Sept. 9, 1947. B. L. CANFIELD 2,427,193

REEL FOR MAGNETIC RECORDING APPARATUS

Filed Dec. 26, 1944

Fig. 1

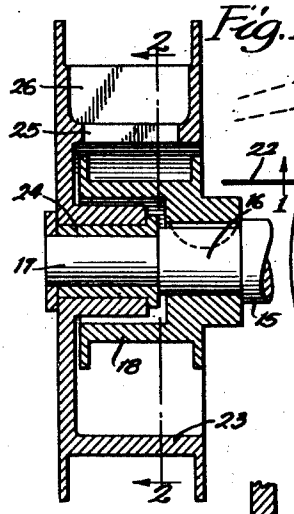


Fig. 2

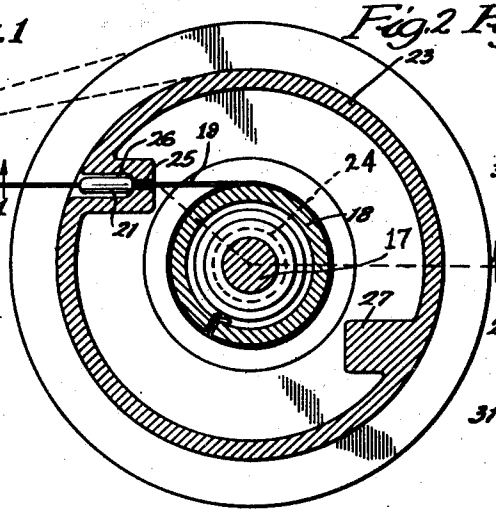


Fig. 3

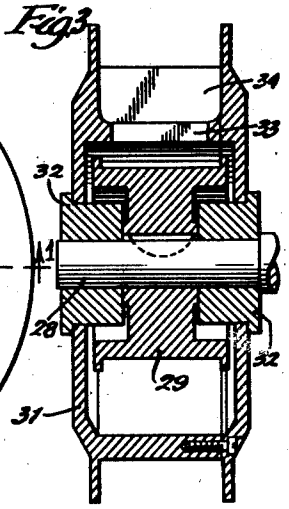


Fig. 4

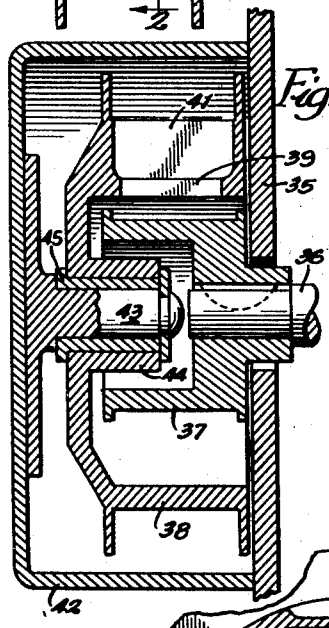


Fig. 5

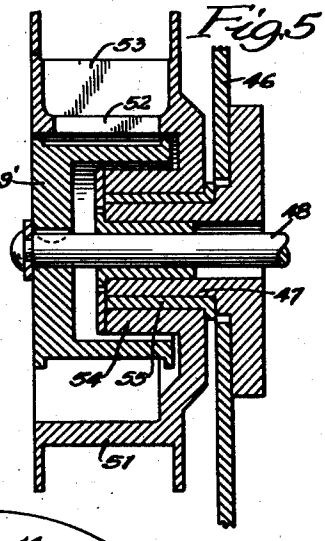


Fig. 6

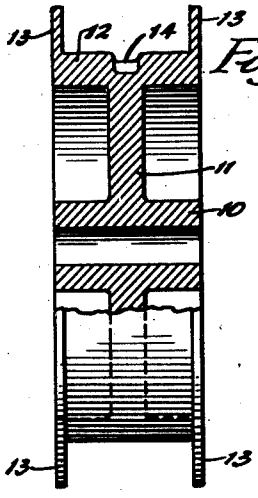
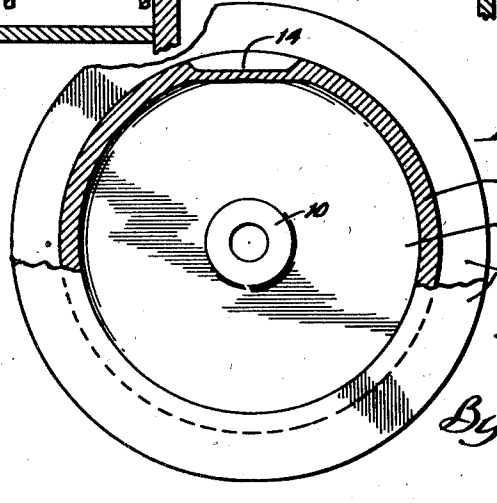


Fig. 7



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REEL FOR MAGNETIC RECORDING APPARATUS

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7 Claims. (Cl. 242—118)

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This invention relates to reels for magnetic recording apparatus and more particularly to a reel to be mounted on a magnetic recording or reproducing apparatus on which wire may be wound.

It has been proposed to utilize on a magnetic recording or reproducing apparatus a permanently mounted takeup wheel or spool having a leader connected thereto carrying a coupling for detachable connection to a wire on a supply spool or reel. The present invention has for one of its objects the provision of a takeup reel or spool for use with apparatus of this character in which provisions are made to prevent tangling or binding of the wire with the leader or the coupling as the wire is wound on the takeup spool.

Another object is to provide a reel in which the takeup spool is formed with a peripheral recess to receive the coupling so that the wire can be wound over the coupling without tangling or binding.

Still another object is to provide a reel in which the leader and wire are wound on separate spools.

A further object is to provide a reel in which inner and outer relatively rotatable spools are provided to receive the leader and wire respectively with a recess on the outer spool to receive a coupling connecting the leader and wire. According to one feature of the invention the inner spool is driven by the apparatus and the outer spool is connected to the inner spool thru the leader and coupling to be driven thereby only after the leader has been fully wound.

The above and other objects and advantages will be more readily apparent from the following description when read in connection with the accompanying drawing, in which—

Figure 1 is an axial section of a reel construction embodying the invention with the leader and coupling omitted, taken on the broken line 1—1 of Figure 2;

Figure 2 is a transverse section on the line 2—2 of Figure 1;

Figures 3, 4, 5 and 6 are views similar to Figure 1 illustrating alternative reel constructions; and

Figure 7 is a partial transverse section of the reel of Figure 6.

Referring first to Figures 6 and 7 which illustrate a simple form of invention the reel shown therein is provided with a hub portion 10 adapted to be mounted on a shaft on the recording or reproducing apparatus to be driven therethru. The reel has a web portion 11 connected to the hub which carries an outer cylindrical spool portion 12 terminating at its ends in flanges 13. In using the reel on a magnetic recording or reproducing apparatus a leader is adapted to be permanently connected at one end to the reel and to carry a coupling for connecting it to a wire on a supply spool or the like. Since the coupling is of larger diameter than the leader and the wire, there is danger that in winding the wire over the top of the coupling the wire might wedge around the coupling to become tangled with the coupling and leader. If this should occur, the wire would be very apt to break on unwinding.

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In order to eliminate tangling or wedging of the wire with the coupling, the spool body 12 is formed in its periphery with a recess 14 of a size to receive the coupling on the end of the leader so that its outer surface will not project beyond the periphery of the spool body. When the leader is wound onto the spool body it is of such a length that the coupling will fall into the recess 14 so that when the wire is subsequently wound over the leader and coupling it will lie over the coupling and will not tend to wedge between the coupling and adjacent turns of the leader or wire. Therefore, when the wire is unwound it will come off of the reel freely without tangling so that danger of breakage is minimized.

In the reel construction shown in Figures 1 and 2 the apparatus is formed with a shaft 15 driven thru a friction drive means or the like to permit slippage to compensate for change of diameter of the reel. The shaft is formed with a portion 16 of intermediate diameter and an end portion 17 of minimum diameter. A small spool 18 is mounted on the shaft portion 16 and is keyed or splined thereto to be driven by the shaft. A leader 19 is connected at one end to the spool 18 and is adapted to be wound on the spool. The leader carries a coupling 21 at its free end which may be detachably connected to a wire or the like indicated at 22.

On the small end portion 17 of the shaft a second hollow spool 23 is rotatably mounted on a bearing 24 so that it is rotatable relative to the shaft and the inner spool 18. The spool 23 encloses the spool 18 and is formed with an axially extending slot 25 in its periphery of a size such that the leader 19 may pass freely therethru but too small to pass the coupling 21. The slot 25 is formed at the bottom of an axially extending recess 26 which is of such a size and shape as to receive the coupling 21 so that no part thereof will project beyond the periphery of the reel. Preferably a weighted portion 27

is provided diametrically opposite to the boss in which the recess 26 and slot 25 are formed to counter-balance the weight of the boss.

In operation when the leader is unwound from the reel 18 it will extend thru the slot 25 so that the coupling 21 may be connected to the end of the wire 22 at a point remote from the takeup reel. During operation of the apparatus, the shaft 15 will be driven to turn the reel 18 and wind the leader 19 thereon, the reel 23 remaining stationary at this time so that the leader may feed to the inner reel thru the slot 25. When the coupling 21 reaches the recess 26 the inner and outer reels are connected thru the leader so that the outer reel will be driven to wind the wire thereon. Since the coupling lies wholly within the recess 26 the wire will not wedge around it and may be freely unwound. During an unwinding operation the wire unwinds from the outer reel until it reaches the coupling 21 and thereafter the outer reel remains stationary while the leader unwinds from the inner reel thru the slot 25.

Figure 3 shows an alternative construction similar to that of Figures 1 and 2 except for the manner of mounting the reels. In this construction, the apparatus is formed with a shaft having a reduced end portion 28 and the reel construction includes a small inner spool 29 and an outer spool 31, enclosing the inner spool and supported on bearing members 32. The shaft portion 28 fits into the hub of the inner spool 29 and may be keyed or splined thereto. The bearing portions 32 fit rotatably on the shaft 28 so that the outer spool may rotate relative to the inner spool and the shaft. The outer spool is formed with a peripheral slot 33 and a recess 34 corresponding to the slot 25 and recesses 26 of Figure 1. This apparatus operates in the same manner as that of Figures 1 and 2 differing therefrom only in the construction and mounting of the spools.

In the apparatus of Figure 4 a supporting plate 35 is formed with an opening thru which a shaft 36 extends. The shaft 36 is keyed or splined to a smaller inner spool 37 and an outer spool 38 encloses the inner spool. The outer spool is formed with a peripheral slot 39 and a recess 41 corresponding to the slot 25 and recess 26 of Figure 1.

The outer spool 38 is in turn enclosed by a cup shaped casing or housing 42 which fits against and is supported by the supporting plate 35. A stub shaft 43 is carried by the casing 42 and is axially aligned with the shaft 36 when the casing is mounted on the apparatus. The outer reel has an inwardly turned hub portion 44 rotatably supported on the stub shaft 43 by a bearing 45 so that the outer reel can turn independently of the shaft 36 and the inner reel 37 except when the coupling on the leader is engaged in the recess 41.

In the apparatus of Figure 5, there is provided a supporting plate 46 which carries a tubular stud 47 thru which a driving shaft 48 extends. The driving shaft 48 is connected at its outer end to a small reel 49 on which the leader is adapted to be wound. An outer reel 51 encloses the reel 49 and is formed with an axial slot 52 and a recess 53 corresponding to the slot 25 and the recesses 26 of Figure 1.

The outer reel 51 is rotatably supported on the apparatus by means of an inwardly turned hub portion 54 lying within the inner reel 49 and supported on a bearing 55 on the stud 47. Thus the outer reel can turn freely relative to

the inner reel except when the reels are connected by means of the leader.

With the several reel constructions of the invention, the coupling on the end of the leader is received in a recess in the periphery of the outer reel so that in all cases the wire may be wound on the reel without wedging against or tangling with the leader or coupling. In the embodiments of Figures 1 to 5, the wire and leader are wound on separate coaxial reels which are connected only by the leader so that the exact length of the leader is not important to cause the coupling to fall properly in the recesses.

The constructions of Figures 1 to 5 provide an additional advantage on machines in which the wire speed is governed by the speed of the shaft on which the take up reel is mounted. In devices of this type the leader will be wound up relatively slowly due to the small diameter of the inner spool until the connector is received in the recess in the outer spool. Thereafter the wire will be wound onto the outer spool at a higher lineal speed due to the increased effective spool diameter. Therefore, the coupling and the initial end portion of the wire will be threaded through the mechanism at a relatively slow speed below the recording and reproducing speed.

While several embodiments of the invention have been shown and described in detail herein, it is understood that these are illustrative only and are not intended as a definition of the scope of the invention reference being had for this purpose to the appended claims.

What is claimed is:

1. A reel for a magnetic recording apparatus comprising a hollow spool adapted to be rotatably mounted on the apparatus, the spool being formed with a peripheral opening thru which a leader may pass and a recess connected to the opening of a size to receive a coupling on the leader, and a second spool in and rotatable relative to the first named spool on which the leader may be wound.

2. A reel for a magnetic recording apparatus comprising a hollow spool adapted to be rotatably mounted on the apparatus, the spool being formed with an axially extending slot therethru and having a peripheral recess of greater width than the slot opening into the slot, the slot being adapted to pass a leader and the recess to receive a coupling on the leader, and a second spool rotatably mounted within the first named spool on which the leader may be wound.

3. A reel for a magnetic recording apparatus having a spool supporting and driving shaft comprising a spool adapted to be mounted on the shaft to be supported and driven thereby, a second hollow spool to be mounted over the first named spool for rotation relative thereto, the second spool being formed with a peripheral opening therein thru which a leader may pass, and with a recess communicating with the opening to receive a coupling connected to the leader.

4. A reel for a magnetic recording apparatus having a spool supporting and driving shaft comprising a spool adapted to be mounted on the shaft to be supported and driven thereby, a second hollow spool to be mounted over the first named spool for rotation relative thereto, a casing enclosing the second spool adapted to be mounted on the apparatus around the shaft, and cooperating bearing means on the casing and the second spool rotatably to support the spool on the casing, the second spool being formed with

an opening therein thru which a leader may pass to be wound on the first named spool.

5. A reel for a magnetic recording apparatus having a tubular stud thereon with a spool supporting and driving shaft extending therethru, comprising a spool adapted to be mounted on the shaft to be driven thereby, a second hollow spool enclosing the first named spool, and bearing means rotatably mounting the second spool on the stud, the second spool having a peripheral opening therein thru which a leader may pass to be wound on the first named spool.

6. A reel for a magnetic recording apparatus comprising a spool adapted to be mounted on the apparatus to be driven thereby, an elongated leader connected at one end to the spool and adapted to be wound thereon, a hollow spool enclosing the first named spool and rotatable relative thereto, the hollow spool having an opening therein thru which the leader may extend, and a coupling on the leader to engage the hollow spool around the opening whereby the spools are drivably connected thru the leader.

7. A reel for a magnetic recording apparatus comprising a spool adapted to be mounted on the apparatus to be driven thereby, an elongated leader connected at one end to the spool and adapted to be wound thereon, a hollow spool enclosing the first named spool and rotatable relative thereto, the hollow spool having an opening therein thru which the leader may extend, and an enlarged peripheral recess communicating with the opening, and a coupling on the leader fitting in the recess.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,438,212	Baluta	Dec. 12, 1922
1,578,231	Deses et al.	Mar. 23, 1926
2,119,943	Marks	June 7, 1938
1,663,923	Shutt	Mar. 27, 1928