(No Model.) 3 Sheets—Sheet 1.

M. A. CLAPP.

STAPLING MACHINE FEED.

No. 538,037. Patented Apr. 23, 1895.

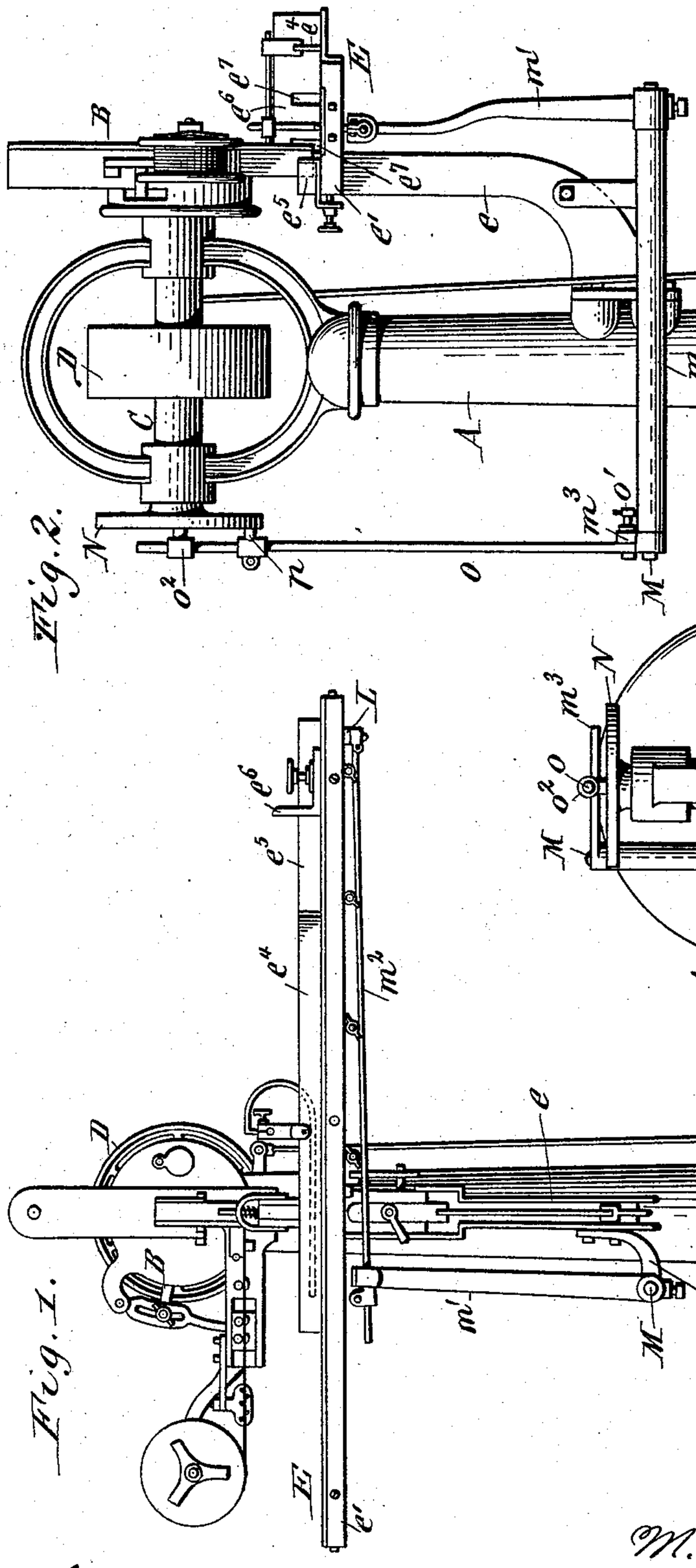

Fig. 1.

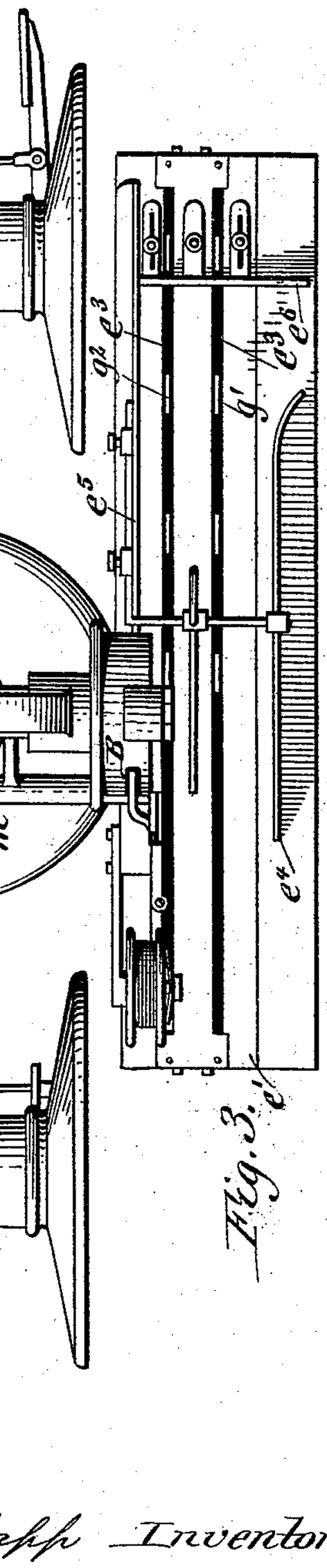

Fig. 3.

Fig. 2.

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Theo. L. Popp
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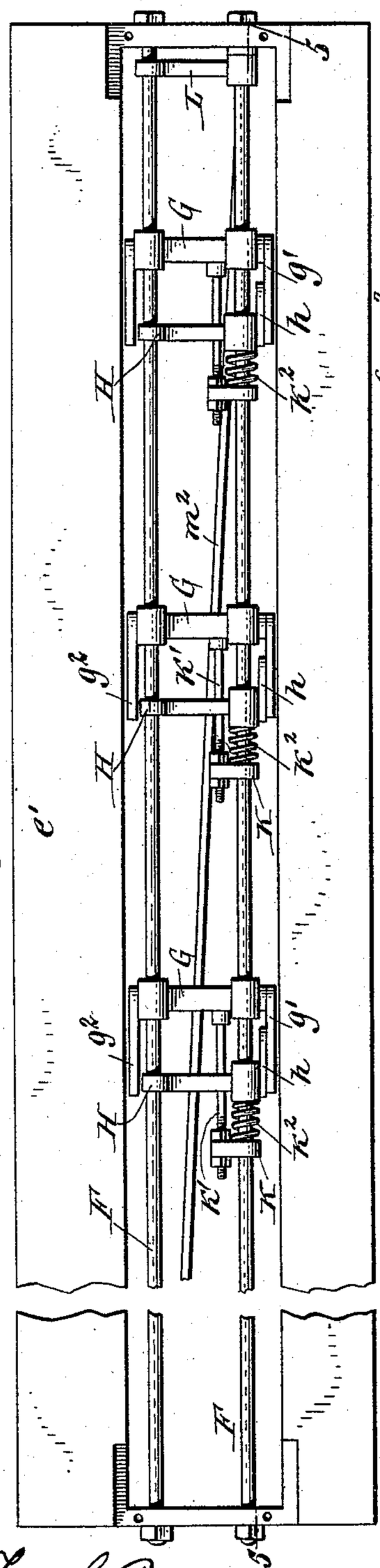

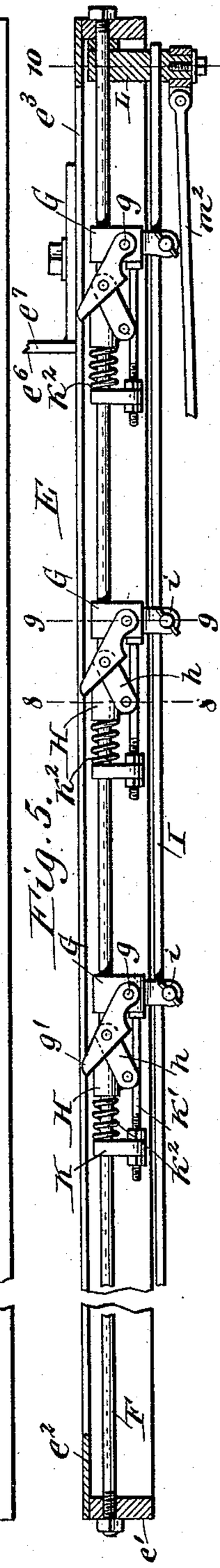

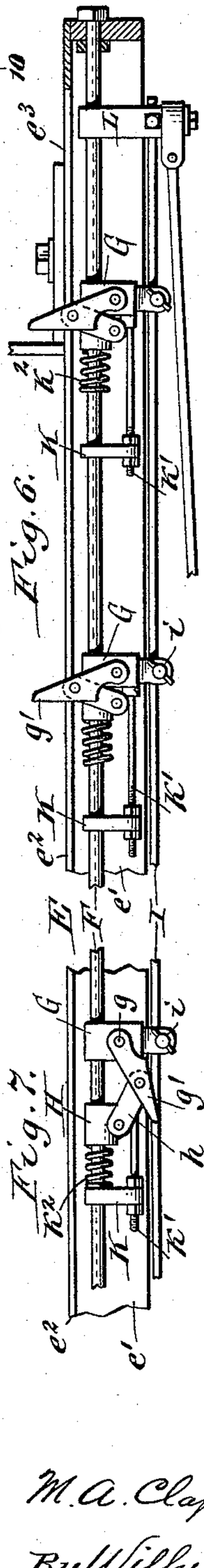

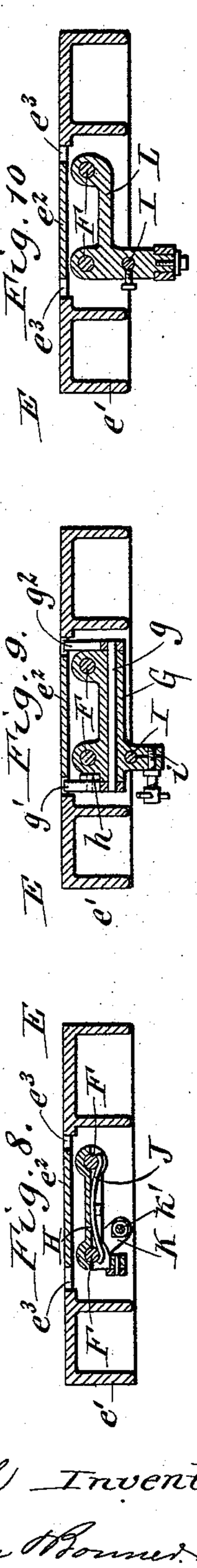

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(No Model.) 3 Sheets—Sheet 3.

M. A. CLAPP.

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Fig. 12.

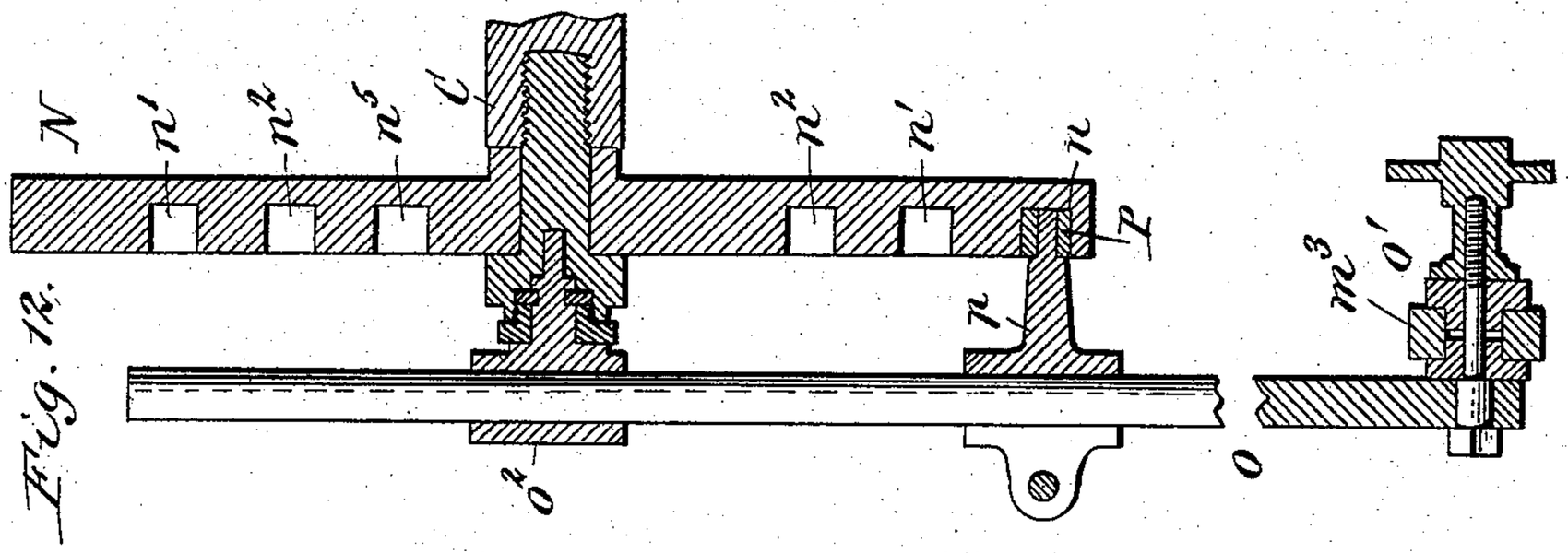


Fig. 11.

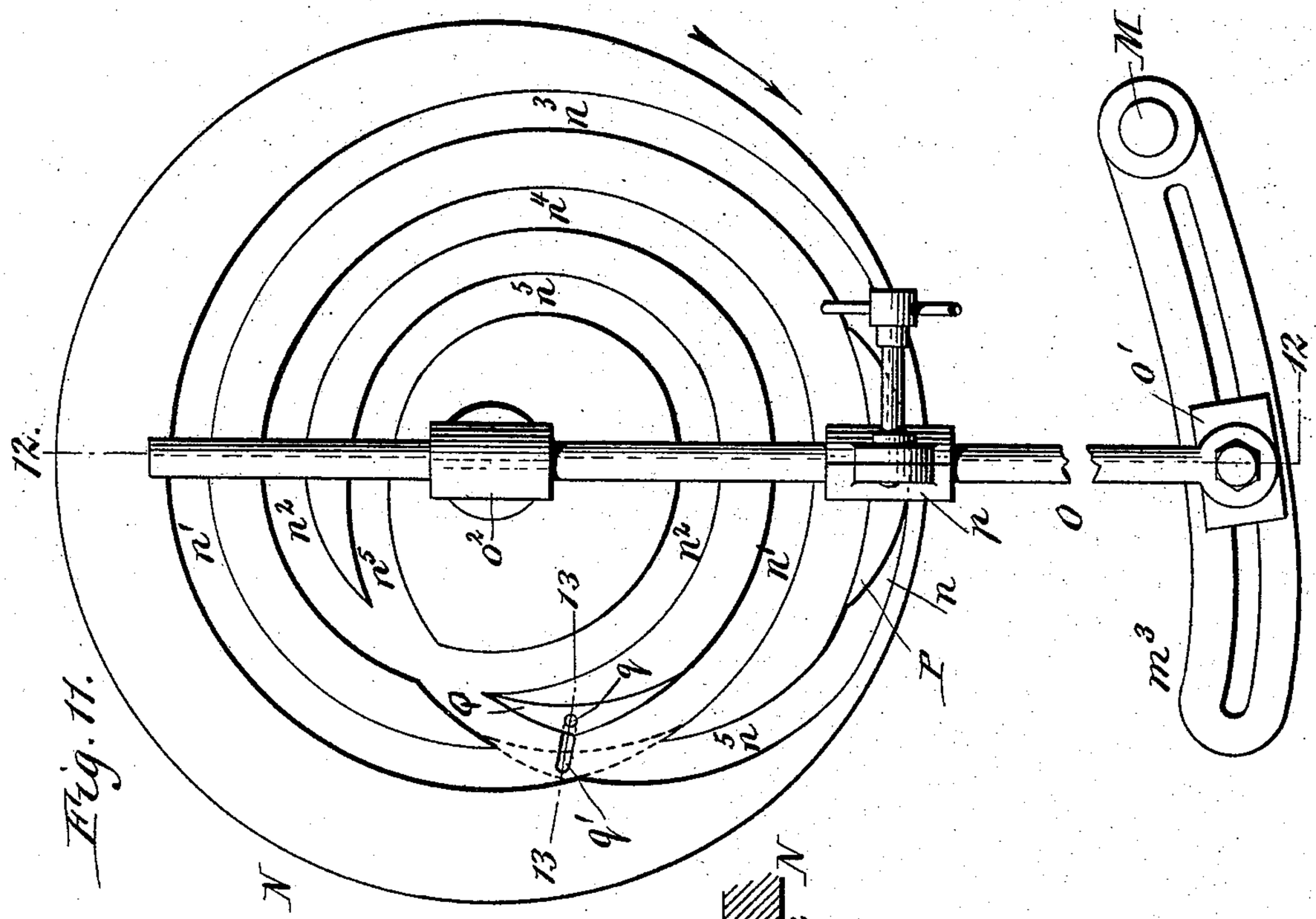
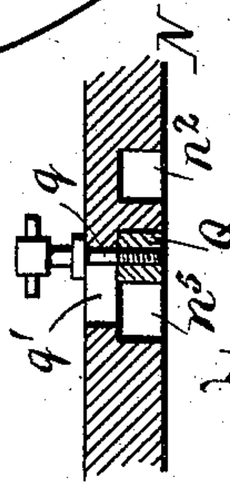


Fig. 13.



Witnesses:
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Emil Neuhart.

M. A. Clapp
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By Wilhelm Bonner
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UNITED STATES PATENT OFFICE.

MORTIMER A. CLAPP, OF POUGHKEEPSIE, NEW YORK, ASSIGNOR TO FREDERICK HART, OF SAME PLACE.

STAPLING-MACHINE FEED.

SPECIFICATION forming part of Letters Patent No. 538,037, dated April 23, 1895.

Application filed September 15, 1894. Serial No. 523,116. (No model.)

To all whom it may concern:

Be it known that I, MORTIMER A. CLAPP, a citizen of the United States, residing at Poughkeepsie, in the county of Dutchess and State of New York, have invented a new and useful Improvement in Wire-Stitching Machines, of which the following is a specification.

This invention relates to that class of machines which are used for fastening together the sheets of pamphlets and other blanks by means of wire staples and which are ordinarily called wire stitching machines.

The invention has the object to produce a feed mechanism for machines of this character which is simple in construction, reliable in operation and which can be produced at comparatively small cost.

In the accompanying drawings consisting of three sheets:—Figure 1 is a front elevation of a wire stapling or stitching machine provided with my improvements. Fig. 2 is a side elevation thereof, viewed from the delivery end of the machine. Fig. 3 is a top plan view thereof. Fig. 4 is a fragmentary top plan view, on an enlarged scale, of the feed table with the gages and top plate removed. Fig. 5 is a fragmentary, longitudinal, sectional, elevation in line 5—5, Fig. 4, showing the position of the carrying fingers during their backward movement. Fig. 6 is a similar view showing the position of the carrying fingers during their forward movement. Fig. 7 is a similar view showing one of the carrying fingers depressed into an inoperative position. Figs. 8, 9 and 10 are transverse sectional elevations in lines 8—8, 9—9, and 10—10, Fig. 5, respectively. Fig. 11 is a rear elevation, on an enlarged scale, of the cam and connecting parts for actuating the carrying fingers. Fig. 12 is a vertical section in line 12—12, Fig. 11. Fig. 13 is a fragmentary section in line 13—13, Fig. 11.

Like letters of reference refer to like parts in the several figures.

A represents the main frame of a wire stapling or stitching machine, B the stapling head arranged on the front portion of the frame, C the main driving shaft journaled in the upper portion of the frame, and D the driving pulley secured to the driving shaft, all of which parts are of any suitable construction.

E represents the feed or stapling table upon which the blanks are placed by the operator and which is arranged underneath the stapling head and supported by an arm *e* secured to the main frame. This table consists essentially of an elongated frame e' and a plate e^2 secured to the top of the frame and separated along its longitudinal sides from the adjacent portions of the table frame, thereby forming two longitudinal slots e^3 in the top of the table.

e^4 e^5 represent front and rear gages arranged lengthwise on the feed table in front and rear of the slots, and e^6 is a transverse gage arranged upon the receiving portion of the feed table and provided with recesses e^7 in line with the slots e^3.

The mechanism whereby the blanks are automatically carried from the receiving end of the table to the stapling head is constructed as follows:

F represents two parallel guide rods arranged lengthwise underneath the top plate and secured with their ends to the frame of the feed table.

G represents a number of main cross heads or slides which are mounted equidistant on the guide rods and adapted to slide lengthwise thereon. In the lower portion of each of these slides a rock shaft *g* is journaled, which latter is provided with a pair of carrying fingers g' g^2 secured to the front and rear ends thereof. During the forward movement of the slides the carrying fingers project upwardly through the slots in the feed table and carry the blanks over the table to the stapling head by engaging against the rear ends of the blank, but during the backward movement of the slides the carrying fingers are depressed below the top of the table so as to clear the blanks.

H represents auxiliary cross heads or slides mounted on the guide rods in front of the main slides and also capable of sliding lengthwise thereon. One end of each auxiliary slide is connected with the adjacent front carrying finger by a link *h*. The link is preferably made as long as the distance from the point

at which it is attached to the carrying finger to the pivot of the latter and the link is attached in the center of the finger, whereby the free end of the carrying finger is caused to move up and down in a vertical line.

I represents a longitudinal connecting and actuating rod which is adjustably secured to the main slides by clamps *i* arranged on the slides and which moves the several slides back and forth simultaneously.

J represents tension springs which are secured to the auxiliary slides and bear against the under sides of the guide bars as represented in Fig. 8, thereby preventing said slides from being moved on the guide bars except when some pressure is exerted against the same. During the first portion of the forward movement of the main slides the auxiliary slides are held stationary by the tension springs J and the main slides approach the auxiliary slides which causes the links to lift the carrying fingers above the top of the feed table. When, during the continued forward movement of the main slide, the latter engage against the auxiliary slides, these slides are carried forward by the main slides to the end of the forward movement of the same.

K represents push blocks arranged loosely upon the front guide rod in front of the auxiliary slides and connected with the main slides by rods *k'*, so as to move with the same.

k^2 are coil springs arranged upon the front guide rod between the auxiliary slides and the push blocks. During the first portion of the backward movement of the main slides the auxiliary slides remain stationary which causes the links to depress the carrying fingers below the top of the table. During the continued backward movement of the main slides the push blocks bear yieldingly against the auxiliary slides through the medium of the springs k^2 and cause the auxiliary slides to move with the main slides during the remainder of the backward movement of the same. The tension of the springs k^2 is such that the auxiliary slides start moving backward with the main slides before the pivots of the links and the carrying fingers are in line or on a dead center, thereby enabling the links to lift the carrying fingers during the subsequent forward movement of the main slides. The distance between the several pairs of carrying fingers can be adjusted by loosening the clamps *i* and shifting the main and auxiliary slides upon the guide rods.

An intermittent forward movement of the carrying fingers and a continuous backward movement thereof is produced by the following mechanism:

L represents a sliding yoke arranged upon the guide rods underneath the receiving end of the feed table and secured to the connecting rod I.

M represents a transverse rock shaft journaled in a bearing *m* arranged on the lower portion of the main frame. This shaft is provided at its front end with an upwardly projecting rock arm *m'* which is connected at its free end with the yoke L by a connecting rod m^2. The rear end of the rock shaft is provided with a laterally projecting slotted rock arm m^3.

N represents a cam disk whereby the carrying fingers are actuated and which is secured to the rear end of the main shaft. This disk is provided in its flat rear face with a cam groove having approximately the form of an endless spiral or helix, the inner end of which is connected with the outer end and consisting of outer, intermediate and inner concentric portions n n' n^2 and outer, intermediate and inner eccentric portions n^3 n^4 n^5, connecting the rear ends of the outer, intermediate and inner concentric portions with the front ends of the intermediate, inner and outer concentric portions, respectively, the inner eccentric portion intersecting the intermediate and inner concentric portions of the cam groove.

O represents a connecting rod adjustably connected at its lower end with the slotted rock arm m^3 by a clamp *o'* and guided at its upper end in a sleeve o^2 which is pivotally supported on the rear end of the main shaft concentrically with the latter.

P represents a shoe engaging with the cam groove and pivoted on an arm *p* secured to the connecting rod.

In the position of the parts represented in the drawings the carrying fingers have been carried backwardly in a depressed position to the beginning of the forward movement at which time the shoe stands in the outer concentric portion of the cam groove as represented in Fig. 11. Upon turning the cam disk in the direction of the arrow in said figure the shoe is raised by the outer eccentric portion n^3 of the cam groove which causes the fingers to be first elevated in rear of the blanks and then moved forwardly one space whereby the blank is moved forwardly the distance between two stitches, after which movement the fingers and blank are held stationary by the succeeding intermediate concentric portion n' of the cam groove. While the blank is so at rest the stapling head places a staple near the front end of the blank after which the fingers and blank are again carried forward another space by the intermediate eccentric portion n^4. The fingers and blank are next held stationary by the inner concentric portion n^2 of the cam groove during which period of rest a staple is placed near the middle of the blank. The inner eccentric portion n^5 of the cam groove next carries the shoe back into the outer concentric portion n. During the movement of the shoe through the inner eccentric portion n^5 the shoe is first raised whereby the fingers and blank are carried forward the extent of one space and then lowered whereby the fingers are depressed and carried backwardly to the place of beginning. During the last portion of the backward movement of the carrying fingers

the stapling head places a staple near the rear end of the blank thereby finishing the same.

As shown in Fig. 3, four pairs of carrying fingers are employed whereby four blanks can be carried in train simultaneously over the feed table. When the stitching of the blank underneath the stapling head has been finished the several pairs of fingers are shifted simultaneously to engage with the rear edge of the blank following each pair of fingers, during which time another blank is placed by the operator against the longitudinal and transverse gages at the receiving end of the feed table.

As shown in Figs. 11 and 12 the cam disk is so adjusted that it moves the carrying fingers forward with three intermittent steps which is suited for placing three staples at a certain distance apart in a blank of a certain length. If it is desired to place the same number of staples in a blank of greater or less length the fingers are shifted upon the connecting rod I and the distance between the staples is increased or decreased accordingly by adjusting the connection between the slotted rock arm m^3 and the connecting rod O to secure the desired throw.

When it is desired to place only two staples in a blank the movement of the shoe P is confined to the intermediate and inner concentric portions of the cam groove and their connecting eccentric portions, whereby the carrying fingers are moved intermittently forward only twice. This is accomplished by means of a switch Q which can be shifted so as to permit or prevent the shoe from traveling in the outer concentric portion and the eccentric portion of the cam groove connected therewith. When the machine is adjusted for placing three staples in a blank the switch is so placed that it forms part of the intermediate concentric portion and part of the inner eccentric portion of the cam groove, as represented in full lines, Fig. 11. Upon shifting the switch outwardly into the position shown in dotted lines, Fig. 11, the switch bridges the inner eccentric portion about midway and directs the shoe from the latter into the intermediate concentric portion thereby cutting out the outer concentric portion. The switch is held in its adjusted position by means of a set screw q passing through a slot q' in the cam disk.

When comparatively small blanks are operated upon all of the carrying fingers may be employed but when it is desired to operate upon very large blanks some of the carrying fingers may be rendered inoperative by depressing them by hand until the links pass below the dead center, as represented in Fig. 7, during which movement the spring k^2 is first compressed and then expanded whereby the fingers are held below the top of the feed table.

I claim as my invention—

1. The combination with the feed table and the stapling mechanism, of a reciprocating sliding support arranged below the feed table, a folding carrying finger pivoted to said support, and mechanism whereby the free end of the carrying finger is swung away from said support and elevated above the feed table for effecting the feeding movement, and swung toward said support and depressed below the feed table for effecting its backward movement, substantially as set forth.

2. The combination with the feed table and the stapling mechanism, of a reciprocating support arranged below the feed table, a series of carrying fingers separately pivoted to said support, and mechanism whereby the carrying fingers are simultaneously swung on their pivots, and elevated with their free ends above the feed table for effecting their feeding movement and folded down toward said support and depressed below the feed table for effecting their backward movement, substantially as set forth.

3. The combination with the feed table and the stapling mechanism, of a reciprocating main slide, an auxiliary slide, a carrying finger pivoted to the main slide, and a link connecting the carrying finger with the auxiliary slide, substantially as set forth.

4. The combination with the feed table and the stapling mechanism, of a reciprocating main slide, an auxiliary slide, a carrying finger pivoted to the main slide, a link connecting the carrying finger with the auxiliary slide, and a friction device connected with the auxiliary slide for retarding the movement of the latter, substantially as set forth.

5. The combination with the feed table and the stapling mechanism, of a reciprocating main slide, an auxiliary slide, a carrying finger pivoted to the main slide, a link connecting the carrying finger with the auxiliary slide, and a push block connected with the main slide and adapted to move the auxiliary slide, substantially as set forth.

6. The combination with the feed table and the stapling mechanism, of a reciprocating main slide, an auxiliary slide, a carrying finger pivoted to the main slide, a link connecting the carrying finger with the auxiliary slide, a push block connected with the main slide, and a spring interposed between the auxiliary slide and the push block, substantially as set forth.

7. The combination with the feed table provided with longitudinal guides, of slides moving on said guides, a reciprocating actuating rod connecting said slides, carrying fingers movably mounted on said slides, and mechanism whereby the fingers are held in their operative position during their forward movement and in their inoperative position during their backward movement, substantially as set forth.

8. The combination with the feed table provided with longitudinal slots in its top and with longitudinal guide bars underneath the top, of a reciprocating main slide and an aux-

iliary slide, both arranged on said guide bars, a rock shaft journaled in said main slide, carrying fingers arranged in line with said slots and mounted on the ends of said rock shaft, a link connecting the auxiliary slide with one of said carrying fingers, a push block arranged upon one of said guide rods and connected with the main slide, a spring interposed between the push block and the auxiliary slide, and a spring secured to the auxiliary slide and bearing against said guide rods, substantially as set forth.

9. The combination with the feed table and the stapling mechanism, of carrying fingers, a rock shaft having a front and rear arm, a rod connecting the front arm with said carrying fingers, and an actuating cam connected with the rear arm, whereby the carrying fingers are moved back and forth, substantially as set forth.

10. The combination with the feed table, the stapling mechanism and the carrying fingers adapted to carry the blanks successively over the feed table to the stapling mechanism, of a rotary disk having an endless helical cam groove consisting of several connected concentric grooves and an intersecting groove connecting the inner and outer grooves, and actuating mechanism operated upon by said cam groove and connected with the carrying fingers, substantially as set forth.

11. The combination with the feed table, the stapling mechanism and the carrying fingers adapted to carry the blanks successively over the feed table to the stapling mechanism, of a rotary disk having an endless helical cam groove and provided with a switch whereby part of the cam groove can be cut out, and actuating mechanism operated upon by said cam groove and connected with the carrying fingers, substantially as set forth.

Witness my hand this 30th day of August, 1894.

MORTIMER A. CLAPP.

Witnesses:
GEORGE SAGUL,
WILLIAM SCHICKLE.