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PATENTED JUNE 2, 1908.

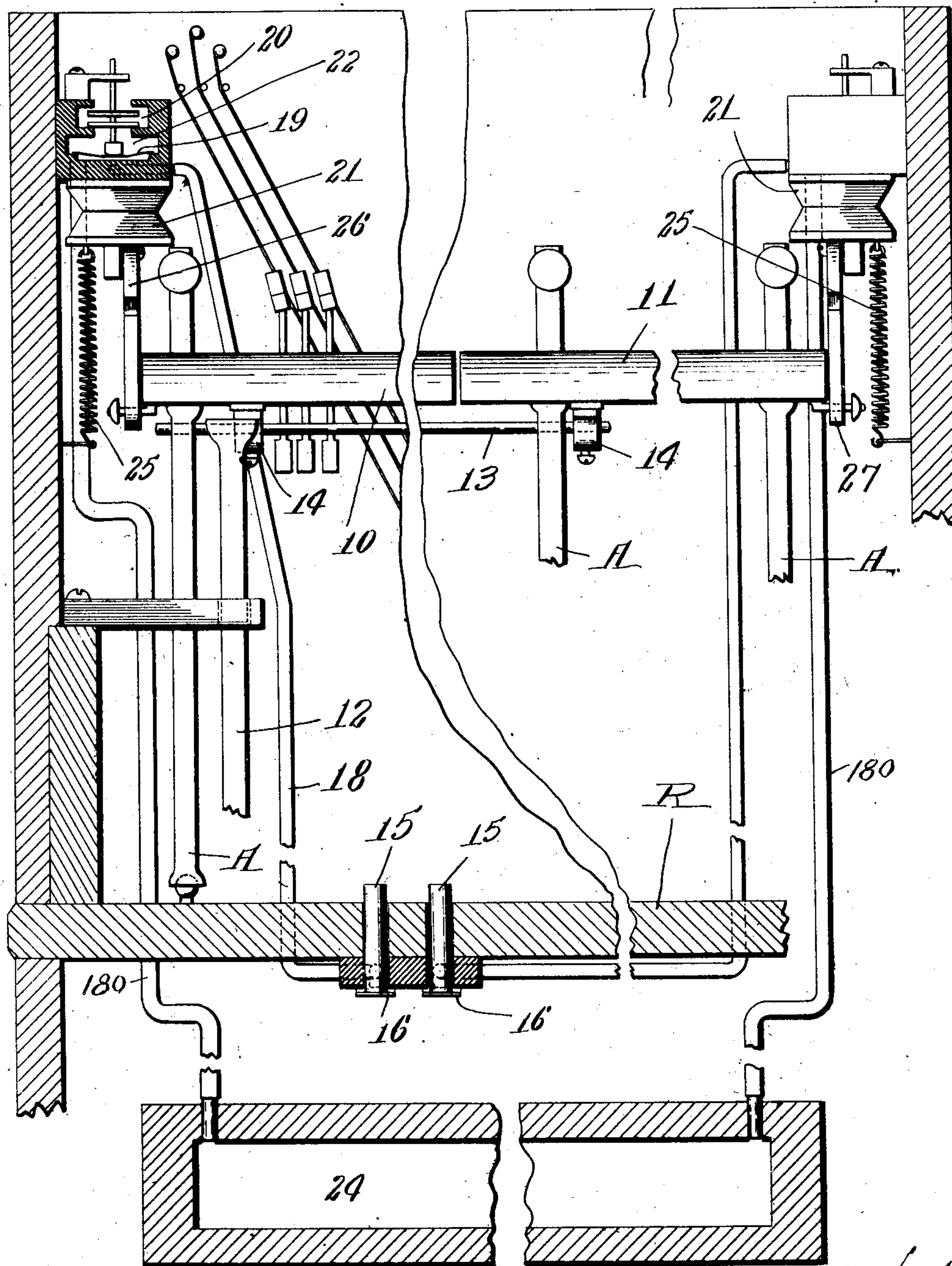
T. DANQUARD.

MODULATING ATTACHMENT FOR AUTOMATIC PIANOS.

APPLICATION FILED MAY 26, 1905.

2 SHEETS—SHEET 1.

Fig. 1.



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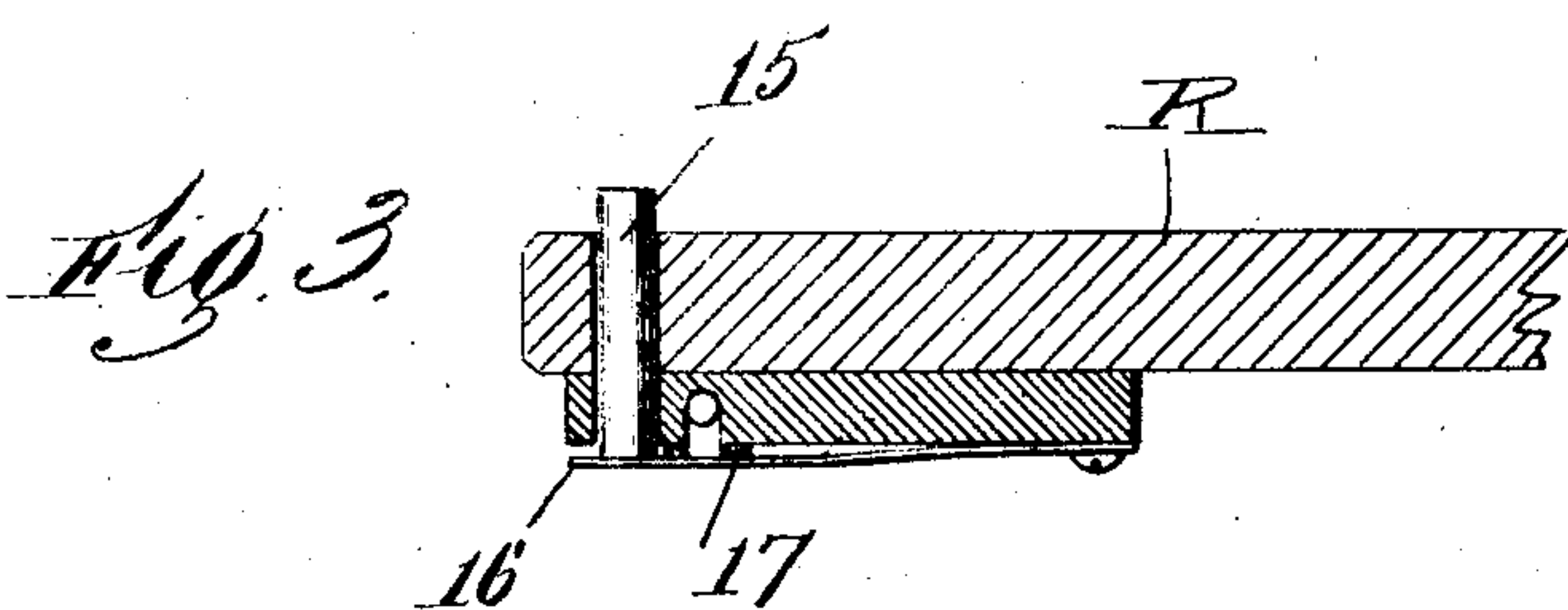
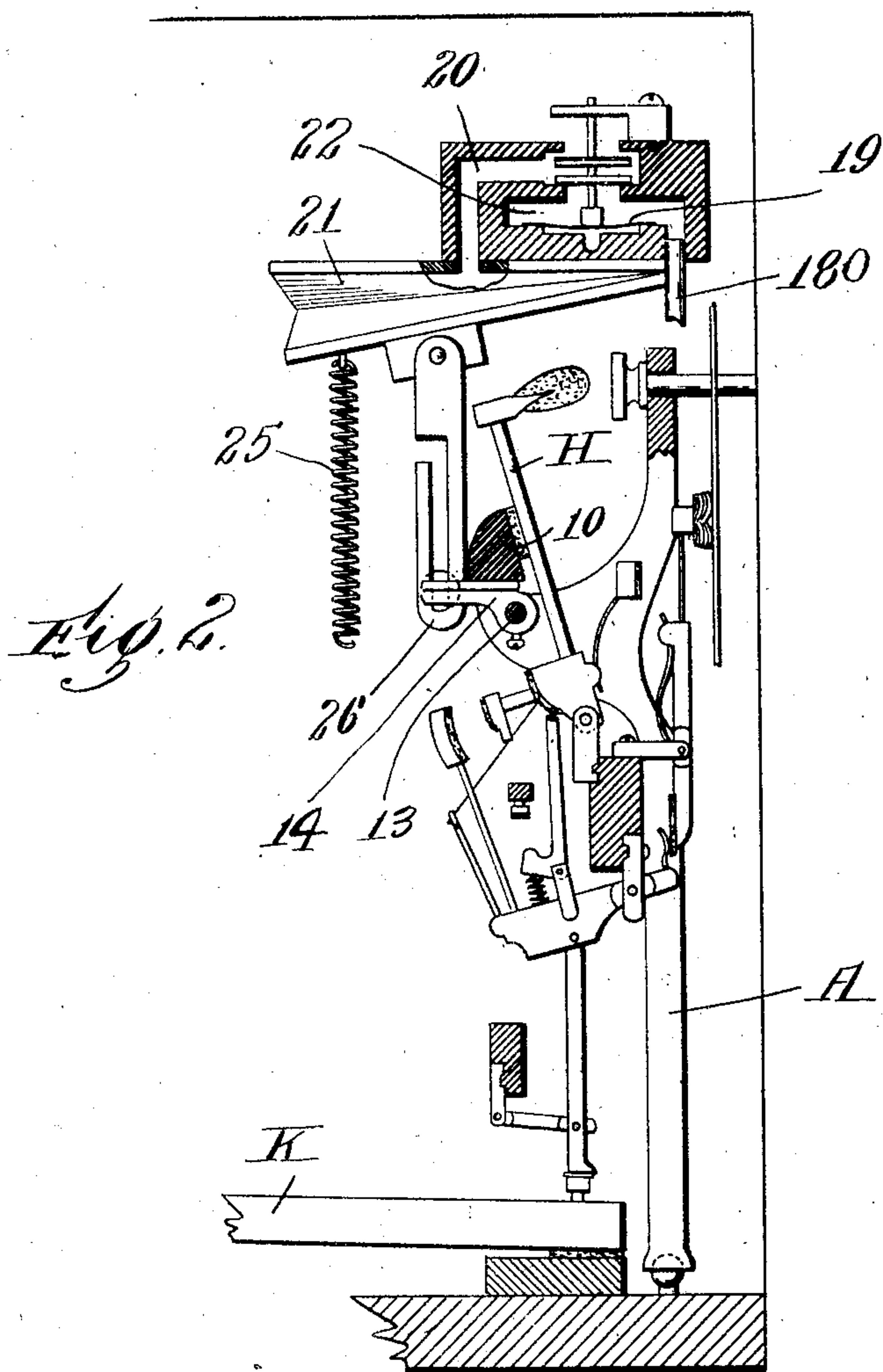
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UNITED STATES PATENT OFFICE.

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MODULATING ATTACHMENT FOR AUTOMATIC PIANOS.

No. 889,444.

Specification of Letters Patent.

Patented June 2, 1908.

Application filed May 26, 1905. Serial No. 262,424.

To all whom it may concern:

Be it known that I, THOMAS DANQUARD, a citizen of the United States, residing at New York, in the county of New York and State New York, have invented a new and useful Modulating Attachment for Automatic Pianos, of which the following is a specification.

This invention relates to a construction for controlling the striking mechanism of an automatic piano to produce modified effects.

The invention relates especially to that class of automatic pianos which are controlled by rolls or strips of perforated paper.

The object of this invention is to provide for automatically controlling the striking mechanism of an automatic piano so as to insure perfect striking or speaking effects of all notes of a musical composition, while at the same time permitting the accenting of the air or melody to produce marked or accented phrases.

To this end this invention consists of means for regulating the striking mechanism of an automatic piano in accordance with air tension or force which is exerted upon the pedals.

In the accompanying two sheets of drawings I have illustrated my invention applied to a piano in which the striking or speaking effects are controlled by shifting the position of the hammer rest-rail so that the hammers are moved up closer or stand further away from the strings.

In the drawings, Figure 1 is a sectional front view of sufficient parts of a piano to illustrate the application of this invention thereto. Fig. 2 is a fragmentary sectional view thereof, and Fig. 3 is a detail sectional view of the finger-key controlling the modulation of a part of a piano action.

In this class of automatic pianos all notes of a musical composition were originally struck or sounded with the same degree of loudness.

In order to produce modified effects necessary to properly shade a musical composition and bring out either the melody or accompaniment with different degrees of loudness, a number of different constructions have been provided. To effect this purpose it has been proposed to divide the pneumatic action of an automatic piano into two or more divisions, and to throttle or vary the air ten-

sions with which the different notes either of the bass or treble are sounded. It has also been proposed to provide mechanical connections for damping or modulating a part of the piano action while leaving other parts of the piano action to be sounded with full striking effects.

In practice I have found that modulating attachments for automatic pianos either when controlled by dividing the pneumatic action, or when controlled by mechanically damping either the bass or treble notes are unsatisfactory for the reason that they are apt to produce slurring or an entire failure to sound anything but the accented notes. For example, where a divided pneumatic action is employed in an automatic piano, unless the pedals are operated with considerable power, the notes which are to be struck lightly or without special emphasis are apt not to be sounded at all. This is also sometimes true where mechanically damped effects are secured by direct mechanical means.

The especial object of this invention is to provide a modulating mechanism for an automatic piano which will insure a perfect speaking effect for all notes of a musical composition, even when the pedals are operated comparatively slowly, or with little power, and I accomplish this result by controlling my modulating mechanism by connections from the wind trunk of the pneumatic action. This enables me to provide an automatic piano in which whenever the pedals are operated powerfully to produce accented or powerful striking effects a part of the notes, for example, the accompaniment may be sounded softly; while at the same time whenever the air tension falls by reason of operating the pedals more slowly or with less power, the muffling or damping effect will diminish in proportion to the change of air tension, so that perfect striking effects of all notes of a musical composition will be effected independently of the power exerted upon the pedals.

Referring to the accompanying drawings for a detail description of the application of this invention to a piano in which the striking effects are controlled by a divided hammer rest-rail which shifts the position of the hammers either away from or towards the piano strings according to whether the notes are to be played loudly or softly, the piano case

may be of any usual or ordinary constructions, and is provided with a keyboard rail R which extends out under the piano keys. The action of the piano may be of any usual or ordinary type.

As herein illustrated a number of supporting castings A are used to carry the piano action which may comprise the usual striking hammers H which are operated through ordinary connections from the piano keys K as shown in Fig. 2. The position of the hammers H is controlled by the hammer rest-rail and in the construction herein illustrated the hammer rest-rail may be divided into a number of sections; in the present instance, the hammer rest-rail being illustrated as comprising a section 10 for moving part of the hammers towards the piano strings when the bass notes are to be played softly, and an independently movable section 11 for throwing part of the hammers towards the piano strings when the treble notes are to be struck or sounded softly.

In order to permit the usual soft pedal effect, the pedal rod 12 is arranged at its upper end to engage and turn a rock-shaft 13 having lifting arms 14 for raising both sections of the divided hammer rest-rail, and I prefer to arrange the parts in this manner so that when the piano is being played by hand the ordinary soft pedal effect for the entire action may be secured if desired.

Referring now to the means which I employ for actuating either section of the divided hammer rest-rail according to whether it is desired to modify the bass notes or treble notes of a musical composition, I control this operation from the air tension employed for producing the automatic playing effects, and I have arranged connections so that when a finger-key is operated to soften or modulate part of the piano action, and comparatively low air tension is maintained by the pedals or otherwise in the main wind trunk, a comparatively slight modulating effect will be produced, this insuring a perfect speaking of all notes which are sounded either with modulated or full striking effect, but when operated under increased air tensions, more complete modulating effects will be produced so as to produce a more perfect softening of the treble or bass notes according to which modulating key is depressed, while still permitting heavily accented effects to be sounded upon other notes.

The connections for modulating either the bass or treble part of the action by swinging back a corresponding part of the hammer rest-rail are substantial duplicates of each other, and a description of one set of such connections will be sufficient. For example, the connections for modulating or softening the bass notes of a piano by swinging rearwardly a section of hammer rest-rail corresponding thereto may comprise a finger-key

15 which is normally raised by a spring 16. The spring 16 as shown in Fig. 3 normally closes a valve-seat 17. When the spring is depressed, atmospheric air pressure is admitted to a passage 18 which leads to a primary pneumatic 19.

The valve-stem operated by the primary pneumatic 19 carries valves for connecting a passage 20 either with the atmospheric air or with the suction chamber 22. The suction chamber 22 is connected by a passage 180 to the main wind trunk 24. The passage 20 connects to an operating pneumatic 21, and extending down from the operating pneumatic at one side of the piano is a link 26, which is slotted to receive a pin projecting from the hammer-rail section 10 which controls the bass notes, while extending down from the other operating pneumatic 21 at the other side of the piano is a link 27 which is slotted to receive a pin extending from the hammer rest-rail section 11 which controls the treble or higher notes of the piano action. The movable section of each of the pneumatics 21 is held down by a spring 25.

Considering now the operation of a complete piano as thus equipped, it is to be understood that the pneumatic devices for producing automatic playing effects are connected to operate the hammers in any of the ordinary ways, which need not be herein shown and described.

Whenever it is desired to sound the bass notes of a musical composition softly, while permitting normal effects to treble notes, the finger 15 corresponding to the bass notes will be depressed, and so long as this finger-key is held down a connection between the operating pneumatic 21 and the main wind chest 24 will be kept open, but at the same time the tendency of the operating pneumatic 21 to shift the bass note-hammer closer to the strings will be resisted by the spring 25, and so long as the automatic action is being played under light or weak air tensions, or without much force being exerted upon the pedals, all the hammers will remain in their normal positions, but as the air tension is increased to produce accented or marked effects, the force exerted by the operating pneumatic 21 will also increase until it overcomes or partly overcomes the tension of its spring 25, thus producing a softening or modulation of the bass notes. This result is secured without in any way interfering with the perfect speaking of all notes of the musical composition, because whenever the force exerted on pedals is diminished, and the air tension falls and the modulating effect is automatically dispensed with, no matter how lightly or delicately musical phrases may be played, there will be no slurring or failure to sound all the notes corresponding with the perforations of the music sheet. In the same way, when the finger-

key corresponding with the treble notes is depressed, a softening or modulating effect will be produced upon such treble notes whenever the instrument operates under high air tensions, but such modulating effects will be automatically dispensed with whenever the air tension diminishes or less power is employed upon the pedals.

It is of course obvious that the hammer rest-rail may be divided into a greater number of sections than two, and in such case, the number of finger-keys in the keyboard ledge will be correspondingly increased, and while I have shown my invention applied to a piano of that type in which the striking effects are controlled by the position of the hammer rest-rail, I do not wish to be limited to the application of my invention to this particular means for dampening or modulating the striking effects.

I am aware that many changes may be made by skilled mechanics in applying my invention to the different types of pianos and I do not wish, therefore, to be limited to the construction I have herein shown and described, but

What I do claim and desire to secure by Letters Patent of the United States is:—

1. In a musical instrument, the combination of pneumatic striking devices, pneumatic means controlled by variations of the air tensions acting on said striking devices for modulating or softening the effects of part of said striking devices, and external yielding means for preventing the operation of the modulating means when the striking devices are operated under low air tensions.

2. In a musical instrument, the combination with striking devices of a piano action and a main wind-chest, of means for modulating or softening the effects produced thereby, said means being controlled by variations in the air tensions in the main wind-chest, and means for entirely preventing the operation of the modulating means when said air tensions are sufficiently low to cause the action to be played softly, and for yielding when the air tension is high enough to cause the action to be played loudly so as to permit said modulating or softening means to act to its full capacity.

3. In a musical instrument, the combination of a wind-chest, a movable hammer rest-rail, an operating pneumatic connected therewith for operating said rail, means for connecting said operating pneumatic with the wind-chest, and separate yielding means for holding the operating pneumatic in normal inoperative position in opposition to the tension of the wind-chest and thus preventing the operation of said pneumatic when the wind-chest is operating the instrument under light air tensions, whereby said operating pneumatic will fail to act in proportion to the air tensions, said yielding means being of

such strength as to be entirely overcome when the wind-chest is operating the instrument under heavy air tensions whereby the pneumatic will operate said rail in proportion to the air tensions when said air tensions are heavy.

4. In a musical instrument, the combination of a movable hammer rest-rail, a pneumatic for moving said rest-rail toward the strings, a spring for normally holding said pneumatic open so as to leave the rail at its maximum distance from the strings, said spring being of such strength that it will not be materially stretched by the ordinary light playing air tensions operating the said pneumatic but that its resiliency will be sufficiently overcome by the ordinary heavy playing air tensions employed for producing accented effects to permit the pneumatic to move said hammer rest-rail in proportion to said heavy air tensions.

5. In a musical instrument, the combination of a pneumatic, a slotted link depending therefrom, a hammer rest-rail having a projection loosely engaged by said link whereby the operation of the link in one direction will move the hammer rest-rail, and a spring connected with said pneumatic for retarding its motion under low air tensions but of such strength that under high air tensions the pneumatic will overcome the resistance of the spring.

6. In an automatic piano, the combination of a pivoted hammer rest rail section, a hook for moving said hammer rail section in a direction toward the hammers, a pneumatic for pulling said hook in a direction to operate the hammer rest rail section, pneumatic means for operating the pneumatic, and a spring for overcoming said pneumatic means when the operating means is worked under a low tension.

7. In an automatic piano, the combination of a pivoted hammer rest-rail, a slotted link for engaging said rail and moving it toward the hammers, a pneumatic for pulling said link to operate the rail, pneumatic means for operating the pneumatic, a spring for overcoming said pneumatic means when the operating means is worked under a low tension, a pedal, and connections from the pedal for shifting the hammer rest-rail toward the hammers when the piano is to be played by hand independently of the position of said link.

8. In an automatic piano, the combination of a hammer rest-rail made up of a plurality of movable sections, pneumatic means for moving each of said sections toward the hammers independently, a pedal, and connections from the pedal for shifting both sections of the hammer rest-rail toward the hammers independently of the position of said pneumatic.

9. In an instrument of the class described,

the combination with a movable hammer
rest rail having an arm, of a link having a slot
which said arm enters and which supports
the arm, and means for lifting the link and
5 thereby moving the rest rail, said link being
pivotally suspended from said means.

In testimony whereof I have hereunto set

my hand, in the presence of two subscribing
witnesses

THOMAS DANQUARD.

Witnesses:

J. W. BARTLETT,
HOPPER S. MOTT.