Feb. 10, 1942. H. E. ROYS 2,272,821

TELEGRAPHONE

Filed July 28, 1939

Fig. 1

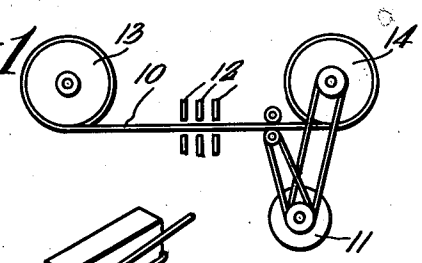
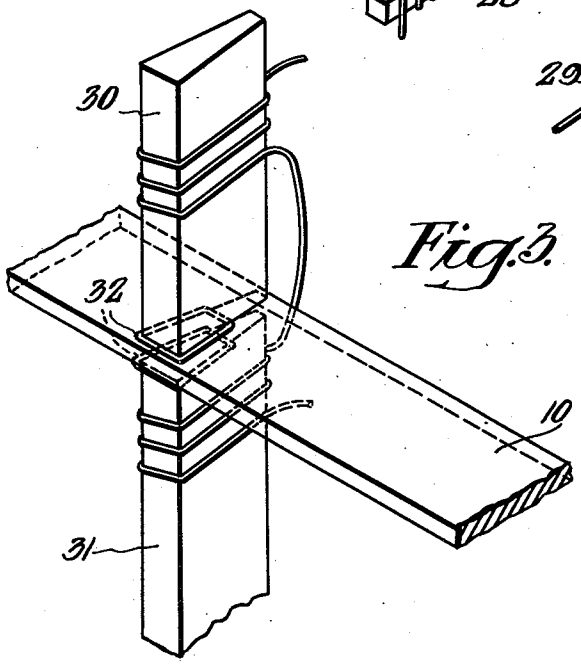


Fig. 2.

Fig. 3.



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TELEGRAPHONE

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1 Claim. (Cl. 179—100.2)

This invention relates to telegraphones and more particularly to an improvement therein adapted to more effectively reproduce high frequencies or to record or reproduce separate frequency bands or channels.

In telegraphones as heretofore constructed, the frequencies which could be recorded or reproduced were limited by the size of the pole pieces of the magnets. If very narrow pole pieces were used, fairly high frequencies could be used, but the efficiency at low frequencies was very poor. If pole pieces of sufficient size to give best response on low frequencies were used, they were incapable of handling high frequencies.

Further, only a single recording could be made on a single record, particularly when the wire type of telegraphone was used.

Since fine steel ribbon has been available, it has been used in the telegraphones for the reason that the orientation of the magnetization could be accurately determined, but it has otherwise been used in the same manner in which wire was used.

I have discovered that, in using steel ribbon, it is possible to handle a much greater frequency range by properly shaping the pole pieces or by using a plurality of pole pieces. It is also possible to place a plurality of totally independent records on a single ribbon and these records may be made by pole pieces particularly adapted to record selected frequency bands, the whole being combined on reproduction, or some of the records may be used as control records for regulating the amplifier on reproduction from the other records, so the recordings may even be so placed on the tape that one recording will be placed when the tape is moved in one direction and the other record will be played when the tape is moved in the other direction.

This arrangement gives the advantage that better frequency response may be secured and a much smaller quantity of tape than heretofore required may be used for a given amount of playing time.

One of the objects of the invention is to provide a telegraphone having an improved frequency response.

Another object of the invention is to provide a telegraphone which is capable of recording and reproducing both high and low frequencies with equal efficiency.

Another object of the invention is to provide a telegraphone which is capable of recording and reproducing a plurality of independent frequency bands on the same record strip.

Another object of the invention is to provide a telegraphone which is capable of simultaneously and independently recording or reproducing high and low frequencies.

Other and incidental objects of the invention will be apparent to those skilled in the art from a reading of the following specification and an inspection of the accompanying drawing, in which

Figure 1 is a diagrammatic illustration of a telegraphone;

Figure 2 is a schematic illustration in perpective of one form of my invention; and

Figure 3 is a perspective view of a second form of my invention.

In the telegraphone shown in Fig. 1, the steel ribbon 10 is wound from a reel 13 on to a reel 14 by means of a motor 11, which drives an appropriate mechanism, such as a pair of rollers, for feeding the ribbon at a constant speed, and also drives the takeup reel 14. The magnetic pickups are generally indicated in this figure at 12.

In the form of the invention shown in Fig. 2, a plurality of different magnetic pickups is shown in appropriate relation to the steel ribbon. Any or all of these pickups may be used as desired.

The pair of pickups 20 and 21, which are of opposite polarities, is located facing each other on opposite faces of the ribbon adjacent one edge thereof. The corresponding pair of pickups 22 and 23 is located on the faces of the ribbon adjacent the other edge thereof. It will be apparent that a record produced by the pickups 20 and 21 will not be affected by the pickups 22 and 23. Conversely, when the record is reproduced, a record produced by the pickups 22 and 23 will not be reproduced through the pickups 20 and 21. The pickups 20 and 21 will, like the pickups 22 and 23, produce magnetization perpendicular to the flat face of the ribbon. A third pair of pickups 24 and 25 is shown having their opposite poles facing the edge of the ribbon and slightly spaced longitudinally of the ribbon. These pickups will produce longitudinal magnetization of the ribbon at the edge thereof. Since this magnetization is longitudinal and is, therefore, perpendicular to the plane of magnetization of the pickups 20 and 21, any record produced by the pickups 24 and 25 will not affect the pickups 20 and 21 and passed therebetween.

The pickups 26 and 27 are relatively narrow pickups applied edgewise to the film like the pickups 24 and 25 but, in this case, they are applied to opposite edges of the film and produce transverse magnetization of the film edgewise.

The pickups 28 and 29 are spaced longitudi-

nally on the film having, of course, their opposite poles adjacent the surface of the film. These pickups, due to their longitudinal spacing, will produce longitudinal magnetization of the film which will not be picked up to any appreciable extent by any of the other types of pickups described.

There will, of course, be a slight amount of pickup, for example, of impulses recorded by a pair of pickups such as **24** and **25**, and by such a pair of pickups as **28** and **29**. Likewise, any of the pickups which produce a permanent magnetization of the material which will pass through the field of any other pair of pickups in such position as to affect the field within those pickups, will produce a certain amount of result, but the level of this effect is quite low compared to the sound level produced on the pickups by the impulses intended for them. This slight mixture of sound corresponds more or less to the cross-talk which occurs on telephone lines and is of the same general order of magnitude. At the relatively low levels and for the purposes for which telegraphones are generally used, this slight cross-talk is negligible. However, pickups arranged as just described may be used so as to avoid any appreciable cross-talk by using, for example, one pair of pickups of appropriate dimensions for recording the low frequencies and a second pair of pickups in synchronous position thereto for recording the high frequencies. The high frequency pickups would, of course, be designed so as to more effectively record and reproduce the high frequencies and, due to the synchronous relation of pickups to any pickup of high frequency by the low frequency pickups, or vice versa, would produce no damage whatever and would merely serve to reinforce the output from the other pickups.

Furthermore, one or more pairs of pickups may be used for recording or reproducing synchronous sound as just described, while additional pickups may be used for recording and reproducing subaudible or superaudible control frequencies which would be used, for example, to control the amplification in the reproducers of the audio frequency portion of the apparatus.

The form of the invention shown in Fig. 3 is not as versatile as that shown in Fig. 2. In this form of the invention, the pole pieces **30** and **31** are tapered laterally of the film. It has been found that, for more effectively recording and reproducing high frequency, very narrow pole pieces must be used. On the other hand, for recording and reproducing low frequencies, narrow pole pieces are not satisfactory for the reason that the total magnetic flux is not sufficient. Therefore, for low frequencies, larger pole pieces are much more satisfactory. In this form of the invention, the lateral taper of the pole pieces provides a narrow portion of the pole pieces for recording and reproducing high frequencies whereby the low frequencies are more effectively recorded and reproduced by the wider edge of the pole pieces. The use of separate pole pieces for recording different frequencies is, in this case, avoided by the shaping of the pole pieces and provision of a common winding for the recording of both the high and low frequencies.

If desired, the thicker end of the pole piece which is intended to record or reproduce the low frequencies may be surrounded by an appropriate conducting ring, such as a copper ring, indicated at **32**. This ring or short-circuited turn has the effect of preventing the thicker end of the pole piece from responding to the high frequencies. As a consequence, the high frequency impulses are transmitted practically entirely through the thinner end of the pole piece, thereby increasing the efficiency of the high frequencies.

I claim as my invention:

A telegraphone including means for moving a magnetizable ribbon between pole pieces, said pole pieces including pole pieces adapted to cooperate with a portion only of the width of said material, other pole pieces adapted to cooperate with a different portion only of said material, other pole pieces adapted to cooperate with an edge only of said material, other pole pieces adapted to cooperate with the edges of said material for transverse magnetization, and other pole pieces cooperating with the surfaces of said material for longitudinal magnetization.

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