Oct. 2, 1934. J. J. VEILLETTE 1,975,413

FASTENER ATTACHING MACHINE

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Fig. 1.

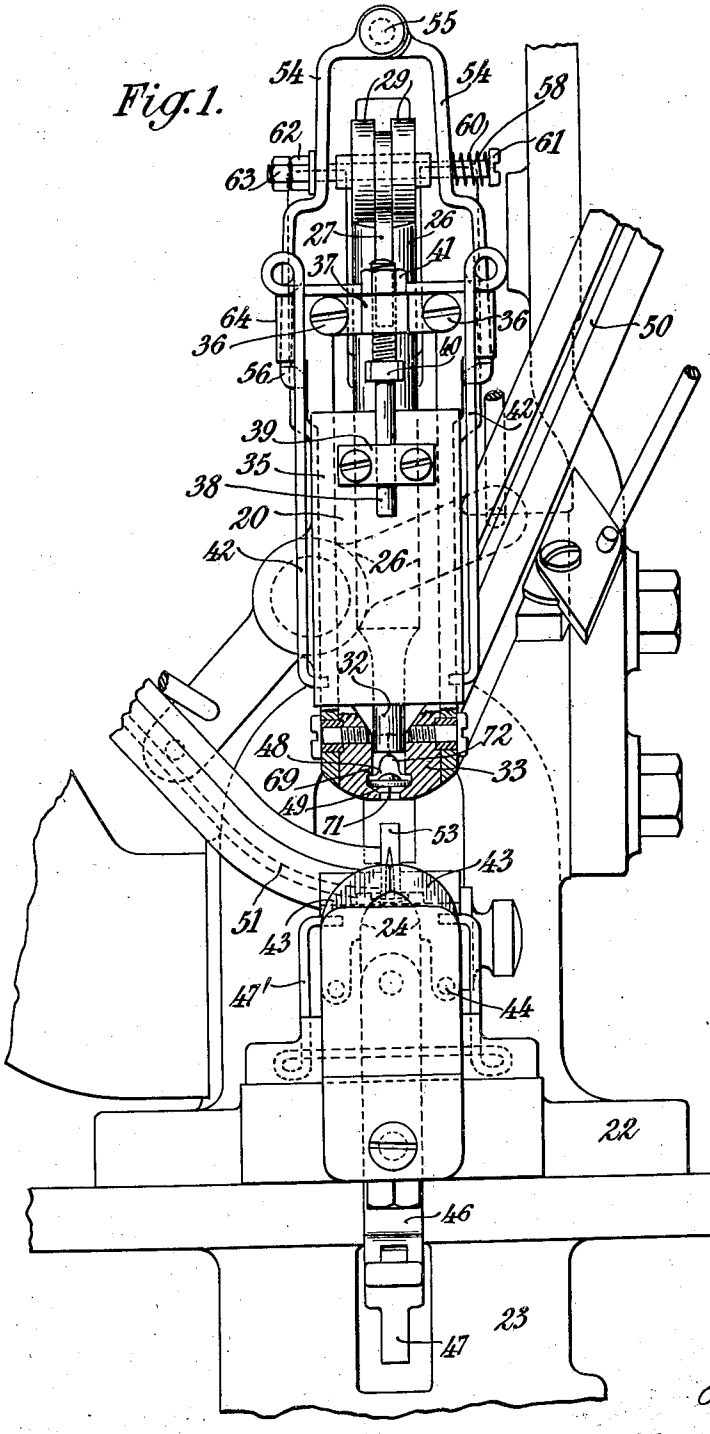
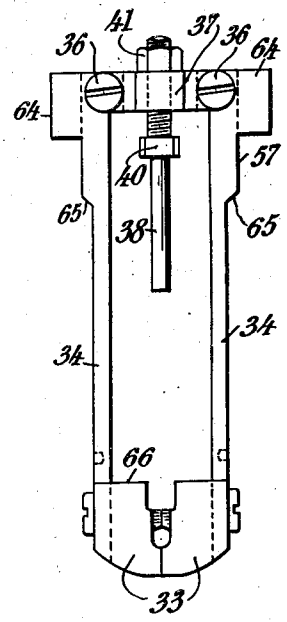


Fig. 3.



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Fig. 2.

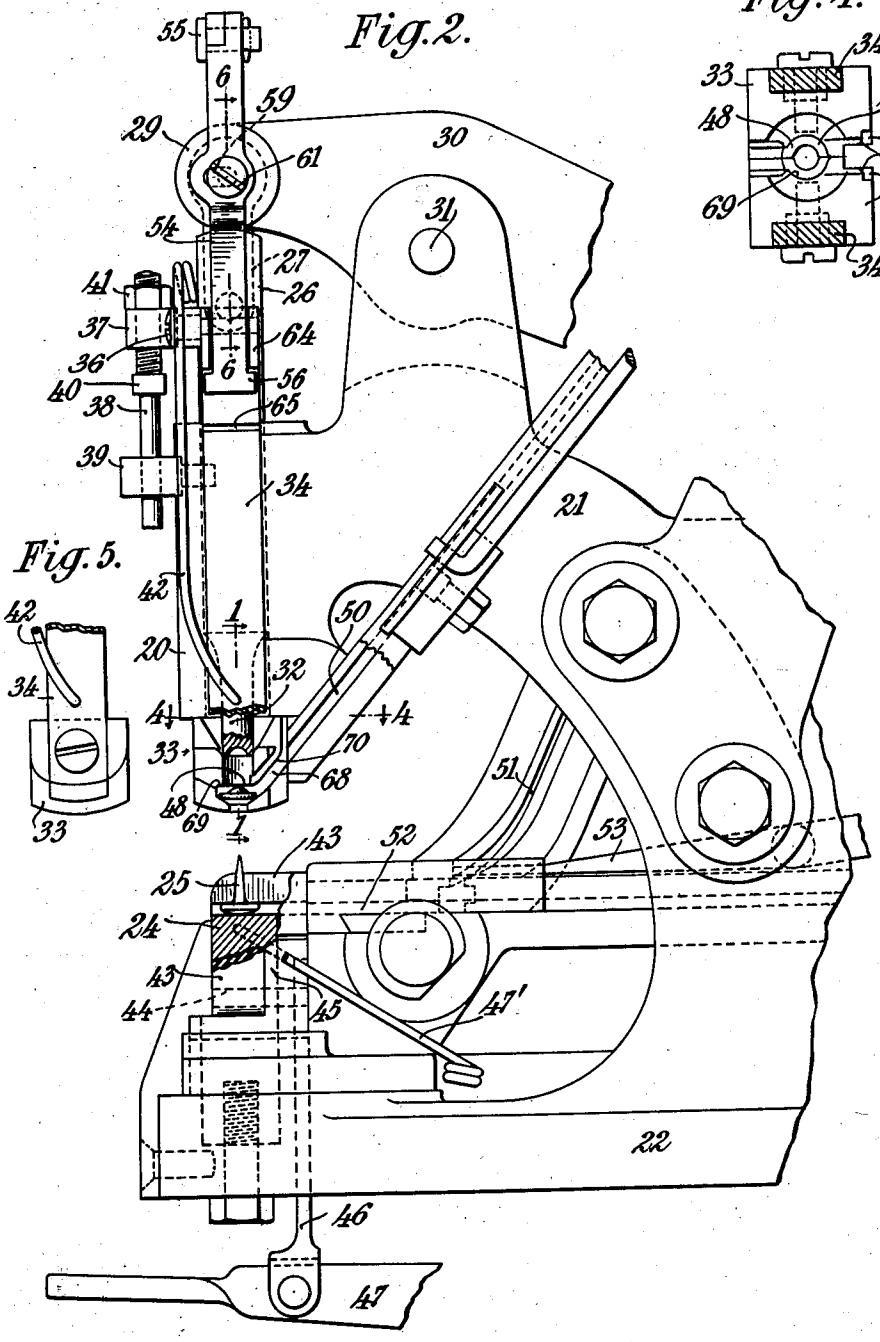


Fig. 4.

Fig. 5.

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Fig. 7.

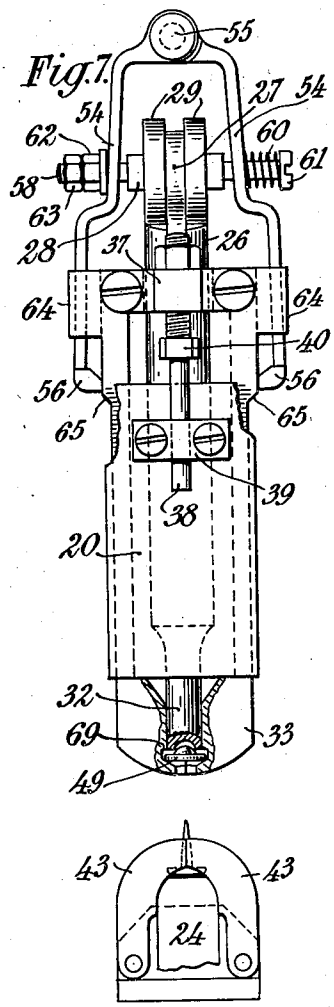


Fig. 8.

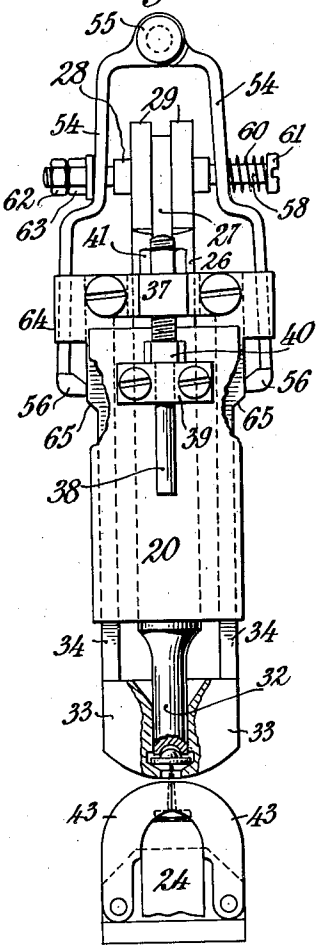


Fig. 9.

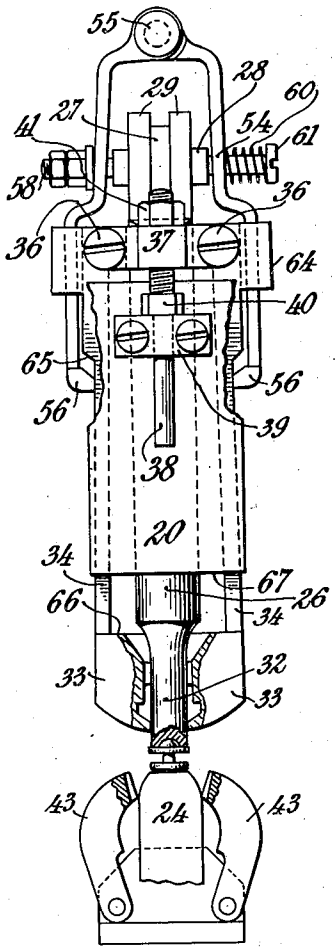
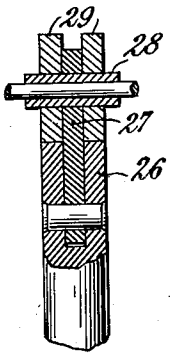


Fig. 6.



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Patented Oct. 2, 1934

1,975,413

UNITED STATES PATENT OFFICE

1,975,413

FASTENER-ATTACHING MACHINE

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Application April 15, 1933, Serial No. 666,228

11 Claims. (Cl. 218—6)

This invention relates to improvements in fastener-attaching machines adapted for use in securing together the parts of buttons or other fastening elements of the type commonly used in the making of garments and other articles of fabric material. It is herein disclosed in a form adapted for use in securing to opposite sides of layers of fabric to be united, an element in the form of a tack and an element in the form of a cap having an opening within which the shank of the tack may be clinched.

The machine comprises an anvil on which the tack may be positioned point up, a pair of jaws by which the cap may be positioned over the point of the tack, and a setting tool in the form of a plunger by which the cap may be released from the jaws and the cap and tack secured together by relative movement between the tool and the anvil.

It is an object of the invention to provide in the jaws a pair of opposed recesses of forms such as to produce for the cap a cavity having overhanging portions so positioned as to prevent the cap from being accidentally overturned or abnormally displaced after it has been positioned between the jaws and prior to the time when it is forced into its engaging relation with the tack.

It is a further object of the invention to form in the jaws oppositely-disposed recesses leading upwardly and outwardly from the cap-receiving cavity to external surface portions of the jaws, the recesses being of a form such as to provide a raceway within which the caps may be fed to the cavity and at the same time prevented from being accidentally overturned or abnormally displaced during such feeding operation.

Other important features of the invention consist of cooperative stops independent of the movement-imparting mechanism and independent of the fastener-feeding mechanism, by which the extent of movement of the fastener-holding jaws may be definitely limited independently of the amplitude of movement of the parts of the mechanism by which the jaws are operated, and means for maintaining the jaws in such relative positions that their cap-receiving recesses will be directly opposite each other throughout their relative movements with respect to the part of the machine in association with which they are mounted.

In the accompanying drawings illustrating the preferred form of the invention,—

Figure 1 is a front view of a portion of a machine embodying the improvement, parts being shown in cross-section along the line 1—1 of Fig. 2.

Fig. 2 is a side view of the portion of the machine shown in Fig. 1, a portion of one of the jaws nearest the observer being omitted to expose underlying parts of the mechanism.

Fig. 3 is a front view of the fastener-holding jaws and associated parts of the mechanism removed from the machine.

Fig. 4 is a cross-sectional view through the jaws along the line 4—4 of Fig. 2.

Fig. 5 is a side view of the lower end portion of one of the jaws.

Fig. 6 is a cross-sectional view, along the line 6—6 of Fig. 2, through the connecting link by means of which motion is transmitted to the plunger or setting tool and associated parts.

Fig. 7 is a front view of the portions of the machine on which the attachment of the parts of the fastening means is primarily dependent, the setting tool being indicated as having been moved into contact with a fastening element.

Fig. 8 is a view of the parts of the machine illustrated in Fig. 7 after they have been moved to relative positions such as to cause the two parts of the fastener to be brought into mutual engagement.

Fig. 9 is a view of the parts of the machine illustrated in Fig. 7, with the respective elements represented in the relative positions which they are caused to assume at or near the time when the parts of the fastener have been completely united, the representation of the fabric, leather or part of a garment or other article to which the fastener would ordinarily be secured, having been omitted.

The invention to be described is applied to a portion of the machine comprising a bearing block 20 (Figs. 1 and 2) supported by a head 21 extending upwardly and forwardly from a portion of the machine bed 22, which, in turn, may be mounted upon a suitable stand or framework, a portion only of which is indicated at 23 (Fig. 1).

Mounted in the machine bed as at 24 is an anvil to receive one part of the fastener herein disclosed as a tack 25, and in the bearing block 20 is mounted a plunger or setting tool 26. The plunger and anvil should be relatively movable, and in the machine disclosed such movement is provided for by so mounting the plunger 26 in the bearing block that it may move endwise with its axis in alignment with the anvil.

To provide for the endwise movement of the plunger it is connected by means of a link 27 and sleeve 28 with the forked end 29 of a lever 30

pivotally connected to the head 21 as at 31. As clearly indicated in Figs. 1, 2 and 6, the forked end 29 of the lever and the upper end of the plunger 26 are provided with contacting cam-like surfaces whereby the driving force may be directly communicated from the lever to the plunger independently of the link 27, the purpose of the link being to withdraw the tool or plunger in a vertical direction.

As a convenient means for positioning one element of the fastener in alignment with the fastener-engaging end 32 of the setting tool, a pair of jaws 33 are provided having parallel supporting elements 34 slidably mounted in guideways 35 in the bearing block 20.

As best represented in Fig. 3, the jaw supports 34 may be pivotally connected as at 36 with a cross-bar 37, within which may be secured, as indicated, a guide 38 movable vertically in a guideway 39, which may be secured to the face of the bearing block 20.

Downward movement of the jaws 33 and their supports 34 may be limited by a stop 40 on the guide 38, and provision may be made for adjusting the position of the stop in any appropriate manner, as by threading the guide into the cross-bar 37 and securing it in any desired position of adjustment by means of a jam-nut 41 or other suitable fastening element.

The jaws 33 and their supporting structure may be held in frictional engagement with the bearing block 20 by means of a spring 42, as clearly indicated in Figs. 1 and 2.

As a means of properly positioning the lower fastener element on the anvil 24, a pair of jaws 43 may be provided between which the fastener element may be thrust prior to a setting operation. These jaws may be pivotally connected as at 44 to a vertically movable slide 45, connected by means of a link 46 with the forward end of a lever 47, which may be depressed to spread and lower the jaws so as to remove them from the fastener element during a setting operation. The jaws may be yieldingly held in their normal fastener-receiving positions by a spring 47', as indicated in Figs. 1 and 2.

The anvil 24, fastener-positioning jaws 43 and the means whereby the jaws 43 are operated, constitute no part of the invention herein to be claimed.

The jaws 33 are provided with recesses which cooperate to form a fastener-holding cavity 48, within which may be positioned a button or other fastener element 49.

Prior to each setting operation the fastener element 49 is fed from a hopper (not shown) through a raceway 50 to the fastener-receiving cavity 48, and a complementary fastener element 25 fed from a hopper (not shown) through a raceway 51 to a guideway 52 is thrust forwardly by a push-finger 53 (Fig. 2) to its proper position on the anvil 24.

The means for operating the lever 30, the lever 47 and the push-finger 53 in their properly-timed relations, and the parts of the mechanism which provide for the feeding of fastener elements one at a time to the jaws 33 and anvil 24, may be controlled by mechanism of the treadle-operated type disclosed in my prior Patent No. 1,836,887, or, if preferred, they may be driven by cranks and cams from a power-operated driving shaft in the manner illustrated and described in prior patents, such, for example, as the patents to Warner et al., No. 1,499,270, and Warner, No. 1,575,596. These parts of the machine disclosed in this application constitute no part of the invention herein sought to be protected.

In accordance with the usual operation of machines of the type of the one herein disclosed, the operation of securing the two parts of a fastener together and to a part of a garment or other article is effected by placing the material of the article just over the jaws 43 and then setting the machine in operation, as a result of which the plunger or setting tool is moved downwardly to the position indicated in Fig. 7, until its lower end makes contact with the fastener element held by the jaws 33, after which the plunger, fastener element and jaws are moved downwardly to the position indicated in Fig. 8 in which the parts of the fastener are represented as having been brought into actual contact and the securing of the two parts together as having been initiated. When in this position the stop 40 will engage the upper surface of the guideway 39 and prevent further downward movement of the jaws 33. At the same time the lever 47 will commence to move downwardly and, through the agency of the link 46, will commence to withdraw the jaws 43 from the lower fastening element. The plunger will then thrust the upper fastener element downwardly, causing the jaws 33 to be separated and with their supporting elements 34 swung around their pivotal connections 36 so as to permit the fastener element to be moved downwardly from between the jaws and the two parts of the fastener secured together in a well-known manner.

The return of the jaws to their normal positions indicated in Figs. 1 and 2 may be effected by novel mechanism constituting one of the improvements herein to be claimed as an invention. This improvement, which may as a matter of convenience be designated generally as a latching mechanism, consists of a pair of arms or tongs 54 pivoted together as at 55 and having inturned fingers 56 normally held in engagement with the outer surfaces of the upper end portions 57 of the jaw supports. The arms 54 are connected with the lever 30 by means of a cross-pin 58 which passes through the sleeve 28 and through elongated slots 59 in the arms. The arms 54 are yieldingly pressed towards each other by means of a spring 60, the ends of which are confined between one of the arms and a head 61 on one end of the cross-pin 58. As a means of adjusting the tension of the spring 60 the effective length of the pin may be varied by adjusting the position of a nut 62 on the end opposite the head 61, which is held by the spring 60 in engagement with one of the arms 54. The adjusting nut 62 may be firmly held in its proper position for any desired adjustment of the spring by means of a lock-nut 63.

A limited degree of relative endwise movement between the latch mechanism as a whole and the jaws and their supports 33, 34, is provided for by spaced parallel lugs 64 which cooperate to serve as a guideway to maintain the latch and jaws in vertical alignment without preventing the desired endwise movement. The elongation of the slots 59 in the arms 54 affords a sufficient amount of clearance to allow for the relative lateral movement of the pin 58 during the rocking of the end of the lever 30.

The upper ends of the jaw supports 34, as indicated at 57, are slightly increased in thickness so as to provide shoulders 65 at short distances below the parts of the jaw supports with which the ends of the fingers 56 of the latch mechanism are normally held in engagement.

The strength of the spring 42 is so great as compared with the strength of the spring 60 that the frictional engagement of the jaw supports 34 with the bearing block 20 will be materially greater than the frictional engagement between the fingers 56 of the latching mechanism and the surfaces of the jaw supports, whereby a downward movement of the latching mechanism will not result in any movement of the jaws.

The parts of the mechanism are so related that the initial downward movement of the forward end of the lever 30, which moves the plunger downwardly into contact with the fastener element held in the jaws, as illustrated in Fig. 7, will move the latching mechanism downwardly to a position such that the fingers 56 are still slightly above the shoulders 65. Up to this point in a setting operation no change will have taken place as to the positions of the jaws. A further downward movement of the forward end of the lever 30, after the parts have been brought to the positions illustrated in Fig. 7, will cause the plunger or setting element, through the agency of the fastener element held by the jaws, to move the jaws downwardly to the positions indicated in Fig. 8. During this movement of the parts from the positions indicated in Fig. 7 to the positions indicated in Fig. 8 the setting tool, the jaws and the latch mechanism are all moved together without any relative movement. After the parts have been brought to the positions illustrated in Fig. 8 further downward movement of the jaws is prevented by the stop 40. The surfaces of the recesses in the jaws which form the fastener-holding cavity are such that downward movement of the setting tool from the position illustrated in Fig. 8 will cam the jaws outwardly so as to swing them about their pivotal connections 36 and permit the setting tool to thrust the fastener element out of its position between the jaws and into its completely united relation with the other element of the fastener, as indicated in Fig. 9. During this last movement of the setting tool after the endwise movement of the jaws has been arrested by the stop 40, the latch mechanism will be moved downwardly with respect to the jaws so as to cause the fingers 56 to be snapped into a position below the shoulders 65 as indicated in Fig. 9. It will be obvious, therefore, that on the upward movement of the forward end of the lever 30, the fingers 56 will first be drawn into engagement with the shoulders 65, after which further upward movement of the latching mechanism by the lever will cause the jaws to move upwardly until the stop surfaces 66 of the jaws make contact with the lower surface 67 of the bearing block 20, after which further upward movement of the forward end of the lever 30 will cause the fingers 56 to be cammed outwardly by the shoulders 65 so as to permit the latch to be moved to its normal position as indicated in Fig. 1. The shoulders 65 and the parts of the fingers 56 should, as illustrated in Fig. 9, be of such form as to provide for this camming action.

It will be apparent that the connection between the lever 30 and the jaws 33 is of the "lost motion" type, which makes it unnecessary to provide for any carefully co-ordinated equalization of the amplitude of movement of the jaws as compared with the movement of the lever. The normal positions of the jaws may be definitely established by the abutting stop surfaces 66, 67. The required degree of downward movement of the jaws may be adjusted at will by varying the position of the stop 40 so as to bring them to rest just after the parts of the fastener have made their initial contact and just before the jaws 33 engage the jaws 43. The latch mechanism provides for any required degree of downward movement of the setting tool independently of the movement of the jaws 33, after they have been arrested by the stop 40, to complete the operation of uniting the parts of the fastener, and also provides for any desired degree of upward movement of the setting tool and connected parts after movement of the jaws has been arrested by the stops 66, 67.

As the setting tool and jaws are elevated to their normal positions indicated in Fig. 1, the forward end of lever 47 is also elevated so as to permit jaws 43 to likewise be restored to their normal positions. Another fastener element is then fed to the fastener-holding cavity between the jaws 33, a complementary fastener element is thrust to its position over the anvil 24 by the push-finger 53, and the operation repeated.

It is another important feature of the invention to so form the recesses in the jaws 33 which cooperate to serve as the fastener-holding cavity 48 and the guideway 68 which serves as an extension of the raceway 50 through which fasteners are fed to the cavity as to provide portions 69 in the walls of the cavity and portions 70 in the walls of the guideway 68 to overhang portions of the fastener as it is fed through the guideway and as it rests in the cavity and prevent it from being overturned or tilted to an abnormal position as a result of shocks and jarring which may be imparted to the mechanism while in operation.

In the form of the invention herein disclosed the recesses in the jaws 33 include portions 71 leading downwardly from the fastener-holding cavity to permit the entrance of a part of a complementary fastener, and portions 72 leading downwardly into the fastener-receiving cavity through which the lower end 32 of the setting tool may be thrust into its engaging relation with the fastener element.

It will be apparent that when the jaws 33 are in their normal positions as illustrated in Figs. 1 and 2, the permissible movements of a fastener element are controlled by means for preventing it from being overturned or abnormally displaced from the time it enters the raceway 50 until it is united with a complementary fastener element by the setting tool. The side walls of the guideway 68 and the side walls of the raceway 50, of which it is an extension, may comprise undercut channels of a cross-sectional form such as to provide a clearanceway for the fastener element without permitting it to have any material degree of angular movement other than a movement of rotation about its axis. When the fastener is nested in the jaw-receiving cavity it is likewise prevented by overhanging portions of the jaws from having any material movement other than a rotational movement about its axis. These overhanging portions 70 and 69 of the guideway and fastener-receiving cavity practically eliminate the element of failure which is present in machines of the prior art in which the fastener is free to be upset, overturned or entirely thrown out of the fastener-receiving cavity before the setting tool has been moved into contact therewith.

The invention is not intended to be limited to the specific form disclosed in this application but should be regarded as including modifications and variations thereof within the scope of the appended claims.

What is claimed is:

1. A fastener attaching machine comprising, in combination, a pair of jaws consisting of oppositely-disposed, adjacent, separable members having, in their adjoining surfaces, contiguous recesses forming a fastener receiving cavity, parts of the jaws being undercut by the recesses in a manner such as to provide portions adapted to closely overlie parts of a fastener of the size and form of those intended to be set by the machine when positioned in the cavity, and prevent it from being accidentally tilted to an abnormal position, and the walls of the cavity-forming recesses of the jaws being shaped to conform with the shape of such a fastener from the under side of its head to its opposite end, contiguous recesses in the adjoining faces of the jaws forming passageways leading to the cavity from opposite directions, the cross-sectional dimensions of each of the passageways being smaller than the size of the head of the fastener, and a fastener setting tool having a setting end of cross-sectional dimensions such as to permit it to freely enter one of the passageways, whereby it may be possible to move the tool into contact with the head of the fastener without spreading the jaws.

2. A fastener attaching machine, as defined by claim 1, having inclined recesses leading upwardly from the cavity to the external surface portions of the jaws to form a sloping raceway through which fasteners may be fed to the cavity, the parts of the jaws which form the walls of the raceway being of a cross-sectional shape such as to include portions so positioned as to closely overlie portions of the fasteners to be fed through the raceway and prevent them from being abnormally displaced during their movements toward the cavity.

3. A pair of jaws for a fastener attaching machine comprising adjacent, separable members having, in their adjoining surfaces, contiguous recesses forming a fastener receiving cavity, parts of the jaws being undercut by the recesses in a manner such as to provide portions adapted to closely overlie parts of a fastener of the size and form of those intended to be set by the machine when positioned in the cavity, and prevent it from being accidentally tilted to an abnormal position, and the walls of the cavity-forming recesses of the jaws being shaped to conform with the shape of such a fastener from the under side of its head to its opposite end, and contiguous, inclined recesses leading outwardly and upwardly from the cavity to external surface portions of the jaws to form a sloping raceway through which fasteners may be fed to the cavity, the fastener overlying parts of the jaws serving as means for positively preventing more than a definitely limited amount of upward movement of an inserted fastener.

4. A pair of jaws, as defined by claim 3, of which the parts forming the walls of the inclined recesses are of a cross-sectional shape such as to include portions adapted to closely overlie portions of the fasteners fed through the raceway and prevent them from being tilted to an abnormal position during their movement towards the cavity.

5. In a fastener attaching machine, a bearing block, a fastener setting tool movably mounted therein, an operating element to advance and retract the tool, a pair of separable jaws movable in a direction parallel with that of the tool, means for yieldingly opposing the separation of the jaws, spaced stops independent of the material on which the machine is to work to limit the extent of the movements of the jaws parallel with the movements of the tool in either direction, oppositely-disposed recesses in adjoining portions of the jaws to jointly serve as a fastener holding cavity, the jaws and their cavity forming recesses being so positioned as to hold a fastener in alignment with but spaced from the setting end of the tool when the tool is in its retracted position, said tool being movable independently of the jaws during the initial advance movement of the operating element to an extent such as to permit the end of the tool to establish a driving contact with the fastener held by the jaws, and the forms of the recesses being such that the jaws may be separated by pressure applied to an inserted fastener by the setting tool so as to permit the operating element to continue to advance the tool after the jaws are arrested by the stops, and a one-way driving connection of limited effectiveness between the operating element and the jaws whereby the jaws may be moved to the extent permitted by the stops during the retracting movement of the tool without interfering with a continuation of such retracting movement after the movement of the jaws is arrested.

6. In a fastener attaching machine, the combination defined by claim 5, of which the driving connection of limited effectiveness comprises a latching mechanism including mutually engageable parts by which the operating element may be connected with the jaws, and resilient means normally tending to move the parts of the latching mechanism into an engaging relation, the forms of the parts of the latching mechanism being such as to permit free advancing movement of the operating element irrespective of the extent of movement of the jaws, to cause them to engage and effect a retractive movement of the jaws during a part of the retracting movement of the operating element and to cause the parts of the latching mechanism to yield and release the jaws when arrested to permit the operating element to complete its retractive movement.

7. In a fastener attaching machine, the combination defined by claim 5, of which the driving connection of limited effectiveness comprises parts of the jaws having two pairs of externally-disposed lateral surfaces, the surfaces of the respective pairs being positioned at different distances from each other so as to provide a pair of intervening, externally-disposed offset portions, a pair of latch-arms connected with the operating element and having inwardly-directed fingers so positioned as to normally make contact with the more widely separated surfaces of the jaws, and resilient means tending to move the latch-arms towards each other, the positions of the offset portions of the jaws being such that the fingers of the latch-arms will be moved beyond the offsets and snapped into contact with the surface portions which are not so widely separated during the advancing movement of the operating element so that the fingers may engage the offsets and cause the jaws to be retracted during a part of the retracting movement of the operating element, and the forms of the offsets and the offset-engaging portions of the fingers on the latch-arms being such that the fingers will be separated and moved past the offsets as a result of the completion of the retractive movement of the operating element after the movement of the jaws is arrested.

8. In a fastener attaching machine, a bearing block, a pair of separable jaws comprising opposed fastener holding elements and supports therefor consisting of parallel slide-bars movable endwise

in guideways in the block, a cross-bar having spaced portions pivotally connected with portions of said slide-bars spaced at material distances from said fastener holding elements, resilient means to yieldingly oppose the separation of the fastener holding elements, a guide-bar fixed to the cross-bar and extending in a direction parallel to the slide-bars when the jaws are closed in their normal fastener holding relation, and a fixed guideway for the guide-bar extending parallel with the guideways for the slide-bars, whereby the jaws may be moved in a direction parallel with the guideways or may be separated by swinging them about their pivotal connections with the cross-bar but will always be maintained in relative positions such that the fastener holding elements will be directly opposite each other.

9. In a fastener attaching machine, the combination defined by claim 8, of which the bearing block and interconnected portions of the structure including the jaws have spaced opposed portions to serve as stops to limit the endwise movement of the slide-bars in both directions.

10. In a fastener attaching machine, a bearing block, a pair of separable jaws comprising opposed fastener holding elements and supports therefor consisting of parallel slide-bars movable endwise in guideways in the block, a cross-bar having its opposite end portions pivotally connected with portions of the slide-bars spaced at equal distances from the fastener holding elements of the jaws, resilient means to yieldingly hold the jaws closed, a guide-bar fixed to the cross-bar and extending in a direction perpendicular to its longitudinal axis, and a fixed guideway for the guide-bar extending parallel with the guideways for the slide-bars.

11. In a fastener attaching machine, the combination defined by claim 5, of which the stop which limits the extent of movement of the jaws by the tool during the advance movement of the tool is adjustable whereby the extent of movement of the jaws towards the material on which the machine is to work may be varied independently of the extent of movement of the operating element.

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