Aug. 30, 1932. W. D. PIERSON 1,874,206

WIRE SPOOLING MACHINE

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Fig. 1.

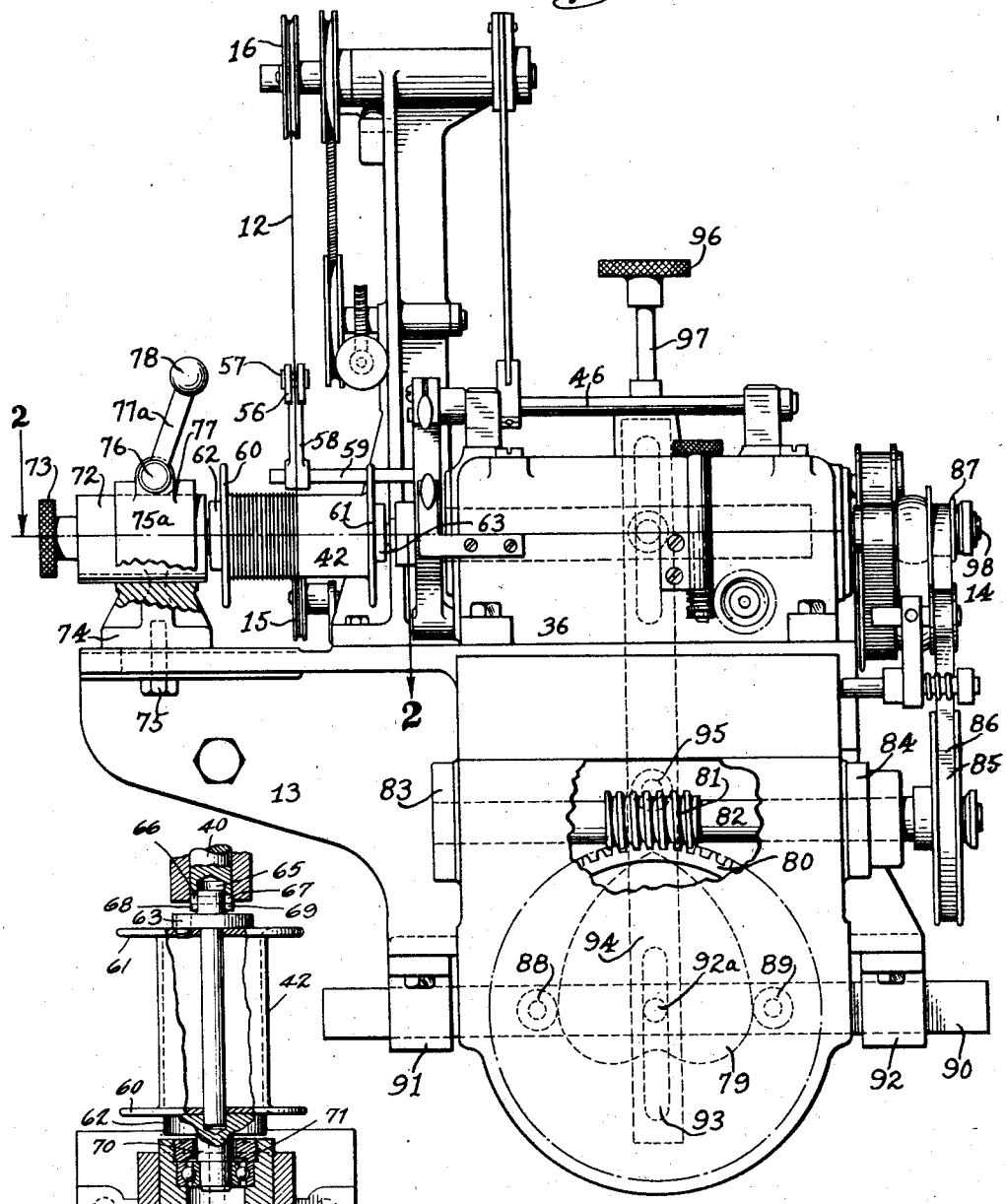


Fig. 2.

INVENTOR.
William D. Pierson.
BY H. G. Manning
HIS ATTORNEY.

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Fig. 3.

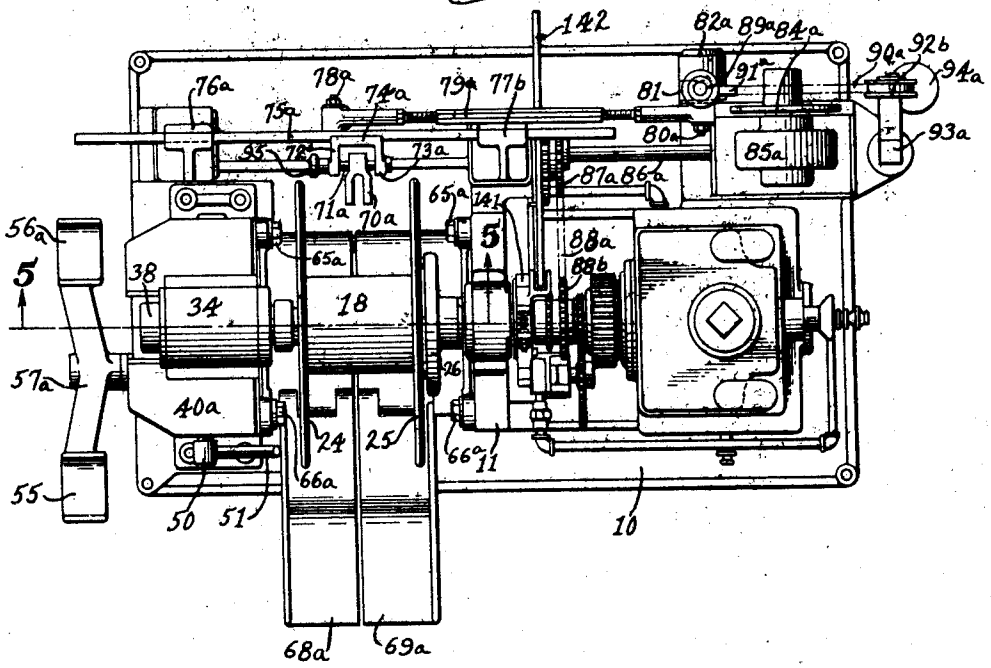
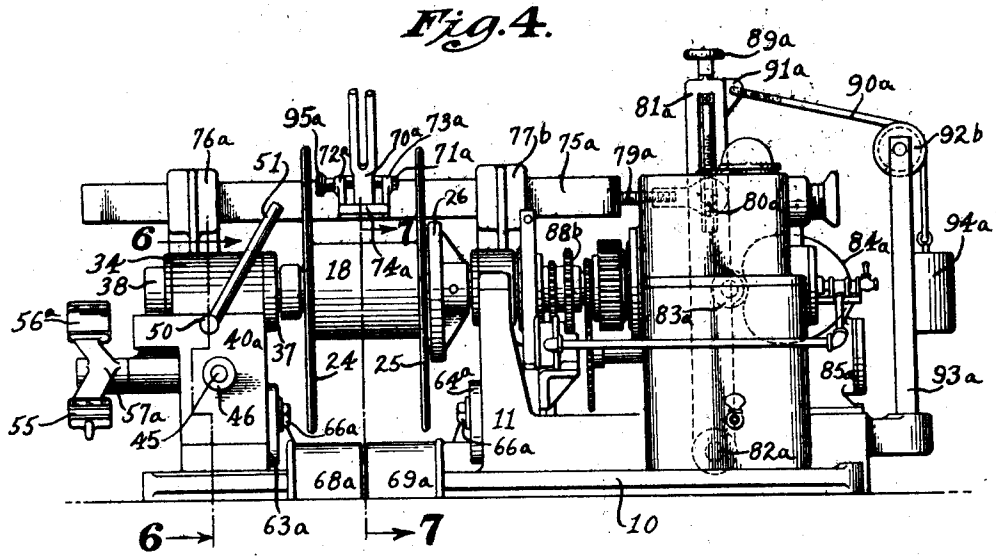


Fig. 4.



INVENTOR.
William D. Pierson
BY H. G. Manning
HIS ATTORNEY

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Fig. 5.

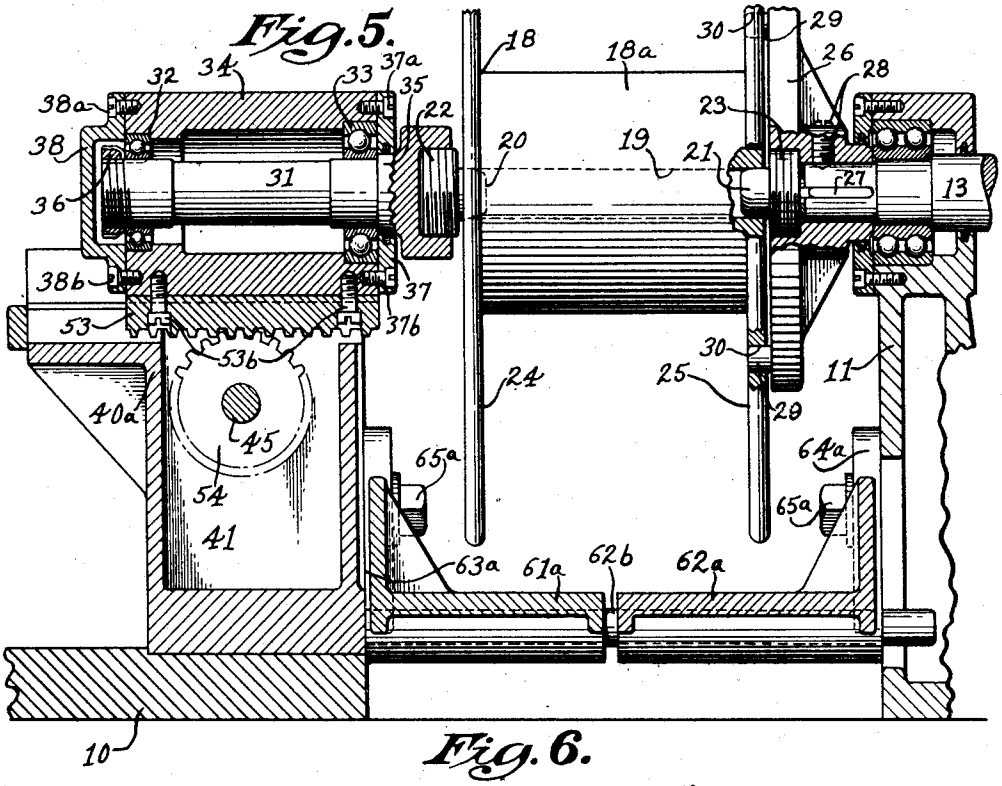
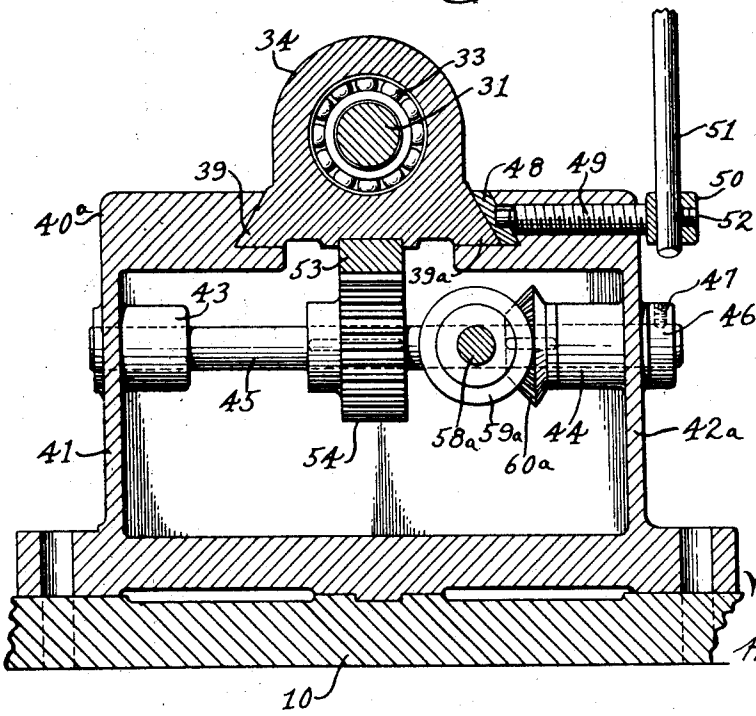


Fig. 6.



INVENTOR.
William D. Pierson.
BY
H. G. Manning
HIS ATTORNEY

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WIRE SPOOLING MACHINE

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Fig. 7.

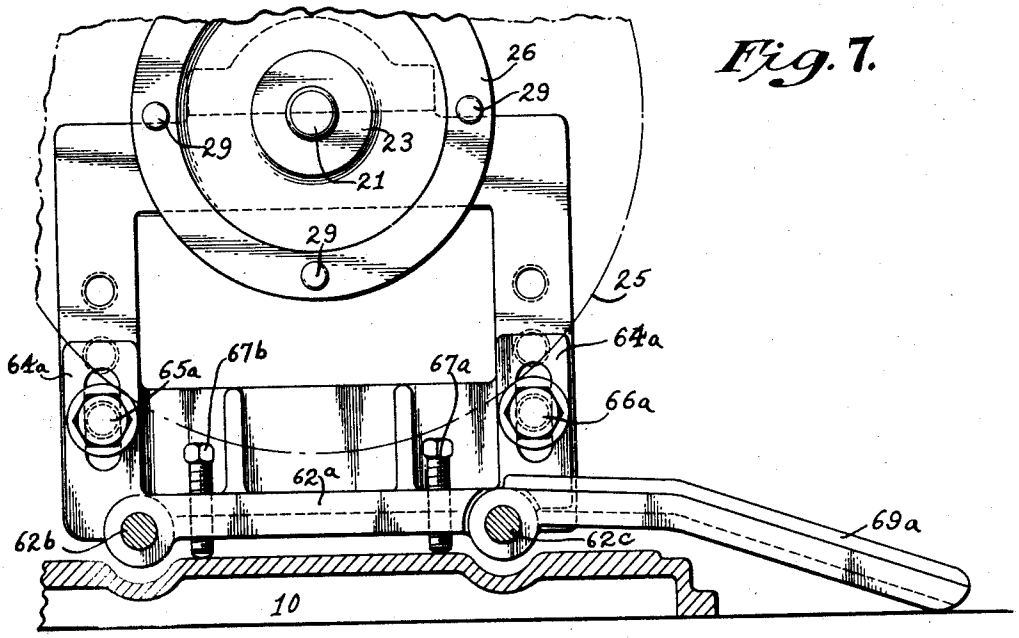
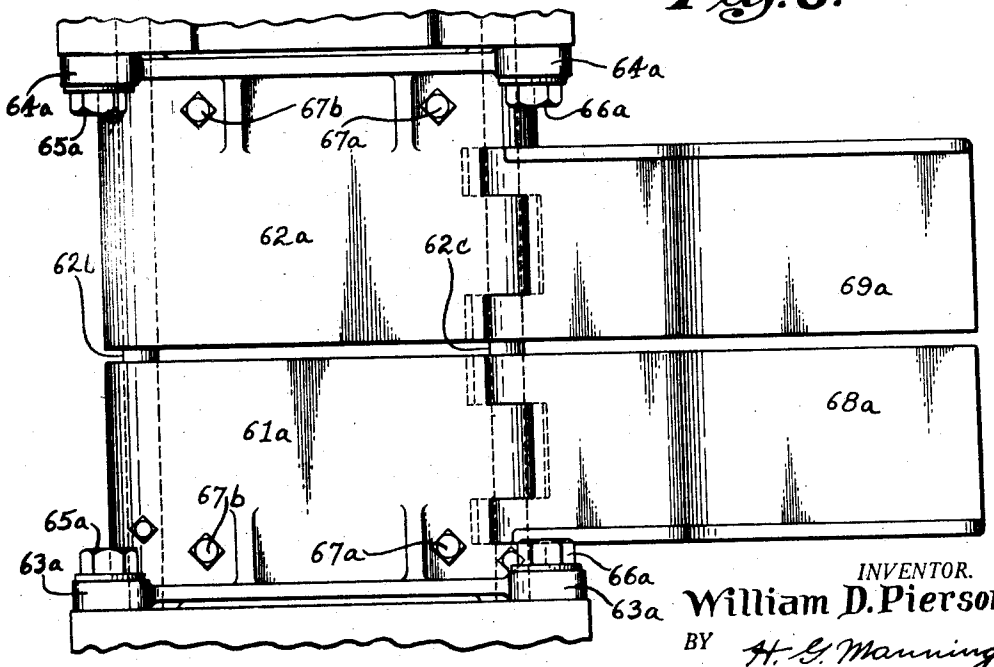


Fig. 8.



INVENTOR.
William D. Pierson.
BY H. G. Manning
HIS ATTORNEY.

Patented Aug. 30, 1932

1,874,206

UNITED STATES PATENT OFFICE

WILLIAM D. PIERSON, OF WATERBURY, CONNECTICUT, ASSIGNOR TO THE WATERBURY FARREL FOUNDRY AND MACHINE COMPANY, OF WATERBURY, CONNECTICUT, A CORPORATION OF CONNECTICUT

WIRE SPOOLING MACHINE

Application filed June 23, 1931. Serial No. 546,265.

This invention relates to wire spooling mechanism adapted to be used in connection with a continuous wire-drawing machine operating at high speed.

This application is a continuation in part of two prior copending applications filed by the same inventor: to wit; Serial No. 420,339, filed January 13, 1930, for high speed spooling attachment for wire drawing machines, and Serial No. 424,259, filed January 29, 1930, for high speed wire spooling machines.

One object of this invention is to provide a spooling machine of the above nature in which the speed of rotation of the spool will be gradually diminished as it becomes filled with wire, in order to maintain a constant peripheral wire spooling speed.

A further object is to provide a wire spooler of the above nature having manually-operated means for permitting the rapid changing of spools.

A further object is to provide adjustable runways directly beneath the spools to permit the latter to be easily removed from operating position.

A further object is to provide a high-speed spooling machine of the above nature which will be relatively simple in construction, inexpensive to manufacture, easy to install and manipulate, compact, and very efficient and durable in use.

With these and other objects in view, there have been illustrated on the accompanying drawings two forms in which the invention may be conveniently embodied in practice.

In the drawings:

Fig. 1 represents a view in elevation of a spooler attachment showing one form of spool holder.

Fig. 2 is a fragmentary top sectional view of the spool-carrying mechanism, taken along the line 2—2 of Fig. 1.

Fig. 3 represents a top plan view of a complete wire-spooling machine, showing the second form of spool holder.

Fig. 4 is a front elevation of the same.

Fig. 5 is a fragmentary longitudinal sectional view of the spool-carrying mechanism and associated parts, taken along the line 5—5 of Fig. 3, looking in the direction of the arrows.

Fig. 6 is a transverse end sectional view of the sliding spool head and its operating mechanism, taken along the line 6—6 of Fig. 4, looking in the direction of the arrows.

Fig. 7 is an end view of the right-hand part of the spool-carrying mechanism taken along the line 7—7 of Fig. 4 looking in the direction of the arrows.

Fig. 8 is a fragmentary top plan view of the spool runways.

Referring now to the drawings in which like reference numerals denote corresponding parts throughout the several views, the invention disclosed in Figs. 1 and 2 will first be described. In these figures, the spooler attachment is shown supported upon a base 13 located at the end of a wiredrawing machine, and power is supplied thereto from a driving mechanism, generally indicated by the numeral 14, and preferably connected with the same source of power as is the wiredrawing machine so that the wire machine and spooler will operate synchronously.

Spool holder

After passing over the guide pulley 16 carried on the free end of a spring tension arm, the wire 12 will be drawn downwardly through a curved bifurcated guiding finger 56 carried by a clamping jaw 57, which in turn is mounted in an inclined arm 58 rigidly attached to a traverse shaft 59. The wire 12 then passes directly down to the spool 42 which, as shown in Figs. 1 and 2, has parallel end flanges 60 and 61, outside of which are reduced end hubs 62 and 63. The rear end of the spool adjacent the hub 63 is provided with a reduced section 64 adapted to fit detachably within a socket 65 formed in the end of the spool shaft 40. A pair of opposed pins 66 and 67 extend laterally from said reduced section 64 and fit within slots 68 and 69 formed in said spool-shaft 40. The hub 62 at the front end of the spool 42 is provided with a reduced section 70, which bears against a ball-bearing raceway 71 suitably mounted in an adjustable tail stock 72 having a knurled handle 73 on its outer end.

The tail stock 72 is adapted to be clamped within a tail stand 74, secured to the frame 13 as by a bolt 75. The stand 74 has a pair of opposed semi-cylindrical upper jaws 75*a*, adapted to be tightly clamped upon the tail stock 72 by means of a horizontal tightening screw 76 threaded into a pair of upstanding lugs 77 at the top of said upper jaws 75*a*, said screw 76 having an upstanding arm 77*a*, provided with a ball-shaped handle 78 on its extremity for convenience in manipulation.

By means of this construction it will be seen that when it is desired to remove the spool 42 to replace it with a new one, it will only be necessary to twist the handle arm 77*a* to the left, as viewed in Fig. 1, thereby releasing the jaws 75*a* and permitting the tail stock 72 to be readily slid to the left in the stand 74. The left-hand end of the spool 42 will thus be released and the spool can then be readily taken out.

After a new spool has been inserted in the end of the spool shaft 40, the tail stock 72 will again be moved to the right as far as it will go, after which the handle arm 77*a* will be again tightened by forcing it to the right, to the position shown in Fig. 1.

Traverse mechanism

In order to reciprocate the guiding finger 56 to cause the wire 12 to be wound upon the spool 42 in successive layers, provision is made of a heart-shaped cam 79, as shown in dotted lines in Fig. 1, said cam 79 being rotatably mounted within the supporting base 13. The heart-shaped cam 79 is driven continuously in one direction by a gear 80, which is in mesh with a worm 81, carried by a shaft 82, journaled in bearings 83 and 84, and driven by a pulley 85 connected as by a belt 86 to a pulley 87 on the driving shaft 98.

The reciprocating movement of the guiding finger 56 is produced by means of a pair of rollers 88 and 89 mounted upon a bar 90 which is slidably supported by a pair of bearings 91 and 92 depending from the base 13. The bar 90 is provided at its center with a pin 92*a*, fitted within a slot 93 of an upwardly extending lever 94 pivoted upon a fulcrum pin 95. The upper end of the lever 94 is connected to the traverse bar 59 by mechanism disclosed in Reissue Patent 16,859, granted January 24, 1928, to the same inventor, and forming no part of the present invention. The amount of the traverse of the guide finger 56 may be manually adjusted while the machine is in operation by rotating a hand knob 96, mounted on the top of a vertical screw shaft 97, which raises or lowers said fulcrum pin 95.

In the second form of the invention shown in Figs. 3 to 8 inclusive, the wire delivered by the wiredrawing machine is adapted to be wound upon a spool 18 comprising a barrel 18*a* having an interior cylindrical bore 19, the opposite ends of which form sockets for the reduced ends 20 and 21 of a pair of screw plugs 22 and 23. The spool 18 has end flanges 24 and 25 to confine the wire being spooled. The right-hand screw plug 23 is threaded into a head-stock plate 26 non-rotatably secured to the left-hand end of the spool shaft 13, as by a key 27 and a set screw 28. The face of the head-stock plate 26 is provided with a plurality of projecting pins 29 adapted to fit within sockets 30 formed in the right-hand spool flange 25. The left-hand screw plug 22 is carried by a socket formed in the enlarged end of a tail-stock shaft 31, which is journaled in ball-bearings 32 and 33 located within a hollow sliding head 34. The shaft 31 is held rigidly in position within the sliding head 34 by means of a shoulder 35 near the right-hand end of the said shaft 31 and a nut 36 screwed upon the left-hand end of said shaft, said shoulder 35 and nut 36 being adapted to engage said ball-bearings 33 and 32 respectively.

In order to exclude dust from the interior of the sliding head 34, provision is made of a ring plate 37 attached to the right-hand end of said head 34, as by screws 37*a* and 37*b*, and a dust cap 38 attached to the left-hand end of said head 34, as by screws 38*a* and 38*b*. The head 34 is provided with a pair of bottom opposed dove-tail flanges 39 and 39*a* adapted to slidably fit within recesses in the top wall of an upstanding frame 40*a*.

The frame 40*a* is provided with front and rear walls 41 and 42*a* having integral bearing sections 43 and 44 within which a horizontal shaft 45 is journaled, said shaft 45 being held in position by a locking collar 46 and a set screw 47. The sliding head 34 is adapted to be held in locked position by means of a flat wedge plate 48 designed to be pressed into contact with the dove-tail flange 39*a* by means of a screw 49 mounted in the top wall of the frame 40*a* and extending forwardly of the front wall 42*a* thereof. The forward extremity 50 of said screw 49 is enlarged and apertured for receiving an operating handle 51 which is secured in position as by a set screw 52.

In order to permit the sliding head 34 to slide in the frame 40 when the locking handle 51 has been released, the bottom of said head 34 is provided with a rack member 53 held in place, as by screws 53*b*, and adapted to mesh with a gear 54 keyed or otherwise secured to the shaft 45. The gear 54 is adapted to be rotated by pressing downwardly upon either the front pedal 55 or rear pedal 56*a* of a foot-treadle 57*a* secured to a shaft 58*a* journaled in the end wall of the frame 40*a* (see Fig. 3). The shafts 45 and 58*a* are operatively connected by means of a pair of intermeshing miter gears 59*a* and 60*a* as most clearly shown in Fig. 6.

By means of this construction, it will be

seen that when it is desired to remove the filled spool 18 for replacement with an empty one, it will first be necessary to rock the handle 51 to the left, as viewed in Figs. 3 and 4, thereby releasing the pressure of the wedge plate 48 upon the sliding head 34. The operator will then press down upon the front pedal 55 which will cause the sliding head 34 to move away from the spool 18 until the screw plug 22 is withdrawn sufficiently to permit the spool 18 to be lowered to a pair of runways 61*a* and 62*a* located a short distance therebeneath, said runways being slidably supported by a pair of rods 62*b* and 62*c*.

The runways 61*a* and 62*a* are adjustably attached as by a pair of angular side brackets 63*a* and 64*a* and bolts 65*a* and 66*a* to the frame 40*a* and bracket 11. Adjustable set screws 67*a* and 67*b* are provided in the runways 61*a* and 62*a* and are adapted to rest upon the bed plate 10 to take up shocks which may occur during the unloading of the spool.

In order to permit the heavy spool 18 filled with wire to be transferred from the runways 61*a* and 62*a* to the floor without requiring the spool to be lifted by the operator, provision is made of a pair of inclined track members 68*a* and 69*a* pivoted to the front rod 62*c*.

When the empty spool has been placed in position with its right-hand socket fitted over the screw plug 23, the operator will press downwardly upon the rear pedal 56*a* of the treadle 57*a*, thereby forcing the sliding head 34 to the right, causing the screw plug 22 to move to the position shown in Fig. 5. The locking handle 51 will then be rocked to the right to the position shown in Figs. 3 and 4 for preventing the spool from moving out of its operating position until it is again desired to change spools.

In order to cause the wire being spooled to be reciprocated so that it will be wound upon the spool 18 in successive layers, provision is made of an inclined forked guiding member 70*a* (see Figs. 3 and 4) carried by a screw shaft 71*a*, which is mounted in a pair of upstanding arms 72*a* and 73*a* of a U-shaped member 74*a* rigidly secured to a flat guide bar 75*a* journaled within a pair of brackets 76*a* and 77*b* located on the frame 40*a* and the bracket 11 respectively. The lower end of the forked member 70*a* is guided in a slot formed in the base of the member 74*a*.

The guide bar 75*a* has a stud 78*a* extending rearwardly therefrom which pivotally supports one end of an adjustable connecting rod 79*a* having its other end journaled to a stud 80*a* on a slotted vertical lever 81*a* which is fulcrumed on a stud 82*a* extending upwardly from the bed plate 10. Intermediate the ends of the lever 81*a*, provision is made of a roller 83*a* located in alinement with a heart-shaped cam 84*a* which is continuously rotated by a worm-gear unit 85*a* driven by means of a shaft 86*a* connected by a sprocket and chain 87*a* and 88*a* to a sprocket 88*b* mounted on the spool shaft 13.

In order to adjust the travel of the guide member 70*a*, the upper end of the slotted lever 81*a* has a manually operated screw 89*a* tapped into the stud 80*a* for permitting the raising and lowering of the right-hand end of the connecting rod 79*a*.

The roller 83*a* of the traverse mechanism is held in constant engagement with the cam 84*a* by means of a flexible cord 90*a* connected at one end with a lug 91*a* on the top of the lever 81*a*, said cord passing over a pulley 92*b* mounted on an upstanding bracket 93*a* secured to the bed plate 10 and having a cylindrical weight 94*a* suspended on its lower end.

In operation, the rotation of the spool shaft 13, by means of the sprocket 87*a*, chain 88*a* and sprocket 88*b*, the shaft 86*a*, the worm-gear unit 85*a*, and cam 84*a* will cause the connecting rod 79*a* to reciprocate and move the forked guide member 70*a* back and forth between the flanges 24 and 25 of the spool 18.

In order to take care of irregularities in commercial spools, a thumb screw 95 is provided on the end of the screw shaft 71*a*, permitting the guide member 70*a* to be minutely adjusted within said flanges 24 and 25.

To stop the machine, the operator will first release the power from the wiredrawing machine by mechanism, not shown. The spool brake will then be applied by means of the rod 142 by an automatic mechanism, not shown, also connected with the wiredrawing machine. This will cause the brake band 141 to contract upon the brake drum and quickly arrest the motion of the spool shaft 13.

One advantage of the present invention is that the spooling machine herein disclosed can be used with continuous wiredrawing machines of practically any make or design.

While there has been disclosed in this specification two forms in which the invention may be embodied, it is to be understood that these forms are shown for the purpose of illustration only, and that the invention is not to be limited to the specific disclosures but may be modified and embodied in various other forms without departing from its spirit. In short, the invention includes all the modifications and embodiments coming within the scope of the following claims.

Having thus fully described the invention, what is claimed as new and for which it is desired to secure Letters Patent, is:

1. In a wire-spooling machine, means for detachably holding a winding spool, a two-part runway located beneath said spool, and means for separating the parts of said runway to accommodate spools of different sizes.

2. In a wire-spooling machine, means for detachably holding a winding spool, a two-

part runway located beneath said spool, and means for changing the height of said runway to accommodate spools having different diameter flanges.

3. In a wire-spooling machine, means for detachably holding a winding spool, a two-part runway located beneath said spool, and means for separating the parts of said runway to accommodate spools of different sizes, said runway parts being mounted on horizontal guide rods secured to the base of the machine.

4. In a wire-spooling machine, means for detachably holding a winding spool, a two-part runway located beneath said spool, and means for separating the parts of said runway to accommodate spools of different sizes, each of said runway parts having an inclined track pivoted thereto to permit said spools to be rolled down to the floor of the room.

In testimony whereof, I have affixed my signature to this specification.

WILLIAM D. PIERSON.