

No. 855,370.

PATENTED MAY 28, 1907.

J. A. WESER.
AUTOMATIC PIANO.
APPLICATION FILED FEB. 25, 1907.

2 SHEETS—SHEET 1

Fig. 1.

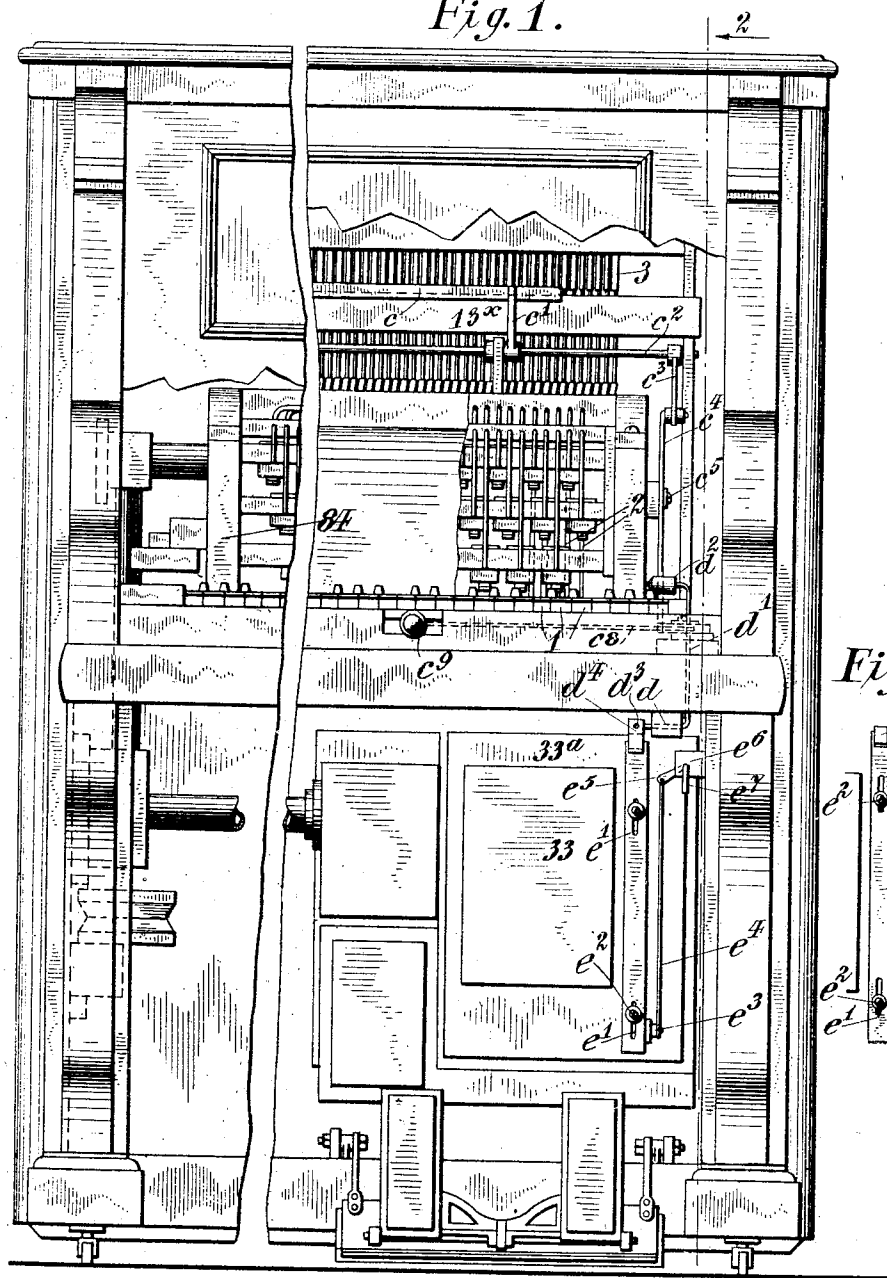
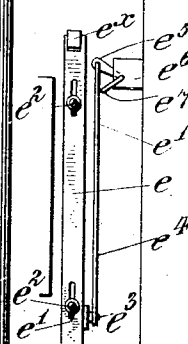


Fig. 3.



Witnesses:
Geoffrey
Ellen J. King

Inventor
John A. Weser
By ^{Attorneys}
Redding, Kiddle & Grier

UNITED STATES PATENT OFFICE.

JOHN A. WESER, OF NEW YORK, N. Y.

AUTOMATIC PIANO.

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To all whom it may concern:

Be it known that I, JOHN A. WESER, a citizen of the United States, residing in the borough of Manhattan, of the city of New York, State of New York, have invented certain new and useful Improvements in Automatic Pianos, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

In automatic pianos, the force of the blows of the hammers varies with the intensity of the source of power for the actuation of the hammers, that is, in pneumatic pianos, with the variation of the air pressure or exhaust pressure or tension in the pumps or feeder bellows from which are operated the pneumatics which directly actuate the hammers, the intensity of the source of power being varied by devices usually under the control of the performer. Additional expression devices also under control of the performer are sometimes provided, such as a movable hammer rest rail by means of which the amplitude of the blows of the hammers can be varied, a softer tone being produced when the hammers are limited to a short range of movement.

By the present invention it is sought to combine the additional or supplemental tone regulating devices in operative relation with the source of power for the operation of the hammers. Two highly desirable results are thus secured; first, the performer is relieved of the necessity of dividing his attention between two sets of expression or tone regulating devices, the one being operated indirectly through the other, and, second, the range of expression is increased, the pianissimo passages being rendered with greater delicacy and the fortissimo passages with greater power. In automatic pianos and piano players in which the control of the expression devices is automatic, the intervention of a performer not being required, simplicity in construction is secured, as well as the greatest range of expression.

In the embodiment of the invention which is chosen for illustration and description herein the supplemental expression device is such a movable rest rail as is referred to above and provision is made whereby it moves in correspondence with the variation of air pressure or tension in the pump or feeder bellows, moving away from the hammers to permit them to have greater amplitude of stroke when the pressure tends to give the greatest

force to the blows, and moving toward the hammers, to restrict the amplitude of their movement, when the pressure is such as to reduce the force of the blows. Preferably the mechanism for shifting the hammer rest rail is actuated directly by the movable member of the bellows. It will be evident, however, that other means may be employed for effecting the desired result.

In the drawings—Figure 1 is a partial view, in front elevation, with some portions broken away, of an automatic piano to which the invention is applied. Fig. 2 is a vertical transverse section on the plane indicated by the line 2—2 of Fig. 1. Fig. 3 is a detail view showing in different positions certain of the parts shown in Fig. 1. Fig. 4 is a detail view showing in different positions certain of the parts shown in Fig. 2. Figs. 5 and 6 are detail views showing plan views in different positions of the devices for controlling manually the position of the hammer rest rail.

In the piano shown in the drawings each finger key 1 acts as usual through an abstract 2 upon the corresponding hammer 3, dampers 4 being provided as usual for co-operation with the strings 5. The source of power for the actuation of the hammers automatically is sufficiently represented by the bellows 33 from which connection is made by suitable ducts with the chest of the hammer action pneumatics, the location of which is indicated at 84. Means are provided as usual for controlling the air pressure or tension in the hammer pneumatics to vary the force of the blows of the hammers and therefore the tone produced, such means not being necessary to be shown and described herein.

So far as the present invention is concerned, any means might be provided for varying the force of the blows of the hammers, as in the construction shown for varying the air pressure or tension in the bellows 33 for this purpose, it being understood that in the construction shown the movable member board or member 33^a of the bellows varies in position with the air pressure therein, moving outward, or to the left in Fig. 2, as the tension decreases, and occupying its extreme inward or right hand position when the tension is greatest.

For the purpose of varying the backward throw of the hammers 3, independently of the action of the soft pedal (not shown) and the hammer rest rail 13^x, and thereby reducing the momentum of the hammers when

they strike the strings and so reducing the force of the blow and modifying the tone produced, there is mounted in rear of the hammer stems a special rest rail *c* which is carried by arms *c'* of a rock shaft *c''*. The latter is provided with an arm *c'''* which bears against the upper end of a lever *c''''* pivoted at *c''''''*. Against the lower end of the lever *c''''* bears the end of a rod *c''''''* which rests upon a suitable support and is connected at its outer end to one arm of a bell crank lever *c''''''''*. The other arm of this bell crank lever is connected with a rod *c''''''''''* having a handle or knob *c''''''''''''*, a spring *c'''''''''''''* being also connected to the bell crank lever so as to press the end of the rod *c''''''''''* against the lower end of the lever *c''''*. The rod *c''''''''''* and knob *c''''''''''''* permit the special rest rail *c* to be operated by the performer when required and the knob *c''''''''''''* also acts as an indicator to show the position of the rest rail, moving as the rest rail moves when actuated by the devices about to be described. Mounted in a suitable bearing *d* near the upper end of the bellows 33 is a bell crank lever, the vertical arm *d'* of which carries a roller *d''* bearing against the lower portion of the lever *c''*. The horizontal arm *d'''* of this bell crank lever carries a wedge shaped or cam block *d''''* for co-operation with the movable member 33^a of the bellows 33, so that the special rest rail *c* shall move toward or from the hammer stems in correspondence with the movement of such movable member 33^a away from or toward the stationary member, thus varying the throw of the hammers as the pressure which actuates the hammers through the hammer pneumatics is reduced or increased by the usual expression or tone regulating device. The action of this part of the mechanism is automatic and in order that this automatic mechanism may be thrown into or out of operation at will, there is mounted movably on the movable member 33^a of the bellows 33 a bar *e* which is slotted, as at *e'*, for engagement with the screws *e''* which hold the bar to the member 33^a. At the lower end of the bar *e*, or near the fulcrum of the movable bellows member 33^a, there is secured a stud *e'''* which is connected by a link *e''''* with one arm of a bell crank lever *e''''''*, mounted in a suitable bearing *e''''''''* and having its other arm *e''''''''''* accessible to the performer. Movement of the arm *e''''''''''* from the position shown in Figs. 1 and 2 to the position shown in Fig. 3 raises the bar and its roller *e''''* from the position shown in Figs. 1 and 2, in which it will not act upon the block *d''''* during the movement of the bellows member 33^a, to the position shown in Figs. 3 and 4, in which it will act upon such block during the movement of the bellows member 33^a from its right hand position to its left hand position. The action of the roller *e''''* upon the block *d''''* rocks the bell crank *d'* and *d'''* on its fulcrum and through the lever *c''*, arm *c'*, rock shaft

c'' and arm *c'*, moves the special rest rail *c* toward the stems of the hammers to reduce their backward throw and thereby to reduce their momentum during their forward throw and consequently the force of the blows with which they strike the strings. The movement of the special rest rail *c* is in correspondence with and proportionate to the movement of the bellows member 33^a, so that the force of the blows of the hammers is by this means reduced or varied in correspondence with and in proportion to the reduction or variation of the force of the blows produced through the hammer pneumatics. When the hammer actuating tension is greatest the throw of the hammers is greatest and fortissimo passages are rendered with greater force. On the other hand, when the hammer actuating tension is least the throw of the hammers is least and pianissimo passages are rendered with greater delicacy.

It will be understood that various supplemental means might be employed for varying the force of the blows of the hammers in correspondence with the intensity of the hammer actuating force and that the invention, therefore, is not limited to the particular means shown and described herein, such means having been chosen merely as an illustration of the nature of the invention and of devices which may be employed conveniently in connection with automatic pianos of the style and construction indicated in the drawings.

I claim as my invention:

1. In a pneumatic piano, the combination of hammers, bellows and intermediate connections to actuate the hammers, and independent means actuated by variations of pressure in the bellows to vary the force of the blows of the hammers.

2. In a pneumatic piano, the combination of hammers, bellows and intermediate connections which actuate the hammers, independent means to vary the force of the blows of the hammers, and connections whereby the last named means are actuated in correspondence with the movement of the bellows.

3. In a pneumatic piano, the combination of hammers, bellows and intermediate connections to actuate the hammers independent means to vary the force of the blows of the hammers, and connections actuated by the movement of the bellows to operate said means.

4. In a pneumatic piano, the combination of hammers, bellows and intermediate connections to actuate the hammers, a movable rest rail to vary the backward throw of the hammers and connections whereby the rest rail is moved in correspondence with the movement of the bellows.

5. In a pneumatic piano, the combination of hammers, bellows and intermediate con-

nections to actuate the hammers, a movable rest rail to vary the backward throw of the hammers and connections actuated by the movement of the bellows to move said rest rail.

5 6. In a pneumatic piano, the combination of hammers, bellows and intermediate connections to actuate the hammers, a movable rest rail to vary the backward throw of the
10 hammers, a lever having one arm arranged to be acted upon by the movable member of said bellows and connections between said lever and said rest rail whereby the latter is moved through the movement of said movable bellows member.

15 7. In a pneumatic piano, the combination of hammers, bellows and intermediate connections to actuate the hammers, a movable rest rail to limit the backward throw of the
20 hammers, connections whereby the rest rail

is moved in correspondence with the movement of the bellows, and independent manually operated devices to move said rest rail.

8. In a pneumatic piano, the combination of hammers, bellows and intermediate connections to actuate the hammers, a shiftable bar carried by the movable member of said bellows, means to shift said bar, a lever arranged to be acted upon by said bar in one position, and connections between said lever and said rest rail to shift the latter in correspondence with the movement of the bellows member.

This specification signed and witnessed this 23rd day of February A. D., 1907.

JOHN A. WESER.

Signed in the presence of—

SAMUEL GOOTENBERG,
CONRAD HAIRIS.