L. C. STEELE.

MACHINE FOR FINISHING TIN PLATE.

APPLICATION FILED FEB. 2, 1910.

995,639. Patented June 20, 1911.

4 SHEETS—SHEET 1.

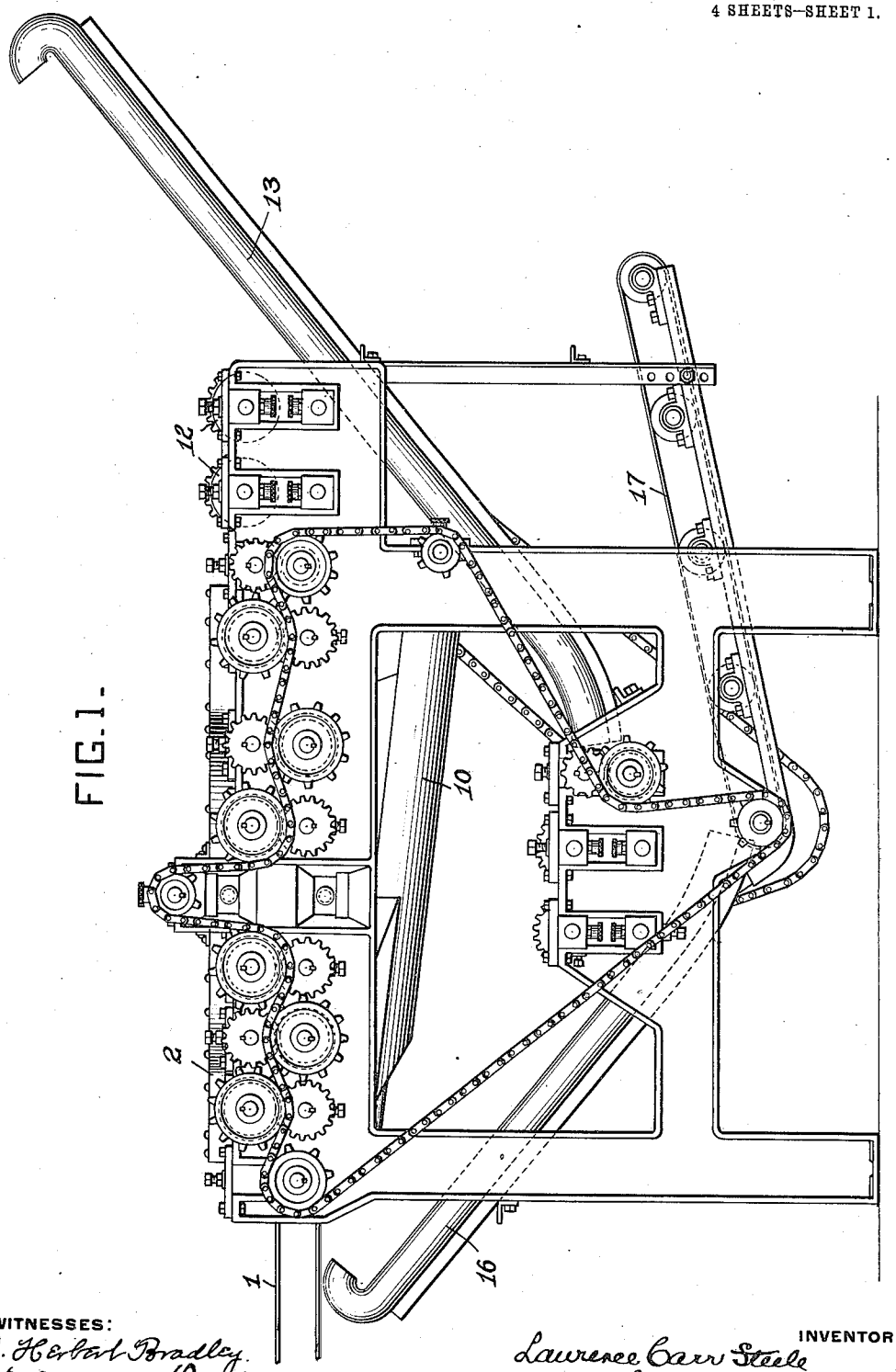

FIG. 1.

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INVENTOR

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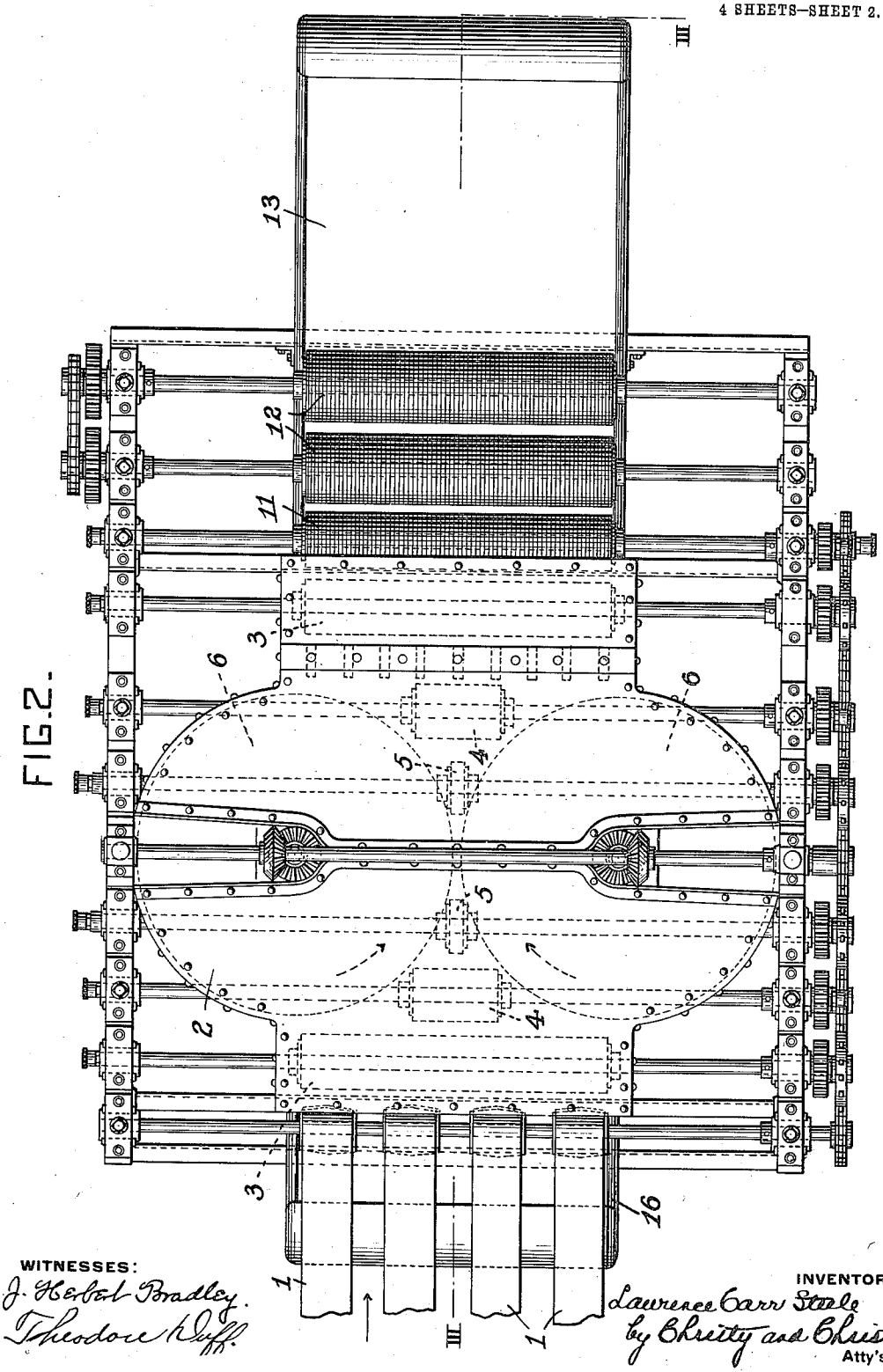
4 SHEETS—SHEET 2.

FIG. 2.



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4 SHEETS—SHEET 3.

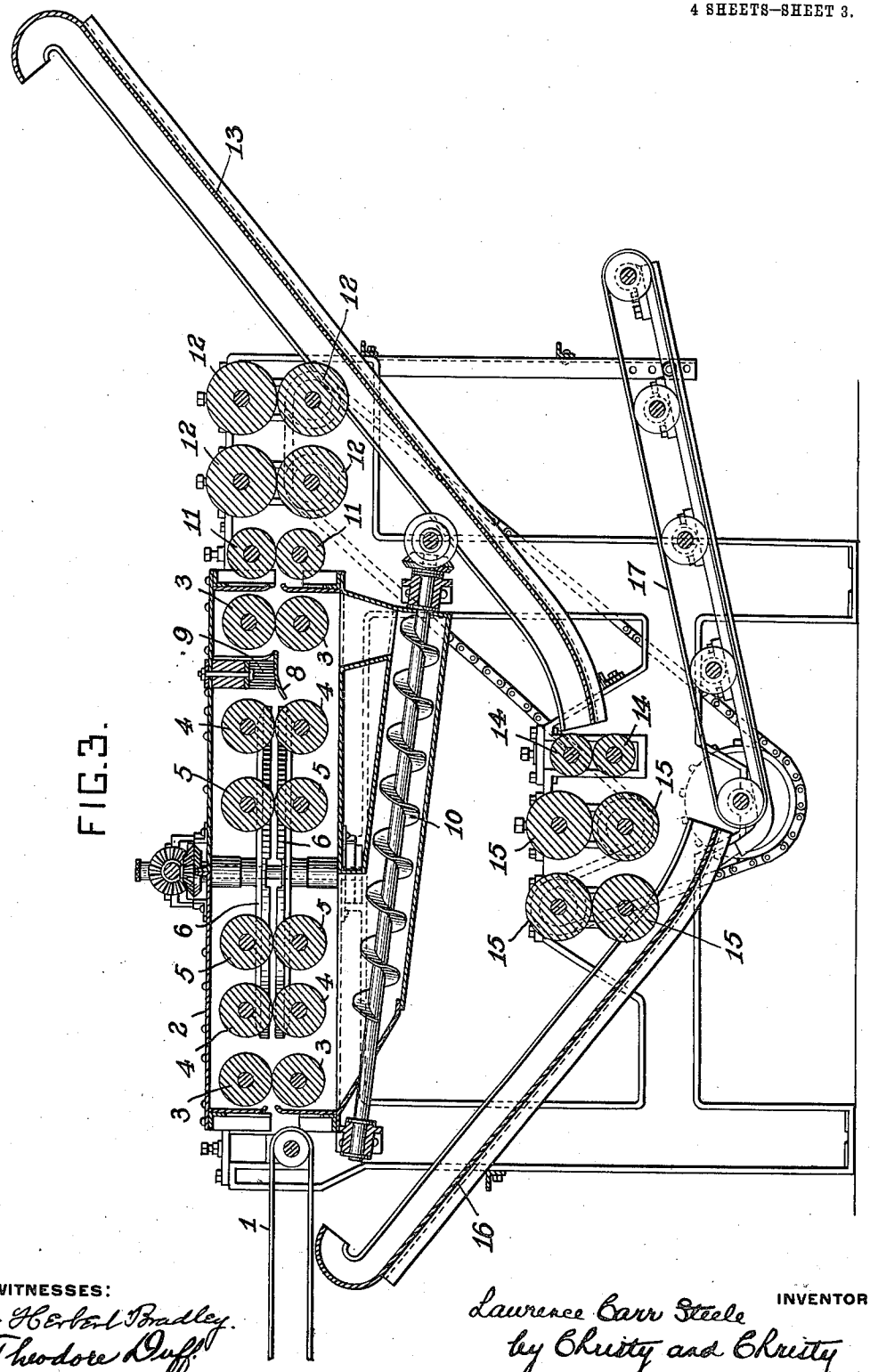

FIG. 3.

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4 SHEETS—SHEET 4.

FIG. 4.

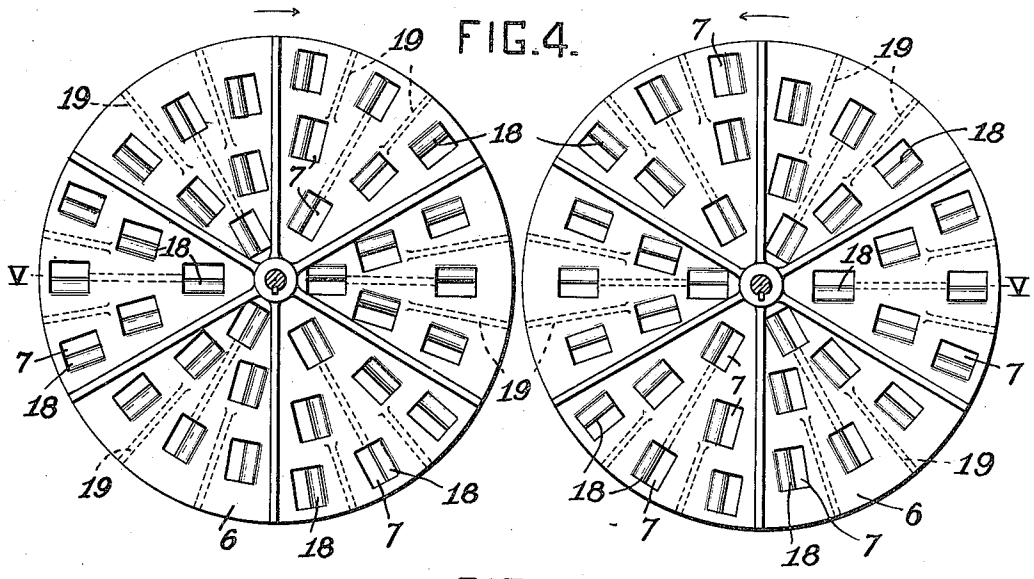


FIG. 5.

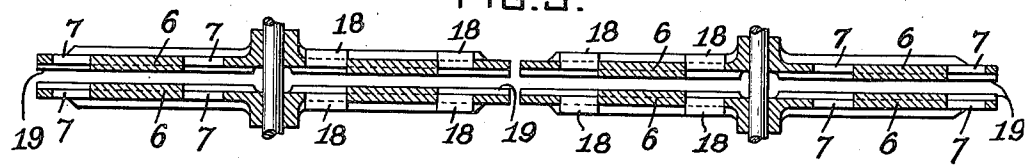


FIG. 6.

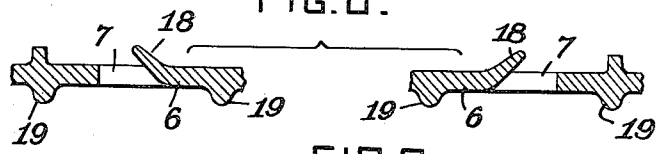
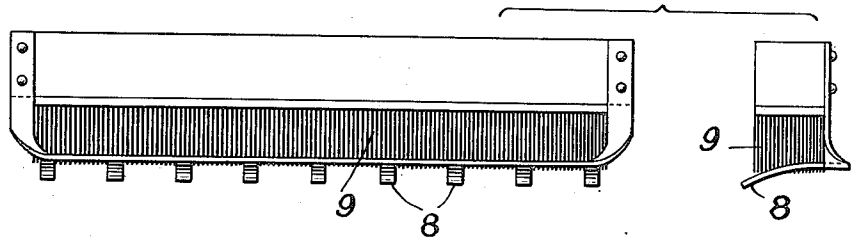


FIG. 7.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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MACHINE FOR FINISHING TIN-PLATE.

995,639. Specification of Letters Patent. Patented June 20, 1911.

Application filed February 2, 1910. Serial No. 541,557.

To all whom it may concern:

Be it known that I, LAWRENCE CARR STEELE, residing at Beaver, in the county of Beaver and State of Pennsylvania, a citizen of the United States, have invented or discovered certain new and useful Improvements in Machines for Finishing Tin-Plate, of which improvements the following is a specification.

My invention relates to improvements in finishing tin plate, and the object of my improvement is a branning and burnishing machine of simple structure and efficient and economic in service.

My improvement is illustrated in the accompanying drawings, in which—

Figure 1 shows the machine in side elevation, and Fig. 2 shows it in plan; Fig. 3 is a vertical longitudinal section on the line III—III at Fig. 2; Fig. 4 is a plan view of the branning mechanism in detail; Fig. 5 is a vertical section on the line V—V Fig. 4; Fig. 6 are vertical sectional views of detached fragments of the rotating disks of the branning apparatus; Fig. 7 shows in side and end elevation the stripping device for removing from a passing strip of tin plate any bran which in the branning operation has adhered to it.

Parts repeated in the several figures bear the same reference numerals in each case.

The machine consists essentially of a branning mechanism, and combined with it of a burnishing or cleaning mechanism. A newly tinned sheet comes from the bath of molten tin through rollers which work in palm oil, and from those rollers it passes on to the branning mechanism. In the branning mechanism the sheet with its newly formed tinned surface and with the adhering film of oil upon it is swept with bran or like substance (sawdust is ordinarily used) to absorb and remove the oil adhering to it, and from the branning apparatus the sheet is conducted to the burnishing or cleaning apparatus, where the newly coated sheet receives its surfacing.

In the accompanying drawings, the conveyer upon which the newly tinned sheet is brought to the branning apparatus is indicated at 1. The bran box within which the branning apparatus is contained is indicated at 2. There are receiving and discharge orifices at the opposite ends of this bran box, and within it the plate is first swept with bran and is then cleaned of the bran adhering to it, before it passes out through the discharge orifice. The mechanism employed for sweeping the sheet of tin plate with bran consists essentially of a plate which extends in a general plane adjacent to and parallel with the path in which the sheet of tin plate advances through the bran-box, and as the sheet advances this plate which extends adjacent to it is moved in the plane in which it extends; and, provision being made for the feeding of bran or equivalent material between the advancing sheet of tin plate and the moving plate last referred to, the surface of the sheet is given the desired sweeping to remove the surface oil. This movable plate which I have thus generally referred to is preferably made in the form of a rotating disk, rotating adjacent to the path of the sheet of tin plate, and preferably there are pairs of rotating disks, arranged at opposite sides of the path of the advancing sheet of tin plate, and thus coöperating to simultaneously sweep opposite sides of the sheet. Preferably also, as indicated in the drawings (particularly Figs. 2 and 4), there are a number of pairs—preferably two pairs—of these rotating plates, which are rotated upon centers lying at the side of the path of the advancing sheets. These rotating plates or disks are in the drawings indicated at 6. The particular construction of these disks enters into my invention. Holes 7 are provided in them, through which holes the bran enters, and fills the space between the disks 6, through which space the sheets of tin plate advance. And on the inner faces of these rotating disks are formed bosses 19, these bosses serving to confine and restrict the otherwise free movement of the bran in the space between the pairs of disks, and so increase the rubbing and sweeping effect of the bran upon the advancing sheets of tin plate. Furthermore, plow-like members are formed upon the outer surfaces of these rotating disks, adjacent to the orifices in it, which plow-like members, as the disk rotates, act to crowd the bran through the openings in the disks. Such a plow is conveniently formed by turning up a lip at the edge of the orifice, this lip being formed of the surplus metal, which otherwise would be entirely removed in forming the orifice, and this lip is turned up along the posterior edge of the orifice, that is, the edge of the orifice which is in the rear as the disk ro-

tates, and the lip protrudes forwardly to effect the described end. As particularly shown in Fig. 4 of the drawings, these openings through the disks 6 are conveniently arranged in staggered lines about the center of rotation, so that the feed of the bran into the space between the rotating disks shall be well distributed.

It will be understood that the adjacent pairs of rotating disks, between the proximate edges of which the sheets of tin plate are fed, rotate preferably in opposite directions, and further it will be noted of these oppositely-turning pairs of disks, that the lips 18 adjacent to the orifices 7 are turned up in opposite positions in the two disks, and in point of fact the upper plate of one pair is interchangeable with the nether plate of the other.

The means employed for causing the sheets of tin plate to advance between the proximate edges of adjacent pairs of rotating disks consist of pairs of rollers 3, 4, 5. These rollers make contact upon the sheets of tin plate above and below. They are preferably disposed, some of them, between the edges of the pairs of disks, being of suitable length, as is indicated in the plan view, Fig. 2. They are preferably faced with felt, that material being suitable for the purpose. It will be understood that by causing the adjacent disks to rotate in opposite directions, as explained above, their rotation will tend to cause the sheet to advance through the bran box.

The stripper, for removing from the surfaces of the advancing sheets of tin plate the bran which adheres to them as they pass through the branning operation, is preferably arranged within the bran box, and adjacent to the discharge orifice thereof. As is particularly illustrated in Fig. 3, this stripper is arranged between the last two pairs of feed rolls 3 and 4, next to the discharge orifice in the box. It preferably consists, as is particularly shown in Fig. 7, of a guide-plate 8 with an edge flaring in the direction of the approach of the advancing sheets, and of a brush 9 coöperating with this guide-plate. The brush will preferably be formed of hair; and, as the sheets of tin plate advance between the guide-plate 8 and brush 9, the bran will be removed. From the stripper the sheets will pass on between the feed rolls 3, and out through the discharge orifice of the bran box.

A further feature of my invention consists in a device for causing the bran to circulate within the bran box. It will be understood that the amount of bran in the bran-box does not entirely fill it, but there is a sufficient quantity to carry on the operation. The tendency of the sheets advancing through the box is to carry all the bran to one end of the box, and I have provided means for bringing it back to the receiving end of the box as fast as it is carried by the advancing sheet to the opposite or discharge end thereof. This means preferably consists, as is shown in Fig. 3, of a worm-conveyer 10 arranged in the lower part of the bran box. One end of this worm-conveyer lies beneath the stripper last described, and receives the bran which is there stripped from the moving sheets, and from that point it extends toward the receiving end of the box, and preferably in an upwardly inclined direction, and this worm-carrier in operation gradually moves the bran, causing it to circulate in the box.

My improved branning apparatus may be economically combined in an organized machine with apparatus for burnishing the sheets of tin plate. The mechanism for burnishing which I employ is not new, in and of itself, but it is new in combination and organization with a bran box.

A burnishing mill for sheets of tin plate consists essentially of a pair of tension rolls and a pair of burnishing rolls rotating at different surface speeds, the burnishing rolls traveling faster than the tension rolls. The passing sheet is engaged first by the tension rolls and, as it advances, is engaged by the adjacently-placed burnishing rolls, and these latter rolls moving at a greater speed than the sheet whose advance is controlled by the tension rolls, give the desired burnishing or surfacing effect. Since there is necessarily an appreciable space between the bite of the tension rolls and the bite of the burnishing rolls, the burnishing operation will not be performed upon the rearmost portion of the passing sheet because, as that rearmost portion passes between the burnishing rolls, there is no drag exerted upon it by the tension rolls, and it passes freely through. It therefore becomes necessary to put the sheet a second time through a burnishing mill in reverse direction, so that the unburnished edge of the sheet, which is the posterior edge in the first burnishing operation, is fed into the mill as the anterior edge in the second operation, and in this way the entire sheet is burnished.

Referring to Fig. 3 of the drawings, it is seen that I employ two burnishing mills, and in each of them I employ a single pair of tension rolls and two pairs of burnishing rolls. Adjacent to, and in line with the discharge orifice from the bran box, the tension rolls 11 are placed, and adjacent to them are placed the two pairs of burnishing rolls 12. Beyond the burnishing rolls, that is on the delivery side of them—the side opposite the bran box—is a chute 13, which receives the sheets as they come from the first burnishing mill, checks their advance and causes them to descend in reverse direction and feeds the

sheets so reversed between the tension rolls 14 of the second burnishing mill. The sheets advancing through the tension rolls 14 enter the spaces between the burnishing rolls 15 of this second burnishing mill, and thence they advance to a second chute 16, which again checks their advance, and reverses them, and delivers them at a lower level to carrier 17 on which the finished sheets are conveyed to the desired point of delivery.

It will of course be understood that all these movements of the various parts of the machine which have been described may be coördinated and effected from a single source of power, as is generally indicated in Figs. 1 and 2. But such coördination forming no necessary part of my invention, does not require detailed explanation here.

I have explained in some minuteness the details of organization. It will be understood that in its broader aspects my invention is not limited to these details, and that such variation of structure as is within the knowledge of one familiar with such machinery is permissible to effect the ends which I have particularly described.

I claim herein as my invention:

1. In a branning machine for tin plate, a plate extending in a general plane adjacent to and parallel with the path of a sheet of tin plate through the machine, an opening through said plate, a plow arranged adjacent to said opening, and means for moving said plate in the plane of its extent defined above, substantially as described.

2. In a branning machine for tin plate, a plate extending in a general plane adjacent to and parallel with the path of a sheet of tin plate through the machine, a boss upon the surface of the plate adjacent to the path of the sheet as defined above, and means for moving said plate in the plane of its extent defined above, substantially as described.

3. In a branning machine for tin plate, a rotary disk extending in a general plane adjacent to and parallel with the path of a sheet of tin plate through the machine, a plurality of orifices through said disk arranged in staggered lines around the center of rotation, substantially as described.

4. In a branning machine for tin plate, a rotary disk extending in a general plane adjacent to and parallel with the path of a sheet of tin plate through the machine, an orifice through said disk, and a lip overhanging the posterior edge of said orifice, substantially as described.

5. In a branning machine for tin plate, the combination of a plurality of rotary disks extending in a general plane adjacent to and parallel with the path of a sheet of tin plate through the machine and feed rollers arranged between said disks for causing sheets of tin plate to advance beneath said disks, substantially as described.

6. In a branning machine for tin plate, the combination of a bran box with orifices at its opposite ends for the introduction and discharge of sheets of tin plate, means for branning the passing sheets arranged within said box, a stripper for removing the bran from a passing sheet arranged within said box adjacent to the discharge orifice aforesaid, and a conveying passage arranged between the opposite ends of the box for carrying the bran back from the discharge end to the receiving end thereof and a conveyer in said conveying passage, substantially as described.

7. In a branning machine for tin plate, a pair of disks placed side by side in a common plane and rotating in opposite directions, and arranged adjacent to and parallel with the path of the sheet of tin plate through the machine, substantially as described.

In testimony whereof, I have hereunto set my hand.

LAWRENCE CARR STEELE.

Witnesses:

BAYARD H. CHRISTY,

ALICE A. TRILL.