

No. 744,227.

PATENTED NOV. 17, 1903.

R. W. PAIN.  
EXPRESSION MECHANISM FOR PIANOLAS OR OTHER MUSICAL  
INSTRUMENTS.

APPLICATION FILED JULY 17, 1903.

NO MODEL.

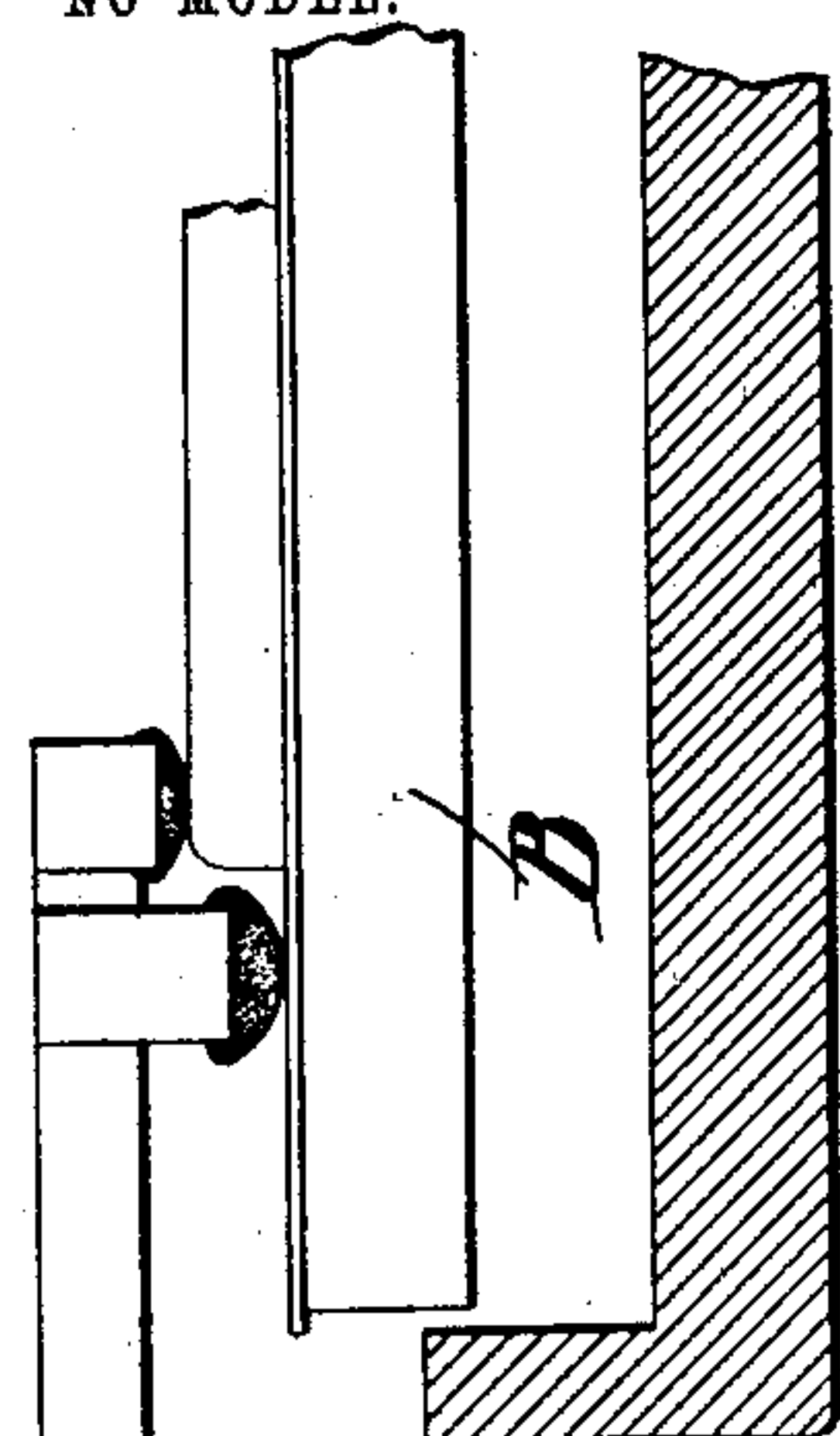


Fig. 1

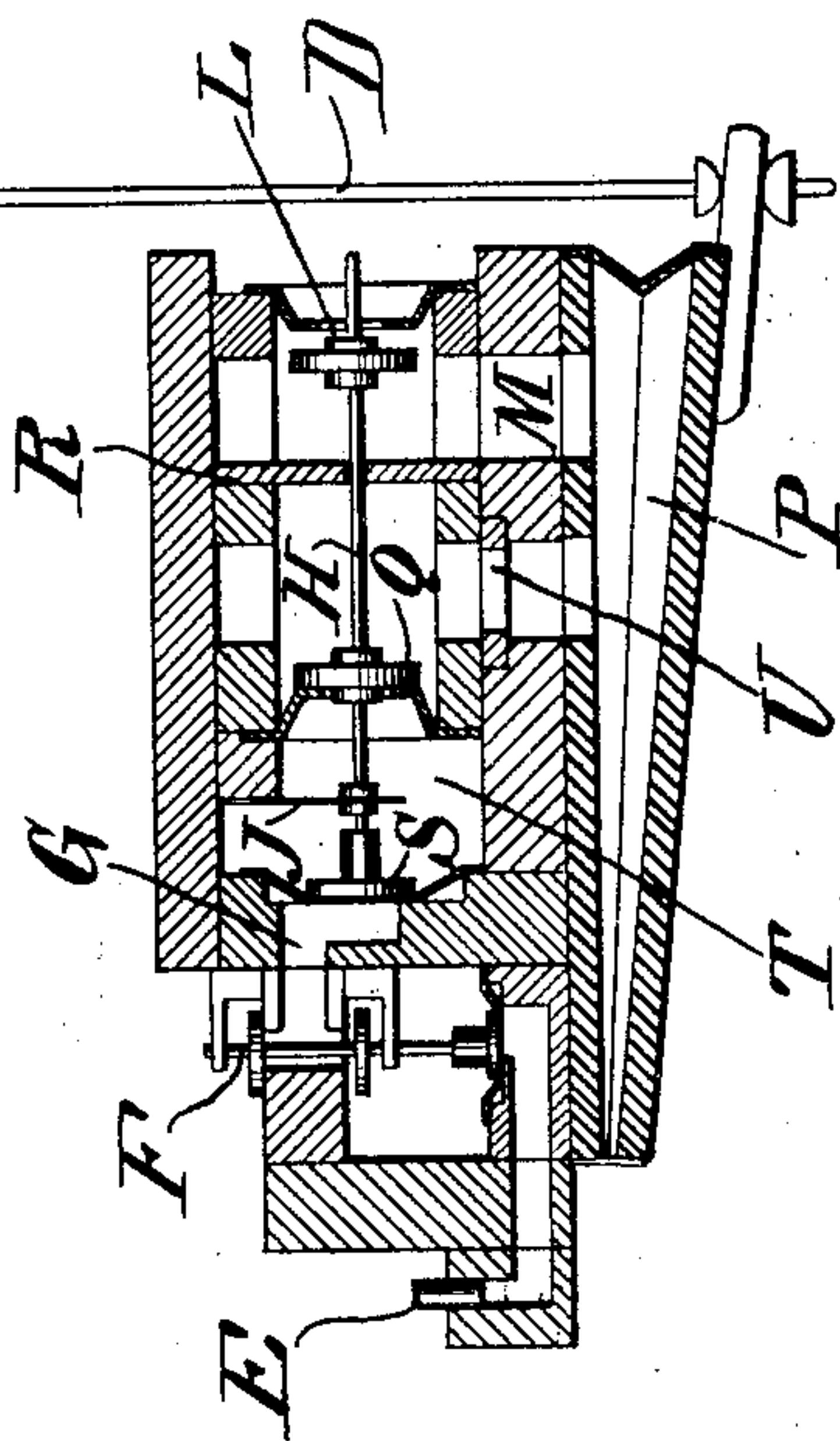


Fig. 2

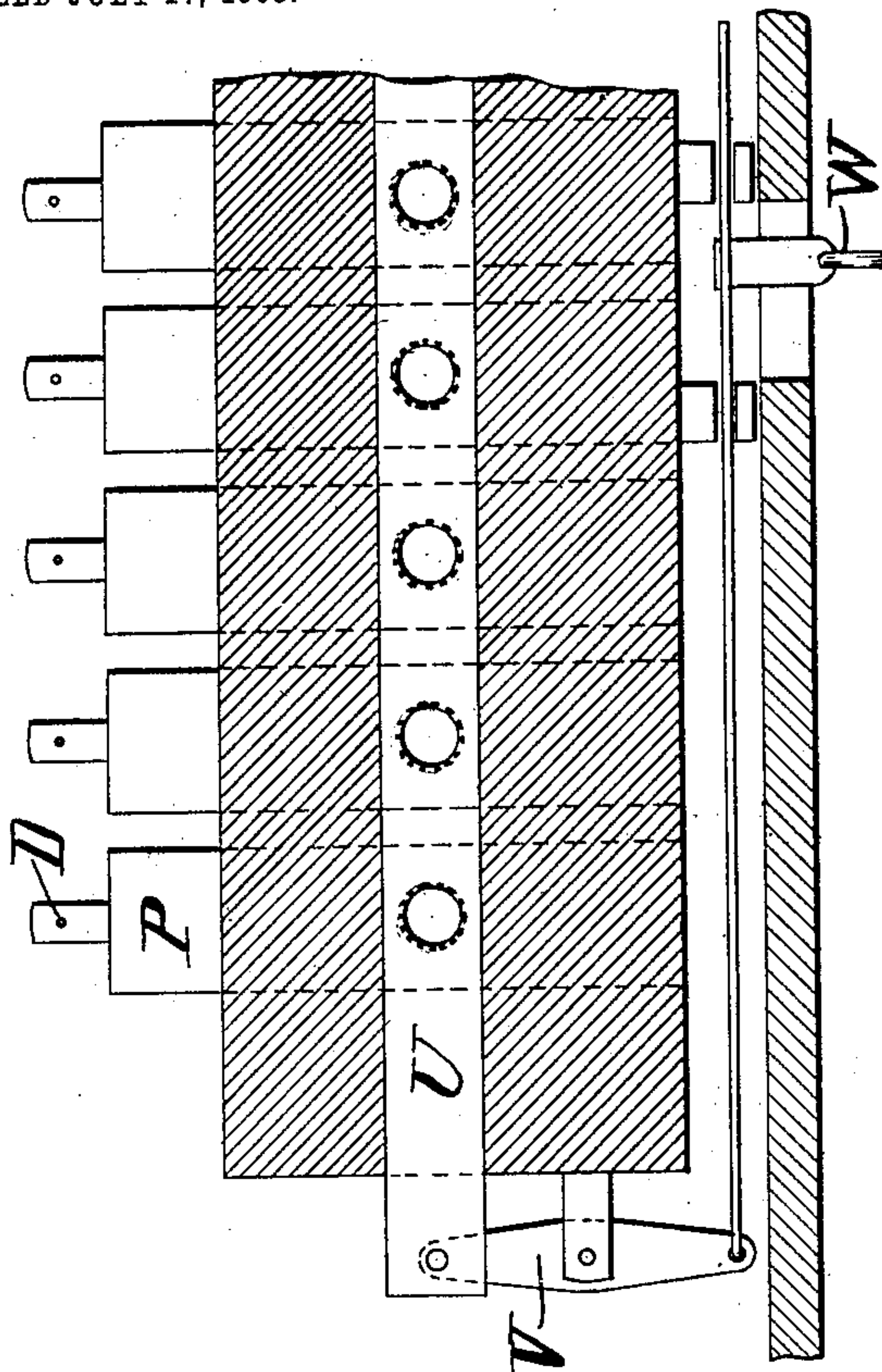


Fig. 3

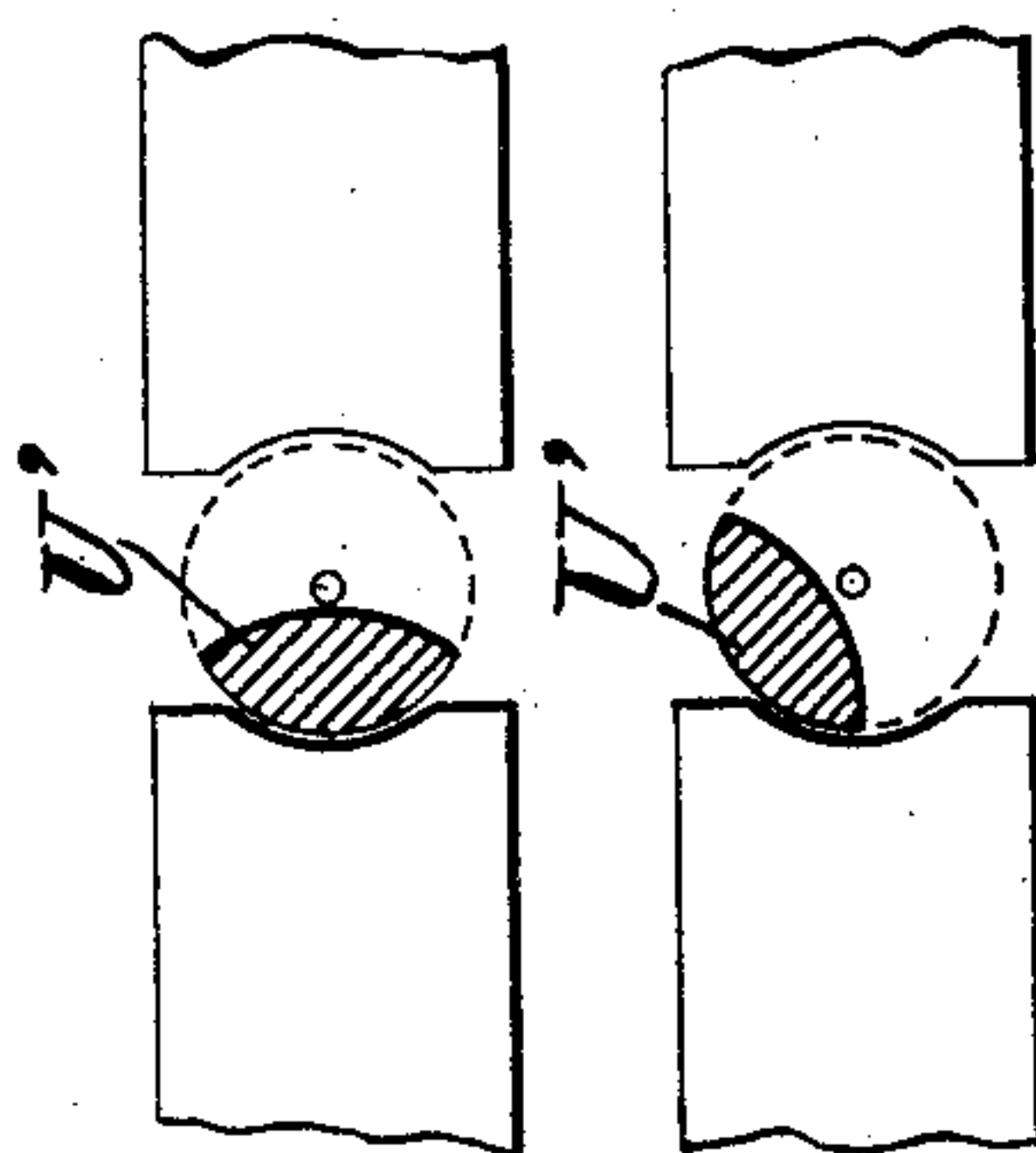


Fig. 3a

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# UNITED STATES PATENT OFFICE.

ROBERT WILLIARD PAIN, OF NEW YORK, N. Y., ASSIGNOR TO THE AEOLIAN COMPANY, OF NEW YORK, N. Y., A CORPORATION OF CONNECTICUT.

EXPRESSION MECHANISM FOR PIANOLAS OR OTHER MUSICAL INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 744,227, dated November 17, 1903.

Application filed July 17, 1903. Serial No. 165,910. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT WILLIARD PAIN, of New York city, State of New York, (post-office address *Æolian Hall*, 362 Fifth avenue, New York city,) have invented certain new and useful Improvements in Expression Mechanism for Pianolas or other Musical Instruments, of which the following is a specification, accompanied by drawings.

The invention relates particularly to means for tempering or giving expression to the action of the actuating-pneumatics that operate the strikers in keyboard playing instruments, such as the pianola and other well-known piano-players.

The present invention contemplates the softening of the action of the strikers by throttling the wind, whether tension or compression, which actuates the striking-pneumatic without at the same time interfering with the exhaust and restoration of the pneumatic to its normal condition after playing a note.

The nature of the invention will be clearly understood from the preferred embodiment of it shown in the accompanying drawings.

Figure 1 is a diagrammatic view, partly in section, showing one of the operating or striking pneumatics, the valves that control it, and its connection with a striker or striking-lever for actuating a piano-key. Fig. 2 is a detailed section showing the slide-valve for modifying the expression by throttling the actuating-wind and showing connections for actuating the slide-valve and the relation of the slide to five of the pneumatics. Figs. 3 and 3<sup>a</sup> are diagrams showing a rotary valve in two different positions, such rotary valve being capable of being employed in place of the slide-valve.

The details of the piano-keys B, strikers or striking-levers C, connecting-rod D, and tracker-board connection E are of no particular interest and therefore need not be described.

At F is the usual primary pneumatic valve-rod, carrying two valves and operated by a pneumatic-diaphragm to admit either suction or atmospheric pressure in the passage G. Such primary pneumatic though desirable is of course not absolutely necessary.

H is the secondary valve-rod normally held in the position shown by the spring J, so as to close the left-hand valve Q and to open the right-hand valve L, which admits atmospheric pressure to the exhaust-port M of the operating-pneumatic P. It will be noticed that the valves Q and L are in separate chambers, divided by the partition R. The object of this partition is to separate the passages which admit the actuating tension or wind to the pneumatic from the exhaust-passages and port M, by which atmospheric air is admitted to the pneumatic P after the note has been played.

S is the usual secondary valve-pneumatic for operating the valves Q and L, T being one of the tension-chambers of the wind-chest, as will be well understood. A valve U is provided, which in the form shown in Figs. 1 and 2 is a slide-valve having openings through it which register with the actuating-port of the pneumatic P, so that by partly closing the valve U the rapidity with which the pneumatic will act will be decreased and the striker operated more gently to give soft expression to the music. This slide-valve is actuated by a lever V and a handle W or in any other desired way, and preferably it is manually and not automatically controlled. Instead of a slide-valve any other form of valve may be used—as, for example, the rotary valve U' in Figs. 3 and 3<sup>a</sup>, shown in two different positions.

The operation of the device is as follows: When the tracker-passage E admits air to and raises the primary pneumatic-valves, and thereby admits atmospheric air to the passage G, the secondary pneumatic S, with its valves Q and L, is forced to the right, opening valve Q, and thereby connecting the pneumatic P with suction through the opening in the slide-valve U. If the valve U is nearly closed, the pneumatic P will operate proportionally slowly and cause a gentle blow upon the piano-key, while if it is wide open it will allow the pneumatic to act with its maximum rapidity. As soon, however, as the key is to be raised, or, in other words, as soon as the atmospheric pressure is cut off from beneath the primary pneumatic, allowing the valves F to drop, the spring J again forces the valve



Q shut and opens the valve L, which permits the atmosphere to rush through the valve L and the unimpeded exhaust-port M into the pneumatic P to expand the pneumatic. It  
 5 will therefore be seen that while the valve U controls the flow of actuating-wind for causing the striking it does not in any way affect the exhaust-port M nor influence the rapidity with which the pneumatic can be restored to  
 10 its normal position after playing a note.

It will be understood that tension-operated pneumatics and pressure-operated pneumatics are well-known equivalents, although I have only described the apparatus as operated  
 15 by tension.

What I claim, and desire to secure by Letters Patent, is the following:

1. In combination with an actuating-pneumatic for musical apparatus and a wind-chest  
 20 and valve-controlled connections for connecting and disconnecting the wind-chest with the said actuating-pneumatic, of a separate set of valve-controlled connections for connecting and disconnecting the said pneumatic with  
 25 the atmosphere, and means for varying the striking action to give various expressions, independently of the return action of the pneumatic, for substantially the purposes set forth.

30 2. In combination with a striking-pneumatic, pneumatic-valves for controlling the actuating-wind and the return wind, of a divided valve-chamber for the said respective valves provided with a partition separating  
 35 the valve that controls the actuating-wind

from the valve that controls the return wind, and means for varying the flow of the actuating-wind for varying the expression, independently of the return wind, for substantially the purposes set forth. 40

3. In combination with an actuating-pneumatic, of actuating wind connections and a valve controlling said connections, atmospheric connections and the valve for controlling said atmospheric connections, said valves  
 45 being located in separate chambers, and a control-valve and operating connections that are independent of the striking-pneumatic for controlling the freedom of passage through the first said valve only, independently of the  
 50 return wind, for substantially the purposes set forth.

4. The combination with a striking-pneumatic and pneumatic-valves and valve-openings for the actuating-wind and for the re-  
 55 turn wind respectively, of a partition separating the valve-chambers of the said valve and a throttling-valve with actuating connections independent of the striking-pneumatic for controlling the freedom of passage through  
 60 the actuating-wind-valve chamber independently of the return wind, for substantially the purposes set forth.

In testimony whereof I have signed this specification in the presence of two subscrib-  
 65 ing witnesses.

ROBERT WILLIARD PAIN.

Witnesses:

E. C. THOMPSON,  
 W. C. MANSFIELD.