

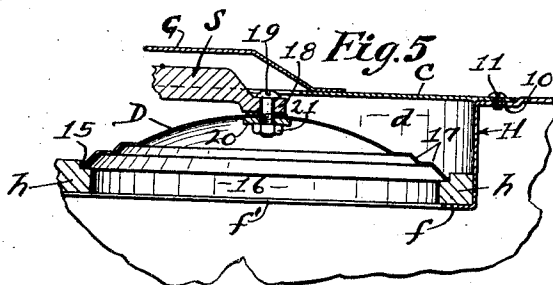
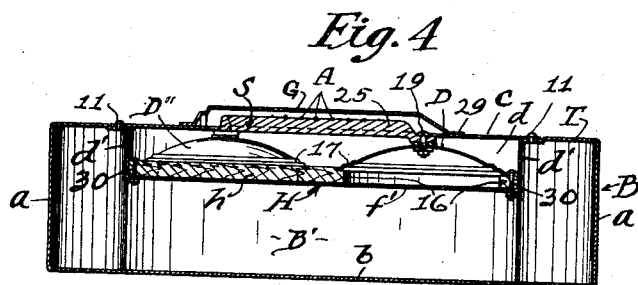
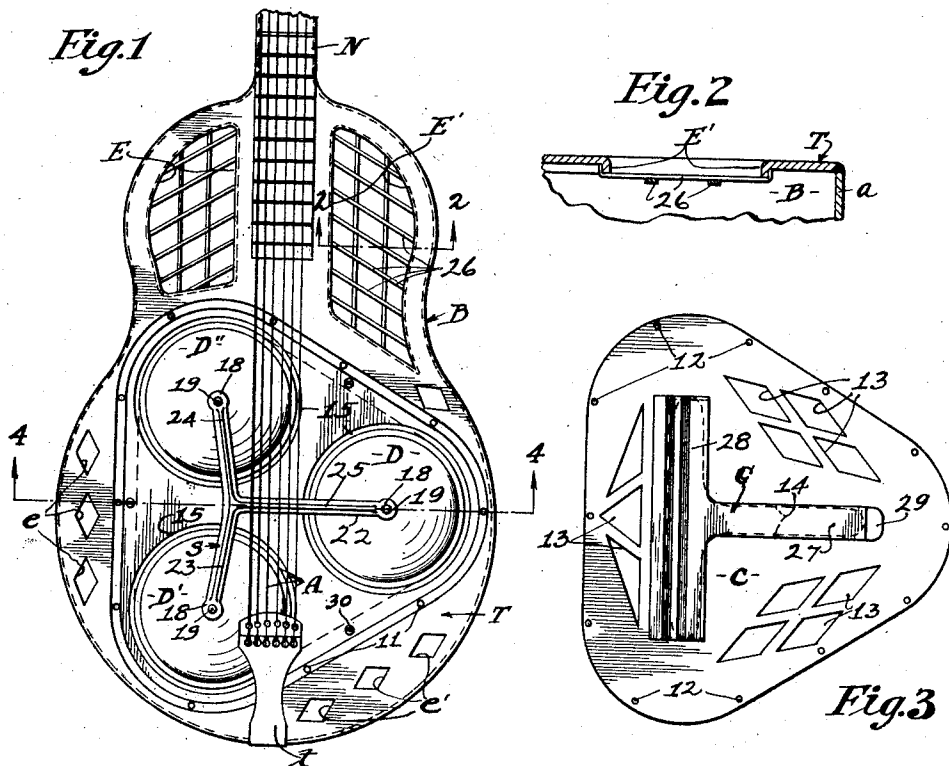
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STRINGED MUSICAL INSTRUMENT

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STRINGED MUSICAL INSTRUMENT

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This invention relates to stringed musical instruments of the general character shown in my pending application for Letters Patent of the United States filed October 12, 1926; Serial Number 141,115, and the primary object of the invention is to provide certain improvements over the form of invention disclosed in the said application, whereby finer tone qualities may be provided, together with a more practical arrangement of parts in order to provide a maximum volume.

A more general object of invention is to provide a stringed musical instrument including a body of thin sheet metal or wood, having resonant properties, provided with a plurality of diaphragms of either metal or wood, preferably three in number, firmly supported at their peripheries and connected at their axes with a common spider, forming a bridge for holding the wires or strings of the instrument in tension, whereby when the strings are vibrated the diaphragm will amplify the vibrations and will provide a maximum volume and an entirely pleasing and satisfactory degree of resonance which could not be otherwise obtained.

Other objects of invention will appear as the description progresses:

I have shown in the accompanying drawings a preferred form of device, subject to modification within the scope of the appended claims without departing from the spirit thereof.

In said drawings:

Fig. 1 is a plan view of an assembled instrument with the cover plate removed therefrom.

Fig. 2 is a fragmentary section of the same on line 2—2 of Fig. 1.

Fig. 3 is a plan view of a cover plate therefor.

Fig. 4 is a transverse sectional elevation of the instrument on line 4—4 of Fig. 1; and

Fig. 5 is an enlarged fragmentary section of the same taken in the same plane as Fig. 4.

In the consideration of this invention, it will be understood that I have shown in the drawings an instrument in the form of a steel

guitar, which is preferably made of metal throughout, but which may be made of thin sheets of wood with satisfactory results.

It will be noted that the form of the body as to its general contour is immaterial to my invention, but the disposition, form and arrangement of the diaphragms which hold the strings of the instrument in tension are material thereto, as hereinafter more fully explained, in order that the maximum volume and best tonal qualities may be provided.

Briefly described, my improved instrument includes a body B to which is attached the usual neck N, preferably made of wood and secured to the body in a suitable manner. The main portion of the body which is enlarged with respect to the portion to which the neck is attached, is provided with a recess d in which is held a non-metallic supporting member h for the plurality of diaphragms D, D' and D'' on which is mounted a spider S for holding the strings A, A, etc., in tension. The recess d in which the diaphragms are supported is enclosed by a detachable cover C, carrying a guard G overlying the spider S, and the strings A on which the hand of the player may rest while the instrument is being played.

In the form of device shown in the drawings, the body B is constructed of thin sheet metal and has a bottom b and continuous side walls a , either integral with the bottom or soldered or otherwise suitably attached thereto, providing an interior chamber B' within the body unobstructed by partitions, blocks or other parts which serve to intercept the vibrations set up in the body, and to otherwise impair the resonance thereof.

The body also is provided with an integral or separate top T suitably secured in a permanent manner to the side wall a and provided in the enlarged portion thereof with the shallow recess d formed by bending the material of the top downwardly to provide vertical walls d' , and an inwardly bent flange f with an enlarged central opening f' therein, as shown in Figs. 4 and 5.

The top T has a shallow depression 10 surrounding the recess d which receives the cover C and supports the same flush with the

top. Said cover is detachably held in position on the top of the body B by means of a plurality of screws 11, 11, etc., inserted through perforations 12, 12, etc., in cover C and either threaded into the material of the top or carrying nuts on the lower ends of the screws for removably holding the cover in position. Said cover is provided with a plurality of apertures as at 13, 13, etc., of suitable form and area, and in the center thereof with a T-shaped aperture 14 beneath the guard G through which the spider S extends upwardly for contact with the strings A.

The diaphragms D, D' and D'' are concentrically mounted in the enlarged main portion of the body about a point on the line 4-4 of Fig. 1, at the intersection of the longitudinal axis of the body therewith, so that the axis of the right-hand diaphragm D will be on the line 4-4 as seen in Fig. 1, while the axes of the other two diaphragms D' and D'' will be positioned at points equidistant from the line 4-4 and on opposite sides thereof longitudinally of the body.

Said diaphragms are mounted preferably on a supporting plate *h*, preferably of wood, and said plate is detachably held on the bottom flange *f* of the indented portion H formed by the wall *d'* and enclosing the recess *d*. Member *h* is counter-sunk at 15, 15, etc., to provide circular depressions for receiving the margins of the diaphragms D, D' and D'' etc., as shown in Fig. 5, so as to loosely support said diaphragms in proper position over openings 16, 16, etc., in the member *h*, without clamps, which would tend to decrease the tonal qualities of the diaphragms.

Said diaphragms are formed preferably of very thin flexible sheet aluminum in order to obtain the best tonal qualities, as I have found that aluminum possesses certain tonal characteristics not obtainable in other metals for use in instruments of this kind. The diaphragms, however, may be constructed of other materials, and are preferably of concavo-convex cross section with their convex sides uppermost substantially as shown. The diaphragms are so thin that they may be easily flexed, or indented, and are preferably provided with annular beads 17 near their peripheries, for the purpose of reinforcing the same. They are attached at their centers to lugs 18 formed at the extremities of the substantially T-shaped spider S.

Screws or bolts 19 are extended through the portions 18 of the spider and through washers 20 internally of the diaphragms, and are detachably held in position by means of nuts 21, shown in Fig. 5. Thus the spider and diaphragms are detachably secured together and may be placed in and removed from position in the instrument as a unit.

The spider S is provided with a transversely disposed leg 22 and arms 23 and 24

extending in opposite directions therefrom for connection, respectively, with the diaphragms D' and D''. The leg 22 is sufficiently longer than the arms 23 and 24 so as to constitute the leg 22 as a bridge for supporting the strings A, A, etc., of the instrument. To this end the leg 22 is provided with an upwardly extending web 25 which may be notched to receive and hold the strings A.

Thus, it will be observed that the usual bridge for instruments of this character is eliminated and the vibrations set up in the strings are directly communicated through the spider S to the diaphragms D, D' and D'', and due to the fact that the portion H of the body is provided with the opening *f'* therein, and the supporting member *h* for the diaphragm is likewise provided with the opening 16 beneath the diaphragms, the vibrations set up in the diaphragms when the instrument is played will at once be communicated to the walls and bottom of the body B and will amplify substantially, due to the form of construction and arrangement of parts shown.

The strings A are attached in the usual manner to the enlarged portion of the body by means of a tail-piece *t*, and the top T of the body is provided in the enlarged portion thereof with several series of openings, as at *e* and *e'* of suitable area, and in the reduced portion thereof adjacent the neck with enlarged openings E and E' protected beneath the top by means of a suitable grill composed of intersecting bars 26.

The guard G has a transverse portion 27 and a longitudinal portion 28 which cover, respectively, the leg 22 and arms 23 and 24 of the spider S, and the opening 27 in cover C through which the spider S is extended. The guard G may be soldered or riveted to the cover C through feet 29, 29, etc., which overlie the cover. The member *h* is removably held in position on the member H by means of a plurality of bolts or screws 30, 30, etc., secured to the flange *f* of said member H.

I have found in the construction of instruments of this character that the number, form and disposition of the diaphragms and their relation to the strings and the body of the instrument influence the tonal qualities of the instrument, and that devices constructed in the form and arrangement shown will produce the best results, although quite satisfactory results may be obtained in some cases with more or less of the diaphragms than I have shown in the drawings forming a part of this application.

I have also found that maximum vibrational and tonal qualities can be produced without the interposition between the diaphragm and the strings of the usual bridges which are usually formed of wood, and which to a certain extent at least serve to insulate the diaphragm from the vibrations rather

than to communicate the vibrations to their fullest extent thereto.

When constructed of metal, preferably aluminum as shown, the diaphragms are of minimum thickness and are in fact so thin that they may be readily flexed or indented by pressure of the finger thereon. Diaphragms of such character are therefore more easily vibrated and more readily communicate the vibrations to the body of the instrument than when constructed of thicker metal or of wood, which must of necessity be substantially thicker than metal in order to provide sufficient rigidity and strength. Particularly because of the more or less fragile character of the diaphragms it is desirable to enclose the same within the compartment *d* by means of the cover C, so that the diaphragms will be protected against injury by accidental or other means.

The openings in the portion H, the top T and cover C of the body, together with those in the supporting member *h* for the diaphragms are of such size and are so arranged that the vibrations produced within and on the body and amplified by the diaphragms may readily escape through the openings, thereby producing a maximum volume.

What I claim is:

1. A stringed musical instrument comprising a body formed of vibratory material, a plurality of thin metallic diaphragms loosely supported in and below the top of said body, a spider having triple arms connecting said diaphragms and extending through an opening in the top of the body, and a plurality of strings held in tension on said body and in contact with an arm of said spider for communicating the vibrations set up in the strings to said diaphragms and said body.

2. A stringed musical instrument including a body formed of thin sheet metal and having a central portion bent downwardly and inwardly thereinto from the top forming a recess, a plurality of conical metal diaphragms mounted in said recess, a metallic spider connecting apices of said diaphragms and having a transverse portion forming a bridge extended upwardly through an opening in the top of the body, and a plurality of strings held in tension over the top of the body and engaging said bridge for communicating vibrations set up in the strings to said diaphragms.

3. A stringed musical instrument comprising a body provided with openings in the top thereof and a central enlarged opening intermediate said other openings, a supporting member mounted in said central opening, a plurality of conical diaphragms mounted on said supporting member below said top, and formed of thin flexible aluminum, a spider connecting the apices of said diaphragms and provided with a transverse portion forming a bridge, and a plurality of

strings held in tension over the top of said body and in engagement with said bridge, for the purpose described.

4. A stringed musical instrument comprising a metallic body provided with openings in the top thereof and a central enlarged opening intermediate said other openings, a non-metallic supporting member mounted in said body below said central opening, a plurality of conical diaphragms mounted in a common plane on said supporting member below said top, a spider connecting the apices of said diaphragms and provided with a transverse portion forming a bridge, a plurality of strings held in tension over the top of said body and in engagement with said bridge, and a cover for said central opening provided with a guard overlying said strings and said bridge for enclosing said diaphragms.

5. A stringed musical instrument comprising a metallic body having openings in the top thereof, said top having a central portion depending into the interior of the body providing a recess, the bottom of said recess provided with an opening therein, a supporting plate having a plurality of openings therein forming the bottom for said recess, a plurality of conical diaphragms mounted on said plate over the openings therein and provided with annular beads on their peripheries, a cover over said recess attached to the top of the body, a spider connecting the central portions of said diaphragms and extended upwardly through an opening in said cover, and a plurality of strings held in tension over the top of the body and engaging a portion of said spider, for the purpose described.

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