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PROXIMITY YOKE APPARATUS

Filed Sept. 26, 1968

FIG. 1

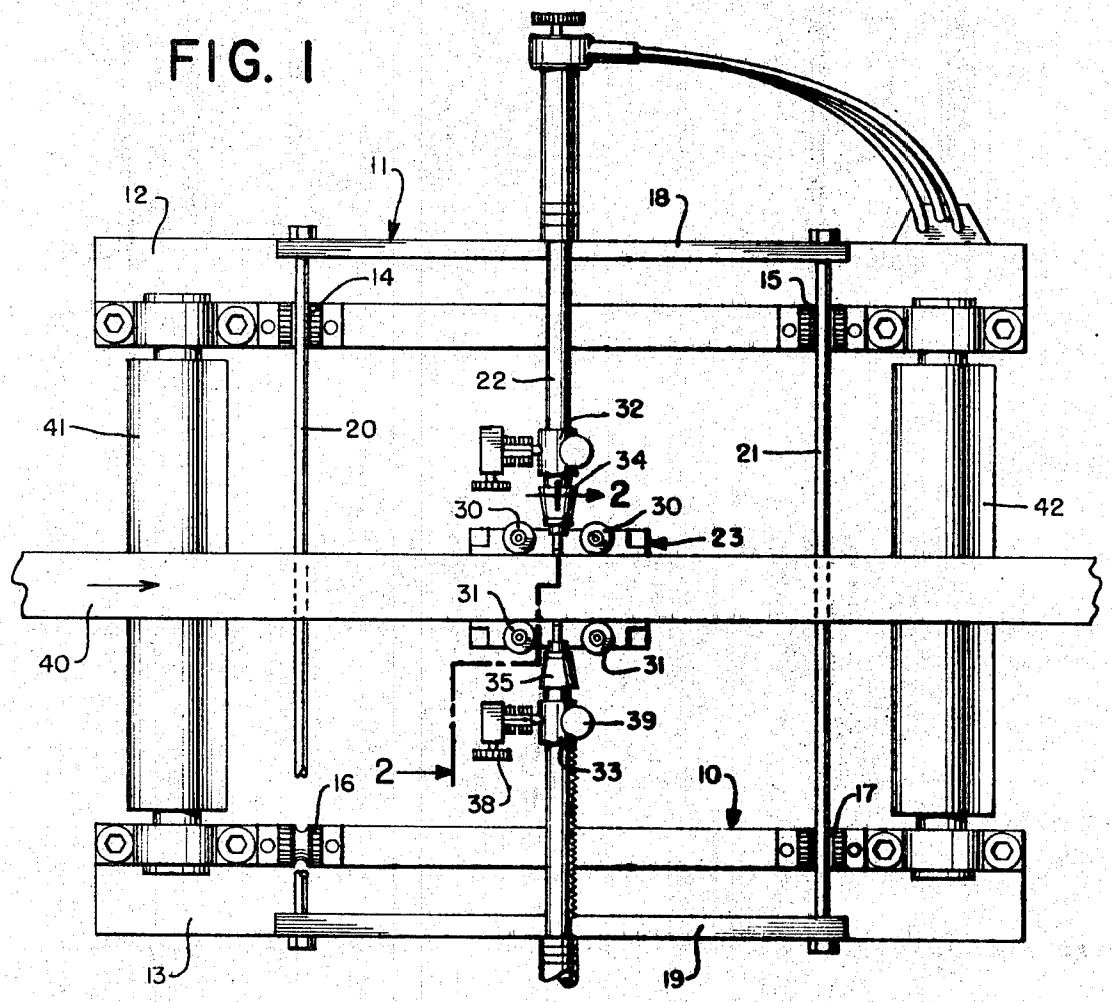
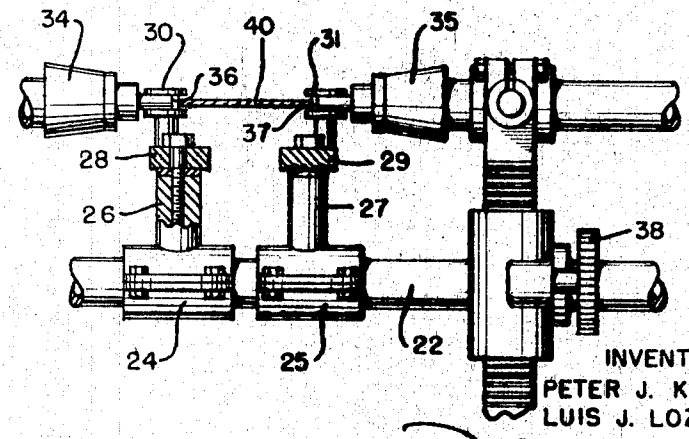


FIG. 2



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PROXIMITY YOKE APPARATUS

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U.S. Cl. 72—200 5 Claims

ABSTRACT OF THE DISCLOSURE

This invention relates to a proximity yoke apparatus for controlling spacing between the sides of a moving strip and some means intended to impart an edge treatment to the moving strip. The apparatus has particular application in contouring the edges of metal strip being drawn through an edge contouring station defined by a heat source. The heat source is mounted on a yoke that moves in response to the lateral thrust of the metal strip as it oscillates from side to side and means are provided to maintain the heat source at a fixed distance from the edge of the strip during oscillation.

BACKGROUND OF THE INVENTION

This invention relates to a proximity yoke apparatus for controlling spacing between the sides of a moving strip and edge treatment means and more particularly to edge contouring apparatus.

In treating an edge of a rapidly moving strip, for example by heating the edge of thin metallic strip to round the edges as disclosed in application Ser. No. 668,096 filed Sept. 15, 1967 of which we are co-inventors, it is essential to maintain a fixed gap between the edge of the strip and an intense heat source at all times during the rapid movement of the metal strip past the heat source. Such spacing control is essential with this method because a critical balance of time and temperature must be maintained if the desired rounded configuration is to be effected on the edge of the strip. It is accordingly the purpose of the invention to provide apparatus capable of receiving strip as it is rapidly stripped from a supply roll and maintaining a predetermined spacing between edge treatment means and the edge of the strip regardless of the amount of side to side oscillation of the moving strip which occurs at the edge treatment station.

SUMMARY OF THE INVENTION

This invention is in a proximity yoke apparatus for controlling spacing between the side of a moving strip and edge treatment means, such as heat source. It includes a supporting frame with a yoke mounted on the frame to float side to side on the frame in response to the transverse oscillatory movements of a strip being fed longitudinally through the apparatus. Guide means, which are fixed on the yoke, for receiving the moving strip and aligning it in a fixed position on the yoke and movable therewith also define an edge treatment station for the strip. Edge treatment means are positioned adjacent at least one edge of the strip at the edge treatment station; the edge treatment means are adjusably mounted on the yoke and movable therewith so that a fixed space will be maintained between the edge treatment means and the edge of the strip during floating movement of the yoke.

Preferably the guide means includes a pair of rollers mounted on each side of the strip to contact opposite edges of the strip and the edge treatment means is positioned between the rollers of one pair. This arrangement is provided to ensure correct spacing and if the pairs of rollers are mounted on a bracket that is pivotally mounted

on the yoke greater latitude in side-to-side movement of the strip is permitted.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top view of apparatus of the invention; and FIG. 2 is an enlarged side elevation, partly in section, taken along line 2—2 of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The preferred embodiment is apparatus for edge contouring metal strip by heat. As shown, it includes a supporting frame structure **10** on which is mounted a yoke assembly **11**. The supporting frame structure **10** includes laterally spaced horizontally extending beams **12** and **13** on which rollers **14**, **15**, **16**, and **17** are mounted with their axes of rotation extending parallel to the beams. As shown, a pair of spaced rollers is mounted on each beam, with each pair of rollers being in alignment with the other to receive the yoke assembly **11** and permit it to float thereon laterally with respect to the longitudinal extension of beams **12** and **13**.

The yoke assembly **11** is composed of a frame defined by two longitudinally extending spaced plates **18** and **19** which are connected by two parallel end rods **20** and **21** dimensioned to seat in the rollers **14**, **15**, **16**, and **17**; a center supporting rod **22** is positioned between rods **20** and **21** and joined to the plates. Thus, the yoke can move laterally on the rollers in a plane parallel to the plane of the moving strip and in a direction normal to the longitudinal direction of strip travel.

Mounted at the center of supporting rod **22** is a guide assembly **23** for receiving a moving strip and aligning it with respect to the yoke assembly so as to define an edge contouring station **24**. The guide assembly **23** is mounted to the center supporting rod **22** by clamps **24** and **25** which have integral upright supports **26** and **27** which are internally threaded to receive a suitable assembly for pivotally mounting longitudinal horizontally extending brackets **28** and **29** to the upright supports. Evenly spaced in each bracket from the pivot point are pairs of rollers **30** and **31**. Each roller is fully rotatable in the plane of the strip and grooved so that the strip will not slip out from between the pairs of rollers. Each bracket is adjusted on the center rod to accommodate the size strip being processed and when the strip is inserted in the rollers as shown in FIG. 2 the strip is aligned on the yoke and can be rapidly moved through the guide assembly as the yoke floats side-to-side without binding. By pivotally mounting the bracket, slight lateral movement of the rollers is permitted to compensate for slight changes in the angle of feed of the strip into the guide assembly and irregularities in the strip itself.

Mounted on the center supporting rod **22** by means of adjustable clamps **32** and **33** are tungsten inert gas heating elements **34** and **35**. While two heating elements are shown, it is of course within the scope of the invention to use only one heating element whenever desired. By means of the adjustable clamps, the heating elements are adjusted on the center supporting rod **22** until the ends **36** and **37** of the heating elements are spaced a predetermined distance from the edge of the strip. The space between the metal strip and the ends of the heating elements may be adjusted vertically by adjustment knob **38** and horizontally by adjustment knob **39**. It is to be noted that the ends of the heating elements are located over the pivot point of the bracket so that the slight pivoting permitted by the guide assembly will not affect the fixed spacing between the heating element and the edge of the strip.

In operation, metal strip **40** is unwound from one supply roll and fed over a first tension roll **41** which is mounted

on the supporting frame so that the top of the roll is substantially the same plane as the rollers of the guide assembly. The strip is moved at speeds of about 30 feet per minute through the guide assembly where the edges are rounded by the application of heat from the heating elements. Thereafter, the strip passes over a second tension roll **42** mounted at the outlet end of the apparatus in the same manner as the first roll; then the metal strip is either rewound onto a supply roll or is passed to further processing stations.

When the metal strip is unwound and fed longitudinally through the guide assembly, there is considerable lateral movement or oscillations of the strip side to side across the apparatus. This movement is fully compensated for with the present apparatus by the yoke assembly which holds the strip in a fixed location on the yoke assembly and nevertheless the yoke assembly which remains free to float side to side in response to the movement of the strip. Moreover, as the guide assembly moves to the extreme sides of the apparatus, the slight change in angle of feed to the guide assembly is compensated for by the pivotal action of the brackets. Finally, the heat source being fixed in the yoke assembly and freely movable with it, and being positioned at the pivot point of the bracket of the guide assembly is always spaced a fixed distance from the edge of the strip so that the edge treatment is uniform.

We claim:

1. Proximity yoke apparatus for controlling spacing between the side of a moving strip and edge treatment means comprising:

(a) a supporting frame;

(b) a yoke mounted on the frame to float side to side on the frame in response to the transverse oscillatory movements of a strip being fed longitudinally through the apparatus;

(c) guide means fixed on the yoke for receiving the moving strip and aligning it in a fixed position on the yoke and defining an edge treatment station for the strip;

(d) edge treatment means positioned adjacent at least one edge of the strip at the edge treatment station, the edge treatment means being adjusably mounted on the yoke and movable therewith so that a fixed space will be maintained between the edge treatment means and the edge of the strip during floating movement of the yoke.

2. Apparatus according to claim **1** wherein said edge treatment means is a heat source for rounding the edge of metal strip by melting.

3. Apparatus according to claim **1** wherein said guide means includes pairs of rollers mounted on each side of the strip to contact opposite edges of the strip and said edge treatment means is positioned between one pair of rollers.

4. Apparatus according to claim **3** wherein said pairs of rollers are mounted on a bracket which is pivotally mounted on said yoke.

5. Apparatus according to claim **1** wherein said yoke is composed of a frame including two parallel rods which seat on rollers mounted on the supporting frame and a center supporting rod parallel with the two rods on which said guide means and said edge treatment means are mounted.

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