Jan. 2, 1951 C. B. DALE 2,536,126

WIRE RECORDER SPOOL

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Fig. 1.

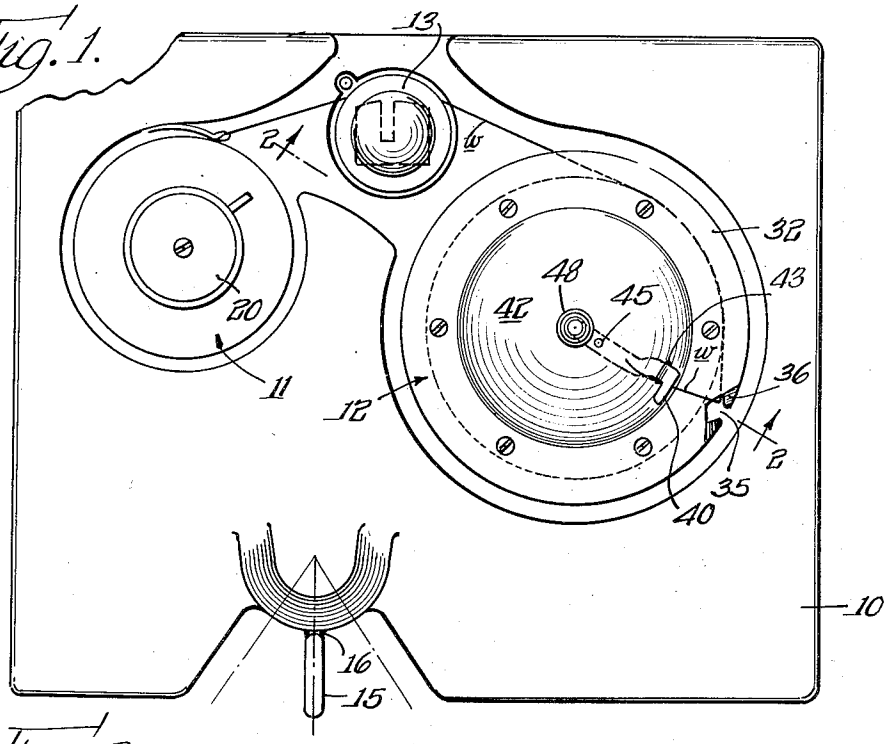


Fig. 2.

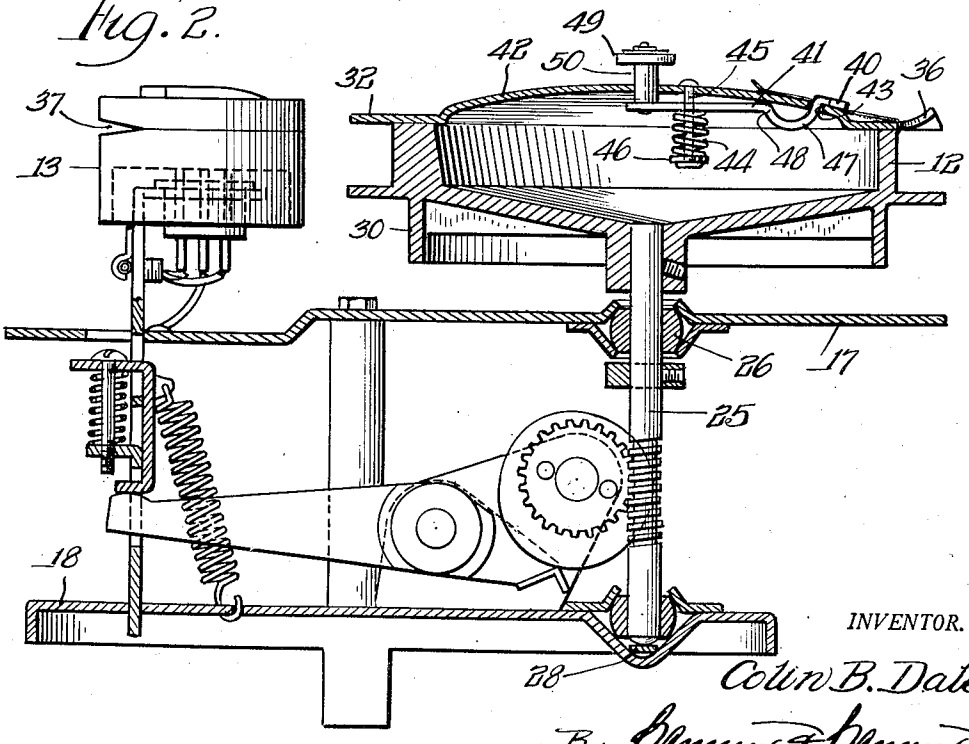


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Fig. 3.

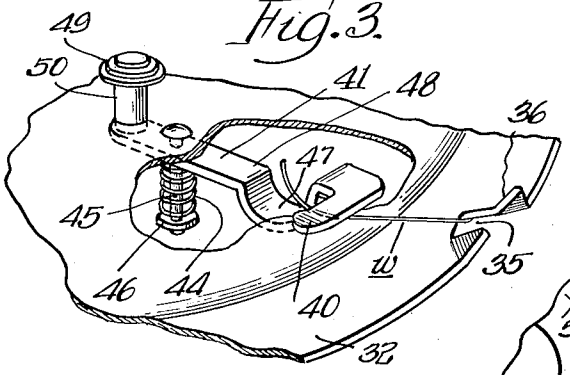



Fig. 4.

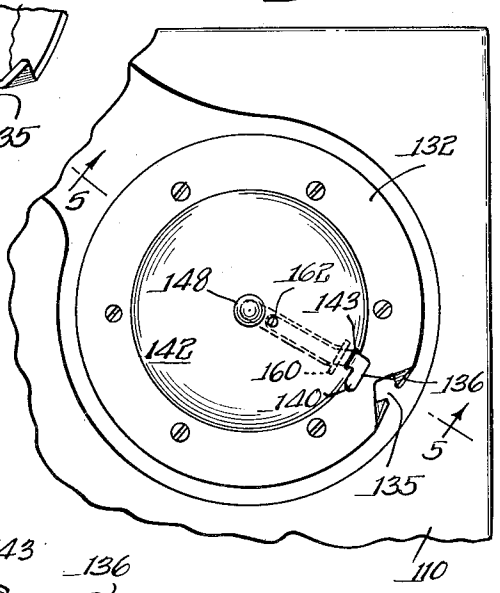



Fig. 5.

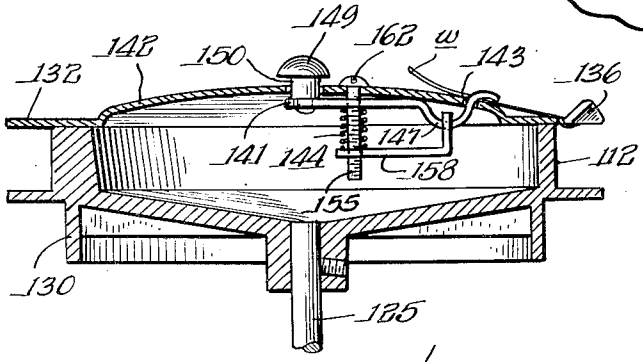
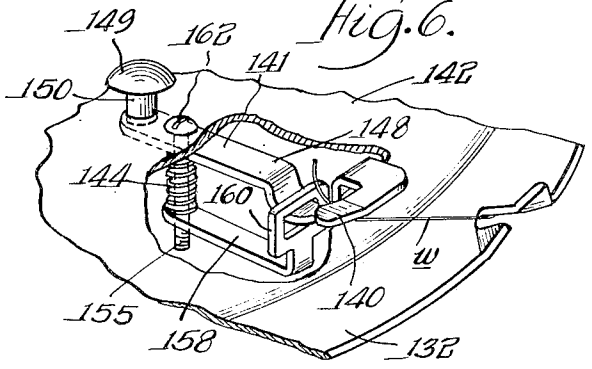



Fig. 6.



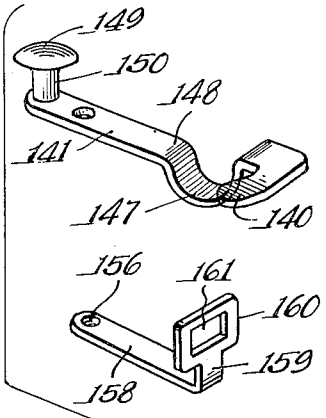




Fig. 7.

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# UNITED STATES PATENT OFFICE

2,536,126

## WIRE RECORDER SPOOL

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Application May 8, 1948, Serial No. 25,823

8 Claims. (Cl. 242—125)

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This invention relates to a spool on which wire of a relatively fine gauge is adapted to be wound. It is designed with particular reference to a sound recording and reproducing machine utilizing a magnetizable steel wire, such an instrument being commonly known as a "wire recorder." A main problem to be dealt with in any such instrument is the securement of the ends of the wire length that are wound upon each spool. By my invention this is accomplished in a simple and effective way which may readily be mastered by anyone. The features of improvement herein claimed have been largely disclosed in my application for patent on a Wire Recorder, filed March 10, 1947 under Serial No. 733,654 of which this case is a continuation in part.

A primary object is to eliminate various inconvenient and annoying characteristics of the wire handling devices of prior wire recorders. One of the disadvantages of such instruments has been the necessity of attaching an end of the wire to a "leader" consisting of a serrated Celluloid strip or the like, wrapped around the wire on the supply spool and fitted tightly between the flanges of the spool for holding the wire in place. When using the wire in the recorder, such a leader is first unwound from the supply spool and wound onto the takeup spool, successive layers of wire then being wound around the leader on the takeup spool in the course of opration of the machine. Unavoidable projections on the leader have caused uneven winding of the wire with the production of "bumpy" spots therein, and this has resulted in distortion of the sound when reproduced. Moreover, if the leader should accidently be broken off, the spool of wire is rendered incapable of further use. In other types of machines adhesive fasteners have been used to secure the wire end to the takeup spool, but such expedients have been subject to the disadvantage that they produce unevenness in the superposed layers of the wire.

My present invention avoids the foregoing difficulties by providing a novel wire handling mechanism adapted to utilize the wire without any such leader as has been commonly employed in the past, and without resorting to the use of adhesive fasteners for attaching the wire end to the takeup spool. The leading end of the wire is merely clamped to the takeup spool by a convenient latching means which is so located as not to obstruct the smooth winding surface of the spool, thereby causing the successive layers of wire to be wound evenly thereon. During the rewind operation the wire is fed tautly and evenly

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back onto the supply spool, and as the operation nears completion, the end of the wire is tensioned to pull loose from the latching means, thereby producing a final tightening and automatic clamping of the wire on the spool. Thus, the wire becomes firmly bound on the spool and cannot unwind. Moreover, the free end of the wire tends to twist into a "pigtail" as it is pulled loose from the latch, making it impossible for the wire end to become buried in the wire on the spool.

In the accompanying drawings, a suggestive embodiment of this invention is set forth in the manner following:

Figure 1 is a top plan view of a wire recorder showing the supply and takeup spools with a recording head therebetween;

Fig. 2 is an enlarged fragmentary section, taken on line 2—2 of Fig. 1;

Fig. 3 is a fragmentary view in perspective looking toward the top of the takeup spool a part of which is broken away to exhibit certain of the parts to the under side thereof;

Fig. 4 is a view in plan looking down upon a takeup spool having a modified construction of wire latch;

Fig. 5 is a vertical section through the takeup spool, taken on line 5—5 of Fig. 4;

Fig. 6, which is a view similar to Fig. 3, shows in perspective the modified construction of Figs. 4 and 5; and

Fig. 7 is an exploded perspective view of the two main parts comprised in the wire latch which is embodied in the construction of Figs. 4–6.

In the illustrated embodiment of the invention the wire recorder and reproducer is housed within a case or cabinet having upon one of its faces a cover plate 10 which is suitably recessed to accommodate a wire supply spool 11, a wire takeup spool 12, and a recording and pickup head 13 which is also part of the level winder. The handle 15 of a control lever 16 is located near one edge of the cover plate 10. The control lever is part of the run-stop-rewind switch which, however, forms no part of the present invention. The framework of the machine includes a base plate 17 and a subbase plate 18 which together support the wire handling means and associated mechanism.

The wire supply spool 11 that is to be used in the machine is mounted on a chuck 20 to be driven thereby, the chuck being carried by a vertical shaft which is motor driven by suitable means (not shown). The wire takeup spool 12 is formed with a depending skirt or drum 30 hori-

zontally aligned with a friction wheel (not shown) that functions as an idler in the transmission between the motor (not shown) and the takeup spool. Because of the relatively large diameter of the drum 30 the takeup spool is rotated rather slowly when it is being driven by the rotor, the wire speed under these conditions being about one-seventh of the wire speed which obtains when the chuck 20 is being driven from the same motor.

A circular cover plate 32 on the takeup spool has a peripheral portion which forms the top flange of the spool. A small slot or notch 35 is formed in the edge of the cover plate 32, and guiding ears 36 are bent upwardly from the edges of the slot on either side thereof as best shown in Fig. 3. The leading end of a wire *w* which is led from the supply spool 20 passes through a groove 37 in the recording head 13 and then to the takeup spool and out through the notch 35 for insertion beneath a latching finger 40 which bears on the upper surface of the cover plate 32 of the takeup spool.

The finger 40 is extended laterally from the outer end of a radial rocker arm 41 which is mounted on the under side of an upwardly crowned center panel 42 of the cover 32, the arm at one place near the finger passing through a slot 43 in the cover plate. Upward pressure is exerted on the rocker arm 41 by a compression spring 44 which is disposed around a pin 45 that extends through the arm 41 and cover plate panel 42 at a point slightly off center therebelow. This pin is headed at both ends, its upper head engaging the top face of the panel 42 and its lower head supporting a washer 46 which provides a thrust bearing for the spring 44. The radial arm 41 in its outer end region is bowed downwardly at 47 to provide a fulcrum point 48, and then curves upwardly to pass through the slot 43 and support the laterally extending finger 40 on its free end. The fulcrum point 48 bears against the under side of the cover plate panel 42, and when the rocker arm 41 is pressed upwardly at its inner end the finger 40 will be positioned downwardly. A rocking movement is thereby provided for, the finger 40 being normally pressed against the top face of the panel 42 by the spring 44. A button 49 is located at the center of the panel, and depending from the button is a shank 50 which extends through to the under side of the panel where it connects with the inner end of the rocker arm 41. When the button is pressed downwardly, the arm 41 is rocked, thereby raising the latching finger 40 from off the top face of the cover plate 32. With release of pressure on the button, the wire *w* when placed under the latching finger will be clamped firmly to the top face of the cover plate 32 of the takeup spool in response to pressure of the spring 44 acting upon the rocker arm 41.

The construction just described is the one illustrated in Figs. 1–3 of the drawings. A similar construction is also depicted in Figs. 4–7, but with slight modifications as will shortly be noted. The parts of the construction in Figs. 4–7 which correspond to that illustrated in Figs. 1–3 bear like reference numerals except that they are raised by 100.

According to the showings in Figs. 4–7, a pin 155 is threaded for engagement with a tapped opening 156 at one end of a floating bracket 158 which extends radially outwardly therefrom and then upwardly at 159 to terminate in a head 160 wherein is a slot 161 for receiving the bowed portion 147 of the arm 141. The pin head 162 is slotted to facilitate rotation by a screw driver, whereby to cause the inner end of the floating bracket 158 to shift either toward or away from the arm 141. When advanced toward the arm the spring 144 is placed under tension to stabilize the support for the bracket 158. This bracket serves as an abutment for one end of the spring 144, and the outer free end of the bracket which is traversed by the arm 141 is thereby maintained against rotation. In other respects the floating bracket has little or no function since the arm 141 rocks about its pivotal point 148 when depressed in response to pressure upon the button 149.

Referring once more to Figs. 1–3, when a new wire supply spool is placed in the machine the leading end of the wire *w* is drawn off therefrom and carried past the recording and reproducing head 13 and then over to the takeup spool 12 and out through the notch 35 to be frictionally engaged by the latching finger 40. With manipulation of the control lever 15 the takeup spool is set in operation, the wire being wound thereupon evenly in uniform layers as the rotation proceeds. To rewind the wire the control handle is moved to the requisite position for producing rotation of the supply spool 10. The wire then is drawn back at considerable speed off of the takeup spool onto the supply spool. During this operation, a drag brake (not shown) applies a light pressure to the takeup spool so as to maintain a constant tension on the wire. When about ready to leave the takeup spool, the wire shifts suddenly from a tangential to a radial position relative thereto. This takes place in a very short space of time, causing a very rapid and progressive amplification in the tension of the wire. It is at this moment and under such circumstances that the wire frees itself from the takeup spool. It does this successfully, while entirely straight throughout its trailing end portion, by slipping out from under the latching finger 40 whose frictional resistance is considerably less than the tensile strength of the wire.

The latching mechanism herein described is advantageous in numerous respects. It permits the end of the wire leading from the supply spool to be conveniently entered through the notch 35 and then placed under the adjacent latching finger 40 which for this purpose is momentarily raised by depressing the central button 49. The wire is thereupon held frictionally with sufficient pressure to be wound onto the takeup spool 12 as operation of the recorder proceeds.

By the provision of a screw threaded pin 155 which permits adjustment in the tension of the spring 144 I provide for varying degrees of pressure to be exerted by the latching finger upon the wire with which it engages. This is a feature of the construction of Figs. 4–7, and it is important because of the varying gauges of wire used in recorder instruments of the kind under discussion. What would be a safe or correct clamping pressure for a wire of larger diameter might not be so for a wire of smaller diameter. It is accordingly possible to vary the pressure by rotatively adjusting the pin 155 which changes the tension of the spring 144 that reacts upon the rocker arm 141 to hold the latching finger with pressure against the wire.

The term "wire," as used herein, refers to the usual magnetizable wire of stainless steel or the like which may or may not be continuous for its full length. For example I have found certain

advantage in affixing to one or both ends of the wire a short leader of nylon or the like. Such a leader can conveniently be tied to the wire and the resulting knot will be inconsequential in size. The leader is limp and has a high frictional value, and because it is lacking in spring properties it will tend to remain in place as an outermost winding upon the supply spool, requiring no fastening means for its retention.

I claim:

1. For use in a wire recorder, a wire takeup spool having at one end a circular cover plate, an operating button extended outwardly from the cover plate, a latching finger engageable with the outer side of the cover plate, a motion transmitting means interconnecting the button and finger for transmitting motion to the latter whereby it is moved toward and from the cover plate, a screw extended through the cover plate at a point near the operating button, a floating bracket in loose connection with the motion transmitting means and in threaded connection with the screw, and a tension spring coiled around the screw and exerting opposing thrust against the bracket and motion transmitting means for maintaining the latching finger in yielding pressure engagement with the cover plate.

2. A wire takeup spool according to claim 1, in which a wire guide is provided in the cover plate edge substantially in line with the button and latching finger.

3. A wire takeup spool according to claim 1, in which the motion transmitting means is a rocker arm extending radially along the inner side of the cover plate and then through a slot therein to the outer side thereof, the latching finger being joined to and carried by the rocker arm end which lies to the outer side of the cover plate.

4. A wire takeup spool according to claim 1, in which the motion transmitting means is a rocker arm extending along the inner side of the cover plate and then through a slot therein to the outer side thereof, and the finger is joined to and carried by the rocker arm end which lies to the outer side of the cover plate, and the spring coiled around the screw is engaged with the rocker arm on a side of its pivotal point which is opposite that whereon the finger is carried.

5. A wire takeup spool according to claim 1, in which the motion transmitting means is a rocker arm arranged radially of the cover plate with the operating button located substantially at its axis, and a guide for the wire is carried by the cover plate at an edge point substantially in line with the button and latching finger.

6. For use in a wire recorder, a wire takeup spool having at one end a cover plate, an operating button extended through the cover plate and outwardly thereof, a latching finger engageable with the outer side of the cover plate, a rocker arm extending through the cover plate and interconnecting the button inwardly thereof and the latching finger outwardly thereof and formed to provide a fulcrum point inwardly of the plate wholly disconnected therefrom, a pin anchored to the plate and extended through the rocker arm intermediately of its fulcrum point and the button, and a compression spring coiled about the pin and supported thereby for exerting a thrust against the rocker arm and maintaining the latter in a rocked position such that the latching finger is yieldingly engaged with the outer side of the cover plate.



7. For use in a wire recorder, a wire takeup spool having at one end a circular cover plate, an operating button extended outwardly from the cover plate, a latching finger engageable with the outer side of the cover plate, a rocker arm extending radially along the inner side of the cover plate and then through a slot therein to the outer side thereof, the latching finger being joined to and carried by the rocker arm end which lies to the outer side of the cover plate, and a spring exerting tension on the rocker arm for maintaining the latching finger yieldingly in pressure engagement with the cover plate.

8. For use in a wire recorder, a wire takeup spool having at one end a circular cover plate, an operating button extended outwardly from the cover plate, a latching finger engageable with the outer side of the cover plate, a rocker arm extending along the inner side of the cover plate and then through a slot therein to the outer side thereof, a finger joined to and carried by the rocker arm end which lies to the outer side of the cover plate, a pin fixedly extended inwardly from the cover plate at a point near the operating button, and a wire spring coiled around the pin and supported thereby in a manner to urge the rocker arm toward the inner side of the cover plate for maintaining the latching finger yieldingly in pressure engagement with the cover plate.

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## REFERENCES CITED

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

UNITED STATES PATENTS

| Number | Name | Date |
|---|---|---|
| 766,936 | DeRoseau | Aug. 9, 1904 |
| 1,164,999 | Duffy | Dec. 21, 1915 |
| 1,274,776 | Preissner | Aug. 6, 1918 |
| 1,389,500 | Goodrich et al. | Aug. 30, 1921 |