

H. P. TIFFNER.
 RESONATOR.
 APPLICATION FILED MAR. 16, 1911.

1,127,320.

Patented Feb. 2, 1915.

2 SHEETS—SHEET 1.

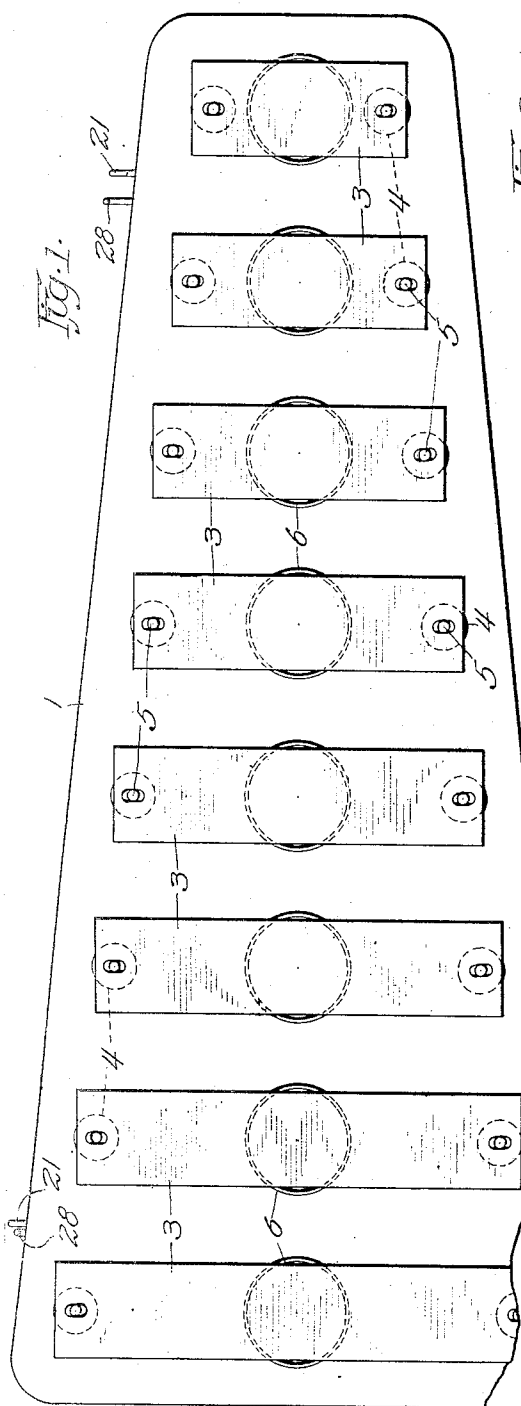


Fig. 1.

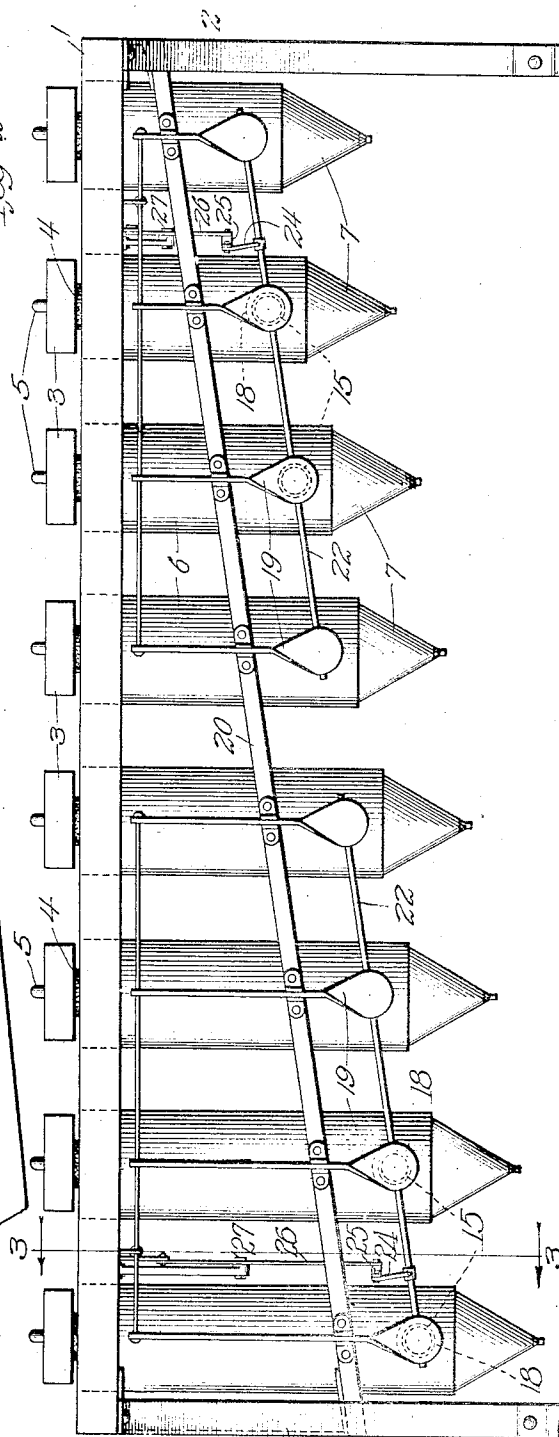


Fig. 2.

Witnesses:

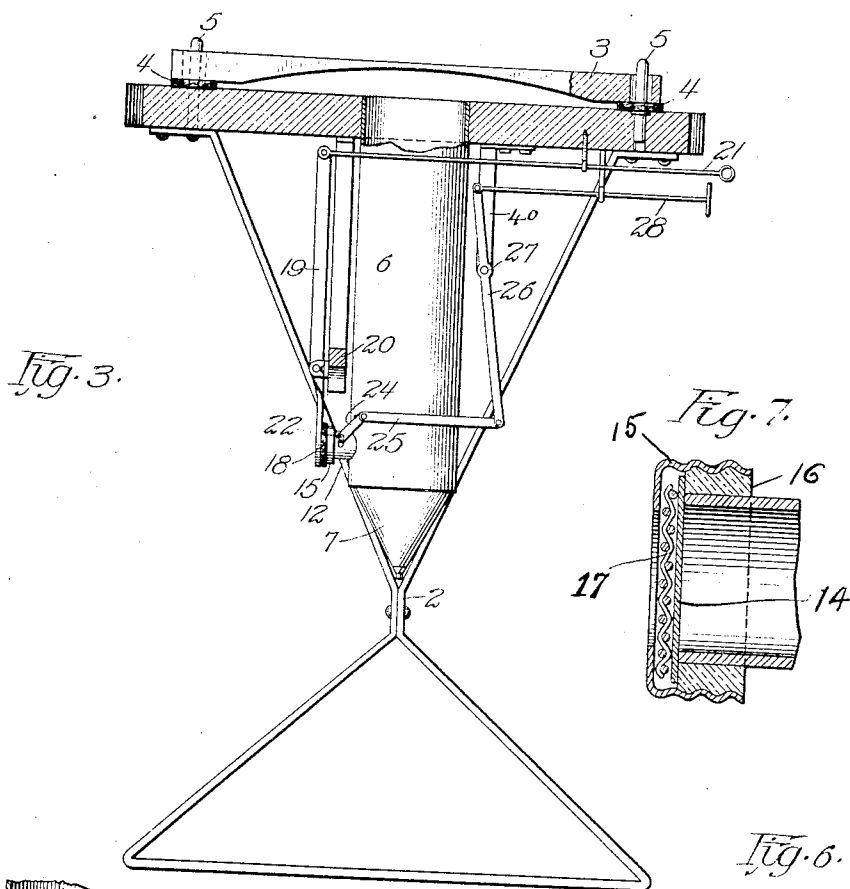
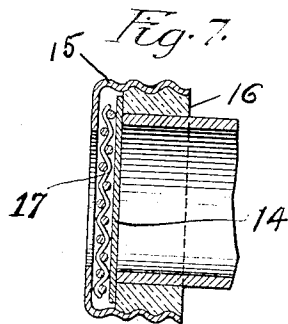
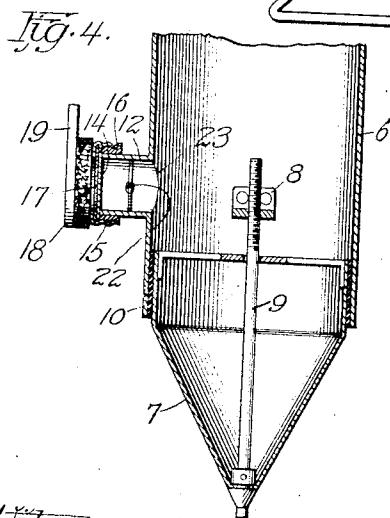
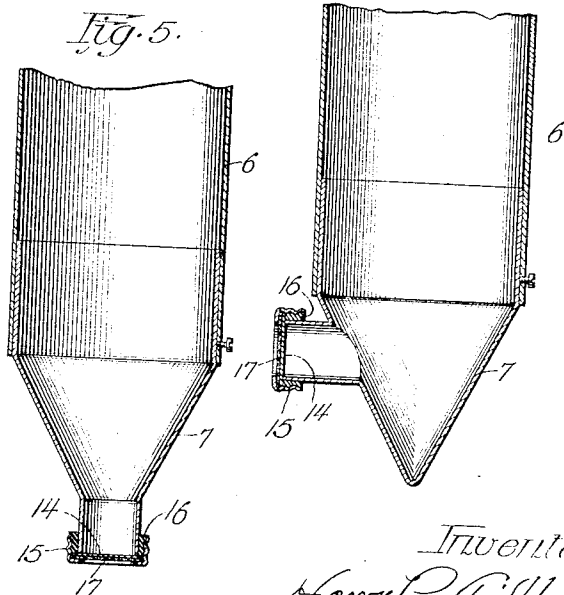
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 2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

HARRY P. TIFFNER, OF CHICAGO, ILLINOIS.

RESONATOR.

1,127,320.

Specification of Letters Patent.

Patented Feb. 2, 1915.

Application filed March 16, 1911. Serial No. 614,798.

To all whom it may concern:

Be it known that I, HARRY P. TIFFNER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Resonators, of which the following is a description.

My invention relates to a device adapted for use with certain musical instruments to improve or control the volume or quality of the musical tones produced by the instrument.

The object of my invention is to produce a simple, efficient and reliable device of the kind described, especially applicable to xylophones, gongs, bells and similar instruments whereby the operator may produce any desired volume or quality of tone desired within the capacity of the instrument.

To this end my invention consists in the novel construction, arrangement and combination of parts herein shown and described and more particularly pointed out in the claims.

In the accompanying drawings wherein like or similar reference characters indicate like or corresponding parts: Figure 1 is a plan view of a xylophone equipped with my improvement. Fig. 2 is a front elevation of the same. Fig. 3 is a section taken substantially on line 3—3 of Fig. 2. Fig. 4 is an enlarged sectional detail of the lower portion of the resonators shown in Figs. 1, 2 and 3. Figs. 5 and 6 are views similar to Fig. 4 but showing slightly modified forms of my device. Fig. 7 is an enlarged sectional detail of the head portion and associated parts of a resonator of my device.

In the drawings merely for the purpose of illustration my improved resonator is shown as forming a part of a xylophone in which 1 is the table or upper frame of the instrument supported on suitable legs or other convenient means 2—2. The bars 3—3 for producing the musical tones are shown supported at each end upon the frame 1 with a pad or washer 4 of felt or other resilient material positioned between the bar and frame adapted to support the bar in position without interfering with its musical properties. A pin or peg 5 is provided at each side of the frame 1. Each pin extends through a suitable opening near the end of the bar to prevent its longitudinal or lateral movement, the whole being arranged

and constructed in the usual or any desired manner and of any suitable material.

In the form shown, the bars are arranged in a substantially horizontal position and each bar is provided with a resonator comprising a tube 6, positioned immediately beneath its particular bar and extending downward at substantially right angles to the bar. The upper end of the tube 6 is preferably positioned at a suitable distance from the underside of the bar to receive the vibration from the bar, without in any way interfering with its vibrations. In the preferred construction a conical part 7 is positioned in the lower end of each tube with suitable means connecting the tube and part 7 for adjusting its longitudinal position in the tube and rigidly maintaining the part in position. The joint between the part 7 and the walls of the tube 6 is preferably packed with a ring of felt or other non-resonant material so as to prevent any discord arising from the independent vibration or rattling between the tube walls and the part 7. The ring packing 10 also prevents the escape of air at the lower end of the tube and increases the effect produced by the resonator. The position of the part 7 may be adjusted in any suitable manner. As shown, a bar 8 extends across the tube with a threaded opening formed near its center at the axis of the tube. A stem 9 is rotatably secured to the part 7 and provided with a threaded part arranged to cooperate with the threaded opening in the bar 8 so that the stem may be engaged with the bar and by rotating the stem the part 7 may be adjusted as desired. In the preferred construction a cross piece 11 is provided at the top of the part 7 arranged to maintain the stem 9 in a central position and prevent the tipping or disarrangement of the part 7 in the tube.

The several parts of my device above described are shown circular in section and formed of brass or other suitable material, but it is obvious that the several parts may be formed of wood or any material adapted to cooperate as above described and impervious to air, although a better result is no doubt attained by using a material capable of producing a musical tone when vibrated.

The several parts above described constitute a resonator of substantially the usual form with the exception of the conical part

7 and the adjustment provided therefor whereby the resonator may be accurately and quickly tuned and a resonator having a conical lower end produces a slightly more satisfactory dwell or prolongation of the tone than where the end of the tube is closed by a part positioned at substantially right angles of the tube.

The principal feature of my improved resonator however, consists in a vibratory head 14 preferably positioned across an opening near the closed end of the tube so arranged that the vibration of the bar 3 above the tube is transmitted by the pulsations of the air in the tube to the head causing the same to correspondingly vibrate, thereby producing a marked mellowing effect upon the musical tone produced and greatly increasing the volume of the tone. In the preferred construction shown a tubular port 12 is provided in the wall of the tube 6 near its closed end at substantially right angles to the tube with the disk or head 14 extending across the port and entirely closing the end thereof.

The head 14 may be formed of any thin, flexible material, such for example, as very fine gold beaters skin or extremely thin and preferably soft parchment. I have found it desirable however, to secure the best results, to provide a specially prepared parchment, thinner and much more flexible than either of the substances above mentioned. In the preferred construction the parchment disk 14 is wholly unattached at its margins and merely rests loosely across the end of the duct 12 so that the slightest pulsation of air within the tube will vibrate the head 14 and produce a musical tone. Any suitable means may be provided to control the position of the head 14 and protect the head when in service. In the preferred construction I provide a disk of fine wire gauze 17 extending across the duct 12 outside of the head 14 and the several parts are secured in position by means of a ferrule or thimble 15 having a central opening corresponding to the bore of the duct and with a body portion of suitable size to receive a ring of leather, rubber or other suitable material 16 adapted to hold the head 14 and disk 17 in the ferrule with the inner diameter of the ring of suitable size to fit upon the exterior of the duct and resiliently maintain the several parts in position.

In the preferred construction suitable means are provided to modify or wholly prevent the vibrations of the head 14 to control the operation of my improvement. In the form shown I provide a damper and a cut-out; the damper consists of a pad of suitable material 18 adapted to press against the disk 17 to control or partially prevent the vibrations of the head. Obviously the force with which the pad 18 is pressed against the disk 17 largely controls the operation of the

head, although in actual practice it is found that even when considerable pressure is put upon the disk 17 resonant action is not wholly prevented. Any suitable means may be provided to control the operation of the pad 18; as shown, the pad is mounted at one end of a lever 19 which is in turn pivotally mounted intermediate its ends upon a bar 20. Suitable means are attached to the free end of the lever 19 extending to a convenient position, as for example, the rod 21 by which the operator may manually control the position of the pad 18. Obviously if desired the several levers 19 may be operated by a pedal or any other convenient means (not shown).

The cut-out preferably consists of a valve adapted to wholly close the duct between the head 14 and the tube 6, so that the duct is wholly closed to the tube. In the form shown a shaft 22 is provided common to a plurality of the ducts extending centrally through each. A valve 23 is positioned in each duct and rigidly secured to the shaft 22 so that when the valves are closed, as shown in Fig. 4, a quarter turn of the shaft will simultaneously open the several valves to their fullest capacity. Any suitable means may be provided to control the movement of the shaft 22. As shown an arm 24 is rigidly secured to the shaft with its free end connected by a link 25 to a lever 26 which is in turn pivotally mounted as at 27 upon a suitable bracket 40 or other convenient means. A rod 28 or other convenient means is attached to the free end of the lever 26 so that a longitudinal movement of the rod will rotate the shaft 22 and control the position of the valves.

The duct 12 may be formed at any convenient point near the closed end of the tube, although it is believed that the nearer the duct is positioned to the end of the tube the more satisfactory the operation of my device. In the form shown in Figs. 2, 3 and 4 the duct extends through the wall of the tube 6 while in Fig. 5 the duct is formed at the apex of the part 7 and in Fig. 6 the duct is formed through the conical wall of the part 7 extending perpendicular to the tube. The several forms are obviously very similar and each produce very similar results. In all cases it should be noted that the length of the tube 6 or in other words the pitch of the resonator must accurately correspond with the pitch of the gong, the bar of the xylophone or other instrument with which it is to cooperate to secure satisfactory results.

Where it is desired to use my resonator upon clock gongs or in other places where the simplest form of mechanism is desired I have found that very satisfactory results may be obtained by forming the walls of the tube 6 of brass or other suitably sonorous

material of suitable size to produce the desired tone when struck or otherwise vibrated. The operation of my device however remains substantially as hereinbefore described, except that the bars 3 are omitted and the initial sounds or vibrations are set up by the tube walls and provides a very simple and pleasing instrument where chimes or a single tone is required.

Having thus described my improvement it is obvious that various immaterial modifications may be made in my device without departing from the spirit of my invention, hence I do not wish to be understood as limiting myself to the exact form or construction shown.

What I claim as new and desire to secure by Letters Patent is:

1. A resonator comprising a tube, and means arranged to close one end of said tube, said resonator having an opening near its closed end, in combination with a vibratory head extending across said opening, and means for supporting said head in position.

2. A resonator comprising a tube and a longitudinally movable member arranged to close one end of said tube, said resonator having an opening near its closed end, in combination with a vibratory head extending across said opening, and means for supporting said head in position.

3. A resonator comprising a tube and a conical member positioned in and arranged to close one end of said tube, said resonator having an opening near its closed end, in combination with a vibratory head extending across said opening, and means for loosely supporting said head in position.

4. A resonator comprising a tube, and means arranged to close one end of said tube, said resonator having an opening near its closed end, in combination with a vibratory head extending across said opening, manually operated means adapted to prevent

the vibration of said head, and means for supporting said head in position.

5. A resonator comprising a tube and means arranged to close one end of said tube, said resonator having an opening near its closed end, in combination with a vibratory head extending across said opening, means extending across said opening adapted to control the position of said head, and means for loosely supporting said head in position.

6. A resonator comprising a tube and a longitudinally movable conical member positioned in and arranged to close one end of said tube and a tubular port near said closed end, in combination with a vibratory head extending across said port, and means for supporting said head in position.

7. A resonator comprising a tube and a longitudinally movable conical member positioned in and arranged to close one end of said tube, and a tubular port near said closed end, in combination with a vibratory head extending across said port, means positioned in said port adapted to control the position of said head, manually operated means adapted to prevent the vibration of said head, and means for supporting said head in position.

8. A resonator comprising a tube and a conical member positioned in and arranged to close one end of said tube, said resonator having an opening near its closed end, in combination with a vibratory head extending across said opening, means extending across said opening adapted to control the position of said head, and means for supporting said head in position.

In testimony whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

HARRY P. TIFFNER.

Witnesses:

BURTON W. HILLS,
BLANCHE CHALMERS.