

(No Model.)

F. W. HEDGELAND.  
WIND MOTOR FOR MUSICAL INSTRUMENTS.

No. 593,215.

Patented Nov. 9, 1897.

FIG. 1.

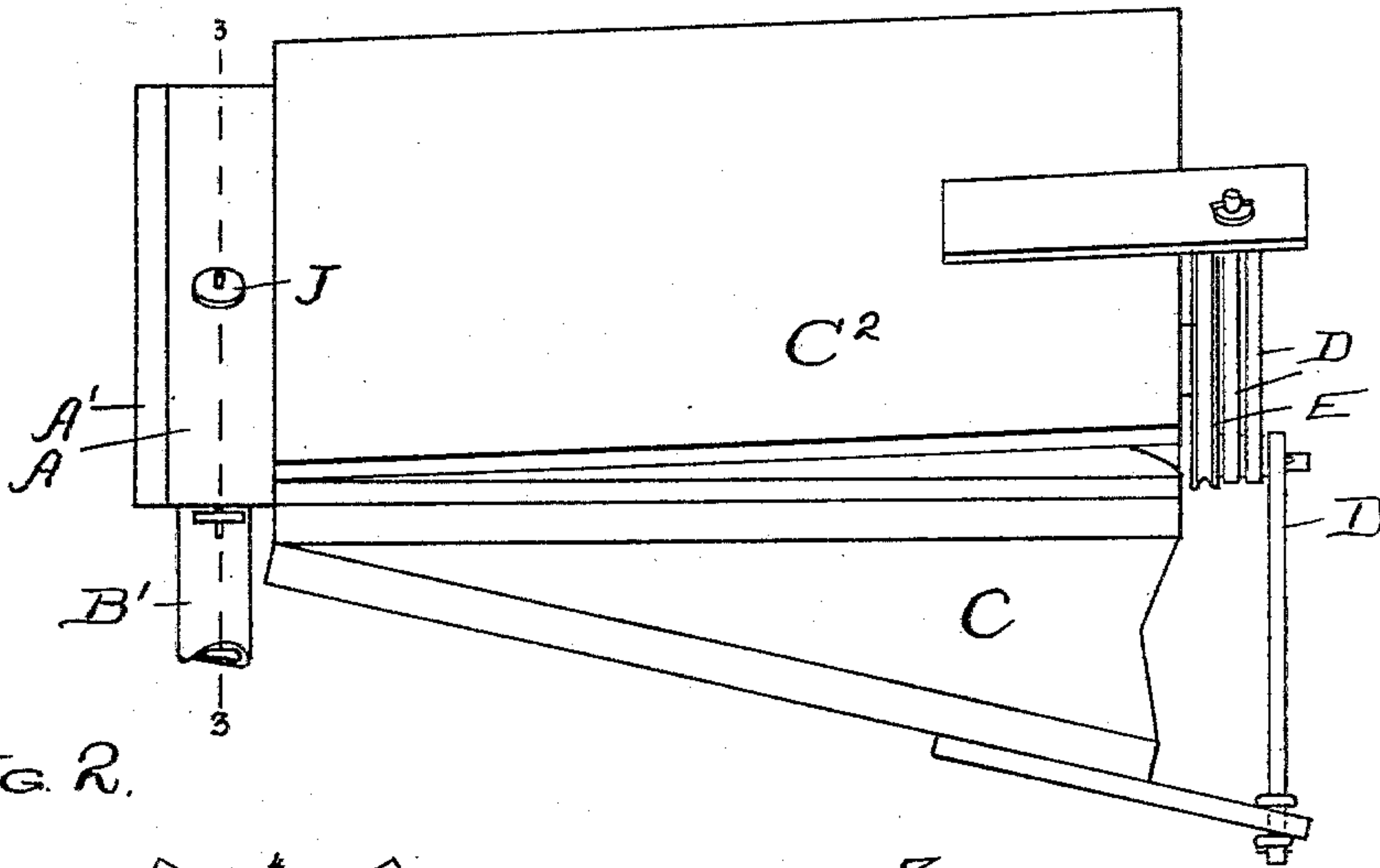


FIG. 2.

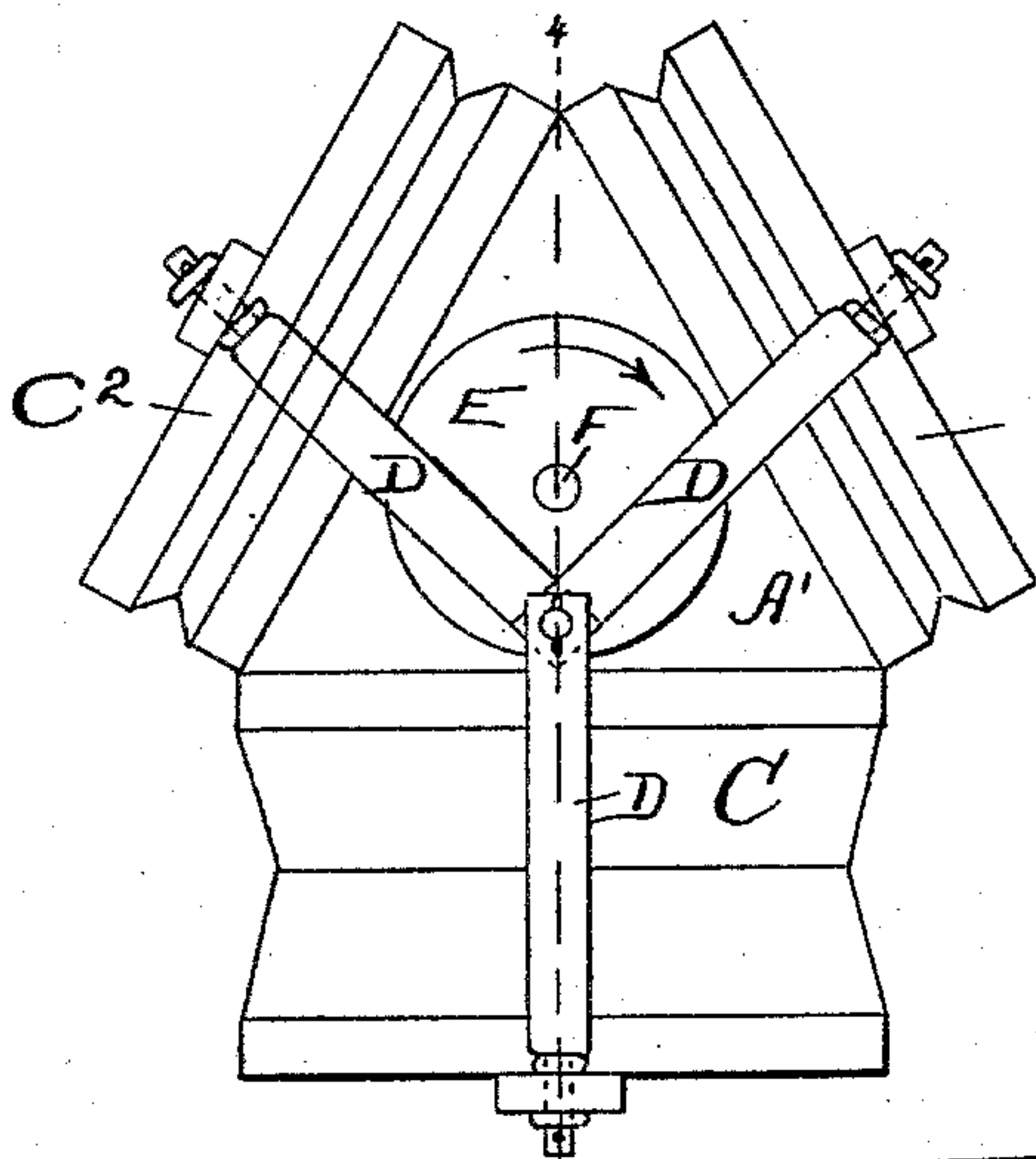


FIG. 3.

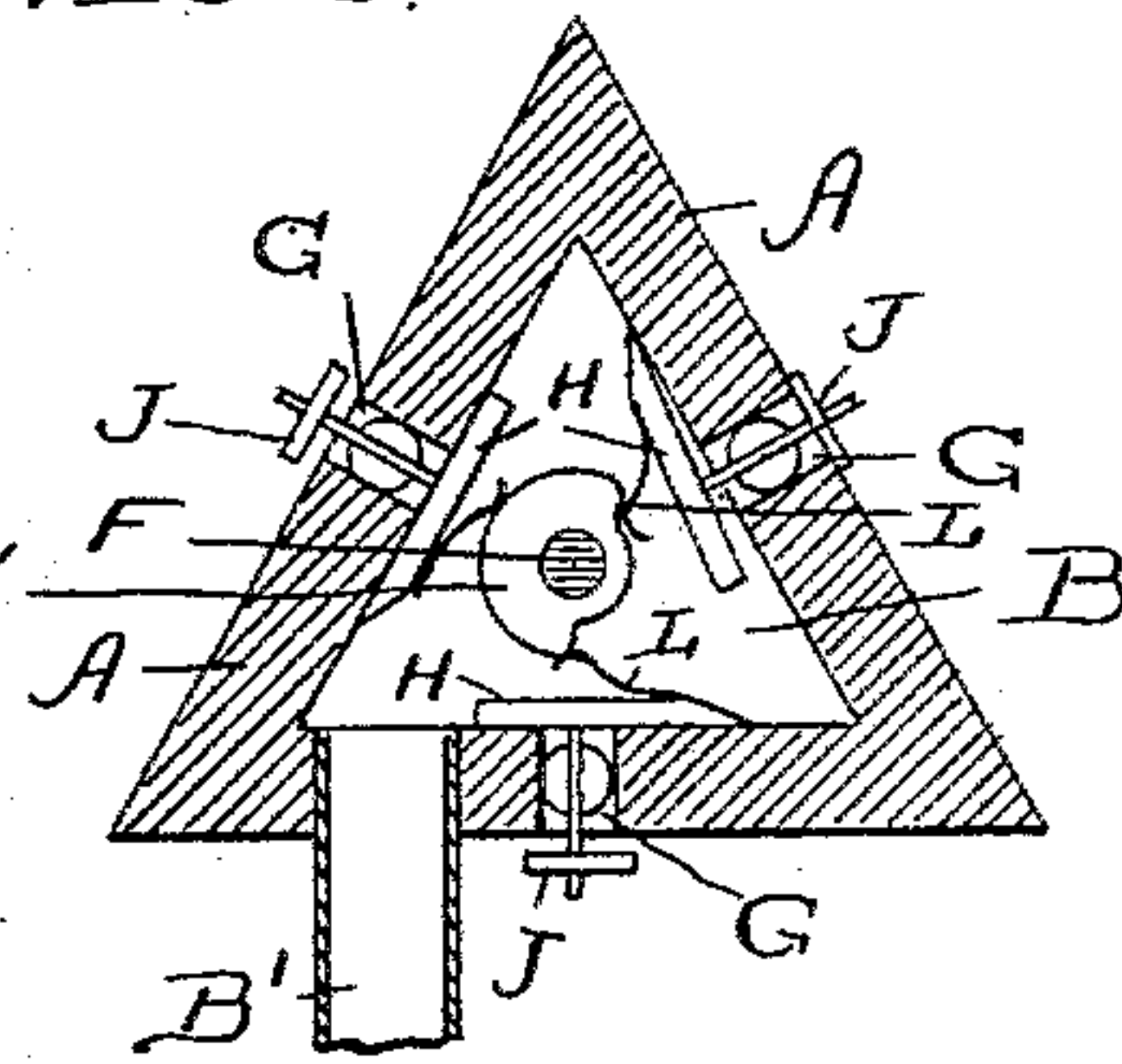
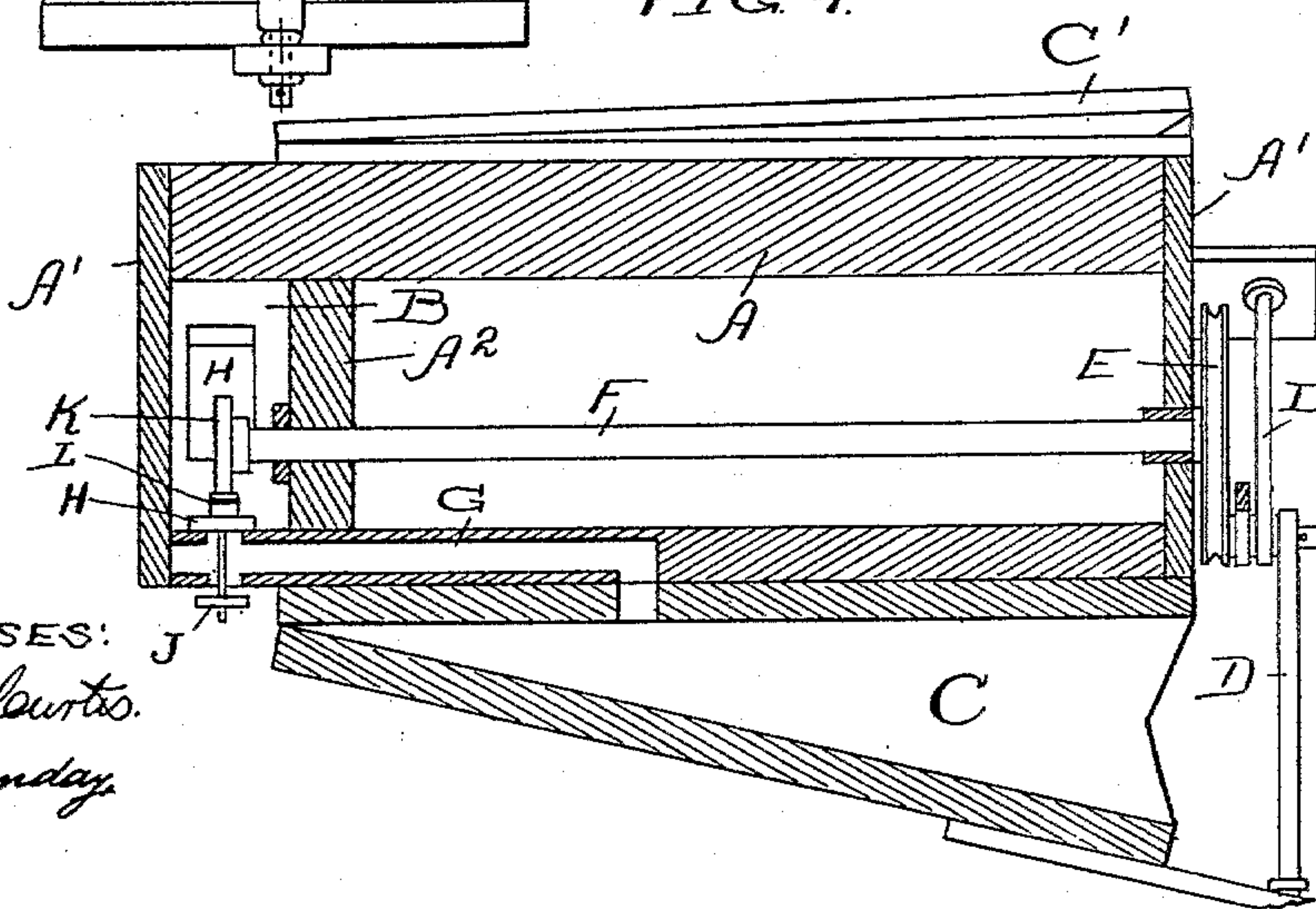


FIG. 4.



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# UNITED STATES PATENT OFFICE.

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

## WIND-MOTOR FOR MUSICAL INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 593,215, dated November 9, 1897.

Application filed January 23, 1897. Serial No. 620,420. (No model.)

*To all whom it may concern:*

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

This invention relates to improvements in wind-motors which are used for actuating the perforated music-sheets of mechanical musical instruments.

My object in the invention is to overcome the slowness of action found in previous constructions used for this purpose.

The nature of the invention will be fully comprehended from the description thereof given below and from the accompanying drawings, in which—

Figure 1 is a side view, and Fig. 2 an end view, of my improved motor. Fig. 3 is a section on the line 3 3 of Fig. 1, and Fig. 4 is a section on the line 4 4 of Fig. 2.

In said drawings, A represents the sides and A' the ends of a box-like frame, and B is an air-chamber formed in one end of the box by the insertion therein of a close partition A<sup>2</sup>. The air is exhausted from chamber B by the pipe B', leading to any suitable suction apparatus—such, for instance, as that customarily used in musical instruments. Upon the outside of this chamber are three pneumatics C, C', and C<sup>2</sup>, one upon each side A, and the movable sides of such pneumatics are connected by pitmen or levers D to a crank-disk E, located just outside the chamber and upon one end of a shaft F, extending longitudinally through the chamber and having bearings in one of the pieces A' and the partition A<sup>2</sup>.

The pneumatics are intended to operate successively in giving a rotary motion to the shaft, and in order that they may do this air is alternately admitted to them and then exhausted from them, so they will collapse under atmospheric pressure, such exhaustion being caused by the suction apparatus referred to. Each pneumatic is connected both with the interior of the motor-chamber B and with the outside air by an air-passage G, the port opening from said passage into the cham-

ber being guarded by a valve H and that opening to the outer air by a valve J, and both valves being upon the same stem, so that they will alternate in action, one opening when the other closes. These valves are moved in one direction by the air-suction existing in chamber B and in the opposite direction by a cam K upon shaft F, each valve being provided with a spring L, which is sufficiently compressed when riding upon the larger diameter of the cam to exert the required power to close the valve.

The disk E is grooved so it may serve as a pulley and be belted to the music-take-up roller.

With this construction of motor the operation is as follows: As soon as the suction apparatus is set in operation it closes any valve J which may then be open, thereby opening the valve H upon the same stem and causing the exhaustion of the pneumatic to which said valve belongs, and this exhaustion is followed by the collapse of the pneumatic as soon as the crank moves far enough to permit it. Supposing the parts to be in the positions shown at Figs. 2 and 3 at the instant of starting, pneumatic C and C' will be exhausted at the same time; but pneumatic C' will be first completely collapsed and will cause the crank to start in the direction of the arrow. The pneumatic C will next collapse and be followed in order by pneumatic C<sup>2</sup>, and each will continue the motion of the shaft initiated by pneumatic C', and thus the three pneumatics will continue to act upon the shaft in succession and impart to it a reasonably rapid rotation. While the valve-springs are riding upon the larger periphery of the cam, the valves will be held in position to admit air to the pneumatics, but while the springs rest upon the smaller periphery of the cam the valves are permitted to yield to the force of the suction and move inward, thereby excluding the outer air from the pneumatics and allowing them to be exhausted.

It will be noticed that the valves used by me are not gradual in their operation, but on the contrary are of a kind which open to their full capacity without loss of time, so that the movements of the air both in inflating and exhausting are quick, and consequently the



pneumatics are much quicker and more decided in their action than in previous constructions, all of which, so far as my knowledge extends, employ valves opening with a gradually-increasing capacity. The cam is also quick in releasing the valves, so that the latter are not hindered or delayed when they should yield to the air.

The air-passages G extend longitudinally of the pneumatics and preferably through the side pieces A to a point opposite the air-chamber B, thereby enabling me to locate the valve H in said chamber. They also preferably extend beyond the pneumatics, so the outside air-port may be conveniently located opposite the suction-port, and thus permit both valves H and J to be put upon the same stem and be controlled by the same cam.

Another advantage attending the use of valves which open to their full capacity without loss of time, as do those shown by me, is that they avoid the production of the whistling noise which attends the movement of the air through the partially open valves of previous constructions and simplify the construction and working parts, and also greatly reduce the attendant friction of other constructions.

By locating all the valves in the same plane and at equal distances apart I am enabled to operate them by a single cam.

I claim—

1. The wind-motor for actuating a shaft wherein are contained a series of pneumatics arranged on different sides of and with their longitudinal axes parallel with the shaft and having their movable sides connected to a crank upon it, an air-chamber connecting with the wind-producing apparatus, air-passages connecting the pneumatics with said air-chamber and also with the outside air,

and valves controlling said passages and adapted to open instantly to their full capacity, substantially as specified.

2. The wind-motor for actuating a shaft wherein are combined a series of pneumatics arranged around and with their longitudinal axes parallel to the shaft having their movable sides connected to a crank upon the shaft, an air-chamber connecting with the wind-producing apparatus, air-passages connecting the pneumatics with said air-chamber and also with the outside air, valves controlling said passages and adapted to open instantly to their full capacity, and a cam on the shaft for actuating said valves, substantially as specified.

3. The wind-motor for actuating a shaft wherein are combined a series of pneumatics arranged around and with their longitudinal axes parallel with the shaft and having their movable sides connected to a crank upon the shaft, an air-chamber connecting with the wind-producing apparatus, air-passages connecting the pneumatics with said air-chamber and also with the outside air by opposite openings, valves controlling said openings, and a cam upon the driven shaft for actuating the valves, substantially as specified.

4. In a pneumatic motor, the combination with the series of pneumatics arranged around and with their longitudinal axes parallel with the driven shaft, and a series of valves controlling said pneumatics, said valves being also arranged around said shaft and in the same plane, of a single cam upon the shaft for operating said valves, substantially as specified.

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Witnesses:

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