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J. T. HENRY
CRIMPING APPARATUS
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3,111,157

FIG. 1

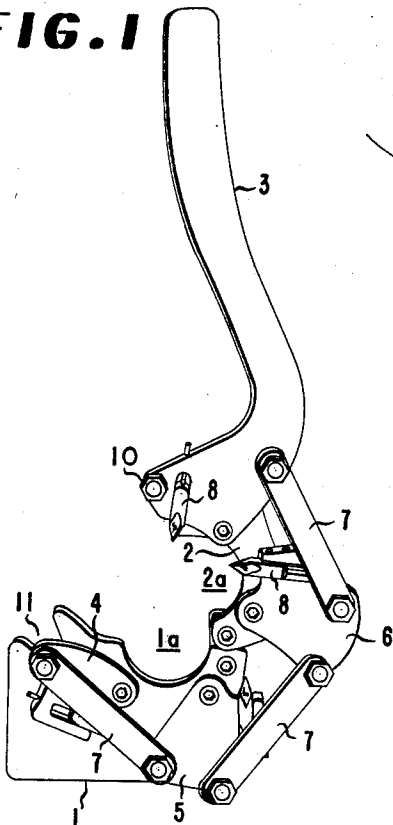


FIG. 2

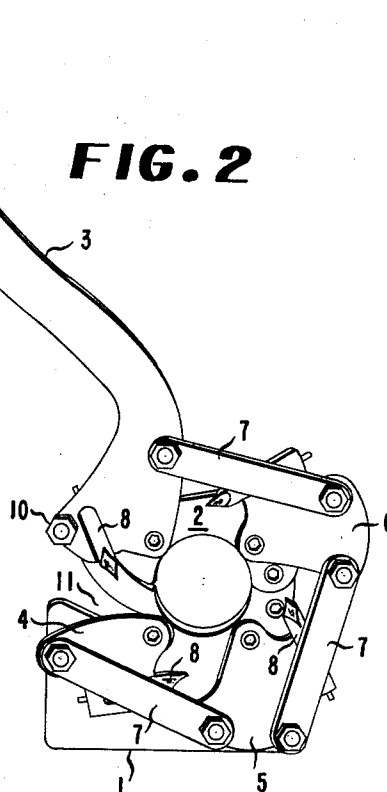


FIG. 3

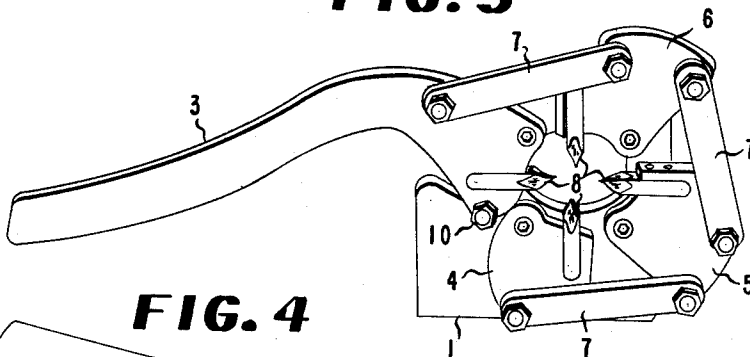
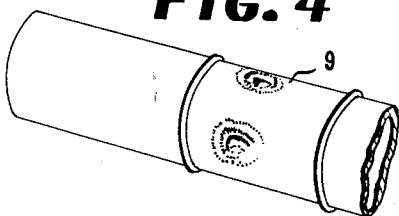


FIG. 4



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CRIMPING APPARATUS

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6 Claims. (Cl. 153—1)

This invention relates to an apparatus for crimping. More particularly it relates to a multiple crimping apparatus. Still more particularly it relates to a crimping apparatus having removable and adjustable crimping members.

An object of this invention is to provide a simple, improved multiple crimping apparatus. Another object is to provide such a crimping apparatus in which the multiple crimping actions operate simultaneously. A further object is to provide such a crimping apparatus in which the crimping members are removable and adjustable. Still other objects will be apparent from the following description of the invention.

The apparatus for crimping hollow-to-hollow or hollow-to-solid articles of this invention comprises a base member provided with a vertical extension, said vertical extension having an indentation for receiving said article to be crimped, a top clamping member having an indentation for receiving said article and being pivotally mounted on said vertical base member, an actuating handle pivotally mounted on said top clamping member, said handle having a slot for receiving a crimping tool, three adjacent camming members each of said camming members being connected to its adjacent camming member and having a slot for receiving a punch or crimping tool, two of said camming members being pivotally mounted on said vertical extension, said third camming member being pivotally mounted on said top clamping member and being connected to said actuating handle, and a crimping tool inserted in each of said slots.

The crimping apparatus will now be more fully described with reference to the accompanying drawing which forms a part of this application. In the drawing, the same reference numerals refer to the same parts throughout the several views. With reference to the drawing

FIGURE 1 is a side elevational view of the apparatus in the open position;

FIGURE 2 is a side elevational view of the apparatus in the semi-closed position;

FIGURE 3 is a side elevational view of the apparatus in the closed position;

FIGURE 4 is a perspective view of a section of an article that has been crimped by the apparatus.

The novel multiple crimping apparatus of this invention, as illustrated in the drawing, comprises a base member provided with a vertical extension or flange 1. The vertical extension can be integrally connected to the base or can be mounted thereon by means known in the art. The vertical extension whose thickness is not critical as a semicircular indentation 1a on its upper surface for receiving a portion of an article 9 to be crimped. The indentation supports and prevents the original shape of the article from being distorted during the crimping operation. The indentation can be of a different configuration than is illustrated, e.g., it can be rectangular, square, annular, etc., but is dependent on the shape of the article to be crimped. Pivotaly mounted on said vertical extension 1 of the base member is a top clamping member 2 which connects the base with an actuating handle 3. The top clamping member has an indentation 2a for receiving a portion of the article to be crimped and which may complement the indentation on the vertical extension. Indentation 2a, like the indentation on

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the vertical extension, supports and prevents the shape of the article from being distorted during the crimping operation. The top clamping member 2 can be straight, curved or can be of annular configuration. The indentation can be of any pattern but, as indicated above, is dependent on the article to be crimped. The actuating handle 3 is pivotally mounted on the top clamping member 2 at an end of said member opposite its base member pivot connection. The handle is provided with a narrow slot for receiving a crimping tool or punch 8 and extends in an upwardly position when the apparatus is in the open position as shown in FIGURE 1. Three adjacent camming members 4, 5 and 6, each having a narrow slot for receiving a crimping tool or punch 8, are the other members of the apparatus which provide the crimping or punching action. Camming members 4 and 5 are pivotally mounted on the vertical extension of the base while camming member 6 is pivotally mounted on top clamping member 2. The adjacent camming members are connected by means of levers or links 7, e.g., rigid connecting links. Camming member 6, in addition to being connected to adjacent camming member 5, is connected to the actuating handle. The slot in the camming members and actuating handle for receiving a crimping tool or punch is generally provided with two or more set screws, one for moving the tool and one or more for locking the tool at the desired setting. By adjusting the screws, the penetration of the tool into the article being crimped can be easily controlled.

In operation, with the apparatus clamped or bolted to a suitable support and in the open position as shown in FIGURE 1, an article 9, such as shown in FIGURE 4 but prior to crimping, is inserted in the indentation 1a of the vertical extension. The article to be crimped, as previously mentioned, must fit into the opening formed by the indentations of the vertical extension and top clamping member (see FIGURE 3). The article to be crimped preferably is the metal sleeve portion of an adjustable length connecting device for joining spaced explosive charges. Such a device is described in assignee's Andrews and Carey application Serial No. 797,678, filed March 6, 1959. The invention is not limited to the above-described article, however, as rectangular or square boxes, and spherical, oval, conical, triangular, etc., shaped articles can be crimped or punched using a modified apparatus as previously described.

Once the article has been placed in the indentation of the vertical extension, force is applied by moving the actuating handle in a downwardly direction as shown in FIGURE 2. The interconnected members thereby move in a rotary-like direction, the camming members and handle rotating so that the ends of the crimping tools enter the article and provide the crimping action. The two halves of the indentations conform to the external shape of the article and clamp or hold the article in position as well as prevent the shape from being distorted.

The actuating handle is preferably provided with a cam lock roller (cam follower) attachment 10, e.g., nut and bolt, rivet, pin, ball or other device which, as the handle is moved downward, slidably fits into an angular cam locking slot 11 in the vertical extension. The downward movement of the lever is halted when the cam lock roller reaches the base of the cam locking slot. The apparatus is then in the closed position as shown in FIGURE 3, the perforations being spaced at essentially a 90° angle with respect to one another. While the right angle crimps are preferred, the spacing is not critical.

The tool 8 for perforating and crimping the article is a standard punch, e.g., a nail-type punch. Other types of punches and tools of various contours can be inserted in the slots, e.g., square, round, triangular, etc. The punches can have single or multiple points. The inserted tools

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must, of course, have ends which, when inserted in the slots, fit tightly or can be readily fastened therein. It is understood that the tools can vary in length and size, and the depth of penetration into the article can be easily adjusted as previously described. The crimping tools can be fabricated from steel, or other hard, long-wearing metal or alloy. Plastic tools are also useful.

The members that comprise the crimping apparatus are preferably fabricated from cold-rolled steel stock although other metals can be used such as stainless steel, carbon steel, aluminum, brass, etc. The parts can be machined while some of the members, e.g., camming members, can be cast. Hard, durable plastics can also be used.

While the crimping devices of this invention were expressly designed for simultaneously indenting the metal sleeve of a telescoping unit for joining explosive charges thereby locking the unit at the desired length, they may find utility in packaging or in crimping other articles such as tubes, boxes, etc., or fastening another article to the preceding articles. Any number of indentations up to four can be made by the apparatus as shown. Additional camming members and crimping tools or punches can be added to the apparatus merely by changing the apparatus design slightly. The modifications can produce any desired number, pattern or shape of indentations.

An advantage of this invention is that the crimping apparatus can be used to make multiple indentations simultaneously in an article. Another advantage is that the apparatus is so designed that the crimping tools or punches can be removed, interchanged or substituted tools of different configurations can be inserted. Still another advantage is that the depth of penetration of the crimping tools is adjustable. Yet another advantage is that the apparatus is of simple construction and is easy to operate. Still other advantages will be apparent from the foregoing description.

What is claimed is:

1. An apparatus for crimping an article which comprises a base member provided with a vertical extension, said vertical extension having an indentation for

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receiving said article to be crimped, a top clamping member having an indentation for receiving said article and being pivotally mounted on said vertical base member, an actuating handle pivotally mounted on said top clamping member, said handle having a slot for receiving a crimping tool, three adjacent camming members each of said camming members being pivotally connected to its adjacent camming member and having a slot for receiving a crimping tool, two of said camming members being pivotally mounted on said vertical extension, said third camming member being pivotally mounted on said top clamping member and being connected to said actuating handle, and a crimping tool inserted in each of said slots.

2. A crimping apparatus as defined in claim 1 wherein said actuating handle extends upwardly when said apparatus is in an open position.

3. A crimping apparatus as defined in claim 1 wherein the indentations in said vertical extension of the base and said top clamping member are of semi-circular configuration.

4. A crimping apparatus as defined in claim 1 wherein said crimping tools are nail-type punches.

5. A crimping apparatus as defined in claim 1 wherein said adjacent camming members and actuating handle are connected by rigid connecting links.

6. A crimping apparatus as defined in claim 1 wherein said vertical extension is provided with an angular cam slot and said actuating handle is provided with a cam roller, said cam slot and cam roller being so positioned on their respective members that as said handle is moved downwardly said roller slidably fits into said slot and descends to the base of said slot thereby halting the downward movement of the handle and the crimping action.

References Cited in the file of this patent

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