

UNITED STATES PATENT OFFICE.

RICHARD GABRIELSKY, OF JERSEY CITY, NEW JERSEY.

MECHANICAL STRINGED MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 708,337, dated September 2, 1902.

Application filed September 4, 1901. Serial No. 74,332. (No model.)

To all whom it may concern:

Be it known that I, RICHARD GABRIELSKY, a citizen of the United States, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Mechanical Stringed Musical Instruments; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to mechanical stringed musical instruments, and more particularly to devices therein for making the music harmonic, the invention being an improvement on my invention of mechanical musical instruments forming the subject of my application for patent, Serial No. 54,309.

The object of my invention is to provide for automatically producing a piano or forte effect or tone and making the music harmonic through the medium of devices which are actuated by the tune-sheet, star-wheels, and a damping device adapted to bear upon the strings of the instrument, as will be hereinafter specifically described.

The parts and combinations of parts constituting my invention will be defined in the claims.

I will now describe the details of construction of my improved devices by reference to the accompanying drawings, in which—

Figure 1 represents a top plan view of a portion of a stringed musical instrument and my mechanical devices for playing the same. Fig. 2 represents a side elevation showing part of the star-wheels and part of my devices for damping the strings. Fig. 3 represents a detail view, on enlarged scale, showing a hammer, star-wheel, the damping device, and actuating devices therefor connecting with the star-wheels. Fig. 4 represents a diagrammatic view showing detached views of the devices for damping the strings and part of the actuating mechanism therefor.

I have shown my improved mechanical devices applied to a zither; but they may be applied to other stringed musical instruments.

The strings 2, part of which only are here shown, are stretched over the sounding-board 1 and attached to the tuning-pins in the usual manner. The frame 3, carrying the star-

wheels, tune-sheet, and operating mechanism, is clamped to the sounding-board 1 in a well-known manner, and the hammer-frame 4 is connected to said frame 3 and is supported by a post (not here shown) on the sounding-board. The star-wheels 5, of which there is one for each hammer, are placed loosely on a shaft 6, which is supported in the posts 7, arranged one between each pair of adjacent star-wheels and serving to space them apart. These posts are provided at the rear with transverse slots, as shown in Fig. 3, for inserting the rod or shaft 6, which carries the star-wheels. At certain intervals on the shaft 6 are placed the rollers 9, which are of slightly-greater diameter than the star-wheels, for supporting the tune-disk 13. Other rollers 10 on a swinging shaft bear upon the upper surface of the tune-disk 13 for causing the teeth on the under side thereof to engage with the star-wheels. The tune-disk 13 is supported centrally upon a post 13^a, so that the teeth or note projections will engage with the points of the star-wheels, as indicated in Figs. 2 and 3. In practice suitable pressure-springs (not here shown) will be arranged to bear upon the faces of the star-wheels for retarding and holding them steady.

Just in front of the posts 7 are secured a series of posts 16, supporting a rod (not here shown) to which are pivotally connected the elbow-levers 17, which are properly spaced apart and are so arranged that the outer end of each lever will be engaged by the teeth of a corresponding star-wheel, as indicated in Fig. 1. The upper ends of the elbow-levers 17 are perforated for attaching the connecting-wires 26, which at their outer ends are attached to the lugs 21 of the hammers 19, which are pivotally connected to the posts 20, arranged along the front inclined bar 4^b of the frame 4, as shown in Figs. 1 and 3. The hammers are made with comparatively wide lower ends which strike the strings and are each provided with a rear extension-lug 22, to which is applied a spiral spring 23, which bears at its lower end upon the bar 4^b, as shown in Fig. 3. The stems of the hammers are preferably made thin and flexible or springy, so that they will readily rebound after striking the strings 2. Soft flexible damping devices 25, such as strings of fibrous ma-

terial, are secured to the lower ends of the hammers and pass around under the strings 2 for damping the same.

The mechanism so far described is fully described and illustrated in my previous application, above mentioned, and is not herein claimed.

I will now describe my automatic piano and forte attachment for making the music harmonic. In this attachment I provide a damping device, which consists of a rod 14, having an eccentric portion 14^a of felt along its entire length below, which rod lies across all the strings and is supported at its opposite ends in posts, so that its eccentric portion may be turned to bear upon the strings and damp the same. This rod is automatically actuated by mechanism which I will now describe. Two extra star-wheels 11 and 11^a are mounted on the inner end of shaft 6 outside of the roller 9 for engaging with and actuating the crank-levers 12 and 12^a, as shown in Figs. 1 and 3. The special teeth will be punched in or applied to the tune-disk 13 for these additional star-wheels 11 and 11^a to make the music harmonic. The crank-levers 12 and 12^a are arranged to rock or partially rotate in bearings 8 in a bracket 17, which is secured to one of the posts 16. The shape of the crank-levers will be understood by reference to both Figs. 1 and 3. The horizontal portions of the same rest in long bearings and are partially rotated or rocked therein, so as to turn their lower ends into inclined positions, as indicated in Fig. 4. The upper inner ends of these levers are placed in position to be engaged by the teeth of the two star-wheels 11 and 11^a, as shown in Figs. 1 and 3. The damping-rod 14 is supported in sockets or journals in the posts 15. These posts are partly bored through at their inner faces to receive the ends of the rod 14, and each post is provided with a foot through which is passed screws for fastening the same to the frame of the zither. A hole is drilled through the front end of rod 14, in which is inserted a transverse pin 18, projecting equally at opposite sides of the rod. This pin is provided at equal distance from the center with holes for attaching the wires 8^a and 9^a, which connect at their opposite ends, respectively, with the lower ends of the crank-levers 12 and 12^a, as shown in Figs. 1, 3, and 4. When the crank-lever 12 is actuated by the star-wheel 11, it operates through the wire 8^a to turn the damping-rod 14 and raises its eccentric 14^a up from the strings 2, as shown in Fig. 4, at which time the instrument will play forte. When the crank-lever 12^a is actuated by the star-wheel 11^a, it operates through the wire 9^a to turn the damping-rod 14 in the opposite direction, so that its eccentric will bear upon

the strings 2 and so damp the sound, causing the instrument to play piano.

It will be understood that a star-wheel when engaged by a tooth of the tune sheet or disk will be partly rotated, thereby pressing down the adjacent end of an elbow-lever and raising a hammer. Now when the elbow-lever is released the spring 23 will act to throw the hammer down onto the string to sound the same.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a mechanical musical instrument, a damping-rod having an eccentric adapted to be applied to the strings, in combination with star-wheels and intermediate actuating mechanism for turning the rod and automatically making the instrument play piano or forte, substantially as described.

2. In a mechanical musical instrument, the combination with the strings, of a damping-rod, supported adjacent thereto and having an eccentric, and mechanism for automatically turning the rod and thereby causing its eccentric to bear upon and to be removed from the strings, for producing a piano or forte effect, substantially as described.

3. In a mechanical musical instrument, the combination with the strings, of a damping-rod having an eccentric, and supported transversely adjacent to the strings, star-wheels and intermediate actuating mechanism for turning said rod to cause its eccentric to bear upon or be removed from the strings, for producing a piano or forte effect, substantially as described.

4. In a mechanical musical instrument, the combination with the strings, of a damping-rod having an eccentric supported transversely thereto, star-wheels, crank-levers adapted to be engaged by the star-wheels, and connections from said crank-levers to said damping-rod, for turning it, for automatically making the instrument play piano or forte, substantially as described.

5. In a mechanical musical instrument having strings, a rod having a damping cam or eccentric and mounted transversely adjacent to the strings, in suitable bearings, in combination with crank-levers, connections therefrom to said rod for turning its eccentric toward or from the strings and means for actuating said levers, for automatically making the instrument play piano or forte, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

RICHARD GABRIELSKY.

Witnesses:

MILTON HANNA,
HERMAN HORLBECK.