MUSIC COMB WITH WEIGHTED CANTILEVER
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This invention has to do with music combs. Hereinbefore the higher notes produced by the shorter vibrators of music combs have either sounded for only a short duration or have been very soft or low in sound as compared to the lower notes produced by the longer vibrators. Consequently, the base and accompaniment usually overpower the melody when conventional music combs are played. This, of course, is disadvantageous in many instances where it is desirable to have a more balanced scale, that is, in which the vibrators produce sounds of more nearly the same degree of loudness and duration. Therefore, it is an object of my invention to provide a novel music comb construction which provides a more nearly balanced scale wherein the vibration periods of the long and short vibrators are more nearly equal than in previous combs without sacrifice of loudness.

Another object is to provide a novel music comb construction which tends to increase the loudness of the higher notes or shorter vibrators of the comb, as compared with those of conventional combs.

It is my belief that the problem of equalizing the sustaining power of the high and low notes in music combs is closely related to the amount of kinetic energy stored in the comb base. For a fixed amount of vibrator deflection, the shorter vibrators, which produce the higher notes, require the storage of a great deal more kinetic energy than the longer vibrators which produce the lower notes. While it is possible to design a comb construction having a heavy base portion which will store the energy required to make the shorter vibrators ring longer, this is unsatisfactory for the reason that the sound is unduly deadened, because a heavy base appears to absorb the energy of vibration instead of transmitting it to the sounding board.

I have found that I can increase both the loudness and the period of vibration of the shorter vibrators of a music comb by providing a stiff arm on the base of the comb at the end thereof having the shorter vibrators, and using a relatively lightweight main base portion. Excellent results are obtained if the arm is approximately the length of the shortest vibrator and preferably the arm should be weighted at the end and in any case be stiff. A further object, therefore, is to provide a simple means of improving the quality of music combs by increasing the duration of vibration of the shorter vibrators without diminishing the loudness of the sound produced by them and further to provide such a means which actually tends to increase the sound produced by the short vibrators.

Still another object is to provide a construction which increases the over-all loudness of the music comb.

These and other objects will be apparent from the drawings and the following description. Referring to the drawings:

Fig. 1 is a plan view of a simple form of music comb embodying the invention;

Figs. 2 and 3 are sectional views on lines 2—2 and 3—3, respectively, of Fig. 1;

Fig. 3A is a view similar to Fig. 3 but showing a modification;

Fig. 4 is a view similar to Fig. 3 but showing a modification;

Fig. 5 is a plan view of an alternate form of music comb; and

Figs. 6, 7, and 8 are fragmentary sectional views on lines 6—6, 7—7, and 8—8, respectively, of Fig. 5.

More particularly describing the invention, referring first to Figs. 1—3, I show a simple form of music comb which is designated generally by 11 and is comprised of a base 12 of die-cast metal in which are mounted a plurality of vibrators 14. The vibrators have one end mounted or embedded in the die-cast metal of the base 12 and the other end free. The free ends may be plucked by any conventional means. The vibrators may be described as arranged from one end to end of the base generally in the order of their length. Thus the longer vibrator is at one end of the comb and the shortest vibrator at the other. While I have shown the vibrators 14 as being individual elements of rectangular cross section, these might be of different cross-sectional shape and they might also be formed integral with a base portion as when the entire comb is formed from sheet metal. Such a type of comb is shown in Figs. 5—8, later to be described.

In order to increase the duration of vibration of the shorter vibrators and increase the loudness of the sound produced by the vibrators of the comb, I provide what I term a stiff, relatively thin arm, designated generally by 15. This preferably should project parallel to the vibrators and is disposed at the end of the base having the shorter vibrators. It may be cast as an integral part of the base. The arm may consist of a thin, stiff section 16 and an outer end portion 17 which is shown as somewhat bulbous. Portion 17 is of greater thickness than the portion 16 and thereby provides greater resistance per linear unit of the arm than portion 16, thereby acting as a weight means at the end of the arm so that the arm may be described as being weighted at its end or end portion. The weighted end may be dispensed with, provided the portion 16 is made somewhat longer than that shown. Preferably, the whole arm should extend for about the same distance from the base as the shortest vibrator, or perhaps a little beyond the end of the shortest vibrator.

I have found that, by providing such an arm 15, the tonal quality of the music comb is improved, the vibrators being more nearly balanced as to loudness and duration of vibration with all vibrators sounding louder. The comb base, of course, is adapted to be firmly secured to an element which would act as a sounding board and for this purpose the base is shown provided with apertured wings 18 to receive rivets (not shown) or other securing means. In the form of the invention shown in Figs. 1—3, the arm 15 is entirely disposed in spaced relation to and thus out of contact with the surface of the sounding board, such surface being represented by the broken line 20 in Fig. 3. While excellent results are obtained with this construction, I find that I obtain a greater transfer of energy to the sounding board if the arm is constructed so that it tightly engages the sounding board, particularly at its outer end, and in Fig. 3A I show such a construction wherein a comb base 12A is shown provided with an arm 15A having an enlarged or weighted end portion 17A which is elongated sufficiently to contact the surface 20 of the sounding board. While I prefer that arm 15 extend parallel and ad-
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jacent to the short vibrator at the end of the comb, it is not essential that the arm extend in exactly this position. The arm may be at a somewhat different angle than the vibrators or it may be provided on the opposite side of the base to extend in a direction oppositely to the vibrators, but in any case should extend from the end of the base in which the shorter vibrators are mounted. Thus, by way of example, in Fig. 4 I show a comb 12B having vibrators 14B, and in this case I show the arm 15B extending from the rear of the music comb base.

Referring now to Figs. 5-8, I show fragmentarily a music box assembly which includes a music comb, designated generally by 25, a plucking disk 26 which is mounted for rotation on the comb, and a sounding board 27 to which the comb is secured. In this form of the invention the music comb comprises a plurality of vibrators 30 provided with inclined end portions 31 which are adapted to be engaged by plucking projections 32 upon the plucking disk 26 as the latter is rotated. The vibrators are shown as having a base portion 30" which is embedded in the main portion 33 of a die-cast base. This is provided with ears 34 at each end to receive rivets 35 by means of which the entire assembly is secured to the sounding board 27.

The die-cast base of the comb is provided with a long arm 38 at one end which extends generally parallel to the vibrators and terminates in a boss to which the disk 26 is rotatively secured, as by rivet 40. The disk is provided with peripheral teeth 26' which are engaged by a drive pinion 42 carried on a crank 43 which in turn is mounted in a bore 43 of the arm 38. A suitable one-way clutch drive means 45 is provided between the pinion 42 and the shaft 43.

For the purpose of increasing the quality of the sound as well as the loudness and the duration of ringing of the shorter vibrators, I provide a relatively short, stiff arm, designated 50, at the end of the base of the comb from which the shorter vibrators project. This arm includes a thin section 51 and a lateral web 52. At its outer end the arm is provided with a somewhat circular enlarged portion or boss 54 which has the dual function of weighting the end of the arm and serving as a means for rotatably supporting a shrouded pinion 56. The latter acts as a guide means for the plucking disk.

The boss or end portion of the short arm 50 is provided with what I will term a foot portion 58 which extends beyond the end surface 54' of the boss 54 to contact the sounding board 27.

It will be apparent that the construction described provides a short, stiff, weighted arm projecting from the die-cast base of the music comb parallel to and adjacent the shortest vibrator of the comb. I have found that this construction greatly increases the duration of vibration of the shorter vibrators and increases the loudness of the sound produced by all the vibrators over other constructions.

Although I have illustrated and described a preferred form of my invention, I contemplate that various changes and modifications can be made therein without departing from the invention, the scope of which is indicated by the following claims.

I claim:
1. In combination with a sounding board element presenting a comb-mounting surface, a music comb comprising a base secured to said sounding board element against said comb-mounting surface thereof, a plurality of vibrators, each vibrator being mounted in the base at one end and free at its other end, said vibrators varying in length and being disposed from end to end of the base generally in the order of their length, and an elongated stiff arm rigid with the base and projecting laterally therefrom at the end thereof from which the shortest vibrators extend, the outer end portion of said arm being weighted and contacting said sounding board comb-mounting surface.

2. A music comb comprising a base, a plurality of vibrators, each free at one end and secured to the base at their other end, said vibrators varying in length and being disposed substantially in the order of their length from end to end of the base, and a stiff arm of substantial length projecting laterally from the base at the end thereof from which the shortest vibrators extend, said arm extending substantially parallel to the vibrators and being substantially as long as the shortest vibrator, said arm being weighted by a portion of substantially increased mass at the end.

3. A music comb comprising a base, a plurality of vibrators, each vibrator being free at one end and secured to the base at its other end, said vibrators varying in length and being disposed substantially in the order of their length from end to end of the base, and a stiff arm of substantial length projecting laterally from the base at the end thereof from which the shortest vibrators extend, said arm having a portion of increased mass at a region thereof spaced from said base whereby said arm is in effect weighted at said region.

4. A music comb as set forth in claim 3 in which the portion of increased mass is at the end of the arm.

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