

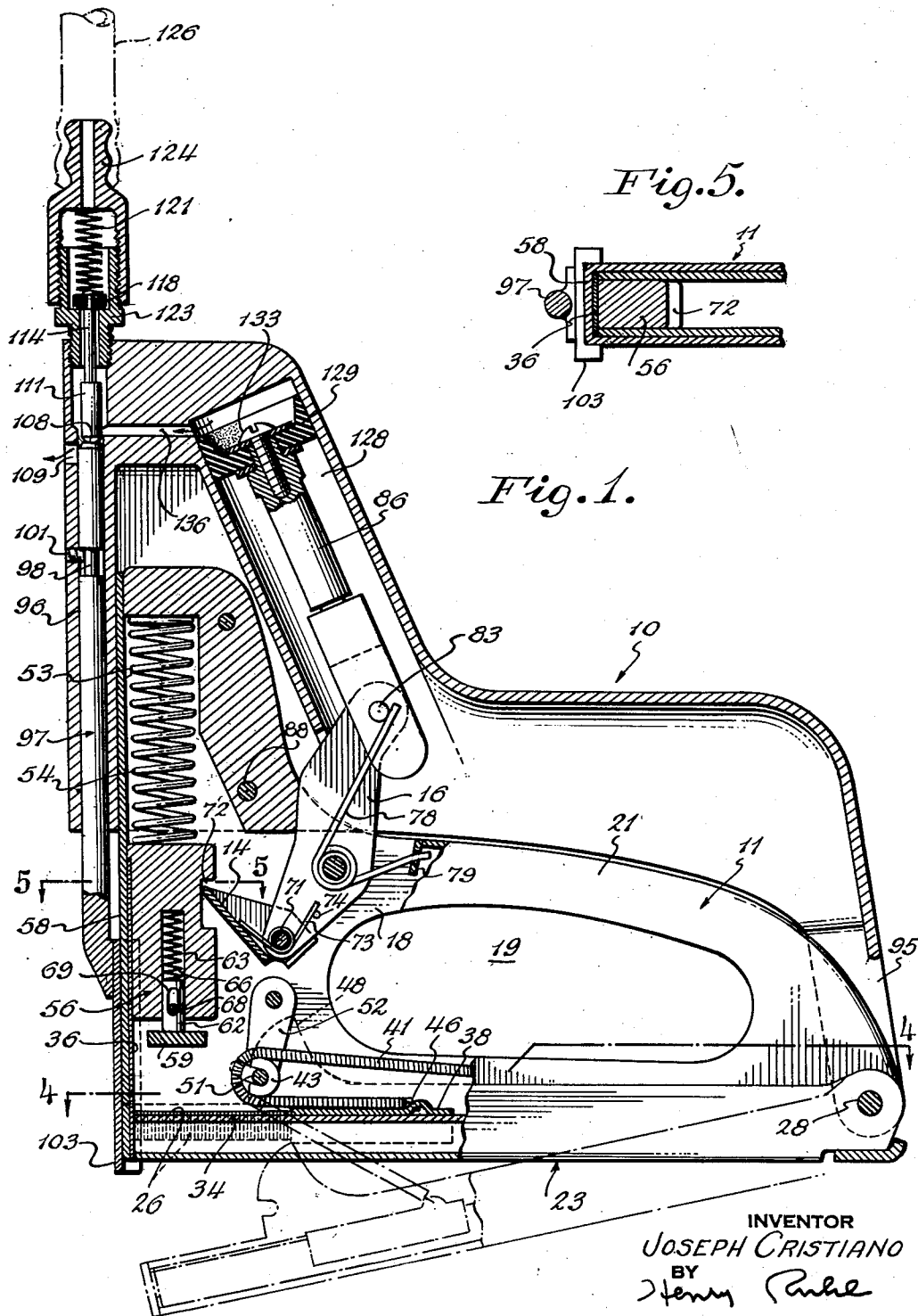
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J. CRISTIANO
STAPLING MECHANISM

2,625,682

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3 Sheets-Sheet 1



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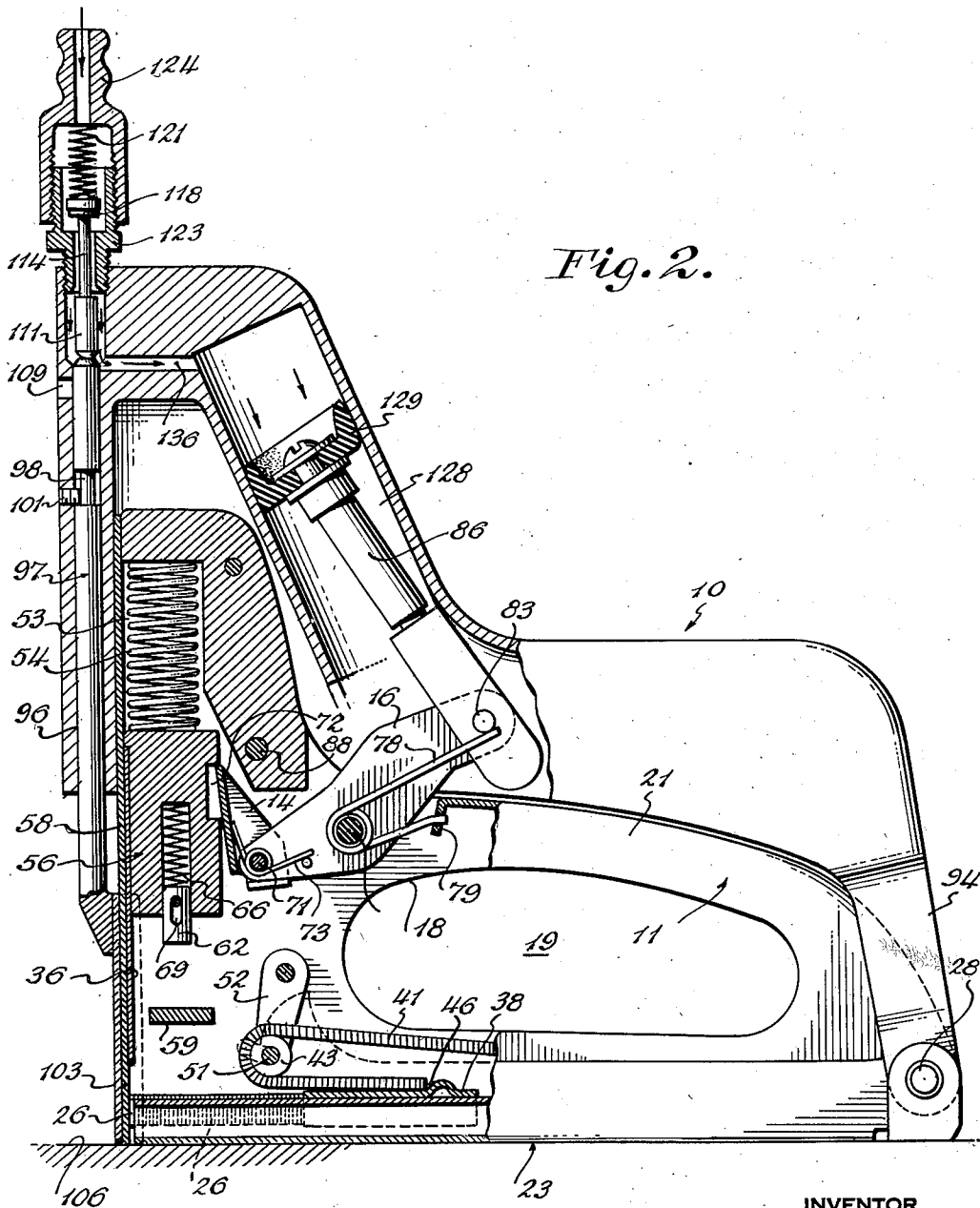
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STAPLING MECHANISM

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The present invention relates to tacking or stapling mechanisms; and, more particularly, to the combination of a staple feeder and a pneumatic device for controlling the successive feeding of staples and for driving one staple at a time into a work piece, such, for example, as an article in the process of being upholstered.

In the illustrative embodiment of the invention described herein and shown by the accompanying drawing, the novel pneumatic device which controls the feeding and driving of staples is constructed to be fitted conveniently to a known type of staple driver referred to in the art as a "tacker." It will be understood, however, that the combination of this invention, which provides for pneumatic feeding and driving of staples, is shown as including an already obtainable tacker for the sake of convenience of disclosure. As shown and described herein, the tacking or stapling device of this invention includes a pressure or touch sensitive means which serves as a trigger thereby to provide for the driving of a single staple without manual effort and with no possibility of an accidental repeating of the mechanism with the resulting possible spoilage of the work pieces and jamming of the staple feed. The pressure or touch sensitive means, preferably, is arranged to contact a work piece at the point where a staple is to be driven. Response of the novel mechanism included in the present invention to action of the pressure or touch sensitive means is obtained pneumatically.

The principal aim or object of the present invention is to provide a novel staple driver or tacker which operates pneumatically in response to pressure mechanically applied against a trigger means. This mechanical pressure is preferably applied by contact with a work piece.

Another and closely related object is to provide for only a single operation of the driving mechanism in response to pressure applied to the trigger mechanism.

A further object is to provide a novel valve mechanism for controlling the driving of staples into a work piece.

A still further object is to provide a novel appliance or attachment for a staple driver or tacker for obtaining pneumatic, rather than manual, operation of the tacker automatically in response to application of the tacker to a work piece.

Other objects and advantages of the present invention will, of course, become apparent and immediately suggest themselves to those skilled in the art to which the invention is directed from

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a reading of the following specification in connection with the accompanying drawing in which:

Fig. 1 is a transverse sectional view in side elevation of a tacking or stapling mechanism embodying the present invention with the parts in the normal or inactivated position, the section being taken on line 1-1 of Fig. 3;

Fig. 2 is a view similar to Fig. 1, but with the parts shown in an advanced stage of operation;

Fig. 3 is a top plan view of the tacking or stapling mechanism of Fig. 1;

Fig. 4 is a view in section on the line 4-4 of Fig. 1;

Fig. 5 is a fragmentary sectional view taken on line 5-5 of Fig. 1; and

Fig. 6 is a view in perspective of the self-contained pneumatically operated appliance or device of the present invention which is shown in Fig. 1 as being applied for operation in combination with a previously assembled tacker.

Referring to the drawing, the entire stapling mechanism or tacker, which is pneumatically operatable in accordance with the present invention, is seen to comprise a pneumatic attachment 10 shown as a separate unit by Fig. 6. Figs. 1 and 2 show the manner in which the pneumatic attachment 10 is carried by a prefabricated stapler or tacker designated in its entirety by reference character 11. While the invention is described, illustratively, as being embodied in an attachment for application to a normally hand operated tacker or stapler, it will be understood that the operating principles of the invention to be described hereinafter may be employed with other types of feeding devices and mechanical drivers. The tacker 11 may, for example, be a Model 200 Speedmatic tacker. This device is manufactured by Speed Products, Inc., of Long Island City, New York. Similar tackers are shown in U. S. Patents Nos. 2,341,530 and 2,412,620 granted to Crosby and Kipp, respectively. This commercially obtainable tacker is modified for use in accordance with the invention by removal of the operating handle or lever (not shown) and by slightly modifying the swingable operating lever for the pawl which cooperates with the driver hammer. In the accompanying drawing this pawl is designated 14 and the swingable operating lever is designated 16.

For the sake of completeness of disclosure, the parts of the tacker 11 will now be described. It comprises a frame 18 having an opening 19 which serves as a finger hole so that the part 21 of the frame can be grasped as a handle. The magazine 23, which is loaded with staples 26, is pivoted

at 28 to the frame 18. The pivot 28, which is normally present in the unmodified stapler or tacker 11, is in the form of a pin, bolt, or the like, which provides a connection for the pneumatic attachment 10 by being received in the holes 29 and 31 (Fig. 6).

For the purpose of holding the staples 26, the magazine 23 is, or may be, channel shaped providing a ridge 34 over which the staples 26 are seated. The staples are urged forwardly against a staple driver bar 36 by a channel shaped rider 38. A relatively long helical spring 41 is anchored in the frame 18 and passes over a pulley 43. The end of the spring is connected as indicated at 46 to the rider 38. Projections 48 in the magazine 23 are notched, as indicated, at 49 to engage a pin 51. This pin may be the journaling means for the pulley 43 and is carried at the end of a pivoted arm 52.

The frame 18 of the stapler or tacker 11 has a suitable bore or passage 53 which receives a helical compression spring 54. The spring 54 reacts against a plunger or hammer 56 to which is attached the previously mentioned driver bar 36. The latter slides along the end wall 58 of the tacker 11. The cross member or cross bar 59 serves as a stop for the plunger 56, and as shown in Fig. 1, an auxiliary shock absorber plunger 62 is slidable in a bore 63 in the plunger 56. The shock absorbing action is provided by an auxiliary helical spring 66. Movement of the auxiliary plunger is limited by a transverse pin 68 received in an elongated slot 69.

The plunger or hammer 56 is operated by the previously mentioned pawl 14 which is pivoted to the end of the swingable lever by suitable means such as a pivot 71. The end of the pawl engages in an elongated recess 72 in the plunger 56. A spring 73 engaged against a stop 74 biases the pawl 14 into engagement with the recess 72 in the position of the parts shown in Fig. 1. The pawl 14 is released from engagement with the recess 72 when the lever 16 is swung slightly further in a clockwise direction as shown in Fig. 2. The pawl engages the plunger 56 for its release. The lever 16 is biased in a counter-clockwise direction by a spring 78 which is engaged in an opening in a tang 79 secured to the frame 18 of the tacker. The remaining end of the spring 78 engages against a pin 83 which serves pivotally to connect a rod 86 to the lever 16.

The parts thus far described, with the exception of the rod 86, are comprised in the stapler or tacker 11. When the stapler or tacker 11 is used as a hand operated device, the lever 16 serves as a trigger and it is operated by a handle (not shown) which is pivoted to a pin 88, for example. This pin 88 may serve to secure the device 10 to the tacker by cooperation by holes 91 (Fig. 6).

The details of the apparatus 10 will now be described. As seen in Fig. 6, it comprises a frame or body member having the bifurcated ends 94 and 95 within which the previously mentioned holes 31 and 29 are provided. The body of the attachment 10 has a cylindrical bore 96 which receives a trigger rod 97 which serves as a valve operator in a manner to be described. The rod 97 is provided with the portion of reduced diameter 98 within which a set screw 101 or the like is engaged to limit movement of the rod 97. The end of the rod 97 opposite the valve arrangement is secured to a trigger bar 103 which, in the position of the parts of Fig. 1, extends beyond the lower edge of the staple magazine 23. In Fig. 2

of the drawing, the entire apparatus is indicated as having been pushed against a surface 106 which may, for example, be the surface of a work piece. In bringing the apparatus into engagement with the surface 106 of the work piece, it is preferable to have the heel or end of the tacker 11 adjacent the pin, contact the work piece first. As soon as the trigger bar 103 is pressed upwardly by engagement with the surface 106 of the work piece the staple driving operation is initiated as will hereinafter appear. The rod 97 is notched, as indicated at 108 so that it will serve as an exhaust valve in combination with an exhaust port 109. The rod 97 contacts a second rod 111 of reduced diameter and which has a still further reduced stem 114 extending therefrom having a valve member 118 secured at its end. A loading spring 121 urges the rod 97 downwardly as viewed in Fig. 1 to maintain the valve 118 closed against its seat and to cause the trigger bar 103 to project slightly. Screw fitting 123 and 124 provide connecting means for a hose 126 that supplies a fluid, such as air, for example, under pressure to the device. The screw fitting 123 has a slightly enlarged bore therein which loosely receives the stem 114 to provide for an air passage.

The body of the attachment 10 is provided with a cylindrical bore 128 which receives a piston 129. This piston is preferably formed of yieldable material such as, for example, synthetic rubber. "Neoprene" has been found suitable for the purpose. Yieldability permits the piston to tilt. The piston 129 is received on the end of the rod 86 and is suitably secured thereon as by a screw and washers 133. The end of the rod 86 is, or may be, bifurcated to straddle the lever 16 to which it is pivotally connected by the pin 83 as previously described.

The operation of the apparatus set forth will now be described. As the heel of the stapler or tacker 11 is set against the surface 106 of the work piece and rocked forwardly the trigger bar 103 will be pressed upwardly thereby pressing the rods 97 and 111 upwardly so as to close the exhaust port 109 and lift the valve 118 from its seat. Air under pressure will then flow through a passage 136 against the head of the piston 129 forcing it downwardly and causing it to rock the swingable lever 16 clockwise. When this is done, plunger or the hammer 56 will be raised and as the lever 16 continues to swing the pawl 14 will move rigidly with the lever 16 and will be disengaged from the notch 72. The hammer 56 will move downwardly carrying with it the driver bar 36 to drive the staple into the work piece. Downward movement of the hammer 56 will be checked by the auxiliary shock absorbing plunger 62. There is no possibility of the operation being repeated so long as the apparatus is in engagement with the work piece. When it is raised therefrom, the spring 121 will insure that the rod 97 is urged downwardly to force the valve 118 against its seat and to open the exhaust port 109 so that the piston 129 returns to its initial position under the influence of the spring 78.

The invention claimed and sought to be secured by Letters Patent is:

1. In an apparatus for driving staples, a staple driver, means to urge said driver in a staple driving direction, means to feed staples to a position against said driver whereby each successive staple is in a position to be driven, means to withdraw said driver against said urging means, said means for withdrawing said driver being releasable from said driver upon continued movement thereof,

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means coupled to said means for withdrawing said driver to secure operation thereof, said last named means comprising a piston, valve means for admitting fluid against said piston, and a trigger projecting from said apparatus for operating said valve means upon contact with a work piece.

2. In an apparatus for driving staples, a staple driver, means to urge said driver in a staple driving direction, means to withdraw said driver against said urging means, said means for withdrawing said driver being releasable from said driver upon continued movement thereof, pneumatically controlled and operated means coupled to said means for withdrawing said driver to secure operation thereof, and a work piece engaging trigger for initiating operation of said pneumatically controlled and operated means.

3. In an apparatus for driving staples, a staple driver, means to urge said driver in a staple driving direction, means to feed staples to a position against said driver whereby each successive staple is in a position to be driven, means to withdraw

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said driver against said urging means, said means for withdrawing said driver being releasable from said driver upon continued movement thereof, and pneumatically controlled and operated means coupled to said means for withdrawing said driver to secure automatic operation thereof, said pneumatically controlled and operated means including a member for contacting a work piece to initiate operation of said staple driving apparatus.

JOSEPH CRISTIANO.

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