Aug. 8, 1933. W. F. MURNANE ET AL 1,921,319

MACHINE FOR ASSEMBLING SPRINGS

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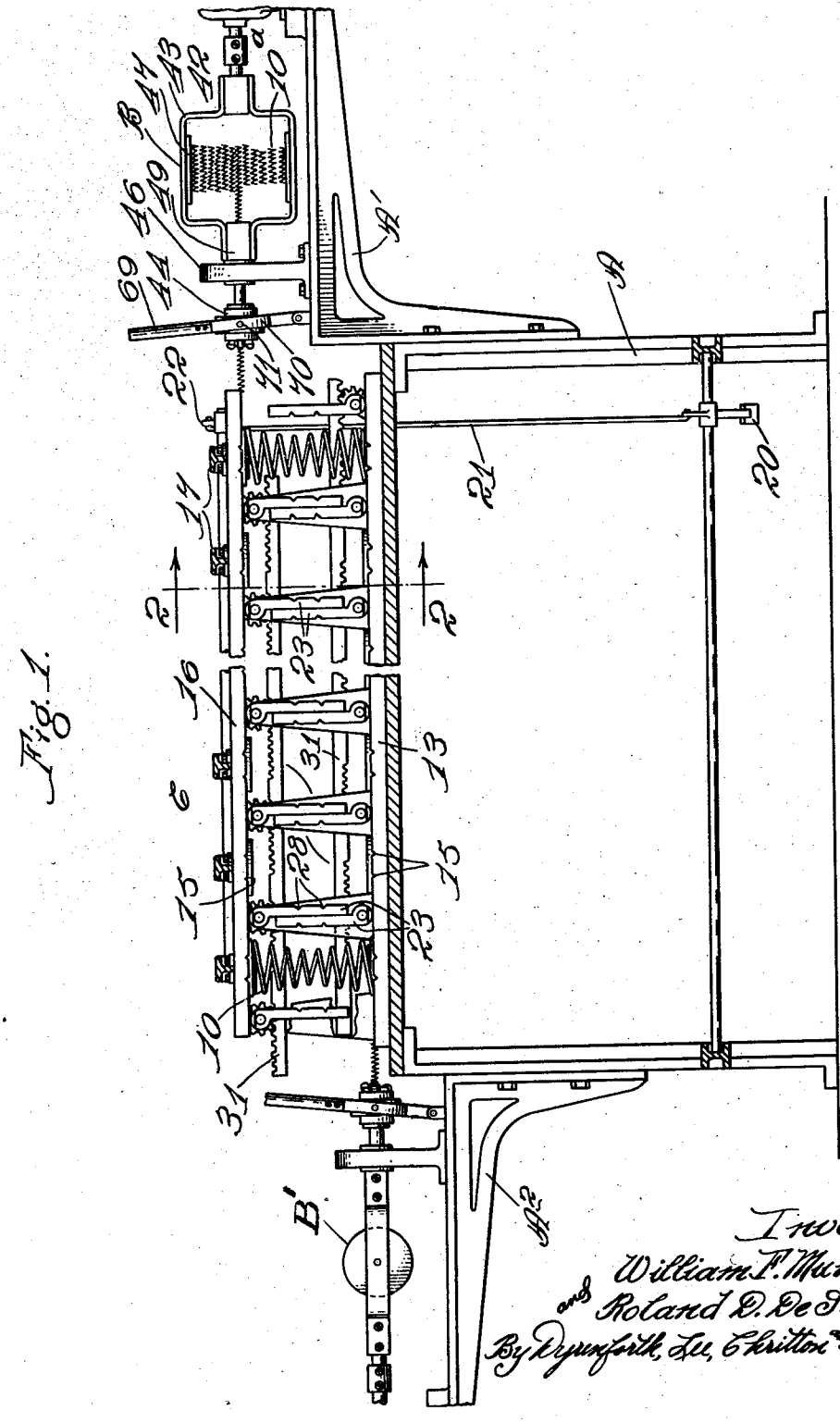


Fig. 1.

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Fig. 2.

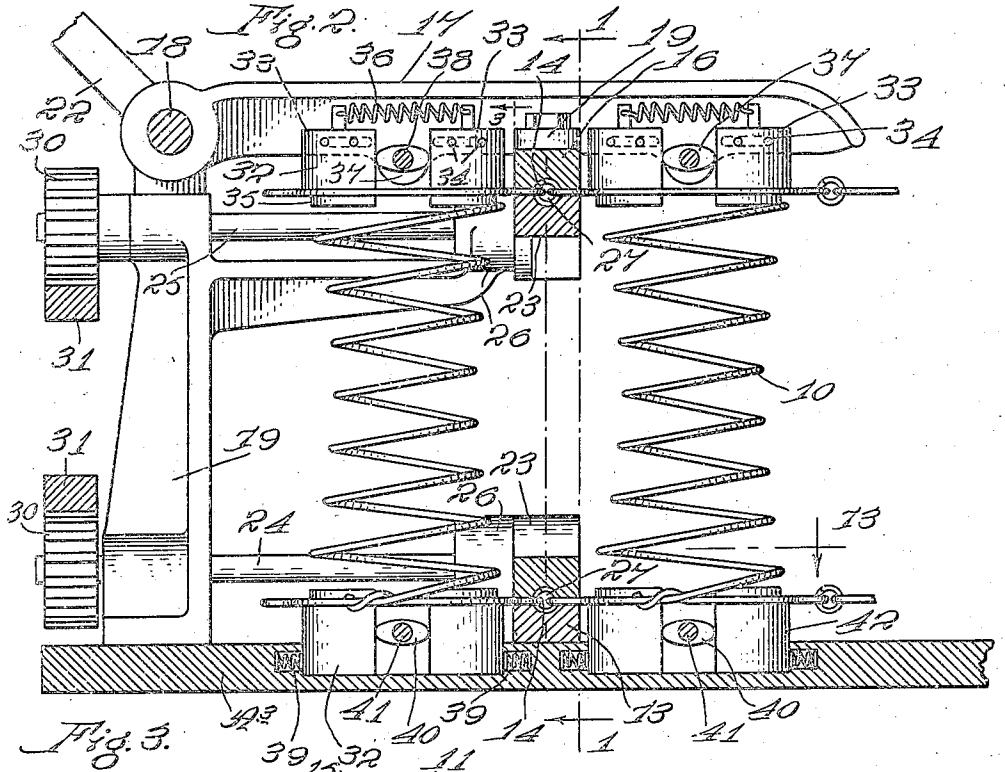
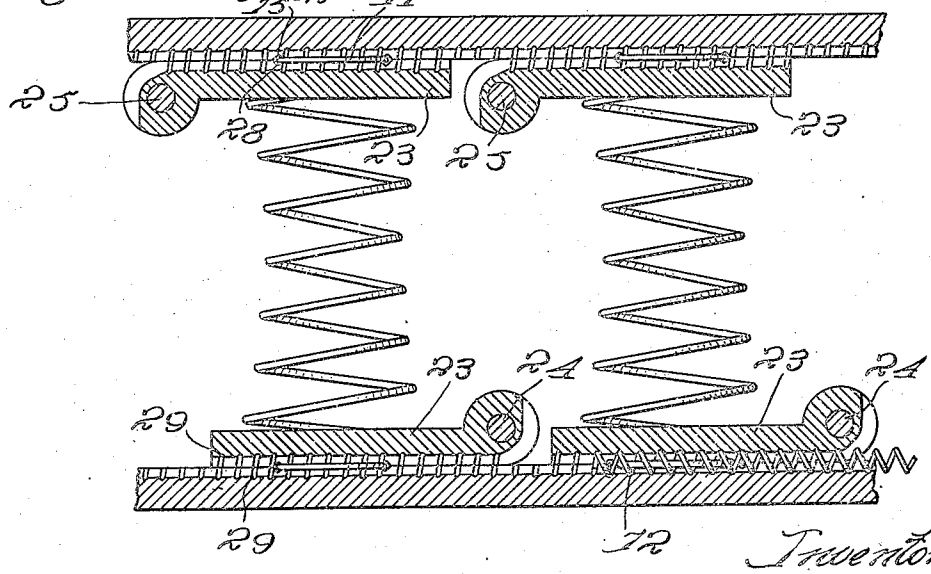


Fig. 3.



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MACHINE FOR ASSEMBLING SPRINGS

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Fig. 7.

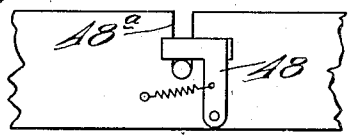


Fig. 4.

Fig. 5.

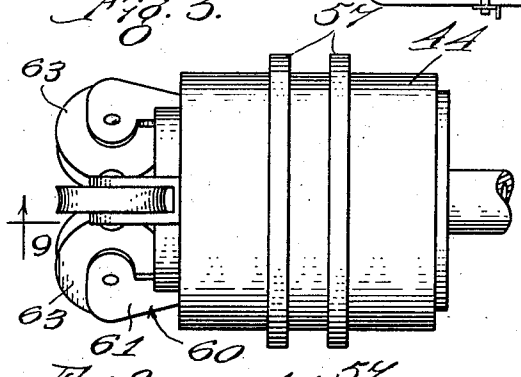


Fig. 6.

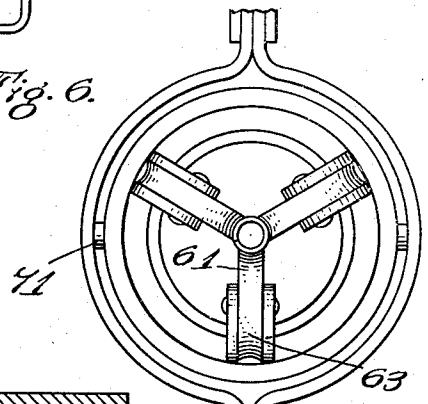


Fig. 8.

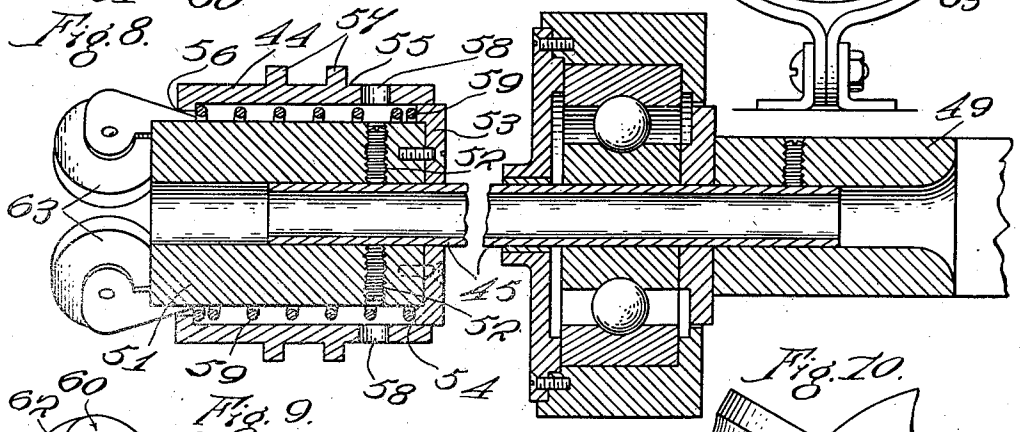


Fig. 9.

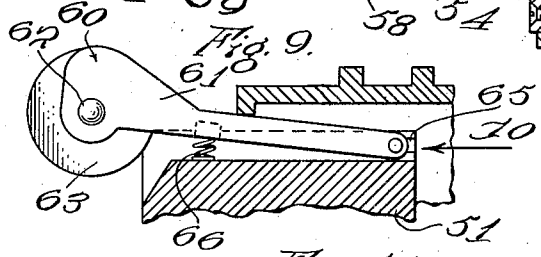


Fig. 10.

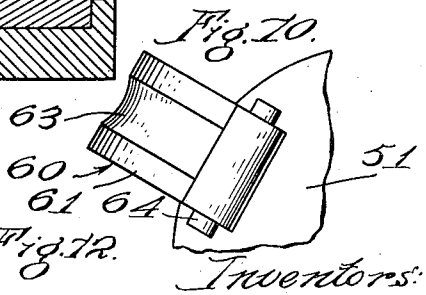


Fig. 11.

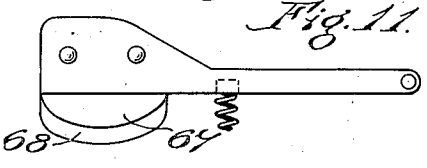
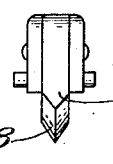


Fig. 12.



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MACHINE FOR ASSEMBLING SPRINGS

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Fig. 13.

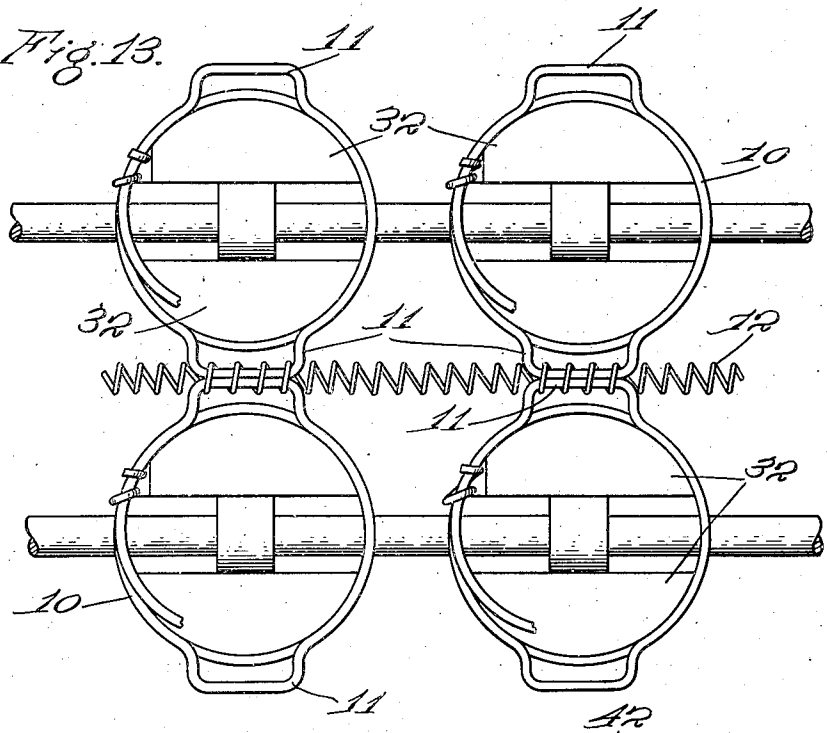
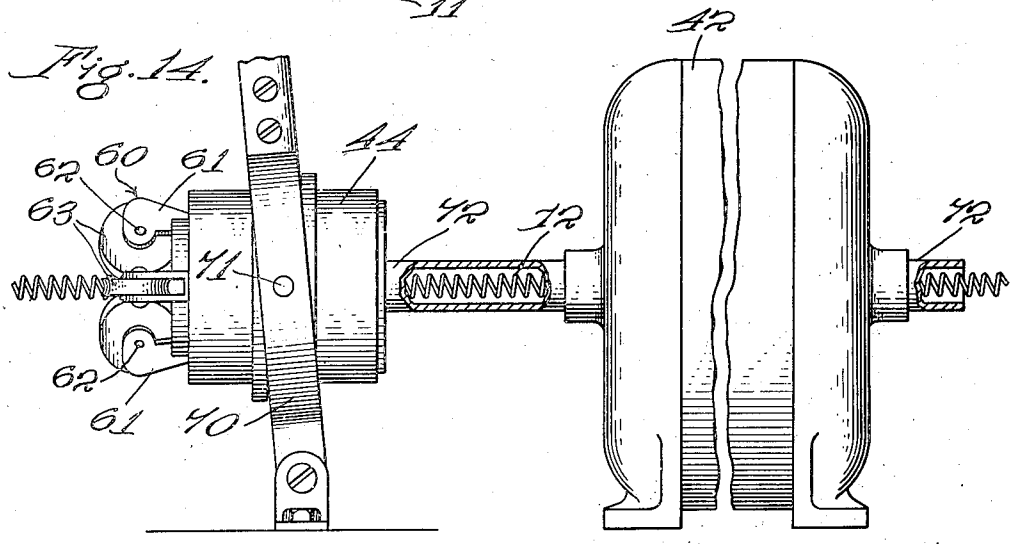


Fig. 14.



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Patented Aug. 8, 1933 1,921,319

UNITED STATES PATENT OFFICE

1,921,319

MACHINE FOR ASSEMBLING SPRINGS

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Application January 11, 1932. Serial No. 586,020

7 Claims. (Cl. 140—3)

This invention relates to a machine for assembling springs and more particularly for assembling springs of the type used in beds, cushions, upholstery, etc.

An object of the invention is to provide improved mechanism for speedily assembling rows of bed springs and the like. Other objects and advantages will appear as the specification proceeds.

The invention is fully described in the following specification and shown in the accompanying drawings in which—

Figure 1 is a partly sectional view in elevation of apparatus embodying our invention, the section being taken as indicated at line 1 of Fig. 2; Fig. 2, a sectional view, the section being taken as indicated at line 2 of Fig. 1; Fig. 3, a broken sectional view, the section being taken as indicated at line 3 of Fig. 2; Fig. 4, a plan view of the helical connector feeding mechanism; Fig. 5, a broken detail view in elevation of the chuck for gripping the helical connectors; Fig. 6, a front view of the chuck; Fig. 7, a broken detail view of latching means for releasably confining the spool or magazine of connector helicals within the feeding mechanism; Fig. 8, an enlarged sectional view, the section being taken as indicated at line 8 of Fig 4; Fig. 9, a sectional view, the section being taken as indicated at line 9 of Fig. 5; Fig. 10, a rear view taken along arrow 10 of Fig. 9; Fig. 11, a view in elevation of a modified form of gripper member; Fig. 12, a front view of the modified form of gripper member; Fig. 13, a plan sectional view, the section being taken as indicated at line 13 of Fig. 2; and Fig. 14, a broken view in elevation of a modified form of feeding mechanism.

In the illustration given, A represents suitable supporting means; B and B', connector helical feeding mechanism; and C, form apparatus for accurately positioning the springs so that they may be readily connected by the connector helicals.

Preferably, as shown more clearly in Fig. 13, the springs 10 are provided with lateral offsets 11 and when the offsets of two adjacent springs are brought together, the springs are united by weaving the helical connector 12 about the offsets.

The supporting means A may be of any suitable form. It is preferably equipped with a bracket extension A' which supports the feeding mechanism B at an elevation a short distance above the support A, and with a second bracket support A^2 which supports the feeding mechanism B' at a point barely above the top of support A.

The feeding machines B and B' are formed so as to feed continuous strips of helical connector wire simultaneously along the top and bottom rings of the springs 10. Any suitable means for cutting off the helical strip after it has advanced through a row of springs may be employed. A detailed description of the feeding mechanism B and B' will be given hereinafter.

The positioning apparatus C may be of any suitable form. In the illustration given, a stationary guide form 13 rests upon the support A and extends substantially the full length of the machine. The guide form is provided with a longitudinal channel 14 adapted to receive the connector helical 12 and with cross openings 15 for receiving the lateral offsets 11 of the springs to be assembled. A similar guide form 16, in inverted position, is movably supported at the upper part of the machine. Guide form 16 is also provided with longitudinal channels 14 and cross openings 15. As shown more clearly in Figs. 1 and 2, the form 16 is carried by T arms 17, which arms are, in turn, rotatably mounted upon shaft 18. Shaft 18 is supported by standards 19. As shown more clearly in Figs. 1 and 2, each of the T arms 17 is provided on each side with an integral lug 19 to which guide form 16 is bolted. Any suitable means for lifting arms 17 and thereby the guide form 16 may be employed. For example, a foot pedal 20 may be employed for this purpose, actuating the arms 17 by means of link or strap 21 which engages arm 22 formed integrally with one of the T arms 17.

Cooperating with the guide forms 13 and 16 are pivotally mounted swing arms 23. Some of the swing arms are pivotally carried by shaft 24 which is mounted near the base of standard 19 and other of the swing arms are carried by shaft 25 which is rotatably supported by standard 19 near its top. Suitable bosses 26 may be used to support the outer ends of shafts 24 and 25. As indicated by the arrows in Fig. 1, some of the swing arms move to a position below the upper guide form 16 while others move to a position adjacent the top of guide form 13. The swing arms 23 are provided with longitudinal grooves 27 which coact with the longitudinal grooves 14 of the forms 13 and 16 and permit the helical connectors to pass through the cylindrical opening thus provided. Also, the swing arms have cross openings 28 which cooperate with cross openings 15 of the guide forms 13

and 16 to receive the lateral offsets 11 of springs 10.

Preferably, the longitudinal channels 14 and 27 have spiral grooves 29 adapted to receive the connector helicals 12 and to guide them into engagement with the offset portions of the springs lying within the longitudinal channels. The spiral grooves also serve to advance the helical connector as it is rotated by the feeding machine.

Any suitable means may be employed for operating swing arms 23. As illustrated more clearly in Fig. 2, the shafts 24 and 25, which carry the swing arms, are provided with pinions 30 which engage racks 31. Reciprocation of the racks swings the arms 23 to vertical or horizontal position.

In order to accurately position the springs 10 within apparatus C so as to bring the offset portions 11 within the longitudinal channels provided by the forms 13 and 16 and swing arms 23, we prefer to employ expansion blocks 32. As shown more clearly in Fig. 2, a pair of expansion blocks 32 are slidably mounted in the T-arms 17 and in the top A^3 of support A so as to engage the top and bottom rings of each spring. The top blocks 32 are provided with slots 33 which receive a pair of pins 34. The lower portion of the blocks may be reduced slightly at 35. The upper blocks are drawn together by means of spring 36. A cam 37 carried by rod 38 may be rotated to expand and to permit the contraction of upper blocks 32.

The lower blocks 32, which are slidably mounted in base plate A^3 are urged together by springs 39 and are spread or expanded by cam 40 which is rotatably mounted upon shaft 41.

The feeding mechanism B and B' are supported at different heights but are the same in construction. A description of the mechanism B will therefore suffice for the mechanism B'. The mechanism B comprises a motor 42, a connector magazine 43 driven by motor 42 and a chuck 44 which is carried by rotatable hollow shaft 45. Shaft 45 is connected to magazine 43 and is rotatably supported in standard 46. Within mechanism B, as shown more clearly in Figs. 1 and 4, is rotatably supported spool 47 which carries a long string of connector helicals 10^a wound thereon. The spool may be releasably confined within the magazine by spring-urged latch 48, as shown in greater detail in Fig. 7.

The hollow shaft 45 which communicates with chuck 44 engages a hollow plug 49 which is fixedly secured to the arms 50 of magazine 43. With this construction, the helical may pass directly from spool 47 through plug 49, shaft 45 and into the chuck 44.

The chuck 44 may be of any suitable construction. It is preferably equipped with a central passage through which the helicals may be fed and also with gripper members which engage the helical and cause it to turn with the barrel of the chuck.

In the illustrations given in Figs. 1, 5, 6, 8 and 9, the chuck is provided with a core 51 which is centrally apertured to receive shaft 45 and to which the core is secured by means of set screws 52. Secured to the core is a back plate 53 which affords shoulders at 54. Enclosing core 51 is a barrel 55 provided at its front with an inwardly turned rim 56. The barrel is also provided centrally with a pair of circular flanges 57. If desired, the barrel may also be provided with openings 58 through which may be had access to set screws 52. A spring 59 rests against shoulder 54 and abuts at its forward end the rim 56 of barrel 55. Secured to the core 51, as shown more clearly in Figs. 9 and 10, are gripper members 60. Preferably, the gripper members are provided with shafts 61 to which are rotatably secured by means of pins 62 to grooved pulleys 63. The rear portion of each shaft 61 is preferably perforated to receive a pin 64 which engages a groove 65 in the core 51. A spring 66 is secured between the core 51 and shaft 61 and urges the shaft outwardly. If desired, a fixed bearing member 67, as shown more clearly in Figs. 11 and 12, may be employed instead of the roller 63; and also, the bearing member may be provided with a sharp edge 68 which will contact with the helical connector.

With the construction illustrated, the gripper members 60 are drawn inwardly against the helical by the pressure of spring 59. When it is desired to release the gripper members from contact with the helical, the barrel 55 may be retracted, thus permitting the springs 66 to elevate or swing outwardly the gripper members 60. Any suitable means for reciprocating barrel 55 may be employed. In the illustration given, a lever 69 which is pivotally connected to bracket A' is provided with a portion 70 which extends about barrel 55 and with lugs 71 which engage one of the flanges 57 when the lever is swung rearwardly.

The operation is as follows:

The upper guide form 16 is elevated and swing arms 23 brought to vertical position. Springs 10 are placed upon the expansion blocks 32 and the guide form 16 is lowered so as to bring the upper expansion blocks 32 within the upper rings of the springs 10. Shafts 38 and 41 are rotated to turn cams 37 and 40 and to expand blocks 32. By means of racks 31, shafts 24 and 25 are then rotated to bring swing arms 23 to horizontal position. The offset portions 11 of springs 10 enter the longitudinal channels formed by the guide forms 13 and 16 and the swing arms 23, and also engage the cross openings 15 and 28, as shown more clearly in Fig. 3. The driving mechanism is then set in motion by motor 42 and the helical connectors pass into the longitudinal channels and engage the spiral grooves 29. In this manner, the connectors are woven around the offsets 11 of springs 10, and the springs are assembled in one structure. After the helicals have connected a row of springs, they may be cut off and another row of springs brought into alignment with the connector helicals. To remove the assembled springs 10, the cams 37 and 40 are turned to release the expansion blocks 32, the treadle 20 is pressed to raise arms 17 and the guide form 16, and racks 31 are moved to return the swing arms to vertical position. The spring structure may then be removed.

In the operation of the feed mechanism B, the helical wire is fed from the rotatably mounted spool 47, and the rotating helical engages the spiral grooves 29 and is advanced through the shaft 45 and chuck 44 until the spool is exhausted. In the feeding operation, the spring 59 urges the barrel 55 of the chuck forwardly against the inclined shaft 61, and thus causes the gripper members to engage the helical wire. When it is desired to place a new spool of wire into magazine 43, latch 48 may be retracted and the spindle of the spool allowed to enter the slots 48^a. The free end of the helical is then passed

through the hollow plug 49 and shaft 45. In order to extend the helical through the gripper members 60, the barrel 55 is retracted by means of handle or lever 69 and the gripper members 60 spring apart under the pressure of springs 66. After the helical has been drawn between the gripper rollers 63, the lever 69 may be released and spring 59 will then force barrel 55 forwardly and cause the gripper member 60 to engage the helical.

In the modified form of feeding mechanism illustrated in Fig. 14, the rotatable magazine 43 is dispensed with and the helical wire is fed through a hollow shaft 72 which extends through motor 42 and into chuck 44. The supply helical wire may be arranged in coils, on spindles, or in any other convenient arrangement.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, but the appended claims should be construed as broadly as permissible, in view of the prior art.

We claim:

1. In apparatus for assembling springs, means for supporting springs with portions in contiguous relation, guide means about said contiguous portions, a hollow feeding member adapted to receive preformed helical connector wire, gripping means carried by said member for releasably engaging said helical wire, and means for rotating said feeding member.

2. In combination with means for supporting springs with portions thereof in contiguous relation, a rotatably mounted gripper member, a gripper member adapted to releasably engage helical connector wire, and means for feeding said connector wire through said gripper member so as to weave said connector wire about the contiguous portions of said springs.

3. In apparatus for assembling springs, means for supporting springs with portions of the springs in contiguous relation, means for weaving preformed helical connector wire about said contiguous portions to unite said springs, said means comprising a rotatably mounted hollow gripping member, a hollow shaft communicating therewith, a spool carrying coils of connector wire also carried by said hollow shaft, and means for rotating said gripper member, shaft, and spool.

4. Mechanism for feeding preformed helical connector wire, comprising a hollow feeding member, gripper members supported therein and adapted to slidably engage said connector wire, means for supplying connector wire to said feeding member, means for releasing said gripper members from contact with said wire, and means for rotating said feeding member.

5. Mechanism for weaving preformed helical connector wire through spring structure, comprising a rotatably mounted hollow feeding member, gripper rollers carried by said feeding member in yielding contact with said connector wire, means for feeding connector wire through said feeding member, means for releasing said wire from contact with said gripper rollers, and means for rotating said feeding member.

6. Mechanism for weaving preformed helical connector wire through spring structure comprising a rotatably mounted hollow shaft, a hollow chuck carried by the forward end of said shaft, said chuck being equipped with gripper members urged inwardly by springs, a magazine carried by the rear end of said hollow shaft and adapted to feed helical wire through said shaft and said chuck, and power driven means for rotating said shaft.

7. Mechanism for weaving preformed helical connecting wire through spring structure comprising, a hollow shaft, a chuck carried at the forward end of said shaft, gripper members carried by said chuck and adapted to slidably engage helical wire passing through said chuck, and a motor provided with a passage therethrough, said hollow shaft extending through said motor and being driven thereby.

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