W. H. PUMPHREY.

TALKING MACHINE.

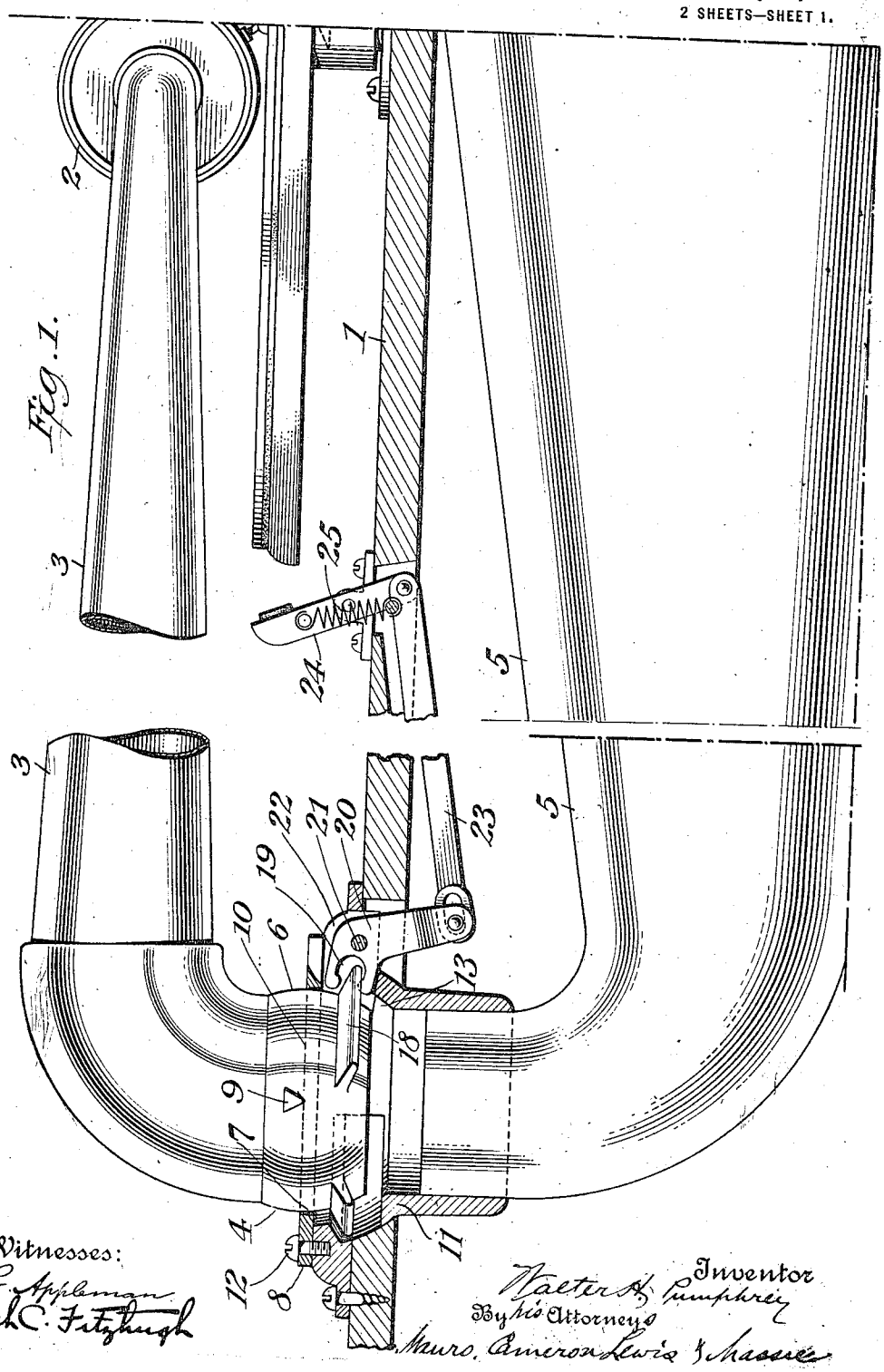
APPLICATION FILED OCT. 5, 1911.

1,139,224.

Patented May 11, 1915.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

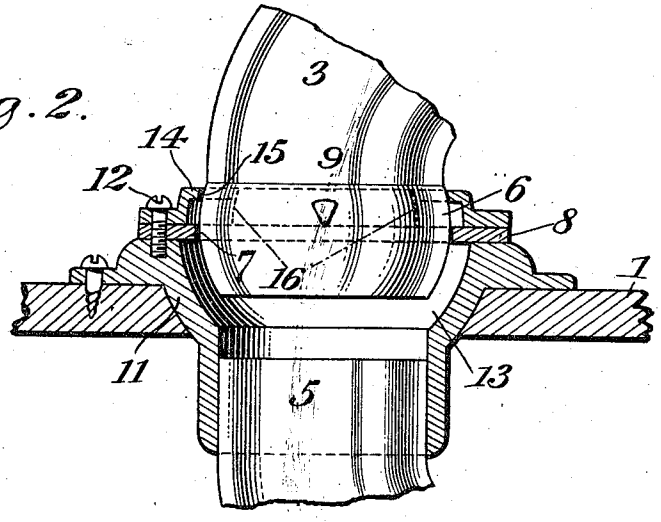


Fig. 3

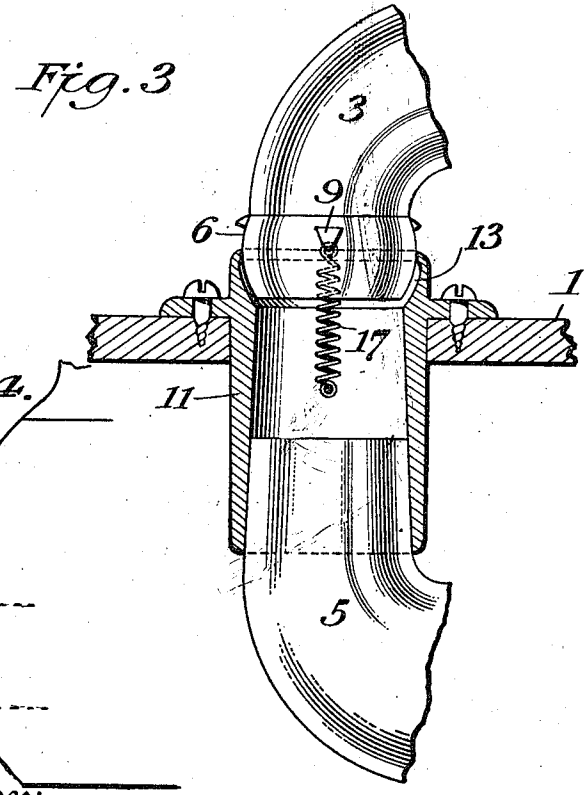


Fig. 4.

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UNITED STATES PATENT OFFICE.

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TALKING-MACHINE.

1,139,224. Specification of Letters Patent. Patented May 11, 1915.

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To all whom it may concern:

Be it known that I, WALTER H. PUMPHREY, a citizen of the United States of America, residing at New York, in the borough of Manhattan, county and State of New York, have invented certain new and useful Improvements in Talking-Machines, of which the following is a specification.

My invention relates generally to talking-machines and has particular reference to the mounting of the tone-arm thereof.

The object of the invention is to produce a mounting for the tone-arm employing a minimum number of parts, of extremely simple construction, which may be manufactured at a comparatively low cost and quickly assembled.

A further object is to arrange the parts in such relation as to make them readily accessible and facilitate their removal for purposes of examination or repair, etc.

A further object is to minimize friction in the mounting without in any way interfering with or limiting the freedom of movement of the tone-arm.

These and other objects and advantages are attained by the construction hereinafter described.

The accompanying drawings will serve to illustrate mechanism suitable for carrying my invention into effect. I wish it understood, however, that I do not limit myself to either the exact form or the details shown, as various changes may be made within the meaning of the present invention.

In the drawings: Figure 1 is a longitudinal section illustrating the application of my invention to a well known type of talking-machine, employing a disk record and a concealed horn. Fig. 2 is a similar view, showing the use of a ring for retaining the tone-arm in position. Fig. 3 is a sectional view, illustrating a modified form of mounting. Fig. 4 is an enlarged detail view.

Referring now to the drawings, 1 represents a talking machine of a form in common use, a portion of the motor cabinet being here shown, having a turn-table mounted thereon as a support for a disk type of record, with which a sound reproducer 2 is adapted to coöperate, in the usual manner.

The sound-box or reproducer 2 is secured to the free end of a tone-arm 3, which is mounted at 4, as will be hereinafter described, to have movement and swing freely in both vertical and horizontal planes, in order that the stylus of the reproducer may track in the record-groove and be fed across the disk by it, in the usual manner.

The mounting, shown at 4, serves to connect the tone-arm and the sound-amplifying means, which latter appears here as a concealed horn 5, *i. e.* a horn contained within the cabinet, and as the shape and arrangement of the same form no part of the present invention, it will not be further described.

The preferred construction of mounting is illustrated in Fig. 1, and takes the general form of a ball-and-socket joint, the end 6 of the tone-arm being shaped exteriorly as a portion of a sphere, which is fitted to turn freely in any direction in an opening 7 in a ring-plate 8. The tone-arm is supported thus and its movement is limited to vertical and horizontal planes, by diametrically-opposite projections 9 from the spherical portion of the arm, which co-act with an annular bearing 10, formed by the upper surface of the ring-plate 8, just referred to.

It will be observed that the annular surface or wall of the opening 7 meets the spherical surface of the tone-arm in tangential relation throughout the circumference thereof, and that the line of contact coincides with the plane of the upper surface or bearing 10 of the ring-plate and also with the center of the spherical enlargement of the tone-arm. The ring-plate, thus arranged, presents two annular converging surfaces which meet or intersect along a circular line. These are the surface 7, serving to center the tone-arm in the mounting, and the bearing surface 10, acting as a support on which the arm maintains itself by its own weight, and on which it is freely movable both vertically and horizontally. This brings the vertical and the horizontal axes where they intersect in the plane of the surface 10.

As shown, the mounting for the tone-arm is made up of separable sections, one of which is the ring-plate 8, above referred to. The base section 11 has the ring-plate removably secured thereon by screws 12, and is preferably cut away interiorly as at 13, to clear the spherical portion of the tone-arm in all positions to which the latter may be swung.

Ordinarily, the tone-arm will maintain

itself in operative relation to the bearings by its own weight; but when the machine is being shipped or moved about from place to place, or is in the hands of careless users, it is desirable to provide means for holding the arm in position. For this purpose, a third section 14 may be employed in the form of a retaining-ring, as shown in Fig. 2. The ring 14 is cut away interiorly to normally clear the spherical portion of the tone-arm but encircles it closely enough at 15, above the point of greatest diameter, to prevent accidental removal of the arm from the mounting.

From the foregoing, it will be seen that only one section of the mounting is in contact with the arm and that such contact is limited to the engaging faces of the projections 9 on the bearing 10. The tangential relation between the wall of the opening 7 and the spherical portion of the arm reduces the engagement to a mere line of contact and the fact that such line is in the plane of the arm-supporting bearing 10, minimizes friction and reduces the function of the bearing 7 to that of a mere guide to maintain the arm in centered relation in the mounting.

If is desirable to limit the swing of the tone-arm across the record, and for this purpose the retaining-ring 14 may be cut away as shown, to provide shoulders 16, 16, which co-act with the projections 9, as stops.

In Fig. 3 I have shown a one-piece mounting having the same general characteristics as the construction just described; but in this instance a helical spring 17, centrally located interiorily of the arm and mounting, is substituted for the retaining-ring 14 shown in Fig. 2, and serves to yieldingly maintain the arm in operative relation in the mounting, and against accidental removal.

The form of arm and a mounting illustrated in Figs. 1 and 2 is specially adapted for automatically operating a motor-brake of the type disclosed and claimed in my prior Patent No. 1,006,128, granted Oct. 17, 1911. The brake referred to is of the spring-thrown type but requires to be positively advanced or retracted a definite distance before the spring acts to throw the brake either on or off; and for the purpose of imparting such movement to the brake, there may be formed on the spherical portion of the arm a lip 18, shaped to enter the notched end 19 of a lever 20, pivoted at 21, in a slot 22, in the base section of the mounting, and connected through a rod 23 with the brake-lever 24. Thus arranged, upward movement of the tone-arm to lift the sound-box or reproducer clear of the record, will be imparted to the brake lever, through the connection described, to shift the brake far enough for the spring 25 to act and apply the same; and the reverse or downward movement of the sound-box (to playing position on the record) will, in a similar manner, be transmitted to cause the spring to act in throwing off the brake.

The lip 18 on the tone-arm is given such length as to insure its remaining in engagement with the notched end of the lever 20, in any and all positions to which the tone-arm may be swung, and when sufficiently extended, retaining-ring 14 may be dispensed with.

The many important advantages of my invention will be apparent from the foregoing, as will also the mode of operation and use and further description thereof will not be given.

Having, therefore, described my invention, I claim:

1. In a talking machine, the combination of a tone-arm supporting ring provided with a bearing surface, and a tone-arm arranged to have both vertical and horizontal movements, the axes of which movements intersect in the plane of said bearing surface.

2. In a talking machine, the combination of a horizontally disposed tone-arm supporting ring provided with a bearing surface, and a tone-arm shaped at one end as a portion of a sphere, and arranged to have both vertical and horizontal movements, the axes of which movements intersect in the plane of said bearing surface.

3. A tone-arm shaped exteriorly at one end as a portion of a sphere, and a mounting for the spherical end of the arm comprising a member having two annular surfaces relatively arranged to contact with the arm only in a plane passing through the center of the sphere, one of said surfaces forming a bearing surface.

4. A tone-arm shaped exteriorly at one end as a portion of a sphere and a mounting for said spherical end of the arm comprising a member having two annular surfaces relatively arranged to contact with the arm only in a plane passing through the center of the sphere, one of said surfaces forming a bearing surface, and retaining means for the arm above said bearing surface.

5. A tone-arm shaped exteriorly at one end as a portion of a sphere and a mounting for the shaped end of the arm comprising a bearing member having two annular surfaces relatively arranged to contact with the arm only in a plane passing through the center of the spherical portion thereof, and a removable retaining ring for the arm above the bearing member.

6. A tone-arm shaped exteriorly at one end as a portion of a sphere and a mounting for the shaped end of the arm comprising a bearing member having two annular surfaces relatively arranged to contact with the arm only in a plane passing

through the center of the spherical portion thereof, a removable retaining ring for the arm above the bearing member, and coacting means on the tone-arm and mounting to limit the movement of the arm.

7. In a talking machine, the combination of a tone-arm bearing surface, and a tone-arm arranged to have both vertical and horizontal movements, the axes of which movements intersect in the plane of said bearing surface, said tone-arm having a part in the form of a portion of a sphere contacting with said bearing surface only in the plane of said surface.

8. In a talking machine, the combination of an annular tone-arm bearing surface, and a tone-arm arranged to have both vertical and horizontal movements, the axes of which movements intersect in the plane of said bearing surface, said tone-arm having a spherical portion contacting with said bearing surface only in the plane of said surface.

9. In a talking machine, the combination of a horizontally disposed tone-arm bearing surface, and a tone-arm arranged to have both vertical and horizontal movements, the axes of which movements intersect in the plane of said bearing surface, said tone-arm having a part in the form of a portion of a sphere contacting with said bearing surface only in the plane of said surface.

10. In a talking machine, the combination of a tone-arm supporting ring, and a tone-arm having a part in the form of a portion of a sphere resting within said ring and contacting with the same only in the plane of the supporting surface thereof, said tone-arm being arranged to have both vertical and horizontal movements, the axes of which movements intersect in the plane of the supporting surface of said ring.

11. In a talking machine, the combination of a tone-arm supporting ring having two surfaces which converge and meet in a circular line, and a tone-arm having a part in the form of a portion of a sphere which contacts with said ring only along said circular line, said tone-arm being arranged to have both vertical and horizontal movements, the axes of which movements intersect in the plane of one of said surfaces.

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