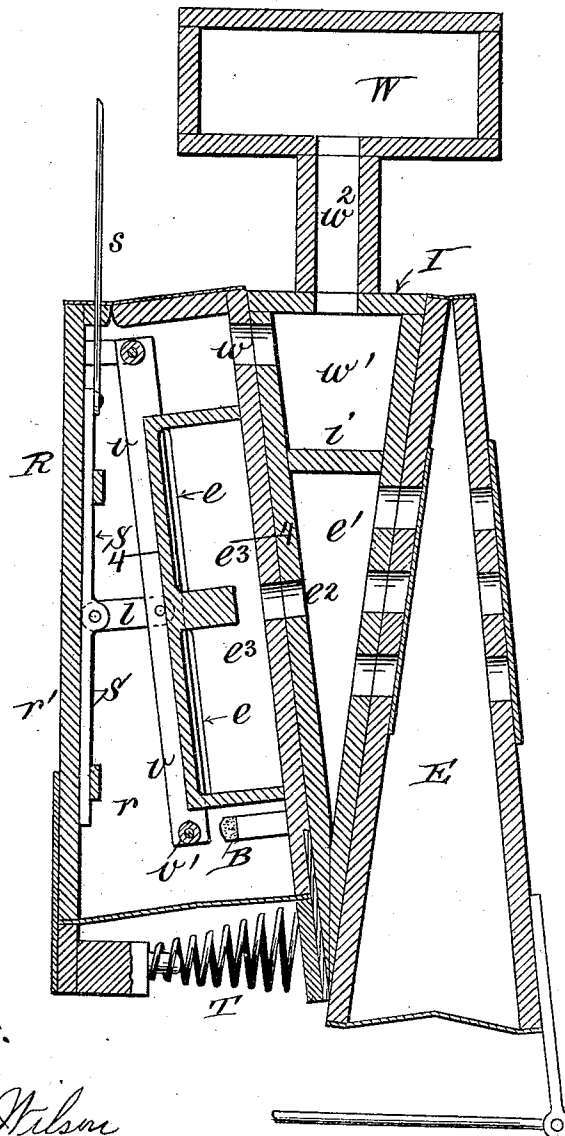


G. P. BRAND.
MECHANICAL MUSICAL APPARATUS.
APPLICATION FILED APR. 11, 1904. RENEWED FEB. 6, 1909.

935,775.

Patented Oct. 5, 1909.
2 SHEETS—SHEET 1.

Fig. 1.



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Fig. 2.

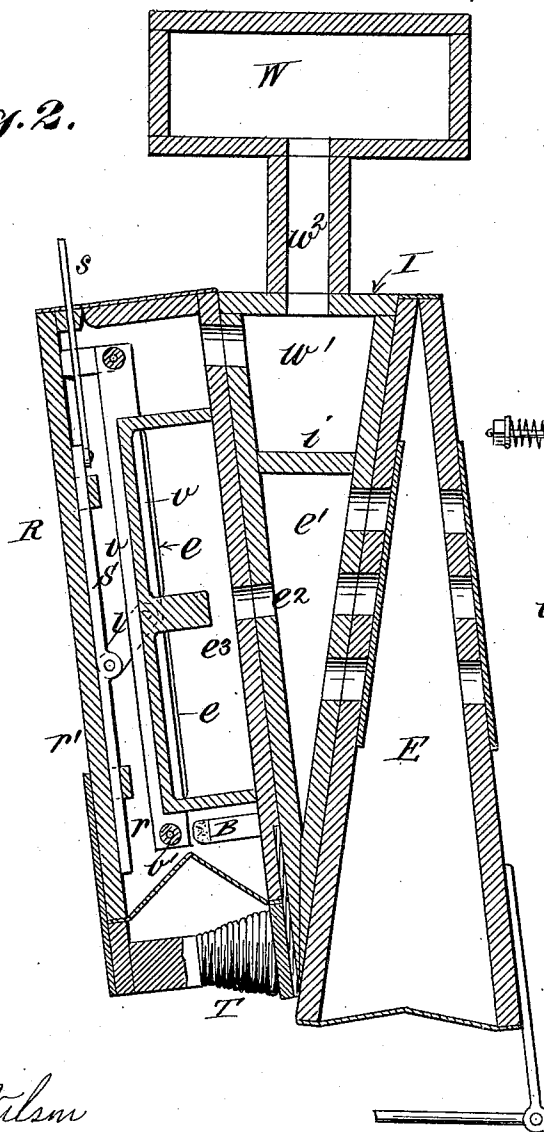


Fig. 3.

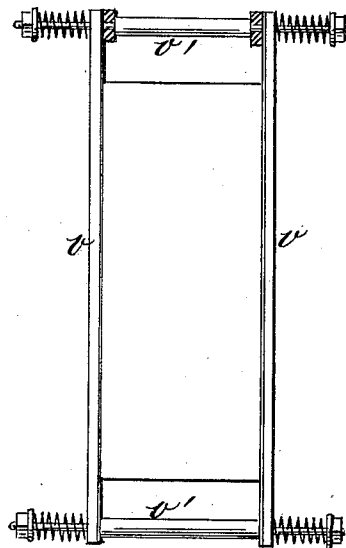
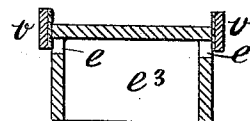


Fig. 4.



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UNITED STATES PATENT OFFICE.

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MECHANICAL MUSICAL APPARATUS.

935,775.

Specification of Letters Patent.

Patented Oct. 5, 1909.

Application filed April 11, 1904, Serial No. 202,543. Renewed February 6, 1909. Serial No. 476,481.

To all whom it may concern:

Be it known that I, GEORGE P. BRAND, a citizen of the United States, residing in the city, county, and State of New York, have
5 invented certain new and useful Improvements in Mechanical Musical Apparatus, of which the following is a specification sufficient to enable others skilled in the art to which the invention appertains to make and
10 use the same.

My invention relates to pneumatic apparatus used in automatic music playing devices, such as mechanical players and the like, and is designed to afford means where-
15 by a so called normal tension or pressure in the wind chest with which the sound actuating pneumatics are connected, may be set and regulated, or varied temporarily, and whereby the degree of tension thus pre-
20 scribed for the wind chest is maintained automatically with the minimum degree of fluctuation from normal. This I accomplish by interposing between the wind chest and the exhaust means, a throttle valve con-
25 trolled by a pneumatic communicating with the wind chest substantially as hereinafter set forth.

My invention also includes certain minor features in the construction and arrange-
30 ment of parts hereinafter described and claimed specifically.

In the accompanying drawings, Figure 1, is a sectional elevation of my improved variable tension regulator and connections, showing the regulator expanded, and set to afford a relatively low degree of tension; Fig.
35 2, a similar view of the parts, the regulator being shown as collapsed and set to afford a relatively high degree of tension; Fig. 3, is a detail view of the valve mechanism; Fig.
40 4, a section upon plane of line 4-4—Fig. 1.

In the drawings W represents symbolically a wind chest of an automatic music player; the actuating pneumatics by which
45 the notes are sounded communicating with said wind chest through suitable ducts or conduits in any usual or desired manner. In like manner E represents symbolically any suitable form of exhaust mechanism, as
50 an exhaust bellows or equivalent.

R is my tension regulator or variable expression device, consisting essentially of a pneumatic *r*, communicating through an open port *w*, with the wind chest W, and
55 through one or more valve ports *e*, with the exhauster E.

I, is an intermediate air chest used for convenience although not absolutely essential since my pneumatic tension regulator R may be arranged to communicate either 60 directly or indirectly with both the wind chest W and the exhauster E in any manner which may be found expedient in adapting my tension regulating device to the require- 65 ments of use in different forms of pneumatic players,—the essential feature in this respect being the interposition, between the exhaust mechanism and the wind chest, of a throttle valve actuated by a pneumatic controlled by the air tension in the wind chest. 70 For this reason the particular form of throttle valve used is also of secondary importance and I do not confine myself in this respect to the identical construction and arrangement of valve ports shown in the 75 accompanying drawings since various modifications may obviously be resorted to with like result.

The intermediate chest I, is divided into two air chambers *w'*, and *e'*, by the partition 80 *i*. The upper chamber *w'*, communicates through the duct *w*² with the wind chest W, and through the open port *w*, with the interior of the pneumatic *r*, thus insuring practically the same degree of tension in the 85 pneumatic *r* that exists in the wind chest W. The lower chamber *e'* communicates through the open port *e*², with the space or chamber *e*³, into which the valve port or ports *e*, open and through which latter communication is 90 had with the interior of the pneumatic *r*. The available area of this communication through the valve port or ports *e*, is governed by the position of the valve blade or cut off *v*, pivotally supported at one ex- 95 tremity and connected by a link *l*, with a slide S mounted upon the movable member *r'*, of the pneumatic *r*, the slide itself being controlled manually or otherwise by means of a rod *s* or other mechanical expedient. 100

It is obvious that the thrust of the valve blade *v* with relation to the valve port or ports *e* when the movable member *r'* of the pneumatic *r* is drawn inward, will be governed by the position of this slide S upon 105 such movable member. Thus if the slide is pushed downward the extent of available thrust will be diminished, and vice versa.

A buffer B is arranged to stop the valve blade *v*, when the latter completely closes the 110 port or ports *e*, as shown in Fig. 2, and a resilient spring or equivalent device T is ar-

ranged to tend constantly to expand the pneumatic *r* and force its movable member outward against the resistance of internal tension. Thus the spring *T* or other retractile device tends constantly to retract the valve blade *v* away from the valve port or ports *e*, while the external atmospheric pressure tends to close the said port or ports owing to the partial vacuum created internally by the exhaust mechanism through said ports.

While I do not restrict myself to a spring as a means of retracting the valve blade *v*, I find the use of a coiled conical compressible spring such as shown advantageous in that it affords a gradually increasing resistance to the closing of the ports *e*.

The whole object being to maintain a prescribed degree of working tension within the wind chest *W*, it is obvious that air admitted thereto through the note sounding pneumatics, be the same more or less in quantity within a given time, should be withdrawn from said wind chest immediately and automatically without increasing the working tension above that desired and prescribed by the operator. Thus the slide *S* being set to represent a prescribed degree of tension in the wind chest, any excess of air admitted from the note sounding pneumatics will inflate the pneumatic *r* of the regulator *R* and thereby cause the valve blade *v* to open the port or ports *e* more or less, to allow the exhauster *E* to quickly withdraw such excess of air. As the normal working tension is thus restored in the wind chest the increase in tension in the pneumatic *r* causes the latter to partially collapse and close the port or ports *e*, more or less, according to the difference in tension existing in the exhauster *E* as compared with that in the wind chest *W*. Thus if the tension in the exhauster *E* is greater than that in the wind chest *W*, the regulator will collapse sufficiently to cause the valve blade *v* to close the port or ports *e*, entirely until air admitted to the wind chest *W* as before stated again reduces the tension therein and permits the pneumatic *r*, to expand under the action of the spring *T*, and these operations will be repeated indefinitely and automatically during the operation of the apparatus,—the number and extent of the fluctuations being dependent upon the character and requirements of the music executed. My regulator *R* thus practically protects the wind chest against an increase of tension above the normal prescribed by the position of the slide *S*, since the exhauster can only take through the throttle the excess of air admitted into the wind chest from the note actuating pneumatics.

While I do not wish to restrict myself to any particular throttle valve mechanism as before stated, I attain by that shown herein

sensitiveness and delicacy of adjustment and operation that is most desirable in practice.

It is to be noted that I have hereinbefore described the use of a single valve blade *e*, and link *L*, which arrangement is entirely practicable but is preferably duplicated as in the drawings; the valve blades being coupled together by cross rods *v'*.

It will thus be seen that by my construction I am able to impart and control expression in the rendition of a musical composition without restriction or limitation as to power or volume of sound.

What I claim as my invention and desire to secure by Letters Patent is,

1. In pneumatic apparatus for use in automatic players, the combination with the working tension wind chest and with the exhaust mechanism, of a pneumatic and valve interposed between said wind chest and said exhaust mechanism, a slide on the movable member of said pneumatic, means for connecting said slide pivotally with the said valve, and means for adjusting said slide to vary the thrust of the valve with relation to the area of communication between the said wind chest and the exhaust mechanism for the purpose set forth.

2. In pneumatic apparatus for use in automatic music players, the combination with a working tension chest and with the exhaust mechanism, of a tension regulator interposed between them, and comprising a pneumatic and contained means for prescribing the degree of tension in said regulator, and for automatically maintaining such prescribed degree of tension therein, and sliding means within said pneumatic connected with said contained means for actuating the same.

3. In pneumatic apparatus for use in automatic music players, a regulator comprising a pneumatic, pivoted means within the pneumatic for automatically retaining any prescribed degree of tension, a slide movable within the pneumatic and connected with said pivoted means for setting the same to any desired degree of tension while the machine is in operation.

4. In pneumatic apparatus for use in automatic music players, a regulator, comprising a pneumatic, means within said pneumatic for automatically retaining any prescribed degree of tension, and means within said pneumatic cooperating with said automatic means and pivotally connected thereto for setting the same to any desired degree of tension while the machine is in operation.

5. In pneumatic apparatus for use in automatic music players, a regulator, comprising a pneumatic, ports and controlling means within said pneumatic for said ports, said controlling means being slidably movable relatively to said ports, and means piv-

otally connected with said means within said pneumatic for setting the same to any prescribed degree of tension.

5 6. In pneumatic apparatus for use in music players, the combination with a working tension wind chest, of means under the control of the operator for producing different degrees of tension while the machine is in operation, the same comprising a pneumatic

and a chamber with ports, means movable 10 over said ports, and means slidable within the pneumatic and connected with said movable means for automatically controlling the same.

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