Sept. 15, 1942. S. M. KASS 2,295,902

TUNING DEVICE

Filed March 14, 1941

Fig. 1.

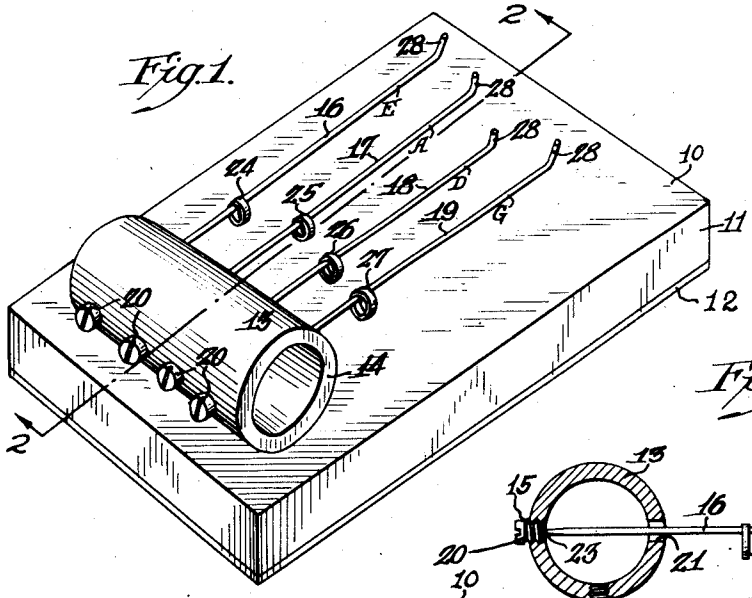


Fig. 2.

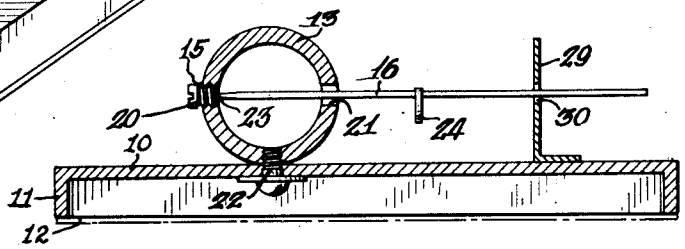


Fig. 3.

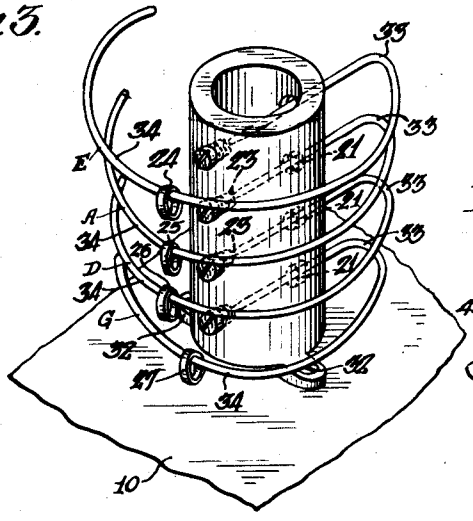


Fig. 4

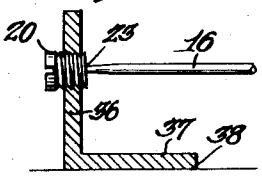
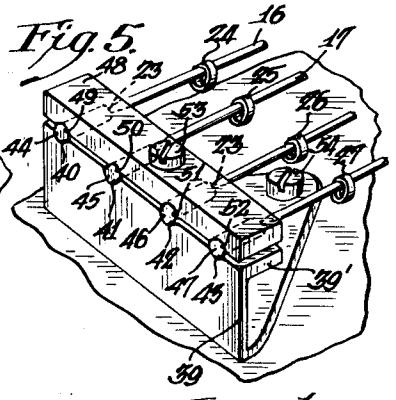


Fig. 5.



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Patented Sept. 15, 1942

2,295,902

UNITED STATES PATENT OFFICE

2,295,902

TUNING DEVICE

Samuel M. Kass, Philadelphia, Pa.

Application March 14, 1941, Serial No. 383,299

3 Claims. (Cl. 84—455)

The present invention relates to the art of tuning musical instruments, particularly wind and string instruments and comprises primarily mechanism by which matching of tones of the instrument being tuned with the standards set by the instrument is indicated visually.

One purpose of the invention is to use a visible indicator of small compass and rigid in construction to establish agreement in pitch of a device which is set to the proposed pitch and a note of an instrument which is being tuned.

A further purpose is to provide a musical chime or gong mounted upon a resonator and capable of responding to its characteristic pitch or tone and carrying a rider which gives visible evidence when the characteristic pitch of the chime or gong is sounded.

A further purpose is to mount one or more chimes or gongs over a sounding board relatively reducing or necking the individual chime or gong close to the mount compared to the adjacent chime or gong as one of the elements in tuning.

Further purposes will appear in the specification and in the claims.

I have illustrated my invention by two main forms only among various forms in which the invention may appear, selecting forms which are practical, efficient, simple and inexpensive but which have been selected primarily because they well illustrate the principles involved.

Figures 1 and 3 are perspective views of preferred forms of my invention mounted each upon a sounding board.

Figure 2 is a section of Figure 1 taken upon line 2—2.

Figure 4 is a fragmentary section showing one of the chimes or gongs mounted from a different kind of bracket.

Figure 5 is a perspective showing a different way of mounting chimes or gongs from that shown in the other figures.

In the drawing similar numerals indicate like parts.

Stringed and wind instruments intended for orchestra use require tuning in the "setting" in which they are to be used just before a performance is to begin. This final tuning is difficult when attempted by the ordinary and accepted means of tuning. For example, the place in which it is necessary to tune may be unusually noisy. The tuning must be effected by the player who may be partially deaf or may tune incorrectly, sharp or flat, preventing him from tuning accurately notwithstanding that he is still able to play acceptably after his instrument has been tuned.

The place at which the tuning must be done may be distant from the piano or other source of pitch.

In the tuning it may have been necessary to tune successively first from one instrument or standard and then from another which has been tuned to the standard and so on, leading to slight deviations from the pitch, which deviations become magnified due to the transfers. Time is also important, especially at radio stations.

My invention is based upon the idea that tuning of a string, for example, may be effected under adverse conditions of noise and personal tuning disabilities of the tuner. using mechanical verification which is independent of the ear of the tuner and which gives visible indication when the pitch has been reached.

The freedom from necessity of effecting final tuning from a single instrument such as a piano makes it possible to determine the pitch of my mechanism under favorable circumstances as an entirely separate operation from the final tuning and under the care of one specially qualified for that purpose.

I am aware that a string has been tuned preliminarily, supplied with a rider and used as a standard from which selection of pitch may be determined, as seen in United States Patent to Schlittenbauer No. 467,203, issued January 19, 1892. However, the string device of this patent is delicate and is subject to the same difficulty in maintaining it in tune as is a violin, for example, for which it is intended to act as a standard. For this reason Schlittenbauer's tuning string must itself be provided with tuning apparatus *a* by which to bring it into tune in addition to the slide *r* by which the string is intended to be changed from one pitch to another. It is also awkward and bulky because of the length of string which must be accommodated.

On the other hand applicant's chime form is small and compact, is rugged in construction and when tuned retains its pitch indefinitely.

In the illustration I show any suitable resonator or sounding board 10 which in the present case has been combined with sides 11 and permissibly with a bottom 12 to form a sound box and in order to provide the convenience of a cover as a container to receive the remainder of the mechanism.

Taking up the description first of Figures 1 and 2:

Upon the resonator, I mount in any suitable way a support 13 of sound-conductive material which is shown as a metallic cylinder 14 apertured on both sides, at 15 for support of metal chimes or gongs 16, 17, 18, 19, hereafter called chimes by means of threaded plugs 20 to which the chimes are rigidly attached, and at 21 for the passage of these chimes through the opposite side of the support without making contact with the support. The support is rigidly held to the sounding board at 22.

The plugs 20 afford the mounts for the chimes

having characteristics such as to cause them to respond to the individual notes to which the four strings, for example, of a violin are to be tuned.

The sound to which any individual chime responds is dependent upon a number of factors, including the material from which it is made, high carbon steel, Phosphor bronze, brass, etc., the diameter of the chime or gong and whether it be solid or hollow.

Assuming that the chimes are otherwise properly selected the pitch is dependent upon the length of the chime, any change in diameter and, because of the compressions and tensions involved, any bends in the metal.

I find that the pitch of the chime for any given chime length is desirably changed by reducing the diameter of the chime as at **23** close to the support, relatively necking it for this purpose but avoiding excessive weakening of the metal.

Each chime carries a rider **24**, **25**, **26** or **27** which is quiescent to pitches and notes different from those to which the chime is tuned but which is rapidly vibrated and caused to dance and to travel along the chime by reason of responsive vibration of the chime when the pitch and note to which it has been tuned is sounded. Due to this condition the chimes can be tuned to approved notes represented as E, A, D and G in the figures, the tuning being effected by experts and under favorable conditions such that the tuning can be effected very exactly. These tuned chimes are then used as test tuning devices by which the strings of a violin, for example, can be tuned under such adverse circumstances as arise during the tuning of many instruments on an orchestra floor. It is not necessary for the one who is effecting the tuning to judge by the sound of the string being tuned. Instead he approximately tunes the string and then tightens or slackens it from time to time until he reaches a string tension such that the chime to whose note he is trying to tune his string vibrates rapidly as seen by the dancing of its rider.

In the Figure 1 construction the initial tuning is effected by mounting the chime in a plug by which it can be inserted within the support, bending the end of the support up if desired as at **28** to prevent the rider from being lost past the end of the chime and necking as far as may be considered desirable and safe.

The chime initially is made slightly longer than is correct for its pitch so that the final correction may be made by clipping the length of the chime. The reason for making clipping the final operation is that the pitch is slightly altered by the necking and also by any bending which is effected, making it undesirable to attempt to select the exact length until after all such operations as necking and bending have been completed.

In Figure 1 the up-turned ends are relied upon to prevent accidental or careless loss of the riders over the ends of the chimes.

In Figure 2 the ends are not shown as turned upwardly because of the use of a guard **29**. It is apertured to permit free passage of each of the chimes at **30** but prevents loss of the riders.

I have had success with various types of riders and the exact material of the rider is not of the first importance. However I have had my best success with sections of large feather quills.

In Figure 3 the support is placed in vertical position and is held upon the sounding board by ears **32**. It may be a laterally-apertured cylinder, as in Figure 1. In order to economize space the chimes after passing through the apertures **21** are bent as at **33** into circular form conveniently surrounding the support by arcs **34** of chimes. Except that the bend in the metal necessarily alters the pitch of the chime, requiring a different length of the metal rod or tube, the effect is much the same as if the tube were straight.

In the form of Figure 4 the character of bracket support is changed, using a bracket of flanged section having a flange **36** supporting the chimes and a flange **37** resting upon and held to a sounding board or box shown at **38**.

In Figure 5 still another form of support is shown in which the bracket arm **39** is turned inwardly at **39'** and is grooved at **40**, **41**, **42** and **43** so that unthreaded plugs **44**, **45**, **46** and **47**, each supplying a mount for a chime may be held by a cap **48** having grooves at **49**, **50**, **51** and **52**. The cap is held in place by a bolt **53** and the bracket is held to the sound box or sounding board by a bolt **54**. The construction shown permits mechanical determination of tuning for individual strings.

It will be evident that though tubular chimes or gongs may be used it will be the exception rather than the rule, as ordinarily solid rod of Phosphor bronze or tempered steel, as the case may be, will generally be used for this purpose.

In view of my invention and disclosure variations and modifications to meet individual whim or particular need will doubtless become evident to others skilled in the art, to obtain all or part of the benefits of my invention without copying the structure shown, and I, therefore, claim all such in so far as they fall within the reasonable spirit and scope of my invention.

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

1. A mechanical rod chime tuning device, a metallic support, a resonator on which the support is mounted, a rod metallic chime connected with the support and of reduced section close to the point of connection with the support, the chime corresponding in rate of vibration with a standard musical note and a rider surrounding the chime and adapted to vibrate with it to indicate by the agitation of the rider when a note corresponding in vibration with that of the chime has been struck.

2. A resonator, a metallic bracket therein, a rod chime supported by the bracket and bent to curve circumferentially about the support, and reduced in section close to the support, a rider carried by the chime and means for retaining the rider on the chime.

3. A resonator, a metallic bracket therein, a plurality of rod chimes supported by the bracket, one over another and bent to curve circumferentially about the support and riders, one carried by each of the chimes.

SAMUEL M. KASS.