W. R. WEBSTER.

APPARATUS FOR COILING MATERIAL.

APPLICATION FILED JUNE 29, 1914.

1,229,357.

Patented June 12, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

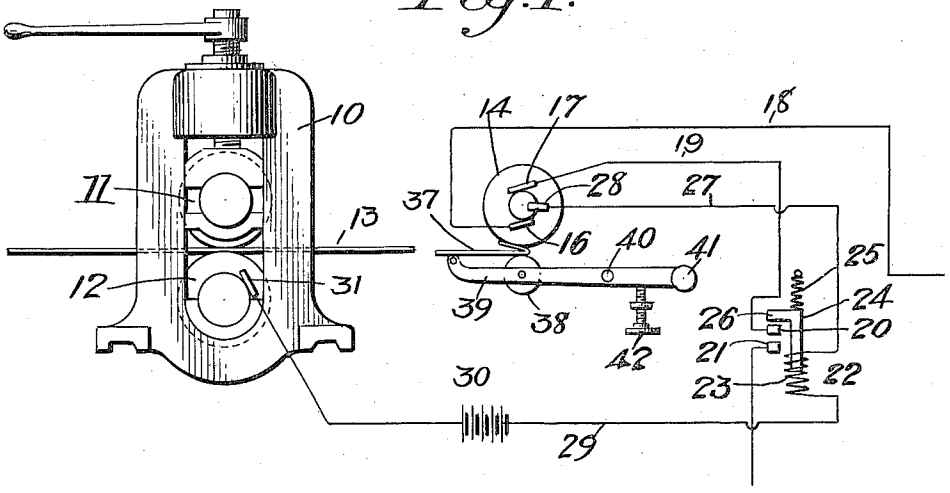
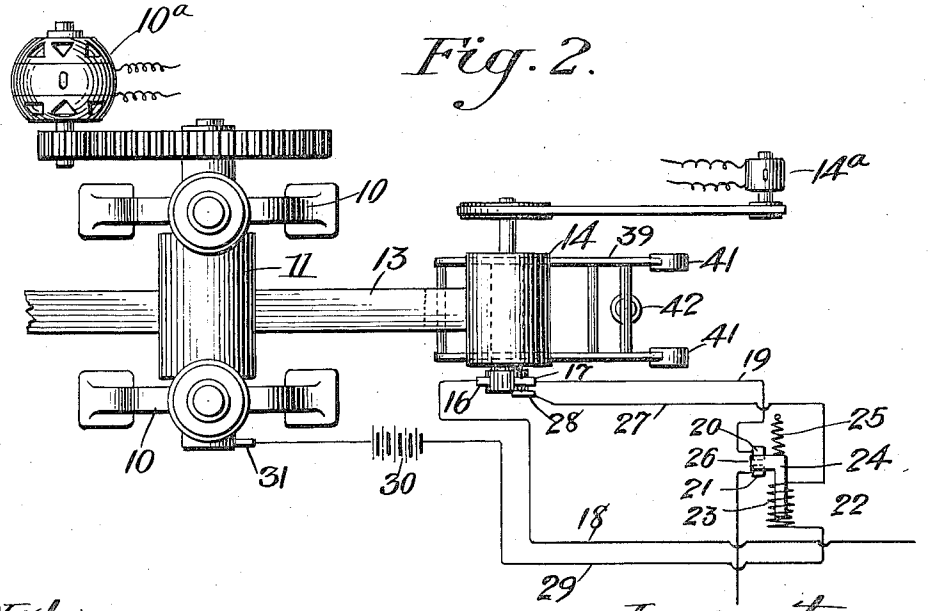


Fig. 2.



Witnesses.

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2 SHEETS—SHEET 2.

Fig. 3.

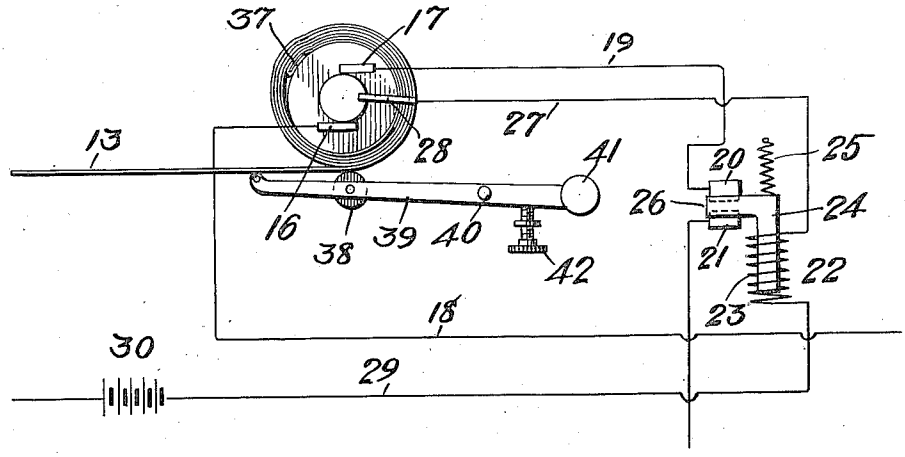


Fig. 4.

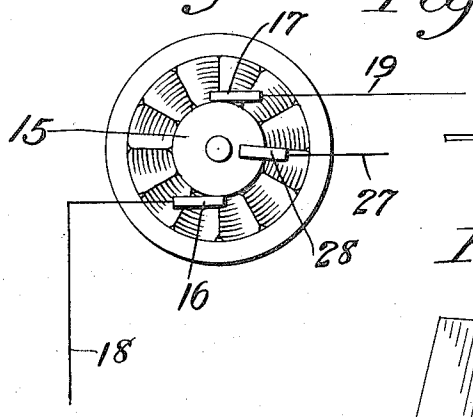


Fig. 5.

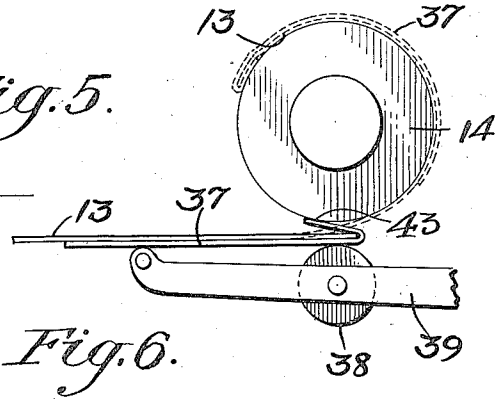
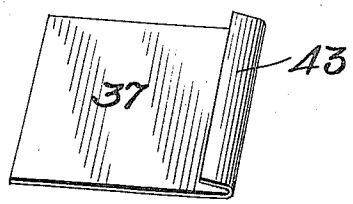


Fig. 6.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR COILING MATERIAL.

1,229,357. Specification of Letters Patent. Patented June 12, 1917.

Original application filed January 9, 1913, Serial No. 741,074. Divided and this application filed June 29, 1914. Serial No. 847,979.

To all whom it may concern:

Be it known that I, WILLIAM R. WEBSTER, a citizen of the United States, residing in the city of Bridgeport, county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Apparatus for Coiling Material, of which the following is a full, clear, and exact description.

This invention relates to an improved apparatus for coiling material in the form of strips, bars, rods and the like, the present application being a division of my application, Serial No. 741,074, filed January 9, 1913. The invention refers more especially to the coiling or blocking of brass or other non-magnetic strips or bars of various gages as said strips or bars emerge from the rolling mill.

In the art of cold rolling bars, strips or sheets, it has been customary to employ a coiling device known as a block for winding up the strip as it emerges from the rolls. Heretofore it has been the common practice to employ a power driven rotary drum or block on which the strip of metal leaving the rolls is coiled by manual manipulation. This manipulation not only requires a high degree of skill and strength on the part of the operative but it is also dangerous, inasmuch as the fingers of the operative are extremely likely to be caught between the strip and the rotating block, thereby causing serious injury. It has been attempted to avoid this drawback by stopping the rolls after the strip has passed through them sufficiently far to engage the surface of the block or drum, and securing the strip in a slot or other device on the surface of the block, after which the rolls are again started up and power is applied to the block or drum to effect the coiling. In other instances the strip has been coiled on the block by automatic devices in the nature of mechanically operated fingers which coil the strip on the block by movements similar to those of the hands of the operative when the coiling is done manually. Both of these last described methods are nearly as objectionable as the manual coiling, for the first is extravagant in time and labor, and the second necessitates the use of complicated and very expensive apparatus.

The primary object of the present invention is to avoid all of the above mentioned defects by providing a new method of coiling which is very safe, simple and efficient, and which is applicable to the coiling of non-magnetic as well as magnetic material. It is also aimed to furnish a blocker for carrying out the improved method, which blocker is of comparatively simple, inexpensive construction. My improved blocker is of the electro-magnetic type, the drum or block proper being provided with a magnet or magnets which may be energized at the proper time to cause the material to be held against the surface of the rotating drum or block so as to be coiled thereon. The block or drum can be magnetized and demagnetized by the operation of a suitable electric switch, and it is not necessary for the operative to place his hands in dangerous proximity to the block.

Another object of my invention is to provide an electro-magnetic apparatus for coiling material of either magnetic or non-magnetic nature, in which the coiling drum or block is magnetized and demagnetized automatically. More particularly, it is proposed to provide an apparatus for coiling non-magnetic material, in which the magnet or magnets are automatically controlled by the strip or bar itself in such a manner that the drum or block will be energized when the strip or bar is brought into a definite position, *e. g.*, when the end of the strip is brought sufficiently near the block to be in the proper position for coiling. On the other hand, the block or drum is deënergized automatically when the strip or bar reaches a definite position in which the magnetic attraction is no longer necessary, *e. g.* when the formation of the coil has been substantially completed.

To these and other ends, my invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

Figure 1 is a diagrammatic side elevation of apparatus embodying my invention, the strip being shown in a position in which it has not yet reached the coiling drum or block, and the controlling switch being open;

Fig. 2 is a top plan view of the appa-

ratus shown in Fig. 1, illustrating the strip in position for coiling with the switch closed;

Fig. 3 is an enlarged view of a portion of Fig. 1, showing the drum or block with several layers of the strip wound thereon;

Fig. 4 is an enlarged diagrammatic end elevation of the magnetic drum or block;

Fig. 5 is a diagrammatic detail showing the action of the magnetic carrier; and

Fig. 6 is a detail perspective view of the magnetic carrier.

Referring to the drawings, 10 indicates a stand having rolls 11, 12 for reducing or otherwise working a strip 13, such as a strip of brass or other non-magnetic metal. The rolls 11, 12 are driven by suitable means, such as an electric motor 10^a. The strip 13 passes from the roll-stand 10 to a power-operated coiling drum or block 14 rotated by means such as an electric motor 14^a. This block comprises a cylinder having one or more electro-magnets, as illustrated diagrammatically in Fig. 4. The block is provided with a commutator 15, by means of which current is furnished to the electro-magnets, through brushes 16 and 17 connected with the leads 18 and 19 respectively, of a suitable magnet-energizing circuit, including a generator or other source of current (not shown). One of the leads of the circuit 18, 19, for instance the lead 19, is normally interrupted by means of a gap between adjacent contacts 20 and 21. The magnetizing circuit is adapted to be opened and closed automatically by means of a solenoid switch 22 of an appropriate form, adapted to connect and disconnect the contacts 20, 21. I have not attempted to show in the drawings a commercial form of solenoid switch, as the invention will be more clearly understood from a diagrammatic illustration. In the example shown, the solenoid switch 22 comprises a coil 23 having the usual core 24 normally held out of the coil by means such as a spring 25. The core 24 carries a contact 26 adapted to bridge the contacts 20 and 21 when the core is drawn into the coil by energizing the latter, but normally the contact piece or bridge 26 of the switch will be held away from the contacts 20, 21, as shown in Fig. 1. The coil 23 of the solenoid is connected with the commutator 15 by means of a lead 27 and brush 28, and it is also connected by means of a lead 29 with a battery 30, or other source of current, and with a part which is in electrical communication with the metal strip as the latter passes to the block 14. In the form shown, the lead 29 is connected with the lower roll 12 by means of a brush 31, whereby the stand 10 and the strip 13 are included in the controlling circuit having the switch 22. The drum or block 14 is suitably insulated from the roll-stand 10, and normally the controlling circuit is interrupted by the gap between said parts. However, when the forward end of the strip 13 emerging from the rolls reaches a certain definite position, electrical communication will be established between the strip and drum, and the switch 22 will be automatically closed, in the manner hereinafter described.

Associated with the drum or block 14 is a suitable clamp or carrier 37 of magnetic material adapted to conform to the block. The carrier may consist of a flat steel plate, or the like, which is sufficiently flexible to conform and adhere closely to the surface of the magnetized block as the carrier is attracted to and carried around the latter. The block is preferably mounted above the plane of the strip issuing from the mill, and the carrier is located beneath the block with one edge of the carrier supported on a presser roll 38, directly beneath the block 14. The opposite edge of the carrier is supported in front of the presser roll by means of a portion of the frame 39 in which the presser roll is journaled. This frame 39 is fulcrumed intermediate of its ends at 40 and carries counter-weights 41 at the side opposite the roll 38, which counter-weights tend to hold the presser roll in contact with the block 14. The position of the presser roll is regulated by means of a set screw 42, so that it may be held a slight distance away from the block.

The operation of the improved apparatus as carried out in coiling a strip of brass, or other non-magnetic material, is substantially as follows: Normally, the magnetic circuit, *i. e.*, the circuit including the magnet or magnets of the block 14 and the leads 18 and 19, will be interrupted by the action of the spring 25, or its equivalent, acting on the solenoid core 24 and holding the contact 26 out of coöperation with the contacts 20 and 21. The controlling circuit, *i. e.*, the circuit including the battery 30, or other source of electricity, and the solenoid coil 23, will also be interrupted. In the operation of rolling the strip by the rolls of the stand 10, both of these circuits will be open (the block 14 being demagnetized) until the forward end of the strip moves into contact with the carrier 37 which is supported in contact with the block, substantially as shown in Fig. 1. The block 14 is rotated by its motor 14^a at a surface speed approximately equal to that of the rolls 11, 12. As soon as the strip is guided or conducted into contact with the carrier which, in turn, contacts with the block, the gap between the insulated roll-stand and the block will be closed by the strip itself, thereby closing the controlling circuit and energizing the solenoid to connect the contacts 20 and 21. This, in turn, closes the

magnetic circuit and energizes the magnet or magnets of the block 14. The carrier 37 is then instantly attracted to the rotating block in such a manner as to confine the forward end portion of the strip between the carrier and the block so that as the carrier is carried around by the block by magnetic attraction, the strip, in turn, is carried around with the block by the clamping effect of the carrier on the strip, as shown by the dotted lines in Fig. 5. As the block continues to rotate a complete layer is wrapped onto the block, and the coiling then proceeds in the usual manner, as shown in Fig. 3, the presser roll 38 being held in contact with the strip by the counter-weights 41 so that the strip is pressed against the block to form a smooth, tight coil. As the strip continues to emerge from the rolls 11, 12, it will be wound tightly on the block 14, the presser roll 38 being moved downward away from the block as the diameter of the coil continues to increase, as will be understood. In the form of apparatus shown, the magnetization of the block continues until the coiling operation is substantially complete. The block must obviously be demagnetized before the metal coil can be removed from it, and in the case illustrated the demagnetization is effected automatically as the rear end of the strip passes out of contact with the rolls 11, 12. This breaks the controlling circuit, whereupon the solenoid switch is actuated to break the magnetic circuit in an obvious manner. The coil on the block may then be removed in the usual manner, and the apparatus will then be ready for coiling another strip.

In the form shown, contact between the carrier and the block is effected prior to the coiling operation proper by means of a lip 43 on one end of the carrier, which lip extends into contact with the surface of the rotating block, as shown in Fig. 5. This lip also forms a pocket which receives the forward edge of the strip and confines the strip more effectively in place between the carrier and block. However, the lip is not an essential part of the carrier or clamping member, and the form of carrier as a whole may be varied widely from that disclosed as required by different conditions. The strip may be directed toward and onto the carrier by means of a guide, such as is well known in the art, or it may be carried by hand into the desired position relative to the carrier and block. It is obvious that the magnetic circuit can be controlled manually, if desired, instead of automatically, and that the invention is not restricted to the coiling of metal in the form of sheets or strips, or to the coiling of metal issuing from a rolling mill. Various modifications in these and other respects may be adopted within the scope of my invention as expressed in the claims.

What I claim is:—

1. In an automatic blocker, a block, means to magnetize the same, and a flexible carrier which wraps around the block when the same is magnetized and confines the non-magnetic material between the carrier and block; substantially as described.

2. In an automatic blocker, the combination of a block, means to magnetize the same, a flexible carrier of magnetic material adapted to wrap around the block, and means to support said carrier in proximity to the block; substantially as described.

3. In an automatic blocker, the combination of a block, means to magnetize the same, a flexible carrier of magnetic material adapted to wrap around the block, and means to support the carrier in proximity to the block, including a presser element which presses the carrier against the block; substantially as described.

4. In an automatic blocker, the combination of a block, means to magnetize the same, a flexible carrier of magnetic material adapted to wrap around the block, and means to support the carrier in proximity to the block, including a presser element which presses the carrier against the block, said carrier and said presser element when in the starting position being located beneath the block so that the strip to be coiled feeds over said carrier in passing toward the lower part of the block; substantially as described.

5. In an automatic blocker, the combination of a rotary block, a carrier, a presser element supporting said carrier in contact with the block at the lower part thereof so that the advancing strip in being fed toward the lower portion of the block will move over said carrier, and electromagnetic means for clamping the strip to the block by means of said carrier automatically controlled by contact of the forward end of the strip with said carrier; substantially as described.

In witness whereof, I have hereunto set my hand on the 26th day of June, 1914.

WILLIAM R. WEBSTER.

Witnesses:

W. H. DONNING,

A. B. LYFORD.