This invention relates to winding mechanism and more particularly to a device of this character which is suitable for use in handling record tapes in telegraph offices.

In the transmission and reception of telegraph messages it is a usual requirement that the record tapes including perforated tape be reeled up for storage purposes after transmission or reception has been accomplished. It has for a long time been a practice to permit perforated tape to fall into a receptacle from which it was later removed and manually wound upon a reel for storage purposes. Inasmuch as this practice is wasteful of labor, attempts have been made to provide motor driven winders which would be adapted to the particular requirements of telegraph offices. There are a number of tape winders which might on first thought be considered adaptable, but in their existing form it has been proved that they generally exert excessive pull on the tape, thus causing errors of transmission, if the tape happens to issue from a telegraph transmitter, or else, as in reception, the tape is drawn too rapidly from the recorder and the record itself is apt to be unduly lengthened or blurred.

Our invention is designed to overcome the above mentioned difficulties. It is an object, therefore, of our invention to provide a tape control device which will permit of automatically winding a record tape upon a spool in conformity with the rate at which the tape is issued from a telegraph transmitter or receiver.

It is a further object of our invention to provide a tape control device which is adapted to start and stop the driving means for a winder in accordance with the amount of slack in a tape which issues from a telegraph instrument.

It is a further object of our invention to provide a tape control device which will operate normally to rewind a record tape, but which upon occasion will permit of unwinding a given length of said tape, should it be necessary to retransmit a message, or to inspect the tape for any purpose.

It is a still further object of our invention to provide a tape control device which is arranged with suitable tensions such that a rewinding mechanism may be automatically operated for winding said tape without excessive drag upon the telegraph instrument from which the tape issues.

Other objects and advantages of our invention will be made clear by the following detailed description taken in connection with the accompanying drawing, in which

Figure 1 illustrates diagrammatically an assemblage of units through which a record tape may be caused to travel, said units including, for example, a perforator, a transmitter, a tape control device, and a rewinder.

Fig. 2 illustrates the tape control device in a suitable position for permitting the tape to be unreeled by manually drawing it away from the winding spool.

Referring first to Fig. 1, we show conventionally a keyboard perforator 10 having thereon a reel 11 which contains unperforated tape. As the operator transcribes a message to be transmitted, the tape issues from the perforator and is fed into a transmitter 12 which may be of any conventional type. The keyboard and the transmitter do not necessarily run at the same speed so that the amount of slack intervening between these two units may vary with traffic conditions.

As the tape issues from the transmitter it is desired that it be wound up on a spool 13 and then removed for storage purposes. The spool 13 may be rotated intermittently by means of a motor 14, the starting and stopping of which is under control of an automatic switch having contacts 15. One of these contacts 15 is shown to be cam-operated. The cam 16 rotates on a pivot 17. Attached to the shaft for the cam 16 is a control arm 18 having a lug 19 which rests upon the tape 20. A certain amount of slack in the tape will permit the control arm 18 to drop and to rotate a raised portion of the cam 16 against one of the springs 15 so as to close the motor circuit through the springs 15. The abruptness of starting the motor is relieved insofar as its effect upon the winder is concerned, this being accomplished through the medium of a friction clutch 21. The friction clutch 21 also serves the purpose of compensating for different rates of winding, such as are necessary when the spool 13 contains very little tape or is nearly filled, and thus a suitable amount of slippage may occur whenever the spool 13 becomes nearly filled.

One of the principal features of our invention resides in the use of an assemblage of tape guides, two of which are designated 22 and are mounted on fixed spindles. A third tape guide 23 is mounted on a lever arm 24 which swings on a pivot center 25 and is urged in one direction by a spring 26 so that various degrees of slack in the tape 20 may be taken up by increasing or decreasing the tape loop which intervenes between the two tape guides 22. The tension of the spring 26 is preferably made adjustable, although a choice may be made between springs having differing degrees of resiliency.
If desired, the tape guides 22 and 23 may be in the form of stationary pins, thus affording a considerable amount of friction. But it is possible, as a refinement of structure, to mount spools on the pins. Whether the tape is guided by spools or pins, however, it will be apparent that sufficient tension is provided by the cylindrical surfaces of these members so that the winder may be permitted to form a reasonably hard and compact coil of the tape.

The short bends in the tape necessary in passing over the guides 22 and 23 develop sufficient drag to insure a firm tape coil upon the reel without interfering with the operation of the transmitter 12.

It is necessary when re-runs are made to unwind a considerable amount of tape from the reel 13 and to feed it again through the tape transmitter 12. Inasmuch as the tape has been weakened from perforations, it is desirable to relieve the strain due to the short tape bends which occur in passing over the guides 22 and 23. Fig. 2 shows how this strain can be relieved. When the tape is manually pulled backwardly to unwind the same from the reel 13 the yielding member 24 is caused to assume the position shown in this Fig. 2, thus reducing the holding surfaces of the guides by unbending the tape. The spring 26 is sufficiently resilient so that, when elongated as shown in Fig. 2, it does not exert an appreciably greater tension than when contracted as in Fig. 1. Hence the tape when straightened can be withdrawn much more freely than when wrapped around the guides, especially if, as previously intimated, the guides are not permitted to rotate.

Various modifications of our invention may be made by those skilled in the art without departing from the spirit and scope of the invention itself.

We claim:

1. In a device for holding a tape, a winder and motor for driving the same, a plurality of guide members so disposed as to introduce bends in the direction of travel of said tape, two of said guide members being fixed and two being yieldably mounted, and a motor circuit switch operable under control of one of the yieldable guide members, the other of said yieldable guide members constituting means operable when the tape is manually retracted in a direction contra to its normal movement for relieving the friction of said tape against said fixed guide members.

2. In a device for holding a tape, a winder and motor for driving the same, a plurality of guide members so disposed as to introduce bends in the direction of travel of said tape, two of said guide members being fixed and two being yieldably mounted, one of said yieldable guide members in combination with said fixed guide members constituting a tape tension regulating device, and means operable under control of the other of said yieldable guide members for switching the motor on and off.

3. A telegraph tape control device comprising a tape issuing instrumentality, a winder having a reel thereon, a motor for turning the reel, means including a friction clutch interposed between the motor and the reel for adjusting the angular velocity of the reel to the variable diameter of the tape coil thereon, a tension regulating device constituted by a plurality of fixed tape-guide members and an intervening yieldable guide member, said device being operable to relieve the tape from excessive strain due to variations of tension, and being further operable when the tape is manually retracted for substantially releasing the tension on said tape and a motor control switch having an operating arm therefrom, said arm terminating in a tape guide member the position of which is determined by the degree of slack in the tape.

4. In combination with a telegraph tape winder and a motor for driving the same, a control device therefor comprising a plurality of stationary tape guide members and a plurality of movable tape guide members, an independent tension lever for supporting each movable tape guide member, one of said tension levers being adapted to swing its guide member across a center-line common to the axes of said stationary guide members for reducing friction between the tape and said guide members, and the other of said tension levers having motor switching means connected thereto, said switching means being operable in response to the occurrence of a predetermined degree of sag in the tape for starting the motor.

5. In combination with a telegraph tape winder and a motor for driving the same, a control device therefor comprising a plurality of stationary tape guide members and two movable tape guide members, an independent tension lever for supporting each movable tape guide member, one of said tension levers being adapted to swing its guide member in an arc transverse to the general direction of tape travel, and a motor control switch operable through this one tension lever in response to variations in the tape slack, the other one of said tension levers constituting means for varying the winding tension between a value such as to produce a compact coil of tape and a value such as to facilitate manually retracting the tape in a direction opposed to the normal winding movement thereof.

6. Apparatus for winding a telegraph tape after it issues from a sending instrument which comprises a tape reel, motor means for driving said reel to wind up the tape, means for introducing frictional slippage between the motor means and the reel to compensate for variations in the diameter of the tape coil on said reel, means for introducing a normal degree of tape tension between said coil and an intermediate point of tape travel whereby the coil is caused to be tightly wound, said means including a resiliently supported tape guide member movable to relieve strain upon the tape when the tape is pulled in an unwinding direction, and means controlled by a degree of slack in a loop in the tape between said sending instrument and said intermediate point for switching said motor means on and off.