

(No Model.)

J. HARRINGTON.
MUSICAL INSTRUMENT.

No. 485,542.

Patented Nov. 1, 1892.

Fig. 1.



Fig. 2.

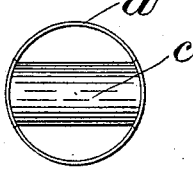
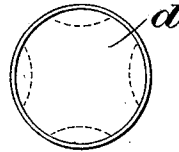


Fig. 3.



Witnesses.
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UNITED STATES PATENT OFFICE.

JOHN HARRINGTON, OF COVENTRY, ENGLAND, ASSIGNOR TO WALTER H. DURFEE, OF PROVIDENCE, RHODE ISLAND.

MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 485,542, dated November 1, 1892.

Application filed December 16, 1891. Serial No. 415,217. (No model.)

To all whom it may concern:

Be it known that I, JOHN HARRINGTON, of Coventry, county of Warwick, England, have invented an Improvement in Means and Apparatus for the Production of Musical Sounds, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to means and apparatus for the production of musical sounds of that class wherein a suspended metallic tube is adapted to be struck by a hammer, the vibration of the metal of the tube caused by the blow producing a musical sound. In apparatus of this class the pitch of the sound produced by the tube when struck by a hammer and set in vibration depends upon the quantity of metal in the tube and is unaffected by the column of air contained within the tube.

The object of this invention is to improve the tone produced by the vibrations of the tube when struck by the hammer without materially altering its pitch, and with this object in view I have discovered by experiment that the quality of the tone, which depends upon the character of the vibrations of the metal of the tube, may be greatly improved by stiffening or solidifying the tube at one or more points, as will be hereinafter described.

Figure 1 of the drawings represents a tube embodying this invention, the ends of the tube being shown in section to illustrate one manner of stiffening; Fig. 2, an end view of the tube shown in Fig. 1; and Fig. 3 an end view of a tube, showing a modified form of stiffening bar or plug.

Referring to the drawings, *a* represents a metallic tube suspended at or near one of its ends by a preferably non-metallic connection *b*, the said tube suspended in this manner when struck by a suitable hammer being set in vibration, the vibrations of the metal of the tube giving forth a musical sound, the tone of the sound depending upon the quantity of metal in the tube, and which is set in vibration irrespective of the quantity or column of

air within the tube, which, so far as the tone produced is concerned, has nothing whatever to do with the sound produced.

In accordance with this invention the tube is stiffened or solidified at one or more points to affect and change the character of the vibrations of the metal of the tube to thereby improve the tone, the stiffening in the present instance being effected by the introduction of one or more stiffening devices *c*, which may extend from side to side of the tube and be held in place in any suitable manner. The stiffening devices may be applied at any suitable points along the tube, according to the quality of the tone it is desired to produce with that particular tube. The shape of the stiffening devices may be varied without departing from this invention, the gist of which lies in stiffening or solidifying the tube at one or more points to so affect the vibration of the metal of the tube as to produce the improved quality of tone desired.

In Fig. 3 the stiffening device *d* is represented as inserted at the end of the tube instead of through the sides, as in Fig. 1, the stiffening device in Fig. 3 being represented as completely filling the tube, or the stiffening device may have portions removed at various points, as indicated by dotted lines, to produce desired results.

To produce the clearest and fullest tones, the hammer blow will be struck upon the end of the stiffening device *c* or upon the surface of the tube at a point where it is stiffened; but whether struck at such point or elsewhere the tone produced by the vibration of the tube is much more full and much less harsh than the tone produced by a similar tube not stiffened in the manner described. The devices employed to stiffen the tube in no manner support the same.

In apparatus of this class the sound is produced solely by vibrations of the metal composing the tube, which vibrations are set up by the hammer blow. The tone of the sound produced depends upon the quantity of metal in the tube, the greater the quantity of metal the flatter will be the tone produced. In stiffen-

ing a tube of known pitch in accordance with this invention the pitch of the tone produced by that tube after stiffening is flattened just so much as the quantity of metal in the stiffening device increases the quantity of the metal in the tube, thereby necessitating the shortening or otherwise reducing the quantity of metal in the tube to an extent to compensate for the additional metal supplied by the stiffening device or devices. Further than this, the stiffening devices do not affect the pitch of the tone produced—*i. e.*, a stiffening device applied at the middle of the length of the tube does not flatten or otherwise change the pitch of the tone produced any more than the same device applied at either end of the tube, the quantity of metal added being the same in either case. The column of air within the tube does not enter into this present invention nor affect materially the tone produced; otherwise the stiffening device at the center

of the tube would affect the pitch more than the same device applied at the end of the tube.

I claim—

In a musical sounding apparatus of the class described, a suspended tube adapted to be struck by a hammer and caused to vibrate to produce by its vibration a musical sound of a certain pitch, combined with one or more stiffening devices in said tube between its point of suspension and its end to affect the vibrations of the metal of the tube and the quality of the tone produced by such vibrations, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN HARRINGTON.

Witnesses:

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