P. B. TAYLOR.

MACHINE FOR BRANNING, CLEANING, AND DUSTING PLATES COATED WITH TIN, TERNE, OR OTHER METAL OR ALLOY.

APPLICATION FILED JUNE 16, 1914.

1,184,894.

Patented May 30, 1916.

2 SHEETS—SHEET 1.

FIG. 2.

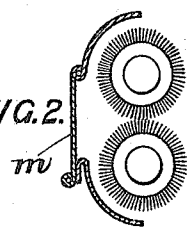


FIG. 3.

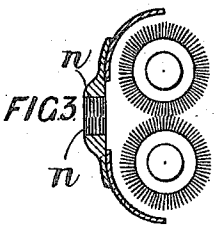


FIG. 4.

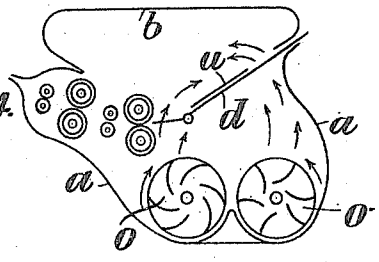


FIG. 1.

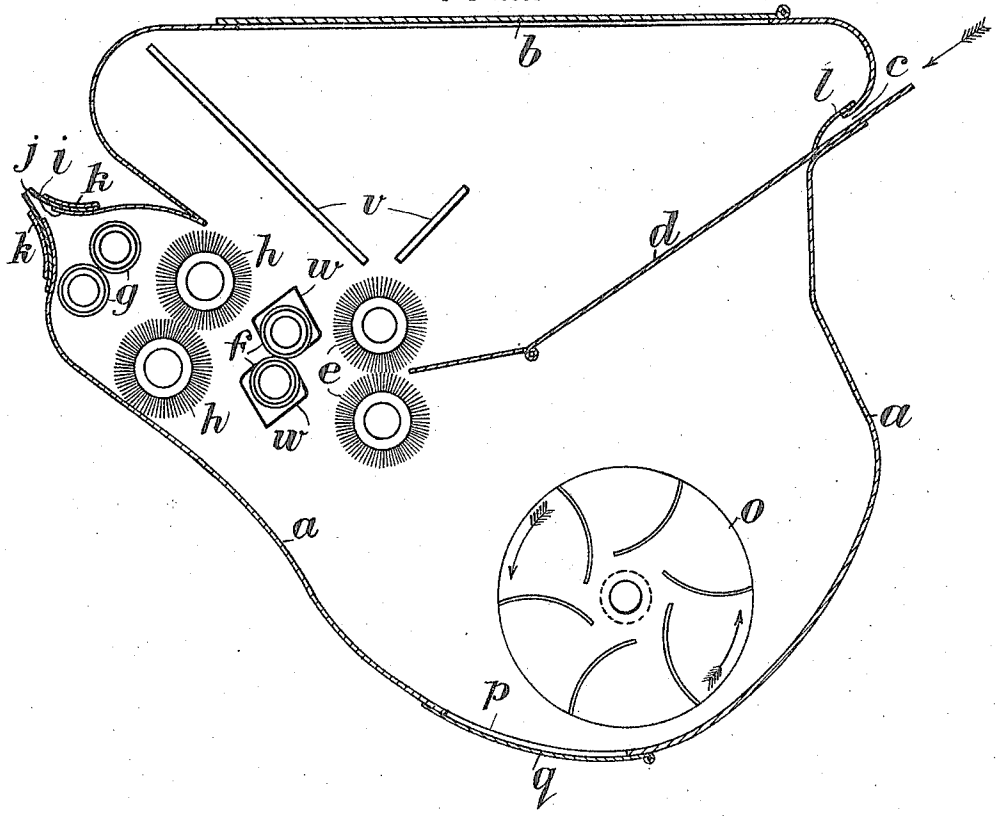
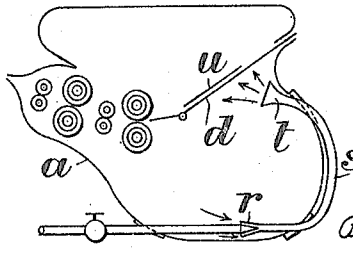


FIG. 5.



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2 SHEETS—SHEET 2.

FIG. 6.

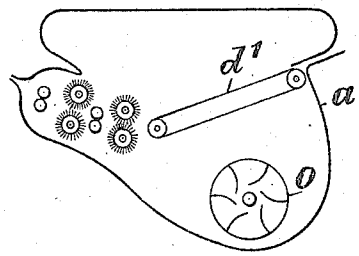


FIG. 7.

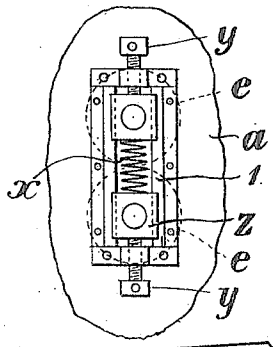


FIG. 8.

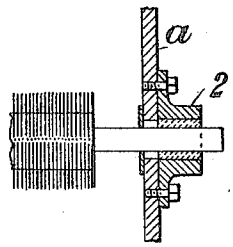
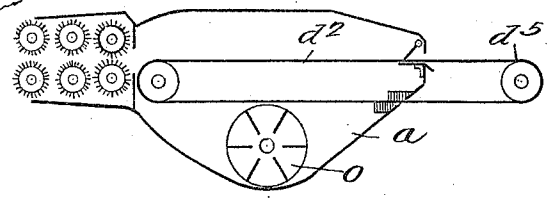


FIG. 10.



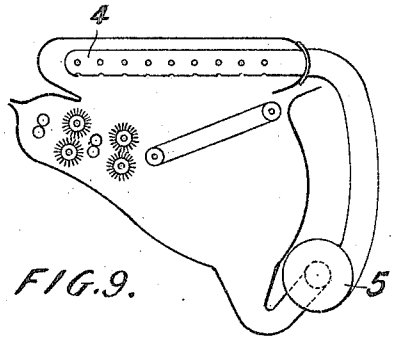


FIG. 9.

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PERCY BRAINE TAYLOR, OF BRITON FERRY, WALES.

MACHINE FOR BRANNING, CLEANING, AND DUSTING PLATES COATED WITH TIN, TERNE, OR OTHER METAL OR ALLOY.

1,184,894. Specification of Letters Patent. Patented May 30, 1916.

Application filed June 16, 1914. Serial No. 845,500.

To all whom it may concern:

Be it known that I, PERCY BRAINE TAYLOR, a subject of the King of Great Britain, and resident of Middleton House, Briton Ferry, South Wales, have invented new and useful Improvements in or Relating to Machines for Branning, Cleaning, and Dusting Plates Coated with Tin, Terne, or other Metal or Alloy, of which the following is a specification.

This invention comprises improvements in or relating to machines for branning, cleaning and dusting plates coated with tin, terne, or other metal or alloy. As is well known, the plates, after being coated by dipping, are passed through finishing rolls which revolve in, for example, hot palm oil. Consequently the plates leave the rolls in such condition as to necessitate the removal of the grease with which they are found to be covered. For this purpose the plates are inserted into a branning or cleaning machine in which they are treated with bran or the like and robbed of their grease by the action of the cleaning medium employed. They are finally treated by cleaning or dusting apparatus.

The object of the present invention is to secure improved working conditions with an absence or minimum of dust emission and to obtain a better finished plate without complicating the branning apparatus or rendering the same costly.

According to this invention the branning machine comprises an inclosed branning chamber containing or combined with a dust-raising or circulating device for bran or other cleaning material, the said device being adapted to disperse into the atmosphere of the chamber particles of cleaning material so that the plate to be branned is enveloped in a dusty atmosphere the dust from which settles upon and becomes attached to the surface of the inserted plate which thereby becomes thickly covered. The device may comprise a suitable agitator, or rotary distributer, or a pneumatic circulator, such being examples of suitable apparatus for creating and maintaining a dusty atmosphere within the chamber. The greasy plates which are suitably conducted to the branning machine from the finishing rolls aforesaid are introduced into the chamber through a suitable aperture, with either a short or a long edge in advance and it is arranged for a suitable time interval to elapse between the introduction of the plate and its seizure by certain feed rolls so that deposition of dust and cleaning material may take place on both surfaces of the plates. Thereafter the plate may be cleaned of the bran deposit and the grease which has been taken up or absorbed by the same.

The invention is thus distinguished from a previous proposal to blow jets of cleaning material against the surfaces of plates to be cleaned, or to cause such material to be applied directly to the surfaces by centrifugal devices, the material being circulated by a fan adapted to withdraw the material after use and return it to a feeding hopper or the blowing jets. In such previous cases the covering of the plates was not due in any way to dispersal of the material into the atmosphere of the chamber but to the direct impelling of the particles on to the plates. Moreover in these previous arrangements only a small portion of the plate was being branned at any given moment.

In carrying out the invention the plate may be passed by means of a chute or other conveyer through the inclosed chamber wherein is freely circulated the bran or other cleaning material as aforesaid. The material is caused to be thickly sprinkled over the whole surface of the plate on both sides, and it is only after such thorough treatment with cleaning material and the lapse of sufficient time for same to absorb the grease, that the cleaning of the plates by rollers, brushes or other means takes place.

The branning machine may be arranged at the back of the tinning machine, so that the coated plates may pass directly into the branning machine from the delivery apparatus of the tinning machine.

In order that the invention may be readily understood reference is made to the accompanying drawings in which:—

Figure 1 is a sectional elevation of one form of apparatus made according to this invention. Figs. 2 and 3 illustrate modified forms of devices for preventing escape of dust from the exit opening of the chamber. Fig. 4 is a diagrammatic view of a chamber having two mechanical dust raising devices and Fig. 5 is a diagrammatic view of a machine using a pneumatic jet apparatus in place of the mechanical devices for raising

and circulating the bran. Fig. 6 is a diagrammatic view of a modified construction comprising an endless conveyer within the casing. Fig. 7 is a side elevation of a portion of the casing fitted with adjustable dust proof bearings. Fig. 8 is a sectional view of a bearing fitted with a dust protector. Fig. 9 is a diagrammatic view of a modified construction comprising a blower and pipes for the dispersal of material into the atmosphere of the chamber, and Fig. 10 is a like view in which an endless conveyer is arranged partly outside and partly inside the casing.

Referring to the drawing *a* indicates a somewhat trough shaped container fitted with a cover *b*, a slot or aperture *c* being left at one side for the introduction of the coated plates, which latter may be fed to the aperture *c* by hand, or by any suitable conveyer or chute. From the inner side of the slot or aperture *c* a wire chute or slope *d* extends to the first cleaning or feeding rollers *e e*. The chute or slope *d* may be in two sections the lower one of which may be inclined less steeply than the upper one, as shown. The sections may be connected or made in one piece as shown in the drawing. The cleaning rollers *e e* are revolved slowly and are designed to slowly conduct a plate from the wire chute *d* to the nip of a pair of feed rollers *f f* revolving at a higher speed. The rollers *f f* conduct the plate to another pair of feed rolls *g g* revolving still faster, a second pair of cleaning rollers *h h* being interposed between the two pairs of feed rollers *f f* and *g g* and revolving at a speed greater than the rollers *f f* and less than the rollers *g g*. Other combination of brushes only or brushes and feed rollers may be employed and are preferably arranged all of increasing speed from entrance to exit end of machine, after the known manner of arranging a series of driven pairs of dusting rollers in a dusting machine. In some cases it may be found advantageous for the diameter of the rollers of the second pair of cleaning rollers to be greater than the diameter of the first pair.

The plates are delivered by the feed rollers *g g* through a slot or mouth-piece *i*. The various rollers and the mouthpiece may as shown be so arranged as to give the plate a curved and upwardly directed path. The inlet and delivery slots are both preferably designed to prevent escape of dust and, as an additional precaution two flaps *j* of leather or other suitable material backed with rubber *k*, or such like flexible material, may be arranged on the outer side of the delivery aperture *i*. A hinged or flexible flap *l* may also be arranged within the entry slot or aperture, if necessary. These flaps press lightly upon the plate making its entry or exit, and, when no plate is passing, the flaps cover their respective slots and prevent leakage of dust. If desired, a self-closing flap *m*, as shown in Fig. 2, may be employed on the exit end; or brushes *n n* may be substituted for the flap, as shown in Fig. 3. These flaps are advantageously made in short sections so that no more of the aperture is exposed than is demanded by the size of plate being cleaned. Flaps have been used heretofore however for guarding the entrances and exits of branning boxes or chambers.

Preferably within the deepest portion of the chamber *a*, or within a hopper shaped bottom, there is mounted a rotary agitator, distributer paddle wheel or similar device *o*, the function of which is to fling the bran or dust into the air space of the chamber *a* and so create and maintain a dust-laden atmosphere which may be very dense. The dust, in falling, is deposited upon the upper surfaces of the plates introduced and the dust floating and being flung upward by the agitating device passes between the wires of the chute *d* and adheres to the lower surface of the plate. The cleaning rollers *e* and *h* also become covered with the falling material. Between the moment that the plate enters the chamber and the moment that it is taken hold of by the first feed rollers *f* from the first pair of slowly revolving cleaning rollers *e*, sufficient time elapses for an effective deposition of dust to take place on the plate and for the dust so deposited to absorb the grease.

As soon as the plate enters the nip of the first pair of feed rollers *f*, the said plate will travel at a speed greater than the peripheral speed of the cleaning rollers *e* and the latter, owing to the differential speed, will act to clean the surfaces of the plate. A similar action will take place during the passage of the plate between the second pair of cleaning rollers *h*. An outlet opening *p* for the bran may be provided as shown in the bottom of the chamber, and such opening may be closed by any suitable cover *q*. It will of course be understood that the plate need not be bent at all during its passage through the branner, but the feed rollers and cleaning rollers may be so arranged that the plate may pass through them in a straight line, this arrangement being particularly suitable when thick plates are to be cleaned.

It may be found necessary or advantageous in some cases to employ a traveling conveyer in place of the chute *d* as shown in Fig. 6 which would have the advantage that the speed with which the plates are conveyed to the cleaning brushes could be made sufficiently slow to insure a thorough coating of bran being deposited on the plates. It may further be found advantageous in some cases to employ a single con-

veyer d^2 to carry the plates from any convenient point outside, into the chamber and if necessary through the chamber a, right up to the cleaning and feed rollers as shown in Fig. 10. However conveyers have been used heretofore for feeding plates to and through branning boxes and chambers.

The cleaning rollers of the branning machine may be of bristle, horse-hair, felt, sheepskin, or other suitable material and preferably the rollers of any pair are driven at different speeds, so that they clean one another when no plate intervenes. It may also in some cases be found advantageous to employ endless bands carried by pairs of rollers and covered with bristles, sheepskin or other suitable material in place of single rollers or brushes. Fliers, or wire or other brushes or other suitable means may be provided and arranged so as to scour the cleaning rollers, and scrapers or brushes may also be provided to keep the feed rollers free from cleaning material, these scrapers being advantageously arranged in the form of guards w to protect the feed rollers as shown in Fig. 1.

When the feed rollers comprise rubber or like disks, the disks of a pair of rollers may be arranged so as not to come opposite one another so as to aid in cleaning such rollers.

The bearings of the rollers are advantageously dustproof and adjustable. For example as shown in Fig. 7 springs x may be arranged to constantly tend to force the rollers of a pair apart, and adjusting screws or bolts y being then provided for regulating the relative positions of these rollers, the spindles of which are journaled in blocks z moving in guides 1. Alternatively the casing containing the cleaning material and inclosing the agitator or distributer and brushes may be constructed as shown in Fig. 8 so that the spindles project through same into bearings 2 arranged on the outside of the chamber, thus keeping the bearings clear of dust.

In place of a revolving or mechanical agitator in the branning chamber, perforated or slotted pipes or nozzle discharges 4, as shown in Fig. 9 may be used and the bran or other material forced through the perforations of such pipes or through the nozzles by means of a blower or fan 5 the perforations or nozzles being so formed or arranged in every case as to disperse the material in the atmosphere of the chamber as described above. The blower or fan may suck bran from the bottom of the branning chamber and deliver the same to the upper part thereof. A single fan or blower may be employed for circulating the bran in several chambers.

If desired, more than one agitator or distributer may be provided in the branning chamber and where two or more agitators or distributers are employed these may be arranged, as shown in Fig. 4, to throw the bran or the like over the front and back ends of each plate u as it moves down the chute d and thus supply a greater amount of cleaning material to the plate.

A further alternative consists in the employment of pneumatic jet apparatus, or pneumatic conveyers. Such jet apparatus may be of the form shown in Fig. 5 and comprise the ejector nozzle arrangement r for picking up the bran from the floor of the chamber a and conveying it through a conduit s to a suitable delivery nozzle t for delivering the bran or cleaning material into, and dispersing it within, the chamber a as shown. In the case of blower, fan or pneumatic apparatus the discharge pipes within the chamber may be arranged both above and below the plate and not only underneath as shown in Fig. 5.

In any arrangement according to this invention the plates are passed through an atmosphere laden with dust or particles. This necessarily implies dispersal of dust or particles into an inclosed space, as distinct from a concentrated jet of dust or particles directed on to the plate at one point only and it also necessarily implies dust or particles in flight or movement and borne on a fluid medium as distinct from a mass of bran or dust in which latter case the particles rest upon and are supported by one another, the lowermost particles resting upon a rigid bottom or support.

In all cases provision may be made for rendering the interior of the branner easily accessible and this may consist of a hinged lid or cover of ordinary form as shown in Fig. 1 or the top of the casing may have a cloth covering which may be arranged to roll up after the manner of a roller blind.

When using the machine for thick or especially heavy coated plates a fan blast may if necessary be arranged in a convenient position so as to cool the plates prior to branning.

If desired, hoppers may be arranged to feed the cleaning rollers with bran or cleaning material. Also it may be arranged for these hoppers or other suitable receptacles to be automatically fed with bran or cleaning material. For example the hopper v shown in Fig. 1 may be provided and will be so fed and the agitator or distributer will feed the hopper to a greater extent during the intervals elapsing between the exit of one plate from the branning chamber and the entry of the next plate. Obviously, if desired, the plates may be passed successively through say two branning chambers containing identical or dis-similar agitating and cleaning arrangements.

While brush or other feed rollers may in special circumstances be employed at the

entrance to the inclosed chamber it is particularly desirable that they be omitted wherever possible so as to thoroughly coat the plate all over with cleaning material prior to passing between any form of cleaning or feed rolls. I do not confine myself to the form of chamber shown.

I claim:—

1. A machine for treating coated metal plates with bran or dust comprising a closed chamber, means thereon to permit entry and exit of plates and to prevent escape of dust, a bran or dust delivery device adapted to disperse said dust into the atmosphere of the chamber, and means to support plates in the dust laden atmosphere whereby the dust becomes attached to the surfaces of the plates.

2. A machine for treating coated metal plates with bran or dust comprising, a closed chamber, means thereon to permit entry and exit of plates and to prevent escape of dust, a bran or dust delivery device adapted to disperse particles of bran or dust into the atmosphere of the chamber in order that said particles may become attached to the surfaces of inserted plates, and conveying means for traveling the plates through the chamber.

3. A machine for treating coated metal plates with bran or dust comprising, a closed chamber, a delivery device adapted to disperse particles of material into the chamber, said particles becoming attached to the surfaces of inserted plates, a conveyer for feeding the plates through the chamber, a wiping mechanism for removing adhering particles from the plates, and means on said chamber to permit entry and exit of plates and to prevent escape of dust.

4. A machine for treating coated metal plates with bran or dust comprising, a closed chamber, a rotary distributer located therein and adapted to disperse particles of dusting material within the chamber which particles become attached to inserted plates, a traveling conveyer adapted to feed the plates through the chamber, a wiping mechanism operative upon the plates and arranged toward the delivery side of the chamber and means on said chamber to permit entry and exit of plates and to prevent escape of dust.

5. A machine for treating coated metal plates with bran or dust comprising, a closed chamber, dust distributing means adapted to produce a dusty atmosphere within said chamber, a conveyer for feeding the plates through the chamber, a series of revolving brushes located near the exit end of the chamber and adapted to remove the adhering particles from the plates and means on said chamber to permit entry and exit of plates and to prevent escape of dust.

6. A machine for treating coated metal plates with bran or dust comprising, a closed chamber, means thereon to permit entry and exit of plates and to prevent escape of dust, dust distributing means adapted to produce a dusty atmosphere within said chamber, a conveyer for feeding the plates through the chamber, a series of brushes located near the point of exit of the plates, and driving means operative upon said brushes to drive them at speeds which increase from entrance to exit.

7. A machine for treating coated metal plates with bran or dust comprising, a closed chamber, entrance and exit openings in the chamber, self closing means to prevent escape of dust through said openings while permitting of entry and exit of said plates, a dust raising device in said chamber, a conveyer operative to feed plates through said chamber, and a revolving brush device operative upon said plates to remove adhering particles.

8. A machine for treating coated metal plates with bran or dust comprising, a closed chamber, a movable cover on said chamber, entrance and exit openings in the chamber, means to prevent escape of dust through said openings while permitting of entry and exit of said plates, a dust raising device, a conveyer operative to feed plates through said chamber, and a rotating wiper device operative upon said plates to remove adhering particles.

9. A machine for treating coated metal plates with bran or dust comprising, a closed chamber, means thereon to permit entry and exit of plates and to prevent escape of dust, delivery means adapted to deliver and diffuse dust into the atmosphere of said chamber, and timed conveyer means adapted to pass plates through said chamber at such a rate as will allow of a sufficient deposition of particles to take place upon the coated surfaces of said plates.

10. A machine for treating coated metal plates with bran or dust comprising, a closed chamber, a portion of which is adapted to serve as a container for bran or dust, a plate support arranged in said chamber above said container, an agitating device in the latter adapted to throw particles or dust into the atmosphere of said chamber and means on said chamber to permit entry and exit of plates and to prevent escape of dust.

11. A machine for treating coated metal plates with bran or dust comprising, a closed chamber, means thereon to permit entry and exit of plates and to prevent escape of dust, a plurality of agitating devices arranged near the bottom of said chamber, and a plate support arranged in the latter above said agitators.

12. A machine for treating coated metal plates with bran or dust comprising, a closed chamber, an entrance thereto, an exit therefrom, means associated with said entrance

and with said exit to prevent escape of dust from said chamber while permitting of entry and exit of said plates, dust raising means adapted to disperse dust into the atmosphere of said chamber, an entering slide-way for said plates, and delivery mechanism adapted to remove plates from said slide-way and deliver them to said exit.

13. A machine for treating coated metal plates with bran or dust comprising, a closed chamber having entrance and exit openings, means on said openings to prevent escape of dust while permitting of entry and exit of said plates, dust raising means adapted to lift dust from the floor of said chamber and disperse it into the atmosphere thereof, an entering slide-way declining from said entrance and a combined delivery and cleaning mechanism adapted to remove plates from said slide-way and deliver them in a cleaned condition to said exit opening.

14. A machine for treating coated metal plates with bran or dust comprising a closed chamber formed with a dust well or receptacle, an agitator in said well, means for feeding plates through said chamber above said agitator, and means on said chamber to permit entry and exit of plates and to prevent escape of dust.

15. A machine for treating coated metal plates with bran or dust comprising, a closed chamber formed with a dust well or receptacle, a plate support above said well, dust raising means adapted to lift dust from said well and disperse it within said chamber, and means on said chamber to permit entry and exit of plates and to prevent escape of dust.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."