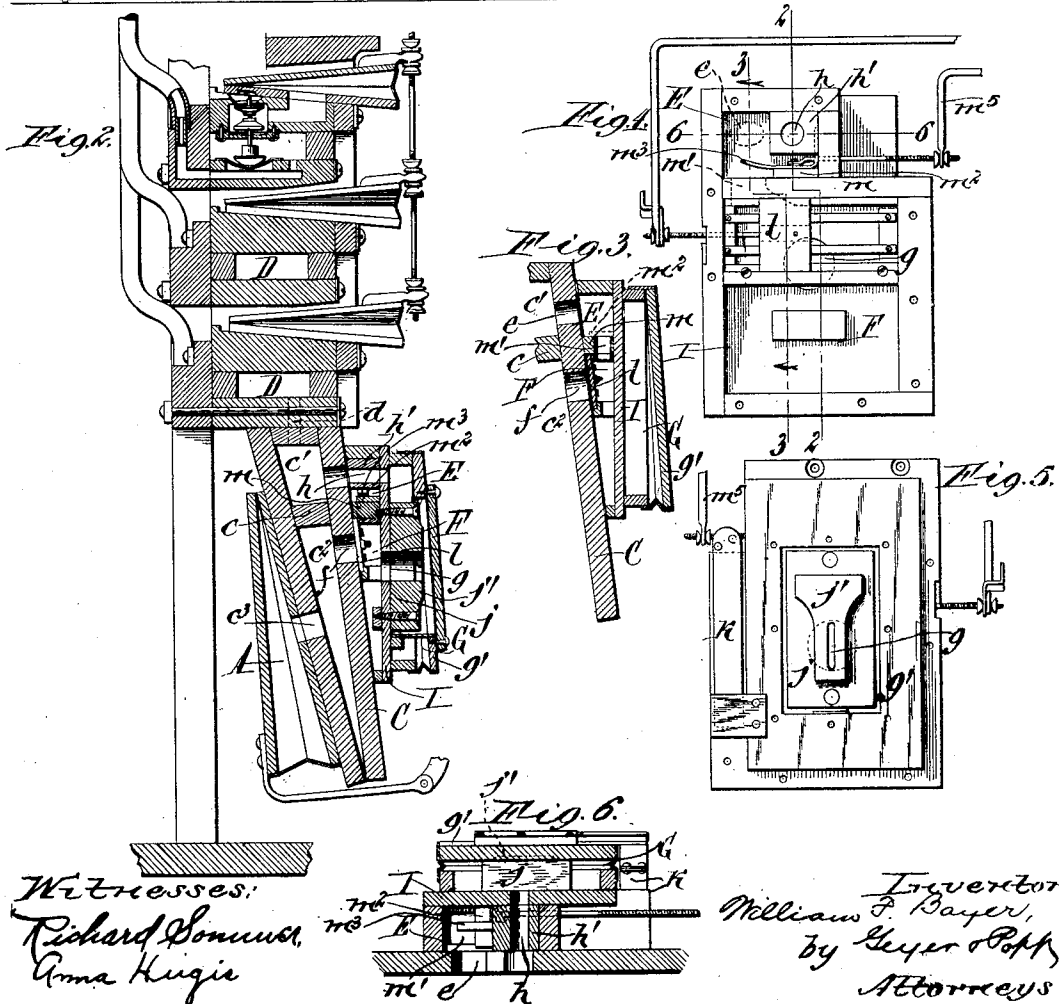
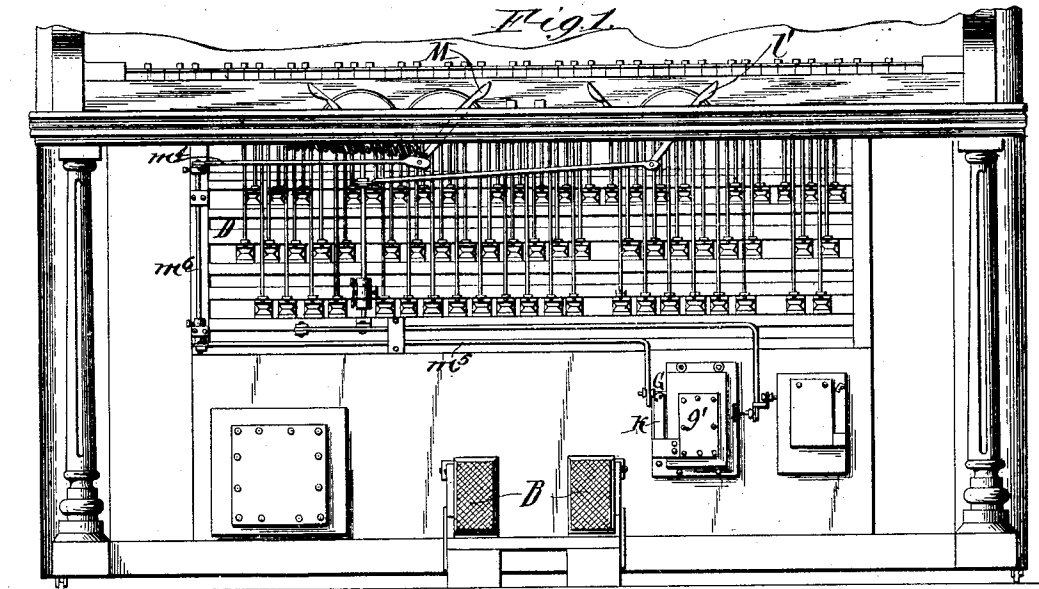


W. F. BAYER.
 COMBINED AIR GOVERNOR AND EXPRESSION DEVICE.
 APPLICATION FILED SEPT. 27, 1909.

961,335.

Patented June 14, 1910.



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UNITED STATES PATENT OFFICE.

WILLIAM F. BAYER, OF BUFFALO, NEW YORK.

COMBINED AIR-GOVERNOR AND EXPRESSION DEVICE.

961,335.

Specification of Letters Patent. Patented June 14, 1910.

Application filed September 27, 1909. Serial No. 519,732.

To all whom it may concern:

Be it known that I, WILLIAM F. BAYER, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Combined Air-Governors and Expression Devices, of which the following is a specification.

This invention relates to the air governors employed in pneumatic musical instruments for maintaining a practically uniform air tension in the wind chest, and more particularly to governors of this kind which are combined with an expression device for accenting some of the notes of a composition. In devices of this character, as hitherto constructed, the governor-bellows has a tendency to flutter when the accent-valve is opened, producing a disagreeable noise.

The object of my invention is the provision of an efficient governor and expression device which overcomes this objection.

In the accompanying drawings: Figure 1 is a fragmentary front elevation of an automatic piano provided with the improvement, a part of the case being removed. Fig. 2 is a transverse section, on an enlarged scale, of the wind chest, the main bellows and the air governor and expression device, the plane of the section being in line 2—2, Fig. 4. Fig. 3 is a similar section in line 3—3, Fig. 4. Fig. 4 is an enlarged rear or inside view of the governor and expression device. Fig. 5 is a front view thereof with the cover removed. Fig. 6 is a horizontal section on line 6—6, Fig. 4.

Similar letters of reference indicate corresponding parts throughout the several views.

A indicates the main suction bellows of an automatic piano or similar instrument which is actuated by the usual pedals B.

C indicates the stationary air reservoir carrying the main bellows A and divided by a partition *c* into separate upper and lower chambers *c*¹, *c*², the bellows being connected with the lower reservoir chamber *c*² by a port *c*³.

D indicates the wind chest which connects with the upper reservoir-chamber *c*¹ by a passage *d*, as shown by dotted lines in Fig. 2.

Applied to the front side of the air reservoir is the improved air governor and expression device which consists of a box or case containing an inlet chamber E which communicates with the upper reservoir-

chamber *c*¹ by a port *e*; an outlet chamber F which connects with the lower reservoir-chamber *c*² by a port *f*, and a connecting chamber or governor bellows G communicating with the outlet chamber F by a port *g*, and with the upper reservoir-chamber *c*¹ by a passage *h*, formed partly in the front wall of the governor-case, partly in a block *h*¹ and partly in the front wall of the reservoir C, as shown in Fig. 2. As shown in Figs. 2 and 6, this block extends from front to rear of the inlet chamber E, so that the passage *h* has no communication with said inlet chamber, but connects only with the upper reservoir-chamber *c*¹ and the interior of the governor-bellows G. The lower port *g* is formed partly in a partition-board I separating the inlet and outlet chambers E, F from the governor-bellows G, and partly in a block *j* secured to the outer side of said partition.

The front or movable wall *g*¹ of the governor-bellows G constitutes a valve which is adapted to seat against or approach more or less closely to a raised face *j*¹ surrounding the passage in the block *j* for equalizing the air tension in the wind chest, as hereinafter more fully described. In its preferred form, the portion of the governor bellows which seats against said block consists of a removable plate or cover having a facing of leather or other suitable material. The governor-bellows is provided with a suitable expansion spring *k* which resists the inward or collapsing movement of its movable board in a well known manner.

l indicates a sliding or other suitable valve applied to the port *f* for cutting off communication between the lower reservoir-chamber *c*² and the outlet chamber F during the rewinding of the perforated music sheet. This valve may be operated by any suitable means, but is preferably actuated by a hand lever *l*¹ arranged in front of the key-board and suitably connected with the projecting stem of the valve.

In the partition *m* which separates the inlet and outlet chambers E, F is arranged an accent or expression port *m*¹ adapted to connect said chambers and controlled by a sliding or other suitable valve *m*². This accent valve may be actuated manually or automatically by any suitable means. In the preferred construction shown in the drawings, it slides upon said partition against which it is held by a spring *m*³ and

it is operated by a hand lever M located at the front of the key board and connected with the valve-stem by rods m^4 , m^5 and an upright rock shaft m^6 .

- 5 The operation of the device is as follows: When the instrument is at rest, the governor bellows G is expanded and the valve formed by its movable board is wide open. When the instrument is to play in the normal manner without the use of the accent or expression device, the cut-off valve l is opened and the accent valve m^2 is closed. Upon now operating the main bellows A air is exhausted from the wind chest through the 15 port d , upper reservoir chamber c^1 , port h , governor bellows G, port g , outlet chamber F, and port f , the governor-bellows being collapsed more or less and the port g correspondingly restricted, according to the resistance of the bellows-expanding spring k and the air tension produced by the main bellows. When the tension increases, the governor-bellows restricts the air current through the port g and when the tension 25 diminishes, the spring k expands the governing bellows and opens said port wider, thus equalizing the air tension in the wind chest and maintaining it practically uniform regardless of variations in the quantity of wind consumed.

- When it is desired to accent one or more notes, or play the same louder, the expression valve m^2 is opened to a greater or less extent, whereupon the main bellows will 35 act upon the wind chest directly through the upper reservoir chamber c^1 , port e , inlet chamber E, accent port m^1 , outlet chamber F, and the port f , subjecting the wind-chest for the time being to more or less of the high tension in the air-reservoir C, according to the position of the accent valve, regardless of the governing or equalizing effect of the governing bellows G. A composition can thus be conveniently accented or shaded 45 according to the expression-marks on the music sheet or the fancy of the performer. In rewinding the music sheet in the ordinary manner, the cut-off valve l is closed, thus

shutting off communication between the air reservoir C and the air governor and wind-chest. By connecting the governor-bellows with the wind chest independently of the inlet chamber E, said bellows does not flutter when the accent-valve is opened, as is the case when the bellows is directly connected 55 with said inlet chamber. The last-named arrangement also produces a disagreeable resistance or sudden stoppage of the main bellows pedals, which objection is avoided by the construction herein shown and described. 60

I claim as my invention:

1. In a device of the character described, the combination of a case having an inlet chamber and an outlet chamber separated 65 by a partition containing an accent passage, a valve controlling said passage, a governing pneumatic communicating with said outlet chamber, said pneumatic having an inlet independent of and disconnected from said 70 inlet chamber and accent passage, and a valve-member actuated by said governing pneumatic and controlling the passage of the air therethrough.

2. In a device of the character described, 75 the combination of a main bellows and a wind chest, a case containing an inlet chamber connected with the wind chest and an outlet chamber connected with said main bellows, said inlet and outlet chambers being separated by a partition containing an 80 accent-passage, a valve controlling said accent-passage, a governor-bellows communicating with said outlet chamber and having a valve-member controlling the passage of 85 the air through the governing bellows, the latter having an inlet communicating with said wind chest but disconnected from said inlet chamber and said accent-passage.

Witness my hand this 3d day of August, 90 1909.

WILLIAM F. BAYER.

Witnesses:

C. F. GEYER,

E. M. GRAHAM.