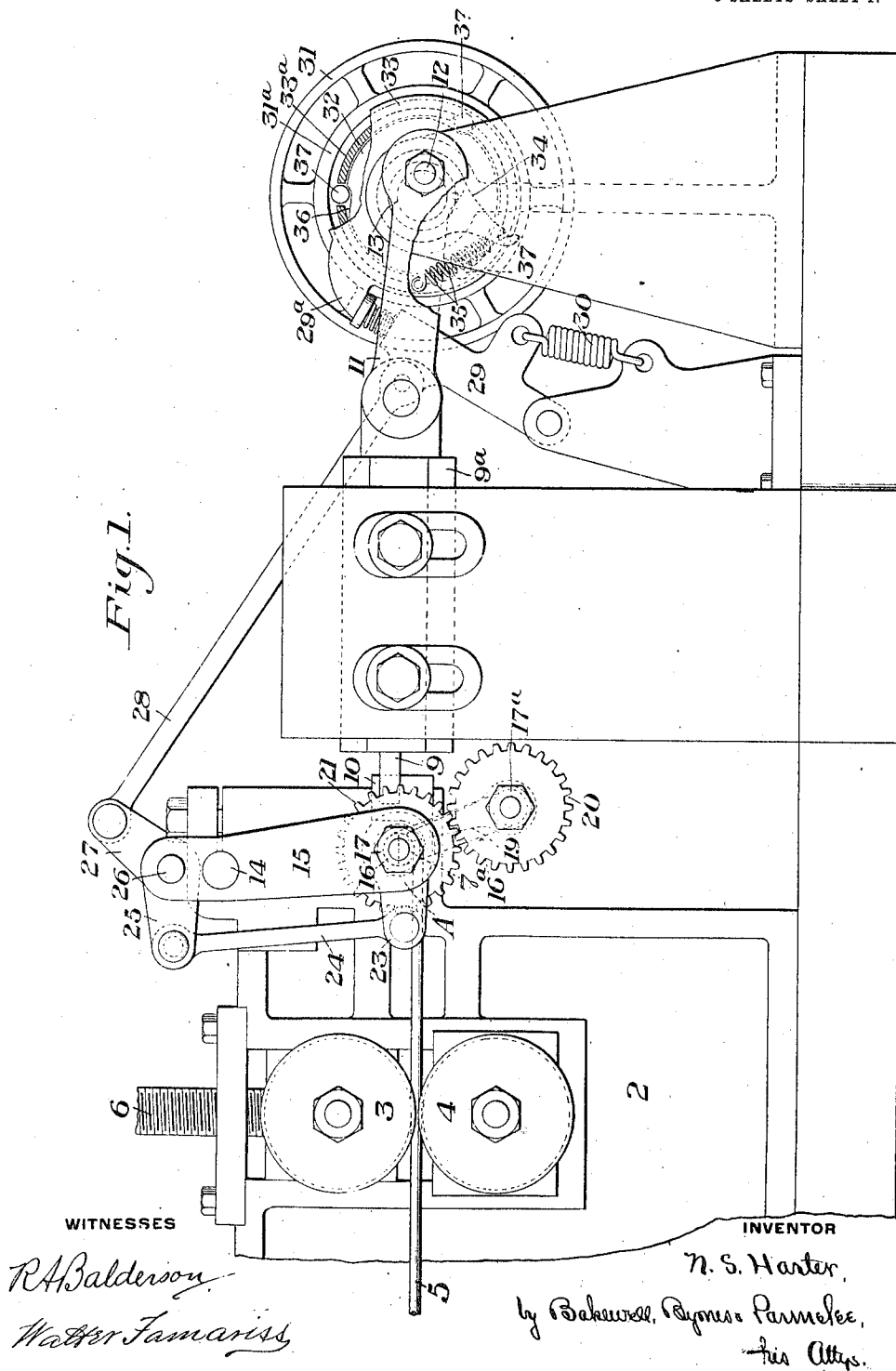


1,029,540.

3 SHEETS—SHEET 1.

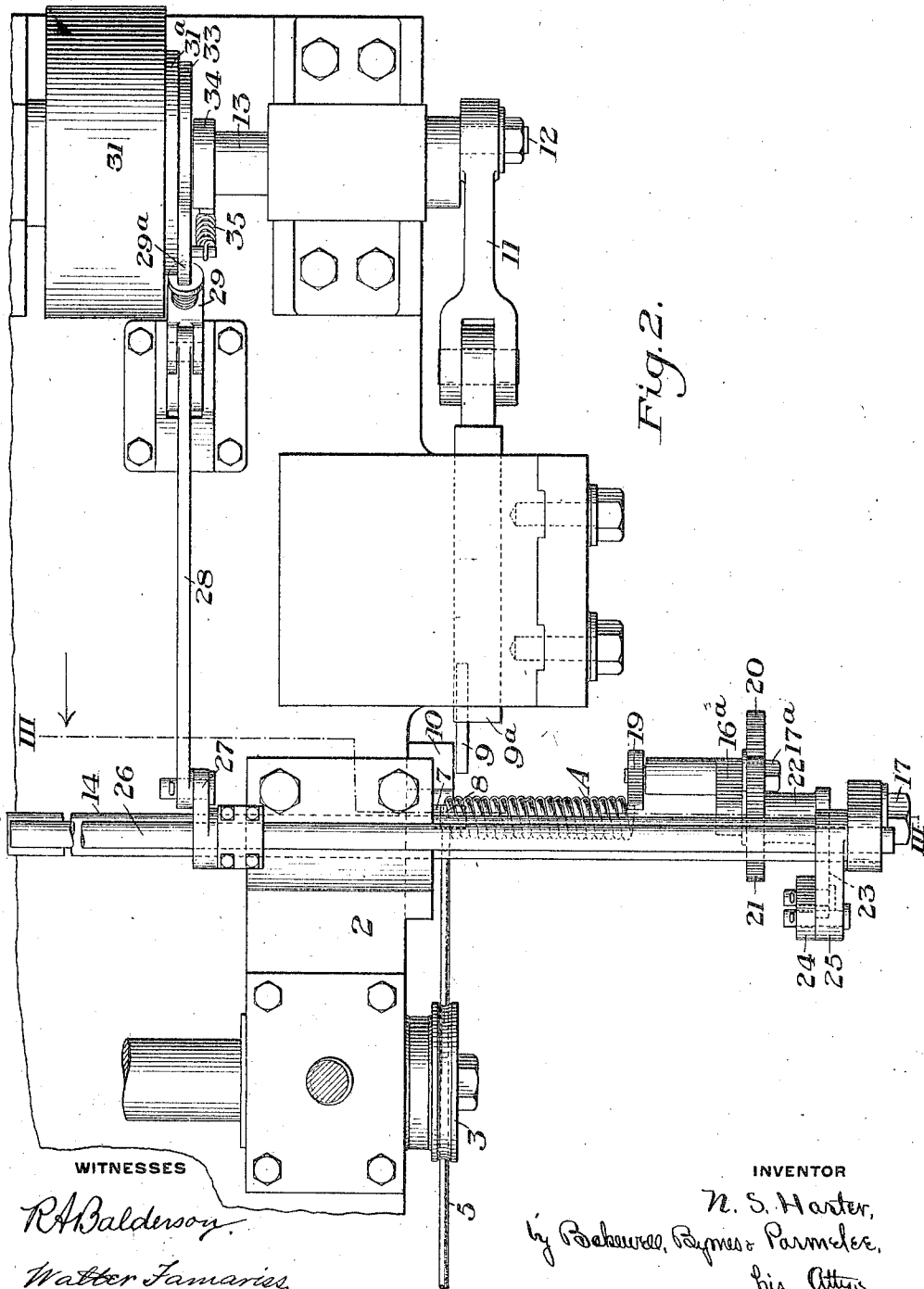


N. S. HARTER.
MACHINE FOR COILING AND CUTTING COIL SPRINGS.
APPLICATION FILED NOV. 19, 1909.

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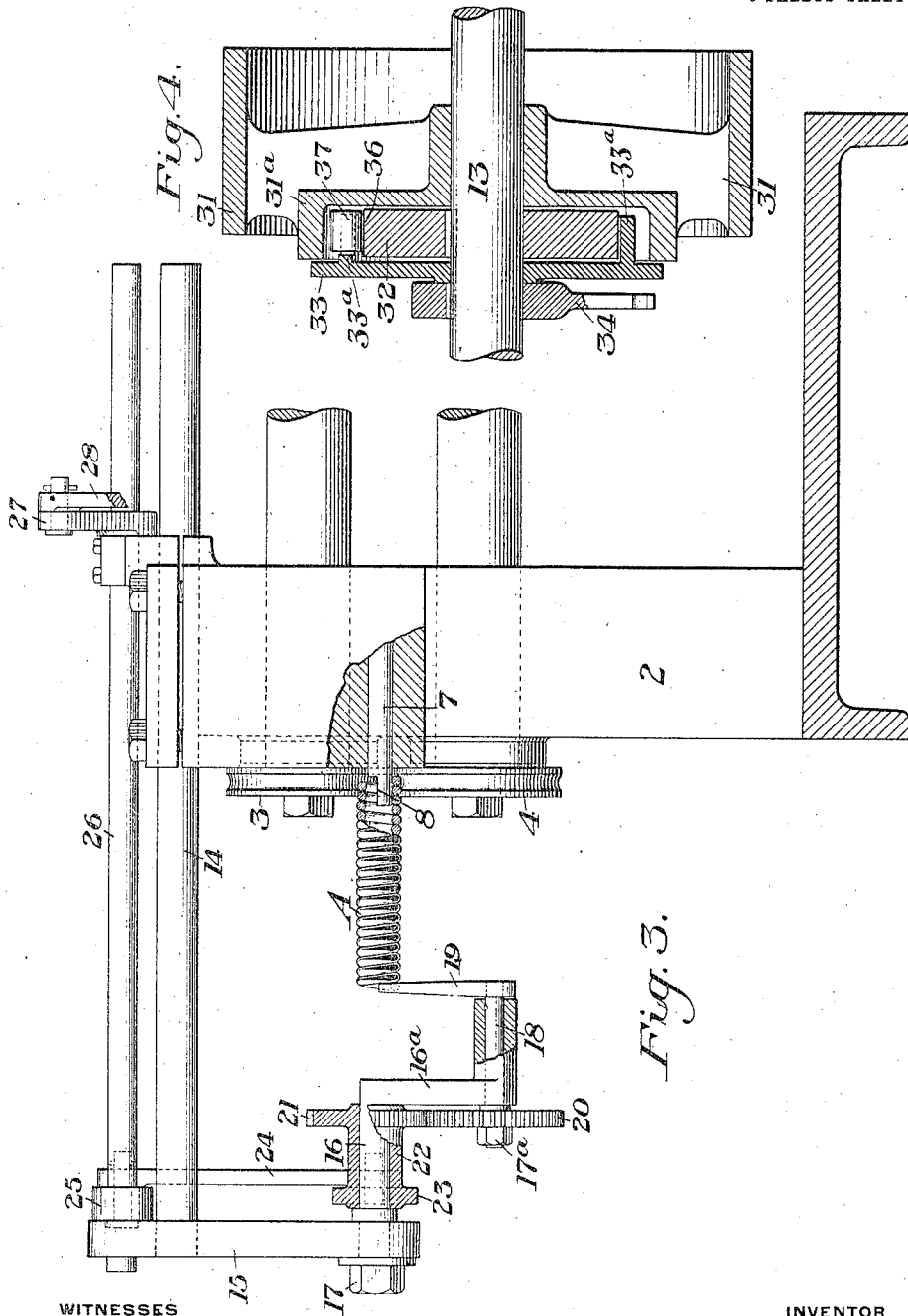


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3 SHEETS-SHEET 3.



WITNESSES
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UNITED STATES PATENT OFFICE.

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

MACHINE FOR COILING AND CUTTING COIL-SPRINGS.

1,029,540.

Specification of Letters Patent.

Patented June 11, 1912.

Application filed November 19, 1909. Serial No. 528,911.

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 Machine for Coiling and Cutting Coil-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 side view of apparatus embodying my invention; Fig. 2 is a plan view of the same; Fig. 3 is a section on the line III—III of Fig. 2, and partly broken away, and Fig. 4 is a detail view of one form of clutch which may be employed.

My invention has relation to apparatus for forming and cutting coil springs, and more particularly, to means of improved character for automatically cutting off the springs after they have been wound into suitable lengths.

The invention is in some respects an improvement upon the apparatus described and claimed in my Patent No. 873,430, of December 10, 1907. The invention covered by that patent provided means for automatically tripping cutting mechanism for the purpose of severing a portion of the coil spring from a coiling mechanism. This was accomplished by placing an electric circuit closer in such a position that the rotating movement of the spring would cause the end of the wire in the spring to effect the closure of an electric circuit, and thereby put into motion the actuating mechanism for the cutting off tool. The present invention accomplishes the same results without the aid of the circuit closer, and wholly by mechanical means, thereby simplifying the apparatus.

Referring to the accompanying drawings, in which I have shown the preferred embodiment of my invention, and which will now be described, the numeral 2 designates the frame of the machine, which may be of any suitable character.

3 and 4 designate feed-in rollers, which are designed to be driven in any suitable manner (not shown), and which feed the wire 5 to be coiled to the action of the coiling mechanism. The upper roll 3 is preferably adjustable by means of a screw 6 so as to give the required pressure between the two rollers.

7 designates the arbor on which the spring 55 is coiled. Part of the end portion of the arbor is cut away as shown at 8 so as to form a shearing edge inside of the spring being coiled.

9 designates a cutting-off tool, which is supported in a reciprocating slide bar 9^a.

10 is a coiling die against which the wire 5 is forced in making the coil about the arbor 7.

The slide bar 9^a is connected by a pitman 11 with a crank pin 12 on the shaft 13.

14 designates an adjustable rod or shaft suitably supported in the frame 2 and having an arm 15.

16 is a knee or bent shaft which is adjustably supported in the arm 15 and is secured in position by the nut 17. The axis of this nut and shaft is approximately in alignment with the axis of the coil spring A being formed on the arbor 7. The knee or bent shaft 16 has an L-shaped end portion 16^a in which is rotatably mounted a pin or shaft 18 having an arm 19 which projects upwardly into a position to be engaged by the advancing and rotating end of the coil A. Secured to the pin or shaft 18 is a pinion 20 which meshes with another pinion 21 carried by a sleeve 22 which is loosely mounted on a portion of the shaft 16. Rigidly secured to the sleeve of the pinion 21 is an arm 23 which is connected by the link 24 with an arm 25 of a rocker shaft 26. The shaft 26 has another arm 27, which is connected by a link 28 with a pivoted stop member 29, which is normally held in the position shown in Fig. 1 by a spring 30.

Loosely mounted on the shaft 13 is the constantly driven member 31 of a clutch, this member being designed to be driven by a belt or other suitable means. 32 designates a second member of the clutch, which is rigidly secured to the shaft 13, and 33 is a third and controlling member of the clutch. Secured to the shaft 13 is an arm 34, to which is connected one end of a spring 35, the other end being connected to the clutch member 33, for drawing the clutch into action. The clutch member 32 has a number of inclines 36 on its periphery, and between these inclines and the inner walls of the flange 31^a of the constantly driven clutch member 31 are a series of rollers 37. When the rollers are in the lower portions

of the inclines, as shown in Figs. 1 and 4, the movement of the constantly rotating member 31 will have no effect on the other members of the clutch, the stop 29 being in position to engage the projection 29^a on the clutch member 33. This clutch member 33 has inwardly projecting portions 33^a between which the rollers 37 are placed, and when the stop 29 is moved out of engagement with the projection 29^a, the spring 35 will actuate the clutch member 33 to move said rollers up the inclines 36 until they become locked or wedged between the members 31^a and 32. The rotating movement of the member 31 will then cause the other clutch members to rotate therewith until a complete revolution has been made, or until the stop 29 is allowed to swing into position to again engage the projection 29^a, which will in turn throw the clutch out of action.

As the coil A is formed, it rotates about the axis of the arbor during its formation. The arm 19 is adjustable parallel to the axis of the coil, and also about the axis of the coil, and its free end is located, as above described, in the path of the coil, so that the end of the wire in the coil will come in contact therewith at the time when the coil is of the proper length. The engagement of the wire with the arm 19 at this time causes a rotary movement of said arm about the axis of the pin or shaft 18, thereby rotating the pinions 20 and 21, and through the arm 24 and its connections moves the stop 29 backwardly out of engagement with the projection 29^a. The clutch now comes into operation, and the shaft 13 rotates and thereby actuates the cut-off slide 9^a and cutting tool 9. As soon as the coil has been cut, the spring 30 draws the stop arm 29 back into its normal position so that the clutch will be thrown out of action when one complete revolution has been made.

By loosening the nut 17 which secures the knee 16 to the arm 15, and also the nut 17^a on the end of the pin or shaft 18, the arm 19 may be adjusted to obtain any relative angle to the two ends of the severed spring; and by adjusting the rod 14 in a direction parallel with the axis of the spring, any desired length of the spring may be obtained.

The advantages of my invention will be apparent to those skilled in the art, since it provides simple and positive means of mechanical character whereby coil springs may be formed into any desired lengths and automatically severed. I do not desire to limit myself, however, to the exact mechanism which I have shown and described, it being evident that various changes may be made in the several parts without departing from the spirit and scope of my invention as defined in the appended claims.

Thus, the form and arrangement of the de-

vices which are actuated by the end of the wire in the formed spring may be changed, various forms of clutches may be employed; the cut-off tool may be actuated in different ways, and other changes may be made.

What I claim is:—

1. In mechanism for forming and cutting off coil springs, the combination with coil-forming mechanism, of a cutting-off tool, means including a clutch for actuating said tool, a stop in the path of the advancing end of the coil being formed, and means operatively connecting a member of said clutch with the stop for positively moving said clutch member when the stop is engaged by the end of the formed coil; substantially as described.

2. In mechanism of the character described, the combination with coil-forming means including an arbor about which the coil is rotated as it forms, of a cutting-off tool, a shaft for actuating said tool, driving means for said shaft including a clutch, an arm located in the path of the advancing rotating end of the coils being formed, and means operatively connecting a member of said clutch with said arm for positively moving said clutch member when the arm is engaged by the advancing end of said coils; substantially as described.

3. In mechanism of the character described, the combination with coil-forming means including an arbor about which the coil is rotated as it forms, of a cutting-off tool, a shaft for actuating said tool, driving means for said shaft including a clutch, an arm located in the path of the advancing rotating end of the coils being formed, means operatively connecting a member of said clutch with said arm for positively moving said clutch member when said arm is engaged by the end of the coils, and means for adjusting said arm in the direction of the axis of the coils to vary the length of the coils; substantially as described.

4. In mechanism for forming and cutting off coil springs, the combination with coil-forming mechanism, of a cutting-off tool, means including a clutch for actuating said tool, an arm in the path of the advancing end of the coil being formed, means operatively connecting a member of said clutch with said arm for positively moving said clutch member when engaged by the end of the coils, and means for adjusting the angular position of said arm; substantially as described.

5. In mechanism of the character described, the combination with coiling means, including an arbor about which the coils are rotated as they are formed, of a cutting-off tool, a shaft for actuating said tool, means for driving the shaft, including a clutch, an arm located in the path of movement of the

advancing end of the coils being formed, a shaft to which said arm is connected, gearing actuated by said shaft, and mechanical connections between the gearing and a member of the clutch; substantially as described.

6. In mechanism of the character described, the combination with coil-forming means, including an arbor about which the coils are rotated as they are formed, of a cutting-off tool, a shaft for actuating the tool, means for driving the shaft, including a clutch, an arm located in the path of movement in the advancing ends of the coils being formed, a shaft to which said arm is secured, an adjustable member in which the shaft is mounted, gearing actuated by said arm, and connections between the gearing and a member of the clutch; substantially as described.

7. Apparatus for making coil springs comprising coil forming mechanism to wind the spring stock into a coil, means for driving said mechanism, a cutting off tool movable into and out of the path of the coiled spring whereby the coiled spring is cut to length, means for intermittently actuating said cutting tool to sever the coiled spring from the spring stock, holding means for securing the cutting tool actuating mechanism in inoperative position, a swinging stop to engage the end of the coiled spring,

and means connecting said stop and the holding mechanism whereby the holding mechanism is moved to release the tool actuating mechanism when the stop is engaged by the end of the coiled spring; substantially as described.

8. Apparatus for making coil springs comprising coil forming mechanism to wind the spring stock into a coil, means for driving said mechanism, a cutting off tool movable into and out of the path of the coiled spring whereby the coiled spring is cut to length, means for intermittently actuating said cutting tool to sever the coiled spring from the spring stock, holding means for securing the cutting tool actuating mechanism in inoperative position, a swinging stop to engage the end of the coiled spring, means connecting said stop and the holding mechanism whereby the holding mechanism is moved to release the tool actuating mechanism when the stop is engaged by the end of the coiled spring, and means for adjusting said swinging arm to vary the length to which the springs are cut by said cutting tool; substantially as described.

In testimony whereof, I have hereunto set my hand.

NOAH S. HARTER.

Witnesses:

JAY WALDECK,
M. S. FEGAN.