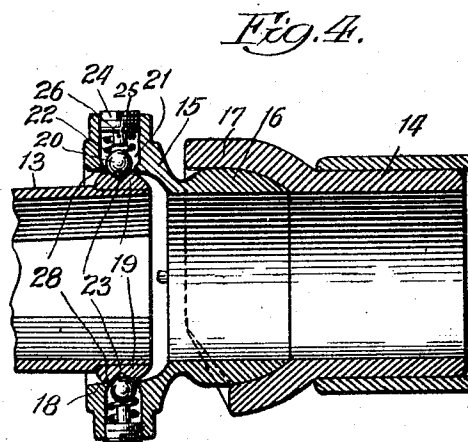
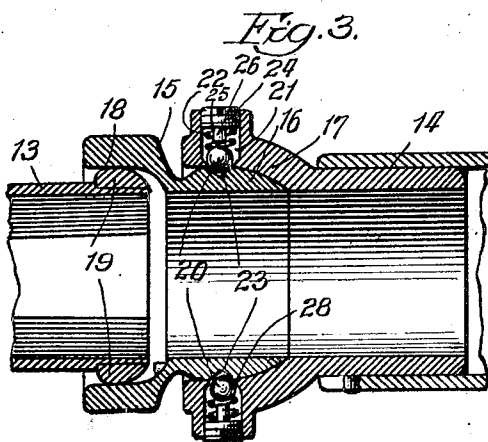
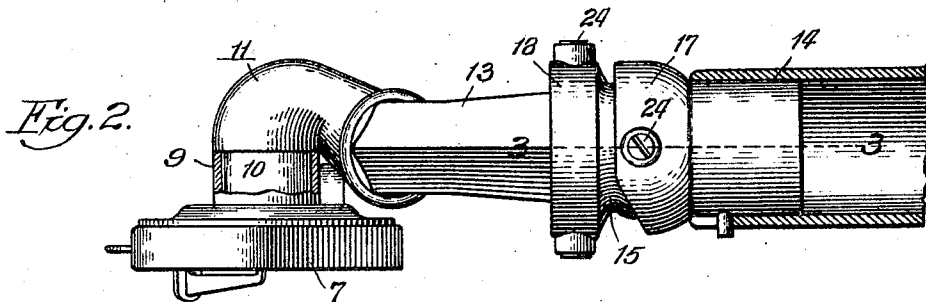
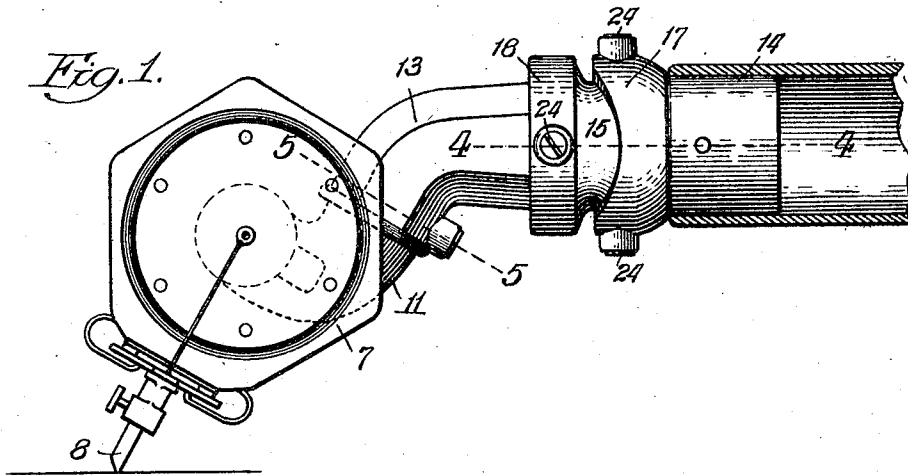


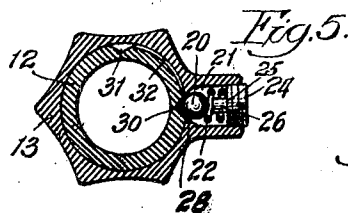
Feb. 20, 1923.

E. FLETCHER.
PHONOGRAPH.
FILED SEPT. 27, 1920.

1,446,006.



Witness:
John Enders



Inventor:
Elmer Fletcher
By Fred J. Gelsch
his Atty.

UNITED STATES PATENT OFFICE.

ELMER FLETCHER, OF CHICAGO, ILLINOIS, ASSIGNOR TO FLETCHER-WICKES COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PHONOGRAPH.

Application filed September 27, 1920. Serial No. 413,140.

To all whom it may concern:

Be it known that I, ELMER FLETCHER, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful improvements in Phonographs, of which the following is a full, clear, and exact description.

The invention relates to phonographs.

In phonographs provided with sound boxes adapted to operate records adapted to feed the tone-arm and those in which the tone-arm is operated by independent feeding mechanism, it is necessary to provide pivotal connections or joints between the tone arm sections to permit relative movement between the tone-arm and the sound box, as well understood in the art. Heretofore, the joints have been constructed so that more or less looseness or play was inevitable, either by reason of their construction or as a result of wear, accidental disconnection was possible. Any such looseness causes a rattle between the members of the tone-arm and has been found to be objectionable because it interferes with the conduction of the sound.

The object of the invention is to provide an improved joint or connection for tone-arm sections which will not rattle; in which wear may be taken up and which will not be connected so it will be accidentally separated.

The invention consists in the several novel features hereinafter set forth and more particularly defined by claims at the conclusion hereof.

In the drawings: Fig. 1 is a side elevation of a sound-box and a portion of the tone-arm embodying the invention. Fig. 2 is a plan. Fig. 3 is a section taken on line 3—3 of Fig. 2. Fig. 4 is a section taken on line 4—4 of Fig. 1. Fig. 5 is a section taken on line 5—5 of Fig. 1.

The invention is illustrated in an instrument comprising a sound-box 7 to which is connected a needle 8. The sound box is provided with a socket 9 into which is fitted a tubular terminal 10 of elbow 11. The other terminal 12 of the elbow is tubular and extends into the outer end of member 13 of the tone arm. The inner member 14 of the tone-arm is connected to the outer member 13 by a universal joint comprising a coupling member 15 which is provided with a spherical

portion 16 fitting in a cylindrical socket 17 secured in member 14 and with a socket 18 to receive a spherical portion 19 on the inner end of the member 13.

Coupling member 15 is held in connected pivotal relation with each of the members 19 and 17 respectively by a pair of oppositely disposed pivot-devices. Each of these devices consists of an anti-friction ball 20 held in the lower portion of a socket 21, a coil spring 22 in said socket and bearing upon the ball and pressing it into a V-shaped seat 23 and a screw 24 threaded to the socket 21 and formed with a shoulder 25 serving as an abutment for the outer end of the spring and a central reduced portion 26 which is adapted to act as a stop to limit the retraction of the ball from the V-shaped seat 23. The balls are held in the members which have concave portions and the seats 23 are formed in the concave portions of the members for coupling the tone arm. As a result of these pivot devices, the balls will be constantly pressed into the V-shaped seats, so that the members of the joint will be connected so they will not be loose or rattle. The inner end of the socket 21 is slightly undercut or formed so the ball cannot pass inwardly therethrough, as at 28. The springs press the balls in their respective seats so that they will be constantly seated therein. The screws 24, on which the stops 26 are formed, are adjusted so that said stops will be disposed in close proximity to, but out of contact with, the balls. As a result, stress should be applied tending to pull the members apart, the tapered seats would force the balls outwardly and, at such times, the stops 26 would limit the outward movement of the balls and prevent sufficient retraction to prevent disconnection of the members.

The sound box is rotatable on the end 10 of the elbow 11 to a limited extent, usually 90 degrees, and a member 13 is similarly connected to adapt the tone-arm for use on different machines. Each of the connections for the elbow 11 comprises a ball 20 held in a socket 21, a spring 22, a screw 24 and a stop 26 similar to the pivot-devices of the universal joint between the members 13 and 14 of the tone-arm. The inside member of each of these rotatable connections between the elbow and the sound-box and tone-arm member 13 respectively is formed with two V-shaped seats 30 and 31 for a ball 20 and a

shallow arcuate groove 32 extends between these seats. When one member is rotated relatively to the other, one side of the V-shaped seat in which the ball is held will force the ball outwardly against the force of the spring sufficiently to permit the inner member to be rotated, the ball riding in the groove 32 until it reaches the other V-shaped seat. In this instance, the stop 26 prevents sufficient outward movement of the ball to permit disconnection of the members, but permits sufficient retraction of the ball to permit turning one member relatively to the other. In this instance, the pivot device serves to retain the connecting members in rotatable connected relation.

The invention exemplifies a phonograph in which pivotally connected devices are connected so that the joints will not rattle or produce any noise to influence the tone of the instrument.

The invention is not to be understood as restricted to the details set forth, since these may be modified within the scope of the appended claims, without departing from the spirit and scope of the invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent, is:

30 1. In a phonograph, the combination with two tubular members and a pivotal connection between them comprising a ball, a tapered seat for the ball in one member,

a socket in the other member in which the ball is held, a coil-spring in the socket, and a screw in the socket for pressing the spring against the ball and having means disposed to limit the retraction of the ball from its seat and prevent disconnection of the members.

2. In a phonograph, the combination with two tubular members and a pivotal connection between them comprising a ball, a tapered seat in one member for the ball, a socket in the other member in which the ball is held and having a constricted inner end to retain the ball in the socket, a spring in the socket, and a screw in the socket for pressing the spring against the ball, having a reduced inner end positioned to act as a stop for the ball and limit its retraction to retain the members in connected relation.

3. In a phonograph, the combination with two rotatably connected tubular members one within the other and a retaining device between them comprising a ball, a plurality of tapered seats and a connecting groove in the inside member and for the ball, a socket in the outside member in which the ball is held, a spring in the socket, and a screw for pressing the spring against the ball and having means to limit the retraction of the ball from its seat to retain the members in connected relation.

ELMER FLETCHER.