DEBURRING DEVICE FOR SLIT STEEL STRIPS

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This invention relates to deburring devices which will effectively deburr the longitudinal edges of slit steel strips. The principal object of the invention is the provision of a deburring device that will maintain the gauge or thickness of the slit strip along the longitudinal edges thereof while deburring the same.

A further object of the invention is the provision of a deburring device that will maintain the gauge or thickness of slit strip passed therethrough and simultaneously deburr the longitudinal edges thereof and simultaneously maintain tension thereon so that the slit strip may be uniformly recoiled.

A still further object of the invention is the provision of a deburring device for a slit steel strip which may be operated continuously and automatically when located, for example, between a slitter and a recoiler.

A still further object of the invention is the provision of a deburring device that may be easily disassembled and the deburring elements changed to conform to the width of the slit strips to be deburred thereby.

A still further object of the invention is the provision of a deburring device for treating the longitudinal edges of slit steel strip and the like so as to maintain a desired configuration thereof and remove longitudinally extending burrs therefrom, and which will simultaneously maintain the desired gauge of the slit strip being deburred, by imparting a lateral mill action thereto simultaneously with its deburring action.

The deburring device disclosed herein is particularly useful in connection with processing steel strip of mill width into commercially desirable slit strips. Such slit strip steel is commonly supplied to users who then feed the coils of slit strip directly into processing machines, such as automatic blanking and stamping dies in suitable press arrangements to fabricate desirable objects directly therefrom.

In the past, the slit steel strip has commonly had longitudinally extending burrs on the edges thereof where the strips were slit from the original mill width of rolled steel. Devices heretofore proposed in the art for deburring the edges of slit steel strip have approached the problem by attempting to engage the opposite longitudinal edges of the slit strips in annular rotary dies having peripheral grooves therein engaged upon the longitudinal edges of the strip to be deburred. Such devices, while effecting a deburring operation, actually deform the edges of the strip and in many cases reduce it to a dog bone shape wherein the longitudinal edges of the slit strip are thicker than the remainder thereof. This complicates the recoiling of the slit strip, and, more importantly, renders it difficult in handling and feeding the strip to suitable automatic equipment for blanking and shearing articles therefrom.

It is, therefore, one of the principal objects of this invention to produce a deburring device which will actually and completely deburr the longitudinal edges of the slit steel strip passed therethrough and at the same time maintain the gauge of the slit strip uniformly thereon across and including the edge portions thereof.

A further disadvantage in the deburring devices heretofore known in the art has comprised the inability of the devices to maintain tension on the strip being deburred with the result that the strips fed to a recoiler would not be recoiled in uniform tension and an unwieldy and loosely coiled product results. The deburring device disclosed herein overcomes all of these objections heretofore found in connection with deburring the longitudinal edges of slit strip steel and at the same time facilitates the recoiling by maintaining uniform tension on the slit steel strips being passed therethrough and deburred thereby and the same are therefore capable of uniformly tensioned recoiling, which is highly desired.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being the intention to cover all changes and modifications of the example of the invention herein chosen for purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention.

The invention is illustrated in the accompanying drawings, wherein:

FIGURE 1 is a side elevation of a deburring device formed in accordance with the invention.

FIGURE 2 is section on line 2-2 of FIGURE 1. FIGURE 3 is an enlarged detail of a portion of the deburring device seen in FIGURE 2, with parts broken away and parts in cross section.

FIGURE 4 is an enlarged detail of a portion of the deburring device seen in FIGURES 2 and 3 of the drawings and illustrating portions of slit strip therein.

FIGURE 5 is a symbolic diagram illustrating the positioning of the top and bottom forming stands of the deburring device in a steel strip slitting line.

By referring to the drawings and FIGURES 1 and 2 in particular, it will be seen that a stand comprising a pair of spaced vertical supports 10, 19 is disclosed and wherein a pair of horizontally positioned rolls 11, 11 having necks 12, 12 are journaled in anti-friction bearings 13, 13 which in turn are located in the spaced vertical supports 10, 19 of the stand.

The bearings assemblies 13, 13 are mounted in support members 14, 14 which in turn are secured to the spaced vertical support members 19, 10 of the stand as will be understood by those skilled in the art. The arrangement and mounting of the horizontally positioned rolls 11, 11 is such that they may be readily removed and replaced when desired.

Positioned in vertically spaced relation above the rolls 11, 11 and centered vertically thereabove, there is a smooth surfaced roll 15, which smooth surfaced roll 15 is provided with necks 16, 16 which are journaled in anti-friction bearings 17, 17 and these are in turn supported by support members 18, 18 which are arranged for vertical movement relative to the spaced vertical supports 10, 19 of the stand in which the several rolls are mounted.

Means (not shown) is provided for moving the support members 18, 18 and the smooth surfaced roll 15 vertically and means may be seen in FIGURE 1 of the drawings for holding the support members 18, 18 in desired position. The holding means comprises wedge-shaped elements 19, 19 engaged against angular lower surfaces 20, 20 of the oppositely disposed support members 18, 18. The wedge-shaped members 19, 19 are arranged to be moved longitudinally by means of screws 21, 21 threadably engaged therein and held against longitudinal motion by a mounting bracket 22. It will thus be seen that the smooth-surfaced roll 15 may be elevated relative to the rolls 11, 11 heretofore referred to so as to permit an idler roll 23 to be positioned therebetween and then repositioned in desirable relation thereto. The
The slit strip sections SS passing through the top former stand of the deburring device will have their lower longitudinal edges deburred as heretofore described and illustrated and particularly with respect to FIGURE 4 of the drawings. These partially deburred slit strip sections SS now move to a second stand which bears the legend "Bottom Former" and wherein the idler roll 23 is positioned above the slit strip sections and carries the reference numeral 23A. The smooth surfaced roll 15A is positioned below the slit strip sections SS and the two horizontally positioned grooved rolls which back up the idler roll 23A are positioned thereabove.

It will be observed that the continuous tension on each of the slit strip sections SS is thereby maintained throughout the two stands of the deburring device and that as the completely deburred slit strip sections SS move from the bottom former stand with their upper longitudinal edges deburred thereby, they will be held under proper tension so that they may be compactly and tightly recoiled by a recoiler generally indicated by the numeral 34. It will occur to those skilled in the art that the novel deburring operation thus performed on the longitudinal edges of the slit strip sections SS is efficiently done and that there is no deformation or thickening of the longitudinal edges of the slit strip sections SS as would be expected to occur with deburring devices heretofore known in the art.

The problem of recoiling the slit strip sections SS is also facilitated by the device which maintains constant full surface engagement and tension on the slit strip sections SS at all times, and thereby avoids looseness or slack in anyone of the slit strip sections so that they are evenly and tightly recoiled in a highly desirable manner.

It will thus be seen that a novel and efficient deburring device for deburring the longitudinal edges of slit strip steel sections has been disclosed which meets the several objects of the invention, and having thus described my invention, what I claim is:

1. A deburring device for slit strips comprising an idler roll having a plurality of longitudinally spaced annular ribs thereabout, a plurality of supporting rolls for said idler roll, at least one of said plurality of supporting rolls having a smooth surface in engagement with the periphery of said idler roll and said supporting rolls having a plurality of grooves therein for receiving said annular ribs on said idler roll and arranged to provide engagement of the areas said supporting rolls having said plurality of grooves therein and the areas of said idler roll between said annular ribs thereof, means positioning said supporting rolls in spaced relation and journaling the same for rotation, said device arranged to receive and engage slit strip sections to be deburred between said smooth surface supporting roll and the areas of said idler roll between said annular ribs thereon with the longitudinal edges of said slit strip sections in engagement with the sides of said annular ribs.

2. The deburring device set forth in claim 1 and wherein the supporting rolls and the idler roll are parallel.

3. The deburring device set forth in claim 1 and wherein the idler roll is formed of a plurality of annular segments each of which has one of the plurality of annular ribs thereon.

4. The deburring device set forth in claim 1 and wherein in the height of the annular ribs is equal to the gauge of the slit strip being deburred.

5. The deburring device set forth in claim 1 and wherein in the idler roll is formed of a harder material than the supporting rolls and the slit strip.

6. The deburring device set forth in claim 1 and wherein there are two supporting rolls having annular grooves therein and positioned horizontally to support said idler roll thereon directly beneath said smooth surfaced roll.

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