J. C. DEAGAN.

MUSICAL BELL.

APPLICATION FILED APR. 11, 1908.

1,052,713.

Patented Feb. 11, 1913.

2 SHEETS—SHEET 1.

Fig. 1.

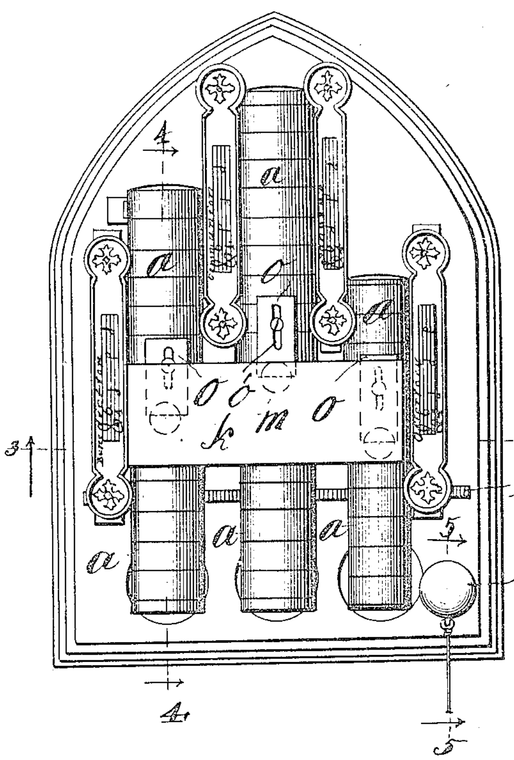


Fig. 2.

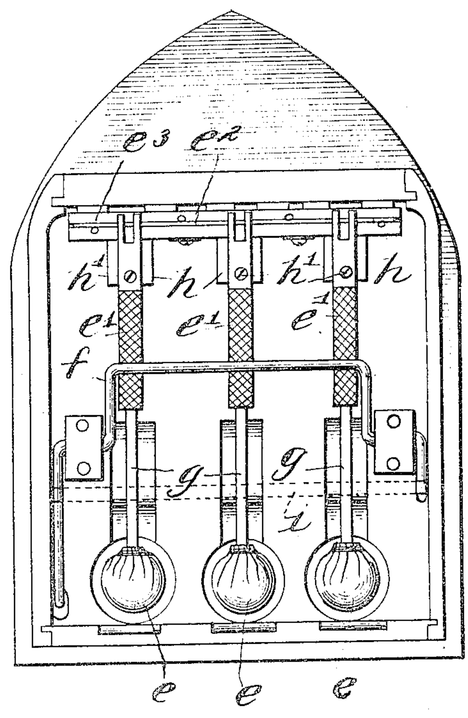
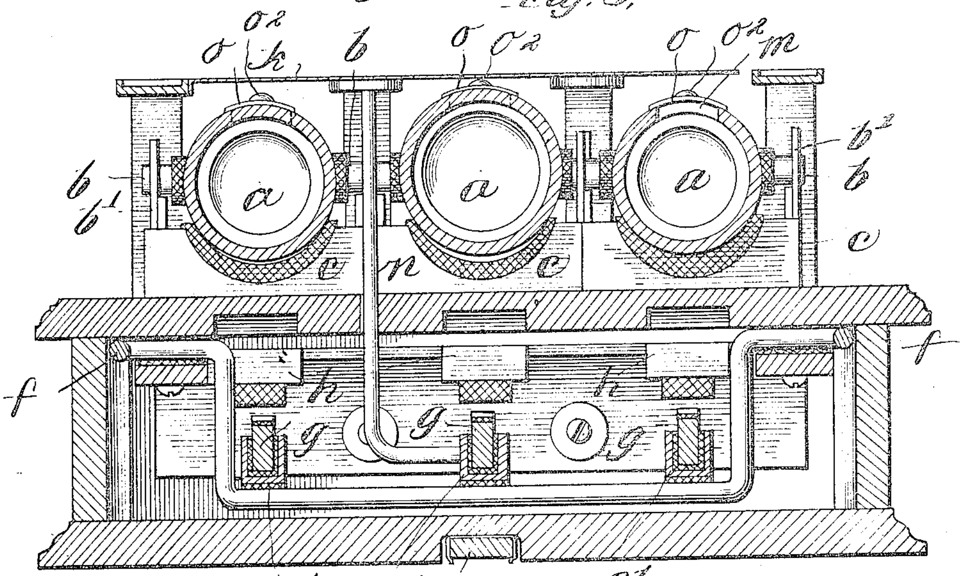


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

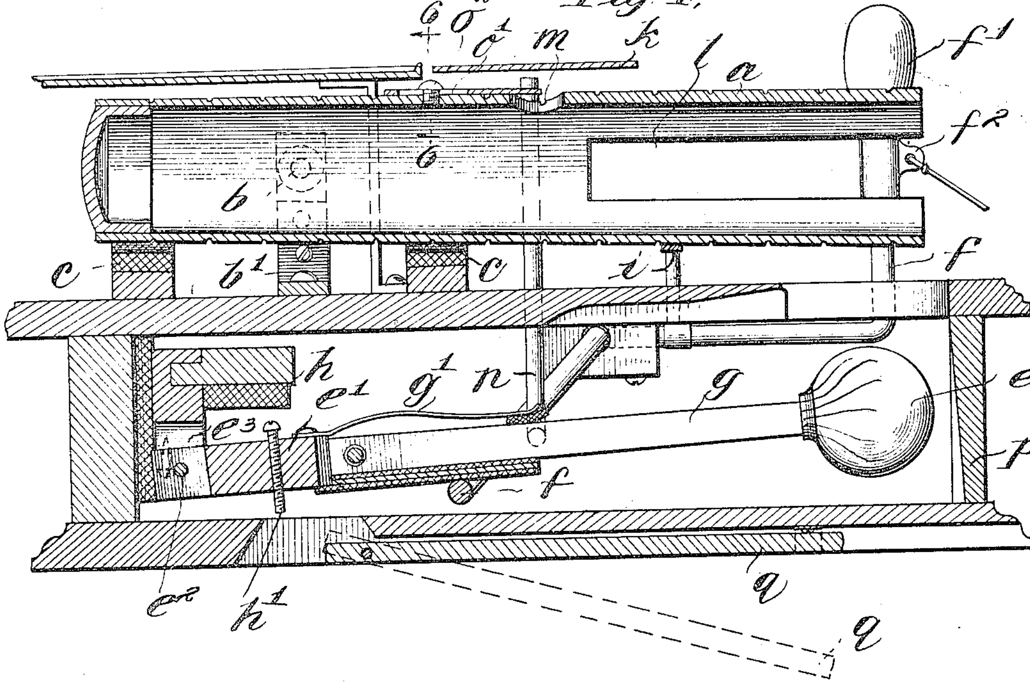


Fig. 5.

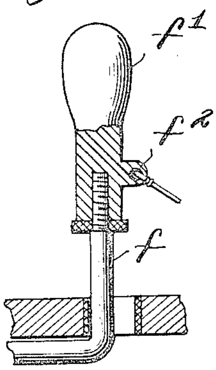


Fig. 6.

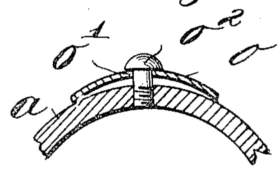
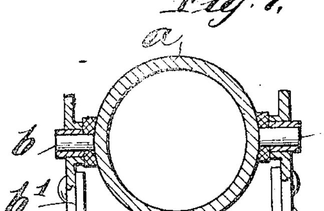


Fig. 7.



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UNITED STATES PATENT OFFICE.

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MUSICAL BELL.

1,052,713. Specification of Letters Patent. Patented Feb. 11, 1913.

Application filed April 11, 1908. Serial No. 426,593.

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, and has a number of objects in view, as will appear by a description of the accompanying drawings, showing the preferred embodiment thereof, and as will be pointed out in the claim.

In the drawings—Figure 1 is a front view of an embodiment of my invention. Fig. 2 is a rear view of the structure shown in Fig. 1. Fig. 3 is a sectional view on an enlarged scale, on line 3 3 of Fig. 1. Fig. 4 is a sectional view on an enlarged scale, on line 4 4 of Fig. 1. Fig. 5 is a detail view illustrating certain operating mechanism entering into my improved construction. Fig. 6 is a view in cross-section taken on line 6 6 of Fig. 4. Fig. 7 is a view in cross-section taken on a vertical line through the pivotal mounting of a tubular bell forming a part of the structure.

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 restricted in all of its embodiments to such elements. 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 provided with suitable sound damping material where they are supported by the trunnion supports b^1. A pair of pillows is provided for each resonating element a, these pillows possessing suitable blocks of sound damping material c against which the corresponding tube is adapted to rest, the trunnion supports b^1 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. The upper pillow c engages the closed end of the tube and takes part in eliminating overtones.

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^1 journaled at its rear end upon a pivot rod e^2, the pivoted ends of the arms e^1 being led into slots provided in a block e^3, through which slots the pivotal rod e^2 also passes, the slots permitting the pivoted ends of the arms e^2 to play therein. A striking lever f, suitably curved and mounted, is adapted for simultaneous engagement with all of the arms e^1, whereby the resonating tubes may be simultaneously struck. A horizontal portion of this striking lever lies underneath the arms e^1, 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, as illustrated, for example, in Figs. 4 and 5, where it is provided with an enlargement f^1 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 f^2, 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^1 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^1. A suitable stop h is provided, against which a projection carried by the arm e^1, such as a screw h^1, may strike when the striking lever f is actuated, the portions

h h^1 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 balance of the arms e^1, 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^1, which tend to maintain the sections of the arms e^1 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.

It may be desired to cause the instrument to produce a vibrating or tremolo sound, and to this end I provide a vibrating tremolo element k, which when set into motion, is adapted to re-act against the sound waves emitted by the instrument, in a manner to effect a variation of the sound. This vibrating 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 vibrating element will have effect.

The embodiment of the invention herein shown includes structural characteristics embraced within the scope of my Patent 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 opening being at that portion of the tube where the slots terminate. Each of the openings m is thus angularly located with respect to the slotting l formed in the same tube therewith. I desirably locate the vibrating 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 vibrating plate. The vibrating plate k is desirably automatically operated when the tubes a are struck by the hammers e, to which end one of the arms e^1 may carry a rod n having its upper end projecting into the range of the plate k, so that when the arms e^1 are elevated in response to the movement of the actuating lever, the striking rod n is also lifted to engage the vibrating 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 vibrating plate k by attaching said striking rod to the section g of one of the arms e^1, gravity and the spring g^1 coöperating to remove said rod from engagement with the vibrating plate k after said plate has been struck by said rod.

It is another object of my invention to regulate the sound that may be emitted by each tubular resonating element a. 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 or arc-shaped 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. The valve plate o is of spring sheet metal which has a slot o^1 therein through which the shank of a screw o^2 is passed, this screw being threaded into the associated tube a. The plate o may be moved longitudinally of the associated tube to cover more or less of the opening m, whereafter the screw o^2 may be tightened to secure the plate o in its position, and inasmuch as the plate is put under compression against the force of its own resiliency by the clamping action of said screw, such plate will not vibrate to produce any jarring noise.

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.

Where a plurality of tubes enter into my improved construction, it is obvious that they may be operated by tapping the same individually, as by a hand mallet.

Certain features shown herein form the subject matter of my divisional application, Serial No. 549,224, filed March 14, 1910.

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:—

A hollow cylindrical resonating element provided with an opening in its cylindrical wall through which sound issues and an arc-shaped valve plate of spring sheet metal having a curvature, when not under stress,

of lesser radius than the radius of the cylindrical surface to which said valve plate is to be applied, and valve holding means for changing the curvature of the plate to have it substantially conform to the curvature of said cylindrical surface.

In witness whereof, I hereunto subscribe my name this seventh day of April A. D., 1908.

JOHN C. DEAGAN.

Witnesses:
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L. E. STROH.