

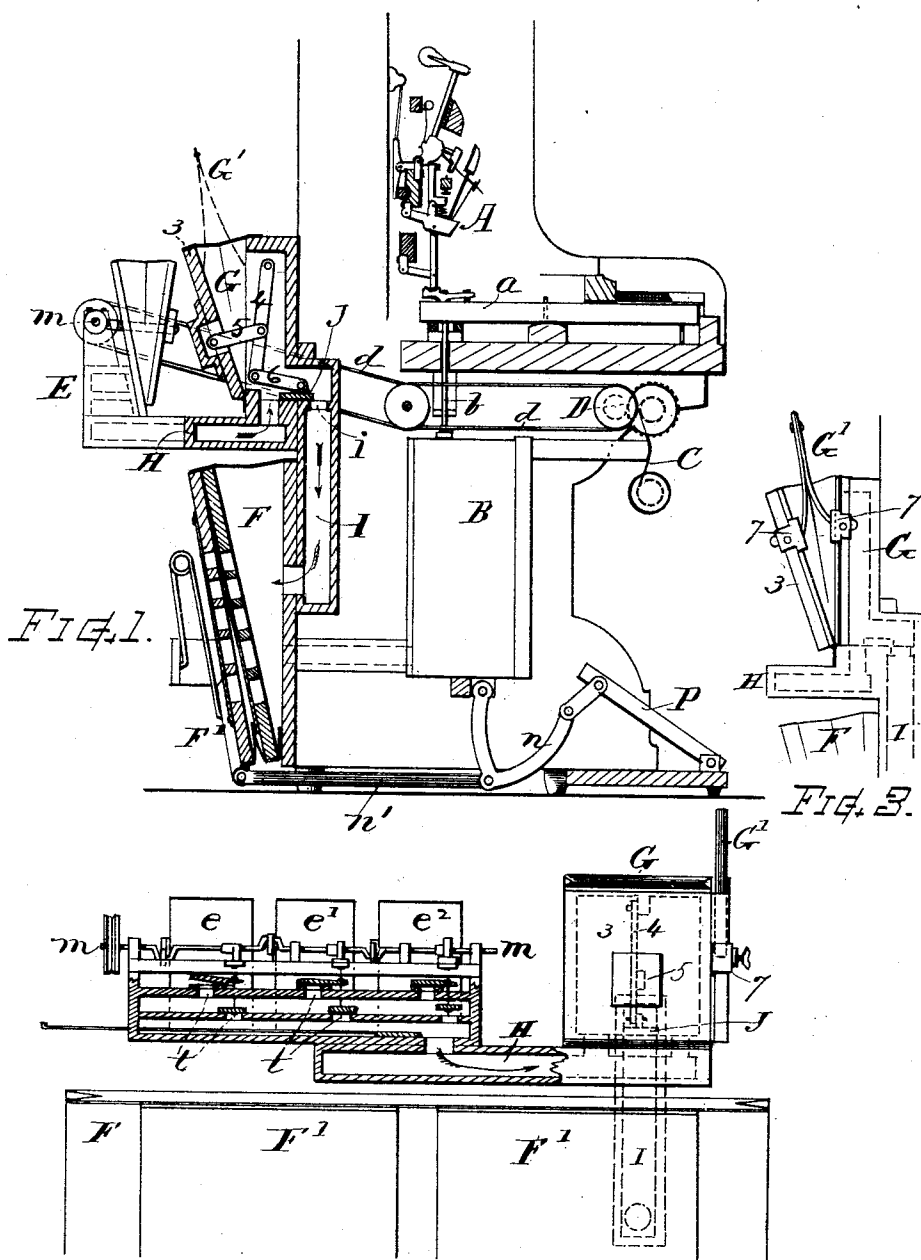
(No Model.)

W. D. PARKER.

AUTOMATIC GOVERNOR FOR PNEUMATIC MOTORS.

No. 473,338.

Patented Apr. 19, 1892.



Witnesses—

W. H. Parker.
Simon E. King

Fig. 2.

Inventor—

William D. Parker
By Chas. H. Burlingame
Attorney

UNITED STATES PATENT OFFICE.

WILLIAM D. PARKER, OF MERIDEN, CONNECTICUT, ASSIGNOR OF THREE-FOURTHS TO EDWARD H. WHITE, OF SAME PLACE.

AUTOMATIC GOVERNOR FOR PNEUMATIC MOTORS.

SPECIFICATION forming part of Letters Patent No. 473,338, dated April 19, 1892.

Application filed October 16, 1891. Serial No. 408,858. (No model.)

To all whom it may concern.

Be it known that I, WILLIAM D. PARKER, a citizen of the United States, residing at Meriden, in the county of New Haven and State of Connecticut, have invented a new and useful Automatic Governor for Pneumatic Motors, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

The object of my present invention is to provide an automatic governor for pneumatic motors of that class employed in mechanical musical instruments for operating the music-sheet propelling devices and for similar purposes, which governor will insure even action of the motor regardless of the variations of bellows-pressure or the force or slowness of the pedal-action, thereby preserving uniformity in time of the music while permitting variation of wind force in the operating pneumatic or sound-producing mechanism.

Another object is to automatically produce an approximately uniform pressure in the wind-chambers and pneumatics of the motor regardless of the variations of pressure that may occur in the exhaust-bellows or wind-inducing apparatus.

Another object is to provide, in combination with an automatic governor for pneumatic motors of the class employed in mechanical musical instruments, means for adjusting the governing apparatus to regulate for a higher or lower uniform rate of speed for changing the time of the music.

These objects I attain by the mechanism illustrated and described, the particular features claimed being hereinafter definitely specified.

The drawings illustrate my governor mechanism as applied in connection with exhaust-bellows, pneumatic-motor, and music-sheet operating mechanism as employed in an automatic piano; but it will be understood that this governor can be successfully employed in automatic organs, organettes, or any other variety of mechanical musical instruments wherein a pneumatic motor is used for pro-

pellling a music-sheet in connection with bellows or wind-inducing mechanism to create air-pressure for running said motor.

Figure 1 is a vertical sectional view of such parts of an automatic musical instrument, its motor, governor, and wind-inducing mechanism as will illustrate the nature of my invention. Fig. 2 is a rear view showing the back of the regulator and bellows and a longitudinal section of the air motor or engine; and Fig. 3 is a side view of the regulator, showing the adjustable spring connections.

Referring to parts, A denotes the musical-instrument action or sound-producing devices; B, the wind-chest, containing a pneumatic action or mechanism of any desired or suitable construction for working the keys *a* or lifters *b* in accordance with the indications of a traveling music-sheet C in any well-known or convenient manner.

D indicates driving-gearing suitably constructed and arranged for advancing the music-sheet C, power and motion for operating the same being transmitted by belts *d* or other driving connections from the rotating shaft *m* of the motor-engine E, operated by exhaust or air pressure induced by the bellows F and feeders F' or any equivalent wind-inducing apparatus.

G indicates the governor or regulator, consisting of a collapsible pneumatic or bellows-formed chamber having a hinged back board 3, that is outwardly pressed by the spring G' or an equivalent device that normally tends to keep the pneumatic chamber expanded with a degree of force equal to the effective tension of said spring. The pneumatic-governor chamber communicates by suitable openings or passways with the air-trunk H of the motor-engine E and also connects with the interior of the bellows F by an air-passage I, the opening *i* to which is controlled by a cut-off or throttling valve J, connected for operation with the hinged or movable back board 3 of the pneumatic G, in the present instance by a swinging lever 4, fulcrumed at the top of the chamber, and links 5 and 6, pivotally connected to said lever and to the valve and back board, respectively, the said parts being best

arranged as shown for giving reciprocative and increased movement to the valve J by the movement of the back board 3.

The motor-engine can be constructed and its parts arranged for operation substantially as described in Letters Patent No. 355,201, December 28, 1886, heretofore granted me, the rotary motion being produced by the collapsible pneumatics $e e' e^2$, connected with the crank on the shaft m and governed by valves t for alternately admitting and exhausting air from the chambers in proper order to effect rotation of the shaft when the air is exhausted in the trunk E' . All of the air entering and utilized for operating the motor-engine passes on its way to the bellows through the governor-chamber G and valveway i , and said governor-chamber, being collapsible and expansible, is sensibly responsive to variations in the air-pressure. Consequently if the exhaust force of the bellows becomes excessive by rapid pumping or from any cause the chamber G becomes correspondingly partially collapsed, and by the swinging back board and its connections effects a corresponding closure of the valve J, reducing the passage i and preventing too strong suction in the pneumatics $e, e',$ and e^2 . Then if the exhaust of the bellows becomes feeble from any cause the spring G' causes the expansion of the governor G and a corresponding opening of the valve J to give free passage of air and more ready draft upon the motor pneumatics $e, e',$ and e^2 .

The expanding spring G' of the pneumatic is best connected with slide-pieces 7 on the edges of the back and frame that are adjustable toward and from the hinging axis or in a manner to decrease or increase the effective tension or expanding power of said spring, thereby causing the pneumatic G to regulate to a lighter or a heavier degree of pressure, accordingly as the spring-tension is decreased or increased, thus providing for a slower or faster uniform speed of the motor-engine and a corresponding rate of movement of the music-sheet for playing fast, slow, or medium time.

The connections $n n'$ and pedals P for working the bellows can be of any well-known or suitable construction.

I do not confine my invention to the use of the particular style of motor-engine, music-sheet driving devices, and bellows herein shown, as it will be understood that my pneumatic governor can be employed in the manner herein described with any analogous style of wind-motor engine and with other wind-inducing apparatus in the various kinds of automatic musical instruments wherein a motor-driven traveling music-sheet is used.

The automatic regulator being arranged as

above described between the bellows and motor, the action of the motor is rendered substantially uniform, regardless of variations of pressure in the bellows or the rapidity of the exhauster action. Consequently even and regular time results whether the motor is running fast or slow.

I claim as my invention herein, to be secured by Letters Patent—

1. In a pneumatic-motor engine and wind-inducing apparatus, the combination, with said motor-engine and wind-inducing apparatus, of a motor-regulator consisting of a cut-off valve disposed within the windway between said motor-engine and wind-inducing apparatus, and a collapsible and inflatable pneumatic communicating with said windway and having its movable part connected for moving said valve to diminish or increase the windway-passage in accordance with the collapse or inflation of said pneumatic, substantially as set forth.

2. The combination, with a pneumatic-motor engine and exhaust-bellows connected with said engine, of the governor-pneumatic and the cut-off valve actuated by said pneumatic, disposed between the motor-engine and bellows, and means for expanding said pneumatic with a limited degree of resistance in opposition to the collapsible force, substantially as set forth.

3. The combination, with the pneumatic-motor engine and wind-inducing apparatus for creating air-currents for actuating said motor-engine, of a sliding cut-off valve controlling the windway between the wind-inducing apparatus and the motor-engine, and the spring-expanded bellows-pneumatic internally communicating with said windway-passage between said cut-off and motor-engine and having internally disposed connections from its movable part to said cut-off valve, substantially as and for the purpose set forth.

4. The combination of the pneumatic-motor engine, the wind-inducing bellows, the regulating-valve in the windway to the motor-engine, the collapsible governing-pneumatic connected with said valve and communicating with said windway, its expanding spring, and means, substantially as described, for adjusting said spring to increase or diminish the effective tension or expansive force in said governing-pneumatic, for the purpose set forth.

Witness my hand this 12th day of October, A. D. 1891.

WM. D. PARKER.

Witnesses:

E. H. WHITE,
J. H. WHITE.