E. W. HART.

WIRE COILING MACHINE.

APPLICATION FILED JUNE 28, 1916.

1,213,480. Patented Jan. 23, 1917.

Fig. 1.

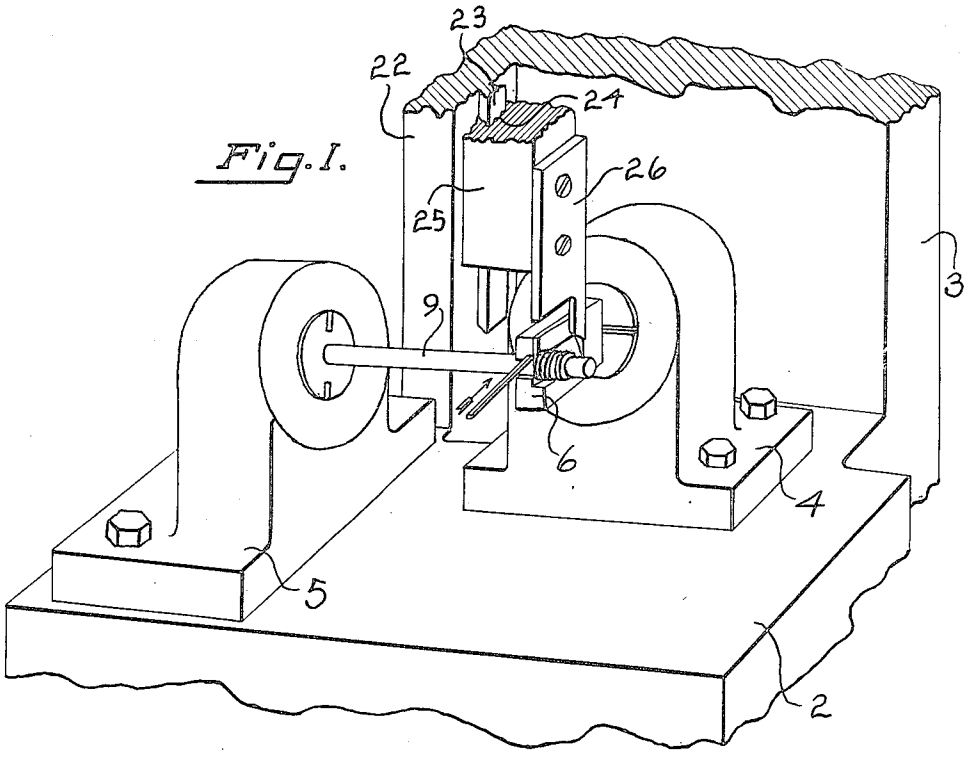


Fig. 3.

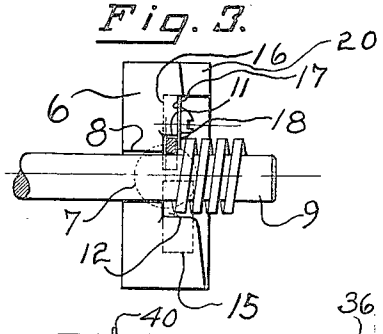
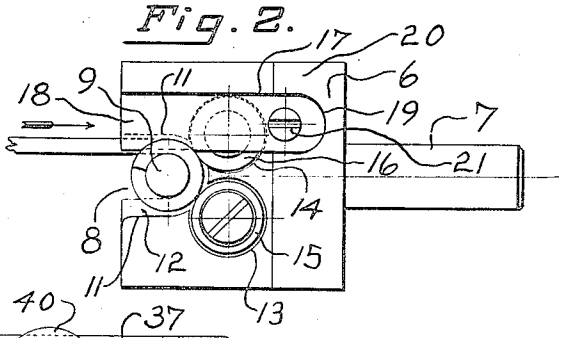


Fig. 2.



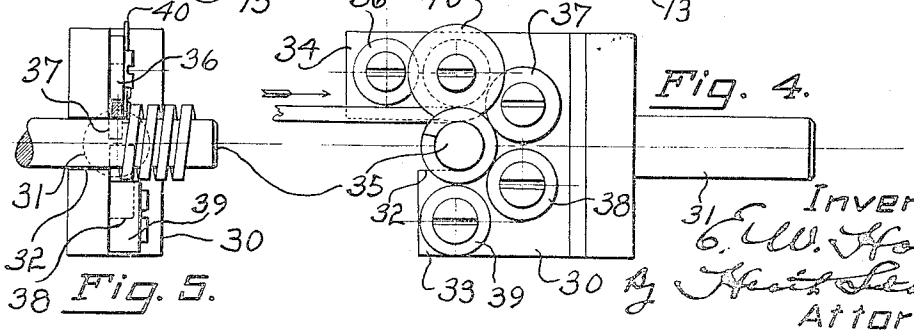


Fig. 5.

Fig. 4.

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UNITED STATES PATENT OFFICE.

EDISON W. HART, OF MASSILLON, OHIO, ASSIGNOR TO THE RELIANCE MANUFACTURING COMPANY, OF MASSILLON, OHIO, A CORPORATION OF OHIO.

WIRE-COILING MACHINE.

1,213,480. Specification of Letters Patent. Patented Jan. 23, 1917.

Application filed June 28, 1916. Serial No. 106,385.

To all whom it may concern:

Be it known that I, EDISON W. HART, a citizen of the United States, residing at Massillon, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Wire-Coiling Machines, of which the following is a specification.

This invention relates to what I shall for convenience term "a wire coiling machine", the object of the invention being to provide an effective apparatus of this character by which wire or equivalent stock can be rapidly and accurately coiled. The resultant coiled article may be used as a spring or its helices may be separated from each other, or a length of the coiled structure may be cut at any desirable points.

In the drawings accompanying and forming part of the present specification I have shown in detail two convenient forms of embodiment of the invention which I will set forth fully in the following description, so that those skilled in the art can practise the invention. Obviously I do not restrict myself to this particular disclosure; I may depart therefrom in several respects within the scope of the invention defined by the claims following said description.

Referring to said drawings: Figure 1 is a perspective view of a machine involving the invention. Fig. 2 is a side elevation of one type of coiling head or that shown in Fig. 1, illustrating a portion of the arbor and a partly coiled structure. Fig. 3 is a front elevation of the same. Figs. 4 and 5 are views corresponding to Figs 2 and 3 respectively of a different form of head.

Like characters refer to like parts throughout the several views, Figs. 2 and 5 being on the same scale which is larger than that of Fig. 1.

The operative parts of the machine may be mounted in any desirable manner. The framework shown for this purpose includes the base or bed 2 and the standard or upright 3 rising therefrom, the two parts being united in any suitable way. As will hereinafter appear the machine involves in its organization a coiling head and an arbor in correlation with each other. These parts may be sustained in any desirable manner for instance a bracket as 4 may be utilized for carrying the coiling head, while a practically similar bracket as 5 may be furnished for supporting the arbor, the two brackets as illustrated being in proximity and at right angles to each other. They are attached to the base or bed in any suitable way for instance by screws or bolts.

Referring first to Figs. 1, 2 and 3, the structure thereby illustrated comprises a coiling head such as that denoted by 6. From the rear of this coiling head there extends the practically cylindrical shank 7, the upstanding portion of the bracket having a bearing hole in which the shank 7 is received and clamped. From this, as will be understood, the coiling head 6 is fixed or stationary. Said coiling head at the front practically centrally of the height thereof has a slot or mouth 8 open at its forward end and extending backwardly from the front edge of the head 6 the requisite distance. This slot or mouth 8 is adapted to receive a mandrel as 9 shown as being of cylindrical form, and the diameter of which defines the internal diameter of the coiled article to be formed. The vertical part of the bracket 5 has a central bearing opening to slidingly receive the mandrel 9. While the feed of the wire or stock whether the same be flat or other form, might be accomplished through the rotation of the mandrel 9, this is not so in the present case, the mandrel being preferably non-rotative. I have shown no means for feeding the stock; it may consist of pawl and ratchet instrumentalities more or less common in the art.

In one side face of the head 6 shown as the face in the foreground of Fig. 2 and that on the right in Fig. 3, is formed an aperture corresponding practically to the form of but larger than the slot 8, thus producing a marginal shoulder 12 around said slot. The distance between the wall of the slot 8 and the wall of the aperture 11 is approximately equal to or in fact is a little larger than the thickness of the stock. In the same face of the head 6 as that in which the aperture 11 is formed, are the two practically circular seats or cavities 13 and 14 in which are received the rotary rollers 15 and 16. These circular seats or cavities 13 and 14 intersect the aperture 11, the result being that the peripheral portions of the rollers 15 and 16 extend into the aperture. The rollers extend but a short distance in the aperture. The roller 15 is wider than the

roller 16 owing to the fact that more than one helix of the structure to be coiled is received against the circumference of the roller 15, the stock of the head 6 in which the circular chamber 13 is situated being thicker than that in which the cavity 14 is located.

Extending longitudinally of the head 6 on the same side thereof as that carrying the rollers 15 and 16 is the depression 17 which receives the gaging element or spacing device 18, the upper side edge of which abuts substantially against the upper wall of the rabbet. The rear end or tail portion of this spacing element or gaging device 18 extends into the recess 19 in the transverse projecting portion 20 at the rear of the head. This spacing device or gage element 18 consists of a substantially flat plate and it is removably held in place in any desirable manner as by the screw 21 tapped into the head. The plate or blade 18 constituting a suitable gage element extends across the aperture 11, the upper side thereof in the present case, the consequence being that there is presented a wire-receiving space or groove between the laterally projecting portion of the plate or blade and the bottom of the aperture 11, which bottom consists as shown of the shoulder or bearing surface 12 already described. This plate or blade 18 defines the space or interval between the helices of the structure to be formed.

When the stock is fed forward for instance in the direction of the arrows in Figs. 1 and 2, it first encounters the projecting peripheral portion of the roller 16 and then the peripheral portion of the roller 15, so that on the continued advance of the stock, it is coiled about the mandrel 9 which is automatically moved forward as the helices are built up, the overhanging portion of the plate 18 being situated between the helix as formed so as to govern the pitch of the coiled part.

The upright 3 is shown provided with a forward extension 22 equipped on its inner surface with a rib 23 shown as dove-tailed and adapted to enter a correspondingly shaped groove 24 in the block 25 constituting a suitable carrier for the knife or cutter 26. The knife may be attached to its carrier in any desirable manner as by screws. The projecting bevel portion of the knife is adapted to enter between helices of the coiled structure on the descent of the carrier or block 25. I have shown no means for operating the block or carrier and therefore the knife.

Referring now to Figs. 4 and 5. The coiling head 30 is equipped with a rearwardly extending shank 31 functioning exactly like the shank 7. This head 30 has a slot 32, so that the head 30 is thus forked at its inner end, the lower branch 33 of the fork being shorter, however, than the upper branch 34 thereof. This slot 32 is shaped exactly like the slot 8 and is intended to receive the mandrel 35 operating exactly like the mandrel 9. That side of the head 30 shown in the foreground in Fig. 4 is cut away, and it acts as a support for the rollers 36, 37, 38 and 39, the rollers 36 and 37 being of substantially the same width. The roller 38 is slightly wider than the roller 37, while the roller 39 is wider than the roller 38. The roller 36 on the long branch 34 is merely a guide roller, while the rollers 37, 38 and 39 are forming rollers. The peripheral portion of the roller 37 is adapted to receive a partially formed helix, while the rollers 38 and 39 are adapted to receive portions of two helices for which reason they are made wider. The cut away face of the head 30 upon which the several rollers 36, 37, 38 and 39 are mounted is practically flat. The peripheries of the three rollers 37, 38 and 39 where they engage the stock are upon a circle of practically the same radius as the helices being formed. It will also be clear that the stock-engaged points of said peripheries are spaced from the slot 32 a distance practically equal to the thickness of the stock, the space between said points and slot presenting a bearing to be engaged by the inner end of the coiled part being formed.

In Figs. 1, 2 and 3 the gage device for regulating the pitch of the coiled article is stationary. The gage device shown in Figs. 4 and 5 for this purpose consists of a disk as 40 rotative about an axis between those of the rollers 36 and 37. The gaging portion of this disk 40 is flat and it overlies the outer surfaces of the rollers 36 and 37, the hub of said disk being between the peripheries of the two rollers 36 and 37 as shown by dotted lines in Fig. 4. In fact the diameters of the rollers 36 to 39 are the same as is the case with the diameters of the rollers 15 and 16. It will be clear that the gaging or marginal portion of the disk 40 is spaced or separated from the adjacent flat face of the head 30 and that into the space thus formed the stock is received.

In action the stock is advanced in the manner described in connection with the other form of head, the stock when in contact with the periphery of the roller 36 and the periphery of the hub of the gage device 40, being as noted, between the marginal or gaging portion of said disk 40 and the flat adjacent face of the head 30. As the stock is fed by pawl and ratchet means, rollers or otherwise in the direction of the arrow in Fig. 4, it is coiled about the mandrel 35 by the action of the coöperating rollers 37, 38 and 39, the marginal portion of the part 40 spacing the helices apart the requisite distance. When necessary one or more helices

can be cut from the remainder of the article or a predetermined length of the wire or rod can be fed onto the mandrel 9 and not severed at all.

It will be noticed that the coiling rollers on the coiling head in both forms of the device are disposed at opposite sides of the slot therein, this slot receiving as stated a mandrel. The parts of the head on opposite sides of the slot form branches which embrace the mandrel. In view of this condition, it will be apparent that the rollers are arranged on opposite sides of a plane passing through the axis of the mandrel and parallel to the arms of the slotted head, this plane being in the present case horizontal, because the stock is fed as shown in this particular direction. The coiled structure as is noted is cut off at predetermined intervals and the thrust of the cutter is transferred to the mandrel and is in turn taken up by the lower branch of the forked coiling head which is an important advantage.

What I claim is:

1. A machine of the class described comprising a head having a slot open at one end to produce a fork and a mandrel arranged in the slot of the head, coiling rollers supported by the head and disposed on opposite sides of a plane through the axis of the mandrel and parallel to the branches of the slotted head, the peripheries of the coiling rollers being in the path of the wire to be coiled and being disposed to coil the wire about the mandrel as the wire is advanced, and means for gaging the pitch of the structure to be coiled.

2. A machine of the class described comprising a head having a slot open at one end to produce a fork, a mandrel arranged in the slot of the fork, coiling rollers supported by the head and arranged on opposite sides of a plane passing through the axis of the mandrel, the peripheries of the rollers being adapted to be engaged by the wire as the wire is fed to thus coil the wire on the mandrel, and a spacing roller supported by the head and overlying an adjacent coiling roller.

3. A machine of the class described comprising a head having a slot open at one end to produce a fork and a mandrel arranged in the slot of the head, the head having means to coil the wire on the mandrel, a cutter adapted to operate against the mandrel to cut off a pre-determined portion of the coil structure, one of the branches of the forked head being adapted to receive the thrust of the mandrel during the cutting action of the cutter.

In testimony whereof I affix my signature in the presence of two witnesses.

EDISON W. HART.

Witnesses:

M. H. CRAWFORD,

R. B. CRAWFORD.