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HOG RING TOOL

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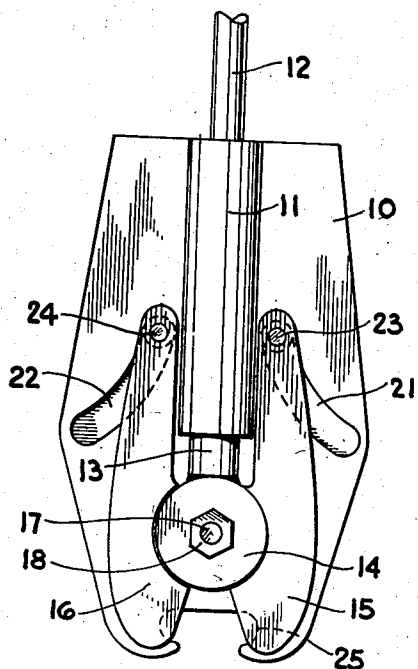


FIG. 1

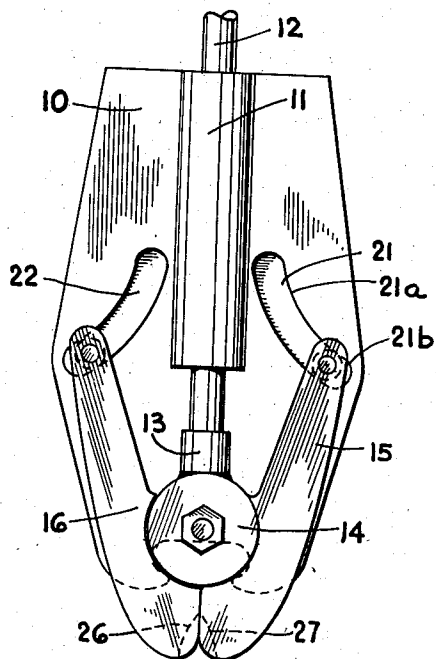


FIG. 2

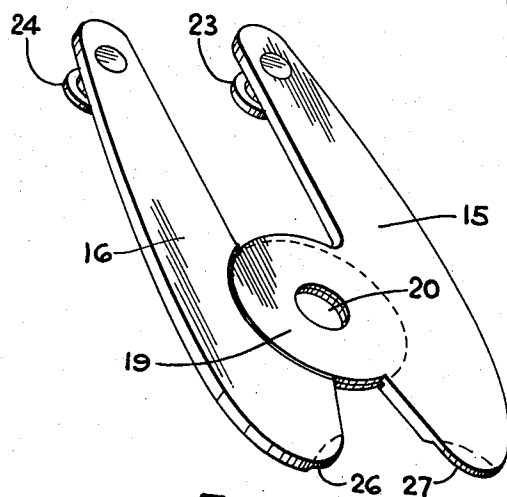


FIG. 3

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HOG RING TOOL

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6 Claims. (Cl. 1—187)

This invention generally relates to hog ring apparatus for applying hog rings, staples or the like, to various coil spring assemblies, for example, in conjunction with automobile seats, mattresses, and the like. More specifically, the invention relates to an improved hog ring tool for drivingly carrying C-shaped hog rings into a desired application position (for example, in coupling fabric coverings to coil springs), and thereafter clinching and closing the hog rings so as to form a coupling member.

Various type of hog ring tools are available on the market and perform satisfactorily for most purposes. However, many of the tools available oftentimes clinch the hog ring before it is properly disposed in proper relationship for the desired coupling action. Furthermore, many of such conventional tools are constructed such that frequent repair and maintenance is necessary resulting in inconvenience and expense to the user.

It is, therefore, an object of the present invention to provide an improved hog ring tool such that the hog ring carried thereby will be moved and urged with a substantially maximum force into the proper position before the closing compression action is effected which results in, for example, joining of fabric to coil spring members or the like.

Another object of the present invention is to provide an improved hog ring tool which is simply constructed with a minimum number of long-wearing parts such that relatively maintenance-free operation is attained without the necessity of repair or replacement of parts over an extended period of time.

Still another object of the present invention is to provide an improved hog ring tool which may be manufactured relatively economically on a production line basis without the need of skilled workers or the like.

These and other objects of the present invention are generally attained by providing in the hog ring tool improvement of the present invention a frame member including a generally C-shaped opening designed to laterally communicate with a stack of hog rings carried, for example, in a magazine in a conventional manner. The frame member also includes a pair of opposing cam grooves extending therethrough, according to an important feature of the present invention.

An actuating rod is mounted on and in parallel relationship to the frame member, and is adapted to move axially between a first position and a second position.

A pair of opposing jaw members are pivotally coupled to one end portion of the rod and are disposed in substantially parallel relationship to the frame member. The jaw members have a pair of opposing end portions positioned adjacent the C-shaped opening and shaped to receive a hog ring when the rod is disposed in the first position. The jaw members have another pair of opposing end portions which define cam members positioned for movement, respectively, in the opposing grooves.

The pair of end portions disposed adjacent the C-

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shaped opening act to clinch and close the hog ring as the cam members move in the grooves in response to movement of the rod from the first position to the second position.

A better understanding of the present invention will be had by reference to the drawings, showing an illustrative embodiment, and in which:

Figure 1 is a front elevational view of the hog ring tool improvement of the present invention;

Figure 2 is a view of the hog ring tool improvement of Figure 1 after the actuating rod has been moved from the first position of Figure 1 to a second position to effect clinching and closing of the hog ring; and,

Figure 3 is an enlarged perspective view of the jaw members embodied in the hog ring tool improvement of Figure 1.

Referring now to the drawings, there is shown in Figure 1 a frame member 10 on which is mounted and rigidly coupled thereto a cylindrical bearing sleeve 11. The bearing sleeve 11 is adapted to slidably axially receive an actuating rod 12, the upper end of which is not shown. In a conventional construction, the actuating rod 12 would have its upper end terminating in a piston such that hydraulic force, for example, could be used to effect downward movement of the rod 12. In addition, some type of spring means would normally be employed to impose an upward force on the rod 12 whereby it would normally be biased to the position shown in Figure 1. Such conventional constructions for downward actuation and return movement of the rod 12 are well known in the art and are, therefore, not shown or further described in connection with this hog ring tool, these elements forming no part of the present invention.

The rod 12 has its lower end terminating in an enlarged diameter portion 13, which functions as a stop member in limiting upward movement of the rod 12 through the bearing sleeve 11. The stop member 13 has secured thereto an annular washer member 14.

Jaw members 15 and 16 are pivotally coupled, as with a bolt 17, to each other and to the washer 14 heretofore mentioned. A nut 18 secures the jaws 15 and 16, and the washer 14 in locked relationship. As will be evident from the view in Figure 3, the jaw 15 includes a semi-circular portion 19 of decreased thickness which is positioned above in juxtaposed relationship a similar projecting semi-circular portion of jaw 16. Each of the jaws 15 and 16 has an aligned aperture defining a common bore 20 adapted to receive the bolt 17 to hold the jaw members together in pivotable relationship thereto.

Referring again to Figure 1, it will be noted that the frame member 10 has disposed therein arcuate cam grooves 21 and 22. The cam grooves 21 and 22 are adapted to receive cam members 23 and 24, respectively, secured to the upper ends of jaw members 15 and 16. The cam members 23 and 24 are more clearly shown in the view of Figure 3, and may be riveted or otherwise secured to the respective jaw members. Preferably, the cam members are spool-shaped as shown such that they are locked for rolling or sliding movement in the grooves.

The frame member 10 further includes a C-shaped opening adapted to receive a laterally extending stack of hog rings retained in a magazine (not shown) in conventional manner. This C-shaped opening is partially shown in the view of Figure 1 and is identified by numeral 25. As the hog ring is received into the opening 25, it is held within an opposing pair of undercut portions 26 and 27 of the respective jaws 16 and 15, as more clearly shown in the views of Figures 2 and 3.

In the operation of the hog ring tool, the parts thereof are normally disposed in a first position as shown in Figure 1. Upon downward axial movement of the rod 12,

the jaws 15 and 16 are, in turn, forced downwardly in view of their locked relationship to the washer 14 at the lower end of the rod. In turn, cam members 23 and 24 are forced to move downwardly through respective grooves 21 and 22. Since the movement of cam members 23 and 24 is the same except for the opposing relationship between these members, description of the movement of one cam member, for example, 23 will suffice for both.

As the cam member 23 begins to move downwardly through the groove 21, it will be noted that it will remain substantially in parallel alignment with the rod 12 since an upper portion 21a of the groove 21 (see Figure 2) has a very slight degree of curvature or a large radius. However, as the cam member 23 moves further towards a lower portion 21b of the groove 21, the cam member 23 will be forced outwardly from the rod 12. With this type of action the jaws and more particularly the recessed portions 25 and 27 thereof adapted to hold the hog ring, will not begin to compress or close the hog ring until the ring has pierced or otherwise positioned itself about the members to be coupled. The advantage of this type of action is best understood when it is realized that the ring must first pierce the fabric and move into position such that it retains the fabric and encircles the spring member before it is compressed and clenched to secure the material or fabric to the spring member in coupled relationship.

It will further be appreciated as a consequence of this type of movement that the rod 12 is exerting its greatest axial load on the jaws 15 and 16 as the hog ring retained in the jaws is piercing the fabric; thereafter, after the hog ring has pierced the fabric, the lower portion 21b of the groove 21 will force the jaw 15 to compress the hog ring in its final position. Thus, with the design of the present invention, the co-operation between the grooves and cam members is such as to meet the operating needs of the tool with a non-linear type of movement being effected in the jaw members 15 and 16.

It will be appreciated that many changes and modifications may be made in the various detailed parts of the present invention, particularly in the illustrative embodiment shown, without departing from the spirit and scope of the invention as set forth in the following claims.

What is claimed is:

1. In a hog ring tool: a frame member including a C-shaped opening designed to laterally communicate with a stack of hog rings, said frame member also including a pair of opposing cam grooves formed therein; an actuating rod mounted on and in parallel relationship to said frame member and adapted to move axially between a first position and a second position; a pair of opposing jaw members pivotally connected to said rod and in parallel relationship to said frame member, said jaw members each having one of a first pair of opposing end portions positioned adjacent to said C-shaped opening and shaped to receive a hog ring when said rod is in said first position, said jaw members each having one of a second pair of opposing end portions defining cam members posi-

tioned for movement, respectively, in said opposing grooves, said first pair of end portions moving towards each other and acting to clinch and close said hog ring as said cam members move in said grooves in response to movement of said rod from said first position to said second position.

2. The subject matter according to claim 1, in which each of said cam grooves is arcuately shaped, and in which each of said grooves represents a mirror-image of the other of said grooves.

3. The subject matter according to claim 2, in which said grooves are, respectively, shaped such that said cam members move away from each other in response to final movement of said rod from a first position to a second position.

4. The subject matter according to claim 3, in which each of said grooves extends from a first point on said frame spaced a given distance above said C-shaped opening to a second point on said frame spaced closer than said given distance to said C-shaped opening, and in which a first portion of each said groove closest to said first point has an appreciably greater radius of curvature than a second portion of each said groove closest to said second point, whereby said cam members will move first generally towards said C-shaped opening and thereafter generally away from each other in response to movement of said rod from said first position to said second position.

5. In a hog ring tool: a frame member including a C-shaped opening designed to laterally communicate with a stack of hog rings, said frame member also including a pair of opposing cam grooves formed therein; a sleeve member rigidly secured to said frame member in parallel relationship thereto; an actuating rod positioned for axial movement in said sleeve member between a first position and second position; a pair of opposing jaw members pivotally connected to said rod and in parallel relationship to said frame member, said jaw members each having one of a first pair of opposing end portions positioned adjacent to said C-shaped opening and shaped to receive a hog ring when said rod is in said first position, said jaw members each having one of a second pair of opposing end portions defining cam members positioned for movement, respectively, in said opposing grooves, said first pair of end portions moving towards each other and acting to clinch and close said hog ring as said cam members move in said grooves in response to movement of said rod from said first position to said second position.

6. The subject matter, according to claim 5, in which said jaw members include aligned apertures, and in which a washer is rigidly secured to an end of said rod; and bolt means extending through said apertures and said washer pivotably coupling said jaw members to said washer and said rod.

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