June 16, 1942. E. R. MUDDIMAN 2,286,686

APPARATUS FOR REJECTING DEFECTIVE METALLIC SHEETS

Filed Nov. 27, 1939

FIG. 1.

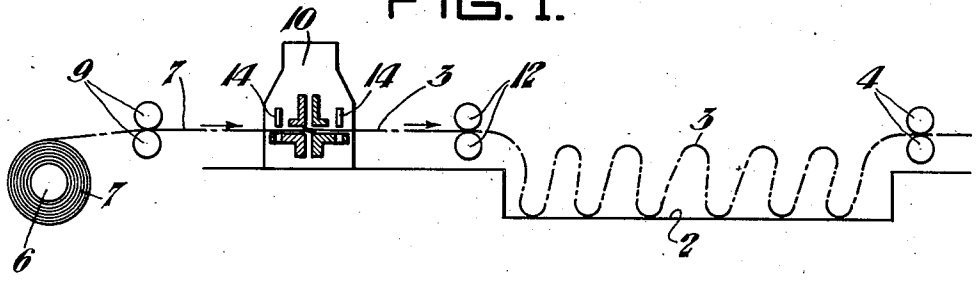


FIG. 4.

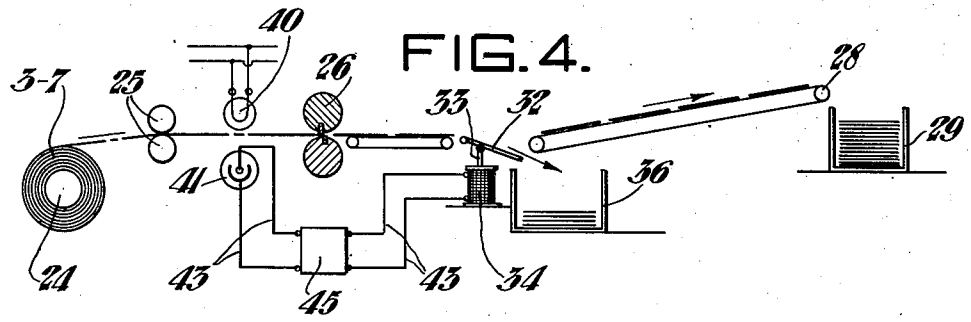


FIG. 2.

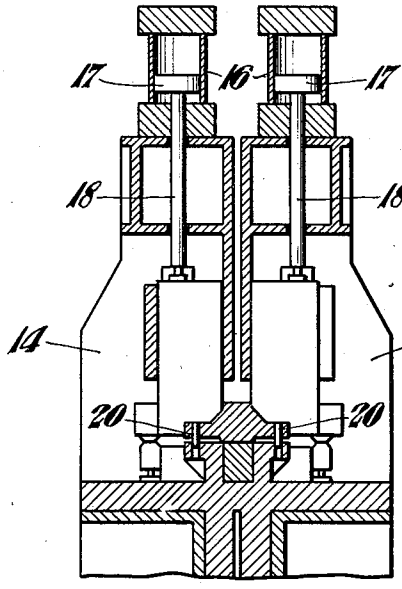
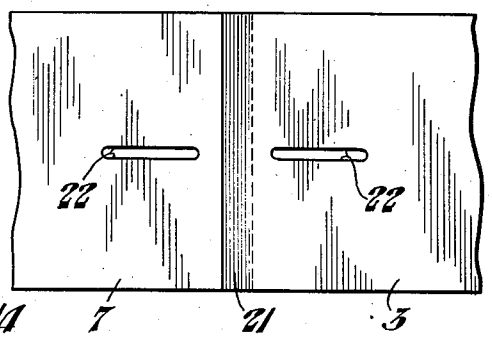


FIG. 3.



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APPARATUS FOR REJECTING DEFECTIVE METALLIC SHEETS

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2 Claims. (Cl. 29—17)

This invention relates to the manufacture of metallic sheets, and more particularly to the rejection of defective sheets after they have been sheared from a length of strip metal.

In the manufacture of strip metal, prior to the shearing thereof into sheets, substantial lengths are joined and the composite strip subjected to various continuous treating operations. In the joining or connecting together of the ends of several strips (after which the continuous length may be directed through pickling and washing tanks, reducing mills, annealing steps, tempering mills, etc.), the actual joint or connection is usually performed by either mechanical stitching or electrical welding.

After the continuously treated strip has been sheared into sheets, those sheets which embody the marks made by the mechanical stitcher or electrical welder are found undesirable and, accordingly, should be rejected. This rejection is usually done by manually locating and marking the stitched or welded portion of the strip after it has been sheared into sheets, and occasions considerable delay.

It is among the objects of the present invention to enable the joining or connecting of several metallic strips, continuous treatment of the joined or connected strips, and the subsequent shearing thereof into sheets, without necessitating the manual location, after shearing into sheets, of those portions of the strips which were part of the joint or connection.

Another object is the automatic detection and elimination of those portions of the strips which were part of the joint or connection.

Still another object is to secure the foregoing results in a simple and inexpensive fashion.

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

Figure 1 is a diagrammatic view illustrating part of the apparatus of the present invention;

Figure 2 is an enlarged sectional elevation of part of the apparatus of Figure 1;

Figure 3 is a fragmentary plan illustrating the function of the apparatus of Figure 2; and

Figure 4 is a diagrammatic view illustrating the remainder of the apparatus of the present invention.

Referring more particularly to the drawing, the numeral 2 designates a looper pit containing a metallic strip 3 of substantial length which is being fed therefrom in the direction of the arrow by means of pinch rolls 4.

Somewhat adjacent the looper pit 2 there is disposed an uncoiling reel 6 having wrapped therearound a coil of metallic strip 7, the leading or advance end of which is to be joined or connected to the trailing end of the metallic strip 3 which is in the said looper pit. Accordingly, the leading or advance end of the metallic strip 7 is fed from the uncoiling reel 6, through pinch rolls 9, and to an electric welder 10 (or mechanical stitcher, if desired) of any suitable design. The trailing end of the metallic strip 3 extends rearwardly from the looper pit 2 through pinch rolls 12, and into the electric welder generally designated at 10.

According to the teachings of the present invention, there is disposed on either side of the operating instrumentalities of the electric welder 10 (or equivalent joining or connecting device), a punch generally indicated at 14, each of which is constructed and arranged to operate on one of the metallic strips (3 or 7) adjacent the joint or connection, as will appear more fully hereinafter.

Referring to Figure 2, it will be noted that each of the punches 14 comprises a vertical fluid cylinder 16 containing a piston 17 to which there is connected a downwardly depending piston rod 18. On the lower end of each of the piston rods 18 there is carried a punch specifically designated at 20. By the control of fluid to and from the fluid cylinder 16 in the manner well known to the art, the punches specifically designated at 20 may be made to punch the strips 3 and 7 for a purpose which will be later described.

Referring to Figure 3 of the drawing, the strips 3 and 7 are shown as being connected by a weld 21, while the punch marks are designated on either side thereof at 22. These punch marks 22 are shown as comprising apertures which are elongated in the direction of the axes of the joined metallic strips 3 and 7; and this is indicative of a condition which exists when the strips have been continuously rolled while in joined or connected state. However, it will be readily understood by those skilled in the art that the purview of the invention is not limited to treatment which comprises rolling after the joint has been effected.

After the joined metallic strips 3 and 7 have been continuously treated in the desired manner (whether to include rolling or otherwise), the composite strip in the form of a coil, and designated hereinafter at 3—7, is placed upon a suitable uncoiling reel 24 from which it is fed through pinch rolls 25 to a flying shear 26. It is desired to convey to a suitable point all sheets sheared

by the flying shear 26 from the composite strip 3–7 which are commercially acceptable; and for this purpose there is provided a horizontal conveyor 28 which feeds the said commercially acceptable sheets to a piling device 29. However, some sheets sheared by the flying shear 26 will embody the weld 21, and possibly one or both of the punch marks 22. It is, therefore, desired to delete from the horizontal conveyor 28 that portion of the sheared metal of the strip 3—7 which extended between and included the punch marks 22. For this purpose there is provided a pivoted deflector 32, which, through a rod 33 operated by an adjacent solenoid 34, normally occupies the plane of the horizontal conveyor 28. When deenergized, the solenoid 34 permits the pivoted deflector 32 to drop downwardly into the position shown in Figure 4, and thereby permit the feeding of metallic sheets into an adjacent piler 36 which collects those which are defective.

In order to permit the pivoted deflector 32 to drop at the desired interval and therefore separate all sheets embodying the punch marks 22 and all portions of the strip 3—7 which were intermediate thereof, there is provided the following:

A light 40 is disposed over the strip 3—7 prior to its entry into the flying shear 26. Immediately beneath the light 40 and under the strip 3—7 there is a photoelectric eye system, generally indicated at 41, which, by means of suitable circuits 43, is electrically connected to the solenoid 34 through a time relay 45. The time relay 45 is so adjusted as to cause the deenergization of the solenoid 34 when those sheets which have been sheared from that portion of the strip 3—7 which was under the light 40 have had an opportunity to progress to the pivoted deflector 32.

While I have shown and described one specific embodiment of my 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. In an apparatus for manufacturing sheets from joined metallic strips comprising means for forming holes in the joined strips on either side of and adjacent the joint, means for detecting said holes while the strips are in motion, means for shearing the strips into sheets, and means for conveying each sheet to one of a plurality of separate discharge points, said last-named means being automatically controlled by the hole-detecting means.

2. Apparatus for manufacturing sheets from joined metallic strips having at least one hole adjacent the joint, said apparatus comprising means for detecting said holes while the strips are in motion, means for shearing the strips into sheets, and means for conveying each sheet to one of a plurality of separate discharge points, said last-named means being automatically controlled by the hole-detecting means.

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