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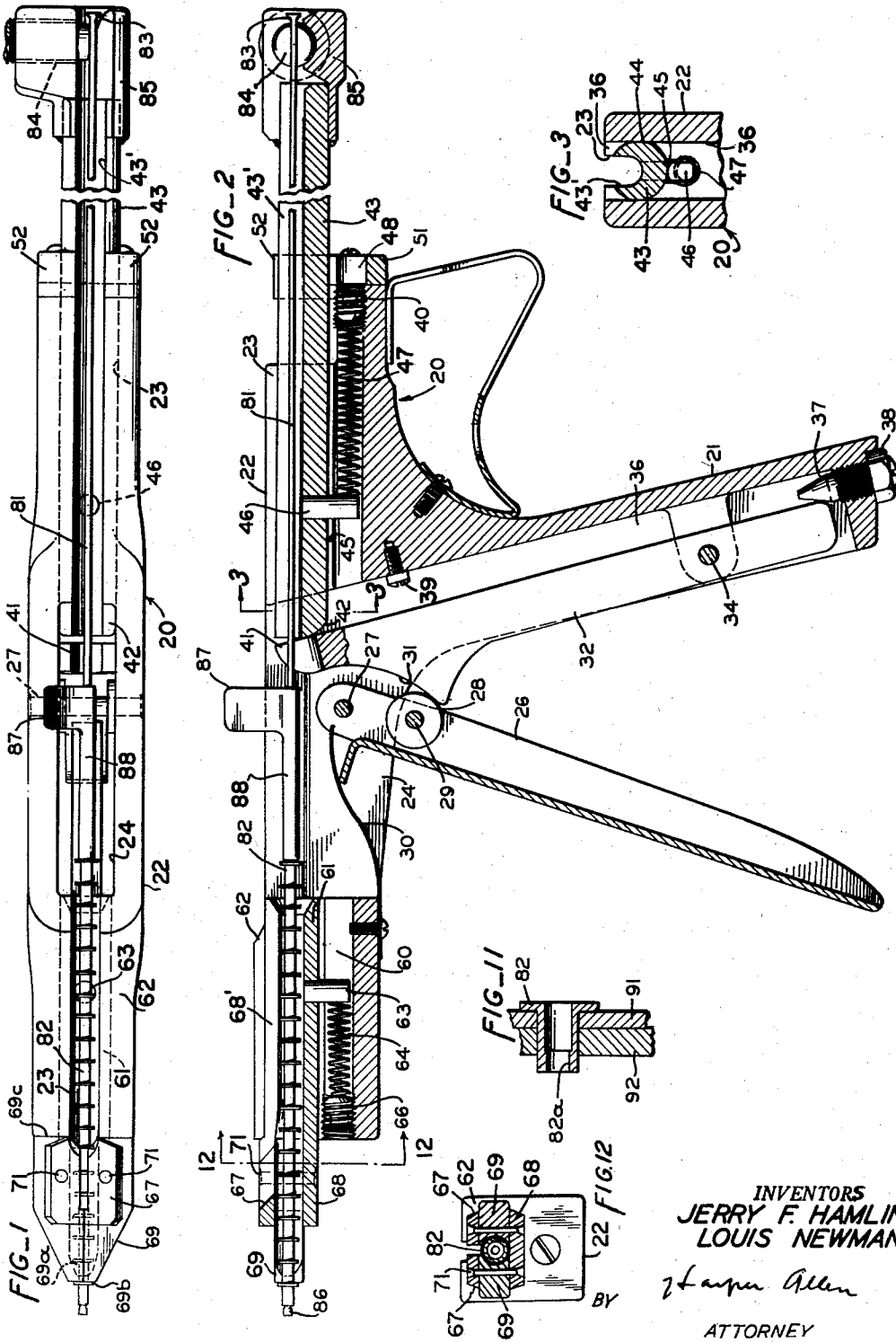
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2,909,302

RIVETING GUN

Filed Feb. 1, 1956

2 Sheets-Sheet 1



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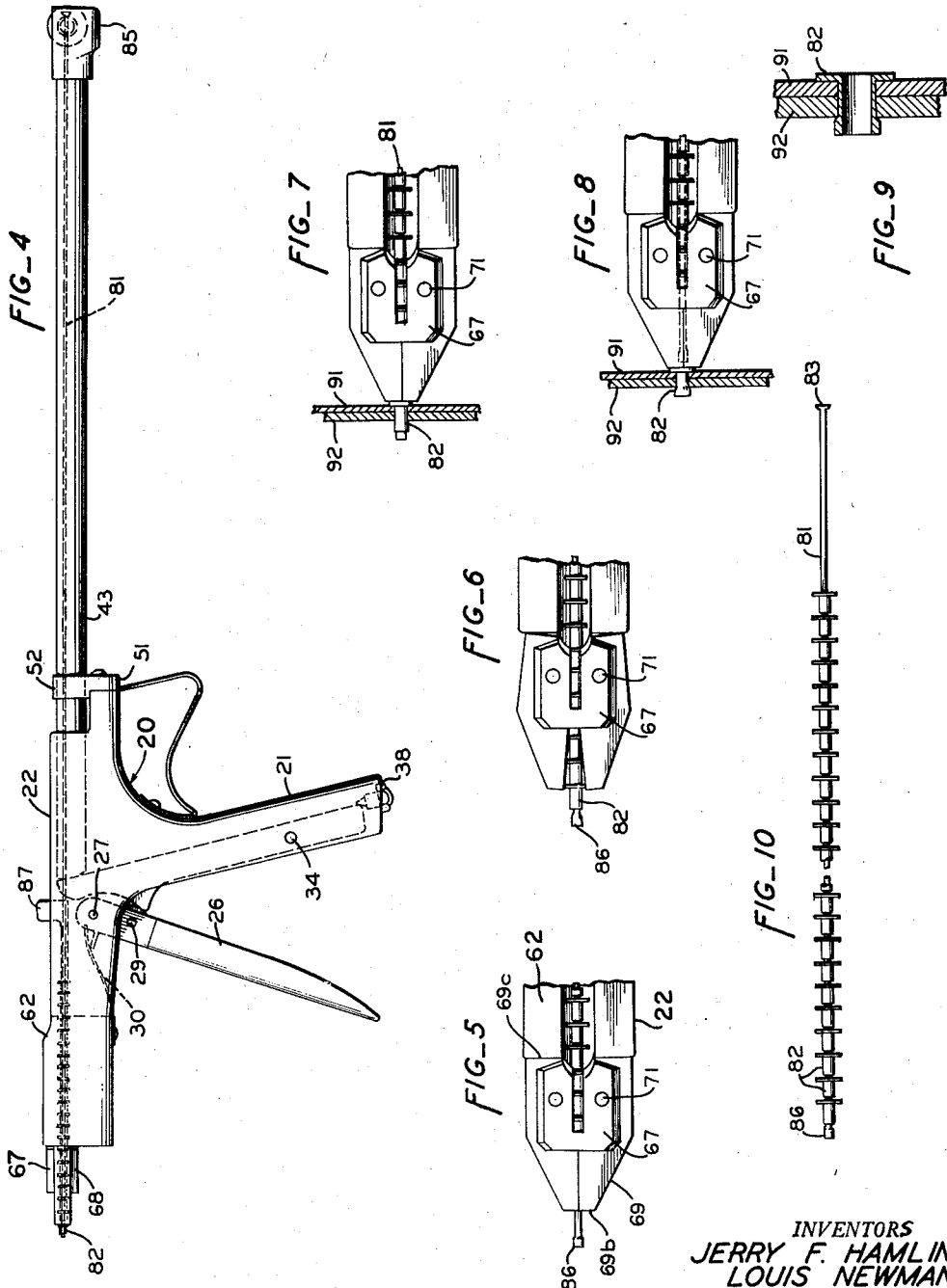
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## RIVETING GUN

Jerry F. Hamlin, San Rafael, and Louis Newman, Oakland, Calif., assignors, by mesne assignments, of one-sixth to Jerry F. Hamlin, one-sixth to Bess E. Hamlin, one-sixth to Ralph M. Cuykendall, and one-sixth to Marie Cuykendall, all of San Francisco, Calif., one-sixth to Louise Newman and one-sixth to Louis Newman, both of Oakland, Calif.

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3 Claims. (Cl. 218—34)

The present invention relates to riveting guns for blind rivets, and is an improvement on the structure shown in our prior Patent No. 2,570,801, issued October 9, 1951. More particularly the invention concerns a riveting gun of the above character which is constructed to facilitate easy handling and loading of the rivets, and which will accommodate in a simple manner rivets of different size and length.

The principal object of this invention is to provide a riveting gun which handles a plurality of rivets in a simple, effective manner, and which plurality of rivets is strung on a holder or wire in series relation so that the plurality can be inserted into an open slot extending across a surface of the tool.

Another object of the invention is to provide in a riveting gun an improved form of rivet follower which facilitates manual feeding of the rivets.

Another object of the invention is to provide a riveting gun having an advantageous adjustment means for accommodating different lengths of rivets.

Other objects and advantages of the invention will be apparent from the following description of a preferred embodiment, taken in connection with the accompanying drawings, in which:

Figure 1 is a plan view of the riveting gun.

Figure 2 is a longitudinal vertical sectional view through the gun.

Figure 3 is a detail section taken in a plane indicated by the line 3—3 in Figure 2.

Figure 4 is a side elevational view of the gun.

Figure 5 is a fragmentary plan view of the jaw end of the gun.

Figure 6 is a view similar to Figure 5 but illustrating the opening of the jaws during feeding of a rivet.

Figure 7 is a view similar to Figures 5 and 6, showing the rivet inserted in two pieces of metal while still on the gun and ready for a riveting operation.

Figure 8 is a view similar to Figure 7 showing the rivet at the end of the upsetting operation.

Figure 9 is an enlarged sectional view showing the rivet in place after being upset.

Figure 10 is a detailed view of a rivet assembly ready for installation in the gun.

Figure 11 is a view similar to Figure 9 showing a rivet before upsetting thereof.

Fig. 12 is a vertical section taken on the line 12—12 of Fig. 2.

In certain types of blind riveting operations, it is customary to insert a rivet of the hollow type through aligned apertures in a pair of sheet members to be riveted together, and then expand the rivet by drawing through the rivet an enlarged head on the end of a mandrel so that the blind end of the rivet is expanded to secure the members together. In this type of operation it is extremely desirable that the rivets be loaded easily in the gun, be fed easily therefrom in placing a rivet in position on the tool for riveting operation, and

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that the rivet gun be easily adjusted to handle different lengths of rivets.

Referring to Figures 1 through 4 there is shown a riveting gun for blind rivets embodying the invention including a main casting or body 20 having a handle portion 21 and an upper elongated barrel portion 22, the barrel portion 22 being slotted at the top throughout its length to provide a longitudinal slot 23 therein for a purpose later described. Intermediate its length, the horizontal portion of the body is centrally slotted at 24 (Fig. 2) entirely through the body portion to receive an operating trigger 26 which is pivoted at 27 between the two side walls defining the slot 24. The trigger 26 has a roller 28 journaled on a pin 29 carried by the trigger. The trigger 26 is urged by a leaf spring 30 to cause the roller to engage a cam surface 31 of an operating lever 32. The lever 32 is pivotally disposed within a slot 36 in the front of handle portion 21 by a pivot 34 extending through the handle portion. The lower rear end portion of lever 32 engages a tapered stop screw 37, having a locking nut 38 associated therewith. By adjusting the screw 37 the extent of throw of lever 32 in relation to the operating of the handle 26 can be controlled for different size rivets. The screw 39 provides an adjustable stop for rearward movement of the upper end of the lever 32.

At its upper end the operating lever 32 (Figs. 1 and 2) is forked at 41 to provide an upwardly opening recess in its upper end. Such upper end engages an end 42 of an operating slide 43 (Figs. 1, 2 and 3) which is circular in form and has a slot 43' in its upper surface extending throughout its length and registering with the slot 23 in the barrel portion 22 of the body of the tool. The slide 43 slides in the rear portion of a bore 44 (Fig. 3) in the barrel portion 22 of the body 20. As shown in Fig. 3, the slot 23 forms a longitudinally extending opening into the bore 44 throughout the length of the bore 44 and also forms an upper continuation of the slot 43' in the slide 43 throughout the length of the slot 43'. A depending pin 46 on the slide 43 extends downwardly through a guide slot 45 and engages a spring 47 which at its other end abuts an adjustable stop 40 (Fig. 2) threaded into the rear portion of the body portion 20 and accessible through an opening 48 in a guide bracket 51 secured to the body 20 and engaging the slide 43 by means of opposite upwardly projecting guide portions 52.

At the front or jaw end of the tool, a jaw slide and support 61 (Figs. 1 and 2) is mounted for sliding movement in a forward portion of the bore 44 extending through a guide portion 62 forming the forward part of the barrel portion, which guide portion also has the slot 23 extending along in its upper surface and forming a longitudinally extending opening into such bore. This jaw slide 61 carries a depending pin 63 which extends downwardly into a guide slot 60 and is engaged by a spring 64 which also engages a stop screw 66 and constantly urges the jaw slide 61 rearwardly. The jaw slide 61 terminates at its front end in upper and lower plate portions 67 and 68, respectively, in which the jaws 69 are pivoted by means of pins 71. As seen in Figures 1 and 2 the upper portion of the jaw slide 61 is provided with a slot 68' for a portion of its length registering with the slot 23 in the barrel portion 22 to continue the slotted upper surface of the tool.

Referring to Figure 1 it will be noted that the inner surface of each jaw member 69 is recessed throughout its length so that the two jaw members 69 provide a passage through the jaws which terminates in respective cam surfaces 69a leading to a smaller opening in the end faces 69b of the jaws. The rear face 69c of each jaw normally abuts the end surface of the barrel portion 22, as shown

in Figures 1 and 5, and is held in this position by the urgency of the spring 64, shown in Figure 2, and in this position the jaws are closed. As will be later described in detail, movement of the slide 61 and the jaws 69 to the left in Figures 1 and 2 will free the jaws for floating pivotal opening movement whenever pressure is applied to the slide of the jaws.

Cooperating with the gun and adapted to be installed therein is a rivet assembly including a wire or mandrel 81 (Figures 1, 2, 4 and 10) having a series of hollow rivets 82 freely slidable thereon and having a rivet retaining shape forming a permanent part of the mandrel such as an upset portion 83 at the end thereof. The end having such upset portion is adapted to be clamped in the operating slide 43 of the tool or gun by means of a set screw 84 threaded into an enlarged slotted end fitting 85 of the slide 43, as seen in Figure 1. At its other end the wire 81 has a tapered head or cam end 86 which is of a dimension to retain the rivets 82 on the wire and which increases in diameter toward the end of the wire. The head 86 can be pulled through the rivets on the mandrel to expand such rivets.

Also strung upon the wire 81 and freely removable therefrom is a tubular rivet follower 88 (Figures 1 and 2) having a handle portion 87 projecting upwardly through the slot 23 in the tool. The feed or follower member 88 is used with successive wire and rivet assemblies, the aperture therein being large enough to fit over the enlarged ends of the wire 81.

To insert the wire and rivet assembly into the tool, it is presented head end foremost to the interior of the hollow jaws 69, and then dropped into the slot 23 extending through the length of the gun or tool and thereby also into registering slots 68' and 43' in the slides 61 and 43, respectively, and secured in place by means of the set screw 84. Preferably the tapered or rivet upsetting end 86 of the wire 81 is spaced from the end faces 69b of the jaws 69 a sufficient amount to allow for one rivet 82 on the projecting portion of the wire. When the wire and rivet assembly is first placed in the tool the end-most rivet 82 to the left in Figure 5 is positioned adjacent the inner cam surfaces 69a, and by employing the follower or feeding member 88 to apply pressure to the series of rivets 82 on the wire 81, the end-most rivet 82, working against the inner cam surfaces 69a of the jaws, will cause the jaw slide 61 to move outwardly, thus causing the jaws 69 to open to pass one rivet through (Figure 6) in position to be riveted as shown in Figures 1 and 2. The end faces 69b of the jaws 69 serve as an abutment for the head of the rivet.

The operation of the feeding of the rivets is illustrated for example in Figure 6, this view showing the rivet just before it is moved into the riveting position shown in Figure 7 where the rivet has been inserted into the aligned apertures in two adjacent members 91 and 92 which are to be riveted. Operation of trigger 26 causes the operating lever 32 to pivot clockwise in Fig. 2, and to move the slide 43 for the extent required to pull the rod 81 so that the tapered end 86 of the rivet-holding wire or mandrel 81 is drawn through the rivet and upsets or expands the rivet to the condition shown generally in Figure 8. Referring to Figure 11 it will be noted that the rivet 82 before expansion has two internal diameters, the larger diameter being of a size to cause the desired expansion within the members 91 and 92. The smaller internal diameter of the rivet provides material at 82a for upsetting into overlapping relation with the member 92 as seen in Figure 9. Figure 9 shows an enlarged view of a rivet when expanded or upset in the riveting operation. Upon release of the trigger 26, the spring 47 returns the slide 43, lever 32 and trigger 26 to the position shown in Fig. 2. The feeding member 87 is then again manually actuated to feed another rivet through the jaws

69 and the tool is conditioned for another riveting operation.

While we have shown and described certain preferred embodiments of the invention, it will be apparent that the invention is capable of variation and modification from the form shown so that the scope thereof should be limited only by the scope of the claims appended hereto.

We claim:

1. A riveting gun including a body member, a jaw-carrying element slidably mounted in said body member, a pair of jaws pivotally mounted on said element, means attached to said body member for normally urging said element in one direction, an operating member slidably mounted in said body member in spaced relation to said element, means normally urging said operating member in a contra direction to said element, and an actuating lever pivotally attached to said body member and engageable with a portion of said operating member for moving the latter in an opposite direction, said actuating lever having a cam surface, a manually actuatable lever pivoted to said body member, said manually actuatable lever having a roller for engaging said cam surface, said body member, said element and said operating member having longitudinally extending openings aligned with each other through which an elongated assembly of rivets may be inserted.

2. A tool for receiving a plurality of hollow rivets strung on a mandrel having a rivet expanding head at the forward end of the assembly of said rivets and said mandrel and for expanding said rivets by pulling said head through individual rivets, said tool comprising an elongated body portion, a jaw structure mounted on one end of said body portion and having openable rivet-head-abutting jaws, said body portion having an open-ended longitudinal groove extending rearwardly from said jaw structure and opening to the outside of said tool for receiving an intermediate portion of said assembly, said jaw structure having a longitudinally extending passageway extending forwardly of the forward end of said groove for receiving the forward portion of said assembly, a mandrel clamping structure mounted on the other end of said body portion for movement longitudinally of said body portion and having mandrel clamping means movable between an open position and a mandrel gripping position, said mandrel clamping structure providing an opening extending rearwardly of the rear end of said groove for receiving the rear end of said mandrel when said clamping means is in said open position, said groove and passageway providing for inserting the forward end of said assembly into said groove adjacent said jaw structure and then through said passageway, said groove and opening having an unobstructed length extending from the rear of said passageway providing for unobstructed movement of the remainder of said assembly into said groove and opening, means to move said clamping means to said gripping position, means for feeding rivets along said mandrel through said jaws, and means to move said clamping structure longitudinally of said body portion away from said jaw structure to pull said head of said mandrel through a rivet retained in position by said jaws.

3. A tool for receiving a plurality of hollow rivets strung on a mandrel having a rivet expanding head at the forward end of the assembly of said rivets and said mandrel and for expanding said rivets by pulling said head through individual rivets, said tool comprising an elongated body portion, a jaw structure mounted on one end of said body portion and having openable rivet-head-abutting jaws, said body portion having an open-ended longitudinal groove extending rearwardly from said jaw structure and opening to the outside of said tool for receiving an intermediate portion of said assembly, said jaw structure having a longitudinally extending passageway extending forwardly of the forward end of said

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groove for receiving the forward portion of said assembly, a mandrel clamping structure slidably mounted on the other end of said body portion for sliding movement longitudinally of said body portion between a forward position and a rearward position and having mandrel clamping means movable between an open position and a mandrel gripping position, said mandrel clamping structure providing an opening extending rearwardly of the rear end of said groove for receiving the rear end of said mandrel when said clamping means is in said open position, said groove and passageway providing for inserting the head end of said assembly into said groove adjacent said jaw structure and then through said passageway, said groove and opening having an unobstructed length extending from the rear of said passageway providing for unobstructed movement of the remainder of said assembly into said groove and opening, means to move said clamping means to said gripping position, means for feeding rivets along said mandrel through said jaws, means to slide said clamping structure longitudinally of

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said body portion away from said jaw structure to said rearward position to pull said head of said mandrel through a rivet retained in position by said jaws, and resilient means for returning said clamping structure to said forward position.

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## References Cited in the file of this patent

## UNITED STATES PATENTS

336,589	Richards -----	Feb. 23, 1886
354,235	Richards -----	Dec. 14, 1886
2,340,066	Lee -----	Jan. 25, 1944
2,401,724	Dowdle -----	June 11, 1946
2,408,431	Lutes -----	Oct. 1, 1946
2,570,801	Hamlin -----	Oct. 9, 1951

## FOREIGN PATENTS

113,538	Australia -----	July 18, 1911
756,942	Great Britain -----	Sept. 12, 1956
1,083,665	France -----	Jan. 30, 1954