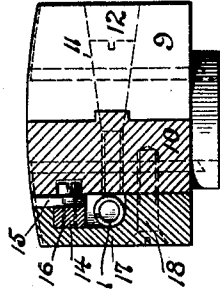


E. P. SHELDON.
STAPLE FORMING MECHANISM.
APPLICATION FILED JAN. 25, 1910.

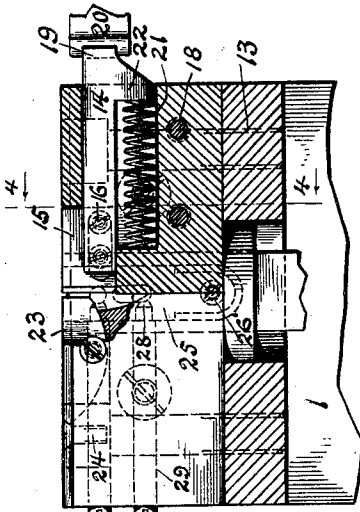
1,047,314.

Patented Dec. 17, 1912.

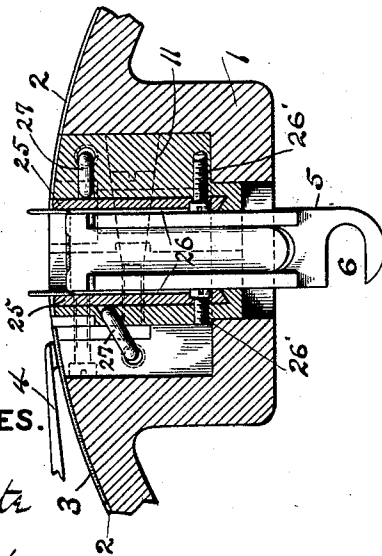
—FIG. 4.—



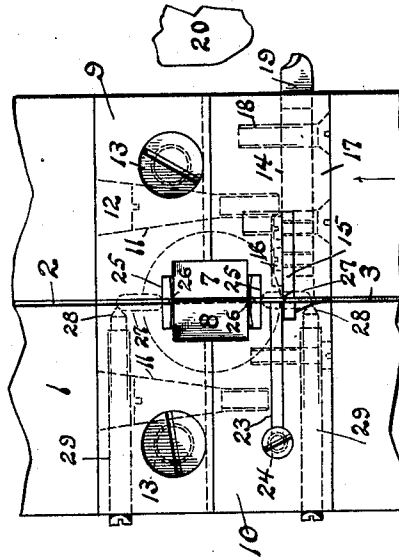
—FIG. 2.—



—FIG. 3.—



—FIG. 1.—



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STAPLE-FORMING MECHANISM.

1,047,314.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, EDWARD P. SHELDON, a citizen of the United States, residing at New York, county of Kings, and State of New York, have invented certain new and useful Improvements in Staple-Forming 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 staple forming mechanism and more especially to that class of staple forming mechanism which is employed for stapling the product of high speed printing machines.

In stapling the product of high speed printing machines it is desirable that the staples be truly formed, that is to say, that the legs of the staples when formed shall stand at the proper angle with relation to the crown, and that this angle, in the operation of the mechanism, shall not vary because of wear in the staple forming mechanism, or for other reasons.

It will be understood that stapling mechanisms of the character referred to are required to run at very high speed, that is to say, each staple forming and inserting mechanism is required to make and drive as high as one hundred and thirty staples per minute, or even more. In order that the staples may be driven at this speed, it is necessary that the legs be positioned with respect to the crown so that they will enter the paper at the proper angle, and if this angle be departed from, it may happen, in many cases, that the staples will not enter the paper, or if inserted at all, will be improperly driven.

Further, in that class of stapling mechanisms in which the staples are driven in line with the movement of the paper,—this class of stapling mechanisms being ordinarily known as "longitudinal staplers"—the wire is received in a circumferentially arranged channel in a rotary carrier in which the staple forming and driving mechanisms are mounted, the wire lengths which are to form the staples being cut off by a cutter operating across the channel in which the wire is received. Mechanisms have been heretofore employed in which the wire is received in a circumferentially arranged channel in a rotary carrier and is advanced by wire length holding devices, the wire length being sev-

ered by a pivotally mounted cutter which swings across the channel. It is important that the cutter in its movement shall not protrude beyond the periphery of the rotary carrier, for if it does it is liable to mar or tear the paper. It follows, therefore, that the operative part of such a rotary cutter as has been referred to can be but very little in excess of the diameter of the wire to be cut which is only about 2/100ths of an inch, and when this cutter wears, the wear can be overcome, practically speaking, only by the insertion of a new cutter.

The present invention has for its object to produce an improved construction for forming staples in which the position of the devices by which the staple is formed with respect to each other may be accurately determined and any variations which may occur because of wear or for any other reason may be quickly compensated for.

A further object of the invention is to improve the cutting devices for severing the wire lengths from which the staples are formed.

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.

Referring to the drawings—Figure 1 is a plan view of so much of a stapling mechanism constructed in accordance with the invention as is necessary to an understanding thereof. Fig. 2 is a sectional elevation of the construction shown in Fig. 1, certain parts being broken away. Fig. 3 is a sectional elevation of the construction shown in Fig. 1, the plane of section being generally at right angles to the plane in which Fig. 2 is taken. Fig. 4 is a section on the line 4—4 of Fig. 2, illustrating certain details of construction.

Referring to the drawings, which illustrate one form of mechanism which may be employed in carrying the invention into effect, 1 indicates a carrier in which the various devices hereinafter referred to are mounted. This carrier as illustrated will be understood to be a rotary carrier, such as is common in this class of mechanism, and it will be further understood that as a rule the carrier will be provided with a plurality of staple forming and driving mechanisms corresponding in construction. To avoid du-

plication in illustration only a part of the carrier and only a single staple forming and inserting mechanism is illustrated.

In the particular construction selected to illustrate the invention, the carrier is provided with a circumferentially arranged groove 2 to which the wire 3 may be delivered in any suitable manner, as from a reel, not shown. If desired, a presser foot, as indicated at 4, may be employed to retain the wire in the channel.

Constructions embodying the invention will employ wire length holding means, the particular construction of which may be widely varied. As illustrated, this wire length holding means includes a plunger 5 mounted to move in the carrier 1, the plunger being provided at its lower end with an operating hook 6 arranged to be engaged by a suitable operating mechanism, not shown. The upper end of this plunger is formed to provide a wire holding jaw 7 with which co-operates a second wire holding jaw 8 carried on the plunger. The particular construction of this wire length holding means will be well understood by those skilled in the art, and as the details thereof are not necessary to an understanding of the invention a full illustration and description of them is omitted in the interest of clearness and brevity.

In the particular construction illustrated, the wire length holding means referred to is located in a suitable recess in two blocks 9, 10, these blocks being located in a recess in the rotary carrier referred to. These blocks 9, 10 may be secured together in any suitable manner, as, for instance, by tapered screws 11, shown, for instance, in dotted lines in Figs. 1 and 4, these screws passing through tapered holes 12 in the block 9. The blocks 9, 10 may be held in the carrier in any suitable manner, as, for instance, by screws 13 which, as shown, pass through the block 9.

After the wire has been presented to the groove in the rotary carrier and gripped and advanced by the wire length holding means, it is severed to provide a proper length for the formation of the staple. The cutting devices employed for severing the wire may be varied widely in construction. In the mechanism selected to illustrate the invention, however, there is employed a cutter bar 14, this bar carrying a cutter 15 which is secured to the bar by screws 16 or in any other suitable manner. The bar 14 is received in a recess in the block 10, the recess in the particular construction shown being closed by a plate 17 secured to the block by screws 18, or in any other suitable manner. The bar, in the mechanism illustrated, is provided with a projecting end 19 arranged to contact with a cam 20 which may be mounted on a side frame of the machine, so that the end of the bar will strike it as the carrier rotates. The end of the bar may, if desired, and as shown,

be chamfered off to ease the contact. The contact of the bar with the cam causes the bar to move in a right line and force the cutter across the wire in the channel, thus severing the wire length.

As shown, the bar is returned after the cutting operation is completed by a spring 21, bearing at one end against a wall of the recess in the block 10 and at the other end against a shoulder 22 formed on the bar. In the particular construction illustrated, the knife 15 coöperates with a cutting block 23 secured in a recess in the block 10 by means of a screw 24, or in any other suitable manner.

It will be observed that, owing to the fact that the wire from which staples of the character made and driven by the mechanism described is formed, is of very small diameter, say, about 2/100ths of an inch, only a small part of the cutter can come in contact with the wire. With the construction shown, however, the operating part of the cutter can be equal to the full depth of the groove in which the wire is received, and, further, since the cutter moves in a right line, there is less danger of missing a cut than with the pivoted cutters heretofore employed. With the pivoted cutters referred to which necessarily swing in an arc across the wire receiving channel, if the operative corner or edge of the cutter becomes dull or if, for any reason, the wire does not lie close to the bottom of the channel, there is liability that the cutter will swing under the wire rather than across it and so miss the cut. With the cutter moving in a right line across the channel, however, a cut is bound to take place if the wire is in the channel, no matter what position it occupies therein, and, further, the construction lends itself readily to the resharpening and replacement of the cutter when this becomes necessary.

After the cutter operates the wire length holding device presents the wire length to bending devices which turn up the ends of the wire and form the legs of the staple, these legs being turned by the bending devices so that they form substantially a right angle with the crown of the staple which, at the time the legs are turned up, is held by the jaws 7, 8 of the wire length holding device. The construction of the bending devices may be varied, but in the best constructions embodying the invention, they will be so constructed that their position may be varied or adjusted with respect to the moving wire length holding device, so as to accurately control the angle which the legs of the staple make with its crown. In the particular construction illustrated, the bending devices consist of two benders or plates 25, these plates being provided with grooves 26 in which the wire is received. These benders, as illustrated, are located in recesses in

the blocks 9, 10, being held in the recesses in any suitable manner, as, for instance, by screws 26'. In the best constructions embodying the invention, the inner faces of these bending plates will be crowned or made slightly convex, and the grooves will be slightly less in depth than the diameter of the wire.

While the means employed for effecting the adjustment of the benders with respect to the wire length holding device may be varied, in the best constructions they will be such as to enable the adjustment to be effected from the outside of the rotary carrier. In the particular construction illustrated, the bending plates are acted upon by pins 27 located in recesses in the blocks 9, 10. As shown, these pins have rounded outer ends which are engaged by the inner ends 28 of screws 29, these screws being tapped through the blocks 9, 10, as shown, the heads being located so as to be readily accessible from the ends of the blocks. It will be understood that as the screws are turned in the pins are forced forward and in turn push the bending plates toward the wire length holding plunger. While the construction by which the benders are permitted to move may be varied, in the construction illustrated, the plates have sufficient spring to enable the slight adjustment which is necessary to be effected. The construction enables a very accurate positioning of the benders to be obtained, in the first instance, and, further, any wear which occurs can be readily compensated for without removing the mechanism from the carrier.

Changes and variations may be made in the construction by which the invention is carried into effect. The invention is not, therefore, to be confined to the particular construction herein shown and described.

What is claimed is:—

1. In a staple forming mechanism, the combination with wire length holding means, of bending devices located on opposite sides of the holding means and to which devices the holding means presents the wire to form the staple, said bending devices being adjustable with respect to the holding means.

2. In a staple forming mechanism, the combination with a rotary carrier, of wire length holding means mounted to move within the carrier, bending devices to which the holding means presents the wire, and means for adjusting the position of the bending devices with respect to the holding means.

3. In a staple forming mechanism, the combination with a rotary carrier, of a wire length holding device mounted to move therein, grooved benders between which the

holding device moves, and means for adjusting the position of the benders.

4. In a staple forming mechanism, the combination with a rotary carrier provided with a circumferentially arranged channel in which the wire is received, of wire length advancing and holding means, grooved benders to which the holding means presents the wire length, means for adjusting the position of the benders, and a cutter for severing the wire lengths.

5. In a staple forming mechanism, the combination with a rotary carrier, of a wire length holding device mounted to move therein, grooved bending plates between which the wire length holding device moves, and means for adjusting the position of the plates with respect to the wire length holding device.

6. In a staple forming mechanism, the combination with a rotary carrier provided with a circumferentially arranged channel in which the wire is received, of wire length advancing and holding means, benders to which the holding means presents the wire length, adjusting devices operating to vary the position of the benders with respect to the wire length holding means, means whereby said adjusting devices may be actuated from the exterior of the carrier, and a cutter for severing the wire lengths.

7. In a staple forming mechanism, the combination with a rotary carrier provided with a circumferentially arranged channel in which the wire is received, of staple forming devices including wire length advancing and holding means, and a sliding cutter independent of said wire length advancing and holding means, said cutter being mounted in the carrier and arranged to move in a right line across the wire receiving channel.

8. In a staple forming mechanism, the combination with a rotary carrier provided with a circumferentially arranged channel in which the wire is received, of staple forming devices including wire length advancing and holding means, a cutter bar independent of said wire length holding and advancing means, said bar moving within the carrier and being provided with an operating projection extending beyond the carrier, and a cutter carried by the bar, said cutter and bar having a right line movement across the wire receiving channel.

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

EDWARD P. SHELDON.

Witnesses:

F. W. H. CRANE,
LOUIS ROEHM.