April 20, 1943. W. H. McLAUGHLIN ET AL 2,316,801

APPARATUS FOR OPERATING ON STRIP METAL

Filed Dec. 26, 1940

FIG. 1.

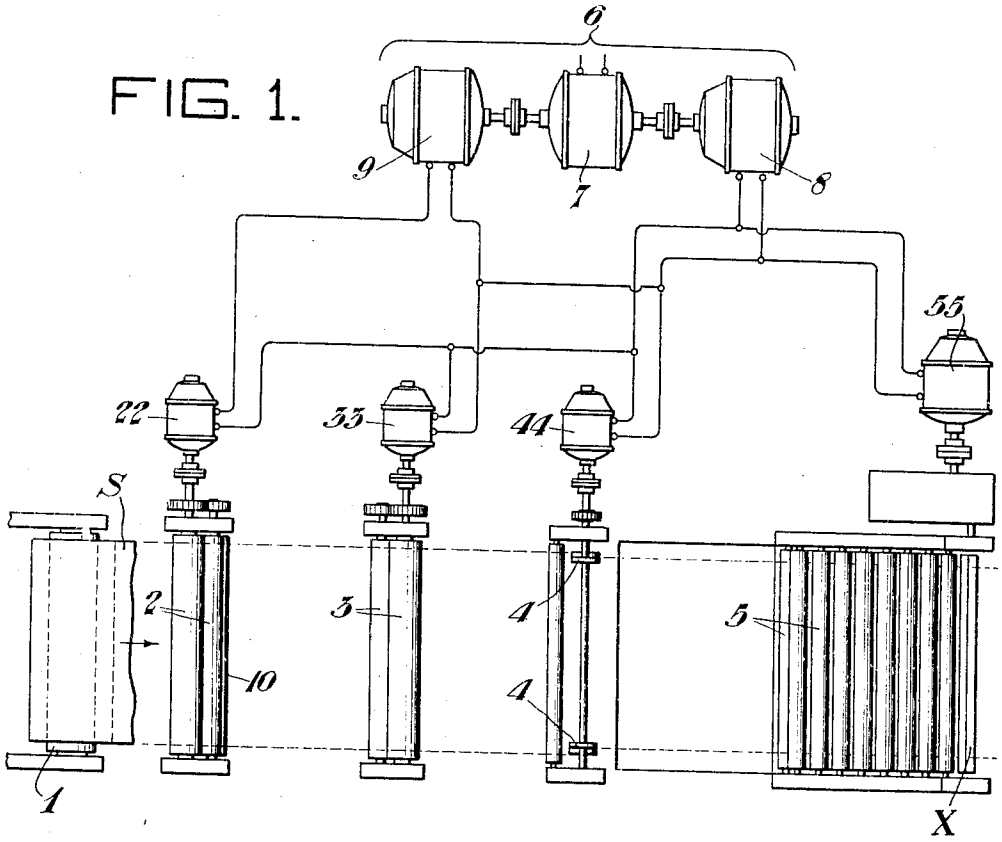
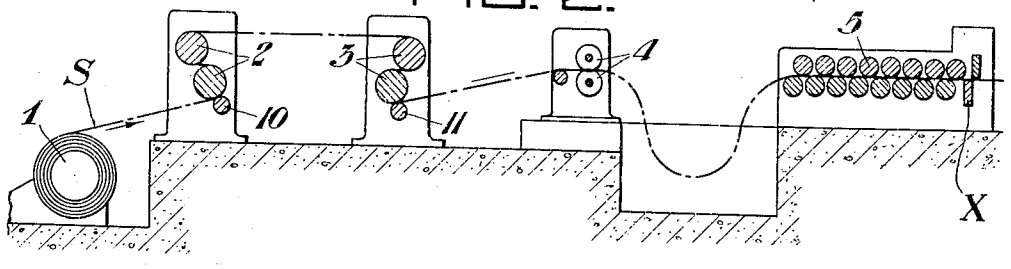


FIG. 2.



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APPARATUS FOR OPERATING ON STRIP METAL

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4 Claims. (Cl. 164—61)

This invention relates to operating on strip metal and more particularly while it is moving at a substantial rate of speed.

In the art of manufacturing certain types of strip metal, such as strip steel, it is of particular importance that the same be straight and flat, and this is especially true with respect to the thinner gages. In the manufacture of tin plate and strip steel, by way of example, the material is usually rolled to the desired gage, cut to the required sheet size, and passed through a tin pot while in sheet form. After the tin coating has been applied, the sheets are packaged and shipped to the consumer. During the rolling operation prior to the cutting of the strip into sheets, the strip acquires a slightly wavy condition, together with side edges which are rough and require trimming. The side edges are usually trimmed prior to a leveling operation which produces the desired straightness and flatness.

Numerous methods have been devised for flattening and straightening the material while it is in strip form and this is also true of the trimming of the side edges thereof.

It is an object of the present invention to provide an improved apparatus for flattening strip metal and trimming of the side edges thereof immediately prior to cutting it into the desired sheet size.

Another object is the provision of apparatus of the class described which enables the material saving of labor.

Still another object is to straighten or level strip metal by the use of a combination of relatively simple instrumentalities which may be inexpensively installed and operated.

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

Figure 1 is a plan of the apparatus of the present invention; and,

Figure 2 is a sectional elevation of the apparatus of Figure 1.

Referring more particularly to the drawing, the numeral 1 designates an uncoiling device which may be entirely conventional in form, such as of the cone type, with retractable heads. As the strip metal is unreeled from the uncoiling device 1, it is directed to a pair of spaced apart rolls, one of which is shown as being disposed above the other. The strip, designated hereinafter at S, is wrapped around the lower portion of the lower of the rolls 2, its direction reversed, and passed around the upper portion of the upper of the said pair of rolls, thus providing a "snubbing" effect as will appear more fully hereinafter. At its initial point of contact with the lower of rolls 2 there is provided immediately below the strip S an adjustable contact roll 10. As it leaves the upper of the rolls 2, the strip S is wrapped around the upper of a pair of rolls 3 which are similar to, and parallel with, the rolls 2, described immediately hereinbefore. As the strip S is passed around the upper of the rolls 3, it is directed between it and a similar roll disposed immediately therebelow, wrapped around the latter, its direction reversed, and threaded into a conventional side trimming device 4 which comprises at each edge of the strip a pair of superposed cutting disks. At its point of delivery from the lowermost of the rolls 3 there is provided immediately below the latter an adjustable contact roll 11 which maintains the strip S in close contact therewith.

From the foregoing, it will be perceived that by the provision of the two pairs of spaced apart rolls 2 and 3 with the strip S wrapped therearound in the manner described, a substantial "snubbing" effect will be obtained and this is materially enhanced by the provision of the adjustable contact rolls 10 and 11 at the points shown.

After the strip S emerges from the side trimmer generally designated at 4, it is directed through a roller leveler 5 of conventional design. While in the roller leveler 5 the strip S acquires the desired degree of flatness and straightness and is directed immediately thereafter into any conventional form of shear, the latter being diagrammatically shown at X.

Referring more particularly to Figure 1, the pair of rolls 2 are geared together and connected to a generator 22, while the pair of rolls 3 are geared together and connected with an electric motor 33. The cutting disks of the side trimmers 4, are suitably geared together and connected with an electric motor 44, while the rolls of the roller leveler 5 are, in the manner well understood in the art, suitably disposed with respect to each other, geared together, and driven by an electric motor 55. The cutting instrumentalities of the shear, whether one or both are rotary or reciprocatory, are also driven from the electric motor 55.

In order that the foregoing elements may be properly operated and controlled, there is provided a motor generator set generally designated at 6, which comprises an electric motor 7, and connected to the opposite ends of the driving shaft thereof a main generator 8 and a booster generator 9. By connecting these electrical elements in the manner shown, current is supplied

from a main generator 8 to the motor 33 which drives the pair of rolls 3, causing them to revolve and attempt to pull the strip S forwardly. At the same time, current from the booster generator 9 is supplied to the generator 22 with which the pair of rolls 2 are connected, thus causing the said rolls to attempt to revolve in a direction of rotation which is opposite to that of the rolls 3. This establishes tension between the two roll stands 2 and 3, the amount of which may be readily controlled either by varying the output of the booster generator 9, or by the regulation of the field of the generator 22.

The motor 33, driving the pair of spaced rolls 3, the motor 44 driving the cutting disks 4, and the motor 55 driving the combination roller leveler and shear are all energized by the output of the main generator 8, whose voltage is raised to the desired point to operate the apparatus at the required speed.

During the continuous operation, tension is maintained between the pairs of spaced apart rolls 2 and 3 by applying current to the generator 22, the said current being supplied by the booster generator 9, which is connected in series to the generator (motor) 22 and also the main generator 8 which is in parallel with the electric motors 33, 44 and 55.

In view of the fact that the spaced apart rolls 3, cutting disks 4 of the side trimming shear, and the combination roller leveler and shear 5 all derive their driving power through their respective motors 33, 44 and 55 from the main generator 8, they are thus electrically synchronized with each other. By varying the speed of rotation of the spaced apart rolls 2 which are connected to the generator 22, sufficient tension can be applied to the strip S between the pairs of rolls 2 and 3 to remove by stretching irregularities imparted to it during the previous processing operations, and ultimately result in the production of a flat and smooth strip from which may be sheared sheets of the desired size.

While we have shown and described one specific embodiment of the present invention, it will be seen that we 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 appended claims.

We claim:

1. Apparatus for operating on strip metal comprising a pair of spaced rolls between and partially around which the strip is wrapped; a second pair of spaced rolls between and partially around which the strip is wrapped; a side trimmer; means for driving said second named pair of rolls and said side trimmer in electrical synchronism, and means for restraining the rotation of said first named pair of rolls.

2. Apparatus for operating on strip metal comprising a pair of spaced rolls between and partially around which the strip is wrapped; a second pair of spaced rolls between and partially around which the strip is wrapped; a side trimmer; a roller leveler; means for driving said second named pair of rolls, said side trimmer and said roller leveler in electrical synchronism, and means for restraining the rotation of said first named pair of rolls.

3. Apparatus for operating on strip metal comprising a pair of spaced rolls between and partially around which the strip is wrapped; a second pair of spaced rolls between and partially around which the strip is wrapped; a side trimmer; a roller leveler; a shear; means for driving said second named pair of rolls, said side trimmer, said roller leveler and said shear in electrical synchronism, and means for restraining the rotation of said first named pair of rolls.

4. Apparatus for operating on strip metal comprising a pair of spaced rolls between and partially around which the strip is wrapped; a second pair of spaced rolls between and partially around which the strip is wrapped; a side trimmer; means for driving said second named pair of rolls and said side trimmer in synchronism, and means for restraining the rotation of said first named pair of rolls.

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