

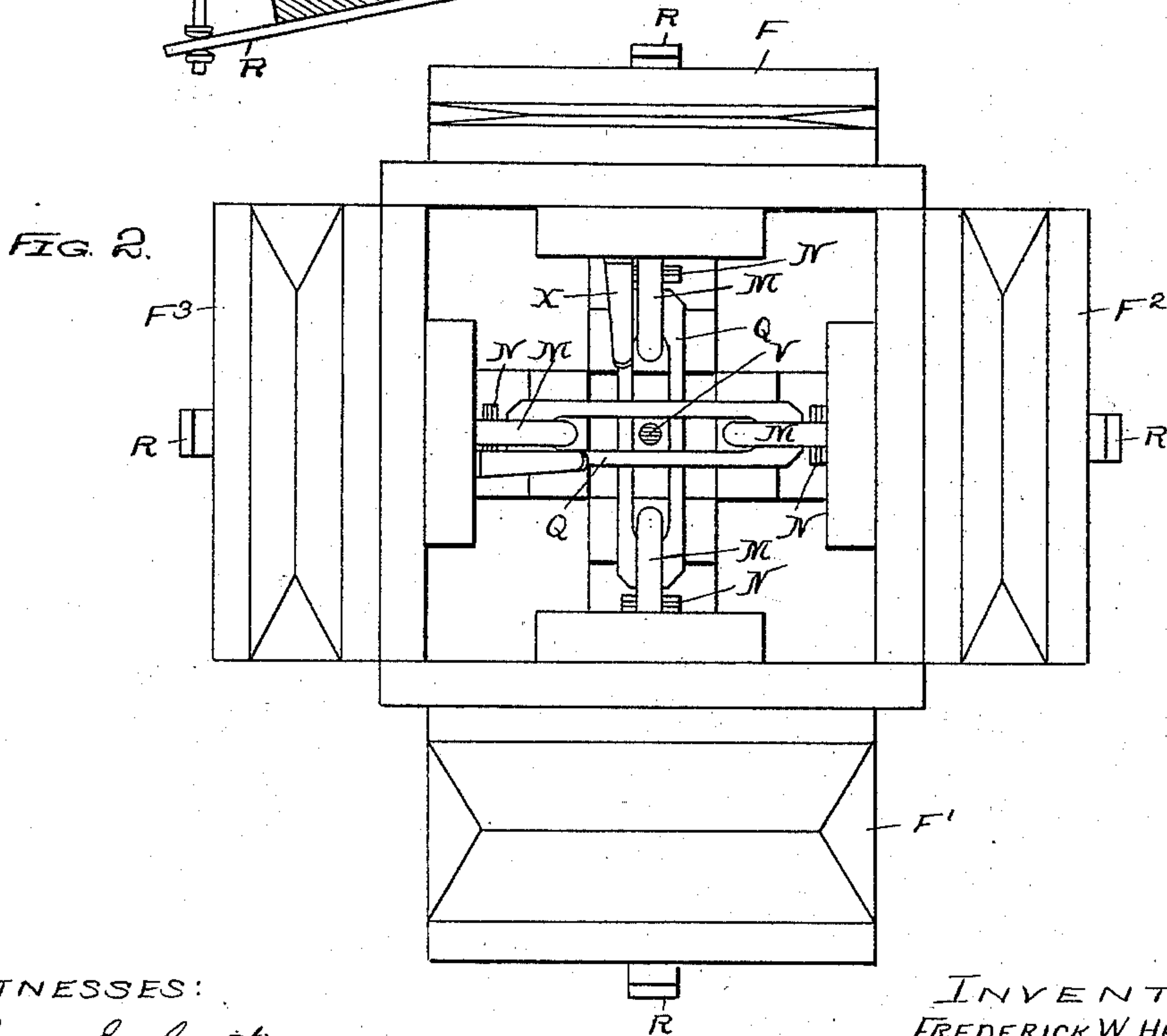
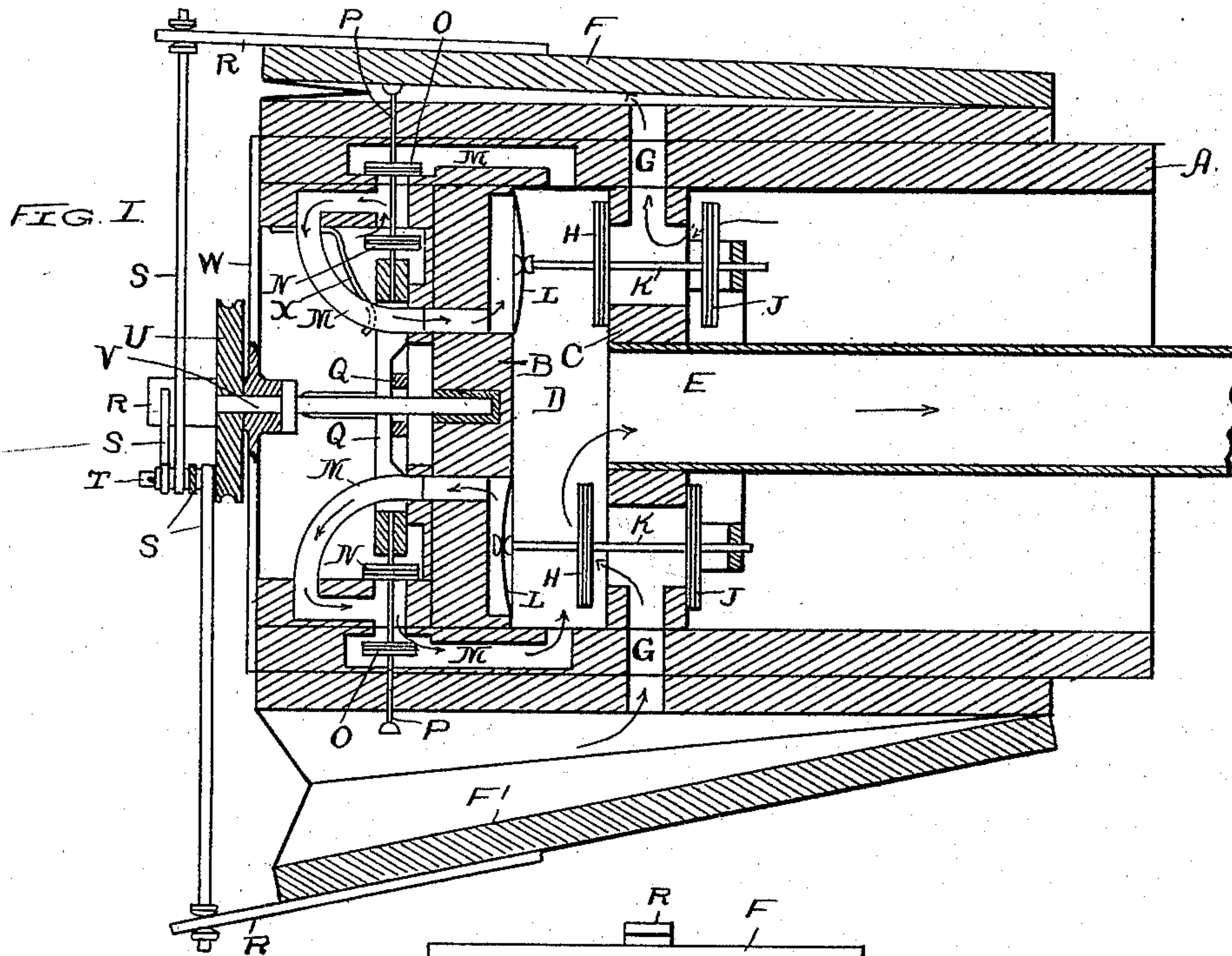
No. 611,629.

Patented Oct. 4, 1898.

F. W. HEDGELAND.
PNEUMATIC MOTOR.

(Application filed Sept. 17, 1897.)

(No Model.)



WITNESSES:

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

SPECIFICATION forming part of Letters Patent No. 611,629, dated October 4, 1898.

Application filed September 17, 1897. Serial No. 652,023. (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.

This invention relates to certain improvements in pneumatic motors, and has been designed more especially for operating the music-sheets of self-playing instruments. Its object is to provide a motor wherein the membrane motors or fingers for operating the valves controlling the inflating and deflating of the several power-giving pneumatics shall be themselves controlled by very simple and positively-acting devices.

It has also been my object to so construct the motor as to render it little likely to get out of order and durable.

The nature of the invention will be fully understood from the accompanying drawings and the following description.

In said drawings, Figure 1 is a central section of the invention; and Fig. 2 is an end elevation of the same, the driven pulley, the supporting-spider, and the pitmen connecting the pneumatics with the pulley being all omitted in the latter figure in order to fully disclose the parts behind them.

In said drawings, A represents a box, trunk, or cylinder made with four or other even number of sides. In this box are two transverse partitions B and C, between which is formed the wind-chamber D, connected with the bellows (not shown) by the passage E. Upon the sides of the trunk A are power-giving pneumatics F, F', F², and F³, the pneumatics F and F' being arranged at opposite sides of the trunk and pneumatics F² and F³ being also opposite one another. All the pneumatics are alike in construction and all communicate with the chamber D and with the outside air by passages G. The ports connecting the passages G with said chamber and with the outside air are in each case guarded by valves H and J, respectively, both mounted upon a common stem K, which is connected to a membrane-motor L, the motors L being employed to shift said valves, as hereinafter stated.

The inflating and deflating of the mem-

brane-motors L is accomplished as follows: From the chamber back of each of said membrane-motors a passage M, formed in part in the construction shown by a curved pipe, extends to the chamber D and is provided at one point with a port to the outer air closed by the valve N. Another valve O is located in this passage and is adapted in one position to close communication with the chamber D, and it is mounted on the same stem P with valve N. The stems P of each opposite pair of pneumatics are united together by links Q, as shown, so that any motion imparted to one of said stems will be communicated to the other and so that the valves N and O belonging to such opposing pneumatics will move in unison, though the two stems thus coupled together do not operate the corresponding valves alike in these movements—that is to say, if the movement is in the direction to close the valve O and open the valve N of one pneumatic the same movement will open the valve O and close the valve N of the other pneumatic; and the reverse of this will be true if the movement is in the opposite direction. The links Q are preferably made as shown—that is, they are slotted longitudinally, so they may not interfere with the shaft of the driven pulley—and each is also cut away upon its wide sides to give room to the other link. The stems extend each into its corresponding pneumatic, so that they will receive the movements described from the moving sides of the pneumatics to which they belong at the instant just prior to the complete collapse of each pneumatic, as will be plainly indicated from Fig. 1. In this figure the upper pneumatic is shown as collapsed and as having depressed the stem P, thereby closing the valve O and opening the valve N, carried by the stem, the same movement serving also to operate the stem P of the pneumatic F', and thereby to close valve N and open valve O, carried by the last-mentioned stem.

The operation just described also causes the inflating of the membrane L belonging to the pneumatic F and shifts its valves H and J so as to shut off the exhaust and admit the outside air to the passage G, thus placing that pneumatic in condition for reinflation. Said operation of the stems of the

valves N and O also opens the passage M of the membrane L of pneumatic F' to the exhaust and closes it against fresh air, so that said membrane is deflated, and its corresponding valves H and J are allowed to move to the position shown at Fig. 1 by the suction force of the exhaust, aided by the air-pressure on valve J, thus placing the pneumatic F' in condition for deflating.

It will be understood that the other pair of pneumatics F² and F³ are provided with similar valves H and J, membrane valve-motors, passages M, valves N and O, stems P, and links Q, and that they operate in the same manner as those pertaining to pneumatics F and F'. As shown in the drawings, one of them is partially deflated and the other partially inflated.

The several pneumatics are provided with overhanging arms R, secured to their moving sides, and these arms are joined to pitmen S, which encircle the wrist-pin T, secured in the side face of a pulley U, mounted upon a shaft V, supported at one end in the center of a spider W and at the other end in the partition B. The pulley U is adapted to actuate the belt whereby power is transmitted to the music-sheet drum or other device actuated by the motor. Friction-exerting springs X are employed with each of the links Q in order to prevent any movement of the links or the stems to which they are attached, except such as is caused by the contact of the moving sides of the pneumatics with the ends of the stems, so that it will be quite immaterial how the motor is positioned.

It will be understood that in operation the several pneumatics are inflated in regular succession and deflated in the same order, so that the pulley will be rotated thereby. In other respects the operation has already been fully described above. The motor can be used with blow-pressure instead of exhaust, if desired.

I claim—

1. The pneumatic motor, having its power-

pneumatics arranged around a common center, and with pairs thereof placed opposite each other, valves controlling each of said pneumatics, pneumatic devices for shifting said valves, and other valves controlling said shifting devices, the last-mentioned valves of each pair of opposite pneumatics being coupled together and operated by the moving sides of said pneumatics, substantially as specified.

2. The pneumatic motor, having its power-pneumatics arranged in opposing pairs, each of such pairs being provided with means for causing the shifting of their controlling-valves, such means being operated in one direction by the moving side of one of the opposing pneumatics and in the other direction by the moving side of the other opposing pneumatic, substantially as specified.

3. The combination of a series of pneumatics arranged in opposing pairs, with coupled valve devices for each pair, such valve devices being actuated in one direction by the moving side of one of the pair of pneumatics and in the other direction by the moving side of the other pneumatic in the same pair, substantially as specified.

4. The combination in a pneumatic motor of an opposing pair of pneumatics each provided with valves N and O, the stems whereof are coupled together and are extended so as to be operated by the moving sides of said pneumatics, substantially as specified.

5. The pneumatic motor wherein are combined a series of pneumatics arranged in opposing pairs, valves and valve-shifting devices for each of said pneumatics, and valves controlling said shifting devices, the controlling-valves for the shifting devices of each pair of pneumatics being coupled together, and means for operating said coupled valves, substantially as specified.

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Witnesses:

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