No. 615,253. Patented Dec. 6, 1898.

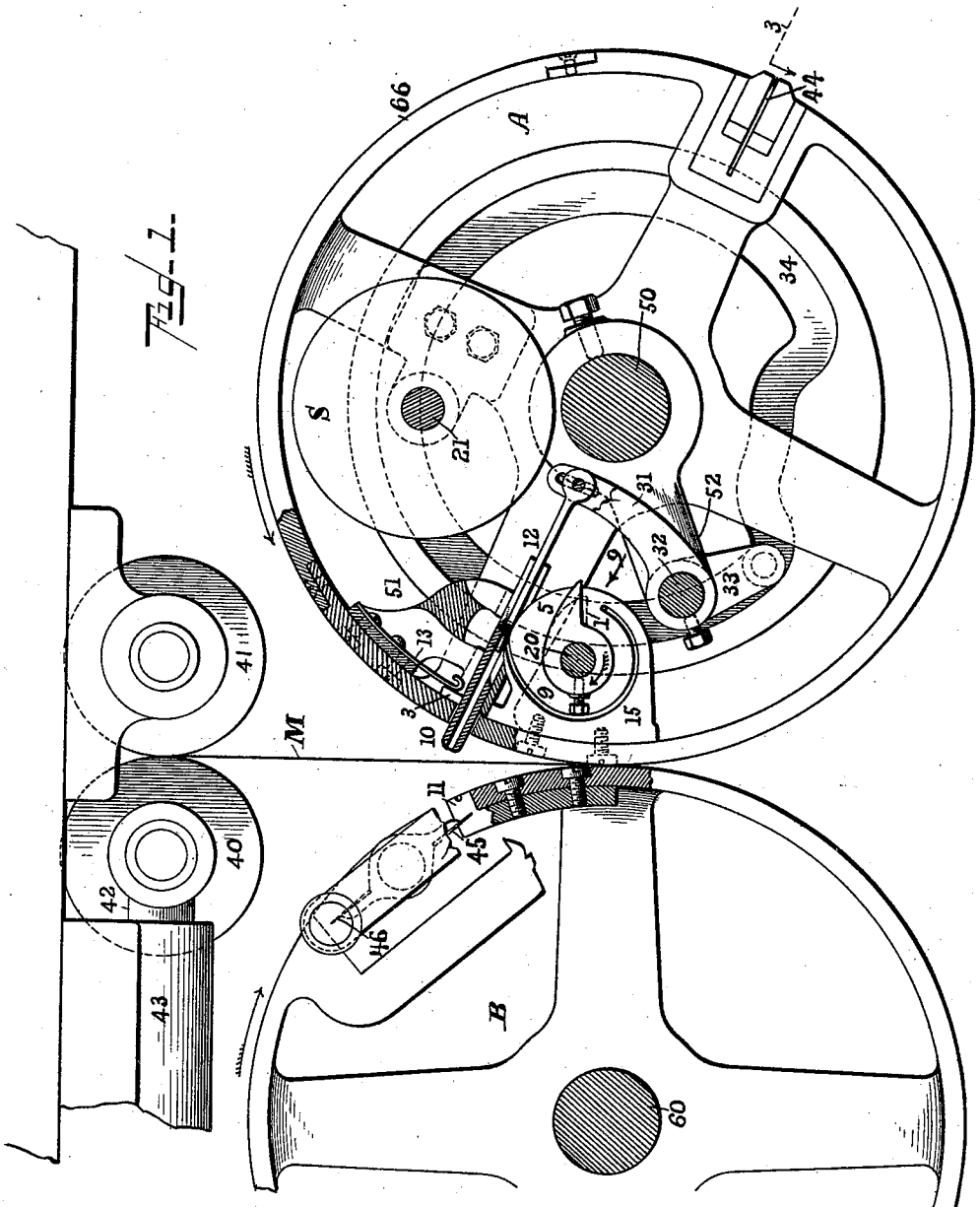
L. C. CROWELL.

STAPLE BINDING DELIVERY MECHANISM FOR PRINTING MACHINES.

(Application filed June 14, 1895.)

(No Model.)

5 Sheets—Sheet 1.



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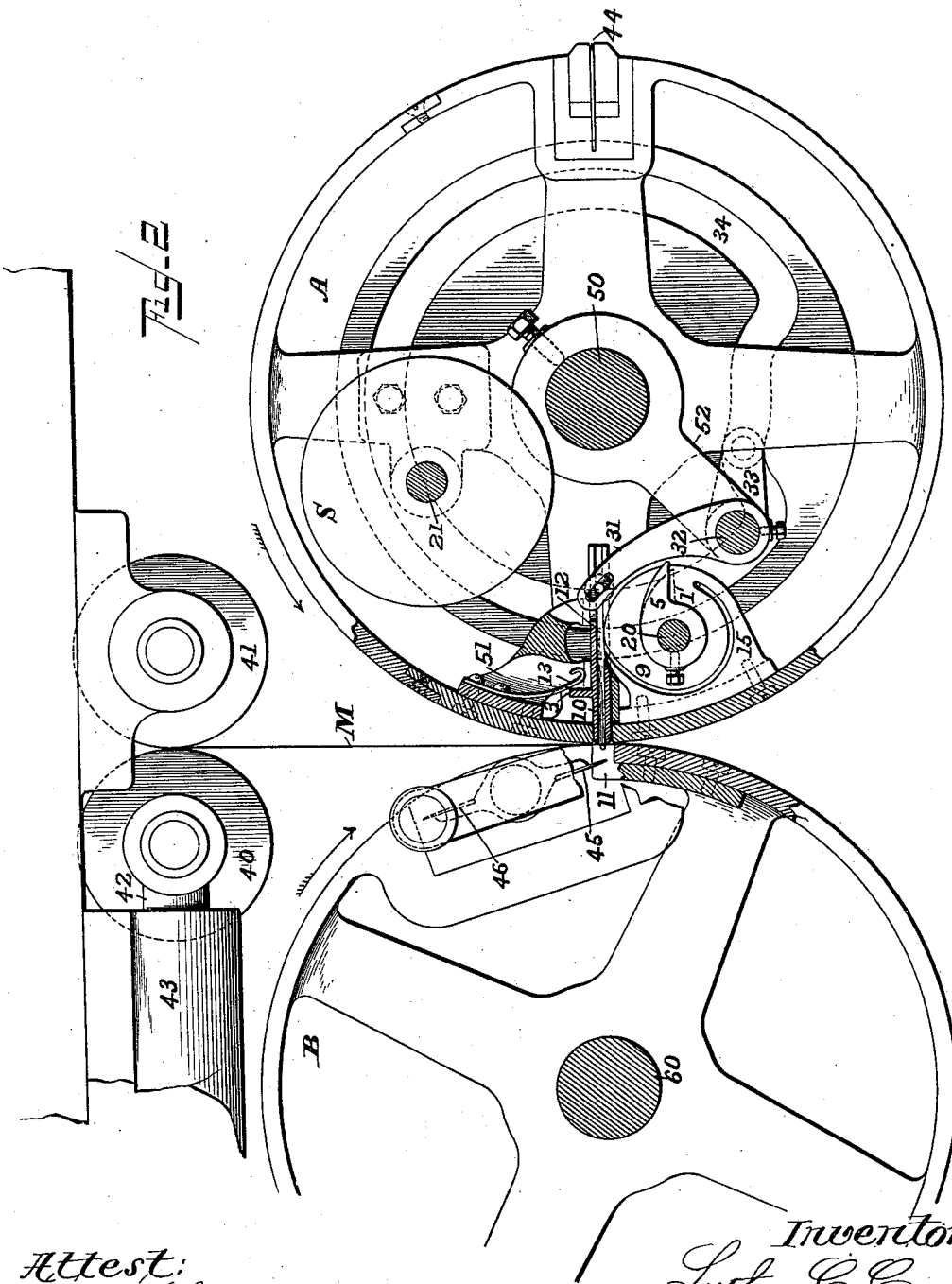
(No Model.) 5 Sheets---Sheet 2.

Fig. 2.



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(No Model.) 5 Sheets—Sheet 3.

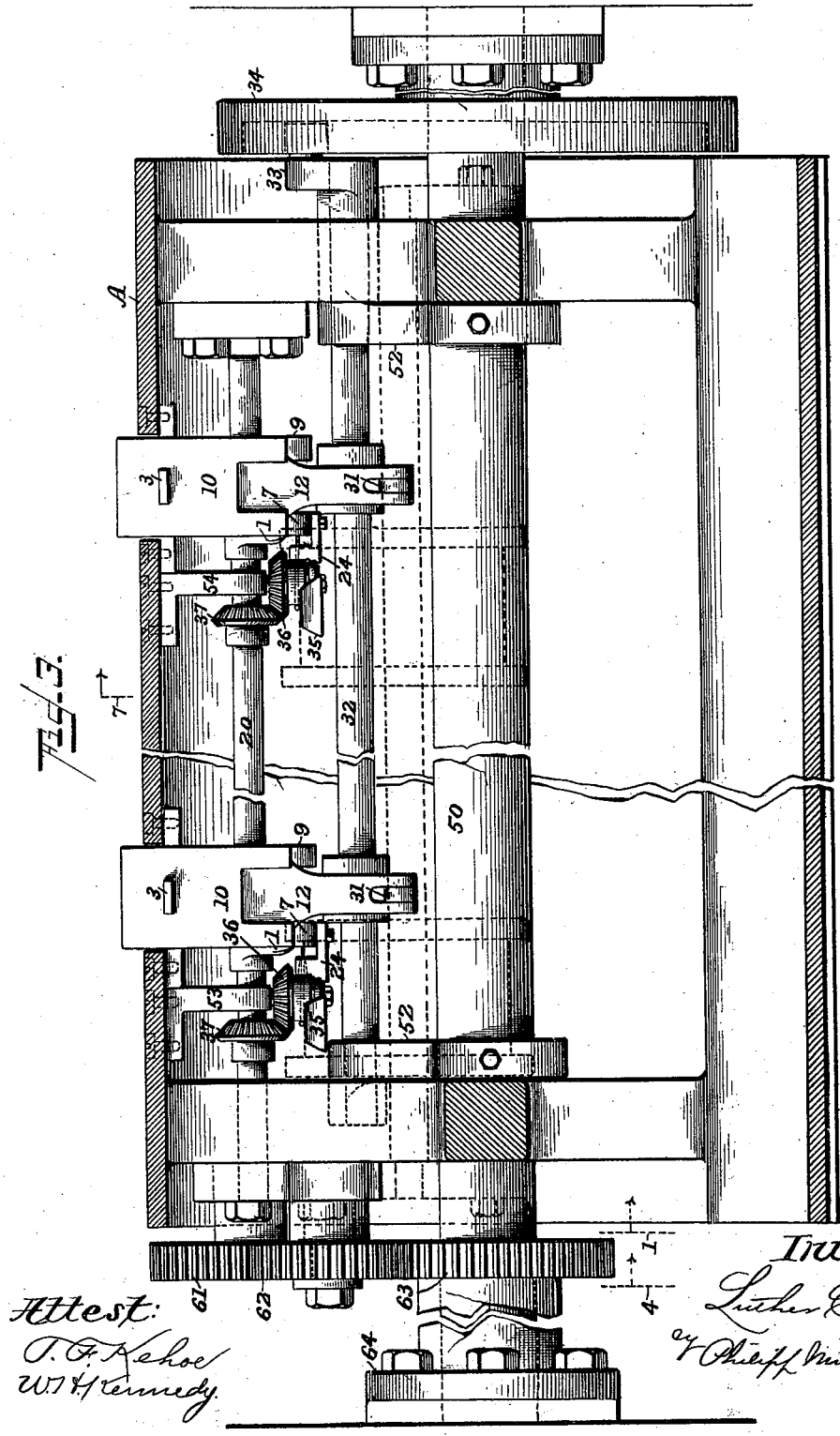

FIG. 3.

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(No Model.) 5 Sheets—Sheet 4.

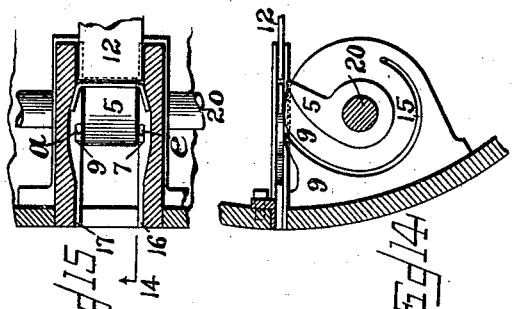

Fig. 15.

Fig. 14.

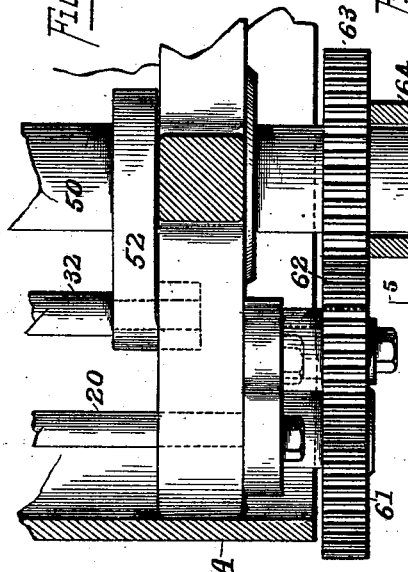

Fig. 5.

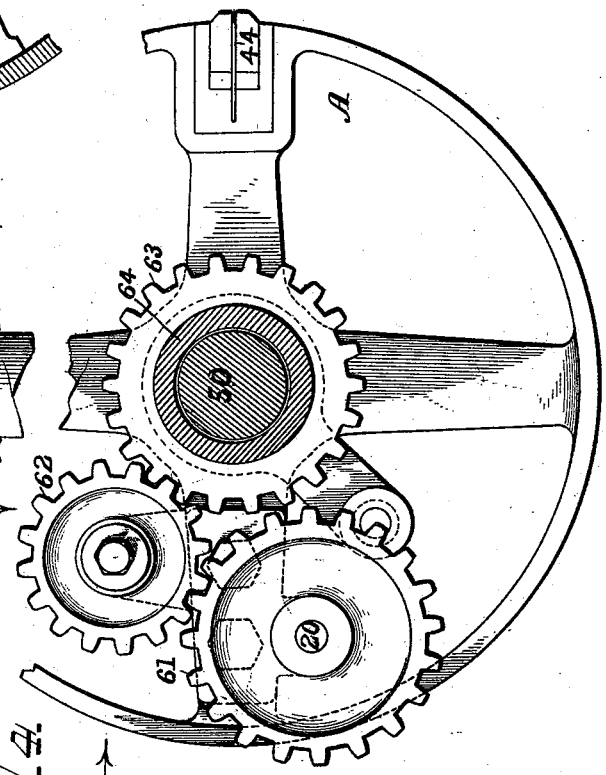

Fig. 4.

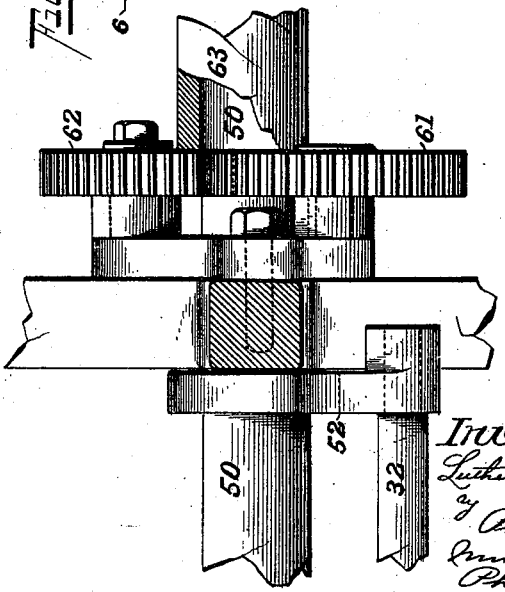

Fig. 6.

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(Application filed June 14, 1895.)

(No Model.) 5 Sheets—Sheet 5.

Fig. 8.

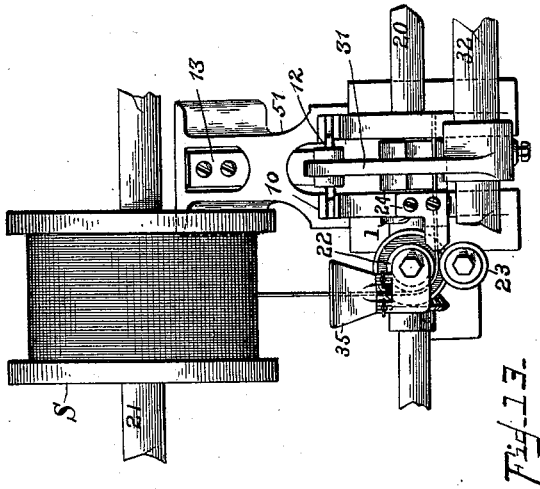


Fig. 9.

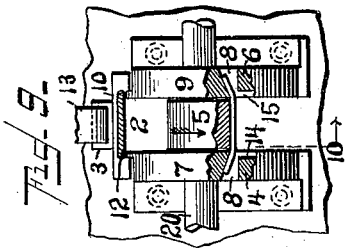


Fig. 13.

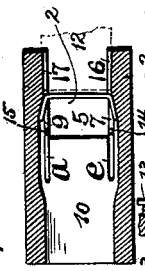
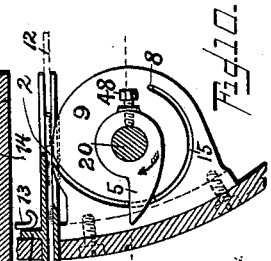


Fig. 10.



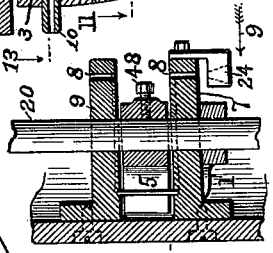


Fig. 7.

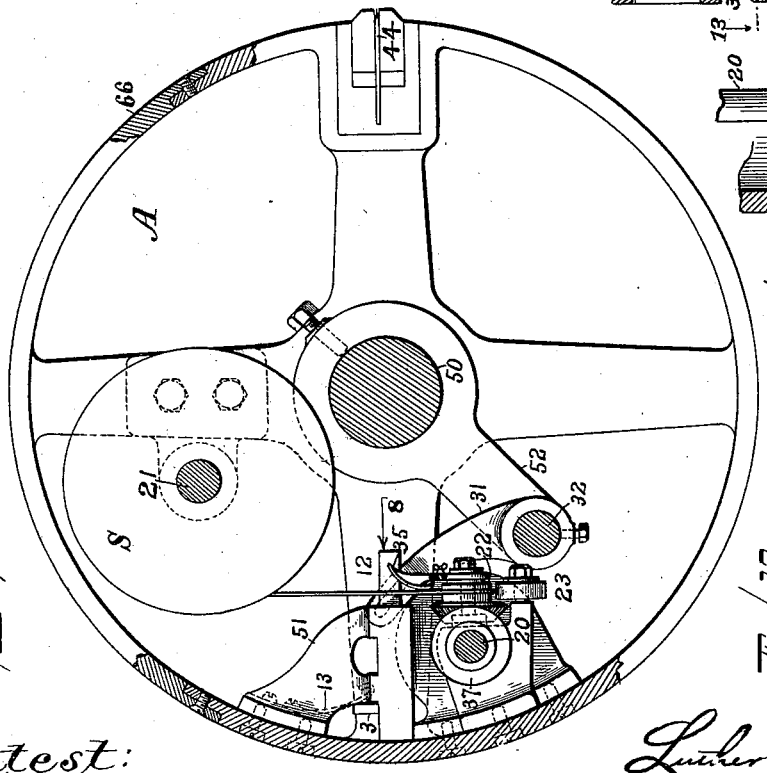


Fig. 11.

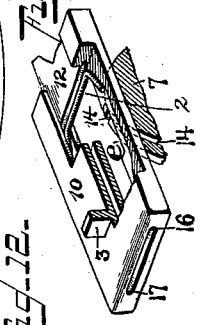


Fig. 12.

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UNITED STATES PATENT OFFICE.

LUTHER C. CROWELL, OF NEW YORK, N. Y., ASSIGNOR TO ROBERT HOE, THEODORE H. MEAD, AND CHARLES W. CARPENTER, OF SAME PLACE.

STAPLE-BINDING DELIVERY MECHANISM FOR PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 615,253, dated December 6, 1898.

Application filed June 14, 1895. Serial No. 552,808. (No model.)

To all whom it may concern:

Be it known that I, LUTHER C. CROWELL, a citizen of the United States, residing at New York, (Brooklyn,) county of Kings, and State of New York, have invented certain new and useful Improvements in Staple-Binding Delivery Mechanism for Printing-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The object of this invention is to provide a rapidly-operating machine whereby many sheets of paper or similar material, whether associated together so as to have raw or cut edges or folded so as to have at least one folded edge or plicated in any other way so as to constitute a pack, may be bound together so as to constitute a single product by means of staples set in, on, or near the binding edge or line of fold, which sheets may be fed within the range of action of the traveling tools of the stapling mechanism by hand or otherwise.

The type of stapling mechanism upon which the present invention is an improvement is generally shown in Patent No. 510,528 and more specifically in Patent No. 510,843, in which the staple presenting and setting tools are transported to and from the setting-point in a rotative carrier, which carrier contains a rotative staple-forming mechanism which supplies the staple to the presenting-tool.

The invention may be broadly stated to consist in novel constructions of rotative mechanisms whereby not only is high operative speed attained, but great certainty of performance is assured in the operations of forming and setting the staple.

The specific features of invention are so fully hereinafter explained and finally set out in the claims as to need no preliminary description.

A practical embodiment of this invention is shown in the accompanying drawings, which illustrate an apparatus designed to form a part of the sheet-delivery mechanism of a perfecting printing-machine.

In the drawings section-lines mark the plane in which an illustration is made, the reference-number for the line indicates the figure which embodies the view, and the arrow-head connected with each section-line points the direction in which the picture is seen. Feathered arrows show the direction of movement of the part or parts with which it is associated and like reference characters designate corresponding parts.

Figure 1 exhibits an end elevation, partially in section, of the rotative cylinders or supports for the stapling mechanisms, together with feeding-rollers whereby material to be stapled may be delivered to the stapling mechanisms. This view is taken on the section-line 1 of Fig. 3, but shows the staple as completely formed and delivered within the staple-holder in advance of the staple inserting tool or driver. Fig. 2 exhibits a similar view of the same parts, but in different positions, the staple in this instance having been inserted into the material and its legs having been clenched down thereon. Fig. 3 exhibits a longitudinal sectional elevation of the cylinder or support that carries the wire-supplying, staple forming, holding or presenting, and inserting tools, the view being taken on the section-line 3 of Fig. 1 and some obstructive parts removed to more clearly expose others. Fig. 4 exhibits a front end elevation of the same cylinder or support as seen on the section-line 4 of Fig. 3. Fig. 5 is a sectional plan view of the parts shown in Fig. 4 as seen looking in the direction of the arrow 5. Fig. 6 is a side elevation of the same parts as seen looking in the direction of the arrow 6. Fig. 7 is an end elevation, partially in section, of the cylinder or support carrying the wire-supplying, staple forming, holding, and inserting tools, the parts being in the positions shown in Fig. 2, but the section is taken on the line 7 of Fig. 3 to more particularly illustrate the wire-feed. Fig. 8 exhibits an inside elevation of the stapling mechanisms, showing more particularly the wire-feeding devices as seen looking in the direction of the arrow 8 in Fig. 7. Fig. 9 exhibits a rear elevation, with some parts broken away, of the rotative staple-forming anvil and the staple-leg-bending arms, or as seen looking in the direction of the arrow 9 in Figs. 1 and 11, when the staple is in course of formation. Fig. 10 exhibits a side elevation of the same parts as seen upon the section-line 10 of Fig. 9. Fig. 11 is a sectional plan view taken on

the section-line 11 of Fig. 10. Fig. 12 is a perspective view of the staple holder or presenting tool removed from the machine and partly broken away to exhibit its interior construction. Fig. 13 is a longitudinal sectional elevation of the staple holder or presenting tool taken on the section-line 13 of Fig. 10. Figs. 14 and 15 are views similar to those of Figs. 10 and 13, respectively, but exhibiting a modified construction of the staple-presenting tool.

In order to readily understand this invention, it may first be stated that the staple holder or presenting tool 10, which delivers the staple to the material M in which it is to be set, and the clenching-die 11, which bends down or clenches the staple-legs upon said material, are each carried in a support that is rotative, the said supports, as illustrated, being cylinders A B; but the office of these cylinders in so far as each tool they carry is concerned being merely to support such tool in such a manner that it may move or travel to and from the staple-setting point for coöperative action with reference to said material all unnecessary parts of such cylinders might be removed or any other suitable support be adopted; but it is sometimes desirable to have such supports in the form of cylinders, as will hereinafter appear, and hence they are so shown.

In Fig. 1 the traveling staple-holding tool 10 and the traveling clenching-die 11 are shown as moving rotatively onward toward the setting-point, traveling in the same direction in which the material M is moving, and thus approaching the same from opposite sides thereof, which material is illustrated as being fed onward between and past these tools by means of feeding-rollers 40 41. In Fig. 2 the supports therefor have so far moved as to have carried the staple-holder 10 and the clenching-die 11 into such complete cooperative relation at the stapling-point and in coaction with the staple inserting tool or driver 12 as to have accomplished the operations of presenting the staple to the material, inserting it therein, and clenching its legs thereon, so that the staple-crown bears upon one side of the material and its legs upon the other side of the material, the plies of which material are thus embraced or bound together. The plies of material thus fed onward and united together by staples may be two or any other number, the feeding-roller 40 having its journals carried by bearers 42, that are spring-seated in holders 43, thus being arranged to accommodate any thickness of the material, which may vary considerably in thickness.

The feeding-rollers 40 41 may receive the material from any source of supply, and it may be in web form or in sheets. The webs or sheets will preferaly be led through these rollers 40 41 or directly between the cylinders or supports A B from the machine producing them—as, for instance, a printing machine or machines—and either before or after being stapled together may, if requisite, be divided transversely or both longitudinally and transversely into sheets of any desired size. If fed to the machine in sheet form, then the sheets may be delivered directly to the stapling mechanisms or between the cylinders or supports A B, which carry such mechanisms, or the sheets may first pass between the said rollers 40 41.

There will be one or more stapling mechanisms, according to the number of staples it is desired that the binding-line shall contain. Herein (see Fig. 3) two is the illustrative number selected, and they are alined parallel with the shafts of the cylinders or supports A B. The plicated material M will thus be fastened together by a line of staples set in the material transversely or at right angles to its plane of onward travel past the stapling mechanisms.

With this preliminary description as indicative of the general operation the construction and operation of the stapling mechanisms will now be described in detail, and as the two sets are duplicates it will be understood that a description of one applies equally to both.

As herein embodied, the supports illustratively chosen for the stapling mechanisms are cylinders A B, which are respectively mounted upon shafts 50 60, that turn in journals supported by suitable framing, concerted rotation of said cylinders being accomplished by intermeshing wheels on their shafts, to which motion is imparted in the usual manner; but where rollers 40 41 are used as the feeding device for the material M they will also be geared so as to run in unison with said cylinders A B. This gearing is not shown, as it is common; but it may be here remarked that if this stapling mechanism is made part of the delivery apparatus of a machine producing the sheets or webs of material then said gearing will be properly connected with said machine so as to cause the two to run in unison.

Except in Figs. 14 and 15, the staple holder or presenting tool 10 is sheath-like in its construction (see Fig. 12)—that is, it is provided with a longitudinal guideway of dimensions suiting it to receive the formed staple and admit of the same being moved longitudinally through and to be discharged from it; but instead of being a sheath with continuous walls its central portion might be cut away and thus constitute it of two arms set a suitable distance apart and each having a guiding-channel, which channels 16 17 would face each other, as in Fig. 15. This holder 10 is preferably arranged to slide longitudinally in a stationary way formed in an inwardly-projecting bracket 51, (see Fig. 7,) that is fastened by screws to the shell of the cylinder A, and that part of said holder facing the rotating forming-anvil is cut away centrally to form a midway recess 2, that provides for the entrance of the end of said an-

vil as it sweeps into the staple-holder, carrying with it the formed staple, (see Figs. 1, 12, 13, 14, and 15,) which recess for the anvil and staple is provided in the sheath form of Fig. 12 by cutting away the central body of the lower member of said holder, and in the modification, Figs. 14 and 15, is provided by the widthwise space between the two arms having the channels 16 17. Openings *a e* are cut through the holder, so as to intercept its guiding-channels 16 17, into which openings *a e* narrow portions of the plates 7 9, containing the channels 14 15, project, as shown in Figs. 9, 10, and 15, to form a substantial continuity between the channels 14 15 and the channels 16 17. To advance the staple in this holder for presentation to the material and to cause the staple to be inserted into the material and its legs to be clenched thereon, the setting-tool or driver 12 is arranged to reciprocate in said holder. This driver is a plate-like tool or device that is guided by its edges sliding in the grooves or channels 16 17 of the holder 10, and its movements are imparted to it by means of a lever 31, whose free end is slotted to admit of the traversing movement of the lever over the pin that connects the two, said lever being fast to a rock-shaft 32, that is journaled in bracket-arms 52, which project from and are fast upon the shaft 50, and said shaft 32 is suitably rocked to move the driver by means of a rock-arm 33, the stud 45 of which runs in the slot of a cam 34, that is made fast by means of a sleeve embracing the shaft and having a flange by which it is bolted to the framework. (See Fig. 3.)

The holder 10, when constructed to slide, is maintained in its foremost or projected position by means of a spring 13, fastened so that it bears against a lug 3, that is carried by the holder, and which lug 3 also operates to limit the range of the outward movement of the holder, and thus determine the extent to which the said holder protrudes beyond the cylinder A or other support or beyond the plane of travel of the material to be stapled.

While other means for supplying the holder 10 with staples which will cause them to be passed through a midway passage in the body of the holder and be deposited in the guiding-channels thereof in advance of the driver 12 with their legs pointing outward may be adopted, that herein shown is preferred as one of advantageous construction, and especially so because it is not only rotative in its operation and therefore capable of high speed in delivering a staple to the holder or presenting-tool, but for the reason that it additionally forms the staple it delivers by a rotative action. This rotative staple-forming mechanism consists of stationary staple-bending arms 4 6 and a rotatively-moving forming-anvil 5, which sweeps between said arms. The bending-arms 4 6, as shown herein, are parts of circular plates 7 9, that are held in place by flanges, through which they are bolted to the shell thereof, so as to project into the cylinder or support A, and said bending-arms are formed by piercing said plates with wire-channels 8, which are enlarged, as in Fig. 9, to permit the necessary movement of the wire ends as they are being bent into staple-legs. The rotative forming-anvil 5 is an arm adapted to sweep past said bending-arms 4 6 and to move between the inner walls of the plates 7 9, being mounted adjustably upon a shaft 20, that is journaled in brackets 53 54, (see Fig. 3,) fast to the inside of the cylinder, and which shaft passes through said plates 7 9. This shaft is suitably rotated by means of a toothed wheel 61, fast upon one end of it, which through an intermediate 62 is driven from a toothed wheel 63, that is carried by a sleeve 64, surrounding the shaft 50 and fastened by its flange to the fixed framework. (See Figs. 3 to 6.) These plates 7 9 have cut into their inner faces staple-leg-guiding ways or channels 14 15, that are intercepted by the wire-passage 8, which guideways or channels are eccentric with the shaft 20 or axis of motion of the forming-anvil 5 and gradually extend outwardly from the wire-receiving point or passage 8 to the staple-discharging point or where they direct the staple midway into the staple holder or presenting tool 10, the staple passing through the widthwise recess in the said holder, which recess connects said channels 17 16. The plates 7 9, the guiding ways or channels 14 15 therein, and the axis of the anvil 5 are so related to the plane in which said holder is positioned that this may be accomplished and the end of the anvil not only sweep into the holder 10 to deposit the staple therein, but swing free from the staple it has formed and delivered into the holder, thus moving onward to repeat its functions, as will more clearly appear in the setting forth of the operation of the mechanisms.

The propelling operation of the anvil 5 not only operates to form the staple-legs substantially at right angles to the crown of the staple, but, coöperating with the channels 14 15, maintains this relation of them while operating in connection with said channels to carry the staple to the delivery-point and elevate the same until its discharge into the channels or guideways 16 17 of the holder 10 is accomplished.

In order to insure the proper position of the staple in the holder 10, so that each staple will be securely lodged therein and accurately guided therefrom in the setting operation, advantage is taken of the resilient action of the wire from which the staples are made, so that the tendency of the staple-legs to move apart may be utilized in securing the proper position of the staple in the holder with respect to its ejecting-guideway. Thus, as is shown in Figs. 12, 13, and 15, the guiding-channels 16 17 in the holder 10 are enlarged laterally at the receiving-point for the newly-formed staple, whereby as the staple is carried into said channels 16 17 by the propelling action

of the anvil 5 and its legs pass out of the channels 14 15 said legs may expand into the enlarged portions of the channels 16 17, as shown in said figures, said enlarged portions of these channels thus operating as shelves to support the formed staple by its expanded legs in the plane of movement of the setting-tool or driver 12 and preventing the staple from moving downward. These channels 16 17 in advance of the receiving-point for the formed staple, which is about midway of the holder, are gradually contracted to dimensions which are equal to the widthwise extent of the staple when its legs stand at approximately right angles to its crown. By this construction said guideways or channels 16 17 will operate, as the driver 12 advances, as guideways, preventing the legs deviating from a true right-line onward course in the setting plane, or that of the movement of said driver, and at the same time act to gradually compress the staple-legs toward each other, so as to attain the right-angular position referred to, which will be accomplished as soon as the staple has passed out of the enlarged parts of said channels and reached or passed into the said channels in the forward part of the holder, said legs thus passing around the recess 2 and openings *a e*, the result being that the staple is in absolute control of rigid holding parts from its formation to its setting. The cylinder or support A also carries within it the wire supplying and feeding devices, the shell of said carrier being provided with a removable section 66 to admit of the introduction of the spools and also of adjustment of the parts and repairs thereto. Long lengths of suitable wire are wound upon spools S, that turn on a shaft 21, whose bearings are in brackets fixed to the cylinder A. The wire therefrom is led past a curved guiding-plate 35, thence between frictional feeding-rollers 22 23, thence through a guiding eye plate or block 24, (see Fig. 11,) and is finally entered into the wire-passage 8. The upper one, 22, of the frictional wire-feeding rollers 22 23 is on a stud suitably supported and is driven by means of a bevel-wheel 36 on said stud, which meshes with a similar bevel-wheel 37 on the shaft 20.

The wire-cutting device consists of a suitably-shaped arm 1, (see Fig. 11,) that is fast on the shaft 20, and it is provided with a cutting edge that sweeps between the plate 7 and the guiding-block 24 and in shearing relation to the outer surface of said plate 7. It is shown (see Figs. 1 and 2) as moving concertedly with the anvil 5 and operating to sever the wire slightly in advance of the impingement of the anvil 5 thereon; but this condition may be changed to suit the speed of operation, the size of the wire, or any other conditions which may affect its operation.

The means for clenching the staple-legs as here shown consist of a block or die 11, that is fastened to the cylinder or support B, so as to move rotatively therewith. In its face there is formed a groove of the length of the staple, the ends of which are tapered or rounded inwardly, as may be its sides, so as to progressively bend the staple-legs toward each other and center or aline them as they are pressed into it, and said groove is shallow enough to cause said legs as they are bent to approach and finally lie flat upon that side of the material opposite to the side from which they were entered into or passed through it.

The machine being set in motion the operations will be as follows: The wire is fed forward into the wire-passage 8, and when a suitable staple length extends therein the rotative cutter 1 and the rotative anvil 5 act in their rotative circuit, the cutter to sever the wire length and the anvil to intercept its body or crown portion, as in Fig. 9, and carry the same onward before it. As the anvil begins to press the wire length onward it first acts to draw the projecting ends of the wire length out of the wire-passages 8, then forces them over the bending-arms 4 6, and then draws them into the channels or guideways 14 15 in the plates 7 9, thus converting said ends into legs and completing a staple. The crown of this staple rests against the forward face of the anvil, while its legs, which lie against the sides of the anvil, are confined in the channels 14 15, (see Fig. 10,) and hence as the rotative circuit of the anvil is continued the staple-legs, controlled by said eccentric guideways or channels, cause the staple to be progressively moved outward as it travels onward, the crown of the staple moving radially and passing over the face of the anvil. When the entrance recess or way 2 into the staple holder or presenting tool is reached, the eccentric guideways or channels in the plates 7 9, acting as an elevator, will raise and guide the staple into said holder or presenting-tool, and as the staple is then advanced into the channels 16 17 of the holder the crown of the staple is moved off from the anvil 5, the staple being thus deposited in the holder or presenting-tool with its crown lying in front of the driver 12. The staple-legs, no longer confined by the channels 14 15, but having been drawn out of them, will expand by their resiliency and lightly press against the outer walls of the enlarged channels 16 17 of the holder or presenting-tool, said legs extending forward or in the direction of the setting movement. As the anvil thus freed from the staple it has formed and transported into the holder 10 moves onward rotatively to repeat its operation that part of the cylinder or support A from which the staple holder or presenting tool protrudes will be approaching the staple-setting point, as in Fig. 2, and the cam 34 will cause the inserting-tool or driver 12 to move forward, carrying the staple before it, so that it may finally stand supported in the mouth or end of the holder or presenting-tool, during which forward or longitudinal movement of the staple in the holder or presenting-tool 10 its legs, pressed

through the contracted portions of the channels 16 17, have been gradually bent into right-angular relation to the staple-crown ready to be set. When the cylinder or support A causes the presenting-tool to press into contact with the material M that is to be stapled and against the companion cylinder or support B or its clenching-die, the staple-legs will pierce the material and enter the clenching-die, and thus the holder or presenting-tool will be progressively pressed rearward against the resistance of its spring 13, while the driver 12 will remain stationary, thereby causing the staple-legs to be bent or clenched upon the material M. When the staple has been completely set by having its crown pressed against one surface of the material M, while its legs are clenched down upon the opposite surface, as in Fig. 2, the holder or presenting-tool will, continuing to move onward in its rotary circuit, be again protruded, the driver 12 will be retracted, the wire will be fed into the passages 8, the forming-anvil will rotate, and the operations described will be repeated.

The clenching device 11 has been described as traveling rotatively with its support, as the cylinder B. It is, however, practical and sometimes advantageous to have the clenching-die remain stationary, in which case it may be supported in the requisite position to coact with the other mechanisms in performing its function of clenching the staple-legs during the operation of setting the staple. In such operation of it there should be a clearance in a downward direction for the clenched staple-legs, in order that when the staple-legs are pressed onto the material they may be carried onward with the same without obstructing such movement or injuring the material.

The staple-bound material may be conveyed to any suitable cutting mechanism for severing it into sheets; but the same may be arranged for coaction with the other mechanisms, if that arrangement is preferred. When arranged to operate in direct connection with the other mechanisms, the cutting devices may be independent of the cylinders or supports A B and may have combined with them means for folding the staple-bound sheets in, on, or near their stapled line of union, or the folding mechanism, whether it be of the rotative or reciprocating type, may be arranged to operate before, after, or during the cutting operation.

It has been stated that it is sometimes desirable to have the supports for the stapling mechanisms in the form of cylinders. Thus if the said supports are also to act as carriers for any part of the material that is to be stapled, as would be the case if the feeding-rollers 40 41 were omitted and the material fed directly to or between the said supports, they would in cylinder form impinge upon and feed the material forward or otherwise cause the material resting thereon to be carried onward. When these supports are cylinders, they may not only carry cutting mechanisms for severing the material into sheet lengths, but support folding devices for doubling or folding the sheets upon their stapled line of union. Herein, as illustrative of this, the cylinder A is provided with a cutting-blade 44, that coöperates with a suitable cutting bed or slot provided in the cylinder B, and the latter is provided with a rotative folding-blade 45 46, that is adapted to coöperate with a pair of folding-rollers in doubling the sheets transversely. When the material is thus to be severed into sheets and folded, the cylinder B will have sheet-carrying grippers or equivalent front-end-engaging devices to carry the sheets onward.

It is to be observed that herein the forming-anvil bears upon the entire crown-forming portion of the wire length not only during the forming operation, but while carrying the formed staple onward for delivery. This is of great importance in mechanism having this mode of operation, because it prevents the staple-crown from kinking or bending, from which might result such a projection downward as would prevent the clearance of the forming-tool 5 in its rotary sweep through the holder 10 after having delivered the formed staple therein.

The staple-forming anvil 5 is shown to be adjustable on its carrying-shaft by means of a holding-screw 48. Of course any other means securing this adjustment may be adopted, the object being to fix the relative movement of the anvil with respect to the setting movement of the driver 12.

With respect to the holder or presenting-tool 10, which has been described as being sheath-like, as shown in Fig. 12, and in a modified form as consisting of two opposed arms, as illustrated in Figs. 14 and 15, it is to be observed that Fig. 14, being taken on the section-line 14 of Fig. 15, shows a facial view of the arm containing the channel 17, and it is to be noted that in the sheath form the tool has a reciprocating motion and in the modified form shown in Figs. 14 and 15 it is a stationary device. Of course there might be a bridge-bar leading from one arm to the other at their forward ends, said bridge-bar being provided with a lug to operate as does the lug 3, and thus convert these separate stationary arms into a moving structure, suitable guides being provided for them to move in.

Where the holder or presenting-tool reciprocates, it is obvious that the openings *a e*, provided for the protrusion therein of portions of the plates 7 9, so that the channels 14 15 therein may intercept and communicate with the channels 16 17 in the holder, must be elongated, as shown in the drawings, to admit of the reciprocation without interference with said plates.

As herein illustrated, the enlarged parts of the channels 16 17 are connected rearwardly as well as forwardly with the enlarged portions of said channels by angular portions.

Of course this is not essential in the rearward direction, but is preferable, since it accommodates the shape taken by the staple, and thus said staple in its entire transit through the holder has its legs continuously supported.

What is claimed is—

1. The combination with stationary plates having bending-arms and provided with eccentric guiding-channels for the staple-legs, of a forming-anvil rotating between said plates and bearing against the entire staple-crown, whereby the staple while carried onward is caused to traverse the face of the anvil by the travel of its legs in said channels, substantially as described.

2. The combination with a holder or presenting-tool, and stationary plates provided with guiding-channels for the staple-legs, of a forming-anvil rotating between said plates to deliver the formed staple into said holder or presenting-tool, a setting-tool reciprocating in said presenting-tool, and means for adjusting the anvil with respect to the presenting-tool, substantially as described.

3. The combination with plates having eccentric guiding-channels for the staple-legs and a staple-carrying anvil rotating between the same, of a staple holder or presenting tool provided with guiding-channels for the staple-legs and recessed midway to admit the carrying-anvil with the staple, substantially as described.

4. The combination with means for feeding staples thereto, of a staple holder or presenting tool provided with opposed guiding-channels for the staple enlarged at its point of reception thereof so as to receive and support a staple with its legs spread apart or at obtuse angles to its crown, substantially as described.

5. The combination with a setting-tool reciprocating therein and means for feeding staples thereto, of a staple holder or presenting tool provided with opposed guiding-channels for the staple enlarged at its point of reception thereof so as to receive and support a staple with its legs spread apart or at obtuse angles to its crown, substantially as described.

6. The combination of means for feeding staples thereto, with a staple holder or presenting tool having opposed longitudinal guiding-channels for the staple-legs, an opening cut through one side of said holder and intercepting said guiding-channels to admit the passage of the staple thereto, said guiding-channels being enlarged laterally at the receiving-point, whereby a formed staple may be delivered into said holder with its legs at right angles, and be retained therein by the spreading apart of its legs at obtuse angles, substantially as described.

7. The combination of a staple driver or setting tool reciprocating therein, with a staple holder or presenting tool having opposite longitudinal guiding-channels for the staple-legs enlarged laterally at the staple-receiving point and contracted beyond the same in the direction of the presenting movement of the driver to substantial parallelism, whereby a staple may be received in the presenting-tool with its legs spread at obtuse angles and said legs be bent substantially at right angles to its crown during the presenting movement, substantially as described.

8. The combination of means for feeding a staple thereto, and a staple driver or inserting tool reciprocating therein with a staple holder or presenting tool having opposed longitudinal guiding-channels for the staple-legs, an opening cut through one side of said holder and intercepting said guiding-channels to admit the passage of the staple thereto, said guiding-channels being enlarged laterally at the receiving-point, and contracted to substantial parallelism in the direction of the setting movement of the driver, whereby a formed staple may be delivered into the holder and received therein with its legs spread apart or at obtuse angles and said legs be bent substantially at right angles to its crown during the setting movement, substantially as described.

9. The combination with stationary plates provided with eccentric guiding-channels for the legs of a staple being carried onward, and an anvil rotating between said plates and operating as a carrier, of a staple holder or presenting tool provided with opposed longitudinal guiding-channels for the staple-legs, with which said eccentric guiding-channels connect between its ends, substantially as described.

10. The combination with stationary plates provided with eccentric guiding-channels for the legs of a staple being carried onward, and an anvil rotating between said plates and operating as a carrier, of a staple holder or presenting tool provided with opposed longitudinal guiding-channels for the staple-legs with which said eccentric guiding-channels connect between its ends and a driver reciprocating in said holder, substantially as described.

11. The combination with stationary plates provided with eccentric guiding-channels for the legs of a staple being carried onward, and an anvil rotating between said plates and operating as a carrier, of a staple holder or presenting tool provided with opposed longitudinal guiding-channels for the staple-legs with which said eccentric guiding-channels connect between its ends, said channels in the holder being enlarged to admit the spreading of the staple-legs therein, substantially as described.

12. The combination with stationary plates provided with eccentric guiding-channels for the legs of a staple being carried onward, an anvil rotating between said plates and operating as a carrier, and a reciprocating staple-driver, of a staple holder or presenting tool provided with opposed longitudinal guiding-channels for the staple-legs, with which said eccentric guiding-channels connect between its ends, said channels in the holder being en-

larged to admit the spreading of the staple-legs therein, and being brought to parallelism in the direction of the setting movement of the driver so as to contract the staple-legs into setting position, substantially as described.

13. A stapling mechanism consisting of a carrier provided with means for clenching the staple-legs and of a rotating carrier supporting within its shell the wire holding, feeding and cutting devices, and the staple forming, presenting and setting devices, substantially as described.

14. A staple holder or presenting tool provided with opposed longitudinal channels for the guidance of the staple-legs and setting-tool or driver, a portion of each of said channels being enlarged and joined at both ends to the main part of the channel by angular portions and said holder having a lateral passage leading to said channels, whereby a staple formed with its legs approximately at right angles to its crown may be delivered through said passage into said holder, and its legs be spread apart in said enlarged channels so as to support the staple, and its outspread legs be contracted to setting form in moving through said holder, substantially as described.

15. The combination with a rotary anvil, guiding-channels through which the staple is moved by the anvil in its rotation and a second set of guiding-channels connecting with the first and placed tangentially with reference to the path of the anvil in its rotation whereby as the anvil rotates the staple carried by it is successively moved through the first guiding-channels into the second guiding-channels and then out of the path of the anvil, substantially as set forth.

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

LUTHER C. CROWELL.

Witnesses:
H. T. MUNSON,
A. L. KENT.