(No Model.) 2 Sheets—Sheet 1.

E. H. MICHENER & W. S. ASHBEY.

SELF FEEDING STAPLE DRIVER.

No. 552,254. Patented Dec. 31, 1895.

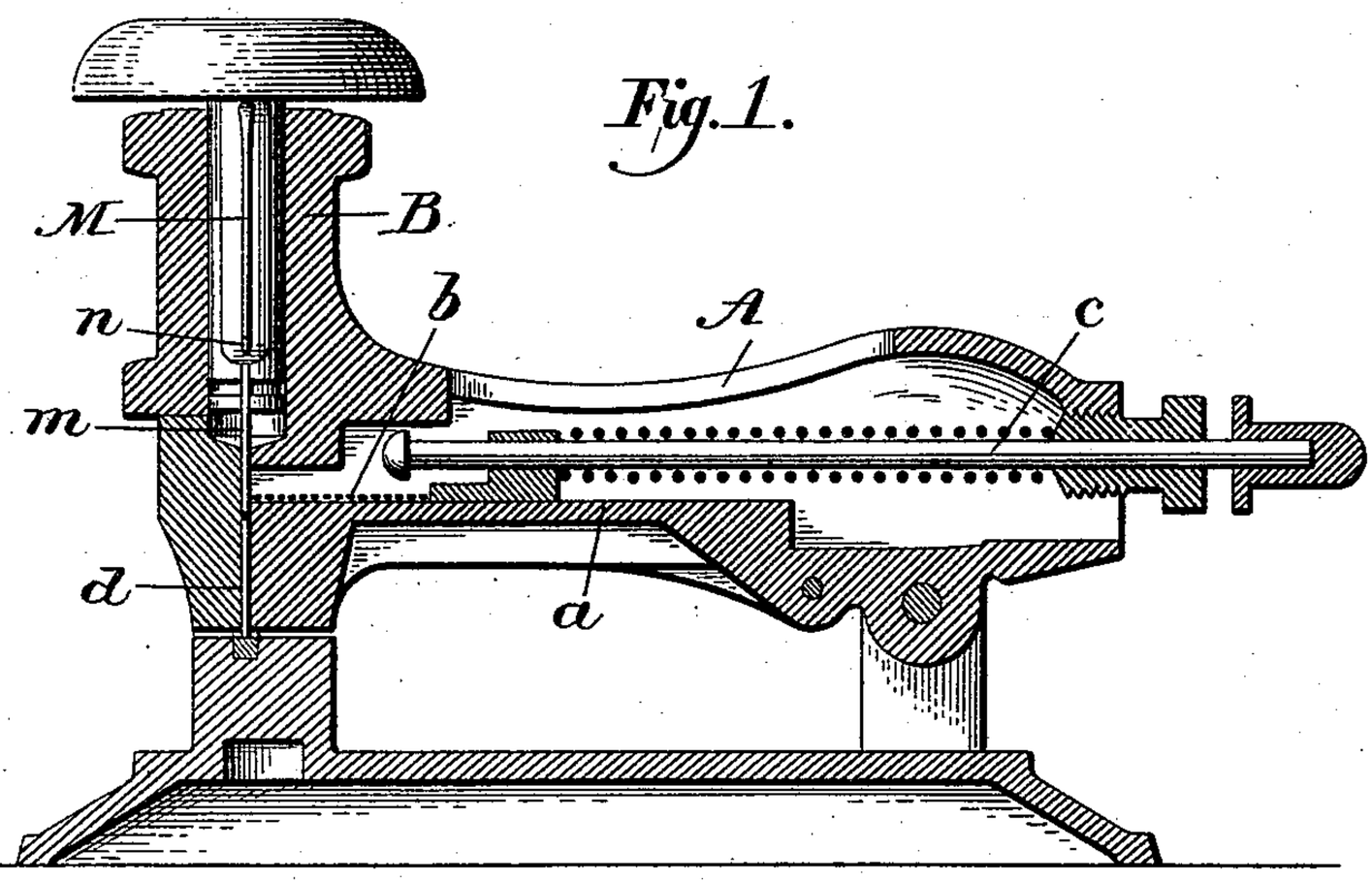


Fig. 1.

Fig. 2.

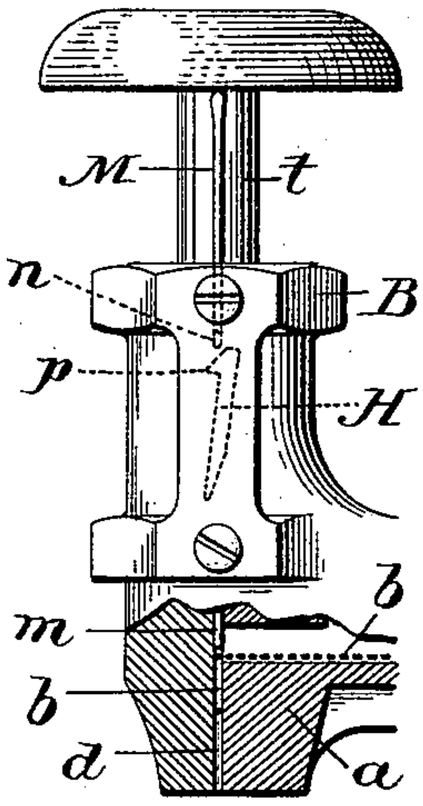


Fig. 3.

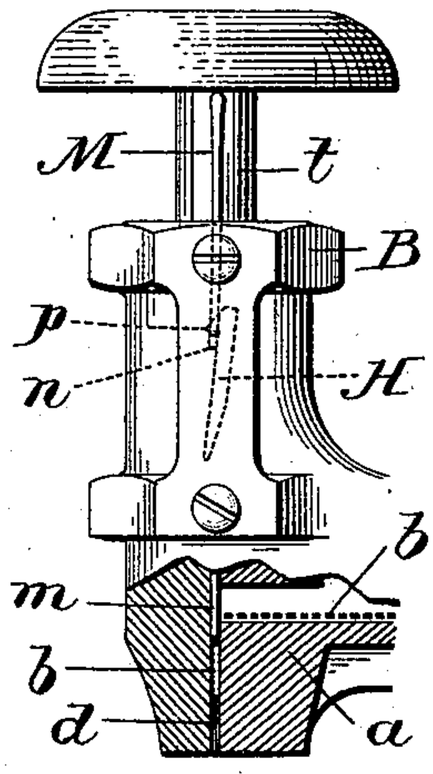


Fig. 4.

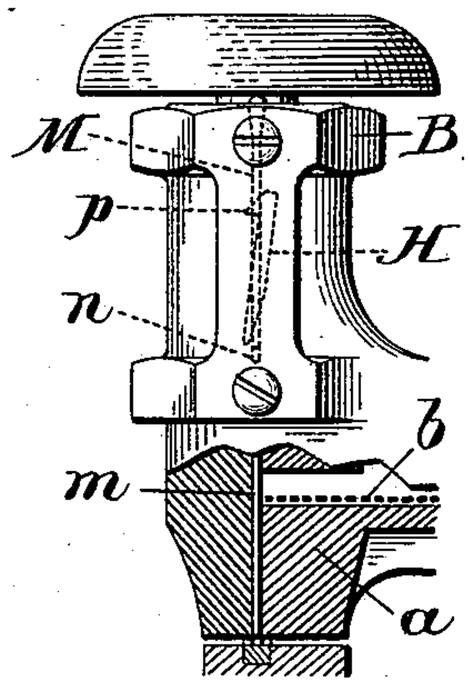
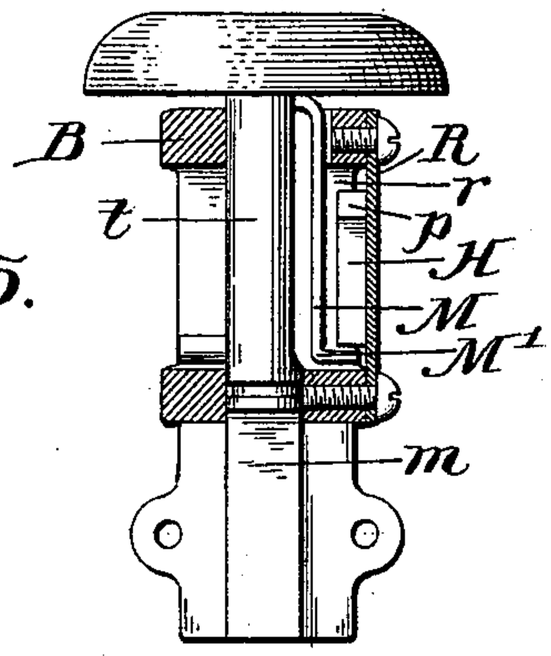


Fig. 5.



Witnesses.

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(No Model.) 2 Sheets—Sheet 2.

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SELF FEEDING STAPLE DRIVER.

No. 552,254. Patented Dec. 31, 1895.

Fig. 6.

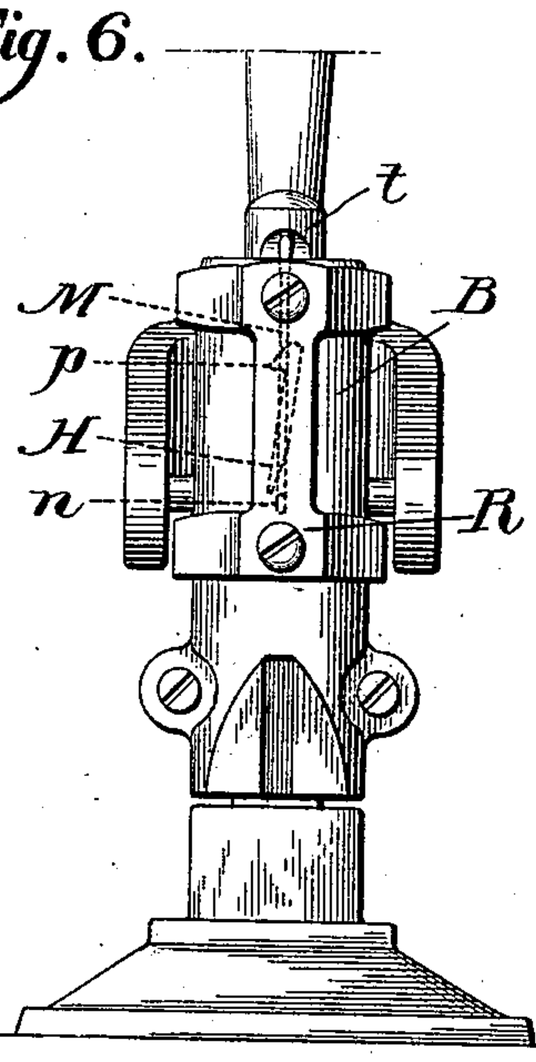


Fig. 7.

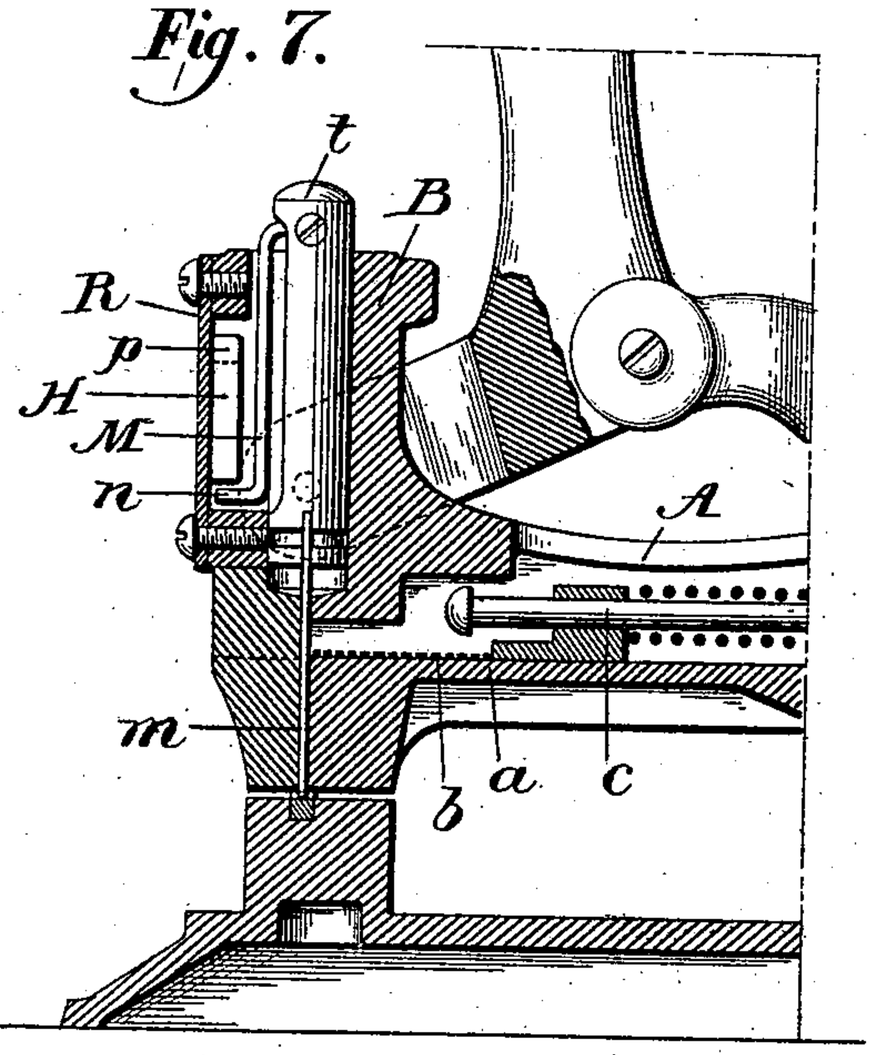


Fig. 8.

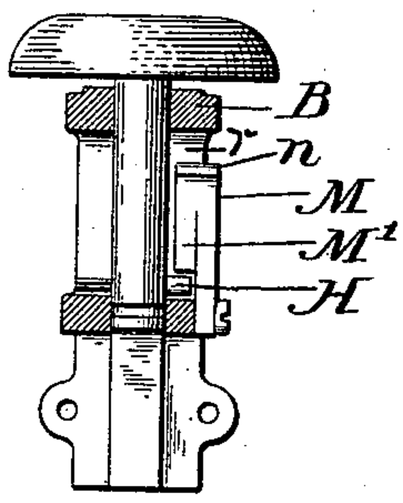


Fig. 9.

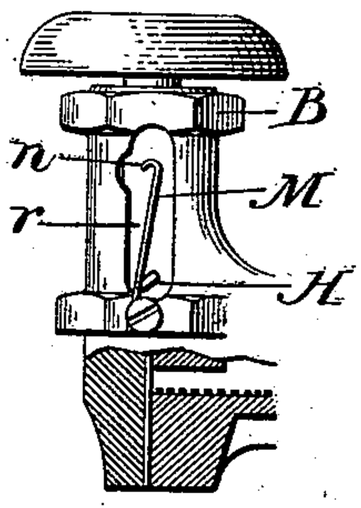


Fig. 10.

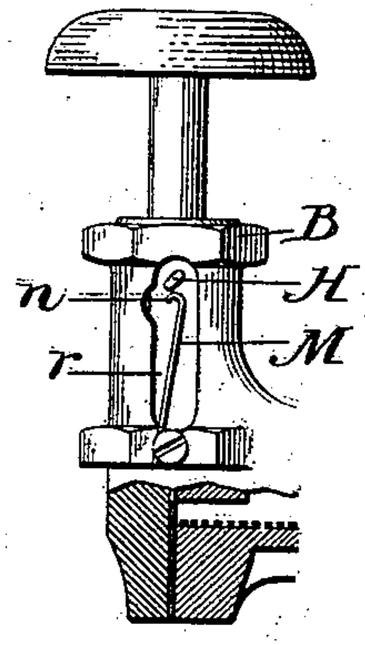
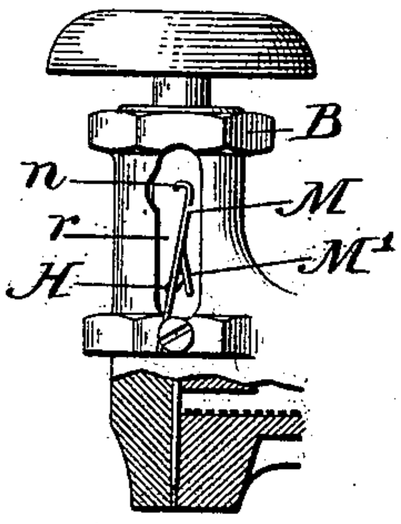


Fig. 11.



Witnesses:

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Attorney.

UNITED STATES PATENT OFFICE.

ELWOOD H. MICHENER AND WINFIELD S. ASHBEY, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNORS TO THE ACME STAPLE COMPANY, LIMITED, OF SAME PLACE.

SELF-FEEDING STAPLE-DRIVER.

SPECIFICATION forming part of Letters Patent No. 552,254, dated December 31, 1895.

Application filed July 3, 1895. Serial No. 554,813. (No model.)

To all whom it may concern:

Be it known that we, ELWOOD H. MICHENER and WINFIELD S. ASHBEY, citizens of the United States, residing in the city of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Self-Feeding 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.

Our invention relates to that class of machines for driving metallic staples sometimes called "automatic" or "self-feeding" staple-drivers, in which a series of such staples in train is maintained upon a feeding-bar within the magazine or other interior portion of the machine which is provided with suitable devices to cause them to be automatically fed forward and delivered singly and successively to the delivery and driving mechanisms.

An illustration of the class of machines to which our improvement hereinafter described is applicable will be found in Letters Patent of the United States granted to William J. Brown, Nos. 532,136 and 532,138, both dated January 8, 1895, also No. 354,885, dated December 28, 1886, and No. 369,916, dated September 13, 1887. A serious defect in all such machines as commonly constructed is that a second or third staple may be and is frequently delivered to the staple-channel of the delivery mechanism before the staple previously delivered thereto is discharged therefrom by the driving mechanism, which invariably results in clogging the delivery mechanism and frequently destroying the further usefulness of the machine. Ordinarily this is occasioned by careless persons raising the driver-blade far enough to uncover the channel of communication between the feeding member and the delivery member, and thus allow a staple to be delivered into the latter, and then, without discharging the staple therefrom, again reciprocating the driver for a part of its upward stroke and deliver a second staple to the delivery-channel, and thus cause the latter to be choked by the two staples therein. Our invention has for its object to effectually prevent this by a novel combination and arrangement of devices which operate to prevent a full upward or return movement of the driver, sufficient to cause a second uncovering of the staple-delivery channel, until any previously-delivered staple in the delivery member is completely ejected therefrom by a full downward stroke of the driver; and to that end the device of our invention consists in the combination, with a staple-driving machine comprising automatic staple-feeding mechanism, a staple-delivery head communicating therewith, and a reciprocating driver-blade operating in the open channel between said feeding and said delivery mechanisms, and serving to open and close said communication, respectively, of a spring-arm, having one end free and provided with a hook thereon, and secured by its other end to the delivery-head or to the driving mechanism, and a cam-lug contacting with pressure against the free end of the spring-arm and arranged opposite thereto and secured upon the other of said two members of the machine, one of said parts being reciprocated vertically and in unison with the driving mechanism of the machine, said parts being so constructed and arranged relatively to each other that when the driver-blade makes a full stroke the cam-lug and the spring will pass to opposite sides of each other at the termination of each full stroke in both directions, but when the driver-blade makes less than a full downstroke the cam-lug will remain in its normal position on the hooked side of the spring-arm and engage the hook on an attempted upward retraction of the driver-blade, and thus prevent the latter being raised high enough to cause a second uncovering of the staple-delivery channel of the feeding member.

In the accompanying drawings, illustrating our invention, Figure 1 is a longitudinal sectional view of a self-feeding staple-driving machine with our improvements attached thereto. Figs. 2, 3, and 4 are like views, respectively, of the delivery and driving mechanisms and part of the feeding mechanism, the views showing in dotted lines the relative positions of the several parts of our device during the reciprocation of the driver-blade

in the channel of the delivery member of the device. Fig. 5 is a lateral sectional view of the delivery-head and driving mechanism and a front view of our device in position therein. Figs. 6 and 7 show the improvement attached to a modified form of the same machine in which the driver is actuated by a hand-lever, the only difference being that our improvements are applied to the front of the delivery-head instead of at the side, as in Figs. 1 to 5. Figs. 8 to 11 show the improvements in a modified form applied to the front of the machine shown in Fig. 1 and it is obviously applicable to many other forms of self-feeding machines well known in the market.

The construction and operation of the feeding member, the delivery-head, and the driving member, and their position and operation relatively to each other are fully described in the Letters Patent granted to W. J. Brown hereinabove referred to, particularly Patent No. 532,136.

The feeding member A consists of an open magazine containing a longitudinal bar or mandrel *a* on which is maintained a row of staples *b* in train which are automatically fed forward under the pressure created by a spring-actuated pusher-rod *c*. This magazine communicates at its front end with a channel *d* at right angles thereto in the delivery member B, in which channel is vertically reciprocated a driver-blade *m* having usually a shanked head M. The driver-blade therefore opens and closes the channel of communication between the feeding member and the delivery-head and thus permits the staples to be delivered automatically singly and successively to the channel *d* of the delivery-head at each upward stroke of the driver-blade. A staple *b* thus delivered into the delivery-head on the upward stroke of the driver is ejected therefrom on the full downward or return stroke of the driver. The driving mechanism performs primarily the function, on its upward stroke, of opening the feed-channel and allowing a staple to be delivered into the staple-channel of the delivery-head, and, secondarily, it performs the function on its downward stroke of ejecting the staple therefrom and driving it; but the latter function necessarily depends upon the downward stroke being a full stroke. The principle of operation of our invention therefore resides in so governing the operation of the driving mechanism by means of our added devices that it cannot perform its primary function of opening the feed-channel until the previous full downward stroke of the driver has been completed and driven out any staple previously delivered into the delivery member.

With this explanation our invention will be readily understood, it being remembered that the driver-blade of the machine is always reciprocated within the staple-channel of the delivery member, which is always stationary relatively to the driver-blade. Obviously, therefore, the two elements of our added device—the hooked spring-arm and the cam-lug—may be applied by attaching the spring-arm to the reciprocating driving member and the cam-lug to the inner face of the stationary delivery-head, as shown in Figs. 1 to 7, or on the other hand the reverse arrangement may be adopted, in which the cam-lug is secured to the reciprocating driving member and the spring-arm secured by one end to the stationary delivery-head, as in Figs. 8 to 11. The latter form is the simplest and in some respects more desirable.

In the drawings, Figs. 1 to 7, M is the spring-arm having one free end with an outwardly-turned hook *n* thereon, arranged and adapted to contact with the cam-lug H. In this form, wherein the spring-arm is the reciprocating element, it is secured free-end downward on the driver-shank, and the cam-lug H is a bar of some length secured on the inner face of a plate R fastened over the opening *r* in the delivery-head. The lug is placed at an angle to create a resistance on one side of the perpendicular spring-arm in passing it, and it is notched or provided with a projection *p* to engage the hook *n* on the spring-arm if the latter is retracted before reaching the lower end of the cam-lug and passing under and up on the other side thereof. The tension on the spring-arm causes it to spring readily to the opposite side of the cam-lug when it reaches the end thereof.

In case the spring-arm is the stationary element, as in Figs. 8 to 11, it may be secured to the delivery-head in or against the opening *r* therein, its free end upward, and the cam-lug H is secured to the shank of the driver, and is in such construction a simple bolt-head placed at an angle so as to slide freely over the rounded hook end of the spring-arm M when carried downward by the descending driver-blade. In this form it is not necessary or desirable to make a hooked projection on the lug, but we divide or split the spring, as shown in Fig. 11, so that at the termination of the downward stroke the lug will not have to overcome the resistance of the entire spring but only the inner split side M′ and therefore will pass more readily around the lower end thereof, which is shortened or cut away on the inner split side to enable the lug to pass to the opposite side of the spring-arm ready to be drawn up on that (the opposite) side of the arm on the return or upward stroke of the driver.

The operation of the device and the purpose to be accomplished thereby is as follows: With the parts of the machine in normal position, the driver down, the cam-lug is on the plain side of the spring-arm, as shown in Figs. 4 and 9. When the driver has made its full upward stroke and let a staple into the delivery-head by opening the channel of communication with the feeding member, the cam-lug is just beyond the free end of the spring-arm, as shown in Figs. 2 and 10, ready to pass to the other or hooked side of the latter on the

return or downward stroke of the driver. If the latter makes a full downward stroke, the lug is directed along that side of the spring-arm its full length, and thence passes to the other or plain side of the arm, and so on as long as the alternate downward strokes of the driver are full strokes; but if a partial downward stroke is made, so that the lug will not pass the whole length of the hooked side of the spring-arm, it is obvious that if then an upward return stroke is attempted the lug will contact with the hook on the spring-arm, as shown in Figs. 3 to 11, and prevent the driver-blade from ascending high enough in the delivery-head channel to open the communication with the feeding member. Hence a second staple cannot be delivered from the latter into the former by such partial upward return stroke, nor will such delivery be possible until the parts are put into normal position by actuating the driving member for a full downward stroke and ejecting the staple previously delivered into the channel of the delivery-head.

Having thus described our invention, what we claim is—

1. In combination with staple driving mechanism of the character described, comprising feeding, delivery and driving members, mechanism consisting substantially of a resilient hooked arm and a cam device one of the same being mounted upon the delivery member and the other upon the driving member, and actuated relatively to each other by and in unison with the driving mechanism; said parts being combined, arranged and operating to control the successive alternate operation of the feeding and driving members, as and for the purpose set forth.

2. The combination in a staple driving machine comprising feeding mechanism and delivery mechanism with driving mechanism governing primarily the channel of communication between the feeding and delivery members and secondarily the ejection of the delivered staple from the latter, of mechanism consisting of a hooked spring arm and a cam lug, one of the same being reciprocated relatively to the other by and in unison with the driving mechanism, said parts being combined and arranged to operate to control and limit the reciprocation of the driving member relatively to the channel of the feeding mechanism, substantially as and for the purpose described.

In testimony whereof we have hereunto affixed our signatures this 26th day of June, A. D. 1895.

ELWOOD H. MICHENER.
WINFIELD S. ASHBEY.

Witnesses:
FRANK S. BUSSER,
H. T. FENTON.