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STAPLE FORMING AND DRIVING MECHANISM.

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1,111,114. Patented Sept. 22, 1914.

Fig. 1.

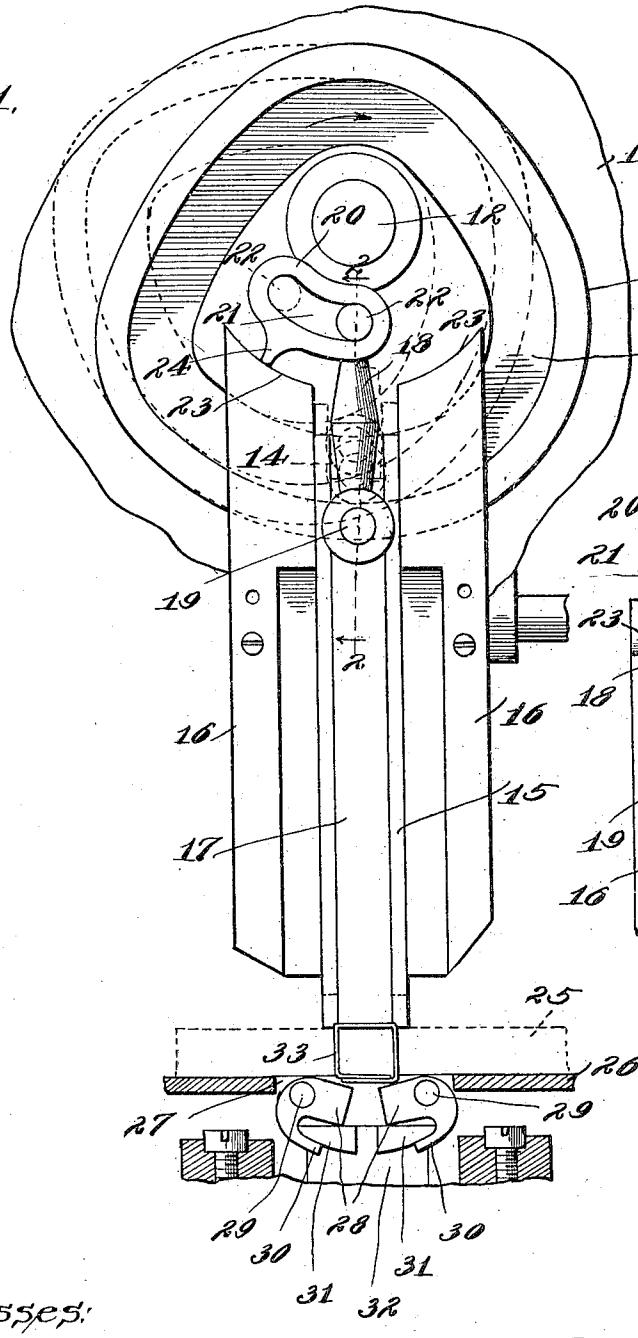
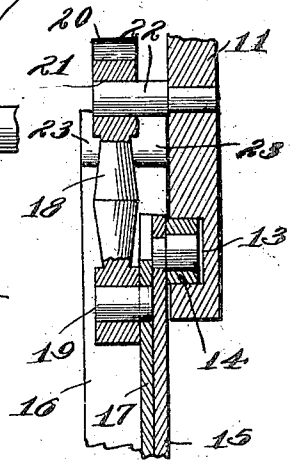


Fig. 2.



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UNITED STATES PATENT OFFICE.

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STAPLE FORMING AND DRIVING MECHANISM.

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To all whom it may concern:

Be it known that I, HENRY WEBER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Staple Forming and Driving Mechanism, of which the following is a specification.

Heretofore, in machines of this character, it has been customary to form the staple over a support by means of a former, and then drive the staple through the work by means of a driver coöperating with the former. Arranged below the work are clenchers which are adapted to engage the ends of the staple to clench them against the work. In machines of this character, and especially in machines where the forming and driving mechanism are operated by a cam, considerable difficulty has been experienced in that when the cam moves so as to cause the point of connection with the driver to pass over the center, a slight retrograde or rebounding movement will be imparted to the driver, causing the latter to move away from the staple before the clenching operation is completed, thereby permitting the staple or stitch to be loose.

In order to overcome these objections and difficulties, and to provide improved means whereby the driver will dwell for a short period of time, that is, during the time when the point of connection between the driver and the cam passes over the dead center, so that the staple will be firmly and tightly clenched in the work is the primary object of the present invention.

A further object is to provide an improved form of link attachment for connecting the driver to the cam whereby a lost motion will be permitted between the cam and the link.

A further object is to provide an improved device of this character which will be simple and cheap in construction, and effective and efficient in operation.

To the attainment of these ends and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty in the construction, combination and arrangement of the several parts hereinafter more fully described and claimed, and shown in the accompanying drawing illustrating an embodiment of the invention, in which—

Figure 1 is a front elevation of the staple forming and driving mechanism having an attachment applied thereto constructed in accordance with the principles of this invention. Fig. 2 is a detail sectional view taken on line 2—2 of Fig. 1.

Referring more particularly to the drawing, and in the present exemplification of the invention, the numeral 10 designates the ordinary and well known support for machines of this character, and upon which support the cam 11 is journaled for rotation by means of a shaft 12. The cam is provided with the usual cam groove 13, within which a projection 14 on a staple former 15 extends, and by means of which the staple former is reciprocated longitudinally in a guide formed by the spaced members 16. The staple former is preferably of channel formation, as shown, and within the channel the staple driver 17 is adapted to reciprocate. The staple driver is connected to the cam 11 in any desired or suitable manner, so that the cam will be adapted for an independent movement with respect to the point of connection with the staple driver. In order to accomplish this result, a link 18 is provided which is pivotally connected by one extremity, as at 19, to the driver 17. The other extremity of the link is provided with an enlarged laterally projecting portion 20, which is provided with a slot 21 therein struck upon an arc described from the center of the point of rotation of the cam 11. Extending from the cam is a pin or projection 22 which is secured to the cam and extends into the slot 21, and is of a diameter substantially equal to the width of the slot. The upper extremities of the guides 16 are preferably curved, as shown at 23, and the enlarged portion 20 of the link 18 is provided with an extension or finger 24 adapted to engage and move upon one of the curved portions 23 of one of the guides 16. These guides are placed on each side of the link to permit the link to have its position reversed to coöperate with the cam irrespective of its direction of rotation. The work 25 is adapted to rest upon the work support 26, which latter is provided with an opening 27 through which the clenching members 28 project. These clenching members are pivotally supported as at 29 and are provided with ears 30 which extend under projections 31 on an adjustable supporting member 32, so that when the member 32 is raised, the clenching members

28 will be raised to clench the ends of the staple 33 against the lower face of the work.

With this improved construction, the staple 33 is formed in the ordinary and usual manner, the operation of which forms no part of the present invention. Suffice it to say that the staple is formed over the usual staple support by means of the former 15, which is driven downwardly to force the material forming the staple over the support and to form the legs of the staple. At the completion of the formation of the staple, the former 15 will rest upon the work 25. For this operation the cam 11 will have moved a sufficient distance about its pivot 12 so that the pin or projection 22 will engage the bottom of the slot 21 of the link 18 and force the driver 17 downwardly against the formed staple. This operation will drive the legs of the staple through the work. The clenching members 28 are then operated to clench the ends of the staple against the bottom of the work. After the staple has been driven through the work by the driver, the driver will dwell or rest for a certain period upon the staple against the work, so that the clenching members will tightly clench the staple in the work. This dwelling or resting of the driver is permitted by means of the slot 21 in the enlarged portion 20 of the link. As shown in Fig. 1, the mechanism is shown in a position just at the completion of the driving and clenching of the staple. It will be apparent that a further movement of the cam 11 in the direction of the arrow after the staple has been clenched will not affect the driver, that is, the driver will remain upon the staple, and the projection 22 on the cam will move in the curved slot 21 until it reaches the other end of the slot, or the position shown in dotted lines in Fig. 1. During the movement of this pin 22 through the slot 21, the clenching members are designed to operate. After the pin or projection 22 reaches the end of the slot, a further movement of the cam in the same direction will raise the driver and position it for the next operation. As the pin 22 passes over the center during the rising movement of the driver, it will move from the position shown in dotted lines back to the other end of the slot, so as to lower the driver to drive another staple. It will be understood that when the pin 22 reaches the highest point of its rotary path of movement, that is to say, at the upper terminal of the vertical diameter of its rotary path, said pin will be located, with respect to the enlargement 20, in the position indicated by dotted lines in Fig. 1; after passing this point the projection 20 will assume an oblique position at an acute angle to the horizontal plane due to the pivotal connection of the link 18 to the staple driver 17. As soon as the projection 22 assumes this position pin 22 will exert a pressure on the lower side of the slot 21 and force the staple driver 17 downwardly and at the same time the pin will move along the slot 21 until the projection 20 and pin 22 are located at the righthand terminal of the horizontal diameter of the path of movement, at which time the pin is located within the slot as indicated in full lines in Fig. 1.

The ear or projection 24 on the portion 20 of the link is provided for the purpose of assisting in supporting the link and holding the latter in proper position, that is to say, during the movement of the pin 22 from one end of the slot to the other, while the driver 17 is at rest, it will rest upon the curved portion 23 of one of the guides 16 to hold the end of the link adjacent its point of connection with the cam in a proper position.

In order that the invention might be fully understood, the details of the foregoing embodiment thereof have been thus specifically described, but

What is claimed as new is:

1. The combination of a staple driver, guides for the driver, clenching mechanism coöperating with the driver, a rotatable cam, and a link pivotally connected to the driver and having a pin and slot connection with the cam, said slot being extended transversely of the link, and struck in an arc described from the center of rotation of the cam, a portion of said link being constructed and arranged to engage and ride upon the top of the said guide.

2. The combination of a staple driver, guides for the driver, clenching mechanism coöperating with the driver, a rotatable cam, a link pivotally connected with the driver, the free end of the link being provided with an enlarged laterally projecting portion having a slot therein struck on an arc described from the center of rotation of the cam, and a crank pin supported by the cam extending into and freely movable in the slot, said enlargement being provided with a portion arranged to engage and move upon a portion of the said guides for holding the slotted end of the link in position.

3. The combination of a staple driver, clenching mechanism coöperating therewith, a cam, a link connecting the driver with the cam whereby the movement of the cam will operate the driver, said link having a loose connection with the cam whereby the cam will move independently with respect to the driver during a portion of the movement of the cam, and means for supporting the end of the link remote from the driver during such independent movement of the cam.

4. The combination of a staple driver, clenching mechanism coöperating therewith,

a cam, a link connecting the driver with the cam whereby the movement of the cam will operate the driver, said link having a loose connection with the cam whereby the cam will move independently with respect to the driver during a portion of the movement of the cam, and means other than the cam for supporting the end of the link remote from the driver during such independent movement of the cam.

5. The combination of a staple driver, clenching mechanism coöperating therewith, a cam, a link connecting the driver with the cam whereby the movement of the cam will operate the driver, said link having a loose connection with the cam whereby the cam will move independently with respect to the driver during a portion of the movement of the cam, and a stationary support for supporting the end of the link remote from the driver during such independent movement of the cam.

6. A link for stapling machines comprising a body having an aperture extending transversely therethrough at one end, the other end of the body being enlarged laterally and extending for some distance to one side of the body, the enlarged portion having an extended curved slot therethrough curving away from the end of the link, there being a projection extending from the edge of the said enlargement on the convexed side of the slot and spaced from the body of the link.

7. The combination with a driving mechanism, of an eccentrically arranged pin mounted thereon, a staple driver coöperating therewith, a link pivoted to said staple driver, and a lateral projection carried by said link to one side thereof provided with a curved slot for the reception of the pin aforesaid.

8. The combination with a staple driver and operating mechanism. therefor, of a link pivotally connected to said driver, a rigid projection carried by said link, and a lost motion connection between said projection and said operating mechanism aforesaid.

9. The combination with a staple driver, of an operating mechanism therefor, a link pivoted to said staple driver, a rigid extension formed upon said link and projecting laterally therefrom, and a lost motion connection between said extension and said operating mechanism.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 14th day of January A. D. 1910.

HENRY WEBER.

Witnesses:
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C. H. SEEM.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."