

UNITED STATES PATENT OFFICE.

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MUSICAL BELL.

991,704.

Specification of Letters Patent.

Patented May 9, 1911.

Original application filed April 11, 1908, Serial No. 426,593. Divided and this application filed March 14, 1910. Serial No. 549,224.

To all whom it may concern:

Be it known that I, JOHN C. DEAGAN, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Musical Bells, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to musical instruments, the present application being a division of my original application Serial No. 426,593, filed April 11, 1908.

My present invention relates to the provision of mechanism for modifying the sound emitted by a sound producing element.

The novel features disclosed in the present application will be described in connection with the accompanying drawing showing one way of practicing the invention, and in which—

Figure 1 is a sectional view on line 1 1 of Fig. 2 and Fig. 2 is a sectional view on line 2 2 of Fig. 1.

Like parts are indicated by similar characters of reference throughout the different figures.

In the embodiment of the invention shown, a plurality of tubular resonating elements *a* is employed, though the invention is not to be thus restricted. The tubular elements *a*, when struck, will be set into vibration so as to emit musical sounds. Each of these tubular resonating elements is provided with trunnion pins *b b* supported by the trunnion supports *b'*. A pair of pillows *c* is provided for each resonating element *a*, these pillows possessing suitable blocks of cushion material against which the corresponding tube is adapted to rest, the trunnion supports *b'* defining an axis of movement for each tube being interposed between the pillows *c c*, whereby the bodily swing of each resonating tube about its axis is limited without impairing the vibratory qualities of the tube. The pillows *c c* serve, as has been suggested, to hold the tube engaged thereby substantially stationary, though permitting sufficient movement of said tube when struck as to allow the tube to vibrate. I have illustrated several tubes in the embodiment of the invention shown and have employed mechanism for simultaneously striking the tubes, so that

the tubes, which are of differing lengths, may jointly produce a sound similar to that of a large cathedral bell. Where a plurality of resonating tubes is employed, I desirably provide a hammer *e* for each tube, each of these hammers being carried by an arm *e'* journaled at its rear end upon a pivot rod *e²*, the pivoted ends of the arms *e'* being received in slots provided in a block *e³*, through which slots the pivotal rod *e²* also passes, the slots permitting the pivoted ends of the arms *e²* to play therein. A striking lever *f*, suitably curved and mounted, is adapted for simultaneous engagement with all of the arms *e'*, whereby the resonating tubes may be simultaneously struck. A horizontal portion of this striking lever lies underneath the arms *e'*, so that when the lever *f* is operated, said arms are raised to force the hammers against the resonating tubes. The lever *f* may project outwardly and be provided with an enlargement *f'* that may be struck by the hand in order to effect the operation of the striking lever and which is also provided with an ear *f²*, to which a cord may be attached if it should be desired to place the instrument out of reach, a pull upon the cord enabling the operation of the striking lever. I preferably rely upon momentum to complete the final movement of the hammers, to which end the arms *e'* carrying the hammers are desirably formed in sections, the section *g* immediately supporting each hammer being pivoted at its rear end to its companion section of the arm *e'*. A suitable stop *h* is provided, against which a projection carried by the arm *e'*, such as a screw *h'*, may strike when the striking lever *f* is actuated, the portions *h h'* being so related that the hammers cannot reach the resonating elements *a* upon a very slow movement of the operating lever *f*. When, however, a quick movement is given to the operating lever, the momentum acquired by the hammers will be sufficient to cause movement of said hammers and the arm sections *g* supporting the same with respect to the arms *e'*, so that the vibrating elements *a* will be impinged upon by the hammers with a force that is nicely adapted to sounding the vibrating elements, the hammers falling back from the vibrating elements as soon as they have struck the vibrating elements, so that said hammers do not damp the sound they occasion

in the vibrating elements *a*. To further insure the short duration of the contact of the hammers with the vibrating elements *a*, I provide springs *g'* which tend to maintain the sections *e'* of the arms in line, but which yield to the momentum acquired by the hammers *e* and which coöperate with gravity in restoring the hammers after they have struck the sound-producing elements. If it should be desired to damp the sound produced by the resonating elements, I may attach a sound-damping element *i* to the operating lever *f*, the operating lever serving to apply the damper *i* to the resonating elements when said lever is released. I provide a tremolo element *k* which, when set into motion, is adapted to vibrate of itself after it is set into operation to re-act against the sound waves emitted by the instrument, in a manner to effect a tremolo sound. This tremolo element *k* may be set into motion in any suitable or preferred way and may be associated with any selected portion of the instrument where said element will have effect. The embodiment of the invention herein shown includes structural characteristics embraced within the scope of my Patent No. 818,874, dated April 24, 1906, which structural characteristics include two longitudinal slots *l* in each tube and an opening *m* in each tube facing the plane in which the said slots lie, the said openings being at that portion of the tube where the slots terminate. I desirably locate the plate *k* before these openings *m*, as I am thereby able to secure the best results, though I do not wish to be limited to this location of said plate. The plate *k* is desirably automatically operated when the tubes *a* are struck by the hammers *e*, to which end one of the arms *e'* may carry a rod *n* having its upper end projecting into the range of the plate *k*, so that when the arms *e'* are elevated in response to the movement of the actuating lever, the striking rod *n* is also lifted to engage the plate *k* to set this plate into motion for the purpose stated. I desirably cause the striking rod *n* to have direct engagement with the plate *k* by attaching said striking rod to the section *g* of one of the arms *e'*, as indicated by the dotted lines showing the concealed continuation of the lower end of rod *n* where it joins part *g*, Fig. 2 being an irregular section. Gravity and the spring *g'* coöperate to remove said rod from engagement with the plate *k* after said plate has been struck by said rod.

Inasmuch as the sound issues in large volume through the openings *m*, I associate

with these openings suitable mechanism for regulating the volume of sound issuing therethrough. In short, I provide a valve in association with each tube, which valve may be adjusted in position to regulate the amount of issuing sound. The valve is desirably in the form of a curved plate *o* having a curvature that conforms somewhat to the curvature of the tube, but when not under stress, of lesser diameter than such tube, all as set forth in my original application.

As shown, the mechanism is mounted upon and within a box *p*, and, if desired, this box may be set in an inclined position, for which purpose the bottom of the box may be provided with an easel leg *q*.

It is obvious that changes may readily be made in the device of my invention herein shown and particularly described without departing from the spirit of the invention, but, having thus described my invention, I claim as new and desire to secure by Letters Patent the following:—

1. A slotted tubular sound-producing element, and a tremolo element which is of itself adapted to continue in vibration after being set into vibration and provided for modifying the sound emitted by the sound-producing element, said tubular element having an opening in its tubular wall through which the sound may be emitted, said opening being located in the unslotted portion of the sound producing element, the tremolo element being located before said opening.
2. A tubular sound producing element, and a tremolo element which is of itself adapted to continue in vibration after being set into vibration and provided for modifying the sound emitted by the sound producing element, said tubular element having an opening in its tubular wall through which the sound may be emitted, the tremolo element being located before said opening.
3. A slotted tubular sound producing element, and a tremolo element for modifying the sound emitted by the sound producing element, said tubular element having an opening in its tubular wall through which the sound may be emitted, said opening being located in the unslotted portion of the sound producing element, the tremolo element being located before said opening.

In witness whereof, I hereunto subscribe my name this eighth day of March, A. D. 1910.

JOHN C. DEAGAN.

Witnesses:

G. L. CRAGG,

R. E. ATHERTON.