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HOG RING TOOL

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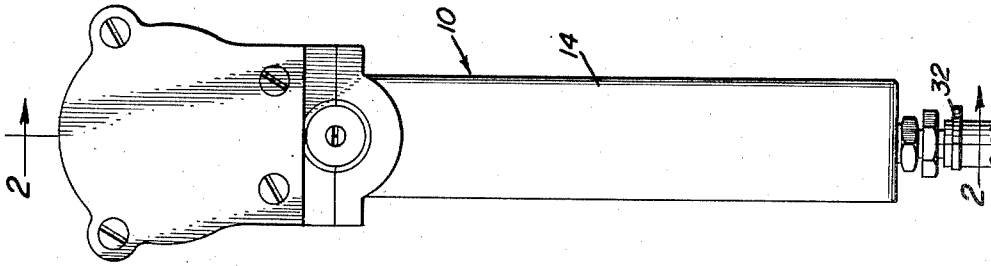


Fig. 1

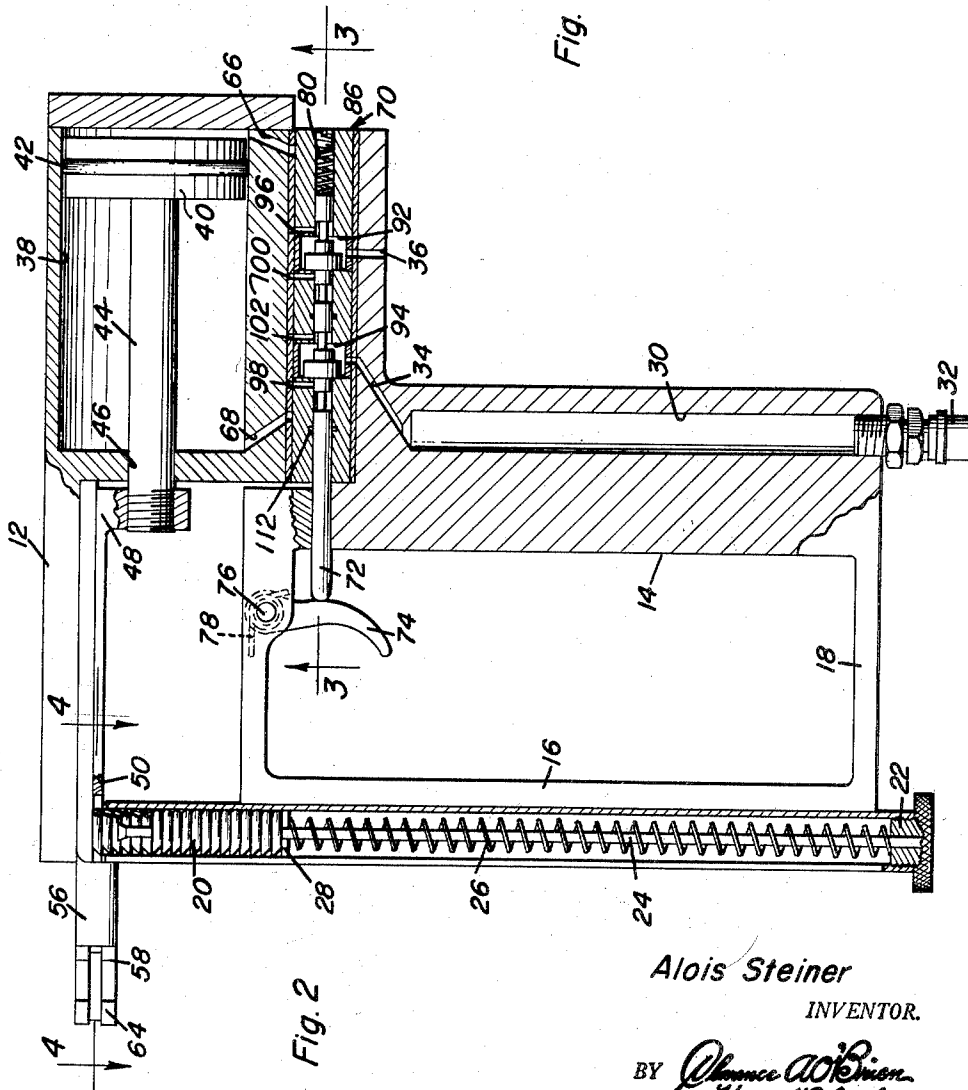


Fig. 2

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HOG RING TOOL

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3 Claims. (Cl. 1—187)

This invention relates to a hog ring tool and more specifically provides a hydraulically operated machine for automatically clinching open ended rings to closed position around a coil spring or frame usually found in upholstered furniture or the like.

The type of rings with which the improved mechanism of the present invention is adapted to be used generally comprises a relatively short section of wire which has been preformed to provide a structure of substantially U-shape having pointed leg members wherein the legs are moved to an overlapping position for securing upholstery to an upholstery frame of coil spring or the like. Therefore, it is a primary object of this invention to provide a simple, efficient, easily operated, long lasting and relatively inexpensive device.

A further object of this invention is to provide a hog ring tool that is preferably fluid operated and including an improved control valve for actuating the tool.

Yet another important object of this invention is to provide a hog ring tool provided with a magazine containing a stack of hog rings and a power operated reciprocating jaw for engaging the outermost of the hog rings and clinching the hog ring around an upholstery frame member of the like.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is an end elevation of the hog ring tool of the present invention;

Figure 2 is a longitudinal, vertical section taken substantially along section line 2—2 of Figure 1 showing the details of construction of the hog ring tool;

Figure 3 is a bottom plan section taken substantially along section line 3—3 of Figure 2 showing the details of construction of the control valve and the associated passages;

Figure 4 is a top plan section taken substantially along section line 4—4 of Figure 2, with the jaw being in retracted position for the beginning of a cycle;

Figure 5 is a view similar to Figure 4 showing the jaw in an intermediate position wherein the hog ring tool is in engagement with the upholstery frame member and the upholstery frame member is engaging the outer edge of the slot;

Figure 6 is a view similar to Figures 4 and 5 showing the jaw in its outermost position with the hog ring in collapsed position thereby securing the upholstery to the upholstery frame; and

Figure 7 is a top plan view of the hog ring tool of the present invention.

Referring now specifically to the drawings, it will be seen that the hog ring tool of the present invention is generally indicated by the numeral 10 and includes a body member 12 having a depending handle portion 14 and a tubular magazine 16 parallel and spaced from the handle 14 and joined together at its lower end by a bracing member 18. The tubular magazine 16 receives a stack of hog rings 20 and includes a screw threaded closure 22 at one end thereof including an elongated guide rod 24 and a coil spring 26 with an abutment member 28 engaging the inner or lowermost hog ring 20, wherein the spring 26 will continuously urge the hog rings 20 towards the discharge or open end of the maga-

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zine 16. The handle 14 is provided with an elongated tubular passage 30 having a suitable fluid pressure line, such as an air line 32, connected to the open end thereof, and the body portion 12 is provided with a passage 34 connecting the inlet passage as described hereinafter and a second passage 36 for communicating a hereinafter described mechanism to the atmosphere. The upper portion of the body 12 is provided with a cylinder 38 having a piston 40 slidable therein and the piston 40 is equipped with an O-ring seal 42 for engaging the inner circumference of the cylinder and a piston rod 44 projecting through an aperture 46 at one end of the cylinder 38, and the piston rod 44 is connected to a slide 48 having a jaw generally indicated by the numeral 50 at its outer end. The jaw 50 includes a first generally U-shaped recess 52 for receiving a hog ring 20 and a second U-shaped recess 54 which is formed in the right portion of the U-shaped recess 52 for a purpose described hereinafter. An encircling guide or sleeve 56 is provided forwardly of the magazine 16 and slidably guides and receives the jaw 50 and portions of the slide 48. The guide 56 is provided with a slot 58 adjacent the end portion thereof for receiving an upholstery frame rod 60 with upholstery 62 positioned therearound. It will be seen that the slot 58 enters from the side of the guide 56 and provides a support or work bearing portion 64 which is the outer edge of the slot 58. The particular spacing of the encircling guide 56 and the slot 58 along with the support 64 permits the jaw 50 to slide there-through wherein the hog ring 20 is brought into engagement with the frame member 60 and due to the movement of the jaw, the hog ring 20 is pushed into recess 54 where it is finally clinched substantially as shown in Figure 6.

It will be seen in Figures 2 and 3 that the cylinder 38 is provided with a pair of passages 66 and 68 with the passage 66 being located at one end of the cylinder 38 and the passage 68 being located at the other end of the cylinder 38. Positioned below the cylinder 38 is a control mechanism generally indicated by the numeral 70 for controlling the reciprocation of the piston 40 and the jaw 50. The control valve generally indicated by the numeral 70 includes a slidable stem 72 engaged by a trigger 74 pivotally mounted on a pivot pin 76 and urged to a normal position by a coil torsion spring 78. The trigger 74 is located adjacent the handle 14 wherein a person may grasp the handle 14 and manipulate the trigger 74 with the first finger of his hand in the nature of firing a gun or the like. The slidable stem 72 is slidable in a longitudinal passage 80 having a screw threaded closure 82 at the remote end and a coil spring 84 positioned between the stem and the screw 82 for urging the slidable stem 72 towards the trigger 74 thereby returning the slidable stem 72 to a normal position. As shown in Figures 2 and 3, a sleeve 86 surrounds the control mechanism 70 and includes a groove 88 and a groove 90, with the groove 88 communicating with the passage 66 in the cylinder 38 and the groove 90 communicating with the passage 68 in the cylinder 38. The control mechanism 70 further includes a pair of enlarged areas 92 and 94, and the groove 88 is in communication with a groove 96 in communication with the enlarged area 92 in one position of the valve stem 72 and a groove 98 is in communication with the enlarged area 94 in the other position of the valve stem 72. The groove 90 is in communication with a groove 100 in communication with the enlarged area 92 in one position of the valve stem 72, and a passage 102 in communication with the enlarged area 94 in the other position of valve stem 72. The valve stem 72 is provided with a valve face 104 that is positioned in the enlarged area 92 and a valve face 106 which is positioned in the enlarged area 94. The valve faces 104 and 106 are held in position on the stem 72 by suitable shoulders 108. Adjacent each of the shoulders 108 is a reduced portion 110 on the stem 72 for a purpose described hereinafter. Further, suitable O-ring seals 112 are positioned around the stem for sealing the fluid pressure.

The operation of the device will be readily understood. With the device in a position as shown in Figure 2, pressure enters through the passage 30 and up through the

passage 34 into the enlarged area 94. The fluid pressure then proceeds through the passage 102 into the groove 90 in the sleeve 86 and thence through the passage 68 at the forward end of the cylinder 38 thereby urging the piston 40 to a position shown in Figure 2. Also, it will be seen that the passage 66 in the rear portion of the cylinder 38 must act as an exhaust wherein the passage 66 is in communication with the groove 88 which communicates with the passage 96 that permits the exhaust air to pass through the enlarged area 92 and then out of the passage 36 to the atmosphere. It will be seen that the passages 98 and 100 are closed by the valve faces 104 and 106 thereby assuring the proper operation of the piston 40. As the trigger 74 is pulled rearwardly thereby urging the valve stem 72 rearwardly, the valve faces 104 and 106 are moved from the forward face of the enlarged areas 92 and 94 to the rear face of the enlarged areas 92 and 94, substantially as shown in Figure 3. In this or the inner position of the valve stem 72, air pressure comes in through the passage 34 into the enlarged area 94 and then into the passage 98 which is in communication with the groove 88 in the sleeve 86. The groove 88 communicates with the passage 66 thereby entering the pressure into the top side of the piston 40 thereby urging the piston 40 towards the magazine 16 or towards the left hand side of Figure 2. The exhaust air proceeds through the passage 68 into the groove 90 and vents out through the passage 100 that is in communication with the enlarged area 92. The air then proceeds through the passage 36 to the atmosphere. It will be seen that the passage 36 is constantly in communication with the enlarged area 92, thereby necessitating that the exhaust air pass through the enlarged area 92. Obviously, the trigger 74 and the stem 72 will return to their normal position, thereby urging the piston again to its right hand position and retracting the jaw 50 for another operation. The jaw 50 is in its normal position directly over the magazine 16 for receiving the uppermost or outermost staple 20. As the jaw 50 moves forwardly, the staple 20 is brought into contact with the upholstery member 60 and the support portion 64 and due to the continuous forward movement of the jaw 50, the staple 20 is collapsed into the recess 54 due to the grooved construction of the junction between the recess 54 and the recess 52 wherein the bight portion of the staple 20 is curved or deformed around the upholstery member rod 60. It will be seen that the device will operate in one complete cycle upon each pull and release of the trigger, and as the trigger is pulled rearwardly, the jaw is forced forwardly, and when the trigger is released and moves forwardly, the jaw is moved rearwardly for a repeat op-

eration. Obviously, the various elements of this invention may be constructed of readily obtainable materials.

From the foregoing, the construction and operation of the device will be readily understood and further explanation is believed to be unnecessary. However, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

What is claimed as new is as follows:

1. In a device for applying hog rings to a wire member, a magazine for feeding a stack of hog rings, a reciprocating jaw for engaging and pushing the outermost hog ring, a guide for said jaw, a support in the path of movement of the jaw for holding the work to be fastened by the hog rings, said jaw having a pair of U-shaped recesses in communication with each other with the largest recess being positioned on the outer end of the jaw for receiving a hog ring from said magazine, and means for reciprocating said jaw to cause the ring to be pushed over the wire member and to be clasped thereto by said smaller recess.

2. The structure as defined in claim 1 wherein said guide includes a member encircling said jaw during a portion of the forward motion of the jaw, said support formed in said guide by a slot for receiving the work, said jaw urging the ring past the support and collapsing the legs of the ring towards each other.

3. A hog ring tool for applying U-shaped hog rings to an upholstery member comprising a frame having an elongated tubular magazine for receiving a stack of hog rings, a reciprocating jaw mounted on said frame and normally positioned over the open end of the magazine for the receiving of the outer hog ring, a guideway for said jaw, a slot in the side of said guideway for receiving the upholstery member, said jaw being provided with a double recess with the outer recess closely receiving the hog ring and the inner recess being in communication with the center of the outer recess, and means for reciprocating said jaw to cause the ring to be pushed over the said upholstery member by the outer recess and clasped thereto by the inner recess.

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