Aug. 5, 1930. L. C. STEELE 1,772,195

STRIPPING DEVICE FOR TIN POT FEEDING

Filed Nov. 5, 1927 3 Sheets-Sheet 1

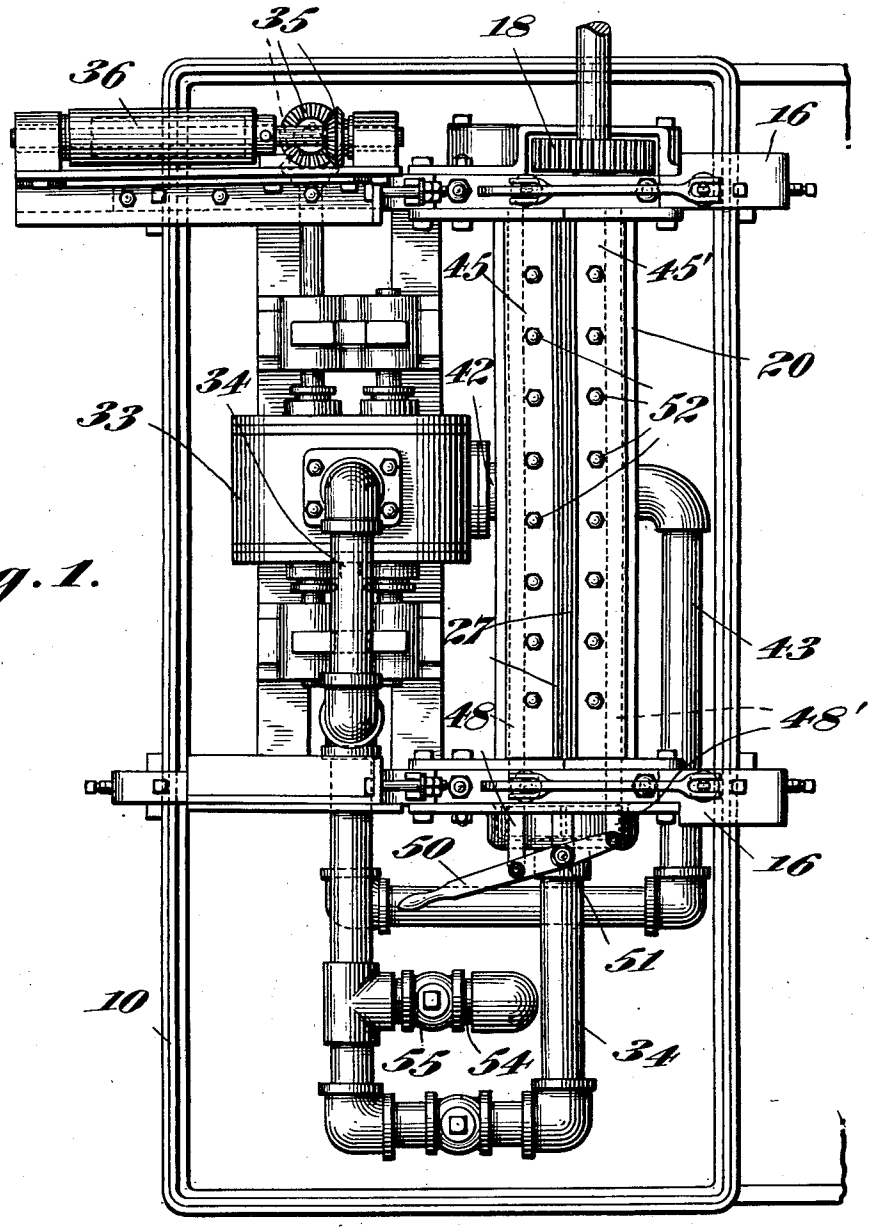


Fig. 1.

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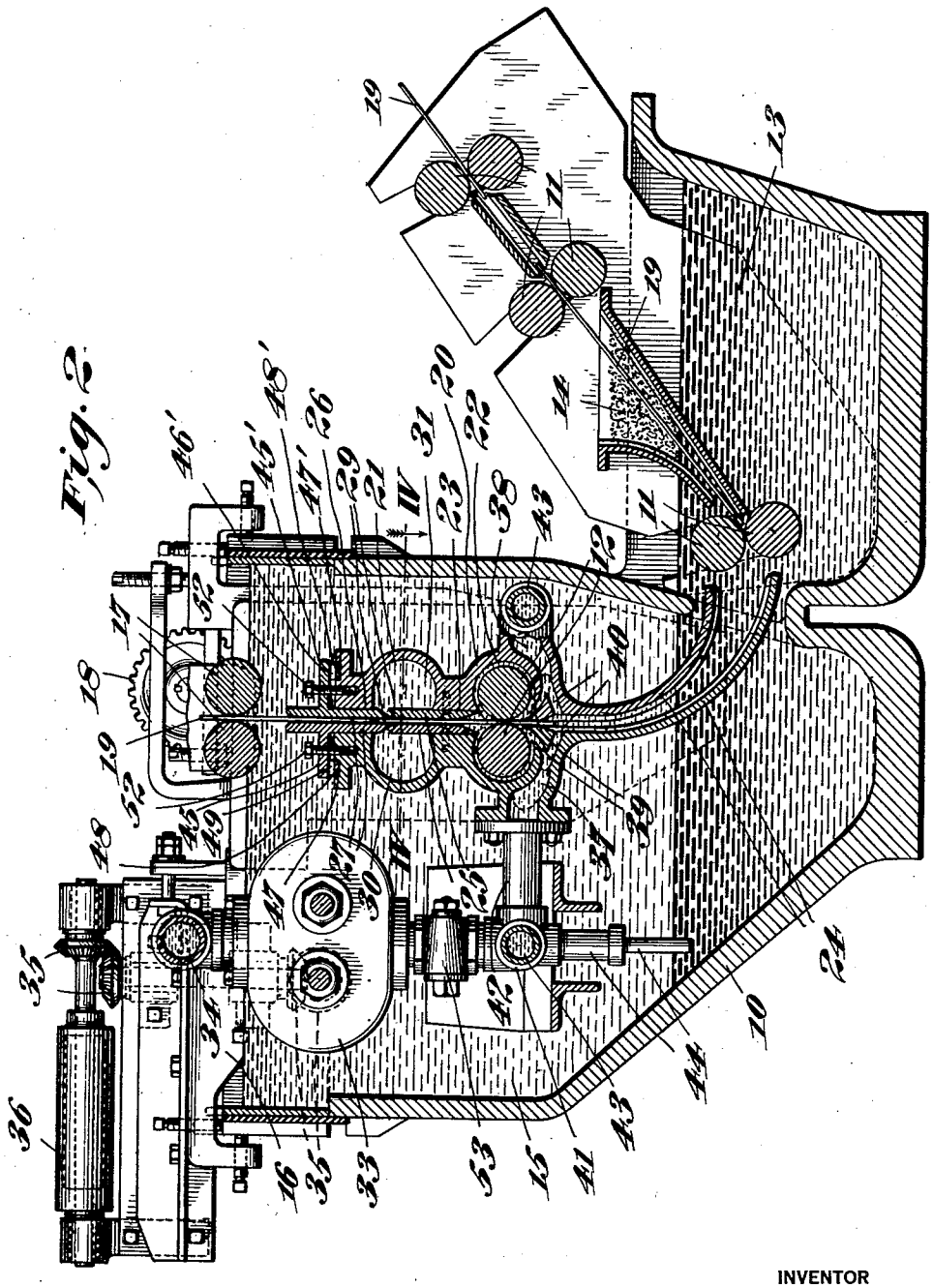
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Fig. 2.



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Fig. 3.

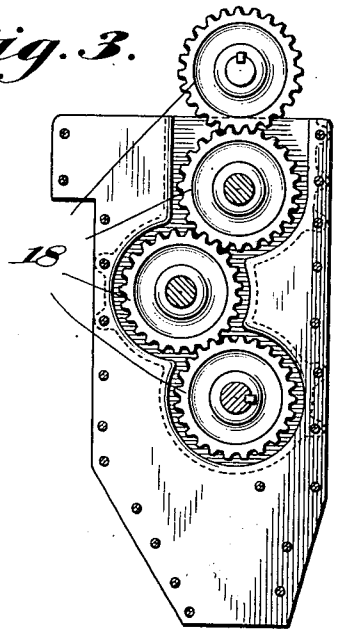


Fig. 4.

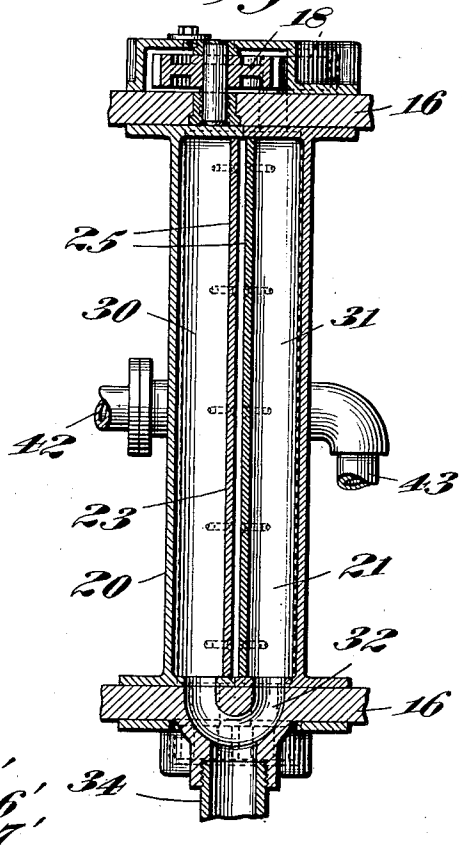


Fig. 5.

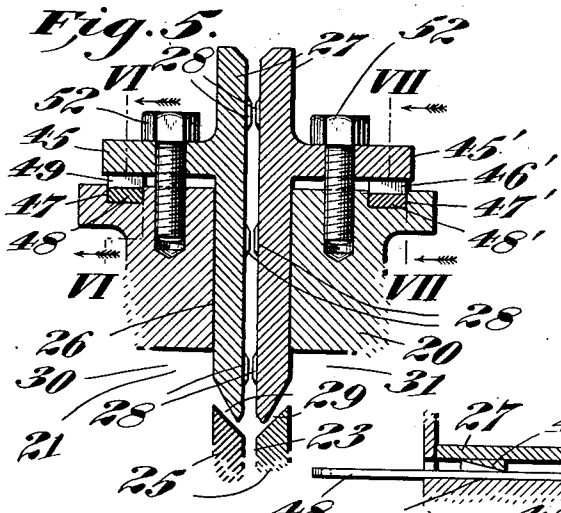


Fig. 6.

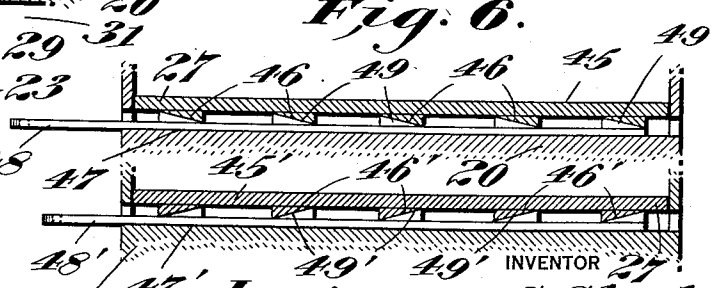


Fig. 7.

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Patented Aug. 5, 1930 1,772,195

UNITED STATES PATENT OFFICE

LAWRENCE C. STEELE, OF BALTIMORE, MARYLAND

STRIPPING DEVICE FOR TIN-POT FEEDING

Application filed November 5, 1927. Serial No. 231,372.

My invention relates to the coating of material and particularly to methods of removing the surplus coating of tin or other analogous materials from steel sheets.

One of the objects of my invention is to provide a simple and efficient device for removing the surplus metal from the sheet after it has passed through the coating bath, thereby greatly reducing the waste material and giving a uniformly distributed coating to the sheet.

Broadly stated my invention comprises a coating machine wherein an apparatus is provided so that after a sheet has been passed through the coating material, heated oil is rapidly flowed over a substantial area of the sheet, in a substantially closed path, which flushes and draws off surplus tin from the surface of the sheet, and means is provided to allow such surplus metal to precipitate from the oil current back to the metal coating bath.

In my prior Letters Patent No. 850,548 issued Apr. 6, 1907, I disclose an apparatus for forcing oil against the surface of a sheet for regulating the thickness of coating thereon, and in Letters Patent 854,006 issued to me under date of May 21, 1907, I disclose an apparatus for applying suction to the surface of a sheet for the purpose of removing the surplus coating therefrom.

I have found in actual practice that neither of the processes of my prior Letters Patents are effective, per se, but affect the gloss and injure the appearance of the sheet when the latter is fed at the rate of speed usually adopted for this character of manufacture.

On the other hand, I have found that when a current of heated oil is flowed moderately rapidly across a fairly substantial area of the coated plate, the resulting surface has a fine gloss, free from imperfection and the coating is very thin but evenly distributed.

The novel features of my invention will be more fully understood from the following description and claims taken with the drawings in which:

Fig. 1 is a partial plan view of a metal coating machine shown in Fig. 2;

Fig. 2 is a longitudinal cross section of a metal coating machine showing an embodiment of my invention;

Fig. 3 is a view showing the train of gearing intermediate the delivery and catcher rolls;

Fig. 4 is a longitudinal cross section taken on the line IV—IV in Fig. 2;

Fig. 5 is a cross section, somewhat enlarged, showing the adjustable inlet nozzle;

Fig. 6 is a cross section taken on the line VI—VI in Fig. 5; and

Fig. 7 is a cross section taken on the line VII—VII in Fig. 5.

Referring to the drawings: 10 designates a metal coating pot of the usual type, 11 being the feed in rolls, and 12 a pair of feed out rolls, 13 indicates the coating metal, 14 the flux material, and 15 the palm oil.

A frame 16 is adjustably supported on the pot 10 and a portion thereof is submerged in the oil. The rolls 12 are journalled in the frame 16, and also journalled in the latter are a pair of catcher rolls 17. The pairs of rolls 12 are driven from any suitable power source through the medium of the train of gears 18, shown in Fig. 3. The pair of rolls 17 are adapted to be rotated, by any suitable power means, at the same peripheral speed as the feed out rolls 12. It will be understood that the aforementioned pairs of rolls are in such spaced relation that the sheet 19 is gripped and moved by at least one pair of rolls during its passage through the coating machine.

Mounted on the frame 16 and submerged in the palm oil is a casing 20 provided with an upper chamber 21 and a lower chamber 22; said chambers communicate with each other through a narrow passageway 23.

The pair of rolls 12 are disposed within the chamber 22 and spaced curved aprons 24 extend from the bottom of the casing to constitute members which guide the sheet 19 to the rolls 12. Mounted in the passageway 23 is a pair of guide plates 25 spaced apart sufficiently to allow the sheet 19 to pass therebetween, and the marginal edges of the plates 25 are beveled in opposite directions, as shown in Fig. 2.

The casing 20 is provided at its upper end

with a narrowed passageway 26 having mounted therein the guide pieces 27 which are provided on their opposed faces with small circular pads or projections 28, see Fig. 5. Preferably the pads 28 on one of said pieces are aligned with the pads 28 on the other piece and the space between their contiguous faces are sufficient to allow for the passage of the sheet 19.

The lower marginal edges of the guide pieces 27 are beveled at their outside faces at an angle which is approximately supplementary to the angle of the bevel formed at the edges of the guide plates 25.

The lower edges of the guide pieces 27 are spaced somewhat from the upper edges of the guide plates 25 and the passageways 29 therebetween constitute nozzle opening for the purpose thereinafter set forth.

By referring to Figs. 2 and 4 it will be seen that the chamber 21 is divided into a pair of chambers 30 and 31, respectively, by means of the guide plates 25 and guide pieces 27 and that they communicate with the space between said plates through the nozzle openings 29.

The chambers 30 and 31 intercommunicate through the return bend 32 which in turn communicates with the discharge end of the pump 33 through the conduit 34. The pump 33 may be of any suitable and well known type and is, therefore, not shown or described in detail, but it is sufficient to say that it is mounted on the frame 16 and is operated by the bevel gearing 35 which is driven by any suitable means, such as the power driven pulley 36.

The casing 20 is provided at its lower end with chambers 37 and 38 which communicate with the chamber 22 through the suction nozzles 39 and with the space between the guide aprons 24 through the suction nozzles 40.

Connected to the suction end of the pump 33 is a manifold 41 which communicates with the chamber 37 through the conduit 42 and with the chamber 38 through the branch conduit 43. At the junction of the conduits 42 and 43 with the manifold 41 there is provided a pipe 44 which extends beneath the level of the coating metal and places the latter in open communication with the manifold.

The guide pieces 27 are adjustably mounted on the casing 20 so that they may be moved vertically toward or from the guide plates 25 in order to decrease or increase the width of the passageways 29, as desired. To this end I provide lateral flanges 45 and 45′ which extend from the outside faces of the guide pieces 27 parallel to and in a plane above the upper surface of the casing 20. On the lower face of flange 45 is formed a series of longitudinally disposed inclined ways 46, and on the lower face of flange 45′ is formed another series of longitudinally disposed inclined ways 46′; the latter ways being inclined oppositely with respect to the inclined ways 46. The upper surface of the casing 20 is provided with a pair of longitudinally extending grooves 47 and 47′ disposed beneath and aligned with each of the series of inclined ways, respectively.

Slidingly mounted in each of the grooves 47 and 47′ are bars 48 and 48′, respectively, provided, on their upper faces with inclined ways 49 and 49′, respectively, which are complementary to and are contiguous with the inclined ways 46 and 46′, respectively, see Figs. 5, 6 and 7. The bars 48 and 48′ extend beyond the casing 20 and are pivotally connected to a hand lever 50 which is fulcrumed to the casing 20 at a point midway between said bars, as at 51. The guide pieces 27 are clamped to the casing 20 by the cap screws 52 which are threaded in the casing.

It will be readily seen that when the lever 50 is rotated about its fulcrum 51, the bars 48 and 48′ are caused to reciprocate in opposite direction. Thus, assuming the screws 52 to be loosened, movement of the lever 50 in a clockwise direction (see Fig. 2) will reciprocate the bar 48 toward the right and the bar 48′ toward the left, see Figs. 6 and 7. During this movement of the bars, the inclined ways 49 and 49′ will ride up the inclined ways 46 and 46′, respectively, and cause the simultaneous elevation of the guide pieces 27 and in this manner increase the width of the passageway 29. From the latter position, the pieces 27 may be lowered by the rotation of the lever 50 in a counter-clockwise direction. In this manner the size of the nozzle opening 29 may be adjusted to the desired size.

A regulating valve 53 is provided in the manifold 41 to control the amount of inlet opening to the pump 33, and a bypass conduit 54, controlled by the valve 55, is connected to the conduit 34 at a point intermediate the return bend 32 and the discharge end of said pump.

In operation, assuming the valve 55 to be closed and the valve 53 to be wide open, upon the operation of the pump 33, palm oil will be sucked for the under side of the rolls 12 and forced through the nozzle opening 29. In this manner a stream of hot oil will be forced to flow rapidly through the passageway between the guide plates 25, so that, the molten metal coating of a sheet passing through said passageway will be subjected to the action of the rapidly flowing stream of heated oil. This action flushes the surface of the sheet at each side and removes therefrom all the surplus coating material. This results in a finished sheet of fine quality, high gloss, and having a very thin coating which is evenly distributed.

The flow of oil across the surface of the sheet may be regulated by manipulating the

valves 53 and 55. By opening the latter valve, a certain quantity of oil discharged by the pump may be bypassed from the nozzle opening 29 to the oil bath, and through the valve 53 the supply of oil to the pump may be regulated. The velocity at which the oil is impinged against the surface may be regulated by adjusting the width of the nozzle opening 29 in the manner described above.

Any coating material carried in the oil stream from the surface of the plate will precipitate and return to the bath through pipe 44.

From the foregoing description it will be seen that I have devised novel means for flushing the surplus molten metal coating from a sheet and evenly distributing the coating thereon which is contiguous with the coating material alloyed with the material of the sheet.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various other changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are imposed by the prior art or as are specifically set forth in the appended claims.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. The combination with a vessel for containing a coating material, of a casing having a passageway for the passage of a sheet, a pump, a discharge nozzle adjacent said passageway, a suction nozzle communicating with said passageway, and conduits operatively communicating said nozzles to said pump.

2. The combination with a vessel for containing a coating material, of a casing having a passageway for the passage of a sheet, a pump, a discharge nozzle adjacent said passageway, a suction nozzle communicating with said passageway, a conduit operatively communicating said discharge nozzle with said pump, a bypass intermediate the latter and said discharge nozzle, a valve in said bypass, a conduit communicating said suction nozzle with said pump, and a valve in the last mentioned conduit.

3. In an apparatus for removing the surplus coating from a coated sheet, the combination of a sheet guiding means comprising an extended passageway, a second sheet guiding means disposed so as to provide an opening between them and the first mentioned guiding means, means to adjust one of said guiding means to vary the size of said opening, means to force a current of fluid through said nozzle openings, and means to flow said fluid through said passageway.

4. In an apparatus for removing surplus coating from a coated sheet, the combination of a pair of spaced guide plates for sheets spaced apart to constitute an extended passageway, a pair of spaced guide pieces disposed in alignment with said guide plates and spaced therefrom to provide a pair of oppositely disposed nozzle openings, means to force a current of fluid through said nozzle openings, and means to flow said fluid through said passageway.

5. In an apparatus for removing surplus coating from a coated sheet, the combination of a pair of spaced guide plates for sheets spaced to constitute an extended passageway, a pair of spaced guide pieces disposed in alignment with said guide plates and spaced therefrom to provide a pair of nozzle openings, means to transmit a sheet through said passageway, and means to flow a current of fluid through said nozzle openings and through said passageway.

6. In an apparatus for removing surplus coating from a coated sheet, the combination of a pair of spaced guide plates for sheets spaced apart to constitute an extended passageway, a pair of spaced guide pieces disposed in alignment with said guide plates and spaced therefrom to provide a pair of nozzle openings, means to transmit a sheet through said passageway, and means to flow a current of fluid through said nozzle openings and through said passageway in a counter-direction to the direction to that which the sheet is adapted to travel.

7. In an apparatus for removing surplus coating from a coated article, the combination of a casing having a nozzle chamber and a suction chamber and an extended passageway communicating said chambers, means for feeding a coated article through said passage way arranged in one of said chambers, and means for circulating a fluid from said nozzle chamber to said suction chamber through said passageway.

8. In an apparatus for removing surplus coating from a coated article, the combination of a pair of spaced guide members spaced apart to constitute a passageway, a second pair of guide members disposed in alignment with the first mentioned guide members and spaced therefrom to provide a pair of nozzle openings, and means to adjust one of said guide members to a predetermined position, said means comprising an inclined way associated with the last mentioned member, and a movable member supporting the last mentioned guide member and having an inclined way complementary to and engaging the first mentioned inclined way.

9. In an apparatus for removing surplus coating from a coated article, the combination of a pair of spaced guide members spaced apart to constitute a passageway, a second pair of guide members disposed in alignment with the first mentioned guide members and

spaced therefrom to provide a pair of nozzle openings, and means to adjust one pair of said guide members to vary said openings, said means comprising a series of inclined ways associated with one of the last mentioned pair of guide members, a series of inclined ways associated with the other guide member of the latter pair, a pair of sliding bars supporting the adjustable guide members and having inclined ways formed thereon complementary to and engaging the inclined ways associated with the guide members, respectively, and means to reciprocate said bars.

10. In an apparatus for removing surplus coating from a coated article, the combination of a casing having a nozzle chamber and a suction chamber and a passageway communicating said chambers, a pair of spaced guide plates projecting into said nozzle chamber and constituting an extension of said passageway, a second pair of spaced guide pieces in alignment with said guide plates and spaced therefrom to provide a pair of opposed nozzle openings communicating the nozzle chamber with said passageway, means to adjust said guide pieces to vary said openings, means to feed a coated article through said passageway, a pump adapted to supply a fluid to said nozzle chamber and draw fluid from said suction chamber, means to control said supply, and means to control the amount of fluid drawn from the latter chamber.

In testimony whereof I hereunto affix my signature.

LAWRENCE C. STEELE.