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LOADING APPARATUS FOR RING CLINCHING DEVICES

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FIG. 4.

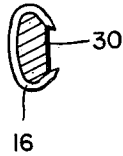


FIG. 2.

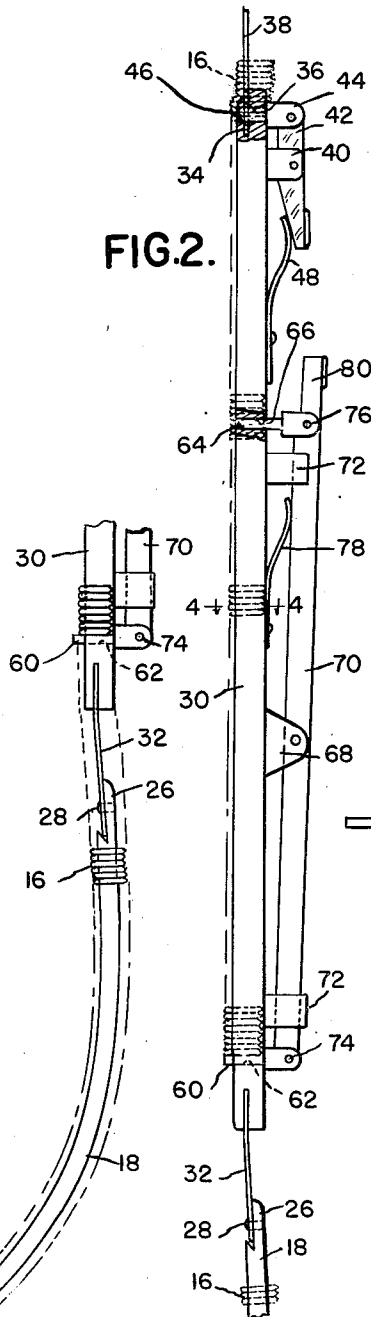


FIG. 3.

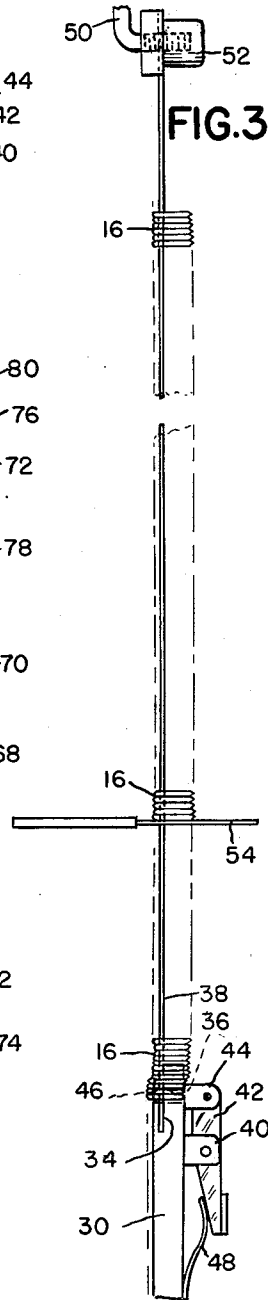
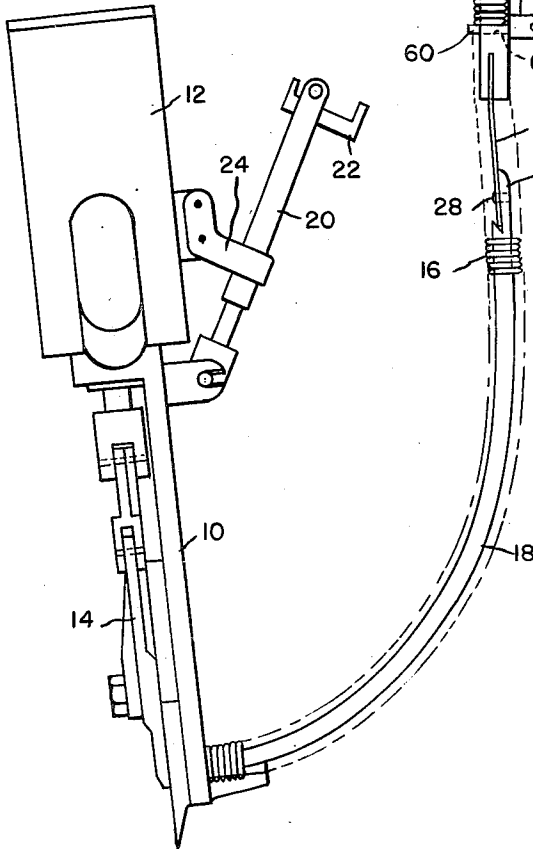


FIG. 1.



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LOADING APPARATUS FOR RING
CLINCHING DEVICES

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8 Claims. (Cl. 1—49.6)

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The present invention relates to loading apparatus for ring clinching devices.

Ring clinching devices of the type referred to in the present case are commonly called hog ring guns and are useful in applying hog rings in the assembly of springs for example, in which case they may be used for clinching burlap or other material over the spring assembly or they may be employed in connecting metallic elements of the spring combination.

An important advantage of the so-called hog ring guns is their ability to apply hog rings with great rapidity is assembly operations.

In the past considerable time has been lost in loading the open hog rings onto the gun and it is an object of the present invention to provide loading apparatus which will expedite loading of the gun.

It is a further object of the present invention to provide loading apparatus characterized by its extreme simplicity and ease of operation, as well as the rapidity with which a new supply of open hog rings may be applied to the gun.

It is a feature of the present invention to provide loading apparatus comprising ring retainer strips, a loading bar adapted to be suspended from one end to the lower end of one of the strips, and means for suspending the free end of the supply arm of the ring gun from the lower end of the loading bar.

It is a further feature of the present invention to provide in the combination defined above, means on the supply bar for preventing advance of the rings onto the supply arm of the gun, means for measuring off a predetermined number of rings on the loading bar, and means operable to release the predetermined number of rings for movement from the loading bar onto the supply arm of the gun.

Other objects and features of the invention will become apparent as the description proceeds, especially when taken in conjunction with the accompanying drawings wherein:

Figure 1 is a side elevation illustrating the connection between the hog ring gun and the lower end of the supply bar.

Figure 2 is a side elevation showing the loading bar and control means thereon.

Figure 3 is a side elevation showing the ring retainer strip and its connection with the loading bar.

Figure 4 is a section on the line 4—4, of Figure 2.

Referring now to the drawings the hog ring gun comprises essentially a frame or support 10 carrying an air cylinder or the like 12, for actuating a pair of clinching jaws, one of which is indicated at 14. A supply of separated open generally C-shaped hog rings 16 is carried by a supply arm 18 forming a part of the gun. A spring pressed telescopic feed arm 20 is carried by the gun and at its free end is provided with

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a shoe 22 which is slidable along the supply arm 18 to cause the hog ring 16 to be fed into clinching position. The hog ring gun includes a spring retainer clip 24 which will retain the arm 20 in inoperative position when the loading operation is to be carried out.

The particular hog ring gun disclosed herein is merely exemplary so far as the present invention is concerned, but for further details thereof reference is made to our copending application, Serial No. 132,471 filed December 12, 1949, and issued as U. S. Letters Patent No. 2,605,467, on August 5, 1952.

At the free end of the supply arm 18 there is provided attaching means which is herein illustrated as comprising a reduced portion 26 of the arm having a headed connector pin 28 projecting therefrom but in position to permit passage of the open hog rings 16 freely thereover. The shape of the open hog rings is best seen by reference to Figure 4 and it will be observed that the head of the connector pin 28 is located inwardly from the path of travel of the pins.

An elongated loading bar 30 is provided having a cross section corresponding to the shape of the open hog ring 16 so that the hog rings are freely slidable thereover. At its lower end the loading bar 30 is provided with a strip 32 having an opening therein adapted to receive the head of the pin 28 so that the hog ring gun may be freely suspended from the lower end of the loading bar. The shape of the strip 32 is such that it serves to guide the open hog rings from the loading bar to the free end of the supply arm 18.

At its upper end the loading bar 30 is provided with a transverse slot 34 which is intercepted by a transverse latch pin opening 36. The slot 34 is shaped to receive the lower apertured end of a ring retaining strip 38 on which a multiplicity of hog rings 16 are freely slidable. Adjacent the upper end of the loading bar and at the side thereof corresponding to the open side of the hog ring 16 is a bracket 40 providing a pivot mounting for a latch lever 42 which at its free end carries a pin element 44 having a pin portion 46 movable through the opening 36 and adapted to enter an opening formed adjacent the lower end of the ring retaining strips 38. The lever 42 is provided with spring biasing means herein illustrated as a leaf spring 48 engaging the end of the lever 42 opposite to its connection with the pin element 44.

Suspension means are provided for a plurality of the ring retaining strips 38 and this means is herein illustrated as an arm 50 having a laterally turned threaded end on which is received a retainer nut 52. A plurality of strips 38 may be suspended from one of the suspension means 50 so that an adequate supply of open hog rings may always be available. Means are provided beneath the suspension device 50 for preventing downward movement of the rings 16 on the strips

38. This means may take any form and is herein diagrammatically illustrated as a clip 54. Alternatively, other means may be provided for this purpose as for example a removable stop element carried by the strip 38 below the lowermost ones of the rings 16.

The loading bar is provided with means for preventing movement of hog rings from the loading bar to the supply arm except when it is desired to load the gun and means for measuring off a predetermined number of hog rings. Specifically, the loading bar 30 is provided with a headed stop pin 60 which extends through a transverse opening 62 adjacent the discharge end of the loading bar. Spaced from the stop pin 60 is a pointed and headed measuring pin 64 which extends through a transverse opening 66 formed in the loading bar. The openings 62 and 66 are spaced apart by a distance equal to the space occupied by the number of pins required to load the hog ring gun. Moreover, it will be observed that the openings 62 and 66 extend transversely through the loading bar from the side thereof which corresponds to the open side of the open hog rings to the opposite side thereof. Accordingly, when the pins 60 and 64 are retracted, free movement of hog rings therepast is permitted.

In order to control sequential actuation of the stop pin 60 and the measuring pin 64, the loading bar is provided with a bifurcated bracket 68 which also is located at the side of the loading bar corresponding to the open side of the open hog rings. A control lever 70 is pivoted intermediate its ends to the bracket 68 and is guided for rocking movement by guiding ears 72 projecting laterally from the loading bar. Adjacent opposite ends of the lever 70 are provided pivot connections indicated at 74 and 76 respectively for connection to the heads of the stop pin 60 and measuring pin 64. A leaf spring or other resilient means 78 is provided biasing the lever 70 in a direction to cause the stop pin 60 to project into the path of movement of the hog rings and to retract the measuring pin 64 out of such path of movement. The lever 70 is also provided with a finger piece 80 by means of which the lever may be shifted by the operator.

In use, when it is desired to load the supply arm 18 of the hog ring gun, the free end of the arm is connected to the strip 32 which suspends the hog ring gun freely from the loading arm and which properly aligns the free end of the supply arm 18 with the loading bar 30. At this time it is assumed that the loading bar 30 is connected to a ring retaining strip 38 and that a multiplicity of independent hog rings are provided on the retaining strip. The clip 54 or the equivalent means is inoperative so that the supply of hog rings is retained against downward movement by the stop pin 60 and they are urged in the appropriate direction by gravity. The operator presses the finger piece 80. The pins 60 and 64 are so proportioned that initial downward movement of the finger piece 80 causes the pointed end of the measuring pin 64 to move into the space between two hog rings and to thus measure off a predetermined number of hog rings between the measuring pin 64 and the stop pin 60. It will be observed that until the measuring pin 64 has moved into position to intercept the supply of hog rings thereabove, the stop pin 60 will not be withdrawn or retracted from the path of movement of the hog rings. Further movement of the finger piece 80 after the measuring

pin 64 has moved into position to intercept the hog rings thereabove, results in retraction of the pin 60 which permits the series of hog rings intermediate the pins 60 and 64 to move downward by gravity over the connector strip 32 and onto the supply arm 18.

When the operator releases the finger piece 80 the spring 78 causes the lever 70 to rock in a clockwise direction as seen in Figure 2 and has the effect of first projecting the stop pin 60 into the path of movement into the hog rings and thereafter retracting the measuring pin 64 from the path of movement of the hog rings. This results in the entire supply of hog rings above the measuring pin 64 moving downwardly by gravity until the lowermost of such rings is arrested by engagement with the stop pin 60.

While the connection between the free end of the supply arm 18 and the lower end of the loading bar 30 is illustrated as comprising the strip 32, which constitutes a bridging guide below the lower end of the loading bar and the upper free end of the supply arm, it will be appreciated that if desired other attaching means could be provided which would result in substantial abutment between the adjacent ends of the loading bar and the supply bar.

The combination of apparatus herein illustrated provides for greatly increased output since the time required to load the gun is reduced to a minimum. It is necessary only for the operator to slip the head of the pin 28 into the opening at the lower end of the strip 32 and thereafter or substantially simultaneously therewith, to press the finger piece 80. This causes a predetermined number of hog rings to be fed onto the supply arm and the follower shoe of the feed arm 20 may be slipped over the open end of the supply arm, thus conditioning the gun for further operation.

In accordance with the present invention supplies of open hog rings may be conveniently stored on the ring retaining strips 38. These strips as illustrated are formed of flat stock and are thus relatively inexpensive. The strips 38 as shown are of substantially greater length than the loading bar 30 and may hold sufficient rings to load the clinching gun several times.

On the other hand, the loading bar is of solid cross-section since it must have sufficient strength to support the levers 50 and 42 and provide means associated with the stop pin 60 and the measuring pin 64. Accordingly, the loading bar is relatively more expensive than the ring retaining strips. However, the loading bar may be successively applied to a plurality of ring retaining strips. The loading bar as illustrated is of not materially greater length than necessary to accommodate the proper spacing between the pins 60 and 64 and the attaching mechanism including the pivoted lever 42.

The drawings and the foregoing specification constitute a description of the improved loading apparatus for ring clinching devices in such full, clear, concise and exact terms as to enable any person skilled in the art to practice the invention, the scope of which is indicated by the appended claims.

What we claim as our invention is:

1. Apparatus for loading a predetermined number of C-shaped clinch rings having open sides onto a supply arm of a clinch gun comprising a loading bar on which a multiplicity of C-shaped clinch rings is disposed in alignment with the open sides of said clinch rings exposing one side of said bar, a detachable connector at one end of

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said bar for engagement with the free end of the supply arm of a gun, measuring stop mechanism on said bar comprising a lever pivoted to the bar at the side thereof exposed by the open sides of the C-shaped rings, said bar having spaced openings therethrough at opposite sides of the pivot connection of said lever extending from the exposed side of said bar to the opposite side, stop pins in said openings projectible therethrough to engage rings on said bar, said pins being operably connected with said lever to move concurrently in ring engaging and disengaging direction respectively upon movement of said lever, said pins being spaced apart by a distance equal to that occupied by a complete load of rings.

2. In loading apparatus for controlling the supply of open sided C-shaped clinch rings to a clinch gun, a loading bar having loading and discharge ends and having a cross-sectional shape from end to end corresponding to the internal shape of the rings and adapted to carry a multiplicity of open sided C-shaped clinch rings aligned thereon with the open sides of said clinch rings exposing one side of said bar, said rings being movable along said bar from its loading to its discharge end, said bar having a pair of longitudinally spaced apertures extending transversely through said bar from the side exposed by the open side of the rings to the opposite side, a stop pin in the opening nearest the discharge end of said bar, a measuring pin in the other opening, a lever pivoted to said bar intermediate its ends at the side of said bar corresponding to the open side of the rings, connections adjacent opposite ends of said lever and said pins, and spring means biasing said lever in a direction to cause said stop pin to project into the path of rings on said bar and to cause said measuring pin to be retracted out of the path of the rings.

3. In loading apparatus for controlling the supply of open sided C-shaped clinch rings to a clinch gun, a loading bar having loading and discharge ends and having a cross-sectional shape from end to end corresponding to the internal shape of the rings and adapted to carry a multiplicity of open sided C-shaped clinch rings aligned thereon with the open sides of said clinch rings exposing one side of said bar, said rings being movable along said bar from its loading to its discharge end, said bar having a pair of longitudinally spaced apertures extending transversely through said bar from the side exposed by the open side of the rings to the opposite side, a stop pin in the opening nearest the discharge end of said bar, a measuring pin in the other opening, a lever pivoted to said bar intermediate its ends at the side of said bar corresponding to the open side of the rings, connections adjacent opposite ends of said lever and said pins, and spring means biasing said lever in a direction to cause said stop pin to project into the path of rings on said bar and to cause said measuring pin to be retracted out of the path of the rings, said measuring pin being provided with a point to provide for insertion between adjacent rings of a series of rings on said bar.

4. In loading apparatus for controlling the supply of open sided C-shaped clinch rings to a clinch gun, a loading bar having loading and discharge ends and having a cross-sectional shape from end to end corresponding to the internal shape of the rings and adapted to carry a multiplicity of open sided C-shaped clinch rings aligned thereon with the open sides of said clinch rings exposing one side of said bar, said rings be-

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ing movable along said bar from its loading to its discharge end, said bar having a pair of longitudinally spaced apertures extending transversely through said bar from the side exposed by the open side of the rings to the opposite side, a stop pin in the opening nearest the discharge end of said bar, a measuring pin in the other opening, a lever pivoted to said bar intermediate its ends at the side of said bar corresponding to the open side of the rings, connections adjacent opposite ends of said lever and said pins, and spring means biasing said lever in a direction to cause said stop pin to project into the path of rings on said bar and to cause said measuring pin to be retracted out of the path of the rings, said pins being dimensioned to prevent movement of said stop pin into retracted position until said measuring pin is in projected position.

5. Apparatus for loading a clinch gun having a ring supply arm extending therefrom provided with releasable coupling means, said apparatus comprising an elongated ring retaining member provided with means at its upper end for suspending said member and coupling means at its lower end, a loading bar having releasable coupling means at its upper end for releasably engaging the coupling means at the lower end of said ring retaining member to suspend said loading bar therefrom in continuation thereof, said coupling bar having means at its lower end for releasable engagement with the coupling means on the supply arm of the clinch gun, whereby said ring retaining member and loading bar form an upward extension of the supply arm of the gun, a stop pin adjacent the lower end of said loading bar normally projecting into the path of open rings on said bar, a measuring pin on said loading bar spaced upwardly from said stop pin a predetermined distance to measure off a selected number of rings, and single operating means for advancing said measuring pin and thereafter retracting said stop pin to release a previously measured number of rings for descent by gravity onto the supply arm of the gun.

6. Structure as defined in claim 5 in which said ring retaining member comprises an elongated strip.

7. Structure as defined in claim 5 in which said ring retaining member comprises an elongated strip and said loading bar has a cross-section conforming generally to the interior dimensions of the open rings used by the gun.

8. Structure as defined in claim 7, said loading bar being of a length not materially greater than that required to accommodate and control the passage of a number of rings constituting a loading for the gun, said ring retaining member being of substantially greater length.

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