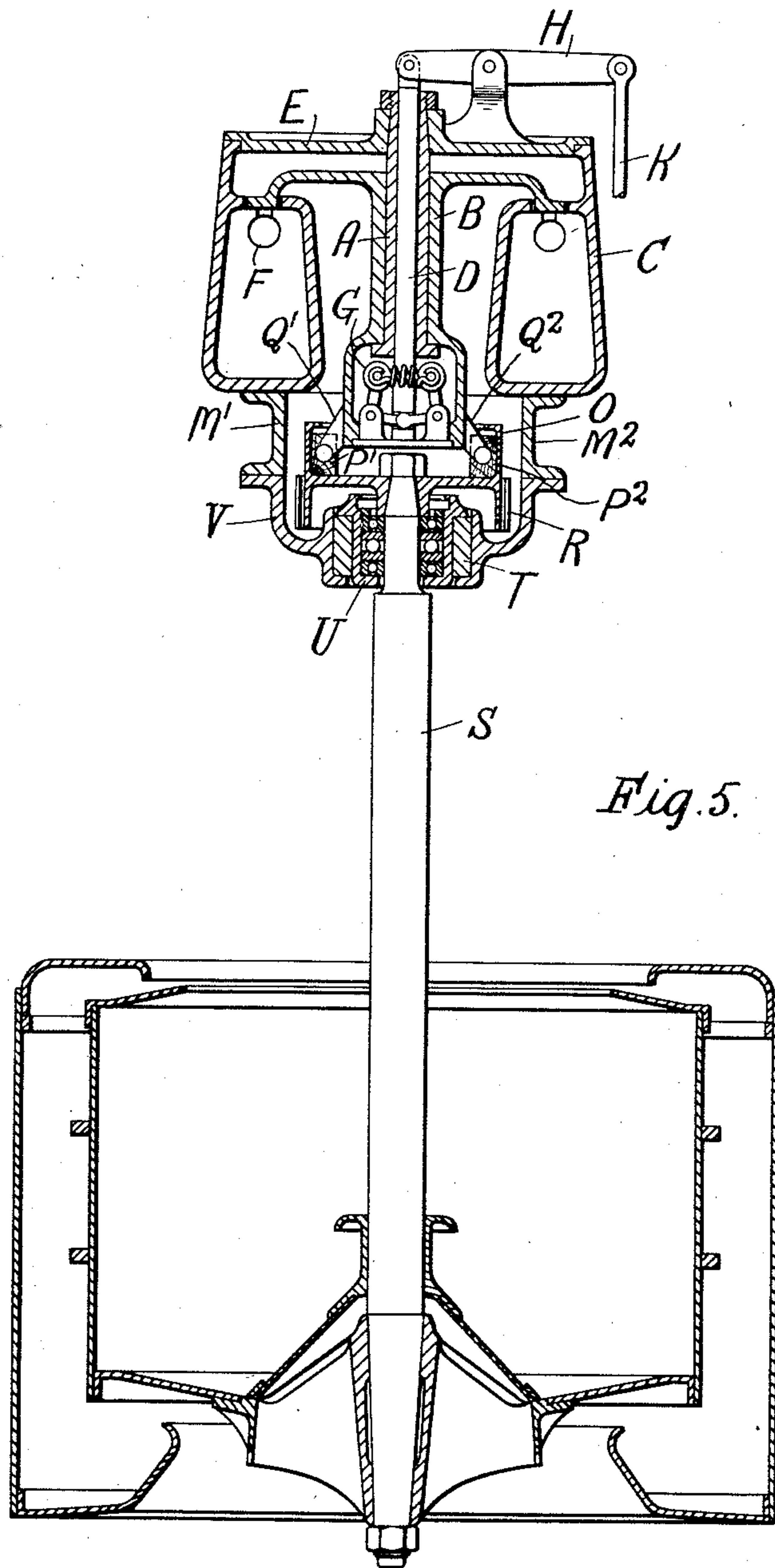


Fig. 5.

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# UNITED STATES PATENT OFFICE.

WILLIAM ALLAN MACFARLANE, OF CATHCART, SCOTLAND.

## APPARATUS FOR DRIVING CENTRIFUGAL MACHINES.

No. 876,368.

Specification of Letters Patent.

Patented Jan. 14, 1908.

Application filed April 13, 1907. Serial No. 368,070.

*To all whom it may concern:*

Be it known that I, WILLIAM ALLAN MACFARLANE, a subject of the King of the United Kingdom of Great Britain and Ireland, and  
5 residing at Cathcart, Renfrewshire, Scotland, have invented certain new and useful Improvements in Apparatus for Driving Centrifugal Drying-Machines, of which the following is a specification.

10 This invention relates to improvements in apparatus for driving centrifugal drying machines, more particularly the type of centrifugal drying machine known as the suspended self-balancing centrifugal drying machine, which are driven by motors or belt  
15 pulleys through the medium of clutches or couplings or combinations of clutches or combinations of couplings or combinations of clutches and couplings.

20 The motors or drivers are usually supported on a framework above the centrifugal drying machine, and the same framework may be used to carry the centrifugal drying machine. Hitherto these motors or drivers  
25 have been made with the revolving part carried on a solid spindle with journal bearings at both ends and a thrust bearing, usually at one end.

The improvement consists principally in  
30 making the revolving part of the motor, or driver, to run on a stud supported from above, and with the necessary journal and thrust bearings to keep the revolving part of the motor or driver in proper relative position. The said stud is made hollow which  
35 permits of making considerable improvements in the arrangement of the accessory details.

Hitherto there have been three methods  
40 practiced of driving centrifugal drying machines. According to one method the revolving part of the motor or driver is coupled to the centrifugal drying machine by a flexible or other suitable coupling, and when  
45 started the revolving part of the motor or driver and the centrifugal drying machine come up to full speed together. A second way is to allow the revolving part of the motor, or driver, to run continuously and  
50 use clutches of the friction or slipping type to bring the centrifugal drying machine up to speed gradually. In the third way the revolving part of the motor, or driver, and the centrifugal drying machine are connected  
55 together by a friction clutch, usually of the centrifugal type, and when the motor is

started the centrifugal drying machine comes up to full speed at a slower rate than the motor.

Depending upon the kind of motor used 60 and the manner in which it is to be applied, the hollow of the stud is utilized to pass a revolving spindle through it to work an externally situated governor for regulating the speed of the motor, or a rod may be passed 65 through it to connect between an internally situated governor and a throttle valve, trip gear, switch, or other regulating device. Also the hollow of the stud may be used to pass the connecting rod or rods for working 70 the clutches connecting the revolving part of the motor or driver to the centrifugal drying machine, and in other ways. The revolving part of the motor may be the rotor or armature of an electro motor, the revolving 75 part of a Pelton wheel or it may be a pulley driven by a belt, or the revolving part of any other form of motor or driving apparatus.

The invention is illustrated in the accompanying drawings in which Figures 1 and 2 80 are vertical sections showing two alternative constructions of driving mechanism in which water is used as the motive power. Figs. 3 and 4 are corresponding views showing respectively an electric drive and a belt drive. 85 Fig. 5 shows to a smaller scale a centrifugal drying machine fitted with the water motor and connections shown in Fig. 2.

Referring to the annexed drawings, S is 90 the spindle of the centrifugal drying machine, which is carried by the bearing U. The bearing U is carried by the elastic buffer T, which is adapted to control the gyratory and vibratory movements of the spindle S. 95 The buffer T is carried by the casing V, which in turn is supported from the underside of the framing M<sup>1</sup>, M<sup>2</sup>. R is the brake for stopping the machine.

Referring more particularly to Fig. 1, C 100 is the casing of a Pelton water motor which is fixed to the upper side of the frame M<sup>1</sup>, M<sup>2</sup>. The Pelton wheel B, carries the cups F, which receive the driving power from water jets (not shown). The wheel B, 105 which, for convenience, may be called the driver, is supported by suitable thrust and journal bearings *a*, *a*<sup>1</sup>, upon the stud A, round which it revolves. The stud A is supported from the cover E, of the motor casing C. D is a spindle or rod, passing through the bore of the stud A and convey-



ing motion to the externally situated governor G, which actuates the gear or mechanism for regulating the supply of water to the motor, through the lever H, and rod K. The driver B is connected to the centrifugal drying machine through the springs  $L^1 L^2$  which form a flexible coupling and allow for the gyration and vibration of the machine spindle S, and when started the driver B and the centrifugal drying machine rise to full speed together.

In Figs. 2 and 5 the arrangement is similar to that of Fig. 1, except that the governor G, is situated within the driver B, and communicates with the lever H, and rod K, through the rod or spindle D. Also the connection between the driver B and the machine spindle S is made in this case by means of a friction clutch consisting of the friction pulley O, friction blocks  $P^1 P^2$  and driving arms  $Q^1 Q^2$ . With this arrangement the centrifugal drying machine comes up to speed at a slower rate than the driver B.

Fig. 3 shows the application of the invention to an electrically driven centrifugal drying machine. C is the outer casing of the motor,  $B^1$  is the armature or driver,  $F^1 F^2$  are the windings. The driver  $B^1$  is connected to the centrifugal drying machine through a combined cone and centrifugal friction clutch. In drawing  $W^2$  is one part of a cone clutch carried by the driver  $B^1$ .  $W^1$  is the other part of the cone clutch, which runs on the bearing X, and carries the driving arms  $Q^1 Q^2$  and which in turn act on the friction blocks  $P^1 P^2$  of the friction pulley O.

The bearing X is carried by the spindle D, supported from the lever H. In this case the motor runs continuously, and to start the centrifugal drying machine, the rod K is released from the catch Z, when the spring Y pulls the cone  $W^1$  into contact with the cone  $W^2$  thus setting in motion the driving arms  $Q^1 Q^2$  and friction blocks  $P^1 P^2$  and starting the centrifugal drying machine. In this construction shown in Fig. 4 the driver  $B^2$  is a belt pulley and runs continuously. Connection is made with the centrifugal drying machine through the cone clutch  $W^1 W^2$  and the flexible coupling  $L^1 L^2$ . As in the construction shown in Fig. 3, the cone  $W^1$  is carried by a bearing X on the spindle D. To start the centrifugal drying machine, the rod K is released from the catch Z, and the spring Y pulls the cone  $W^1$  into contact with the cone

$W^2$ . In this case the cone  $W^1$  slips on the cone  $W^2$  until the centrifugal drying machine has reached full speed, and the rapidity of the acceleration of the centrifugal drying machine can be regulated by regulating the strength or leverage of the spring Y.

For the purpose of this specification the revolving part of the motor or driving pulley is termed the driver, and the connection between the driver and the centrifugal drying machine is termed the driving connection.

Having now described my invention what I claim and desire to secure by Letters Patent of the United States is:—

1. In a centrifugal drying machine the combination with a driver, a machine spindle, a driving connection between said driver and spindle, a hollow vertical stud supported from above and around which the stud driver revolves, said stud having thrust and journal bearings to keep the driver in its proper relative position, and a rod passing through said stud and operatively associated with said driving connection.

2. In a centrifugal drying machine the combination with a driver, a machine spindle, a driving connection between said driver and spindle, a hollow vertical stud supported from above and around which stud the driver revolves, said stud having thrust and journal bearings to keep the driver in its proper relative position, means for regulating the speed and acceleration of the machine, and a rod passing through said hollow stud and having an operative connection with said regulating means.

3. In a centrifugal drying machine the combination with a driver, a machine spindle, a hollow vertical stud supported from above and around which stud the driver revolves, said stud having thrust and journal bearings to keep the driver in its proper relative position, a rod passing through said stud, and a clutch including one member carried by the driver and one member carried by said rod.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM ALLAN MACFARLANE.

Witnesses:

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