

No. 616,323.

Patented Dec. 20, 1898.

F. W. HEDGELAND.  
VALVE FOR PNEUMATIC MOTORS.

(Application filed May 26, 1898.)

(No Model.)

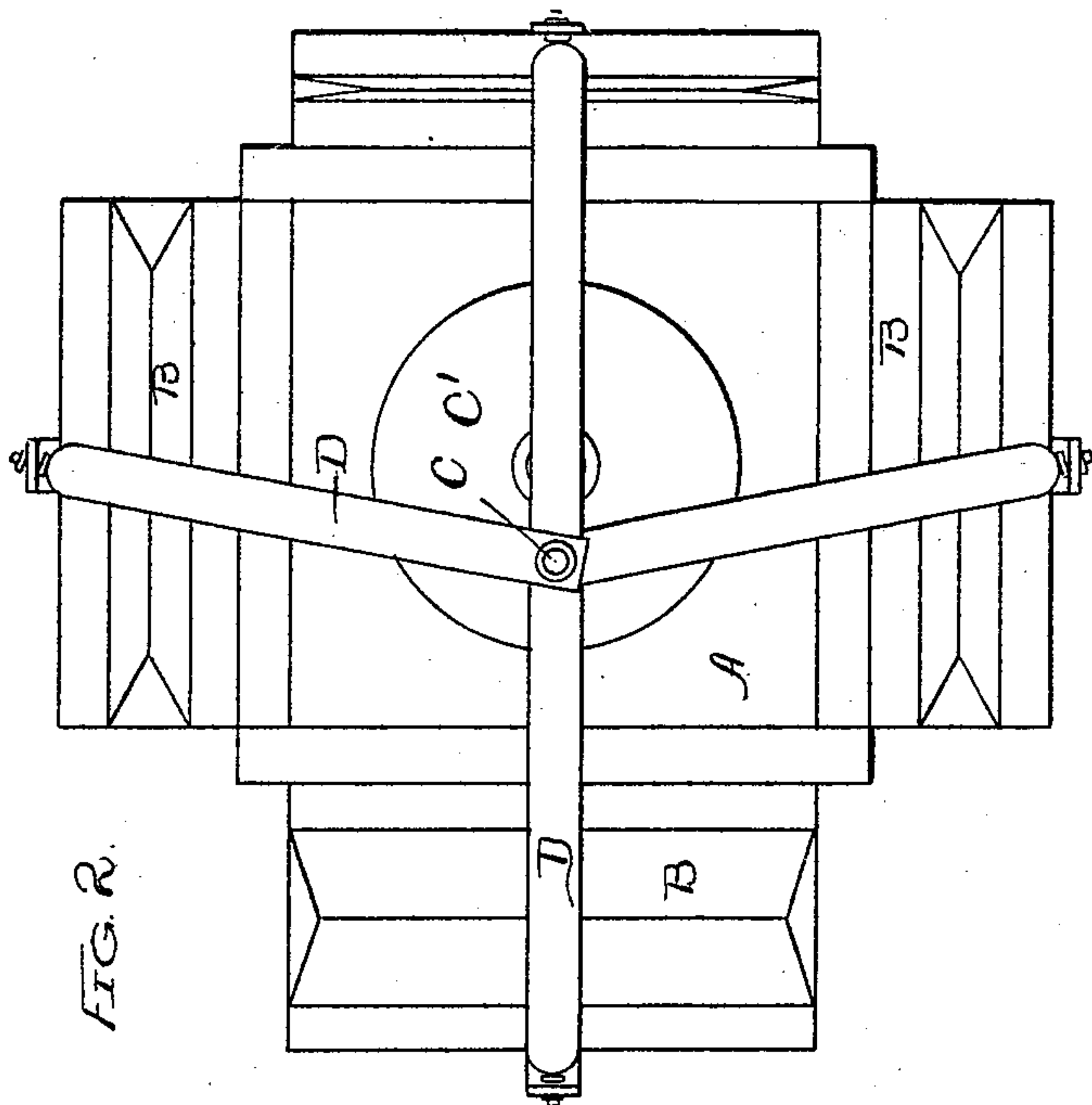


FIG. 2.

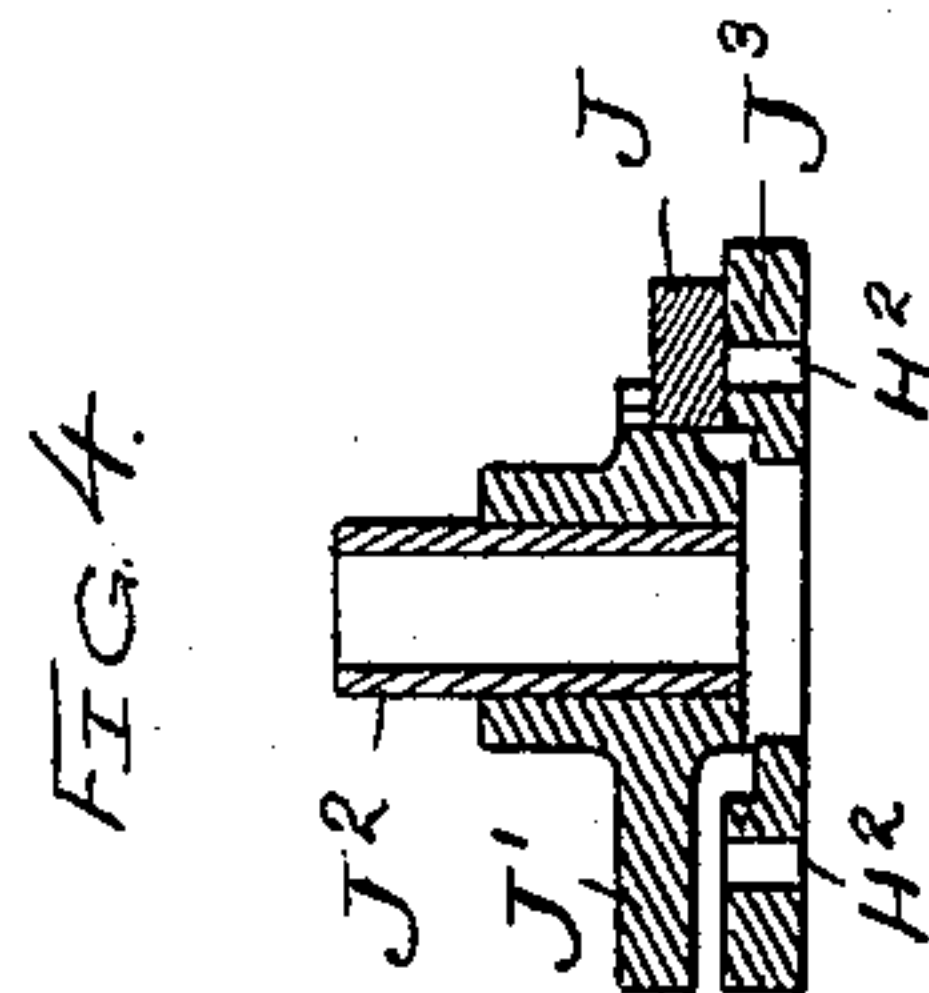


FIG. 4.

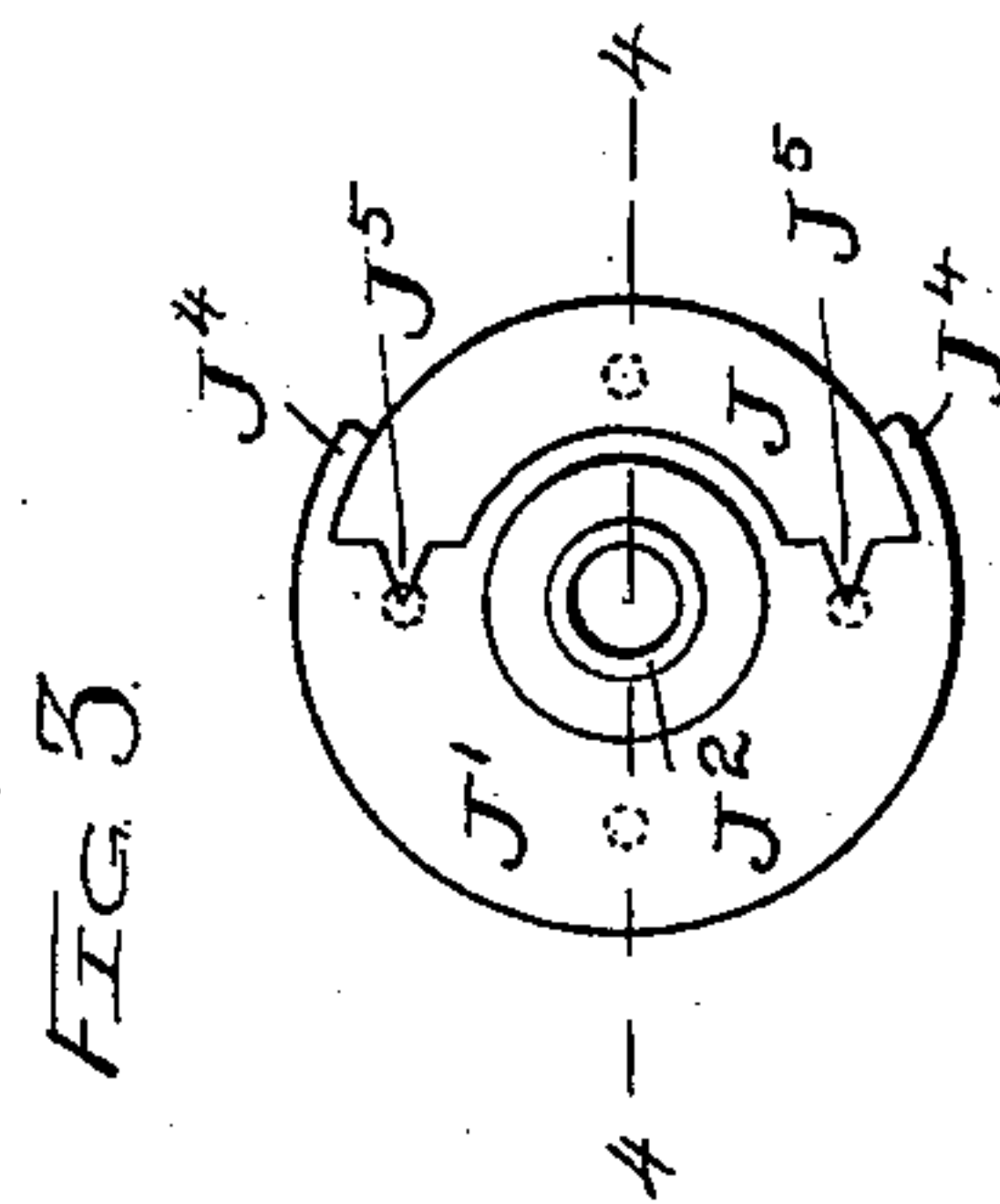


FIG. 3.

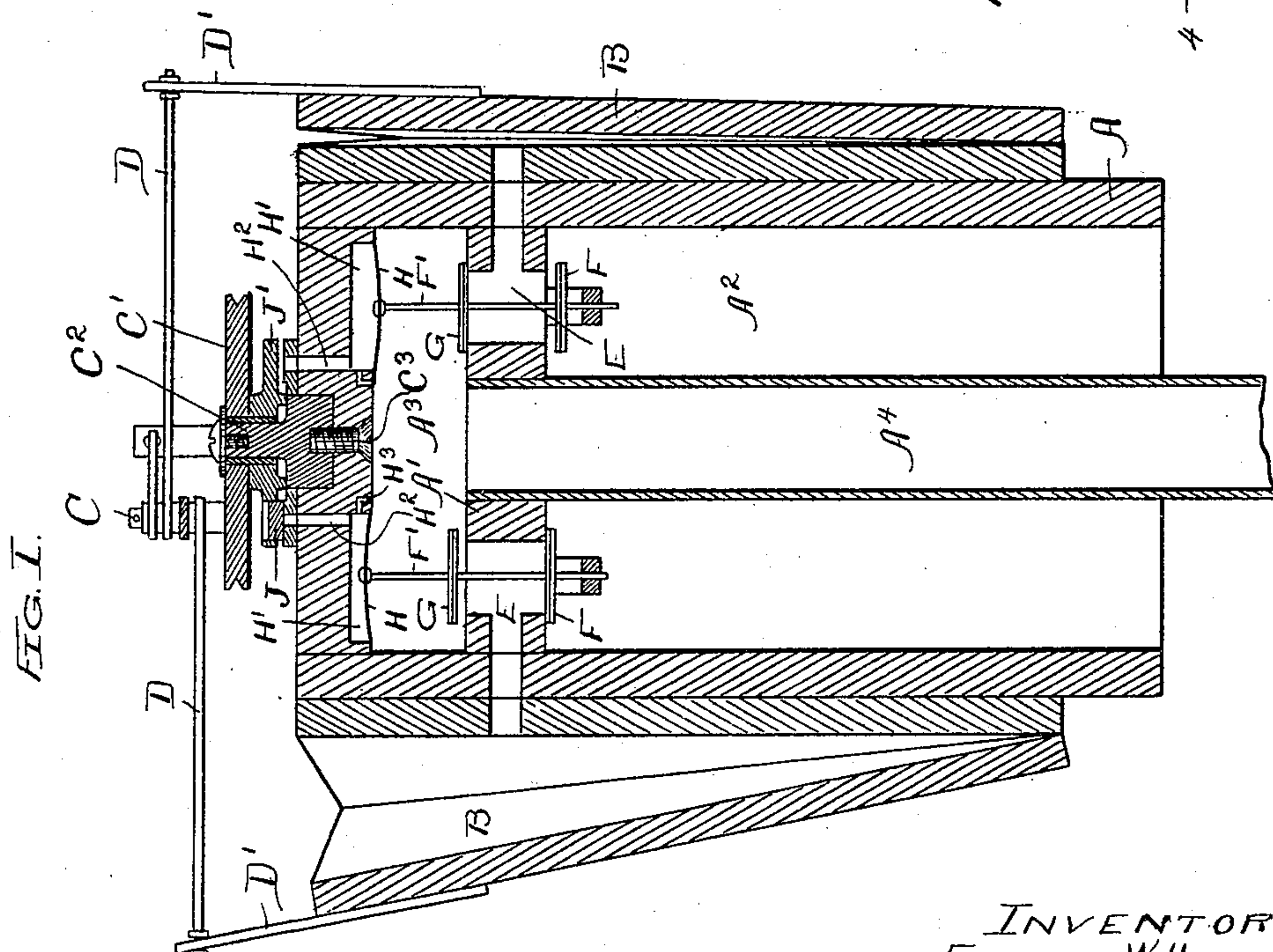


FIG. 1.

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# UNITED STATES PATENT OFFICE.

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## VALVE FOR PNEUMATIC MOTORS.

SPECIFICATION forming part of Letters Patent No. 616,323, dated December 20, 1898.

Application filed May 26, 1898. Serial No. 681,806. (No model.)

*To all whom it may concern:*

Be it known that I, FREDERICK W. HEDGELAND, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Valves for Pneumatic Motors, of which the following is a specification.

This invention relates to improvements in the valves of pneumatic or wind motors of the type shown in my previous application, Serial No. 658,991, filed November 18, 1897, and now Patent No. 605,876, of June 21, 1898. In the construction shown in my said application the power-pneumatics are all connected to the driven pulley, at one side of the latter, and in consequence of this there is a liability that in the course of time the pulley may acquire a wobbling motion or become loose in its bearings, and inasmuch as the valve which controls the motor is attached to the pulley or mounted upon the same shaft therewith this looseness or wobbling may affect the operation of the motor and render it sluggish in action by preventing close contact by the valve with its seat. My present improvement is intended to obviate this difficulty, and I accomplish that end by means of the construction which is detailed below and illustrated in the accompanying drawings.

In said drawings, Figure 1 represents a vertical section of the motor. Fig. 2 is a plan thereof. Fig. 3 is a plan of the controlling-valve, and Fig. 4 is a section on the line 4 4 of Fig. 3.

In said drawings, A represents a box, chest, or tank divided interiorly by the partition A' into two chambers A<sup>2</sup> and A<sup>3</sup>. The former of these chambers is constantly open to the outside air, and the latter is constantly exhausted of air by the bellows or other wind-producing devices, being connected therewith by one or more ducts A<sup>4</sup>. The trunk is many-sided and the pneumatics B are placed one at each side. The number of sides as well as the number of pneumatics may be varied. The movable sides of the several pneumatics are each connected to a crank-pin C upon the pulley C' by means of the links D and arms D', so that by successively inflating and deflating the pneumatics they will actuate said pulley and thereby create power in the latter, which may

be transferred to the shaft, which is to be driven by any suitable belt running in the groove of the pulley. The pulley is supported upon the stud C<sup>2</sup>, secured in the top of the box by the screw C<sup>3</sup>. I position the motor vertically, as in Fig. 1, with the valve and pulley on top, in order that gravity may affect all the power-pneumatics alike, and for an additional reason which will appear later on.

The pneumatics are supplied with the air necessary for inflation from the chamber A<sup>2</sup> by means of the passages E, of which there is one leading from each pneumatic, and each of such passages also connects with chamber A<sup>3</sup>, so that deflation may take place into that chamber. These movements of the air are controlled by pairs of valves F and G, mounted upon stems F' and located one in the chamber A<sup>2</sup> and the other in the chamber A<sup>3</sup> and at the ports connecting those chambers with said passages E.

Each pair of the valves F and G is connected by means of their stem with a corresponding membrane-motor H, located at the top of the chamber A<sup>3</sup> and having an air-chamber H' back of it. This air-chamber communicates with the outer air by an intermittently open duct H<sup>2</sup> and with chamber A<sup>3</sup> by an air-passage H<sup>3</sup>, which is constantly open, but has only a limited capacity as compared with duct H<sup>2</sup>. The ducts H<sup>2</sup> are opened and closed at each rotation of the pulley by my newly-devised valve, which instead of being made in one piece, as in my said application, is now made in two parts, of which the part J is the valve proper and the part J' is the actuating device or keeper. The part J is confined in the part J', so that it must rotate therewith, but it is free therefrom so far as vertical movement is concerned. The keeper is attached to the pulley in any suitable way—as, for instance, by means of a sleeve J<sup>2</sup>, secured to the pulley and fitting down over the stud C<sup>2</sup>. The valve J rests by gravity upon a circular seat or plate J<sup>3</sup>, which is attached to the top of the motor-box and provided with apertures registering with the ducts H<sup>2</sup>, and as the valve passes such apertures it alternately opens and closes them, as will be obvious. The keeper J' does not come in contact with the plate J<sup>3</sup> unless it be near the center and inside the



duct-apertures, so that the air can freely move in and out of the ducts H<sup>2</sup>.

The valve J is confined by the keeper, so that it may not lose its position, by providing the keeper with points J<sup>4</sup>, lapping around the outer side of the valve, and also by providing the ends of the valve with V-shaped projections J<sup>5</sup>, which enter corresponding recesses in the keeper.

10 The valve should fit the keeper with sufficient looseness, so that it will always rest by gravity upon the plate J<sup>3</sup>, and thus be rendered independent of the pulley so far as any wobbling motion of the latter is concerned.

15 By this construction I render the valve uniform in its action and obtain a more perfect closing of the ducts than can be obtained by the construction shown in my said previous application. By actual test I find that with 20 the same wind-pressure and the same resistance the speed of the motor is considerably increased by the use of this form of valve.

If deemed advisable, means may be provided for preventing the valve from slipping out of the keeper when the motor is inverted, as it is liable to be while being handled or transported. As this may obviously be done in various ways I have not deemed it necessary to illustrate any of them.

30 I claim—

1. In a wind-motor, the combination with a series of motors for operating the valves of

the power-pneumatics, of a single valve controlling said motors, said valve being held to its seat by gravity, substantially as specified. 35

2. In a wind-motor, the combination with a series of motors for operating the valves of the power-pneumatics, of a valve held to its seat by gravity and actuated by power from the device driven by the motor, substantially 40 as specified.

3. In a wind-motor, the combination with a series of motors for operating the valves of the power-pneumatics, of a rotating valve held to its seat by gravity, and means whereby said 45 valve may be rotated by power from the device driven by the motor, substantially as specified.

4. In a wind-motor, the combination with a series of motors for operating the valves of 50 the power-pneumatics, of a gravity-depressed valve J, and a keeper for rotating said valve, the latter being driven by the motor, substantially as specified.

5. A wind-motor having a rotating valve 55 for controlling the motors which operate the valves of its power-pneumatics, said valve being seated by gravity, substantially as specified.

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Witnesses:

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