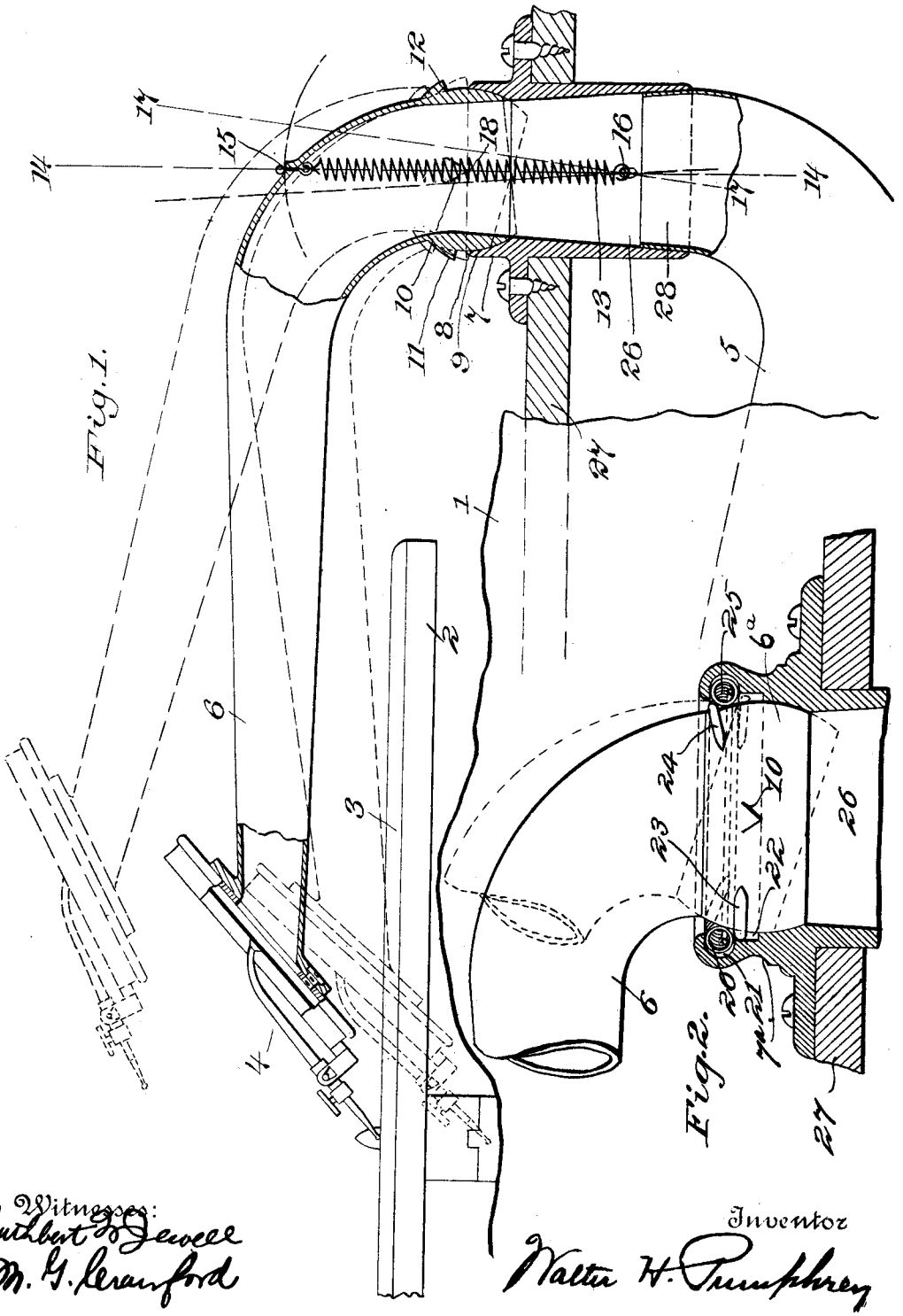
W. H. PUMPHREY.

TALKING MACHINE.

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TALKING-MACHINE.

1,087,256. Specification of Letters Patent. Patented Feb. 17, 1914.

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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 city, 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 more particularly to the construction and mounting of the sound-conveying tube or tone-arm employed in connection with such machines.

The object of the invention is to simplify the construction and dispense with small parts in mounting the tone-arm and at the same time give it the required freedom of movement in planes parallel and at right angles to the surface of the record.

The accompanying drawings will serve to illustrate several forms suitable for carrying my invention into effect. I wish it understood, however, that I do not limit myself to the exact constructions shown in the drawings, as various changes may be made therein within the meaning of the present invention.

In the drawings, Figure 1 is a view in elevation, partly in section, showing the application of my improved form of mounting to a modern talking machine. Fig. 2 is a detail sectional view illustrating another form which my invention may assume.

Referring to the drawings, 1 represents a portion of a casing or cabinet in which the machine is usually contained.

2 is a rotating table, carrying a sound record of the disk type. Coöperating with the record there is a reproducing sound-box 4, from which a sound-conveying tube or tone-arm leads and serves to connect the sound-box or reproducer with a horn 5.

As the novelty of the present invention lies in the construction and mounting of the tone-arm, the description will be confined to that feature, which is adapted for use with many types of machines other than that here illustrated. The tone-arm, as shown, is a sectional arm, consisting of two parts or members 6 and 7. The member 6 or main section thereof may be of uniform internal diameter throughout its length, if desired, but is preferably tapered and has its rear end shaped externally as part of a true sphere, as indicated at 8, which shaped or spherical portion is designed to seat in a similarly shaped bearing 9, formed in the open end of the second section 7 of the arm, the arrangement being such, as to form, in effect, a ball and socket joint between the tone-arm sections, permitting free motion of the main section 6 thereof, in planes at right angles to each other or parallel and at right angles to the surface of the record. The main section 6 is maintained upright or against slipping or falling sidewise, by oppositely disposed side lugs 10, which bear on the upper edge of the section 7. The vertical movement of the main section is likewise limited by front and back lugs 11 and 12 which, when the sound-box or reproducer is raised or lowered, as indicated by dotted lines in Fig. 1, co-act with the upper edge of the section 7.

Heretofore, a spring catch of suitable form has been employed to yieldingly hold the sound-box elevated above and clear of the record, and it is one of the objects of the present invention to dispense with the use of such a catch, as a separate device, and cause its function to be performed by a member or part below referred to, in addition to the main function of such part.

The main section of the tone-arm, mounted as above described, rests by its own weight in the spherical seat or bearing provided in the adjoining section 7 and in order to operatively connect these sections in assembled relation, a helical or other suitable form of spring 13 is secured, preferably in the line 14, 14, of the vertical axis of the section 6, one end of the spring being attached to the section 6 at the point 15 and the opposite end thereof to a cross pin 16 of the section 7. The manner of attaching the spring may be varied and suitable provision made to avoid torsional action as the tone-arm swings about its vertical axis.

Normally, that is when the sound-box is coöperating or in position to coöperate with the record, the spring is practically dead so far as its influence on the sound-box is con-

cerned, as its pull is in the line of centers, indicated by the vertical turning axis 14, 14, and while it draws the main section of the tone-arm into close contact or engagement with its bearing in the section 7, it does not in anywise appreciably limit or affect the freedom of movement of the sound-box. If, however, it is desired to yieldingly hold the sound-box against the record, this may be readily done by attaching the upper end of the spring somewhat to the left of the vertical axis 14, 14. When the sound-box or reproducer is swung upward, clear of the record, to the dotted line position indicated in Fig. 1, with the rear stop lug of section 6 engaging the edge of the section 7, the pull of the spring will be in the line 17, 17, to the right of the horizontal turning axis 18, and being thus shifted to one side of the center (18) the spring will yieldingly maintain the sound-box in the position described, performing this function, for which a spring catch is ordinarily employed, as above stated, in addition to its main function of operatively connecting the tone-arm sections.

While I have shown only one spring, it will be understood that two or more may be employed if desired and arranged in various ways to produce the result described.

In the modification illustrated in Fig. 2, the helical spring is in the form of a ring 20, having an internal diameter somewhat less than the greatest external diameter of the spherical end of the tone-arm section 6 and so arranged in an annular seat 21 in the section 7^a as to yieldingly oppose entrance therein of such spherical portion of the section 6^a. The section 7^a is counter-bored to provide an annular shoulder 22, corresponding to the upper edge of the spherical bearing and on which the side lugs 10 rest, as in Figs. 1 and 2. Front and rear lugs 23 and 24 are employed, as above described, to limit the vertical swing of the section 6 carrying the sound-box but in this instance, the lugs co-act directly with the spring to maintain the sound-box above and clear of the record, as indicated by dotted lines in the figure (3). The sections, in this form of the invention, are assembled by forcing the spherical end of section 6^a through the spring ring in section 7^a. Under this pressure, the ring expands and permits passage of the spherical portion to its bearing below and immediately thereafter the spring ring contracts, yieldingly gripping the section 7^a and acting to force it downward to a bearing in the seat below. The front lug 23 also passes through the spring ring and in co-acting with the annular shoulder 22 positively limits downward movement of the sound-box. When the sound-box is swung upward to the position indicated by dotted lines, the front lug is forced upward and the rear lug downward through the spring ring, which latter yieldingly opposes the return thereof to normal position and thereby maintains the sound-box elevated above and clear of the record. Excessive upward movement of the sound-box which would tend to disconnect the sections of the tone-arm, is prevented by the rear lug 24, which co-acts with the annular shoulder, and positively limits such excessive movement. To prevent the spring ring being accidentally forced out of the annular containing groove, a ring of wire may be employed in connection therewith, as indicated at 25, such wire ring being preferably of slightly greater diameter than the opening at the upper end of the section 7^a.

The section 7 of the tone arm is preferably secured fast to the casing of the machine and has a depending portion 26 which projects downward through an opening in a partition 27, to receive the small end 28 of the horn, or connect with other suitable sound amplifying means.

The operation, manner of assembling and disconnecting the parts, as well as the many important advantages of the invention will be apparent from the foregoing description.

Having, therefore, described my invention, I claim:

1. In a talking machine, the combination of a hollow tone-arm composed of a plurality of sections united by a universal joint, whereby one section is capable of moving both vertically and horizontally with relation to the other section, and an interior spring acting to hold the movable section in both operative and elevated position.

2. In a talking machine, a tone-arm composed of a plurality of hollow sections united together by a universal joint whereby one of the sections is capable of movement both vertically and horizontally with relation to the other section, and an interior spring reacting between the sections to hold them together and to retain the movable section elevated when adjusted into that position.

3. In a talking machine, a tone-arm composed of a plurality of hollow sections united by a universal joint whereby one of the sections is capable of movement around vertical and horizontal axes with relation to the other section, and a spring within the hollow sections connected to each of the sections and normally lying within the vertical axis of the movable section, whereby said spring holds the sections together, and also holds the movable section in either the operative or elevated position, as it may be adjusted.

4. In a talking machine, a tone arm composed of a plurality of hollow sections united by a universal joint whereby one of the sections is capable of movement around

vertical and horizontal axes with relation to the other section, and a spring within the hollow sections lying within the vertical axis of the movable section and having one end connected to said movable section and the other end to said stationary section whereby said spring holds the sections together and also holds the movable section in either the operative or elevated position as it may be adjusted.

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