Aug 5, 1941. F. G. BUHRENDORF 2,251,322

TELEGRAPHONE

Filed Feb. 29, 1940

FIG. 1

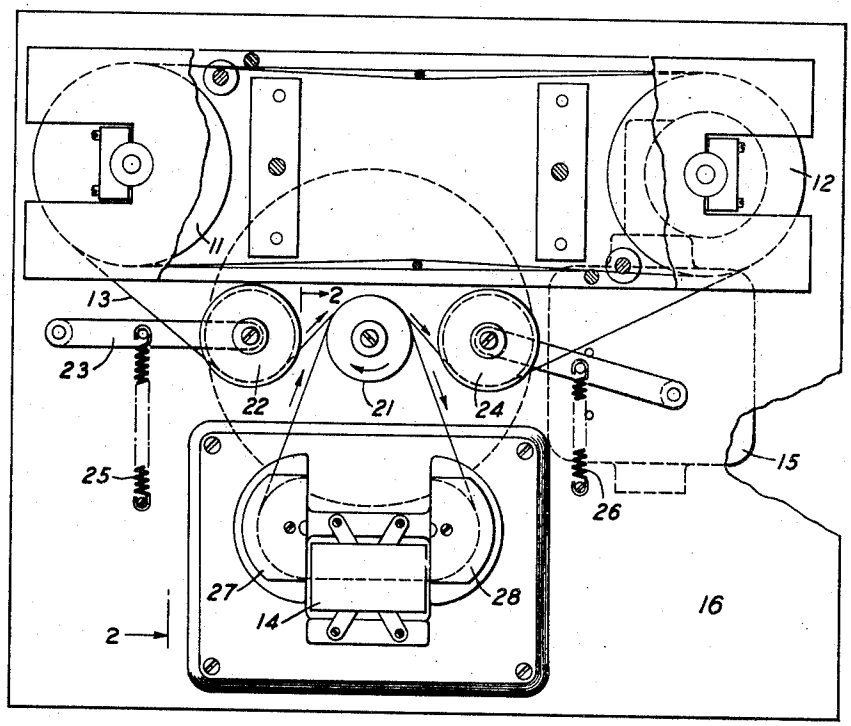
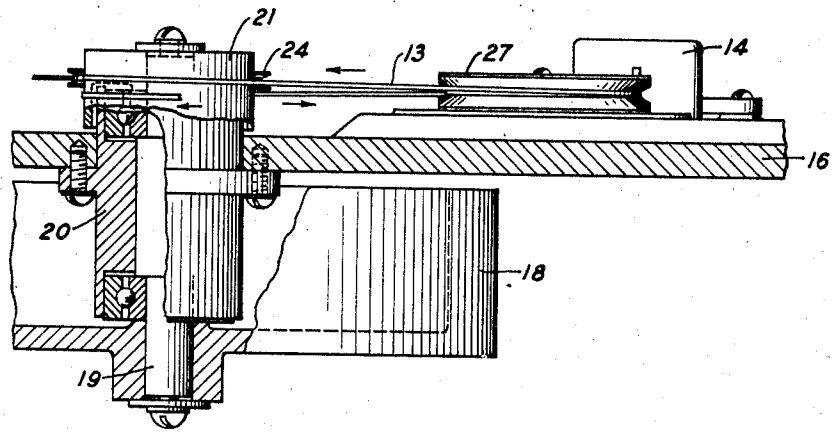


FIG. 2



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2,251,322

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2,251,322

TELEGRAPHONE

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Application February 29, 1940, Serial No. 321,392

3 Claims. (Cl. 179—100.2)

The invention relates to telegraphones and the object of the invention is to maintain constant linear speed of the record member through the talking head.

According to the invention the speed of the record member, such as a tape or wire, passing through the talking head is controlled by an inertia roller or fly-wheel device of high inertia which rotates freely and independently of the record driving means. This control is effected by looping the tape around the roller, passing the looped portion through the talking head and tensioning the tape at the roller by means of resiliently mounted idlers between the roller and the tape storage means. The inertia roller is driven solely by the frictional contact of the tape therewith and any "flutter" in the speed of the tape on the storage means produces compensating changes in the positions of the idlers and the flutter is not transmitted to the looped portion of the tape with which the magnets are co-operating.

This invention will be more clearly understood from the following detailed description and the accompanying drawing in which:

Fig. 1 is a plan view of a continuous tape telegraphone according to the invention; and

Fig. 2 is an elevation showing particularly the inertia roller.

In the drawing, the telegraphone shown has tape storage mechanism comprising two spaced drums 11, 12 with the tape record member 13 spirally wound around them in a continuous loop as disclosed more in detail in a copending application, Serial No. 284,155, filed by C. C. Towne, July 13, 1939. The talking head 14 is of the type shown in Patent 2,202,139 granted to me May 28, 1940, but it will be understood that both the tape storage mechanism and talking head shown are merely illustrative and that the invention is equally applicable to any telegraphone using a continuous tape or wire record member.

The inertia roller comprises a heavy fly-wheel 18 secured to a shaft 19 which is suitably mounted for free rotation in a bearing 20 in the base plate 16. At its upper end there is secured to the shaft a roller 21 around which the tape passes in its transit from one drum to the other. The tape 13 is driven at the required speed by the motor 15 beneath the base plate 16 through suitable gearing on the shaft of the drum 12. As it leaves the drum 11, the tape passes first under the idler 22, which is mounted on a pivoted arm 23, then over the roller 21, through the talking head 14, back over the roller 21, under the pivoted idler 24 and around the drum 12 to the drum 11 as indicated by the arrows. The idlers 22 and 24 are pressed against the tape by suitable springs 25 and 26 in such a manner as to hold the tape in contact with the roller 21 over a considerable part of its circumference but, because of the high inertia of the roller and its associated fly-wheel, slippage may occur at the roller in some cases when the tape first begins to move. The friction between the tape and the roller, however, soon accelerates the roller to the speed of the tape and no slippage occurs in normal operation.

It will be seen that with this construction the loop of tape extending from the roller 21 through the talking head and back to the roller is entirely under the control of the roller which, due to the large inertia of the associated fly-wheel, keeps the tape passing through the head at substantially constant speed.

If, due to imperfect gearing in the driving mechanism, eccentricities of the drums on which the tape is stored or to any other cause, the linear speed of the portions of the tape leaving or approaching the drums is subjected to "flutter" variations, the idlers 22 and 24 will shift their positions slightly in accordance with such variations and in such directions as to prevent the variations from affecting the tensions of the tape at the roller. For example, if at a given instant the speed of the tape tends to increase, thereby tending to increase the tension at idler 24 and decrease the tension at idler 22, the spring 26 will elongate slightly and spring 25 will contract slightly, thereby keeping the tensions of the parts of the tape approaching and leaving the roller 21 substantially constant. Conversely, if the speed of the tape tends to decrease, spring 26 contracts slightly and spring 25 elongates slightly and the tape tensions are again maintained substantially constant. The springs 25 and 26 are, of course, preferably such as to give small changes in tension for relatively large changes in length so that for the slight movements of the idlers necessary to compensate for flutter variations, the changes in the spring tensions are negligible. Since the inertia of the mass rotating with the roller 21 is very large and the period of the flutter variations is ordinarily very short, the speed of the tape through the talking head is not appreciably affected by these variations and sound reproduced from the tape will be free from this distortion.

With a single inertia roller, the idlers 22 and 24 must be mounted in a slight angular relation to each other to keep the adjacent turns of the tape on the roller running freely. It will be

understood that, if desired, two spaced inertia rollers may be used between the idlers instead of the single roller shown. In that case, the talking head will engage the tape between the rollers and the idlers may be positioned in the same plane but the operation is essentially the same as with the single roller. The talking head 14 has been shown as provided with stationary grooved tape guides 27, 28. If these are replaced with rotary guides to reduce friction, they must be made and mounted with great accuracy since any eccentricities in such rotary guides would introduce other flutter variations in the tape which cannot be eliminated by the roller.

What is claimed is:

1. In a telegraphone, a record member, means for driving the member, a roller of high inertia freely rotatable independently of the driving means and a signal translating device cooperating with the member, said member being looped around the roller with the looped portion spaced away from one side of the roller and passing through the device between its successive engagements with the roller.

2. In a telegraphone, a record member, record member storage means comprising a feed reel and a take-up reel, means for driving the take-up reel, two resilient record member tensioning means, a freely rotatable roller of high inertia engaging the member between the tensioning means and a signal translating device having guides for and cooperating with the member, said member being looped around the roller with the looped portion passing through the guides and the translating device.

3. In a telegraphone, a magnetic tape, driving means therefor, freely rotatable means of high inertia engaging the tape and driven thereby at the average speed imparted to the tape by the driving means, a spring tensioned idler engaging the tape on each side of the inertia means and translating magnets cooperating with the tape between the spring tensioned idlers.

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