

Jan. 1, 1957

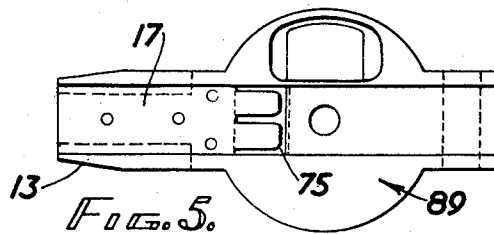
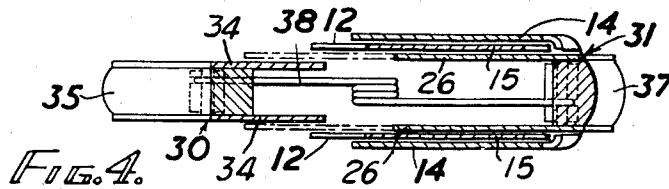
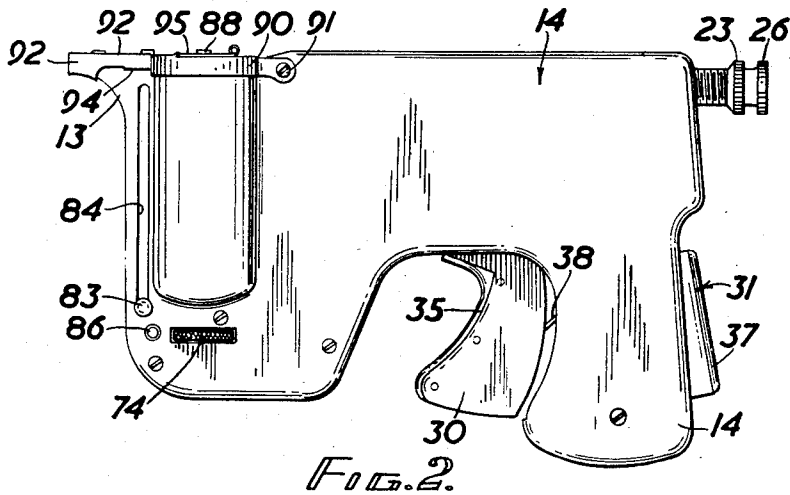
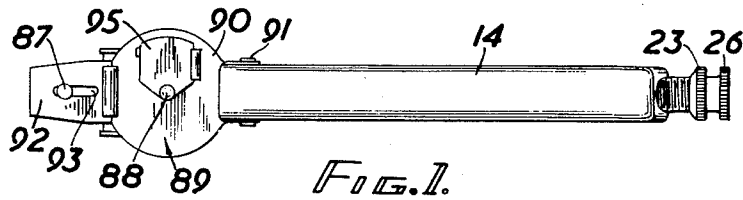
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2,775,765

HAND OPERATED STAPLING APPLIANCES

Filed Nov. 9, 1954

3 Sheets-Sheet 1



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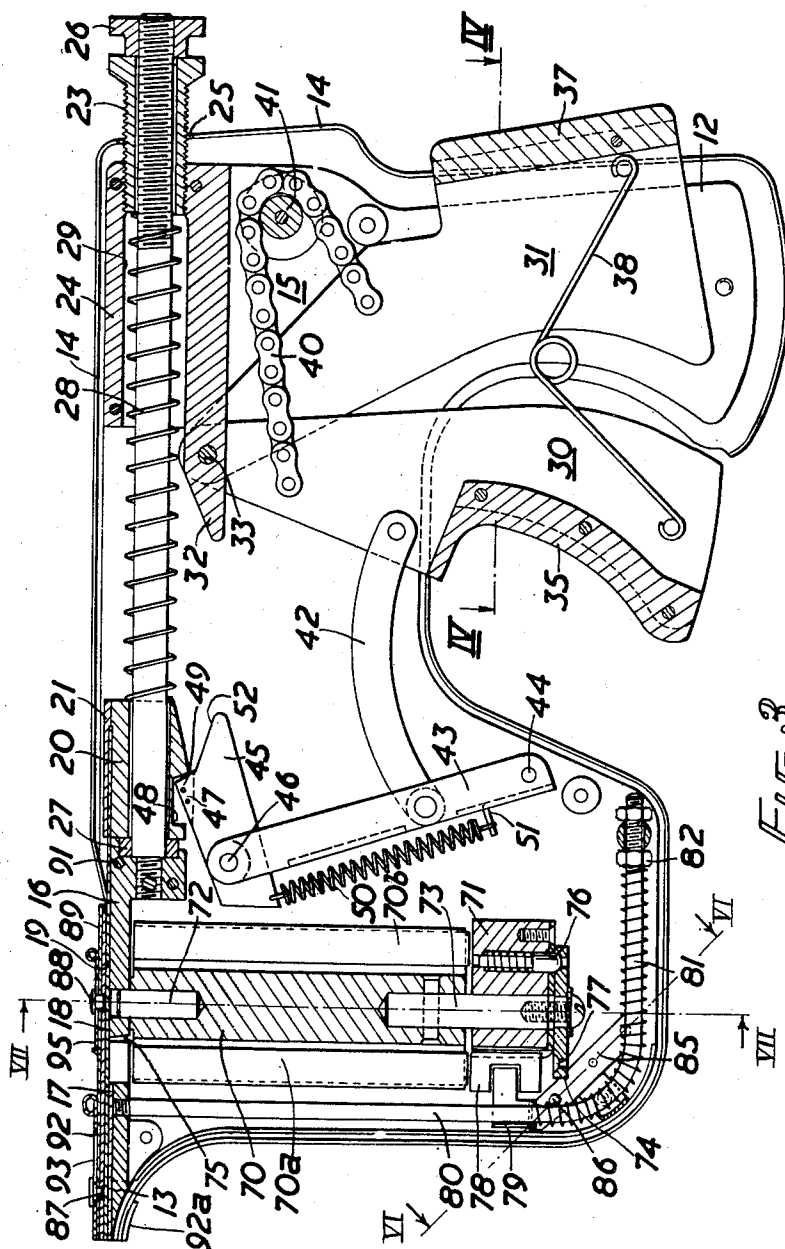


FIG. 3.

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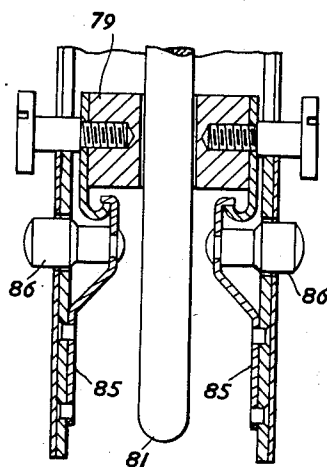


FIG. 6.

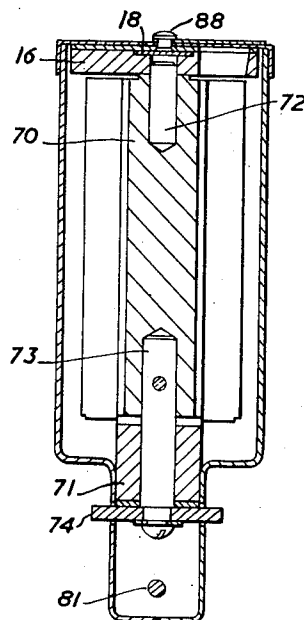


FIG. 7.

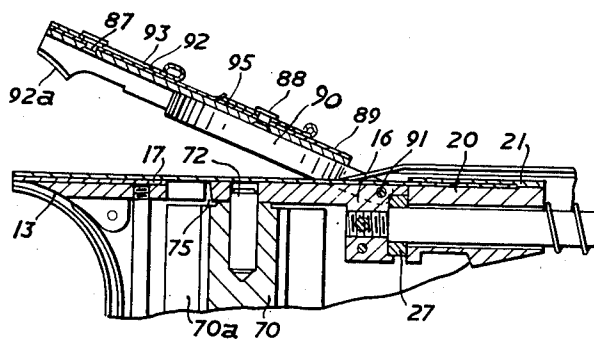


FIG. 8.

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1

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HAND OPERATED STAPLING APPLIANCES

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Application November 9, 1954, Serial No. 467,857

Claims priority, application Great Britain November 10, 1953

5 Claims. (Cl. 1—49)

This invention relates to hand-operated stapling appliances and has particular reference to that type of such appliances where the staples are driven under spring pressure upon the operation of a trigger device operated after the fashion of a pistol. In such devices when used for such purposes as tacking a fabric covering to wood in the manufacture of furniture, for example, considerable spring pressure is required to eject the staples through the fabric firmly and into the wood and with an ordinary hand-operated trigger lever considerable manual effort is required to effect the compression of the staple ejecting spring.

An object of the present invention is to provide a trigger mechanism by means of which this operation is more easily effected and according to the invention this is accomplished by the use of what may be described as a double gripping trigger. That is to say the action of compressing the staple ejecting spring is effected by the gripping of two trigger levers instead of the mere pulling upon a single trigger lever. Another object of the invention is to provide a construction which employs many parts that can be used for a pneumatically operated appliance such as that described in my copending application Serial No. 467,858 of even date.

Thus, in accordance with the invention, a hand-operated stapling appliance has two hand-operated levers adapted to be operated simultaneously and jointly to effect actuation of the appliance. In a preferred form of the invention, the appliance comprises a compression spring adapted to cause the driving of staples from the appliance and a pair of hand-operated pivoted levers arranged so as to be jointly grasped by a hand, one being engaged by the fingers and the other by the hand, and each to be forced towards one another, the levers being coupled together and with the spring so that on forcing the levers they jointly cause compression of the spring.

The invention will be more clearly understood from the following description of a stapling appliance in the form of a pistol or gun, reference being made to the accompanying drawings, in which:

Figures 1 and 2 are a plan view and a side view respectively of the appliance;

Figure 3 is a central longitudinal section on an enlarged scale of the appliance;

Figure 4 is a section on the line IV—IV of Figure 3;

Figure 5 is a plan view of a part of the stapling appliance;

Fig. 6 is a section taken on line VI—VI of Fig. 3;

Fig. 7 is a section taken on line VII—VII of Fig. 3; and

Fig. 8 is a sectional view of the forward end of the appliance, the magazine cover being shown in elevated position.

As illustrated in the accompanying drawings, and especially Figures 2 and 3, the appliance has the general exterior form of a gun with a pistol grip 12 and a nose 13. The appliance has an outer casing 14 in which are mounted two sub assembly plates 15 which are spaced accurately apart by spacing members.

2

At the forward end of the appliance, there is a support bracket 16 secured by screws between the plates 15 and having a smooth upper surface which with a wearing plate 17 forms a staple drive-way 18. This drive-way 18 extends to the nose 13 of the appliance and within it is slidably located the staple drive blade 19 which extends rearwardly of the bracket 16 and is clamped in a suitable recess in a hammer block 20 by a plate 21 which is secured to the block 20. The hammer block 20 is slidably mounted on a guide rod 22 which at the forward end is firmly fixed in the support bracket 16 and at the rearward end is supported freely in an adjustable sleeve 23 which is threaded in a support block 24 secured by screws between the sub assembly plates 15. The guide rod 22 and the sleeve 23 projects through an opening 25 in the casing 14. A lock nut 26 is threaded on to the end of the guide rod 22 and locks the parts together.

A leather pad 27 is carried on the forward end of rod 22 against the support bracket 16 and a strong helical compression spring 28 is located on the guide rod between the hammer block 20 and the forward end of the sleeve 23, a part of the spring 28 being located within the bore 29 of the support block 24. The compression of spring 28 can be adjusted by adjusting sleeve 23 in block 24.

The actuating mechanism for the staple appliance comprises two hand-operated levers 30, 31, both of which are pivoted at their upper ends on a forwardly projecting portion 32 of the support block 24, on a common pivot pin 33. The forward lever 30 consists of a pair of parallel plates 34 and an aluminium finger member 35 bridging the plates at the lower forward end. Similarly, the rear lever 31 consists of a pair of parallel plates 36 bridged by an aluminium palm piece 37 along the lower rearward edge. The levers 30, 31 are biased apart by the light spring 38 into the position shown in Figure 3, in which the levers can be easily grasped by the hand with the fingers round the finger piece 35 and the palm in contact with the palm piece 37. By gripping the two levers they can be forced inwardly towards one another. As shown in Figure 4, the spacing of plates 34 is less than the spacing of plates 36 so that with this inward movement course, lever 30 can be received within lever 31.

Levers 30, 31 are coupled together by a chain 40, the end links of which are received in and pivotally secured to the plates 34 and 36, respectively. The chain 40 passes round a jockey wheel 41 rotatably mounted between the sub assembly plates 15. The effect of the chain 40 and jockey wheel 41 is to transfer the force applied to lever 31 by the palm to the lever 30 in the same direction as the force applied by the fingers to lever 30.

Lever 30 is connected by an arcuate link 42 to an operating lever 43, link 42 being pivoted at its ends to the levers 30, 43. Lever 43 is pivoted at its lower end between the plates 15 by the pin 44 and carries at its upper end a catch 45 which is pivoted to the lever 43 by the pin 46. Catch 45 has a shoulder part 47 at its upper end and this shoulder part is received within a recess 48 in the underside of the hammer block 20. This recess 48 has a rearward working surface 49 with which the shoulder part 47 engages. Catch 45 is biased by the light helical spring 50 secured between the catch and a bracket 51 on the lower part of lever 43 so that the shoulder 47 is forced into the recess 48. The catch 45 has also a cam surface 52 projecting rearwardly and downwardly from the shoulder part 47. This cam surface 52 is adapted to co-operate with the rounded forwardly projecting part 32 of the support block 24.

At the forward end of the appliance there is provided a magazine 70 which is generally of the type described in pending United States patent application Ser. No. 238,688, filed July 25, 1951. Magazine 70 has four

vertical compartments of which two are shown at 70a, 70b and is rotatably mounted, at the top in the support bracket 16 by a pin 72 and at the bottom in the detent block 71 by a pin 73. Each compartment is adapted to receive a bank of staples. Pin 73 passes right through the detent block 71 and carries at its lower end an operating wheel 74 which projects through the casing 14 to enable the magazine 70 to be rotated and to bring in turn the compartments of the magazine into alignment with a slot 75 in the support bracket 16 leading to the drive-way 18. This slot 75 is shaped to receive three-legged staples as described in copending application No. 252,641, filed October 23, 1951, now abandoned, and is shown in Figure 5 which is a plan view of part of the support bracket 16 with the structure thereabove removed. The detent block 71 has a spring biased plunger 76 which is receivable in any of four equally spaced recesses 77 in the wheel 74 (Figure 2). The plunger 76 and the recesses 77 ensure that the compartments of the magazine are properly aligned with the slot 75. The staples located in the operative compartment of the magazine 70 are urged upwardly through the aperture 75 by a staple pusher 78 which is attached to a pusher slide 79 mounted on a rod 80, and which is T-shaped in section to bear against the crown and central leg of the lowermost three-legged staple in the magazine. The four compartments 70a, 70b are closed at the bottom except for a T-shaped slot for pusher 78 so that the staples are retained in the magazine. The rod 80 is bent so as to extend rearwardly and carries a long helical spring 81 located between the pusher slide 79 and an abutment 82 to supply the necessary upward bias for the slide 79 and pusher 78. Pusher slide 79 carries two screws 83 (Figure 2) which project in opposite directions through slots 84 in the casing 14. By grasping these screws 83 with the fingers, the pusher 78 can be withdrawn downwardly to clear the compartment 70a to allow the magazine 70 to be turned 90° to bring the next compartment into operative position. The pusher 78 can be held in its lowest position by two springs 85 (Fig. 6) which clip on to hooks on the pusher slide 79; the pusher slide can be released by applying pressure to two pins 86, secured to the springs 85 and projecting through openings in the casing 14, to free the springs from the hooks of the slide 79.

The wearing plate 17 forming the top of the drive-way 18 is secured by rivets to a nose cover 89 which covers the magazine 70 and which is independent of the casing 14 which does not extend over the magazine. Nose cover 89 has downwardly projecting parts 90 which are hinged to the support bracket 16 by pins 91 and is prevented from lifting by the yoke 92. Yoke 92 is attached to cover 89 by a rivet 87, which passes through a slot 93 in the yoke, and a forward part 92a embracing the forward end of the nose 13 although not blocking the drive-way 18. At the rearward end, yoke 92 has lips 94 engaging outwardly projecting lips on the plates 15. By moving the yoke forward relative to cover 89 so that lips 94 are freed from the co-operating lips on plates 15 and so that the forward part 92a clears the nose 13, the assembly consisting of the cover 89, wearing plate 17 and yoke 92 can be swung backwards to expose the drive-way 18 and to allow any stoppage to be cleared.

The nose cover 89 has an opening enabling staples to be fed into the magazine compartment when these need refilling. The opening is normally covered by the cover plate 95 which is pivoted about a rivet 88. To reload the magazine compartments, the plate 95 is turned away from the opening and staple strips fed into each compartment in turn.

The operation of the device is as follows: Normally the various parts of the appliance are in the position shown in Figure 3 and the leading staple in the operative compartment of the magazine 70 is forced against the underside of the drive blade 19 by the pusher 78. When

it is desired to eject a staple, the levers 30, 31 are grasped in the hand and are forced together so that lever 30 is received within lever 31. Owing to the chain 40 the push applied by the palm to lever 31 is transferred into a pulling force assisting the pull applied by the fingers to the lever 31 so that the two forces operate in the same direction. The movement of the lever 30 causes, through link 42, the lever 43 and the catch 45, the hammer block 20 to move rearwardly and to cause compression of the actuating spring 28. As the hammer block 20 moves rearwardly, the drive blade 19 is withdrawn past the slot 75 so that the leading staple in the magazine compartment can enter the guide-way 18. When the spring 28 has been fully compressed, the projecting part 32 of block 24 engages against the cam surface 52 of catch 45 and trips that catch to release the spring 28. The hammer block 20 and the drive blade 19 are thus forced forwardly to cause ejection of the leading staple from the appliance.

On release of the levers 30, 31, the spring 38 will cause the catch 45 to return to the position shown in Figure 3 riding over the hammer block and entering the recess 48 ready for the next operation.

By the provisions of two levers 30, 31 instead of the usual single operating lever, the compression of the spring 28 by hand is facilitated.

In my copending application Serial No. 467,858 of even date, I have described a pneumatically operated stapling appliance using the magazine, drive blade and compression spring mechanisms of the present specification. The construction of the appliance of the present application by using parts common to that of the copending application reduces production costs and eases manufacture.

What is claimed, is:

1. Actuating means for a hand-operated stapling appliance having a staple drive blade, said means comprising strong ejection spring means for said blade, two hand-operated levers pivoted about a single axis and each movable towards the other, a part at least of one said lever being receivable in the other said lever, and said levers being capable of being grasped in the hand, one being engaged by the fingers and the other by the palm, return spring means biasing said levers apart, a jockey wheel located at one side of both said levers, a chain passing over said jockey wheel and secured at its ends to said levers, and coupling means between one said lever and said ejection spring.

2. A stapling appliance comprising a frame, a staple drive blade, means for feeding staples in front of said drive blade for driving them from said appliance, means comprising a strong compression spring acting on said drive blade, two hand-operated levers pivoted about a single axis on said frame and movable towards one another, said levers being capable of being grasped in the hand, one by the fingers and the other by the palm, spring means biasing said levers apart, coupling means between said levers whereby force applied to one said lever is transferred to the other said lever to assist the force applied directly to said other lever by the hand, a linkage operatively connecting one said lever and said spring whereby compression of said levers together causes compression of said compression spring and withdrawal of said blade, and release means for releasing said spring when compressed for driving said blade to drive a staple.

3. In a stapling appliance having a staple drive blade, a hammer block secured to said blade, a staple magazine and means for feeding staples from said magazine in front of said blade for driving them from said appliance; the combination comprising a strong compression spring acting on said hammer block a frame, two hand-operated levers pivoted about a common axis on said frame and each movable towards the other, said levers being capable of being grasped in the hand, one with the fingers and the other with the palm, spring means biasing said levers

5

apart, coupling means between said levers whereby force applied by the hand to one said lever is transferred to the other said lever to assist the force applied directly by the hand to said other lever, a catch releasably engaging said hammer block, a linkage between one said lever and said catch whereby compression of said lever together causes compression of said compression spring and withdrawal of said blade, and release means located in the path of said catch for releasing said catch from said hammer block on compression of said spring, whereupon said compression spring forcibly drives said hammer block and blade to drive a staple.

4. In a stapling appliance having a staple drive blade, a hammer block secured to said blade, a staple magazine and means for feeding staples from said magazine in front of said blade for driving them from said appliance; the combination comprising a strong compression spring acting on said hammer block, a frame, two hand-operated levers pivoted about a common axis on said frame and each movable towards the other, said levers being capable of being grasped in the hand, one with the fingers and the other with the palm, and a part at least of one said lever being receivable in the other said lever, spring means biasing said levers apart, a jockey wheel located at one side of both said levers and a chain passing over said jockey wheel with each of its ends connected respectively to said levers, a catch releasably engaging said hammer block, a linkage between one said lever and said catch whereby compression of said levers together causes compression of said compression spring and withdrawal of said blade, and

6

release means located in the path of said catch for releasing said catch from said hammer block on compression of said spring, whereupon said compression spring forcibly drives said hammer block and blade to drive a staple.

5. A stapling appliance comprising a frame, a staple drive blade, means for feeding staples in front of said drive blade for driving them from said appliance, means comprising a strong compression spring acting on said drive blade, two hand-operated levers pivoted on said frame and movable towards one another, said levers being capable for being grasped in the hand, one by the fingers and the other by the palm, spring means biasing said levers apart, coupling means between said levers whereby force applied to one said lever is transferred to the other said lever to assist the force applied directly to said other lever by the hand, a linkage operatively connecting one said lever and said spring whereby compression of said levers together causes compression of said compression spring and withdrawal of said blade, and release means for releasing said spring when compressed for driving said blade to drive a staple.

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