Draftsman.

No. 827,700. PATENTED AUG. 7, 1906.

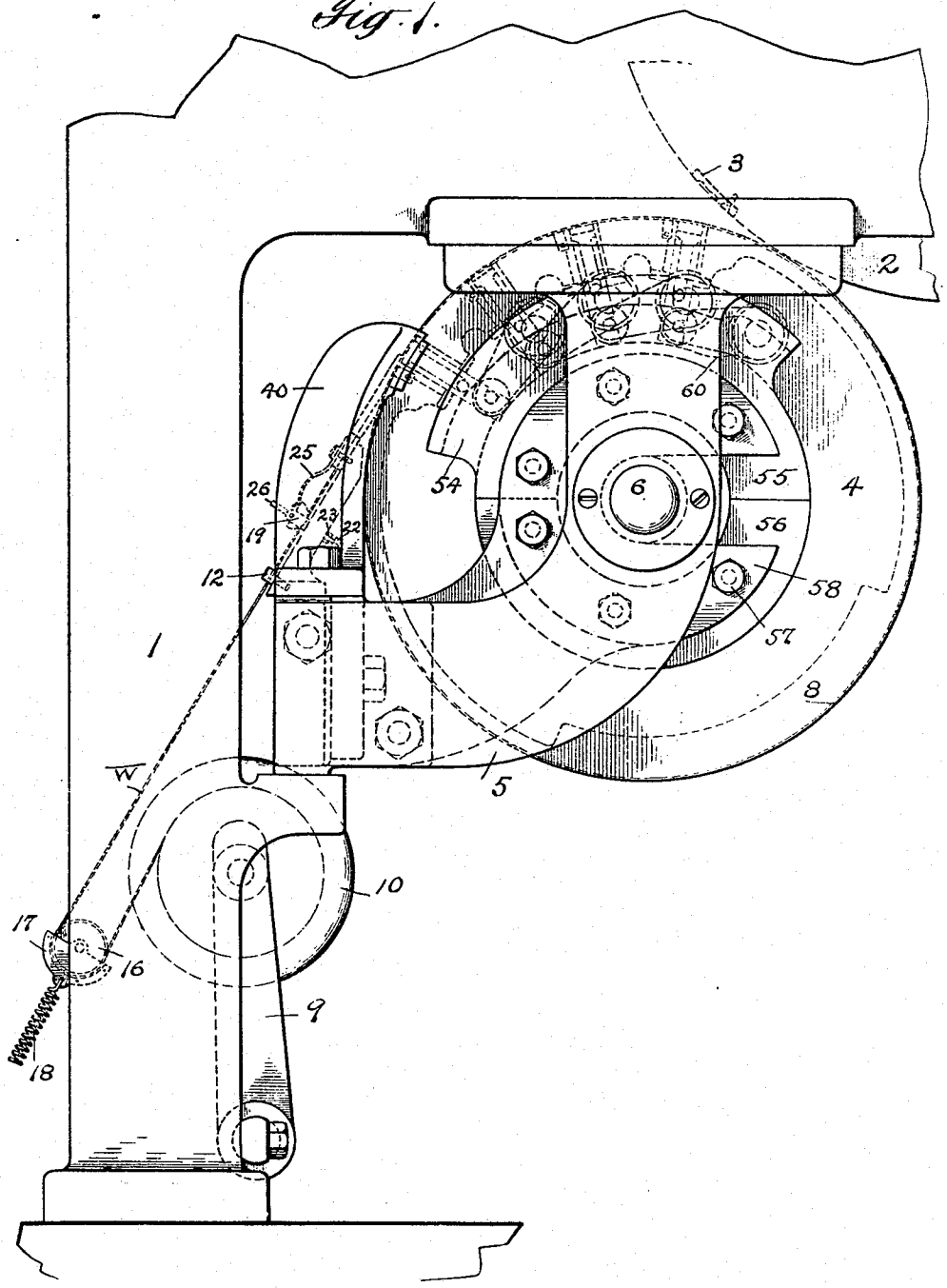
J. C. F. BALZE.

STAPLING MECHANISM.

APPLICATION FILED MAY 10, 1904.

5 SHEETS—SHEET 1.

Fig. 1.



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Burton & Kennedy

THE NORRIS PETERS CO., WASHINGTON, D. C.

1. NAILING AND STAPLING,
Staple Forming and Setting.
Draftsman.

No. 827,700. PATENTED AUG. 7, 1906.

J. C. F. BALZE.

STAPLING MECHANISM.

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5 SHEETS—SHEET 2.

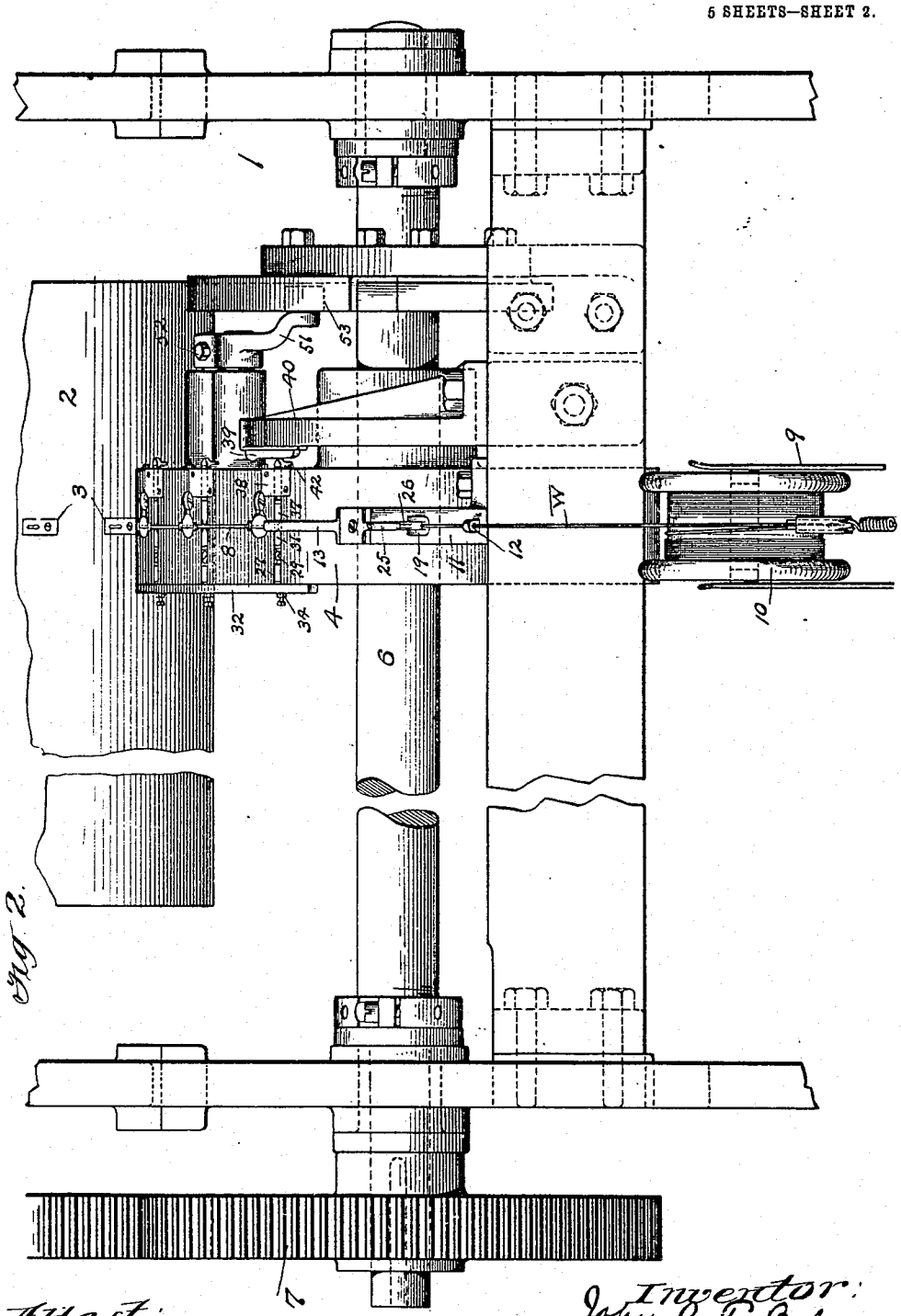


Fig 2.

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THE NORRIS PETERS CO., WASHINGTON, D. C.

1. NAILING AND STAPLING,
Book
Staple Forming and Setting
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5 SHEETS—SHEET 3.

Fig. 5.

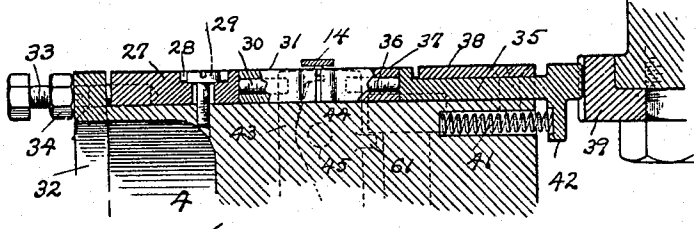


Fig. 3.

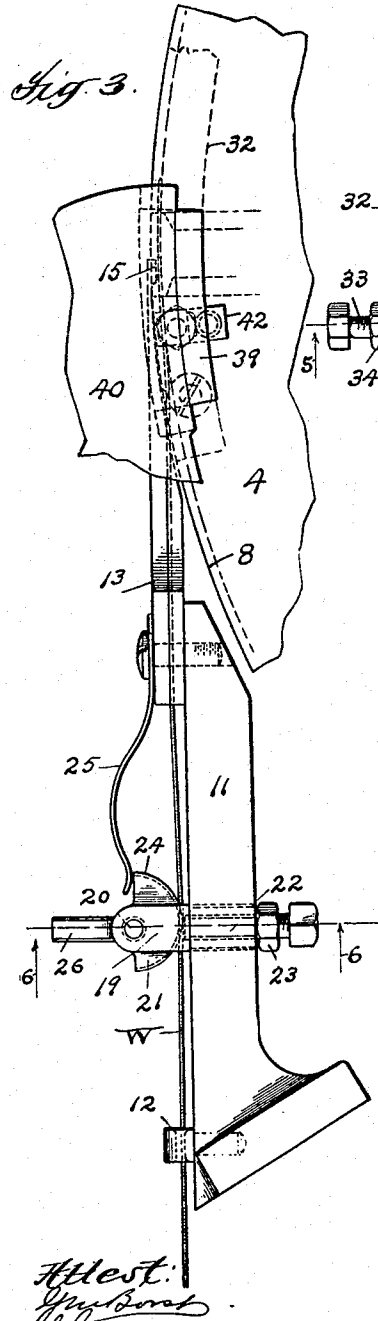


Fig. 4.

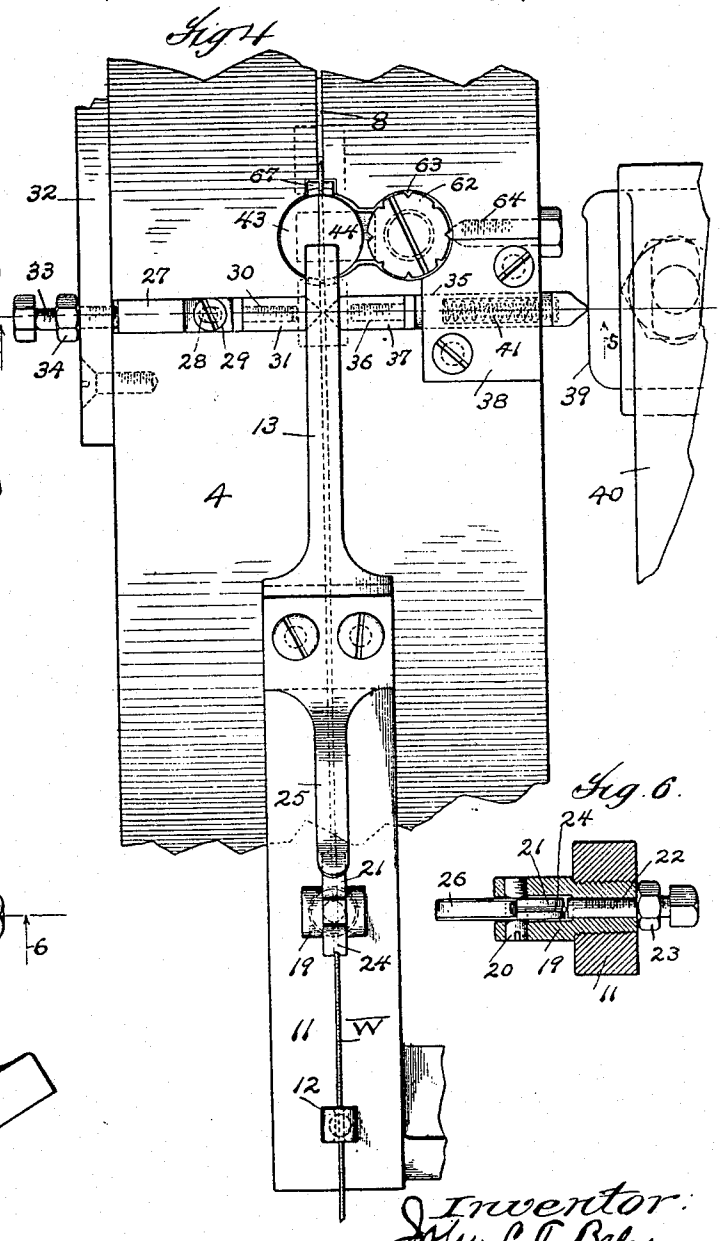


Fig. 6.

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THE NORRIS PETERS CO. WASHINGTON, D. C.

1. NAILING AND STAPLING [illegible]
Stapling and Setting.

Draftsman.

No. 827,700. PATENTED AUG. 7, 1906.

J. C. F. BALZE.

STAPLING MECHANISM.

APPLICATION FILED MAY 10, 1904.

6 SHEETS—SHEET 4.

Fig. 8.

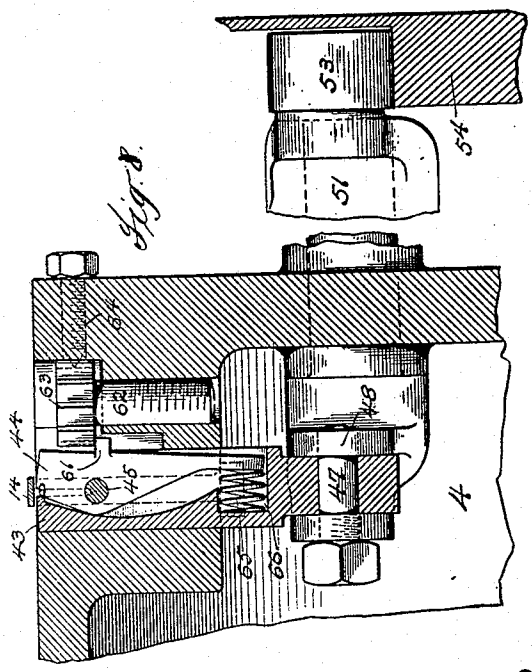


Fig. 10.

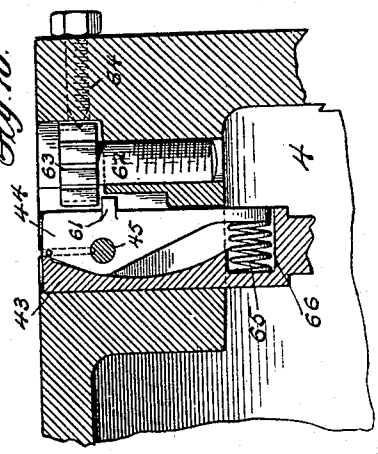


Fig. 7.

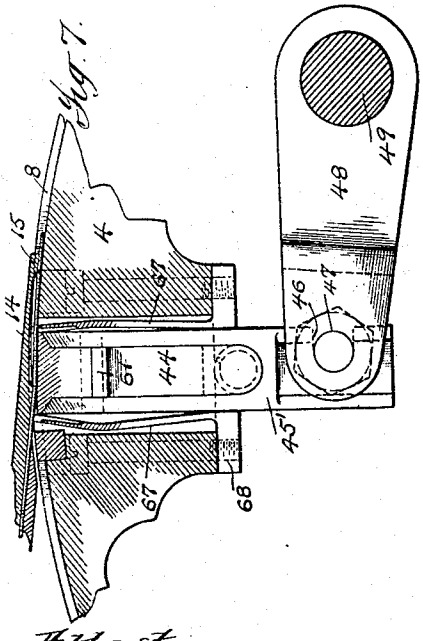
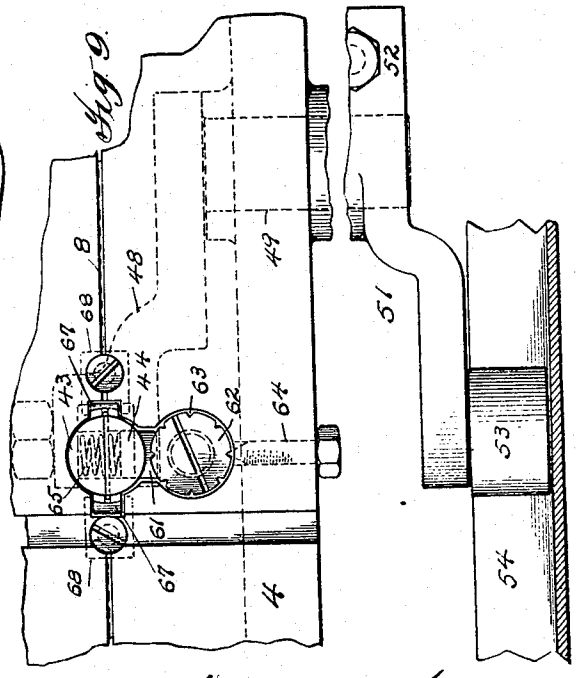


Fig. 9.



Witnesses:
[illegible]
[illegible]

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I. NAILING AND STAPLING
Reference Book
Stapling Forming and Setting.

Draftsman.

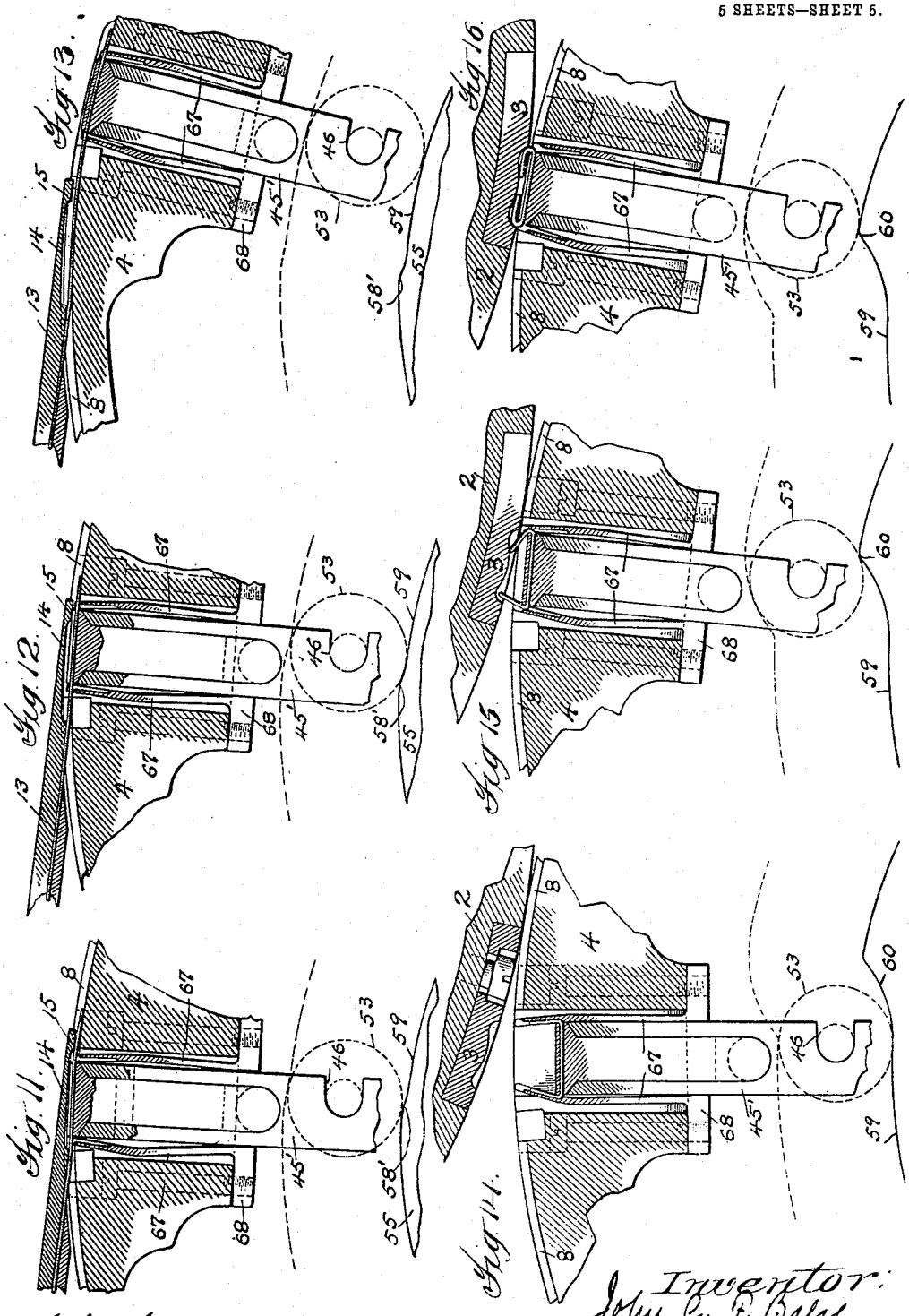
No. 827,700. PATENTED AUG. 7, 1906.

J. C. F. BALZE.

STAPLING MECHANISM.

APPLICATION FILED MAY 10, 1904.

5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

JOHN C. F. BALZE, OF NEW YORK, N. Y., ASSIGNOR TO ROBERT HOE, OF NEW YORK, N. Y.

STAPLING MECHANISM.

No. 827,700. Specification of Letters Patent. Patented Aug. 7, 1906.

Application filed May 10, 1904. Serial No. 207,237.

To all whom it may concern:

Be it known that I, JOHN C. F. BALZE, a citizen of the United States, residing at New York, county of New York, and State of New York, have invented certain new and useful Improvements in Stapling Mechanisms, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to certain improvements in stapling mechanisms, and more particularly to that class of stapling mechanisms which are employed to staple the product of fast rotary printing-machines. In the mechanisms heretofore commercially employed for this purpose the stapling mechanisms have been mounted on a rotating carrier and have been arranged across the carrier, all the staples, usually three or four in number, being inserted simultaneously and the wire being fed to the stapling mechanisms from the side of the carrier or across its direction of movement. In mechanism of this sort it is apparent that the center or stapling line of the product must lie across the cylinder, this line being the line on which the product is afterward folded. The carrier on which the stapling mechanisms are mounted coöperates either with the collecting-cylinder of the printing-machine or with a cylinder mounted parallel therewith. In certain printing-machines, however, the center line of the product as it comes onto the collecting-cylinder runs around the cylinder instead of across it, and in stapling such products it is necessary that the stapling mechanisms be arranged around the cylinder and that the staples be driven successively. It has been proposed to mount the stapling mechanisms on a rotating carrier and around the same in order to staple products of this character, the wire being fed to the carrier in the direction of rotation of the carrier. In the mechanisms heretofore proposed, however, difficulty has been experienced in controlling the feed of the wire when the machines run at high speeds, so as to form staples of uniform size. Furthermore, in stapling devices heretofore constructed for stapling the product of high-speed rotary printing-machines the staples have been driven by the rolling contact between the carrier for the stapling mechanisms and the coöperating cylinder.

The present invention has for one of its objects to produce an improved stapling mechanism employing a rotating carrier around which the stapling devices are located, improved devices being provided for accurately effecting the feed of the wire.

A further object of the invention is to produce an improved stapling mechanism mounted on a rotating carrier in which the staple is inserted by a movement of the mechanism additional to and independent of the rotating movement of the carrier, whereby quicker staple-inserting action is obtained.

A further object of the invention is to generally improve the details of construction of wire-stapling mechanisms such as are employed for stapling the product of high-speed printing-machines.

With these and other objects not specifically referred to in view the invention consists in certain constructions and in certain parts, improvements, and combinations, as will be hereinafter fully described and then specifically pointed out in the claims hereunto appended.

Referring to the drawings, Figure 1 is a side elevation of so much of a stapling mechanism embodying the invention as is necessary to an understanding thereof. Fig. 2 is a front elevation of the construction shown in Fig. 1. Fig. 3 is a side elevation of a part of the wire-feeding devices. Fig. 4 is a front elevation of the construction shown in Fig. 3, this figure also showing the cutting, staple forming and inserting mechanism. Fig. 5 is a section on the line 5 5 of Fig. 4. Fig. 6 is a detail section on the line 6 6 of Fig. 3. Figs. 7 and 8 are sectional views illustrating the construction of the staple forming and inserting mechanism. Fig. 9 is a plan view of the construction shown in Fig. 7. Fig. 10 is a view illustrating the construction shown in Fig. 8 with the parts in a different position. Figs. 11, 12, 13, 14, 15, and 16 are diagrammatic views illustrating the several steps of the staple forming and inserting operation.

Referring to the drawings, which illustrate a preferred embodiment of the invention, 1 indicates a frame which is, in the present instance, a part of the frame of a printing-machine this frame being of any usual construction. In the machine selected to illustrate the invention the material to be stapled is presented to the stapling devices by the collecting-cylinder of the printing-machine, a

part of this cylinder only being shown and it being marked 2. It will be noted, however, that the material might be presented otherwise than by the collecting-cylinder, if desired. This cylinder is or may be provided with the usual clencher-blocks 3, which assist in turning in the ends of the wire.

The stapling mechanisms to be hereinafter described are mounted on a rotating carrier 4, which may be supported and operated in any desired manner. As shown, the frame is provided with curved brackets 5, in which the carrier-shaft 6 is journaled, this shaft being provided with a gear 7, which is driven by a suitable train from any suitable moving part of the machine. The carrier 4 is preferably cylindrical in outline, though it might be differently shaped, if desired, and in the best constructions is provided with a circumferential groove 8.

In the machine which has been selected to illustrate the invention the wire is fed to the carrier in the direction of the rotation of the carrier. The source of supply from which the wire is obtained may be of any suitable character. As shown, the machine is provided with arms 9, suitably supported in the frame, these arms carrying a spool or bobbin 10, on which the wire W is wound.

The means for directing the wire in the groove of the cylinder may be widely varied in form and construction. As shown, the machine is provided with a bracket 11, (see Fig. 3,) which carries an eye 12, through which the wire is led. The bracket 11 further carries a channeled guide-block 13, through which the wire is led, said block terminating at its forward end in a presser 14, which is located over the groove in the cylinder. This presser is preferably provided with a rib 15, (see Fig. 7,) which enters the groove so as to force the wire down into the bottom thereof, thus insuring that the wire is laid straight in the groove and is prevented from curling.

In the machine selected to illustrate the invention the wire is intermittently fed forward by the stapling mechanism to be hereinafter described, and in the preferred construction the wire will be held under tension. The tension device may be of any suitable character; but in the construction shown there is provided a tension-wheel 16, mounted in a curved block 17, this block being connected by a spring 18 to any suitable part of the machine-frame.

In the best constructions devices will be employed for preventing any back feed of the wire between the successive forward feeds. The means by which the prevention of back feed is effected may be of any suitable character. As shown, the bracket 11 is perforated, and in this perforation is located a threaded standard 19, this standard affording bearings for a stud 20, on which is mounted a curved block 21, the bearings for this block being eccentrically located. The standard 19 is perforated as shown, (see Fig. 6,) and in this perforation is located a hardened screw 22, this screw being adjustable by means of nuts 23 or in any other suitable manner. The face of the block 21 is preferably provided with a groove 24 for guiding the wire which passes between the block and the upper end of the screw 22. A spring 25 is or may be provided to rock the block 21 backward, so as to pinch the wire between the surface of the block and the upper face of the screw 22. It is apparent that as the wire is pulled forward the block 21 will rock, thus permitting a free passage of the wire. If, however, the wire tends to move back, the block will swing back and pinch the wire between its face and the upper end of the screw 22, thus preventing any backward movement of the wire. The block is or may be provided with an operating-handle 26, by which it may be thrown out, if desired.

In wire-stapling mechanism of this character it is desirable that the wire before a length for a staple is cut off be fed forward and brought up to the surface speed of the carrier on which the stapling mechanisms by which the staples are formed and inserted are mounted, and in the present construction this forward feed of the wire is, as has been indicated, effected by the stapling mechanism. While the stapling mechanism might include a special feeding device for this purpose, in the preferred construction the feed will be effected by one of the usual operating parts of the stapling mechanism and preferably, furthermore, by the cutting device. In the construction shown a plurality of stapling mechanisms mounted around the cylinder are employed. Each stapling mechanism includes a cutting device by which a wire length is supplied, which wire length, by the action of the staple forming and inserting mechanism, is formed into a staple and inserted in the materi[illegible]o be stapled. The particular construction of these wire-length-cutting devices may be varied within wide limits. As shown, the rotating carrier 4 is provided with a plurality of slots, of which, since in the present instance there are four stapling mechanisms, there are four slots, and in each of these slots is located a cutting device comprising a stationary member and a member which is movable to effect the cut. In the particular construction shown the stationary member of each cutting device consists of a shank 27, having a slot 28 therein, through which passes a holding-screw 29, this screw being secured in a threaded perforation in the bottom of the cylinder-groove. Each of these shanks 27 carries a threaded dowel-pin 30, on which the cutter-bar 31 is mounted. By this construction the cutter-bars can be readily removed for sharpening or

replacement when worn. The cylinder carries a curved rib 32, which is or may be secured to the cylinder by screws or in any other suitable way, and through this rib are tapped screws 33, these screws entering the threaded sockets in the shanks 27 before referred to. These screws are or may be provided, as shown, with lock-nuts 34. This screw construction enables a very fine adjustment of the cutter to be obtained. By loosening the screw 29 the cutter-shank and attached cutter may be given a movement in either direction to adjust them, after which the adjusted position is retained by screwing up the screw 29 and setting the lock-nut 34.

The movable member of the cutting device or of each cutting device when a plurality of devices are employed may be of any suitable construction. As shown, this movable member comprises a slide 35, which carries a threaded dowel-pin 36, to which the cutter 37 is secured. The surface of the cylinder is recessed somewhat, and in this recess is screwed a plate 38, which retains the slide 35 and its attached cutter in the cylinder-groove. It is apparent that by operating the slide 35 the cutter 37 will be advanced toward its companion cutter and the wire cut-off.

In the construction shown the feeding of the wire is effected by the operation of the cutters, the cutters being in the first instance given a movement which is sufficient to grip and advance the wire, but is not sufficient to cut the wire off. After this wire-advancing movement is completed and the proper length of wire is in the bite of the staple forming and inserting mechanism to be hereinafter described the cutters are then given a further operation, which completely severs the wire.

The means for operating the cutters to effect the result referred to may be varied widely. A simple and effective means, however, for accomplishing this result may be obtained from a stationary cam of proper shape which the cutters pass in succession, the cam being located so as to give the preliminary gripping movement of the cutters at the right point and the severing movement at the right point. In the construction shown such a cam as has been referred to is employed, this cam being marked 39. This cam 39 is carried on a bracket 40, which rises from the machine-frame. It will be observed that the cam is properly shaped at the end to be struck by the cutters so as to throw them into gripping engagement with the wire. The cam then has a level surface over which the end of the cutters pass, and during this time the cutters are simply held in biting or gripping engagement with the wire. The cam at its other end is given a sharp rise, so as to force the cutters in and cut off the wire, which at this time will be in the grip of the staple-forming mechanism.

Suitable returning means are preferably provided for the cutters, which may be of any convenient construction. As shown, the return of the cutters is effected by a spring 41, which bears against a depending projection 42 on the slide 35.

The staple forming and inserting mechanism may be widely varied in construction, but will be of such a character that it may in inserting the staple be given a movement which is independent of the carrier in which the mechanism is mounted. In the construction illustrated four sets of staple forming and inserting mechanisms are shown arranged around the cylinder; but it is to be understood that the number employed may be and will be varied according to the number of staples it is desired to insert in the product.

Each staple forming and inserting mechanism includes a holder by which the wire lengths are taken in the first instance. The specific construction of this holder may be widely varied. As shown, it consists of a supporting-jaw 43 and a holding-jaw 44, which is preferably pivoted in and carried by the supporting-jaw, the pivot of the jaw 44 being marked 45. In the construction shown these jaws are semicircular in form, so that they together form a plunger which works in a circular opening in the cylinder. These jaws may be operated in any desired manner. As shown, the jaw 43 has a downward projection 45′, provided with a recess 46, which takes over a pin 47, fast in a fork on an arm 48, which is secured to a rock-shaft 49, supported in suitable bearings in the carrier 4. The pin 47 is in the form of a screw having a squared head, by which it may be adjusted. The other end of the shaft 49 is provided (see Fig. 9) with a rock-arm 51, which is split at its outer end and secured to the shaft by means of a clamping-screw 52. The arm carries at its outer end a bowl 53, which engages a cam-groove 54 in a two-part cam 55 56, this cam being secured, by means of bolts 57 or in any other suitable manner, to a slotted bracket 58, secured to the frame, the slot in this bracket embracing the cylinder-carrying shaft 6. The cam-groove 54 is preferably formed, as indicated in dotted lines in Fig. 11, with a slight depression 58′ near its mouth and then with a gradually-depressed surface 59, this surface terminating in a sharp upward rise 60. The remaining part 55 of the cam and all of the part 56 are formed to provide a concentric path with respect to the center of the shaft 6.

Suitable means for opening and closing the jaws 43 44 are provided, and these means may be varied widely in construction. In the preferred form and as shown the jaw 44 is provided with a projection 61, and located in the path of this projection is an adjustable stop 62, which is or may be formed by a

screw. The head of this screw is provided with slots 63, any one of which may be engaged by a holding-screw 64, tapped through the side of the cylinder. By loosening the screw 64 the stop-screw may be vertically adjusted, so that it will be struck sooner or later by the projection on the jaw 44, this adjustment being a convenient and ready one and being particularly useful in adjusting the stop according to the thickness and number of plies of paper to be stapled. The jaw 44 in the construction shown is closed by a spring 65, located in a socket 66 in the lower part of the jaw 43.

Suitable bending means are provided for forming the staple, which bending means may be of any suitable form. When, as in the construction shown, the plunger is movable, the bending means will be stationary and will be brought into action by the movement of the plunger. As shown, the bending means consist of two stiff spring-fingers 67, these fingers being carried on blocks 68, secured to the cylinder, these spring-fingers lying in the opening in the cylinder in which the plungers move. The upper ends of these fingers are preferably bent in somewhat, so that the legs of the staple when it is completely formed will be at an angle which is somewhat acute to the crown of the staple.

The operation of the mechanism is as follows: The end of the wire which protrudes from the channeled guide 13 is laid in the groove 8 of the cylinder by the presser 14, the wire being forced down into the groove by the rib 15 on the presser. As the forward end of the staple forming and inserting jaws come around into position the wire passes into the jaws, which are at this time open, the bowl 53 running on the concentric part of the cam 55 56. At the proper time—that is, when a proper length of wire to form a staple lies in the opening of the jaws—the bowl 53 runs down the depression 58′ in the cam, thus moving the jaws down slightly and allowing the projection 61 to move away from the stop 62, so that the spring 65 closes the jaws. Just at this instant the shank 35 of a cutting device strikes the cam 39 and the cutters are forced inward, biting and gripping the wire, which is thus pulled off the spool 10. When the cylinder has moved sufficiently far ahead so as to pull off a length of wire sufficient to form the succeeding staple, the slide 35 runs up onto the sharp incline on the cam 39, and the wire is severed, the back feed of the wire being prevented, however, by the action of the block 21. As the cylinder moves onward the jaws 43 44 are moved into the opening in the cylinder by the operation of that part of the cam marked 59, the operation being made clear by reference to Figs. 11, 12, 13, and 14. As the jaws move into the recess the bending-springs operate on the ends of the wire and bend it up to form the legs of the staple. When the staple has been completely formed, the material to be stapled is approaching the inserting position, this material in the particular construction illustrated being a plurality of sheets of paper carried on a collecting-cylinder of a printing-machine, this collecting-cylinder being provided with the clencher-blocks, which are usual in such constructions. As a clencher-block 3 comes into staple-inserting position the bowl 53 rides up the sharp incline 60 of the cam, so that the staple is inserted not only by the rolling action of the two cylinders, but by a quick outward movement of the jaws which are holding the staple. In prior constructions the rolling action of the cylinders alone has been depended upon to insert the staple. These staples are, however, formed of very light wire, as is well known, and this wire can be more effectively driven into the paper if the operation of inserting the staple is performed very quickly. By giving the staple-inserting devices the quick outward movement such as is effected by the sharp cam-surface 60 the staple is quickly and positively driven through the paper, better results being thus secured than where the rolling action alone of the cylinders is depended upon for inserting the staples. Just as the outward movement of the staple-inserting devices is completed the projection 61 strikes the stop 62, thus opening the jaws and releasing their grip on the inserted staple. The jaws remain open, owing to the fact that the bowl 53 is traveling on the concentric part of the cam 55 56, until they again come into position to seize a length of wire.

Changes and variations may be made in the construction by which the invention is carried into effect, and it is furthermore to be understood that certain features of the invention may be used independently of other features, and such independent use is contemplated. The invention is not, therefore, to be restricted to the specific construction hereinbefore described, and illustrated in the accompanying drawings.

What is claimed is—

1. The combination with a rotating carrier, of means for presenting material to be stapled thereto, a source of wire-supply delivering wire to the carrier in the direction of its rotation, and stapling mechanism mounted on the carrier, said mechanism including means by which the wire is brought up to the speed of the carrier before the lengths are severed, substantially as described.

2. The combination with a rotating carrier, of means for presenting material to be stapled thereto, a source of wire-supply delivering wire to the carrier in the direction of its rotation, and a plurality of stapling mechanisms mounted on the carrier, each of said stapling mechanisms including means whereby

the wire is brought up to the speed of the carrier by said mechanisms in succession and successive lengths are cut off, formed into staples and inserted, substantially as described.

3. The combination with a rotating carrier, of means for presenting material to be stapled thereto, a source of wire-supply delivering wire to the carrier in the direction of its rotation, wire-cutting and staple forming and inserting mechanism, and means whereby the wire is brought up to the speed of the carrier by said mechanism, before the wire lengths are cut off and the staples formed and inserted, substantially as described.

4. The combination with a rotating carrier, of means for presenting material to be stapled thereto, a source of wire-supply delivering wire to the carrier in the direction of its rotation, and a plurality of wire-cutting and staple forming and inserting mechanisms located around the carrier, the wire being taken in succession by each mechanism and brought up to the speed of the carrier before the successive wire lengths are cut off, formed into staples and inserted, substantially as described.

5. The combination with means for presenting material to be stapled, of a rotating carrier having a groove running in the direction of its rotation, a source of wire-supply delivering wire to the carrier in the direction of its rotation, and stapling mechanism mounted on the carrier, said mechanism including means by which the wire is brought up to the speed of the carrier before the lengths are severed, substantially as described.

6. The combination with means for presenting material to be stapled, of a rotating carrier having a groove running in the direction of its rotation, a source of wire-supply delivering wire to the carrier in the direction of its rotation, and a plurality of stapling mechanisms mounted on the carrier, each of said stapling mechanisms including means whereby the wire is brought up to the speed of the carrier by said mechanisms in succession and successive lengths are cut off, formed into staples and inserted, substantially as described.

7. The combination with means for presenting material to be stapled, of a rotating carrier having a groove running in the direction of its rotation, a source of wire-supply delivering wire to the carrier in the direction of its rotation, wire-cutting and staple forming and inserting mechanism, and means whereby the wire is brought up to the speed of the carrier by said mechanism before the wire lengths are cut off and the staples formed and inserted, substantially as described.

8. The combination with means for presenting material to be stapled, of a rotating carrier having a groove running in the direction of its rotation, a source of wire-supply delivering wire to the carrier in the direction of its rotation, and a plurality of wire-cutting and staple forming and inserting mechanisms located around the carrier, the wire being taken in succession by each mechanism and brought up to the speed of the carrier before the successive wire lengths are cut off, formed into staples and inserted, substantially as described.

9. The combination with a rotating carrier, of means for presenting material to be stapled thereto, a source of wire-supply delivering wire to the carrier in the direction of its rotation, a wire-cutting device, means for forming the wire lengths into staples and inserting them, and means for operating the cutting device so as to grip the wire and bring it up to the speed of the carrier and then cut it off, substantially as described.

10. The combination with a rotating carrier, of means for presenting material to be stapled thereto, a source of wire-supply delivering wire to the carrier in the direction of its rotation, a plurality of staple forming and inserting mechanisms located around the carrier, a cutting device for each staple forming and inserting mechanism, and means for operating said cutting devices in succession to grip the wire and bring it up to the speed of the carrier and afterward to cut it, substantially as described.

11. The combination with means for presenting material to be stapled, of a rotating circumferentially-grooved carrier, a source of wire-supply delivering wire to the groove in the carrier, a plurality of staple forming and inserting mechanisms operating on the wire in the groove, said mechanisms being located around the carrier, a plurality of wire-cutting devices, one for each forming and inserting mechanism, and means operating said cutting devices successively so as to grip the wire and bring it up to the speed of the carrier and then to cut wire lengths therefrom, substantially as described.

12. The combination with a rotating carrier, of means for presenting material to be stapled thereto, a source of wire-supply delivering wire to the carrier in the direction of its rotation, stapling mechanism mounted on the carrier, said mechanism including means by which the wire is brought up to the speed of the carrier before the lengths are severed, and means for preventing back feed of the wire after cutting, substantially as described.

13. The combination with a rotating carrier, of means for presenting material to be stapled thereto, a source of wire-supply delivering wire to the carrier in the direction of its rotation, a plurality of stapling mechanisms mounted on the carrier, each of said stapling mechanisms including means whereby the wire is brought up to the speed of the

carrier by said mechanisms in succession and successive lengths are cut off, formed into staples and inserted, and means for preventing back feed of the wire after cutting, substantially as described.

14. The combination with a rotating carrier, of means for presenting material to be stapled thereto, a source of wire-supply, means for presenting wire to the cylinder in the direction of movement and at the speed of the cylinder, tensioning means for the wire, means on the carrier for cutting, forming and inserting staples, and means for preventing back feed of the wire after each cutting operation, substantially as described.

15. The combination with a rotating carrier, of means for presenting material to be stapled thereto, a source of wire-supply delivering wire to the carrier in the direction of its rotation, a tensioning mechanism, a stapling mechanism mounted on the carrier, said mechanism including means by which the wire is brought up to the speed of the carrier before the wire lengths are severed, severing devices, and means for preventing back feed of the wire, substantially as described.

16. The combination with a rotating carrier, of means for presenting material to be stapled thereto, a source of wire-supply delivering wire to the carrier in the direction of its rotation, tensioning devices for the wire, a plurality of stapling mechanisms mounted on the carrier, each of said stapling mechanisms including means whereby the wire is brought up to the speed of the carrier by said mechanisms in succession and successive lengths are cut off, formed into staples and inserted, and means for preventing back feed of the wire after the cutting operation, substantially as described.

17. The combination with means for presenting material to be stapled, of a rotating circumferentially-grooved carrier, a source of wire-supply delivering wire to the carrier in the direction of its rotation, a tension device for the wire, a plurality of stapling mechanisms mounted around the carrier, each of said mechanisms including means whereby the wire is brought up to the speed of the carrier and successive lengths are cut off, formed into staples and inserted, and means for preventing back feed of the wire, substantially as described.

18. The combination with means for presenting material to be stapled, of a rotating circumferentially-grooved carrier, a source of wire-supply delivering wire to the carrier in the direction of its rotation, a tensioning device for the wire, a plurality of staple forming and inserting mechanisms mounted around the carrier, cutting devices, one for each forming and inserting mechanism, operating on the wire in the groove, means for causing said cutting devices in succession to grip the wire, bring it up to the speed of the carrier and then cut it off, and means for preventing back feed of the wire after each cutting operation, substantially as described.

19. The combination with means for presenting material to be stapled, of a rotating carrier, a source of wire-supply delivering wire to the carrier in the direction of its rotation, a plurality of staple forming and inserting mechanisms mounted around the carrier, a plurality of cutting devices, one for each forming and inserting mechanism, each of said devices including a movable member, and a cam operating on said movable members in succession to cause the cutting devices in succession to first grip the wire and bring it up to the speed of the carrier and thereafter to cut it off, substantially as described.

20. The combination with means for presenting material to be stapled, of a rotating carrier, a source of wire-supply delivering wire to the carrier in the direction of its rotation, a plurality of staple forming and inserting mechanisms mounted around the carrier, a plurality of cutting devices, one for each forming and inserting mechanism, each of said devices including an adjustable member and a movable member, and a cam operating on said movable members in succession to cause the cutting devices in succession to first grip the wire and bring it up to the speed of the carrier and thereafter to cut it off, substantially as described.

21. The combination with a rotating carrier, of a wire-length-holding device, coöperating staple-forming means, and means for giving the holding device an inserting movement which is independent of the movement of the carrier, substantially as described.

22. The combination with rotating means for presenting material to be stapled, of a rotating carrier, staple-forming mechanism including a holder, and means for giving the holder a movement which is independent of the movement of the carrier to force the staples through the material, substantially as described.

23. The combination with means for presenting material to be stapled, of a rotating carrier, a wire-length-holder mounted on the carrier, coöperating bending means whereby the wire is bent to form the legs of the staple, means for giving the holder a movement with respect to the bending means to form the staple and for giving it a movement in the reverse direction to insert the staple, substantially as described.

24. The combination with means for presenting material to be stapled, of a rotating carrier, a wire-length holder mounted on the carrier comprising a supporting-jaw and a holding-jaw, coöperating staple-forming means, means for giving the holder a movement in addition to the movement of the carrier to insert the staple, and means for open-

ing the jaws as the staple is inserted, substantially as described.

25. The combination with means for presenting material to be stapled, of a rotating carrier, a wire-length holder mounted on the carrier comprising a supporting-jaw and a holding-jaw, coöperating staple-forming means, means for giving the holder a movement in addition to the movement of the carrier to insert the staple, and means located in the path of movement of the holder for opening the jaws as the staple is inserted, substantially as described.

26. The combination with means for presenting material to be stapled, of a rotating carrier, a wire-cutting device mounted thereon, a wire-length holder mounted on said carrier, said holder comprising a supporting-jaw and a holding-jaw, jaw-closing devices, coöperating bending means, means for giving the holder a movement with respect to the bending means to form the staple, means for giving the holder a movement with respect to the carrier to insert the staple, and means for opening the jaws, substantially as described.

27. The combination with means for presenting material to be stapled, of a rotating carrier, a wire-cutting device mounted thereon, a wire-length holder mounted on said carrier, said holder comprising a holding-jaw and a supporting-jaw, jaw-closing devices, coöperating bending means, means for giving the holder a movement with respect to the bending means to form the staple, means for giving the holder a movement with respect to the carrier to insert the staple, and means located in the path of movement of the holder for opening the jaws as the staple is inserted, substantially as described.

28. The combination with means for presenting material to be stapled, of a rotating carrier, a wire-cutting device mounted thereon, a wire-length holder mounted on said carrier, said holder comprising a supporting-jaw and a pivoted holding-jaw, jaw-closing devices, coöperating bending means, means for giving the holder a movement with respect to the bending means to form the staple, means for giving the holder a movement with respect to the carrier to insert the staple, and means for opening the jaws, substantially as described.

29. The combination with means for presenting material to be stapled, of a rotating carrier, a wire-cutting device mounted thereon, a wire-length holder mounted on said carrier, said holder comprising a supporting-jaw and a holding-jaw, a spring for closing the jaws, coöperating bending means, means for giving the holder a movement with respect to the bending means to form the staple, means for giving the holder a movement with respect to the carrier to insert the staple, and means for opening the jaws, substantially as described.

30. The combination with means for presenting material to be stapled, of a rotating carrier, a wire-cutting device mounted thereon, a wire-length holder mounted on said carrier, said holder comprising a supporting-jaw and a holding-jaw, a spring for closing the jaws, a projection on one of said jaws, coöperating bending means, means for giving the holder a movement with respect to the bending means, said movement permitting the spring to close the jaws and effecting the formation of the staple, means for giving the holder a movement with respect to the carrier to insert the staple, and a stop located in the path of the projection on one of the jaws by which the jaws are opened as the holder completes its inserting movement, substantially as described.

31. The combination with means for presenting material to be stapled, of a rotating carrier, a wire-cutting device mounted thereon, a wire-length holder mounted on said carrier, said holder comprising a supporting-jaw and a holding-jaw, a spring for closing the jaws, a projection on one of said jaws, coöperating bending means, means for giving the holder a movement with respect to the bending means, said movement permitting the spring to close the jaws and effecting the formation of the staple, means for giving the holder a movement with respect to the carrier to insert the staple, and an adjustable stop located in the path of the projection on one of the jaws by which the jaws are opened as the holder completes its inserting movement, substantially as described.

32. The combination with means for presenting material to be stapled, of a rotating circumferentially-grooved carrier, stapling mechanism mounted on the carrier, a source of wire-supply delivering wire to the carrier in the direction of its rotation, and a presser constructed to enter the groove in the carrier and force the wire down thereinto, substantially as described.

33. The combination with means for presenting material to be stapled, of a circumferentially-grooved rotating carrier, a plurality of stapling mechanisms mounted around the carrier, each stapling mechanism including means whereby the wire is brought up to the speed of the carrier by said mechanisms in succession and successive lengths of wire are cut off and formed into staples, a source of wire-supply, a wire tension, a back-feed-preventing device, and a presser operating to force the wire into the groove of the carrier, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN C. F. BALZE.

Witnesses:
F. W. H. CRANE,
LOUIS ROEHM.