May 10, 1927. 1,627,889

W. E. ELLIOTT

ATTACHING MACHINE

Filed April 5, 1922 2 Sheets-Sheet 1

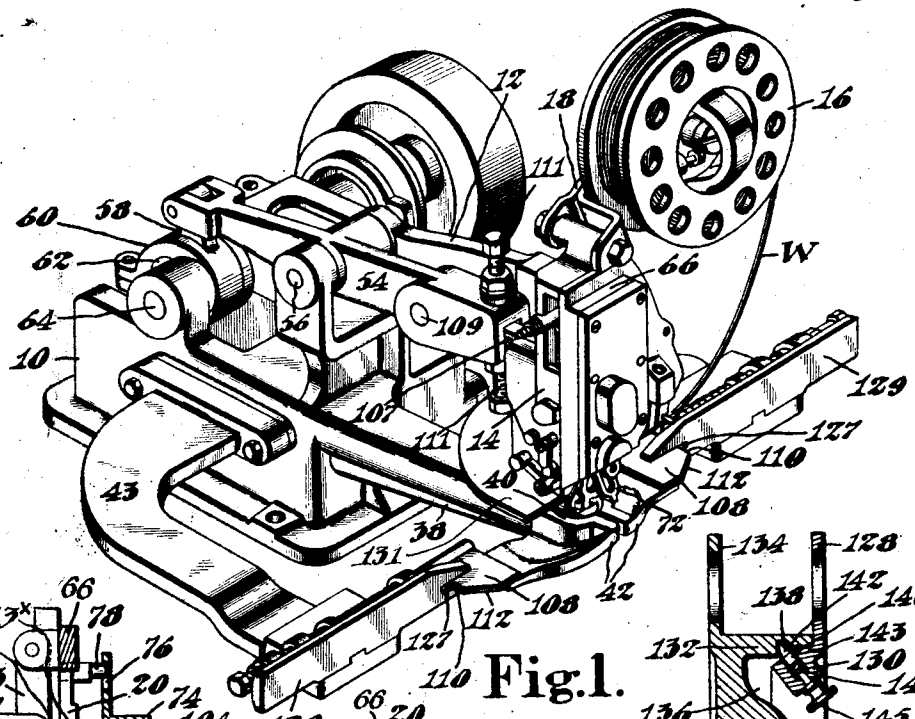

Fig.1.

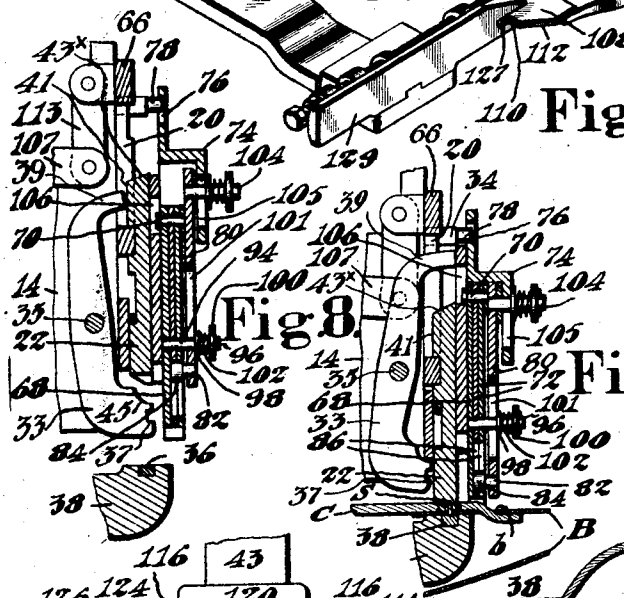

Fig.8.

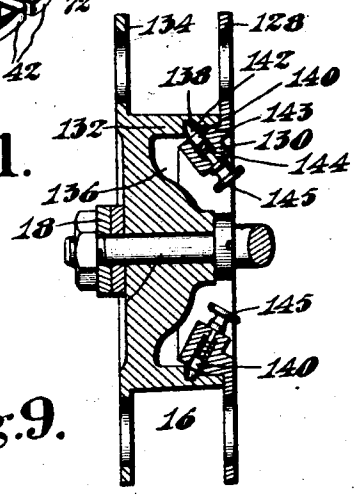

Fig.9.

Fig.11.

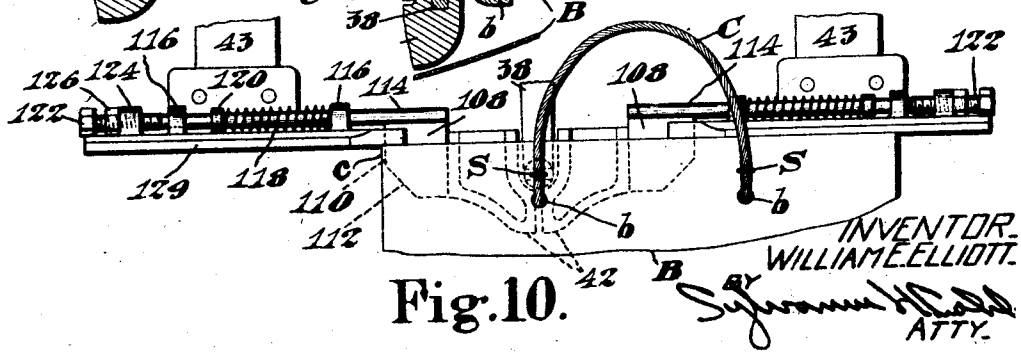

Fig.10.

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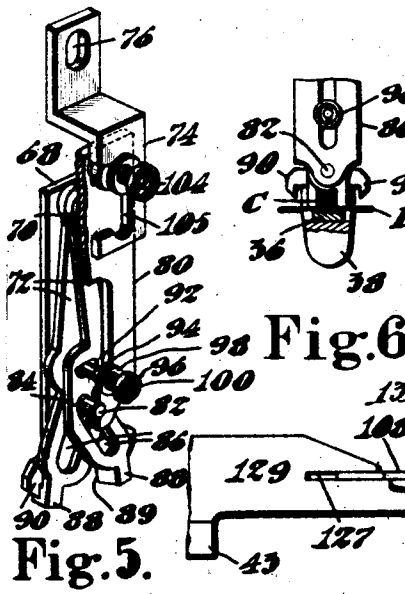

Fig.5.

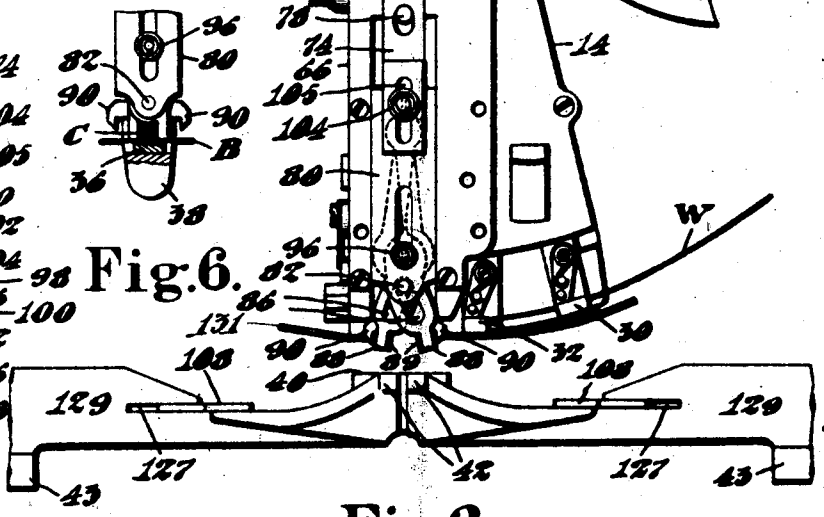

Fig.6.

Fig.2.

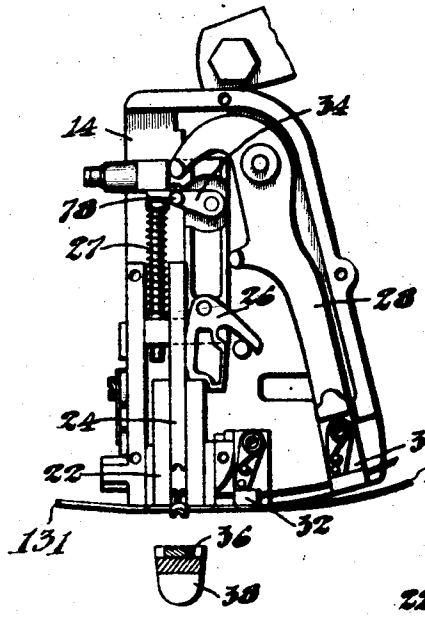

Fig.3.

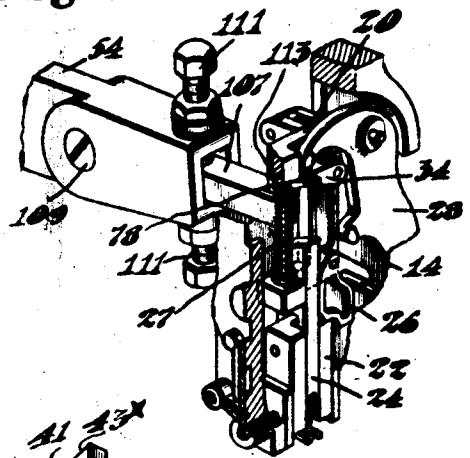

Fig.4.

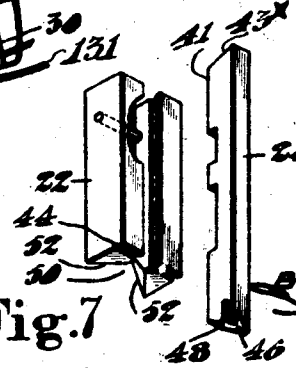

Fig.7

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Patented May 10, 1927. 1,627,889

UNITED STATES PATENT OFFICE.

WILLIAM E. ELLIOTT, OF LYNN, MASSACHUSETTS.

ATTACHING MACHINE.

Application filed April 5, 1922. Serial No. 549,889.

This invention concerns machines for attaching to articles certain portions thereof, being directed particularly to apparatus for stapling handles upon bags. Many inexpensive carrying devices consist of a sack of paper, or like material, at each side of the center of which, in both the opposite walls and near the mouth, is an opening, into which the end of a loop of cord extends and is stapled to the wall just outside the opening. It is the purpose of this invention to provide a machine by which these handles may be attached rapidly and accurately, without requiring skilled manipulation by the operator, and also to generally improve the construction of apparatus of this character.

In the accompanying drawings, illustrating a particular embodiment of the invention, Fig. 1 is a perspective view of my improved machine; Fig. 2 is a front elevation of the head of the machine, associated work-supporting table and a portion of the wire-reel; Fig. 3 shows the mechanism in the interior of the head for feeding the staple-wire and forming and setting the staples; Fig. 4 is a perspective view of this portion of the apparatus, including the actuating lever; Fig. 5 illustrates in perspective the work-positioning members and their more closely associated actuating elements; Fig. 6 is a detail in front elevation showing the work-positioning members in their closed relation; Fig. 7 is a perspective view of the staple-former and staple-driver; Figs. 8 and 9 are vertical sections taken through the center of the head from the front toward the rear of the machine, illustrating the parts respectively in their inactive and active positions; Fig. 10 is a plan view of the gaging devices for the bag; and Fig. 11 is a central section through the wire-reel.

Similar characters indicate like parts throughout the several figures of the drawings.

Extending forwardly from a frame 10 is a substantially horizontal arm 12, at the forward extremity of which is a head 14 carrying mechanism for forming a staple S made from wire W. This wire is coiled upon a reel 16 arranged to turn upon a bracket 18 projecting from one side of the arm 12 adjacent to the head. The forming and driving mechanism includes a primary slide 20 mounted to move vertically in ways upon the rear wall of the head, a staple-former 22 mounted to reciprocate in the lower portion of the head, a driver-bar 24 movable up and down through the staple-former and directly joined to the slide 20, a former-actuating member 26 pivoted on said slide, a yieldable pressure member 27 acting upon the staple-former, and a wire-feeding lever 28 with its feed-dog 30 and holding dog 32. All these elements, save for some trifling changes due to the present adaptation of the mechanisms for the attachment of bag-handles rather than buttons, are as shown and described in my Patent No. 1,147,381, granted July 20, 1915, and need not here be described. The lever 34 for controlling the wire-feed is also located and operated as in said patent; but, in addition to its previous function, has another, which will be hereinafter developed.

In the present invention a novel staple forming mechanism is provided which comprises a lever 33 which is pivotally mounted upon a stud 35 in the head of the machine and has a transversely slotted end portion 37 to receive the staple wire as it is fed beneath the former 22. The upper end of the lever 33 is provided with a tail 39 which normally engages the vertical side 41 of the driver, but during the driving movement of the driver passes over the inclined upper end $43^{\times}$ of the driver.

In the operation of the machine the lever 33 is normally held in the position illustrated in Fig. 8 during the downward movement of the driver and former and is retained in such position until the staple is bent into U-form around the lower member of the transversely slotted end portion 37. During the further downward movement of the driver the inclined lower edge of the driver engages the curved or cam-shaped portion 45 of said lever and forces it rearwardly toward the left to the position illustrated in Fig. 9 during the driving and setting of the staple. After the staple has been set the upward movement of the driver causes the inclined upper edge $43^{\times}$ of the driver to engage the tail 39 of the lever thereby forcing the lower bifurcated end portion forward, to the position illustrated in Fig. 8, so that if the staple should be retained in the upwardly moving former it will be knocked out and prevented from rising with the former and thus interfering

with the proper engagement of the former with the next wire when the next staple is to be formed.

The driver-bar 24 co-operates, in the setting of the staple formed by the member 22, with an anvil 36 fixed below the head upon the forward extremity of an arm 38 extending from the frame 10. In proximity to the anvil, upon the upper surface of the arm 38, is supported a table 40 having lateral extensions 42, 42, which are held upon the ends of brackets 43, 43 projecting from opposite sides of the frame. In the former 22 is a transverse groove 44, and in the driver-bar 24 a similar groove 46, these grooves respectively engaging the wire in the formation of the staple and the yoke of the formed staple to effect its setting. Lying transversely of the groove 46 in the end of the driver-bar is a space 48, through which a cord C to be stapled to a bag B to furnish its handle may extend during the setting operation, without being pinched between the driver-bar and the anvil. In the staple-former is a like space 50, the walls 52, 52 of which diverge rearwardly, this receiving the handle in a similar manner and also permitting its deflection to one side or the other as it curves away from the point of attachment, as is best illustrated in Fig. 10 of the drawings. The actuating mechanism for this forming and driving mechanism includes a lever 54 fulcrumed at 56 upon the frame and oscillated by an eccentric-rod 58, the strap 60 of which surrounds an eccentric 62 fixed upon a power-shaft 64 journaled horizontally in the frame.

Attached to the front of the head 14 is a casing 66, within which, mounted in vertical ways, is a secondary slide 68. Pivoted at 70 on the upper portion of this slide is a pair of handle-positioning members 72, 72, which extend downwardly below the head, their ends lying at each side of the anvil and being movable in the operation of the machine transversely thereof. In their open position, these lower handle-engaging ends are separated by a considerable space, as appears in Figs. 2 and 5 of the drawings, so that as they descend in the operation of the machine, they may contact with a handle not precisely located in the stapling position, and move it across the anvil into alinement with the end of the driver-bar 24, as they close to the point illustrated in Fig. 6. Guided in the casing 66, in front of the handle positioning members 72, 72 and moving in a direction parallel to that of the slide 68, are two actuating slides 74 and 80 connecting the primary and secondary slides and operating the positioning members. One of these actuating slides 74 has, at its upper extremity, a vertically elongated opening 76 receiving the end of a pin 78 which is secured to and projects from the lever 34 so that the oscillation of the lever 34 serves also to actuate the slide 74. Between the slide 74 and the positioning members is a second actuating slide 80 having mounted about a horizontal pin 82 at the inner side of its lower end, a roll 84 lying within slots 86, 86 in the positioning members 72, 72. These slots are inclined in opposite directions at angles of about 45 degrees to the direction of movement of the slides, their upper and lower walls acting as cam-surfaces in the contact of the roll 84 with them to swing the members 72 about their pivot as the roll travels. Below the slots 86 each positioning member has a substantially vertical end 88, by which the handle is engaged in the positioning operation. Their rear adjacent edges, which are nearest the anvil, approach each other most closely to attain accuracy in positioning the handle. From these edges, the walls of the portions 88, 88 diverge outwardly to give some freedom for the handle to vary in its lateral position where precision of location is unnecessary. The outward movement of the members 72, 72 may be limited by depending arms or abutments 90, 90 upon the secondary slide 68. Projecting forwardly from this slide, through arcuate slots 92, 92 in the members 72, 72, is a rod 94 of a friction device 96 for connecting the slides 68 and 80. This device is shown as consisting of washers 98 and 100, the former bearing against the outer face of the actuating slide 80, through a vertical slot 101 in which the rod 94 extends, while the latter is pinned upon the outer end of the rod. Between these washers is a helical spring 102 surrounding the rod and exerting its expansive force to press the washer 98 against the slide 80. A friction device 104, similar to 96, connects the actuating slides 74 and 80. In this device 104, the rod which attaches it to the inner slide passes through a slot 105 in the slide 74. When the pin 78 descends with the lever 34 in the staple-driving movement, its contact with the lower end of the opening 76 carries down the actuating slide 74, the friction devices 96 and 104 at this time causing the actuating slide 80 and the secondary slide 68, with the supported positioning members 72, 72, to move together, the ends 88, 88 of the members being separated.

When the inner extremity of the pivot-pin 70 of the members 72 strikes the bottom of a slot 106 in the casing 66, into which it projects, the travel of the secondary slide 68 is stopped with the handle-engaging ends 88 of the members 72 just above the table 40. Movement of the actuating slide 74 in this direction continuing, the friction device 96 slips so that the roll 84 carried by the actuating member 80 travels along the inclined slots 86, causing the ends 88 to approach each other, and contacting with the handle which has been placed between them,

bring it into alinement with the attaching mechanism. As the downward progress of the pin 78 in the driving of the staple continues, the friction 104 slips, all the elements of the positioning mechanism now remaining stationary, except the actuating member 74. The attachment of the handle having thus been completed, upward travel of the pin 78 first carries the ends 88 of the positioning members away from the anvil to free the attached handle. Then the friction 96 slips, causing the actuating member 80 to separate the positioning members when the pivot-pin 70 contacts with the upper extremity of the slot in which it moves. At the end of the operation, the actuating slide 74 travels alone to its initial position, the friction 104 yielding.

To communicate the movement of the actuating lever 54 to the primary slide 20, the lever 54 has at its forward extremity a terminal portion 107 pivoted at 109 upon the lever and capable of playing vertically with lost motion between stop-screws 111, 111. The outer end of this terminal portion is connected to the primary slide by a link 113. By varying the position of the stop-screws, the time at which the terminal portion becomes effective to reciprocate the slide 20 may be altered, and the extent of movement of the slide, both downwardly and upwardly, adjusted to produce the proper setting action upon the staple and the amount of feed of wire from the reel.

Mounted at opposite sides of the stapling mechanism and just above the table-extensions 42 are gage members 108, 108, which may be of thin material adapted to readily enter the mouth of the bag to which the handles are to be attached. Each gage member has at its side farthest removed from the attaching mechanism a bag-locating edge 110, the normal distance of which from the center of the anvil is preferably equal to the space between the edge of the bag at its mouth and the point at which the staple is to be set to secure the handle. Outside this locating edge 110 is an inwardly inclined edge 112, which facilitates the application of the bag to the gage. Each gage member 108 is supported upon a horizontal rod 114 movable in perforated lugs 116, 116 projecting from the corresponding bracket 43. Surrounding the rod, between the inner lug and a collar 120 fixed upon said rod, is a helical spring 118, which by its expansion holds the gage in its normal position with a capacity for yielding toward the attaching mechanism. The point at which the gage-edge 110 lies may be determined and adjusted by a screw 122 threaded through a lug 124 and being alined with the rod 114. The screw may be locked in its adjusted position by a check-nut 126. Each gage may be held against turning about the axis of its supporting rod by a slot 127 formed in a wall 129 continuing the corresponding table-extension 42. The position of the openings *b* in the bags varies somewhat, and the operator, having placed the mouth of a bag over the table-extensions, with its upper edge against the forward faces of the walls 129, which brings the setting points for the staples at the right distance from the mouth of the bag, may find that on moving the edge of the bag at *c* against the locating edge 110 of the gage, the stapling point transversely is not substantially opposite the opening *b*. If so, he can, as with the bag in the position illustrated in Fig. 10, either move it and the gage to the right against the tension of the spring 118, or may carry the bag to the left, away from the locating edge, until the alinement is correct, whereupon he may start the machine to set the staple. In a like manner, the other point of handle-attachment may be accurately located by bringing the opposite edge of the bag into cooperation with the companion gage.

In order to prevent the handle loop from engaging or embracing the rear side of the head a guard plate 131, which may be of substantially semi-circular form and of a sufficient width to cover the handle when either of its limbs are in attaching position, is secured to the under face of the head to overlie the positioned handle member so that after the operator has presented the bag to the attaching mechanism and stapled the limbs of the handle to the bag the loop of the handle will be prevented from engaging the head during the movement of the bag.

As the wire-reels of machines of this character are ordinarily constructed, upon applying the usual movable head to the body-portion of the reel after a fresh coil of wire has been put in place, one of the convolutions of the coil is almost certain to fall between the head and the end of the body-portion, rendering it very difficult to get said head in place. This trouble I obviate by the construction particularly illustrated in Fig. 11. Here the separable head 128 has a hub 130 arranged to fit within the cylindrical body-portion 132, this body being provided with a fixed head 134 opposite the head 128, the coil of wire being received between the two. The body is cored out at 136, and extending about the wall of this portion, somewhat within the outer end of the body and in a plane parallel thereto, is an annular groove 138. Movable in an inclined direction in the hub of the separable head, preferably lying at about 45 degrees to the horizontal, are two or more retaining pins 140, each of which pins has a conical end 142. These ends are forced out beyond the cylindrical surface 143 of the hub, which

fits within the portion 136 of the body, by springs 144 which encircle the shanks of the pins and abut against the inclined enlargements and the ends of the bores in which they fit. After the operator has removed the head 128 and placed a fresh coil of wire upon the body-portion, the hub of the head is inserted in the body, the pins 140 being drawn back by finger-pieces 145 to permit this. The length of the tapered surface of the ends 142 is such that if, when the head 128 is pressed in, a strand of wire interposes itself between the head and the body, these ends will still have engagement with the groove 138, exerting a retaining effect. Then, as the machine is operated and the reel rotated by drawing the wire from it, as the turn caught between the body and head comes to the under side, it will be freed by gravity, and as it leaves the space in which it has been caught, the expansion of the springs 144 pressing the inclined ends of the pins into the groove, will exert a force a component of which is parallel to the axis of the reel, thus drawing the head into place.

To outline generally the operation of the apparatus, it may be said that the operator, taking a bag with its opposite sides at the mouth parallel to one another, inserts one end of the handle C through one of the openings *b*, and brings one of the ends of the mouth against the gage-edge 110 at this side of the attaching mechanism, the relation of the point of attachment to the upper edge of the bag being determined by the contact of this edge with the walls 129. If, when thus applied to the machine, the stapling point is found to be opposite the handle-receiving opening, the machine is actuated to set the staple and secure the handle. If an inaccuracy in the punching of the opening *b* brings this point too far to one side or the other of the opening, the bag is shifted either with the gage, by compressing its spring, or in the opposite direction by moving it away from the bag-locating edge. The bag being thus correctly disposed for the stapling operation, the machine is started, and the members 72, 72, descending, contact with the handle at one side or the other, if it is not properly located, and move it into place, there retaining it during the staple-setting operation. After this, the positioning members rise and free the handle, whereupon the operator may slide the bag along the walls 129 until its opposite edge strikes the other gage; and then, the other end of the handle being in the corresponding opening *b*, the stapling operation is repeated, completing the attachment of the handle at this side of the bag.

I claim:

1. In a machine for attaching portions of articles, attaching mechanism, positioning means movable in contact with the portion to be attached in proximity to and upon opposite sides of the attaching mechanism to aline it laterally with the attaching mechanism and means for actuating said positioning means from said attaching mechanism.

2. In a machine for attaching portions of articles, attaching mechanism, positioning means movable to engage opposite sides of the portion to be attached to aline it centrally with the attaching mechanism and means for actuating said positioning means from said attaching mechanism.

3. In a machine for attaching portions of articles, an anvil, a movable driver co-operating therewith, and portion-positioning members situated adjacent to the driver means operable by the movement of said driver to move said positioning members toward each other laterally of the anvil, to aline the portion to be attached with the attaching mechanism.

4. In a machine for attaching portions of articles, an anvil, a movable driver co-operating therewith, portion-positioning members situated adjacent to the driver and being movable laterally of the anvil, and means for moving said positioning members from the driver.

5. In a machine for attaching portions of articles, an anvil, a movable driver co-operating therewith, portion-positioning members situated adjacent to the driver and being movable laterally of the anvil, and means operable through the driver for moving the positioning members into contact with the portion to be attached prior to the attaching action of the driver, said members being arranged to retain the portion during such attaching action.

6. In a machine for stapling handles upon bags, staple-driving means, and handle-positioning means co-operating with the driving means to clamp and position the handle properly with respect to the driving means.

7. In a machine for stapling handles upon bags, staple-driving means, and pivotally mounted handle-positioning means movable from opposite sides of the driving means in co-ordination with the driving movement of the staple-driving means to position the handle properly with respect to the driving means.

8. In a machine for stapling handles upon bags, an anvil, staple-driving means movable toward and from the anvil, and handle-engaging means movable with the driving means at each side of the anvil.

9. In a machine for stapling handles upon bags, an anvil, staple-driving means movable toward and from the anvil, and handle-engaging means movable with the driving means at each side of the anvil, the driving means and handle-engaging means being

capable of independent relative movement in the direction of driving.

10. In a machine for stapling handles upon bags, an anvil, staple-driving means movable toward and from the anvil, handle-engaging means movable with the driving means at each side of the anvil, and means for moving said engaging means transversely with respect to the direction of driving.

11. In a machine for attaching handles to bags, a primary slide, a staple-driver reciprocated thereby, a secondary slide mounted to reciprocate with the primary slide, and handle-engaging members movable upon the secondary slide.

12. In a machine for attaching handles to bags, a primary slide, a staple-driver reciprocated thereby, a secondary slide mounted to reciprocate with the primary slide, handle-engaging members movable upon the secondary slide, and frictional connections between the slides.

13. In a machine for attaching handles to bags, a primary slide, a staple-driver reciprocated thereby, a secondary slide mounted to reciprocate with the primary slide, handle-engaging members movable upon the secondary slide, frictional connections between the slides, and means actuated by the relative movements of said slides permitted by said frictional connections for causing the handle-engaging movement of the members.

14. In a machine for attaching handles to bags, a primary slide, a staple-driver reciprocated thereby, a secondary slide mounted to reciprocate with the primary slide, handle-engaging members movable upon the secondary slide, and a plurality of sliding actuating members between the primary and secondary slides.

15. In a machine for attaching handles to bags, a primary slide, a staple-driver reciprocated thereby, a secondary slide mounted to reciprocate with the primary slide, handle-engaging members movable upon the secondary slide, a plurality of sliding actuating members between the primary and secondary slides, and frictional connections between said actuating members.

16. In a machine for attaching portions of articles, attaching mechanism, a gage member adapted to enter the article situated at each side of the attaching mechanism and means permitting said gage members to yield toward the attaching mechanism.

17. In a machine for attaching portions of articles, attaching mechanism, a gage member adapted to enter the article situated at each side of the attaching mechanism means permitting said gage members to yield toward the attaching mechanism, and means arranged to vary the normal position of the gage members.

18. In a machine for attaching portions of articles, attaching mechanism, an article-locating wall extending at each side of the attaching mechanism, and a gage member extending from each wall in perpendicular relation thereto.

19. In a machine for attaching portions of articles, attaching mechanism, an article-locating wall extending at each side of the attaching mechanism, and a gage member extending from each wall in perpendicular relation thereto and being yieldable longitudinally of the wall toward the attaching mechanism.

20. In a machine for stapling handles upon bags, stapling mechanism and co-operating manually operable gage members located respectively on opposite sides of said stapling mechanism and arranged to enter and position the mouth of the bag presented to the stapling mechanism.

21. In a machine for stapling handles upon bags, stapling mechanism, co-operating movable gage members located respectively on opposite sides of the stapling mechanism arranged to enter and position the mouth of the bag and springs resisting the movement of the respective gage members toward the stapling mechanism.

22. A machine for stapling handles upon bags comprising a head, stapling mechanism mounted in said head, means for actuating said stapling mechanism and means for preventing the loop of the bag handle from engaging said head.

23. A machine for stapling handles upon bags comprising a head, stapling mechanism mounted in said head, means for actuating said stapling mechanism and a plate secured to said head of sufficient area to overlie the handle and acting to prevent the handle from engaging said head upon the removal of the bag from the machine.

24. In a machine for stapling handles upon bags, stapling mechanism, a movable gage member arranged to enter the mouth of a bag at each side of the stapling mechanism, springs resisting the movement of the gage members, and means arranged to adjust the gage members toward and from the stapling mechanism against the tension of the springs.

25. In a machine for stapling handles upon bags provided with handle-receiving openings, stapling mechanism, and gage members situated at each side of the stapling mechanism and separated therefrom by distances determined by the space between the handle-receiving openings and the sides of the bag.

26. In a machine for stapling handles upon bags provided with handle-receiving openings, stapling mechanism, handle-positioning means movable at opposite sides of the stapling mechanism, gage members situated at opposite sides of the stapling mech-

anism and separated therefrom by distances determined by the space between the handle-receiving openings and the sides of the bag, and a yieldable mounting for each gage member permitting movement thereof to compensate for departures from normal of the spacing of the handle-receiving openings.

27. In a stapling machine, a reciprocatory staple-driving member, actuating mechanism therefor, and pivotal connections between the actuating mechanism and driving member having means to permit lost motion therebetween and including adjustable means respectively arranged independently to vary the limit of travel of the driving member in opposite directions.

28. In a stapling machine, a reciprocatory staple-driving member, actuating mechanism therefor, pivotally united lost-motion connections between the actuating and driving mechanisms, and adjustable means arranged respectively to vary independently the lost motion for travel of the driving member in either direction.

29. In a stapling machine, a reciprocatory driver, an oscillatory actuating lever having a pivotally mounted terminal portion movable thereon in the direction of movement of the driver, a link connecting said terminal portion to said driver, and adjustable stops arranged to vary the limit of movement of the terminal portion.

30. In a stapling machine, a reciprocatory driver, an oscillatory actuating lever having an axial recess in its forward end, a terminal portion pivotally mounted therein and capable of vertical movement relatively to the end of said lever, a link connecting said terminal portion to said driver and oppositely disposed set screws adjustably mounted in the end of said actuating lever adapted to engage said terminal portion and limit the range of lost motion thereof.

31. In a machine for stapling handles upon bags, a movable staple-engaging member provided with a space to receive a bag-handle having rearwardly diverging walls to permit the deflection of the handle as it curves away from the respective points of attachment.

32. In a machine for stapling handles upon bags, an engaging member provided with a groove to receive a staple and with a handle-receiving space at each side of the groove having walls diverging rearwardly from points adjacent to said groove to permit deflection of the handle as it curves away from the respective points of attachment.

33. In a machine for stapling handles upon bags, an anvil, and an engaging member co-operating with the anvil and provided with a groove extending transversely of the anvil to receive a staple and with a handle-receiving space extending from front to rear of the anvil having walls diverging rearwardly from points adjacent to said groove to permit deflection of the handle as it curves away from the respective points of attachment.

34. In a stapling machine, a reciprocating staple forming member and reciprocating driving member and means for imparting differential movement to said forming member from said driving member, a co-operating pivotally mounted forming member having a tail engaging said driving member, means upon said driving member for actuating said pivotally mounted forming member to remove the same from staple-forming position during the staple-setting movement of the driver and means upon said driving member to cause said pivotally mounted forming member to strip the staple from the reciprocating staple-forming member.

Signed at Boston, in the county of Suffolk and State of Massachusetts, this 3rd day of April, 1922.

WILLIAM E. ELLIOTT.