Dec. 18, 1956 R. D. LEWIS ET AL 2,774,593

APPARATUS FOR GUIDING STRIP MATERIAL

Filed Dec. 2, 1952

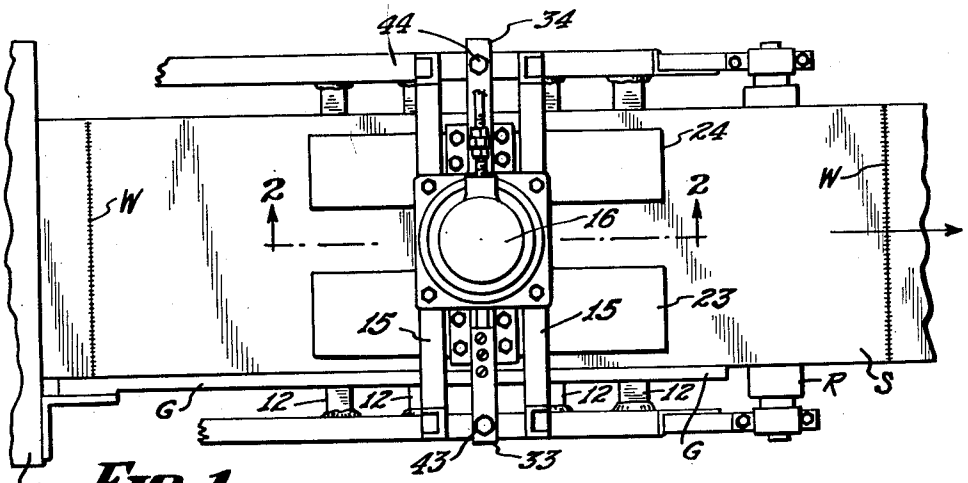


FIG. 1.

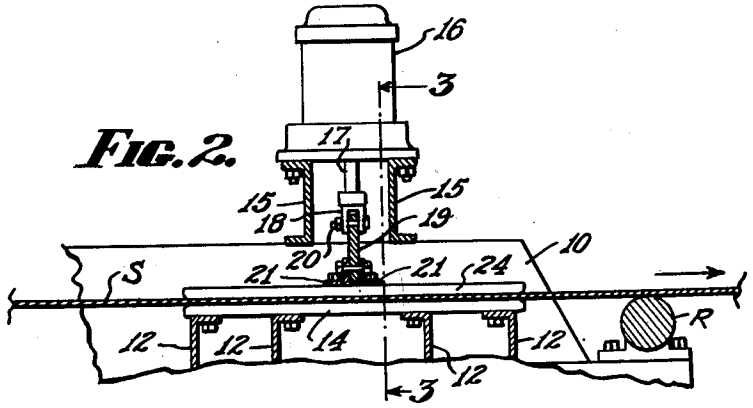


FIG. 2.

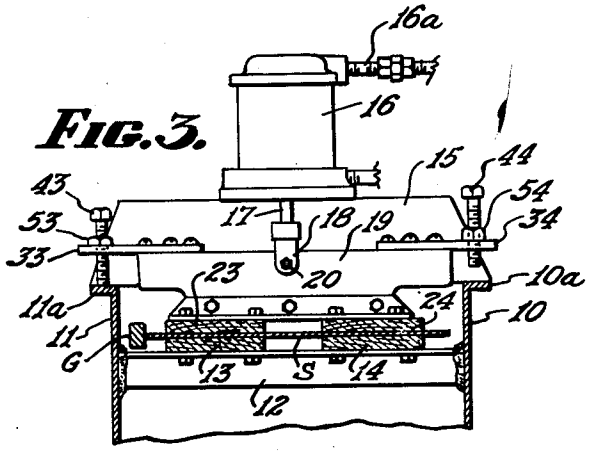


FIG. 3.

INVENTORS.
ROBERT D. LEWIS
AND KARL F. WIETZEL,
BY

ATTORNEYS.

United States Patent Office 2,774,593 Patented Dec. 18, 1956

2,774,593

APPARATUS FOR GUIDING STRIP MATERIAL

Robert D. Lewis, Crooksville, and Karl F. Wietzel, Zanesville, Ohio, assignors to Armco Steel Corporation, Middletown, Ohio, a corporation of Ohio

Application December 2, 1952, Serial No. 323,595

2 Claims. (Cl. 271—2.6)

This invention relates to an apparatus and method for guiding strip material. More particularly, it has to do with an arrangement for guiding welded metallic strip. While the invention will be found to be capable of many uses, it is particularly useful in steel mills in connection with the guiding of metal strip, and particularly welded metal strip in a coiling operation. It is most desirable in such a coiling operation to obtain even coils. This facilitates later handling of the coiled material. In order to obtain even tight coils it is necessary to provide some sort of guiding means for strip material. This is often difficult particularly where welded strip is used, which welded strip is made up from a number of sheets welded end to end. These sheets are subjected to pack shearing and when they are welded together end to end the strip will have one straight side and the other side will be uneven.

With these considerations in mind it is the principal object of the present invention to provide an apparatus and a method for guiding strip material by one edge, which in the case of welded strip may be the straight even edge.

It is another object of the present invention to provide an apparatus for guiding strip material which may be simply a minor modification of presently existing tension apparatus used in connection with coiling operation.

It is still another object of the invention to provide means for causing the strip material to hug a side guide for guiding purposes and to control the tightness with which the strip material hugs the side guides so as to avoid damage to the strip edges.

These and other objects of our invention we accomplish by that series of method steps, and by that construction and arrangement of parts, of which we shall now describe an exemplary embodiment.

Reference is made to the drawings forming a part hereof, and in which:

Figure 1 is a fragmentary plan view of a portion of a strip line showing an apparatus according to the invention;

Figure 2 is a fragmentary cross sectional view taken on the line 2—2 of Figure 1; and

Figure 3 is a fragmentary cross sectional view taken on the line 3—3 of Figure 2.

In the coiling of metal strip it is well known to provide a so called tension box through which the strip passes. The tension box applies pressure to the strip to give a braking action so that the coil will be tightly wound.

Briefly, in the practice of our invention we modify the tension box apparatus so that the degree of pressure may be adjusted transversely of the strip, we have found that the strip will tend to migrate to that side where the pressure is least. We therefore provide means whereby we can provide for greater pressure on the strip on a side remote from the side guide and less pressure on the side of the strip adjacent the side guide. The strip

will therefore tend to migrate toward the side guide. We also provide means for adjusting the difference in pressures so that the strip will not be forced too hard against the side guide, thus, producing damaged edges.

Referring now more particularly to the drawings, we have indicated a tension box which is mounted upon a framework indicated generally at 10 and 11. A number of transverse angle irons 12 suitably welded between the plates 10 and 11 support the two lower pressure elements 13, 14 which may be planks of suitable hard wood and which are bolted or otherwise suitably secured to the angle irons 12.

A pair of channel members 15 are suitably welded or otherwise secured across the members 10, 11 and support a pneumatic cylinder 16. Secured to the piston rod 17, which is provided with a forked end 18, is a yoke 19. The yoke 19 may rock with respect to the member 18 about the axis of the pin 20. The yoke 19 has secured to it by bolting, welding or other desired procedure, the angle irons 21 to which in turn are bolted the upper pressure elements 23, 24.

From the foregoing description it will be clear that when air is supplied to the cylinder 16 above the piston thereof by means of the line 16*a*, the piston will be forced downwardly, as seen in Figures 2 and 3, and through the rod 17 and member 18 and pin 20 will exert pressure on the yoke 19 so as to cause the pressure elements 23 and 24 to be pressed downwardly against the strip S, which in turn passes over the fixed pressure elements 13, 14. Without further provision the pressure between the blocks 13 and 23 would be equal to the pressure between the blocks 14 and 24. However, we provide brackets 33 and 34 secured to the yoke 19 and having threaded holes through which the bolts 43 and 44 pass. Lock nuts 53 and 54 are provided for the bolts respectively. The bolts are positioned so that they may contact the upper flanges 11*a* and 10*a* of the members 11 and 10 respectively.

A side guide is provided at G for contact by one edge only of the strip. This side guide may be of any suitable material.

In practice, if the strip tends to move away from the guide G the bolt 43 will be tightened until the pressure on the member 23 has been reduced to the point that it is less than the pressure on the member 24 whereby the strip will be caused to migrate toward the left and against the guide G. The lock nut 53 will then be tightened. The bolt 44 will be withdrawn so as to have at least a one inch clearance.

If the strip is rubbing against the guide G with too much pressure then the bolt 43 is released, and the bolt 44 appropriately adjusted. By a proper adjustment of the bolts 43 and 44 therefore the strip S may be caused to hug the guide G and not to hug it too tightly whereby the strip edge might be damaged. As a precautionary measure it should be observed that both the bolts 43 and 44 should never be tightened at the same time, because in that event no pressure will be placed upon the elements 23 and 24 and the coil will not be formed tightly.

In Figure 1, a treatment apparatus is indicated generally at A and this may be the exit of a welding machine, and the strip is shown as moving toward the right to a coiling apparatus not shown. The butt welds in the strip are indicated by the transverse lines W. The strip is shown as passing over a roller R as it emerges from the guiding apparatus.

It will be clear that numerous modifications may be made without departing from the spirit of our invention, and we therefore wish it to be understood that we do not intend to limit ourselves except as set forth in the claims which follow.

Having now fully described our invention what we claim as new and desire to secure by Letters Patent, is:

1. Apparatus for guiding strip material, comprising fixed pressure drag members adapted to contact one side of said strip material movable pressure drag members engaging the opposite side of said strip material in opposition to said fixed pressure drag members, a side guide for engagement by one edge of said strip material, means for applying pressure to said movable pressure drag members, and means to selectively vary the intensity of pressure applied to one edge of said strip material with respect to the other, whereby a differential pressure may be applied transversely of said strip material, to cause said strip material to hug said side guide.

2. Apparatus for guiding strip material, comprising a frame, a transverse yoke movably mounted in said frame, a side by side pair of fixed pressure members mounted in said frame and adapted to contact one side of said strip material, a side by side pair of movable pressure members secured to said transverse yoke and adapted to bear against the opposite side of said strip material in opposition to said fixed pressure members, a side guide for engagement by one edge of said strip material, means mounted on said frame for applying pressure to said yoke centrally thereof, and means for selectively limiting the movement of said yoke at either end, whereby less pressure may be applied to that one of said pair of movable pressure members which is closer to said side guide, to cause said strip material to hug said side guide.

References Cited in the file of this patent

UNITED STATES PATENTS

1,566,441	Smothers	Dec. 22, 1925
1,678,925	Tackaberry	July 31, 1928
1,763,092	Clarke	June 10, 1930
2,246,456	Quigley	June 17, 1941
2,250,677	Paulsen	July 24, 1941
2,260,128	Walter	Oct. 21, 1941
2,475,743	Haringx	July 12, 1949
2,616,690	Haringx	Nov. 4, 1952