

F. W. HEDGELAND.
PNEUMATIC MOTOR.

Patented June 21, 1898.

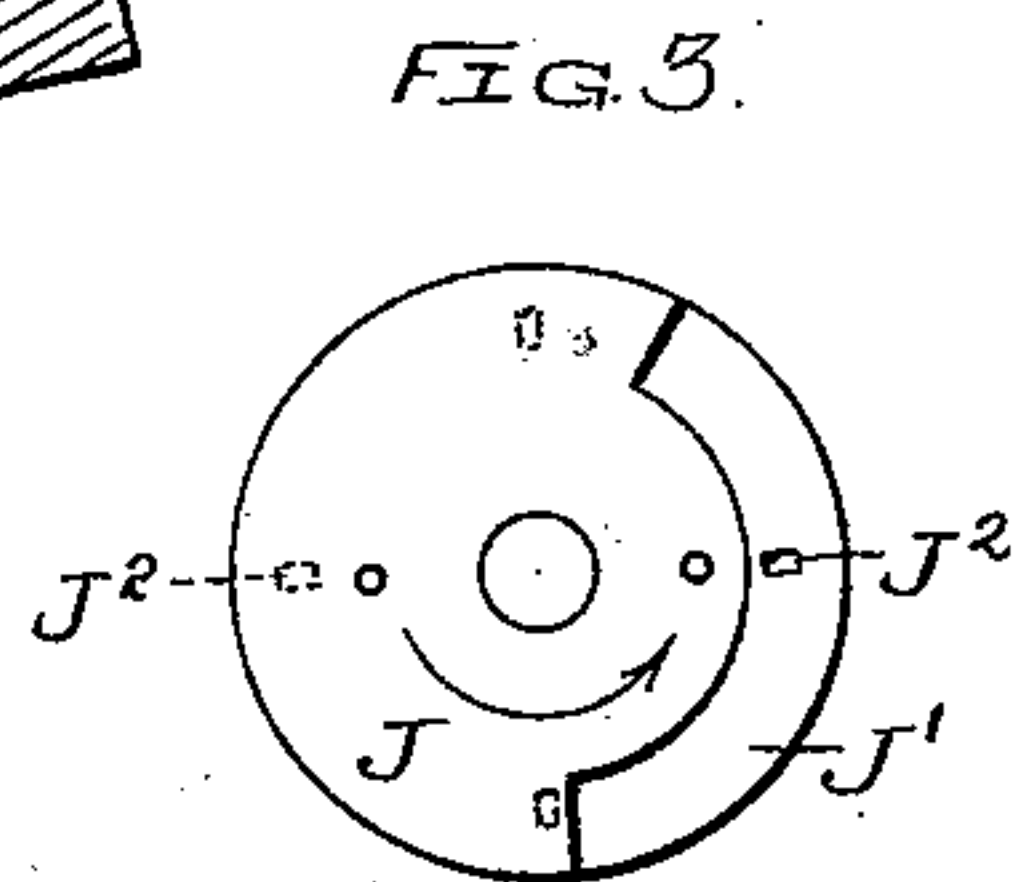
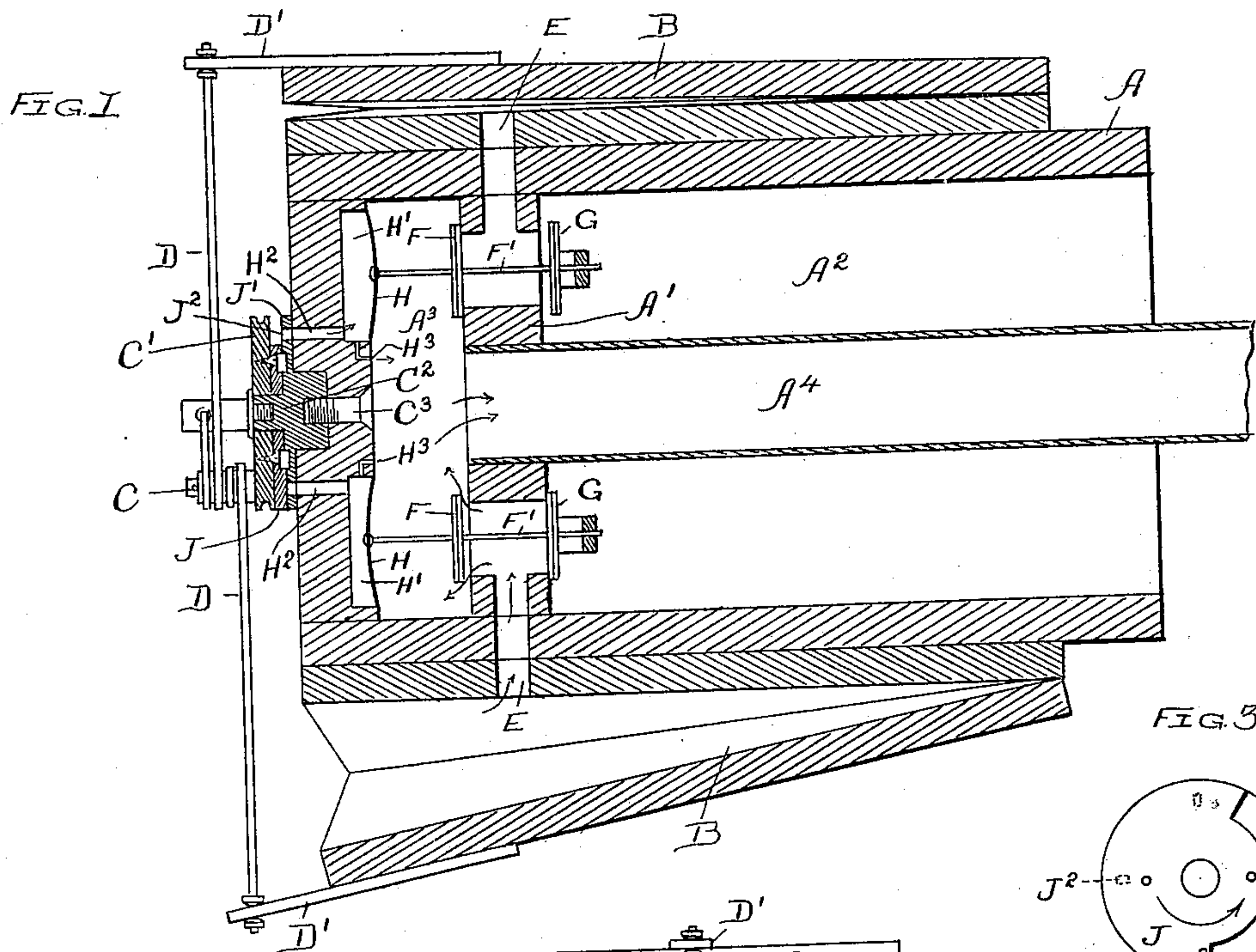
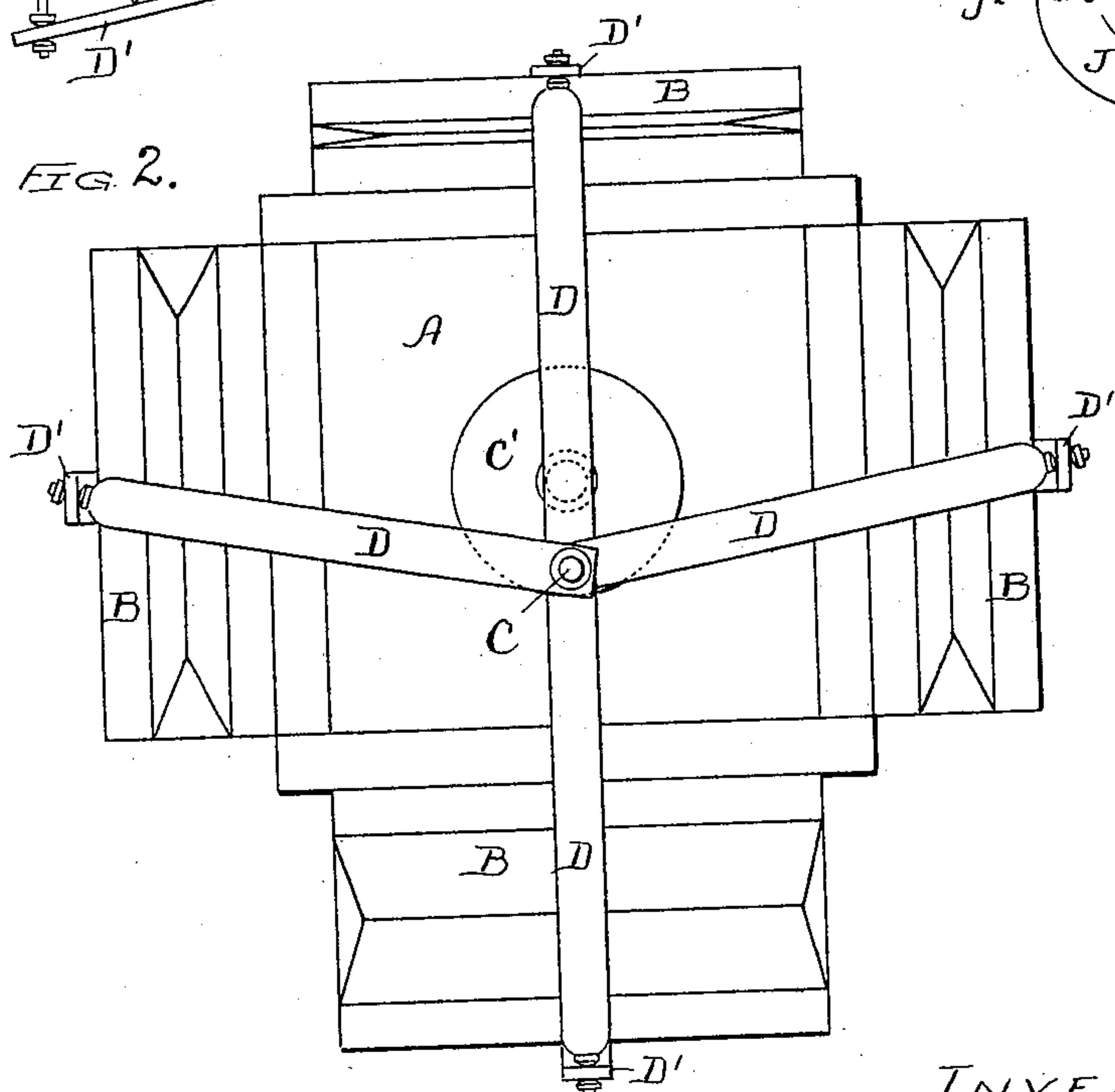


FIG. 2.



WITNESSES:

Sew. C. Curtis
J W Munday

INVENTOR:
FREDERICK W. HEDGELAND

BY *Wm. E. Everts & Adcock.*

HIS ATTORNEYS

UNITED STATES PATENT OFFICE.

FREDERICK W. HEDGELAND, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE
W. W. KIMBALL COMPANY, OF SAME PLACE.

PNEUMATIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 605,876, dated June 21, 1898.

Application filed November 18, 1897. Serial No. 658,991. (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 Pneumatic Motors, of which the following is a specification.

My object in this invention has been to produce a pneumatic or wind motor which will be as free as possible from friction and which will be unaffected by atmospheric conditions.

The nature of the improvement is fully given below, and is also illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section of the motor. Fig. 2 is an end view, and Fig. 3 is a detail elevation of the rotating valve-plate and its seat.

In said drawings, A represents a box, chest, or trunk divided interiorly by the partition A' into two chambers A² and A³. The former of these chambers is constantly open to the outside air at one end, and the latter is constantly exhausted of air by the bellows or other wind-producing devices, being connected therewith by one or more ducts A⁴. 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 C², secured in the end wall of the box by the screw C³.

The pneumatics are supplied with the air necessary for inflation from the chamber A² by means of the passages E, of which there is one leading from each pneumatic, and each of such passages also connects with chamber A³, so that the 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 A³ and the other in the chamber A² and at the ports connecting these chambers with said passages E.

Each pair of the valves F and G is connected by means of their stem with a membrane-motor H, located in the outer wall of the chamber A³ and having an air-chamber H' in its rear communicating both with the outer air by duct H² and with chamber A³ by air-passage H³, which is constantly open, but has only a limited capacity as compared with passage H². The passages H² are opened and closed at each rotation of the pulley by a valve-plate J, attached to the side face of the pulley and which is cut away at one side, so that it uncovers the passages one after another in successive order and closes them almost immediately in the same successive order. When the passages are uncovered, the outer air rushes in and inflates the membranes and operates the valves F and G in one direction, and when they are closed the exhaust, acting through the small passages H³, renders the membranes neutral, thereby allowing the exhaust to shift the valves in the other direction.

A flat-faced plate J' is attached to the box A to form a seat for the valve J. It is provided with openings J², registering with and forming the ports of the passages H². This plate should be in close contact with the valve, but should create no unnecessary friction therewith.

The operation of the motor will be fully understood from the foregoing description and does not differ essentially from that of the motor set forth in the patent to me, No. 591,213, of October 5, 1897, except that the membrane-motors are differently controlled, and this feature will be understood when it is stated that when the air-passages H² are uncovered a larger volume of air is admitted behind the membranes than can be exhausted through the permanently-open small passages H³, so that the latter does not prevent the inflation.

The motor can be used with blow-pressure as well as with exhaust-pressure, the passages H² then becoming deflators and the passages

H³ becoming inflators. The changes in the valve necessary in using blow-pressure, as well as such as are necessary where the number of pneumatics is greater or less than four, are all within the province of those skilled in the art and do not need to be set forth.

I claim—

1. The combination in a pneumatic motor of a series of pneumatics, a series of valves corresponding to the pneumatics and controlling the inflating and deflating thereof, a series of motors controlling said valves and a rotating valve controlling said motors, substantially as specified.

2. The combination in a pneumatic motor of a series of pneumatics, a series of valves corresponding to the pneumatics and controlling the inflating and deflating thereof, a series of motors controlling said valves and a single valve controlling said motors, substantially as specified.

3. The combination with a pulley or other

rotating device, of a wind-motor for driving the same, and consisting of a series of pneumatics, valves controlling the pneumatics, and membrane-motors for operating said valves, said membranes being each provided with a large valved air-passage and a small permanently-open air-passage whereby the membrane-chambers may be alternately inflated and deflated, substantially as specified.

4. The combination with the valve controlling the power-pneumatic of a wind-motor, of a membrane-motor having both a large valve-controlled passage to the outer air and a small permanently-open passage to the exhaust-pressure chamber through which it is alternately inflated and deflated, substantially as specified.

FREDERICK W. HEDGELAND.

Witnesses:

EDW. S. EVARTS,
H. M. MUNDAY.