

May 23, 1939.

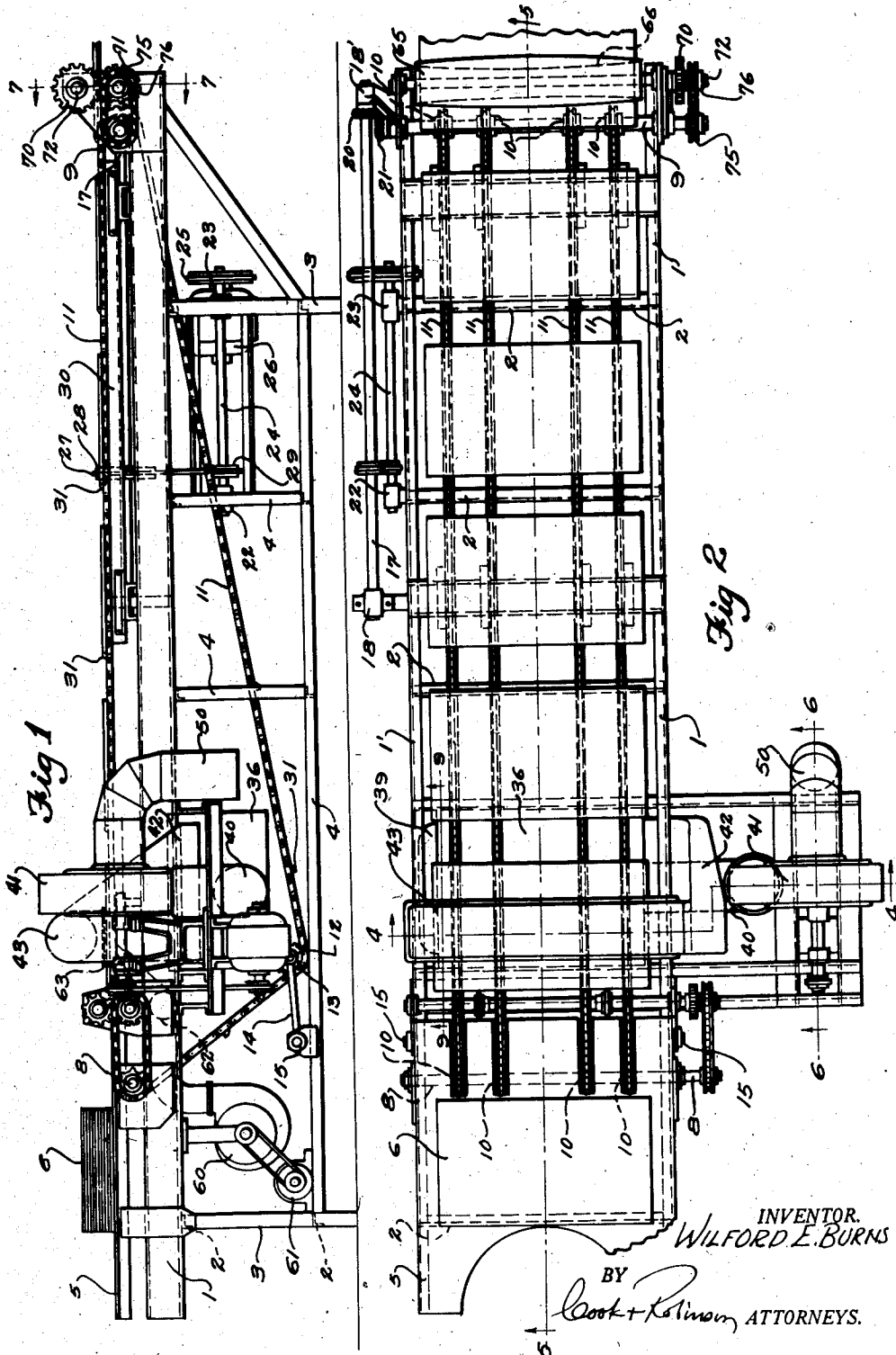
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2,159,351

METHOD OF AND MEANS FOR WAXING TIN PLATE.

Filed Jan. 18, 1937

3 Sheets-Sheet 1



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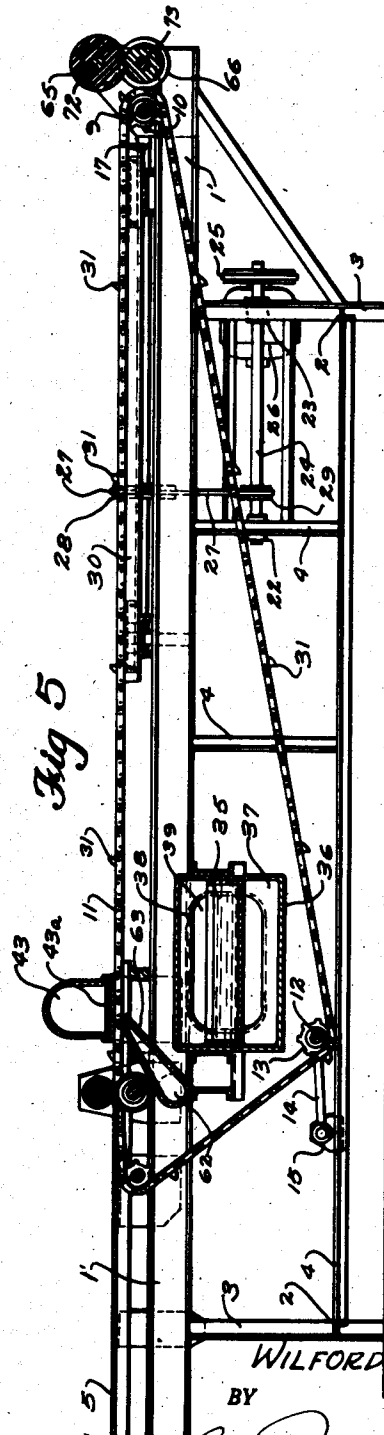
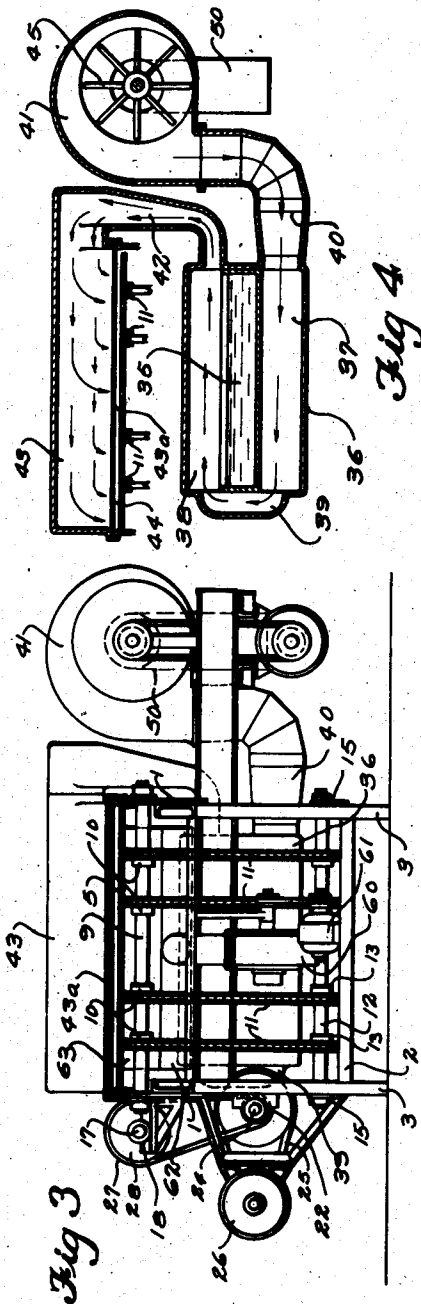
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METHOD OF AND MEANS FOR WAXING TIN PLATE

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3 Sheets-Sheet 2



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METHOD OF AND MEANS FOR WAXING TIN PLATE

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3 Sheets-Sheet 3

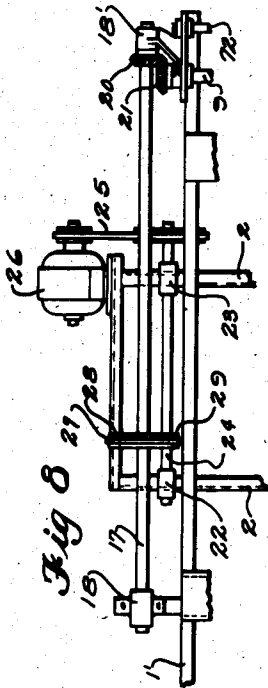


Fig 8

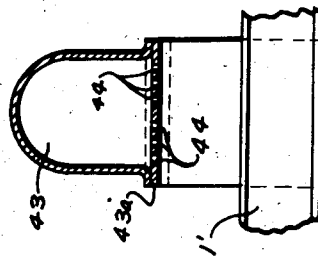


Fig 9

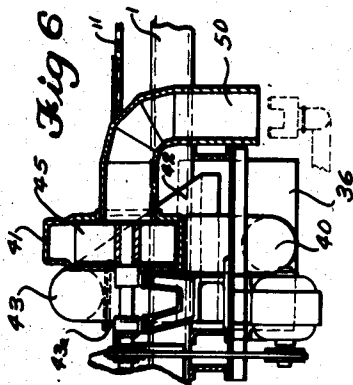


Fig 6

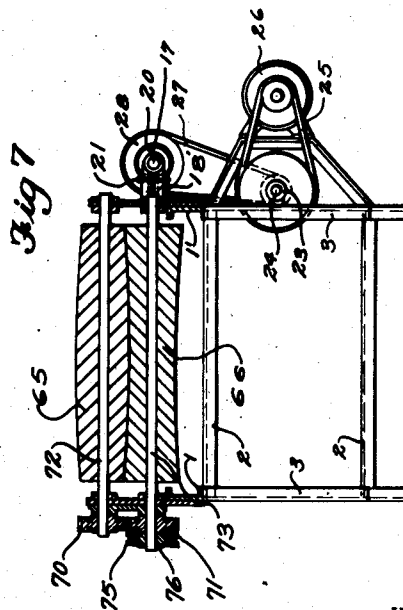


Fig 7

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UNITED STATES PATENT OFFICE

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METHOD OF AND MEANS FOR WAXING
TIN PLATEWilford E. Burns, Burlingame, Calif., assignor to
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Application January 18, 1937, Serial No. 121,153

4 Claims. (Cl. 91—70)

This invention relates to a method of and means for applying wax, or the like, to sheet metal plates, and it has reference in particular to the application of a film of wax or other lubricant to tin plate as used in the manufacture of cans.

In the manufacture of tin cans by present-day methods and machines, it is the general practise to prepare the body blanks and the ends of the cans from sheets of tin plate, first by cutting the plates into pieces or blanks of a required size and then forming the body blank into bodies, and stamping the ends from other pieces. Later, the ends and bodies are assembled to complete the cans. The body blanks, generally, are rolled or bent into body form and are usually cylindrical, while the ends, which are to be applied to the open ends of the bodies, are die-formed. In a great many instances, the metal forming the ends is drawn to a considerable extent in the formation of special shapes, flanges or in the formation of stiffening or strengthening ribs and corrugations generally to be found in can ends.

Particularly by reason of the die-forming of the blanks, it is extremely desirable that the tin plate be treated with a lubricant to facilitate the drawing operation in the dies without danger of cracking or rupturing the metal, and it is most convenient that this lubricant be applied to the plates while they are in the large sheet form. Therefore, it has been the general practice to apply a coat or film of wax or oil to the large sheet plates prior to their being cut into the blanks or smaller pieces for delivery to the body makers or end presses, but heretofore the most common method of applying the wax or oil has been by use of brushes, either hand or mechanically operated. One of the most common means involved the passing of the plates of tin against revolving brushes which were also in contact with cakes of wax; the arrangement being such that the brush first contacted the lubricant and then the plate. This means or method, however, has not been entirely satisfactory for the reason that it is impossible to evenly apply the wax or oil to the plates. When hand operation of brushes has been employed, this was not satisfactory because of excessive expense as well as ineffective application.

In view of the above, it has been the principal object of this invention to provide a method of and means whereby a thin film of wax or oil may be evenly and effectively applied in an economical and practical manner, at very small

expense and whereby it is insured that every part of a plate will receive the wax film to a desired extent.

More specifically, the present invention resides in the provision of means whereby the wax may be vaporized and applied to the tin plate in the form of vapor, and other means for expediting the condensation of the wax vapor on the surfaces of the tin plate.

It is also an object of the invention to provide mechanical means for conveying the plates beneath a lubricating vapor delivery nozzle, and other means for effecting a forced flow of heated air across the vapor producing vat and into the nozzle in a manner whereby the vapor is carried in suspension on the hot air and is directed against the surfaces of the cooled plates for condensation thereon.

Other objects of the invention reside in the various details of construction and in the combination of parts, and in the mode of operation as will hereinafter be more fully described.

In accomplishing these and other objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings wherein—

Fig. 1 is a side view of a wax applying machine embodied by the present invention.

Fig. 2 is a plan or top view of the same.

Fig. 3 is an end elevation of the machine.

Fig. 4 is a cross sectional view on the line 4—4 in Fig. 2, particularly illustrating the wax vaporizing vat, the vapor delivery header or nozzle and the air circulating fan and pipe connections.

Fig. 5 is a longitudinal section of the machine illustrating the means of conveyance for the tin plate and the location of the wax vat and vapor applying head.

Fig. 6 is a cross section on line 6—6.

Fig. 7 is a cross sectional view of the end delivery rollers taken on line 7—7 in Fig. 1.

Fig. 8 is a plan view of the driving mechanism.

Fig. 9 is a cross section of the vapor delivery nozzle, on the line 9—9 in Fig. 2.

Briefly describing the machine, it comprises a horizontal chain belt conveyer mechanism whereby sheet metal plates may be conveyed, one at a time, from the receiving to the delivery end of the machine. The conveyer is arranged to support the sheets of tin plate horizontally so that, in their conveyance, they will be carried beneath a vapor discharge head or nozzle from which wax or other lubricating vapor is delivered

ered directly into contact with the top surfaces of the tin sheets. Located below the conveyer is an air delivery means whereby cool air is directed against the plates, thus to keep them cool and facilitate the condensation of the lubricating vapor as it is delivered against their upper surfaces. Also located beneath the conveyer is a vat in which the lubricant is retained in melted condition by an application of heated air so that there will be a steady rise of vapor from the vat. A blower operates to deliver the heated air against the bottom of the vat as a means of heating the latter, and the heated air is then directed across the top of the vat to pick up the vapor and to carry it in suspension into the delivery nozzle housing from which it is discharged with the hot air through small perforations, against the metal sheets. The wax vapor is thus applied to the sheets shortly after they enter the machine and they are then carried through a suitable cooling interval before being delivered from the machine onto a stack. If it is desired, vapor delivery nozzles may be located both above and below the conveyer for an application of wax to both sides thereof.

Referring more in detail to the drawings—

The frame structure of the machine comprises parallel, opposite side beams 1—1', joined in spaced relation by cross beams 2. Legs 3 support the structure and these are braced in a suitable manner by the connecting and brace bars 4. Across one end of the frame is a horizontal plate 5 that is supported on the beams 1—1' and serves as a table for the support of a stack of sheets of tin plate, as designated at 6 in Figs. 1 and 2. At opposite ends of the frame, respectively, are cross shafts 8 and 9 on which are fixed sprocket wheels 10 for the driving and carrying of four endless conveyer chain belts 11. These are in parallel, spaced relation, with their top rims all in the same horizontal plane, and their lower rims operating about tensioning sprockets 12 on a cross shaft 13, swingingly suspended by links 14, attached to the frame structure as at 15. The cross shaft 9, in this instance, is rotatably driven to effect the desired travel of the four conveyer belts, and the driving means, as shown best in Figs. 2, 7 and 8, comprises a shaft 17 extending longitudinally of the frame and rotatably supported from the beam 1' by bearing brackets 18—18. On one end of the shaft 17 is fixed a bevel gear 20 in driving mesh with a bevel gear 21 fixed on cross shaft 9. Rotatably supported below shaft 17, parallel thereto and rotatably supported in bearings 22 and 23, is a shaft 24. This latter shaft is driven through a belt connection 25 with an electric motor 26, and shafts 17 and 24 are operatively connected by a belt 27 operating about belt wheels 28 and 29 fixed on the shafts respectively. The ratio of belt wheels and gearing is such as to provide the desired speed of travel for the belts 4.

In operation, the operator feeds the sheets of tin successively from the stack onto the traveling belts 4, so that they are conveyed thereon at spaced intervals from the receiving to the delivery end of the machine. Through the latter half of their travel, the belts may be supported in guides, as designated at 30, and to insure advancement of the tin plate and to prevent their becoming out of position thereon, the outside belts are equipped at intervals with lugs 31, which are aligned transversely of the direction of travel. Located adjacent the receiving end of the machine and below the top runs of the sev-

eral conveyer belts, is an open top vat 35, as shown best in Figs. 4 and 5. This vat is enclosed in a housing 36, which provides air chambers or passageways 37 and 38, respectively, below and above the vat. These passageways are connected at one side of the vat by an air passage 39, as shown in Fig. 4, and at the opposite side of the vat the passageway 37 has a connecting pipe 40 leading to a blower housing 41, while the passageway 38 has a connecting pipe 42 leading to a nozzle header 43 disposed transversely of the machine directly above the conveyer chains. The nozzle header is provided with a bottom plate 43a parallel with and closely above the plane of travel of the tin plates on the conveyer chains, and it is provided with closely placed, small perforations 44, as noted in Figs. 4 and 9. A blower fan 45 is mounted for operation in the housing 41 and in operation it drives intaken air through pipe 40 into passageway 38 below the vat, thence through the connecting conduit 39 into the chamber 37 above the vat, thence through conduit 42 into header 43.

It will here be mentioned that a supply of wax or oil is placed in the vat 35 and also that suitable burners or air heaters, as designated at 51 in Fig. 6, are located in the air inlet pipe 50 of the blower housing 41 so that all intaken air is heated. This heated air then operates, in housing 36, to heat oil or melt the wax and cause the desired vaporization thereof. The vapor rises from the vat as steam and is picked up and conducted by the stream of hot air into the nozzle header from which it is discharged with the air in fine jets directly against the top surfaces of the tin plate sheets as they pass beneath the nozzle.

It will here be stated that in the present machine, it has been found most practical to maintain the melted wax at a temperature of approximately 400° F. This will be maintained by the delivery air, heated to a necessary temperature, below and across the top of the vat as illustrated in Fig. 4.

In order that the wax or oil vapor may be readily condensed on the plates, I have provided a blower 60 located beneath the receiving end of the machine and operated by a motor 61 to deliver cool air into a cross header 62 from which one or more nozzles 63 direct it against the under sides of the tin sheets as they are passing beneath the nozzle. This cooling of the plates causes a ready condensation of the wax or oil vapor thereon. Then the plates have an extended period of travel for complete cooling before being discharged.

As the plates pass from the conveyer chains, they are received between two parallel rollers 65 and 66, as shown in Figs. 2 and 5. The lower one of these rollers is longitudinally dished and the other conforms thereto so as to hold the plate in a horizontal position until it has completely passed through the rolls, and will then fall flat instead of edgewise. These rollers are rotatably driven by means shown in Figs. 1 and 2, wherein 70 and 71 designate intermeshing gears which are fixed respectively to the supporting shafts 72 and 73 of the rollers and a chain belt 75 operates about a sprocket wheel 76 on the driven shaft 9 and on the supporting shaft 73 of the lower roller.

With the machine so constructed, sheets of tin plate may be quickly passed through the machine and a wax or oil film applied thereto to any extent desired, depending upon speed of

travel, heat and air delivery, and every plate will be evenly and effectively coated.

If it should be desired to apply a coat of wax or oil to both sides of the tin sheets, it is only required that an additional nozzle be applied below the plane of travel of the sheets so as to direct the atomized wax against their under surfaces in the same manner as accomplished by the upper nozzle.

10 Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

15 1. The method of applying a lubricating film, which comprises conveying the sheets of tin plate through a treating station and then through a cooling interval, creating lubricating vapor within an enclosure, causing a stream of hot air to be directed through the enclosure, thereby to be charged with the vapor, and then against the plate surface to be treated while the sheet is passing through the treating station, and causing cooling air to be directed against the surface of the sheet opposite that being treated.

20 2. The method of applying a lubricating film to the surface of a tin plate sheet, comprising conveying the sheet through a treating station and

cooling interval, maintaining a supply of lubricant in a vaporizing vat, enclosing the vat, causing a stream of heated air to be directed into the vat enclosure to effect the heating and vaporization of the lubricant, and the charging of the air stream with the vapor, then directing the charged air stream from the enclosure to a nozzle whereby it is discharged evenly over the entire surface of the plate, causing a cooling air stream to be directed against the surface of the plate opposite that being treated, and then conveying the sheet through a cooling interval. 10

3. The method of applying a lubricating film to metal sheets which comprises heating a lubricant to cause it to vaporize and creating a flow of air whereby to carry the vapor in suspension in the air against the sheets of metal for condensation thereon. 15

4. The method of applying a lubricating film to metal sheets which comprises heating a lubricant to cause it to vaporize and creating a flow of air whereby to carry the vapor in suspension in the air against the sheets of metal for condensation thereon, and directing a cooling current of air against the sheets to facilitate condensation. 20

25 WILFORD E. BURNS.