Dec. 22, 1936. C. O. CARLSON 2,065,488

TOOL

Filed Feb. 4, 1936 4 Sheets-Sheet 1

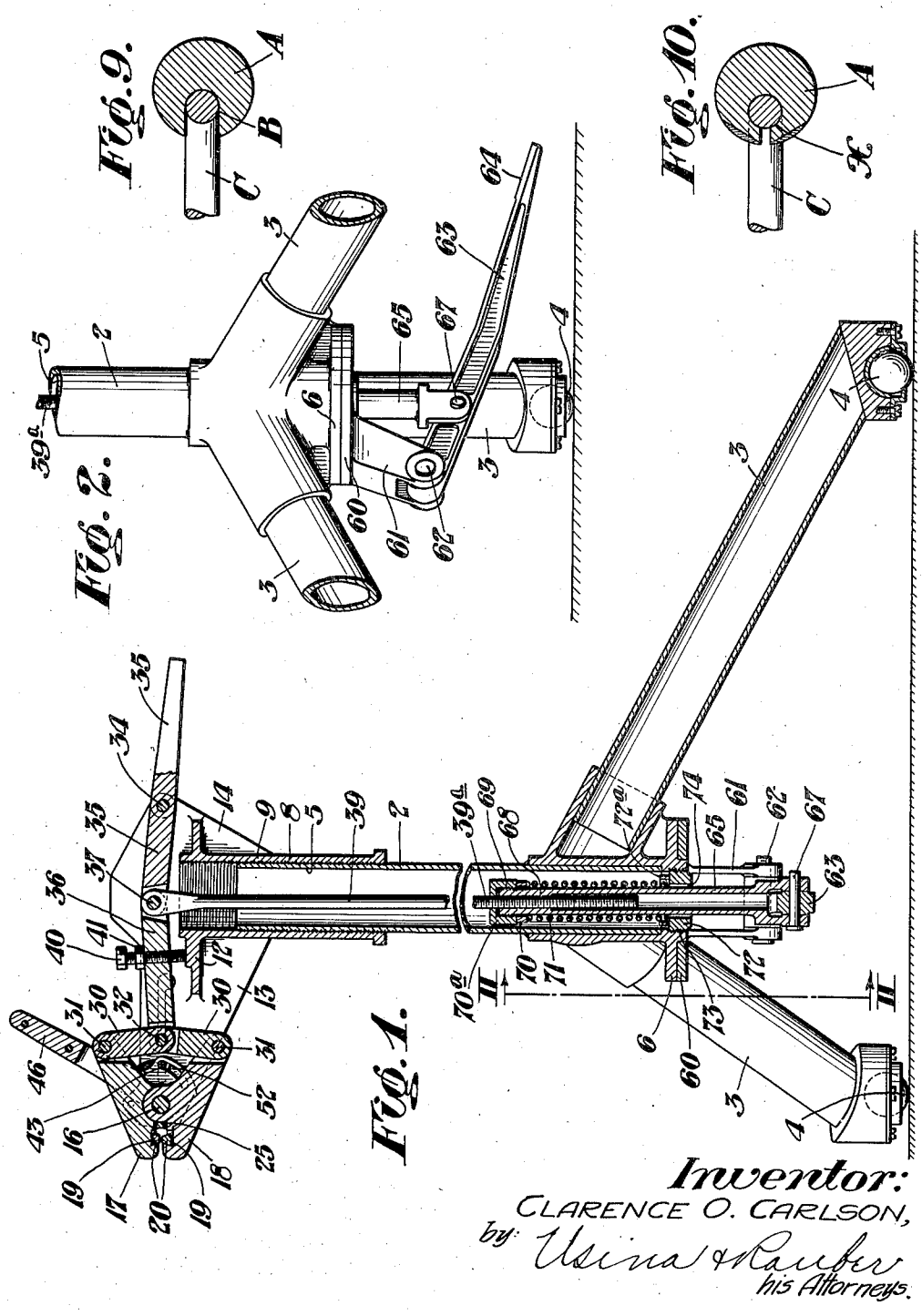

Fig. 1.

Fig. 2.

Fig. 9.

Fig. 10.

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TOOL

Filed Feb. 4, 1936 4 Sheets-Sheet 2

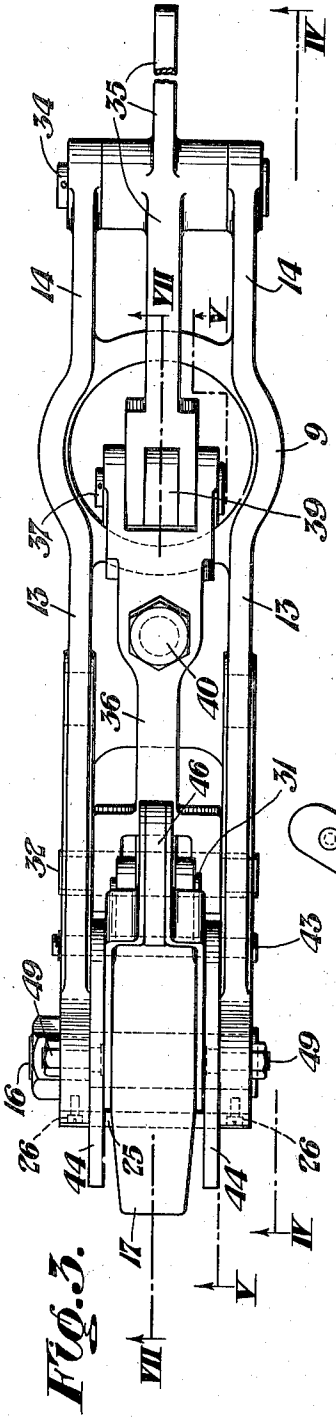

Fig. 3.

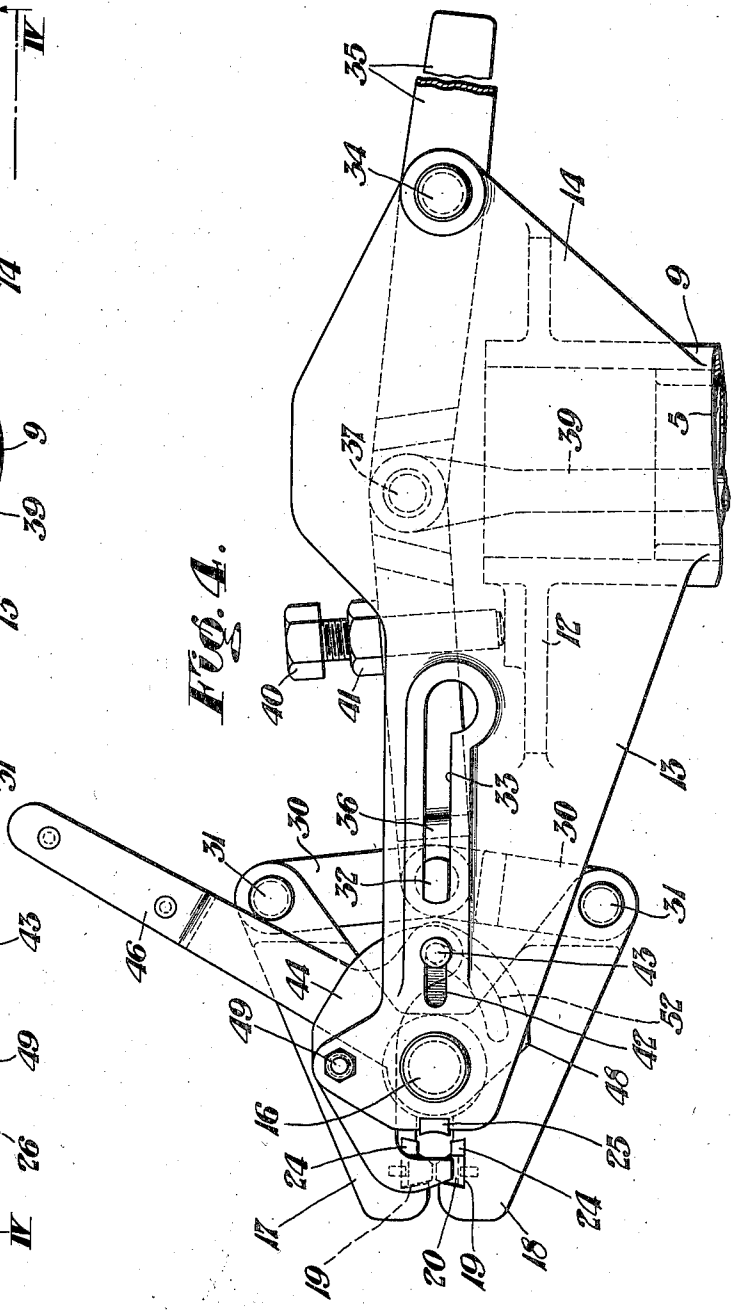

Fig. 4.

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TOOL

Filed Feb. 4, 1936 4 Sheets-Sheet 3

Fig. 5.

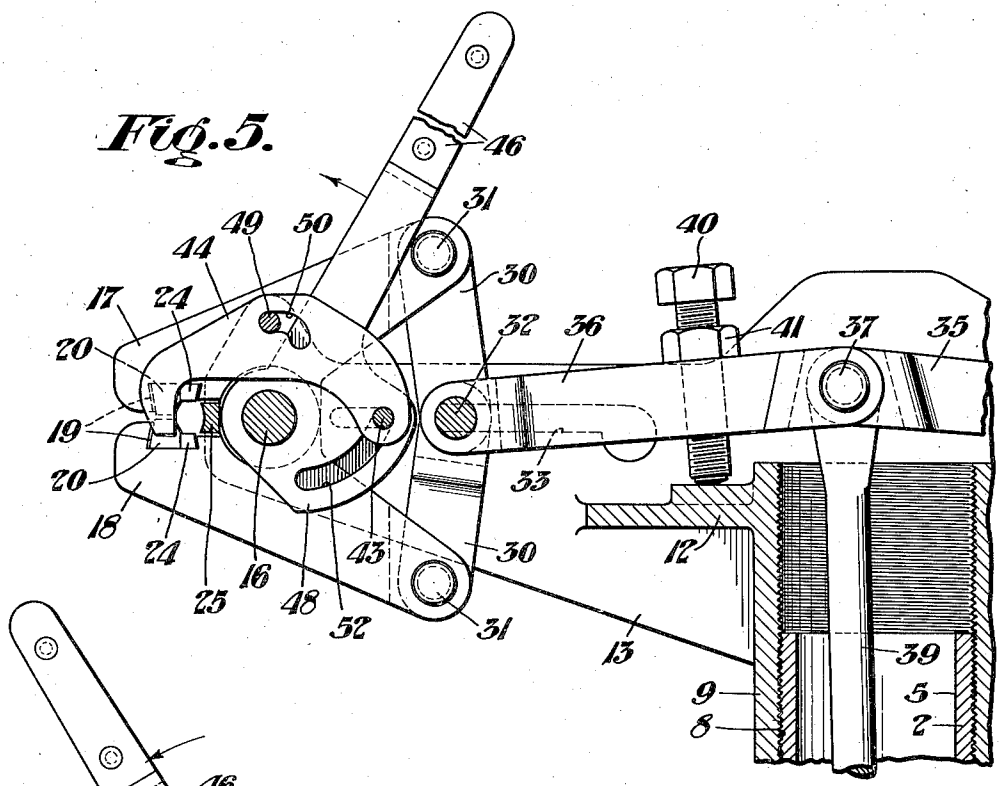
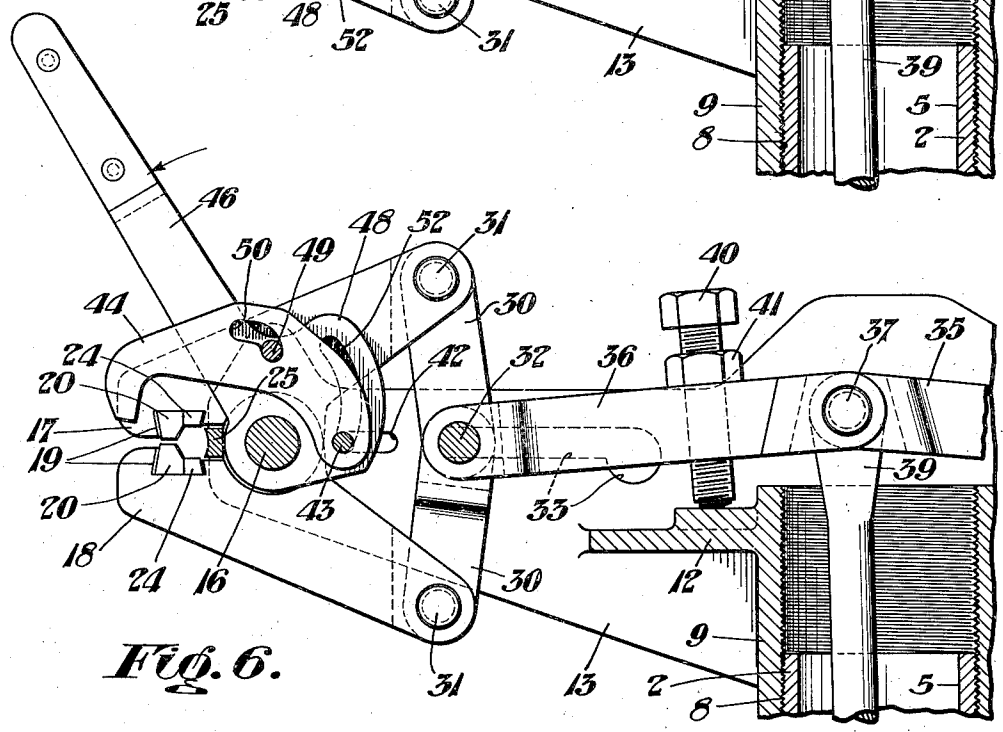


Fig. 6.



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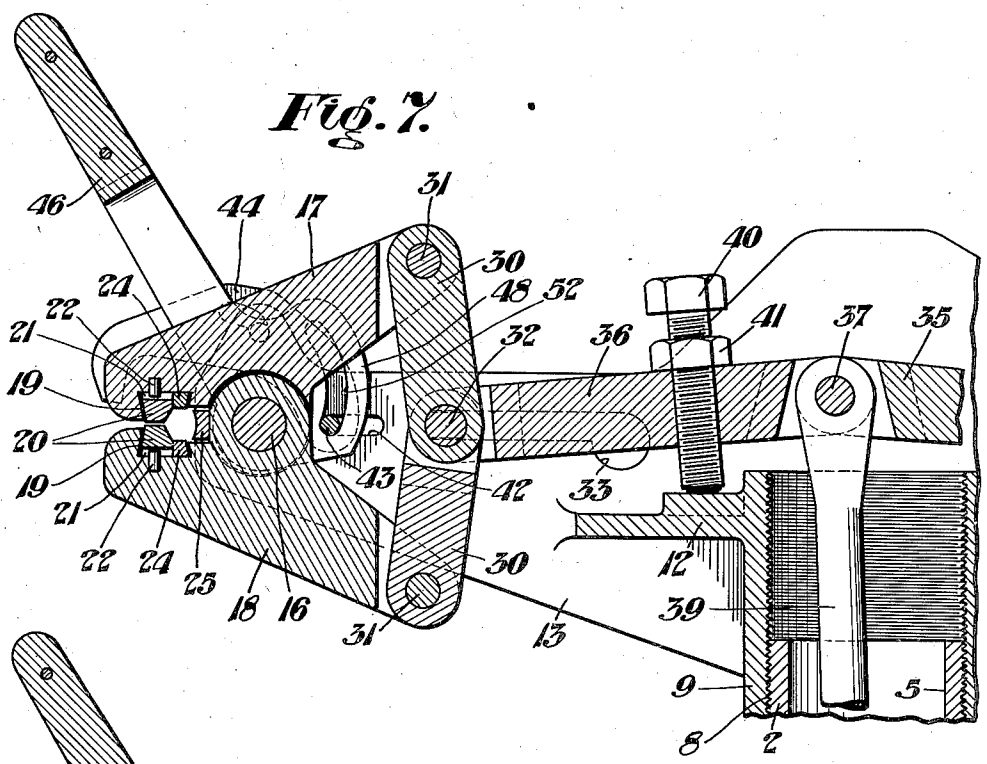
Filed Feb. 4, 1936 4 Sheets-Sheet 4

Fig. 7.



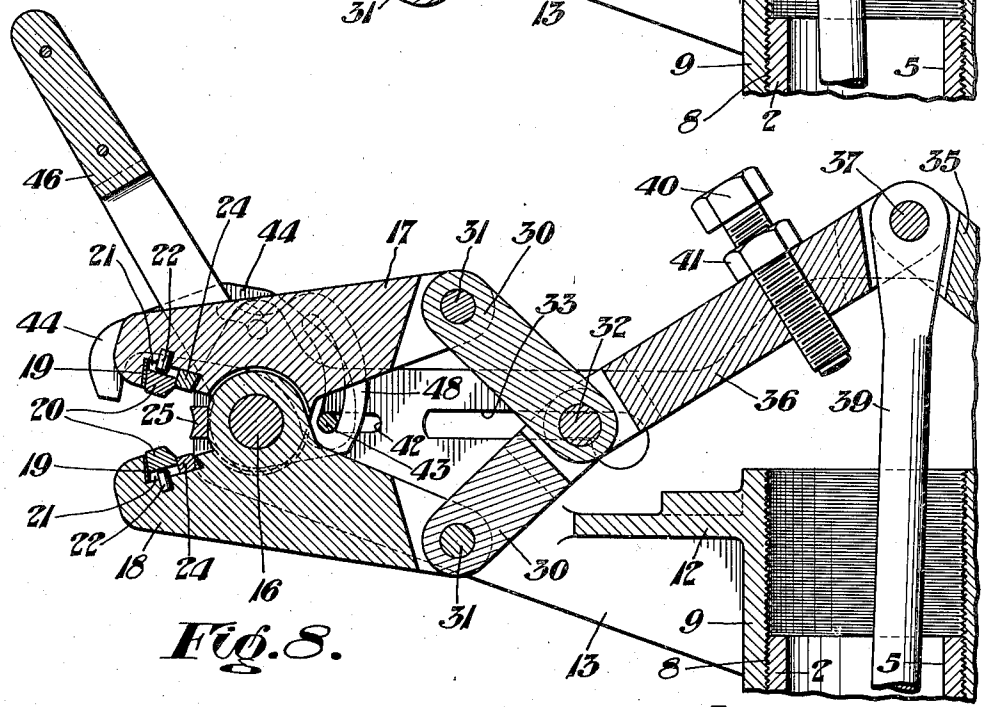


Fig. 8.

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Patented Dec. 22, 1936 2,065,488

UNITED STATES PATENT OFFICE

2,065,488

TOOL

Clarence O. Carlson, Cleveland Heights, Ohio, assignor to The American Steel and Wire Company of New Jersey, a corporation of New Jersey

Application February 4, 1936, Serial No. 62,373

4 Claims. (Cl. 140—55)

This invention relates to tools, and more particularly to one which is adapted for rigidly connecting wire articles, such as bed-spring coils, etc., to grooved border wires, although not limited thereto.

It is common practice, in the manufacture of bed-springs, to connect the outside edges, or convolutions, of spring units to a grooved border wire, in which they are adapted to seat. The grooved border wire is then upset, or deformed, making a rigid connection. The upsetting of the grooved border wire is only accomplished with considerable difficulty when using the various devices of the prior art.

In my Patent No. 2,017,039, dated October 15, 1935, entitled "Tools", I have disclosed a device for upsetting grooved border wire in a very expeditious manner. The tool of this patent is one which is intended to be operated by hand, and is accordingly of relatively light construction.

It is among the objects of the present invention to provide a novel heavy duty tool for assembling elements of the type referred to in a very simple and easy manner.

Another object is the provision of a device of the class described which effects the upsetting of the grooved border wire without necessitating the use of the hands of the operator of the device.

These and further objects will be apparent after referring to the drawings, in which:

Figure 1 is a sectional elevation of the device of the invention.

Figure 2 is a fragmentary elevation on the line II—II of Figure 1.

Figure 3 is a plan of a portion of the device.

Figure 4 is an elevation on the line IV—IV of Figure 3.

Figure 5 is a sectional view on the line V—V of Figure 3.

Figure 6 is a view similar to Figure 5 but showing some of the elements of the device in other positions.

Figure 7 is a sectional view on the line VII—VII of Figure 3.

Figure 8 is a view similar to Figure 7 but showing some of the elements of the device in other positions.

Figures 9 and 10 are enlarged sectional details.

Referring more particularly to the drawings, the numeral 2 designates a vertical sleeve which is supported by suitable legs 3, the latter being provided on their lowermost extremities with conventional casters 4.

The sleeve 2 has a central bore 5 at the bottom of which there is provided an annular outwardly extending flange 6. The vertical sleeve 5 is externally threaded on its upper end, as at 8, to carry an internally threaded housing 9, which is of relatively cylindrical shape. The housing 9 is disposed at a height which is suitably accessible to a workman and provided on its upper end with an outwardly extending flange 12, and two pairs of horizontal arms, as at 13 and 14, which extend in opposite directions.

The arms 13 on the housing 9 carry a pin 16 on their outer extremities. A pair of cooperating upper and lower jaw members are pivotally supported by the pin 16, as at 17 and 18, respectively. The outermost ends of the jaws 17 and 18 are recessed on their adjacent faces, as at 19, in order that each may receive a die member 20. Each of the die members 20 is slotted at right angles to the axis of the pin 16, as shown at 21, to receive a pin 22, which prevents its displacement.

The die members 20 are held against lateral movement toward the pin 16 by means of wedges 24, one of which is disposed in each of the recesses 19. The upper and lower jaws 17 and 18, respectively, are so shaped between the pin 16 and their outer extremities as to receive a bar 25, which is concaved on its outer face. The bar 25 is secured to the outer ends of the arms 13 by means of cap-screws 26.

A pair of links 30 are pivoted, as at 31, to the ends of the upper and lower jaw members 17 and 18, respectively, which are most adjacent the housing 9. The adjacent ends of the links 30 are connected together by means of a pin 32, the ends of which are slidably disposed in suitable slots, or grooves, 33 on the inner faces of the arms 13.

A pin 34 is carried on the outer ends of the arms 14, and pivotally supports a lever 35. A link 36 is suitably connected on one of its ends to the pin 32, which connects the link 30, and on its other end to the lever 35 by means of a pin 37. The pin 37 is disposed in alinement with the bore of the housing 9, and has connected thereto a downwardly extending operating rod 39. The link 36 carries an adjusting screw 40 for preventing its excessive downward movement toward the flange 12 on the housing 9, with which it makes contact, and is suitably maintained in adjusted position by means of a lock-nut 41.

The outer ends of the arms 13 are horizontally slotted, as at 42, to receive a pin 43 between the upper and lower jaw members 17 and 18, respectively. To this pin 43 there is pivoted a pair of

forwardly extending curved links 44, one on each side of the upper jaw member 17. A bifurcated lever 46 is pivotally mounted on the pin 16 which carries the upper and lower jaw members 17 and 18, respectively. Each of the arms 13 carries a pin 49 which extends into a curved slot 50 in each of the curved links 44. The offset portion 48 of the lever 46 has a curved slot 52 through which the pin 43 extends. It will be seen from Figures 5 and 6 that the backward and forward movement of the lever 46 causes the forward ends of the links 44 to register with the recesses 19 in the upper and lower jaw members 17 and 18, respectively. This permits the links 44 to effectively hold the outside convolution of a coil spring in a groove in a border wire which is disposed between the die members 20.

It will be understood by those skilled in the art that the operating rod 39 is readily susceptible to being vertically reciprocated at proper intervals by suitable power, or one of a number of manually operable devices which do not require the use of the hands of an operator. One form of such a manually operable device is illustrated as embodying a foot-control. According to this embodiment, the flange 6 of the sleeve 2 carries an attached plate 60 which is provided with downwardly extending arms 61 to which there is pivoted, as at 62, a suitable foot-lever 63. This foot-lever 63 carries on its end opposite its pivot 62 the usual pedal portion 64. A small-diameter tube 65 is connected to the foot lever 63 intermediate its ends, as shown at 67.

This small-diameter tube 65 extends into the bore 5 of the sleeve 2 and is screw-threaded on its upper extremity, as shown at 68. The lower end of the operating-rod 39 is screw-threaded, as at 39a, to cooperate with the screw-threads 68 of the tube 65. The pitch of the threads of the bore of the housing 9 and the cooperating threads 8 on the sleeve 2 is the same as the pitch of the threads 68 of the tube 65 and the cooperating threads 39a of the operating-rod 39, respectively. This provides for the adjustment of the housing 9 with respect to the upper end of the sleeve 2 without causing the disconnection of the operating-rod 39.

A nut 70a is carried on the threaded portion 69 of the tube 65. A spring 71 is carried on the tube 65, below the collar 70, and is confined from downward movement out of the bore 5 of the sleeve 2 by means of a plug 72, which is screw-threaded, as at 73, into the bottom of the flange 6. The plug 72 is apertured, as at 74, to receive the tube 65. The lower end of the spring 71 is held in the collar 72a.

In operation: A border wire A (Figures 9 and 10) having a deformable groove B therein is disposed between the upper and lower jaw members 17 and 18 and against the concaved face of the bar 25 with the groove B extending outwardly.

The outside convolution C of a coil spring is suitably disposed in the groove B of the border wire A, and the lever 46 is moved toward the housing 9, thus moving the links 44 to hold the convolution in this position.

The foot lever 63 is depressed, causing the small-diameter tube 65 to move downwardly against the spring 71. The downward movement of the tube 65 causes the similar movement of the operating rod 39 to which it is connected. This moves the pin 37 downwardly and causes the link 36 to move the pin 32 toward the pin 16 which is held between the arms 13. This movement of the pin 32 in the groove 33 causes the links 30 to force apart the ends of the upper and lower jaw members 17 and 18, respectively, which are nearest the housing 9. This moves the die members 20 toward each other, and causes the border wire A to be upset around its groove B, as shown at X in Figure 10, whereby the outside convolution C of coil spring is securely held. Deformation of the groove B is continued until the adjusting screw 40 on the link 36 comes into contact with the flange 12 on the housing 9. The wedges 24 which hold the die members 20 in the recesses 19 are so constructed and arranged that the distance between them is equal to the diameter of the border wire A when the upper and lower jaw members 17 and 18 are in closed position. It will thus be seen that if one die member 20 performs its function on the border wire A before the other die member, the border wire A engages the wedge and prevents further travel in that direction. This insures equal upsetting of the border wire A on both of its sides.

After the upsetting of the border wire A around its groove B is completed and the outside convolution C of the coil spring suitably secured therein, the foot lever 63 is released, which permits the spring 71 to expand. This moves the operating rod 39 upwardly, withdrawing the links 30, and forces apart the ends of the jaw members 17 and 18.

The lever 46 is then moved away from the housing 9, causing the links 44 to move backwardly and away from the outside convolution C of the coil spring, consequently releasing the latter. It is to be understood that the present invention contemplates the provision of a suitable power unit for reciprocating the operating rod 39, in lieu of the foot lever 63.

While I have shown and described certain other specific embodiments, it is also to be understood that various modifications may be made without departing from the scope of the invention, as defined by the following claims.

I claim:

1. A tool for connecting an element to a second element having a deformable groove comprising, in combination, a housing, a pair of jaw members pivoted on said housing, means connecting one end of each of said jaw members, an operating rod, a link connecting said operating rod and the means connecting one end of each of said jaw members, and a lever for moving said operating rod whereby said jaw members are caused to deform said groove.

2. A tool for connecting an element to a second element having a deformable groove comprising, in combination, a housing, a pair of jaw members pivoted on said housing, means connecting one end of each of said jaw members, an operating rod, a link connecting said operating rod and the means connecting one end of each of said jaw members, a lever for moving said operating rod whereby said jaw members are caused to deform said groove, and means for resisting the movement of said lever.

3. A tool for connecting an element to a second element having a deformable groove comprising, in combination, a housing, a pair of jaw members pivoted on said housing, a die carried by one end of each of said jaw members, linkage connecting the other ends of said jaw members, a stop carried by said housing for enabling the positioning of said second named element between said pivoted jaw members, means for supporting said

first named element in the groove in said second named element, and means connected with said linkage for simultaneously moving both of said jaw members to deform said groove.

4. A tool for connecting an element to a second element having a deformable groove comprising, in combination, a housing, a pair of jaw members pivoted on said housing, a die carried by one end of each of said jaw members, linkage connecting the other ends of said jaw members, a stop carried by said housing for enabling the positioning of said second named element between said pivoted jaw members, means for supporting said first named element in the groove in said second named element, an operating rod, a link connecting said rod and the linkage connecting said jaw member, and means for moving said last named link toward said linkage, whereby said jaw members are simultaneously moved to cause their dies to deform said groove.

CLARENCE O. CARLSON.