(No Model.) 4 Sheets—Sheet 1.

W. M. HUNT.

AUTOMATIC MACHINE FOR INSERTING AND LOOPING WIRE IN PACKAGES OF PAPER.

No. 457,351. Patented Aug. 11, 1891.

FIG. 1.

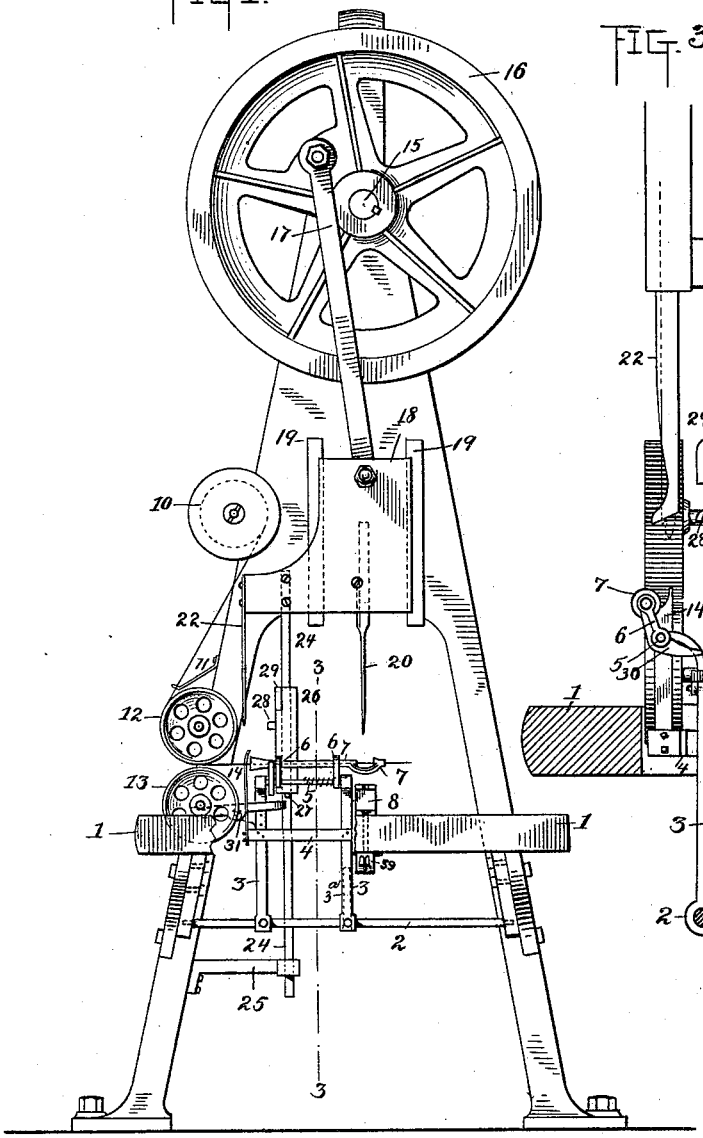


FIG. 3.

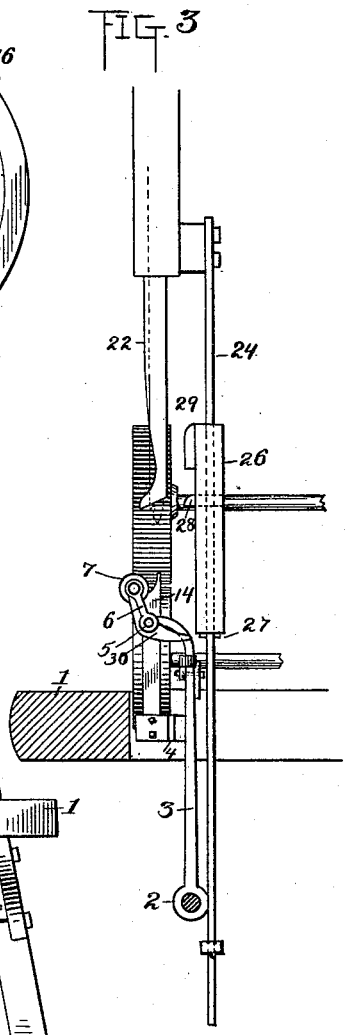
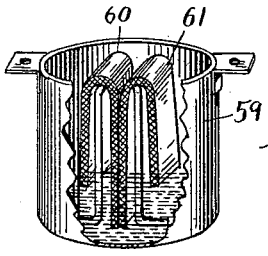


FIG. 19.



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W. Hyer

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D. H. Driscoll

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(No Model.) 4 Sheets—Sheet 2.

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AUTOMATIC MACHINE FOR INSERTING AND LOOPING WIRE IN PACKAGES OF PAPER.

No. 457,351. Patented Aug. 11, 1891.

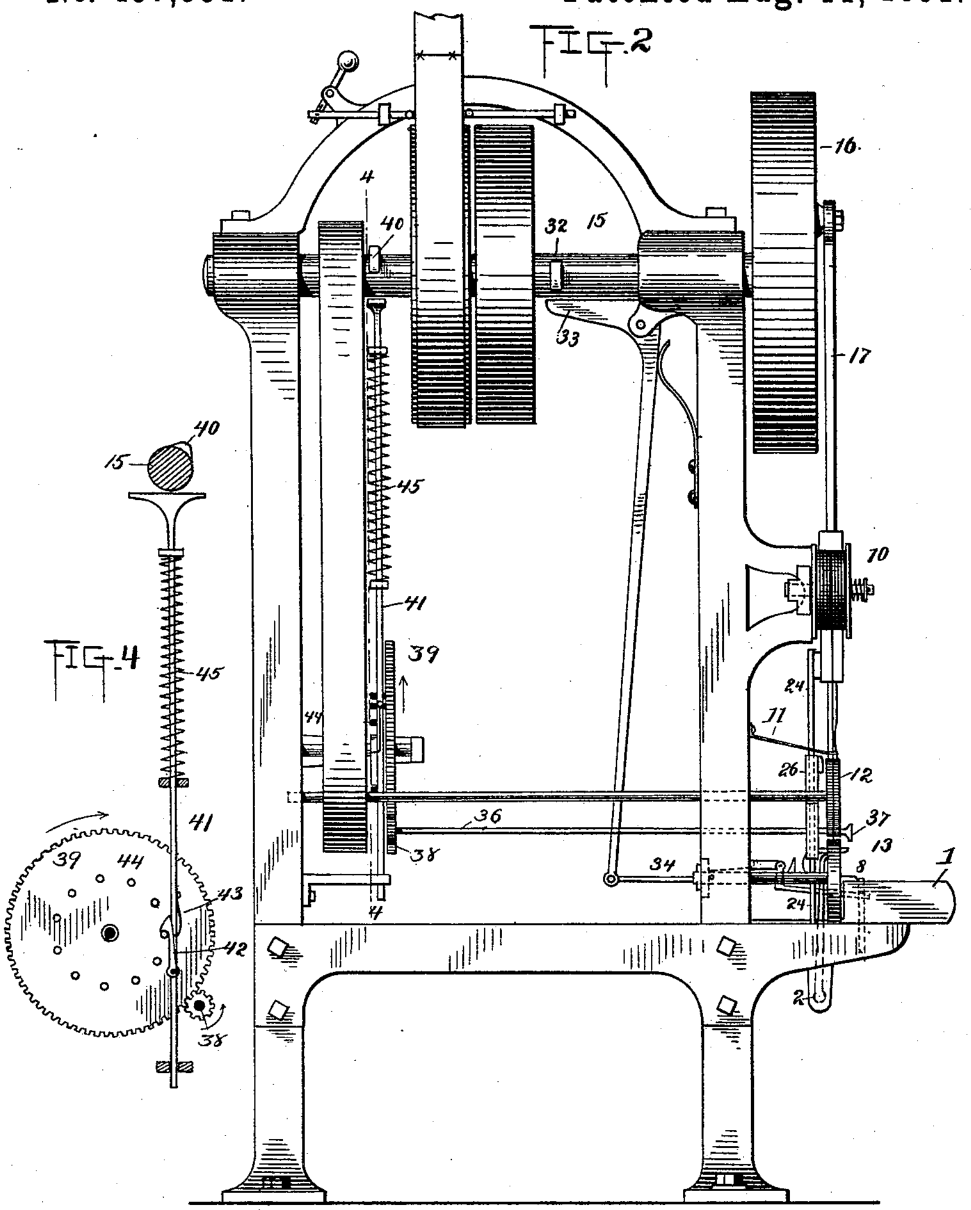

FIG. 2

FIG. 4

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(No Model.) 4 Sheets—Sheet 3.

W. M. HUNT.

AUTOMATIC MACHINE FOR INSERTING AND LOOPING WIRE IN PACKAGES OF PAPER.

No. 457,351. Patented Aug. 11, 1891.

FIG. 5.

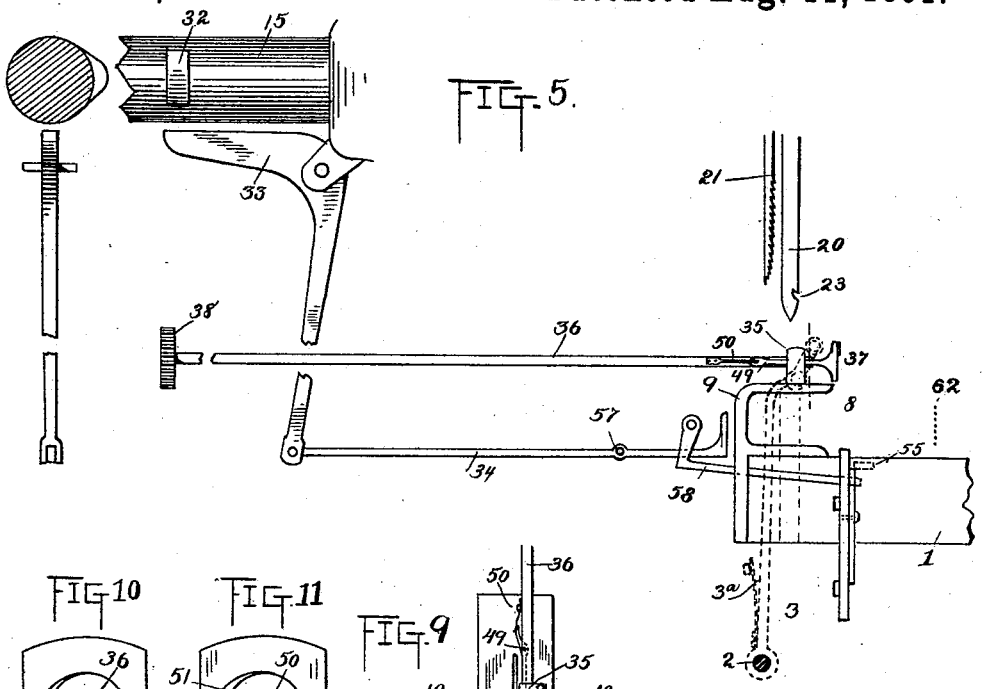


FIG. 10

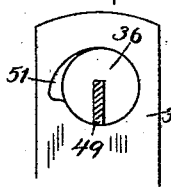


FIG. 11

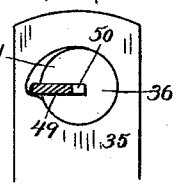


FIG. 9

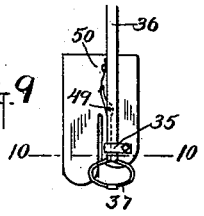


FIG. 14.

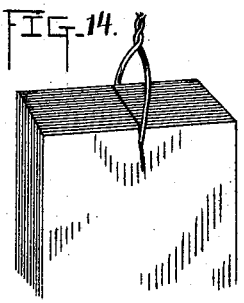


FIG. 6

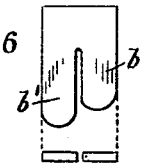


FIG. 8

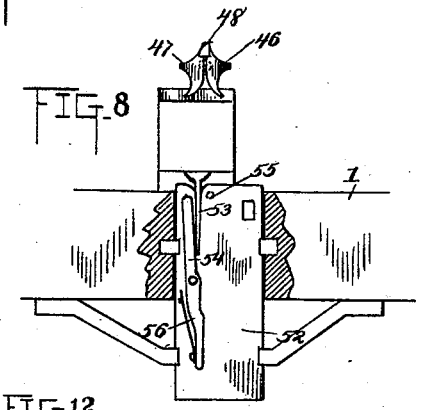


FIG. 7

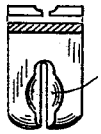


FIG. 12

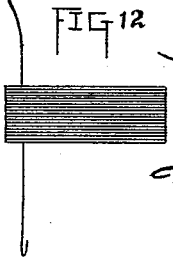
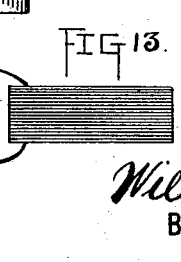


FIG. 13.



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(No Model.) 4 Sheets—Sheet 4.

W. M. HUNT.

AUTOMATIC MACHINE FOR INSERTING AND LOOPING WIRE IN PACKAGES OF PAPER.

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FIG 17

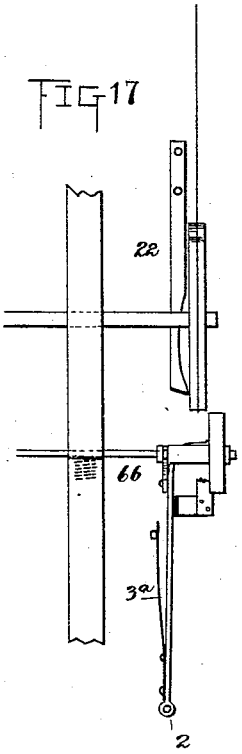


FIG 16.

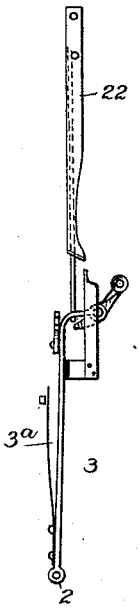


FIG 15

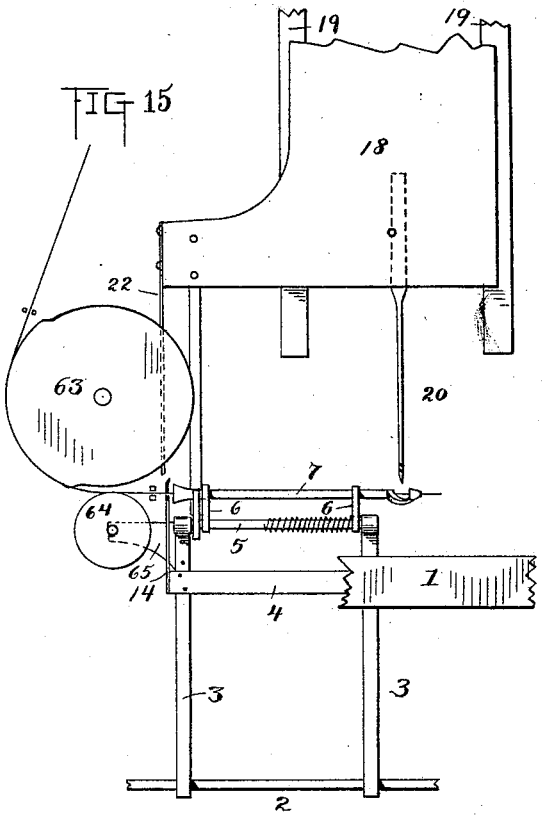
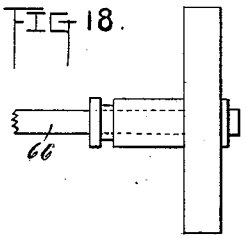


FIG 18.



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UNITED STATES PATENT OFFICE.

WILLIS M. HUNT, OF GLEN GARDNER, NEW JERSEY; KATE T. HUNT ADMINISTRATRIX OF SAID WILLIS M. HUNT, DECEASED.

AUTOMATIC MACHINE FOR INSERTING AND LOOPING WIRE IN PACKAGES OF PAPER.

SPECIFICATION forming part of Letters Patent No. 457,351, dated August 11, 1891.

Application filed January 25, 1890. Serial No. 338,149. (No model.)

To all whom it may concern:

Be it known that I, WILLIS M. HUNT, a citizen of the United States, residing at Glen Gardner, in the State of New Jersey, have invented a new and useful Automatic Machine for Inserting and Looping Wire in Packages of Paper, of which the following is a specification.

The main object of my invention is to produce a machine which will automatically perform the successive steps necessary to provide a package of paper with a wire loop.

A further object of my invention is to provide mechanism such that the package being wired will receive a slit adjacent to the wire, so that each of the sheets of the package, however irregularly their edges may be arranged, may be pulled off with equal facility.

A further object of my invention is to provide mechanism to throw certain of the working parts out of operation when there is no package in place to be operated upon.

A further object of my invention is to provide mechanism for cutting off the wire from the main supply when the determined length has been fed to the needle.

Further objects of my invention will appear in the subjoined description, and will be more particularly pointed out in the claims.

In the accompanying drawings, forming a part of this specification, Figure 1 is a front elevation of a machine embodying my invention with certain of the parts omitted, so that the others may be more clearly seen. Fig. 2 is a side elevation of the machine shown in Fig. 1 with certain additional parts. Fig. 3 is an enlarged sectional elevation on the line 3 3 of Fig. 1. Fig. 4 is an elevation in detail taken on the line 4 4 of Fig. 2. Fig. 5 is a detail view showing the operating parts of the twisting or knotting mechanism, with the position of other parts indicated for clearness. Fig. 6 is a plan of the upper plate of the package-receiver. Fig. 7 is a plan view of the upper surface of the lower plate of the package-receiver. Fig. 8 is an enlarged elevation, partly in section, of the gripping and twisting jaws of the machine. Fig. 9 is a plan view of the twister-head, showing its relation to the upper plate of the package-receiver. Figs. 10 and 11 are cross-sections through the line 10 10 of Fig. 9, showing the parts in different positions. Fig. 12 is a view showing the position of the wire before the package of paper has been pushed out of the jaws of the receiver. Fig. 13 is position of wire immediately after. Fig. 14 shows the condition of the package of paper when the operations are completed. Figs. 15, 16, 17, and 18 are detail views of a modification for feeding the wire intermittently. Fig. 19 is a partly-sectional view of the oil-can for the needle.

In the drawings, 1 is the operating table or platform of the machine. Below this table or platform is supported a cross-shaft 2, upon which is pivotally mounted the upright arms 3 3, braced by the cross-piece 4 and carrying at their upper ends a shaft 5, upon which are pivotally mounted uprights 6 6, carrying a tubular wire-guide 7, having a bell-mouth at the end at which the wire enters and an eye at the other end leaving the wire bare, so as to be caught in the hooked eye of the needle. Suitable slots are formed in the operating table or platform to permit of the movement of the parts carried by the pivotally-mounted uprights 3 3. Rigidly attached to the table is the package-carrier 8, arranged in such position thereon that its back plate 9 (shown in Fig. 5) will be adjacent to and in the rear of the foremost position of the uprights 3 3, which position is shown in dotted lines in said figure, in which the spring 3^a tends to maintain them, so that when the package of paper to be operated on is inserted in the jaws of the receiver and carried to the back plate 9 thereof the uprights 3 3 and parts carried thereby will be swung into an operating position, it of course being understood that the width of the back plate 9 of the receiver is less than the width of the package, so that the package will project beyond said back plate and strike one of the uprights 3 3.

The construction of the plates or jaws of the receiver is as follows: The plates are slotted to permit the needle to pass through the package held between them. The upper plate is provided with a short finger *b* and a long one *b'*, as shown in Fig. 6, the object of which arrangement is to avoid interference between the wire being inserted and the new

one being supplied, the short finger permitting the wire to bend out of the way readily. The lower plate is countersunk, as shown at *c*, Fig. 7, around the slot on the upper side of the plate. The object of this is to prevent the needle from choking as it passes through the paper, the recess formed permitting the paper to yield freely and lessen the resistance to the passage of the needle.

The supply of wire is carried by a reel 10, suitably supported on the frame of the machine. The supply end of the wire is carried from the reel downward and through the guide-piece 11, thence between a milled roller 12 and an idler-roller 13, over the top of the knife-blade 14, and thence into the wire-guide 7. The operation of feeding the wire is an intermittent one in operation only when the idler-roller 13 is in contact with the milled roller 12, this contact being regulated as hereinafter described.

The main shaft 15 carries a fast and loose pulley and belt-shifter, as shown, and also a fly-wheel 16, to which is attached by a wrist-pin the connecting-rod 17, which reciprocates the sliding head 18, suitable guides for which are provided on the frame of the machine. This head 18 in front elevation is somewhat L-shaped, as shown in Fig. 1, and carries the needle 20, the shape of which is shown in side elevation in Fig. 5, and behind the needle and in line therewith is a saw or cutter 21. The upper cutting-blade 22 of the wire-cutting knife is also carried by this head. When the head descends, the wire is hooked into the eye of the needle, and at the moment that occurs the cutting-knife operates to cut the wire from the main supply, thus leaving for the package a length of wire of about the same length as the wire carrier or guide 7. The head 18 carries a rod 24, which at its lower end works in a guide 25. On this rod 24 slides a block 26, supported thereon by the pin 27. This block carries the wipers 28 and 29. When the head 18 descends, the wiper 28 strikes the inner end of the elbow-lever 30, pivoted to the cross-shaft 5 and in contact at its upper end with the wire-carrier 7, and carries the wire-carrier into position, so that the wire carried by it will enter the eye of the needle as the needle passes downward. The descent of the block 26 is not stopped by the contact of the wiper 28 with the elbow-lever 30, but continues until finally the wiper 29 rests on the incurved end of the lever 31, suitably pivoted at about its middle upon a pivot which rocks with the uprights 3 3, thus lifting the idler-roller 13. The weight of the block 26 is sufficient to raise the idler into frictional contact with the continuously-rotating milled roller. The block 26 remains on the end of the lever 31 a regulated length of time sufficient to feed the required quantity of wire into the wire-carrier 7, the further downward movement of the head 18 being permitted by reason of the sliding connection between the rod 24 and block 26. On the upward movement of the rod 24 when the pin 27 comes in contact with the block 26 that block will be carried upward and the idler-roller will fall away from the roller 12, the feed of the wire cease, and the elbow-lever 30 give way before the wiper 28 as it ascends.

The looping and twisting mechanism will now be described. Upon the main shaft 15 is located a wiper 32, in the path of which is the short arm of the elbow-lever 33, pivotally supported from the frame of the machine. The long arm of this elbow-lever is connected to the rod 34, the head of which is arranged adjacent to the back plate of the package-receiver, so that when the rod is moved forward it will push the package a proper distance from the receiver—say to dotted lines 60. Upon the top plate of the package-receiver a bearing 35 for the shaft 36 of the knotter-head 37, Fig. 5, is located. This shaft 36 carries a pinion 38 at its end, which meshes with a gear 39, operated from the shaft 15 as follows: A wiper 40 is carried by the shaft 15 in position at proper intervals to contact with and depress the rod 41, which is suitably guided in its reciprocating motion. Near its lower end this rod 41 carries a pawl 42, which is held by a spring 43 in position to engage with pins 44 on the back of the gear 39. Therefore when the rod 41 is depressed the pawl will cause the gear to turn and then rotate the shaft 36. A spring 45 coiled about the rod 41 retracts it to position to be operated upon again on the next revolution of the driving-shaft.

The knotter-head 37 has a stationary jaw 46 and a movable jaw 47, between which the ends of the wire are grasped and clamped during the twisting operation. A piece 48 is placed on the stationary jaw 46 in position to prevent the ends of the wire from passing entirely over between the jaws. The movement of the jaw 47 is effected by means of a rod 49, connected to it and pivoted on shaft 36, the rod having a tail upon which acts a spring 50. This rod 49 is flat or oblong in cross-section and is loosely inserted into a correspondingly-shaped recess in the shaft 36. The bearing 35 is provided with a cam-shaped recess 51, Figs. 10 and 11, the end enlargement of which is sufficient to permit the jaws 46 and 47 being opened sufficiently to take in the ends of the wire, the opening of said jaws being effected when the shaft 36 in its revolution brings the rod 49 opposite the extension of the cam-opening, when the spring 50 will project that rod out, as shown in Fig. 11, thereby separating the jaws.

Supported in suitable slideways on the frame is the lower gripper 52, located beyond the outer edge of the knotter-head. This gripper 52 is provided with a slot 53, within which the lower end of the wire inserted through the package of paper has entered. 54 is a lever pivoted on the gripper 52, so that one end of it will be capable of movement across the slot 53, one side of this lever being

irregular or cam-shaped, and a pin 55 on the frame of the machine, the position of which is indicated in dotted lines in Fig. 8, coming in contact with this cam-shaped portion of the rod 54 causes its upper end to move across the slot 53 and grip both ends of the wire at the moment the gripper 52 has ascended to the knotter-head. A spring 56 retracts the rod to its original position after it has descended below the pin 55. This gripper 52 is raised to position with the wire which it carries by a pin 57, projecting from the pusher 34, coming in contact with a pivoted elbow-lever 58, which carries the sliding gripper.

Below the package-receiver in the path of the needle is located an oil-cup 59. (Shown enlarged in Fig. 19.) This oil-cup is provided with two wicks 60 and 61, supported on upright spring-strips, one end of each wick dipping into the oil contained in the cup. The needle descends between the wicks and is oiled without waste and in a cleanly manner, whereby its efficiency is increased.

In Figs. 15, 16, 17, and 18 I have shown a modified form of device for intermittently feeding the wire. Instead of raising and forcing an idler-pulley into contact with a driven pulley, I provide a cam-shaped fast pulley 63 and an idler-pulley 64, carried by brackets 65 on the rocking frame. When this frame is rocked into operative position, the pulley 64 is carried beneath the pulley 63, sliding on its shaft 66, so that it will be in position to grip the wire between it and the rise of the cam on pulley 63, and thereby feed the same, these operations occurring at determined periods. To effect a yielding contact between the feed-pulleys, I provide a spring-bearing 67 for the shaft 66, as shown.

The operation of the machine is as follows: Assuming that a sufficient length of wire to form the loop for a single package of paper is in position and that the other parts are in position ready to receive the package when the package is inserted into the jaws of the receiver 8 and pushed into contact with the back plate thereof, the uprights 3 3 and the mechanism supported by them will be rocked into position to bring the elbow-lever 30 into the path of the wiper 28. The head 18 then descending causes the wiper 28 to strike the elbow-lever 30 and rock the wire-carrier into position at the moment the needle descends, so that the wire will be hooked into its eye. The needle and knife-blade 22 being nearly of the same length and descending together at the moment the wire begins to be forced toward the package of paper, the knife-blades act to cut the necessary length of wire. The head 18 still descending carries the block 26 until it finally strikes the lever 31 and lifts the idler-roller 13 into contact with the roller 12 and begins to feed an additional supply of wire and continues until the block 26 is raised on the ascent of the head 18. After the wire has been forced through the package being operated on the package is then in the condition shown in Fig. 12. The cam or wiper 32 then strikes the lever 33 and causes the pusher to eject the package from the jaws of the receiver. During this outward movement of the package the wire is bent into the shape shown in Fig. 13, with its lower end in the slot 53 and the other in the knotter-head 37. The wire is, however, simply in the slit 53 between the jaws and is not gripped thereby. When the wire is in this position, the cam or wiper 40 operates through the rod 41 and its connection to revolve the shaft 36, which carries the revolving gripper-head. Before the shaft 36 has started to revolve, however, the gripper 52 has carried up its end of the wire and the package and inserted the wire between the jaws of the knotter-head. The shaft 36 now begins to revolve, and the wires being held stationary by the gripper 52 a few revolutions of the knotter-head completely and firmly twist the ends. At the same time that the needle was puncturing the package the saw-blade 21 was making the slot in the ends of the sheets of the package, (shown in Fig. 14, which also shows the condition of the completed package.)

What I claim is—

1. The combination, with a reciprocating needle and mechanism for operating the same, of wire-feeding mechanism, and a movable wire-guide and a package-receiver, the back plate of which is adjacent to and in advance of said movable wire-guide, whereby by the insertion of the package the wire-guide is moved to the operative position, substantially as set forth.

2. The combination, with a reciprocating needle and mechanism for operating the same, of wire-feeding mechanism, a movable wire-guide, the back plate of which is adjacent to and in advance of said movable wire-guide, whereby by the insertion of the package the wire-guide is moved to the operative position, and a spring for returning said wire-guide from the operative position, substantially as set forth.

3. The combination, with a reciprocating needle and mechanism for operating the same, of intermittently-operating wire-feeding mechanism, a wire-cutter, a movable wire-guide, and a package-receiver, the back plate of which is adjacent to and in advance of said movable wire-guide, whereby by the insertion of the package the wire-guide is moved to the operative position, substantially as set forth.

4. The combination, with a reciprocating carrier and needle carried thereby, of wire guiding and feeding mechanism and a slotted package-receiver, substantially as set forth.

5. The combination, with a reciprocating carrier and needle carried thereby, of intermittent wire-feeding mechanism and a cutter mechanism operated by said carrier, substantially as set forth.

6. The combination, with a reciprocating

carrier and needle carried thereby, of a saw blade or cutter also carried by said carrier adjacent to said needle, and wire-feeding mechanism, substantially as set forth.

7. The combination, with a reciprocating carrier and needle carried thereby, of a wire-carrier frame, and coacting mechanism on said reciprocating carrier and wire-carrier frame to bring the wire-carrier into the path of the eye of the needle, substantially as set forth.

8. The combination, with a reciprocating carrier and needle carried thereby, of a rocking wire-carrier frame, a pivotally-mounted wire-guide thereon, and mechanism for throwing said wire-carrier frame and wire-guide out of the path of the needle when a package is not in place, substantially as set forth.

9. The combination, with a reciprocating carrier and needle carried thereby, of a slotted package-receiver, and an oil-receptacle arranged below said package-receiver in the path of the needle, substantially as set forth.

10. In a knotter-head having a stationary and a movable jaw, the combination, with the shaft thereof, of a pivoted lever carrying the movable jaw, said lever being recessed in the shaft of said knotter-head, a cam-bearing for said shaft, and a spring-bearing on the tail of the pivoted lever, substantially as set forth.

11. The combination, with a rocking frame, of a wire carrier or guide supported thereon, a package-receiver, the back plate of which is adjacent to and in advance of said frame, a reciprocating needle adapted to carry wire through the package, and a cutter for cutting the wire into lengths, substantially as set forth.

12. The combination, in an oil-cup, of upright spring-strips and wicks arranged thereon, substantially as set forth.

13. The combination, in a package-receiver for a wire-looping machine, of slotted upper and lower plates, the upper plate having one finger longer than the other, substantially as set forth.

14. The combination, in a package-receiver for a wire-looping machine, of slotted upper and lower plates, the lower plate being countersunk, substantially as set forth.

This specification signed and witnessed this 11th day of January, 1890.

WILLIS M. HUNT.

Witnesses:
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