Oct. 15, 1935. C. O. CARLSON 2,017,039

TOOL

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Fig. 1.

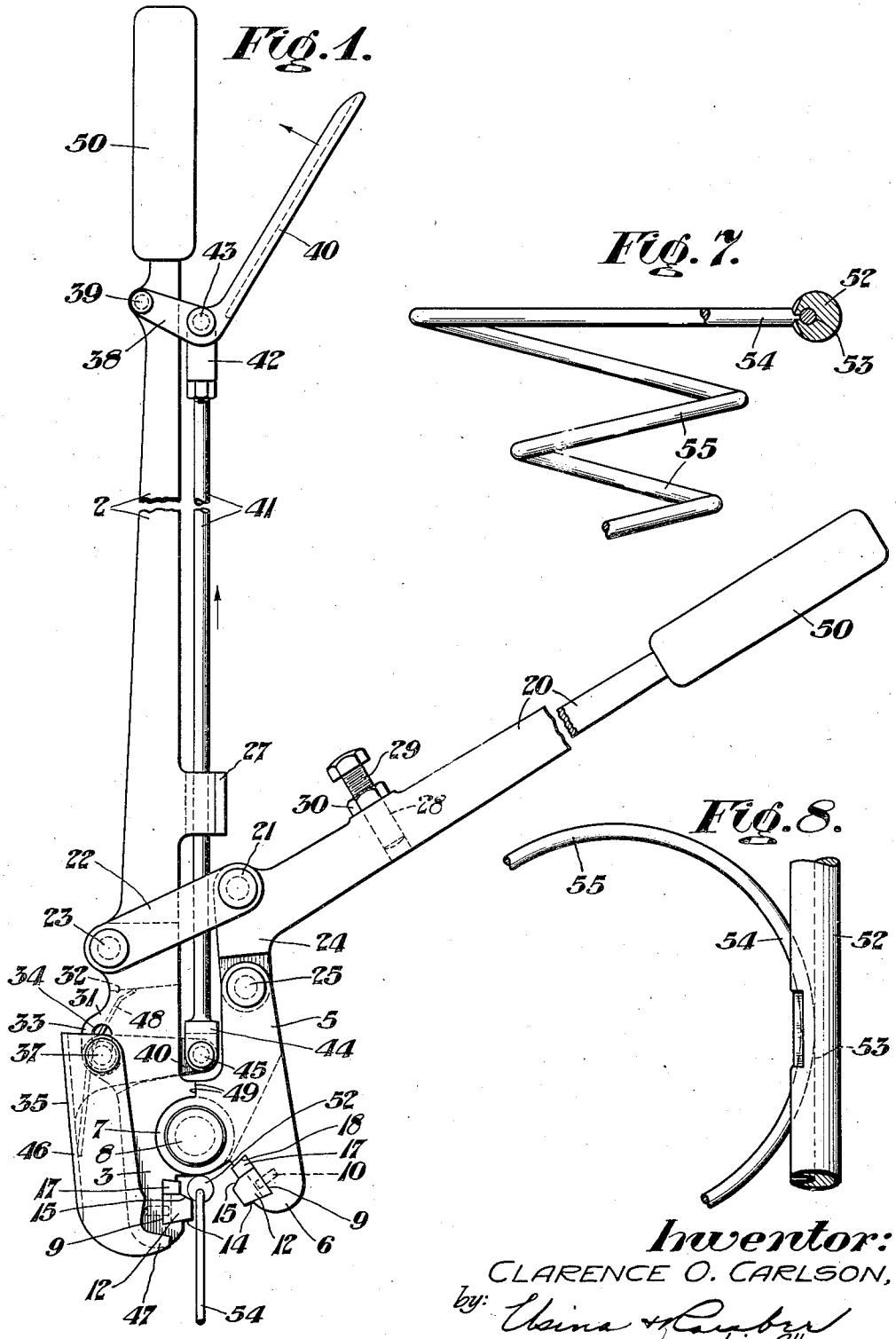


Fig. 7.

Fig. 8.

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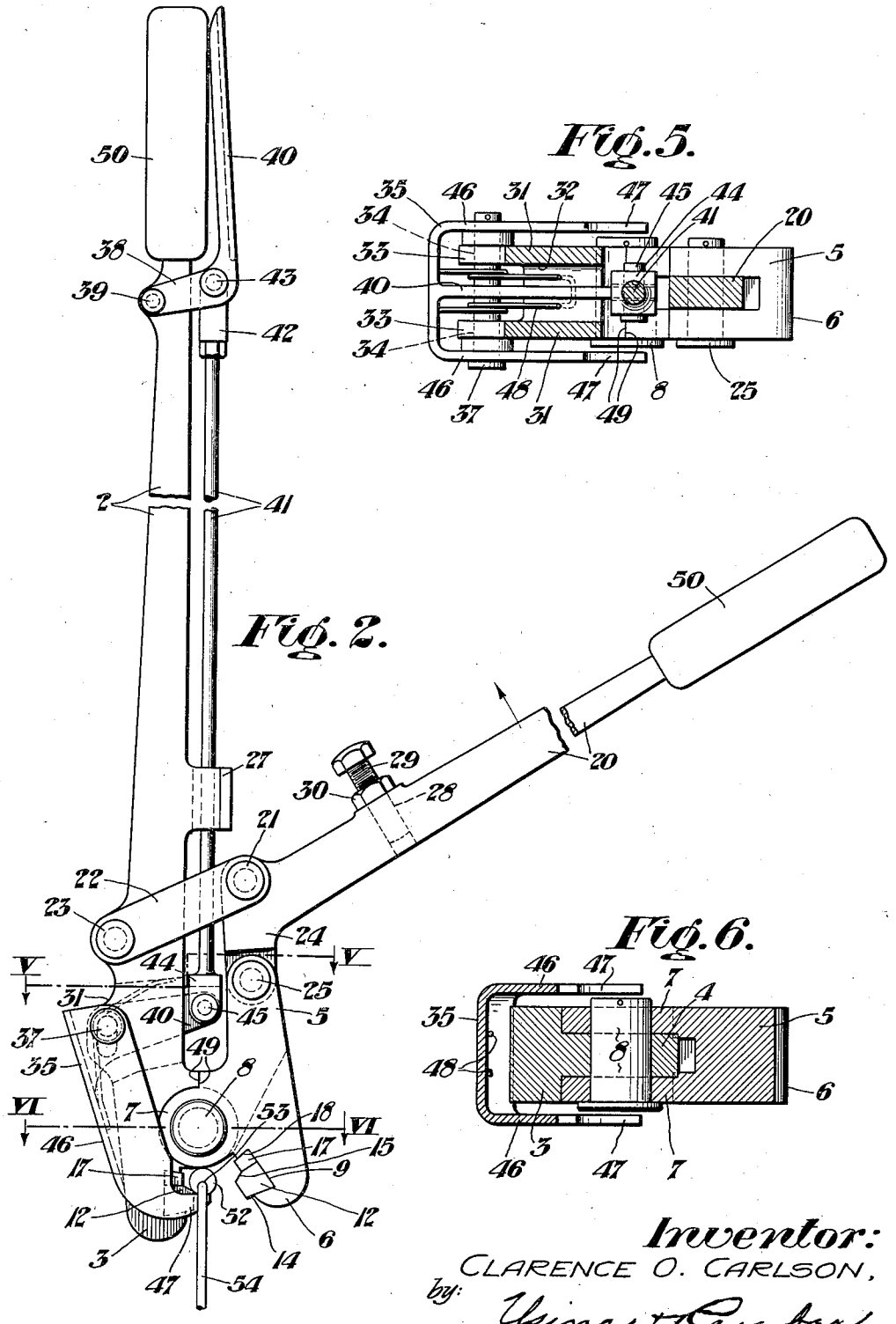


Fig. 2.

Fig. 5.

Fig. 6.

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Fig. 3.

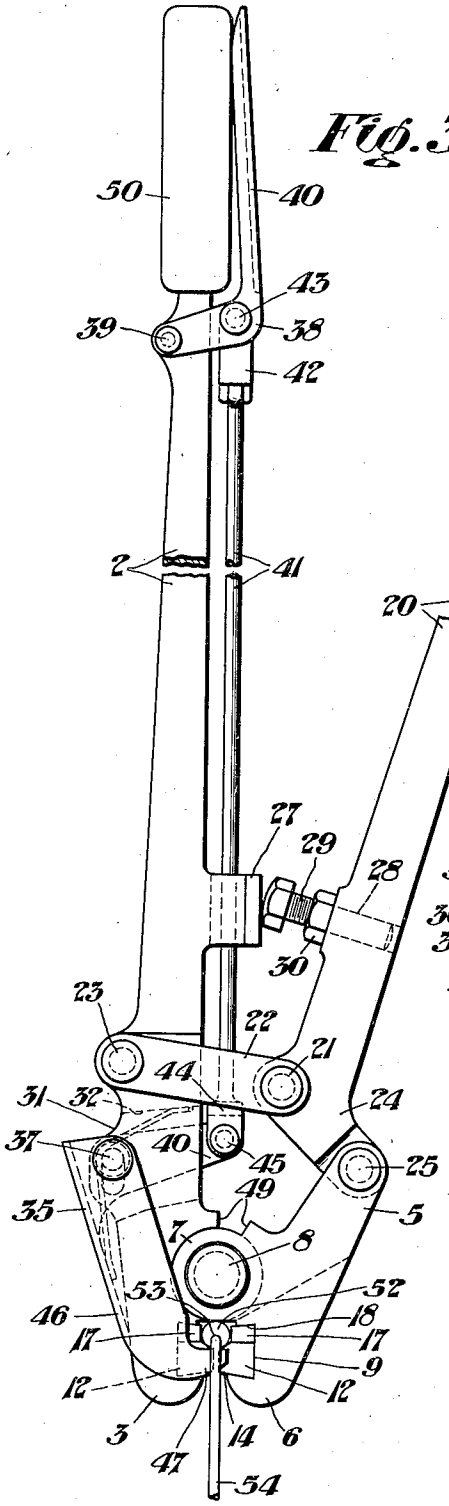
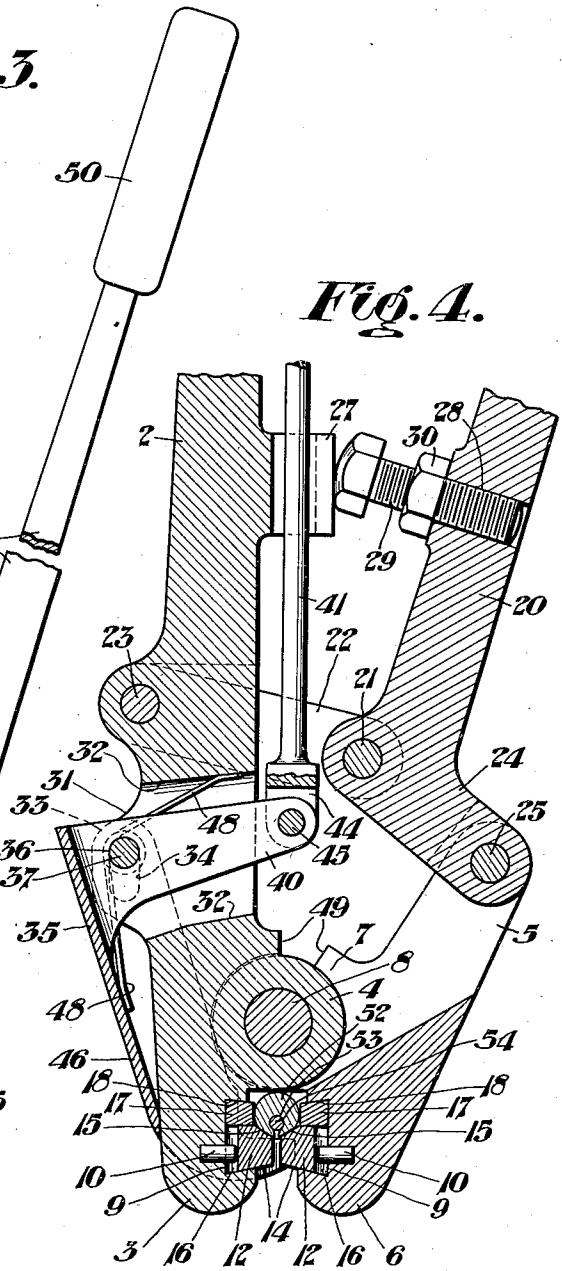


Fig. 4.



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Patented Oct. 15, 1935 2,017,039

UNITED STATES PATENT OFFICE

2,017,039

TOOL

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Application November 21, 1934, Serial No. 754,156

4 Claims. (Cl. 140—55)

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

In the manufacture of bed springs and the like it is common practice to assemble and interconnect the outside edges or convolutions of spring units to a grooved border wire in which they are adapted to seat. The forming of the rigid connection between these elements (i. e., the outside convolutions of the spring units and the grooved border wire) has heretofore been accomplished with considerable difficulty by utilizing various types of crimping tools.

It is one of the objects of the present invention to provide a novel 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 may be easily and cheaply manufactured and at the same time prove durable in service.

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

Figure 1 is a side elevation of the novel tool of the invention.

Figure 2 is a view similar to Figure 1 but disclosing various elements thereof in a stage of its operation.

Figure 3 is a side elevation of the elements of the tool in another stage of operation.

Figure 4 is an enlarged sectional elevation of the tool in a third stage of its operation.

Figure 5 is a sectional view on the line V—V of Figure 2.

Figure 6 is a sectional view on the line VI—VI of Figure 2.

Figures 7 and 8 are, respectively, a fragmentary sectional elevation and a fragmentary plan, showing the manner in which the tool functions to rigidly connect the outside convolution of a spring unit to a grooved border wire.

Referring more particularly to the drawings, the numeral 2 designates a stationary lever which is provided adjacent its lower extremity 3 with a cylindrical boss 4. A relatively short lever 5 is provided adjacent its lower extremity 6 with a cylindrical boss 7 which is adapted to intermesh with the cylindrical boss 4 of the stationary lever 2 and to be secured thereto in pivotal relationship with a pin 8. The lower extremities 3 and 6 of the levers 2 and 5, respectively, are each provided on their adjacent surfaces with a wedge-shaped recess 9 in each of which there is disposed a projecting pin 10. A die 12 is adapted for disposal in each of the wedge-shaped recesses 9 and each has a lower inclined side wall 14 for engagement with the lower side walls of the latter. The dies 12 are beveled on their upper adjacent edges, as at 15, and each has a vertical slot 16 to accommodate one of the pins 10 and restrain itself against longitudinal movement.

A wedge 17, having an inclined wall 18, is disposed in each of the wedge-shaped recesses 9 for maintaining the dies 12 rigidly therein.

A movable operating lever 20 is pivotally connected as at 21 to a link 22, the other end of which is connected in a like manner, as shown at 23, to an intermediate portion of the stationary lever 2. This movable operating lever 20 is provided with an offset 24 adjacent its pivotal connection 21 to the link 22, which is pivotally connected, as at 25, to the upper end of the relatively short pivoted lever 5. A sleeve 27 is integrally formed on the intermediate portion of the stationary lever 2 on its side adjacent the movable operating lever 20, and the latter is provided in relative alinement therewith with a screw-threaded aperture 28 in which there is disposed a capscrew 29. The capscrew 29 is adapted to abut the sleeve 27 in such manner as to restrain excessive proximity of the stationary lever 2 and the movable operating lever 20, and is locked in adjusted position by means of a nut 30.

The stationary lever 2 carries an offset 31 immediately below the pivotal connection 23 of the link 22, and has formed therein a slot 32. This provides a pair of ears 33 in each of which there is provided a vertically extending slot 34. A bell-crank lever 35 is disposed with one of its arms extending through the slot 32 and has at the jointure of its arms an aperture 36 through which a pin 37 extends to seat in either side in the vertically disposed slots 34 in the offset 31 of the stationary lever 2.

A bell-crank lever 38 is pivotally connected, as at 39, adjacent the upper extremity of the stationary lever 2. This bell-crank lever 38 is provided with an upward extension 40. A rod 41 is provided with a relatively adjustable sleeve 42 which is pivotally connected, as at 43, to the bell-crank lever 38 and carries on its other end a clevis 44 which is pivotally connected, as at 45, to the upper end of the bell-crank lever 35.

The lower portion, or arm, of the bell-crank lever 35 is of substantial channel-shape, as shown at 46, for nesting over the lower extremity 3 of the stationary lever 2. This channel-shaped portion 46 of the bell-crank lever 35 is provided on

each of its lower edges with a substantially right angular extension 47.

In order to provide for the influencing of the substantially channel-shaped portion 46 of the bell-crank lever 35 away from the lower extremity 3 of the stationary lever 2, a spring 48 is disposed around the pin 37 with its radially extending ends resting against the upper side wall of the slot 32 and the other against the back wall of the channel-shaped portion 46.

The stationary lever 2 and the relatively short pivoted lever 5 are each provided immediately above their cylindrical bosses 4 and 7, respectively, with an abutment 49 to limit the excessive rotation thereof.

Referring to Figures 7 and 8 of the drawings, the numeral 52 designates a border wire having formed therein a groove 53 in which it is desired to rigidly maintain the outside convolution 54 of a spring unit generally indicated at 55.

In order to facilitate the crimping of the stationary lever 2 and the movable operating lever 20, their upper extremities are provided with handle portions 50.

In operation, the lower extremities 3 and 6 of the stationary lever 2 and the pivoted lever 5, respectively, are disposed over the border wire 52 as shown in Figure 1. The outside convolution 54 of a spring unit 55 is disposed in the groove 53 in the border wire 52 and held in such position by means of the lower inward extension 47 of the substantially channel-shaped portion 46 of the bell-crank lever 35. This is caused by the movement of the extension 40 on the upper portion of the bell-crank lever 35 toward the handle portion 50 on the upper extremity of the stationary lever 2, which causes the bell-crank lever 35 to be carried upwardly by the upward movement of the pin 37 in the slots 34. The lower inward extensions 47 of the bell-crank lever 33 thus make contact with the inner surface of the outside convolution 54 of the spring unit 55. The movable operating lever 20 is next moved toward the stationary lever 2, thus causing the pivoted lever 5 to move its lower extremity 6 toward the lower extremity 3 of the stationary lever 2. This movement permits the dies 12 to move in such manner that their beveled upper adjacent edges 15 engage the surface of the border wire 52 adjacent its groove 53.

Due to the movement of these portions of the dies 12, the border wire 52 is deformed in such manner as to partially close the opening of the groove 53, thus rigidly maintaining the outside convolution 54 of the spring unit 55 therein. The border wire 52 should be deformed equally on both sides of the groove 53, and this is accomplished by making the wedges 17 of such width that when the lower extremities 3 and 6 of the stationary lever 2 and the pivoted lever 5, respectively, are in their most adjacent positions, the distance between the outside surfaces of the wedges is substantially the same as the diameter of the border wire.

Thus, if one side of the border wire offers less resistance and its crimping is completed before the other, it will come in contact with the surface of the adjacent wedge 17, and prevent further movement in that direction. This permits the other side to be deformed to the proper degree. In order to accommodate variations in the size of the border wire 52, the size of the outside convolution 54 of the spring unit 55 or the depth of the groove 53 of the border wire 52, the dies 12 may be suitably adjusted, as by "shimming".

The tool of the invention has been described in the foregoing specification, for the purpose of convenience, as used in a vertical position, but it is to be understood that it may be used with equal facility in any position, and while I have shown and described one specific embodiment of my invention, it will be understood that I do not wish to be limited exactly thereto, since various modifications may be made without departing from the scope of my invention, as defined by the following claims.

I claim:

1. A tool for rigidly connecting an element to a second element having a deformable groove including, in combination, a lever, a die member secured to said lever adjacent one of its extremities, a relatively short lever pivoted to said first named lever adjacent the extremity to which said die is secured, a die member on said relatively short lever, said last named die being immediately opposite said first named die member, an operating lever pivotally connected to the end of said relatively short lever which is remote from the extremity to which said second named die member is secured, a link connecting said last named lever to said first named lever, and means for maintaining said first named element in the groove of said second named element while between said die members.

2. A tool for rigidly connecting an element to a second element having a deformable groove including, in combination, a lever, a die member secured to said lever adjacent one of its extremities, a relatively short lever pivoted to said first named lever adjacent the extremity to which said die is secured, a die member on said relatively short lever, said last named die being immediately opposite said first named die member, an operating lever pivotally connected to the end of said relatively short lever which is remote from the extremity to which said second named die member is secured, a link connecting said last named lever to said first named lever, means for maintaining said first named element in the groove of said second named element while between said die members, and means for moving said last named means into operative position.

3. A tool for rigidly connecting an element to a second element having a deformable groove including, in combination, a lever, a die member secured to said lever adjacent one of its extremities, a relatively short lever pivoted to said first named lever adjacent the extremity to which said die is secured, a die member on said relatively short lever, said last named die being immediately opposite said first named die member, an operating lever pivotally connected to the end of said relatively short lever which is remote from the extremity to which said second named die member is secured, a link connecting said last named lever to said first named lever, means for maintaining said first named element in the groove of said second named element while between said die members, and means for moving said last named means into operative position, said moving means being remotely operable from the remote end of said first named lever.

4. A tool for rigidly connecting an element to a second element having a deformable groove including, in combination, a lever, a die member secured to said lever adjacent one of its extremities, a relatively short lever pivoted to said first named lever adjacent the extremity to which said die is secured, a die member on said relatively short lever, said last named die being immediately

opposite said first named die member, an operating lever pivotally connected to the end of said relatively short lever which is remote from the extremity to which said second named die member is secured, a link connecting said last named lever to said first named lever, means for maintaining said first named element in the groove of said second named element while between said die members, means for moving said last named means into operative position, said moving means being remotely operable from the remote end of said first named lever, and means for preventing the excessive movement of the lever pivotally connected to said relatively short lever and said first named lever toward the latter.

CLARENCE O. CARLSON.