

No. 608,699.

Patented Aug. 9, 1898.

E. H. MICHENER.
STAPLE DRIVING MACHINE.

(No Model.)

(Application filed July 28, 1897.)

2 Sheets—Sheet 1.

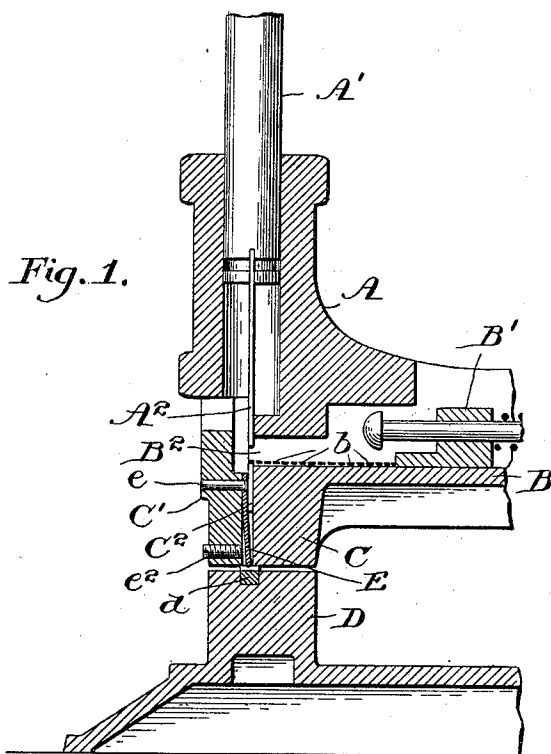


Fig. 2.

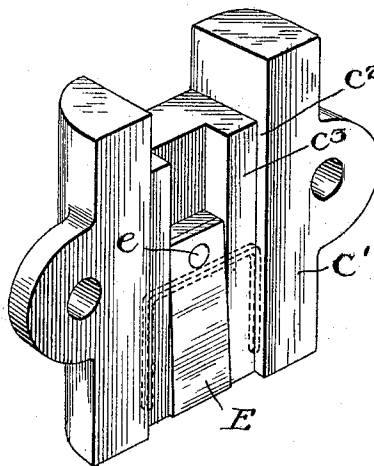


Fig. 5.

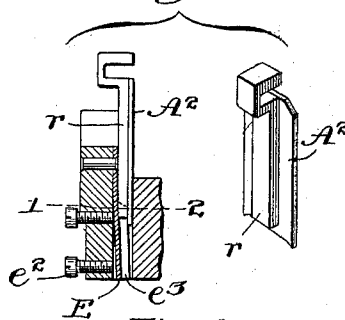


Fig. 6.

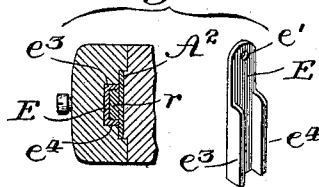
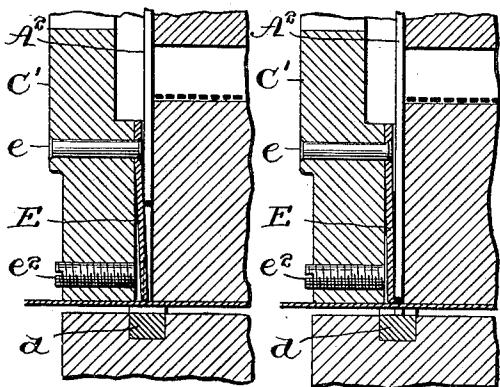


Fig. 3.

Fig. 4.



Witnesses.

M. L. Linn

A. V. Grouse

Inventor.

Edward H. Michener
By J. N. Steuben

Attorney.

No. 608,699.

Patented Aug. 9, 1898.

E. H. MICHENER.
STAPLE DRIVING MACHINE.

(No Model.)

(Application filed July 28, 1897.)

2 Sheets—Sheet 2.

Fig. 7.

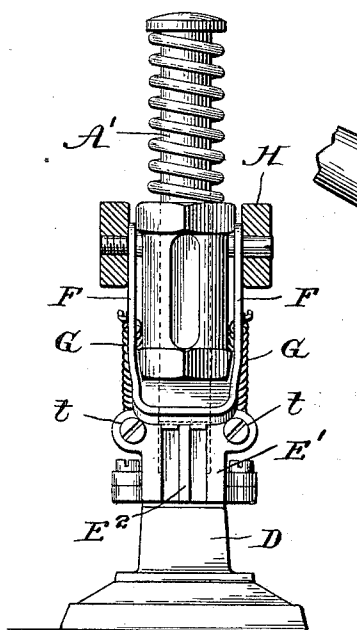


Fig. 8.

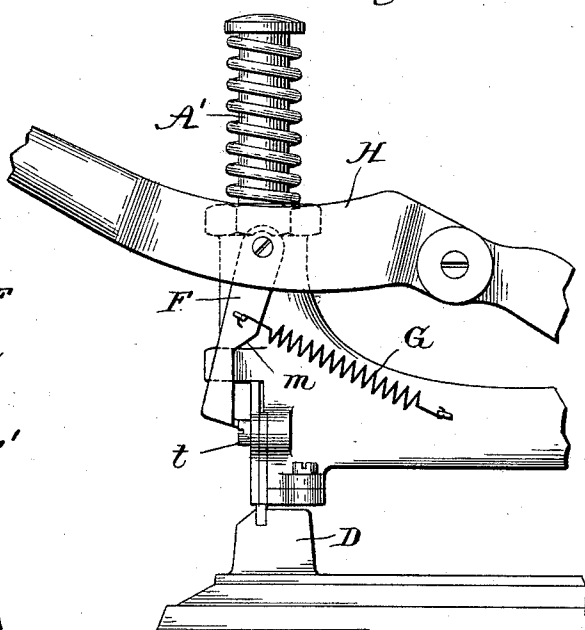


Fig. 9.

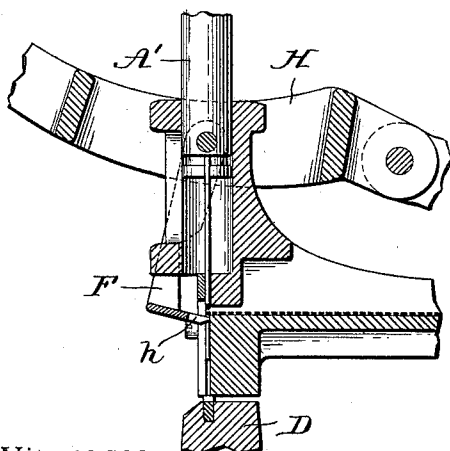
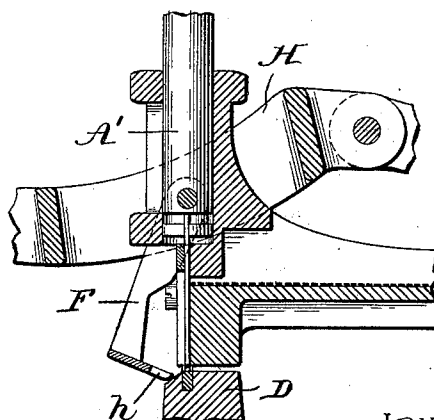


Fig. 10.



Witnesses.

M. Loun
A. V. Grouper

Inventor.

Edward H. Michener
By A. V. Grouper
Attorney.

UNITED STATES PATENT OFFICE.

ELWOOD H. MICHENER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
ACME STAPLE CO., LIMITED, OF SAME PLACE.

STAPLE-DRIVING MACHINE.

SPECIFICATION forming part of Letters Patent No. 608,699, dated August 9, 1898.

Application filed July 28, 1897. Serial No. 646,183. (No model.)

To all whom it may concern:

Be it known that I, ELWOOD H. MICHENER, a citizen of the United States, residing in the city of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Staple-Driving Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to staple-driving machines, and is applicable more particularly to self-feeding machines of the class referred to in United States patent granted to Michener and Ashbey, No. 552,254, dated December 31, 1895, in which machines a series of metallic staples arranged in train is maintained upon a feeding-bar within the magazine or other internal portion of the machine, which is provided with suitable devices to cause the staples to be automatically fed, delivered, and driven singly and successively by the feeding, delivery, and driving mechanisms, respectively.

In staple-driving machines, particularly the self-feeding machines, it has been a commonly-observed defect that when driving staples of very thin wire or with long legs or through thick paper-stock the sudden impact of the driver-blade on the unsupported crown-staple will exert such a pressure thereon as to bend or destroy the crown, and this occurs when the point of the leg of the staple has reached the paper-stock, and the driver-blade then exerts its greatest pressure on the crown of the staple to drive its legs through the paper.

The object of my improvement, hereinafter described, is to provide a device applicable to such machines which will sustain the crown of the staple and hold it up against this downward pressure of the driver-blade on the otherwise unsupported crown until the staple-legs have been driven through the paper-stock and the crown has almost reached the upper surface of the paper-stock, when by suitable devices the sustaining devices are thrown out of their position in supporting the crown of the staple, allowing the latter to be driven full home by the completion of the downward stroke of the driver-blade.

I have shown in the accompanying drawings two forms of this device, one of which merely performs the function above referred to and the other of which performs the additional function of the mechanism referred to in the aforesaid patent, No. 552,254, applicable to self-feeding machines, in preventing more than a single and successive delivery of staples from the magazine to the delivery-channel.

To effectuate the object of my invention, hereinabove mentioned, my improvements consist in the combination, with machines of the character described, of a spring-controlled device normally closing the delivery-channel of the machine below the feed-channel and adapted to retard the passage of the staple in its discharge from the delivery-channel, with means operating to throw the retarding device out of normal position when the crown of the staple shall have reached the mouth of the delivery-channel under pressure from the driver-blade.

In the accompanying drawings, illustrating my invention, Figure 1 is a longitudinal sectional view of the front end of a self-feeding staple-driving machine with my improvement attached thereto. Fig. 2 is an elevation of the delivery-channel plate with my improvement attached thereto. Figs. 3 and 4 are sections of part of the feeding, delivery, and driving mechanisms with my improvement in position in the delivery-channel, the views showing the relative positions of the driver-blade to the spring-controlled arm applied by me to such machines to effectuate the object hereinbefore mentioned. Figs. 5 and 6 are intended to illustrate the form of spring-controlled arm applicable to large machines in which it has been found necessary to use a rib-strengthened driver-blade. Figs. 7 to 10, inclusive, are views showing the operation of a modified form of my invention.

The construction and operation of the machines of the general character to which my improvements are applicable are fully shown and described in patent to Brown, No. 532,136, dated January 8, 1895, and hence need not be further described except to state that such machines consist, essentially, of feeding mech-

anism, delivery mechanism, and driving mechanism so combined and arranged relatively to each other that staples arranged in train on the feeding devices are on each upward stroke of the driver-blade fed singly and successively to the delivery devices and on each downward stroke of the driver are delivered therefrom and driven. These parts so combined and arranged must, to produce the result stated, act in unison of time with each other—that is to say, the staples are arranged in train on the mandrel or feed-bar of the feeding device and are under constant spring-pressure acting from the rear of the train, tending to push them forward and eject them from the mouth of the feed-channel and so discharge them into the staple-delivery channel, which is at right angles to the feed-channel. This action is controlled by the blade of the driving mechanism, said blade reciprocating vertically in the aforesaid delivery-channel and normally closing the mouth of the feed-channel. Hence when the driver-blade has made its downstroke it closes the delivery-channel and of course prevents a second staple entering the said channel until the last one discharged therein from the feed-channel has been driven. On the return or up stroke of the driver-blade it will of course open the mouth of the feed-channel and allow another staple to be discharged therefrom into the delivery-channel below the driver-blade. Obviously this staple so delivered is temporarily suspended by friction in the delivery-channel, or if the latter be relatively large the staple will drop down in the channel until the points of its legs rest upon the paper-stock to be wire-stitched. In either event it remains in one or the other of said positions in the delivery-channel until the return or down stroke of the driver contacts with its crown and ejects it from the delivery-channel by driving it through the underlying paper-stock resting on the clenching-anvil of the machine. Obviously the impact of the driver-blade on the staple-crown is both forcible and sudden, and the staple being free and unsupported in the channel the result frequently is to bend or crush inward the crown of the staple, more especially when hard paper-stock is to be stitched or when thin wire staples are employed for fine book-work or when staples with long legs are to be driven through very thick and necessarily strong resisting paper-stock.

My improvement applicable to such machines operates to support the crown of the staple from the time it is shot into the delivery-channel and during the whole of its passage therethrough until it is discharged and driven through the paper-stock to be stitched.

Referring to Sheet 1 of the drawings, in Fig. 1 are shown the driving devices, composed of frame A, bar A', and blade A², the feeding devices, composed of staple-bar B, with a train of staples b thereon, spring-actuated pusher B', and channel B², formed by

the frame, while the delivery devices consist of the portion C of the frame and the grooved plate C', forming the staple-channel C². The anvil is represented at D and is provided with the usual clenching-recess d. This plate C', which is the part of the machine to which my improvement is preferably added, is shown in enlarged perspective view in Fig. 2. It is recessed, first, to form a staple-channel C², and the wall C³ of the latter is recessed or grooved to receive a flat spring E, which is riveted or otherwise secured at its upper end in said recess in the wall C³ by a screw, such as indicated at e. The lower end of the flat spring is of course free, and it is made to project more or less into the staple-channel, as may be desired from time to time, by means of an adjusting-screw e². (See Figs. 1, 3, and 4.) In Figs. 3 and 4 will be seen enlarged views illustrating the position of the flat spring E in the staple-channel relatively to the mouth of the feed-channel and in the former figure the position of the driver-blade relatively to the spring when the blade on its downstroke reaches the crown of the staple, while in Fig. 4 is shown the blade on the completion of its downstroke, having forced the staple down against the sustaining power of the spring.

Sometimes in large machines operated by power the driver-blade must be strengthened, such as by adding a central rib to it, as indicated at r, (see right-hand side of Fig. 5,) and in that event it is obvious that the rib would reciprocate in the inner recess formed in the wall C³ of the cap-plate C'. (See Fig. 2.) Such construction is indicated by Fig. 5 and further illustrated by the left-hand portion of Fig. 6, which is a section on the line 1 2 of Fig. 5. In case the driver-blade is thus ribbed and the recess occupied by the rib it is necessary to flange the spring E, as shown in the right hand of Fig. 6, the spring being secured at e' in the recess of the staple-channel plate, and the edge surfaces of the projecting flanges e³ e⁴ therefore operate, as does the flat spring-plate E, in supporting the crown of the staple and retarding its delivery from the channel.

The operation of the device is apparent from the description already given and is clearly shown in Fig. 2, in which the dotted lines indicate a staple resting in the delivery-channel and supported therein by a side pressure against its crown exerted by the spring-bar E, and this position is the one assumed automatically by the staple when it drops in the channel after being shot out of the feeding-channel.

A modification of my invention is illustrated in Figs. 7 to 10, and though I prefer the other form as the simplest and cheapest the modified form performs not only the primary function of supporting the staple-crown in the manner and for the purpose described, but also the secondary or additional function of preventing a second or double delivery of

staples from the feed to the delivery channel, which is the object accomplished by the mechanism patented and described in my former patent, No. 552,254, dated December 31, 1895.

5 In Fig. 7 is shown a front view, and in Fig. 8 a side view, of a machine in all respects like the machine of Fig. 1, saving only in the form of the delivery-channel plate C', which is devoid of the inner recess; but instead thereof
10 the wall C³ (of Fig. 2) is slotted vertically to admit the points of the arm F, and is preferably double-slotted, so as to form a central guide-bar E², the points of the arm F entering the slots on either side of the central bar
15 E². This swinging arm F is pivotally hung on a shaft which passes through the operating-handle H and the driver-bar A', and hence reciprocates with it. Its pointed or fingered
20 end is caused by the spring G to normally rest in the slots in the channel-plate on either side of the central bar E², and hence these fingers or points pass into the staple-delivery
25 channel and will catch a staple by the under side of its crown when it is ejected from the feed-channel on the upward stroke of the
30 driver-blade. Fig. 9 shows such a position of the parts, the driver-blade having just passed upward and opened the feed-channel, thereby permitting a staple to be shot into the de-
35 livery-channel and rest by its crown on the fingers or points of the swinging arm F. The position of the several parts on a return or
40 down stroke of the driver is illustrated in Fig. 10, wherein is shown the arm F carried down by the reciprocating movement of the
45 blade-bar A', all the while supporting the staple by its crown, until the latter having almost reached the mouth of the channel the arm F is swung outward and its points or fingers withdrawn from the staple-channel (and the consequent further support of the staple) by contact of the bevel *m* of the spring-controlled arm with the projecting edges of the screws *t* of the delivery-plate. Obviously
50 the spring G causes the swinging arm F to return to its normal position on the return or upward stroke of the driver.

Having thus described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

1. In a staple-driving machine, the combination with staple-driving mechanism of the character described, comprising feeding, delivery and driving mechanism operating to feed, deliver, and drive staples singly and successively on each full reciprocating stroke of the driver-blade, of means, consisting essentially of a spring-controlled arm, normally closing the delivery-channel in position to be straddled by the staple and to support the same by pressure against its crown portion only, said arm being arranged to maintain such pressure until the staple-legs have been driven through the paper and the clenching thereof is about to be completed, substantially as specified.

2. The combination with the driving and delivery members of staple-driving machines of the character described, of a spring of less width than the staple to be driven, and mounted in the staple-channel of the delivery member in position to be straddled by the staple, and operating to support the same by upward pressure against its crown portion during the downward pressure thereon of the driver-blade and to maintain such pressure until the legs of the staple have been driven through the paper, substantially as specified.

3. The combination in machines of the character described, with a delivery-channel plate C' having its inner channel-wall C² recessed, of a spring-arm E mounted in said channel and fast thereto at its upper end at *e*, and with its lower spring end projecting into the staple-delivery channel, and with means, such as set-screw *e*², to adjust the same; substantially as described.

In testimony whereof I have hereunto affixed my signature this 19th day of July, A. D. 1897.

ELWOOD H. MICHENER.

Witnesses:

M. E. CONN,

GEO. W. REED.