Dec. 16, 1958 E. R. MUDDIMAN 2,864,106

SPRAY GUARD

Filed April 3, 1957

FIG. 3.

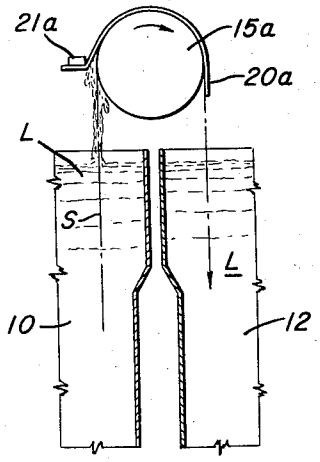


FIG. 1.

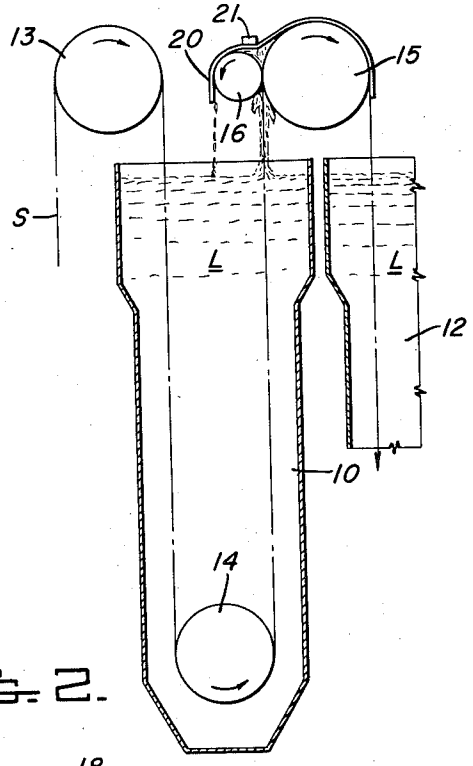
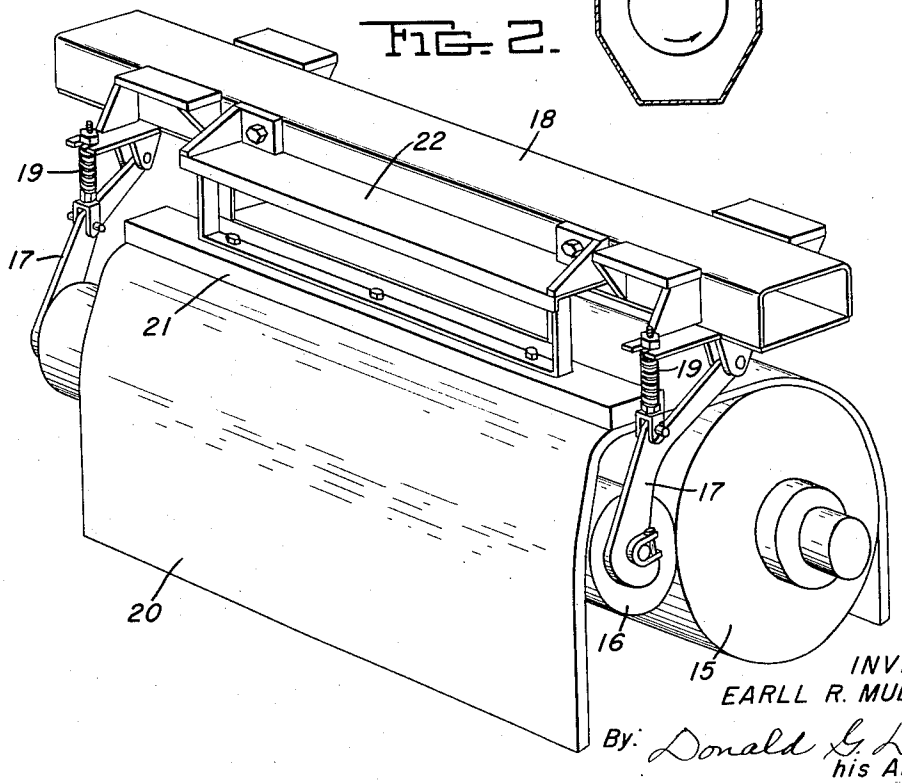


FIG. 2.



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SPRAY GUARD

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4 Claims. (Cl. 15—102)

This invention relates to a spray guard for use in a high speed strip processing line.

Many strip metal processing lines include a series of tanks through which strip passes vertically for treatment with a liquid. Typical examples are electrolytic tin-plating cells or acid pickling cells. Conventionally the strip passes over a top directional roll downwardly into one of the tanks, under a sink roll adjacent the bottom of this tank, upwardly from this roll back through the tank and over another top directional roll into the next tank. Strip traveling at high speed tends to drag liquid from the tanks. A common practice is to journal a squeezer roll alongside the top directional roll at exit side of a tank. As strip leaves the tank, it passes between the squeezer roll and the top directional roll, which return drags out liquid to the tank. At moderate strip speeds (for example up to 1000 F. P. M.) this arrangement is satisfactory, but as the speed is increased, liquid dragged from the tank passes between the strip surface and the squeezer roll and creates an objectionable spray above the rolls.

An object of the present invention is to provide a guard which positively prevents any spray of dragged-out liquid above the rolls and returns such liquid to the tank.

A further object is to provide, in combination with a top directional roll and optionally also with a squeezer roll, a guard which includes an overlying flexible curtain suitably supported for returning dragged out liquid to the tank.

In accomplishing these and other objects of the invention I have provided improved details of structure, preferred forms of which are shown in the accompanying drawing, in which:

Figure 1 is a diagrammatic vertical partially sectional view of a portion of a strip processing line equipped with a spray guard in accordance with my invention;

Figure 2 is a perspective view in more detail of a top directional roll and a squeezer roll which have my guard installed thereon; and

Figure 3 is a diagrammatic vertical partially sectional view of a modification in which the squeezer roll is not used.

Figure 1 shows two conventional tanks 10 and 12 of a series in which a continuous metal strip S is treated with a liquid L. The strip passes over a conventional top directional roll 13 journaled above the entry side of tank 10, downwardly through the liquid in this tank, under a conventional sink roll 14 journaled adjacent the bottom of the tank, upwardly back through the liquid, over another top directional roll 15 journaled above the exit side of the tank, and downwardly into the next tank 12. A conventional squeezer roll 16 is journaled alongside the top directional roll 15. As shown in more detail in Figure 2, the squeezer roll can be supported on a pair of arms 17 which are pivoted to an overhead beam 18. A pair of compression springs 19 urge the respective arms downwardly and thus force the squeezer roll 16 toward the directional roll 15. As the strip S leaves the tank 10, it passes between rolls 15 and 16 which tend to return dragged-out liquid to the tank, but which become ineffective for this purpose at high speeds, as already explained.

The spray guard of my invention comprises a flexible curtain 20 which overlies both the top directional roll 15 and the squeezer roll 16 and extends below its lines to tangency with these rolls. As best shown in Figure 2, the curtain 20 is attached intermediate its length to the underside of a transverse bar 21 which is suspended from beam 18 on a bracket 22. The curtain can be of any flexible material inert to the liquid of the tank, for example various plastics or glass fibers. If the top directional roll 15 is a type which conducts electric current to the strip, as in an electrolytic tinning operation, electric insulation is interposed between the curtain and beam. Bar 21 itself can be formed of rigid insulating material for this purpose. Liquid adhering to the strip as it emerges from the bite of rolls 15 and 16 furnishes lubrication between the strip and curtain. Such liquid is intercepted by the curtain and returns to the tanks as indicated in Figure 1, without creating a spray above the rolls.

Figure 3 shows a modification in which my guard is applied to a top directional roll 15*a* not associated with a squeezer roll. The guard includes a curtain 20*a* attached to a transverse bar 21*a* suitably supported so that its underface lies in approximately the same horizontal plane as the roll axis. The curtain overlies the directional roll as in the first embodiment and acts to return liquid to the tanks in similar fashion.

From the foregoing description it is seen that my invention affords a simple guard for positively preventing objectionable sprays above tanks in a high speed processing line for continuous strip. The invention has the further advantage that it can be installed on existing lines without otherwise altering their structure.

While I have shown and described certain preferred embodiments of my invention, it is apparent that other modifications may arise. Therefore, I do not wish to be limited to the disclosure set forth but only by the scope of the appended claims.

I claim:

1. In a strip processing line which includes at least one tank adapted to contain liquid and from which strip emerges traveling upwardly, and a top directional roll journaled above the tank and over which the strip passes after leaving the liquid of the tank, the combination with said roll of a spray guard comprising a flexible curtain of material inert to the liquid of the tank overlying said roll, and support means to which said curtain is attached.

2. In a strip processing line which includes at least one tank adapted to contain liquid and from which strip emerges traveling upwardly, a top directional roll journaled above the tank and over which the strip passes after leaving the liquid of the tank, and a squeezer roll journaled alongside said directional roll for returning to the tank liquid dragged out with the strip, the combination with said rolls of a spray guard comprising a support above a portion of at least one of said rolls, and a flexible curtain of material inert to the liquid of the tank attached to said support and overlying both said rolls for intercepting liquid which passes above the bite of the rolls.

3. In a strip processing line which includes at least one tank adapted to contain liquid and from which strip emerges traveling upwardly, a top directional roll journaled above the tank and over which the strip passes

after leaving the liquid of the tank, an overhead beam above said directional roll, support means pivoted to said beam, and a squeezer roll journaled to said support means and cooperable with said directional roll for returning to the tank liquid dragged out with the strip, the combination with said rolls of a spray guard comprising a tranverse bar supported by said beam above a portion of at least one of said rolls, and a flexible curtain of material inert to the liquid of the tank attached to said bar and overlying both said rolls for intercepting liquid which passes above the bite of the rolls, said curtain having lines of tangency with both said rolls and extending below these lines of tangency.

4. A combination as defined in claim 3 in which said curtain is electrically insulated from said beam.

References Cited in the file of this patent

UNITED STATES PATENTS

2,317,533	Joslin	Apr. 27, 1943
2,324,652	Stoker	July 20, 1943