

March 26, 1940.

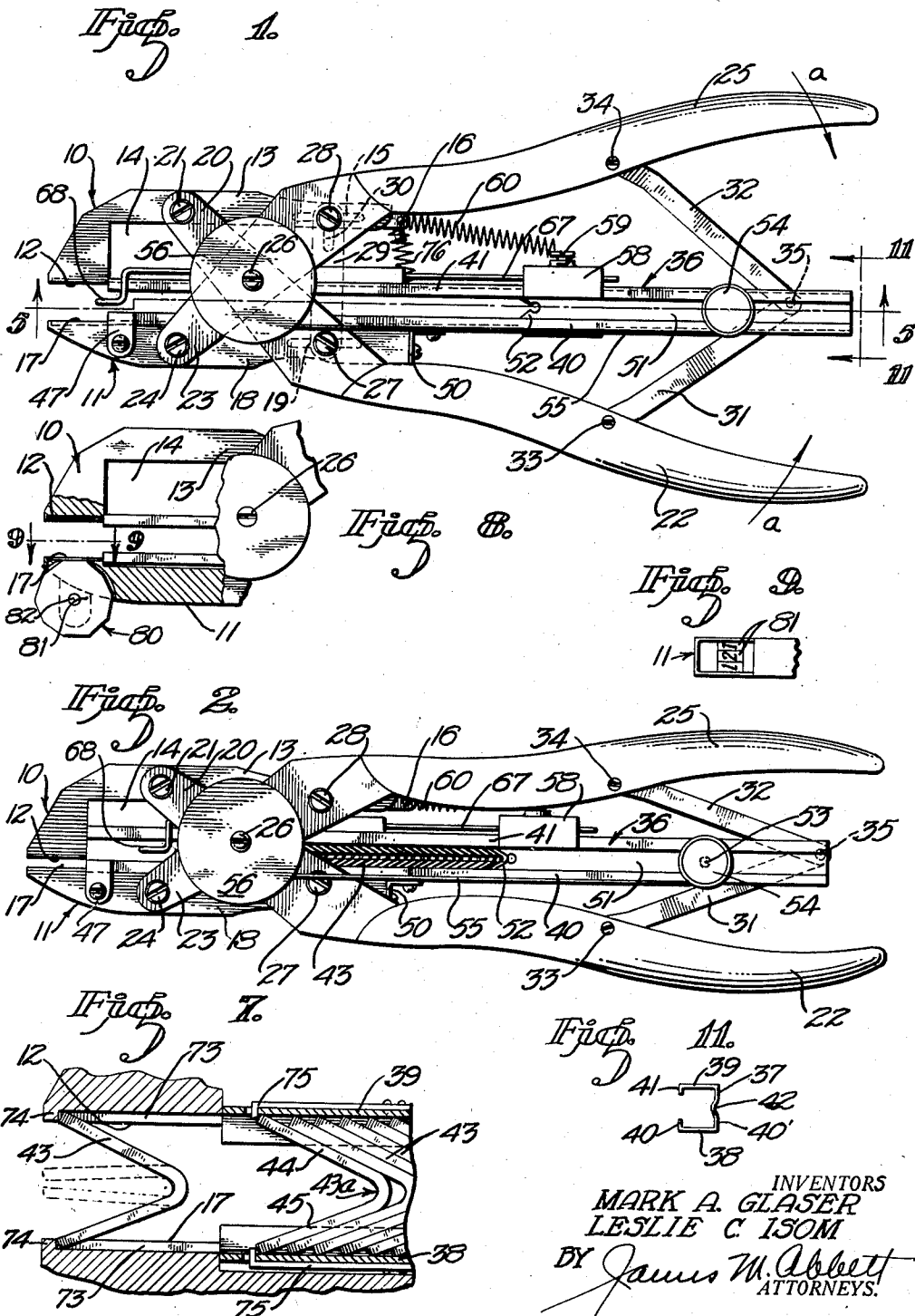
M. A. GLASER ET AL

2,194,748

CLIP APPLICATOR

Filed April 15, 1937

2 Sheets-Sheet 1



INVENTORS
MARK A. GLASER
LESLIE C. ISOM
BY James M. Abbott
ATTORNEYS.

March 26, 1940.

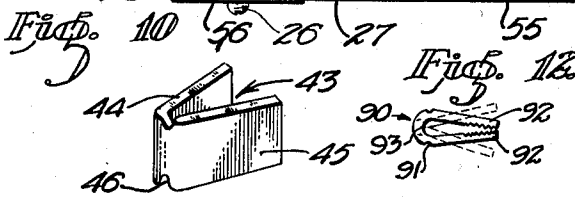
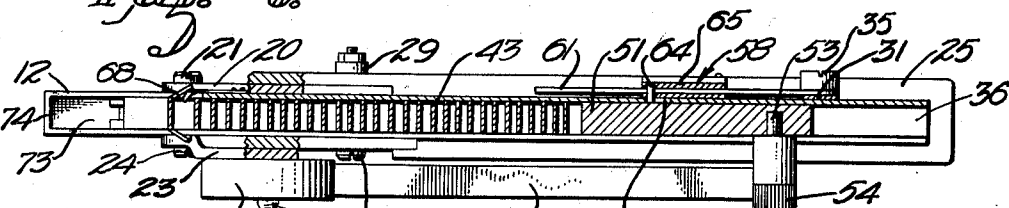
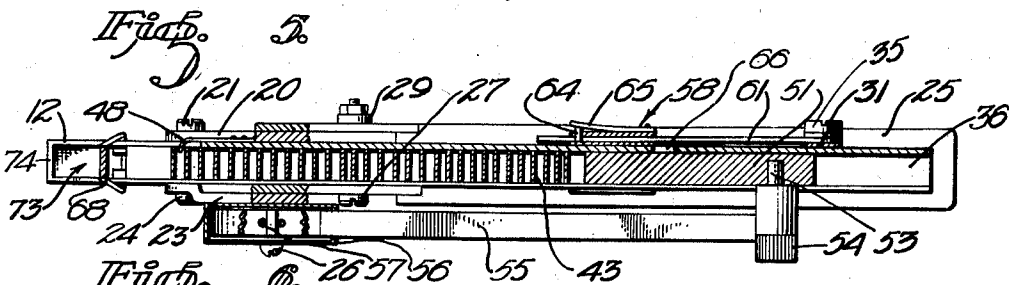
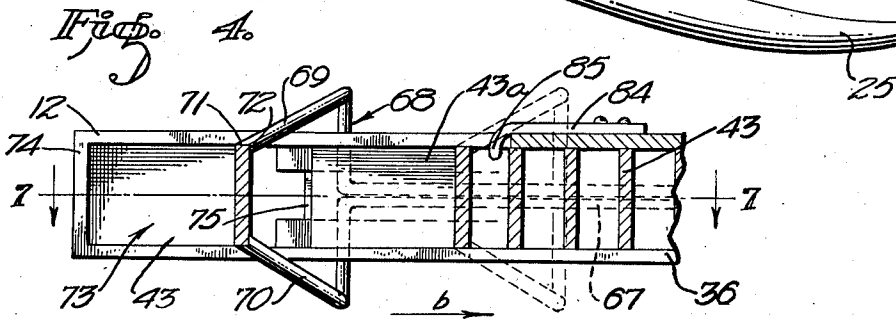
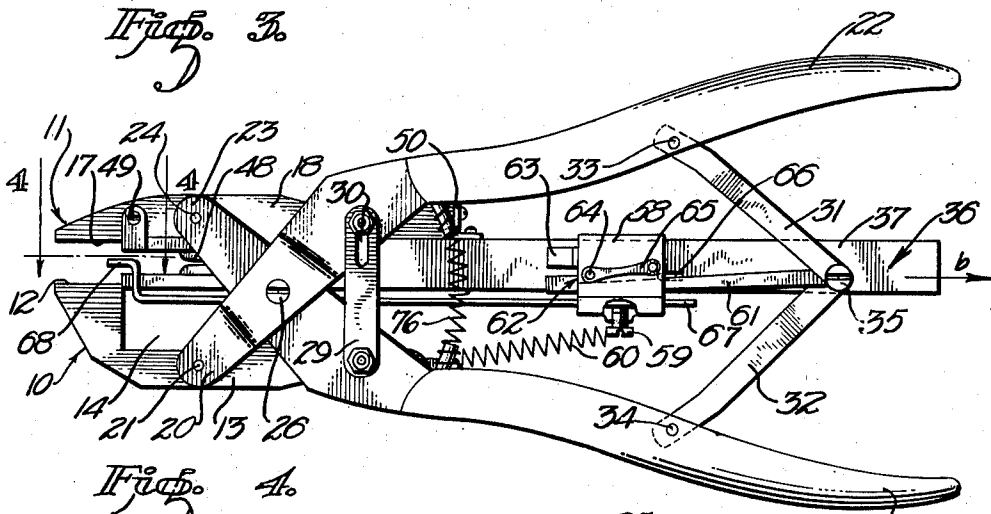
M. A. GLASER ET AL

2,194,748

CLIP APPLICATOR

Filed April 15, 1937

2 Sheets-Sheet 2



INVENTORS
MARK A. GLASER
LESLIE C. ISOM
BY James W. Abbott
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,194,748

CLIP APPLICATOR

Mark A. Glaser and Leslie C. Isom,
Los Angeles, Calif.

Application April 15, 1937, Serial No. 137,064

11 Claims. (Cl. 81—3)

This invention relates to fastening means, and particularly pertains to a clip applicator.

It is the principal object of the present invention to provide a fastening clip and means for applying the same, the clip and its applicator being capable of a large number of desirable uses. For example, the clips may be used in surgical work as a haemostat to block off the flow of blood in the veins and arteries, and in which case the applicator is especially adapted to conveniently apply and remove the clips. It is also an object of the present invention to design a device of this character which may apply clips for fastening papers together or for marking articles, such as when laundry markers or the like are required.

The present invention contemplates the provision of a simple and novel clip structure which may be placed within an applicator, the said applicator being so designed and arranged as to be in the form of hand operated pliers carrying a magazine for the clips and having associated therewith means for consecutively feeding the clips from the magazine to the jaws of the structure and for holding the fed clip while it is being applied.

The invention is illustrated by way of example in the accompanying drawings in which:

Figure 1 is a view in side elevation showing the clip applicator with which the present invention is concerned and with the jaws of the applicator in their opened position.

Fig. 2 is a view of the applicator as shown in Fig. 1 with the jaws in their closed and clamping position.

Fig. 3 is a view of the applicator similar to that shown in Fig. 1, but showing the reversed side of the applicator.

Fig. 4 is an enlarged sectional view as seen on the line 4—4 of Fig. 3 and showing the operation of the clip ejector, said ejector being indicated in its outermost position in solid lines and in its retracted position in dotted lines.

Fig. 5 is a view in central section and elevation through the applicator as seen on the line 5—5 of Fig. 1 and shows the position of the clip magazine between the plier elements of the device and the ejector in its outermost position.

Fig. 6 is a view similar to Fig. 5 showing the structure with the ejector in its retracted position.

Fig. 7 is an enlarged view on the line 7—7 of Fig. 4 showing the position of the clips as they are fed forwardly to the clamping jaws.

Fig. 8 is a similar view in section and side ele-

vation showing a variation of the present invention in which a marking element is associated with the clip applying jaws for the purpose of applying indicia to the clips or material carried thereby, such as would be the case in connection with the use of laundry marks or the like.

Fig. 9 is a view in elevation indicating the marker as seen on the line 9—9 of Fig. 8.

Fig. 10 is a view in perspective showing one of the clips.

Fig. 11 is an end view of the magazine as seen on the line 11—11 of Fig. 1.

Fig. 12 is a view showing a form of clip in solid lines and indicates its reopened position in dotted lines.

Referring more particularly to the drawings, 10 indicates an upper jaw member and 11 indicates a lower jaw member. The upper jaw member is formed with a gripping element 12 and a shank 13 which is secured thereto and is disposed at right angles to the gripping member to form a clearance space 14. The shank 13 is formed with a slotted opening 15 extending longitudinally of its end portion and which end portion terminates in an eye 16. The lower jaw 11 has a gripping face 17 and is relatively thin so far as thickness is concerned so that it may be easily introduced into confined spaces. The end of the gripping jaw 11 is formed with an extension 18 through which a slotted opening 19 occurs. The upper jaw 10 is carried by a pair of arms 20 of a handle fork which are parallel to each other and extend along opposite sides of the jaw. These fork arms 20 are pivotally connected with the jaw member 10 by pivot screw 21. The fork arms 20 form a continuation of an operating handle 22 which occurs upon the opposite side of the longitudinal center of the structure from the upper jaw member 10. The lower jaw member 11 is provided with a handle fork comprising a pair of arms 23 which are disposed parallel to each other and extend along opposite sides of the lower jaw. These arms are pivotally connected to the lower jaw by a pivot screw 24. The arms 23 constitute the fork of a handle 25. It will be seen, particularly in Fig. 3 of the drawings, that the arms of the handle forks cross each other at a point along the longitudinal center line of the applicator and that they are pivoted together by a central pivot pin 26. The arms 20 also carry a link pin 27 which extends through the slotted opening 19 of the lower jaw 11. The arms 23 carry a link pin 28 which extends through the slotted opening 15 of the upper jaw 10. As shown in Fig. 3 a link 29

is also engaged by the pins 27 and 28 and is formed with a slotted opening 30 to allow movement of the handles 22 and 25 toward each other, the link being provided to limit movement of the handles away from each other. The handles 22 and 25 are also connected by draw links 31 and 32. The link 31 is pivotally attached to the handle 22 by a screw 33 and the link 32 is pivotally attached to the handle 25 by a screw 34. These links at their contiguous ends are pivoted together by a screw 35. A longitudinally extending clip magazine 36 is disposed between the handles 22 and 25. This magazine is channel shaped as shown in Fig. 11 and has a floor 37 and side walls 38 and 39. The side walls have overhanging flanges 40 and 41. The floor 37 is formed with a central longitudinal rib 42. This magazine is adapted to receive a plurality of clips 43. It will be understood that in their various applications the clips may differ in design but that essentially they are as indicated in Fig. 10, where it will be seen that they are formed from a piece of flat metal folded intermediate its ends to provide a pair of legs 44 and 45 disposed at an angle to each other. Along the area of the fold and at opposite edges of the clips grooves 46 are made so that the clips will seat over the rib 42 in the floor of the magazine. The magazine 36 extends longitudinally between the handles 22 and 25 and the side wall 38 of the magazine extends along the upper face of the jaw 11 to a point beneath the fastening element 47 carried by the jaw. The side wall has opposite short upturned flanges, one being the flange 40 previously described and the other being a complementary flange 40'. The side wall 39 also extends forwardly and terminates at the forward edge of the recess 14 in the jaw 10. A portion of the back wall is cut away between these forwardly extending portions and terminates in a fork 48 as particularly shown in Fig. 3. The clips 47 provided on the front of magazine 36 and are fastened to the sides of the jaws 11 by screws 49. This holds the front end of the magazine 36. The magazine is also anchored to the jaw 11 by an angle plate 50 and also by securing the magazine to the links 31 and 32 by the screw 35. A pusher bar 51 is slidably positioned within the magazine 36 and follows the nested set of clips 43, the rearmost one of which seats within an angle-shaped end groove 52 of the pusher bar. The pusher bar is fitted with a pin 53 receiving a knob 54 which is connected to a flexible steel element 55 leading into a drum 56 where a coil spring 57 holds the steel element under tension and acts to move the pusher bar 51 forwardly in the magazine 36 to force the clips to an ejecting position. The drum is mounted upon the pivot pin 26. Slidably mounted upon the magazine 36 is a removable carriage 58 provided at its side with a pin 59 to which a spring 60 is attached. The forward end of the spring 60 is fastened into the eye 16 of the jaw 10 and tends to draw the carriage 58 toward the discharge end of the magazine. This carriage is provided with a draw bar 61 which extends through a longitudinal passageway in the carriage and has a catch shoulder 62 at its forward end. This shoulder engages the forward end of the carriage. The draw bar 61 is pivotally connected to the screw 35 and when the handles 22 and 25 are forced toward each other the links 31 and 32 will move together and force the draw bar 61 longitudinally pulling the carriage 58 toward the end of the magazine against the ten-

sion of spring 60. A stop 63 limits the forward movement of the carriage 58 as influenced by the spring 60. Carried upon the carriage 58 is a lock pin 64 which is mounted upon a spring leaf 65. Formed through the floor of the magazine 36 at an appropriate place is an opening 66 which receives the lock pin when the carriage is in its retracted position and temporarily holds the carriage against movement while allowing the draw bar 61 to move forwardly as the handles 22 and 25 spread away from each other. Slidably mounted through a bearing in the carriage 58 is a feed bar 67 which is adjustably held to move with the carriage by the screw 59. This feed bar extends forwardly along the side wall 39 of the magazine and terminates at its forward end in a fork 68 which straddles the side wall 39 of the magazine in the space 14 of the jaw 10 and extends downwardly along opposite sides of the side wall to a point along the plane of the longitudinal center of the magazine.

The fork 68, as particularly shown in Fig. 4 of the drawings, terminates in a pair of angularly disposed fingers 69 and 70 which have a slight amount of resiliency and may flex for a purpose to be hereinafter described. The ends of the fingers 69 and 70 are formed with side faces 71 and shoulders 72, which shoulders may engage the folded portion of the outermost clip 43 within the magazine when the fork 68 is in a retracted position, as indicated by dotted lines in Fig. 4, and will move the outermost clip forwardly to the position indicated by solid lines in Fig. 4. Attention is directed to the fact that the faces 12 and 17 of the jaws 10 and 11, respectively, are each formed with a rectangular recess 73 having a width substantially equal to the width of the clips and terminating in end shoulders 74, particularly shown in Fig. 7 of the drawings. These temporarily retard the outer movement of the outermost clip as will be hereinafter described. Spring fingers 75 are mounted upon the side walls 38 and 39 of the magazine as shown in Fig. 7 and retain the clips within the magazine prior to being selected and ejected by the fork 68. A spring 76 is interposed between handles 22 and 25 and tends to urge the handles to their outermost and separated positions.

As previously stated the applicator here disclosed may be used for applying clips of various types and for various purposes. The clips previously described are applied to veins and arteries in surgical operations to block off the flow of blood. At present the clips used must be individually placed in the haemostat forceps by an attendant and handed to the surgeon. In extensive operations this requires a great deal of time. By the structure here disclosed these clips can be applied as rapidly as desired.

In other applications of this invention clips of slightly different form are provided if desired so that they may be used as markers, such for example as marking poultry, rabbits and other animals, or the clips may be used as laundry markers, or for sales tags, in which instance it may be desirable to apply the same or consecutive marks on a marking field carried by the clip. In order to accomplish this last result it may be desirable to provide a marking mechanism generally indicated at 80 in Fig. 8 of the drawings. This structure comprises a series of marking wheels 81 mounted upon shaft 82 which shaft may be carried in suitable bearings disposed either upon the jaw structure 10 or 11. The marking wheels may be manually set to produce

a selected mark or may be actuated by mechanism connected with the handles 22 and 25 so that the wheels may act in the same manner as mechanical counters and consecutively turn out each actuation of the applicator. It is also to be understood that the clip applicator might be used as an article of office equipment to bind papers together.

In operation of the present invention the applicator is assembled as shown in the drawings and a nested string of clips is disposed within the magazine 36. These clips are preferably maintained in their nested position by the application of some adhesive or binding material, such as lacquer, cellophane, or the like. When the clips are in position the groove 46 in their fold will straddle the rib 42 in the floor 37 of the magazine and the outer edges of the leaves 44 and 45 of the clip will rest against the top and bottom walls 38 and 39 of the magazine. After the clips have been placed in the magazine 36 the pusher bar 51 is placed in the end of the magazine with the V-shaped portion 52 bearing against the rearmost clip. The knob 54 attached to the flexible spring 55 is then mounted upon the pin 53 of the pusher bar. This creates tension on the spring and tends to urge the pusher plate forwardly and to force the clips out through the front end of the magazine. This movement is restrained, however, by the spring fingers 75 as shown in Fig. 7 and temporarily prevent the clips from moving outwardly. When it is desired to feed a clip from the magazine and to apply it for its intended purpose the applicator is grasped in the hand of the operator while it is in the position shown in Fig. 1 of the drawings. In this position it will be possible for the jaw 11 to easily pass under an object upon which the clip is to be applied, since this jaw is relatively thin as compared to the jaw 10. Pressure then may be brought upon the handles so that the handles will swing toward each other in the direction of the arrows *a* in Fig. 1. Due to the manner in which the handles are linked together and are attached to the jaws 10 and 11 the jaws will be forced toward each other while being maintained in a parallel relationship. As the jaws are forced toward each other the links 31 and 32 will swing toward each other upon their pivot screw 35, and this screw will move in the direction of the arrow *b* as indicated in Fig. 3 of the drawings. In this movement the draw bar 61 will be drawn in the same direction and since its shoulder 62 has engaged the forward edge of the carriage 58 it will draw the carriage rearwardly along the magazine 36. This movement will continue until the catch pin 64 drops into the slot 66, thus limiting the rearward movement of the carriage 58 and swinging movement of the handles 22 and 25 in the direction of the arrows *a*. As the carriage moves rearwardly it will draw the feed bar 67 rearwardly and will retract the fork 68 until the feed fingers 69 and 70 move from the position indicated by solid lines in Fig. 4 to the position indicated by dotted lines in Fig. 4. These feed fingers 69 and 70 will thus ride over the folded portion of a clip 43, and the shoulders 72 on the fingers will abut against the back face of the clip. The particular clip engaged is indicated in Fig. 4 at 43a. The clip when in position between the jaws is indicated at 43. By reference to Fig. 7 of the drawings it will be seen that the clip 43a abuts at its forward edges against the spring fingers 75 which extend through the side walls 38 and 39 of the magazine. The remaining clips are retained

within the magazine by a spring finger 84 having inturned end 85 as particularly shown in Fig. 4. The feed fingers 69 and 70 reach the dotted line position shown in Fig. 4 when the carriage 58 has been retracted until the pin 64 has come to register within the slot 66. When pressure on the handles 22 and 25 has been released so that these handles may swing in a counter direction to that indicated by arrows *a* and under the expansive action of the spring 76 the forks of the handles will act to separate the jaws 10 and 11. As these jaws separate additional tension will be imposed upon the spring 60 connected to the carriage 58. This will cause the pin 64 to be drawn out of the slot 66 and will release the carriage 58 so that it will move forwardly under the influence of the spring 60 and force the feed bar 67 forwardly. The fork 68 on the feed bar will then force the clip 43a from its frictional engagement with the spring fingers 75 and 85 and will move it forwardly until its forward edges abut against the shoulder 74 of the jaws. This will place the clip 43a in position to be compressed by the jaws so that the leaves 44 and 45 will assume the positions indicated by dotted lines when the next closing operation of the jaws takes place. It will thus be seen that by this arrangement the clips may be rapidly and automatically fed forwardly and instantly applied. It has also been learned that by using the forward ends of the jaws as a pair of pliers and squeezing the folded portion of an applied clip the leaves 44 and 45 may be caused to spread apart so that the clips may be easily removed.

Referring particularly to Fig. 12 a spiral form of clip is shown. This clip 90 is bent intermediate its ends and the leg portions 92 are provided on their inner end surfaces with transversely extending teeth and a transverse groove 91 in each of its legs 92 at a point near the fold 93 of the metal. This makes it possible for the clip to be removed easily by compressing the fold 93. The legs or leaves 92 will spread outwardly releasing the object gripped by the clip.

It will thus be seen that by the construction here disclosed a simple and effective clip applicator is provided, which acts automatically to feed and apply clips by the use of a compact structure, which is well balanced to be conveniently handled and operated.

While we have shown the preferred form of our invention, as now known to us, it will be understood that various changes might be made in the combination, construction, and arrangement of parts, by those skilled in the art, without departing from the spirit of the invention, as claimed.

Having thus described our invention, what we claim and desire to secure by Letters Patent, is:

1. A clip applicator comprising a pair of jaws adapted to move toward and away from each other in parallel planes, a pair of handles adapted for actuation to impart movement to said jaws, a magazine disposed centrally of said handles for receiving clips to be applied by the applicator, said clips being in the form of a flat sheet metal strip folded upon itself to provide a pair of leaves extending foremost and at angles to each other, and feed means comprising a fork having a pair of fingers at one end thereof the other end thereof being slidably mounted upon the magazine clip and being connected to a pair of links associated with the handles whereby the feed means will be actuated by a partial movement of the handles toward each other to select the outermost clip

in the magazine and move it to a position between jaws whereby when the jaws are moved into engagement with each other they will apply pressure to the leaves of the clip and fold them together in a clamping action.

2. A clip applicator comprising a pair of movable jaws, a pair of handles associated with said jaws and adapted for actuation to force the jaws toward each other, spring means acting to separate the jaws when the handle grasp is released, a clip magazine positioned between the handles and adapted to guide clips to a position between the jaws, feed fingers associated with the clip magazine and acting to select the outermost one of a series of clips within the magazine and to feed it forwardly to a position between the jaws, means acting to hold a fed clip in a position to be operated on by said jaws, and means for holding the remainder of said clips in inoperative position in said magazine.

3. A clip applicator comprising a pair of jaws movable toward and away from each other in a parallel plane, a pair of handles adapted when compressed to close the jaws, a clip magazine carried by one of said jaws and extending between the handles to receive a series of clips to be successively fed from the magazine to said jaw, feed means operably associated with the handles for the clips and being slidably mounted upon the magazine for reciprocation by movement of the handles toward each other to engage a clip in the magazine, and acting to feed said clip to a point between the jaws when the handles are separated, and means for moving the handles and the jaws to their separated positions.

4. A clip applicator comprising a pair of jaws movable toward and away from each other in a parallel plane, a pair of handles adapted when compressed to close the jaws, a clip magazine carried by one of said jaws and extending between the handles to receive a series of clips to be successively fed from the magazine to said jaw, feed means for the clips slidably mounted upon said magazine and adapted to be reciprocated to engage a clip in the magazine when said handles are moved toward each other, and acting to feed said clip to a point between the jaws when the handles are separated, means to move the handles and the jaws to their separated positions, and means comprising an adjustable pin associated with the clip magazine and the feed means for regulating the forward movement of the feed means.

5. A clip applicator comprising a pair of jaws movable toward and away from each other in a parallel plane, a pair of handles connected to said jaws and acting when compressed to close the jaws, a clip magazine carried by one of said jaws and extending between the handles to receive a series of clips to be successively fed from the magazine to said jaw, feed means for the clips slidably mounted upon the magazine and adapted to be reciprocated by a movement of the handles to engage a clip in the magazine when the handles have been moved toward each other and acting to feed said clip to a point between the jaws when said handles are moved to separated position, means acting to move the handles and the jaws to a separated position, means comprising an adjustable pin associated with the clip magazine and the feed means for regulating the forward movement of the feed means, and stop means for limiting the retracted movement of said feed means.

6. A clip applicator comprising a pair of jaws

having parallel pressure faces adapted to move toward and away from each other in a parallel movement, a pair of handles for said jaws adapted to be grasped by the hand of an operator and when forced toward each other closing the jaws, said handles being formed at their forward ends with handle forks, one fork straddling one jaw and the other fork straddling the opposite jaw, means pivoting said handle forks to their respective jaws, means pivoting the handle forks to each other, means limiting the degree of separation of the handles and the jaws, spring means acting to move said handles and jaws to a position separated from each other, a magazine disposed between the handles and carried by one of said jaws to receive clips characterized as being formed of a flat piece of ductile material folded upon itself to form a pair of leaves normally bent at an angle to each other and adapted to be compressed in a gripping position by the jaws, and means connected to a pair of links operably associated with the handles for consecutively feeding said clips from the magazine to a position between the jaws incident to the movement of said handles, said means including a carriage slidable upon the magazine and longitudinally between the handles, a feed bar connected therewith, and a pair of yieldable feed fingers carried at the forward end of the feed bar and acting in its retracted position to engage the foremost clip in the magazine and in its advanced position to feed the clip to a clamping position between the jaws.

7. A clip applicator comprising a pair of jaws having relative movement with each other in parallel, a magazine adapted to receive clips and guide said clips to a position to be operated on by said jaws, feeding means slidably mounted on said clip magazine comprising a pair of fingers for selectively feeding clips from the magazine to a position between the jaws, and means adapted to simultaneously move the jaws toward and away from an operative position and to actuate said feeding means.

8. A clip applicator comprising a pair of movable jaws, a pair of handles associated with said jaws and adapted for actuation to force the jaws toward each other, spring means acting to separate the jaws when the handle grasp is released, a clip magazine positioned between the handles and adapted to guide clips to a position between the jaws, feed fingers associated with the clip magazine slidably mounted thereon and articulately connected by a pair of links to said handles whereby manipulation of the handles will actuate the feed fingers to select the outermost one of a series of clips within the magazine and to feed it forward to a position between the jaws, means acting to hold a fed clip in a position to be operated on by said jaws, and means for holding the remainder of said clips in inoperative position within the clip magazine.

9. A clip applicator comprising a pair of movable jaws, a pair of handles adapted for actuation to force the jaws toward each other, spring means acting to separate the jaws, a clip magazine positioned between the handles and adapted to guide clips to a position between the jaws, feed means associated with the clip magazine and acting to select the outermost one of the clips and to feed it forwardly to a position between the jaws, means acting to hold a fed clip in position to be operated on by said jaws, means for holding the remainder of said clips in inoperative position, and means acting to separate the handles and jaws when pressure is released and to

retract the clip feeding means to a position where it will engage a clip in the magazine.

5 10. A clip applicator for applying clips characterized as being made from a sheet of material
 5 folded upon itself to form a pair of leaves adapted to embrace and be compressed against an article
 10 means in the opposing faces of said jaws against which a clip may be positioned, a pair of handles
 15 pivoted together and having end extensions engaging the jaws to move the same toward and
 20 away from each other, a clip magazine extending between the handles and carried by one of said
 25 jaws to receive a series of clips, carriage means within the magazine, a drawbar connected to said
 30 carriage means, a pair of links pivotally connected to said drawbar and operably associated with said
 handles, said combination acting to urge the clips toward their discharged position between the
 jaws, means for holding the foremost clip in position to be operated on by said jaws and prevent-
 ing the remainder of the clips in the magazine from being fed therefrom, and automatic feed-
 ing means associated with the magazine and actuated by movement of the handles to engage the
 foremost clip in the magazine when the jaws are in a closed position and to feed a clip from the
 magazine as the jaws move to an opened position.

11. A clip applicator for applying clips characterized as being made from a sheet of material
 folded upon itself to form a pair of leaves adapted to embrace and be compressed against
 an article to grip the same, said applicator com-

prising a pair of jaws movable toward and away from each other and being maintained in a parallel plane, receiving means in the opposing faces of said jaws against which a clip may be positioned, a pair of handles pivoted together and
 5 having end extensions engaging the jaws to move the same toward and away from each other, a clip magazine extending between the handles and
 10 carried by one of said jaws to receive a series of clips, carriage means within the magazine, a drawbar connected to said carriage means, a pair
 15 of links pivotally connected to said drawbar and operably associated with said handles, said combination acting to urge the clips toward a dis-
 20 charging position between the jaws, means engaging the foremost clip in the magazine and temporarily preventing the remainder of the
 25 clips from being fed from said magazine, automatic feeding means associated with the magazine and actuated by movement of the handles to en-
 30 gage the foremost clip in the magazine when the jaws are in a closed position and to feed a clip from the magazine as the jaws move to an opened
 position, stop means comprising a link fastened to the forward ends of the handles and having a
 slot formed therein associated with a pin actuated by movement of the jaws away from each other whereby a clip fed therebetween will be held
 in position pending the clamping operation, and spring means acting to move the jaws to a sep-
 arated position and the clip feed means to a retracted position.

MARK A. GLASER.
 LESLIE C. ISOM.

35