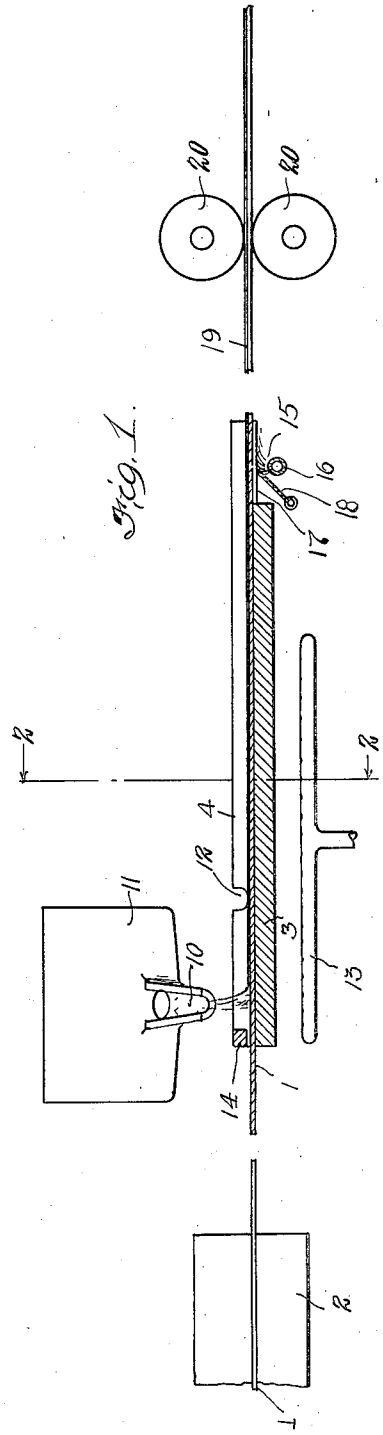
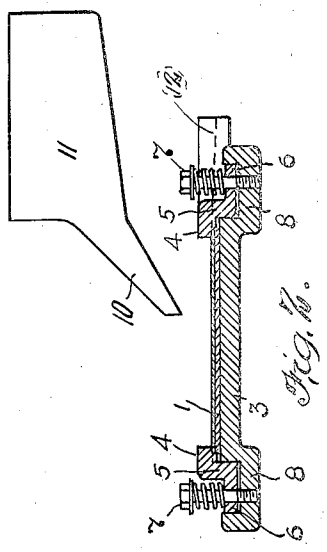
Feb. 25, 1936. G. S. SALZMAN 2,031,795

APPARATUS FOR PRODUCING BIMETALLIC STRIP

Filed Feb. 23, 1933





INVENTOR.
George S. Salzman
BY
Day, Oberlin & Day
ATTORNEYS

Patented Feb. 25, 1936

2,031,795

UNITED STATES PATENT OFFICE

2,031,795

APPARATUS FOR PRODUCING BIMETALLIC STRIP

George S. Salzman, Cleveland, Ohio, assignor to The Cleveland Graphite Bronze Company, Cleveland, Ohio, a corporation of Ohio

Application February 23, 1933, Serial No. 658,100

2 Claims. (Cl. 207—11)

The present invention relating as indicated to a method of and apparatus for producing bimetallic strip is particularly directed to improvements in methods and apparatus which have been used or are now in use for the purpose of manufacturing composite metal strip consisting of a layer of some relatively strong high tensile metal such as steel, bronze, or the like, and a second layer of a softer metal of lower melting point, such, for example, as babbitt or similar material.

The principal object of the invention is to provide a new and simplified method of manufacturing such bimetallic strip with a minimum of apparatus and with a close control of the thickness of the coating of soft metal which is applied to the stronger metal. To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawing and the following description set forth in detail certain structure embodying the invention, such disclosed means constituting, however, but one of various structural forms in which the principle of the invention may be used.

In said annexed drawing:

Fig. 1 is a side elevation more or less diagrammatic in character illustrating one form of apparatus capable of carrying out the steps of the present method; and Fig. 2 is a section on the line 2—2 of Fig. 1.

Referring now to Fig. 1, I have shown a strip 1 of metal such as steel issuing from a heating chamber or furnace 2 in which the metal may be brought to the temperature approximating that of the melting point of the second metal which is to be applied thereto. It will be understood that the term "steel" as used in the following description is intended to denote any suitable metal which may be employed as the backing or reinforcing strip for the bimetallic article to be produced such as steel, bronze or the like, while the term "babbitt" is intended to include any softer, lower melting point metal, such, for example, as babbitt proper, high lead bronzes and similar materials.

The strip 2 is next passed through an open channel or shell of a box consisting of a flat bottom 3, side walls or flanges 4, the latter extending over the edges of the strip 1 a sufficient distance to blank or mask the extreme edge portions of the strip. Also the over-hanging flanges 4 are so formed that they will snugly and tightly engage against the edge portions of the strip 1 and prevent leakage of the molten babbitt under the flanges or around under the strip proper. In order to vary the pressure between the flanges 4 and the strip, and to adjust the position of the flanges for varying thicknesses of strip, I have formed the flanges 4 separate from the base 3 of the open box and provided the flange with an extension 5 and projecting portions 6 through which a bolt 7 is passed which also extends through a projection 8 on the base 3. Adjustment of the bolt 7 will, of course, change the position of the flange and thereby modify the pressure between the overhanging portion of the flange and the strip 1.

Molten babbitt is allowed to flow onto the top of the strip 1 from a pouring spout 10 extending from a chamber 11 in which babbitt may be maintained in a molten condition, the flow being controlled in any suitable way to provide as much new metal on top of the strip as is removed by the passage of the strip beyond the open box. A slight excess of metal may be supplied and this excess will overflow from appropriate openings 12 along the sides of the flanges 4. The open box is maintained in a heated condition during operation of the apparatus by means of a burner 13 illustrated in Fig. 1, and there is preferably a shallow forward end 14 across the box sufficiently raised from the bottom 3 to permit the introduction of the strip 1. For varying thicknesses of coating desired on the steel strip, various flanges 4 having predetermined or adjusted overflow openings 12 at different levels may be employed as these flanges are, of course, removably secured to the sides of the base 3 of this chamber. An extremely accurate thickness of coating can be applied in this manner and by supplying approximately only as much metal as is currently carried away as coating on the strip, the necessity for maintaining a large bath of metal with the resulting loss from oxidation is avoided.

The babbitt on the steel strip, of course remains molten for some period, but is preferably solidified as rapidly as possible by means of a spray of cooling liquid 15 issuing from a suitable conduit 16 and impinging upon the bottom of the steel strip at a point where the strip is supported at its edges in the guides, but where the central portion of the base 3 has been cut away as indicated at 17 to allow the cooling liquid to engage directly against the steel strip. By flooding cooling liquid onto the strip and by preventing any of this liquid from striking this strip except at a given line across its surface which I

accomplish by means of a pivoted deflector plate 18, it is possible to solidify the metal evenly and uniformly across the strip and in a space of time which is measured by a fraction of a second. This almost instantaneous solidification of the babbitt prevents improper grain growth in the structure and avoids other difficulties which arise from slow or gradual cooling of the metal. The solidified and united babbitt and steel which constitute the composite strip 19 are drawn through the entire apparatus by means of feed rolls 20.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the means and the steps herein disclosed, provided those stated by any of the following claims or their equivalent be employed.

I therefore particularly point out and distinctly claim as my invention:

1. In apparatus of the character described, the combination of a supporting bed adapted to receive a strip of steel passing thereover, and overhanging flanges mounted on said supporting bed adapted to cover and frictionally contact the marginal portions of the surface of a strip passing over said bed, said flanges being provided with overflow openings at a predetermined level.

2. In apparatus of the character described, the combination of a supporting bed adapted to receive a strip of steel passing thereover, and overhanging flanges mounted on said supporting bed adapted to cover and frictionally contact the marginal portions of the surface of a strip passing over said bed, said flanges being provided with overflow openings at a predetermined level, and means urging said flanges into contact with said strip.

GEORGE S. SALZMAN.