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WIRE FEEDING DEVICE FOR COILING MACHINES.

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1,093,390. Patented Apr. 14, 1914.

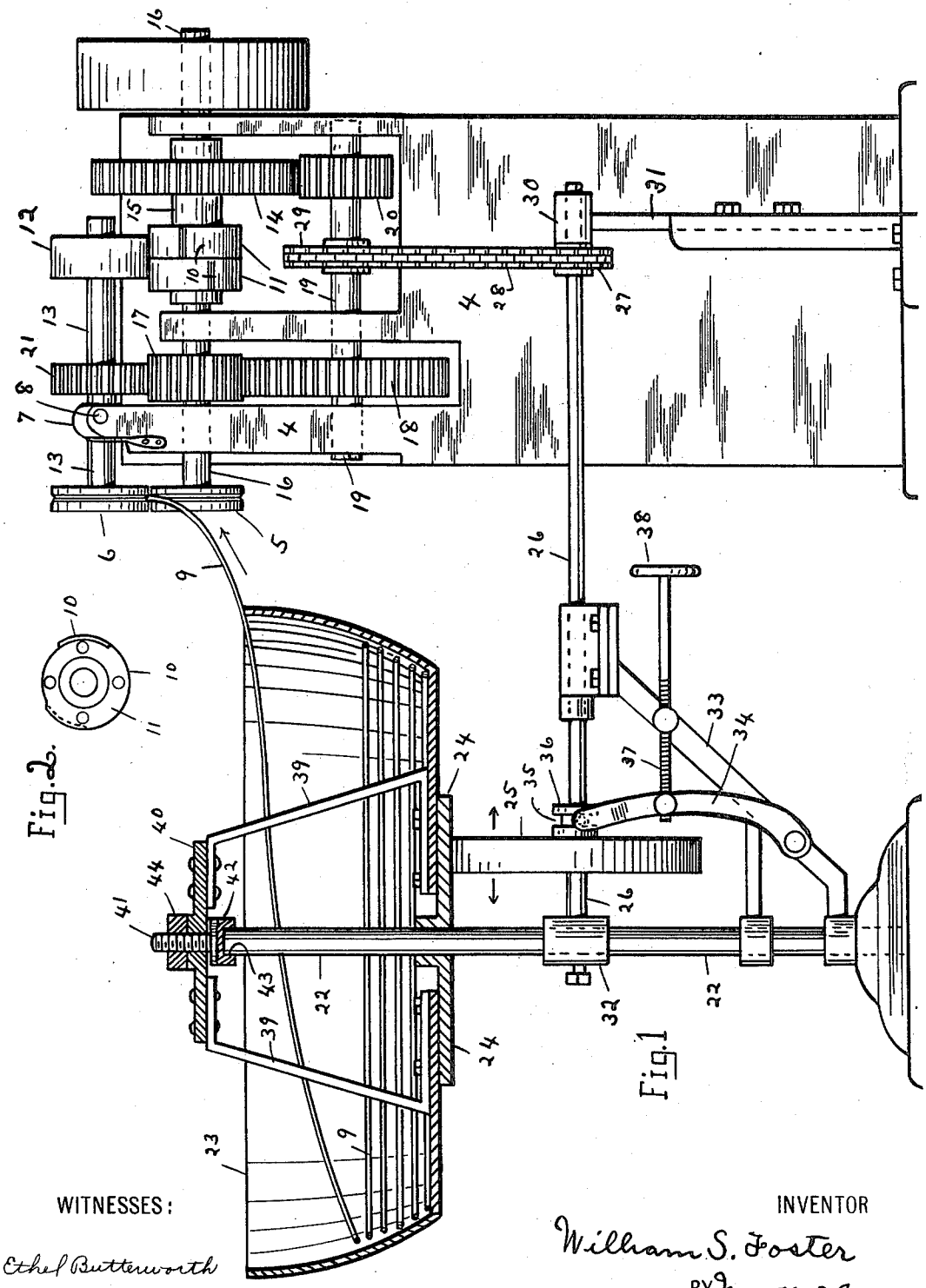

Fig. 1

Fig. 2.

WITNESSES:

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WIRE-FEEDING DEVICE FOR COILING-MACHINES.

1,093,390. Specification of Letters Patent. Patented Apr. 14, 1914.

Application filed May 9, 1912. Serial No. 696,098.

To all whom it may concern:

Be it known that I, WILLIAM S. FOSTER, of Utica, in the county of Oneida and State of New York, have invented certain new and useful Improvements in Wire-Feeding Devices for Coiling-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the reference-numerals marked thereon, which form part of this specification.

The purpose of my present invention is to provide an improved automatic wire feeding device to be used in connection with machines which form coiled wire springs or what are commonly known as spring coiling machines.

Figure 1 is a view mostly in side elevation of a spring coiling machine and a feeding device embodying my invention. Fig. 2 is an end view of one of the removable collar cams.

The right hand portion of Fig. 1 illustrates in a somewhat diagrammatic manner the relevant features of a common form of spring coiling machines.

Suitably mounted upon the frame 4 is a power driven lower feed roller 5 above which is the upper feed roller 6 rotating in a bearing 7 pivoted at 8 so that the upper feed roller may be moved near enough to the lower feed roller to grasp the wire 9 therebetween and force it forward to the forming operations. The extent to which the wire is drawn into the machine is determined by the time the upper feed roller is forced toward the lower feed roller and this movement is controlled by the larger diameter 10 of the double collar cam 11 coming into rolling engagement with a roller 12 mounted upon the same shaft 13 as is the upper feed roller 6 but upon the opposite end thereof. The collar cam 11 is mounted to revolve at the same rate as the main gear 14 by their being both mounted upon a tubular shaft 15 which for convenience may rotate loosely upon the shaft 16. Upon this shaft 16 is also mounted the lower roller 5 and a gear 17 meshing with a gear wheel 18 upon a countershaft 19 upon which is a pinion 20 meshing with the main gear 14. The gear 17 meshes with a gear wheel 21 upon the shaft 13 near its pivoting point 8. During one rotation of the main gear 14 the upper and lower feed rollers 6 and 5 rotate several times and a complete spring is formed. Operating once with each full revolution of the main gear 14 are other parts (not shown) for regulating the size of the coils and their distance apart and for cutting off the spring when completed. To adapt such a machine to make springs of various lengths it is only necessary to change the movable part of the double collar cam 11 to have a greater or less part of the total periphery of the two parts of a size to render the lower and upper feed rollers 5 and 6 operative. It is obvious that by adjusting the collar cam so that it will have the greater portion of its periphery of enlarged diameter more wire will be fed into the machine before the spring cutting mechanism becomes operative.

It will be seen that a wire coiling machine operating upon these general principles will have all its rotating parts and even its feed rollers revolving continuously but that the consumption of wire will be intermittent and that the ratio of wire consuming to non-wire consuming time will vary greatly according to the length of wire going into the spring which the machine is adjusted to make. While the machine is not consuming wire the parts are revolving to perform a complete spring-forming operation and so as to bring the parts into proper position to make the next spring.

Heretofore the reel holding the supply bundle of wire was loosely mounted so as to revolve and allow the wire to be uncoiled as drawn off by the coiler. On account of the intermittent consumption of wire by the coiler the reel would be started with a jerk and after it got under way would continue unreeling the wire after the coiler ceased consuming it. The amount of this over-feed might be several feet of wire and with such an over-supply the wire was apt to get into kinks and catch in the reel or other parts of the machine. When the coiler started to consume wire again it would take up this slack and again start the reel with a jerk. In practice it required a man at each reel to keep the wire proceeding to the coiler in proper form.

To obviate the disadvantages above pointed out is one of the purposes of my invention. I accomplish this by a feeding device

operatively connected to some continuously moving part of the coiler and with such easily adjustable means as will admit of the operator of the coiler readily adjusting the rate of the feed from the wire receptacle to practically average the rate of consumption of wire by the coiler. The adjustment can be readily made to accommodate the feed to the different sizes of springs that may be made by the coiler. Upon being once adjusted for springs of a given size the wire is fed to the coiler as needed and in this way the continual attendance of a man or boy upon the wire reel is dispensed with.

Rotatably mounted upon an upright standard 22 is the basket reel 23 containing a bundle of wire 9. Secured to the bottom of the basket reel 23 is a downwardly facing friction disk 24 making contact with a friction wheel 25 keyed to but slidingly mounted upon a horizontal shaft 26 driven by a sprocket wheel 27 thereon being connected by chain 28 to a sprocket wheel 29 mounted upon or driven by some continuously moving part of the coiler such as shaft 19. The right hand end of the shaft 26 is journaled in a bearing 30 provided on a suitable adjustable upright 31. The left end of the shaft 26 may be journaled in a collar 32 secured to the standard 22. Upon a bracket 33 extending from the upright 22 is pivotally mounted an arm 34 having its under end forked and provided with suitable fingers to engage an annular groove 35 upon the hub 36 of the friction wheel 25. An adjusting screw 37 with hand wheel 38 at its outer end connects bracket 33 and arm 34 so that rotation of the adjusting screw 37 moves the friction wheel 25 toward or away from the center of friction disk 24 and thereby in an obvious manner increases or decreases the speed with which the basket reel 23 is rotated in relation to the constantly moving member of the coiler.

The upright 22 extends loosely through friction disk 24 and acts as a shaft around which the friction disk freely revolves. From the bottom of the basket reel 23 arms 39 extend upwardly and are secured to a cross-piece 40 through which extends the screw-threaded shank 41 of a cap 42 in the lower side of which is a recess 43 forming a bearing in which rests the upper end of the upright 22. The shank 41 being screw-threaded through the upright 40 and provided with a lock nut 44 provides means for raising or lowering the basket reel slightly and thereby regulating as needed the amount of friction between the friction disk 24 and the friction wheel 25.

From the description of parts now made it will be obvious that the basket reel 23 will be rotated continuously at a speed that will have any desired ratio to the speed of the constantly moving parts of the coiler. For instance if the coiler is making springs that have therein seven feet of wire the feeding device will be adjusted by rotation of hand wheel 38 so as to feed out about seven feet of wire during each rotation of the main gear 14 or during each complete spring-forming operation of the coiler. During the time when the coiler is not drawing any wire the feeding device is operative and is steadily feeding out or loosening wire ready for consumption. When the coiler again becomes operative it will take up this slack and all the wire that the feeding device has supplied meanwhile so that at the end of the wire consuming process there will be no slack wire. In other words during one complete spring-forming operation the necessary amount of wire will have been continuously fed out by the constantly moving basket reel 23. The slack wire that accumulates during the non-consuming time is taken up at each operation by reason of the fact that the wire is handled by the feed rollers 5 and 6 when they are operative faster than the wire is loosened in the reel 23. When properly adjusted the feed of the basket reel 23 should be at a rate that will equal the average consumption of wire by the coiler. If the operator sees that the wire is being fed a little too fast a slight adjustment may be made by hand wheel 38 which it is plain can be done without stopping the machine.

When the coiler is changed to make springs having a different amount of wire therein the position of friction wheel 25 is shifted accordingly. For instance if it is desired to change from making springs having seven feet of wire to springs having five feet of wire it is obvious that the wire fed out by the continuously moving basket 23 must be fed out at a slower rate in order to compensate for the reduced average speed of consumption of wire by the coiler. It will be noticed that with a coiler driven at a similar rate of speed, the wire when being taken at all by the coiler will be consumed at the same rate, but that the difference between different sized springs will come from the coiler not consuming wire during as large a fractional part of its complete operation.

What I claim as new and desire to secure by Letters Patent is:

1. In combination, a spring coiling machine having parts consuming wire intermittently, a reel from which the wire for said coiler is to be unwound, and means adapted to rotate said reel to unwind the wire therefrom and allowing further rotation of said reel and unwinding therefrom by the tension from the consuming feed.

2. In combination, a spring coiling machine having parts consuming wire intermittently, a reel from which the wire for

said coiler is to be unwound, and means operatively connected to said coiler and adapted to rotate said reel to unwind the wire therefrom and allow further rotation of said reel and unwinding therefrom by the tension from the consuming feed.

3. In combination, a spring coiling machine having parts consuming wire intermittently, a reel from which the wire for said coiler is to be unwound, and means adapted to rotate said reel to unwind the wire therefrom at the average rate of consumption and allow further rotation of said reel and unwinding therefrom by the tension from the consuming feed.

4. In combination, a spring coiling machine having parts consuming wire intermittently, a reel from which the wire for said coiler is to be unwound, and means operatively connected to said coiler and adapted to rotate said reel to unwind the wire therefrom at the average rate of consumption and allowing further rotation of said reel and unwinding therefrom by the tension from the consuming feed.

5. In combination, a spring coiling machine having parts moving continuously but consuming wire intermittently, a reel from which the wire for said coiler is to be unwound, and means operatively connected to said continuously moving parts and adapted to rotate said reel continuously to unwind the wire therefrom and allowing its further rotation by the tension from the consuming feed.

6. In combination, a spring coiling machine having parts moving continuously but consuming wire intermittently, a reel from which the wire for said coiler is to be unwound, and means operatively connected to said continuously moving parts and adapted to rotate said reel continuously to unwind the wire therefrom at the average rate of consumption and allowing its further rotation by the tension from the consuming feed.

In witness whereof I have affixed my signature, in the presence of two witnesses, this 2nd day of May 1912.

WILLIAM S. FOSTER.

Witnesses:

ETHEL BUTTERWORTH,

HARRIET WILLIAMS.