

(No. Model.)

F. W. HEDGELAND.
WIND MOTOR.

No. 591,218.

Patented Oct. 5, 1897.

FIG. 1.

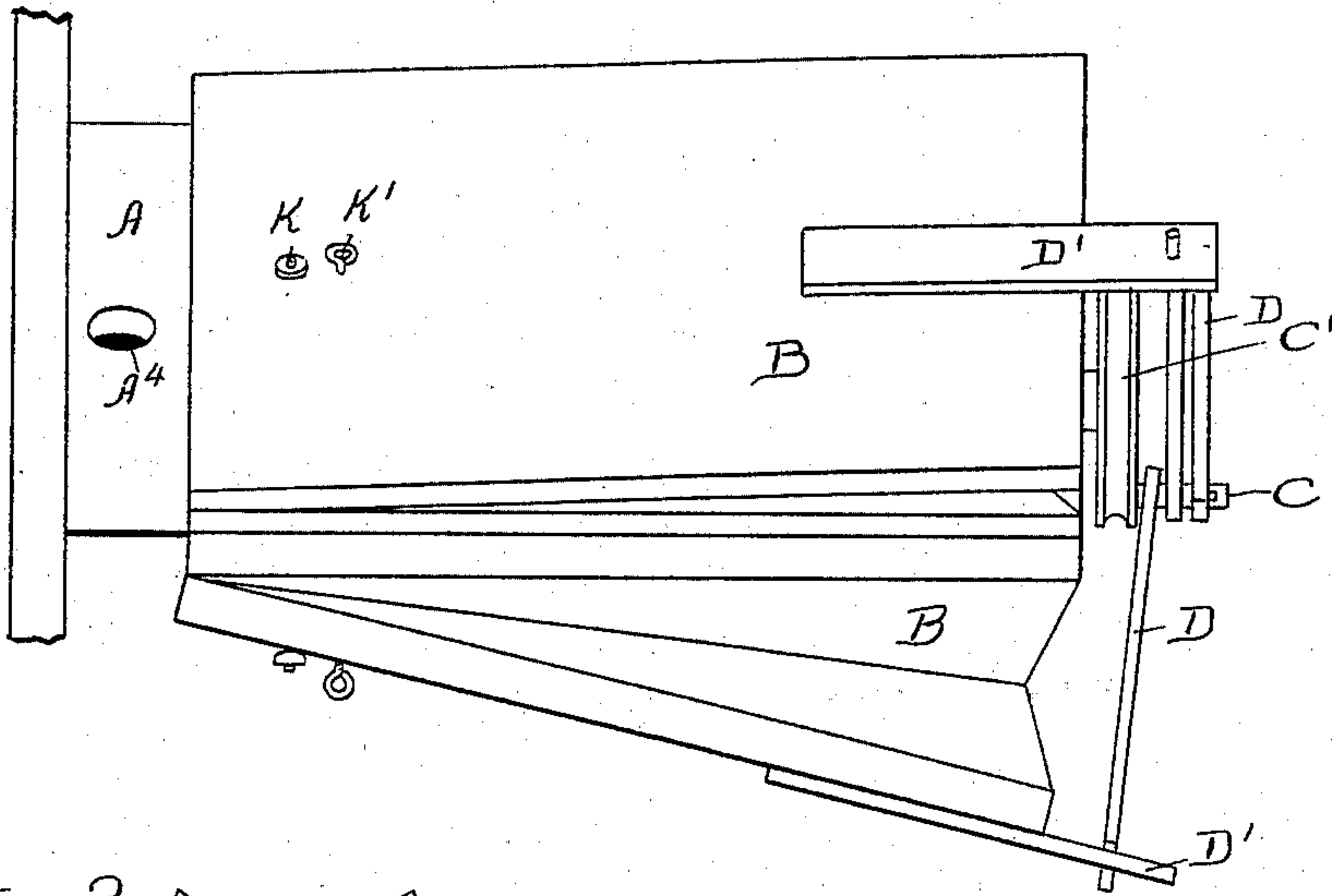


FIG. 2.

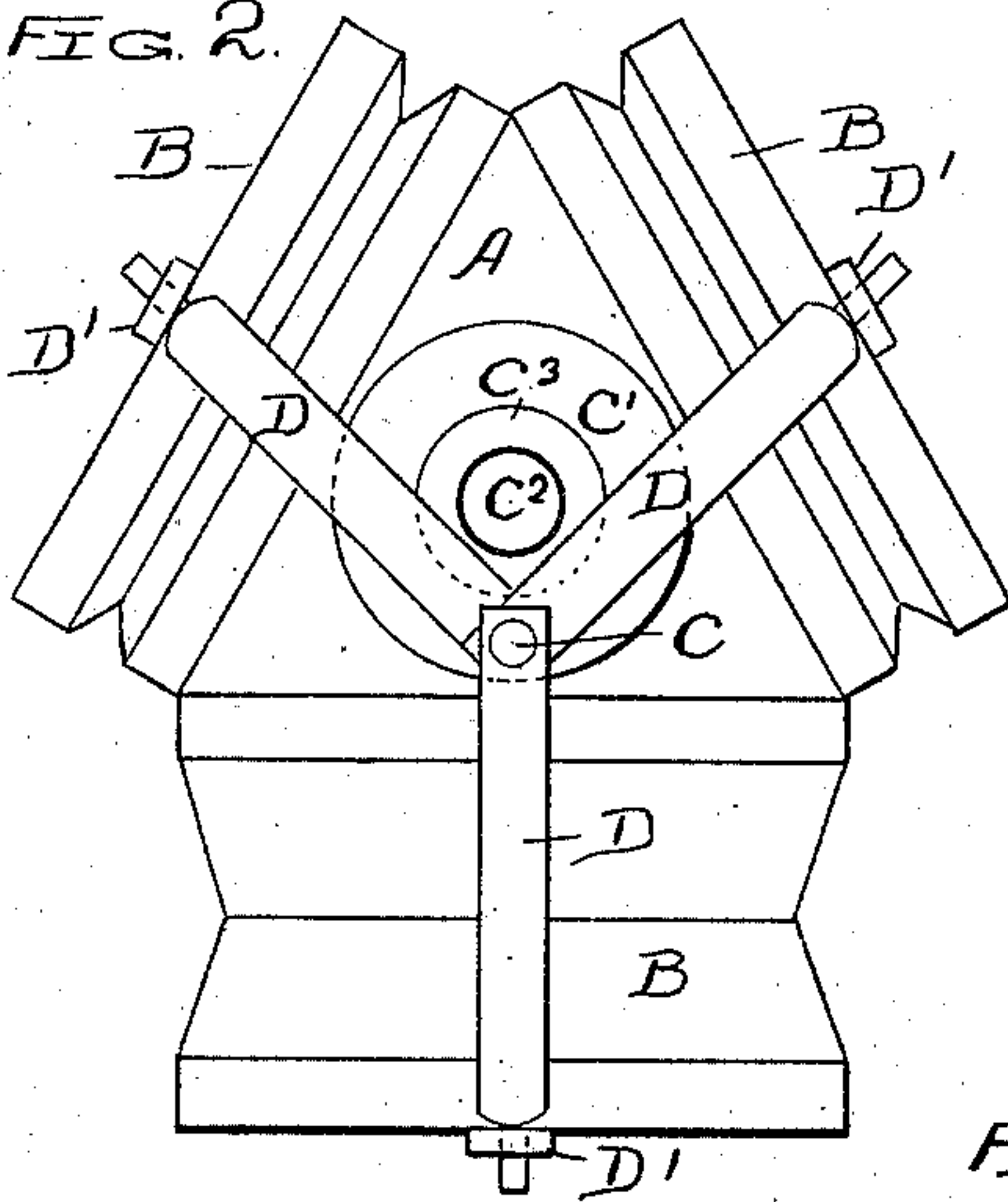


FIG. 4.

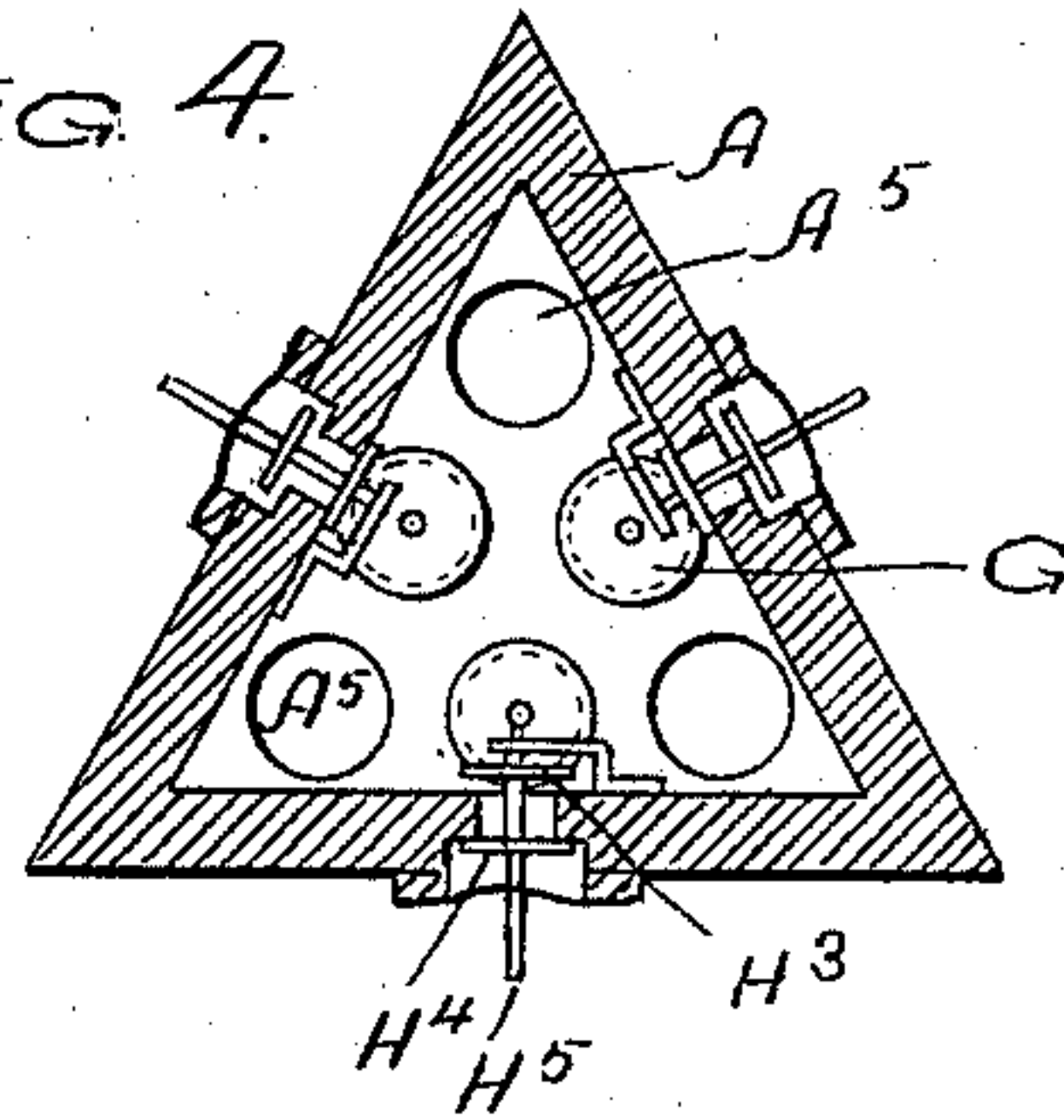
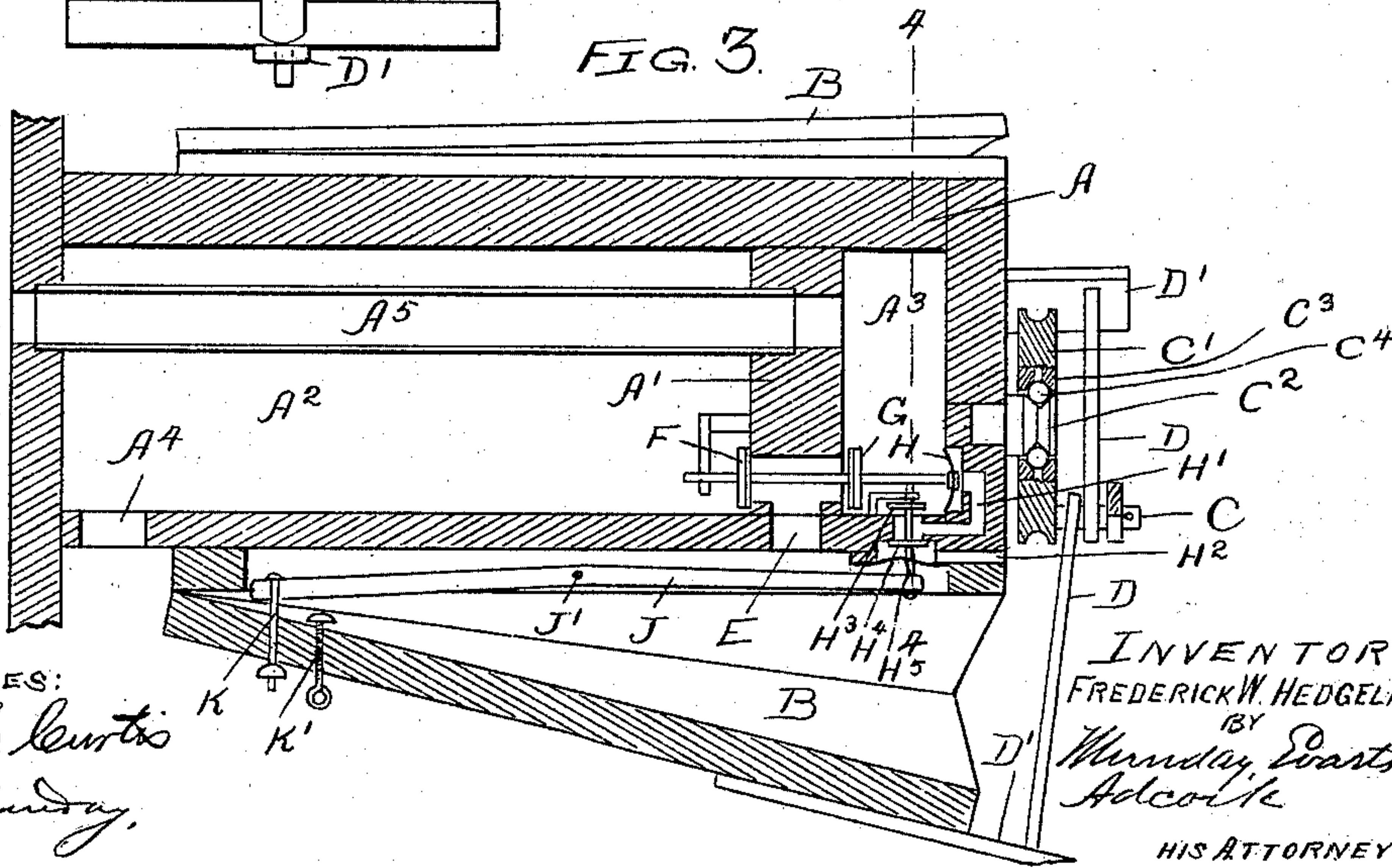


FIG. 3.



WITNESSES:

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UNITED STATES PATENT OFFICE.

FREDERICK W. HEDGELAND, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE
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WIND-MOTOR.

SPECIFICATION forming part of Letters Patent No. 591,218, dated October 5, 1897.

Application filed May 10, 1897. Serial No. 635,852. (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 Wind-Motors, of which the following is a specification.

This invention relates to improvements in wind-motors. It has been devised more especially for use in operating the tremolos and music-sheets of organs; and its leading object is the obviating of the friction present in previous constructions.

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

Figure 1 is a side and Fig 2 is an end elevation of the invention. Fig. 3 is a longitudinal section; and Fig. 4, a transverse section, the latter upon the line 4 4 of Fig. 3.

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 communicates with the air by the opening A⁴, which is constantly open, and the latter is constantly exhausted of air by the bellows or other wind-producing devices, being connected therewith by one or more ducts A⁵. The trunk is preferably three-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, however. 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. The pneumatics are supplied with the air necessary for inflation from the chamber A² by means of 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 valves F and G, mounted upon the same stem and located one in the chamber A² and the other in the chamber A³ and at the ports connect-

ing those chambers with said passage E. Each pair of the valves F and G is connected by means of their stem with a membrane-motor H, located in the wall of chamber A³ and having an air-passage H' in its rear, communicating both with the outer air by duct H² and with chamber A³ by ports guarded by valves H³ and H⁴, mounted upon a common stem H⁵ and adapted to open and also to close the ports alternately. These latter valves are operated automatically by their corresponding pneumatics at the close of each expansion, and also at the close of each collapse of the pneumatic by means of a lever J, located in the pneumatic, as shown, and rocking upon a pivot J', the lever being positively attached at one end to the stem of the valves and receiving power at its other end from the moving side of the pneumatic through the medium of a tension device K, secured in said moving side and passing freely through the lever with a button below the same, so that it will pull upon the lever just before the conclusion of the expanding movement of the pneumatic, and a stop K' is also carried by said moving side and adapted to depress the lever as the moving side nears its completely-exhausted position. Both the devices K and K' may be adjustable, so they may be regulated as to the time of their action and the extent of movement imparted by them.

In the position shown at Fig. 3 the lower pneumatic is shown as fully expanded and the valves F G as shifted ready to permit deflating, the valve H³ being also open and valve H⁴ closed, so that the motor-passage H' may also be exhausted. The main valves F G are moved to this position by the suction power existing in chamber A³, acting upon valve G, the membrane-motor being neutralized at the time by the fact that like conditions prevail upon both sides of it, and the valves H³ and H⁴ have been shifted to the location shown by the lever J when last actuated by the connection K. Deflation now ensues and collapses the pneumatic and reverses the lever J by means of stop K', and in so doing the valves H³ and H⁴ are also reversed, so that the air flows through duct H² into passage H' and inflates motor H, causing such pressure on the latter as will shift

the main valves F and G to their other position, in which they cut off communication between chamber A³ and the pneumatic and open that between the latter and chamber A².

5 The pneumatic is now charged with air and expands again to the position of Fig. 3, and its moving side again carries lever J to the position in said figure. This closes valve H⁴, opens valve H³, allows the exhaust to draw
10 air from behind membrane H, so as to neutralize said membrane, and the suction then shifts valves F and G back to the position illustrated.

One great advantage of my invention is
15 that it has so few points at which friction exists, and to still further decrease the friction I provide the belt-pulley C' with a ball-bearing, the supporting stud or pivot C² being grooved, as shown, so as to form two opposite-
20 faced cones, and the interior of the pulley being provided with cups C³ at opposite sides. The balls C⁴ are by this construction confined at both sides, and a bearing is formed which is not only very durable and requires no lu-
25 bricating, but is also noiseless.

My invention is in no wise dependent upon the number of sides or the number of pneumatics, nor upon the arrangement of the pneumatics around the chamber or trunk, nor
30 to the use of a pulley mounted upon a stud instead of long shaft, nor to the connecting of the pneumatics directly to the driven pulley.

I claim—

1. The combination in a pneumatic-motor,
35 of a series of pneumatics, a series of valves corresponding to the pneumatics and acting to control the inflating and deflating thereof, and means whereby each pneumatic, independently of the other pneumatics, is enabled
40 to control its own valves, substantially as specified.

2. The combination in a pneumatic-motor, of a series of pneumatics, a series of valves corresponding to the pneumatics and acting
45 to control the inflating and deflating thereof, and a separate motor device in the case of each pneumatic for operating said valves,

such motor device being under the independent control of the movable side of the corresponding pneumatic, substantially as specified. 50

3. The pneumatic-motor, wherein are combined a series of pneumatics B, and their controlling-valves, each pneumatic being provided with means whereby it may, independently of all the other pneumatics, control its own valves, substantially as specified. 55

4. The combination with a pulley or other rotating device, of a wind-motor for driving the same, said motor containing a series
60 of pneumatics, valves controlling said pneumatics, and means whereby each pneumatic may, independently of the other pneumatics, operate its own valves, substantially as specified. 65

5. The combination in a pneumatic-motor, of a series of power-pneumatics B, a wind-chamber, valves controlling the passages between the chamber and the pneumatics, a separate lever for each pneumatic actuated by the
70 moving side thereof, and devices whereby each of said levers controls the valves of its own pneumatic, substantially as specified.

6. The wind-motor, consisting of a series of pneumatics arranged around a wind-chest,
75 valves for each pneumatic controlling the inflating and deflating thereof, a membrane-motor for shifting the valves of each pneumatic, and a lever adjacent to and actuated by the moving side of each pneumatic, and
80 serving to cause the operation of the membrane-motor of the same pneumatic, substantially as specified.

7. The pneumatic-motor, consisting of a series of pneumatics, each provided with separate valves, and each having its movable side
85 connected to and controlling its own valves by means of connections independent of the other pneumatics, substantially as specified.

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Witnesses:

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