

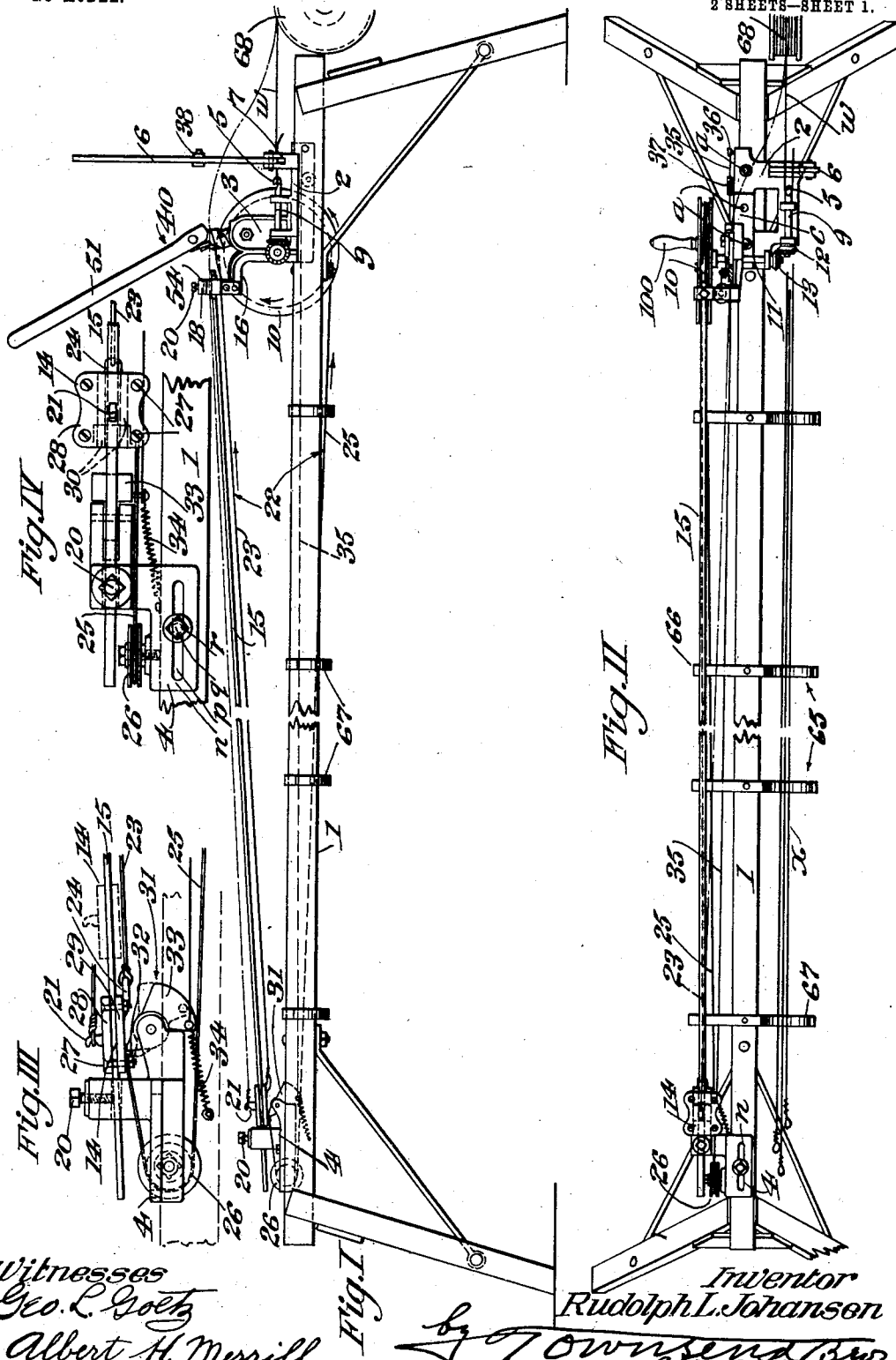
No. 761,231.

PATENTED MAY 31, 1904.

R. L. JOHANSEN.
BALE TIE MACHINE.
APPLICATION FILED MAY 7, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



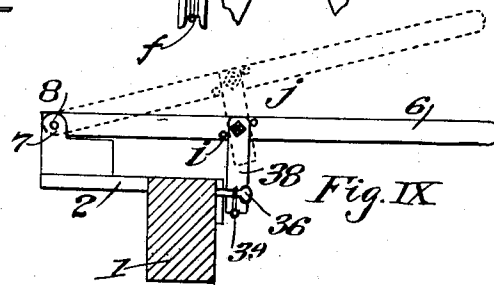
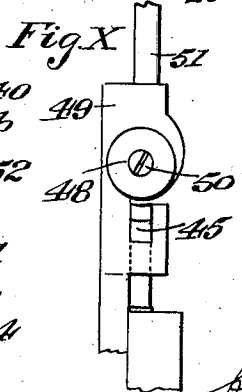
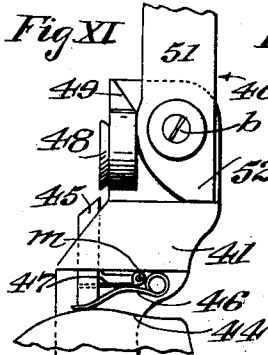
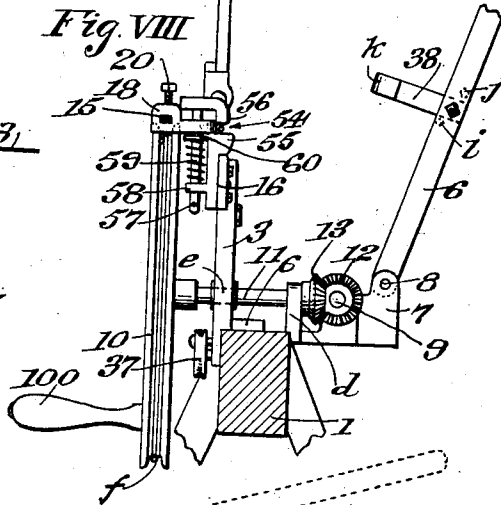
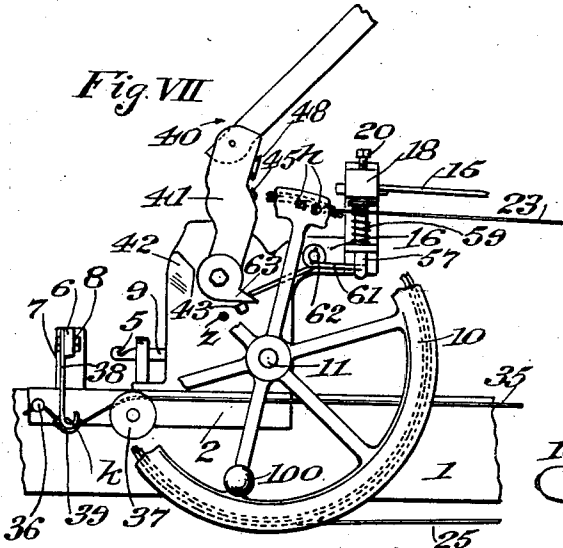
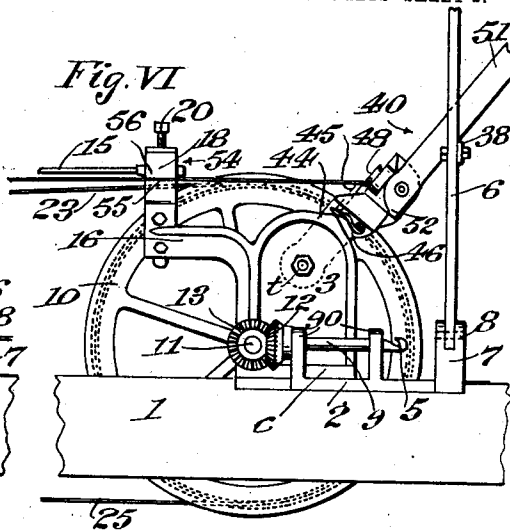
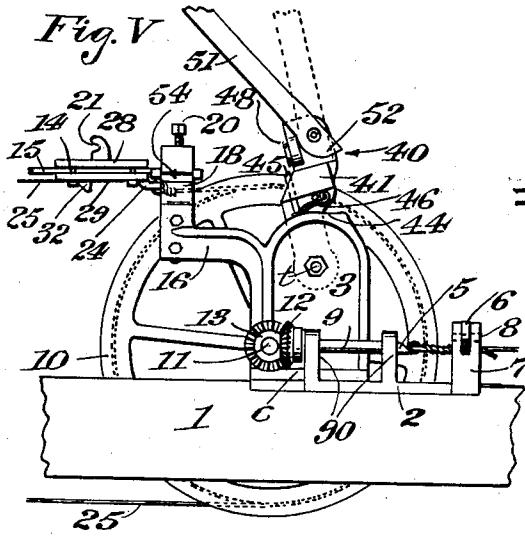
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NO MODEL.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

RUDOLPH L. JOHANSEN, OF LOS ANGELES, CALIFORNIA.

BALE-TIE MACHINE.

SPECIFICATION forming part of Letters Patent No. 761,231, dated May 31, 1904.

Application filed May 7, 1903. Serial No. 155,991. (No model.)

To all whom it may concern:

Be it known that I, RUDOLPH L. JOHANSEN, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Bale-Tie Maker, of which the following is a specification.

This invention relates to a machine for making metallic ties for use in baling hay, cotton, and the like.

An object of the invention is to provide an improved apparatus for making bale-ties, in which straightening, measuring, cutting, and eye-forming mechanism will all be combined in one cheap, simple, and durable machine, capable of easy manual operation.

With these and other ends in view the invention consists, broadly, in supporting means upon which is mounted a combined wire-cutting and wire-straightening lever, tie-measuring and eye-forming mechanism. The wire-straightening and tie-measuring mechanism includes a reciprocating carrier adapted to detachably hold the end of a wire and means for holding said carrier against the pull of the straightening-lever.

More specifically, my invention relates to the construction and combination of parts illustrated in the accompanying drawings, in which—

Figure I is a side elevation of the complete machine, a section of the middle portion thereof being omitted to contract the view. Fig. II is a plan view of Fig. I. Fig. III is a side elevation of a portion of the wire-straightening and tie-measuring mechanism. Fig. IV is a plan view of the parts shown in Fig. III. Fig. V is a fragmental side elevation of the machine, showing only a section of the frame and omitting a portion of the wire-straightening and tie-measuring mechanism. Fig. VI is a view similar to Fig. V, showing the position of the parts at a more advanced stage of the operation. Fig. VII is a view of the parts shown in Fig. V from the reverse side of the machine. Parts are broken away to contract the view and show underlying parts. Fig. VIII is an end view of the parts shown in Figs. V, VI, and VII. Fig. IX is a view of a portion of the eye-forming mechanism.

Figs. X and XI are detail views of the wire-cutting knives and adjacent parts.

Referring in detail to the drawings, the mechanism of the device may be mounted on supporting means, consisting of an elongated frame 1, furnished at the forward end with a base-plate 2 and a standard 3 and at the rear end with a longitudinally-adjustable bracket 4. Base-plate 2 is preferably set into a recess in the frame, as shown, and fastened therein by bolts *a*. Standard 3 may also be secured on the top of the base-plate by means of screws or bolts *a*, inserted through holes in a flange *c*, which extends laterally from the base of said standard 3.

5 is a rearwardly-opening twisting-hook with which the eye-forming mechanism is provided. Loop-holding lever 6 cooperates with said hook and is mounted upon a pedestal 7, to which said lever is pivoted at 8. The mechanism for rotating the twisting-hook comprises a twisting-shaft 9, mounted in bearings 90 and driven by the crank-wheel 10 through the crank-wheel shaft 11 and beveled gears 12 and 13, fixed, respectively, to the twisting-shaft 9 and the crank-wheel shaft 11. Said shaft 11 is provided with bearings *d* and *e*, carried, respectively, by the base-plate 2 and standard 3.

100 designates the crank for driving crank-wheel 10.

14 designates a forwardly and rearwardly reciprocating carrier on a track 15. Said track is preferably composed of an angular bar fastened at the forward end to an extension 18, carried by an arm 16, with which standard 3 is furnished. A hole through extension 18 receives the forward end of the track, and the rear end of said track may likewise be mounted on bracket 4 after being inserted into a hole therethrough. 20 designates set-screws for removably holding said track in place. The carrier 14 is furnished with means adapted to detachably hold a wire, which may consist of an upwardly-projecting and rearwardly-opening wire-holding member or hook 21. The parts are so adjusted with relation to each other that when the crank is rotated anticlockwise the carrier returns from its rearmost position to the forward end of the ma-

chine by the time the eye-forming mechanism has completed the twisting of the loop to form the eye. The means for operating the carrier consists of flexible connecting means 22, formed in two sections, which wind upon crank-wheel 10 in reverse directions. The shorter section 23 directly connects the carrier with the top of the crank-wheel, said crank-wheel being provided with a peripheral groove *f*. The other end of connection 23 may be tied to an eyepiece 24, fastened to the carrier. The carrier is moved rearwardly by means of the section 25 of the connection which runs from the carrier to the lower side of the crank-wheel and is of more than double the length of the travel of the carrier. Said connection 25 is led from the lower side of the crank-wheel back around a pulley 26 at the rear end of the frame and then brought forward over the pulley and fastened to the rear end of the carrier in any convenient way, as by being tied to one of the bolts 27, by which the upper and lower plates 28 and 29, respectively, of which the carrier is composed are fastened together.

h designates holes leading from the base of groove *f*, through which the connections may be run and fastened therein by tying knots in their end.

Crank-wheel 10 is adjacent to the eye-forming mechanism so that the loop-holding lever 6 and crank 100 are both within easy reach of the operator. The axis of the crank-wheel lies at substantially right angles to the track 15, upon which carrier 14 moves, so that the connections running from the carrier to the wheel will operate properly. The forward end of track 15 is preferably adjacent to the top of the crank-wheel, and a portion of the length of each section of the flexible connection equal in length to the travel of the carrier is adapted to be wound upon and unwound from the crank-wheel, so as to fully reciprocate the carrier between the crank-wheel and carrier-catch.

30 designates parallel ribs which may extend from the lower side of plate 28 to form a way through the carrier adapted to fit the track 15. A carrier-catch 31 is adapted to engage a lug 32, projecting from the lower side of the carrier. Said catch 31 is actuated by the combined action of a weight 33 and a spring 34, the main object of the spring being to prevent a rebound of the catch.

35 is a catch-releasing cord fastened at the forward end of the frame to a pin 36 and provided with a roller 37 near said pin. Said roller engages the lower side of said cord just forward of the path of pendent arm 38, with which the loop-holding lever 6 is provided. The pendent arm 38 is preferably limited in its pivotal movement by stops *i* and *j*, which prevent said arm from being swung into an inoperative position.

39 is a protecting rubber sleeve for catch-

releasing cord 35. The free end of arm 38 is curved backward at *k* to form a suitable surface for engaging said sleeve 39 when the lower end of said arm is brought down upon the portion of the cord between the roller 37 and pin 36 to operate the carriage-catch. The object of pivoting arm 38 is to allow the free end thereof to move directly down upon the cord instead of describing an arc.

The combined wire-stretching and wire-cutting mechanism consists of a jointed lever 40, provided with a base 41. Said base 41 is pivoted to standard 3 at *t* and limited in its movement thereon by a lug 42 and an adjustable stop 43. *z* designates a threaded hole into which said stop may be screwed to allow jointed lever 40 a longer throw.

Standard 3 is provided on its upper side with a cam-face 44, adapted to actuate a sliding knife 45.

46 designates an arm or leaf-spring fastened to the pivoted base 41 and having the upper side of its free end engaging the base of the sliding knife, the under side of its free end engaging said cam-face, as best shown in Fig. XI. The sliding knife 45 may be provided with a spring 47, coiled around a pin *m* to hold said knife yieldingly against the upper side of arm 46 or directly against the cam-face if said arm is not used.

48 is a washer-shaped knife having a circular cutting edge adapted to cooperate with the upper end of sliding knife 45. Said circular knife 48 may be attached to a flange 49 by a screw 50, which arrangement provides means for circumferentially adjusting the knife.

51 is a lever or arm pivotally attached at *l* to the base 41 and provided with a wire-gripping heel 52.

It will be seen that the carrier 14 moves outwardly along the track 15 from the stretching mechanism carried by lever 40 and returns toward said mechanism along the same path. Hence the location of carrier-catch 31 in the path of the carrier and at the outward limit of the travel thereof enables said catch to engage the carrier directly, and consequently firmly resist the strain of the stretching mechanism.

54 is a wire-holding clamp located materially distant from the vertical plane in which the carrier moves and between the wire-stretching mechanism and the before-described means for holding the wire against the strain of said mechanism. 55 designates the lower jaw of said clamp, and 56 the upper jaw, said upper jaw being carried by a vertical rod 57, sliding through holes through extension 18 and lug 58.

59 is a spring coiled around rod 57 and pressing against the collar 60, thereby to raise said rod and automatically release and open the clamp.

61 is a spring or resilient lever pivoted at 62 and secured at one end to rod 57, the other

end being in operative engagement with a part or tappet 63, carried by pivoted base 41.

The parts operatively connected with the clamp are so adjusted that when pivoted base 41 is in its normal or rearward position (shown in Fig. VIII) spiral spring 59 is allowed to close the clamp. When, however, the base is moved forward, tappet 63, carried thereby, engages the forward end of lever 61, and thereby swings the rear end of said lever downward and yieldingly holds the clamp in closed position.

The means for receiving the bale-ties when completed preferably consist of a series of brackets 65, provided with shanks 66 and broad tie-receiving hooks 67, said hooks being on the same side of track 15 with clamp 54, said clamp being materially distant from the vertical plane of track 15.

68 designates a supply-reel of wire from which the ties may be made.

w designates the section of the wire out of which a tie is about to be made, and *x* a bunch of completed ties held by the tie-receiving hooks.

Bracket 4 is provided with a slotted base *n*, having a slot *p* and adjusting-bolt *q* and nut *r*. Said bracket may be adjusted to form ties of different lengths, the carriage-track, carriage-operating connections, and cord for releasing the carriage-catch being adjusted to correspond. Another advantage of the adjustable bracket is that it provides convenient means for taking up slack in the carriage-operating connections.

Operation: Assuming the operating parts of the device to be in the position shown in Fig. I, with the arm 51 and the pivoted base 41 of the jointed lever in their rearmost positions and the carrier retained in its rearward position by the catch-carrier 31, the operator will fold back the free end of the wire on the reel and will then hook the fold or loop thus formed onto twisting-hook 21. Loop-holding lever 26 will now be brought down, causing the lower end of pendent arm 31 to press upon sleeve 39, and thereby pull the cord 35, operating catch 31 and releasing the carrier. Next the crank-wheel is rotated, so as to move carrier 31 forward in the direction indicated by the upper arrows in Fig. I. While the carrier is moving to the forward end of the track, the twisting-loop is simultaneously operated through its connections with the crank-wheel, and an eye is thus formed. When the carrier reaches the forward end of its track and is stopped by coming up against clamp 54 the operator unhooks the eyeleted end of the wire from the twisting-hook and hooks it onto upright hook 21, carried by the carrier. Now the crank-wheel is rotated in the reverse direction, that indicated by the two lower arrows in Fig. I, and through connection 25 the carrier is moved from the forward position (shown in Fig. V) to the rear-

ward end of its track, thus unreeling the wire and measuring off a portion of the length thereof sufficient to make a tie. When the carrier has reached its rearmost position, it is retained by the automatic carrier-catch 31, and the wire is passed between the open jaws of clamp 54 and underneath the heel 52 of arm 51. Said arm 51 is now moved forward, the initial movement thereof gripping the wire between heel 52 and base 41. Continued forward movement of arm 51 carries with it base 41, thus stretching and straightening the wire. As said base 41 moves forward cam-face 44 raises sliding knife 45, causing said knife to approach circular knife 48 and sever the wire. As said base 41 approaches the part of its movement at which the wire is severed, tappet 63 engages spring-lever 61, and thereby lifts rod 57, causing the clamp to yieldingly grip the wire. When the wire is completely severed, yielding clamp 54 keeps it from being jerked rearwardly by the recoil, and jointed lever 40 is swung back to its initial position, thereby releasing the clamp, and the wire in the completed bale-tie being slightly elastic will recoil sufficiently to release its eyeleted end from the shallow hook 21. The completed bale-tie will then fall onto or toward the hooks 67.

In Figs. I and II a broken line indicates the wire when in position to be stretched and straightened between the carriage and jointed operating-lever.

It is to be understood that this invention is not limited to the exact construction described, but that many mechanical equivalents may be substituted for the elements herein specified and many alterations may be made in the construction described without departing from the spirit of the invention.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. In a bale-tie maker, supporting means, eye-forming mechanism, a reciprocatory carrier adapted to detachably hold a wire, and stationary means at the outward limit of the path of said carrier adapted to hold said carrier from returning.

2. In a bale-tie maker, supporting means, eye-forming mechanism, a reciprocatory carrier adapted to detachably hold a wire, a carrier-catch in the path of said carrier, and means for simultaneously operating said eye-forming mechanism and moving said carrier.

3. In a bale-tie maker, supporting means, rotary eye-forming mechanism, a reciprocatory carrier, a carrier-catch in the path of said carrier, a wheel, means for simultaneously rotating said wheel and eye-forming mechanism, and a flexible connection operatively connecting said wheel with said carrier.

4. In a bale-tie maker, supporting means, eye-forming mechanism, a reciprocatory carrier, a carrier-catch in the path of said carrier, a crank-wheel adjacent to said eye-forming

mechanism and operatively connected therewith, a flexible connection operatively connecting said wheel with said carrier, and a track for said carrier, one end of said track being adjacent said wheel.

5 5. In a bale-tie maker, supporting means, an eye-forming twister at one end of said supporting means, a wheel adjacent said twister and provided with means for being manually
10 rotated, a gearing connecting said wheel with said twister, a track extending longitudinally of said supporting means, a reciprocatory carrier mounted on said track and provided with wire-holding means, a flexible connection operatively connecting said wheel with said carrier, and a carrier-catch.

6. In a bale-tie maker, a frame, an eye-forming twister at one end of said frame, a wheel adjacent said twister and provided with means
20 for being manually rotated, a bevel-gearing connecting said wheel with said twister, a track extending longitudinally of said frame and at right angles to the axis of said wheel, a reciprocatory carrier mounted on said track and provided with wire-holding means, a flexible connection operatively connecting said wheel with said carrier to reciprocate the same, and a catch to prevent the premature return of the carrier.

30 7. In a bale-tie maker, supporting means, a reciprocatory carrier, a carrier-catch adapted to directly engage said carrier, a track for said carrier, a rotatable wheel at one end of said track and having its axis at substantially right
35 angles thereto, a pulley at the other end of said track, and flexible connecting means operatively connecting said wheel and carrier, a section of said means extending around said pulley.

40 8. In a bale-tie maker, a reciprocatory carrier, a carrier-catch adapted to directly engage said carrier, a rotatable wheel having its axis at substantially right angles to the path of the carrier, said carrier reciprocating between
45 said wheel and catch, a pulley beyond the catch, and a flexible connection, one section of said connection running direct from the carrier to the wheel, the other section of said connection running from the wheel around
50 said pulley and back to the carrier.

9. In a bale-tie maker, supporting means, a reciprocatory carrier, a carrier-catch, a rotatable wheel having its axis at substantially right angles to the path of the carrier, said carrier
55 reciprocating between said wheel and catch, a pulley beyond the catch, and a flexible connection, one section of said connection running direct from the carrier to the wheel, the other section of said connection running from
60 the wheel around the pulley and back to the carrier, said last-named section being of a length more than double the travel of the carrier and a portion thereof equal in length to the travel of the carrier adapted to be wound
65 upon said wheel.

10. In a bale-tie maker, supporting means, a reciprocatory carrier, a carrier-catch, a rotatable wheel having its axis at substantially right angles to the path of the carrier, said wheel having a peripheral groove, said carrier reciprocating between said wheel and catch, a pulley beyond the catch, a flexible connection running direct from the carrier to the wheel, said connection being made fast to the wheel and adapted to be wound therearound, and a second flexible connection made fast to the wheel and led therearound in the reverse direction to and around the pulley and back to the carrier, said connections both being made fast to the carrier.

11. In a bale-tie maker, supporting means, a reciprocatory carrier, a carrier-catch, a rotatable wheel having its axis at substantially right angles to the path of the carrier, said wheel having a peripheral groove and a perforated line-fastening portion adjacent said groove, said carrier reciprocating between said wheel and catch, a pulley beyond the catch, a flexible connection running direct from the carrier to the wheel, said connection being made fast to the wheel and adapted to be wound therearound, and a second flexible connection made fast to the wheel and led therearound in the reverse direction to and around the pulley and back to the carrier, said connections both being made fast to the carrier.

12. In a bale-tie maker, supporting means, a reciprocatory carrier, an automatic carrier-catch, a rotatable wheel having its axis at substantially right angles to the path of the carrier, said carrier reciprocating between said wheel and catch, a cooperating weight and spring to actuate said catch, and a flexible connection operatively connecting said wheel and carrier.

13. In a bale-tie maker, supporting means, a reciprocatory carrier, a track for said carrier, a carrier-catch at one end of said track, a rotatable wheel at the other end of said track, and having its axis at substantially right angles thereto, a flexible connection operatively connecting said wheel and carrier, a wire-holding clamp near the wheel and materially distant from the vertical plane in which said track extends, and tie-receiving means on the same side of the track as said wire-holding clamp.

14. In a bale-tie maker, supporting means, a reciprocatory carrier, a track for said carrier, a carrier-catch at one end of said track, a rotatable wheel at the other end of said track and having its axis at substantially right angles thereto, said track being inclined downwardly from the wheel to the catch, a flexible connection operatively connecting said wheel and carrier, a wire-holding clamp near the wheel and materially distant from the vertical plane in which said track extends, and tie-receiving means on the same side of the track as said wire-holding clamp.

15. In a bale-tie maker, supporting means, a reciprocatory carrier, a track for said carrier, a carrier-catch at one end of said track, a rotatable wheel at the other end of said track and having its axis at substantially right angles thereto, a flexible connection operatively connecting said wheel and carrier, a wire-holding clamp near the wheel and materially distant from the vertical plane in which said track extends, and a series of tie-receiving brackets on the same side of the track as said wire-holding clamp.

16. In a device of the class described, combined cutting and stretching mechanism, means adapted to hold wire against the strain of said mechanism, and a clamp adapted to grip the wire between said means and the cutting portion of said mechanism.

17. In a device of the class described, combined cutting and stretching mechanism, means for holding the wire against the strain of said mechanism, a clamp adapted to grip the wire between said means and the cutting portion of said mechanism, and clamp-actuating means operatively connected with said mechanism.

18. In a device of the class described, combined wire cutting and stretching mechanism, means for holding the wire against the strain of said mechanism, an automatically-releasing clamp adapted to grip the wire between said means and the cutting portion of said mechanism, and clamp-actuating means operatively connected with said mechanism.

19. In a device of the class described, combined wire cutting and stretching mechanism, means for holding the wire against the strain of said mechanism, a clamp adapted to grip the wire between said means and the cutting portion of said mechanism, automatic clamp-releasing means adapted to yieldingly hold said clamp released, and means for actuating the clamp and operatively connected with said mechanism.

20. In a device of the class described, combined wire cutting and stretching mechanism, means for holding the wire against the strain of said mechanism, a clamp adapted to grip the wire between said means and the cutting portion of said mechanism, and resilient means operatively connecting said clamp and mechanism.

21. In a device of the class described, combined wire cutting and stretching mechanism, means for holding the wire against the strain of said mechanism, a clamp adapted to grip the wire between said means and the cutting portion of said mechanism, a spring yieldingly holding said clamp open, and resilient means operatively connecting said clamp and mechanism.

22. In a device of the class described, combined wire cutting and stretching mechanism, means for holding the wire against the strain of said mechanism, a clamp between said means

and mechanism, and a pivoted spring operatively connecting said clamp and mechanism.

23. In a device of the class described, combined wire cutting and stretching mechanism, means for holding the wire against the strain of said mechanism, a clamp between said means and mechanism, a spring yieldingly holding said clamp open, and a pivoted spring operatively connecting said clamp and mechanism.

24. In a device of the class described, combined wire cutting and stretching mechanism, means for holding the wire against the strain of said mechanism, a clamp adapted to grip the wire between said means and the cutting portion of said mechanism, and a pivoted lever having one end connected with the clamp and the other end lying in the path of a part operatively connected with said mechanism.

25. In a device of the class described, combined wire cutting and stretching mechanism, means for holding the wire against the strain of said mechanism, a clamp adapted to grip the wire between said means and the cutting portion of said mechanism, and a pivoted resilient member having one end connected with the clamp and the other end lying in the path of a part operatively connected with said mechanism.

26. In a device of the class described, supporting means, a pivoted hand-lever, wire-stretching means operated by said lever, wire-cutting means carried by said lever, wire-holding means for holding said wire against the strain of said stretching means, a clamp adapted to grip the wire between the holding means and cutting means, and means operatively connecting the lever and clamp.

27. In a device of the class described, supporting means, a standard mounted thereon, a jointed lever comprising a base pivoted to said standard and an arm pivoted to said base, said arm having a heel adapted to cooperate with the base to grip the wire, and means holding the wire against the pull of the lever.

28. In a device of the class described, supporting means, a standard mounted thereon, a jointed lever comprising a base pivoted to said standard and an arm pivoted to said base and having a limited movement with relation thereto, said arm having a heel adapted to cooperate with the base to grip the wire, an adjustable stop on the standard and limiting the movement of the base, and means holding the wire against the pull of the lever.

29. In a device of the class described, supporting means, a standard mounted thereon, a jointed lever comprising a base pivoted to said standard and an arm pivoted to said base, said arm having a heel adapted to cooperate with the base to grip the wire when stretched, wire-holding means holding the wire against the pull of the lever, and a clamp between said means and lever, said clamp being operatively connected with said lever.

30. In a device of the class described, a

frame, a standard mounted thereon and provided with a cam-face, a lever pivoted to said standard, and cooperating wire-cutting members carried by said lever, one of said members adapted to be moved with relation to said lever by said cam-face.

31. In a device of the class described, a frame, a standard mounted thereon and provided with a cam-face, a lever pivoted to said standard, and cooperating wire-cutting members carried by said lever, one of said members adapted to be moved with relation to said lever by said cam-face, the other member having a circular wire-cutting edge and circumferentially adjustable.

32. In a device of the class described, a frame, a standard mounted thereon, a lever pivoted to said standard, a circumferentially-adjustable member carried by said lever and having a circular wire-cutting edge, a second wire-cutting member adapted to cooperate with the first-named member, and means for relatively moving said second member toward and from the other member.

33. In a device of the class described, a frame, a standard mounted thereon and provided with a cam-face, a lever pivoted to said standard, a part movable with relation to said lever and carried thereby in engagement with said cam-face, and cooperating wire-cutting members carried by said lever, one of said members operatively engaging said part.

34. In a device of the class described, a frame, a standard mounted thereon and provided with a cam-face, a lever pivoted to said standard, a part movable with relation to said lever and carried thereby in engagement with said cam-face, cooperating wire-cutting members carried by said lever, and a spring yieldingly holding one of said members against said part.

35. In a device of the class described, a frame, a standard mounted thereon and provided with a cam-face, a lever pivoted to said standard, a resilient arm carried by said lever in engagement with said cam-face, and cooperating wire-cutting members carried by said lever, one of said members operatively engaging said arm.

36. In a device of the class described, a frame, a standard mounted thereon and provided with a cam-face, a lever pivoted to said standard, a resilient arm carried by said lever in engagement with said cam-face, cooperating wire-cutting members carried by said lever, and a spring yieldingly holding one of said members against said arm.

37. In a device of the class described, a frame, a standard mounted thereon and provided with a cam-face, a jointed lever comprising a base pivoted to said standard, and an arm pivoted to said base, cooperating wire-cutting members carried by said base, one of said members adapted to be moved with relation to the base by said cam-face, said arm

having a heel adapted to cooperate with the base to grip the wire when stretched, and means holding the wire against the pull of said lever.

38. In a device of the class described, a frame, a standard mounted thereon and provided with a cam-face, a jointed lever comprising a base pivoted to said standard and an arm pivoted to said base, a part movable with relation to said base and carried thereby in engagement with said cam-face, and cooperating wire-cutting members carried by said base, one of said members operatively engaging said part.

39. In a device of the class described, a frame, a standard mounted thereon and provided with a cam-face, a jointed lever comprising a base pivoted to said standard, and an arm pivoted to said base, a resilient arm carried by said base in engagement with said cam-face, and cooperating wire-cutting members carried by said base, one of said members engaging said resilient arm.

40. In a device of the class described, supporting means, a reciprocatory carrier, means for reciprocating said carrier, a carrier-catch, twisting mechanism, a loop-holding lever, and catch-releasing means adapted to be operated by said lever.

41. In a device of the class described, supporting means, a reciprocatory carrier, means for reciprocating said carrier, a carrier-catch, twisting mechanism, a loop-holding lever, and a catch-releasing cord adapted to be operated by said lever.

42. In a device of the class described, supporting means, a reciprocatory carrier, means for reciprocating said carrier, a carrier-catch, twisting mechanism, a loop-holding lever provided with a pendent arm, and a catch-releasing cord adapted to be operated by said arm.

43. In a device of the class described, a frame, a reciprocatory carrier, means for reciprocating said carrier, a carrier-catch, twisting mechanism, a loop-holding lever provided with a pendent arm, a catch-releasing cord in the path of said arm, and a rotary support for said cord adjacent the path of the arm.

44. In a bale-tie maker, supporting means, eye-forming mechanism, a carrier reciprocating toward and from said mechanism and adapted to detachably hold a wire, and means engaging said carrier at the rearward limit of its travel to prevent the premature return thereof.

45. In a device of the class described, supporting means, a rearwardly-opening twisting-hook at the forward end of said means, loop-holding means, a forwardly and rearwardly reciprocating carrier provided with a wire-receiving hook, a crank-wheel, means operatively connecting said crank-wheel and twisting-hook, and a flexible connection operatively connecting said crank-wheel and carrier.

46. In a device of the class described, supporting means, a rearwardly-opening twisting-hook at the forward end of said means, loop-holding means, a forwardly and rearwardly reciprocating carrier provided with a wire-receiving hook, a crank-wheel, means operatively connecting said crank-wheel and twisting-hook, a flexible connection operatively connecting said crank-wheel and carrier, a carrier-catch at the rear end of the frame, and catch-releasing means.

47. In a device of the class described, a frame, a rearwardly-opening twisting-hook at the forward end of the frame, loop-holding means, a forwardly and rearwardly reciprocating carrier provided with a wire-receiving hook, a crank-wheel, means operatively connecting said crank-wheel and twisting-hook, a flexible connection operatively connecting said crank-wheel and carrier, a carrier-catch at the rear end of the frame, and catch-releasing means operatively connected with the loop-holding means.

48. In a bale-tie maker, supporting means, stretching mechanism, a carrier, a track extending from said mechanism, means for reciprocating said carrier along said track, and a stop limiting the outward movement of said carrier along said track.

49. In a bale-tie maker, supporting means, stretching mechanism, a carrier, a track extending from said mechanism, means for reciprocating said carrier along said track, a stop limiting the outward movement of said carrier along said track, and a catch adapted to retain said carrier at the outward limit of its travel.

50. In a bale-tie maker, supporting means, stretching mechanism, a reciprocatory carrier traveling toward and from said mechanism along the same path, and stationary means for holding said carrier against returning, said holding means being at the outward limit of the path of said carrier.

51. In a bale-tie maker, supporting means, stretching mechanism, a track extending from said mechanism, a carrier adapted to travel along said track, means for moving said car-

rier outwardly upon said track and returning it thereupon in the same path, and a catch for holding said carrier against returning.

52. In a device of the class described, stretching mechanism, means for holding the wire against the strain of said mechanism, a clamp between said means and mechanism, and a pivoted lever having one end connected with the clamp and the other end lying in the path of a part operatively connected with said mechanism.

53. In a device of the class described, stretching mechanism, means for holding the wire against the strain of said mechanism, a clamp between said means and mechanism, and a pivoted resilient member having one end connected with the clamp and the other end lying in the path of a part operatively connected with said mechanism.

54. In a bale-tie maker, supporting means including an elongated frame, an eye-forming twister at one end of said frame, a wheel adjacent said twister and provided with means for being manually rotated, a gearing operatively connecting said wheel and twister, a track extending longitudinally of the frame, a reciprocatory carrier mounted on said track and provided with a wire-holding hook, a flexible connection operatively connecting said wheel with said carrier, an automatic catch adapted to retain said carrier at the rearward limit of its travel, a loop-holding device, catch-releasing means for the carriage-catch and operated by said loop-holding device, combined wire-cutting and wire-stretching mechanism, and a wire-holding clamp operatively connected with said combined cutting and stretching mechanism.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, at Los Angeles, in the county of Los Angeles and State of California, this 30th day of April, 1903.

RUDOLPH L. JOHANSEN.

Witnesses:

ALBERT H. MERRILL,
JULIA TOWNSEND.