

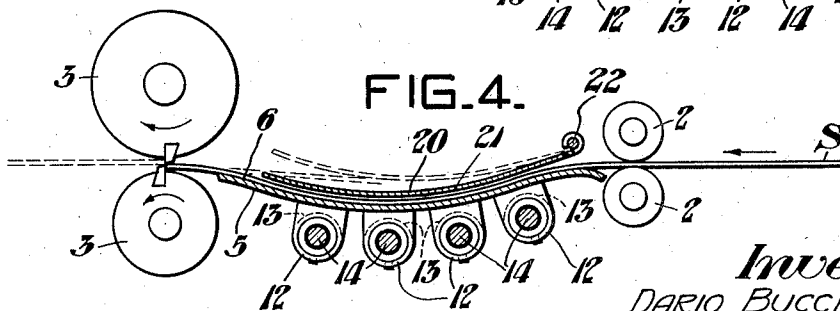
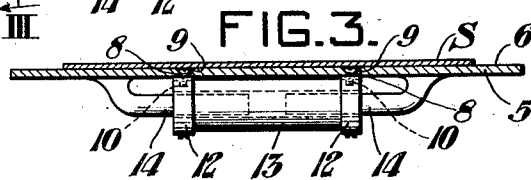
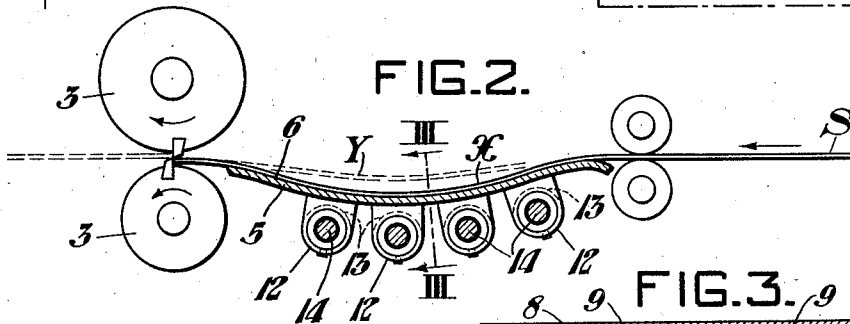
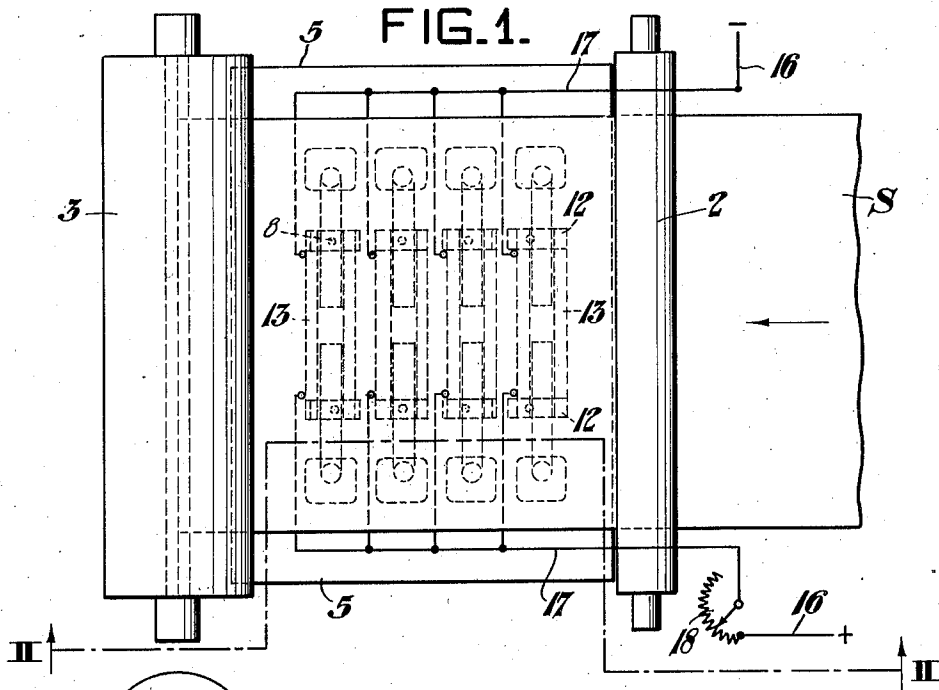
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FEED REGULATING DEVICE

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FEED REGULATING DEVICE

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5 Claims. (Cl. 271—2.3)

This invention relates to feed regulating devices, and more particularly to those which are operative on strip materials.

In the steel industry, by way of example, considerable difficulty has been experienced in regulating the feed of metallic strip. When the metallic strip has a highly finished surface it is important that it be kept free of any marking. With the high delivery speeds now being utilized, it is difficult to shear metallic strip without marking its surface. For example, where metallic strip is fed from a leveling device to a flying shear, the rollers of the leveler exert a forward pushing action. This pushing action is normally uniform and positive and, in order to obtain a finished product of satisfactory quality, it is essential that this action be so maintained. The difficulty of maintaining this uniform and positive forward pushing is due to the tendency, on the part of the flying shear, to pull the strip forwardly at the time of the cut. This pull exerted by the flying shear effects an abnormal forward movement of the metallic strip, causing it momentarily to move faster than the normal speed at which it is being delivered from the leveling, or other feed-out, device. This momentarily increased speed of the metallic strip causes it to slip in the rolls of the leveler, and results in marking its surface along its lines of contact with said rolls.

Attempts have been made to overcome this difficulty by means of establishing an excess loop of material between the leveling and flying shear, whereby the pull exerted on the material by the flying shear might be prevented from transmittal back to the leveling device. The maintenance of this loop so as to obtain satisfactory performance of the shearing or other operation has, in turn, been extremely difficult, due to the fact that the materials vary over a considerable range in width, thickness, shearing strength, flexibility, and other physical characteristics. The requirements of the loop of material consequently vary accordingly. As the loop is increased to meet the requirements of a particular material, the more difficult it becomes to maintain the positive pushing action of the leveling device which feeds out the material. The looped strip, if left free, has a tendency to buckle and to shift out of its original proper alignment with respect to the shear, resulting in inaccurate cutting. The looped strip, if restrained in position between fixed limits, will not be capable of absorbing variable amounts of momentary forward pull exerted by the flying shear.

It is among the objects of the present invention to accurately regulate the feed of strip materials

in such manner as to avoid the difficulties previously mentioned.

Another object is to provide a novel device for maintaining an excess length of the material being operated upon which may be quickly and conveniently adjusted to accommodate materials which differ in dimension, weight, or other physical characteristics.

The foregoing and other objects will be apparent after referring to the drawing, in which:

Figure 1 is a plan of the device of the invention;

Figure 2 is a sectional view on the line II—II of Figure 1;

Figure 3 is an enlarged detail; and,

Figure 4 is a view similar to Figure 2, but disclosing a modification.

Referring more particularly to the drawing, the numeral 2 generally designates any device which is constructed and arranged to feed strip material. In the present instance, this device 2 is shown as comprising the exit end of a roller-leveler of conventional design. A flying shear 3 is shown as disposed adjacent but spaced from the roller-leveler 2 and constructed and arranged to shear the strip fed thereby.

A preferred embodiment of the device of the invention comprises a suitably supported table 5 having a longitudinally concave top 6 which is preferably of a non-magnetic material, such as brass or stainless steel. If desired, the concave top 6 of the table 5 may be provided with a suitable soft covering, such as felt, or the like. This table 5 is provided with a series of transversely aligned pairs of apertures 8, the upper ends of which are countersunk, as shown at 9. Each of these apertures carries a countersunk screw 10 which supports on its lower end a bracket 12. Each pair of transversely aligned brackets 12 carries the solenoid winding 13 of an electro-magnet which is provided with a pair of spaced-apart, oppositely extending poles 14. The extended ends of the poles 14 closely underlie the underside of the table 5 and are freely movable with respect thereto.

The solenoid windings 13 of the transversely parallel electro-magnets are connected to electric power lines 16 by means of a suitable wiring circuit 17 which has incorporated therein a hand-operated rheostat 18.

The effective spread of the magnetic field desired can easily be regulated by extending or retracting the poles 14 and fixing them in position by means of set-screws which extend through the brackets 12. The strength of the magnetic

field is regulated by the setting of the hand-operated rheostat 18. The extent of regulation of these factors is determined by the physical characteristics (e. g., gauge, flexibility, shearing strength, etc.) of the particular strip S.

In operation, the roller leveler 2 is set in motion and the strip S propelled by the positive forward pushing action thereof, advancing it onto the top 6 of the table 5. The strip S then enters the magnetic field established by the electro-magnets. The magnetic field, by exerting a pull on the strip S, causes it to contact the longitudinally concave top 6 of the table 5 and conform to the shape thereof.

The strip S progresses across the concave top 6 of the table 5 in similar form, having thereby developed in it an excess length, or loop. The positive forward pushing action exerted by the roller-leveler 2 continues undiminished due to the fact that the strip S is restrained, by the action of the magnetic field, from any motion except that of advancing along the concave top 6 of the table 5. Likewise, the original alignment of the strip S is maintained. On entering the flying shear 3 the strip S encounters a momentary tendency on the part of the former to pull it forwardly at a higher speed than the delivery speed of the roller-leveler 2. This tendency is in the form of a spasmodic jerk but is prevented from transmittal through the strip S back to the roller-leveler 2 by the device of the invention, whereby the marking of the strip in the roller-leveler is prevented. That is, the pulling tendency, or spasmodic jerk, draws the strip S out of its loop X afforded by the concave top 6 of the table 5 and against the yieldable opposition offered by the magnetic field established by the electro-magnets. Thus, the oncoming strip S, advancing across the concave top 6 of the table 5, is directed into the loop X of excess material in proper alignment until the shearing cut is made, upon which the spasmodic jerk of the flying shear will pull it into the dotted line position, shown at Y.

The foregoing description is intended to apply only to metallic strip having substantial paramagnetic properties.

Referring to Figure 4, I have disclosed a modified form of the device of the invention, for use in regulating the feed of strip material having little or no paramagnetic characteristics. According to this modification, the elements heretofore discussed are all utilized, together with a horizontally disposed guide 20 having a longitudinally convex bottom surface 21 which corresponds in contour to the longitudinally concave top 6 of the table 5. This horizontally disposed guide 20 is formed of material having substantial paramagnetic characteristics and is suitably pivoted, as shown at 22, at its end which is most adjacent the roller-leveler 2. If desired, the longitudinally convex bottom surface 21 of the guide 20 may be provided with a suitable soft covering,

such as felt or the like. The response of the guide 20 to the magnetic field is identical with that of the paramagnetic strip S in Figures 1, 2 and 3.

While I have shown and described several specific embodiments of the invention, it will be understood that I do not wish to be limited exactly thereto since various modifications may be made without departing from the scope of the invention, as defined by the following claims.

I claim:

1. Apparatus for regulating the feed of metallic strip comprising means for pushing the strip forwardly, means for receiving the pushed strip and pulling the same forwardly, and electro-magnetic means intermediate said first-named means and said second-named means for yieldably deflecting the strip from its normal path of travel, said means for receiving the pushed strip and pulling the same forwardly being capable of overcoming said last-named means.

2. Apparatus for regulating the feed of metallic strip comprising means for pushing the strip forwardly, means for receiving the pushed strip and pulling the same forwardly, a feed table between said first-named means and said second-named means, said feed table having a concave surface, and means for yieldably maintaining the pushed strip in the concave surface of said feed table, said means for receiving the pushed strip and pulling the same forwardly being capable of overcoming said last-named means.

3. Apparatus for regulating the feed of metallic strip comprising means for pushing the strip forwardly, means for receiving the pushed strip and pulling the same forwardly, a feed table between said first-named means and said second-named means, said feed table having a concave surface, and electro-magnetic means for yieldably maintaining the pushed strip in the concave surface of said feed table, said means for receiving the pushed strip and pulling the same forwardly being capable of overcoming said magnetic means.

4. Apparatus for regulating the feed of a strip comprising means for pushing said strip forwardly, a paramagnetic guide for deflecting the movement of said strip out of its normal path and magnetic means for yieldingly maintaining said paramagnetic guide in strip-deflecting position.

5. Apparatus for regulating the feed of metallic strip comprising means for pushing the strip forwardly, means for receiving the pushed strip and pulling the same forwardly, a feed table between said first-named means and said second-named means, said feed table having a concave surface, and paramagnetic means for yieldably maintaining said strip in the concave surface of said feed table, said means for receiving the pushed strip and pulling the same forwardly being capable of overcoming said last-named means.

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