C. E. SAFFORD.

REEL FOR WIRE FABRIC MACHINES.

APPLICATION FILED NOV. 18, 1911.

1,139,077.

Patented May 11, 1915.

5 SHEETS—SHEET 1.

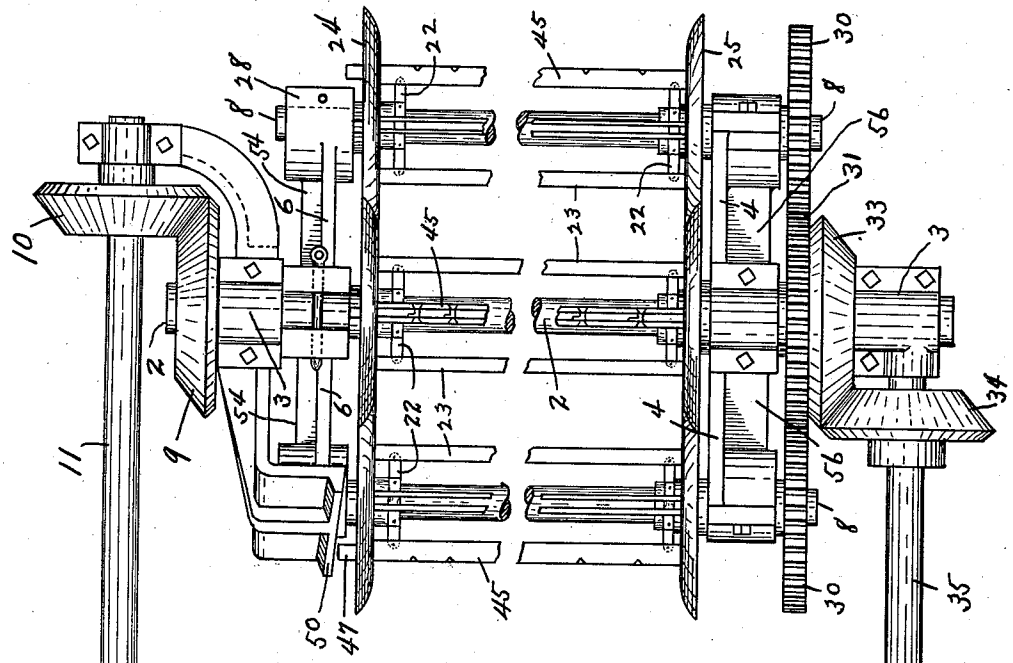


Fig. 1.

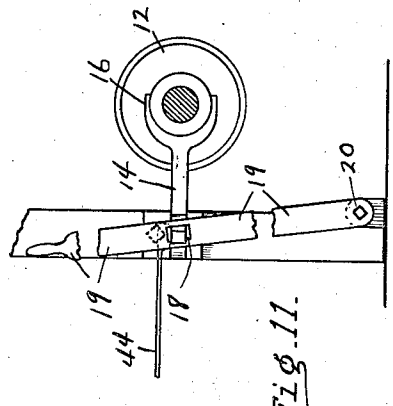


Fig. 11.

WITNESSES:

J. H. Perrault

J. Otto Baenziger

INVENTOR

C. E. Safford

BY

E. S. Wheeler

ATTORNEY

C. E. SAFFORD.

REEL FOR WIRE FABRIC MACHINES.

APPLICATION FILED NOV. 18, 1911.

1,139,077.

Patented May 11, 1915.

5 SHEETS—SHEET 2.

Fig. 2.

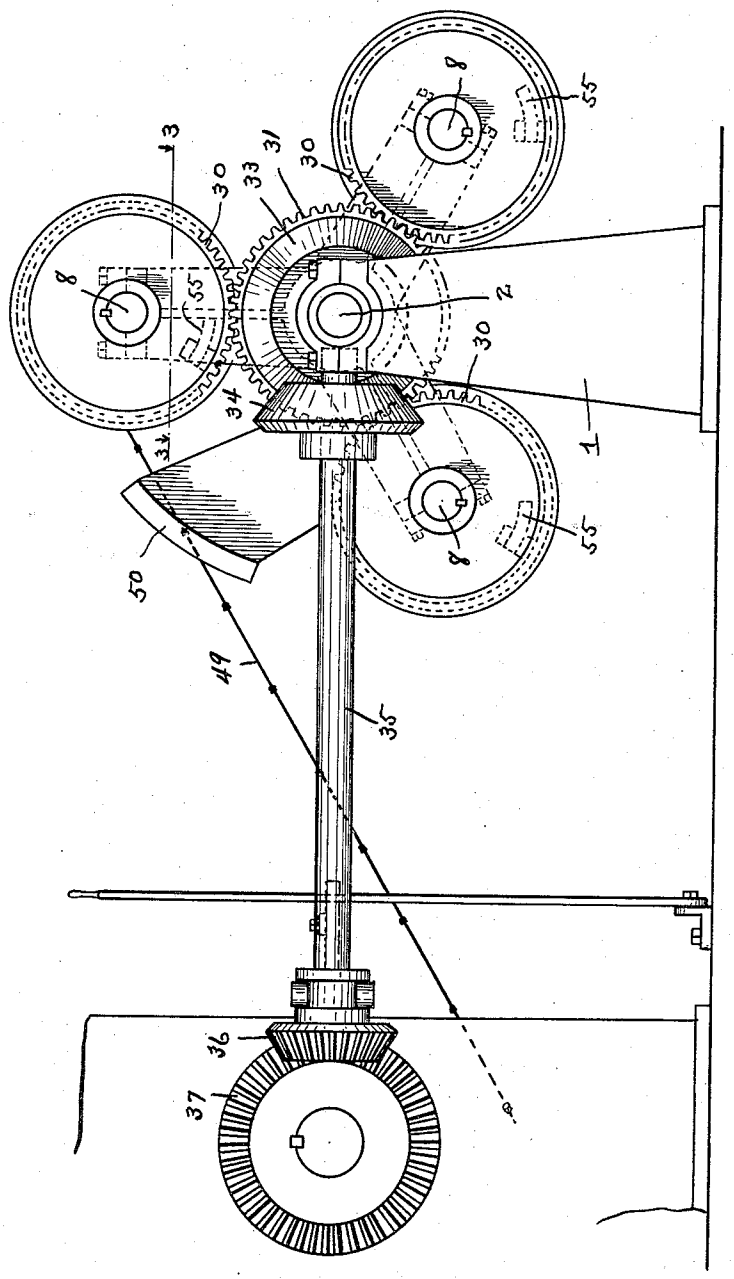
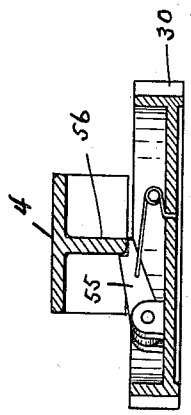


Fig. 3.



WITNESSES:

J. H. Perrault

J. Otto Baenziger

INVENTOR

C. E. Safford

BY

E. S. Wheeler

ATTORNEY

C. E. SAFFORD.

REEL FOR WIRE FABRIC MACHINES.

APPLICATION FILED NOV. 18, 1911.

1,139,077.

Patented May 11, 1915.

5 SHEETS—SHEET 3.

Fig. 4.

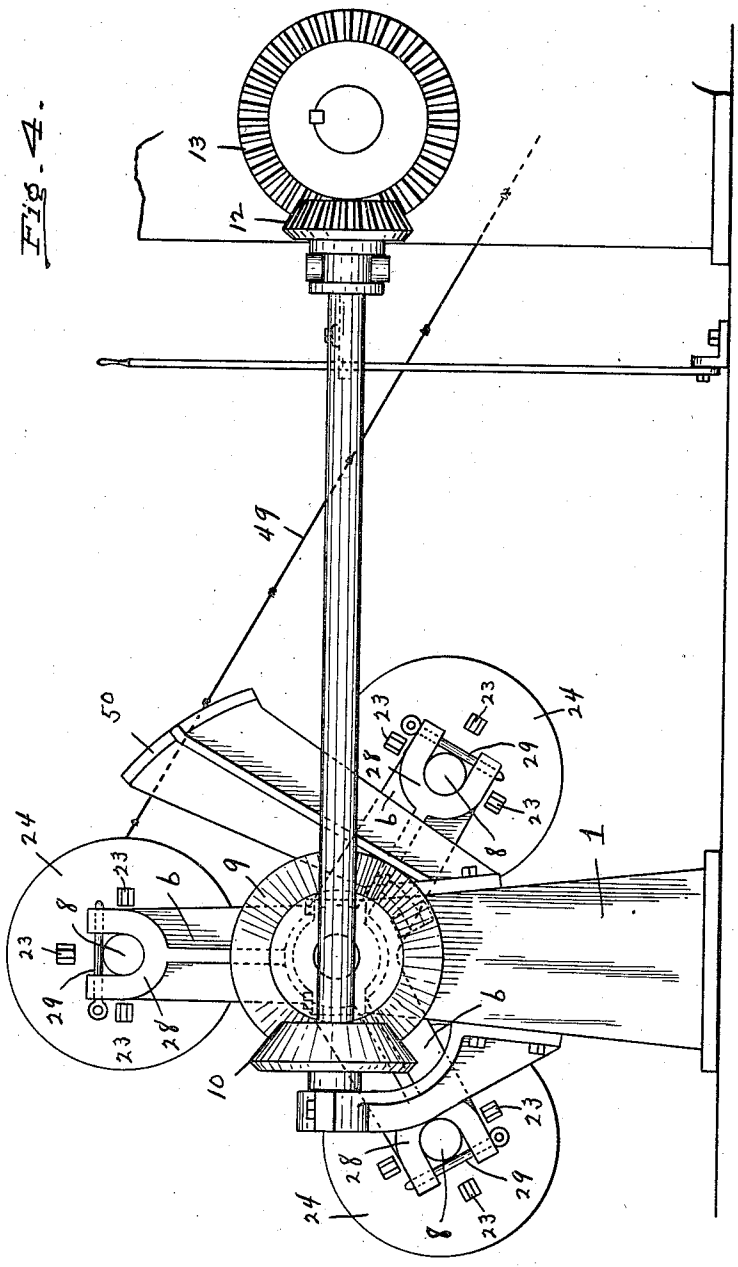
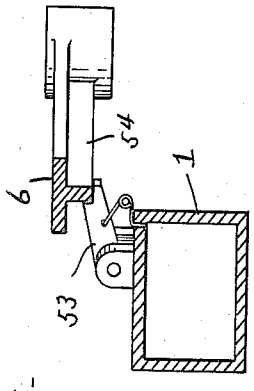


Fig. 5.



WITNESSES:

J. H. Perrault

J. Otto Baenziger

INVENTOR

C. E. Safford

BY

E. S. Wheeler

ATTORNEY

C. E. SAFFORD.

REEL FOR WIRE FABRIC MACHINES.

APPLICATION FILED NOV. 18, 1911.

1,139,077.

Patented May 11, 1915.

5 SHEETS—SHEET 4.

Fig. 6.

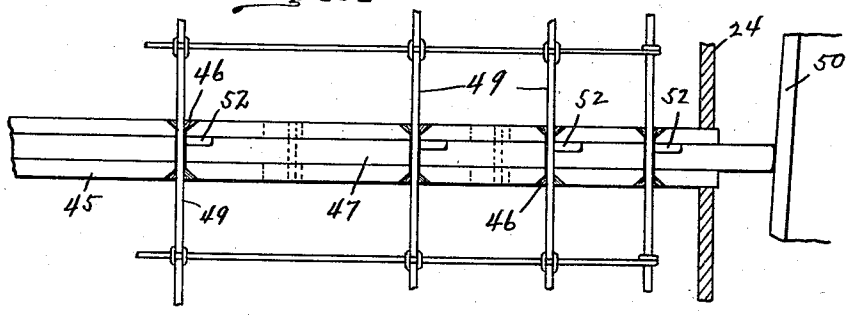


Fig. 7.

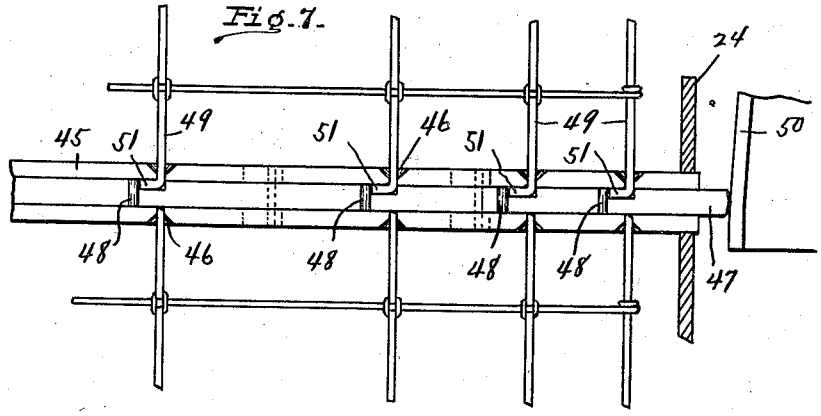
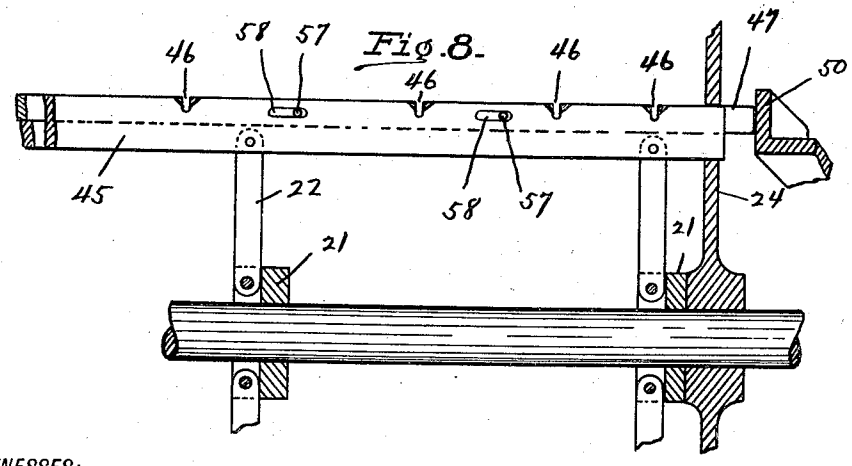


Fig. 8.



WITNESSES:

J. H. Perrault

J. Otto Baenziger

INVENTOR

C. E. Safford

BY

E. S. Wheeler

ATTORNEY

C. E. SAFFORD.

REEL FOR WIRE FABRIC MACHINES.

APPLICATION FILED NOV. 18, 1911.

1,139,077.

Patented May 11, 1915.

5 SHEETS—SHEET 5.

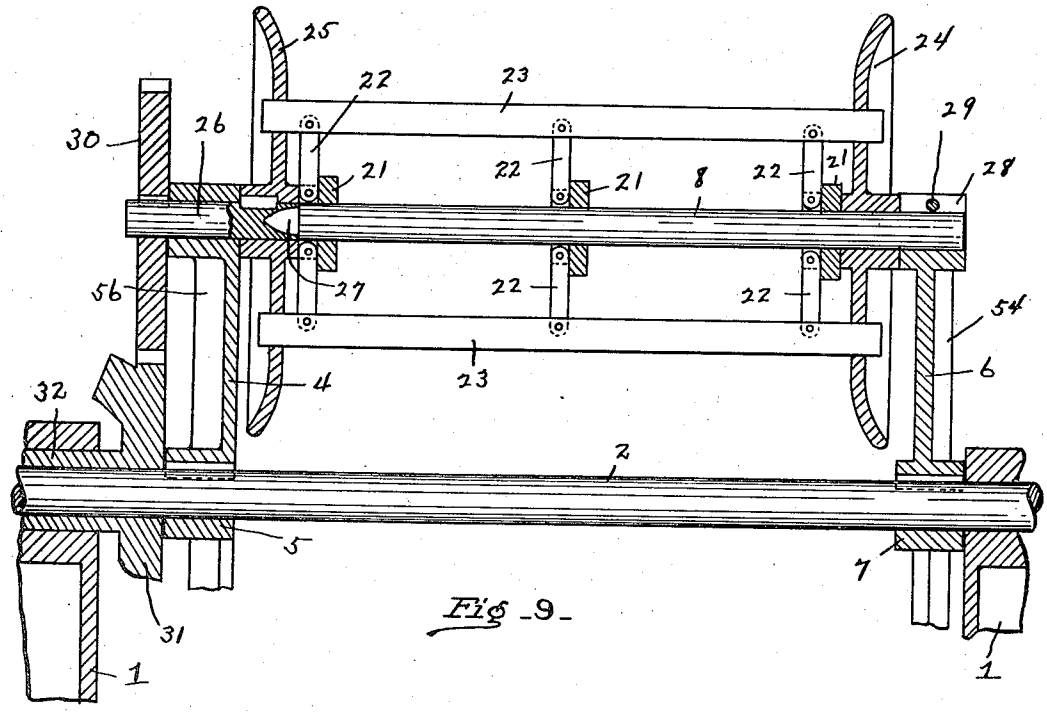


Fig. 9.

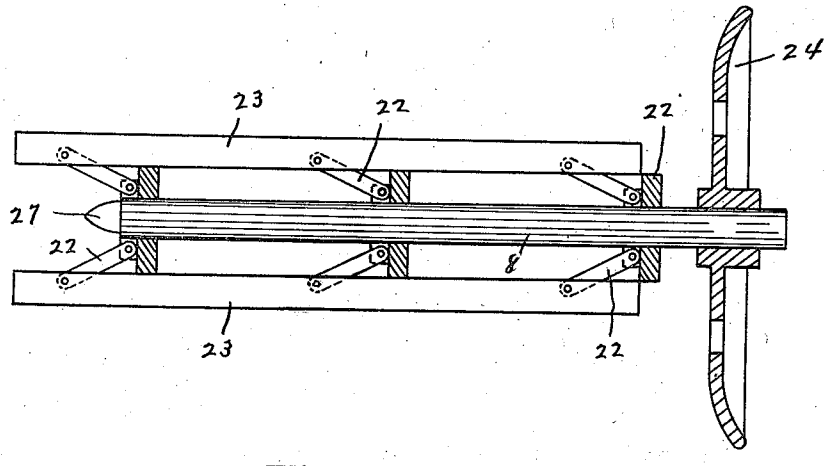


Fig. 10.

WITNESSES:

J. W. Perrault

J. Otto Baenziger

INVENTOR

C. E. Safford

BY

E. S. Wheeler

ATTORNEY

UNITED STATES PATENT OFFICE.

CLARENCE E. SAFFORD, OF DETROIT, MICHIGAN.

REEL FOR WIRE-FABRIC MACHINES.

1,139,077. Specification of Letters Patent. Patented May 11, 1915.

Application filed November 18, 1911. Serial No. 660,953.

To all whom it may concern:

Be it known that I, CLARENCE E. SAFFORD, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Reels for Wire-Fabric Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates to a multiplex reel especially designed for use in connection with wire fabric machines, to receive the fabric from said machines and wind it into bundles as rapidly as the completed fabric is discharged from the loom.

The invention consists in the construction and arrangements of parts hereinafter more fully set forth and claimed.

The object of the invention is to provide comparatively simple and efficient means through the medium of which the completed fabric from a loom or fabric machine may be continuously wound into bundles and said bundles periodically discharged from the reel without interrupting the operation of the fabric machine, provision being made for severing the longitudinal strands of the fabric after each bundle shall have been completed, and for automatically securing them to the succeeding winding drum initiatory to the starting of the successive bundle. Provision is also made for readily collapsing the winding drums of the reel to facilitate discharging the completed bundles and for replacing in operative position in the reel the drums in succession from which the bundles have been discharged.

The invention further contemplates driving means through the medium of which the winding drums may be revolved in a manner to compensate for the increasing diameter of the bundles while being formed, and for swinging the winding drums about a common center to successively bring each into winding position.

The above object is attained by the mechanism illustrated in the accompanying drawing, in which:—

Figure 1 is a plan view of a reel embodying my invention, parts being broken away. Fig. 2 is an end elevation of the structure shown in Fig. 1. Fig. 3 is a fragmentary view in section, as on line 3—3 of Fig. 2, through the driving gear of one of the winding drums and through one of the spider arms of the reel carrying the shaft of said drum, showing the detent or spring actuated locking dog carried on the gear engaging the web of said arm to prevent a backward turning of the winding drum. Fig. 4 is an end elevation of the reel showing the end of the reel opposite to that illustrated in Fig. 2. Fig. 5 is a fragmentary view in section through one of the columns carrying the shaft of the reel, and through one of the webbed arms carrying the winding drums, showing a detent or spring actuated locking dog mounted on said column and engaging the web of said arm to prevent a backward turning of the reel when swung into a position to wind the completed fabric onto one of the drums thereof. Fig. 6 is a fragmentary plan view partly in section illustrating the position of parts prior to the actuating of the cutting bar for severing the longitudinal strands of the fabric at the completion of each bundle. Fig. 7 is a similar view showing the position of parts at the completion of the operation of severing said strands, and bending the ends of the severed strands so as to fasten them to one of the bars of the drum on which the succeeding bundle of fabric is wound. Fig. 8 is a fragmentary elevation partly in section illustrating the position of parts shown in Fig. 6 with the fabric omitted and showing the shaft of the winding drum. Fig. 9 is a fragmentary view in longitudinal section showing the main shaft of the reel, a pair of the spider arms mounted thereon carrying one of the winding drums, and the disks of said drum in which the collapsible bars of the reel are mounted. Fig. 10 is a fragmentary view partly in section showing the collapsed position of said bars. Fig. 11 is a fragmentary view partly in section illustrating one of the shifting levers and one of the bell cranks actuated thereby for shifting the driving pinions into and out of mesh with their respective gears for the purpose of turning the reel, or for driving the winding drums

thereof, said section being taken on line 11—11 of Fig. 1.

Referring to the characters of reference, 1 designates the columns in which the main shaft 2 of the reel is journaled, said shaft being supported at its ends in suitable bearing boxes 3 on said columns. Fast to the shaft 2 near one end thereof is a spider comprising the radial arms 4 extending from a common hub 5 through which said shaft 2 passes. Near the opposite end of the shaft 2 is a spider comprising radial arms 6 extending from a common hub 7 through which the shaft 2 also passes. These spiders are so disposed on the shaft 2 that the corresponding arms thereof stand in radial alinement with respect to the shaft 2 so as to cause the corresponding arms of said spiders to coöperate in pairs in forming supports for the shafts 8 of the winding drums. As herein illustrated each of the spiders consists of three radially extending arms affording a reel having three winding drums onto which the product from a wire fabric machine may be successively wound, as hereinafter explained.

Mounted on one end of the main shaft 2 is a beveled friction wheel 9 driven from a friction pinion 10 which turns in peripheral contact therewith, and which is mounted upon a horizontally extending shaft 11. At the opposite end of the shaft 11 is a beveled pinion 12 which is splined thereon and is adapted to have meshing engagement with a beveled gear 13 which may be driven from any suitable source of power. The beveled pinion 12 is moved longitudinally of the shaft 11 to carry it into and out of engagement with the gear 13 through the medium of a bell crank lever 14, which is fulcrumed at 15 on the frame and is provided with a forked end 16 which embraces the channeled hub 17 of said pinion. The opposite end of the lever 14 extends freely into an opening 18 formed through an actuating lever 19 which is fulcrumed at 20 and is adapted to have a slight movement in the arc of a vertical circle. As the lever 19 is swung on its fulcrum the bell crank lever will be actuated to carry the pinion 12 into and out of mesh with the pinion 13, as may be desired. When the shaft 11 is rotated from the gear 13 it will turn the main shaft 2 of the reel and swing the winding drums in a circle around the axis thereof, the purpose of which is to carry each of the winding drums as required into operative position. Each of the winding drums comprises a shaft 8 on which are fixed a plurality of collars 21. Pivoted in each of said collars are radial links 22, which, at their outer ends are pivoted to longitudinally extending bars 23. At one end of each drum the ends of said bars are supported in a disk 24 which is slidable on the shaft 8. At the opposite end of each drum the ends of the bars 23 are supported in a disk 25, which is fixed to and turns with a short shaft 26 (see Fig. 9) journaled in the end of each of the arms 4. The inner end of each of the shafts 26 is provided with a tapered socket which receives the tapered end 27 of the shaft 8, the opposite end of the shaft 8 of each of the winding drums being journaled in a slotted bearing 28 in the outer end of each of the arms 6, being held therein by a transverse pin 29 crossing said slot.

Upon the projecting end of the short shaft 26 of each of the winding drums is a spur gear 30 which meshes with a gear 31 on the inner end of a sleeve 32, which is loosely mounted on the end of the main shaft 2. On the side of the gear 31 is a beveled friction surface or gear 33 adapted to have peripheral contact with a frictional driving pinion 34 secured to one end of a longitudinally extending shaft 35. Splined upon the opposite end of shaft 35 is a beveled pinion 36 adapted to have meshing engagement with a beveled gear 37 which may be driven from the same source of power employed to drive beveled gear 13. It will be noted, especially on referring to Fig. 2, that all of the gears 30 of the winding drums are in constant mesh with the gear 31 driven through the medium of the friction gears 33 and 34, whereby, as shaft 35 revolves, each of the winding drums will be caused to revolve abouts its shaft 8.

The pinion 36 is caused to slide longitudinally of shaft 35 for the purpose of carrying it into and out of mesh with gear 37 through the medium of a bell crank lever 38, which is fulcrumed at 39 and is provided with a forked end 40 which embraces the channeled hub 41 of said pinion. The opposite end of said bell crank, like crank 14, extends through an opening in an operating lever 42 fulcrumed at 43, whereby, upon a movement of said lever on its fulcrum, the bell crank will be carried to slide the pinion 36 upon its shaft 35, which movement will carry it into and out of engagement with the driving gear 37 as may be desired. When the winding drums are being revolved it is never desirable to revolve the whole reel; therefore the bell crank levers 14 and 38 are so connected by a connecting rod 44 as to cause them to be actuated in unison, the arrangement being such that when bell crank 38 is moved to carry the pinion 36 into mesh with the gear 37, pinion 12 on shaft 11 will be actuated to carry it from engagement with the gear 13. It therefore follows that when pinion 12 is actuated to carry it into mesh with its driving gear, pinion 36 will be moved out of engagement with its driving gear 37.

One of the longitudinal bars in each of the winding drums is a channeled bar 45 (see Figs. 6, 7, and 8) provided with regis-

tering slots 46 in the margins thereof. Lying in the channel of each of the bars 45 of the winding drums is a reciprocatory slide bar 47 provided with transverse channels 48 in the upper edge thereof, adapted to normally register with the slots 46 in the edges of the channel bar 45. The slots in the channeled bars 47 which register therewith are spaced such distance apart as to correspond with the spacing of the strand wires 49 of the fabric, so that said strands will enter and lie in said registering slots and channels as shown in Fig. 6. This is the position of the parts when the fabric starts to wind upon one of the drums at the inception of the operation of the reel but after a bundle has been formed upon one of the drums and the reel is swung to bring the succeeding drum into winding position, the line of the running fabric from the loom or fabric machine to the reel is such as to cause the longitudinal strands thereof to draw into the registering slots and channels in the channeled bar and slide bar of said succeeding drum. As the reel then swings upon its main shaft 2 to bring the drum onto which the fabric leads into the uppermost or winding position, the projecting end of the slide bar 47 engages the inclined face of a fixed cam 50 suitably mounted on the frame, which, as the reel continues to swing, will crowd the bar 47 longitudinally so as to shift the channels 48 therein out of alinement with the slots 46 of the channeled bar 45. This operation will shear off the longitudinal strands on the far side of the channeled bar and will bend the severed ends of said strands on the near side of said bar so as to form hooked terminals 51, as clearly shown in Fig. 7, which lie in the short longitudinal recesses 52 in the slide bar 47, which, in this operation becomes a cutter bar which severs the longitudinal strands and turns the severed ends thereof into hooked engagement with the channeled bar 45, whereby said strands are not only severed to permit of the removal from the reel of a completed bundle, but are also locked to the succeeding winding drum in a manner to insure the forming of a bundle thereon as said drum revolves.

To hold the reel against backward turning upon its shaft 2 when one of its winding drums is being revolved to wind a bundle thereon, there is provided upon the inner face of one of the columns 1 (see Fig. 5) a spring actuated dog or detent 53 having a notched free end adapted to engage the projecting web 54 on the radial arms 6 at a time when the active drum is in operative position to prevent a backward turning of the reel because of the strain of the winding fabric thereon.

In order to hold each of the winding drums against backward rotation there is employed upon the inner face of each of the gears 30 (see Figs. 2 and 3) a spring actuated pawl or detent 55 having a notch in its free end adapted to engage the web 56 of the arms 4. By this arrangement the winding drums are locked against backward rotation while they are being swung from the filled to the discharging position.

It will be noted on referring to Fig. 9, that, as each of the disks 25 is revolved through the medium of its gear 30, the complementary portion of the winding drum is caused to revolve therewith because of the engagement of the bars 23 at their ends in openings in the web of said disk.

After a winding drum has been filled, or after a complete bundle has been formed thereon, the formed bundle may be discharged from the drum by rotating the reel so as to carry the filled drum from the winding position downwardly to the discharging position. This movement will carry the succeeding drum into the winding position to receive the fabric from the loom, whereby the operation of the reel is made continuous. When a filled drum has been swung downwardly to the discharging position the bundle thereon may be removed therefrom by removing the transverse pin 29 so as to allow one end of the shaft 8 of the drum to be lifted from the slotted bearing 28, when the disk 24, which is loose on said shaft 8, may be slid longitudinally thereon such distance as to allow the ends of the bars 23 of the drum to be withdrawn from engagement with the disk 25. This will allow the drum to be removed from the reel, when, by sliding the disk 24 entirely free from engagement with the ends of the bars 23, said bars may be collapsed by swinging them longitudinally upon the pivoted links 22, thereby reducing the diameter of the drum of the reel sufficiently to enable it to be readily withdrawn from the bundle. The collapsed bars 23 are then restored to their normal position, and the shaft and drum replaced in the reel to again be brought into use for winding the fabric thereon in its regular turn. During the operation of removing a formed bundle a succeeding bundle is being wound upon the drum which at that time is in operative position in the reel.

To keep the cutter bars 47 within the channeled bars 45 they are provided with laterally projecting pins 57 which extend into longitudinal slots 58 in the side of the channeled bars, and retain the cutter bars therein while allowing said bars to reciprocate longitudinally.

Having thus fully set forth my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a wire fabric reel, a rotatable wind-

ing drum, comprising a central shaft and longitudinally extending bars hinged thereto, disks forming the ends of said drum receiving and supporting said bars, means for rotating said drum, one of said disks connected with said rotating means, the other of said disks being movable longitudinally of the shaft of the drum, and means for permitting the withdrawal of the shaft of said drum from its supporting bearings.

2. A wire fabric reel, comprising a rotatable frame, a plurality of winding drums mounted in said frame, means for rotating said frame, means for revolving said drums independently of the frame rotating means, and means carried by each winding drum actuatable by the rotation of the frame for severing the strand wires of the fabric as said drums in succession swing into winding position.

3. A wire fabric reel comprising a plurality of spaced winding drums, means for imparting bodily movement to said drums in a predetermined direction, means for rotating the forward drum about an axis at right angles to the general direction in which the drums may be moved to fill said forward drum, means for severing the longitudinal strands of wire after the forward drum is filled and for positively engaging the ends of the strands of the main portion of fabric in the succeeding drum after the severing of the portion on the filled drum, and means for actuating said severing means while the drums are being moved in the predetermined direction.

4. A wire fabric reel, comprising a main rotary frame, a plurality of winding drums journaled in said frame, means for rotating the main frame, means for revolving said drums, each of said drums having shearing plates, and means for actuating a shearing plate on each drum at a predetermined point in the circle described by the rotation of the main frame.

5. A wire fabric reel, comprising a rotatable frame, a plurality of revoluble drums detachably mounted in said frame, means for turning the frame, means for revolving said drums, and means carried by each of the drums for severing the strand wires of the fabric and bending the ends of the severed strands into engagement with a member of the severing device.

6. A wire fabric reel comprising a rotatable frame, a winding drum mounted therein to revolve and swing in the arc of a vertical circle, a channeled bar setting longitudinally of the drum having notches to receive the strand wires, a reciprocatory cutter bar sliding in said channeled bar and having channels which normally register with said notches, said cutter bar also having channels, a cam plate adapted to cooperate with the cutter bar as the frame revolves to actuate said bar to sever the strands of the fabric, and bend the ends of the severed strands into the channeled bar so as to lie in the recess of the cutter bar.

7. A rotatable winding drum comprising a central shaft and longitudinally extending bars hinged thereto, bearings for the shaft, members forming the ends of said drum supporting said bars, means for rotating said drum, one of the end-forming members being connected with the rotating means, the other of said end-forming members being movable longitudinally of the shaft of the drum, and means permitting the shaft of said drum to be withdrawn from its supporting bearings.

8. A reeling mechanism comprising a movable support, a plurality of winding drums mounted on the support, means for moving the support, means for revolving said drums idependently of the support moving means, and means carried by each winding drum actuable by the movement of the support for severing the strand wires of the fabric as said drums in succession move into winding position.

9. A reeling mechanism comprising a main movable support, a plurality of winding drums journaled in said support, means for moving the support, means for revolving the drums, each of said drums having coacting shearing members, means, in respect to which the support is movable, for actuating one of the shearing members at a predetermined point in the movement of the main support.

10. A fabric reel comprising a movable support, a plurality of revoluble drums detachably mounted in said support, means for moving the support, means for revolving the drums, and means carried by each of the drums for severing the strand elements of the fabric and bending the ends of the severed strands into engagement with a member of the severing device.

11. A fabric reel comprising a movable support, means for moving the support, a winding drum thereon transversely to the line of movement of the support, a bar arranged longitudinally of the drum and having transverse channels in one of its faces to receive the strand elements of the fabric, a second bar also arranged longitudinally of the drum and having transverse channels that normally register with the channels in the first mentioned bar, the channels in one of the bars being extended longitudinally to form pockets, one of the bars being movable in respect to the other, and means adapted to coöperate with the movable bar as the support moves to actuate said bar to sever the strands of fabric, and to bend the ends of the severed strands so as to lie in the pockets.

12. A wire fabric reel comprising a plu-

rality of spaced winding drums, means for swinging said drums in the arc of a vertical circle, means for rotating the forward drum about a horizontal axis, means for severing the longitudinal strands of wire after the forward drum is filled and for positively engaging the ends of the main portion of the fabric in the succeeding drum after the severing of the portion on the filled drum, and means for actuating said severing means while the drums are swinging in the arc of the vertical circle.

In testimony whereof, I sign this specification in the presence of two witnesses.

CLARENCE E. SAFFORD.

Witnesses:

J. OTTO BAENZIGER,

M. E. BROESAMLE.