A. L. KITSELMAN.

MACHINE FOR MAKING WIRE FABRIC.

APPLICATION FILED JUNE 11, 1904.

980,104. Patented Dec. 27, 1910.

5 SHEETS—SHEET 1.

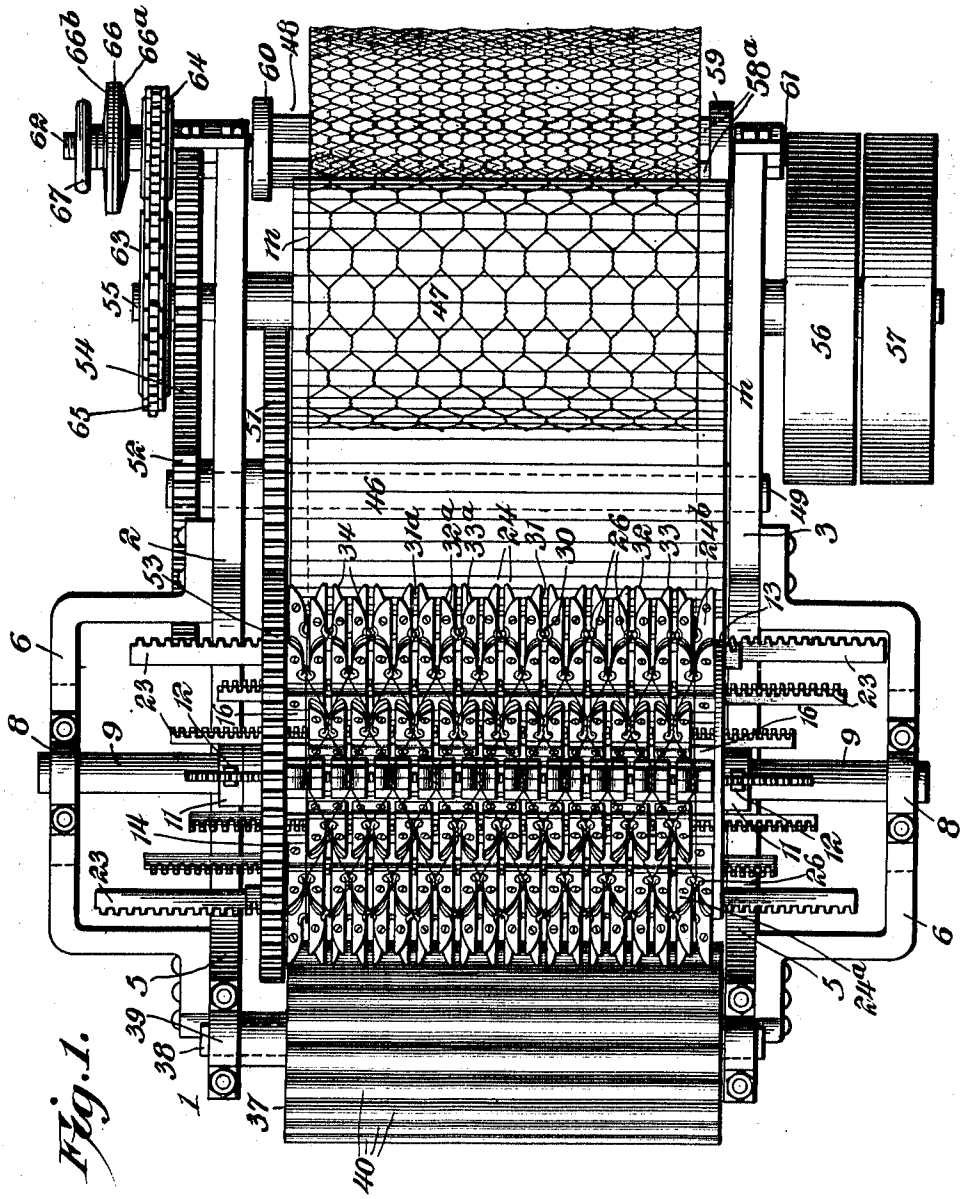

Fig. 1.

Witnesses
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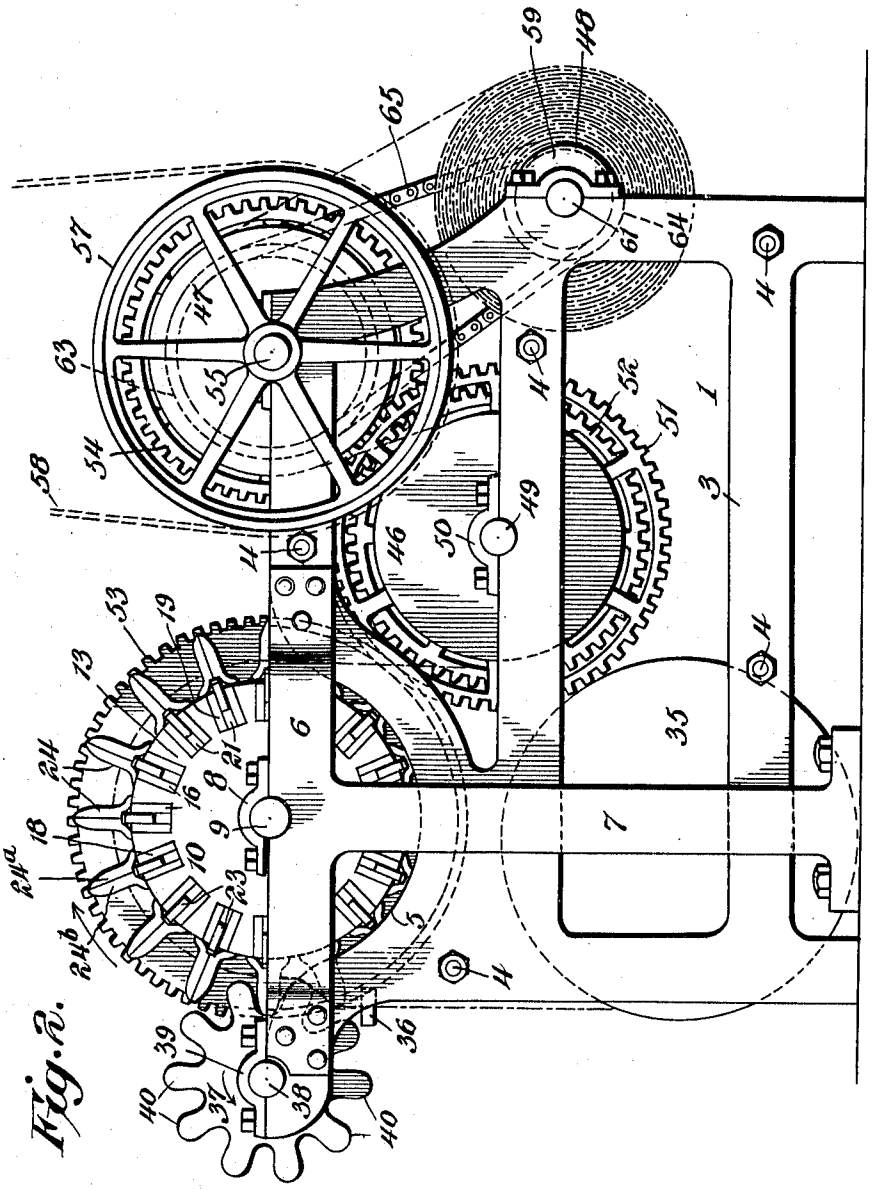

Fig. 2.

Witnesses

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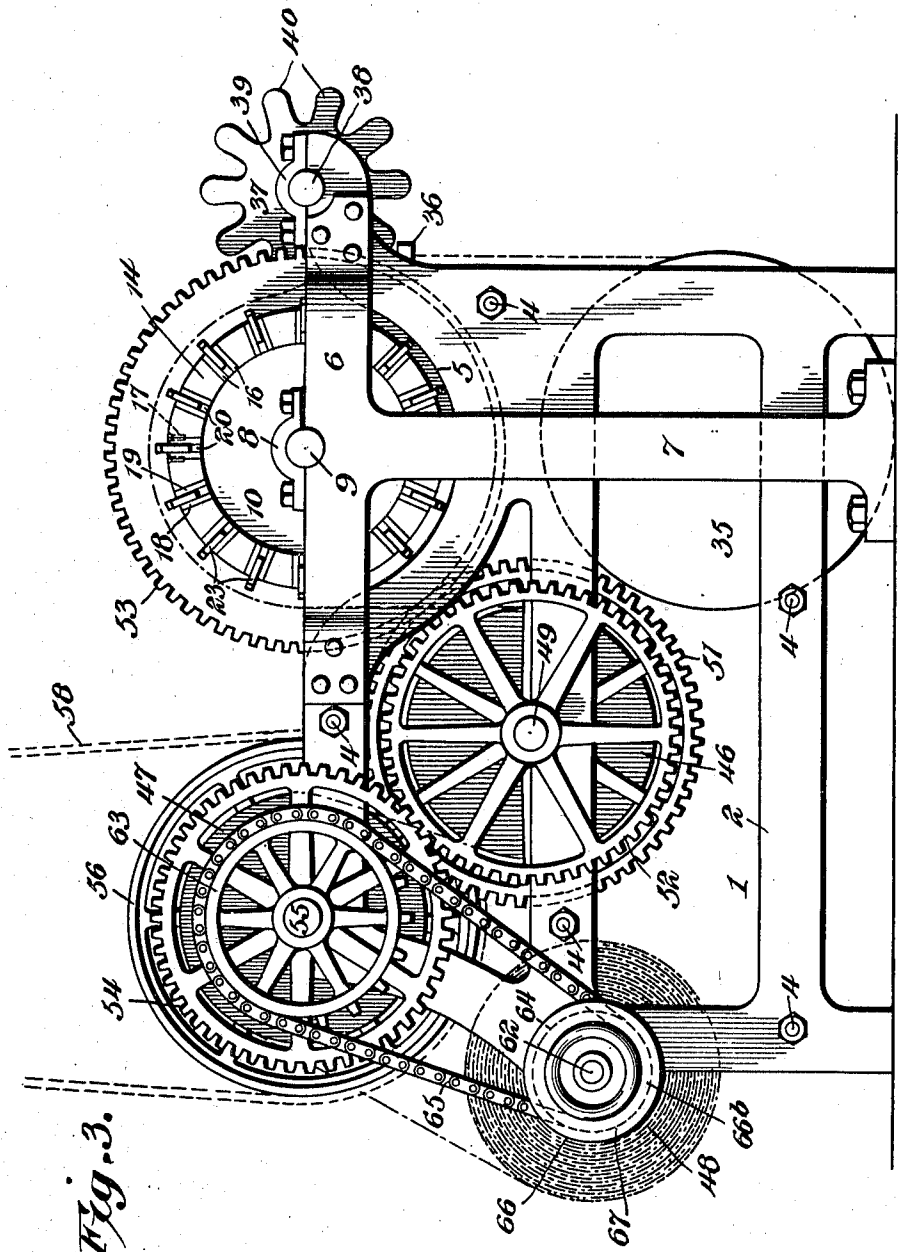

Fig. 3.

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5 SHEETS—SHEET 4.

Fig. 4.

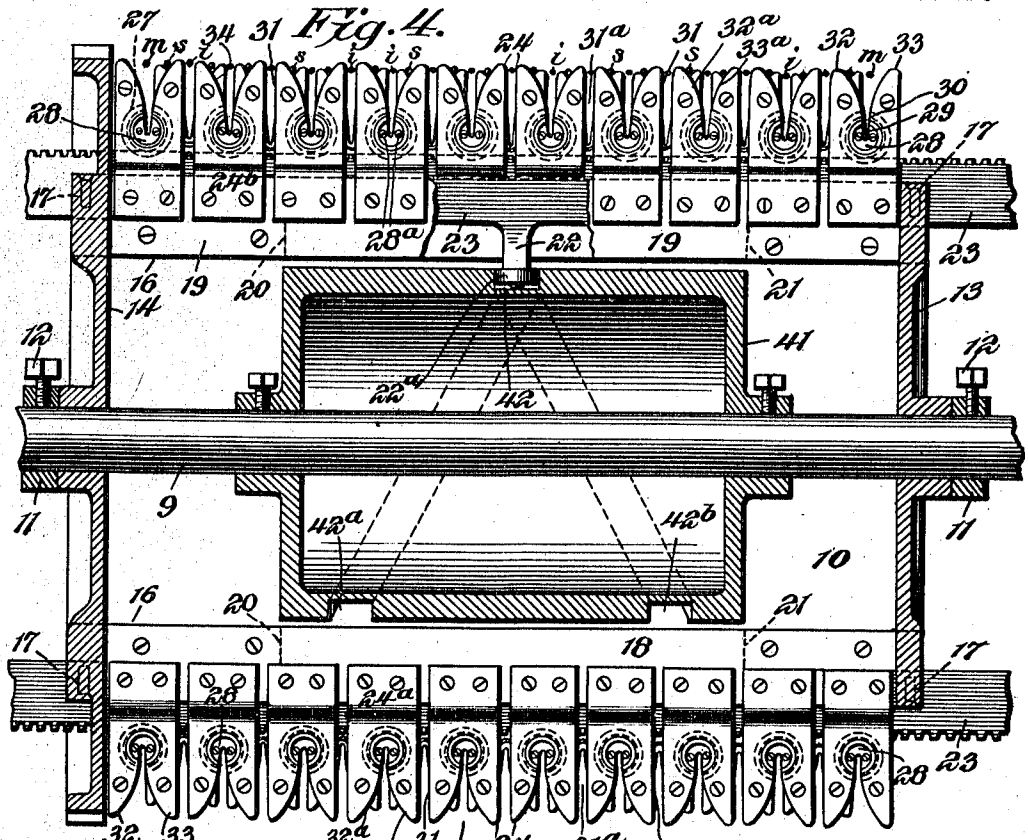


Fig. 9.

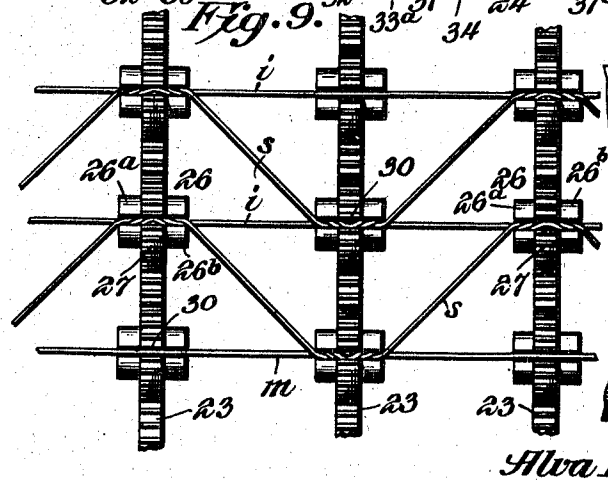
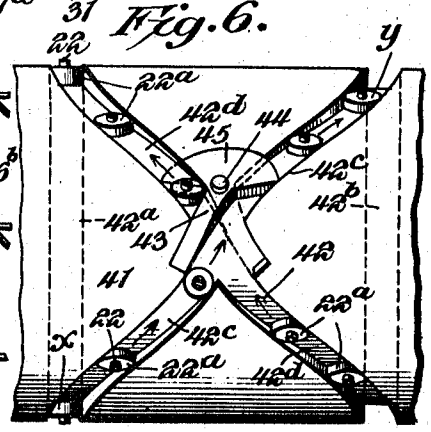


Fig. 6.



Witnesses

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5 SHEETS—SHEET 5.

Fig. 5.

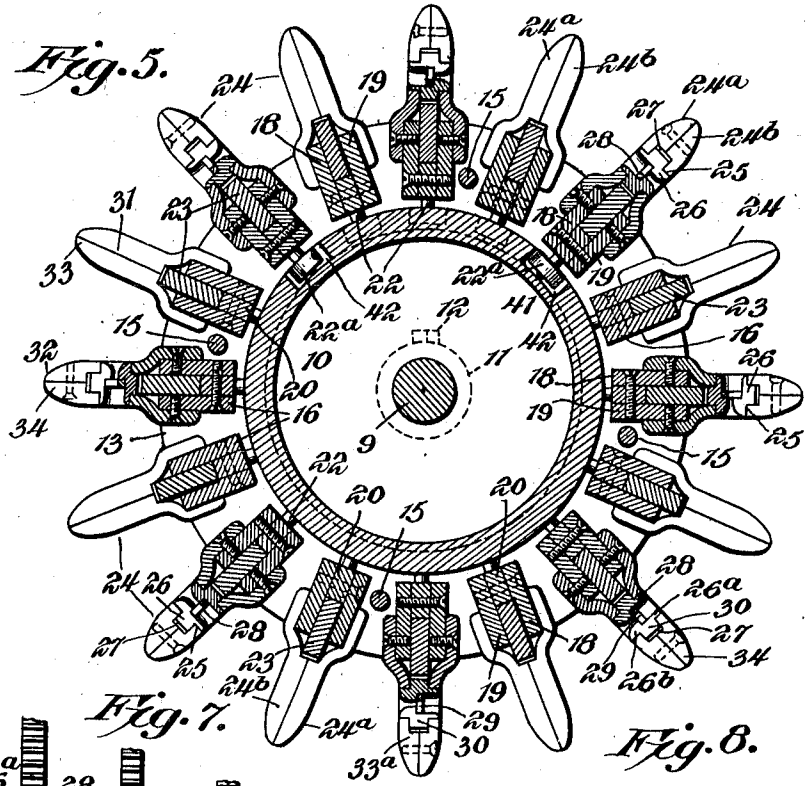

Fig. 7.

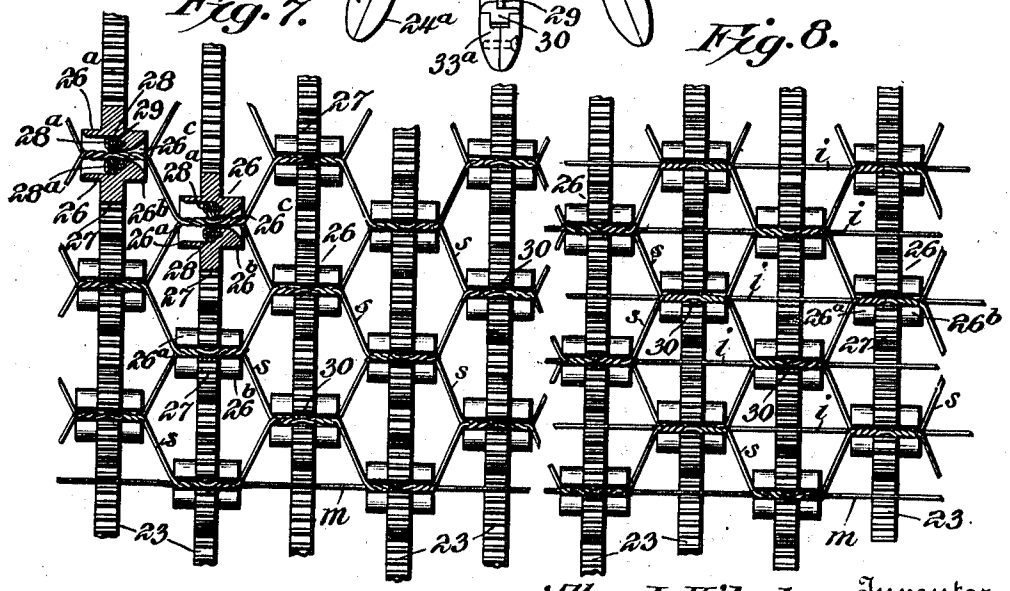

Fig. 8.

Witnesses

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UNITED STATES PATENT OFFICE.

ALVA L. KITSELMAN, OF MUNCIE, INDIANA, ASSIGNOR TO INTERLOCKING FENCE COMPANY, OF MORTON, ILLINOIS, A CORPORATION OF ILLINOIS.

MACHINE FOR MAKING WIRE FABRIC.

980,104. Specification of Letters Patent. Patented Dec. 27, 1910.

Application filed June 11, 1904. Serial No. 212,196.

To all whom it may concern:

Be it known that I, ALVA L. KITSELMAN, a citizen of the United States, residing at Muncie, in the county of Delaware and State of Indiana, have invented a new and useful Machine for Making Wire Fabric, of which the following is a specification.

My present invention relates to a novel machine for making woven wire fabric, more particularly such as is known as netting or fencing, according to the gage of the wire, the size of the mesh, or the purpose for which it is particularly adapted.

The object of the invention is to produce a comparatively small and positively operating machine, arranged to connect continuously moving wires, for the purpose of producing a maximum quantity of fabric in a minimum of time and with an economical expenditure of power.

Subordinate to the general object stated, a further object of the invention is to so organize the machine that all of the primary elements thereof will rotate in the direction of feed, so that the speed of the machine will not be retarded by the presence of weavers or other similar devices moving in a direction transverse to the feed and requiring accurate timing.

A further object is to include in the organization of the machine means whereby all of the wires, that is to say, the line, margin and mesh wires will all be fed through the machine in the same direction, from a common source, if desired, the mesh wires being carried back and forth between their points of connection or between the line wires, as the case may be, without the aid of transversely movable carrying means, this end being attained by wire deflecting mechanism which, like the other primary machine elements, moves in the line of the feed and thus facilitates the continuous production of the fabric.

A still further object is to mount the entire weaving mechanism upon a single rotary element, as for instance a drum, operated from a rotary tension element to rotate several movable series of twisters arranged to intertwist the line and mesh wires, or the margin and mesh wires, or both, for the purpose of continually weaving the fabric as the latter is drawn forward under the proper tension and wound upon a receiving reel or spool.

A still further object is to assemble the entire weaving mechanism in a rotary structure arranged to move continuously in the direction of feed and associated with a fixed element, as for instance a cam, for effecting the operation of the twisters at the proper time to connect the mesh wires with the line or margin wires or both.

A further object of the invention is to so organize the twisters and their operating mechanism that lost or retractile movements will be entirely eliminated, said twisters being operated by reciprocating devices which effect the formation of a complete twist during each stroke, successive twists being formed by successive strokes irrespective of the direction of the latter.

Still another object of the invention is to include rotary means coöperating with guides fixed upon the drum to simultaneously urge the wires into engagement with the twisters, deflect the mesh wires to form the meshes and to produce sufficient slack in the wires to provide for the formation of the twists and meshes.

Subordinate to the objects stated are others which will appear during the course of the succeeding description of that embodiment of the invention which, for the purpose of this disclosure, is illustrated in the accompanying drawings and embraced within the scope of the appended claims.

In said drawings—Figure 1 is a plan view of my machine complete. Fig. 2 is a side elevation thereof. Fig. 3 is a similar view of the opposite side. Fig. 4 is a longitudinal sectional view of the weaving drum and the twister cam, a portion of the structure being broken away for illustrative purposes. Fig. 5 is a transverse section of the subject-matter shown in Fig. 4. Fig. 6 is a detailed elevation of the twister cam showing the disposition of the various rack rollers and illustrating the arrangement of the switch. Fig. 7 is a detail view showing a section of hexagon mesh fabric in connection with a plurality of twisters and racks and designed to clearly illustrate the arrangement of the twisters upon the drum. Fig. 8 is a view similar to Fig. 7, but showing hexagon mesh fabric with intermediate line wires in addition to the margin wires, and Fig. 9 is still another view of this character illustrating a section of what is known as half-diamond mesh fabric.

Like numerals are employed to designate corresponding parts throughout the several views.

The frame 1 of the machine preferably includes a pair of vertically disposed side castings 2 and 3 of any suitable construction, spaced apart a proper distance and connected by tie-rods 4. Adjacent to the rear end of the frame, the upper edges of the side castings are formed with substantially semi-circular depressions or openings 5 opposite which are disposed a pair of horizontal bearing yokes 6 bolted to the castings 2 and 3 and supported upon vertical standards 7 suitably secured at their lower ends to the floor or other supporting surface. The yokes 6 are provided with suitable clamps 8 for rigidly securing the opposite ends of a fixed drum shaft 9 upon which, at a point within the frame, is mounted what may be termed the weaving drum 10. The drum 10 is designed to rotate freely upon the shaft 9 and is retained between a pair of bearing collars 11 secured to the shaft by set screws 12, or other suitable means, and opposed to the hubs of the drum heads 13 and 14, as shown in Fig. 4. The drum-heads are retained in properly spaced relation by suitable tie-rods 15, also serving as struts, and are provided each with a circumferential series of openings for the reception of longitudinal channel bars 16 having a radial arrangement and retained in place by screw keys 17 screwed into the peripheries of the heads and engaging the bars 16. These channel bars 16 may be constructed in any desired manner consistent with the proper performance of their functions, but by preference each bar is of sectional form and comprises a pair of parallel side sections or plates 18 and 19 laterally separated, to form a channel or guide-way, by a pair of short bottom sections 20 and 21 which latter extend inwardly from the heads a comparatively short distance, as indicated in Fig. 4, so as to leave a considerable interval between their proximate ends for the accommodation of a centripetally disposed arm 22 extending from a twister operating rack 23 disposed lengthwise of the drum and guided in the channel bar. Each of the bars 16, which, as stated, are arranged in a circular series around the drum, is of similar construction and each constitutes a guide for one of the racks, the latter, in the illustrated construction, being sixteen in number.

Along each channel bar 16 are arranged a series of twister brackets 24, each preferably comprising a pair of plates 24^a and 24^b bolted together at their outer ends and having their inner ends separated to straddle the channel bar and the rack associated therewith and bolted or otherwise secured to the side members of the bar. Beyond the toothed faces of the racks 23 the brackets 24 are formed with sockets 25 for the reception of rotary twisters 26 having their axes transverse to the racks and each provided with peripheral teeth 27 meshing with the teeth of the adjacent rack. Obviously, therefore, the twisters of each series extending across the drum are operated by a single rack bar, which, when reciprocated in a manner to be described, rotates the twisters simultaneously to effect the intertwisting of the wires, as will be hereafter explained.

Each twister is constructed substantially as shown in Fig. 7, having the general form of a pinion provided with hubs 26^a and 26^b having bearings in the twister bracket, as best shown in Fig. 5. The twister is also formed with an axial opening 26^c enlarged at one end to permit the introduction of a detachable gripper plate 28, of steel or other highly durable material, concentric with the body of the twister and secured thereto as by screws 28^a. The plate 28 is provided, as shown in Fig. 4, with a radial slot or wire seat 29 extending from its periphery to a point slightly beyond its center and constituting a continuation of a radial opening 30 extending to the periphery of the twister. The radial slot or opening 29 in the gripper plate is designed to receive a plurality of wires, but its width is only slightly greater than a single wire or strand so that when several wires are seated in the plate they will be located at different distances from the axis thereof and will be necessarily twisted one upon the other when rotary movement is imparted to the twister.

In addition to their functions as twister supports, the brackets 24 also serve as wire guides and deflectors. To attain this additional end the several brackets 24 of the series are formed with straight side edges 31 and are spaced apart to define intermediate guide-ways 31^a for the margin and intermediate line wires. In addition to these guide-ways the outer end of the bracket is bifurcated to form a pair of wire guiding and deflecting fingers 32 and 33 having inclined and preferably curved opposed faces 32^a and 33^a forming a flared throat 34 converging toward the radial opening 30 in the twister and the wire slot or seat in the gripper plate thereof.

As shown in Figs. 4, 5 and 7, the brackets and twisters of adjacent series are in alternating arrangement and it may also be remarked that each alternate series includes an additional twister and guide. By this arrangement it will be noted that the twisters of each series are arranged opposite the guide-ways 31^a of the two adjacent series of twister brackets and that in like manner these guide-ways 31^a are disposed in line with the two adjacent series of twisters. It follows as a natural result that oppositely disposed guide fingers of adjacent series will

be in substantial alinement at their bases with their oppositely inclined faces 32^a and 33^a, respectively, appearing in intersecting relation so that a wire fed between the outer ends of these fingers will have different portions thereof guided or deflected in different directions so that said wire will be engaged by a twister of each adjacent series notwithstanding the fact that said twisters are not in alinement. In other words, by alternating the guides and twisters of the several series, a wire presented to the drum in a vertical plane midway between a twister and the adjacent guide-way 31 will be deflected in both directions from its normal plane to present those points of the wire at the opposite ends of an intermediate, angular or mesh forming portion, to a pair of twisters constituting units of different series and located out of alinement. In order that the utility of these wire deflecting guides may be better understood, the mesh forming wires *s* are indicated in Fig. 4 in their normal planes, that is to say, before they have been engaged by the guiding and deflecting fingers. The marginal line wires *m*, instead of being presented to the drum in planes intermediate of the twisters, are presented in line with one circumferential row of twisters so that they will pass into the latter through the open throats 34 without being deflected, since it is necessary that the marginal wires extend straight along the opposite edges of the fabric instead of being carried back and forth in zigzag paths like the stay or mesh wires to form meshes. Similarily, if in addition to the marginal wires it is desired to incorporate intermediate line wires *i* in the fabric, such intermediate wires are likewise presented in the paths of intermediate twisters so that no deflection thereof will be produced. The several wires may be led to the machine from any suitable source of supply, but they are all preferably received from the spools 35 resting on the floor below the weaving drum 10, as shown in Fig. 2. The several wires are carried up vertically from spools to the drum and are retained in their proper paths relative to the guiding fingers and twisters by one or more wire guides 36, located adjacent to the upper rear corner of the machine frame.

In rear of the weaving drum 10 is mounted a rotary wire depressing and slacking mechanism which preferably has the form of a corrugated cylinder 37 provided with trunnions 38 mounted in suitable bearing boxes 39 at the upper rear corners of the machine frame. The cylinder 37 is longitudinally co-extensive with the drum and its corrugations are so proportioned that an intermeshing relation will be established between the radial twister brackets 24 of the drum and the wire depressing and slacking teeth or ribs 40 defined upon the periphery of the cylinder 37. As the drum rotates in the direction of the arrow in Fig. 2, the ribs 40 of the cylinder 37 will extend between the longitudinal rows of brackets 24 and will depress the wires sufficiently to force them into the twisters, the mesh forming wires being forced down the oppositely inclined faces of the guide fingers 32 and 33 and thus deflected to form meshes, and the line wires being forced straight into the throats 34 and guide-ways 31^a alined with said throats in the manner heretofore explained.

Incidental to the depression of the wires by the cylinder 37 more or less slack is formed therein, as indicated in Fig. 2, so as to provide sufficient surplus wire for the mesh forming deflections and twists. The slacking of the wires is due to the fact that they extend up to the drum in a line tangential to a circle intersecting the outer extremities of the several twister brackets and, as the teeth or ribs 40 of the cylinder 37 extend in between the brackets a considerable distance, the rotation of the cylinder and drum in unison, with the ribs and brackets intermeshing in a manner similar to the teeth of a pair of gear wheels, the wires are necessarily forced inward out of their normal path.

I will now describe the manner in which the twisters are operated to intertwist the wires and will then describe the instrumentalities which are employed in advance of the drum for winding or storing the completed fabric upon a reel.

By reference more particularly to Figs. 4, 5 and 6 of the drawings, it will be seen that as each longitudinal series of twisters is in mesh with a twister operating rack 23 the reciprocation of the rack will effect the simultaneous rotation in the same direction of all the twisters of that series. If, therefore, a plurality of wires have moved into the wire seats of the twisters, the rotation of the latter will necessarily effect a right and left intertwist of such wires, as shown in Figs. 7, 8 and 9 of the drawings.

In accordance with my invention it is proposed to utilize both movements of the rack for separate twisting operations. That is to say, by imparting sufficient throw to the rack in one direction it will cause one or more, preferably two, complete rotations of the associated twisters each of which will thus be made to complete a twist or connection of two wires, the twisters then being in position to permit the release of the twists as the drum continues to rotate. The rack and the associated twisters then remain stationary, except for their movement with the drum, until the twisters have again received their complement of wires at which time the rack moves back in the opposite direction for the purpose of effecting the formation of

additional twists by the reverse rotation of the twisters, it being immaterial so far as the effective intertwisting of the wires is concerned, whether the twisters are rotated in one direction or the other.

The reciprocatory movement of the racks is imparted thereto by the rotation of the drum in coöperation with what may be termed a twister operating cam 41 having the form of a fixed cylinder concentric with the drum, and preferably mounted within the latter, upon the shaft 9, although it is obvious that any other character of mounting may be substituted for that shown, if desired. The peripheral face of the cam 41 is formed with a cam-way 42 in which are guided the anti-frictional rollers 22^a mounted at the lower ends of the inwardly extending projections 22 of the racks. This cam-way 42 is of peculiar form, the requirements thereof being that each rack shall effect its complete movement in one direction during approximately one-half of a complete rotation of the drum, that said rack shall remain stationary as to endwise movement while the drum is completing its rotary movement and that the rack shall complete its throw in a reverse direction during the succeeding one-half rotation of the drum. In order to fulfil these requirements the cam-way 42 comprises a pair of dwell channels 42^a and 42^b arranged in parallel relation and separated by an interval equal to the desired throw of the racks. These dwell channels extend approximately half way around the cylindrical cam 41 and at the opposite side thereof the way 42 includes a pair of intersecting spiral channels 42^c and 42^d each of which connects one end of a dwell channel with the opposite end of the other dwell channel. By reference to Fig. 6 the manner in which any given roller 22^a traverses the cam-way will be apparent. For instance, the roller marked x is associated with a rack which is about to move to the right for the purpose of operating its twisters, said roller being located at the intersection of the dwell 42^a, which it has just traversed, and the spiral channel 42^c. As the drum continues to rotate the roller x will be forced to travel along the channel 42^c until it reaches the receiving end of the dwell 42^b, the spiral form of the channel thus causing the roller to progress longitudinally of the cam the distance of the rack throw while the drum is making one-half of a complete rotation. When this movement of the roller x has been completed it lies a little beyond the position of the roller y the rack having completed its throw and a series of twists having been formed in the fabric. The twisters associated with the rack just operated will now have made two complete rotations and will be in position to permit the withdrawal of the twists as the drum continues to rotate. During the next half rotation of the drum the rack and its twisters will remain relatively stationary because the roller x will merely travel along the dwell channel 42^b which permits no progressive movement of the rack in either direction. When, however, the roller reaches the discharge end of the dwell 42^b, the twisters will again receive their complement of wires and will twist the same in the reverse direction, as the roller enters and traverses the reverse spiral channel 42^d. When this traverse has been completed a series of twists will have been formed, as before, through the instrumentality of a reverse movement of the rack, and the roller will now traverse the dwell channel 42^a preparatory to a repetition of the described operations.

For certain economic reasons, as for instance to equalize the strains on the apparatus and to insure absolute uniformity in the completed fabric, it is desirable to move alternating racks in opposite directions, thus producing a reversal of each alternate transverse series of twists in the fabric. To attain this end the rollers of each alternate rack at the upper or active side of the drum are located in one spiral channel of the cam-way, as for instance, the channel 42^c while the rollers of the other racks at the upper side of the drum are similarly located in the other spiral channel 42^d, it being noted that the rollers in the two channels are in alternating order as to progressive position, see Fig. 6. As the channels 42^d and 42^c intersect it is obvious that some means must be provided to keep the rollers in their proper paths, it being noted that as each roller is forced along by reason of its engagement with one wall of its way a break in the continuity of such wall will tend to effect a deflection of the roller, as for instance, from one channel to the other at their point of intersection. To avoid this I provide, at the intersection of the spiral channels, an automatic switch 43 pivoted as indicated at 44 and provided with a segmental trip 45 disposed beyond its axis. The face of the cam 41 is cut away to accommodate the switch 43 and its trip, and in one position, to-wit that shown in Fig. 6, the switch is disposed across the channel 42^d for the purpose of preventing a roller traversing the channel 42^c, from being deflected from its proper path as it passes the point of intersection of the two channels. In this position of the switch, however, one end of the trip 45 associated therewith projects into the channel 42^c at a point beyond the intersection so that when a roller has passed along the switch and thus successfully crossed the channel 42^d it will come in contact with the trip 45 to automatically shift the switch to the dotted position shown in Fig. 6.

It has been stated that the rollers located in the two spiral channels are in alternating arrangement as to progressive position and it will, therefore, be apparent that the next roller to approach the switch will be traversing the channel 42^d and as the switch has now been shifted to prevent the deflection of the roller from this channel, said roller will pass along the switch and after safely crossing the channel 42^c will strike the opposite end of the trip 45 to restore the switch to its initial position for the proper guidance of the next succeeding roller traversing the channel 42^c.

From the front side of the weaving drum 10 the finished fabric is carried down and around the under side of a friction drum 46 and thence over a second friction drum 47 and down again to a reel 48 upon which latter the fabric is wound or stored. The friction drum 46 may be, and preferably is, of the usual slatted construction and is mounted on a shaft 49 journaled in suitable bearings 50 and equipped at one side of the machine with a pair of gears 51 and 52. The wheel 51 is located just within the machine frame as shown in Fig. 1 and meshes with a comparatively large gear wheel 53 located at one end of the weaving drum 10 and preferably integral with the head 14 of the latter, as shown in detail in Fig. 4. The wheel 52 on the shaft 49 is in mesh with a wheel 54 of like diameter keyed or otherwise secured to the driving shaft 55 journaled in suitable bearings at the upper front corner of the machine frame and carrying the upper friction drum 47. The two friction drums 46 and 47 and the weaving drum are all driven at the same peripheral speed from the driving shaft 55, equipped for this purpose with fixed and loose pulleys 56 and 57 by means of which power may be applied from any suitable source by a belt 58. The reel 48 upon which the finished fabric is wound is likewise driven from the shaft 55. This reel may be of any desired construction but it preferably comprises, as usual, a pair of beams 58^a detachably secured to a pair of heads 59 and 60 carried at the inner or proximate ends of a pair of stud shafts 61 and 62 journaled in suitable bearings at opposite sides of the machine frame at, or adjacent to, its front end, as shown in Fig. 1.

The shafts 55 and 62 are equipped with contiguous sprocket wheels 63 and 64 geared together by a sprocket chain 65. The sprocket 64 is mounted loosely on the shaft 62 and is connected to the latter by a friction clutch 66 comprising friction disks 66^a and 66^b, the former being rigid with the hub of the sprocket and the latter being splined on the shaft 62 and associated with an adjusting nut 67 screwed upon the shaft 62 and arranged to urge the friction disks 66^a and 66^b into frictional engagement. This frictional connection between the sprocket 64 and the reel shaft 62 is necessitated by reason of the fact that, as the diameter of the roll of fabric on the reel 58 increases, the peripheral speed of the roll would necessarily increase provided no provision was made for a variation of the relative rotation of the shafts 55 and 62. Therefore, in order that the peripheral speed of the roller will be maintained substantially uniform notwithstanding the increase in diameter due to the accumulation of the fabric, the friction clutch 66 is utilized so that the wheel 64 may slip before the fabric is subjected to sufficient strain to endanger its integrity or interfere with the proper operation of the machine.

It is believed that the construction and operation of the machine will be properly comprehended from the foregoing description. It should be understood, however, that while the present embodiment of the invention appears to be preferable, I do not limit myself to the structural details defined, but that on the contrary, I expressly reserve the right to effect such changes, modifications, and variations of the illustrated structure as may come fairly within the scope of the protection granted.

What I claim is:—

1. In a machine for making wire fabric, the combination with a plurality of wire connecting devices arranged out of alinement, of oppositely inclined wire guiding devices associated with the wire connecting devices to deflect different portions of a wire in different directions to present said wire to the connecting devices.

2. In a machine for making wire fabric, the combination with means for advancing a wire, of oppositely inclined wire guides arranged to engage the wire at different points, twisters to which the wire is deflected by said guides, means for advancing a second wire to certain of the twisters, and means for operating the twisters to connect the wires.

3. In a machine for making wire fabric, the combination with several sets of twisters, of means for leading a plurality of wires, wire guiding fingers arranged to guide certain of the wires to the twisters without deflection and to deflect certain other of the wires to the twisters.

4. In a machine for making wire fabric, the combination with a plurality of traveling twisters, of wire guiding fingers associated therewith and having wire deflecting faces, and means for advancing a plurality of wires in the direction of the twister travel to be connected by said twisters.

5. In a machine for making wire fabric, the combination with a rotary twister mounted to travel in an endless orbit, of a cam having oppositely disposed spiral chan-

nels, and a rack geared to the twister and having an extension movable in the channels of the cam.

6. In a machine for making wire fabric, the combination with a traveling twister, of a twister operating cam having intersecting spiral channels, a rack geared to the twister and having an extension movable in the channels, and a switch located at the intersection of the channels.

7. In a machine for making wire fabric, the combination with a rotary twister, of a twister operating cam having intersecting spiral channels, a rack geared to the twister and movable in said channels, and an automatic switch located at the intersection of the channels.

8. In a machine for making wire fabric, the combination with a series of twisters, of a twister operating cam having oppositely disposed spiral channels, and racks geared to the twisters and having extensions engaging the channels of the cam.

9. In a machine for making wire fabric, the combination with a series of traveling twisters, of a twister operating cam common thereto and provided with oppositely disposed intersecting spiral channels, racks geared to the twisters and having extensions movable in the channels, and a switch located at the intersection of the channels.

10. In a machine for making wire fabric, the combination with a series of traveling twisters, of a twister operating cam common thereto and provided with intersecting spiral channels, of racks geared to the twisters and having extensions, the extensions of alternate racks being disposed in different channels of the cam, a switch located at the intersection of the channels, and means cooperating with the rack extensions for operating the switch.

11. In a machine for making wire fabric, the combination with a traveling twister, of means for advancing a plurality of wires with the twister, means for deflecting the wires at points adjacent to the twister to insure their engagement thereby and to produce sufficient slack for the formation of the twist.

12. In a machine for making wire fabric, the combination with a traveling twister, of a rotary wire depressing and slacking device coöperating therewith.

13. In a machine for making wire fabric, the combination with a traveling twister, of a rotary wire depressing and slacking device coöperating therewith, and wire guiding means movable with the twister and engaging the depressing and slacking device to operate the same.

14. In a machine for making wire fabric, the combination with a rotary drum, of a circumferential series of twisters mounted thereon, wire guiding and deflecting means associated with the twisters, and a rotary wire depressing and slacking device provided with radial teeth meshing with the guiding means.

15. In a machine for making wire fabric, the combination with a rotary drum equipped with rotary twister brackets and twisters mounted therein, of a rotary wire depressing and slacking device provided with teeth meshing with the twister brackets.

16. In a machine for making wire fabric, the combination with a rotary drum, of a series of twisters mounted thereon, inclined wire guiding and deflecting devices associated with the twisters, and a rotary wire depressing device arranged to urge the wires along the inclined guides and into the twisters.

17. In a wire fence machine, the combination of a fixed shaft, a continuously revoluble carrier mounted on the fixed shaft, a plurality of coiling mechanisms mounted on and revoluble with the carrier and arranged in series, each series comprising a plurality of coiler heads, a pinion for each coiler head, a rack bar common to all the pinions of a series of coiler heads, and means operative from the revolving of the carrier to reciprocate the rack bars and successively actuate the different series of coiler heads, substantially as described.

18. In a wire fence machine, the combination of a continuously revoluble carrier, a plurality of coiling mechanisms mounted on and revoluble with the carrier and arranged in series, each series comprising a plurality of coiler heads, each coiler head having a longitudinal slot for the passage of a strand wire to the center of the coiler head and each coiler head having thereon a driving pinion, a rack bar common to all of the pinions of a series of the coiler heads, a roller fixed on the rack bar, a drum having a fixed position within the carrier and provided with an inclined slot forming a track-way to receive the roller, for the travel of the roller up and down in the trackway with the revolving of the carrier to reciprocate the rack bar and operate the coiler heads, substantially as described.

19. In a wire fence machine, the combination of a continuously revoluble carrier over which a plurality of strand wires lead, a plurality of coiling mechanisms mounted on and revoluble with the carrier and arranged in series longitudinally of the carrier, each series comprising a plurality of coiler or twister heads corresponding to the number of strand wires and each coiler or twister head having a longitudinal slot for the passage of a strand wire to the center of the coiler head, mechanism for simultaneously actuating the coiler heads of a series, a roller at the rear of and below the upper traveling surface of the carrier and common

to all of the strand wires and under which the completed fence passes, and means for spooling the completed fence, said means located rearward of the roller, substantially as described.

20. In a wire fence machine, the combination of a continuously revoluble carrier over which a plurality of strand wires lead, a plurality of coiling mechanisms mounted on and revoluble with the carrier and arranged in series longitudinally of the carrier, each series comprising a plurality of coiler or twister heads corresponding to the number of strand wires and each coiler or twister head having a longitudinal slot for the passage of a strand wire to the center of the coiler head, mechanism for simultaneously actuating the coiler heads of a series, a roller at the rear of and below the upper traveling surface of the carrier and common to all of the strand wires under which the completed fence passes, and a reel on to which the completed fence is wound and by which in conjunction with the continuously revolving carrier the strand wires have a continuous forward feed, substantially as described.

21. In a wire fence machine, the combination of a continuously revoluble carrier over which a plurality of strand wires lead, a plurality of coiling mechanisms mounted on and revoluble with the carrier and arranged in series longitudinally of the carrier, each series comprising a plurality of coiler or twister heads corresponding to the number of strand wires and each coiler or twister head having a longitudinal slot for the passage of a strand wire to the center of the coiler head, mechanism for simultaneously actuating the coiler heads of a series, a roller at the rear of and below the upper traveling surface of the carrier and common to all of the strand wires and under which the completed fence passes, a reel onto which the completed fence is wound and by which in conjunction with the continuously revolving carrier the strand wires have a continuous forward feed, and a take-up mechanism coöperating with the reel as the roll of fence increases in size to maintain the proper drive for the reel, substantially as described.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

ALVA L. KITSELMAN.

Witnesses:
JOHN H. SIGGERS,
FLORENCE WALTER.