April 30, 1946. E. O. THOMPSON 2,399,585

STYLUS DEVICE

Filed Nov. 6, 1942

FIG. 1.

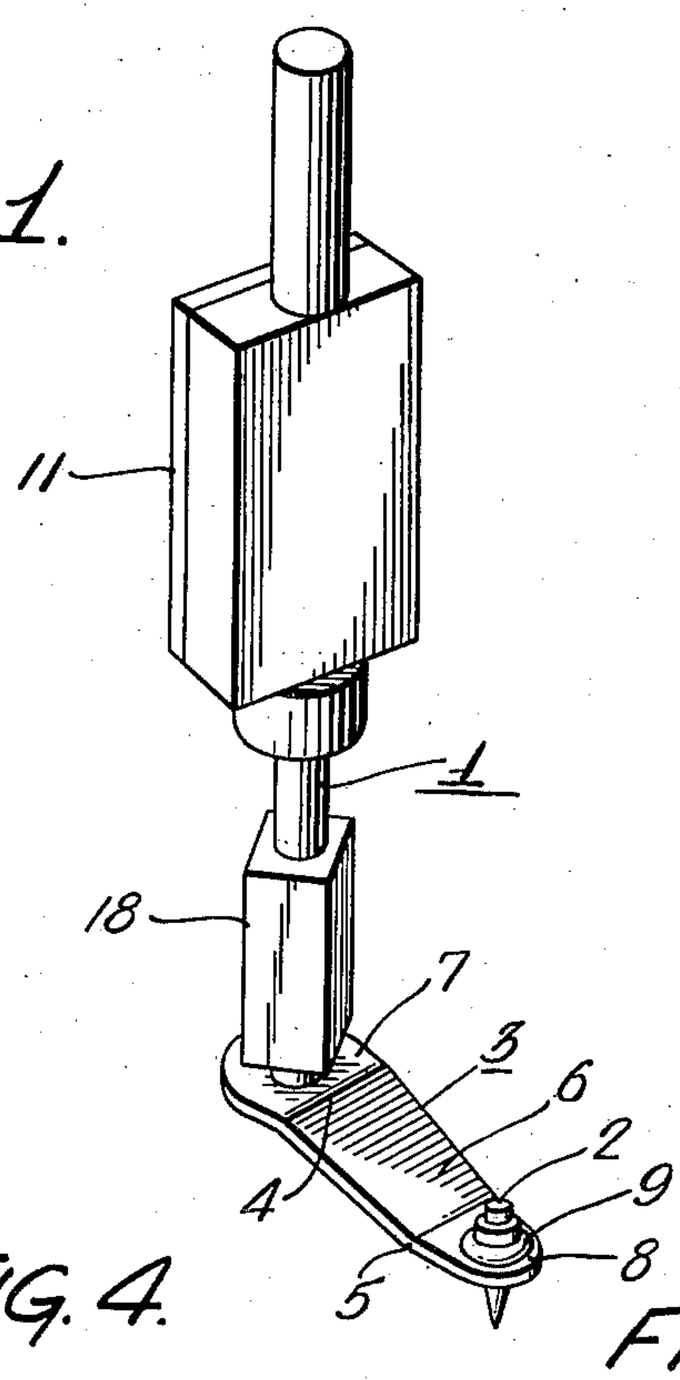


FIG. 3.

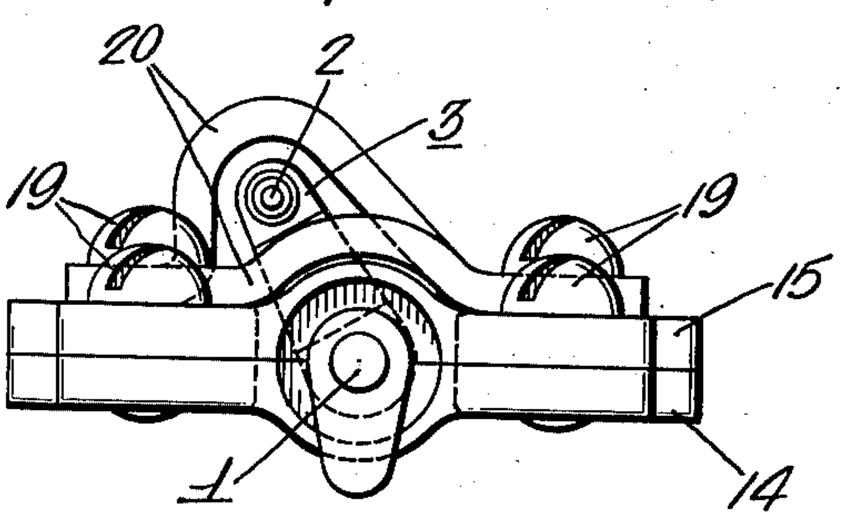


FIG. 2.

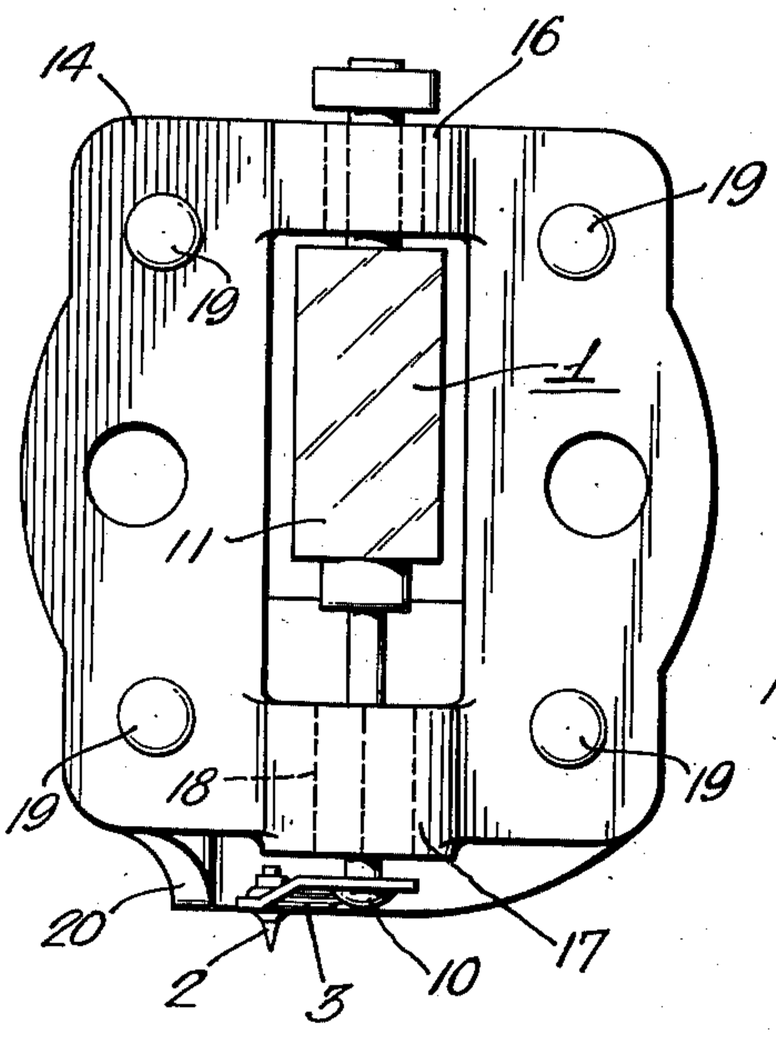


FIG. 4.

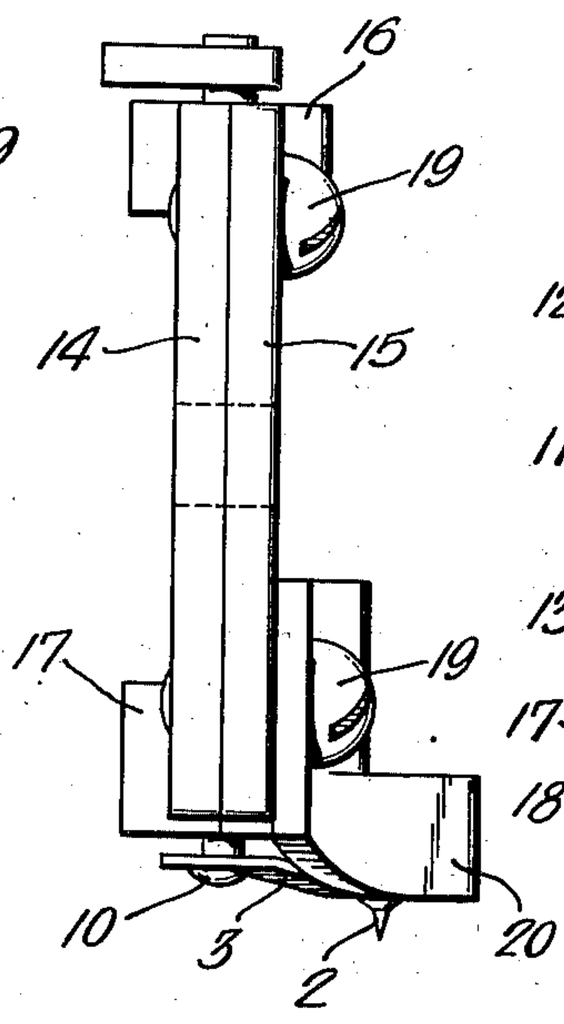
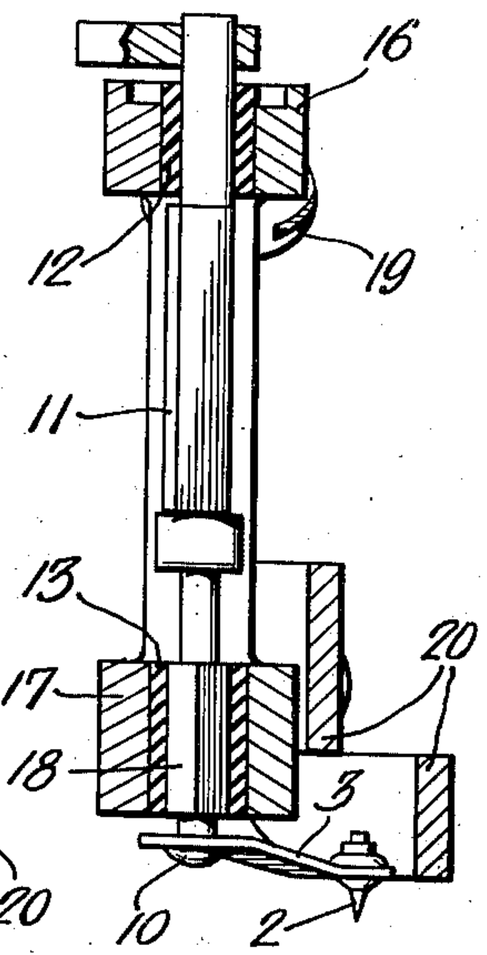


FIG. 5.



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Patented Apr. 30, 1946

2,399,585

UNITED STATES PATENT OFFICE

2,399,585

STYLUS DEVICE

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Original application September 18, 1940, Serial No. 357,322. Divided and this application November 6, 1942, Serial No. 464,805

2 Claims. (Cl. 179—100.41)

This invention relates to stylus devices for use in phonographs of the type employing sound records having a laterally cut groove. This application is a division of my copending application Serial No. 357,322, filed September 18, 1940, now Patent No. 2,359,808, granted October 10, 1944.

The principal object of the present invention is to provide a stylus device which is adapted to transmit very accurately the lateral undulations of a record groove to a suitable translating mechanism, and to afford a maximum of protection of the stylus and the record from injury such as might be caused by accidentally dropping the stylus onto a record.

A more specific object of the invention is to provide a stylus device comprising a rigid element to which the undulations are to be transmitted, a stylus laterally offset from said element, and an arm interconnecting the rigid element and the stylus, said arm having substantially greater width than thickness and having transverse bends therein, whereby it is very rigid to lateral movements of the stylus, but is highly flexible to vertical movements thereof.

Other objects and features of the invention will appear hereinafter.

In the accompanying drawing:

Fig. 1 is an enlarged perspective view of a stylus device embodying the invention, the particular form of the device illustrated being that shown in the aforementioned copending application;

Fig. 2 is a face view of the assembly including the device of Fig. 1 according to the aforementioned copending application;

Fig. 3 is a plan view of the same;

Fig. 4 is a side elevational view of the same; and

Fig. 5 is a sectional view of the same.

Referring particularly to Fig. 1, in accordance with the present invention, there is provided a stylus device comprising a rigid shank 1, a stylus 2 laterally offset from the shank 1, and an arm 3 interconnecting the shank and the stylus, which serves to transmit very accurately the lateral movements of the stylus to the rigid shank and which also provides a highly flexible mounting for the stylus in a vertical sense. This arm is formed from a strip of spring material, such as metal, and it has transverse bends 4 and 5, thus providing an inclined body portion 6 and end portions 7 and 8 extending at appreciable angles from the body portion.

Since the lateral movements of the stylus 2 are applied to arm 3 in the direction of its width, which is substantially greater than its thickness, the arm is rigid to such movements. However, the lateral bends 4 and 5 greatly increase the rigidity of the arm to such movements, with the result that the lateral undulations of a record groove are transmitted very accurately from the stylus to the rigid shank 1. At the same time, the bent structure of the arm 3 disposes the record-engaging portion of the stylus well below the lower end of the rigid shank, and the stylus is permitted to recede upwardly in response to vertical forces by reason of the flexibility of arm 3 to such forces. This resilient mounting of the stylus in a vertical sense serves to protect the stylus and the record against injury or damage due to violent contact between the two, as would occur, for example, if the stylus were accidentally dropped onto a record.

In the specific form of the device illustrated, the stylus 2, which may take the form of a sapphire element, is mounted on the free end of arm 3 by means of a rivet 9, and the other end of arm 3 is riveted to the lower end of shank 1 at 10, as shown more clearly in Figs. 2, 4 and 5. It will be understood, however, that any other arrangement of the parts may be employed so long as the principles of the invention are adhered to.

In the employment of the stylus device in a photoelectric translating system of the type disclosed in the aforementioned parent application, the lateral movements of the stylus transmitted by the arm 3 cause the shank 1 to rotate slightly about its axis, to the end that a light reflector 11 mounted on shank 1 is oscillated to effect the photoelectric translating action. While the present invention is not particularly concerned with the specific adaptation of the stylus device disclosed in the said parent application, Figs. 2 to 5 show more clearly the manner in which the device is utilized in such adaptation and thus serve to illustrate one possible arrangement of the device in a phonograph pick-up mechanism.

Referring to Figs. 2 to 5, the armature assembly including shank 1 is supported by resilient bearings 12 and 13 (see Fig. 5) within a pair of frame members 14 and 15 whose upper and lower portions are formed to provide bearing retainers 16 and 17. The shank 1 has a non-circular portion 18, and the lower bearing 13 and its retainer 17 are similarly formed so as to normally maintain the light reflector 11 in a predetermined position. Owing to the resilience of the bearings, the shank 1 and the reflector 11 carried thereby are permitted to rotate slightly in response to

lateral movements of the stylus. The entire assembly is held together by means of screws 19 passing through the complementary frame members. A guard 20 is carried by one of the frame members and the stylus is adapted to recede within the guard under the impetus of vertical forces.

From the foregoing description, it will be seen that the invention provides a novel stylus device having the features hereinbefore mentioned.

It will be understood, of course, that the invention is not limited to the specific disclosure, but is capable of various changes and modifications within the scope of the appended claims. The stylus device may, of course, be used with any known form of phonograph pick-up mechanism.

I claim:

1. In a stylus device for use with a phonograph record having a laterally undulating groove, an elongated vertical armature, means for supporting said armature for limited rotation about its longitudinal axis, a stylus laterally offset from said armature, and a vertically deflectible arm of substantially greater width than thickness connecting said stylus to said armature for effecting limited rotation of the armature about its longitudinal axis in response to lateral displacements of the stylus.

2. In a stylus device for use with a phonograph record having a laterally undulating groove, an elongated vertical armature, means for supporting said armature for limited rotation about its longitudinal axis, a stylus laterally offset from said armature, a vertically deflectible arm of substantially greater width than thickness connecting said stylus to said armature for effecting limited rotation of the armature about its longitudinal axis in response to lateral displacements of the stylus, and guard means on said supporting means in cooperative relation with said stylus for protecting the latter against abnormal vertical forces.

ELMER O. THOMPSON.