A. FISCHER.

SOUND BOX FOR TALKING MACHINES.

APPLICATION FILED FEB. 3, 1908.

904,523. Patented Nov. 24, 1908.

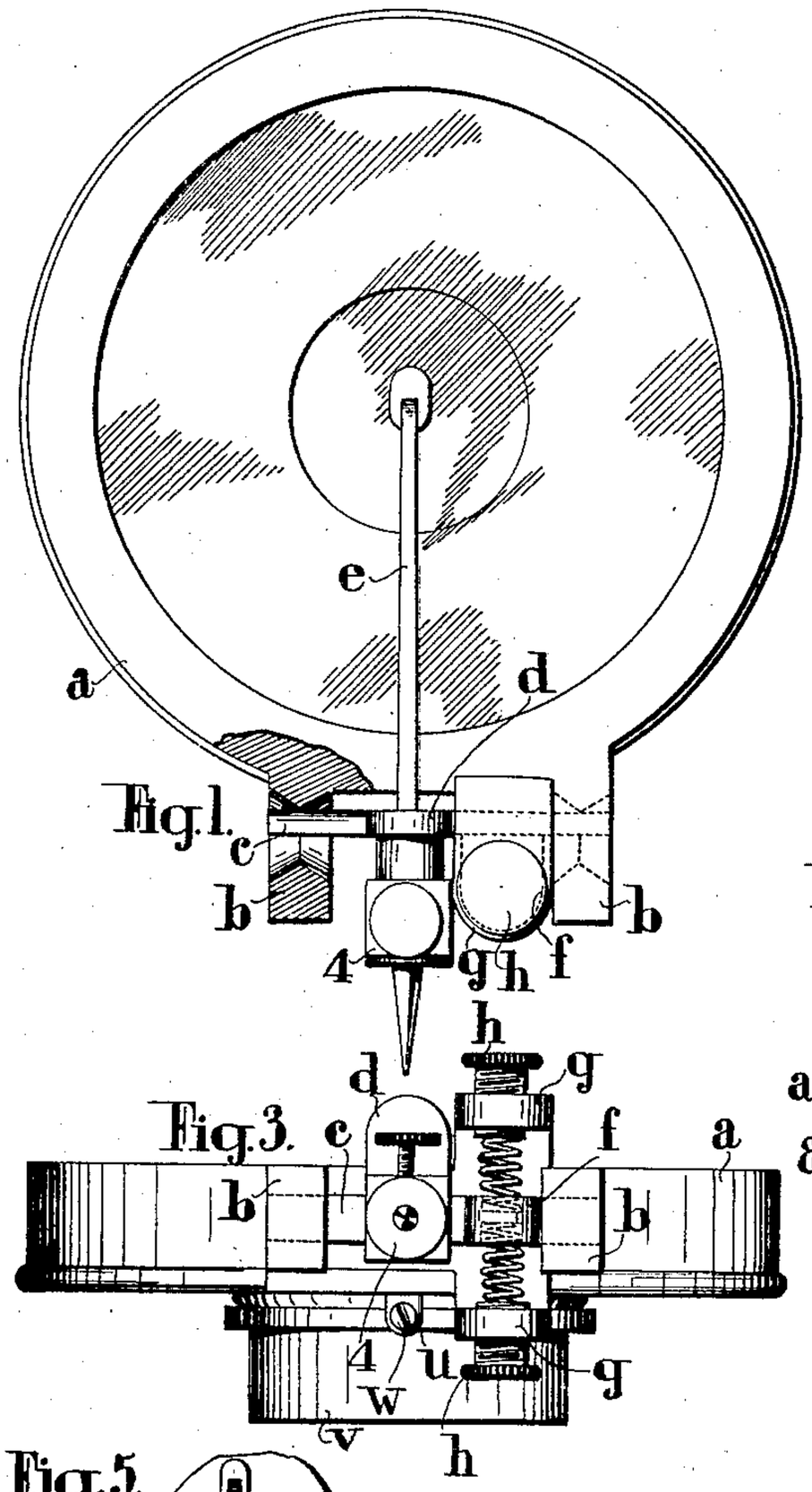

Fig. 1.

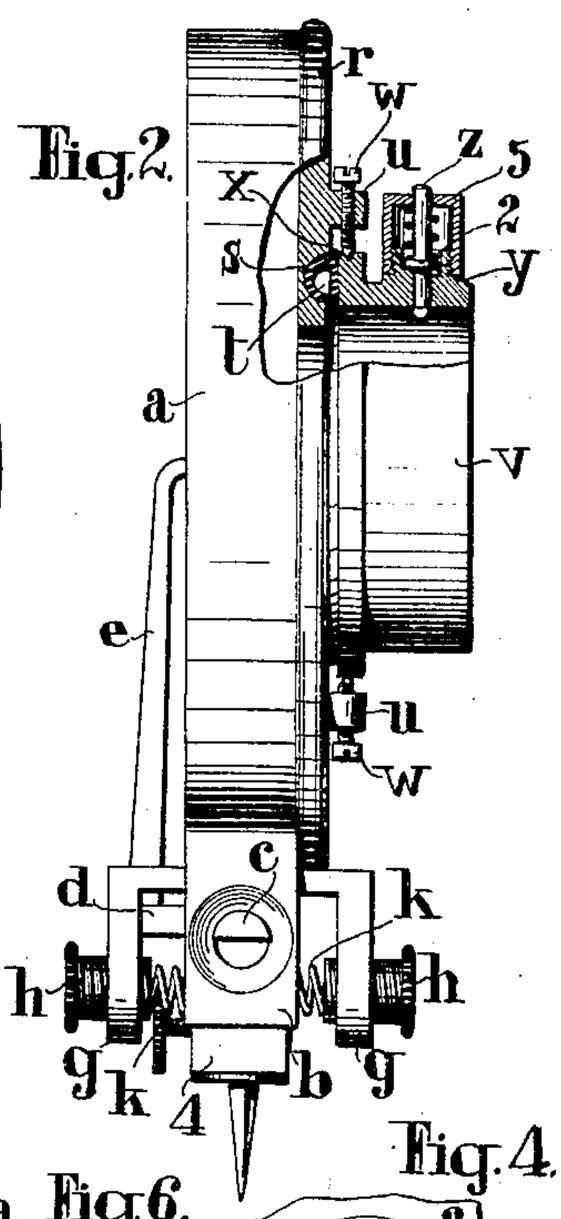

Fig. 2.

Fig. 3.

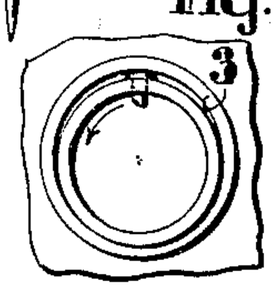

Fig. 4.

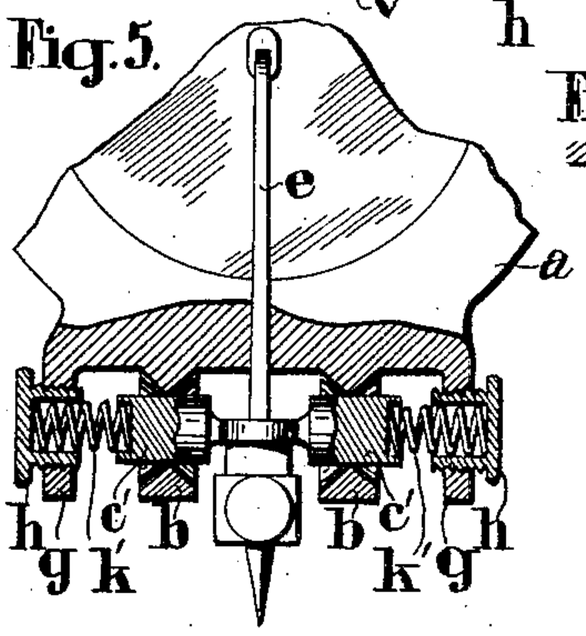

Fig. 5.

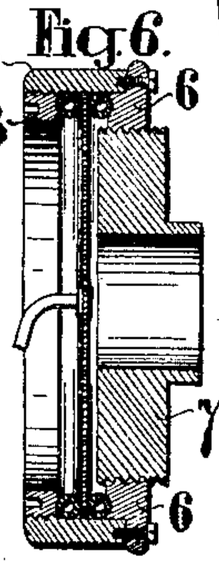

Fig. 6.

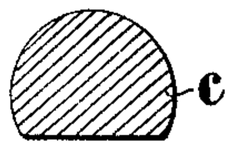

Fig. 7.

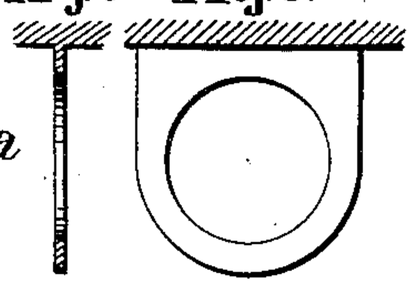

Fig. 8 Fig. 9.

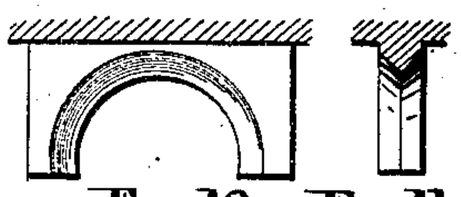

Fig. 10. Fig. 11.

Fig. 12.

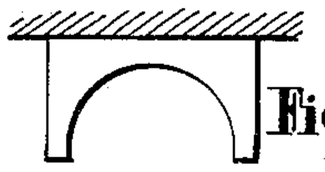

Fig. 13.

Witnesses:
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Inventor:
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by Williamson, Fish & Watkinson
his Attorneys

UNITED STATES PATENT OFFICE.

ALEX FISCHER, OF KENSINGTON, LONDON, ENGLAND.

SOUND-BOX FOR TALKING-MACHINES.

No. 904,523. Specification of Letters Patent. Patented Nov. 24, 1908.

Application filed February 3, 1908. Serial No. 414,070.

To all whom it may concern:

Be it known that I, ALEX FISCHER, a subject of the King of England, residing at 16 Maelise road, Kensington, in the county of London, England, have invented certain new and useful Improvements in the Construction of Sound-Boxes for Talking-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in the construction of sound boxes for talking machines of the disk type.

Hitherto in nearly all sound boxes the plate carrying the stylus and stylus bar is placed on knife edges or points and is pressed against the same by springs or by some other devices. These springs or other devices also perform the function of holding the stylus and the stylus bar in position. Unless these springs or other devices press the plate against the knife edges etc., tightly, there is jarring, when the sound box is played and in consequence the reproduction is bad. But this pressure also makes the stylus and the stylus bar rigid and, therefore, they are not free and sensitive enough to react to fine impulses of the stylus produced by the turning record. To improve this, I place the spindle carrying the stylus bar on two sensitive hinges as hereinafter described or in the known form of simple hinges or on center points which enter center holes in the plate, and I form an arm on the spindle which takes between two spiral or other springs. By these means the spindle will be quite free to react to the finest impulses, the springs having no other function than to hold the stylus and the stylus bar in position. The reproduction, therefore, becomes broad in tone, soft and natural and full of shading. There are, however, other advantages as well in this construction. The tension of the diaphragm can be regulated to a nicety by pushing the arm backwards or forwards as it is maintained in position by means of the springs. Both springs may be screwed tighter or looser according to the requirement of the record to be played or the nature of the diaphragm. And in order that my said invention may be better understood I will now proceed to describe the same with reference to the drawings accompanying this specification, in which:—

Figure 1 shows a front elevation of a sound box constructed according to my improved invention. Fig. 2 is a side view of the same, partly in section. Fig. 3 is an edge view thereof. Figs. 4 to 13, inclusive, show modifications and details hereinafter referred to.

The same letters and numerals of reference are employed to denote the same parts in all the views.

a shows the shell of the sound box. On this shell I mount two brackets *b*, *b*.

c shows a spindle passing through the brackets *b*, *b*. To the spindle *c* is connected (or it may be formed therewith) an arm *d*, to which the stylus bar *e* is fixed. Attached at right angles to the arm *d* is another arm *f*, recessed at each side.

g, *g* are two other brackets in which are screwed hollow nuts *h*.

k, *k* are two compression springs, one end of each of which passes into the hollow nuts *h*, and the other ends bear against the arm *f*.

Attached to the under part of the spindle *c* is a needle holder 4.

The spindle *c* is formed circular or partly circular in cross section, and the brackets *b*, *b* are oppositely beveled so that the bearing surface on the spindle *c* is reduced to a minimum. The spindle *c* to which the stylus bar *e* and the needle holder 4 are attached is in this way sensitively hinged to the shell *a* of the sound box. The tension of the diaphragm can be regulated by the action of the springs *k* and the hollow nuts *h* on the arm *f*. By screwing the front hollow nut in or the back out, the stylus bar, which is fixed to the diaphragm, will pull it (the diaphragm) and thus increase the tension of same. By screwing the back hollow nut in or the front one out, the stylus bar will be pushed towards the diaphragm and lessen the tension on same. Screwing the two nuts equally in, will not alter the position of the stylus bar, but will only stiffen the springs; while screwing them both out equally, will make the springs weaker without affecting the position of the stylus bar in any way.

The brackets marked *b* through which the ends of the spindle *c* pass may be made with a bevel bearing or may be made of a thin ring or its equivalent so as to give the spindle *c* a

minimum amount of bearing surface. The bracket *b* would then be formed with a hole of similar shape to the cross section of the aforesaid spindle *c*, namely circular or partly circular and in this form I may have either a bevel bearing or a thin part ring as aforesaid.

Fig. 7 shows cross section of the end of the spindle, but it may be made of an entire circle or any part of a circle.

Figs. 8 to 13 show several modified forms of bracket bearings; Figs. 8 and 9 show cross section and side view of a thin ring bearing; Figs. 10 and 11 show end elevation and side view of a bevel bearing having a hole which may correspond to the cross section of the end of the spindle *c* or it may be made circular or partly circular. Figs. 12 and 13 show two corresponding views to Figs. 10 and 11 but of a thin plate bearing.

Fig. 5 shows front elevation, partly in section, of a modified form of sound box using the compression springs. In this case the spindle *c'* has two circular ends which work in a bevel guide bearing *b*. The spindle *c'* has at each end recesses into which compression springs *k'* fit such compression springs being held in position by screw nuts *h* held by brackets *g* attached to the shell *a* of the sound box. The rest of the construction may be the same as that at Figs. 1 to 3, that is springs *k* may also be fitted on either side of the spindle *c*.

It may here be observed that in place of spiral springs such as those marked *k* flat springs may in all cases be fitted if preferred or found desirable.

In sound boxes so constructed the spindle carrying the stylus bar and needle holder turns, as shown, on a correspondingly formed guide bearing in the brackets *b*, whereas in all other known constructions of sound boxes the spindle does not turn but rocks on knife edges, points or the like, including the known construction where the spindle is provided with center holes and turns again on center points in those center holes.

I do not wish to limit myself to spiral springs, taking between them the small arm on the spindle, or to the use of hollow nuts, as these may be varied without departing from the principle of my invention. I may also use one tension adjusting spring on one side of the spindle only, instead of two, or one on each side, as described. I may also construct a cheaper form of sound box without diaphragm tension adjustment, where the spindle will be hinged as described, without the brackets *g*, *g* hollow nuts *h*, and springs *k*, *k* and of course without the arm *f*. I also do not wish to limit myself to the precise forms of the brackets *b* shown or described as equivalents may be used without departing from the principle of the invention which consists in having the end of the spindle cylindrical or partly cylindrical turning on a suitably formed guide bearing offering the minimum amount of surface.

Referring to Figs. 1 to 3, *r* shows the back plate of the sound box. This back plate is provided with an annular groove *s*, into which a rubber washer *t* (preferably tubular) is placed. *u*, *u* show two small brackets attached to the back *r*. *v* is a flanged tube forming the sound exit tube fixed on to the back of the sound box by center screws *w* screwing through the brackets *u* and into two center holes *x* in the flange of the tube *v*. In this position the flange of the ring *v* presses tightly against the hollow rubber ring *t*, making a flexible sound tight joint, which will allow the sound box a small turn around its vertical axis, the center screws forming the turning axis. On the tube *v* I form a boss *y* into which a spring pin *z* is fitted, such spring pin being provided with a flange 2 to limit its action, so that the bottom of the pin may enter a hole in the tone arm or trumpet in order to attach the sound box firmly thereto. 5 is a cap screwed on the boss *y* to hold the spring in position.

Fig. 4 shows a simplified form of spring for the pin. Instead of having the spiral spring and cap 5 screwed to the boss *y*, I have a rubber ring 3 passing round the tube *v* and over the head of the pin. At its lower end the spring pin is so formed that the sound box can only be turned in one direction, suitable means being employed to prevent the spring pin from turning round its vertical axis. Two holes (preferably opposite one another) are provided on the small end of the tone arm, on to which the sound box is pushed. In these holes the pin *z* springs, which will lock the sound box to the tone arm in the playing position, and with a half turn the sound box will be brought in position for changing the needle easily. The spring pin at its lower end is cut on the slant and will allow the sound box to be turned round in the direction as indicated by the arrow (Fig. 4) while a turn in the opposite direction will be impossible. By turning the sound box the pin held down by the spiral springs and cap or rubber ring will be pushed up, or slide up and ride on the top of the sound arm until the hole is reached again. An annular shallow groove may be provided on the tone arm connecting the two holes to form a guide for the pin to prevent the sound box from slipping off when not locked in the holes.

I may also use on the back of the sound box instead of the screws *w*, the brackets *u*, and the center holes *x* on the flanged tube *v*, other equivalent devices, say, hinging the flanged tube by simple hinges so as to allow a slight turn around its vertical axis.

In other respects the shell *a* and the back

of the sound box are of known type, but I may in some cases construct them as shown in detail at Fig. 6, in which figure the back *r* of the sound box is formed in two portions, the ring portion 6 of which is fixed to the shell *a* of the sound box. There is also a center portion 7 which is screwed or pushed into the ring portion 6 and screwed therein or otherwise suitably fixed at any required distance from the diaphragm. This construction will allow variation of the air space between the diaphragm and the back of the sound box. I may also form the shell part *a* in two portions, making a separate ring portion and a ring 8 screwing into same. This construction also enables the pressure of the two rubber gaskets which hold the diaphragm between them to be varied, by screwing the ring 8 into the shell portion *a*.

What I claim and desire to secure by Letters Patent of the United States of America is:—

1. In a talking machine, the combination of a casing, a diaphragm in said casing, a pair of guide bearings rigid with said casing, a spindle provided with a circular side mounted in said guide bearings, a stylus bar attached to the said spindle and to the said diaphragm, an arm carried by said spindle, a pair of brackets on said casing, a pair of springs, one on each side of said arm, located between said arm and said brackets, in line with each other and oppositely located, and a needle holder attached to said spindle, substantially as described.

2. In a talking machine, the combination of a casing; a diaphragm in said casing; a pair of perforated brackets rigid with said casing; a spindle provided with a flat and a circular side mounted in said brackets; a stylus bar attached to said spindle and to said diaphragm; a pair of springs for controlling said bar; a pair of hollow nuts for controlling said springs; and a needle holder also attached to said spindle, substantially as described.

3. In a talking machine, the combination of a casing; a diaphragm in said casing; a pair of oppositely beveled perforated brackets rigid with said casing; a spindle provided with a flat and a circular side mounted in said brackets; a stylus bar attached to said spindle and to said diaphragm; a second pair of brackets on said casing; a pair of springs for controlling said bar; a pair of hollow nuts for controlling said springs mounted on said second pair of brackets; and a needle holder also attached to said spindle, substantially as described.

In testimony whereof, I affix my signature, in presence of two witnesses.

ALEX FISCHER.

Witnesses:
LILY SIMMONDS,
A. BOURNE.