Sept. 22, 1931. A. K. SANDERSON 1,823,990

WIRE TAKE-OFF MECHANISM

Filed April 12, 1929 3 Sheets-Sheet 1

Fig. 1

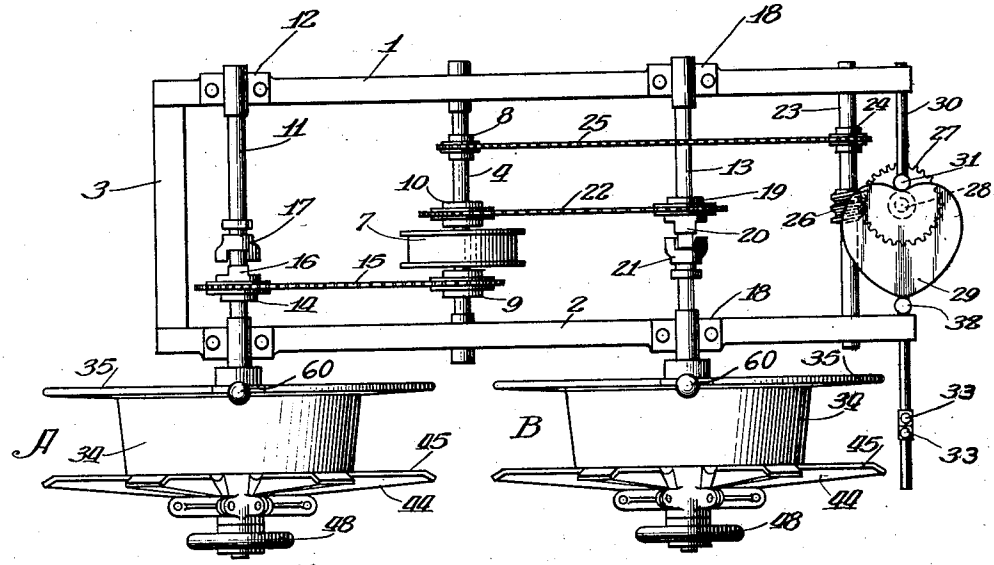
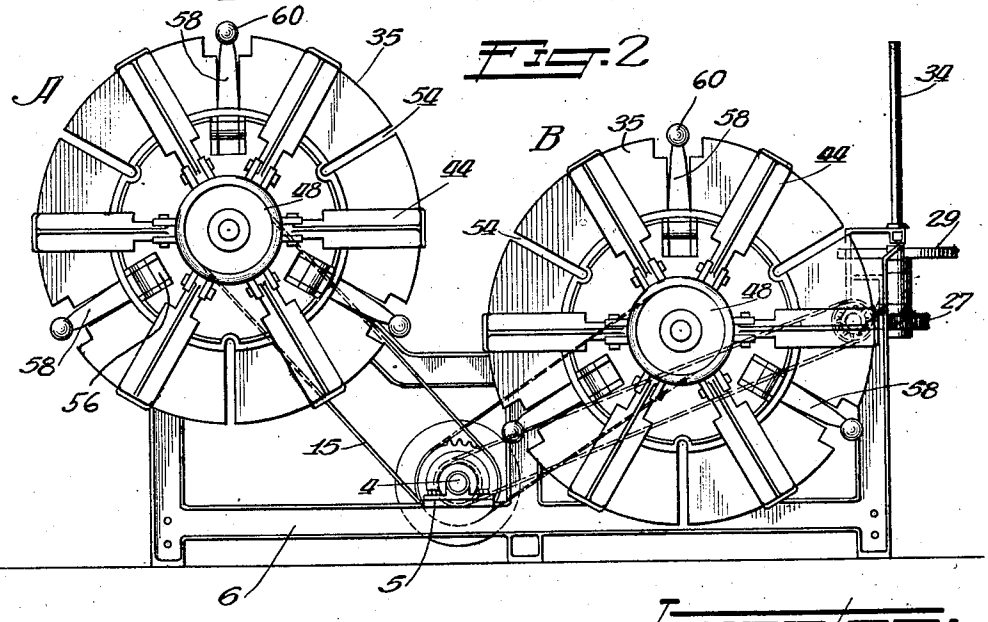


Fig. 2



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WIRE TAKE-OFF MECHANISM

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Fig. 3

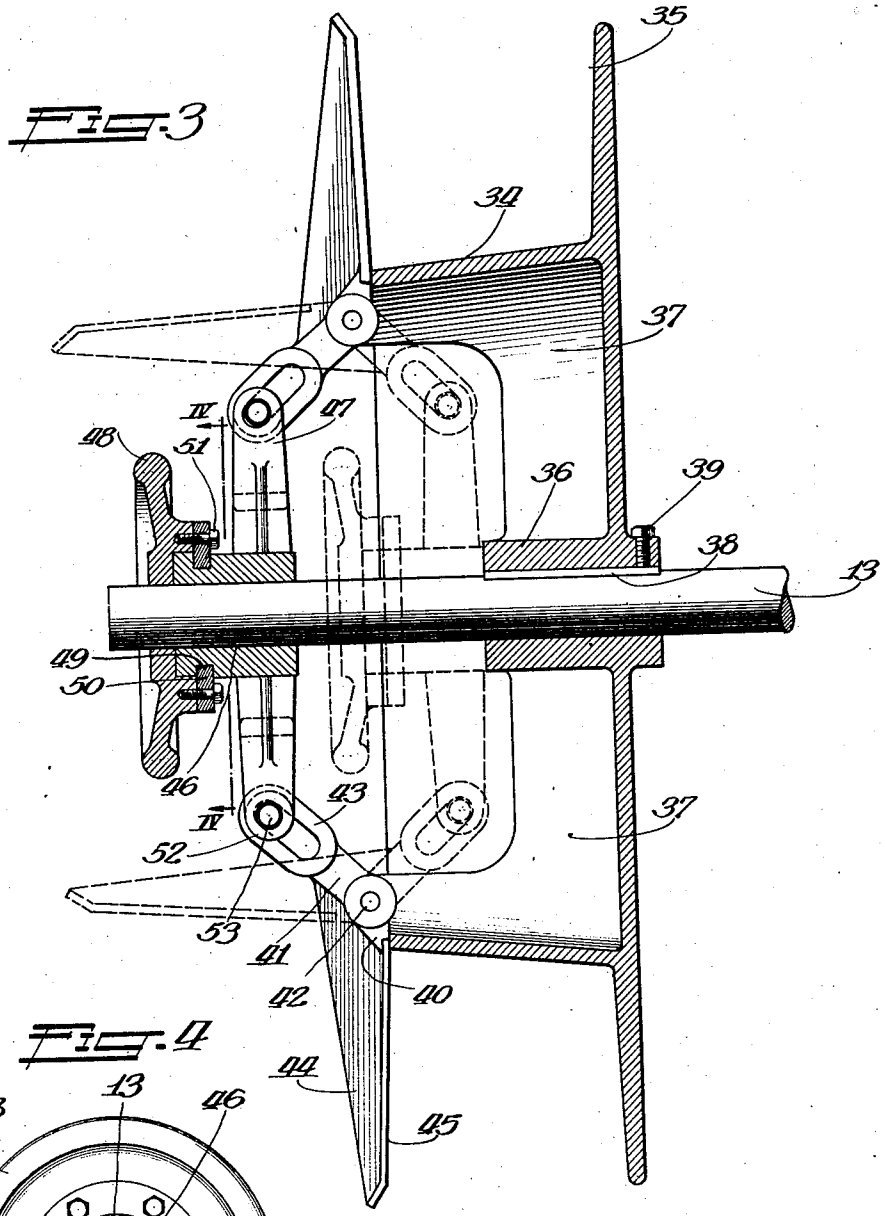
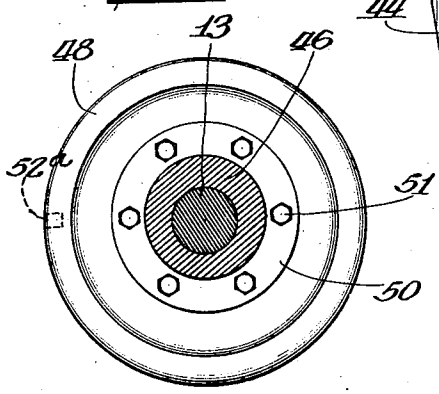


Fig. 4



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WIRE TAKE-OFF MECHANISM

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Fig. 5

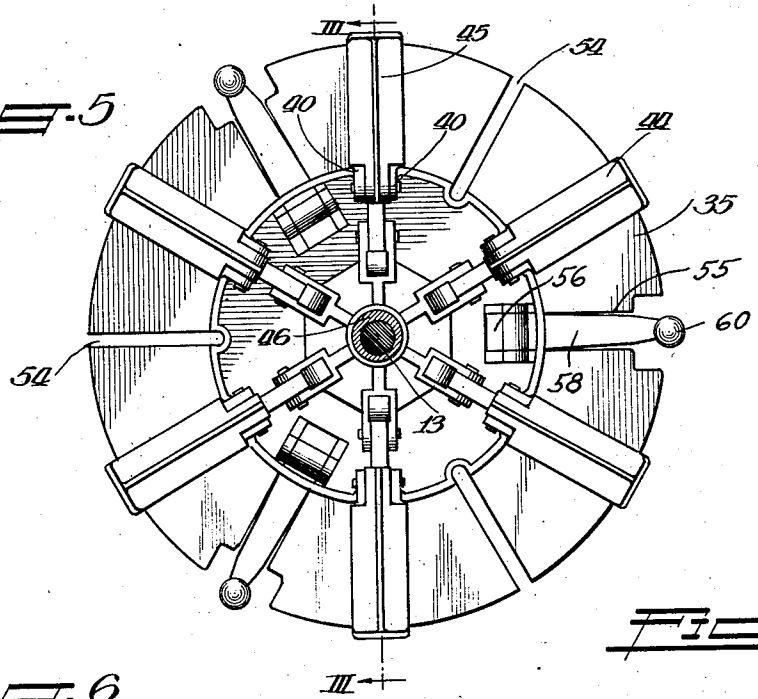


Fig. 6

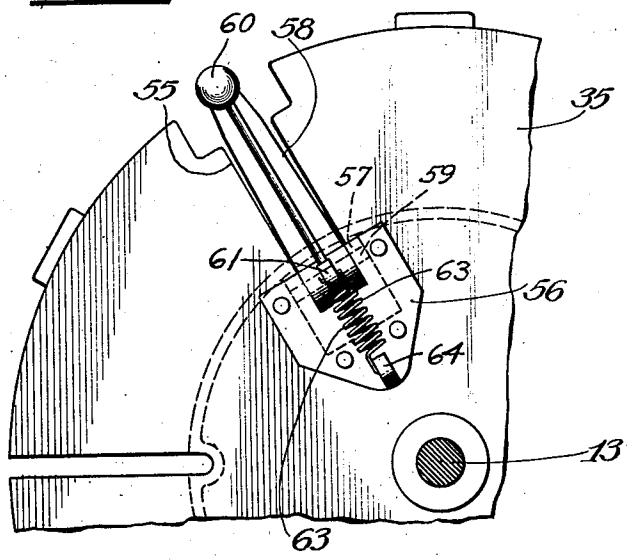
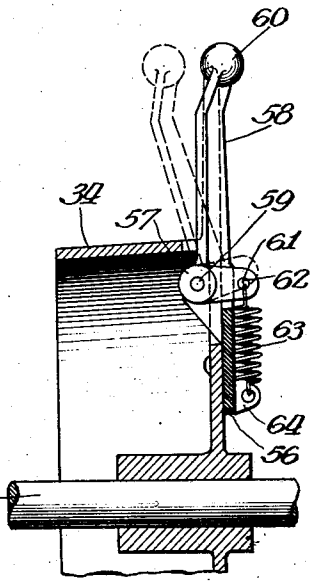


Fig. 7



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UNITED STATES PATENT OFFICE

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WIRE TAKE OFF MECHANISM

Application filed April 12, 1929. Serial No. 354,543.

This invention relates to a wire take off mechanism and particularly to one which may be used with any type of wire machine useful for making wire, wrapping wire, insulating wire or polishing the wire, or rewinding from spool into coil form.

An object of the invention is to provide a take off mechanism having a plurality of winding spools which are arranged to be filled one at a time to allow the removal of the wound wire from one spool while another is being filled.

Another object of the invention is to provide a take off mechanism having winding spools provided with collapsible fingers forming the front wall or flange of the spool together with a sliding hub connected to the fingers in such fashion as to actuate the same in toggle like manner together with a lock for securing the parts in operative posi ion.

A further object of the invention is to provide a spool for wire take off mechanism which spool has a drum fashioned as a truncated cone with a fixed rear flange or wall and a plurality of fingers pivoted to the front margin of the drum for extending radially to serve as the front wall of the spool and to be moved away into such position as to allow ready removal of the wire wound on the spool together with a sliding hub on the spool shaft connected by links to the fingers in such manner as to actuate said links in toggle like manner and a lock on the hub for locking the fingers in extended or active position said lock consisting of a hand wheel carried on the hub and arranged slightly off center with respect to the same whereby rotation of the hand wheel will cause clamping action of the hub against the spool axle.

A still further object of the invention is to provide a take off mechanism having a plurality of winding spools all driven from a common source of power and arranged to be connected or disconnected with such source of power at will, spools being provided with pivoted fingers forming the front wall of the same together with means on the spool axle for actuating said fingers to move the same into substantially radial position for winding wire on the spool or to move said fingers into collapsed position to allow removal of the wound wire from the spool, the fingers being actuated by the single member on the spool axle or shaft.

A still further object of the invention is to provide a take off mechanism for wire machines including a plurality of winding spools which are selectively filled with wire, said spools having collapsible fingers serving as the front wall of the same and there being kick off levers in the rear wall for starting the wound wire from the hub of the spool when the same has been completely filled and the fingers collapsed.

Another and further object of the invention is to provide a take off mechanism for wire machines which is economical to manufacture, efficient in use and certain in operation.

The above, other, and further objects of the invention will be apparent from the following description, accompanying drawings, and appended claims.

The form of machine chosen to exemplify this invention is illustrated in the accompanying drawings and the views thereof are as follows:

Figure 1 is a top plan view of a take off mechanism showing two winding spools which mechanism embodies this invention.

Figure 2 is a front elevational view of the arrangement of Figure 1.

Figure 3 is an enlarged central section through one of the winding spools or drums.

Figure 4 is a section taken on line IV—IV of Figure 3.

Figure 5 is a front elevational view of one of the drums showing the collapsible fingers in active position.

Figure 6 is a fragmental view of a portion of the rear wall showing in elevation one of the kick off arms.

Figure 7 is a fragmental radial sectional view showing in full lines the kick off arm in normal position and in dotted lines the position to which the same is moved for dislodging wire wound on the spool drum.

The form of mechanism selected to exemplify this invention is shown as consisting of a frame comprising side members 1 and 2 of

cast iron connected by cross members 3 the frame being of course rigidly constructed.

A main power shaft 4 is supported in bearing blocks 5 arranged on the lower member 6 of the side frames the shaft extending transversely of the frame structure. A pulley 7 is keyed to the shaft 4 for rotation from any suitable source of power such for instance as the driving mechanism of a wire making machine.

A sprocket wheel 8 is keyed to said shaft 4 and another sprocket wheel 9 is also keyed to the shaft.

A third sprocket wheel 10 is fast on the shaft 4.

A shaft 11 is carried in bearing blocks 12 on the upper portion of the frame at one end thereof which frame is arranged to extend upwardly from the balance of the same so as to support the shaft 11 above a second shaft 13.

A sprocket wheel 14 is carried on the shaft 11 and is free to rotate relatively to the same. A sprocket chain 15 engages sprocket wheel 14 on shaft 11 and sprocket wheel 9 on shaft 4 to rotate the sprocket 14 when the power shaft 4 is rotated. The sprocket 14 is provided with clutch dogs 16 for cooperation by sliding clutch member 17 splined to the shaft 11. The clutch member 17 is actuated axially of the shaft 11 by suitable connections not shown but which are well understood.

The shaft 13 is supported in bearing blocks 18 near the other end of the frame structure which shaft is below shaft 11. A sprocket wheel 19 is freely rotatable on shaft 13 and is provided with clutch dogs 20. A sliding clutch member 21 is splined on the shaft 13 for engaging the dogs 20 on the sprocket 19 for driving the shaft 13. The clutch member 21 is actuated in any suitable manner by means not shown as such means are well understood.

The sprocket 19 on shaft 13 is connected by means of a sprocket chain 22 to the sprocket wheel 10 on shaft 4.

Another shaft 23 is supported by the side frame members 1 and 2 near the end of the frame structure in suitable bearings. A sprocket wheel 24 is keyed to the shaft 23 and is connected by means of a sprocket chain 25 to the sprocket 8 on main shaft 4. A worm gear 26 is keyed to the shaft 24 for cooperating with a worm wheel 27 supported by a vertically disposed stub shaft 28 suitably journalled in the frame. The upper end of the shaft 28 is provided with a heart shaped cam 29. An axially movable bar 30 is supported in the side frame members 1 and 2 of the structure and has upstanding pins 31 and 32 thereon between which the cam 29 is arranged so that on rotation of the stub shaft 28 the bar 30 will be given reciprocating movement in accordance with the contour of the cam 29. Outwardly of the side frame member 2 the bar 30 is provided with two upstanding guides 33 between which is received a wire not shown from a wire machine and which wire is to be wound on one of the spools of the mechanism of this invention. The reciprocating bar 30 and its supported guides 33 serve to direct the wire being received by the take off mechanism in such manner as to wind the wire evenly on the spools.

A spool or winding drum A is arranged on the shaft 11 outwardly of the side frame member 2 and a similar spool B is arranged on the shaft 13 outwardly of the side frame member 2. These spools are alike in every particular and one will now be described in detail.

Figure 5 is a front elevational view of a spool or reel embodying this invention and Figure 3 is an enlarged transverse central section taken substantially on line III—III of Figure 5 however with the fingers in elevation instead of in section.

A spool as exemplified herein comprises a drum 34 which in axial section has the appearance of a truncated cone and a back wall 35 integral with the drum 34, the two parts being made as a casting preferably of cast iron.

A hub 36 is cast integrally with the back wall 35 and extends inwardly of said wall stopping short of the outer margin of the drum 34. Webs 37 are provided for strengthening the structure. The hub 36 is apertured to receive a shaft for the spool to which shaft the spool is keyed by a key 38 which is retained in position by a set screw 39 thus securely fastening the spool to the shaft 13.

The outer margins of the webs 37 are provided with pairs of spaced ears 40 between which pairs of ears are pivoted links 41 by rivets or bolts 42 in such manner that every pair of ears 40 supports one of the links 41 in pivotal association. The links 41 are provided with elongated slots 43 near the outer ends of the same.

Cast integrally with every one of the links 41 is a finger 44 having a flat surface 45 and a flange perpendicular to said flat surface 45 serving as a reinforcement. The link 41 and finger 44 are integral and arranged so that the axis of the link portion makes an obtuse angle with the flat surface 45. The ears 40 are spaced inwardly a slight distance from the outer margin of the drum 34 so that when the fingers 44 are pivoted into collapsed position as hereinafter described the surfaces 45 of said fingers will lie inwardly of the conical surface extended defined by the drum 34.

A hub 46 is carried on the shaft 13 outwardly of the drum hub 36 and arranged to be movable axially of the shaft as well as relatively rotatable on the same. The hub 46 is provided with a plurality of radially extending arms 47 there being as many arms 47 on

the hub 46 as there are fingers 44 pivoted to the drum.

The hub 46 is slightly eccentric with respect to the shaft 13. The hub 46 is cylindrical but its axis is displaced a very slight distance from the axis of the shaft 13. A hand wheel 48 is rotatably associated with the hub 46 and the periphery of the hand wheel is concentric with the shaft 13. The hub 46 is provided with an annular groove 49 which is concentric with the axis of the hub and eccentric with respect to the axis of the shaft 13. A ring 50 is secured by bolts 51 to the rear side of the hand wheel 48 and extends into the groove 49 in the hub. The inner surface of the ring 50 is eccentric with respect to the shaft 13. The hand wheel 48, the hub 46 and the ring 50 and the groove 49 are arranged so that by giving the hand wheel 48 a turn in one direction the hub 46 will be clamped against the shaft 13 to lock the hub on the same and by turning the hand wheel in the opposite direction will unlock the hub. The hand wheel 48 is provided with a recess 52*a* in its periphery whereby a spanner wrench having a projection may be applied to the hand wheel with the projection in the recess 52*a* for tightening the hand wheel 48 in locking engagement should it be impossible to tighten the same sufficiently by hand.

The outer ends of the arms 47 on the hub 46 are provided with apertured spaced ears 52 and pins 53 are arranged in these apertures which pins pass through the slots 43 in the links 41.

It will be observed that the hub 46 is so connected by means of its arms 47 with the links 41 of the fingers 44 that when the hub is moved outwardly as shown in full lines in Figure 3 the fingers will be extended substantially radially which is the active position of the same forming the front wall or surface of the spool and when the hub is moved inwardly to the dotted line position of Figure 3 the fingers will be collapsed to allow removal of the wound wire on the spool.

The locking arrangement heretofore described is sufficient to lock the hub 46 to the shaft with the fingers in active position which is the full line position of Figure 3 tightly enough for the purpose intended. The particular arrangement of the axes of the shaft and the hub is such as to allow clamping action of the hub against the shaft when the hand wheel 48 is turned in one direction to tightly lock the parts in adjusted position. It will be observed that the fingers and the associated links and arms in effect have toggle like action as the hub is moved axially on the shaft the proportion of the parts being such as to prevent accidental collapse of the fingers when wire is being wound on the spool.

The back wall 35 of the space is provided with several slots 54 for tying the coil of wire on the spool, the slots 54 allowing space for the passing of cord about the coil at three points prior to removal from the spool.

The back wall 35 of the spool is provided with a plurality of radial slots 55 which extend a slight distance inwardly of the drum surface 34. Brackets 56 are secured to the outer surface of the back wall 35 adjacent the lower ends of the slots 55. A bracket has a pair of inwardly extending apertured ears 57 to which is pivoted a lever 58 by means of a pin 59. The lever has a rounded end 60 serving as a handle. The lever is provided with an upstanding ear 61 having an aperture 62 in the same into which is hooked one end of a spring 63, the other end of the spring being hooked to an ear 64 on the bracket 56. The lever 58 is arranged to be pivoted so as to move inwardly of the back wall 35 against the tension of the spring 63 for the purpose of freeing the wound wire on the drum 35 should perchance the winding be so tight as to prevent ready removal of the same by hand. There are several of the levers 58 arranged in the manner heretofore described, three such levers being shown in the drawings arranged at 120° apart although of course as many more or a fewer number may be used as desired.

The upper end of the recess or slot 55 is enlarged to allow manipulation of the lever 58 by the hand of the operator.

The take off mechanism of this invention is susceptible of use with any kind of wire machine and is useful in connection with the wire polishing machine set forth in a copending application wherein the take off mechanism of this invention is illustrated.

The operation of the take off mechanism is as follows:

The take off mechanism is arranged with respect to a wire machine so that the wire coming from said machine is trained between the guides 33 on the even winding rod 30. The end of the wire is bent and hooked over one of the fingers 44 in either of the spools A or B which is empty and the clutch controlling said spool is actuated to rotate the same after the power shaft 4 has been connected to the source of power not shown for driving the shaft. The wire is therefore wound onto such spool by reason of rotation of the same being wound evenly by the reciprocation of the rod 30 as influenced by the cam 29, the winding continuing until the spool is filled whereupon the wire is cut, the end bent and then hooked around a finger 44 of another of the winding spools and the winding started on the spool. The clutch of the first spool is then disconnected, and the coil of wire is tied through the slots 54 the hand wheel 48 turned to unlock the engagement of the hub 46 with its shaft and then the hub is pushed inwardly into dotted line position of Figure 3 which collapses the fingers 44 allowing removal of the wound wire

from the spool. Should however the wire be so tightly wound as to resist ordinary efforts to remove the same then the levers 58 may be actuated to kick off the bundle of wire on the drum 34 at least to loosen these wires sufficiently so that it may be readily removed. When the bundle of wire has been removed in the manner just described the hub 46 is moved outwardly to full line position of Figure 3 whereupon the fingers 45 are restored to normal position and the hand wheel 48 actuated to lock the hub on its shaft whereupon the spool is ready for filling another time.

The provision of a take off mechanism with a plurality of winding spools enables continuous operation of a wire machine thus reducing the cost of operation of such machine and increasing its efficiency.

It is of course within the scope of this invention to provide more than two winding spools as illustrated in the drawings there being two spools shown merely for the purposes of illustration.

The winding spools as before stated are preferably made of cast metal with the rear wall or flange 35 integral with the conical drum 34 and the fingers 44 serve as front flange members when in active position which is that shown in Figure 3 of the drawings that is when the fingers are substantially perpendicular to the shaft and which fingers serve as lateral extensions of the drum 34 when in collapsed position that is when the fingers are substantially parallel to the shaft.

The invention has been described herein more or less precisely yet it is to be understood that changes may be made in the arrangement and proportion of parts and that equivalents may be substituted without departing from the spirit and scope of the invention.

The invention is claimed as follows:

1. A wire take off mechanism including in combination a plurality of winding spools, means for connecting any one of said spools in winding relation, said spools having a plurality of pivoted fingers for normally forming the front frame of the spools, and sliding cylindrical eccentric hubs on the shafts of said spools for moving said fingers into and out of flange forming position, said hubs having clamping means thereon for locking the same to the spool shafts.

2. A winding spool for wire take off mechanisms including in combination, a shaft, a spool having a fixed hub fastened to said shaft, said spool having a back wall or flange and a drum surface, a plurality of fingers pivoted to the margin of said drum surface remote from said back flange arranged to form the front flange members of the spool when said fingers are in one position, a sliding hub on said shaft, said hub being eccentrically arranged on said shaft, said hub having a plurality of arms connected to said fingers for moving the same into and out of position as front flange members, said arms and fingers having toggle like action under movement of said sliding hub, and a hand wheel rotatably mounted on said hub for clamping said hub to said shaft by cam action.

3. A winding spool for wire take off mechanisms including in combination, a shaft, a spool having a fixed hub fastened to said shaft, said spool having a back wall or flange and a drum surface, a plurality of fingers pivoted to the margin of said drum surface remote from said back flange arranged to form the front flange members of the spool when said fingers are in one position, a sliding hub on said shaft, said hub having a plurality of arms connected to said fingers for moving the same into and out of position as front flange members, said arms and fingers having toggle like action under movement of said sliding hub and means carried by the sliding hub for locking the same to said shaft, said locking means comprising a hand wheel rotatably arranged on said sliding hub the periphery of which wheel is concentric with said shaft, said hub being arranged eccentrically with respect to said shaft, a ring carried by said hand wheel and frictionally engaging said hub, said ring being eccentrically arranged with respect to said shaft, said hand wheel serving to compress the hub against the shaft when turned in one direction to lock said hub to said shaft and to release said hub from such locking engagement when turned in the opposite direction.

4. A winding spool for wire take off mechanisms including in combination, a shaft, a spool having a fixed hub fastened to said shaft, said spool having a back wall or flange and a drum surface, a plurality of fingers pivoted to the margin of said drum surface remote from said back flange arranged to form the front flange members of the spool when said fingers are in one position, a sliding hub on said shaft, said hub having a plurality of arms connected to said fingers for moving the same into and out of position as front flange members, said arms and fingers having toggle like action under movement of said sliding hub, said sliding hub being eccentrically arranged with respect to the shaft, said hub having an annular groove near one end thereof the inner diameter of which is eccentric with respect to the shaft, a hand wheel on said hub concentric with said shaft, a ring carried by said hand wheel and entering the groove on said hub which ring is eccentric with respect to said shaft, said hand wheel when turned in one direction acting through said ring to compress said hub against the shaft for locking the hub thereon and when turned in the opposite direction

releasing said hub from locking engagement with said shaft.

5. A winding spool for wire take off mechanisms including in combination, a shaft, a spool having a back wall or flange and a drum surface, said back flange having a plurality of radially extending recesses formed therein, levers pivoted to said back wall and arranged to swing through said recesses under certain conditions, the inner surfaces of said arms normally lying within the inner surface of said back flange, said arms being arranged to be pivoted towards the front of said spool for dislodging wire wound on the same, and means for returning said arms to normal or inactive position.

6. A winding spool for wire take off mechanisms including in combination, a shaft, a spool having a fixed hub fastened to said shaft, said spool having a back wall or flange and a drum surface, and a plurality of arms pivoted to the back wall of said spool and arranged as kick off members to dislodge a coil of wire wound on said spool.

7. A sliding hub lock including in combination with a shaft, a cylindrical hub eccentrically mounted on said shaft, said hub having an annular groove therein concentric with the hub axis and eccentric with respect to the shaft axis, a ring rotatable in said groove, the inner periphery of said ring being eccentric with respect to said shaft, and a hand wheel connected to said ring for rotating it in said groove to clamp said hub to said shaft when turned in one direction and unlock said hub from said shaft when turned in the opposite direction.

In testimony whereof I have hereunto subscribed my name at Aurora, Illinois, Kane county.

ARTHUR K. SANDERSON.