

Sept. 15, 1925.

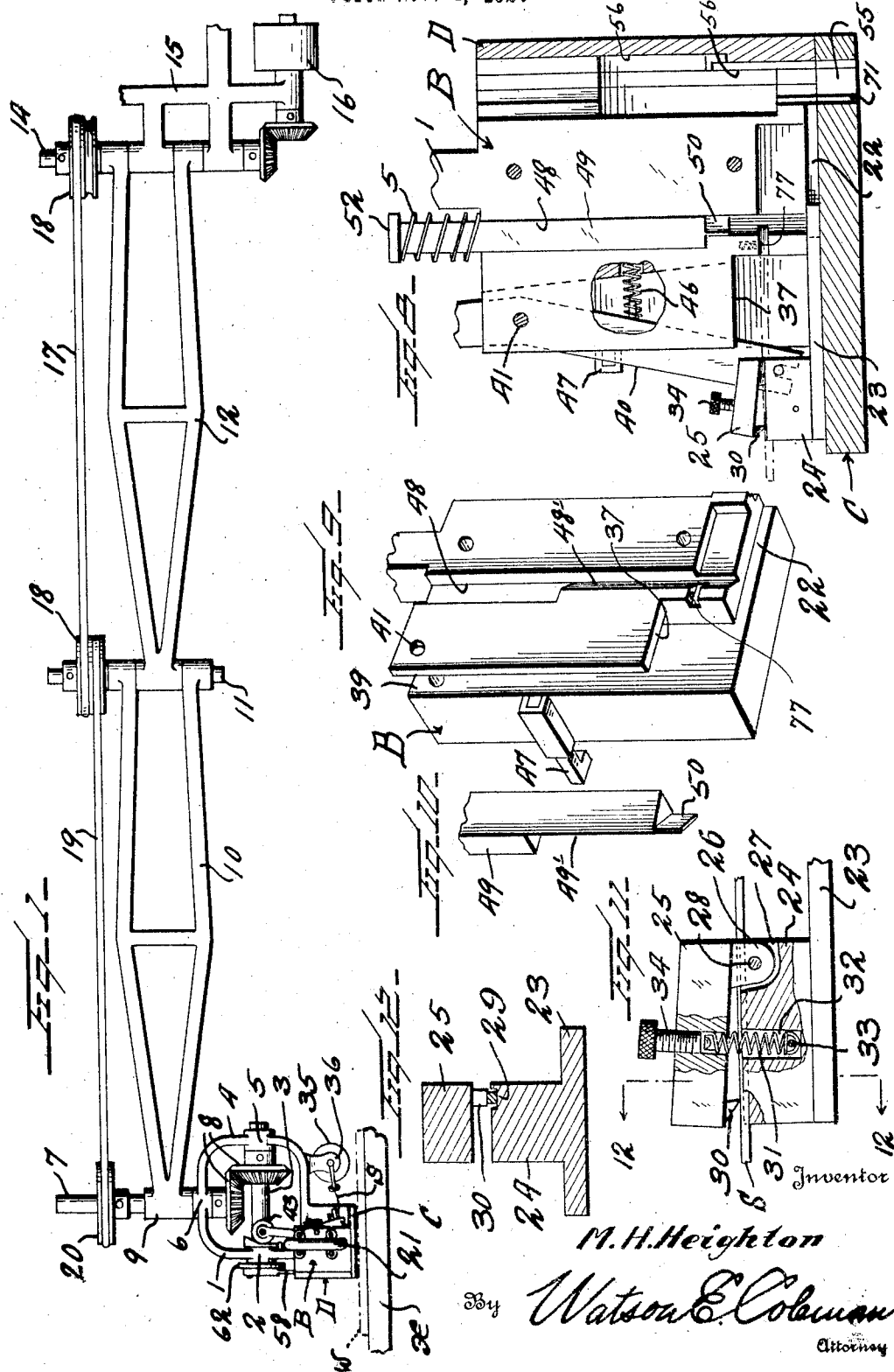
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M. H. HEIGHTON

STAPLING MACHINE

Filed Nov. 4, 1924

3 Sheets-Sheet 1



Sept. 15, 1925.

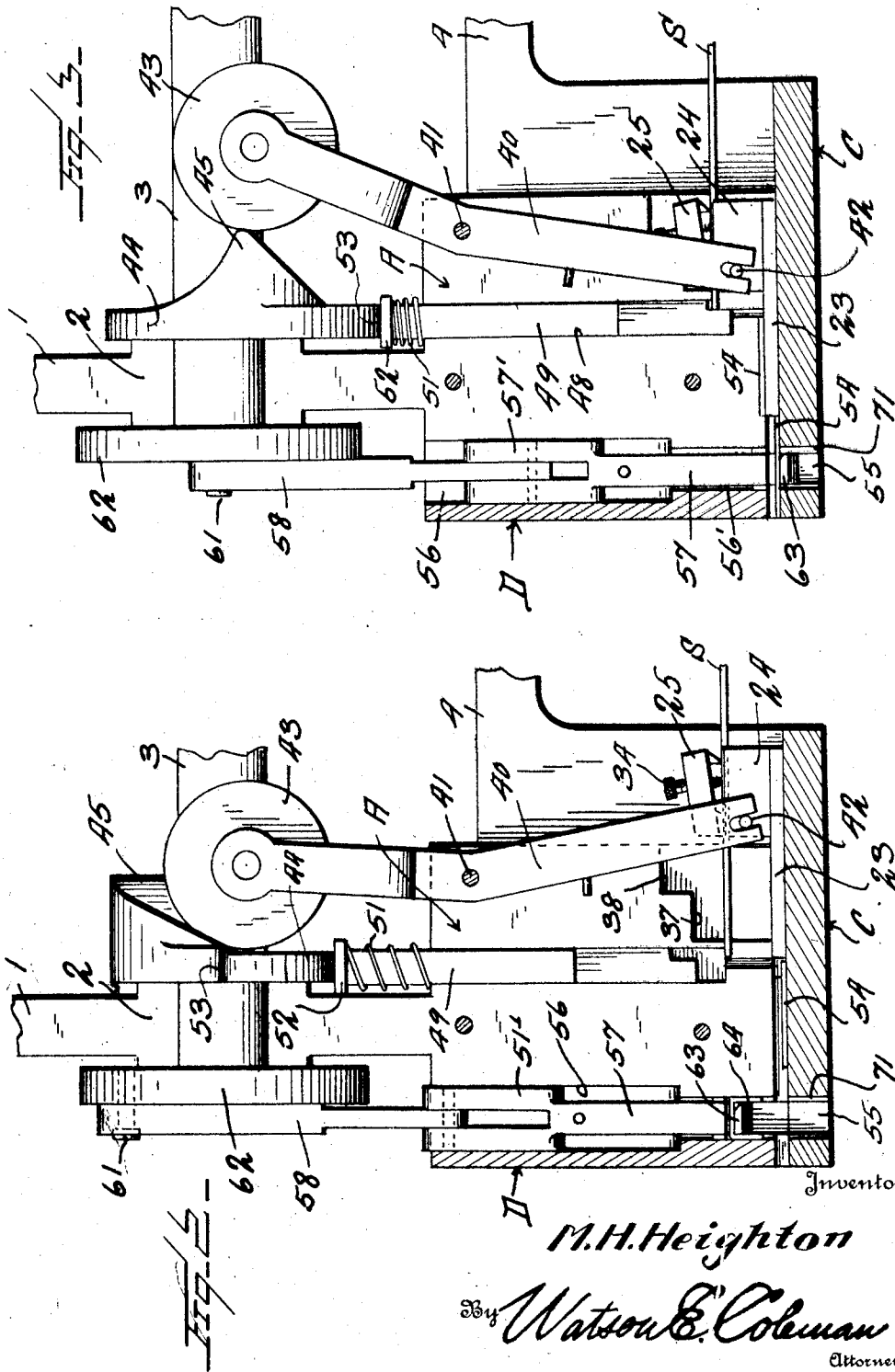
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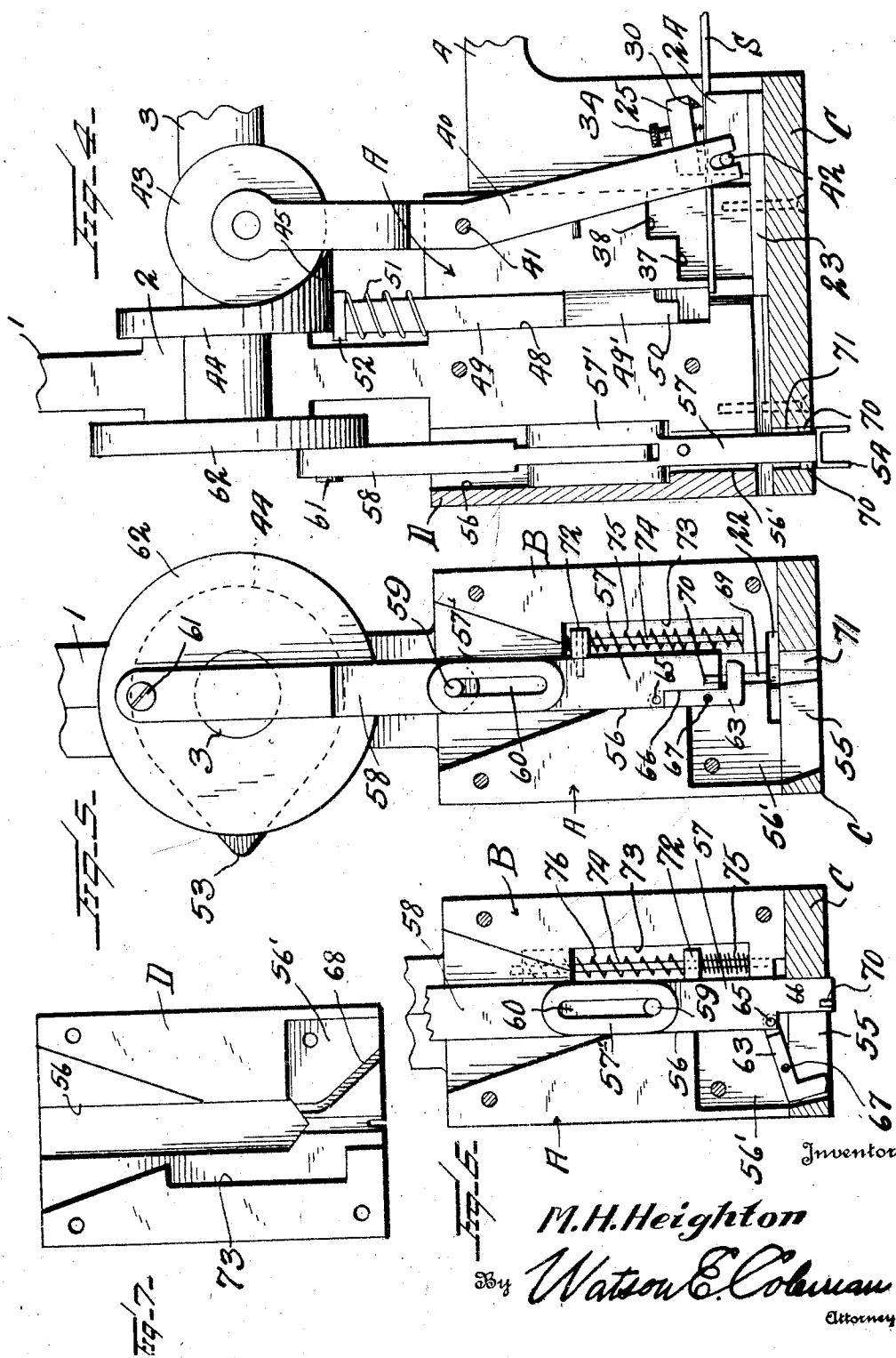
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STAPLING MACHINE

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Patented Sept. 15, 1925.

1,553,774

UNITED STATES PATENT OFFICE.

MARIUS HERBERT HEIGHTON, OF HYPOLUXO, FLORIDA.

STAPLING MACHINE.

Application filed November 4, 1924. Serial No. 747,814.

To all whom it may concern:

Be it known that I, MARIUS HERBERT HEIGHTON, a citizen of the United States, residing at Hypoluxo, in the county of Palm Beach and State of Florida, have invented certain new and useful Improvements in Stapling Machines, of which the following is a specification, reference being had to the accompanying drawings.

10 This invention relates to certain improvements in stapling machines and it is an object of the invention to provide a device of this character having novel and improved means whereby the staples are intermittently formed from a single strand of material or stock and driven into the work.

Another object of the invention is to provide a novel and improved machine of this general character wherein stock is fed into the machine and cut off into lengths together with means for successively forming said lengths into staples and driving the same into the work.

Another object of the invention is to provide a novel and improved machine of this general character driven in any preferred manner and wherein the various operations incident to forming the staple and driving the same into the work are accomplished in an automatic manner.

30 The invention consists in the details of construction and in the combination and arrangement of the several parts of my improved stapling machine whereby certain important advantages are attained and the device rendered simpler, less expensive and otherwise more convenient and advantageous for use, as will be hereinafter more fully set forth.

40 The novel features of my invention will hereinafter be definitely claimed.

In order that my invention may be the better understood, I will now proceed to describe the same with reference to the accompanying drawings, wherein:—

45 Figure 1 is a view in elevation illustrating a machine constructed in accordance with an embodiment of my invention, the work to receive a staple being indicated by broken lines;

50 Figure 2 is an enlarged fragmentary view partly in vertical section and partly in elevation taken through my improved machine;

55 Figure 3 is a view similar to Figure 2 but showing certain of the parts in a second position;

Figure 4 is a view somewhat similar to Figures 2 and 3 but showing certain of the parts in a third position;

Figure 5 is a fragmentary view partly in front elevation and partly in section of the structure as illustrated in Figure 2;

Figure 6 is a fragmentary view partly in front elevation and partly in section showing the hammer in a position as illustrated in Figure 4;

Figure 7 is a view in inside elevation of the end plate of the head unapplied;

Figure 8 is a view partly in section and partly in elevation opposite to that illustrated in Figure 6;

Figure 9 is a view in perspective of the head section illustrated in Figure 8 with the feed lever and cutting member removed;

Figure 10 is a fragmentary view in perspective of the lower or working end portion of the cutting member;

Figure 11 is an enlarged fragmentary view partly in section and partly in elevation of a portion of the cutting means as herein disclosed;

Figure 12 is a sectional view taken substantially on the line 12—12 of Figure 11.

As disclosed in the accompanying drawings, my improved device comprises a head consisting of two sections A and B arranged side by side and having at the lower ends thereof a bottom plate C suitably secured thereto and providing the means for maintaining said sections A and B in assembled relation. The bottom plate C extends in advance of the forward ends of the sections A and B to provide for the mounting of a front end plate D bolted or otherwise secured in applied position and further maintaining the sections A and B in assembled relation.

The sections A and B at their tops are continued by the upstanding members 1 in close contact one with the other and providing the post having a bearing 2 for an end portion of a shaft 3. This post is laterally continued to provide a substantially rectangular bracket 4 connected with the rear faces of the sections A and B and provided with a second or outer bearing 5 for the shaft 3. The bracket 4 at a point intermediate the bearings 2 and 5 is provided with a third bearing 6 the bore of which is at right angles to the applied shaft 3. Rotatably disposed through the bearing 6 is a shaft 7 the lower or inner end of which is in driving connection through the meshing gears 8 with the shaft 3.

The shaft 7 is also directed through a bearing 9 carried by the outer end portion of an arm 10 of desired length, the opposite end portion of said arm being pivotally connected through the medium of the pin or pintle 11 with the outer end portion of a second arm 12. The opposite end portion of this arm 12 is pivotally connected through the medium of a shaft 14 with a suitable supporting bracket 15. While in the accompanying drawings I show but two arms 10 and 12 it is to be understood that if preferred one or a greater number of such arms may be used.

The shaft 14 is adapted to be power driven, as indicated at 16, and said shaft 14 through the medium of the belt 17 and the pulleys 18 drives the pin or pintle 11. The pin or pintle 11 in turn drives the shaft 7 through the medium of the belt 19 operatively engaged with the pulleys 18 on the pin or pintle 11 and the pulley 20 fixed to the shaft 7 above the bearing 9.

Through the medium of the arms 10 and 12 the machine proper may be readily adjusted by the operator as desired and in order to facilitate such adjustment, one of the sections of the head, as B, has bolted or otherwise secured thereto a hand grasp 21. This hand grasp can be affixed with equal facility to the section A, the particular location being dependent upon whether or not the operator works with his left hand or his right hand.

For convenience and clarity in disclosure the head of the machine will hereinafter be described as made of a solid piece it being understood, however, in practice that the opposed faces of the sections A and B will be formed or machined to provide the various openings or recesses which will hereinafter be referred to.

The head of the machine immediately adjacent to the bottom plate C has disposed lengthwise thereacross or in a direction parallel to the shaft 3 a groove or channel 22 in which is arranged a plate 23 for sliding, the outer end of which being provided with an upstanding block 24. Superimposed above the block 24 is a second block 25, the inner end of which being provided with a depending lug 26 extending within a recess 27 provided in the inner end of the block 24 and pivotally connected with a pin or bolt 28 disposed through the block 24 and intersecting the pocket or recess 27. By this means, the block 25 is supported for vertical swinging movement with respect to the block 24.

The upper face of the block 24 to one side of its transverse center is provided therealong with a groove 29 through which is adapted to pass the stock S. The free end portion of the block 25 has depending therefrom a beveled tooth 30 which, when the block 25 is forced downwardly, engages the stock S and

operates to feed such stock forwardly upon requisite movement of the plate 23.

The block 25 is constantly urged in a direction toward the block 24 and to maintain the tooth 30 in contact with the stock S by a retractile spring 31. As herein disclosed, the member 31 is in the form of a coil spring and has its opposite end portion extending within the pockets or recesses 32 formed in the opposed faces of the blocks 24 and 25. The extremity of the spring 31 within the recess 32 of the block 24 is anchored to the pin 33 while the opposite end portion of the spring is secured to the inserted end of the bolt 34 threaded within the pocket 32 of the block 25 from without. By proper adjustment of the bolt 34 the tension of the spring 31 may be regulated as the occasions of practice may necessitate.

The stock S comprises an elongated strand of requisite gauge and preferably rounded, said strand or wire S being initially disposed around a spool 35 rotatably supported, as at 36, by the bracket 4. The rear portion of the groove or channel 22 is vertically enlarged, as at 37, to receive the blocks 24 and 25, the top wall of said enlarged portion 37 being provided with a recess 38 in which is received the outer or extended portion of the bolt 34. The rear face of the head is provided with a vertically disposed groove 39 in communication with the enlarged portion 37 to one side of the recess 38. Extending downwardly in the groove 39 is a rock lever 40 pivotally supported intermediate its length, as at 41, at the upper portion of said groove, by a suitable pin or the like. The lower portion of the lever 40 is operatively engaged, as at 42, with the block 24 so that upon requisite rocking movement of the lever 40 the blocks 24 and 25 will be reciprocated to effect the ready intermittent feeding of the stock S.

The upper portion of the lever 40 carries a roller 43 with which contacts the side face of a disc 44 fixed to rotate with the shaft 3. The disc 44 is provided with an outstanding cam member 45 which contacts with the roller 43 to effect the desired rocking of the lever 40 to reciprocate the plate 23. The lower portion of the lever 40 is constantly urged outwardly to maintain the roller 43 in proper contact with the disc 44 through the medium of the expansible member 46, Fig. 3, interposed between the lower portion of the lever 40 and the base of the groove 29. In this connection, it is to be stated that in Figures 2, 3 and 4 the lever 40 is shown with the section B of the head in which the groove 39 is formed removed.

When it is desired to maintain the plate 23 inactive a sliding bolt 47 may be adjusted to extend across the groove 39 with the lower portion of the lever 40 within such groove. When the lever 40 is held in this manner, the

roller 43 will be in a position completely out of the path of travel of the cam 45.

Directly below the disc 44 the head has disposed therethrough a vertically directed opening 48, the lower portion 48' of which is reduced with its base wall disposed transversely on a desired incline or angle. Mounted for endwise movement within the opening 48 is a cutting member 49 having a lower extension 49' which works within the portion 48' of the opening 48. The inner or working end of the member 49 is provided with a vertically disposed cutting blade 50 which is adapted upon proper depression of the member 49 to cut the stock S along a line angular to its axis whereby the staple when formed has each of its entering edges pointed. The member 49 extends above the head a desired distance and is constantly urged in such upward or outward direction by the expansible spring 51, herein disclosed as encircling the member and interposed between the enlarged upper end 52 thereof and the top face of the head. The spring 51 maintains the upper or outer end of the member 49 constantly in contact with the periphery of the disc 44, said periphery being provided with a radial cam 53 which operates to force the member 49 downwardly to effect a cutting of the stock in proper timed sequence with respect to the feed of such stock. The initial length 54 of the severed stock drops upon the plate 23 in advance of the block 24 and as said plate 23 is retracted said length is received upon the bottom wall of the groove or channel 22, said bottom wall constituting the applied bottom plate C. When the plate 23 advances with the next succeeding severed length 54 it pushes the first length 54 forward and across the elongated and transversely disposed opening 55 provided in the forward or extended portion of the plate C. This operation is continued as the stock S is fed into the machine.

The applied end plate D together with the opposed face of the head is provided with a vertically disposed opening 56 in which is mounted for reciprocatory movement the elongated hammer 57. The upper portion 57' of the hammer 57 is bifurcated to provide spaced parallel arms between which is disposed the lower end portion of a connecting rod or pitman 58. The pitman 58 has projecting beyond each side thereof a pin 59 which extends within a slot 60 produced in each of the arms of the bifurcation whereby the connecting rod or pitman 58 has a limited movement independently of the hammer 57. The outer end portion of the rod or pitman 58 is operatively engaged, as at 61, with a disc 62, fixed to rotate with the shaft 3. Upon rotation of the disc 62 the hammer 57 is reciprocated and in order that the rod or pitman 58 may have its requisite oscil-

latory movement the upper portion of the opening 56 is enlarged or flared.

The lower portion of the opening 56 is enlarged, at 56', to have said lower portion of a length substantially coextensive in length with the opening 55 in the base plate C.

When a length 54 is moved to overlie the opening 55 and the hammer member 57 has been retracted or raised above the adjacent or forward end of the groove or channel 22, the cam 45 is so timed to permit a severed length 54 to be forced across the opening 55.

As the hammer member 57 continues its upward movement a hook member 63 carried by the lower end portion of the hammer member 57 swings downwardly and along the portion of the length 54 overlying the opening 55 resulting in such length being pulled upwardly by the hammer member 57 resulting in the end portions of said length 54 extending beyond opposite sides of the opening 55 to be flexed or turned downwardly to provide the completed staple 64 as particularly illustrated in Figure 2 of the drawings. As the hammer 57 moves downwardly, the dog 63 swings upwardly into an inoperative position before the member 57 reaches the end of its downward stroke, whereby the member 57 is permitted to force the staple 64 into the work, diagrammatically indicated by broken lines at W in Figure 1, said work being suitably rested on a support X.

The hook member 63, as herein disclosed, is substantially L-shaped in form and the lower portion of the member 57 immediately below the pivotal connection 65 for the hook member 63 is cut away, as at 66, to substantially snugly receive the stem or leg of the member 63 as is illustrated in Figure 5. The foot of the hook member is adapted to underlie the lower end of the member 57 but slightly spaced therefrom as is also illustrated in Figure 5.

The stem or leg of the hook member 63 is provided at a predetermined point therealong with the forwardly directed pin or lug 67 which rides within a properly formed cam groove 68 provided by the inner face of the end head plate D whereby the requisite swinging movement of the member 63 is effected in proper sequence when the hammer 57 is in operation.

The sliding connection between the pitman or rod 58 and the hammer member 57 causes the hammer member 57 to intermittently remain inactive at the proper time to permit a severed length 54 to be properly positioned with respect to the opening 55 or in other words to permit the member 57 to remain inactive to compensate for the requisite functioning of the plate 23 and the parts carried thereby.

The enlarged portion 56' of the opening 56 provides requisite space for the proper action of the hook member 63.

Opposed walls of the opening 56 are each provided in its lower portion with a groove 69 to receive an outstanding lug 70 carried by the lower or working end of the hammer member 57 to assure proper driving force on the shoulders of the formed staple or brad. Each of these slots 69 is continued by the slot 71 formed in a side wall of the opening 55.

The hammer 57 at a point substantially midway its ends is provided with a laterally directed lug 72 which extends within an elongated pocket 73 formed at one side of the opening 56. This lug 72 is freely engaged with a rod 74 extending lengthwise of the pocket 73 suitably anchored or secured to the end walls of such pocket. Surrounding the rod 74 at opposite sides of the lug 72 are the coil springs 75 and 76 each bearing against the lug 72 and an end wall of the pocket 73.

When the hammer 57 is at its lowermost position the spring 75 is placed under compression so that when the pitman or rod 58 moves upwardly the hammer member 57 will be retracted by the spring 75 to a distance to initially free said member 57 of the groove or passageway 22. This action of the spring 75 occurs during the period the rod or pitman 58 is having independent movement with respect to the member 57 as afforded by the slots 60. This spring 75 also provides means whereby the hammer member 57 is maintained in applied position and prevented from dropping down through the bottom plate C. The upper spring 76 is employed for the purpose of avoiding clearance.

My improved apparatus as herein disclosed is particularly designed and adapted for use in forming and driving staples or brads in screen frames and kindred flat work.

It is to be noted that the arms 10 and 12 are preferably constructed so as to fold nearly their full length and thereby permit the operator to reach the work relatively close to the bracket 15. It is also to be noted that the pin or lug 67 may constitute a roller so as to travel in the grooves 68 with a minimum of friction and wear.

In order to hold the stock 8 against retrograde movement when the plate 23 moves outwardly, I provide a spring pressed member 77, as illustrated in Figure 8, which in the present instance has frictional engagement from above with said stock yet to an extent insufficient to prevent the forward feed thereof.

From the foregoing description it is thought to be obvious that a stapling machine constructed in accordance with my in-

vention is particularly well adapted for use by reason of the convenience and facility with which it may be assembled and operated, and it will also be obvious that my invention is susceptible of some change and modification without departing from the principles and spirit thereof and for this reason I do not wish to be understood as limiting myself to the precise arrangement and formation of the several parts herein shown in carrying out my invention in practice except as hereinafter claimed.

I claim:—

1. A machine of the class described comprising, in combination, a head provided with an opening therethrough and a delivery opening in the bottom thereof in communication with the first named opening, means for feeding stock within the first named opening, means for cutting off a length of the stock after being fed within the head, means for moving said severed length across the delivery opening, a hammer member carried by the head and traveling in a path intersecting the first named opening and into the delivery opening, and means carried by the hammer member engaging the severed length disposed over the delivery opening upon retracting movement of the hammer member to bend the extremities of the severed stock into staple form, the opposite movement of the hammer member operating to force the staple into the work.

2. A machine of the class described, comprising, in combination, a head provided with an opening therethrough and a delivery opening in communication with the first opening, means for feeding stock within the first named opening, means for cutting off a length of the stock after being fed within the head, means for moving said severed length to a position across the delivery opening, a hammer supported for reciprocation by the head, said hammer moving in a path of travel intersecting the first named opening and into the second opening, and a hook member to engage the severed length of stock upon retracting movement of the hammer member to bend the end portions of said severed length of stock during the retracting movement of the hammer member.

3. A machine of the class described comprising, in combination, a head provided with an opening therethrough and a delivery opening in communication with the first opening, means for feeding stock within the first named opening, means for cutting off a length of the stock after being fed within the head, means for moving said severed length to a position across the delivery opening, a hammer supported for reciprocation by the head, said hammer moving in a path of travel intersecting the first

named opening and into the second opening, a hook member to engage the severed length of stock upon retracting movement of the hammer member to bend the end portions of said severed length of stock during the retracting movement of the hammer member, and means coacting with the hook member for moving the same into operative and inoperative position.

4. A machine of the class described comprising, in combination, a head provided with an opening therethrough and a delivery opening in communication with the first named opening, means for feeding stock within the first named opening, means for cutting off a length of the stock after being fed within the head, means for moving said severed length to a position across the delivery opening, a hammer supported for reciprocation by the head, said hammer moving in a path of travel intersecting the first named opening and into the second opening, and a hook member to engage the severed length of stock upon retracting movement of the hammer member to bend the end portions of said severed length of stock during the retracting movement of the hammer member, said hook member being provided with an outstanding part, the head being provided with a cam groove in which the outstanding part of the hook member travels to move said hook member in proper sequence into operative and inoperative position.

5. A machine of the class described comprising, in combination, a head having an opening therethrough and a delivery opening in communication with the first named opening, a feed member having reciprocating movement within a portion of the first named opening, means carried by said feed member for carrying stock within said first named opening, means for severing the stock after being fed into the head, said feed member upon inward movement engaging the severed stock to move the same in a position to overlie the delivery opening, a hammer member moving in a path of travel intersecting the first named opening and into the delivery opening, means for reciprocating the hammer member, and means carried by the hammer member for engaging the severed stock disposed across the delivery opening to move said severed stock with the hammer member on its retracting stroke to bend the end portions of such severed stock.

6. A machine of the class described comprising, in combination, a head having an opening therethrough and a delivery opening in communication with the first named opening, a feed member having reciprocating movement within a portion of the first named opening, means carried by said feed member for carrying stock within said first named opening, means for severing the stock

as fed into the head, said feed member upon inward movement engaging the severed stock to move the same in a position to overlie the delivery opening, a hammer member moving in a path of travel intersecting the first named opening and into the delivery opening, means for reciprocating the hammer member, and means carried by the hammer member for engaging the severed stock disposed across the delivery opening to move said severed stock with the hammer member on its retracting stroke to bend the end portions of such severed stock, said operating means for the hammer working independently of the hammer member during intermittent periods of movement of said operating means.

7. A machine of the class described comprising, in combination, a head having an opening therethrough and a delivery opening in communication with the first named opening, a feed member having reciprocating movement within a portion of the first named opening, means carried by said feed member for carrying stock within said first named opening, means for severing the stock as fed into the head, said feed member upon inward movement engaging the severed stock to move the same in a position to overlie the delivery opening, a hammer member moving in a path of travel intersecting the first named opening and into the delivery opening, means for reciprocating the hammer member, means carried by the hammer member for engaging the severed stock disposed across the delivery opening to move said severed stock with the hammer member on its retracting stroke to bend the end portions of such severed stock, said operating means for the hammer working independently of the hammer during intermittent periods of movement of said operating means, and automatic means for imparting initial retracting movement to the hammer member.

8. A machine of the class described comprising, in combination, a head having an opening therethrough and a delivery opening in communication with the first named opening, a feed member having reciprocating movement within a portion of the first named opening, means carried by said feed member for carrying stock within said first named opening, means for severing the stock as fed into the head, said feed member upon inward movement engaging the severed stock to move the same in a position to overlie the delivery opening, a hammer member moving in a path of travel intersecting the first named opening and into the delivery opening, means for reciprocating the hammer member, means carried by the hammer member for engaging the severed stock disposed across the delivery opening to move said severed stock the

hammer member on its retracting stroke to bend the end portions of such severed stock, said operating means for the hammer working independently of the hammer during intermittent periods of movement of said operating means, and automatic means for imparting initial retracting movement to the hammer member, said last named means serving to hold the hammer member against independent dropping movement through the delivery opening.

9. A machine of the class described comprising, in combination, a head having an opening therethrough and a delivery opening in communication with the first named opening, a feed member having reciprocating movement within a portion of the first named opening, means carried by said feed member for carrying stock within said first named opening, means for severing the stock as fed into the head, said feed member upon inward movement en-

gaging the severed stock to move the same in a position to overlie the delivery opening, a hammer member moving in a path of travel intersecting the first named opening and into the delivery opening, means for reciprocating the hammer member, means carried by the hammer member for engaging the severed stock disposed across the delivery opening to move said severed stock with the hammer member on its retracting stroke to bend the end portions of such severed stock, said operating means for the hammer working independently of the hammer during intermittent periods of movement of said operating means, and a spring coacting with the hammer member for initially imparting retracting movement thereto.

In testimony whereof I hereunto affix my signature.

MARIUS HERBERT HEIGHTON.