

Nov. 24, 1942.

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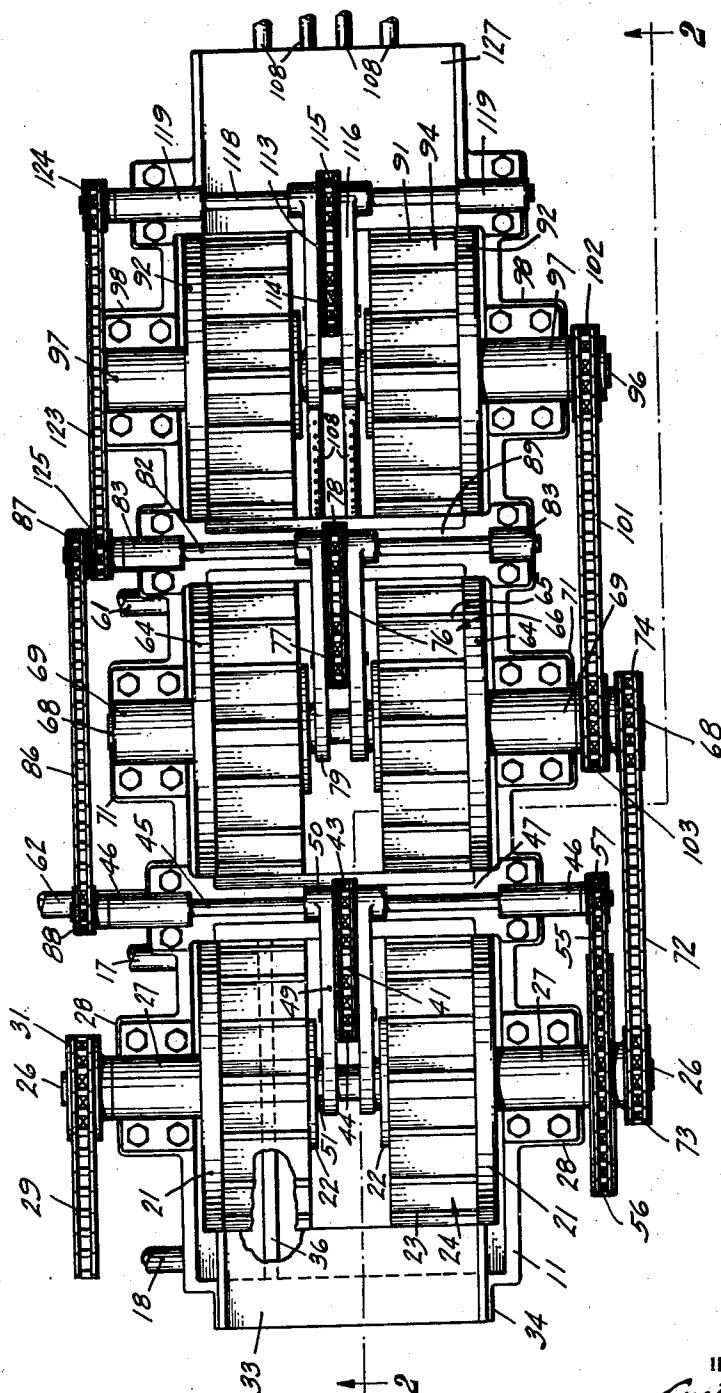
2,302,731

SHEET METAL TREATING MACHINE

Filed Feb. 28, 1940

2 Sheets-Sheet 1

Fig. 1



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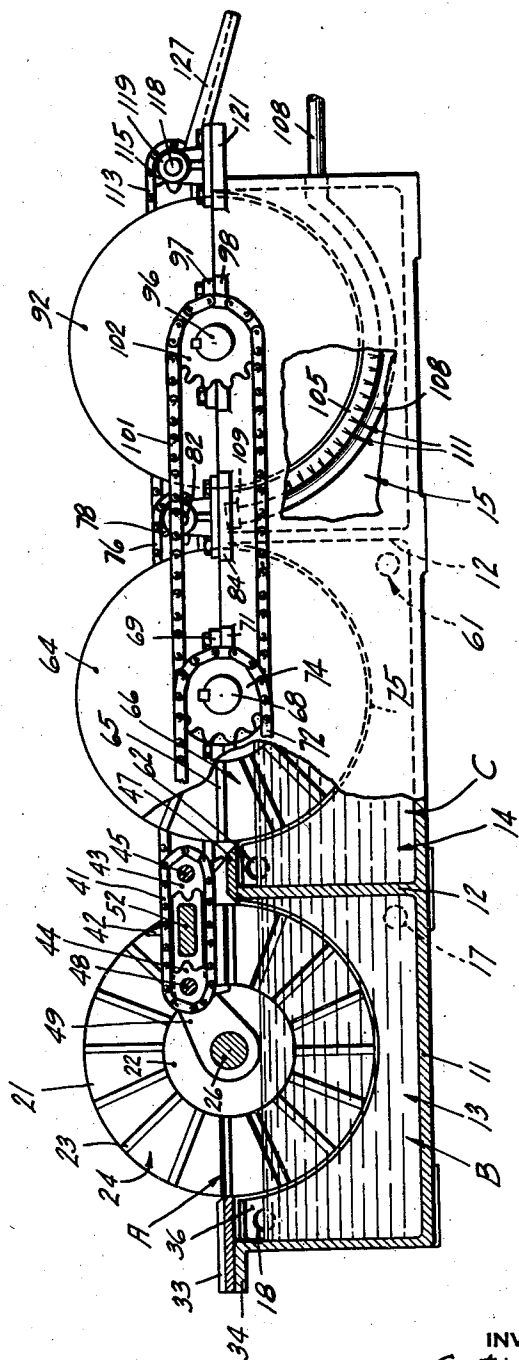
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SHEET METAL TREATING MACHINE

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2 Sheets-Sheet 2

Fig. 2



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SHEET METAL TREATING MACHINE

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3 Claims. (Cl. 266—7)

The present invention relates to a machine for treating metallic sheet material and has particular reference to preparing such material for can manufacture or similar purposes wherein sealed joints or seams are produced and wherein the plate is dipped into a deoxidizing medium preparatory to sealing of the seams.

In can manufacture, sheets or strips of steel or iron, usually referred to as black plate, are coated with tin to produce the well known commercial tinplate so widely used in the manufacture of tin cans. Cans made from tinplate are first blanked out and the blanks are formed into tubular shape. Edges of the blank are joined in a side seam to produce the tubular can body. Such a side seam may include an overlapping or an interfolding of the blank edges and these edges may be soldered or welded together to make a tight joint.

For some products the use of the untinned black plate has been suggested in the manufacture of cans. However, it has been found difficult to solder or weld the side seams of such cans because of the oxide surface of the black plate. The same is also true of some metallic coated sheets other than those which are tin coated. Such oxide surfaces may be prepared for soldering, etc., by deoxidation.

The instant invention contemplates a machine for overcoming this difficulty by preparing the blanks in a deoxidizing medium so that the side seam edges may be readily soldered or welded.

An object, therefore, of the invention is the provision of a black iron or other sheet metal treating machine wherein the sheets are dipped into a deoxidizing medium preparatory to being formed into cans and as an incident to having their edges sealed in a seam.

Another object is the provision of such a machine wherein the deoxidized sheets are immediately washed with hot clean water and dried after being subjected to such a deoxidizing treatment.

Another object is the provision of a machine of this character wherein the sheets to be deoxidized move in a continuous procession through the machine and are subjected to the deoxidizing treatment in progressive stages.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a top plan view of a machine embodying the instant invention; and

Fig. 2 is a side elevation of the machine, with parts broken away and parts shown in section.

As a preferred embodiment of the invention the drawings disclose a machine in which metallic sheets in the form of can body blanks A are subjected to a deoxidizing treatment prior to the blanks being formed into container bodies. In such a treatment the blanks are first dipped into a bath B (Fig. 2) of a liquid deoxidizing medium or agent such as for example, hot hydrochloric acid or hot sulphuric acid.

Upon being withdrawn from the deoxidizing bath B the sheets are immediately washed off in a bath C of hot clean water. This washing is followed by a drying treatment wherein hot air is blown against the sheets to dry them. The drying action prevents the sheets from rusting.

The machine for subjecting the sheets A to such a deoxidizing treatment preferably includes an open top tank frame 11 having transverse partition walls 12 which divide it into three separate tank sections or compartments. These tank sections include a deoxidizing tank compartment 13, a washing tank compartment 14, and a drying tank compartment 15.

The deoxidizing tank 13 contains the bath B of hot deoxidizing liquid. This liquid is circulated through the tank by way of an inlet pipe 17 and an outlet pipe 18. The pipes are threaded into a side wall of the tank frame and communicate with the interior of the tank 13. The inlet pipe 17 leads to any suitable source of the deoxidizing medium. The outlet pipe 18 may also lead to the same source of the deoxidizing medium so that the returned liquid may be recirculated through the tank.

Within the deoxidizing tank 13 there is located a pair of spaced rotatable deoxidizing wheels 21 having enlarged hubs 22 from which a plurality of vanes 23 radiate. The vanes set off a plurality of adjacent radial pockets 24. The wheels are mounted on a transverse shaft 26 journaled in bearings 27 bolted to pads 28 formed on the tank frame 11 adjacent its top edge. The shaft is continuously rotated in a counterclockwise direction (as viewed in Fig. 2) and in any suitable manner such as for example by a chain 29 which takes over a driving sprocket 31 mounted on one end of the shaft.

The sheets A to be deoxidized are fed in any suitable manner in horizontal position across a table 33 secured to a pad 34 formed on the front

of the tank frame 11 adjacent its top edge. As a pocket 24 of the rotating wheels 21 comes adjacent the table, the sheet A is pushed into the pocket. One end of the sheet is in a pocket of one wheel and the other end of the sheet is in a similar pocket in the other wheel. In this position the sheet is carried down into the bath of deoxidizing liquid in the tank as the wheel continues to rotate. Longitudinal guide rail partitions 36 in the tank, below each wheel, hold the sheets in the pockets as the wheels carry them through the liquid.

When the wheels bring the sheets up out of the deoxidizing liquid each sheet is discharged from its pocket by a continuously moving endless chain conveyor 41 having discharge fingers 42. This chain conveyor is located between the deoxidizing wheels 21 and operates over a pair of spaced sprockets 43, 44. Sprocket 43 is mounted on and is keyed to a cross-shaft 45 journaled in bearings 46 formed on a transverse table 47 located adjacent the discharge side of the deoxidizing wheels and the bearings are secured to suitable pads formed on the tank frame adjacent its top edge.

Sprocket 44 is mounted on a short shaft 48 secured in an H shaped bent bracket 49 disposed between the two deoxidizing wheels 21. At one end, the bracket is formed with a pair of spaced bearings 50 which surround the conveyor shaft 45. The other end of the bracket is formed with a similar pair of bearings 51 which surround the deoxidizing wheel shaft 26. These bearings 50, 51 are formed in the arms of the bracket 49 which is tied together in the middle by an integral web part 52.

The conveyor 41 is actuated in time with the rotation of the deoxidizing wheels 21. This is effected by way of an endless drive chain 55 which takes over a drive sprocket 56 mounted on the deoxidizing wheel shaft 26 and over a driven sprocket 57 mounted on the conveyor shaft 45.

Hence when the sheet A in its pocket 24 of the deoxidizing wheels 21 comes into a horizontal position adjacent the conveyor chain 41 a finger 42 of the chain engages behind the sheet and pushes it out of the pockets and clear of the wheels which continue to rotate. At that time the sheet is already deoxidized and in passing from the deoxidizing wheels, is propelled across the discharge table 47 in readiness for entry into the adjacent washing tank 14 hereinbefore mentioned.

The washing tank 14 contains the bath C of hot washing water hereinbefore mentioned. Clean heated water is constantly circulated through the tank by way of an inlet pipe 61 and an outlet pipe 62. These pipes are threaded into a side wall of the tank frame 11 and communicate with the interior of the tank 14. The inlet pipe leads from any suitable source of clean hot water while the outlet pipe leads to any suitable place of discharge for the used water.

Within the washing tank 14 there is located a pair of spaced washing wheels 64 which are preferably identical in construction with the deoxidizing wheels 21. These washing wheels also are formed with a plurality of radial vanes 65 which set off radial pockets 66.

The washing wheels 64 are mounted on a cross-shaft 68 which is journaled in a pair of bearings 69 secured to pads 71 formed on the tank frame 11 adjacent its top edge. The shaft is continuously rotated in a counterclockwise direction by an endless chain 72 which takes over a driving

sprocket 73 mounted on the deoxidizing wheel shaft 26. The chain also takes over a driven sprocket 74 which is mounted on the washing wheel shaft 68.

Hence as the rotating washing wheels 64 move their pockets 66 past the discharge table 47 of the deoxidizing tank 13, a deoxidized sheet A being discharged from the deoxidizing tank by the conveyor 41 is pushed directly into a passing pocket of the washing wheels. The received sheet is thereupon carried by the washing wheels down into and through the clean washing water. This action thoroughly washes off any of the deoxidizing liquid B which adheres to the sheet when it is discharged from the deoxidizing tank. During the passage of the sheets through the washing water they are held in their wheel pockets by a pair of longitudinal guide rail partitions 75.

When the washing wheels 64 bring the washed sheets up out of the water and again into a horizontal position, each sheet is discharged from its pocket by a continuously moving endless chain conveyor 76. This chain may be identical with the deoxidizing conveyor 41. The washing tank conveyor 76 is formed with spaced discharge fingers and operates over a pair of spaced sprockets 77, 78. Sprocket 77 is carried in an H-shaped bracket 79 which is identical with the H-shaped bracket 49 and is similarly mounted between the washing wheels.

Sprocket 78 is mounted on a drive shaft 82 which is journaled in a pair of bearings 83 secured to pads 84 formed on the tank frame 11 adjacent its top edge. The shaft is continuously rotated by an endless chain 86 which takes over a driven sprocket 87 carried on an outer end of the shaft and over a driving sprocket 88 which is mounted on the deoxidizing conveyor shaft 45.

Hence when a washed sheet in its washing wheel pocket 66 comes adjacent the discharge conveyor 76, a finger on the conveyor engages behind the washed sheet and carries it out of the pocket and clear of the wheel. The discharged sheet now is supported on a discharge table 89 where it is adjacent the drying tank 15 hereinbefore mentioned.

The drying tank 15 contains a pair of drying wheels 92 which are preferably identical in construction and operation with the deoxidizing wheels 21 and the washing wheels 64. These drying wheels also are formed with radial vanes 93 which set off sheet carrying pockets 94.

The drying wheels 92 are rotated in time with the other wheels and for this purpose they are mounted on a cross-shaft 96 which is journaled in a pair of spaced bearings 97 bolted to pads 98 formed on the tank frame 11 adjacent its top edge. The shaft is rotated by an endless chain 101 which takes over a driven sprocket 102 carried on an outer end of the shaft and over a driving sprocket 103 which is mounted on the washing wheel shaft 68.

As the drying wheels 92 rotate in their tank compartment and carry their radial pockets 94 past the washing tank discharge table 89, a washed sheet A being discharged from the washing wheels 64 is propelled across the discharge table and is pushed directly into a passing pocket of the drying wheels. The received sheet is thereafter carried by the drying wheels down into and through the drying tank. Longitudinal guide rail partitions 105 disposed in the tank below each wheel hold the sheets in the pockets of the moving wheels.

While in the drying tank 15 the washed sheets are subjected to a drying action which evaporates the water left on the sheet from the previous bath. As hereinbefore mentioned, this drying action is preferably effected by hot air discharged from a plurality of curved pipes 108 which are located adjacent the path of travel of the sheets as they pass through the tank.

The outer ends of the pipes lead from any suitable source of hot air maintained under pressure. The inner ends of the pipes are closed with caps 109. Along their length the pipes are formed with a plurality of spaced nozzles or are merely perforated in small discharge holes 111. The hot air forced into the pipes 108 under pressure issues from the discharge holes 111 in small jets which impinge against the wet sheets as they move past. It is this action that dries the sheets.

Discharge of the dried sheets from the drying tank 15 is effected in the same manner as from the deoxidizing tank and the washing tank hereinbefore described. This discharge is brought about by a horizontal endless chain conveyor 113 which is formed with suitable discharge fingers. The conveyor takes over a driven sprocket 114 and a driving sprocket 115. Sprocket 114 is carried in an H-shaped bracket 116 which is identical with the deoxidizing conveyor bracket 49 and the washing conveyor bracket 79 and is mounted between the drying wheels in the same manner.

Sprocket 115 is carried on a cross-shaft 118 which is journaled in a pair of spaced bearings 119 secured to pads 121 formed on the tank frame 11 adjacent its top edge. The shaft is driven in time with the other conveyors by an endless chain 123 which takes over a sprocket 124 carried on an outer end of the shaft. The chain is driven by a sprocket 125 which is carried on the washing tank discharge conveyor shaft 82.

Hence as the rotating drying wheels 92 bring a dried sheet up out of the drying tank it comes adjacent the discharge conveyor 113 and one of its discharge fingers engages behind the sheet and pushes it out of its wheel pocket 94. The ejected sheet falls into a discharge chute 127 secured to the end of the tank frame 11 and is thus directed to any suitable place of deposit.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. In a machine for treating metallic sheets in continuous procession, the combination of an open top tank frame having a plurality of longitudinally spaced transverse partition walls dividing said frame into three separate contiguous tank sections comprising respectively a sheet deoxidizing compartment for holding a liquid deoxidizing medium, a sheet washing compartment for holding a washing liquid and a sheet drying compartment having drying means therein, a conveyor wheel having radially disposed sheet receiving pockets thereon rotatably mounted on each tank compartment and having means for rotating the same to successively immerse the pocketed sheets in the separate deoxidizing and

washing liquids in adjacent tank compartments and for thereafter drying the sheets thus treated in a succeeding tank drying compartment, and a plurality of endless conveyors respectively mounted between adjacent tank compartments for successively receiving the treated sheets from the pockets of a said rotating wheel in one of said tank compartments and for transferring the sheets respectively to the succeeding positioned pockets of a rotating wheel in a succeeding tank compartment.

2. In a machine for treating metallic sheets in continuous procession, the combination of an open top tank frame having a plurality of longitudinally spaced transverse partition walls dividing said frame into three separate contiguous tank sections comprising respectively a sheet deoxidizing compartment for holding a liquid deoxidizing medium, a sheet washing compartment for holding a washing liquid and a sheet drying compartment having drying means therein, a conveyor wheel having radially disposed sheet receiving pockets thereon rotatably mounted on each tank compartment and having means for rotating the same to successively immerse the pocketed sheets in the separate deoxidizing and washing liquids in adjacent tank compartments and for thereafter drying the sheets thus treated in a succeeding tank drying compartment, a plurality of endless conveyors respectively mounted between adjacent tank compartments for successively receiving the treated sheets from the pockets of a said rotating wheel in one of said tank compartments and for transferring the sheets respectively to the succeeding positioned pockets of a rotating wheel in a succeeding tank compartment, and means for continuously driving said sheet conveyor wheels and said endless conveyors in synchronism from a common power source.

3. In a machine for treating metallic sheets in continuous procession, the combination of an open top tank frame having a plurality of longitudinally spaced transverse partition walls dividing said frame into three separate contiguous tank sections comprising respectively a sheet deoxidizing compartment for holding a liquid deoxidizing medium, a sheet washing compartment for holding a washing liquid and a sheet drying compartment having drying means therein, a conveyor wheel having radially disposed sheet receiving pockets thereon rotatably mounted on each tank compartment and having means for rotating the same to successively immerse the pocketed sheets in the separate deoxidizing and washing liquids in adjacent tank compartments and for thereafter drying the sheets thus treated in a succeeding tank drying compartment, said drying means comprising a plurality of curved pipes disposed adjacent the periphery of said drying compartment wheel and having spaced apertures therein for projecting jets of air upon the washed sheets for drying the same, and a plurality of endless conveyors respectively mounted between adjacent tank compartments for successively receiving the treated sheets from the pockets of a said rotating wheel in one of said tank compartments and for transferring the sheets respectively to the succeeding positioned pockets of a rotating wheel in a succeeding tank compartment.

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