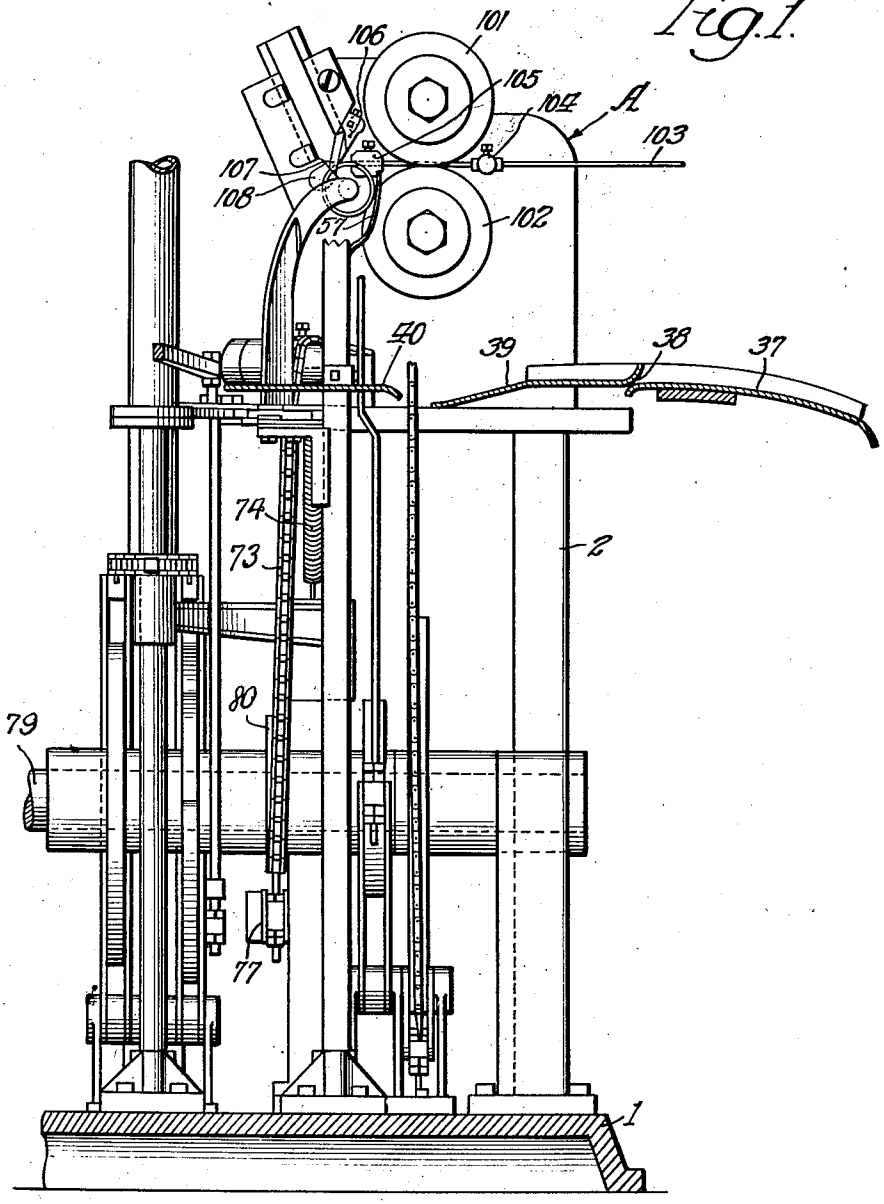
Oct. 6, 1931. J. F. GAIL 1,826,612

WIREWORKING MECHANISM

Original Filed Feb. 26, 1926 3 Sheets-Sheet 1

Fig. 1.



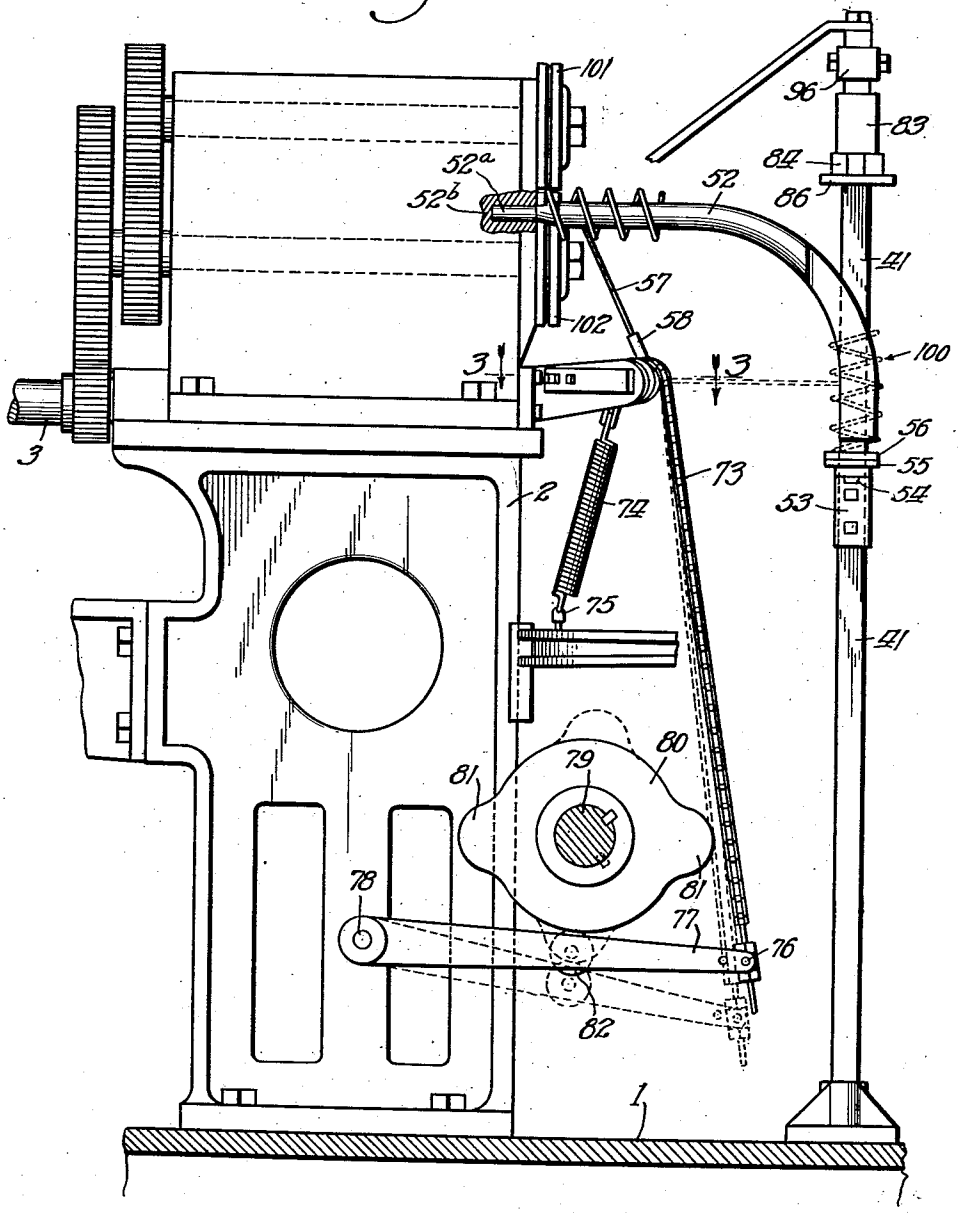
Inventor
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Fig. 2.



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WIREWORKING MECHANISM

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Fig. 3.

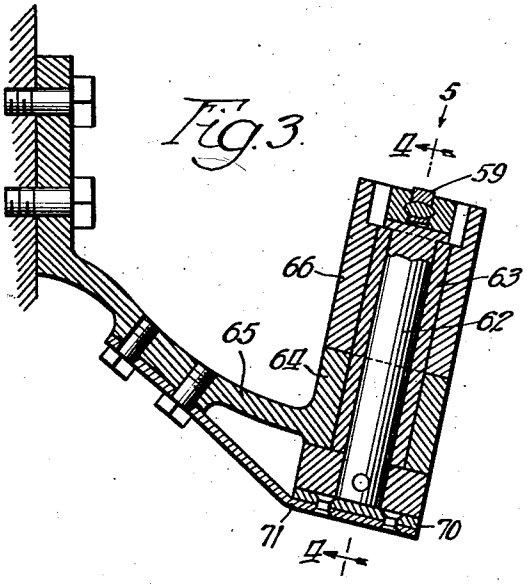


Fig. 5.

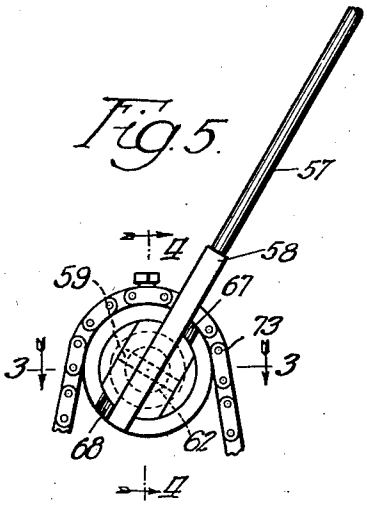


Fig. 4.

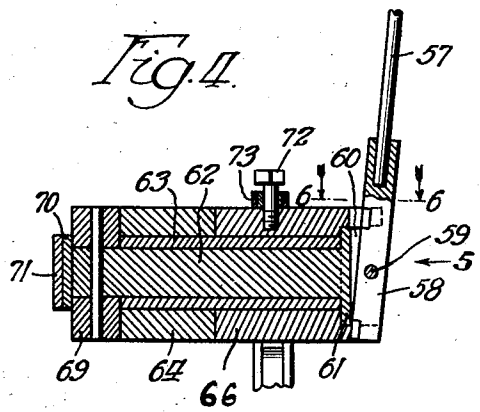


Fig. 6.

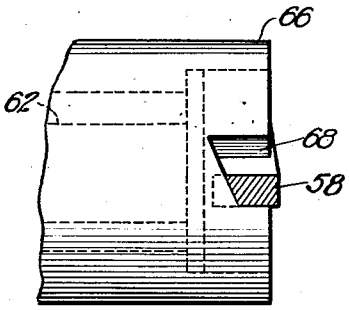
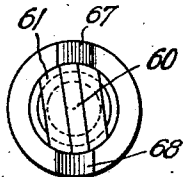


Fig. 7.



Fig. 8.



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Patented Oct. 6, 1931

1,826,612

UNITED STATES PATENT OFFICE

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WIREWORKING MECHANISM

Original application filed February 26, 1926, Serial No. 90,892. Divided and this application filed March 23, 1929. Serial No. 349,316.

This invention relates to the art of wire working mechanisms and in its chief intended application, has reference to a wire working mechanism forming a part of a machine for assembling springs constituting the subject matter of an application heretofore filed by me on the first day of February, 1928, Serial No. 251,040½, and patented October 29, 1929, No. 1,733,660, which is a divisional application of my previous application, Serial No. 90,892, filed February 26, 1926.

The present application constitutes a division of my above-mentioned application Serial No. 251,040½, which relates to mechanism for coiling springs, guiding and transferring the coiled springs to a mechanism for flattening the same, guiding and holding the springs during the flattening operation and bodily transferring the springs edgewise between the folds of a two-ply fabric strip, which latter is then stitched to form pockets containing the springs.

The subject matter of the present application relates more particularly to the mechanism for forming the coil springs and to mechanism constituting part of the coil-forming mechanism, for guiding and transferring the coil springs from the forming mechanism, to the spring-flattening mechanism.

In the three sheets of drawings forming a part hereof, I have illustrated that part of the complete machine disclosed in my said Patent No. 1,733,660, which relates more particularly to the subject matter of this application and is deemed necessary to a full and clear description thereof.

In the drawings:

Fig. 1 is a front elevation of the coiling mechanism proper, certain parts of the complete machine being incidentally shown.

Fig. 2 is a fragmentary elevation of the left-hand side of the mechanism shown in Fig. 1.

Fig. 3 is a section on the line 3—3 of Figs. 2 and 5.

Fig. 4 is a section on the line 4—4 of Figs. 3 and 5.

Fig. 5 is an end elevation of the mechanism shown in Figs. 3 and 4, as indicated by the arrows 5 associated with the said Figs. 3 and 4.

Fig. 6 is an enlarged plan of the right-hand end of Fig. 4 as indicated by the line 6—6 of Fig. 4.

Fig. 7 is a detail illustration of a transfer arm best shown in operative position in Figs. 2 and 5; and

Fig. 8 is an end elevation of the right-hand end of Fig. 6.

With the specific structural features of the spring coiler, the present invention is not concerned. Any suitable or approved automatic spring-coiling machine may be employed, preferably a machine of the type which delivers light coil springs of uniform diameter. As shown in Figs. 1 and 2, the coiler is mounted on a suitable frame structure 2 secured on the base plate 1, and mechanism is driven by suitable gearing from a drive shaft 3 which is driven and controlled by any suitable mechanism, preferably that shown and described in my above-mentioned patent. A more detailed description of a wire coiling mechanism such as above referred to may be had by reference to my Patent No. 1,681,728.

In Fig. 1 certain parts shown in section and designated 37, 38, 39 and 40 constitute parts of a guide for guiding folded fabric into position for receiving flattened coil springs; and in Fig. 2, the parts designated 41, 53, 54, 55, 56, 83, 84, 86 and 96 constitute parts of the coil-spring flattening mechanism. The said folded fabric guide and coil-spring flattening mechanism are fully described in my above mentioned patents and applications to which reference may be had for such full description. The detail construction of these parts is not involved in the present application and such parts are not important for present purposes except insofar as they cooperate with the spring coiling and transferring mechanism which I am about to describe. Hence, a detail description of the said folded-fabric guide and spring-flattening mechanism is not included herein.

The spring transfer device includes a substantially vertically disposed elbow-shaped

guide which, at its upper end, is mounted in the spring coiler at the delivery point of the latter so that the springs, as they emerge from the coiler, encircle the same, and a pivoted swinging arm that engages behind the rear end of the spring and positively pushes the latter outwardly and downwardly lengthwise of the guide into the field of action of a spring compressor or flattener.

As best shown in Fig. 2, secured at its upper end in the coiling machine substantially axially coincident with each spring as it is delivered from the machine, is a horizontally and downwardly extending elbow-shaped guide 52, the lower depending portion of which is narrowed and flattened in one direction and gradually widened in the other to approximately the internal diameter of the spring. The lower end of the guide 52 is free and terminates just above the fixed member 56 of the spring compressor or flattener above referred to. The said member 56 serves as an anvil or a support for the springs when the latter are disposed in delivered position as shown at 100 (Fig. 2). In this position, the springs are subjected to the compressing mechanism and the mechanism for transmitting or inserting the compressed springs between the folds of a folded strip of fabric.

In the present instance the coiling mechanism is designated in its entirety by the reference character A and includes wire feed rolls 101 and 102 which are rotated by means of suitable gearing from the main drive shaft 3, substantially as shown in Fig. 2. The wire from which the coil springs are made is indicated at 103 and is guided by means of guides 104 and 105 on opposite sides of the feed rolls 101 and 102. The wire emerging from the guide 105 engages a coiler member 106 which effects the bending of the wire into the coil and cut-off mechanism including a stationary member 107 and a reciprocable member 108 is provided for cutting off the completed springs from the wire stock 103. Suitable means, well known in the art, may be provided for regulating the pitch of the coils formed by the above described elements and the coiler block 106 may or may not, as desired, be adjustable to vary the diameter of the coils.

The guide 52 is secured to the coiler in any suitable manner, in the present instance, by means of a shank 52^a, which is fitted into a socket 52^b provided in the framework of the coiler A. As above indicated, the guide is so located that the upper, horizontal part thereof is substantially coaxial with the springs as they are formed by the coiling mechanism and, hence, the springs are formed around the said guide bar. To insure a certain and quick travel of the spring over the guide 52 a pivoted transfer finger is employed, the free end of which engages behind the spring as it emerges from the coiler, and, by a quick swinging movement, pushes the spring endwise over the guide. As herein shown, this finger comprises a rod 57 mounted at its lower end in a socket piece 58 that, in turn, is pivoted on a pin 59 in a transverse slot 60 formed in the head 61 of a rock shaft 62. This shaft is encircled by a bushing 63 mounted in a bearing 64 on a bracket 65 attached to the rear frame of the coiler.

Encircling the portion of the shaft 62 and its bushing 63 which projects beyond one side of the bearing 64 is a sleeve 66 formed in its outer end with diametrically opposed notches having similarly inclined cam bottoms 67 and 68, the cam bottoms of said notches having bearing engagement with the socket piece 58 of the finger 57 on opposite sides of the pivot 59 as clearly shown in Fig. 4. Pinned to the other end of the shaft 62 is a brake disc 69, against which a friction brake 70 is pressed by a leaf spring 71 attached to the bracket 65, the purpose of the brake being to prevent overthrow of the finger at the extremes of its movement. On the sleeve 66 is a screw 72 which attaches the sleeve to a sprocket chain 73.

As shown in Fig. 2, one end of said chain is connected to a pull spring 74 anchored at 75 to a sub-frame member, while the other end of said chain is anchored at 76 to a cam-actuated lever 77 that is pivoted at 78 to one of the sub-frame members. Keyed to a cam shaft 79 is a cam disc 80 formed on its periphery with diametrically opposed protuberant cams 81 adapted to engage with a cam roller 82 journaled in the lever 77.

It will thus be seen that the cams 81 oscillate the sleeve 66 in a direction to swing the finger 57 downwardly and propel the spring onto the anvil 55, while the spring 74 oscillates the sleeve 66 in the reverse direction to return the finger 57 to its high position. The notches in the end of the sleeve 66 are wider than the finger socket 58, so that, as said sleeve starts to turn to swing the finger downwardly, the lower cam 68 throws the upper end of the finger 57 inwardly behind the spring; and as the sleeve 66 begins to turn in the reverse direction, the other cam 67 first rocks the finger outwardly beyond the circumference of the spring so that it will clear the latter on its return.

The cam shaft 79 may be rotated by means of any suitable driving mechanism, but preferably by means of mechanism driven from the main drive shaft 3 and, therefore, controlled by the mechanism for controlling the said main shaft 3. Such driving mechanism is clearly shown and described in my above mentioned Patent No. 1,733,660 and hence need not be again described in this application.

The flared outer end portion of the guide 52 is substantially vertically disposed and is

a free end, that is, it is not attached to any other mechanism. In the present instance, the outer and lower end of the guide is spaced above the spring receiving support or upstanding rib-like part 56 of the anvil 55 so that after the springs are compressed between the movable compressor part 86 and the anvil 55, the compressed springs may be fed edgewise, laterally away from their positions in alignment with and under the outer end of the guide 52. Any suitable form of mechanism may be associated with the free end of the guide 52 for compressing the springs and for removing the compressed springs from their initial position in alignment with and under the free end of the guide bar or for receiving and disposing of the coiled springs without first compressing the same. Such mechanisms will, of course, depend upon the succeeding operations to be performed on the springs.

I am aware that changes may be made in the details of the construction above described as well as in the arrangement of parts and in the mechanisms associated with the coiling machine without departing from the spirit of my invention, the scope of which should be determined by reference to the following claims, the same being construed as broadly as possible consistent with the state of the art.

I claim as my invention:

1. In combination, a spring coiler, and an elbow-shaped guide bar around which the springs are formed, said guide bar having a substantially horizontal upper end portion mounted in said coiler and a substantially vertical free lower end portion.

2. In combination, a spring coiler, and a downwardly extending guide bar around which the springs are formed, said guide bar being mounted in said coiler at a point substantially axially coincident with the springs as the latter emerge from the coiler and formed with an outwardly and downwardly flaring lower end portion.

3. In combination, a spring coiler, and a depending elbow-shaped guide bar around which the springs are formed, said guide bar having a substantially horizontal upper end portion mounted in said coiler at a point substantially axially coincident with the springs as the latter emerge from the coiler, and a substantially vertical outwardly and downwardly flaring lower end portion.

4. In combination, automatic mechanism for coiling and delivering a succession of separate helical wire springs, and a fixed guide bar having one end positioned adjacent the delivery point of the said mechanism and around which the springs are formed, and provided with a bend intermediate its ends so as to effect a change in the position of the axis of said springs as they travel successively towards the other end of the guide bar, said latter end being free to permit disengagement of the springs from the bar.

5. In combination, automatic mechanism for coiling and delivering a succession of separate helical wire springs, a fixed guide bar of considerably less diameter than the interior diameter of the spring, having one end positioned adjacent the delivery point of the said mechanism and around which the springs are formed, and provided with a bend intermediate its ends so as to effect a change in the position of the axis of said springs as they travel successively towards the other end of the guide bar, said latter end being free to permit disengagement of the springs from the bar, and means beyond the free end for supporting said springs in said axially changed position.

6. In combination, a spring coiler, and a guide bar located relative to the delivery point of said coiler so that the springs surround said guide bar as an incident to the discharge of the springs from said coiler, said guide bar having a receiving portion of less diameter than the inside diameter of the spring coils and a delivery portion of such increased diameter as to substantially center the springs on said delivery portion.

7. In combination, a spring coiler, and a guide bar for receiving the springs discharged by said coiler, said guide bar having a receiving part and a delivery part extending at an angle to said receiving part, said guide bar being mounted at its receiving end in said coiler and being free at its lower end.

8. In combination, a spring coiler, and a guide bar for receiving the springs discharged by said coiler, said guide bar having a receiving part and a delivery part extending at an angle to said receiving part, said guide bar being mounted at its receiving end in said coiler and being free at its lower end, and being of smaller diameter than the internal diameter of the spring coils whereby the latter are freely movable along said guide bar, the delivery part including a widened portion serving to center the springs in delivered position.

JOHN F. GAIL.