C. H. HAISLEY.

WIRE FENCE MACHINE.

APPLICATION FILED JULY 24, 1911.

1,047,125.

Patented Dec. 10, 1912.

5 SHEETS—SHEET 1.

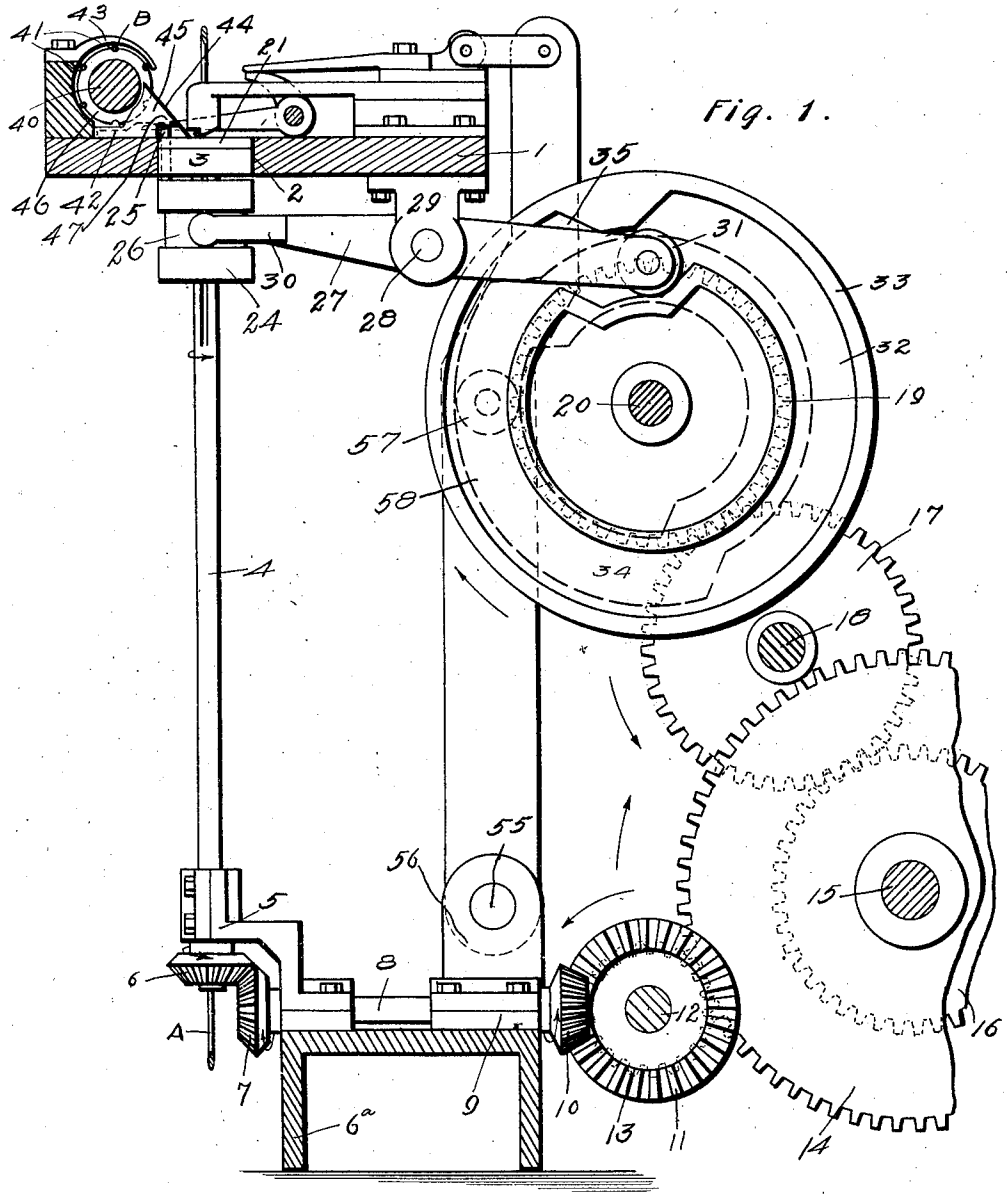

Fig. 1.

Witnesses.

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5 SHEETS—SHEET 2.

Fig. 4.

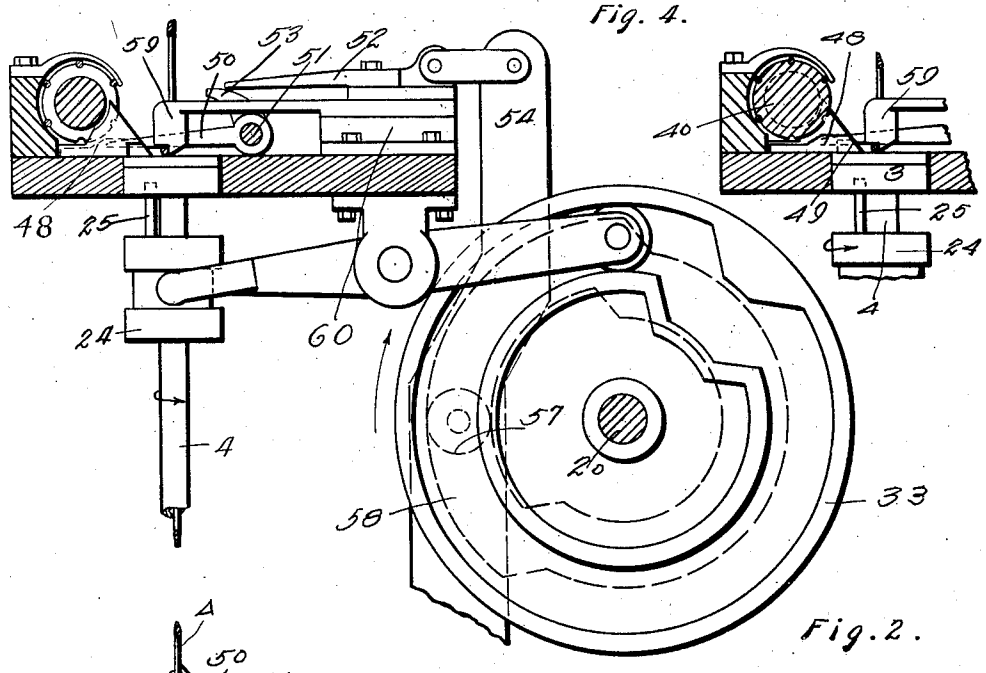

Fig. 2.

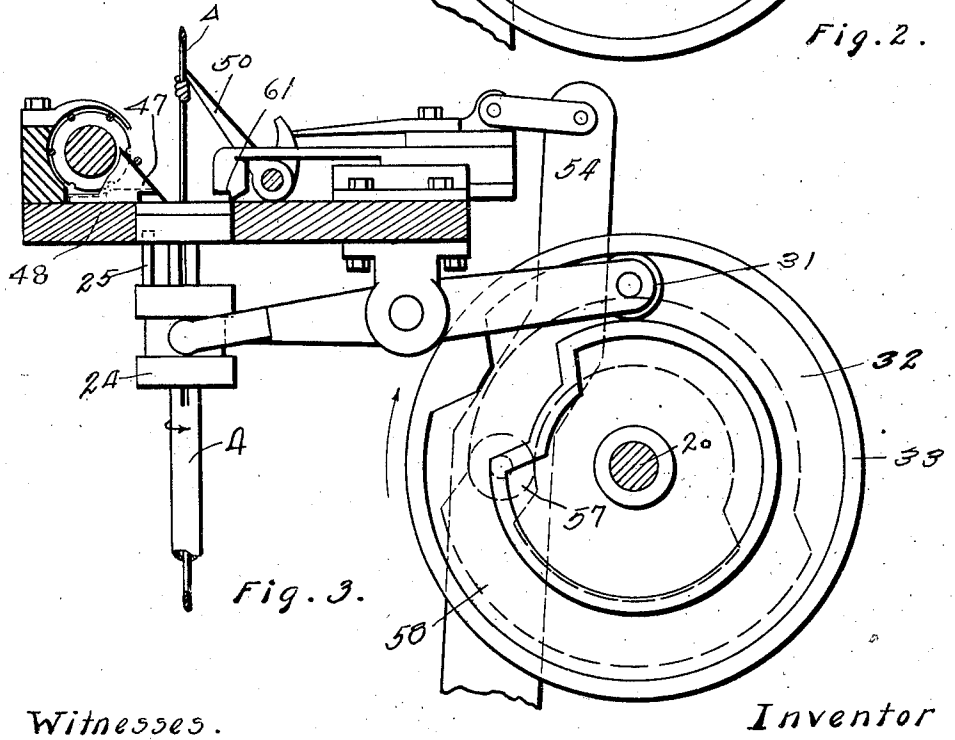

Fig. 3.

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5 SHEETS—SHEET 3.

Fig. 5.

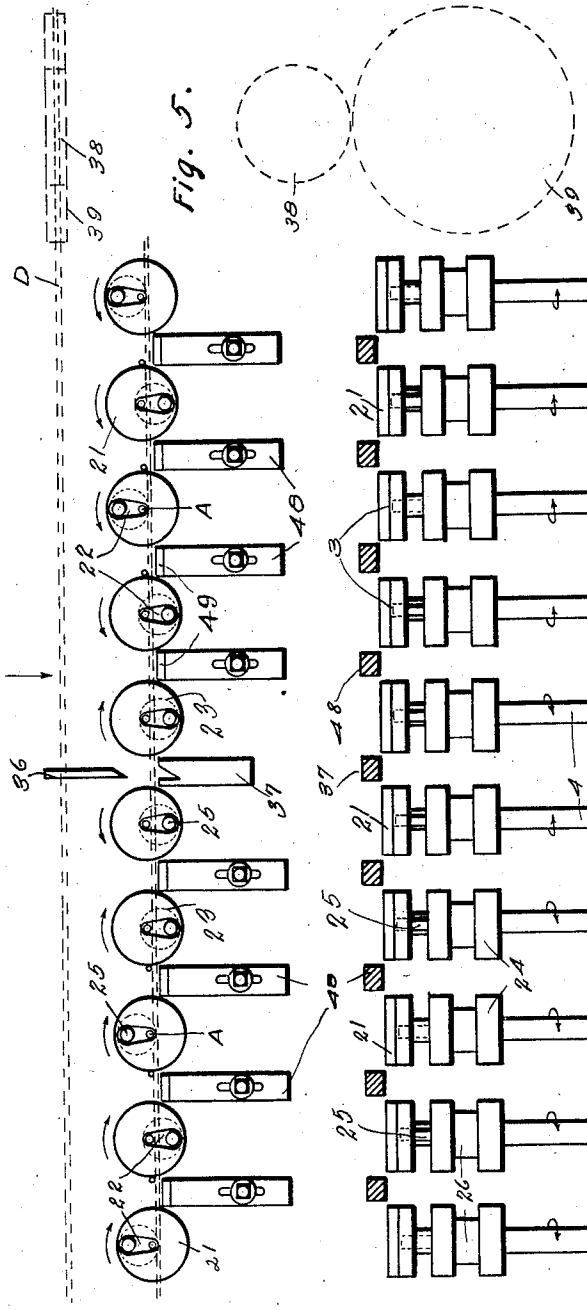
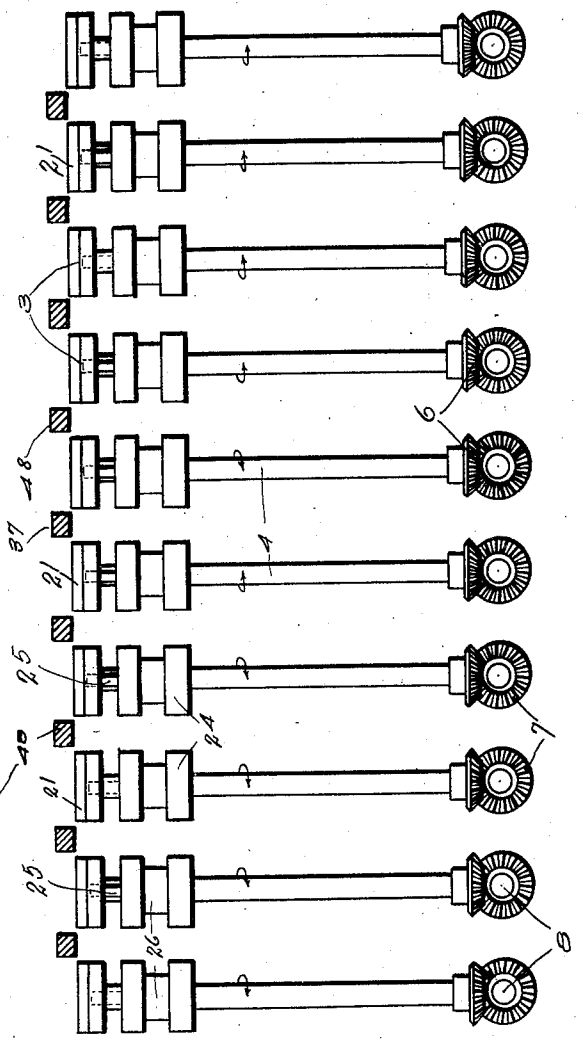


Fig. 6.



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5 SHEETS—SHEET 4.

Fig. 7.

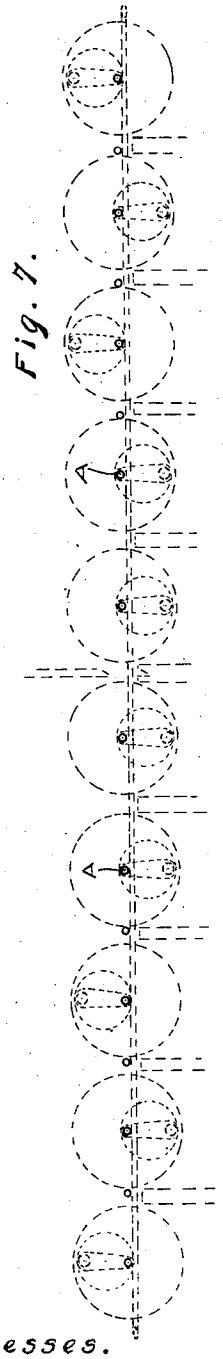


Fig. 8.

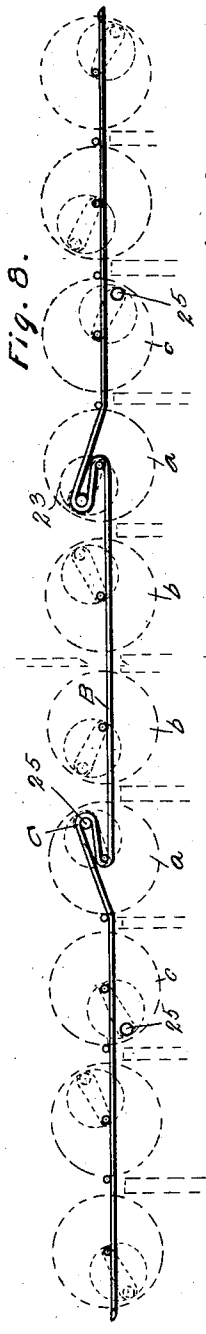


Fig. 9.

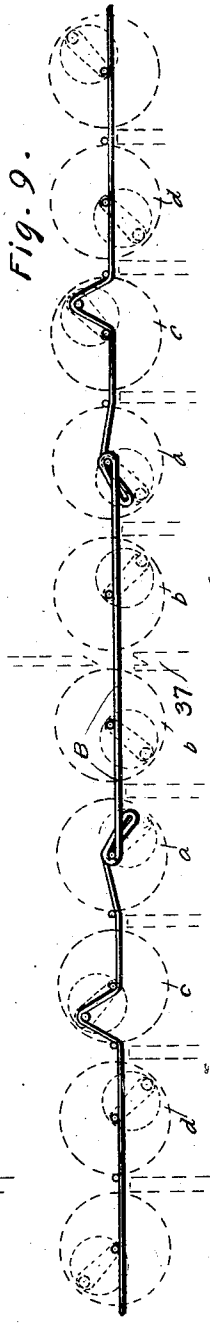
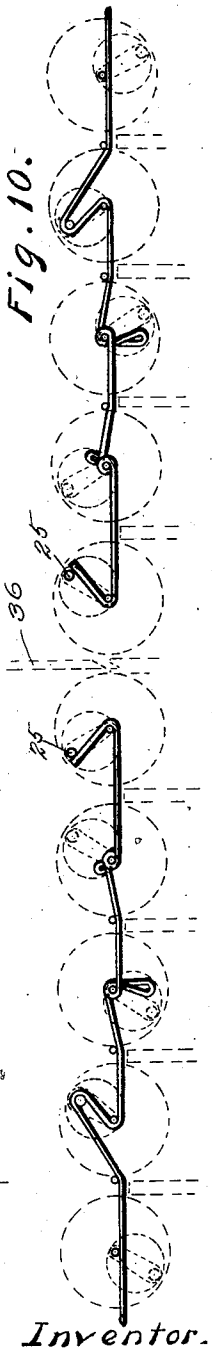


Fig. 10.



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5 SHEETS—SHEET 5.

Fig. 11.

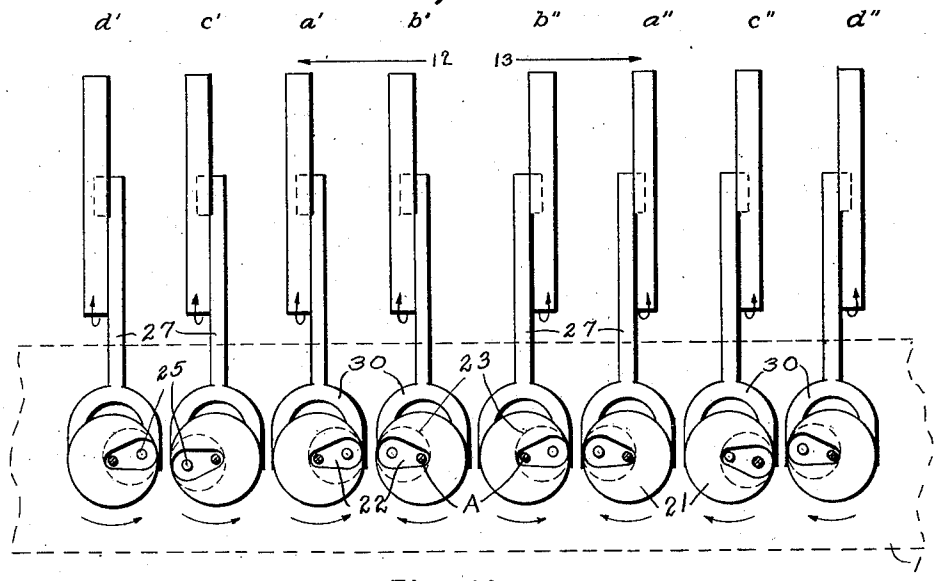


Fig. 12.

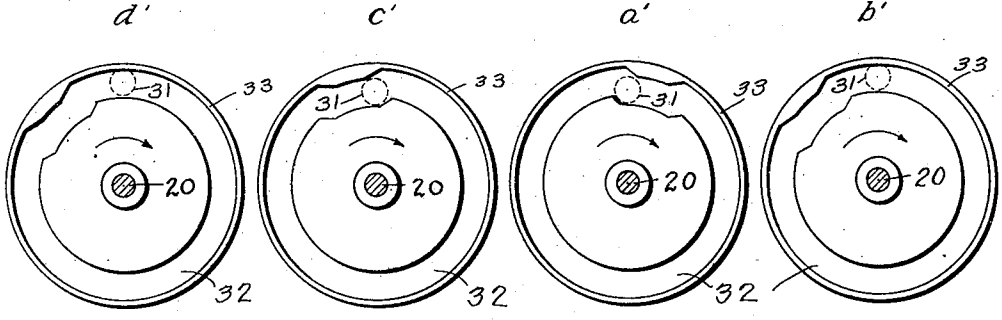
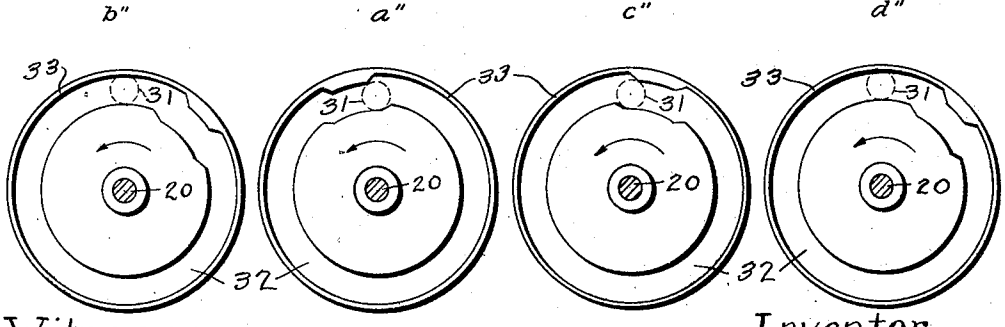


Fig. 13.



Witnesses.

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UNITED STATES PATENT OFFICE.

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WIRE-FENCE MACHINE.

1,047,125. Specification of Letters Patent. Patented Dec. 10, 1912.

Application filed July 24, 1911. Serial No. 640,280.

To all whom it may concern:

Be it known that I, CHARLES H. HAISLEY, a citizen of the United States, residing at Muncie, in the county of Delaware and State of Indiana, have invented certain new and useful Improvements in Wire-Fence Machines, of which the following is a specification.

This invention has reference to improvements in wire fabricating machines and relates particularly to machines for making wire fence fabrics for farm, field and poultry uses.

The invention has for its object to improve that type of wire fence fabricating machines, wherein a fence fabric is made including a plurality of longitudinal running or strand wires connected by a plurality of transverse stay or picket wires; said stay or picket wires united to the running or strand wires by loops which are formed in the stay or picket wires and wrapped or coiled around the running or strand wires. The ends of said stays or pickets are merely coiled or wrapped around the outside marginal or selvage wires, constituting said fence fabric.

The invention has for a further object to provide a plurality of continuously operating wire spindles, each of said spindles having a wrapper head and retractable looping pins associated therewith and which revolve in unison with said spindles; said retractable looping pins adapted to be intermittently projected through said wrapping heads into operative position to engage and form loops in a wire preparatory to said loops being wrapped by said wrapping heads around other wires, said projection of the looping pins being at predetermined intervals, and at a moment when the wire in which the loops are to be formed, is in the position to be engaged by said pins for the purpose of connecting said loops of wire to other wires.

A further object of the invention is to operate continuously the coiling spindles and to intermittently retract and project the looping means of said spindles. The mechanism for operating the looping means of the successive spindles is graduated, whereby loops are successively formed in the stay during the continuous operation of said spindles.

That the invention may be more fully understood, reference is had to the accompanying drawings, forming a part of this description, in which:—

Figure 1 is an elevation, partly in section, showing so much of a wire fabricating machine as is deemed necessary to illustrate the application of my invention thereto; the looping pin of the wrapping head in this figure being shown in a position preparatory to engage a stay wire to form a loop therein, which said loop will be wrapped around the strand wire shown passing through the wrapping head; Fig. 2 is a view similar to Fig. 1, with the exception that only the upper half of the mechanism is shown, the parts being in a position where the stay has been looped and such loop wrapped or coiled about the running wire, and the looping pin retracted, preparatory to drawing the strand and stay wire through the wrapping head; Fig. 3 is a view similar to Fig. 2, the parts being in that position where the strand and stay wire have been connected and are being drawn through the wrapping head, the looping pin still retracted and a new stay in a position to be delivered on to the wrapping head and just prior to that operation shown in Fig. 1; Fig. 4 is a detailed view, partly in section, showing more clearly, a wire guide for the stay wire, which is only shown in dotted lines in Figs. 1, 2 and 3; Fig. 5 is a plan view of a plurality of wrapping heads which have been shown as arranged in two separate series; and showing in dotted lines, the stay feeding means and the position of the stay when on the wrapping heads, preparatory to forming the loops therein; Fig. 6 is an elevation of the mechanisms shown in Fig. 5; Figs. 7, 8, 9 and 10 show in dotted lines and full lines, the plurality of wrapping heads arranged in two series, as in Fig. 5, and the successive figures show the progressive steps in the operation of forming the loops in a stay wire, the wrapping of said loops around the strand wires and the severing of the stay into two separate and distinct stays. Fig.

11 is a diagrammatical plan view of part of the two series of wrapping heads and the pin projecting mechanisms. Fig. 12 is a diagrammatical view of the pin operating cams of the portion of the left hand series shown in Fig. 11. Fig. 13 is a diagrammatical view of the pin operating cams of the portion of the right hand series shown in Fig. 11.

My invention, as will be inferred from the foregoing description, has reference particularly to the continuous operation of the coiling spindles and wrapping heads, and the intermittent projection of the looping pins through the wrapping heads, for forming loops in a stay, preparatory to said loops being wrapped around a plurality of strand wires.

It is of course understood that the invention is intended to be used in connection with wire fabricating machines, and while I have seen fit to show it associated with a preferred form of mechanism for feeding and delivering a stay or stays in the position to be acted upon by said looping pins, and for severing a stay into two distinct stays, for the purpose of forming two distinct rolls of fabric simultaneously, I do not wish to limit myself to this particular application of the invention. I wish it further understood that I lay no claim to being the first to manufacture a fence fabric including running or strand wires and stay or picket wires connected thereto by looping the stays or pickets at the intersection of the running or strand wires and wrapping or coiling such loops around the same; nor do I lay claim to being the first to arrange a plurality of coiling spindles having wrapping heads in which operate looping pins for forming loops in the stay or picket wires, and thereafter wrapping said loops around a plurality of strand or running wires; nor do I lay claim to being the first to arrange a plurality of coiling spindles having wrapping heads and looping pins which are divided into two sets or series and the severing mechanisms for cutting the stays, whereby two rolls of fence are simultaneously produced on the one machine; nor do I lay claim to being the first to employ the particular stay feed and delivering mechanism as shown in the drawings, forming a part of this description; but I believe that I am the first to employ in a machine of the type shown, a plurality of continuously operated coiling or wrapping spindles provided with looping pins which are adapted to be intermittently projected through the rotation of such spindles, for engaging a stay at intervals and forming loops in such stay, which said loops are subsequently wrapped about longitudinal running or strand wires.

In the following description, no attempt will be made to disclose or describe the complete machine, such for instance as the frame structure and the entire or combined mechanism which is associated with the mechanism shown and described, necessary to the production of a completed machine, and to initiate and carry on the operation of such mechanism; with the exception of that mechanism coöperating with and necessary to the continuous operation of the coiling spindles and wrapping heads and the intermittent movement of the looping pins through the wrapping heads.

In the drawings, the table of the machine is indicated as 1 and said table is provided with a plurality of openings 2 in which are revolubly mounted wrapping heads 3. The wrapping heads are secured on the upper end of tubular spindles 4; the lower ends of which are journaled in brackets 5 secured to a cross frame 6^a. The cross frame 6^a and the table 1 are intended to form a part of or be attached to the general frame work of the machine. The openings 2 in the table 1 may be spaced equi-distant from each other or they may be arranged at graduated distances apart. If equi-distant or uniformly spaced, it is obvious that the longitudinal running or strand wires would be equally spaced apart, and if graduated, that the spacing of the longitudinal strand or running wires would be irregularly spaced apart. In Fig. 5, wherein a plan view is shown of a plurality of coilers, they are shown in two separate series, one series on either side of a suitable cutting mechanism, whereby two rolls of fabric may be made simultaneously.

The tubular spindles 4 are arranged to have longitudinal running or strand wires "A" passed up through the same, such wires being fed from coilers or spools, and after the stays have been attached thereto, the completed fabric is drawn off and wound up by a reel or drum, not shown. On the lower end of the spindles 4 are carried gear wheels 6, preferably miter gears, and these gears mesh with similar gears 7 on the forward end of short transverse shafts 8. The shafts 8 are journaled at their forward ends in the brackets 5 and their rear ends journaled in brackets 9, which like the brackets 5, are secured to the frame 6. On the rear ends of the shafts 8 are carried gears 10, preferably bevel gears, and the gears 10 mesh with the larger bevel gears 11 on a longitudinally disposed shaft 12 journaled in any suitable manner in the frame of the machine. At some suitable point on the shaft 12 is carried a gear wheel 13, preferably a spur gear, which is shown in dotted lines in Fig. 1, and the gear 13 is in mesh with and driven by the larger gear wheel 14 carried on a longitudinally disposed shaft 15. The shaft 15 is understood to be the driving shaft and may receive its power direct from a suitable

source of power or receive its power indirectly, it being immaterial in what manner such shaft is driven. On the shaft 15 at some suitable point, preferably near one end thereof, is carried a gear wheel 16, preferably a spur gear, and the gear 16 meshes with an idler gear 17 carried by a shaft 18, and the gear 17 in turn meshes with and imparts power to a gear wheel 19 on what will be known as a cam shaft 20, said shaft extending longitudinally of the machine and journaled in any suitable manner.

It will be observed that power is transmitted from the driving shaft 15 to the spindles 4, as well as the cam shaft 20, and that while the spindles 4 are driven much more rapidly than the driving shaft 15 because of the great reduction in the gearing between the driving shaft and the spindles, the cam shaft rotates approximately, if not at the same speed, with the driving shaft 15. The driving shaft is intended to be driven continuously, which in turn will cause the spindles 4, or cam shaft 20 to be driven not only simultaneously, but in unison therewith. Each of the wrapping heads is provided with a cap-plate 21 and each cap plate has an opening 22 therein (see Fig. 5), such opening extending from the center of the plate to a point near its peripheral edge, through which the strand wires A pass, and through which certain looping pins, to be described, are projected. The openings 22 in each of the cap plates 21 communicate with the circular recesses 23, in the cap-plates 21 (see Fig. 5), the function of such recesses being hereinafter more particularly described.

Referring to Figs. 1, 2 and 3, 24 designates sleeves which are feathered on the spindles 4, so that during the rotation of the sleeves with the spindles, such sleeves may be reciprocated or moved longitudinally back and forth or up and down on said spindles. Each sleeve is provided with a pin 25, which I have seen fit to designate as a looping pin, and said pins extend upwardly from the sleeves through suitable openings in the wrapping heads 3, and when projected, extend through the openings 22 in the cap-plates 21 secured to said wrapping head. It is to be noted that the pin 25 is entirely without the spindle, that is, it is spaced therefrom and has no connection therewith other than indirectly through the sleeve 24. Each sleeve has a groove 26, and to reciprocate or move the sleeves up and down on the spindles 4, levers 27 are provided which are fulcrumed at 28 in brackets 29 secured to the lower face of the table 1, and said levers have yokes 30 operating in the grooves 26 of the sleeves 24, so that when the levers are actuated, they will in turn depress or lower and elevate or raise said sleeves 24, and with them, the pins 25. The rear end of each lever 27 is provided with a roller 31 operating in a cam groove 32 of cam wheel 33 on the cam shaft 20. It is understood that there is a lever 27 for each spindle 4 and its sleeve 24, and that there is also a cam wheel 33 with the cam groove 32 for each lever 27 on the cam shaft 20. The cam groove 32 of each of the cam wheels 33 has the long regular grooved portion 34 and the very much shorter irregular grooved portion 35. When the roller 31 of each lever 27 is riding through the long regular grooved portion 34, the levers 27 are in the position shown in Figs. 2 and 3 holding the sleeves 24 with the pins 25 in their lower positions on the spindles 4, but when the said rollers 31 on the levers 27 are moved through the shorter irregular grooved portion 35 of the cam wheels 33, the levers are operated to raise or elevate the sleeves 24 on the spindles 4 and project the pins 25 up through the wrapping heads 3 and through the openings 22 in the cap-plates 21. As the rollers 31 enter the irregular grooves 35, the sleeves 24 and pins 25 are elevated and as said rollers 31 leave such grooves, the sleeves and their pins are lowered to a retracted and inoperative position.

In the manufacture of fence fabric where the stays are formed with loops at intervals and said loops wrapped or coiled around the longitudinal running or strand wires, enough slack must be taken up out of the stay wire to form a loop before the operation of taking up other slack to form another loop begins. I accomplish this by adjusting the cam wheels 33 on the cam shaft 20 so that the smaller irregular grooves 35 of the adjacent and successive cam wheels are positioned at graduated distances relatively to each other around the shaft 20, whereby the cam wheel 33 for elevating the first sleeve 24 with its looping pin 25, will place such looping pin in a position to take up sufficient slack in the stay wire to form a loop before the second looping pin starts to produce the slack for forming the second loop. This operation is carried on with each of the successive and adjacent looping pins, and the arrangement is illustrated diagrammatically in Figs. 11, 12, and 13, wherein the cam wheels 33 corresponding to the wrapping heads *a*, *b*, *c*, and *d*, of Figs. 7 to 10, are indicated as *a'*, *b'*, *c'*, and *d'* for the left-hand series and *a''*, *b''*, *c''*, and *d''* for the right-hand series. It is to be understood that these cam wheels 33 are so adjusted on the shaft 20 that the cam grooves therein actuate the levers 27 progressively across the machine, with the exception that the cam wheels *a'* and *a''* operate their levers before the cam wheels *b'* and *b''* operate their levers. This is true whether only one set or series of coiling spindles and looping pins are used or

whether the coiling spindles and looping pins are used in two series, as shown in Figs. 5, 7, 8, 9 and 10.

If only one set or series of spindles and looping pins are used, a stay is projected across the machine and the slack would be taken up in the stay for the successive loops, drawing in the wire from the loops, preferably all from one side or one end of the stay. If two sets or series of spindles and looping pins are used, as is illustrated in Figs. 5, 7, 8, 9, and 10, then the slack for the loops will be drawn in a stay from the opposite ends of said stay or stays. With this manner of forming the stay and loops, the stay is fed so that there will be left extra long ends at the opposite ends of the stays and the looping portion will be started approximately centrally of the stay or stays and the looping pins brought into successive operation, starting from the center of the machine and ending up at the opposite ends of the stay or stays. In the present operation, as shown in the drawings, I prefer to start the looping operation with the looping pins of the second coilers of the two separate sets or series of coilers from the two inner or end coilers of said sets or series. In other words, referring to Fig. 7 wherein the wrapping heads and looping pins are shown in dotted lines, the span wires A are shown in full lines, the parts are in a neutral position; that is, while the coilers are presumed to be rotating, the looping pins have not started their looping operation.

In Fig. 8, the second coilers *a*, *a* of the two separate sets or series of coilers, starting from the two inner and adjacent coilers *b*, *b* of the two sets or series, show the looping pins, 25, in full lines, having been projected to engage the stay wire B to form loops C, the position of said looping pins being in that position just prior to the retraction of same, for drawing the loops down into the recesses 23 of the cap-plates 21, whereby the walls of the recesses 23 will act, during the continued rotation of the spindles, to wrap or coil said loops C around the strand wires A. The looping pins 25 of the next adjacent coilers *c* (Fig. 8) are shown in a position just prior to their engaging the stay wire B to produce slack in the stay and form loops as shown on the coilers *a*, *a*. However, the looping pins of the coilers *c* do not draw in the slack until the looping pins of the coilers *a*, *a* have taken up sufficient slack, formed their loops and are ready to be retracted. This is deemed necessary so that there will be no undue tension on the wire between the coilers and cause the same to snap or break, or be unduly strained, weakening that part of the fabric. As shown in Fig. 8, the operation of the looping pins of the coilers *a* draws in slack from the opposite ends of the stay, leaving the wire taut between the coilers *a* of the two separate series.

In Fig. 9 the looping pins of the coilers *a* are shown retracted and their loops being wrapped around the strand wires, while on the coilers *c* the looping pins are in the act of taking up the slack and forming the loops, and at a time just prior to the projection of the looping pins on the next adjacent coilers *d*.

In Fig. 10, the loops on coilers *a* are in that position where the wrapping or coiling of the same about the strand wires is nearly completed; the loops on coilers *c* are still in the act of being wrapped or coiled around the strand wires passing through such coilers and the looping pins on coilers *d* have been projected, the slack being taken up and the loops in the act of being formed. Subsequently to the projection of the looping pins on the coilers *b* to start the taking up of the slack in the stay to form the loops to be wrapped around the strands passing through coilers *c*, a movable cutter bar 36 shown in dotted lines, is operated and in conjunction with the stationary cutter bar 37 shown in dotted lines, severs the stay length between the coilers *b*, separating such stay length B into two separate stay lengths, one for each separate set or series of coilers, whereby two distinct rolls of fence fabric may be simultaneously formed. Immediately upon the severance of the stay length B into two parts, the pins 25 of the coilers *b* are projected and engage the ends of the separate stay sections and cause them to be wrapped or coiled around the inner marginal wires passing through the two inner and adjacent coilers *b*. The operation of looping the stays at intervals and wrapping said loops around the successive and adjacent strand wires is carried on throughout the two separate series of coilers, until the last or outside coilers are reached, when the ends of the stays are wrapped around the outside marginal wires.

Severing the stay section B into two separate and distinct stay sections as shown in Fig. 10, makes it necessary to rotate the two inner and adjacent coilers *b* in a direction opposite to the remainder of the coilers of the separate sets or series. To accomplish this, the gear wheels 11 on the longitudinal shaft 12 which operate the short shafts 8 for rotating the coilers *b* have a reverse position on the shaft 12, to that shown in Fig. 1 so as to impart a reverse operation to the coilers *b*, or rotate the same in the direction indicated by the arrows, see Fig. 5. It being presumed this operation is understood, it is thought unnecessary to illustrate the reverse position of the gears 11 on the shaft 12 to drive the coilers *b*, as stated.

To feed and deliver a stay wire into a

position from which may be severed the stay B and such stay B delivered on to the wrapping heads, I employ and show the following mechanism: 38 and 39 designate feed wheels, shown in dotted lines, for the stay feed wire D. These wheels are intended to coöperate to shoot a stay wire across the machine and may be intermittently operated by any suitable means. One of the said wheels, preferably the wheel 39, should be continuously driven, whereas one of said wheels, preferably wheel 38, should be intermittently moved into position whereby a frictional engagement may be made with the stay feed wire D. Located in advance of the wrapping heads 3 and extending transversely thereto above the table 1, is shown a feeding drum 40 journaled in any suitable manner upon said table and driven by any suitable means, so long as the mechanism for operating said drum imparts an intermittent rotation thereto. This drum is provided with a plurality of longitudinally disposed wire grooves or slots 41 for receiving the stay wire D when they move to a proper position, said stay wire D being projected by the wheels 38 and 39 through said grooves 41, and when a proper length of stay wire has been fed into such grooves through the operation of rotating the drum 40, a stay section B is severed from said stay wire D. Said severing mechanism, which is not shown, is preferably located at the end of the drum 40, where the stay wire D is fed into the grooves thereof. The character of this cutting mechanism is immaterial.

A guide comprising a bar or plate 42 is placed in front of the frame 40 in the manner shown in Figs. 1, 2, 3 and 4 to prevent the stays from slipping out or becoming dislodged from the grooves 41 of the drum, and a plurality of overhanging guides such as 43, are also provided to insure the stay B remaining in the grooves of the drum, and such guides 43 terminate at a point where it is desired to have said stays D discharged from the drum and delivered on to the wrapping heads. The stays B leaving the drum, drop on to the inclined surfaces 44 of brackets 45, which insure the stays B, being directed toward the center of the wrapping heads 3 of the coilers 4 and adjacent to the strand wires A passing therethrough, being that position where the looping pins are enabled to engage the stay wires to produce the loops C which are wrapped around the strand wires A. The drum 40 is provided with a plurality of annular grooves 46 and the brackets 45 are correspondingly numbered and coincide with and extend in such grooves as shown in Figs. 1, 2 and 3, which insure that the stay sections B, when they reach the inclined surfaces of such brackets, will be discharged from such drum. The brackets 45 are further provided with the off-set portions 47 which extend part way over the wrapping heads 3, under which the looping pins 25 are projected, when such pins are moved to a position preparatory to taking up the slack for the loop in the stay wire. In other words, it is at this point that the operation of projecting the looping pins through the wrapping heads 3 and plates 21 is initiated.

In addition to the guides formed by brackets 45, which coincide with and partially overlie the wrappers of the spindles 4, I employ other guides 48, shown in full lines in Figs. 4, 5 and 6 and in dotted lines in Figs. 1, 2 and 3. The guides 48 are disposed as shown in Fig. 5, between the adjacent wrapping heads of the sets or series of coilers and have their acting ends beveled or inclined as at 49. The beveled ends 49 of the guides are disposed in the same plane and conforming to the beveled or inclined faces of the brackets 45, so that when the stay wire passes over the beveled or inclined faces of the brackets 45, they will also pass over the inclined faces 49 of the guides. The function of the guides 48 is not only to assist in the proper delivery of the stay wires on to the wrapping heads and adjacent the strand wires, but to prevent the stay wires moving forward in the direction of the drum, in which position they might prevent or interfere with the projection and operation of the looping pins.

It is the function of the looping pins after the formation of a loop, to draw it down into the recesses 23. This may be done frictionally or positively by having the ends of the pins bent. This is an old method and is not new with me.

Coöperating with the drum feed of the machine are the pivoted stay engaging arms 50 carried by the longitudinally disposed rocking rod 51. These arms operate when depressed to engage the stays and insure their discharge from the drum. The drum is provided with a series of annular grooves, not shown, but similar to those indicated as 46, through which the arms 50 pass as they are raised and lowered. The arms are raised by the stays when the finished fabric is being drawn out, as shown in Fig. 3 and are lowered through the engagement of the forward movement of fingers 52 engaging fingers 53 on the rocking shaft 51. The fingers 52 are operated by one or more levers 54 fulcrumed at 55 in brackets 56 secured to the cross frame 6^a and said lever or levers are provided with a roller 57 operating in the cam groove 58, shown in dotted lines in Figs. 1, 2 and 3, which may be formed on or made a part of one or more cam wheels on the cam shaft 20, being preferably formed on the reverse side of one or more of the

cam wheels, 33. The cam grooves 58 in which operate the rollers 57, are so arranged that the fingers 52 will be retracted as shown in Fig. 3 at the proper moment to allow the fabric to be drawn out, raising the arms 50, and subsequently and at the proper moment, the levers 54 are operated to move the fingers 52 forward, depressing or lowering the arms 50 to engage the stay, in the manner and for the purpose explained.

The levers 54 are connected in a suitable manner with presser arms 59, which are movable with the fingers 52, in guides 60. The presser arms are retracted and moved forward with the alternate operations of the levers 54, and said presser arms are each provided with a wire engaging off-set 61, which offsets move into position and overlie the stay to assist in retaining the same in proper working position.

The arms 50, fingers 53, levers 54 and presser arms 59, may or may not be used, depending of course on the character of the stay feed, but are so shown, and in a general way described, as a means to coöperate with the stay feed, to the perfect operation of the machine. It is obvious that some other form of feed might well be introduced in the machine without affecting the application of my invention thereto.

What I claim is:—

1. In a wire fabricating machine, in combination, a continuously operating coiling spindle, a wrapping head thereon having an opening therethrough, a sleeve feathered on the spindle, a pin carried by the sleeve and operable through the opening in said head, and means for intermittently sliding said sleeve on said spindle during the rotation of the latter.

2. In a wire fabricating machine, in combination, a plurality of continuously operating coiling spindles, a wrapping head on each spindle having an opening therethrough, a sleeve feathered on each spindle and carrying a pin operable through the opening in its wrapping head, separate operating means for each sleeve and pin, said operating means having a graduated relation with respect to each other, whereby the sleeves are progressively operated, and means for actuating said operating means.

3. In a wire fabricating machine, a plurality of spindles, a driving shaft, gearing between said shaft and spindles for continuously rotating the latter, a pin reciprocably carried on each spindle, a cam shaft, means for continuously operating said cam shaft, a plurality of cam wheels on said cam shaft, one for each spindle, and means for operating the pins of the respective spindles from said cam wheels.

4. In a wire fabricating machine, in combination, a plurality of spindles, a driving shaft, means for continuously operating said spindles from said shaft, a pin reciprocably carried on each spindle to rotate therewith, a cam shaft, means for operating the same, a plurality of cam wheels on the cam shaft, the successive cam wheels having their operating portions spaced at graduated intervals relatively to each other around said shaft, and means actuated by the cam wheels for operating said pins.

5. In a wire fabricating machine, in combination, a plurality of spindles through which strand wires are drawn, means for delivering stay wires upon and transversely of said spindles, guides for preventing displacement of such stay wires, pins carried by said spindles to rotate therewith and adapted to be reciprocated thereon, means for continuously operating said spindles, a plurality of cam wheels, and means operated by said cam wheels for projecting and withdrawing said pins.

6. In a wire fabricating machine, in combination, a plurality of spindles through which strand wires are drawn, means for intermittently depositing stay wires across said spindles, means for imparting continuous rotation to said spindles, reciprocable wire engaging pins carried by said spindles, a continuously driven shaft, a pin operating member for each pin carried by said shaft, said operating members being so arranged relatively to each other that the pins of the successive spindles will be projected into wire engaging position progressively, and means operated by said members for actuating said pins.

7. In a wire fabricating machine, in combination, a plurality of continuously driven spindles, a driving shaft, gearing between said shaft and said spindles, a sleeve feathered on each spindle, a wire engaging pin carried by each sleeve, a cam shaft, a plurality of cam wheels on said cam shaft, each cam wheel having a long regular groove and a short irregular groove, and a lever in operative relation with the sleeve of each spindle and having a roller movable in the grooves of each cam wheel.

8. In a wire fence machine, in combination, a plurality of coiling stems each provided with a coiler head, a collar slidable on each stem, a pin attached to each collar and operable through the coiler head, a cam lever for reciprocating each collar and pin, and a wheel having a cam groove for operating each lever.

9. In a wire fence machine, in combination, a plurality of coiling stems each provided with a coiler head, a collar slidable on each stem, a pin attached to each collar and operable through the coiler head, a cam lever for reciprocating each collar and pin, and a wheel having a cam groove for operating each lever, said cam groove having a

long regular portion to hold said pin in a retracted position and a short irregular portion to project said pin, the operating portions of said cam wheels being spaced at graduated intervals relatively to each other to operate the cam levers progressively across the machine.

10. In a wire fabricating machine, in combination, a continuously operating coiling spindle, a wrapping head thereon having an opening therethrough, a sleeve feathered on said spindle, a pin carried by said sleeve and operable through said opening in said head, and means for sliding said sleeve on said spindle to project said pin during the rotation of said spindle.

11. In a wire fabricating machine, in combination, a continuously operating coiling spindle, a wrapping head thereon having an opening therethrough, a sleeve feathered on said spindle, a pin carried by said sleeve and operable through said opening in said head, and means for reciprocating said sleeve on said spindle to project and retract said pin during the rotation of said spindle.

12. In a wire fabricating machine, in combination, a plurality of continuously operating coiler spindles, a wrapping head on each spindle and having an opening therethrough, a sleeve feathered on each spindle, a pin carried by each sleeve and operable through the opening in its wrapping head, and means to operate each sleeve to project said pin during the rotation of said spindle.

13. In a wire fabricating machine, in combination, a plurality of continuously operating coiler spindles, a wrapping head on each spindle having an opening therethrough, a sleeve feathered on each spindle, a pin carried by each sleeve and operable through the opening in its wrapping head, and means to operate each sleeve to project said pin during the rotation of said spindle, said operating means being arranged so that the sleeves are progressively operated.

14. In a wire fabricating machine, in combination, a plurality of continuously operating coiling spindles, a wrapping head on each spindle having an opening therethrough, a sleeve feathered on each spindle, a pin carried by each sleeve and operable through the opening in its wrapping head, and means for operating each sleeve to reciprocate its pin during the rotation of said spindle.

15. In a wire fabricating machine, in combination, a plurality of continuously operating coiling spindles, a wrapping head on each spindle having an opening therethrough, a sleeve feathered on each spindle, a pin carried by each sleeve and operable through the opening in its wrapping head, and means for operating each sleeve to reciprocate its pin during the rotation of said spindle, said operating means being so arranged that the sleeves are progressively operated.

16. In a wire fence machine, the combination with a coiling stem provided with a coiler head, of a collar slidable on said stem, a pin attached to said collar and operable through said coiler head, a lever for reciprocating said collar and pin, and a wheel having a cam groove for operating said lever.

17. In a wire fence machine, the combination with a coiling stem provided with a continuously rotated coiler head, a collar slidably feathered on said stem, a pin attached to said collar and operable through said coiler head, a cam lever for reciprocating said collar and pin, a cam for positively moving said collar and pin in one direction, and another cam for positively moving said collar and pin in the opposite direction.

18. In a wire fence machine, the combination with a coiling stem provided with a coiler head, of a collar slidable on said stem, a pin attached to said collar and operable through said coiler head, a lever for reciprocating said collar and pin, and a wheel having a cam groove, said cam groove having a long regular portion to hold said pin in a retracted position and a short irregular portion to project said pin.

19. In a wire fence machine, the combination with a coiling stem provided with a continuously rotated coiler head, a collar slidably feathered on said stem, a pin attached to said collar and operable through said coiler head, a lever for reciprocating said collar and pin, a cam for operating said lever to positively move said collar and pin in one direction, and another cam for operating said lever to positively move said collar and pin in the opposite direction.

20. In a wire fabricating machine, in combination, a continuously operating coiler spindle, a wrapping head thereon having an opening therethrough, a sleeve slidable on said spindle, a pin secured to said sleeve and operable through the opening in said head, and means for reciprocating said sleeve and said pin on said spindle.

21. In a wire fabricating machine, in combination, a continuously operating coiler spindle, a wrapping head thereon having an opening therethrough, a sleeve slidable on said spindle and rotating therewith, a pin secured to said sleeve and operable through the opening in said head, and means for reciprocating said sleeve and said pin on said spindle.

22. In a wire fabricating machine, in combination, a continuously operating coiling spindle, a wrapping head thereon having an

opening therethrough, a sleeve slidably feathered on said spindle, a pin secured to said sleeve and operable through the opening in said head, and means for reciprocating said sleeve and said pin on said spindle.

23. In a wire fabricating machine, in combination, a continuously operating coiling spindle, a wrapping head thereon having an opening therethrough, a sleeve slidable on said spindle, a pin secured to said sleeve and operable through said opening in said head, and means for reciprocating said pin during the rotation of said spindle.

24. In a wire fabricating machine, in combination, a support, a driving shaft disposed longitudinally on said support, a plurality of counter-shafts on said support driven from said driving shaft, a plurality of coiling spindles, said coiling spindles carrying pins, gear connections from one of said counter-shafts to continuously drive said coiling spindles, and a plurality of cam wheels on another of said counter-shafts operating to project and retract said pins during the rotation of said spindles.

25. In a wire fabricating machine, in combination, a support, a driving shaft disposed longitudinally on said support, a plurality of counter-shafts on said support driven from said driving shaft, a plurality of coiling spindles journaled in said support, each coiling spindle carrying a pin, a gear on each of said coiling spindles, a supplemental shaft in operative connection with each gear and also operatively connected with one of said counter-shafts to continuously drive said coiling spindles, a lever for each of said pins, and a cam wheel for each of said levers, said cam wheels being secured to another of said counter-shafts and operating through said levers to reciprocate said pins during the rotation of said spindles.

26. In a wire fabricating machine, in combination, a support, a driving shaft disposed longitudinally on said support, a plurality of counter-shafts on said support driven from said driving shaft, a plurality of coiling spindles journaled in said support, each coiling spindle carrying a pin, a gear on each of said coiling spindles, a supplemental shaft in operative connection with each gear and also operatively connected with one of said counter-shafts to continuously drive said coiling spindles, a lever for each of said pins, and a cam wheel for each of said levers, said cam wheels being secured to another of said counter-shafts and operating through said levers to reciprocate said pins during the rotation of said spindles, said cam wheels being arranged so as to operate said pins progressively.

27. In a wire fabricating machine, in combination, a support, a driving shaft disposed longitudinally on said support, a plurality of counter-shafts on said support driven from said driving shaft, a plurality of gear wheels on one of said counter-shafts, an auxiliary shaft operatively connected to each of said gear wheels, each of said auxiliary shafts having a gear thereon, a coiling spindle driven by each of said last mentioned gears, said coiling spindles carrying pins, a plurality of cam wheels on another of said counter-shafts, and connections between said cam wheels and said pins to reciprocate said pins during the rotation of said spindles.

28. In a wire fabricating machine, in combination, a support, a driving shaft disposed longitudinally on said support, a plurality of counter-shafts on said support driven from said driving shaft, a plurality of gear wheels on one of said counter-shafts, an auxiliary shaft operatively connected to each of said gear wheels, each of said auxiliary shafts having a gear thereon, a coiling spindle driven by each of said last mentioned gears, said coiling spindles carrying pins, a plurality of cam wheels on another of said counter-shafts, and connections between said cam wheels and said pins to reciprocate said pins during the rotation of said spindle, said cam wheels being so arranged as to operate said pins progressively.

29. In a wire fabricating machine, in combination, a support, a driving shaft disposed longitudinally on said support, a plurality of counter-shafts on said support driven from said driving shaft, a plurality of gear wheels on one of said counter-shafts, an auxiliary shaft driven by each of said gears, a coiling spindle having a gear at one of its extremities driven by each auxiliary shaft, said coiling spindles carrying pins, a cam wheel for each pin on another of said counter-shafts, and connections between each of said cam wheels and each pin whereby each pin is reciprocated.

30. In a wire fabricating machine, in combination, a support, a driving shaft disposed longitudinally on said support, a plurality of counter-shafts on said support driven from said driving shaft, a plurality of coiling spindles, said coiling spindles carrying pins, gear connections from the lower one of said counter-shafts to continuously drive said coiling shafts, and a plurality of cam wheels on the upper counter-shaft having connections operating to reciprocate said pins during the rotation of said spindles.

31. In a wire fabricating machine, in combination, a rotatable spindle, a sleeve slidably carried on said spindle, a pin secured on said sleeve, a wheel having a cam groove, and a lever engaging said cam groove and said sleeve whereby said sleeve and pin are actuated by said cam groove.

32. In a wire fabricating machine, in combination, a rotatable spindle, a sleeve slid-

ably mounted on said spindle, a pin carried by said sleeve, a wheel having a cam groove, a lever engaging said sleeve, and a roller on said lever operating in said cam groove whereby said sleeve and pin are actuated from said cam groove.

33. In a wire fabricating machine, in combination, a rotatable spindle, a grooved sleeve slidably mounted on said spindle, a pin carried by said sleeve, a wheel having a cam groove therein, and a lever having a yoke engaging the groove in said sleeve, said lever also having a roller operating in said cam groove.

34. In a wire fabricating machine, in combination, a rotatable spindle, a sleeve slidably feathered on said spindle, said sleeve being grooved, a wheel having a cam groove therein, and a lever having a yoke engaging said groove in said sleeve, said lever also operating in said cam groove, whereby said sleeve and pin are actuated by said cam groove.

35. In a wire fabricating machine, in combination, a support including a table having openings therein, rotatable spindles having wrapping heads disposed in said openings, said wrapping heads having openings therethrough, a sleeve slidably feathered on each spindle, a pin carried by each sleeve and adapted to be projected through the opening in its wrapping head, a wheel for each spindle having a cam groove therein, a lever for each spindle pivoted beneath said table and engaging said sleeve at one end and having a roller operating in said cam groove at the other end, whereby said pins are actuated by said cam wheels, and means for rotating said spindles.

36. In a wire fabricating machine, in combination, a spindle, means for continuously rotating said spindle, a pin carried by said spindle to rotate therewith, said pin being positioned without said spindle, and means for intermittently projecting and retracting said pin during the rotation of said spindle.

37. In a wire fabricating machine, in combination, a plurality of spindles, means for continuously rotating said spindles, a pin carried by each spindle to rotate therewith, said pins being positioned without said spindles, and means for projecting and retracting the pins of the successive spindles in succession.

38. In a wire fabricating machine, in combination, a plurality of spindles, means for continuously rotating said spindles, a pin carried by each spindle to rotate therewith, each pin being positioned without its spindle, and means for reciprocating said pins during the rotation of their spindles, said means being arranged to operate said pins successively.

39. In a wire fabricating machine, in combination, a spindle, means for continuously rotating said spindle, a pin carried by said spindle to rotate therewith, said pin being positioned without said spindle, and means for projecting said pin.

40. In a wire fabricating machine, in combination, a spindle, means for continuously rotating said spindle, a pin carried by said spindle to rotate therewith, said pin being positioned without said spindle, and means for projecting said pin during the rotation of said spindle.

41. In a wire fabricating machine, in combination, a spindle, means for continuously rotating said spindle, a pin carried by said spindle to rotate therewith, said pin being positioned without said spindle, and means for reciprocating said pin.

42. In a wire fabricating machine, in combination, a plurality of spindles, means for continuously rotating said spindles, a pin carried by each spindle to rotate therewith, said pins being positioned without said spindles, and separate means for projecting each pin during the rotation of its spindle.

43. In a wire fabricating machine, in combination, a plurality of spindles, means for continuously rotating said spindles, a pin carried by each spindle to rotate therewith, said pins being positioned without said spindles, and separate means for projecting and retracting each pin during the rotation of its spindle.

In testimony whereof I affix my signature, in presence of two witnesses.

CHARLES H. HAISLEY.

Witnesses:
HARRY E. HARTMAN,
O. L. BARBER.