

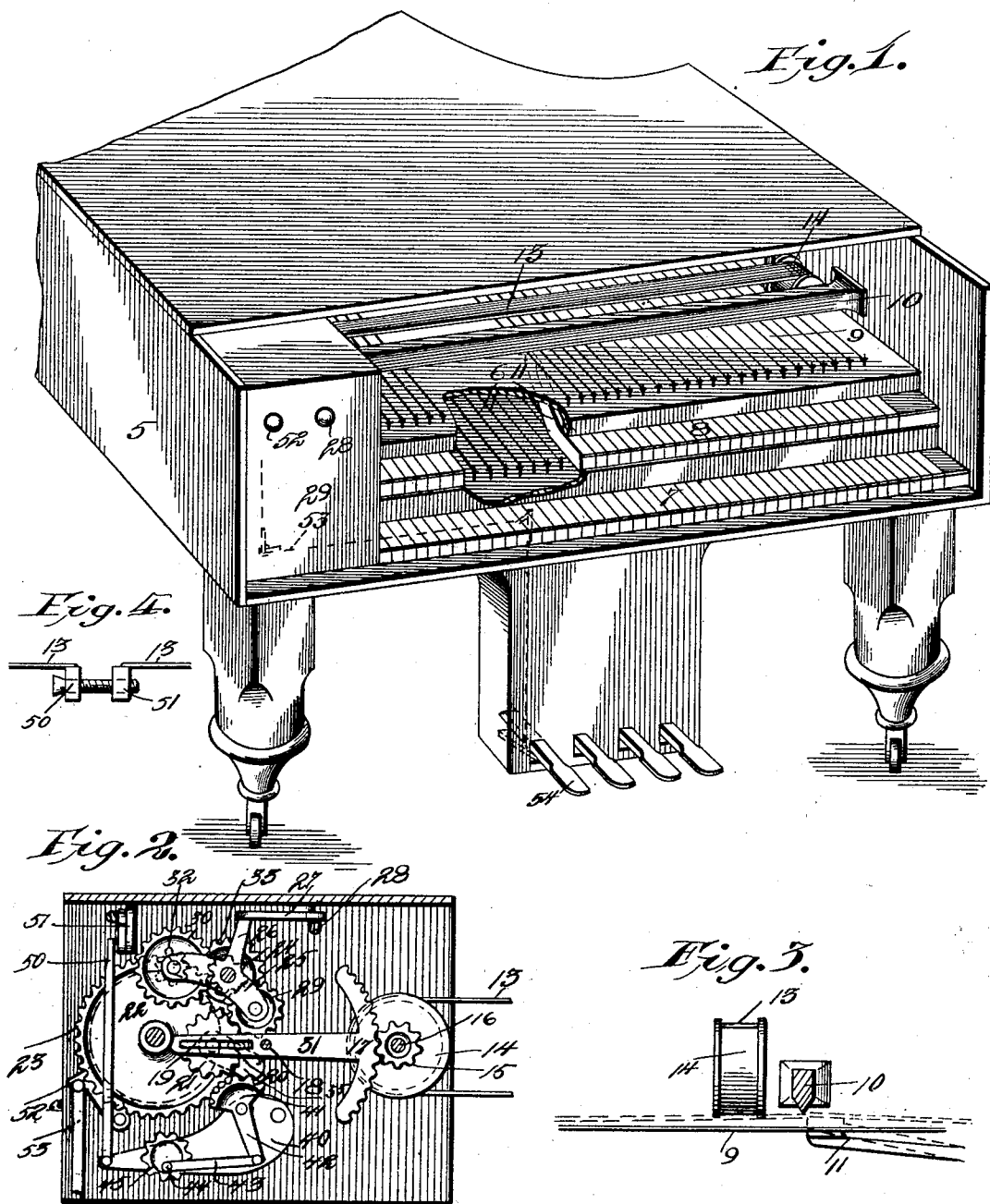
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Patented Feb. 27, 1900.

C. G. FERRATA.
PIANO ATTACHMENT.

(Application filed July 8, 1899.)

(No Model.)



Witnesses
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UNITED STATES PATENT OFFICE.

CHEVALIER GIUSEPPE FERRATA, OF GREENVILLE, SOUTH CAROLINA.

PIANO ATTACHMENT.

SPECIFICATION forming part of Letters Patent No. 644,244, dated February 27, 1900.

Application filed July 8, 1899. Serial No. 723,166. (No model.)

To all whom it may concern:

Be it known that I, CHEVALIER GIUSEPPE FERRATA, a citizen of the United States, residing at Greenville, in the county of Greenville and State of South Carolina, have invented a new and useful Piano Attachment, of which the following is a specification.

This invention relates to pianos in general, and more particularly to an attachment therefor which may be connected permanently with the piano or be removable therefrom, the object of the invention being to provide in connection with the usual arrangement of strings and keys therefor of a separate bank of keys and a separate set of strings, these strings being adapted to be raised into contact with a common ridge and then to be vibrated through the medium of a reciprocatory bow after the method of operating a violin.

In the drawings forming a portion of this specification and in which like numerals of reference designate corresponding parts in the several views, Figure 1 is a perspective view of a portion of a piano, showing the location and arrangement of the attachment with respect thereto. Fig. 2 is a detail elevation of the mechanism for operating the bow at various speeds to secure different effects. Fig. 3 is a diagrammatic representation of a portion of the bridge and portions of a string and key or lever adapted to press and hold the string against the bridge, the view also showing the location and arrangement of the bow and its supporting-rollers with respect to the strings and bridge. Fig. 4 is a detail showing the means for maintaining tension of the bow.

Referring now to the drawings, 5 represents a piano-casing, within which is stretched a plurality of strings 6, adapted to be vibrated by means of hammers connected with keys 7 in the usual manner. Above these keys and strings is arranged a second series of keys 8, which are adapted to engage their respective strings 9 and raise them into engagement with the edge of a bridge 10, secured at its ends to the sides of the casing 5 and extending transversely of the strings 9, the extensions 11 of the keys 8 engaging the strings at a point in front of the bridge 10, so as not to

retard the vibration of said strings. The bridge 10 is located adjacent the front ends of the strings, so as to have a maximum length of string for the production of the desired tone.

In order to vibrate those strings which are in engagement with the bridge, a bow 13 is employed, which consists of an endless band mounted for reciprocatory motion upon rollers 14, suitably supported upon the casing 5, the lower portion of said bow being adapted to engage the strings when they are raised to the bridge.

In order to most nearly simulate a violin, it is desired to give the bow 13 a reciprocatory motion; also to vary the speed of movement of the bow and to vary the length of its path of movement.

Upon the shaft 16 of one of the rollers 14 is mounted a pinion 15, which is engaged by a segmental gear 17, pivoted at 18 to a suitable support through the medium of an extension 31, provided beyond said pivot with a longitudinal slot 19. In this slot 19 there plays a wrist-pin 20, carried eccentrically of a pinion 21, carried by an arm 55, mounted upon the casing containing the mechanism. A spring-operated drum 22 is mounted adjacent the pinion 21 and carries a gear 23 in constant engagement with a pinion 24, upon the shaft of which is pivotally mounted a rocker 25, which latter has an extension 26, connected with a bell-crank lever 27, having an operating rod or stop 28 extending through the front portion of a box 29, inclosing this mechanism and through the medium of which the rockers may be oscillated. Mounted upon the rocker 25 are pinions 29 and 30, of which the former is smaller than the latter and which pinions are adapted for successive engagement or alternate engagement with the pinion 21. The pinion 29 is in direct engagement with the pinion 24, while mounted upon the shaft of the pinion 30 is a second and smaller pinion 32 (shown in dotted lines) in constant engagement with a larger pinion 33 upon the shaft of the pinion 24. Thus if the rocker 25 be moved to engage the pinion 29 with the pinion 21 the lever 31, forming an extension of the segmental gear 17, will

be oscillated at a predetermined speed and will correspondingly oscillate the pinion 15 and roll 14 to reciprocate the bow.

If the rocker 25 be operated to throw the pinion 29 from the pinion 21 and to engage the pinion 30 with the pinion 21, the speed of the pinion 24 will be multiplied through the intervening pinions and the pinion 21 will be rotated with a much higher speed and a greater speed of reciprocation of the bow will result.

If the pinions 29 and 30 be moved to that position where neither will mesh with the pinion 21, then the bow will lie at rest. To then operate the bow with short quick strokes there is suitably pivoted a carrier 40, upon which is mounted a segmental gear 41, having a lever extension 42, connected, by means of a pitman 43, with the wrist-pin 44 of a pinion 45, the positions of the pinion and segmental gear being such that the carrier may be moved to simultaneously engage the pinion with the gear 23 and the gear 41 with the pinion 21. The rotation of the pinion 45 will then act to reciprocate or oscillate the gear 41, from which the pinions 21, gear 17, and pinion 15 will be oscillated to reciprocate the bow 13 in an extremely-short path. By the introduction of suitable sleeve-gearing the speed of reciprocation of the bow may be made as desired.

In order to maintain tension of the bow, the ends thereof are attached to blocks 50 and 51, one of which has smooth perforations therein, while the other has threaded perforations, clamping-screws being passed through the former and into engagement with the latter. Thus by turning up the screws the blocks may be drawn together and the tension of the bow increased.

It will of course be understood that other mechanism may be employed for giving the bow the various movements and that other means than the rod 50, the bell-crank lever 51, and push-rod 52 may be employed for operating the carrier 40; also that the specific arrangement and construction of the apparatus may be varied without departing from the spirit of the invention.

In connection with the drum 22, carrying the spring, there is employed a brake 52^a, having connections 53 with a pedal 54, supported in the usual manner from the under side of the piano and through the medium of which the speed of the drum, and hence the speed of reciprocation of the bow, may be regulated.

It will of course be understood that a sounding-board may be suitably arranged with respect to the supplemental strings and that, if

desired, such a board may be arranged above and below them by the maker of the instrument, as he may desire.

Having thus described the invention, what is claimed is—

1. In a musical instrument, the combination with a plurality of vibratory bodies, of a bow adapted for reciprocation with respect thereto and in engagement therewith, means for reciprocating the bow at a predetermined speed, means for reciprocating the bow at a different speed, and means for varying the length of the path of reciprocation of the bow.

2. In a musical instrument, the combination with a vibratory body, of means for vibrating the body, means for raising the body into engagement with the vibrating means, means for varying the speed of effective operation of the vibrating means, and means for varying the length of the path of motion of the vibrating means.

3. In a piano, the combination with the strings, of a bridge, means for raising the strings into engagement with the bridge, a bow adapted to engage the strings when raised, means for reciprocating the bow at a predetermined speed, means for reciprocating the bow at a second predetermined speed, and means for varying the length of the path of reciprocation of the bow.

4. In a musical instrument, the combination with a vibratory body, of a bridge, means for engaging the body with the bridge, a reciprocatory bow adapted to engage the body when in engagement with the bridge, means for reciprocating the bow at different speeds, and means for varying the length of the path of reciprocation of the bow.

5. In a piano, the combination with the strings, of a bridge adapted for engagement by the strings, means for establishing engagement between the bridge and strings, a reciprocatory bow adapted to engage the strings when in engagement with the bridge, means for operating the bow at a predetermined speed, means for operating the bow at a second predetermined speed, means for varying the speed of operation of the bow when in operative relation to either of the first-named means, and means for varying the length of the path of operation of the bow.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

CHEVALIER GIUSEPPE FERRATA.

Witnesses:

A. M. HILL,
J. V. CROSKEYS.