July 31, 1956 L. R. CAMPBELL 2,756,426

VALVE TRIPPING MECHANISM FOR AIR STAPLING GUN

Filed Jan. 13, 1954

FIG. 1

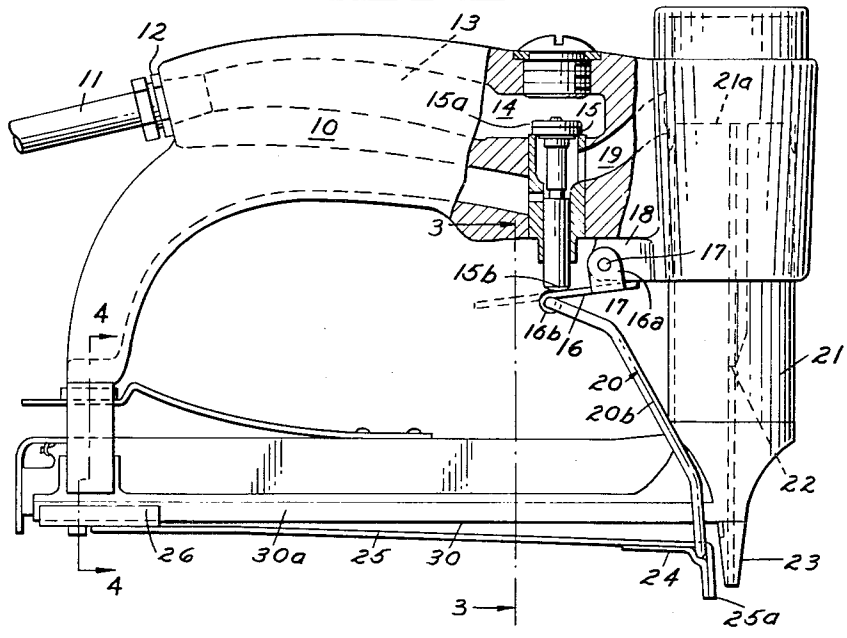


FIG. 2

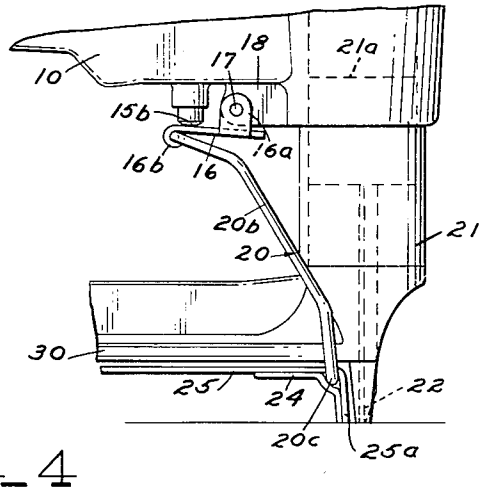


FIG. 3

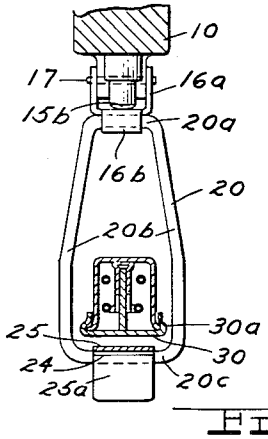
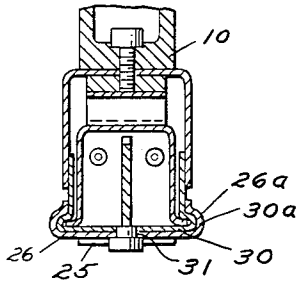


FIG. 4



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VALVE TRIPPING MECHANISM FOR AIR STAPLING GUN

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10 Claims. (Cl. 1—101)

This invention relates to manual air stapling guns of the type wherein a fluid pressure or compressed air operated piston and cylinder is employed to propel a staple driver to cause it to sever a staple or other fastening device from a strip of interconnected staples, contained in a suitable magazine and feed structure, and then to drive the separated staple into and/or through the material to be stapled or secured in a desired position or location.

The principal object of the present invention is to provide a new and improved construction of automatic means that will obviate the necessity for the operator of the gun to manipulate a finger actuated trigger to cause the gun to be actuated when it is brought into engagement with the work at the point where a staple is to be driven.

Briefly, the present invention consists of an air stapling gun of the type disclosed in the co-pending application Serial No. 246,491 filed August 24, 1951, and issued as U. S. Letters Patent No. 2,713,165, on July 19, 1955, jointly, by myself, Frank E. Ebert, Alton Lee Shoening and Le Roy C. Reiterman, and in which compressed air from any convenient source of supply is fed into a conduit enclosed by the handle of the air gun to a valve chamber from whence it flows, under the control of a trigger actuated valve, through a conduit leading to an air cylinder to cause a piston slidably mounted therein to be driven outwardly of the cylinder to perform a staple driving stroke.

The stapling air gun of said co-pending application also includes a staple driver cooperatively associated with said piston and slidably mounted in a nosepiece having a trackway adapted to receive a single separated staple which is in communication with a combined staple magazine and feed structure with which said nosepiece is integrally associated so that the latter projects outwardly beyond the magazine structure for ready engagement with the work piece.

The staple magazine and feed structure of said application includes a track section having a staple-supporting track adapted to slidably support a strip of inter-connected staples, and a cover therefore slidable to and from opened and closed positions, together with any suitable feeding means to cause said strip to be fed toward said nosepiece.

The constructional details, however, of said feeding means may be varied as desired and forms no part of the present invention which relates to an attachment for automatically actuating the air valve of an air stapling gun such as shown in said application, but which is capable of general application to any type of trigger actuable valve controlled manual compressed air tool which is placed in juxtaposition to a work piece and so that when the tool is brought to the desired position the valve may be opened to cause actuation of the tool by exerting a slight pressure on the handle of the tool.

The above and other objects of the prespent invention will papear more fully from the following, more detailed,

description and by reference to the accompanying drawings wherein

Figure 1 is a side elevation, partly in section, showing by way of example, the air gun of said application with an automatic valve tripping attachment secured thereto;

Figure 2 is a view similar to Figure 1 of the nosepiece of said gun and showing the valve tripping device moved into position to open the air valve and admit air under pressure to the air cylinder to cause the piston therein to perform a staple driving stroke and

Figures 3 and 4 are cross sectional views taken on the lines 3—3 and 4—4 of Figure 1.

As shown in the drawings, the handle 10 of the air gun is connected by an air hose 11 to a source of compressed air which is delivered through a connecting nipple 12 to a conduit 13 that terminates at its inner end in a valve chamber 14 into which projects the enlarged head 15a of a valve 15. The lower end 15b of the stem of valve 15 engages a trigger 16 pivotally secured by pin 17 passing through a pair of spaced ears 16a of said trigger and a lug 18 of the main body of the air gun.

When valve 15 is raised off its seat by the trigger 16, the air under pressure is permitted to flow through conduit 19 into the top of cylinder 21 to cause the piston 21a to propel the staple driver 22 through the nosepiece 23.

In the air gun of said application, the trigger 16 projects to the left considerably beyond the bottom 15b of the valve stem, as indicated by the dotted line showing, for ready engagement by a finger of an operator in whose hand the handle 10 of the gun is grasped. When, however, the valve actuating attachment of the present invention is employed, the longer manually operated trigger may be removed by driving out the pivot pin 17 and the shorter trigger 16 is substituted therefore. The substitution of the shorter trigger is not essential as the longer trigger may be retained so that the gun may be used interchangeably as an automatic or as a manually operated gun.

As shown, the rear or left hand end of trigger 16 is curled back on itself to provide a bearing 16b in which is pivotally received the upper bar 20a (Fig. 3) of a connector, indicated generally by the numeral 20, and which consists of the upper bar portion 20a, the side legs 20b and the lower bar portion 20c. The lower bar portion 20c of the connector 20 is pivotally mounted in a bearing formed between a small angle member 24 and the downturned free end 25a of a leaf spring 25, the rear end of which is fixedly secured to an attachment clip 26 locked in position to the base 30 of the staple magazine by any suitable means such as an Allen set screw 31.

The air gun of the said co-pending application is particularly adapted for the ready attachment to the magazine unit thereof of the valve actuating attachment of the present invention because of the fact that the base of the track section of its magazine unit is provided with outwardly projecting longitudinal beads 30a about which ears 26a of the clip 26 may be engaged, thereby obviating the necessity of drilling screw holes in the air gun. It will be understood, that the present invention is not limited to this particular constructional detail but that any suitable means for connecting the attachment to an air gun or other tool may be employed.

The manner in which the device operates is as follows: The leaf spring 25 is so designed and so attached to the clip 26 that the lower edges of angle member 24 and end 25a of the spring 25 will normally project beyond the end of the nosepiece 23, as shown in Figure 1. When the end of the nosepiece 23 is moved to the position in which it is desired to drive a staple, the operator exerts a slight downward pressure on the handle 10 sufficient to cause the free end 25a of leaf spring to be forced upwardly

to the position shown in Figure 2. As this action takes place, the connector **20** will cause trigger **16** to be swung in a clockwise direction and by exerting pressure on the lower end **15**[b] of valve stem, will cause valve **15** to be raised off its seat to permit air to flow from valve chamber **14** to conduit **19** and thence to the top of cylinder **21** to cause a staple driving stroke to be performed.

As will be seen from the foregoing description, it is not necessary when an attachment constructed in accordance with the present invention is secured to the stapling gun, for the operator to perform a separate manual operation to trip or open the valve **15**, as this function is accomplished by the mere act of placing the end of the nosepiece of the gun in contacting engagement with the work piece and at the same time, exerting sufficient downward pressure on the handle **10** of the gun to move the edges of the downwardly extending end **25**[a] and angle member **24** to the retracted position, shown in Figure 2 and thus cause connector **20** and trigger **16** to open the valve **15**.

The leaf spring **25** is preferably made of sufficient strength as to require the exertion of a slight downward pressure on the handle **10** to move the edges of end **25**[a] and angle member **24** to the retracted valve opening position thereby to permit the operator to shift the gun to bring the end of the nosepiece into position to drive the staple at the desired place.

Although I have described the present invention as an attachment particularly adapted to be secured to an air gun for driving staples, it will of course be understood that it is equally applicable to an air gun for driving any kind of fastening devices such as tacks, brads, or the like. Hence, the term stapling gun as used in the claims hereunto appended is employed in an illustrative sense and not as a limitatio;n. It will moveover be obvious that the invention is equally applicable to any type of pneumatic tool employing a manually operable trigger for opening a valve to cause the tool to be actuated.

While I have described and shown a constructural example that has proven highly satisfactory in commercial and industrial use, it will, of course, be understood that many changes, variations and modifications of the details of such constructional example may be resorted to without departing from the scope or spirit of the appended claims.

I claim:

1. The combination with an air stapling gun having an air actuated piston, a cylinder in which said piston is slidably mounted, a staple driver co-operatively associated with said piston, a projecting nosepiece having a staple receiving trackway in which said staple driver is slidably mounted, a reciprocating valve means for admitting air under pressure to said cylinder to cause said piston and staple driver to perform a staple driving stroke, said valve means having a valve stem projecting from the exterior of said gun, a valve actuating trigger, a removable pivot pin for detachably connecting said trigger pivotally to said gun adjacent to said valve stem, said trigger having a portion for simple contacting engagement with said valve stem for raising said valve means to open position, of an attachment for causing said trigger to be actuated automatically to move said valve means to opened position when said nose piece is pressed into engagement with a work piece to be stapled, said attachment comprising a retractable work engaging member, spring means for normally urging said member in position to project beyond the end of said nose piece and a single connector extending betwen said trigger and said member to cause the latter to actuate said valve to opened position when said member is moved to a retracted position against the action of said spring means by the engagement of said member with a work piece, means for pivotally connecting said connector at its ends to said trigger and to said member, and means for securing said attachment to said stapling gun.

2. The combination as set forth in claim 1 in which said spring means consists of a leaf spring having one end anchored to said securing means and a free end having a downwardly extending projection to form said work engaging member.

3. The combination with an air stapling gun having an air actuated piston, a cylinder in which said piston is slidably mounted, a staple driver co-operatively associated with said piston, a projecting nosepiece having a staple receiving trackway in which said staple driver is slidably mounted, a staple magazine track section having outwardly projecting beads extending longitudinally along the bottom edges thereof, a staple supporting track for slidably supporting a strip of interconnected staples thereon and means for normally urging said strip towards the trackway of said nosepiece, valve means for admitting air under pressure to said cylinder to cause said piston and staple driver to perform a staple driving stroke, of a valve tripping attachment for causing said valve means to be opened automatically when the end of said nosepiece is pressed into engagement with a work piece to be stapled, said attachment comprising a retractible work engaging member, resilient means for normally urging said member in position to project beyond the end of said nosepiece, a trigger for actuating said valve, a removable pivot pin for detachably connecting said trigger pivotally to said gun adjacent to said valve means, means connecting said trigger and work engaging member to cause said valve means to be actuated to open position when said member is moved to retracted position against the action of said resilient means, and means for securing said attachment to said stapling gun.

4. An attachment as set forth in claim 3 in which said securing means comprises a U-shaped clip having a pair of upwardly extending spaced legs for straddling engagement with said magazine track section of said gun, and means for locking said securing means against movement relatively to said gun.

5. An attachment as set forth in claim 4 in which the upwardly extending spaced legs of said clip are provided with longitudinal recesses for interlocking slidable engagement with said longitudinal beads of said magazine track section.

6. An automatic valve tripping attachment for a stapling air gun, or the like, having a valve controlled pneumatic piston and cylinder comprising a pivotally mounted valve trigger for engaging and moving the valve of said gun to opened position thereby to admit air under pressure to said cylinder to cause said piston to perform a staple driving stroke, a work engaging member movable to and from a retracted and an extended position, resilient means for normally urging said member to its extended position into contacting engagement with a work piece to be stapled, a single connecting rod connected to said trigger and member to cause said trigger to actuate said valve to open position when said member is moved to retracted position against the action of said resilient means, and means for securing said attachment to said gun.

7. An attachment as set forth in claim 6 in which said trigger is detachably pivoted to said gun, adjacent to said valve and is provided with a valve engaging extension, and means for pivotally connecting the ends of said connecting rod to said trigger and to said work engaging member.

8. An attachment as set forth in claim 6 in which the resilient means comprises a leaf spring having one end anchored to said securing means and a lateral projection at its free end to form the work engaging member.

9. An attachment as set forth in claim 6 in which the resilient means comprises a leaf spring having one end anchored to said securing means and a lateral projection at its free end to form the work engaging member, pivot means for detachably connecting said trigger pivotally to said gun, and trigger having a valve engaging extension adjacent to said valve; and means for pivotally connecting

the ends of said connecting rod to said trigger and to said work engaging member.

10. The combination with an air stapling gun having an air cylinder, a piston slidably mounted in said cylinder, a valve for admitting air to said cylinder to cause said piston to perform a staple driving stroke, said valve having a valve stem, a staple driver having its upper end cooperatively associated in driving engagement with said piston, a nosepiece in which the lower end of said staple driver is slidably mounted, of an attachment for automatically causing said valve to be opened to admit air under pressure to said cylinder comprising a trigger having an extension for engagement with said valve stem, a removable pivot pin for detachably securing said trigger

pivotally to said gun adjacent to said valve with said extension in contacting engagement with said valve stem, a retractible work engaging member, spring means for causing said member normally to project beyond the end of said nosepiece, a single connecting rod having one end pivotally connected to said trigger and its other end pivotally connected to said attachment, and means for detachably connecting said member to said stapling gun.

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