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RIVETING GUN OR LIKE APPLIANCE

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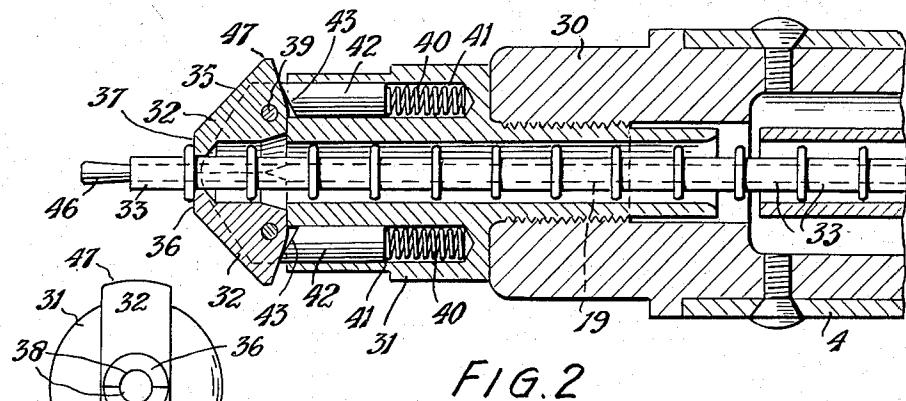


FIG. 2

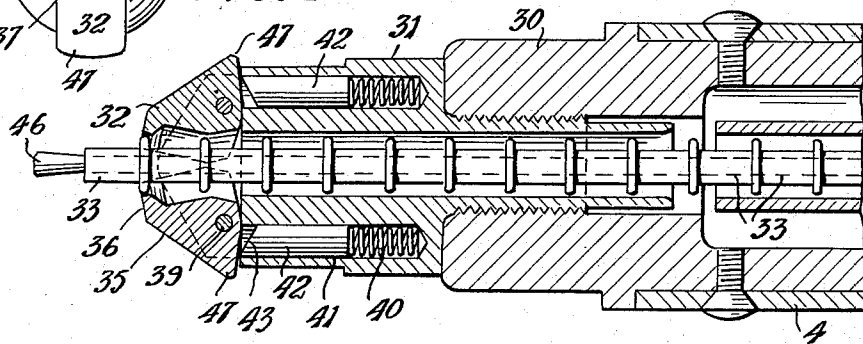


FIG. 3

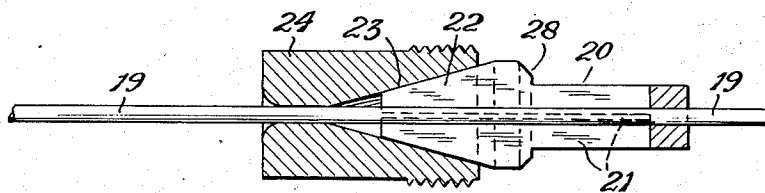


FIG. 4

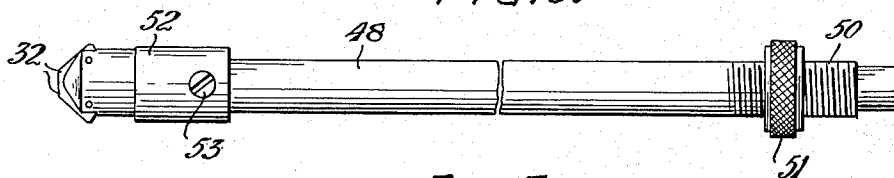


FIG. 5

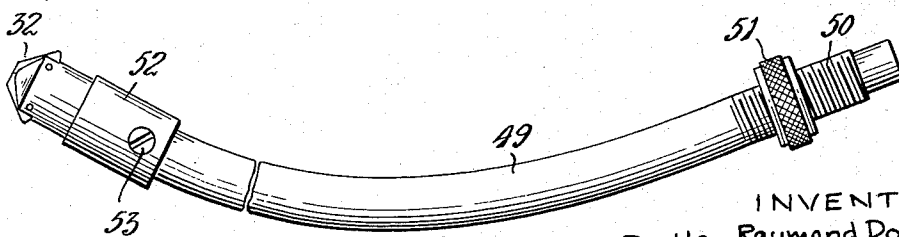


FIG. 6

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UNITED STATES PATENT OFFICE

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RIVETING GUN OR LIKE APPLIANCE

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5 Claims. (Cl. 218-19)

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This invention relates to an improved riveting gun or like rivet-inserting appliance of the type in which tubular rivets are threaded on a central rod, the outer end of which has an enlarged or mandrel-like head adapted to be drawn through each rivet to expand the latter after it has been inserted in position in the work.

The object of the invention is to provide an improved and simplified construction of riveting gun of this type which will operate more efficiently than previous types, is less liable to get out of order, and generally will be found to be easier to operate and maintain in proper working condition.

Particular features of the improved gun are an improved construction of the nose or chuck portion, the jaws of which are opened against spring pressure solely by the thrust imparted thereto by the rivets in the forward movement of the rivet-carrying rod, improved means for actuating the rivet-carrying rod and its mandrel-like head, improved means for clamping the rivet-carrying rod in the gun and permitting rapid and easy removal for re-charging with rivets, and special extension fittings which, in association with the improved construction of the nose or chuck portion, enable the appliance to be used for inserting rivets in corners and other normally difficult positions.

The invention is more fully described aided by reference to the accompanying drawings wherein—

Fig. 1 is a longitudinal sectional view through the improved gun.

Fig. 2 is an enlarged sectional view through the nose or chuck portion of the gun, the jaws being shown in closed position.

Fig. 3 is a similar view to Fig. 2, but showing the jaws in open position to permit the passage of a rivet.

Fig. 4 is a front view of the nose or chuck portion of the gun.

Fig. 5 is a sectional detail view of the clamping means or collet for the rivet-carrying rod.

Fig. 6 is a plan view of the piston or operating member of the gun.

Figs. 7 and 8 are views illustrating the extension fittings that can be used with the gun.

As shown in these views, the improved gun comprises a casing 1 having cylindrical extensions 2 and 3 which receive and support a front tube 4 and a rear tube 5 respectively.

Slidably fitted within the tubes 4 and 5 is a piston member 6 which is normally urged forwardly by a coiled spring 7 bearing against its

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rear end. The spring 7 is seated at its rear end against a bush 8 screwed or otherwise fitted into the end of the rear tube 5.

The piston member 6 is slidably actuated by means of a hand-lever 9 which is pivoted at its upper end on a pin 10 carried by the casing 1. The piston member has gaps or slots 11 formed in its opposite sides and the hand-lever consists of two parallel arms 12 extending through said gaps, see Fig. 6. The arms 12 bear against square pressure blocks 13 movably fitted on a pin 14 passed through the piston member 6.

The hand-lever 9 in its operation bears against the pressure blocks 13 to retract the piston member 6 and said blocks, because of their pivotal mounting on the pin 14, can adjust themselves automatically to the surfaces of the arms 12, thus minimizing wear on the parts.

The lower end of the hand-lever has a hand grip 15 secured between the two arms 12 and co-acting with a pistol grip 16 projecting from the casing 1.

The hand-lever also engages a pin 17 on the piston member. Said pin restricts the forward movement of the hand-lever.

The piston member 6 has an axial hole 18 through which passes the central rivet-carrying rod 19. The rear end of said rod is clamped to the piston member by means of a collet 20. The collet is formed with crossed saw-cuts or slits 21 in its forward end and has a tapered nose 22 which fits into a correspondingly tapered seat 23 in a member 24 screwed into a recess 25 in the rear end of the piston member.

A clamping member 26 is provided to contract the collet 20 onto the end of the rivet-carrying rod 19. Said clamping member screws into the recess 25 in the rear end of the piston member 6 and has a tubular end 27 which abuts against a shoulder 28 on the collet. The clamping member 26 fits slidably through the bush 8 at the end of the tube 5 and has a hole to receive a tommy bar 29 or the like.

When the clamping member 26 is tightened by the tommy bar 29, the collet 20 is forced into the seat 23 of member 24 and the tapered surfaces cause the slitted forward end portion of the collet to be contracted to securely grip the end of the rivet-carrying rod 19, see Fig. 5. Said rod is thus securely clamped to the piston member 6 and moves with the latter in its operation by the hand-lever 9.

The forward end of the tube 4 carries a head 30 into which the nose or chuck member 31 of the gun is screwed. The chuck member is char-

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acterized by having its jaws 32 opened solely by the thrust of the rivets 33 on the rivet-carrying rod 19 in the forward movement of said rod.

The jaws 32 are of short block-like construction and are fitted in a diametrical slot 34 in the body of the nose or chuck member 31 with their outer surfaces 35 sloped to coincide with the substantially conical formation of said nose or chuck member.

The nose portions 36 of the jaws are so shaped as to form, when the jaws are closed, a rigid anvil surface 37 of annular shape against which the head of the foremost rivet is drawn while the rivet is being expanded. Each jaw also has a semi-circular recess 38 in its nose portion to enable the jaws, when closed, to embrace the tail portion of the succeeding rivet as shown in Fig. 2.

The jaws are pivoted on pins 39 near to their inner ends so that the nose portions 36 of the jaws can open widely, and coiled springs 40 are provided to exert pressure on the jaws to normally hold them closed. The springs are fitted in holes 41 extending inwardly from the end of the slot 34 housing the jaws.

The springs 40 act on short pins 42 or the like sliding in the holes 41. The pins 42 have sloped forward ends 43 to act on the jaws 32 and apply the thrust of the springs 40 as close as possible to the outer edges of the jaws.

The rivets 33 are threaded on the rod 19 and the usual feeding spring 44 and clamping member 45 fitted behind them. The spring 44 feeds the rivets forwardly towards the enlarged or mandrel-like head 46 at the forward end of the rod.

In the use of the appliance, the coiled springs 40 normally tend to keep the jaws 32 closed. When the rivet-carrying rod 19 moves forwardly under the influence of the spring 7, that is, when pressure on the hand-lever 9 is released, the jaws 32 are forced open automatically by the thrust imparted to the column of rivets, and particularly to the head portion of the foremost rivet, by the spring 44, as shown in Fig. 3. The jaws thus allow the foremost rivet to pass out and into contact with the head 46 and then close automatically under the pressure of their springs 40 behind the head of the rivet to form the anvil surface 37 as shown in Fig. 2.

The appliance with the positioned rivet is then applied to the work in the usual manner and the hand-lever 9 operated in the direction of the arrow in Fig. 1. This operation retracts the rivet-carrying rod 19 and draws the enlarged or mandrel-like head 46 through the rivet to expand it and leave the rivet secured in the work.

On the release of the hand-lever 9, the rivet-carrying rod 19 again moves forwardly under the action of the spring 7 and the thrust of the next rivet in line again, under the impetus of spring 44, forces open the jaws 32 of the chuck member allowing said rivet to pass out through the chuck in the same manner as previously described.

To re-charge the appliance with rivets, the clamping member 26 is rotated by means of the tommy bar 29 to loosen the collet 20. The empty rod 19 can then be withdrawn through the jaws 32 and a charged rod inserted, after which the collet 20 is tightened by screwing up the clamping member 26 to thus secure said rod 19 to the piston member 6.

To enable the jaws 32 to be freely opened by finger pressure for changing the rivet-carrying rod 19 and for inspection, cleaning or other pur-

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poses, each jaw may have a suitable finger piece such as 47 projecting from it.

The capacity of the gun can be increased by using extension fittings as shown in Figs. 7 and 8. Such fittings also enable the appliance to be used in normally difficult positions, the straight extension 48 enabling rivets to be inserted in positions such as between struts, plates or the like, while the curved extension 49 can be used in corners and positions to which straight access cannot be had.

The extension fittings each have a screw-threaded end 50 to screw into the head 30 of the appliance in place of the chuck member 31 which is removed, and a clamping ring or nut 51 is preferably provided to secure the joint.

At the outer ends, the extension fittings are fitted with chuck or nose members 52 secured as by means of a clamping screw 53. These chuck fittings, apart from the clamping screw arrangement, are identical in construction with the chuck members 31.

When the extension fittings 48 and 49 are used, correspondingly longer rivet-carrying rods 19 are used and, in the case of the curved extension 49, the rivet-carrying rod is sufficiently flexible to accommodate itself to the curvature of the fitting.

The chuck members 52 of the extension fittings operate in the same manner as the chuck member 31, the jaws opening automatically under the contact of the rivets in the forward movement of the rivet-carrying rod to allow one rivet to pass and closing by the spring pressure behind each rivet to form the anvil surface.

The whole gun or appliance as described will be found to be highly efficient in use. The opening of the jaws 32 solely by the movement of the rivets is very satisfactory and the absence of cams or equivalent mechanism previously used for operating the jaws considerably simplifies the construction of the nose or chuck member. Moreover, the serious difficulties previously met with in adjusting the jaws and jaw opening cams are eliminated.

The short block-like construction of the jaws 32 also forms a more rigid anvil surface against which the head of the rivet is drawn while the rivet is being expanded.

The hand-lever 9 and operating means for the piston member 6 are also found to be very efficient with a minimum of wear on the parts, while the collet 20 and the clamping member 26 enable the rivet-carrying rod 19 to be quickly and positively secured to the piston member 6 and also easily released when required during the re-charging of the gun or appliance with rivets.

I claim:

1. A riveting gun or like rivet-inserting appliance comprising a casing, a piston-like member slidable in said casing, means for slidably moving said piston member in the casing, a rivet-carrying rod having an enlarged or mandrel-like head at its outer end, means for securing said rivet-carrying rod to the piston member so that it is moved with the latter, a nose or chuck member at the forward end of the casing having a diametrical slot formed in it, two jaws pivoted in said slot and arranged one on each side of the rivet-carrying rod so that the rivet-carrying rod passes between them, the nose portions of the two jaws surrounding the rivet-carrying rod to form an anvil surface, jaw-closing springs in the chuck member exerting pressure on the jaws to close them around the rivet-carrying rod, and

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a rivet feed spring for urging a column of rivets threaded on said rivet carrying rod in a forward direction, said rivet feed spring being sufficiently strong to overcome, even in its maximum distended condition, the force of said jaw-closing springs, whereby the jaws are opened solely by the thrust of the rivets in the forward movement of the rivet-carrying rod and closed automatically behind the foremost rivet by the jaw-closing springs so that the nose portions come together and form the anvil surface behind said foremost rivet against which the latter is drawn while being expanded by the retraction of the enlarged or mandrel-like head of the rivet-carrying rod through it.

2. A riveting gun or like rivet-inserting appliance comprising a casing, a piston-like member slidable in said casing, means for slidably moving said piston member in the casing, a rivet-carrying rod having an enlarged or mandrel-like head at its outer end, means for securing said rivet-carrying rod to the piston member so that it is moved with the latter, a nose or chuck member at the forward end of the casing having a diametrical slot formed in it, two jaws of block-like form pivoted in said slot and arranged one on each side of the rivet-carrying rod so that the rivet-carrying rod passes between them, the nose portions of the two jaws surrounding the rivet-carrying rod to form an anvil surface, coiled jaw-closing springs housed in holes extending inwardly from the slot in the nose or chuck member, and pins slidable in said holes and acted on by the coiled springs, said pins having sloped forward ends to act on the jaws and apply the thrust of said jaw-closing springs close to the outer edges of the jaws, and a rivet feed spring for urging a column of rivets threaded on said rivet carrying rod in a forward direction, said rivet feed spring being sufficiently strong to overcome, even in its maximum distended condition, the force of said jaw-closing springs, whereby the jaws are opened solely by the thrust of the rivets in the forward movement of the rivet-carrying rod and closed automatically behind the foremost rivet by the jaw-closing springs so that the nose portions come together and form the anvil surface behind said foremost rivet against which the latter is drawn while being expanded by the retraction of the enlarged or mandrel-like head of the rivet-carrying rod through it.

3. A riveting gun or like rivet-inserting ap-

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pliance comprising a casing, a piston-like member slidable in said casing, a spring acting on said piston member to move it forwardly in the casing, a hand-lever pivoted to the casing, pins on the piston member between which the hand-lever passes so that movement of the hand-lever slidably moves the piston member, a co-acting pistol grip on the casing, a rivet-carrying rod having an enlarged or mandrel-like head at its outer end, means for securing said rivet-carrying rod to the piston member so that it is moved with the latter, a nose or chuck member at the forward end of the casing having a diametrical slot formed in it, two jaws pivoted in said slot and arranged one on each side of the rivet-carrying rod so that the rivet-carrying rod passes between them, the nose portions of the two jaws surrounding the rivet-carrying rod to form an anvil surface jaw-closing springs in the chuck member exerting pressure on the jaws to close them around the rivet-carrying rod, and a rivet feed spring for urging a column of rivets threaded on said rivet carrying rod in a forward direction, said rivet feed spring being sufficiently strong to overcome, even in its maximum distended condition, the force of said jaw-closing springs, whereby the jaws are opened solely by the thrust of the rivets in the forward movement of the rivet-carrying rod and closed automatically behind the foremost rivet by the jaw-closing springs so that the nose portions come together and form the anvil surface behind said foremost rivet against which the latter is drawn while being expanded by the retraction of the enlarged or mandrel-like head of the rivet-carrying rod through it.

4. A riveting gun or like rivet-inserting appliance as claimed in claim 3 wherein the hand-lever consists of parallel arms which pass one on each side of the piston member in gaps in the latter and the pins on the piston member have pressure blocks against which said arms bear.

5. A riveting gun or like rivet-inserting appliance as claimed in claim 2 wherein the means for securing the rivet-carrying rod to the piston member comprises a slitted collet having a tapered nose to engage a correspondingly tapered seat in the piston member and a clamping member to force the tapered nose of the collet into the seat whereby its slitted portion is contracted to grip the rivet-carrying rod.

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