

Sept. 27, 1938.

R. C. PIERCE

2,131,069

## MANUFACTURE OF CORE ELEMENTS

Filed Aug. 15, 1936

3 Sheets-Sheet 1

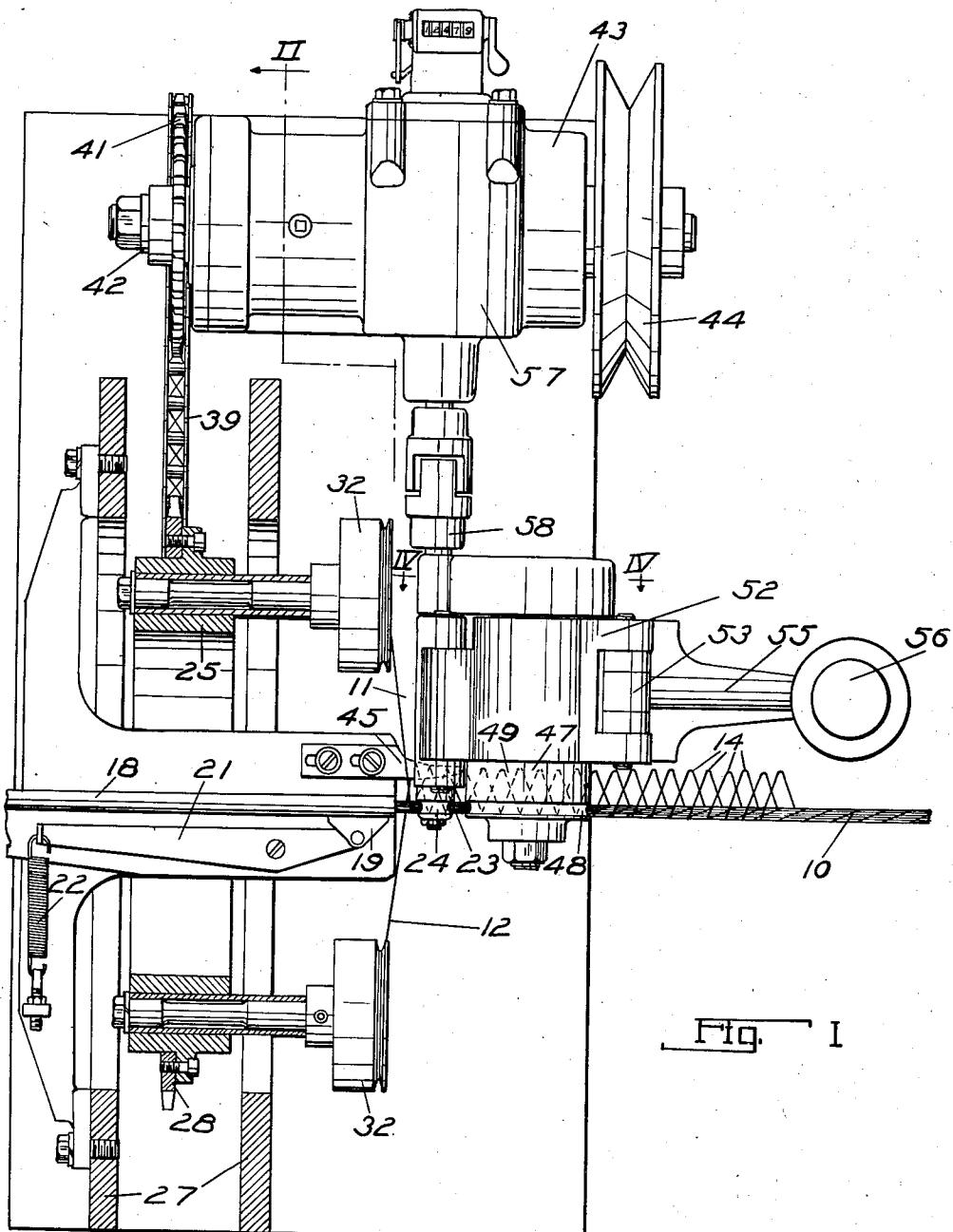


Fig. I

INVENTOR.

INVENTOR.  
*ROBERT C. PIERCE*

BY

McConkey & Booth  
ATTORNEYS.

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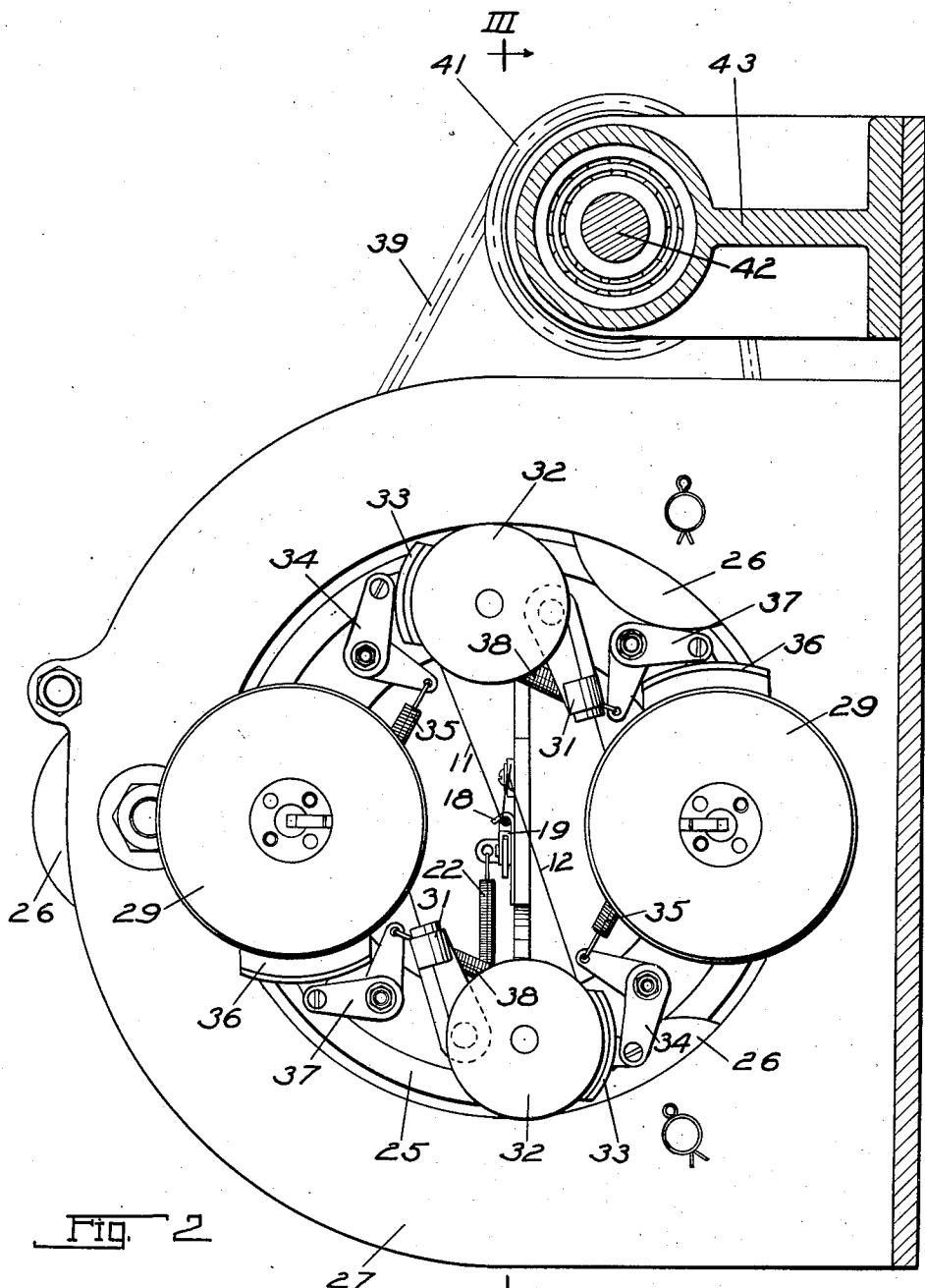
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MANUFACTURE OF CORE ELEMENTS

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3 Sheets-Sheet 2



INVENTOR.  
ROBERT C. PIERCE

BY

Mc Conkey & Booth  
ATTORNEYS.

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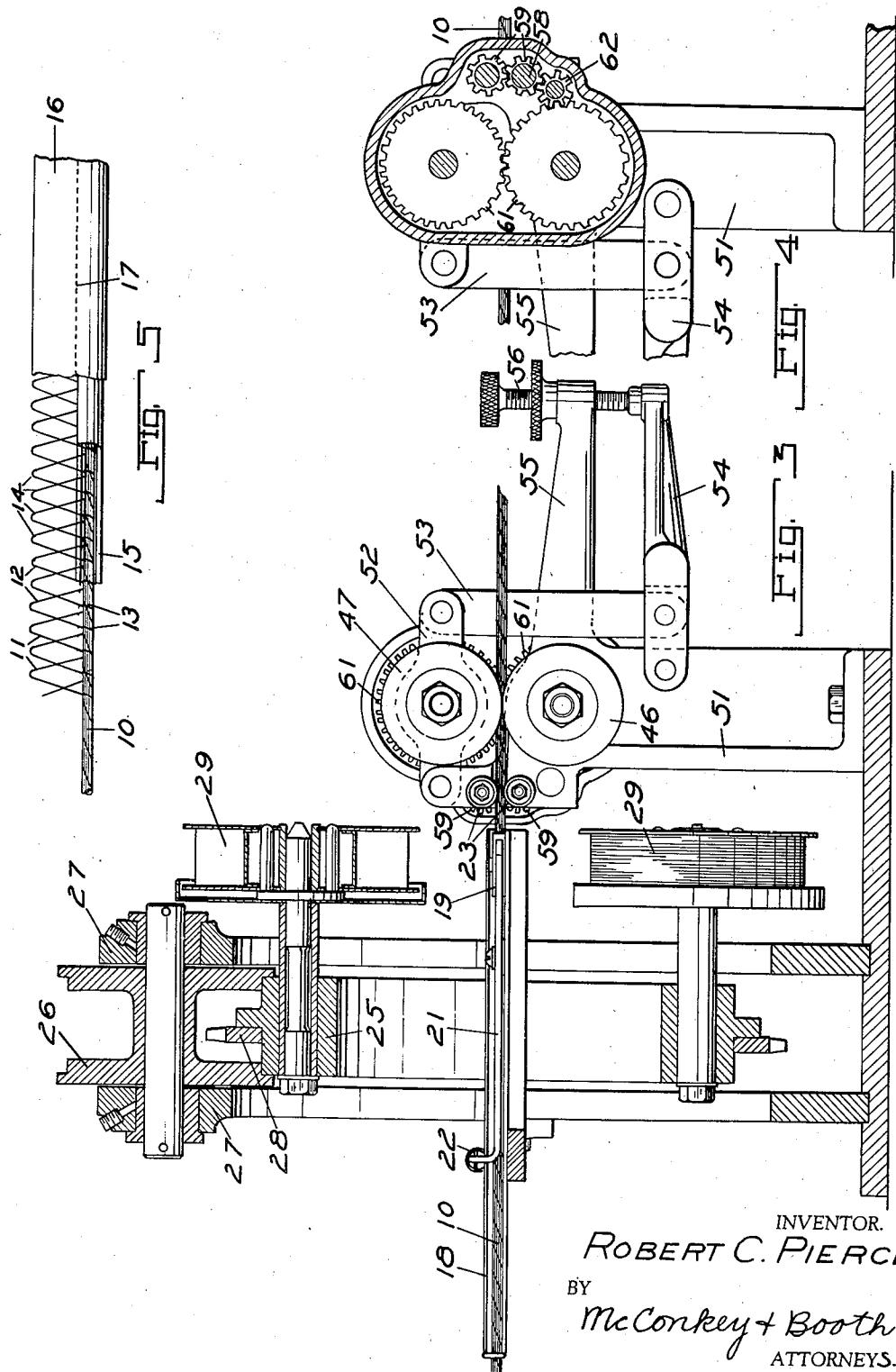
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## MANUFACTURE OF CORE ELEMENTS

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3 Sheets-Sheet 3



## UNITED STATES PATENT OFFICE

2,131,069

## MANUFACTURE OF CORE ELEMENTS

Robert C. Pierce, Niles, Mich., assignor to National Standard Company, Niles, Mich., a corporation of Michigan

Application August 15, 1936, Serial No. 96,194

18 Claims. (Cl. 140—71)

This invention relates to the manufacture of elongated core members, more particularly for weather strips, window channels and the like.

One of the objects of the invention is to provide a method and machine for making a core member in which an elongated cordlike element is formed with a series of overlapping loops of resilient wire or the like extending from one side thereof. Preferably the loops are formed by separate wires wound about the cordlike element in overlapping relationship so that the loops mutually brace and support each other.

Various other objects of the invention relate to the provision of a simple and compact machine for producing the core element automatically in which the wire loops are formed about a stationary pressure foot and the element and in which the loops are subsequently flattened by adjustable rollers whereby the flattening pressure can be controlled.

One machine for carrying out the invention includes an annular power rotated member carrying two wire spools and two feeding mechanisms spaced 180° apart. A cordlike element is fed through the center of the member by a pair of grooved rollers and a stationary presser foot is mounted in spaced relation to the element in such a position that as the member rotates the wires will be wound around the element and presser foot in overlapping loops. The rollers serve to draw the loops from the presser foot and to compress the loops about the element to secure them thereto. From the rollers the core member is fed into a second set of rollers grooved to receive the element and having substantially cylindrical portions to flatten the loops. Preferably one of the second set of rollers is mounted on a rigid part of the machine and the other on an adjustable lever so that the pressure exerted thereby on the loops and the element can be adjusted.

The above and other objects and novel features of the invention including desirable sub-combinations and particular arrangements of parts will be apparent from the following description when read in connection with the accompanying drawings, in which:

Figure 1 is a plan view with parts in section of a machine embodying the invention;

Figure 2 is a section on the line II—II of Figure 1;

Figure 3 is a section on the line III—III of Figure 2;

Figure 4 is a partial section on the line IV—IV of Figure 1; and

Figure 5 is a side view with parts in section of a weather strip embodying the invention.

The invention is illustrated and will be described in connection with the manufacture of a novel weather strip including an elongated cordlike element or core 10 of twisted paper, hemp or the like having a pair of resilient wires 11 and 12 wound therearound in the form of overlapping loops, the loops formed by the different wires alternating along the length of the strip. That portion of the loops adjacent the element 10 has been compressed around the element as indicated at 13 and preferably stretched beyond the elastic limit of the wire so it will not spring back and the remainder of the loops has been flattened to form flat loops 14 all lying approximately in the same plane at one side of the element 10. The core member per se is more particularly described and claimed in my copending divisional application Serial No. 162,441, filed September 4, 1937.

The element 10 may be enclosed by a tubular cover 15 of rubber or the like slit along one side to permit the loops 14 to project through and a fabric cover 16 may enclose the entire assembly. The cover 16 is preferably stitched at 17 and may, if desired, have other seams therein where it projects outwardly of the element 10, the covered projecting loops forming a resilient attaching flange as fully described in my copending application Serial No. 13,979.

The illustrated machine for forming the weather strip comprises a guide 18 to receive the element 10 from a reel or other suitable source, not shown. From the guide the element passes over a suitable tensioning shoe 19 pivoted on a horizontal lever 21 which is urged by an adjustable spring 22 in a direction to grip the element frictionally against the guide 18 to maintain suitable tension thereon. A pair of power driven rollers 23 formed with registering grooves 24 to receive the element 10 draw it lengthwise under tension from the shoe 19.

The guide 18 is at the center of an annular carriage 25 rotatably mounted on bearings 26 on a pair of spaced supports 27 and which is formed with a sprocket gear 28 by which it is driven. The carriage 25 carries a pair of spools 29 carrying the wires 11 and 12, which pass from the spools through suitable guide members 31 (Figure 2) and then one or more times around tensioning rollers 32 which are arranged at diametrically-opposite points and guide the wires as they are wound around the element 10. The tensioning rollers are held by friction shoes 33.

mounted on bell cranks 34 and urged into engagement with the rollers by springs 35 and similar friction shoes 36 may be mounted on bell-cranks 37 and urged into engagement with the 5 spools 29 by springs 38, if desired, to maintain a predetermined drag on the spools to prevent overrunning thereof.

The carriage 25 is driven by a sprocket chain 39 meshing with the gear 28 and with a gear 41 10 mounted on a horizontal power shaft 42 which is journaled in a frame 43. The shaft 42 may be driven by a pulley wheel 44 belted to any suitable source of power.

As the carriage 25 rotates, the wires 11 and 12 15 will be wound around the element 10 and around a suitable presser foot 45 which is rigidly secured to the machine frame spaced from but substantially parallel to the element 10. The presser foot 45 extends past the rollers 23 and serves to form 20 the wires into overlapping loops larger than the element 10. As the element 10 with the wires 11 and 12 looped around it passes through the rollers 23, the wires will be tightly crimped around the element due to the grooves 24 and will preferably 25 be stretched beyond their elastic limit so there will be little or no tendency to spring back.

From the rollers 23 the core passes to a pair of rollers 46 and 47 formed with registering grooves 48 to receive the element 10 and with substantially 30 cylindrical portions 49 between which the loops 14 are flattened out. The roller 46 is mounted on a horizontal spindle on a rigid frame member 51 and the roller 47 is mounted on a lever 52 which is pivoted at one end on the frame 51 and 35 has its other end connected by a link 53 to a lever 54 likewise pivoted on the frame 51. The frame 51 has an extension 55 which carries a screw 56 adapted to engage the end of the lever 54. As will be apparent the screw 56 serves as an 40 adjustment to control the position of the roller 47 thereby to adjust the pressure exerted on the element 10 and the loops 14 by the rollers 46 and 47.

The two sets of rollers 23 and 46 and 47 are 45 preferably driven by the power shaft 42 and for this purpose a suitable gear drive 57 is provided driving a shaft 58. The shaft 58 is preferably connected directly to one of rollers 23 which are 50 geared together by pinions 59. The rollers 46 and 47 are preferably also geared together by pinions 61, one of which is geared to one of the pinions 59 by an idler pinion 62. In this way the speeds 55 of all of the various elements are synchronized so that the loops 14 will always be evenly spaced on the element 10 and there will be no tendency to break the element 10.

While one embodiment of the invention has been illustrated and described in detail, it is not to be understood that the scope of the invention is limited to that particular embodiment, or otherwise than by the terms of the appended claims.

What is claimed is:

1. The method of making elongated core members which comprises feeding a cordlike element lengthwise, looping a plurality of wires about said 65 element in evenly-spaced overlapping loops larger than the diameter of the element, and compressing said loops about the element leaving the excess wire projecting in flattened loops at one side thereof.

2. The method of making elongated core members which comprises feeding a cordlike element lengthwise, looping a plurality of wires about said element and a presser foot spaced from the element in evenly-spaced overlapping loops larger 70 than the diameter of the element, compressing

said loops about the element leaving the excess wire projecting in flattened loops at one side thereof and withdrawing the loops from the presser foot.

3. The method of making elongated core members which comprises feeding a cordlike element lengthwise, winding a pair of wires around the element at diametrically-opposite points to form evenly-spaced overlapping loops larger than the element, and compressing said loops about the 10 element leaving the excess wire projecting in flattened loops at one side only of the element.

4. The method of making elongated core members which comprises feeding a cordlike element lengthwise, winding a pair of wires around the 15 element and a presser foot spaced therefrom at diametrically-opposite points to form evenly-spaced overlapping loops larger than the element, compressing said loops about the element leaving the excess wire projecting in flattened loops at 20 one side only of the element and withdrawing the loops from the presser foot.

5. A machine for making elongated core members comprising means for feeding a cordlike element of considerable length, a plurality of means 25 evenly spaced about said element for applying a plurality of wires to the element with portions encircling the element and portions projecting laterally from the element in overlapping loops arranged approximately in the same plane. 30

6. A machine for making elongated core members comprising means for feeding a cordlike element of considerable length, a pair of means at diametrically opposite points about said element 35 for applying a pair of wires to the element with portions encircling the element and portions projecting laterally from the element in overlapping loops arranged approximately in the same plane. 40

7. A machine for making elongated core members comprising means for feeding a cordlike element of considerable length, a stationary presser foot spaced from and paralleling the element, means for winding a wire around the element and the presser foot, and means for compressing the wire about the element with the portions thereof which encircled the presser foot projecting from the element in a series of loops. 45

8. A machine for making elongated core members comprising means for feeding a cordlike element of considerable length, a stationary presser foot spaced from and paralleling the element, means for simultaneously winding a plurality of wires around the element and the presser foot, and means for compressing the wires about the element with the portions thereof which encircled the presser foot projecting from the element in a series of loops. 50

9. A machine for making elongated core members comprising an annular rotary member carrying a supply of separate wires, means for feeding lengthwise through said member an elongated cordlike element, means for winding said wires separately around said element in overlapping loops larger than the element, and means for compressing said loops on the element. 55

10. A machine for making elongated core members comprising an annular rotary member carrying a supply of separate wires, means for feeding lengthwise through said member an elongated cordlike element, a stationary presser foot paralleling and spaced from said element, said wires being wound around the element and presser foot as said annular member is rotated to form a series of overlapping loops, and means for compressing said loops on said element. 60

11. A machine for making elongated core members comprising an annular rotary member, a pair of spools forming supply sources for wires carried by said member, a pair of feeding mechanisms carried by said member at diametrically opposite points for feeding said wires, means for feeding lengthwise through said member an elongated cordlike element, said feeding mechanisms winding the wires around said element in a series 10 of overlapping loops larger than the element as said member is rotated, and means for compressing said loops on the element.

12. A machine for making elongated core members comprising an annular rotary member, 15 a pair of spools forming supply sources for wires carried by said member, a pair of feeding mechanisms carried by said member at diametrically opposite points for feeding said wires, means for feeding lengthwise through said member an elongated cordlike element, a presser foot spaced 20 from said element, said feeding mechanisms winding the wires around said element and presser foot in a series of overlapping loops larger than the element as said member is rotated, and 25 means for compressing said loops on the element.

13. A machine for making elongated core members comprising means for feeding a cordlike element lengthwise, means for winding a wire about said element in a series of loops larger 30 than the element, and means for compressing the loops about said element with portions projecting in flat loops at one side thereof, said last-named means including a pair of rollers having registering grooves to receive said element and generally cylindrical portions to flatten 35 said loops, and means for moving said rollers relatively toward and away from each other to adjust the pressure on the element and the wire.

14. A machine for making elongated core members comprising means for feeding a cordlike element lengthwise, means for winding a wire about said element in a series of loops larger 40 than the element, and means for compressing the loops about said element with portions projecting in flat loops at one side thereof, said last-named means including a pair of rollers having registering grooves to receive said element and generally cylindrical portions to flatten said loops, one of said rollers being mounted on a 45 stationary part of the machine and the other roller being mounted on a movable part for movement toward and away from the first roller thereby to adjust the pressure on the element and the wire.

15. A machine for making elongated core members comprising means for feeding a cordlike element lengthwise, means for winding a wire about said element in a series of loops larger 50 than the element, and means for compressing the loops about said element with portions projecting in flat loops at one side thereof, said last-named means including a pair of rollers having registering grooves to receive said element and generally cylindrical portions to flatten said loops, one of said rollers being mounted on a stationary part of the machine, a pivoted lever carrying the other roller for movement toward and away from said one roller, and means 55 for adjusting the position of said lever thereby to adjust the pressure on said element and wire.

16. A machine for making elongated core members comprising means for feeding a cordlike element lengthwise, means for winding a wire about said element in a series of loops larger 10 than the element, and means for compressing the loops about said element with portions projecting in flat loops at one side thereof, said last-named means including a pair of rollers having registering grooves to receive said element and to compress the loops about said element, a second pair of rollers having registering grooves to receive said element and generally cylindrical portions to flatten said loops, one of said second 15 pair of rollers being mounted on a fixed part and the other on a movable part whereby the pressure on the element and the loops can be adjusted.

17. A machine for making elongated core members comprising means for supplying an elongated cordlike element, a pair of driven rollers having registering grooves to receive said element for feeding the element lengthwise, a presser foot rigidly secured to the machine spaced 20 from and substantially paralleling said element, and means for winding a wire in loops about the element and presser foot, said rollers compressing said wire about the element and withdrawing the loops from the presser foot as the element 25 is advanced.

18. A machine for making elongated core members comprising means for supplying an elongated cordlike element, a pair of driven rollers having registering grooves to receive said element for feeding the element lengthwise, a presser foot rigidly secured to the machine spaced 30 from and substantially paralleling said element, means for winding a wire in loops about the element and presser foot, said rollers compressing said wire about the element and withdrawing the loops from the presser foot as the element 35 is advanced, a second pair of rollers having substantially cylindrical portions to flatten said loops, and means for adjusting said second pair of rollers thereby to adjust the pressure on the loops.

ROBERT C. PIERCE.