J. C. ENGLISH.

TALKING MACHINE.

APPLICATION FILED JULY 29, 1911.

1,042,098. Patented Oct. 22, 1912.

Fig. 1.

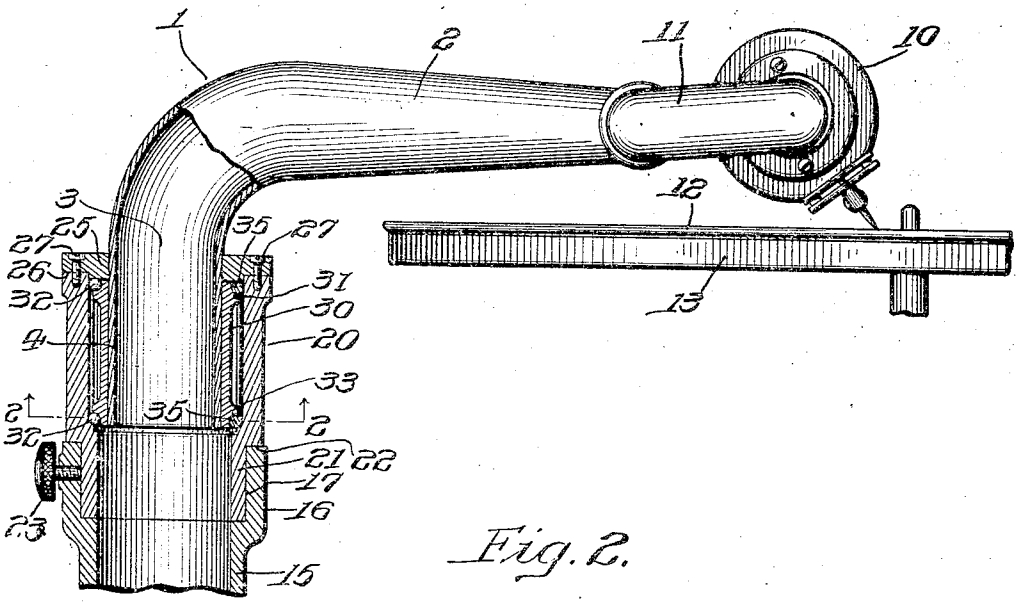
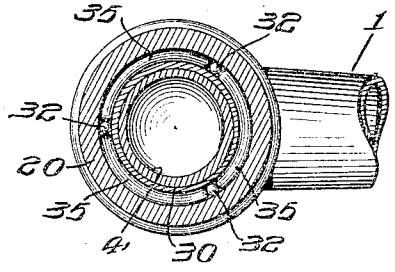


Fig. 2.



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TALKING-MACHINE.

1,042,098. Specification of Letters Patent. Patented Oct. 22, 1912.

Original application filed May 29, 1909, Serial No. 499,080. Divided and this application filed July 29, 1911. Serial No. 641,250.

To all whom it may concern:

Be it known that I, JOHN C. ENGLISH, a citizen of the United States, and a resident of the city of Camden, county of Camden, and State of New Jersey, have invented certain new and useful Improvements in Talking-Machines, of which the following is a specification, this application being a division of my application, Serial No. 499,080, filed May 29, 1909.

The main objects of this invention are to provide in a talking machine, an improved combined sound box, and tone arm and mounting therefor; to provide an improved anti-friction mounting for a tone arm or sound box arm, and to provide other improvements as will appear hereinafter.

In the accompanying drawings, Figure 1 is a fragmentary side elevation of a talking machine partially in vertical central section, showing one embodiment of this invention; and Fig. 2 a horizontal section on line 2—2 of Fig. 1 looking in the direction of the arrows.

Referring to the drawings, one embodiment of this invention comprises a hollow tapering tone arm or sound box arm 1, the smaller end 2 of which preferably projects substantially horizontally and the larger end of which is turned downwardly through an arc of 90 degrees and terminates in a substantially vertical cylindrical portion 3.

Connected to the smaller end of the tone arm 1 in any well known or suitable manner so as to communicate therewith and be movable upwardly and downwardly with respect thereto is a sound box 10 of any well known or suitable construction. In this instance the sound box 10 is connected to the smaller end 2 of the tone arm in a well known manner by means of a longitudinally curved tube 11, one end of which is pivotally connected to the smaller end of the tone arm and the other end of which is connected to the sound box. The sound box 10 is arranged to coöperate with the usual sound record 12 mounted upon the usual turntable 13.

For rotatably supporting the sound box arm 1 so that its smaller horizontal end 2 will be restrained to swing in a fixed horizontal plane, there is provided beneath and in axial alinement with the larger end 4 of the sound box arm, a downwardly extending hollow bracket or support 15 which is fixed in position by being rigidly secured to the usual cabinet (not shown) of the talking machine, or to any other fixed support. The upper end of the hollow bracket 15 is substantially cylindrical in shape and is enlarged externally as at 16 and provided internally with an annular cylindrical recess extending from the top of the bracket a short distance downwardly into the enlarged end of the bracket, forming a vertical socket 17.

Telescoping in the socket 17 of the hollow support 15 is a substantially cylindrical and vertical hollow head or casing 20, the lower end of the head being reduced in diameter externally, or provided with an external annular recess, to form a cylindrical neck 21 which fits snugly but removably into the recess 17 of the bracket 15. Between the neck 21 of the casing 20 and the upper portion thereof, there is thus formed an annular external shoulder 22 which rests upon the upper end of the bracket 16 when the casing is in operative position in the bracket. The casing 20 is held in a fixed position in the bracket 15 by means of a thumb screw 23 threaded through the upper portion of the bracket and engaging against the neck 21 of the casing, and the casing may be readily removed from the bracket when the screw is loosened.

The upper end of the casing 20 surrounds and is spaced from the lower or larger end 4 of the tone arm 1, and is closed by an annular cover 25 in which the larger end 4 of the tone arm fits snugly but rotatively. The under side of the cover 25 is provided with an annular peripheral recess 26 in which the upper end of the casing 20 fits snugly, and the cover is held rigidly in place upon the casing 20 by screws 27 extending through the covers and threaded into the casing. The portion of the sound box arm within the casing 20 is surrounded by a sleeve 30 within the casing and rigidly secured to the arm by any suitable means, the sleeve preferably fitting tightly around the arm.

The sleeve 30 is preferably enlarged at each end and is provided at each end with

an annular external groove coaxial therewith to form annular bearings 31 for anti-friction balls 32. The interior of the casing 20 is enlarged to receive the sleeve 30 and to form an annular bearing 33 opposite the lower annular bearing 31 of the sleeve, the interior diameter of the enlarged portion of the casing being somewhat greater than the outside diameter of the sleeve to permit of the free rotary movement of the sleeve.

The balls 32 surrounding the upper end of the sleeve rest in an annular raceway formed by the annular bearing 31 upon the upper end of the sleeve and annular bearings formed by the inner portion of the upper end of the casing and the adjacent inner portion of the cover 25, and the balls 32 surrounding the lower end of the sleeve rest in an annular raceway formed between the annular bearing 31 on the lower end of the sleeve 30 and the corresponding annular bearing 33 formed in the casing.

Preferably but three balls 32 are used in each annular raceway between the sleeve 30 and the casing 20, thus forming a three point support in each raceway for the tone arm. The three balls in each raceway are preferably equi-spaced, each ball being separated from each adjacent ball by means of a segmental space bar 35, preferably round in cross section, which fits loosely in the raceway.

From the foregoing description, it is evident that this invention provides a simple and durable anti-friction mounting for a tone arm by which the tone arm will be restrained to rotate or oscillate freely about a fixed axis. By providing the larger end of the tone arm with spaced annular bearings or raceways, each containing a set of three balls, the larger end of the tone arm is held against lateral or longitudinal movement and the smaller or free end 2 of the tone arm is restrained to rotate or oscillate smoothly and freely in a horizontal plane about an axis coincident with the longitudinal vertical axis of the larger end of the tone arm. By thus mounting the tone arm, a maximum efficiency of the sound box is obtained.

Although only a single form has been illustrated herein in which this invention may be embodied, the invention is not limited to any particular construction but may be varied to meet various conditions without departing from the spirit of this invention or the scope of the appended claims.

Having thus described my invention, I claim and desire to protect by Letters Patent of the United States:—

1. The combination with a hollow bracket, of a hollow head detachably connected to said bracket and communicating therewith, a radial sound box arm rotatably engaging in said head, a sleeve surrounding and fixed upon said arm in said head, and rotary antifriction means between said sleeve and said head.

2. The combination with a hollow bracket, of a hollow head detachably connected to said bracket and communicating therewith, a radial sound box arm rotatably engaging in said head, a sleeve surrounding and fixed upon said arm in said head, and ball bearings between said sleeve and said head.

3. The combination with a hollow head, of a radial sound box arm engaging in said hollow head, a sleeve surrounding said arm and fixed thereon in said head, said sleeve being provided with annular recesses and rotary antifriction means in said recesses, between said sleeve and said head.

4. The combination with a fixed hollow bracket having one end enlarged and provided with an internal annular recess, of a hollow head detachably fixed in said recess, a radial sound box arm engaging in said hollow head, a sleeve surrounding said arm and fixed thereon in said head, said sleeve being provided with annular recesses, and balls in said recesses between said sleeve and said head.

5. The combination with a hollow head of an annular cover removably connected to said head, a radial sound box arm projecting through said cover and into said head, a sleeve surrounding and fixed on said arm in said head and having annular grooves forming bearings, one of said grooves being adjacent the inner surface of said cover, and balls in said grooves contacting with said sleeve and with said head.

6. The combination with a hollow bracket, of a hollow head detachably fixed thereon and communicating therewith, an annular cover removably connected to said head, a radial sound box arm projecting through said cover and into said head, a sleeve surrounding and fixed on said arm in said head and having annular grooves forming bearings, one of said grooves being adjacent the inner surface of said cover, and balls in said grooves contacting with said sleeve and with said head.

7. The combination with a hollow head of an annular cover removably connected to said head, a radial sound box arm projecting through said cover and into said head, a sleeve surrounding and fixed on said arm in said head and having annular grooves forming bearings, one of said grooves being adjacent the inner surface of said cover, and balls in said grooves contacting with said sleeve and with said head and its cover, said head being enlarged internally to receive said sleeve and said balls.

8. The combination with a hollow bracket of a hollow head detachably fixed thereon and communicating therewith, an annular

cover removably connected to said head, a radial sound box arm projecting through said cover and into said head, a sleeve surrounding and fixed on said arm in said head and having annular grooves forming bearings, one of said grooves being adjacent the inner surface of said cover, and balls in said grooves contacting with said sleeve and with said head and its cover, said head being enlarged internally to receive said sleeve and said balls.

9. The combination with a sound box arm, of a sleeve on one end of said arm, having annular grooves in the opposite ends thereof, supporting members in said grooves, and segmental spacing members between said supporting members.

10. The combination with a sound box arm, of a sleeve on one end of said arm, having annular grooves in the opposite ends thereof, equally spaced supporting members in said grooves, and segmental spacing members between said supporting members.

11. The combination with a sound box arm, of a sleeve on one end of said arm, having annular grooves in the opposite ends thereof, equally spaced rotary supporting members in said grooves, and segmental spacing members between said rotary supporting members.

12. The combination with a sound box arm, of a sleeve on one end of said arm, having annular grooves in the opposite ends thereof, equally spaced rotary supporting members in said grooves, and segmental spacing members between said rotary supporting members, the rotary members in the respective grooves acting in opposite directions longitudinally of said sound box arm to form a double thrust-bearing.

13. The combination with a sound box arm, of a sleeve on one end of said arm having annular grooves in the opposite ends thereof, three equi-spaced rotary supporting members in each of said grooves, and segmental spacing members between said rotary supporting members.

14. The combination with a sound box arm, of a sleeve on one end of said arm having annular grooves in the opposite ends thereof, three equi-spaced supporting members in each of said grooves, and segmental spacing members between said supporting members.

15. The combination with a hollow bracket, of a hollow head detachably connected to said bracket and communicating therewith, a radial sound box arm rotatably engaging in said head, a sleeve surrounding and fixed upon said arm in said head, and equi-spaced rotary anti-friction means between said sleeve and said head.

16. The combination with a hollow bracket, of a hollow head detachably connected to said bracket and communicating therewith, a radial sound box arm rotatably engaging in said head, a sleeve surrounding and fixed upon said arm in said head, and equi-spaced ball bearings between said sleeve and said head.

In witness whereof I have hereunto fixed my hand this 27th day of July, A. D. 1911.

JOHN C. ENGLISH.

Witnesses:

FRANK B. MIDDLETON, JR.,

CHARLES F. WILLARD.