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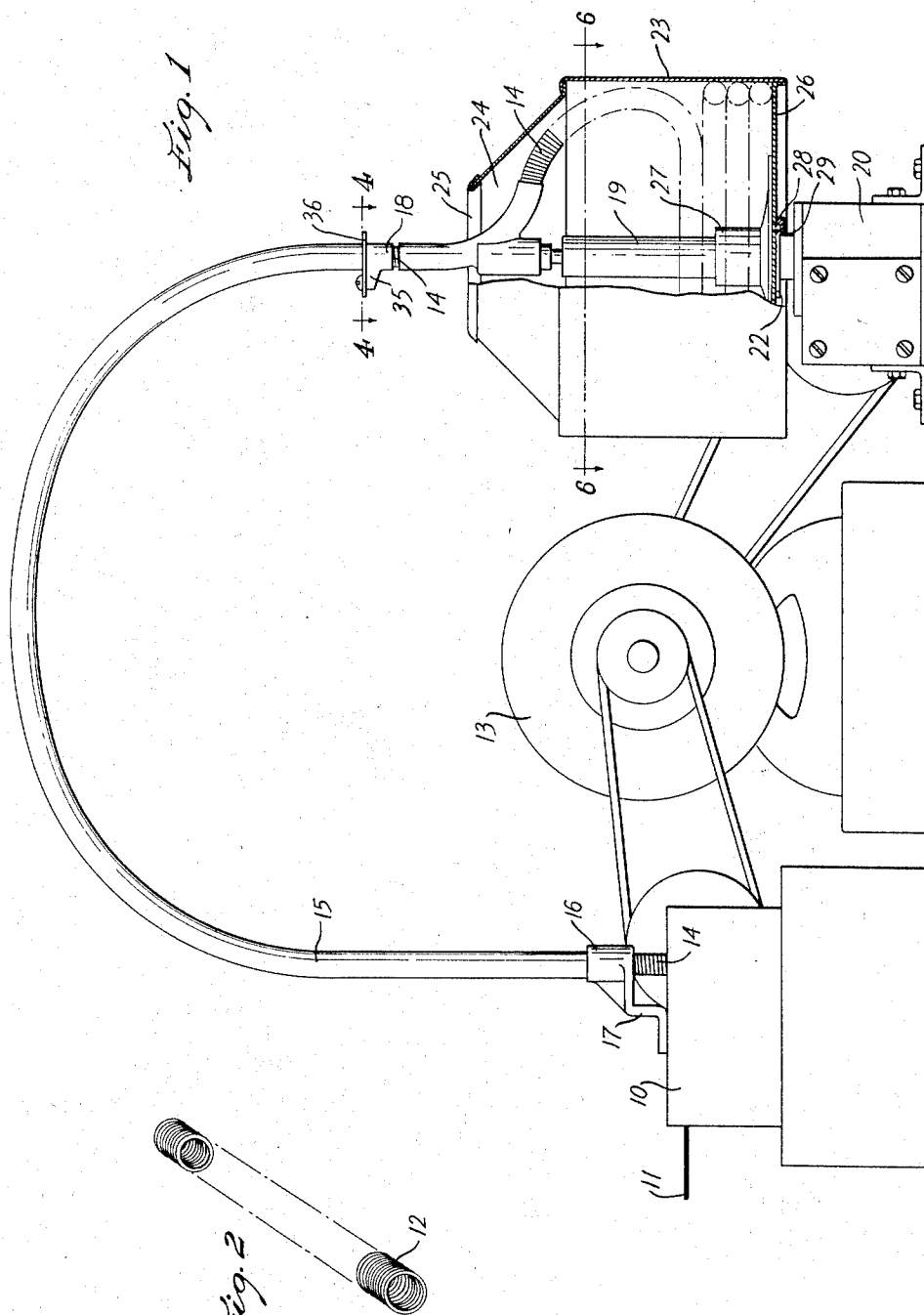
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2,227,442

APPARATUS FOR COILING HELICAL WIRE

Filed Jan. 24, 1939

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

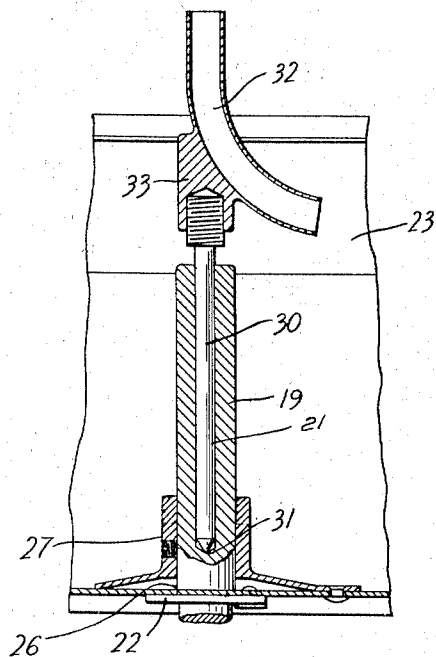


Fig. 3

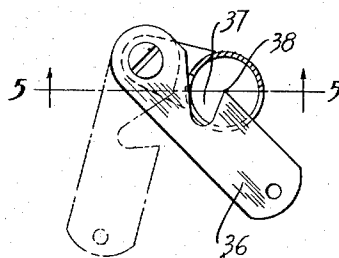


Fig. 4

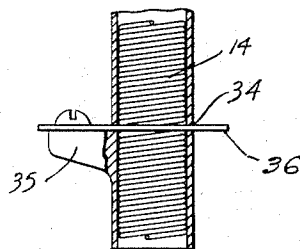


Fig. 5

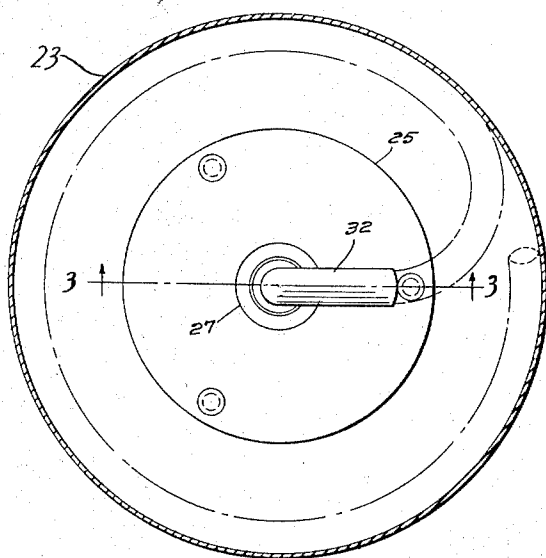


Fig. 6

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UNITED STATES PATENT OFFICE

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APPARATUS FOR COILING HELICAL WIRE

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Application January 24, 1939, Serial No. 252,564

6 Claims. (Cl. 153—64)

My present invention relates to wire constructions, and has particular reference to a novel apparatus for handling a continuous length of coil wire.

It is the principal object of my invention to provide a novel arrangement for handling a coil wire as it comes in a continuous length from the coiling apparatus so that it will not twist or turn or distort.

Another object of my invention is to provide a means for temporarily storing a coiled wire as it comes from the coiling machine for further operation on other machines such as the one described in my copending application entitled Wire knitting machine, Serial No. 252,614, filed January 24, 1939.

It is a further object of my invention to provide a novel apparatus for handling a coiled wire which is synchronized with the speed of operation of the coiling machine.

With the above and other objects and advantageous features in view, my invention consists of a novel arrangement of parts and a novel method of operation more fully disclosed in the detailed description following, in conjunction with the accompanying drawings, and more specifically defined in the claims appended thereto.

Referring to the drawings:

Fig. 1 is a plan view partly in section of my novel machine;

Fig. 2 is a perspective view of a section of coiled wire of the type to be handled by the machine shown in Fig. 1;

Fig. 3 is an enlarged detailed sectional view of the feed arrangement;

Fig. 4 is a sectional view taken along line 4—4 on Fig. 1;

Fig. 5 is a sectional view taken along line 5—5 on Fig. 4; and

Fig. 6 is a sectional view taken along line 6—6 on Fig. 1.

Machines for forming ordinary straight metallic wire into resilient coils or loops are conventional and well known in the art. However, a problem is presented in such machine inasmuch as the spinning and twisting action on the wire causes the coil of wire, as it comes from the machine, to twist and turn and distort, and the present invention is directed to a means for handling the coiled wire as it comes from the coiling machine. At the same time, the coiled wire is preferably placed in a suitable storage compartment.

Referring more in detail to the drawings em-

bodying my invention, the conventional coiling machine 10 is adapted to coil a straight wire 11 into a helical coil 12 shown in Fig. 2. The coiling apparatus 10 may be suitably driven by a central power plant 13, and forms the wire 11 into a continuous helical coil which emerges from the top of the coiling machine in a continuous coil 14, as shown in Fig. 1. Inasmuch as the coil 14 is continuously under resilient tension, the coil will tend to twist, turn, wobble and distort after an unwieldy and heavy length of coil is extruded from the machine 10. I therefore provide a rigid metallic tube 15 for guiding the coil 14 to the storage mechanism. The tube 15 is rigidly clamped in a collar 16 which is held to the top of the coiling machine 10 by means of suitable angle flanges 17, and maintains the opening of the tube 15 vertically over the extruding coil 14, slightly spaced from the point from whence it issues from the coiling machine.

The rigid tubing 15 is preferably of an inverted U-shape as shown in Fig. 1, and the other end 18 thereof extends downwardly above the storing mechanism hereinafter to be described.

A vertical shaft 19 is positioned directly beneath the opening 18 of the tube 15 and extends into a gear box 20 which is powered preferably by the same power means 13 which operates the coiling machine 10. As shown in Fig. 3, the shaft 19 is provided with an elongated central bore 21 having a conical bottom. The shaft 19 is also provided, adjacent its lower ends, with a plate 22 which is rigidly keyed to the shaft and rotatable therewith. I provide a metal storage compartment or can 23 of circular cross section and having a conical upper portion 24 with an opening 25. The bottom of the can is provided with an opening 26, and has an upstanding collar 27 which is adapted to seat around the shaft 19. The bottom of the can 23 may be locked to the shaft 19 or the plate 22 by any conventional means such as a pin 28 in the bottom of the can, the plate 22 having an opening 29 for receiving said pin.

After the can is mounted on the shaft and locked thereto, an auxiliary shaft 30 is loosely seated in the bore 21 with the bottom 31 whereof pivoted in the conical end of the bore. An L-shaped tubing section 32 of the same material and diameter as the tubing 15 is now mounted on the upper end of the auxiliary shaft 30 as shown in Fig. 3. Any suitable mounting may be used, but preferably the tube 32 is mounted in a head 33 having a threaded opening therein and the upper end of the auxiliary shaft 30 is pro-

vided with complementary threads adapted to engage the threaded opening.

The length of the L-shaped tube 32 is designated to align it with the end 18 of the tube 15 but slightly spaced therefrom as shown in Fig. 1.

The twisting coil 14 is pushed through the tube 15 by the extruding action of the coiling machine 10 and enters the tube 32 and, as shown in Fig. 1, twists around the inner circumference of the can 23. To compensate for the turning and twisting of the coil 14, the can 23 is rotated in synchronism with the coil formation by means of the gear box 20, and the coiled wire 14 coils upon itself and gradually extends to the top of the can. The conical portion 24 of the top then forces successive lengths of the coil inwardly so that the next series of coils will nest within the first series of coils until the can is full. At the same time the tube 32 compensates for the differential speed of extrusion of the coil 14 from the coiling machine 10 and speed of rotation of the can 23, by turning sufficiently to permit the coil 14 to coil freely within the can 23.

In practice, since the coil 14 is not a true spring but is merely a coil of formed wire, it is found that the weight of the downwardly extending coil into the can and the centrifugal force of the can will tend to pull the coil away from the coiling machine 10, thus spreading the various turns of the coil away from each other. To prevent such action I provide the end 18 of the tube 15 with a horizontal slot 34 as shown in Figs. 1, 4 and 5, and mount a support 35 adjacent thereto, on which is pivotally mounted a blade 36 adapted to extend into the slot 34. The inner end of the blade 36 is provided with a cut-out 37 forming a sharp pointed tongue 38 as shown in Fig. 4. When the blade 36 is turned manually so that its edge enters within the slot 34, the pointed edge 38 will enter between adjacent wire coils and will extend to approximately the center of the tubing 15. Since the coil 14 rotates as it moves forwardly, the point 38 rides between the coils of the wire 14 as a thread, and retards the forward push of the coil 14. Inasmuch as the forward movement of the coil 14 from the machine 10 is governed by the speed of circular rotation, the action of the blade 36 prevents the coil 14 from passing the slot 34 at a faster rate than the coil 14 is being extruded from the machine 10. This takes all strain off the wire in the tubing 15 and prevents separation of the coils.

When the can 23 is full, the machine may be stopped and the coil 14 cut at a point between the end of the tube 15 and the beginning of the L-shaped tube 32. The L-shaped tube 32 can be removed from the shaft 19 and the can lifted from the shaft 19 and transported to any other desired place for operation in any other desired manner. A new can is then placed onto the shaft 19, the L-shaped tube 32 is replaced, and the storage operation continued.

It is thus evident that the provision of a storage can 23 permits extended lengths of coiled wire to be made, without having the wire twist, turn, and thrash as it comes from the coiling machine. The storage arrangement is easy and economical to manufacture and to assemble, as the machine has no complicated or unduly numerous moving parts.

While I have described a specific construc-

tional embodiment of my invention, it is obvious that changes in the pulling mechanism, coiling mechanism employed and in the size and shape of the storing can and in the general arrangement of parts, may be made to suit the requirements for different sizes of coils of different materials and resiliency, without departing from the spirit and the scope of the invention as defined in the appended claims.

I claim:

1. In combination, a former for forming wire into a helical coil, a hollow rotatable receptacle for storing said helical coil, means for rotating the receptacle in timed relation to the helical coil formation, and guide means for guiding the formed helical coil to said receptacle comprising a freely rotatable guide head for receiving the helical coil from the former and feeding the helical coil circularly to the receptacle.

2. In combination, a former for forming wire into a helical coil, a rotatable receptacle for storing said helical coil, guide means for guiding the formed helical coil to said receptacle comprising a freely rotatable guide head for receiving the helical coil from the former and feeding the helical coil to the receptacle, and means in said guide head for regulating movement of the helical coil therethrough.

3. In combination, a former for forming wire into a helical coil, a rotatable receptacle for storing said helical coil, guide means for guiding the formed helical coil to said receptacle comprising a freely rotatable guide head for receiving the helical coil from the former and feeding the helical coil to the receptacle, and means for regulating movement of the helical coil through said guide head, comprising a fixed tongue positioned to extend between adjacent moving coils of said helical coil.

4. In combination, a former for forming wire into a helical coil, a rotatable receptacle for storing said helical coil, guide means for guiding the formed helical coil to said receptacle comprising a freely rotatable guide head for receiving the helical coil from the former and feeding the helical coil to the receptacle, and means for regulating movement of the helical coil through said guide head, comprising a fixed tongue manually movable to extend between adjacent moving coils of said helical coil.

5. In combination, a former for forming wire into a helical coil, a rotatable receptacle for receiving said helical coil, power means for actuating said former and rotating said receptacle in timed relation, a fixed tubular guide for receiving the helical coil from said former, a swivelled guide head having a tubular arcuate passageway for receiving the helical coil from said tubular guide, and a manually movable tongue on said tubular guide insertable to extend into the moving helical coil between adjacent coils thereof.

6. In combination, a former for forming wire into a helical coil, a hollow rotatable receptacle for storing said helical coil, guide means for guiding the formed helical coil to said receptacle comprising a freely rotatable guide head for receiving the helical coil from the former and feeding the helical coil circularly into the receptacle, and means in said guide head for controlling movement of the helical coil therethrough.

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