March 1, 1949. T. M. SHRADER 2,463,001

TELEGRAPHONE

Filed May 30, 1945 3 Sheets-Sheet 1

Fig. 1.

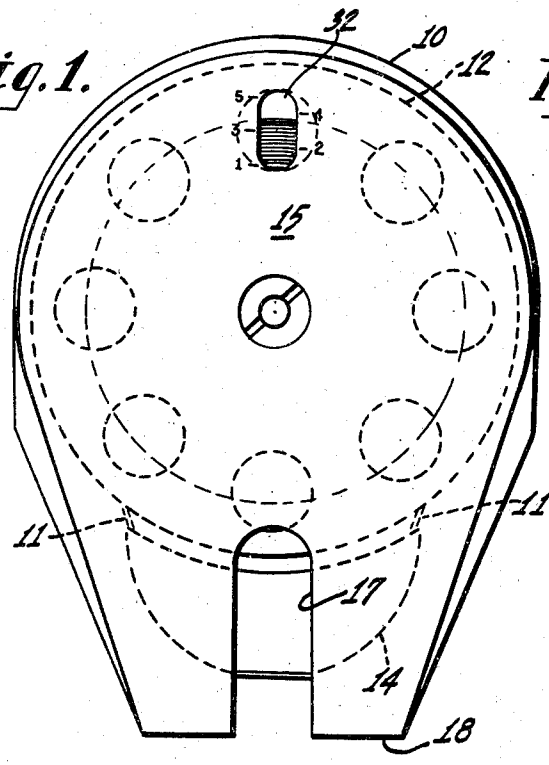
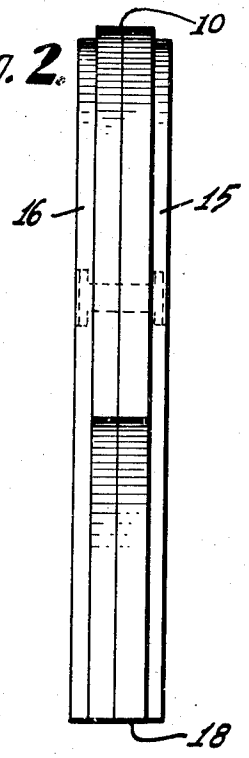


Fig. 2.



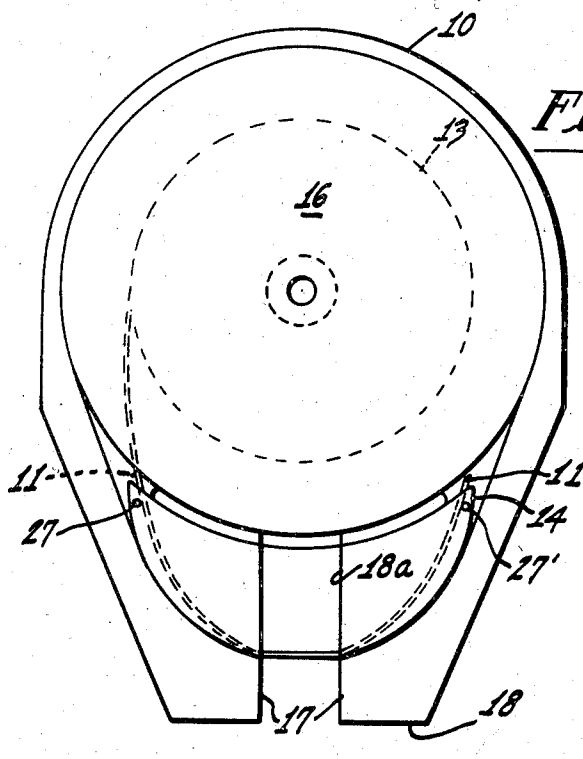


Fig. 3.

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March 1, 1949. T. M. SHRADER 2,463,001

TELEGRAPHONE

Filed May 30, 1945 3 Sheets-Sheet 2

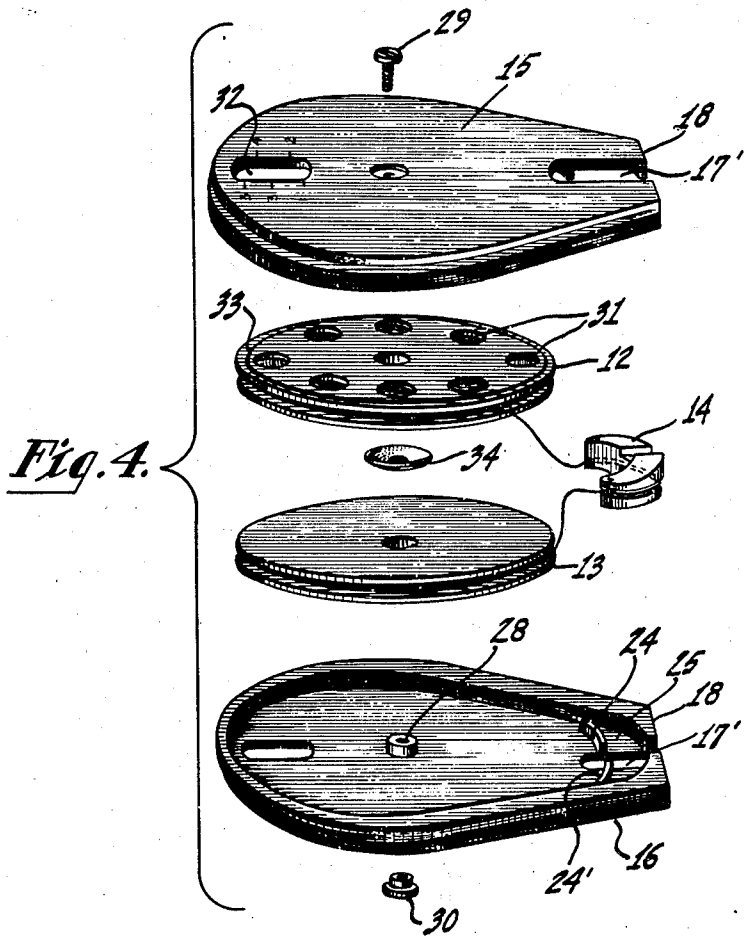


Fig. 4.

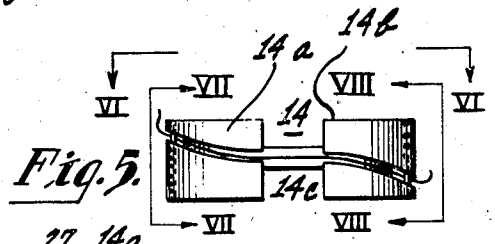


Fig. 5.

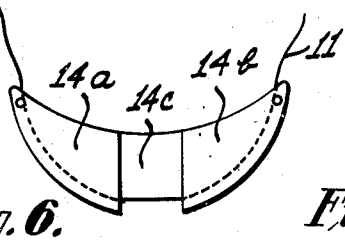


Fig. 6.

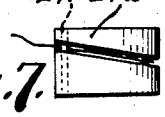


Fig. 7.

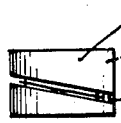


Fig. 8.

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March 1, 1949. T. M. SHRADER 2,463,001

TELEGRAPHONE

Filed May 30, 1945 3 Sheets-Sheet 3

Fig. 9.

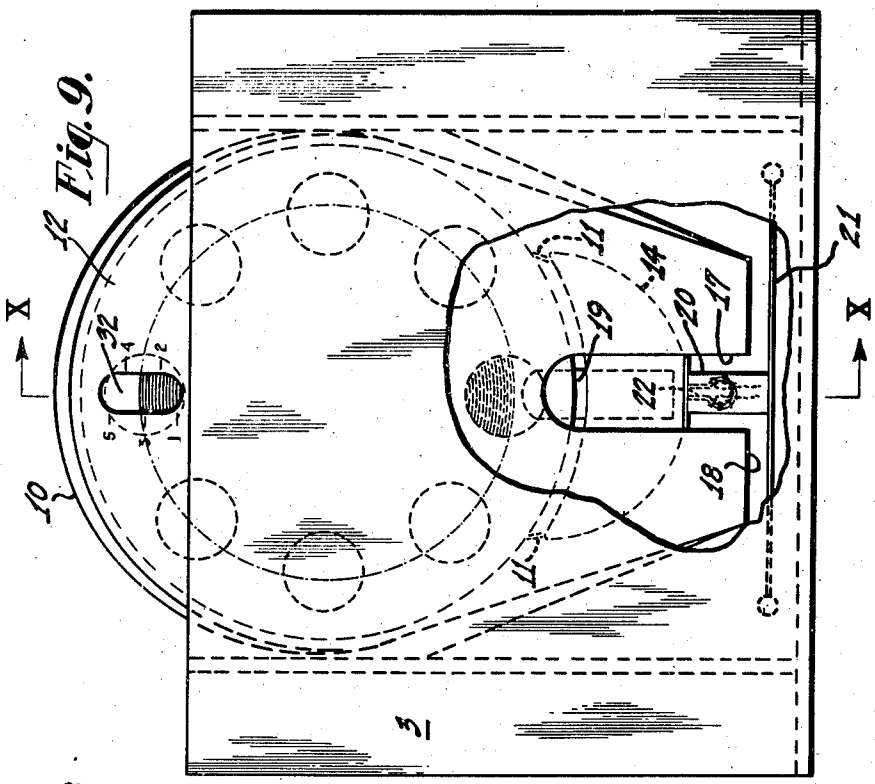
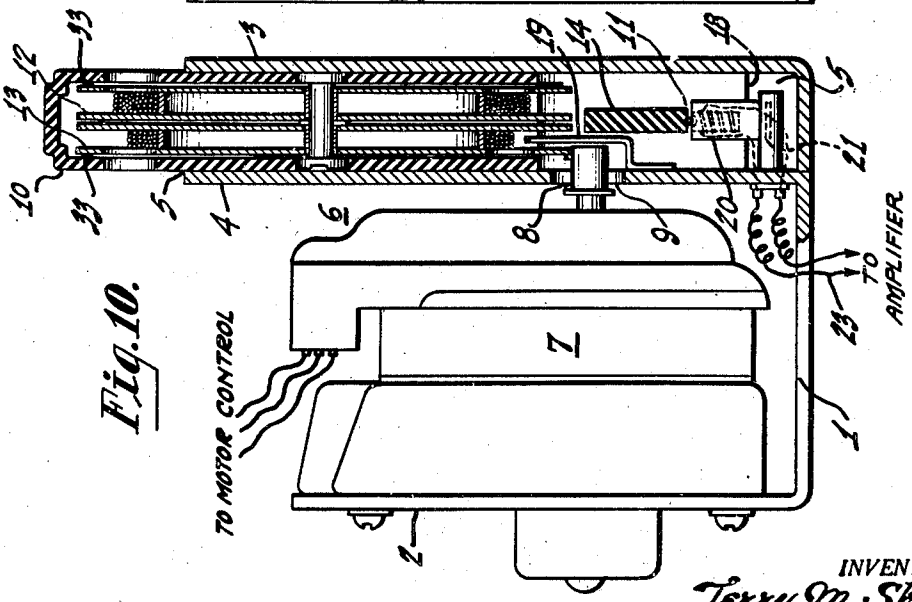


Fig. 10.



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Patented Mar. 1, 1949 2,463,001

UNITED STATES PATENT OFFICE

2,463,001

TELEGRAPHONE

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Application May 30, 1945, Serial No. 596,690

3 Claims. (Cl. 242—54)

1

This invention relates to magnetic sound recording and reproducing apparatus and has special reference to the provision of improvements in magnetic phonographs or "telegraphones" of the type wherein the wire or other flexible record is enclosed in a removable casing or cartridge.

In telegraphones designed to accept record cartridges it is the usual practice to mount the magnetic transducer or pick-up unit within the cartridge along with the storage and take-up reels. This necessitates the use of a plug and socket arrangement for making the necessary electrical connections between the pick-up unit and the amplifier, microphone, loudspeaker, oscillator and other components of the set. Such a connector may become noisy with use and this possibility is augmented when the telegraphone comprises a plural-wire machine, or when the pick-up unit includes discrete recording, reproducing and wiping coils.

In an effort to obviate the necessity for using plug-in connectors it has previously been proposed (see British Patent 236,237, of 1925 and 236,574 of 1926) to mount the transducer or "magnetic box" on top of the phonograph cabinet between two keyed spindles and to enclose the reels or spools in a detachable casing which is provided, intermediate its ends, with a slot for accommodating the magnet box. In these British patents the reels are loosely arranged at opposite ends of the casing and are provided with keyways which are designed to engage the spindle keys. The spaced apart arrangement of the reels necessitates the use of an oversize, relatively cumbersome casing. Furthermore, the difficulties incident to bringing the wire within the casing or cartridge into register with the magnet box and the spindle keys into register with the separate reel keyways, renders the assembly of the said parts far more difficult than is desirable in the case of an instrument whose use may be entrusted to an unskilled operator.

Accordingly, the principal object of the present invention to provide a magnetic recording and reproducing apparatus which shall obviate the use of plug-type connectors and other potential sources of noise and which shall dispense with the clutching, keying, wire-positioning and other alignment problems incident to the use of present-day telegraphones.

Another and related object of the invention is to provide an improved telegraphone wherein the pick-up unit, the wire record and wire reeling mechanism are brought into playing position simply by dropping or otherwise inserting the

2

record-cartridge within a slot or socket in the cabinet of the set.

Another object of the present invention is to provide a record-cartridge wherein the record may be rewound on its storage reel simply by reversing the position of the cartridge within its socket.

Another object of the present invention is to provide a record cartridge incorporating a direct-reading dial or indicator, the indicator being of a construction calculated to decrease rather than to increase the weight of the cartridge.

Another and related object of the present invention is to provide an inexpensive, light-weight, yet rugged record cartridge, and one which may be sent through the U. S. mail in an ordinary envelope.

Another object of the present invention is to provide a simplified "stop" for disconnecting the reel and reel driving mechanisms when the record has completed its journey from one reel to another.

Still another object of the present invention is to provide an extremely simple, yet reliable tensioning arrangement for a wire or other reelable record.

Other objects and advantages will be apparent and the invention itself will be best understood upon reference to the following specification and to the accompanying drawings, wherein:

Fig. 1 is a front elevation, Fig. 2 a side elevation, Fig. 3 is an elevation with the cover removed and Fig. 4 is an exploded view of a telegraphone record cartridge constructed in accordance with the principle of the invention.

Fig. 5 is an enlarged plan view of the wire guiding portion of the cartridge,

Fig. 6 is an enlarged side elevation of the wire guide, looking in the direction of the arrows VI—VI in Fig. 5,

Figs. 7 and 8 are end views of the wire guide, looking in the direction of the arrows VII—VII and VIII—VIII respectively, of Fig. 5,

Fig. 9 is a front elevation of a telegraphone or magnetic phonograph having the record cartridge of Figs. 1 to 8 inserted therein in a position to be played, and

Fig. 10 is a sectional view taken on the line X—X of Fig. 9.

In the drawings, wherein like reference characters represent the same parts in all figures, 1 (Fig. 10) designates generally a metal chassis or base having upstanding a rear wall 2, a front wall 3 and intermediate parallel wall 4 which divides the chassis into two compartments, 5 and 6,

respectively. The rear compartment 6 accommodates a motor 7 having a rubber tired stub-shaft or drive roller 8 which extends into the front compartment 5 through a suitable aperture 9 in the intermediate wall 4. This relatively narrower front compartment 5 comprises an open-topped receptacle or socket for a removable record cartridge 10.

As will hereinafter more fully appear the cartridge 10 contains a wire or other reelable magnetic record 11 and reel assembly therefor, including two reels 12 and 13 and a wire guide 14 over which the record travels in its journey from one reel to the other.

It will be observed upon inspection of Figs. 1 to 4 inclusive that the casing of the cartridge is of bi-part construction and that each of its internally dished complementary halves 15 and 16 is provided with a slot 17, 17' which extends upwardly along the vertical axis of the cartridge from its bottom or leading edge 18 to a point just beyond the periphery of the reel 12 (or 13). These vertical slots 17, 17' are dimensioned to accommodate the motor driven roller 8 irrespective of which face (15 or 16) of the cartridge is presented to the rear surface of the socket 5. Thus, when the cartridge 10 is dropped into its socket the periphery of one or the other of the reels 12 or 13 will engage the roller 8 and, when the motor 7 is energized, will be driven thereby.

The vertical slots 17, 17' at the lower or leading end of the cartridge 10 also provide a clearance space for a bent arm 19 (see Fig. 10) which is secured at its lower end to the inner surface of the rear wall 4 of the socket and extends upwardly into the wire-receiving groove of the drivers reel 12. As viewed in Fig. 10 the inner reel 13 is the "take-up" reel, that is to say the wire 11 is taken-up by the said reel as it is drawn off the other or "storage" reel 12. It will now be apparent that as the wire is piled-up in the groove of reel 13 it will eventually touch the end of the arm 19 whereupon the cartridge will be urged upwardly in its socket a sufficient distance to lift the periphery of the said reel out of engagement with the driving roller 8 and thus prevent the wire from running completely off the other reel 12.

The socket 5 also accommodates a magnetic transducer 20 for the magnetic wire 11. This unit 20 is preferably supported upon a leaf spring 21 at the bottom of the socket whereby the pole-pieces or core ends 22 of the transducer are biased into engagement with the record 11. The transducer is preferably of the compact (0.075" diameter) construction shown in Fig. 9 and described in Henry E. Roys copending appln. Serial No. 591,071 filed April 30, 1945. Such a transducer may be used, selectively, for recording, reproducing and "wiping" purposes, in which event it will be understood that its leads 23 (Fig. 10) should be connected to a suitable switch (not shown) having contacts individual to the wiping oscillator and the amplifier for the microphone and loudspeaker of the set.

Referring now particularly to Figs. 4 to 8 inclusive which show the internal structure of the cartridge. The shell-like halves 15 and 16 of this molded plastic casing are of duplicate construction and are each provided with a pair of molded-in arcuate ridges 24, 24': one on each side of the slot 17 within which the motor driven roller 8 (Fig. 10) is accommodated. These ridges 24, 24' together with the inner periphery of the casing define a seat 25 for the wire-guide 14 insert 26 around which the wire 11 is led from one reel to the other. This insert 14 comprises two slotted end portions 14a, 14b for guiding the wire between the reels and an exposed unslotted central part 14c against which the pole pieces 22 of the transducer 20 (Figs. 9 and 10) are urged by the leaf-spring 21 at the base of the socket 5. Retaining pins 27, 27' which extend across the slotted ends 14a, 14b of the guide block 14 may be provided, if desired, for keeping the wire in the guide grooves.

The opposite halves 15 and 16 of the casing are also provided with molded-in bearings 28 upon which the reels 12 and 13 rotate. These bearings are bored to accommodate a small bolt 29 which is provided with a nut 30 for holding the assembly together.

It will be observed that the outer side-face of each reel (12 and 13) is provided with a number of circumferentially spaced openings 31 which communicate with the reel grooves. These openings 31 not only decrease the weight of the assembly but also permit inspection, through a window or windows 32 in the casing, of the quantity of wire within the said grooves. Since the reels are driven at a speed sufficient to ensure "persistance of vision" the quantity of wire on the storage reel can be observed throughout the recording interval. The quantity of wire available may be translated into units of time by suitable indicia on the face of the casing adjacent to the window 32.

Referring still to the self-contained direct reading indicator, it should be noted that since the inner side-surface of each reel is unperforated (at least to the depth of the groove) an observer looking into one of the windows 32 can see the wire on only one of the reels, i. e. on the reel adjacent to that window. There is thus no possibility of obtaining a false reading such as might be obtained if one could look right through the outer reel into the wire receiving groove of the inner reel. Another feature of this indicator resides in the fact the reel faces (or at least so much of them as is presented to the window) are provided with a gun-metal or other dull finish to contrast with the usually bright finish of the wire record.

Since the quality of any magnetic recording may be seriously impaired by irregularities in the speed of the wire it is essential that some means be provided for maintaining substantially uniform tension on the wire throughout the recording and playing intervals. This may be achieved, by way of example, by the provision of a pair of springs (not shown) wound in opposite directions about the common axis of the reels in the manner disclosed by Terry M. Shrader in copending appln. Serial No. 584,197 filed March 22, 1945. While this earlier described record tensioning mechanism is very compact it adds to the weight of the reel and its cost can not be absorbed in the marketing of a record cartridge designed to sell at the lowest possible price.

Accordingly, as previously indicated, the present invention contemplates the provision of a less expensive record tensioning system. This system depends for its operation upon an added "friction load" on the reels, such as may be produced by biasing the outer side surfaces of each reel into contact with the adjacent inner surfaces of the casing. To this end, referring now particularly to Figs. 10 and 4, the outer side surface of each reel is preferably provided with a narrow rim 33 which is urged lightly yet constantly into

frictional engagement with the adjacent inner surface of the casing as by means of a dished spring or washer **34** mounted between the reels. In the embodiment of the invention which has been selected for purposes of illustration the dimensions of the cartridge were substantially as follows: length 2¾", maximum width 2", thickness ⅝". The reels contained approximately 600 ft. of 0.004" wire. Thus, when the wire speed was 2 ft. per second the wire accommodated a 5 minute recording. The total weight of the cartridge was approximately 3½ oz.

It will now be apparent that the present invention provides a reliable, yet compact and inexpensive cartridge-type telegraphone, and one which lends itself readily for use by the general public for correspondence and other purposes.

What is claimed is:

1. A cartridge for a magnetic wire record, said cartridge comprising a casing containing bearing means and a reel assembly for said wire, said reel assembly comprising a plurality of reels mounted for rotation upon said bearing means and a wire-guide upon which said wire is adapted to travel in its journey from one reel to another, said casing having an aperture adjacent to said wire guide through which energizing elements may be applied, respectively, to said wire and to said reel assembly.

2. A cartridge for a reelable magnetic record, said cartridge comprising a casing containing bearing-means and a reel assembly for said record, said reel assembly comprising a driving reel and a driven reel mounted for rotation in coaxial torque-transfer relation upon said bearing means, said casing having an aperture through

which a driving element may be applied to the periphery of said driving reel.

3. In apparatus of the character described, a socket adapted to accommodate a cartridge containing an assembly including a grooved storage reel, a grooved take-up reel and a wire record wound to run between said storage and take-up reels, said cartridge having an aperture through which access may be had to said reel-grooves, driving means mounted in said socket and adapted to be received in said aperture for engaging and driving said reel assembly, and means mounted within said socket in register with one of said reel-grooves for moving said reel assembly out of driven relation with respect to said driving means when said record is wound to a predetermined height in said reel-groove.

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