Sept. 21, 1954

C. F. JENSEN

2,689,738

ELECTROMECHANICAL PHONOGRAPH TRANSDUCER

Filed June 8, 1949

Fig. 1.

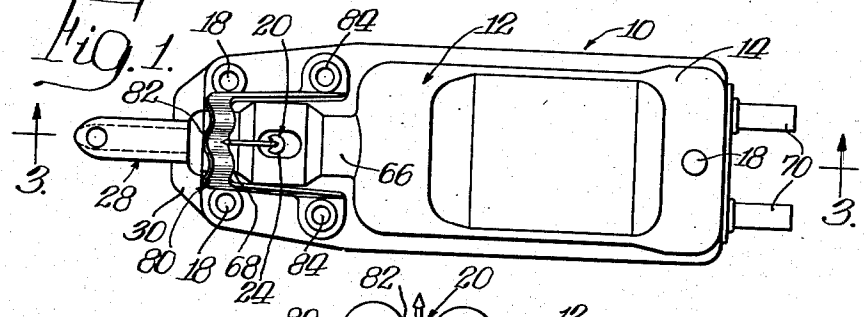



Fig. 2.

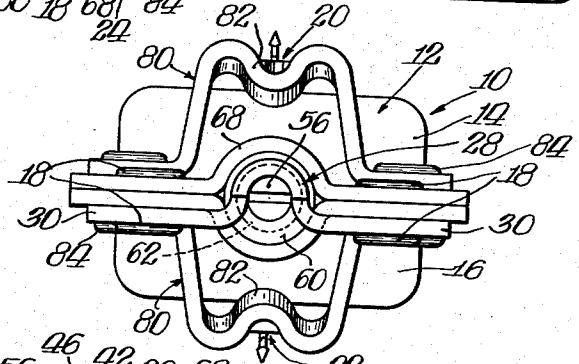



Fig. 3.

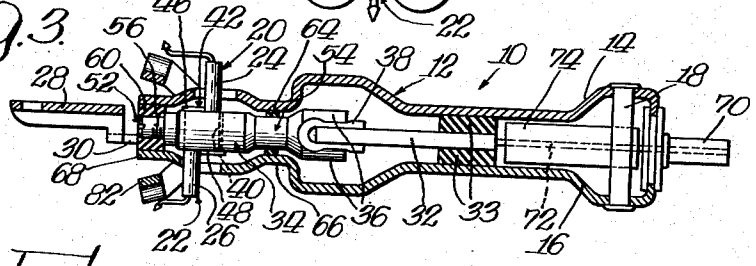
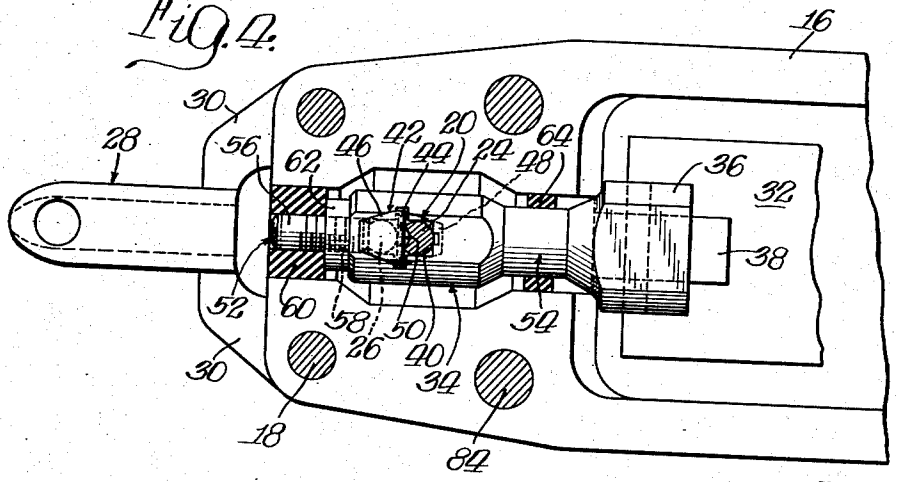



Fig. 4.




INVENTOR.

Clarence F. Jensen,

BY

Mason, Kolehmainen, Rathburn & Wyss

Attys.

Patented Sept. 21, 1954

2,689,738

# UNITED STATES PATENT OFFICE

2,689,738

## ELECTROMECHANICAL PHONOGRAPH TRANSDUCER

Clarence F. Jensen, Racine, Wis., assignor to Webster Electric Company, Racine, Wis., a corporation of Delaware

Application June 8, 1949, Serial No. 97,824

4 Claims. (Cl. 274—37)

1

The present invention relates to an electromechanical transducer and it has for one of its primary objects the provision of a new and improved transducer which is especially suitable as a pickup used in the reproduction of sound from records.

A further object of the present invention is to produce a new and improved transducer characterized by its light weight and low inertia.

A further object of the present invention is to provide a new and improved transducer including a transducer element actuating needle chuck having spaced trunnions, one of which is constituted by an axially movable needle securing element, preferably a needle securing screw.

In brief, the transducer of the present invention includes a needle chuck which is movable by a needle secured in the chuck and adapted to engage in the sound grooves of records. The chuck is mounted for torsional movement by axially spaced apart trunnions, one of which is constituted by a needle securing element, such as an axially movable securing screw. The chuck is mounted in spaced apart bearings of some suitable damping material which are held in compression around the trunnions by cooperative parts of a housing which may include two like but opposed parts held together by suitable means such as rivets.

Other objects and advantages of the present invention will become apparent from the ensuing description of an illustrative embodiment thereof, in the course of which reference is had to the accompanying drawings, in which:

Fig. 1 is a top plan view of a pickup constructed in accordance with the present invention;

Fig. 2 is an enlarged front elevational view of the pickup;

Fig. 3 is an axially vertical cross sectional view through the pickup taken along the line 3—3; and

Fig. 4 is an enlarged fragmentary axial horizontal cross sectional view through the pickup.

Referring now to the drawing, it may be noted that the pickup which is indicated generally by the reference character **10** comprises a housing **12** including like opposed portions **14** and **16** secured together in a suitable manner as by rivets **18**. The housing portions can be stamped from metal or molded from some suitable plastic material.

The pickup illustrated is of the multiple needle type for playing records of different types such as conventional or "long playing" records. It should be understood, however, that this type of

2

pickup has been shown for illustrative purposes only and that the present invention may be embodied in pickups of various types and which include one or more needles. The illustrated pickup includes a needle **20** for playing conventional records and a needle **22** for playing long playing records. The needle **20** includes a shank **24** and needle **22** includes shank **26**, the shanks being secured to the remainder of the needle structure in a desired manner, as by soldering, welding or swaging.

The needles project beyond the housing so that they may be selectively positioned to engage a record. According to one arrangement the pickup can be supported for rotation in a tone arm (not shown) along its longitudinal axis so that one or the other of the needles extends downwardly for engagement with a record placed on a turntable. The means for rotatably securing the pickup includes the forwardly extending structure **28** having a bifurcated end **30** secured to the housing by the rivets **18**. The rear end of the cartridge is adapted rotatably to be supported by means not shown, but which may be like that disclosed in my copending application Serial No. 82,315, filed March 19, 1949, now abandoned.

A suitable electro-mechanical transducer **32**, which is illustrated as being of the "twister" crystal type, but which may be of other types, is mounted within the housing between the damping and holding blocks **33** for actuation by one or the other of the needles through a needle holding chuck **34** provided with spaced clamping jaws **36** at one end adapted to embrace and to be secured to the transducer. A damping strip **38** can be placed between jaws and crystal.

The chuck is provided with an aperture **40** into which the needle shanks extend. The needle holding means includes a locating and holding element **42** having a central portion **44** extending through the aperture and flanged ends **46** and **48** engaging opposite sides of the chuck thereby to hold the needle locating and holding element in position. The central portion of the element is provided with a resilient tongue **50** disposed so as to be in line with the needle shanks when the needles are placed in the aperture and to be of a desired cross sectional configuration to facilitate locating of the needles, which are provided with shanks of different configuration. If desired, the construction may be and is illustrated as being like that disclosed and claimed in the co-pending application of David J. Munroe, Serial No. 97,809, filed contemporaneously herewith.

In accordance with the present invention, the

chuck is movably supported within the housing by spaced trunnions **52** and **54**, the former of which is constituted by a movable needle securing element, which may take the form of the screw **56**. The screw is movably mounted in the outer end portion of the chuck which has an internally threaded opening **58** for receiving the screw, which is externally threaded. The other trunnion **54** is located between the needle receiving portion of the chuck and the end in cooperative relationship with the crystal.

The chuck is mounted in spaced bearings encircling and compressively held around the trunnions. The bearing surrounding the securing screw is indicated by the reference character **60**. It extends outwardly beyond the head of the screw and abuts against the end **62** of the chuck, thereby to form what might be considered a thrust bearing. The other bearing, which is indicated by the reference character **64**, encircles the trunnion **54**. The bearings are held under compression and the various parts are held in assembled relation by the reduced dimensions of portions **66** and **68** of the pickup housing.

The electrical connection to the crystal is made through the terminals **70** secured to the rear end of the housing and connected by conductors **72** to the crystal. The conductors (only one of which is shown) are insulated from the casing by insulating strips **74**.

Damage to the needles by the application of excess pressure to the tone arm is prevented by the opposed arms **80** which are of generally U configuration, as best illustrated in Fig. 2. The bights are reversely bent slightly, as indicated by reference character **82**, in line with the needles. The protecting structures are secured to the housing by the rivets **84**.

From the foregoing detailed description of the present invention it is apparent that the transducer of the present invention is simple and inexpensive to construct and that it is also light and has a low mechanical inertia because of the elimination of the usual trunnion and because of the concentration of a larger percentage of the weight at the axis of the chuck.

While the present invention has been described in connection with specific detail of an illustrative embodiment it should be understood that these details are not intended to be limitative of the invention except insofar as set forth in the accompanying claims.

Having thus described my invention what I claim as new and desire to secure by United States Letters Patent is:



1. A phonograph transducer including a needle comprising a support, a bearing on said support, a chuck defining a needle receiving opening and having a trunnion pivotally supported by said bearing, said trunnion being constituted by means engaging the needle and securing it in said opening.

2. A phonograph transducer including a needle comprising a support, a bearing on said support, a chuck defining a needle receiving opening and having a trunnion pivotally supported by said bearing, said trunnion also constituting an axially movable screw for securing the needle in said opening.

3. A phonograph transducer including a needle chuck having a needle receiving aperture for receiving a pick-up needle, a supporting trunnion at one side of said aperture constituted by an integral part of the chuck, an axial opening located coaxially of said trunnion at the other side of said aperture, a trunnion at the said other side of said aperture constituted by needle securing means which is mounted in said axial opening so as to hold the needle in said needle receiving aperture, tubular bearings of damping material surrounding at least portions of each of said trunnions, and opposed housing sections secured together holding said bearings under compression.

4. A phonograph transducer including a needle comprising a two part housing having spaced apart bearing receiving portions, tubular bearings of damping material mounted in said portions, and a chuck mounted in said housing having spaced trunnions in said bearings, said chuck defining a needle receiving opening, one of said trunnions consisting of an axially movable element mounted in the chuck and movable through one of said tubular bearings to secure the needle in said opening.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| Number | Name | Date |
|---|---|---|
| 786,509 | Merritt | Apr. 4, 1905 |
| 1,022,126 | Dennison | Apr. 2, 1912 |
| 2,197,967 | Dally | Apr. 23, 1940 |
| 2,201,735 | Loeb | May 21, 1940 |
| 2,261,616 | Dally | Nov. 4, 1941 |
| 2,451,221 | Hutter | Oct. 12, 1948 |
| 2,479,894 | Andrews | Aug. 23, 1949 |