United States Patent

[11] 3,628,230

[72] Inventor **Frederick G. J. Grise**
West Brookfield, Mass.

[21] Appl. No. **3,042**
[22] Filed **Jan. 15, 1970**
[45] Patented **Dec. 21, 1971**
[73] Assignee **Novelty Tool Company, Inc.**
Spencer, Mass.

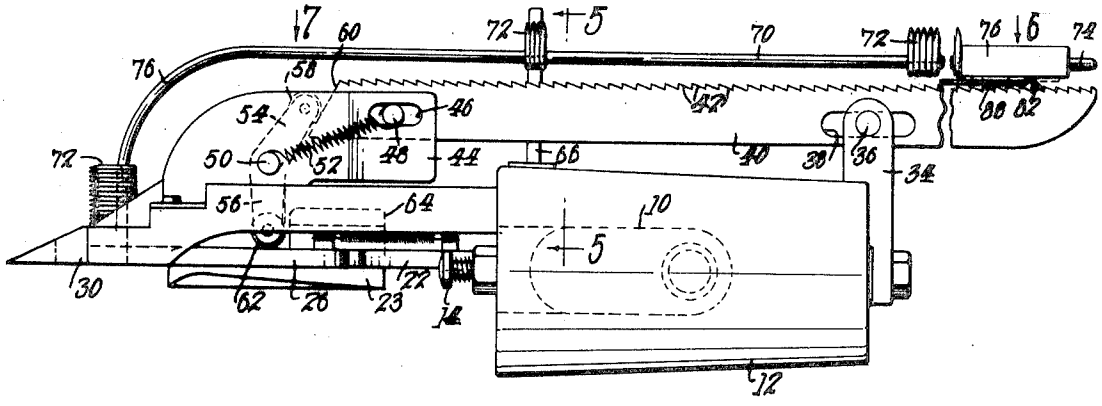
[54] **HOG RING GUN**
13 Claims, 14 Drawing Figs.

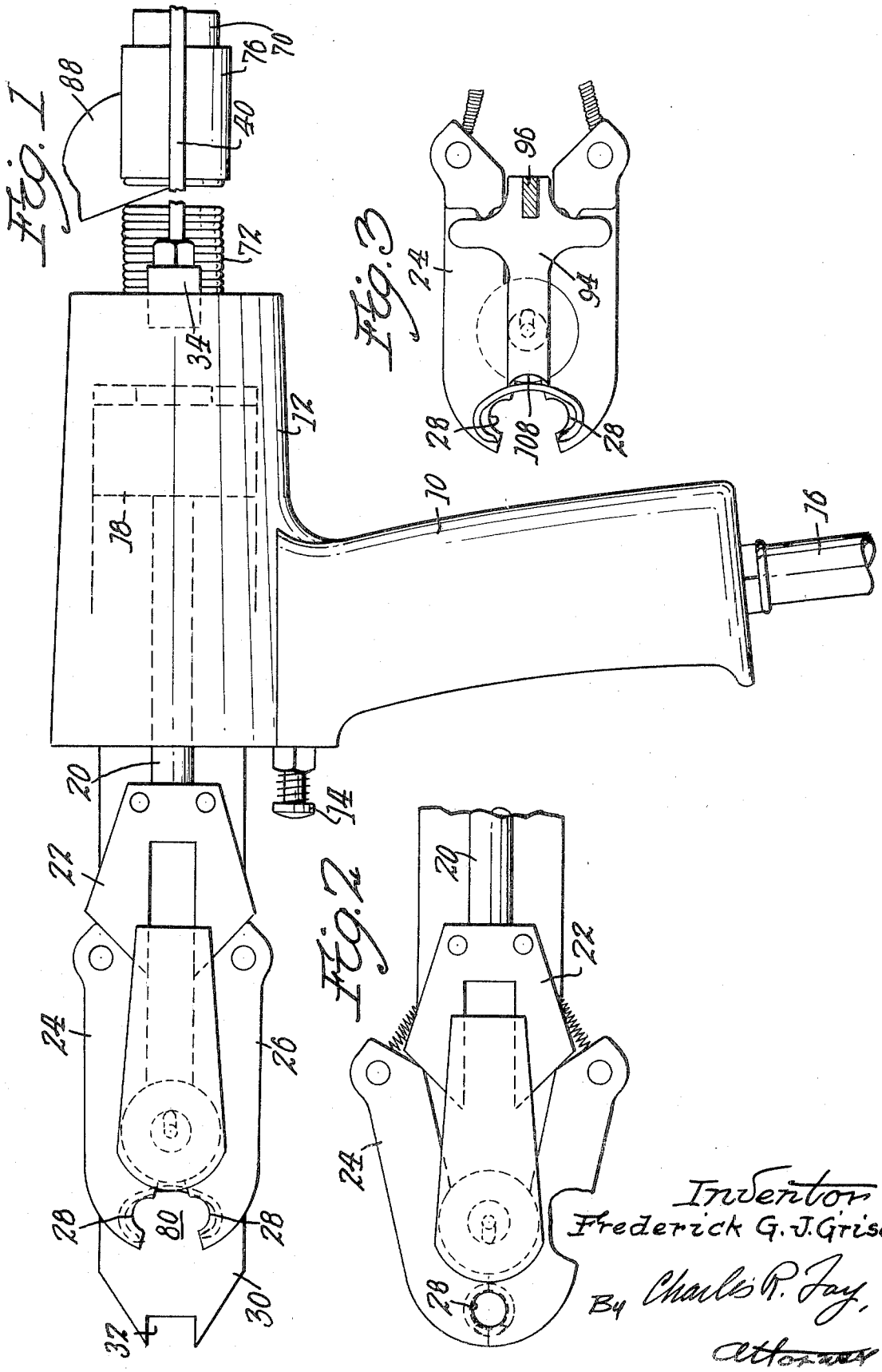
[52] U.S. Cl. ..... **29/212 D,** 29/243.56
[51] Int. Cl. **B23q 7/10,** B23p 11/00
[50] Field of Search ..... 29/212 D, 243.56, 212 R, 212 P

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Primary Examiner—Thomas H. Eager
Attorney—Charles R. Fay

ABSTRACT: A hog ring gun including usual means for ejecting and clinching the rings, in combination with a bayonet type of magazine on which the hog rings are slidable and mounted in a row, a manually operated spring-actuated reciprocating toothed rack exerting predetermined pressure and alternate relief step by step on the row of rings on the bayonet to feed the rings to the anvil one at a time. Means is provided for causing the hog rings to become clinched substantially in a circle.





Inventor
Frederick G. J. Grisé
By Charles R. Fay,
Attorney

Fig. 8

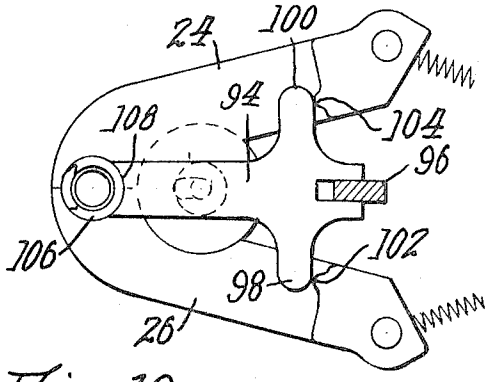


Fig. 10

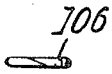


Fig. 11



Fig. 9

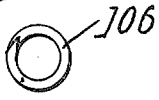


Fig. 12

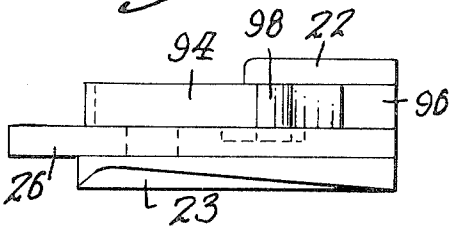


Fig. 13

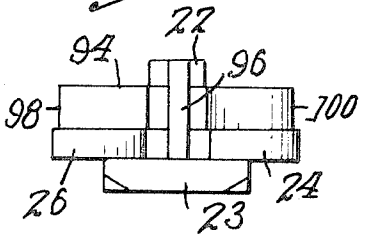
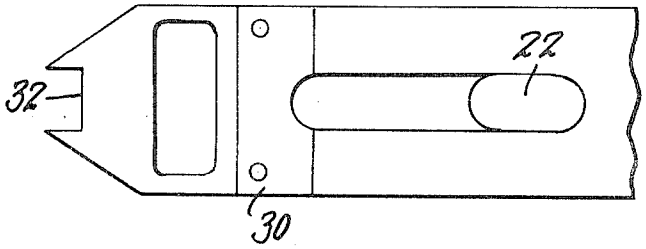


Fig. 14



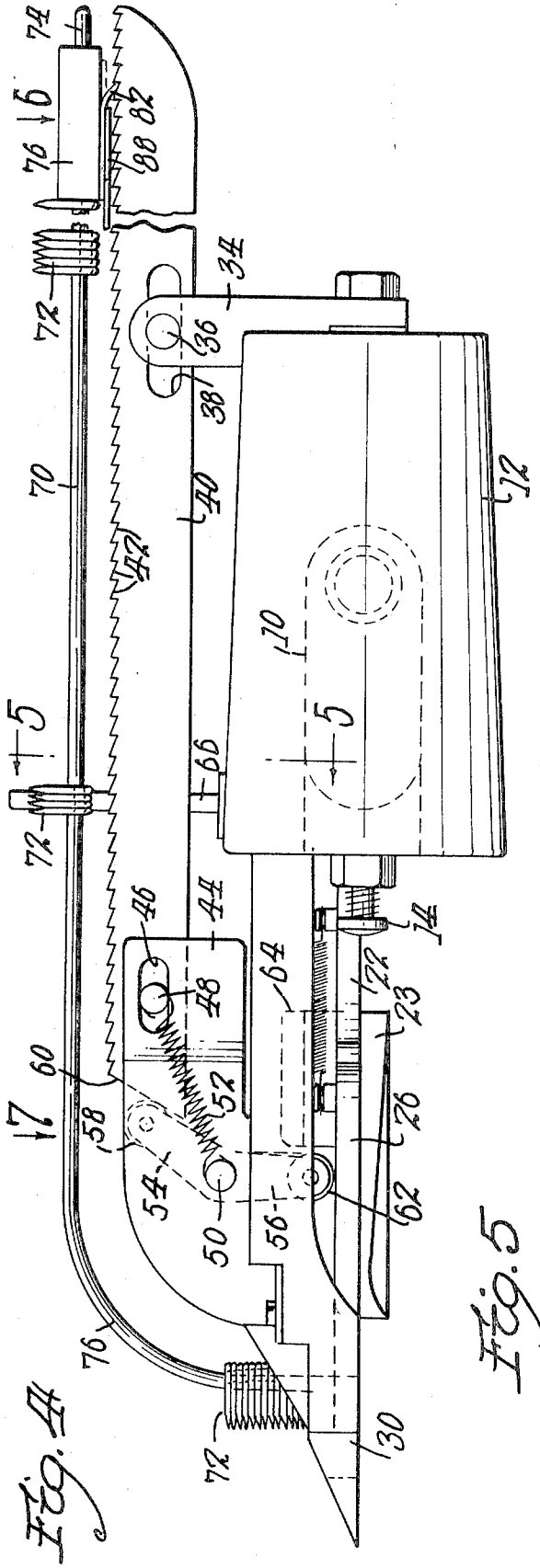


Fig. 4

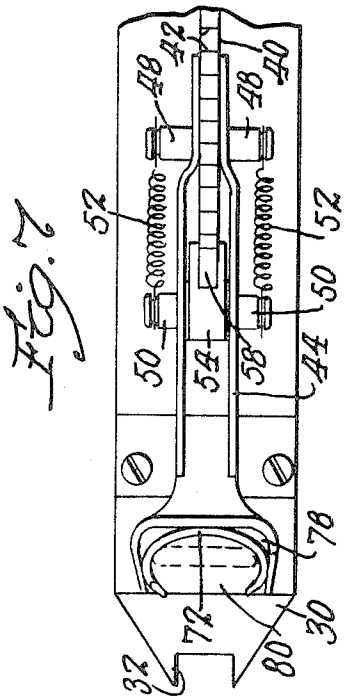


Fig. 7

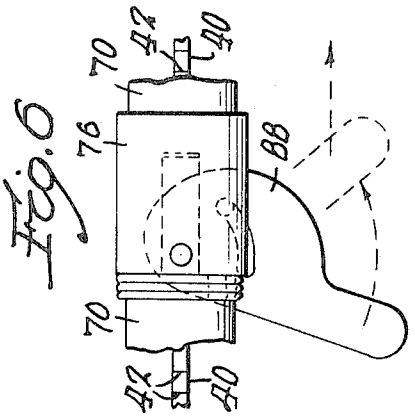


Fig. 6

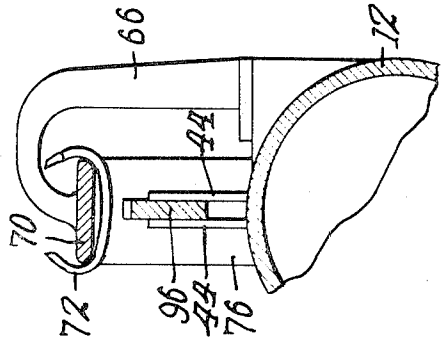


Fig. 5

HOG RING GUN

BACKGROUND OF THE INVENTION

Hog ring guns have long been used and have generally been found satisfactory for the operation involved, but in the past such guns have a tendency to jam from time to time because of the fact that the pressure feeding the rings to the clinching jaws is always present, thus pressing the succeeding hog ring against the one which is just about to be clinched, so that the clinching mechanism at times will not only move the hog ring intended to be clinched but also the succeeding ring, thus causing jamming.

In addition however, most magazines are provided with a spring which loses its resilient power as the line of hog rings becomes less and less, and must be stretched to a very great degree when the hog ring gun is replenished with rings.

In addition, most hog ring guns of the prior art are relatively difficult to reload and it often happens that an operator for instance in an awkward position working on vehicle body upholstery, etc., will run out of rings when in his awkward position and in order to replenish his rings must waste time returning to the supply; whereas in the present case, means is provided for not only much more easily loading the hog rings onto the bayonet-type ring holder, but also indicating to the operator whether he should reload his gun before attempting the next operation.

SUMMARY OF THE INVENTION

The present invention provides a hog ring gun which is operated in clinching more or less as is normal but which is provided with an elongated bayonet-type magazine for receiving the hog rings in aligned relationship merely by thrusting the bayonet into a stacked package of hog rings; and including a reciprocating rack under influence of a spring, said rack being utilized to maintain a constant uniform pressure on a line of rings on the bayonet regardless of the length of the line of rings. Means is provided to slightly retract the rack to release pressure on a stack of rings just as the feed and clinching operation takes place, the means for retracting the rack being associated with the ring feed and clinching means and operating in timed relationship therewith, so that when the feed and clinching takes place there is no pressure at all on the ring which is moved forwardly and clinched, thus eliminating any tendency for the rings to jam.

Also the bayonet is free-ended, being provided with a detachable follower which upon being removed, allows a new stack of rings to be applied to the bayonet quickly and easily and the follower is then merely set in place, being provided with cam and spring means for operating the same at each step of operation of the rack, that is, retraction of the rack in each step.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a view in elevation illustrating a hog ring gun;

FIG. 2 is a view of the clinching mechanism showing the same in clinching position;

FIG. 3 is a view showing a modified clinching arrangement;

FIG. 4 is a view in elevation illustrating the invention;

FIG. 5 is a section on line 5—5 of FIG. 4;

FIG. 6 is a plan view of a detail looking in the direction of arrow 6 in FIG. 4;

FIG. 7 is a similar view at a remote point with respect to the rack;

FIG. 8 is a view of clinching jaws according to FIG. 3 showing the same in clinching position;

FIG. 9 represents a hog ring in clinched condition having been clinched by the mechanism shown in FIG. 8;

FIG. 10 is a side view thereof;

FIG. 11 illustrates a conventional shape of the hog ring when clinched, and

FIGS. 12, 13 and 14 show details of the ring-clinching mechanism.

PREFERRED EMBODIMENT OF THE INVENTION

Referring first to FIG. 1 there is shown a hog ring gun having a handle 10 mounted on an operating frame 12 containing an air cylinder as usual under influence of a trigger 14 controlling the cylinder. The air pressure is received through a hose 16 from a source not shown. The cylinder which is indicated at 18 reciprocates a rod 20 in turn reciprocating the head 22 which operates the pivoted arms 24 and 26 having the jaws as are shown at 28, these being mounted on a base member 30.

As the rod 20 moves to the left, the arms 24, 26 move to the left, pick up a ring, feed it, and clinch it in the area of the cutout 32 on the frame 30. This is all old and well known and it is believed need not be described further.

In the present case however, referring now to FIG. 4, the frame 12 is provided with an upright or standard 34 having a cross pin 36 thereon working in a slot 38 in a rack 40. The rack 40 has the row of teeth 42 as shown which extend in a direction away from the frame 12. There is also provided a forward support 44 having a slot 46 in which there is a pin 48 attached to the rack 40 and moving therewith. Thus the rack is reciprocable right to left and is supported and guided by its fixed pin 48 and the pin 36 on standard 34.

The frame member 44 is provided with a pivot pin 50 to which is secured one end of each of a pair of springs 52, the other ends of springs 52 being secured to the pin 48. These springs return the rack in leftward direction after it has reached the limit of its motion to the right under influence of the arm 54 of a bellcrank 56 having a roller or the like 58 riding on an inclined surface 60 at the forward end of the rack 40. At the opposite end of this crank is another roller 62 which is adapted to be moved in a leftward direction by means of an abutment 64 for a limited distance.

Abutment 64 is mounted on the sliding head 22 in the frame 30 for movement therewith, so that each time the trigger 14 is pressed and the jaw members 24, 26 move forwardly and inwardly, abutment 64 moves the crank 56 in a clockwise direction, thus causing the roller 58 in engagement with the inclined edge 60 to move the rack in a right-hand direction against the action of springs 52. The springs return the rack to its original position upon retraction of head 22 under influence of the reverse stroke of piston 18.

The frame 12 is provided with another standard 66 in the form of an inverted "J," see FIG. 5, and this supports the elongated lateral head 70 of the bayonet ring support. The head 70 is flat as clearly shown and receives the stack of hog rings 72 as indicated in FIGS. 4 and 5. The rings slide along the elongated head 70 from right to left in FIG. 4 under influence of a pusher member generally indicated at 76. This pusher member 76 is removable for the reception of the rings.

The head 70 has a free end at 74 spaced from the rack 40. It curves as at 76 in toward the clinching mechanism and terminates at a point indicated in FIG. 7 as at 78 just above a stop 80 at the top surface of member 30, being spaced therefrom enough to allow the clinching jaws to come forward, push the lowermost (leading) hog ring 72 on stop 80 from the end of the stack, move it forwardly and clinch it, while at the same time preventing the succeeding hog ring from becoming detached from the head 70. The pressure of the rack 40 through the pusher member is relieved at each operation so as to prevent jamming as explained above.

The pusher member 76 has a spring element 82 depending therefrom for engagement successively with the teeth 42 as the rack is reciprocated. It will be seen that this spring element rides on a tooth from the root over the point thereof to the root of the next, and therefore at each reciprocation of the rack the stack of rings is moved a distance equal to the thickness of one ring. The pusher member has a slight frictional contact with respect to the member 70. It is also provided with a pivoted cam member 88 by which means the finger 82 can be removed from the teeth so as to allow

removal of the pusher **76** from the bayonet member **70** so that another stack of rings may be applied to the bayonet over the free end **74**.

It will be seen that the bayonet member **70** is closely spaced with relation to the rack **40** and that it is of "T"-shape providing a certain degree of stiffness. Whereas if it is struck downwardly for instance as shown in FIG. **4**, it will not be damaged and will spring back to its original shape, but the construction and shape of the head provides against ordinary damage being applied thereto by a blow in a direction at right angles. At the same time the rings are easily and freely slid onto this head **70** in the correct relationship with respect thereto and the standard **66** indicates to the operator just how many hog rings he has left. That is, if at any time the pusher member gets up to the standard **66**, the operator is advised to replenish the supply.

In case of the prior art jaws **24** and **26**, the ordinary clinching of the hog ring is as illustrated at **90** in FIG. **11**. This will be seen to be noncircular, with a point at **92**. However it has been found that if a third jaw member generally indicated at **94** in FIGS. **3** and **8** be provided, and given a slight leftward motion under influence of the head **22** as by a connection indicated at **96**, the point **92** is smoothed out into a circle, see **106**. A pair of laterally oppositely extending cams or the like **98**, **100** mounted on head **94** together with followers **102** and **104** on the jaws **24** and **26** actuate the third jaw. This is enhanced if the head **94** be provided with a curved forward operating conformation **108** and the action is clearly illustrated in FIG. **8**.

That is, as the jaw members **24** and **26** are urged to the left and together as by head **22**, the followers **102** and **104** ride along the surfaces of the cam elements **98** and **100** and cause the same to be urged forwardly from the FIG. **3** position to the clinching position shown in FIG. **8**.

I claim:

1. A tool for feeding and clinching clips, comprising a frame, power-operated means in the frame, and means to control said power-operated means in the frame, and means to control said power-operated means, an elongated support for holding a plurality of clips stacked in a row, means applying spring pressure to the terminal clip tending to move the entire row towards a work station,

means for advancing and clinching the leading clip in the row under influence of the power-operated means, and means for simultaneously releasing said pressure momentarily so that the means for clinching the leading clip avoids interference with succeeding clips in the stack.

2. The tool of claim **1** including a stop at the work station for the leading clip, said clip support terminating in spaced relation to said stop, said advancing and clinching means operating on the leading clip only between the stop and the terminus of the clip support.

3. The tool of claim **1** wherein the means applying spring pressure includes a reciprocating member, a clip follower, and interengaging means between said clip follower and said member whereby the follower is advanced the width of one ring in each reciprocation of said member.

4. The tool of claim **1** including a rack, a ring follower in alternate engagement and disengagement with respect to the rack, means for reciprocating the rack to thereby move the follower step by step in a predetermined direction maintaining pressure on said row of rings.

5. The tool of claim **1** including a rack, means to reciprocate the rack, the means to reciprocate the rack including an element moving it in one direction under influence of said power means simultaneously with the feeding and clinching operation, and means to return the rack.

6. The tool of claim **1** including a rack, means to reciprocate the rack, the means to reciprocate the rack including an element moving it in one direction under influence of said power means simultaneously with the feeding and clinching operation, and spring means to return the rack.

7. The tool of claim **1** wherein said elongated clip support comprises a T-shaped free-ended member attached to said frame.

8. The tool of claim **1** wherein said elongated clip support comprises a T-shaped free-ended member attached to said frame intermediate the ends of the support.

9. An implement for clinching rings one after the other, a frame, power means in said frame, means for feeding and clinching rings operated by said power means, means for controlling the power means, and a clinching station,

an elongated rod mounted with respect to said frame at one end thereof, the other end being free-ended to receive a long line of clips thereon in mutually contacting relation,

means to resiliently press said line of rings forwardly to the clinching station, said last-named means comprising a pusher member having a resilient finger, a rack, means for reciprocating said rack while in engagement with said resilient finger member to index said pusher member step by step in a direction to feed the rings toward the clinching area,

and means releasing pressure on said rings simultaneously with the feeding and clinching of the initial ring of said line.

10. The implement of claim **9** wherein said pressure releasing means comprises an element movable with the feeding means and an interconnection thereof with said rack to retract the same one step simultaneously with the motion of the means to accomplish the feeding and clinching operation.

11. The implement of claim **9** wherein said pressure-releasing means comprises an element movable with the feeding means and an interconnection thereof with said rack to retract the same one step simultaneously with the motion of the means to accomplish the feeding and clinching operation, and spring means returning said rack to its original position, once again applying pressure to said line of rings.

12. The implement of claim **9** wherein said pressure-releasing means comprises an element movable with the feeding means and an interconnection thereof with said rack to retract the same one step simultaneously with the motion of the means to accomplish the feeding and clinching operation, and spring means returning said rack to its original position, once again applying pressure to said line of rings, said interengaging means comprising a crank bearing upon the forward end of said rack and pushing the same to retract it, the spring means then bringing the rack forwardly upon retraction of said feeding and clinching means under influence of said power means for the next operation.

13. The tool of claim **9** including means for retracting said resilient finger from the rack to provide for sliding the pusher member from the rod for replenishment of the rings thereon.

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