Nov. 14, 1939. J. F. CULLIN 2,179,574

MECHANISM FOR DEREELING OR UNWINDING WIRE FROM COILS

Filed May 13, 1936 2 Sheets-Sheet 1

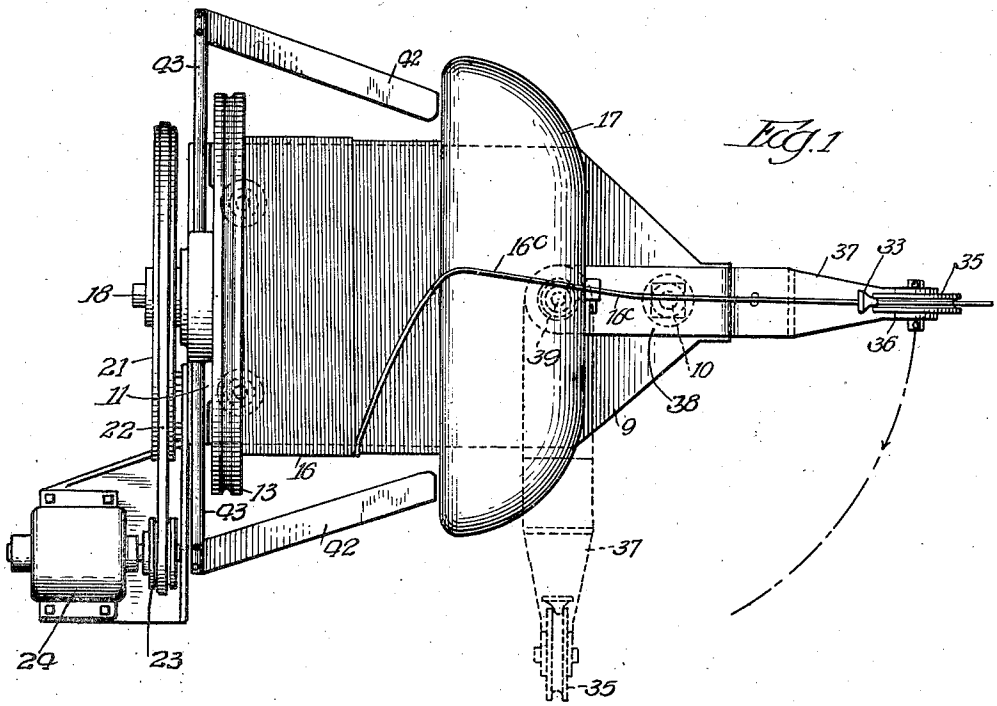


Fig. 1

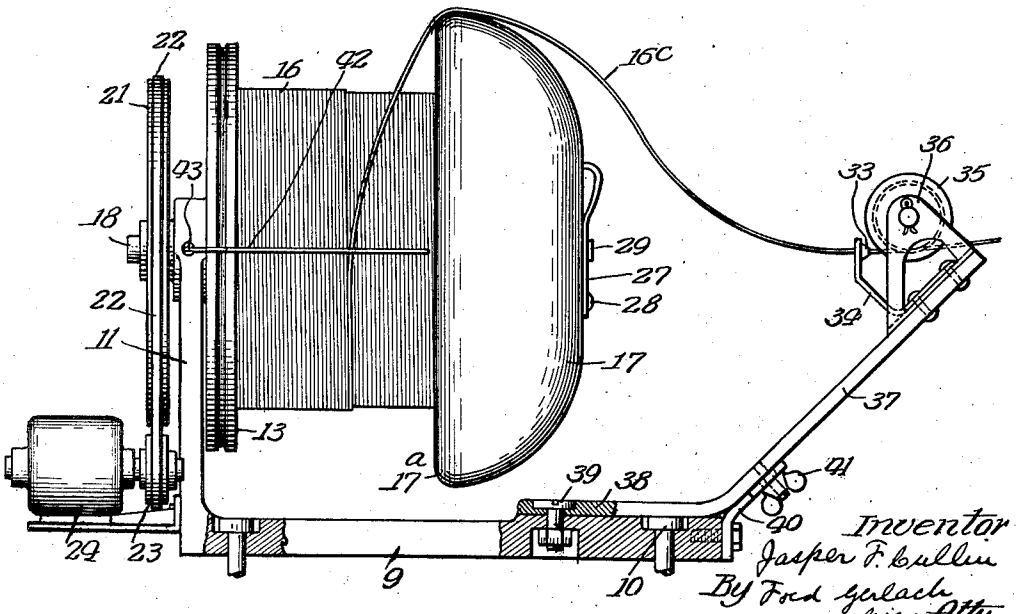


Fig. 2

Inventor
Jasper F. Cullin
By Ford Gulack
his Atty.

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Fig. 3

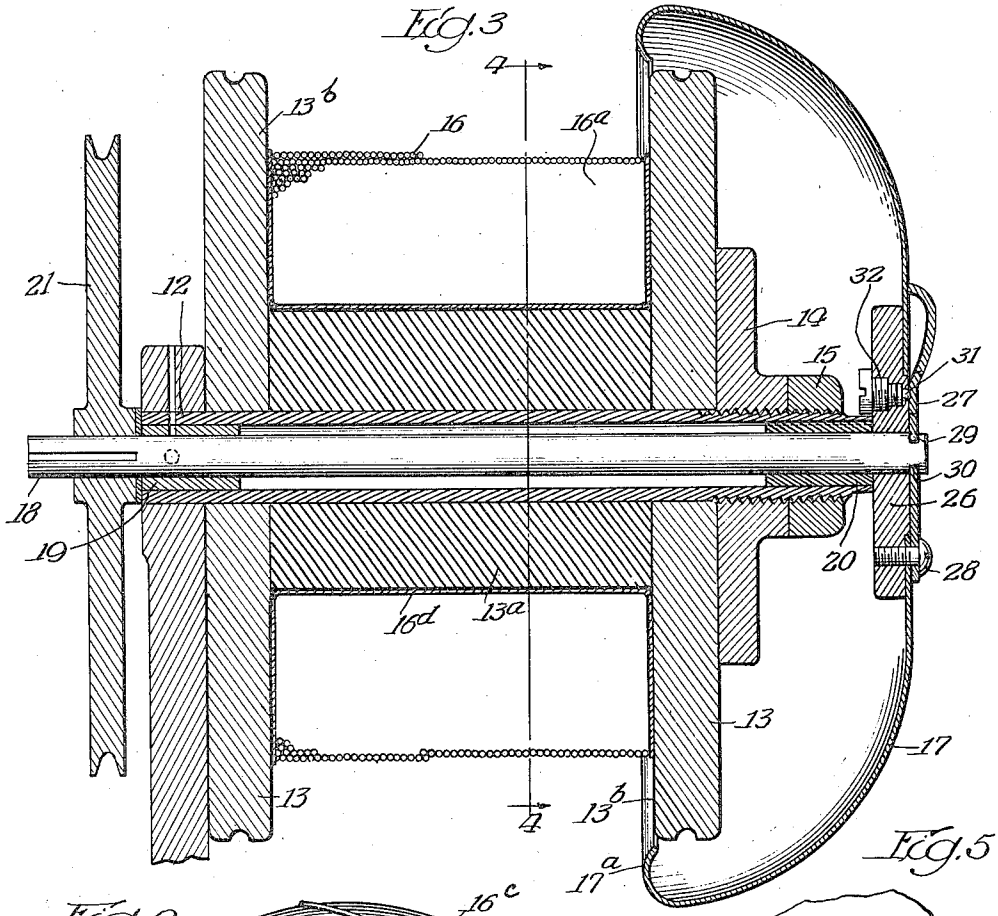


Fig. 5

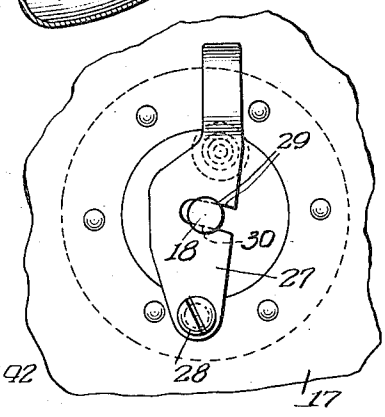
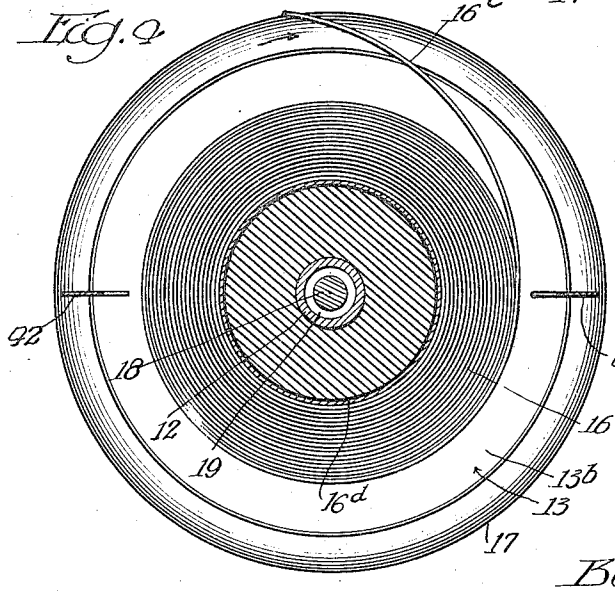


Fig. 4



Inventor
Jasper F. Cullin
By Fred Gerlach
his Atty.

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UNITED STATES PATENT OFFICE

2,179,574

MECHANISM FOR DEREELING OR UNWINDING WIRE FROM COILS

Jasper F. Cullin, Detroit, Mich., assignor, by direct and mesne assignments, of two-thirds to Lou Mervis, Chicago, Ill.

Application May 13, 1936, Serial No. 79,474

2 Claims. (Cl. 242—128)

The invention relates to mechanism for dereeling or unwinding a continuous strip of material, such as wire, from coils for paying it out to winding or other machines.

One object of the invention is to provide improved mechanism for unwinding and paying out wire from a coil at the rate at which the wire is taken up by machines such, for example, as coil winding machines.

Another object of the invention is to provide improved dereeling mechanism in which the stretching or breaking of fine wire by the pull thereon due to the inertia of the large spool and coil, which occurs when the wire is pulled off a rotatable coil, will be avoided.

Another object of the invention is to provide an improved dereeling mechanism in which it is unnecessary to place the wire under tension to prevent its tangling when the take-up of the wire is stopped.

Another object of the invention is to provide an improved dereeling mechanism which is adapted to unwind wire from a coil of wire, which is readily removable from a separable spool or reel so the spool or reel can be reloaded with a coil of wire without transporting the spools or reels to the place where the wire is manufactured for reloading.

In accomplishing these objects, the spool or reel is mounted against rotation and an annular driven unwinding element at one end of the spool is adapted for frictional engagement with a loop of wire from the coil so that when the wire in the loop is taken up by the machine to which it is fed, the friction between the rotating element and the wire, will unwind the wire from the coil and, when the take-up by coil-winding machine ceases, the loop will be automatically freed from the rotating element to discontinue the unwinding of the wire from the spool; restraining devices are provided which prevent the wire from becoming loose around the coil when the pay-out is stopped; and the unwinding element is detachably mounted at one end of the spool and the spool is formed of sections or parts between which the coil of wire can be stationarily confined and so that the spool may be reloaded with a coil of wire.

Other objects of the invention will appear from the detailed description.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by claims at the conclusion hereof.

In the drawings:

Fig. 1 is a plan.

Fig. 2 is a side elevation of a machine embodying the invention.

Fig. 3 is a longitudinal section through the unwinding mechanism.

Fig. 4 is a section on line 4—4 of Fig. 3.

Fig. 5 is a detail on the latch for mounting the annular unwinding member on, and to rotate with, the drive shaft.

The invention is exemplified in mechanism which is mounted in a base 9, which is adapted to be secured by bolts 10 in any suitable place to supply wire to a machine such, for example, as winding machines for magnet-helices, armature-coils, etc. One end of a sleeve 12 is fixedly secured in a standard 11 on the base, the other end being free to receive a spool or reel 13 which fits around the sleeve and is supported thereby. A flange 14 is carried on and adjacent the free end of the sleeve 12 and is adapted to be clamped by a nut 15 which is screw-threaded to the sleeve against the spool to secure it against rotation on the sleeve. The spool is composed of a core or cylinder 13^a which fits on sleeve 12 and sides 13^b which are separately formed and adapted to be clamped together with the core between them by the flange 14 and nut 15 to fixedly secure the spool on the non-rotatable sleeve 12. A coil 16 of wire, furnished to the user with a paper liner 16^d and suitable ties for keeping it intact, fits around the core 13^a and between spool-sides 13^b. When the nut 15, flange 14 and outer spool-side 13 are removed from the sleeve 12, the coil 16 can be slipped endwise onto the core 13^a. When the outer spool-side 13 is clamped in place by the nut 15 and flange 14, the spool and coil will be supported by, and concentrically around, the sleeve and secured against rotation.

The means for unwinding the wire from the coil 16 and paying it out as required by the machine to which the wire is fed, comprises an annular member 17, such as a disk or drum, which has a longitudinally curved periphery and is removably mounted on the free end of shaft 18 which projects beyond the end of sleeve 12. This annular element is driven from shaft 18 and, while rotating, is adapted to be engaged by a loop of wire 16^c from the coil 16 when the free end of the wire is taken up at a sufficient rate of speed to cause the loop to contact with the periphery of element or disk 17. This disk is driven in the proper direction to unwind the wire from the coil and pay it off while the take-up of the wire is kept up at a sufficient rate to keep the loop 16 in frictional contact with the disk 17. When the pay-off by the disk is at a greater rate than

the take-up by the winding machine, the loop will be sufficiently enlarged or loosened to cause it to pass out of contact with the disk. This automatically discontinues the pay-off and unwinding of the wire from the reel. The inner side of the disk 17, which may be made of sheet metal, is curved or turned inwardly, as at 17a, to prevent the wire from catching on the disk. The outer portion of the disk is curved inwardly to guide the wire to an eye 33. This formation of the disk causes it to form the loop 16c between the coil and said eye, which is coaxial with the coil.

Shaft 18 extends axially through sleeve 12 and is journaled in bearings 19 and 20 adjacent the ends of the sleeve. A pulley 21 is keyed to the inner end of shaft 18 and is driven by a belt 22 from a small pulley 23 on the shaft of an electric motor 25 which is fixed to the supporting base 9 and standard 11. This motor and gearing are adapted to drive shaft 18 so that the disk 17, while the wire is frictionally held against the disk or drum, will unwind the wire from the coil 16 at, or slightly greater than, the maximum take-up of the winding mechanism. During the operation of the winding mechanism which takes up the wire from the reel, the motor 24 and the disk 17 will be constantly driven.

The wire from loop 16c passes through eye 33 and is formed in a bracket 34 to the winding machine. A grooved roller 35 journaled in a bracket 36 guides the wire to the winding machine. Brackets 34 and 36 are fixedly secured to an upwardly inclined arm 37 of a bracket 38 which is pivoted at 39 to the base 9. The winding machine will take up the wire from the loop 16c through eye 33. This take-up will cause the loop of wire 16c to be drawn against the periphery of the constantly rotating disk 17. The contacting point between the disk and the loop 16c will rotate around the spool and unwind the wire from the coil and pay it out to the winding machine. When the take-up is insufficient to shorten the loop 16c into frictional contact with the disk 17, the loop will be free from the disk and the unwinding of the wire from the coil will stop.

The disk 17 is permanently secured to a hub or flange 26 which fits around shaft 18. The hub and disk 17 are removable endwise from the outer end of shaft 18 and are held thereon by a latch 27 which is pivoted at 28 and provided with a slot 29 for engaging flat grooves 30 in the periphery and adjacent the outer end of shaft 18, so that when the latch is in its operative position, the shaft will drive the disk. A spring-detent 31 confined in a screw 32 in hub 26 engages the latch 27 to secure it against movement on its pivot 28 during the rotation of the disk and shaft 18. When the latch 27 is swung so that it will be disengaged from the notches 30 and shaft, the disk, with its hub 26, will be removable endwise from shaft 18 to provide access to nut 15, flange 14 and the spool for reloading the latter with a coil of wire.

Bracket 38 and arm 37 are pivotally mounted on the base 9 to permit the roller 35 and eye 33 to be swung inwardly to one side, as indicated by dotted lines in Fig. 2, to provide clearance for the removal of the disk 17 and reloading of the spool. A plate 40 fixed to base 9 and a thumb-screw 41, are provided to lock the base 38 and arm 37 into position to hold the eye 33 coaxial with the spool.

A pair of restraining strips 42 extend obliquely across the opposite sides of the spool and coil of wire and are supported at one end by rods 43, which are fixedly secured in upright 11. Their free ends terminate at points adjacent the inner face of the outer spool-side 13b. These strips converge from rods 43 toward the disk 17 and are formed of light resilient or spring-metal. When the loop 16c of wire becomes loose and passes out of contact with the disk 17, as the result of less wire being taken up than is paid out, the wire between the coil and the disk will be restrained from unwinding by one or the other of the strips 42 so that whenever the pay-off stops, the convolutions of the wire on the coil will not be unwound and the wire will not become tangled. When the wire between disk 17 and the coil, during the rotation of the disk, encounters either of the strips 42, the latter will flex in the direction of rotation of the disk and permit the wire at the inner end of the loop 16c to pass the strips.

In the operation of the machine, no load which requires the wire to rotate the coil or spool, is imposed on the wire and the power for unwinding the wire from the coil and paying it out is provided by the disk and its frictional contact with the wire. As a result, very fine wire can be unwound without subjecting it to elongation. The stretching or breaking of the fine wire caused by the pull on the wire due to the inertia and necessity of rapidly starting the heavy spool and coil of wire incident to devices in which the coil is rotated by the take-up of the wire, is avoided. When rectangular coils are being dereeled by the machine, stretching or breaking caused by intermittent or variations in pull to unwind wire, is avoided. The spool is left stationary and the pay-off is automatically varied according to the take-up of the winding or other machine. The spool can be readily reloaded and the single spool serves for holding packaged coils of wire. Tangling of the loose convolutions of the coil or the paid-off loop, when the take-up is discontinued, is prevented by the restraining strips. The mechanism is efficient in use and can be economically operated in connection with coil-winding and other machines. While the invention is particularly advantageous in dereeling wire, it will be understood that it may be used for other material.

The invention is not to be understood as restricted to the details set forth, since these may be modified within the scope of the appended claims, without departing from the spirit and scope of the invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent is:

1. In unwinding mechanism, the combination of means for holding a spool containing a coil of wire, an annular driven rotatable member at one end of the spool for unwinding the wire from the coil and coaxial with the spool and having a periphery adapted to contact and rotate with a loop of wire from the coil according to the take-up of the wire and to automatically discontinue the pay-off of the wire when it becomes loose, means for guiding the wire from the coil to form a loop around said member, and a wire-restraining strip extending lengthwise of the periphery of the coil, having one of its ends fixedly supported and its other end free and terminating inwardly of the periphery of and spaced longitudinally from said member, to permit the loop of wire around the member to rotate through the space between the member and the free end of the strip, and to restrain said loop when it becomes disengaged from the member.

2. In unwinding mechanism, the combination

of means for holding a spool containing a coil of wire, an annular driven rotatable member at one end of the spool for unwinding the wire from the coil and coaxial with the spool and having a periphery adapted to contact and rotate with a loop of wire from the coil according to the take-up of the wire and to automatically discontinue the pay-off of the wire when it becomes loose, means for guiding the wire from the coil to form a loop around said member, and a wire-restraining strip extending lengthwise of the periphery of the coil, having one of its ends fixedly supported and its other end free and terminating inwardly of the periphery of and spaced longitudinally from said member, to permit the loop of wire around the member to rotate through the space between the member and the free end of the strip, and to restrain said loop when it becomes disengaged from the member, the strip being flexible so its free end can be circumferentially deflected by said loop when it is taut.

JASPER F. CULLIN.