

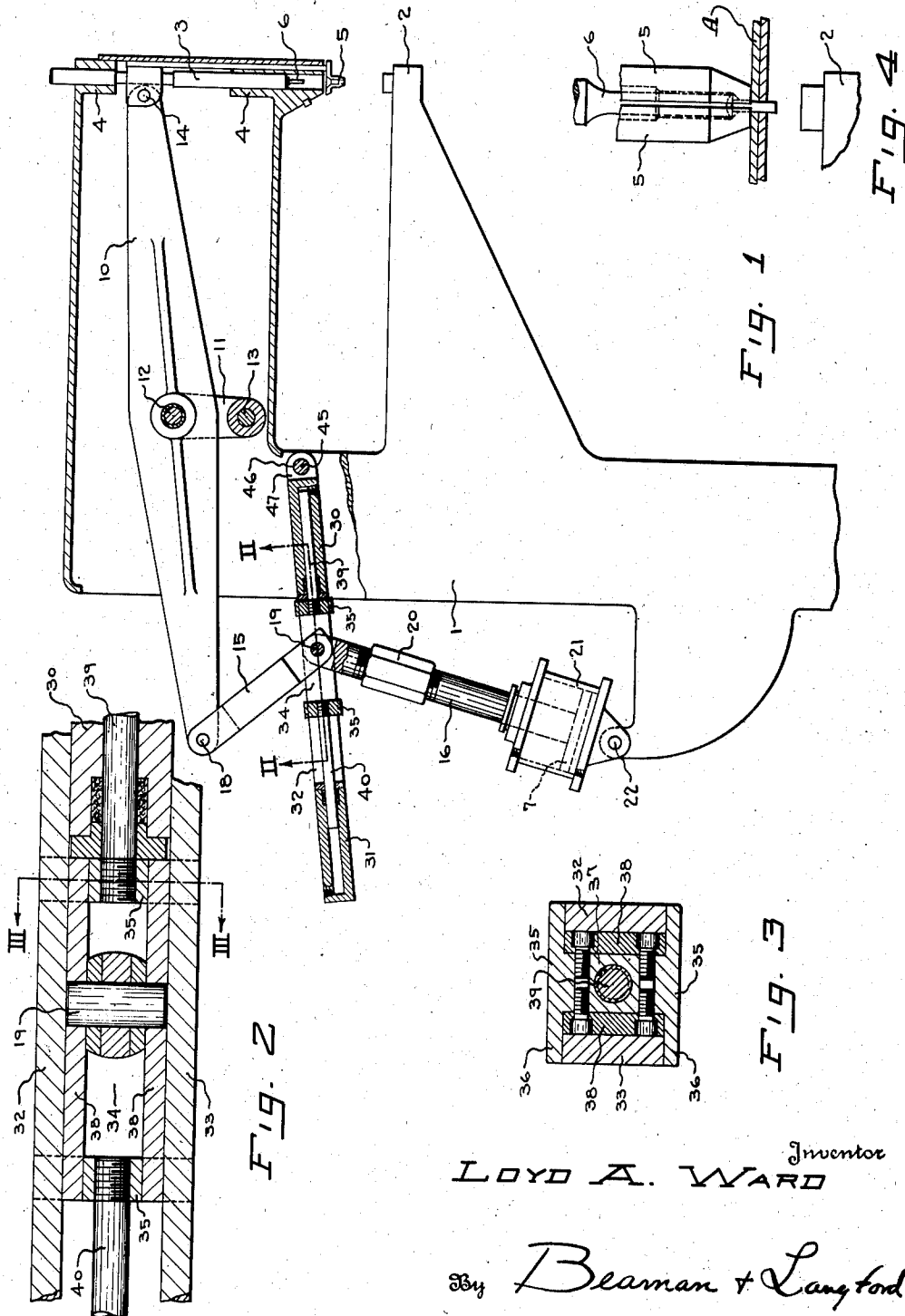
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ACTUATING MECHANISM FOR RIVETING MACHINES

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ACTUATING MECHANISM FOR RIVETING MACHINES

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This invention relates to riveting machines and more particularly to actuating mechanism therefor.

The invention has for its object the provision of mechanism which will operate in two steps, one to present a rivet so that the work may be moved over it and the other to move the rivet and work toward the anvil to upset the rivet.

A more specific object is to provide a fluid pressure operated toggle to accomplish the rivet presenting step and additional fluid pressure mechanism to accomplish the second or upsetting step.

These and other objects will be apparent from the following specification when taken with the accompanying drawing in which

Figure 1 is an elevational view partly in section showing the invention,

Figure 2 is a section on the line II—II of Figure 1.

Figure 3 is a section taken on the line III—III of Figure 2 and

Figure 4 is a detail showing the set projecting a rivet from the rivet clamping jaws at the end of the first advance.

Referring particularly to the drawing the reference character 1 indicates the frame of a riveting machine having an anvil 2. Above the anvil 2 is a ram 3 reciprocable in guideways 4. Mounted in operative relation with the ram 3 is a pair of rivet clamping jaws 5 to which rivets are fed in a known manner and held for engagement with a set 6 mounted on the lower end of the ram 4. The foregoing structure is disclosed in my co-pending application Serial No. 101,210 filed September 17, 1936, wherein in operation the jaws remained stationary while the set moved down to project a rivet from the bottom of the jaws and then the jaws, rivet and set moved simultaneously to move the rivet against the anvil to upset it, the set moving continuously through the complete cycle.

The present invention constitutes mechanism for moving the rivet set through part of its full stroke to move a rivet held in the jaws 5 just far enough to project it from the lower end of the jaws 5 so that with the rivet stationary, the work A to be riveted may be moved by an operative over the downwardly projecting rivet as shown in Fig. 4, and then moving the rivet, jaws 5 and the work A through the rest of the stroke to upset the rivet against the anvil 2 as a unit.

The ram 3 and set 6 are reciprocated by a walking beam 10 pivoted to a link 11 about a pin 12, the link 11 being pivoted on the frame 1 about a pin 13. The link 11 permits the pin 12 to fol-

low an irregular path during the rocking of the walking beam 10, which is connected at one end to the ram 3 by a pin 14.

For rocking the walking beam 10 to move the ram 3 in steps as set forth above a toggle having toggle arms 15 and 16 is provided to move the ram 3 through its first step and a piston 17 is provided to move the ram 3 through its second step.

The toggle arm 15 is pivoted at one end to the outer end of the walking beam 10 by a pin 18 and at the other end to the toggle arm 16 through a pin 19. The toggle arm 16 has a threaded coupling 20 to adjust its length and is connected to the piston 17 which is disposed in a cylinder 21. To permit operation of the toggle the cylinder 21 is pivoted to the frame 1 about a pin 22.

A pair of cylinders 30 and 31 disposed in axial alignment constitute the mechanism for operating the toggle. The cylinders 30 and 31 are maintained in alignment and rigidly connected in spaced relation by side bars 32 and 33. The portions of the side bars 32 and 33 between the cylinders 30 and 31 constitute ways for a cross-head 34 shown in section in Fig. 3 and pivoted by the pin 19 to the toggle arms 15 and 16.

The crosshead 34 is formed of two end H sections 35 each having side members 36 and a central web 37. Plates 38 bolted to the webs 37 complete the crosshead 34. As shown particularly in Figure 3 the ends of the side members 36 overhang the side bars 32 and 33 and guide the crosshead for reciprocating sliding movement. The pin 19 is pivoted between the plates 38 of the cross-head 34.

Within the cylinders 30 and 31 are disposed pistons 39 and 40 respectively which are secured to the H sections 35 of the crosshead 34. Thus when a fluid is admitted to the outer end of either the cylinder 30 or 31, the crosshead 34 together with the connecting point of the toggle arms 15 and 16 are moved in a corresponding direction. The assembly including the cylinders 30 and 31 is pivoted to the frame 1 by a pin 45 mounted in holes 46 in the right ends 47 of the side bars 32 and 33 to permit free movement.

In operation the first step is to admit a fluid to the right end of the cylinder 30 to move the piston 39 to the left. This movement will result in straightening the toggle and moving the ram 3 and the set 6 to move a rivet positioned between the jaws 5 until it projects from the lower end of the jaws 5 as shown in Figure 4. The relation between the toggle arms 15 and 16 and the piston 39 at its extreme left position is such that the

toggle will be on dead center and the set 6 in such relation with respect to the jaws 5 that a rivet between the jaws 5 will be projected therefrom the distance desired. An operative then places the work over the projecting rivet and the machine is ready for its second step. This step is performed by admitting a fluid into the cylinder 21 against the lower side of the piston 17 which moves upwardly against the ends of the toggle arms 15 and 16, now in dead center position, to rock the walking beam 10 to complete the downward upsetting movement of the set 6. The riveting step having been completed the machine is returned to its initial position by admitting a fluid to the left end of the cylinder 31 and the upper end of the cylinder 21 with the result that the piston 40 through the crosshead 34 moves the toggle away from its dead center position and into the position shown in Fig. 1 and the piston 17 is returned to its lower position.

It will be clear from the foregoing description that as the toggle is operated the cylinders 30 and 31 will pivot about the pin 45 and the cylinder 21 will pivot about the pin 22. The fluid preferably used to operate the pistons 17, 39 and 40 is a liquid, a hydrocarbon being very satisfactory, but obviously air or other fluid may be used if desired. The controls for directing and exhausting the fluid may be of any type desired. Furthermore the cylinders may have separate or interconnected controls. For instance, a single control might conveniently be used for exhausting the cylinder 30 and the upper side of the cylinder 21 and admitting fluid to the lower side of the cylinder 21 and the cylinder 31 for returning the machine to its starting position. Also a single cylinder and piston might be used to operate the toggle. However it is to be understood that my invention is not limited solely to the actuating mechanism shown but may within its scope include other mechanisms for obtaining the same rivet presenting and upsetting action.

Having thus described my invention what I desire to secure by Letters Patent and claim is:

1. In a riveting machine a rivet set, means to actuate said set to project a rivet for receiving work to be riveted, and independent means operable after an elapsed time interval, to actuate said set to upset said rivet.

2. In a riveting machine a rivet set, an anvil, rivet holding jaws, means to actuate said set to project a rivet from said jaws for receiving work to be riveted, and independent means operable after an elapsed time interval, to actuate said set to move said rivet against said anvil to upset the same.

3. In a riveting machine having a rivet set, a ram supporting said set and rivet holding jaws, means to project a rivet held within said jaws partially from said jaws for receiving work thereon, said means comprising a toggle connected to said ram and means to actuate said toggle, and additional means operable after an elapsed time interval, to move said ram and set to upset said rivet.

4. In a riveting machine having a rivet set, a ram supporting said set and rivet holding jaws, means to project a rivet held within said jaws partially from said jaws for receiving work thereon, said means comprising a toggle connected to said ram and means to move said toggle to dead center position, and additional means operable after an elapsed time interval, effective

through and along the longitudinal axis of said toggle, while at dead center, to move said ram and set to upset said rivet.

5. In a riveting machine having a frame, a rivet set, a ram supporting said set and rivet holding jaws, means to project a rivet held within said jaws partially from said jaws for receiving work thereon comprising a lever pivoted at one end to said ram and between its ends to said frame, a toggle having one end pivoted to the other end of said lever, and means to actuate said toggle to rock said lever to project a rivet through said jaws, and additional means to move said ram and set to upset said rivet.

6. In a riveting machine having a rivet set, a ram supporting said set and rivet holding jaws, means to project a rivet held within said jaws partially from said jaws for receiving work thereon, said means comprising a lever pivoted between its ends, a toggle having one end pivoted to one end of said lever, and means to move said toggle to dead center position to rock said lever to project a rivet through said jaws, and means effective through and along the longitudinal axis of said toggle while at dead center to further rock said lever to further move said set to upset said rivet.

7. In a riveting machine having a frame, a rivet set, a ram supporting said set, and rivet holding jaws, a link pivoted at one end to said frame, a lever pivoted between its ends to the other end of said link, a toggle, one end of said lever being pivoted to said ram, means to actuate said toggle to rock said lever to project a rivet through said jaws, and additional means to move said ram and set to upset said rivet.

8. In a riveting machine having a frame, a rivet set, a ram supporting said set and rivet holding jaws, a link pivoted at one end to said frame, a lever pivoted between its ends to the other end of said link, a toggle, one end of said toggle being pivoted to one end of said lever and the other end of said lever being pivoted to said ram, means to actuate said toggle to dead center to rock said lever to project a rivet through said jaws, and additional means effective through and along the longitudinal axis of said toggle while at dead center, for further rocking said lever to move said ram and set to upset said rivet.

9. A device of the character described, comprising a frame, operable means movable and stepped advances, a toggle having one end thereof connected to said operable means, a cylinder pivoted to said frame, a piston in said cylinder, said piston and cylinder comprising an arm of said toggle, a second cylinder pivoted to said frame, a second piston in said second cylinder, a connecting rod connected to said second piston for actuating said toggle to move said operable means through one advance, said first named piston being operable to move said operable means through a second advance.

10. A device of the character described, comprising operable means movable in stepped advances, a walking beam, means to pivot said walking beam at one end to said operable means and at a portion between its ends to said frame, said means having a compensating connection, a toggle, one end of said toggle being pivoted to the other end of said walking beam and the other end of said toggle being pivoted to said frame, means for actuating said toggle for rocking said walking beam to move said operable means through one advance, and means effective through the longitudinal axis of said toggle for further rocking

said walking beam to move said operable means through a second advance.

11. A device of the character described, comprising operable means movable in stepped advances, a walking beam, said walking beam having one end thereof pivoted to said operable means, a link pivoted at one end to said frame, the other end of said link being pivoted to a portion of said walking beam between its ends, a toggle, one end of said toggle being pivoted to the other end of said walking beam and the other end of said toggle being pivoted to said frame, means for actuating said toggle for rocking said walking beam to move said operable means through one advance, and means effective through the longitudinal axis of said toggle for further rocking said walking beam to move said operable means through a second advance.

12. In a riveting machine having a frame, a ram, axially, slidable in said frame, a rivet set supported by said ram, rivet holding jaws and an anvil, a walking beam, means pivoting said walking beam at one end to said ram and between its ends to said frame, said means including a compensating connection, a toggle, one arm, thereof being pivoted to the other end of said walking beam, means comprising a cylinder and piston assembly pivoted to said frame for actuating said toggle to rock said walking beam to project a rivet through said jaws, and a second cylinder and piston assembly comprising the other arm of said toggle for further rocking said walking beam to further move said ram and set to move said rivet against said anvil to upset the same.

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