

No. 648,717.

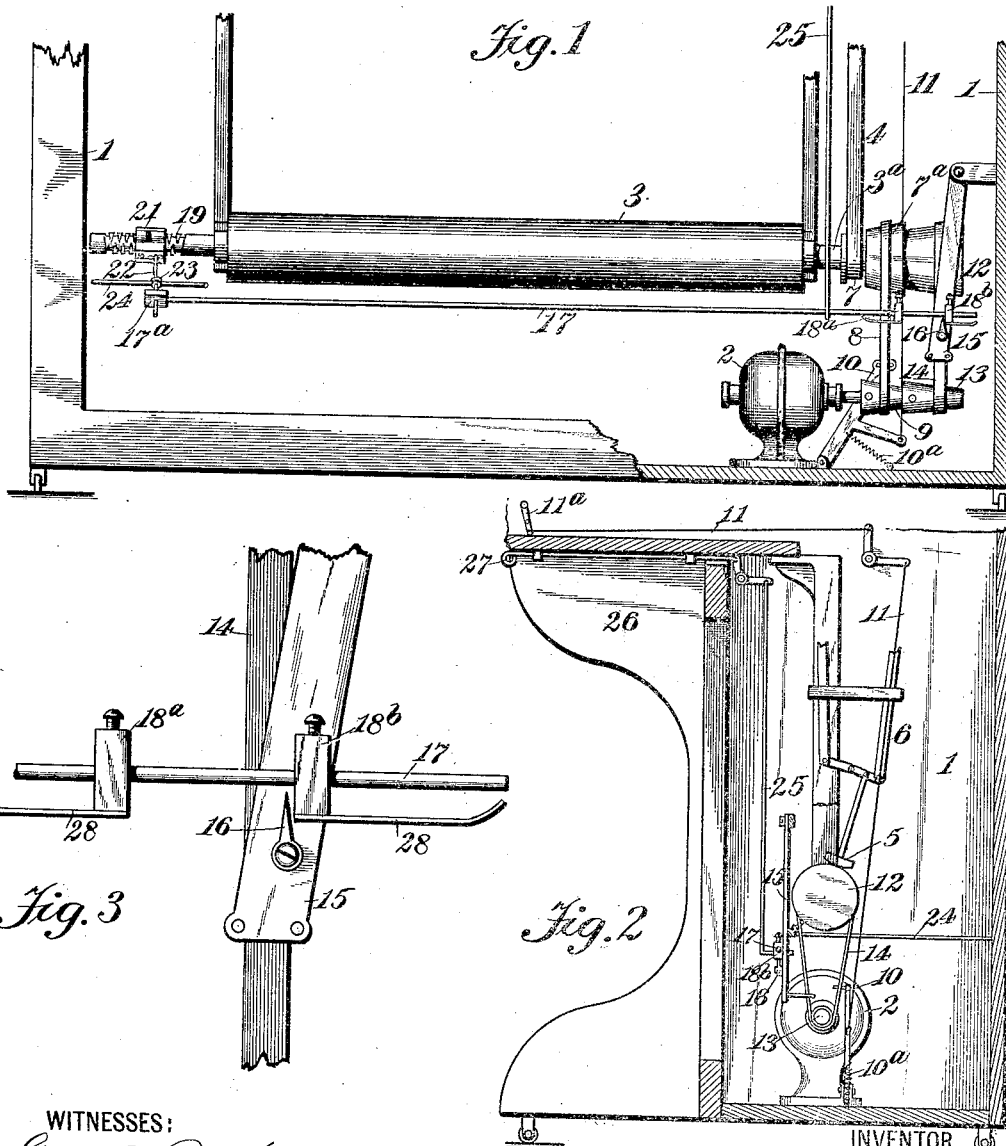
Patented May 1, 1900.

J. A. WESER.
AUTOMATIC MUSICAL INSTRUMENT.

(Application filed Nov. 2, 1899.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES:
Geo. B. Rowley.
Peter A. Ross.

INVENTOR
John A. Weser
BY
Harry Combs
ATTORNEY

No. 648,717.

Patented May 1, 1900.

J. A. WESER.
AUTOMATIC MUSICAL INSTRUMENT.

(Application filed Nov. 2, 1899.)

(No Model.)

3 Sheets—Sheet 2.

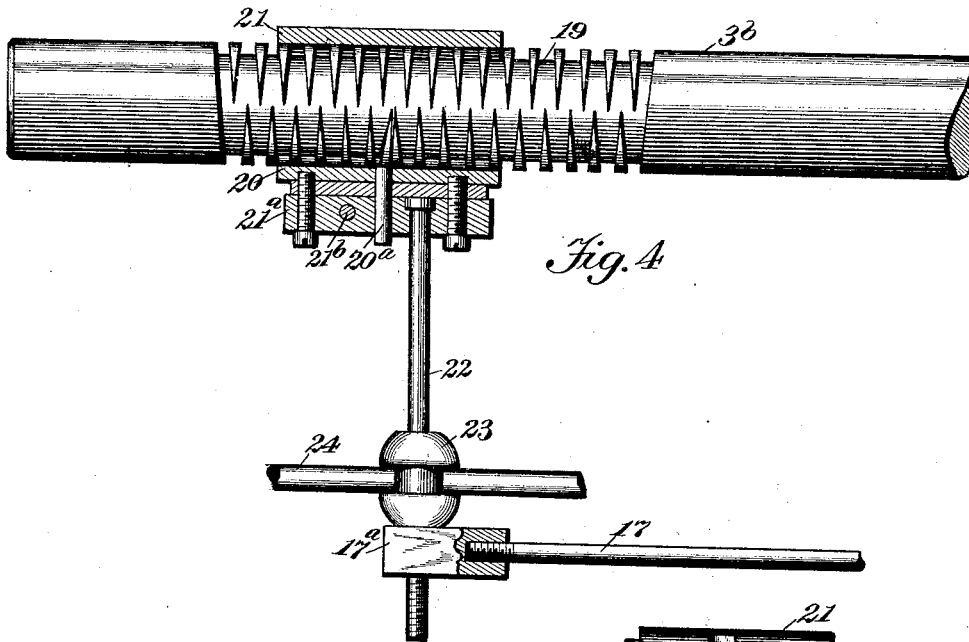


Fig. 4

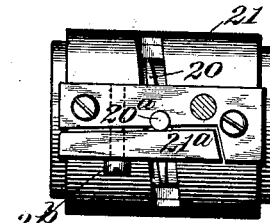


Fig. 5

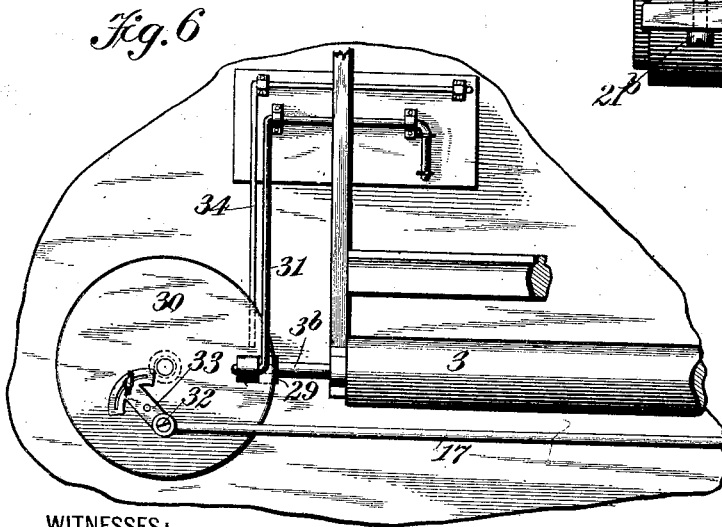


Fig. 6

WITNESSES:

Geo. B. Rowley.
Peter A. Ross

INVENTOR

John A. Weser

BY

Harry Connors
ATTORNEY

No. 648,717.

Patented May 1, 1900.

J. A. WESER.
AUTOMATIC MUSICAL INSTRUMENT.

(Application filed Nov. 2, 1899.)

(No Model.)

3 Sheets—Sheet 3.

Fig. 7

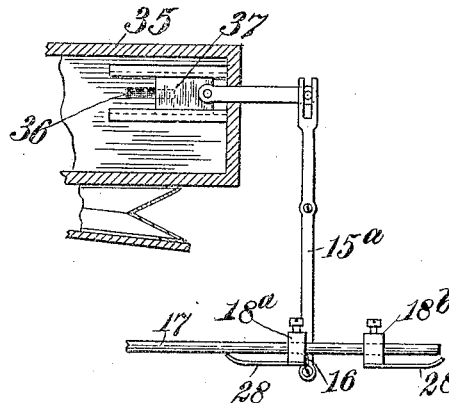
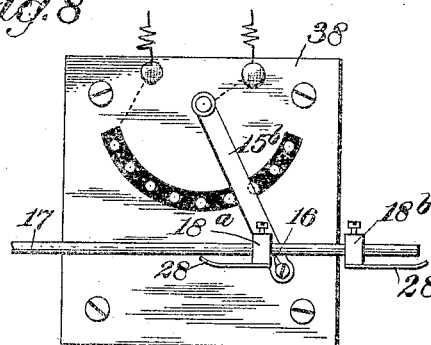


Fig. 8



WITNESSES:

Geo. B. Rowley.

Peter A. Ross.

INVENTOR

John A. Weser.

BY

Harry Bennett
ATTORNEY

UNITED STATES PATENT OFFICE.

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

AUTOMATIC MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 648,717, dated May 1, 1900.

Application filed November 2, 1899. Serial No. 735,584. (No model.)

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, city, county, and State of New York, have invented certain new and useful Improvements in Automatic Musical Instruments, of which the following is a specification.

This invention relates to all classes of self-playing or automatic musical instruments; and the object is to effect automatically a certain expression by the production of crescendo and diminuendo effects, the forte and pianissimo effects being more or less sustained, as desired. These effects are produced by gradually increasing or decreasing the force which produces the sounds and not by means of pedals and dampers or mufflers. My invention may, however, be employed, if desired, in connection with the usual pedals, and it may be operated, for example, in a self-playing piano by varying the force or sharpness of the blow of the hammer on the string, increasing or decreasing such force gradually and if applied to an automatic organ the same or a very similar effect may be produced by gradually and automatically changing the valve which controls the pressure of air on the reeds or in the wind-chest. If applied to a self-playing piano where the stroke of the hammer is effected electrically, then the current may be controlled by an automatically-operating rheostat so as to produce the desired expression. In the present case the invention is set forth as applied to an automatic or self-playing piano, the strokes of the hammers on the strings being effected mechanically and controlled by a moving perforated music-strip. The mechanisms are driven by an electric motor, and the expression sought is attained by varying the speed of the friction-drum—driven from the motor—which actuates the hammers.

In the drawings which illustrate this embodiment of the invention, Figure 1 is a front elevation of the mechanism mounted in the piano-case, and Fig. 2 is a side elevation of the same. Figs. 3, 4, and 5 are enlarged fragmentary detail views of the mechanism. These will be hereinafter fully described. Fig. 6 illustrates a slightly-modified construction, which will be hereinafter described. Fig.

7 illustrates the application of the invention to an organ or a pneumatically-operated piano, and Fig. 8 illustrates the application of the invention to means for varying the power of an electric current which operates an automatic musical instrument.

The general construction of the motor, the driving mechanism for the music-strip, and the hammer-operating mechanism is similar to that of the corresponding mechanisms illustrated in my pending application, Serial No. 678,832, filed April 26, 1898, and a brief description will serve for the parts shown in said pending application.

Referring primarily to Figs. 1 and 2, 1 represents the case of the instrument, and 2 an electric motor, which drives a rotatively-mounted friction-drum 3. It need only be stated here that through suitable mechanism whenever an aperture in the music-strip comes into register with one of a set of key-levers the corresponding key-lever permits a shoe 5, Fig. 2, connected therewith and coupled to a key-operating tracker-pin 6, to bear on the rotating drum 3, which then carries the shoe back, and in the manner of a toggle this shoe acts through its pin on one of the keys of the piano to sound a note of the music. So far as above described the mechanism is the same in substance as that illustrated in my said pending application.

On the journal 3^a of the drum 3 is rotatively mounted a pulley 7, carrying the driving-belt 4 of the music-strip, and connected with this pulley 7 is a cone-pulley 7^a, which is driven by a belt 8 from a cone-pulley 9 on the shaft or arbor of the motor 2. By shifting the belt 8 along the cone-pulleys 7^a and 9 the speed of the music-strip may be varied. The belt 8 is shifted through the medium of a shifter 10, its spring 10^a, and a cord or wire 11, extending up and out to an operating-handle 11^a, Fig. 2, near the keyboard or front of the instrument. Other means, however, may be employed for varying the speed of the music-strip. That herein shown is substantially like the corresponding mechanism illustrated in my pending application before referred to herein.

The drum 3 is driven through the medium of a cone-pulley 12, fixed on its journal 3^a, a cone-pulley 13, fixed on the shaft of the mo-

for 2, and a belt 14. This belt is shifted by a shifter 15. This driving mechanism for the drum so far as described is in substance the same as that shown in my before-mentioned pending application.

In order to get expression, as before explained in the operation of the hammers on the strings of the piano, means are provided for gradually and automatically increasing and decreasing the rotary velocity of the drum 3, and this mechanism will now be described.

On the belt-shifter 15 is secured an upright spur 16 of any suitable form, and mounted on a slide-rod 17, suitably supported, are two blocks 18^a and 18^b. (Seen in Fig. 1 and on a much larger scale in the detail view Fig. 3.) These blocks are adapted by the sliding of the rod 17 endwise in its supports to engage the spur 16 and through it to operate the shifter 15 and shift the belt 14. Preferably the blocks 18^a and 18^b will be secured adjustably on the rod 17 by set-screws or other means. Obviously when the slide-rod is moved in one direction (to the right in Figs. 1 and 3) the block 18^b will act to shift the belt 14 so as to gradually reduce the speed of the drum 3, and thus gradually reduce and soften the tones or produce diminuendo effects, and if said rod be moved in the opposite direction the block 18^a will act to shift the belt so as to gradually increase the speed of the drum 3, and thus gradually increase the tone, thus producing a crescendo effect. The space between the blocks 18^a and 18^b governs the dwell or maintenance of the tone at the forte and pianissimo points—that is to say, after the block 18^b, for example, shall have reached the end of its movement and shifted the belt 14 as far toward the larger end of the pulley 13 as the extent of movement of the rod 17 will permit and the said rod starts to return the belt will remain at the point placed on the pulley 13 until the block 18^a shall reach the spur 16, thus sustaining the forte effect through a period governed by the distance at which the blocks 18^a and 18^b may be set apart. This adjustment of the said blocks at different points and distances apart on the rod 17 also enables the range of speed of the drum 3 to be varied by varying the extent of shift of the belt along the pulleys, a greater range of crescendo and decrescendo effects being attainable when the blocks are set near together than when they are set farther apart.

In order to operate the slide-rod 17 endwise to and fro automatically, any suitable device may be employed. That shown in the principal view consists of a right-hand screw and a left-hand screw cut on the prolonged journal 3^b of the friction-drum 3, producing a known spiral driving device 19 (seen best in the enlarged detail view, Fig. 4) and an axially rotative or rocking fork 20, engaging the grooves of the device 19. A sleeve 21 embraces slidably the device 19, and the stem 20^a of the fork 20 rocks in a bearing in said

sleeve and in a clamp device 21^a, (seen from the under side in the sectional detached view, Fig. 5,) this clamp having a movable jaw which is set up to the stem 20^a by a screw 21^b. The purpose of this clamp device is to put some friction on the stem of the fork 20, so that the latter may not turn too easily. To the sleeve 21 is secured a stem 22, and on this stem is screwed a block 17^a, forming an attaching end piece for the rod 17. Obviously when the drum 3 rotates it will drive the fork 20 to and fro along the journal 3^b, causing the blocks 18^a and 18^b to shift the belt 14, and thus vary the speed of the drum 3, and it will also be noted that as the speed of the drum decreases the belt 14 will be shifted more and more slowly, so that the diminuendo effects will be more prolonged than the crescendo effects.

To support the stem or arm 22, it is provided with a circumferentially-grooved block 23, which rests on a fixed guide-rod 24 in the case 1 and parallel with the drum 3. In case it is not desired to employ this attachment on the instrument for the time being the rod 17 may be raised by means of a lifting-rod 25, attached to it at the lower end and coupled to a bell-crank 26 above, Fig. 2, the other arm of said crank having attached to it an operating-pull 27, extending out to the front of the instrument. When the rod 17 is raised until the blocks 18^a and 18^b are free from the spur 16, its to-and-fro movements do not effect the belt 14. When the rod 17 is lowered, it is essential that the spur 16 should not engage the outer faces of the blocks 18^a and 18^b, and to prevent this these blocks are provided each with a guard 28, Fig. 3, to rest on the spur and permit it to take only between the blocks.

It may be proper here to state that the object of the device above described is merely to impart a variation or wavy character in the tone of the instrument during the playing, and not fortissimo and pianissimo effects to particular parts of the music, as would be produced by a pianist through the medium of loud and soft pedals. When the instrument is to be played without this variation of strength, the operator may raise the rod 17 either at the pianissimo or fortissimo points, and the instrument will continue to play with that strength. When he lowers the rod 17, it will either engage directly according to its position or the guard 28 will rest on the spur 16 until it moves into engagement again. The rod should be lifted when it is at one or the other of its terminal positions.

Fig. 6 is a view illustrating another device for imparting a reciprocating endwise movement to the rod 17. In this construction the journal 3^b of the drum 3 has on it a friction driving-roller 29, which drives a crank-disk 30 by peripheral contact with the face of the latter. The disk 30 is rotatively mounted and held up to the roller 29 by a spring 31, carrying a pressure-roller which bears on the

outer face of the disk above or over the roller 29. The rod 17 is coupled to a crank-pin 32, carried by the disk, so that rotation of the disk moves the rod 17 to and fro endwise.

5 As herein shown, the crank-pin is in one arm of a lever 33, fulcrumed on the disk and provided with means for adjusting it, so as to vary the throw of the crank. The disk 30 is capable of a little movement, so as to free it
10 from contact with the driving-roller 29, and to render the device inoperative for the time being the rod 25 (seen in Fig. 2) or its equivalent is connected with a rocking rod 34, which takes under the disk 30 and holds it
15 out of contact with the roller 29. This rod 34 effects the same end as the lifting of the rod 17 of the principal construction.

Where the musical instrument is operated pneumatically, the device shown in Fig. 7
20 may be employed. In this view, 35 is a wind-chest having a port 36, controlled by a valve 37, and this valve is operated through a lever 15^a, corresponding to the belt-shifter 15 of the principal views. On this lever 15^a is the
25 spur 16. The operation will be obvious. The valve 37 controls the port 35, opening to the atmosphere, and this varies the vacuum (or pressure, as the case may be) in the wind-chest, thereby modifying the pressure of the
30 air-current acting on the reed, so as to cause the latter to produce softer or louder tones.

The electric device which operates the mechanism that effects the musical sounds may also be controlled by a rheostat, as illustrated
35 in Fig. 8, wherein 38 is the rheostat or device for putting more or less resistance into the circuit. The rheostat-lever 15^b corresponds in function to the belt-shifter 15 of the principal views and carries the spur 16. The operation of this device will also be readily understood. The increasing or decreasing of
40 the power of the current will produce the same effect as the shifting of the driving-belt over cone-pulleys. This rheostat device may be employed in any automatic musical instrument where electricity is employed, whether
45 operated through a motor, electromagnets, or otherwise.

Having thus described my invention, I
50 claim—

1. In an automatic musical instrument, the combination with means for selecting the notes to be sounded, and means for producing the sounds, of mechanism, independent
55 of the means for selecting the notes, for automatically and gradually varying the force applied by said sound-producing means, whereby crescendo and diminuendo effects are produced.

60 2. In an automatic musical instrument, the combination with means for selecting the notes to be sounded, and means for producing the sounds, of automatically-operating mechanism, for alternately increasing and
65 decreasing the force applied by said sound-producing means, for the purpose set forth.

3. In an automatic musical instrument, the

combination with means for producing the sounds, of means for automatically increasing and decreasing alternately and in a regular order throughout the playing, the force
70 applied by said sound-producing means, for the purpose specified.

4. In an automatic musical instrument, the combination with a hammer-operating mechanism for producing the sounds, of means for increasing and decreasing alternately and automatically, the force of the said hammer-operating mechanism, whereby the force of the
75 blows of the hammers is varied.

5. In an automatic musical instrument, the combination with a rotating, hammer-operating mechanism, of automatically-operating means for alternately increasing and decreasing the speed of said mechanism, for the purpose set forth.
80

6. In an automatic musical instrument, the combination with a motor, of a rotary, hammer-operating mechanism for producing the sounds, and means for automatically and gradually varying the rotative speed of said
85 hammer-operating mechanism, whereby crescendo and diminuendo effects are produced.

7. In an automatic musical instrument, the combination with a motor, a drum 3, cone-pulleys on the arbor and journal, respectively, of said motor and drum, a driving-belt connecting said pulleys, and a shifter for shifting said belt to vary the speed of said
90 drum, of automatic means for gradually shifting said belt to and fro on the pulleys, substantially as set forth.

8. In an automatic musical instrument, the combination with a motor, a drum 3, cone-pulleys on the arbor and journal, respectively, of said motor and drum, a driving-belt connecting said pulleys, and a shifter for shifting said belt to vary the speed of said
95 drum, of automatic means, operated by said drum for gradually shifting said belt to and fro on said pulleys, for the purpose set forth.

9. In an automatic musical instrument, the combination with a motor, a drum 3, cone-pulleys on the arbor and journal, respectively, of said motor and drum, a driving-belt connecting said pulleys, and a shifter for shifting said belt to vary the speed of said drum;
100 of automatic means for operating said shifter, comprising a rod 17, adapted to operate said shifter, and mechanism between said drum and said rod for converting the rotary motion of the drum to reciprocating, endwise motion of the rod, for the purpose set forth.

10. In an automatic musical instrument, the combination with a motor, a drum 3, cone-pulleys on the arbor and journal, respectively, of said motor and drum, a driving-belt connecting said pulleys, and a shifter for shifting said belt to vary the speed of said drum,
105 of automatic means for operating said shifter, comprising a rod 17, engaging said shifter for operating it, converting mechanism between the drum and said rod for imparting a reciprocating motion to the latter, and means
110

for manually disengaging said rod from the shifter, substantially as set forth.

11. In an automatic musical instrument, the combination with a motor, a drum 3, cone-pulleys on the arbor and journal, respectively, of said motor and drum, a driving-belt connecting said pulleys, and a shifter for shifting said belt to vary the speed of said drum, of the rod 17, engaging said shifter at one end for operating it, the device 19, on the journal of the said drum, the fork 20, engaging said device, and the sleeve carrying said fork, said sleeve being connected with the rod 17, substantially as set forth.

12. In an automatic musical instrument, the combination with the belt-shifter 15, having the spur 16, of the rod 17, the blocks 18^a and 18^b, on said rod and provided with shields 28, and means for raising said rod, manually, to disengage said blocks from said spur, substantially as set forth.

13. In an automatic musical instrument, the combination with the slide-rod 17, of

means for imparting a reciprocating endwise movement to same, comprising the rotating spiral driving device 19, the fork 20, carried by the slide-bar, and the clamping device on the stem of said fork to prevent too free axial movement of same, substantially as set forth.

14. In an automatic musical instrument, the combination with cone-pulleys, a belt thereon and a belt-shifter, of a reciprocating slide-rod for operating said belt-shifter, and two blocks adjustably mounted on said rod at opposite sides of said shifter and adapted to actuate same, whereby a uniform extent of movement of the slide-rod may be made to impart more or less movement to the belt-shifter, as desired.

In witness whereof I have hereunto signed my name, this 11th day of October, 1899, in the presence of two subscribing witnesses.

JOHN A. WESER.

Witnesses:

SAMUEL G. DERRICKSON,
MAX LEVIAN.