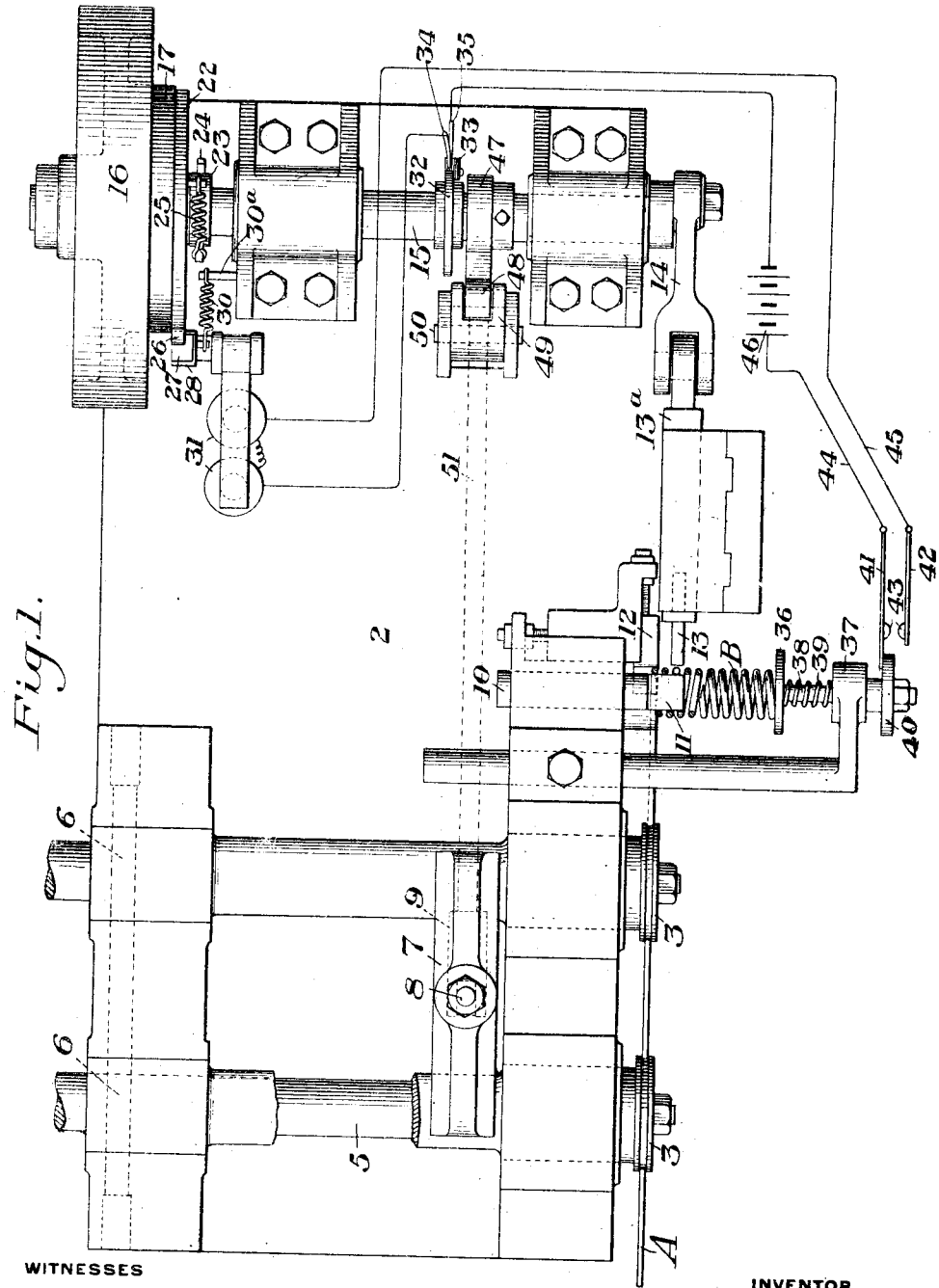


N. S. HARTER.
 MECHANISM FOR COILING AND CUTTING WIRE SPRINGS.
 APPLICATION FILED DEC. 13, 1909.

1,040,196.

Patented Oct. 1, 1912.

3 SHEETS-SHEET 1.



WITNESSES
R. A. Balderson
Walter Tamaris

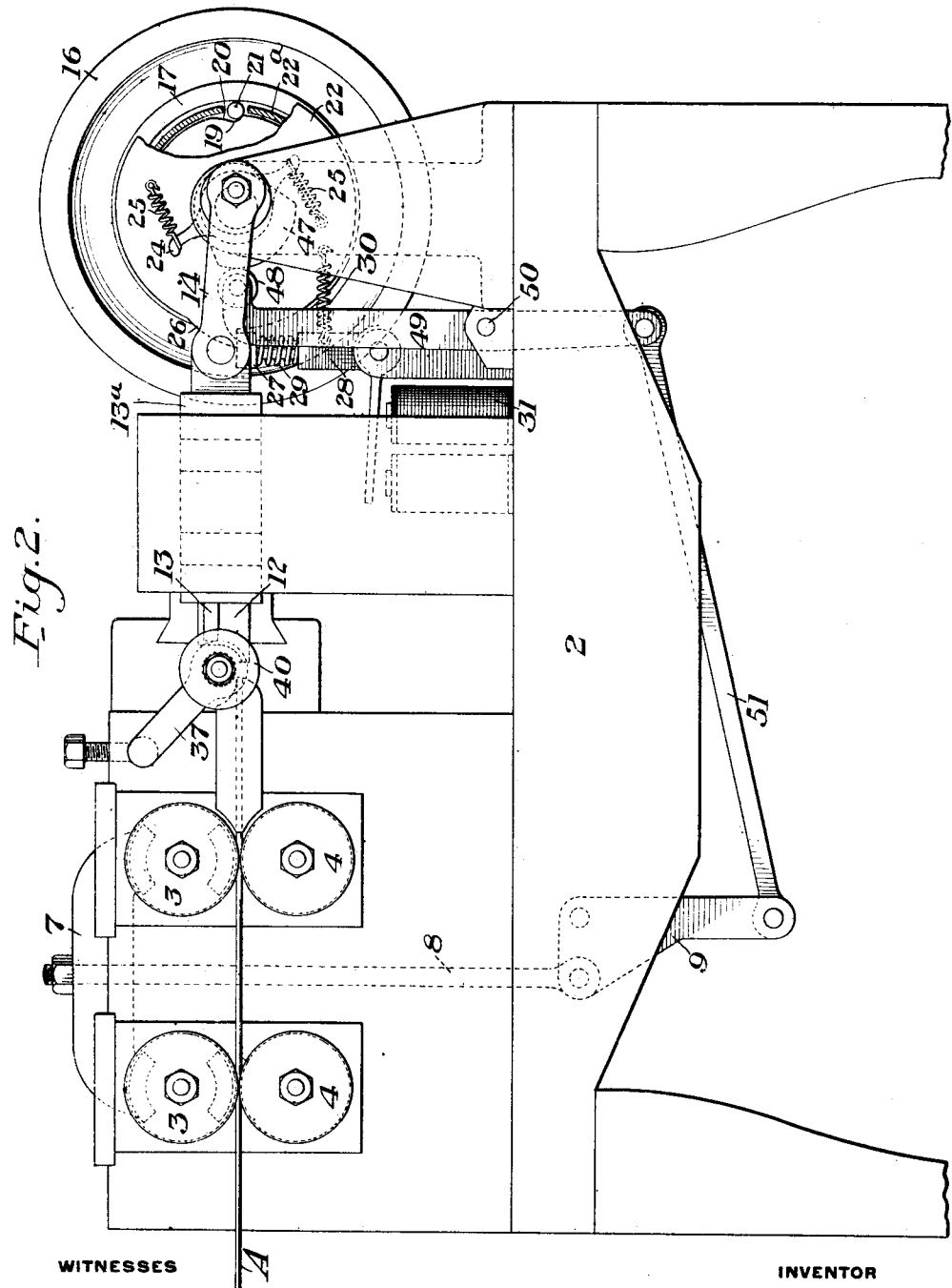
INVENTOR
N. S. Harter
 by *Baker, Byrnes, Parmeter,*
 his Attys.

N. S. HARTER.
 MECHANISM FOR COILING AND CUTTING WIRE SPRINGS.
 APPLICATION FILED DEC. 13, 1909.

1,040,196.

Patented Oct. 1, 1912.

3 SHEETS—SHEET 2.



WITNESSES

R. A. Baldwin,
Walter Tammes

INVENTOR

N. S. Harter
 by *Babeux, Bygones, Parmelee,*
his Attys

APPLICATION FILED DEC. 13, 1909.

Patented Oct. 1, 1912.

3 SHEETS—SHEET 3.



Fig. 6.

WITNESSES

R A Balderson.

Walter Sainaros

INVENTOR

N. S. Harter.

by Bakeress, Byrnest Paimalet.
his Atty

UNITED STATES PATENT OFFICE.

NOAH S. HARTER, OF WAUKEGAN, ILLINOIS, ASSIGNOR TO AMERICAN STEEL AND WIRE COMPANY OF NEW JERSEY, OF HOBOKEN, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MECHANISM FOR COILING AND CUTTING WIRE SPRINGS.

1,040,196.

Specification of Letters Patent.

Patented Oct. 1, 1912.

Application filed December 13, 1909. Serial No. 532,884.

To all whom it may concern:

Be it known that I, NOAH S. HARTER, of Waukegan, Lake county, Illinois, have invented a new and useful Mechanism for Coiling and Cutting Wire Springs, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan view of mechanism embodying my invention; Fig. 2 is a side view of the same; Figs. 3 and 4 are detail views showing the clutch mechanism; Fig. 5 is a detail view of a portion of the mechanism for releasing the pressure of the feed rollers; and Fig. 6 is a detail view of the rotary circuit controlling switch.

My invention has relation to mechanism for coiling and cutting coil springs, and is in some respects an improvement upon the mechanism described and claimed in my prior Patent No. 873,430.

An object of my invention is to provide improved means, in an automatic coiling and cutting machine, for releasing the pressure of the feed rollers from the wire from which a spring is being coiled, so that the coiling of the spring will be momentarily discontinued at the time the cut is made, thus avoiding mutilation of the spring.

A further object is to provide means of simple and convenient character for automatically coiling and cutting coil springs, wherein the coiling of the spring may depend in part on the action of the position of the cutting mechanism.

A still further object is to provide means of improved character for automatically breaking the electric circuit which controls the operation of the cutting mechanism, the circuit breaker to be controlled by the movement of the cutting mechanism in a manner to avoid breaking of the electric circuit at the circuit-closing contacts used for controlling the cutting mechanism, and thus avoid possible arcing at this point.

Other objects and advantages of my invention will hereinafter appear.

Referring to the drawings, the numeral 2 designates the frame of a spring coiling machine, which may be of any suitable character for supporting the operative parts.

The numerals 3 and 4 designate two pairs

of feed-in rollers for the wire A from which the springs (one of which is indicated at B) are to be formed. The lower rollers 4 are relatively fixed rollers, which may be positively driven in any manner not shown. The upper rollers 3 are each mounted on a shaft 5, which is pivoted at one side of the machine frame so as to permit the shaft to swing upwardly in a vertical plane about the center 6, thus separating the rollers 3 and 4 of each pair sufficiently to release the feeding pressure on the wire A. The two sets of rollers are preferably peripherally grooved, as indicated, to properly guide the wires to be fed.

The rollers 3 are normally held in contact with the wire A by means of a yoke 7 bearing upon the roller shafts and which is connected by a rod 8 with a bell crank lever 9, which is actuated in the manner hereinafter described.

10 designates an arbor around which the spring B is coiled. This arbor is cut away at its end portion as shown at 11 to form a cutting edge within the spring B.

12 designates a coiling die; and 13 is a cutting tool mounted in the reciprocating cutter bar 13^a connected to an operating crank 14 on a transverse shaft 15. Loosely mounted on the shaft 15 is a fly wheel 16, which may be driven by belt or other suitable means.

17 designates a clutch member, which is formed with or rigidly secured to the fly wheel 16 so as to turn constantly therewith. 18 is another clutch member, which is rigidly secured to the shaft 15 within the clutch member 17, and which has on its periphery a number of depressions 19 having the inclined walls 20. 21 designate rollers, which are placed in said depressions, and which are controlled by a member 22 which is loosely mounted on the shaft 15. This member 22 has an inwardly extending slotted flange 22^a, the rollers 21 lying in the slots of said flange.

23 is a collar which is rigidly secured to the shaft 15 and which is provided with a number of radially projecting arms 24. Connected to these arms at one end and to the member 22 at the other end, are springs 25. The member 22 also has a projecting nose 26, which is adapted to engage a stop

27: This stop is mounted in one arm of a lever 28, and is preferably provided with a cushioning spring 29.

30 is a tension spring connected at one end to the lever 28 and at the other end to a fixed bracket 30^a of the machine frame, which supports the shaft 15. The lever 28 is normally held by the spring 30 in a position to be engaged by the nose 26, as shown in Fig. 3; and is moved out of such position into the position shown in dotted lines in said figure by the action of electromagnets 31.

Rigidly secured to the shaft 15 is a disk 32 of fiber or other insulating material. Mounted on this disk is a metal segment 33 adapted to be engaged by a pair of contact brushes 34 and 35 forming a part of the circuit of the electromagnets 31.

36 is a metal disk, which is mounted opposite the end of the coiling mandrel 10 and in the path of the spring B. This disk is loosely mounted in a bracket 37 by means of a rod 38, a coil spring 39 being introduced between the bracket and disk. Secured to the rod 39 is a disk 40 of fiber or other insulating material.

41 and 42 designate contact springs having the contact points 43, and which are connected to opposite sides of the wires 44, 45 leading from the battery 46 and forming part of the circuit of the magnets 31. The spring 39 is sufficiently stiff to normally hold the disk 40 against the contact spring 43, and thereby hold said contact spring sufficiently away from the contact spring 42 to normally keep the circuit of the electromagnets open between these springs, as shown in Fig. 1.

47 designates a cam, which is rigidly secured to the shaft 15, and which is engaged by a roller 48 at the upper end of a lever 49. The lever 49 is pivoted to the frame at 50 and its lower arm is connected by link 51 with the bell crank lever 9 before referred to.

The operation is as follows:—Assuming that the feed rollers 3 and 4 are being driven and that the wire A is being forced into the coiling mechanism and a coil spring B is being formed, the wheel 16 is turning loosely on the shaft 15 and the clutch is out of action. The shaft 15 is, therefore, stationary. When the spring B has been coiled to the desired length, it comes in contact with the disk 36 and forces said disk outwardly against the resistance of the spring 39. This permits the contact points of the contact springs 42 and 43 to engage each other and close the circuit from the battery 46 through the electromagnets. This in turn moves the stop 27 out of engagement with the nose 26 of the clutch member 22. The springs 25 then act to turn the member 22 sufficiently to force the rollers 21 up the inclines 20 so as to wedge them between the

clutch members 17 and 18. This causes the shaft 15 to rotate. As this shaft turns from its normal position, the cam 47 is also turned with it, and the lever 49 drops off from the high part of said cam and through the connections described releases the pressure of the yoke 7 on the upper feed rolls 3. This causes the coiling of the spring to be momentarily discontinued, without discontinuing the rotating movement of the feed rollers. When the cutter shaft has made a portion of a revolution, the crank 14 actuates the cutting tool to cut the wire in one of the coils in the spring B during the time that the coiling process is discontinued. When the shaft 15 has been moved only a portion of a turn, the fiber disk 32 will have been turned with it so that the brushes 34 and 35 will no longer be in contact with the metal segment 33. The electric circuit will, therefore, be broken between the contacts 34 and 35. This deenergizes the magnets 31 and permits the spring 30 to pull the stop 27 back to its stop position. When the shaft 15 has made a complete revolution, the clutch member 22 will strike the stop 27, thus stopping the rotating movement of the member 22; and this in turn moves the rollers from their wedged positions between the clutch members 17 and 18 and throws the clutch out of action. There is always sufficient momentum in the shaft 15 and the members mounted thereon so as to produce a slight continued movement of said members after the part 22 has come to a stand-still. The rollers 21 will, therefore, remain loosely between the clutch members 17 and 18 until the stop 27 is again moved out of engaging position. The cam 47 will also have completed one revolution and stopped in its normal position, so that the coiling process will be continued until the circuit is again closed at the contacts 42 and 43.

The position of the spring-engaging disk or plate 36 can readily be adjusted so as to suit any length of spring.

The mechanism described forms a simple and practical mechanism by means of which coil springs may be formed and automatically cut into the desired lengths without mutilation by reason of the cutting operation.

It will be obvious that various changes may be made in the details of construction, arrangement and combination of the several parts. Thus, any suitable form of clutch may be employed for controlling the movement of the shaft 15; the electric circuits and their controlling devices may be arranged in various ways, and other changes may be made in the details of the parts.

What I claim is:—

1. In a helical spring coiling machine the combination of mechanism for forming a

helix having a plurality of coils, cutting mechanism for severing the helix from the uncoiled wire stock, means for actuating the coil forming mechanism and means arranged to momentarily arrest the operation of the coil forming mechanism while the cutting mechanism is being actuated to sever the helices from the wire.

2. In a helical spring coiling machine the combination with mechanism for forming a helix having a plurality of coils and a cutting mechanism to sever the formed helices from the wire, of friction delivery rollers to feed the wire to the coiling mechanism, and means for temporarily releasing the pressure of the friction delivery rollers on the wire while the cutting mechanism is being actuated to sever the formed helices from the wire.

3. In a helical spring coiling machine the combination with mechanism for forming a helix having a plurality of coils, cutting mechanism for severing the formed helices from the wire stock, and means for actuating the coiling and cutting mechanisms, of a plurality of pairs of feed rollers, one roller of each pair being movable toward and away from its opposing roller, mechanically operated pressure means for normally holding said movable rollers in feeding relation to the wire, and mechanism operated by the means actuating the cutting and coiling mechanisms for releasing the pressure means at intervals, said means being adjustable to vary the length of said intervals.

4. In a helical spring coiling machine the combination with wire coiling mechanism for forming a helix having a plurality of coils and means for intermittently operating said coiling mechanism, of a cutting tool, a shaft for actuating said tool, a constantly driven member loosely mounted on said shaft, clutch means for intermittently

connecting the member and shaft, and an electromagnet for controlling the clutch mechanism, and a stop located in the path of movement of the helical spring being coiled, said stop having a contact arranged to control the circuit of said magnet and being actuated by pressure of the end of the coil being formed to complete the circuit of said magnet.

5. In a helical spring coiling machine the combination with mechanism for forming a helix having a plurality of coils and means for intermittently operating said coil forming mechanism, of a cutting-off tool, a shaft for actuating said tool, a constantly driven member loosely mounted on said shaft, clutch means for connecting the member and shaft, an electromagnet for controlling the clutch mechanism, a circuit controlling device mounted on said shaft, and a second circuit controlling device having means actuated by the formed helix for controlling the action of the second circuit controlling device.

6. In a helical spring coiling machine the combination with mechanism for forming a helix having a plurality of coils, of a cutting-off tool, means for actuating said tool, an electromagnet for controlling the operation of the cutting-off tool, a circuit controlling device operated by the movement of the formed helix for starting the operation of the cutting-off tool, and means controlled by the operation of the tool actuating means to momentarily stop the feed of wire and arrest the coil forming operation while the cutting tool is operated.

In testimony whereof, I have hereunto set my hand.

NOAH S. HARTER.

Witnesses:

E. E. BOOTHMAN,
HARLOW M. COMBS.