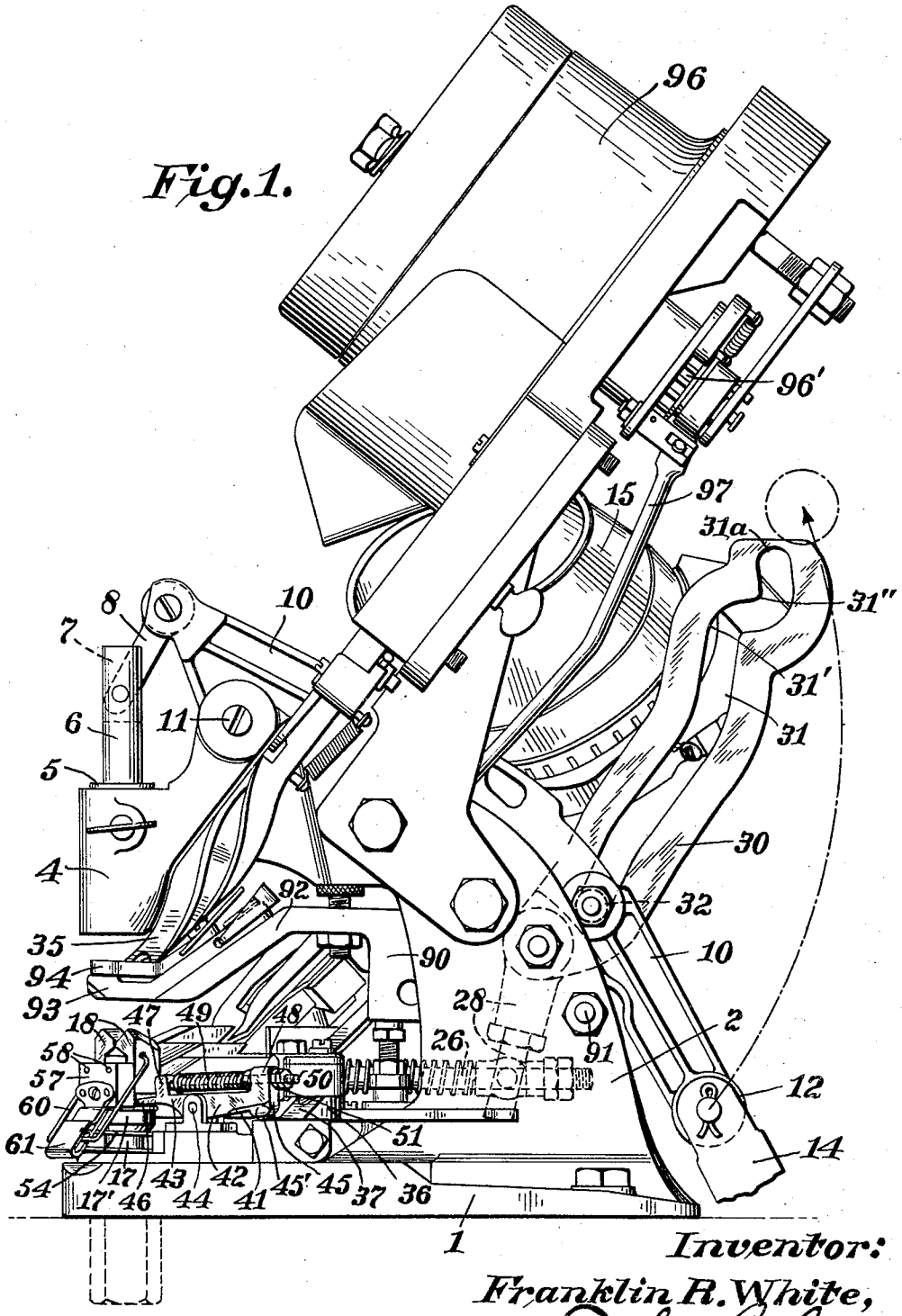
March 14, 1933. F. R. WHITE 1,901,386

BUTTON ATTACHING MACHINE

Filed Jan. 7, 1932 4 Sheets-Sheet 1

Fig.1.



Inventor:
Franklin R. White,
By Parker Cook Atty.

March 14, 1933. F. R. WHITE 1,901,386

BUTTON ATTACHING MACHINE

Filed Jan. 7, 1932 4 Sheets-Sheet 2

Fig. 2.

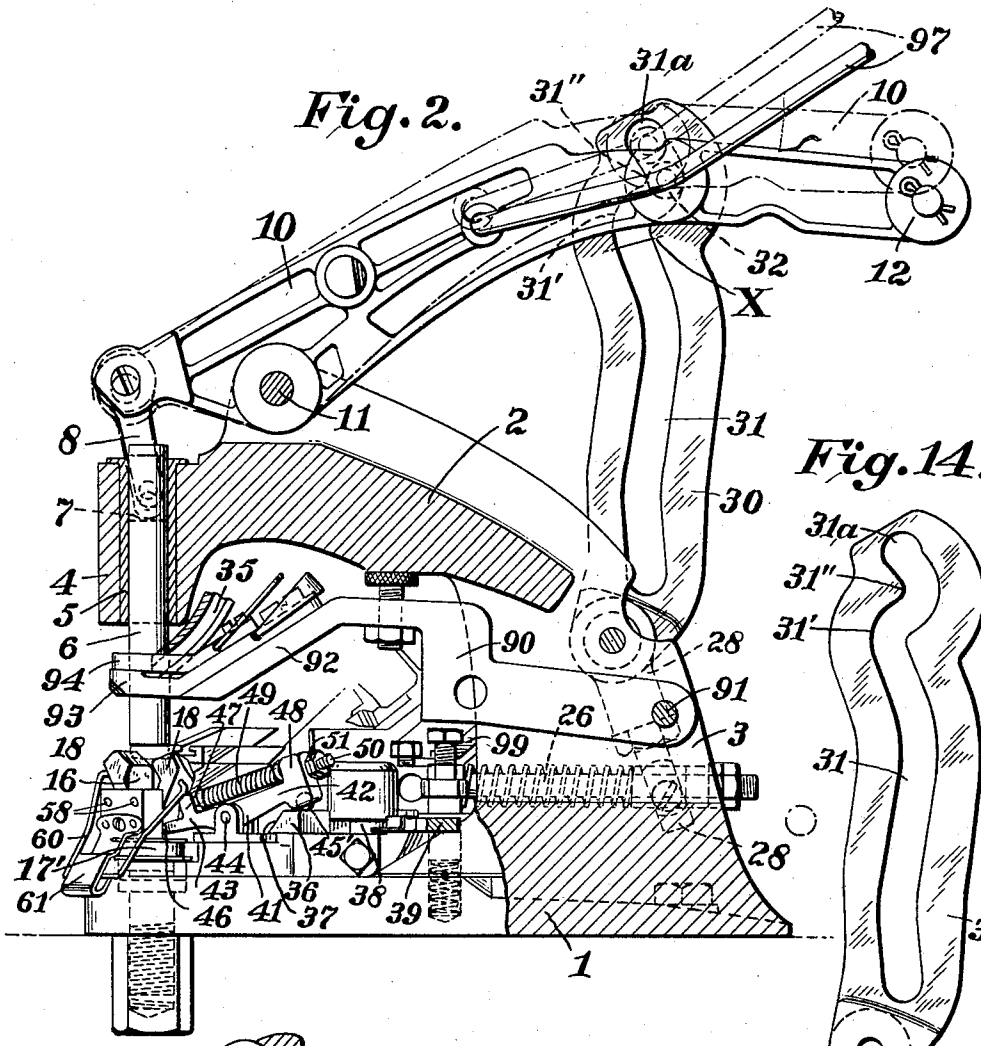


Fig. 14.

Fig. 12.

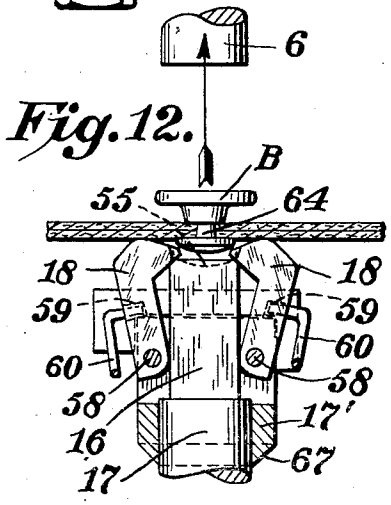
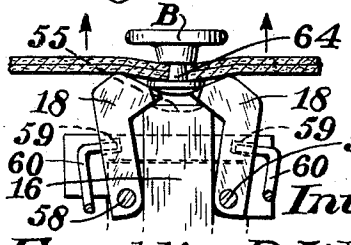


Fig. 13.



Inventor:
Franklin R. White,
By Parby Cook Atty.

March 14, 1933. F. R. WHITE 1,901,386

BUTTON ATTACHING MACHINE

Filed Jan. 7, 1932 4 Sheets-Sheet 3

Fig. 5.

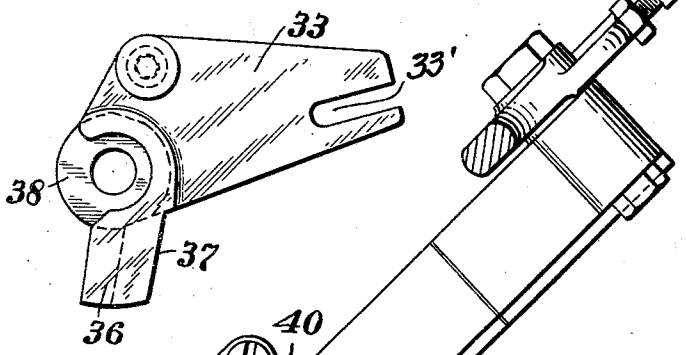


Fig. 3.

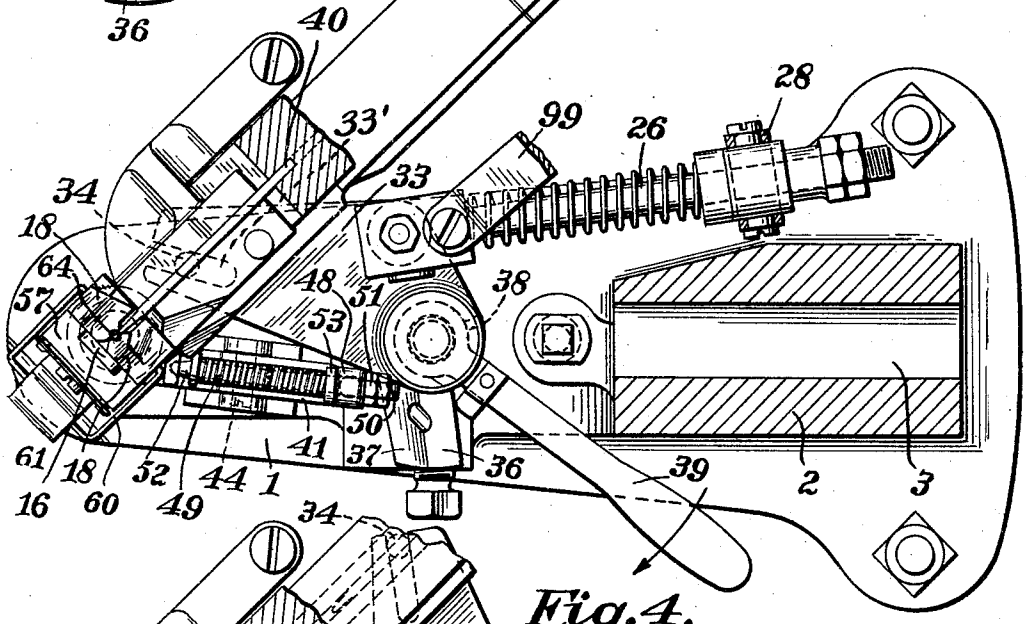
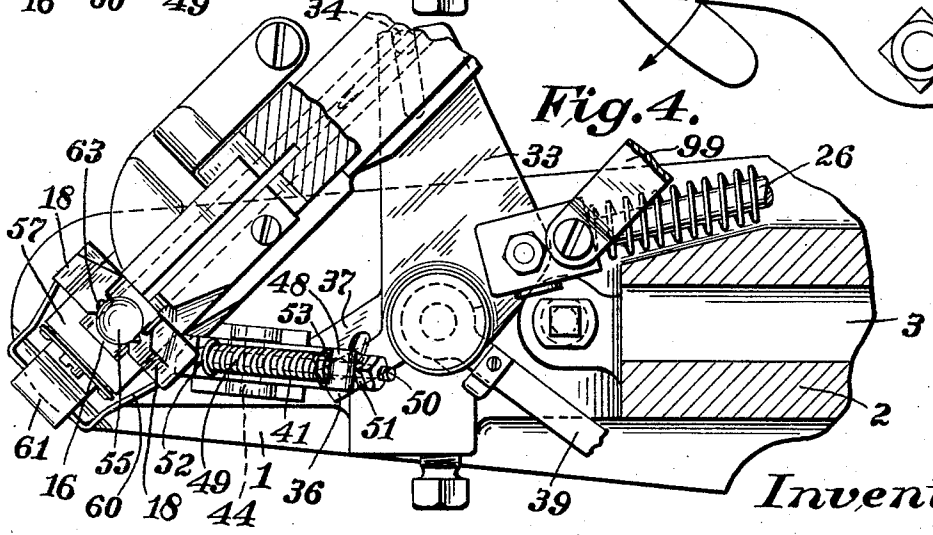


Fig. 4.



Inventor:
Franklin R. White,
By Parby Cook Atty.

March 14, 1933. F. R. WHITE 1,901,386

BUTTON ATTACHING MACHINE

Filed Jan. 7, 1932 4 Sheets-Sheet 4

Fig. 6.

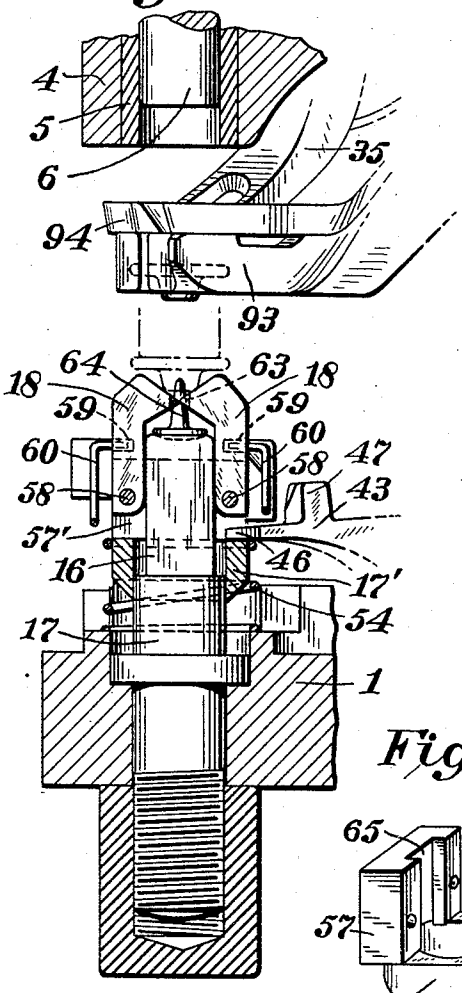


Fig. 7.

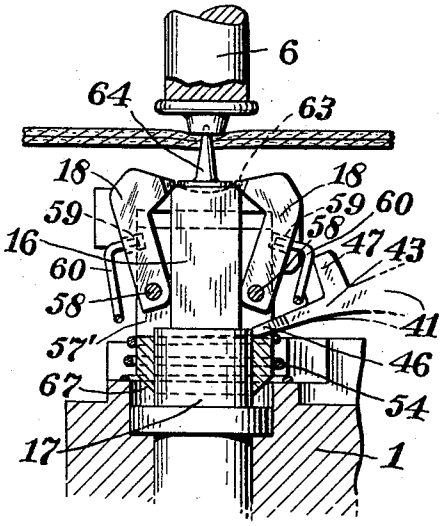


Fig. 8.

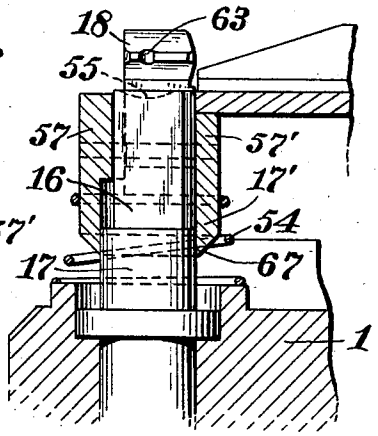


Fig. 10.

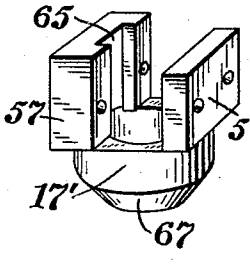


Fig. 9.

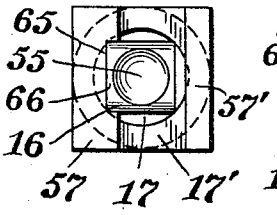
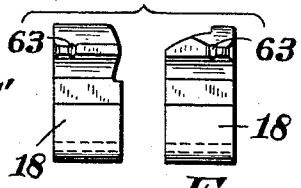


Fig. 11.



Inventor:
Franklin R. White,
By Parker & Cook Atty.

Patented Mar. 14, 1933 1,901,386

UNITED STATES PATENT OFFICE

FRANKLIN R. WHITE, OF WATERBURY, CONNECTICUT, ASSIGNOR TO THE PATENT BUTTON COMPANY, OF WATERBURY, CONNECTICUT, A CORPORATION OF CONNECTICUT

BUTTON ATTACHING MACHINE

Application filed January 7, 1932. Serial No. 585,319.

My invention relates to new and useful improvements in button attaching machines, and more particularly to the jaw and jaw operating mechanism that retains the tacks or button fasteners in position while the plunger forces the button head down on the fastener, so that the fastener, in turn, will pierce the material to which the button is to be attached and be jammed up within the button head to thus tightly secure the button to the material.

The present application in its broadest aspects is similar to the types of button attaching machines shown in Patent Nos. 1,079,968, 1,083,420 and 1,567,882, granted to me respectively on December 2, 1913, January 6, 1914, and December 29, 1925. The present application is also a continuation in part of the application filed by Frederick H. Peterson on April 8, 1931, Serial No. 528,680, for button attaching machines.

In the application just above-mentioned, the anvil post is undercut, so that cooperating interlocking jaws hold the tack in the jaws until the button has been forced up into the button head, the button head, through the action of the plunger, forcing the tapered jaws apart, so that they are thus unlocked from the anvil, after which they are forced downwardly away from the tack and button head. Also, in the application of Frederick H. Peterson above-mentioned, there is provided a cam action that starts into effect on the initial movement of the plunger to put a downward pressure on the tack or fastener gripping jaws, so that when the button head finally spreads the jaws apart the carrier of the jaws being under heavy spring pressure and the jaws being now unlocked will snap to a lower plane and out of the way.

The present application embodies the same general type of machine as shown in the Peterson application and in the aforementioned original patent to me, No. 1,567,882. However, instead of providing a cam arrangement wherein the pressure is built up while the jaws are still locked, so that when the jaws are unlocked the jaw carrier will snap down out of place, I have provided an arrangement whereby the jaws are capable of quickly opening and closing but do not lock in the sense that they did in the Peterson embodiment, nor are they forced open by the button head pressing on the tapered jaws but, on the other hand, are opened wholly by a cam action which is so timed that as the plunger is about to jam the button down on the tack, the jaws will be quickly moved downwardly and out of the way by the cam action. Thus, there is no snapping of the jaws as in the former instance.

Still another object of the invention is to provide a button attaching machine wherein the jaws for the tack or fastener extend over the top of the anvil post to hold the tack tightly in its proper position until the tack has just started to penetrate the button head. In the meantime, a cam, which will afterwards be duly explained, has moved so that at the moment the tack is to be jammed in the button head, the jaws will be operated by the cam and moved rapidly out of the way, that is, during the last moment of the stroke of the plunger. The jaws also will remain in the lowered position during a portion of the upstroke of the plunger, so that the newly attached button and the cloth will not hinder the succeeding operation.

Still another object of the invention is to provide a cam operating arrangement for opening and lowering the tack holding jaws, so that the lever or arm which also operates the button attaching plunger will cause the cam that affects the jaws to move slowly through the initial movement of the plunger and will then cause the cam, that is, during the last part of the stroke of the plunger, to move very rapidly but with an even movement to then retract the jaws, so that the button can be firmly attached to the cloth and the jaws be out of the way.

Still another object of the invention is to provide a button attaching machine with a cam arrangement for operating the jaw carrier and jaws that hold the tacks or fasteners in position, wherein the opening of the jaws will take place at the proper time but there will be no downward snapping of the

jaws, as the jaws are never locked in the sense that they are locked in the arrangement shown by Peterson.

Still another object of the invention is to so shape the cam operating slot of the oscillating arm or lever which operates the tucker slide and the tack holding jaws that the tack jaws will remain closed during the greater part of the downward movement of the button attaching plunger, but just as the plunger is about to force the button head on the tack, the oscillating arm or lever will quickly operate the cam that operates the tack jaws to thereby lower the jaws on the anvil post and out of the way.

It might be mentioned here that in all button attaching machines, one of the desideratums is to have the tack holding jaws firmly hold the tack in an upright position, so that the tack when forced up into the button head will come in the proper position. At the same time, the jaws must be moved out of the way to thus not interfere with the repositioning of the cloth for the next button attaching operation.

Still another object of the invention is to provide a button attaching machine wherein the reverse movement is true, that is, after the plunger has ascended a slight distance, the jaws will be allowed to rise, while during the rest of the upward stroke of the plunger the new tack will be held in position for the next stroke of the plunger and, at the same time, there will be plenty of room between the plunger and the button attaching jaws so that the operator, in feeding the cloth over the jaws, will not be hampered by the jaws or plunger.

Still another object of the invention is to provide a synchronized opening and closing of the jaws and the downward and upward movement of the plunger, so that the machine may be operated rapidly but smoothly without pressure being built up on the jaws while they are waiting to be opened, as would be the case in the Peterson application.

With these and other objects in view, the invention consists in certain new and novel arrangements and combination of parts, as will be hereinafter more fully described and pointed out in the claims.

Referring to the drawings,

Fig. 1 is a side elevation of my improved button attaching machine showing the plunger in its uppermost or normal position and showing the tack or fastener holding jaws in their closed or normal position;

Fig. 2 is a substantially vertical central section with parts removed for the sake of clearness, other parts being shown in elevation, the plunger being shown as about to jam the button head down on the tack, the button holding jaws being shown in their lowermost position, the cam for lowering the jaws being fully advanced; the dotted line position of the main oscillating lever showing the lever in its uppermost position.

Fig. 3 is substantially an enlarged horizontal central section of the machine with parts removed, showing the tack jaws in their closed position and showing the cam and its mechanism for lowering the jaws in their normal position;

Fig. 4 is a similar view but showing the cam mechanism for forcing the jaw carrier downwardly in its advanced position while the tack holding jaws are shown in their opened and lowered positions;

Fig. 5 is a detail bottom plan view of the jaw carrier operating cam located on what I term the tucker lever or plate;

Fig. 6 is an enlarged detail sectional view partly in elevation showing a portion of the plunger, button receiving jaws, tack receiving jaws, movable sleeve or carrier which supports the jaws, the carrier and jaws being shown in their normally closed position, and the dotted lines showing the position of the plunger and button just at the moment the tack holding jaws are about to be opened;

Fig. 7 is a fragmentary view similar to Fig. 6; in this instance, however, the jaw carrier operating cam has moved to lower the jaw carrier and its jaws to thus open the jaws while the button head is about to be forced down on the tack fastener;

Fig. 8 is an enlarged detail side sectional view of the anvil and jaw carrier taken at right angles to Fig. 6, the jaws being removed for the sake of clearness, and showing the carrier in its upper or normal position;

Fig. 9 is a top plan view of the jaw carrier and anvil plate;

Fig. 10 is a perspective of the jaw carrier;

Fig. 11 is a detail view of the jaws;

Fig. 12 is a detail fragmentary sectional view showing the plunger on its return stroke, the jaws forcing the cloth away from the jaws;

Fig. 13 is a similar view with the jaws nearly closed;

Fig. 14 is a detail view of the oscillating arm that operates the tucker lever and jaw operating cam, the cam slot causing the jaw operating cam to be accelerated near the final movement of the arm to thus accelerate the opening of the jaws at the proper instant.

It might be mentioned here that only that much of the mechanism of the button attaching machine is shown as is thought necessary to illustrate and describe the invention and to show how the tack jaws are operated and synchronized with the stroke of the plunger. The details for the movement and synchronization of the tucker slide and lock, the ratchet mechanism for the hoppers that

respectively contain the buttons and the button fasteners, and many other details of the machine shown in Patent No. 1,567,882, are not described or mentioned, or are only inferentially mentioned.

Referring now more particularly to the several views, and to Fig. 1 for the moment, there is shown a metal base or table 1 from which extends a curved upright arm 2 integral with the base and slotted in its rear, as at 3, (Fig. 2) the slot extending from near the base to the upper end of the arm where the arm is, in turn, made to form a bearing 4 in which there is a bushing 5 and in which operates the die or plunger 6. This plunger is slotted at its upper end, as at 7, to receive the connecting link 8 while the other end of the link is secured to the outer end of the main oscillating arm or lever 10, and hereinafter termed the "oscillating arm" to distinguish from a further oscillating lever that controls the movement of the tack holding jaws. This oscillating arm 10 is fulcrumed, as at 11, in the upright arm 2, as may be seen in Figs. 1 and 2.

The lower end of the oscillating arm 10 has the bearing 12 for the reception of a connecting rod 14 (Fig. 1) while the said oscillating arm is to be actuated in the manner shown in a previous patent granted to me on December 2, 1913, and numbered 1,079,968.

As may also be seen in Fig. 1, there is a magazine or hopper 15 for holding and supplying the "tacks" or "button fasteners" which are fed down a chute (not shown) to a tucker slide 40 (see Fig. 3) where they are forced one by one onto a small head or block 16, which is the upper part of an anvil post 17, where the tack or fastener gripping jaws 18 hold the same while the button head is about to be forced thereon.

It is these tack holding jaws, a carrier for the same, the anvil post just mentioned, the cam mechanism for operating the jaw carrier, and the special formation of an oscillating cam lever 30 (all of which parts will be described in full as the specification proceeds) that form the gist of the present invention.

The tucker mechanism just referred to is shown and described in detail in the patent granted to me, Franklin R. White, on December 29, 1925, and numbered 1,567,882.

As far as the specification has proceeded, the device is similar to the patent just above referred to.

Going back for the moment to the other general parts of the machine, which are also illustrated in the co-pending application, to wit, Frederick H. Peterson, filed April 8, 1931, Serial No. 528,680, for button attaching machines, so that the synchronization of the plunger 6 with the action of the tack gripping jaws 18 may be understood, there is shown a hopper or magazine 96 for holding the button heads. There is also a ratchet mechanism 96′ that is operated by a rod 97 which is connected to the main oscillating arm 10. The specific manner in which this hopper is rotated with each movement of the oscillating arm 10 is of no importance to the present invention and is, therefore, not described.

Now there is an oscillating lever 30, as may be seen in Figs. 1 and 2, and it is the movement of the main arm 10 that actuates this irregularly-shaped oscillating lever 30. This latter lever is provided with a slot 31 in which travels the pin 32 (roller), which pin 32 is fastened to the aforementioned oscillating arm 10. The oscillating lever 30 is shaped differently than the one shown in the co-pending case of Peterson, and it is by the difference in shape and cam path (slot) of this oscillating lever 30, together with the difference in the anvil post and tack holding jaws, that cause the tack holding jaws to operate the way they do and in a different manner than that shown in the co-pending application to Peterson.

It might be reiterated here that in the above-mentioned Peterson application, the carrier supporting the tack holding jaws is locked with the anvil post during a certain portion of the stroke of the plunger 6, during which time pressure could be built up on the carrier and jaws, so that when the jaws were unlocked they would snap down below the top plane of the anvil post, whereas in the present application the oscillating lever 30 with its slot or cam actuating path is so designed as to cause the cam which operates the jaws to move slowly forwardly for a certain period of time, there being no pressure whatever on the tack holding jaws for this interval. Then just as the plunger is about to force the button head on the tack the jaw operating cam will be moved rapidly forwardly and in so doing raises the jaw operating lever (rear end) to thus quickly open the tack holding jaws and move them to a lower plane on the anvil post, all of which will be described in detail when the operation of the machine is set out.

This oscillating lever 30 is provided with the slot 31 as heretofore mentioned, and it will be noticed that near the upper end of the lever the said slot 31 changes its path abruptly, as at 31′, to the point 31″, where the slot again extends upwardly, as at 31ª. It is the abrupt change of the cam path (slot) at 31′ which causes the opening of the tack holding jaws and the lowering of the same, as will be explained in detail.

Now returning to the general description of the machine. At the lower end of this oscillating lever 30 is the yoke 28 which is connected to the pitman 26 (see Fig. 2),

which pitman, in turn, is fastened to the bell crank or tucker lever 33, which latter is the timing element for a number of the parts of the machine, as in the former case. The above pitman, yoke and connection are similar in construction, as shown in the patent granted to me, to wit, No. 1,567,882, and the co-pending application referred to.

It is the movement of the bell crank or tucker lever 33 which operates the tucker slide 40 to advance the tacks or button fasteners onto the block 16, because the tucker lever 33 is slotted at its outer end, as at 33′, to engage the downwardly extending pin 34 which is a part of the tucker slide 40. The detailed description of the tucker slide and its synchronization with the feeding of the buttons is shown in the patent granted to me, No. 1,567,882.

There will now follow just a short description of the means for holding the button heads, which button heads are acted on by the movement of the main plunger or die.

Referring again for the moment, therefore, to Fig. 1, there is shown a button chute 35 which leads from the magazine 96 and extends down to and under the plunger or die 6. There will also be seen the arm 90 which is pivoted, as at 91, (see Fig. 2) while the forward portion 92 of the arm extends downwardly in an angular relation and has the jaws 93 mounted thereon. These, however, are not the jaws that form a part of the gist of the present invention and should not be confused therewith. There is also shown a supplemental pair of jaws 94 cooperating with the jaws 93 for preventing the buttons from rebounding from the jaws 93 and neither should these jaws be confused with the jaws that hold the "tacks" or "button fasteners".

As in the co-pending application, or in Patent No. 1,567,882, granted to me, and formerly mentioned, the machine and its operation are very similar, and it will be understood that when the main oscillating arm 10 is raised, it not only causes the plunger or die to push the arm 92 with its button and jaws downwardly, but it will also cause the oscillating lever 30 to move forwardly and, in turn, through the yoke and pitman move the tucker lever 33 which, in turn, will force the tucker slide rearwardly beyond the tack escapement (not shown) so that when the oscillating lever 10 is again lowered, the tucker slide on its forward movement will force a tack or button fastener out on the anvil block 16 to be clutched by the jaws 18. An operation of the lever 30 also rotates the magazine 96 to liberate a further button to the chute and also performs other operations that need not be mentioned at this time.

Now understanding the general operation of the machine, reference will be made to the manner in which the tack holding jaws are formed and operate and how the cam mechanism is synchronized with the stroke of the plunger, and it is this part of the machine that differs from the co-pending application and from the patents previously mentioned.

It will also be remembered that when the word "tack" is used, it is used in its broadest sense to cover a tack or other desirable form of button fastening member.

Referring for the moment to Fig. 5, there will be seen the tucker lever 33, the cam 36 thereon and the operating face 37 thereof. The tucker lever is very similar to the tucker lever shown in the co-pending application, but the position of the operating cam face is in a different position, so that the lever 33 may rotate or swing forwardly through a somewhat wider arc than previously, before the cam face contacts with its member or lever for lowering the tack holding jaws. This tucker lever 33 is substantially in the form of a triangular plate and has its apex slotted to encircle a pin 34 which operates the tucker slide. The tucker slide is connected to a pitman 26, so that a movement of the oscillating lever 30 will actuate this tucker slide. There is also a rod 99, a fragmentary portion of which is shown in Figs. 3 and 4, which extends up to the hopper which holds the tacks for imparting a ratchet movement to the hopper, so that the tacks may be liberated to the tack chute. As this tucker lever is revolved from the position shown in Fig. 3 to that shown in Fig. 4, it will, besides operating the tucker slide, cause a small lever 41 to be operated, which lever 41 will lower the jaw carrier and its jaws, as will shortly be described.

In the co-pending application, this lever 41 placed the jaw carrier under a pressure that was continuously built up until the jaws were unlocked, after which the jaws would snap down in their lowermost position, whereas in the present application the jaw carrier is made to travel quickly but not to snap, thus avoiding any chance of breaking of the jaw or jaw carrier of the cam lever 41.

As in the former instance, the tucker lever is partly cut-out on its under surface 38 to receive a handle 39 so that this tucker lever 33 may be hand-operated in case a tack becomes jammed in the tucker slide. This is fully illustrated in Patent No. 1,567,822, above referred to.

Referring for the moment to Figs. 1 and 2, there is shown the cam lever 41, which is identical to the form of cam lever shown in the co-pending application and, therefore, but a short description is necessary.

It will be seen that it is formed of two parts 42 and 43, the parts being pivotally joined about the pin 44. There is one slight change, however, and that is the heel 45 has a socket, so that a steel ball 45′ may be placed therein. In this way, there will be

but little friction when it rides up the hardened surface 37 of the cam 36 formed on the tucker lever 33. The nose or forward end 46 of this articulated lever projects over and normally rests on the vertically movable jaw carrier 17′, which is in the form of a sleeve and travels about the anvil post 17, as will be clearly seen in Figs. 6 to 9, inclusive, which jaw carrier will be described shortly in detail.

The lever part 43 has the little upwardly extending lug 47 near its forward ends, while the projection or lug 48 is on the rear portion 42, so that a small compressible spring 49 may be mounted on the pin 50, which extends between the two lugs. The pin 50 and the spring are assembled and assisting their assembly is a small nut 51 which is screwed up to the shoulder or lug, after which a check nut is placed in back of the same. The pin will be provided with the little integral nose 52, while the collar 53 may be seen at the rear end of the spring. The nose will fit within a slight depression in the lug 47 of the lever. The pin, with the spring 50 under heavy compression, is fitted between the two parts.

There is an advantage in having this little lever articulated, as even though there is no built-up pressure on it, as in the former instance, still if it so happens that the operator does not take good care to keep the dirt and lint from around the anvil post, the sleeve will gradually pack the lint about it and the jaw carrier would soon stop short of its full length of travel. However, the spring joint in the lever will take care of the difference in stroke. It will be understood that the tucker lever must make its full oscillation and the tucker slide must operate throughout its full stroke or it would not tuck the tack or rivet or button fastener properly in the tack holding jaws.

Now referring to the anvil post and the jaw carrier, it will be seen that these differ radically from those shown in the co-pending application, as there is no necessity for undercutting the anvil post nor in providing lugs on the jaws to lock with the anvil post as, although the jaws overhang the anvil post to clutch the tack, still it is only necessary for a downward pressure on the jaw carrier to lower the same to thus spread the overhanging jaws and bring the noses of the jaws nearly flush with the upper surface of the anvil post, so that they will not be in the way of the attached button.

Referring now to Figs. 6 to 9 inclusive, there will be seen a coil spring 54 under the carrier 17′ to normally hold the carrier in its proper position, this carrier fitting over the anvil post 17, which latter fits within the bore of the forward end of the table. It will be understood that when the tucker lever 33 is operated from the position shown in Figs. 3 and 4, through the movement of the oscillating arm 10 and the lever 30, the heel 45 of the lever 41 rides up the cam face 37. There is a different timed relation here than in the co-pending application. In the present instance, the tucker lever, with its cam, travels throughout the greater part of its rotation before the cam face 37 contacts with a heel 45 of the lever 41. Furthermore, when the cam does contact with the lever 41, the cam is moved very rapidly rather than at the same rate of speed as is the case in the co-pending application.

Now as the articulated lever 41 exerts pressure on the jaw carrier 17, it will be greater than the upward pressure exerted by the light spring 54, so that the jaws now will be forced downwardly out of the way.

Referring now further to the anvil post and jaws, it will be seen that this post 17 has the anvil or head 16 at the top thereof, which is slightly dished, as at 55, to accommodate the curvature of a tack rivet or fastener. Slidingly mounted on the post 17 is the aforementioned carrier 17′ which has the small jaws 18 pivotally mounted thereon. There are two uprights 57 and 57′ forming a part of the carrier and to these uprights are pivoted the jaws 18 by the little pivot pins 58, these jaws operating between the two uprights, as may be seen in the several views.

The jaws 18 are provided with the notches 59 in their front faces so that the respective ends of a spring or resilient member 60 may fit within these notches 59 to normally hold the jaws in their compressed position. There is also shown a spring holder 61 which is attached to the upright 57 mounted on the carrier 17′ which holds this compressible member in position, as may be seen in Figs. 1 and 2. The little spring carrier is also illustrated in detail in Patent No. 1,567,882.

It will be noticed that these little jaws 18 are not provided with locking lugs on their stems, as in the co-pending application, but are relatively smooth.

The jaws at their respective noses are slightly indented or nicked, as at 63, so that when a tack 64 is forced into the jaws by the tucker slide and the jaws are closed, the recess 63 will encircle the prong of the tack to hold it rigidly in position. As may be seen in Figs. 6 and 7, the nose 46 of the cam-operated lever 41 rests on the upper surface of the jaw carrier 17′ that carriers the jaws 18 just referred to to force the carrier and the jaws downwardly when the button is jammed down on the tack. It will be noticed that when the carrier 17′ is in its normal position, the tack encircling jaws will be in the position shown in Figs. 1 and 6, and the jaws will then tightly grip the tack 64 which is resting on the anvil, the

tack having been forced to the anvil by the tucker slide in the usual manner.

As in the former application (Fig. 8) it will be noticed that in the left upright 57, there is formed a keyway or slot 65 which is adapted to slidingly fit about the front 66 of the anvil to thus prevent the carrier 17′ from revolving or moving out of its preliminary vertical alignment.

It is not thought necessary to further describe the anvil, anvil post and jaws, these being similar to those shown in the co-pending application, with the exception, however, that the anvil is not undercut and the inner faces of the jaws are relatively smooth, so that although the jaws when closed tightly hold the tack in position and the noses of the jaws overlie the top of the anvil, they are not locked against an upward or downward movement, as is the case in the structure shown in the co-pending application above-mentioned.

Before setting out the operation, it will be understood that the lower portion of the carrier 17′ is circular and then tapers inwardly and downwardly, as at 67, while the spring 54 encircles the post 17 and extends up about the tapered portion 67 and rests beneath the rear uprights of the carrier, so that this spring can normally hold the carrier in its upward position to thus, in turn, hold the jaws normally closed.

Operation

Supposing there is a button head within the jaws 93, which jaws are directly beneath the plunger 6, and presume there is a tack or rivet 64 resting on the anvil 16. Then the cloth to which the button is to be attached will be placed directly over the jaws while a clutch (not shown) will be operated and a rod (not shown) will move the main oscillating arm 10 upwardly, that is, the rear end of the same. This moving of the oscillating arm 10 will start the plunger in its downward course and will also move the oscillating lever 30 inwardly, which lever is connected to the bell crank or tucker lever 33. As the plunger 6 continues to descend by the continued upward movement of the rear end of the oscillating arm 10, the oscillating lever 30 with its cam path therein will also be continuously moved inwardly, while its lower end 28, of course, moves outwardly, which operates, it will be remembered, the tucker lever 33 through the connecting pitman 26. The tucker lever 30 will continue to turn slowly, and after the plunger has descended for a goodly part of its stroke and within close proximity to the tack point on the anvil, the cam face 37 will be directly under the heel 45. The oscillating arm 10 with its pin will now be about opposite the point X (see Fig. 2) on the oscillating lever 30. The tack at this point will just have made contact with the hub of the button shell.

As the oscillating lever continues to rise from the point marked "X" to the position shown in full lines in Fig. 2, the lever 30, due to the curved cam path at this point 31, will move them more rapidly inwardly and, in turn, pull the pitman 26 more rapidly rearwardly to thus quickly advance the cam on the lever 33 and, in turn, tilt the lever 41 as shown in Fig. 2. The nose of this lever 41 bearing on the jaw carrier 17′ will cause the same to rapidly descend and in doing so open the jaws and lower them out of the way.

The plunger will then continue in its downward stroke until the oscillating arm 10 has advanced to its full position as shown in dotted lines in Fig. 2. There will be no further movement of the tucker lever during this portion of the stroke, as the remainder of the cam path in the oscillating lever 30 follows the arc with the pivotal point of the oscillating arm 10 as a center.

Thus, it will be seen that the jaws tightly grip the tack on the anvil until the button head is slightly pierced by the tack, thus assuring that the tack will be held firmly in its upright position during the piercing of the button head. Then, at the last moment, as the button is about to be jammed down on the tack, the jaw carrier with its jaws are moved quickly downwardly, thus spreading the jaws and moving the same downwardly out of the way. Thus, there is no built-up pressure on the jaw carrier during the descending of the plunger and the jaws grip the tack until the button is about to be forced on the tack, at which time the jaws are rapidly opened and pulled downwardly. In the meantime, the tucker slide is driven rearwardly so that it will advance another tack forwardly when the tucker slide again advances.

After the tack has been driven through the cloth and up into the button head and the main oscillating arm 10 starts downwardly the plunger will move upwardly while the jaws still remain in their lowermost position until the oscillating lever is again in the full line position shown in Fig. 2.

The oscillating arm 10 descends until the roller on the pin 32 is opposite the point 6. Then the oscillating lever 30 will again move rapidly to the right until the pin is again opposite the point X. As this oscillating lever moves to the right, of course, the tack holding jaws will rapidly ascend and will pass through the position shown in Fig. 11. The head of the tack which has been forced through the cloth will never catch between the closing jaws, because as the jaws rise they will tend to raise the cloth and the noses of the jaws will go under the tack head rather than jam between the tack head

and the cloth, as may be seen in Figs. 11 and 12.

As the oscillating arm 10 continues to descend, it will, of course, move the oscillating lever 30 outwardly and, through the pitman, will cause the tucker lever 33 to again assume its normal position, that is, the position shown in Fig. 3. Thus, the cam face 37 will again be to the rear of the heel of the jaw carrier operating lever 41.

The oscillating arm 10 will again descend to its lowermost position, as shown in Fig. 1, and the cloth, of course, will be moved by the operator along the jaws to the position for the next button. In the meantime, the escapements for the tacks have operated, and another button has been liberated to the button chute, all of which is similar to the machine shown in the former patents granted to me and in the co-pending application mentioned.

It will thus be seen that the tack holding jaws are not operated by the cam lever 41 until the tack is just about to be driven into the button head and that there is no built-up pressure on the lever 41, as there was in the former instance, which pressure was held until the jaws unlocked. In the present instance, the oscillating lever 30 causes the cam to advance, but the cam does not contact with its lever until the plunger has nearly descended its full stroke. Then the tucker lever 33 with its cam 37 is moved rapidly, due to the acute angle of the cam path in the oscillating lever 30. At this instance of speeding up of the tucker lever, the cam will be jammed under the lever 41, and thus cause the jaw carrier to move swiftly downwardly to spread the jaws and move the same out of the way. This opening of the jaws and the downward moving of the same are accomplished in a smooth and even manner, thus lengthening the life of the jaws, cam-actuated lever and the other cooperating parts of this mechanism.

Furthermore, the jaws and jaw carrier are operated wholly by the operation of the lever 41, whereas in the co-pending application the jaws are spread by the action of the bevel-shaped button head, forcing the jaws apart and permitting them to snap to a lower position.

From the foregoing, it will be seen that I have devised a very efficient tack jaw operating mechanism that may be easily applied to the former types of machine now in use or may be built right into a new machine of this general type. It will also be understood that the parts illustrated and described are only those that are thought necessary for a full understanding of the synchronization of the various cooperating parts.

Many slight changes might be made without in any manner departing from the spirit and scope of the invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A button attaching machine including a plunger, an anvil, slidable and spreadable tack gripping jaws overhanging said anvil, and a jointed lever cooperating with the jaws and so arranged that an upward pressure on the rear of the lever will cause a downward pressure on the jaws to thereby operate the same.

2. A button attaching machine including a plunger, an anvil, slidable and spreadable tack gripping jaws overhanging said anvil, and a jointed lever synchronized with the plunger contacting with said jaws, and the lever so arranged that an upward pressure on the rear of the lever will cause a downward pressure on the jaws to thereby open the same.

3. A button attaching machine including a plunger, a tucker lever, an anvil, slidable and spreadable tack gripping jaws overhanging said anvil, means for normally holding the jaws closed, and means connected with the tucker lever and synchronized with the plunger for exerting a downward pressure on the jaws to thereby open the same near the end of the stroke of said plunger.

4. A button attaching machine including a plunger, an anvil, a jaw carrier on said anvil, a tucker lever, spreadable tack gripping jaws on said jaw carrier, spring means for normally holding the carrier in an upper position and the jaws closed, and cam means synchronized with the plunger and operable by the tucker lever for quickly exerting a pressure on the jaw carrier to thereby lower the same to open the jaws just before the end of the stroke of said plunger.

5. A button attaching machine including a plunger, an anvil beneath said plunger, a jaw carrier movable up and down said anvil and provided with tack gripping jaws, a tucker lever, and means for forcing the said carrier downwardly to spread said jaws comprising cam means on said tucker lever, said cam means being synchronized with the plunger so that the jaws are adapted to open just as a fastener is driven within a button head.

6. A button attaching machine including a plunger, an anvil beneath said plunger, a jaw carrier slidable up and down said anvil and provided with tack gripping jaws, means for normally holding the jaw carrier in an upper position, a cam-operated lever bearing on said jaw carrier, a tucker lever, a cam on said tucker lever for operating said lever, and an oscillating lever for operating said tucker lever, said oscillating lever cooperating and being synchronized with the

said plunger whereby the said jaw carrier will be lowered and the jaws spread when the said plunger has nearly completed its stroke.

7. A button attaching machine including an anvil, a jaw carrier movable on said anvil, spreadable tack gripping jaws on said jaw carrier, a lever normally in contact with said jaw carrier, a cam for operating said lever, and means for moving said cam slowly into engagement with said cam lever and for then thrusting said cam quickly under said cam lever to thereby quickly lower and open said jaws.

8. In a button attaching machine, a reciprocating plunger, an anvil, a jaw carrier movable on said anvil, spreadable tack jaws on said carrier, a tucker lever provided with a cam thereon, a lever contacting with said jaw carrier, and operated by said cam, and an oscillating lever for operating said tucker lever to in turn operate said cam, said jaw carrier and said tucker lever being synchronized with the movement of the plunger to cause said jaw carrier to release and lower said tack holding jaws and to open said jaws near the end of the stroke of the reciprocating plunger.

9. In a button attaching machine, a reciprocating plunger, an anvil, a jaw carrier movable on said anvil, spreadable tack jaws on said carrier, a cam and lever mechanism for lowering said carrier and jaws to open said jaws and being synchronized with the movement of the plunger, and means for accelerating the movement of said cam to quickly lower said jaw carrier near the final movement of the stroke of the plunger.

10. In a button attaching machine, a reciprocating plunger, an anvil, a jaw carrier movable up and down said anvil, spreadable tack jaws on said carrier, the said jaws being closed when the carrier is up and open when the jaw carrier is down, a cam and lever mechanism to actuate said carrier in synchronism with the movement of the plunger, and an oscillating lever for operating said cam and lever mechanism and arranged to accelerate the movement of said cam near the final movement of the stroke of the reciprocating plunger to thereby quickly lower said jaw carrier and open said jaws.

11. In a button attaching machine, a reciprocating plunger, an anvil, a jaw carrier movable up and down said anvil, spreadable tack jaws on said carrier, the said jaws being closed when the carrier is up and open when the carrier is down, a cam and lever mechanism to actuate said carrier, and an oscillating lever provided with a tortuous cam path for operating said cam and lever mechanism and arranged to accelerate the movement of the cam near the final stroke of the movement of the reciprocating plunger to thereby lower said jaw carrier and open said jaws.

12. In a button attaching machine, a reciprocating plunger, an anvil, a jaw carrier movable up and down said anvil, spreadable tack jaws on said carrier, the said jaws being closed when the carrier is up and open when the carrier is down, a cam and lever mechanism to actuate said carrier, and an oscillating lever for operating said cam and lever mechanism and provided with a cam path, the cam path diverging sharply at an angle near one end to accelerate the movement of said cam to thereby quickly lower said jaw carrier and open said jaws.

13. A button attaching machine including movable and spreadable tack holding jaws, a cam and lever mechanism for lowering and spreading said jaws, and an oscillating lever having a forward and rearward movement connected with said cam and lever mechanism, said oscillating lever being provided with a cam path, said cam path diverging sharply near one end in a direction opposite the forward movement of travel of said oscillating lever to thereby accelerate the movement of the cam and lever mechanism to thus quickly open said jaws at a predetermined time.

14. In a button attaching machine, a reciprocating plunger, an anvil, a jaw carrier movable up and down said anvil, spreadable tack jaws on said carrier, the said jaws being closed when the carrier is up and open when the carrier is down, a cam and lever mechanism to actuate the said carrier, and an oscillating lever having a forward and rearward movement provided with a tortuous cam path for indirectly operating said cam and lever mechanism, said oscillating lever being synchronized with the reciprocating plunger, the cam path near one end diverging sharply at an angle to the forward movement of travel of said oscillating lever to accelerate the movement of said cam as the plunger nears the end of its stroke to thereby quickly lower said jaw carrier and open said jaws.

15. A tack fastener holding means comprising a vertically movable jaw carrier, pivotal jaws on said carrier, an oscillating cam for moving said carrier to open and close said jaws, and means for accelerating the cam during a predetermined interval.

16. A tack fastener gripping mechanism including a vertically movable jaw carrier, pivotal jaws mounted on said carrier, an oscillating lever and cam for actuating said jaw carrier to open or close said jaws, and means for accelerating the oscillating movement of said cam at a desired time in the oscillation of said cam.

17. A button attaching machine including a tucker mechanism, a forwardly and rearwardly oscillating tucker lever for operat-

ing said tucker mechanism, means for operating said tucker lever, an anvil, a jaw carrier provided with movable jaws adapted to grip a fastener when on said anvil, the said carrier being vertically movable on said anvil, a cam on said tucker lever, and means extending between the cam and jaw carrier for forcing said carrier downwardly quickly to open said jaws when said oscillating tucker lever has nearly completed a rearward oscillation.

18. A button attaching machine including an oscillating lever adapted to control a tucker mechanism and a tack gripping mechanism, said oscillating lever being provided with a cam path extending substantially longitudinally thereof for the greater part of its distance, then extending slightly forwardly with respect to the machine and then sharply rearwardly and finally upwardly to its extreme end.

19. An oscillating lever for a button attaching machine adapted to control the opening and closing of tack gripping jaws and a tucker mechanism, said lever when in its normal position having a cam path extending from its bottom rearwardly upwardly with respect to the front of the machine, then slightly forwardly, and then sharply rearwardly and finally vertically upwardly.

20. In a button attaching machine, an anvil, slidable and spreadable jaws on said anvil, a normally positioned horizontal articulated lever cooperating with said jaws, means for raising the rear end of the articulated lever upwardly to slidably move said jaws downwardly to thereby open the same, and means for returning said jaws to their upper closed position.

In testimony whereof I affix my signature.

FRANKLIN R. WHITE.