E. K. NORTON.

SHEET FEEDING MECHANISM FOR TINNING POTS.

APPLICATION FILED JAN. 12, 1911.

Patented Dec. 3, 1912.

1,045,878.

3 SHEETS—SHEET 1.

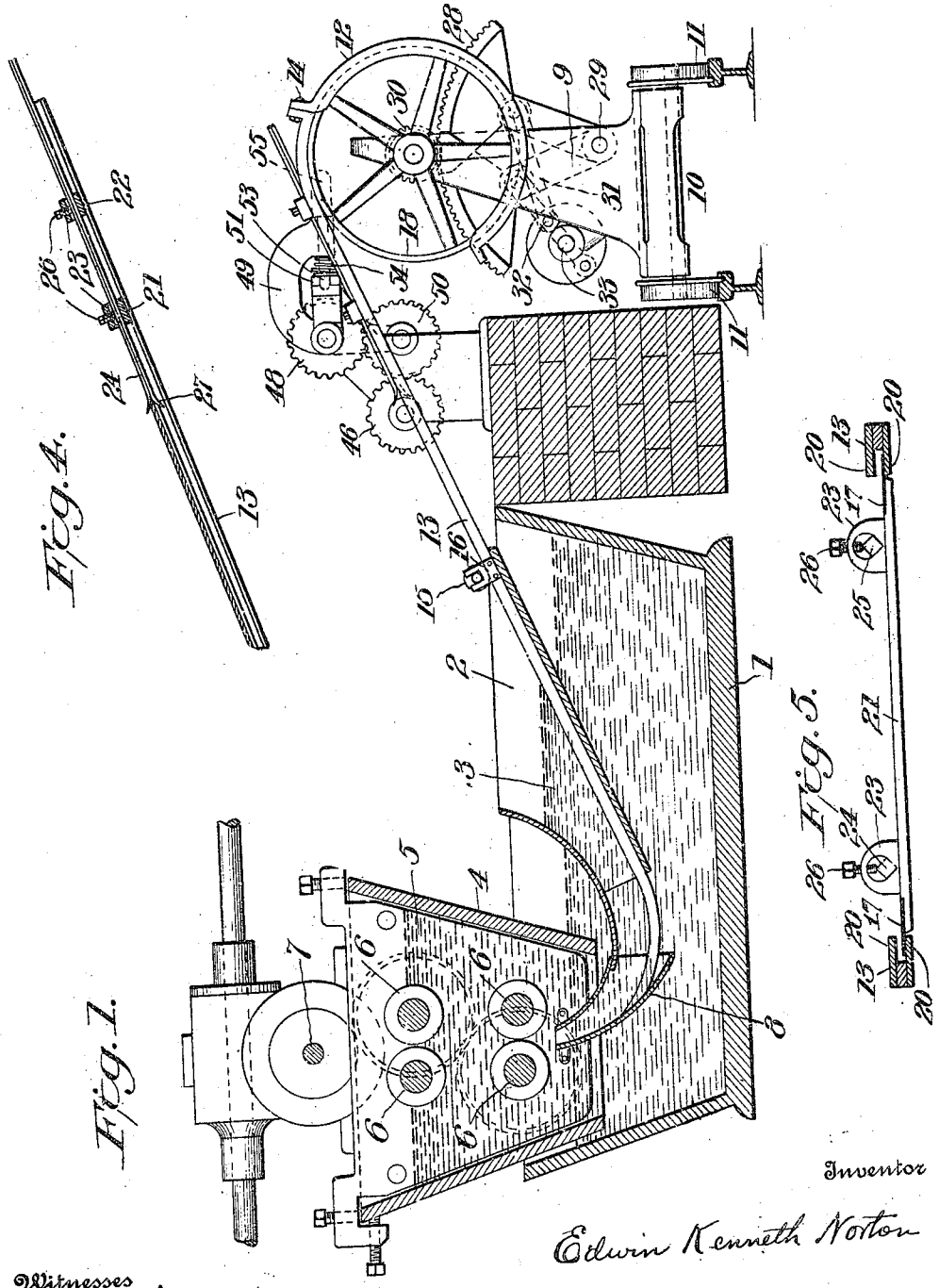

Fig. 1.

Fig. 4.

Fig. 5.

Witnesses

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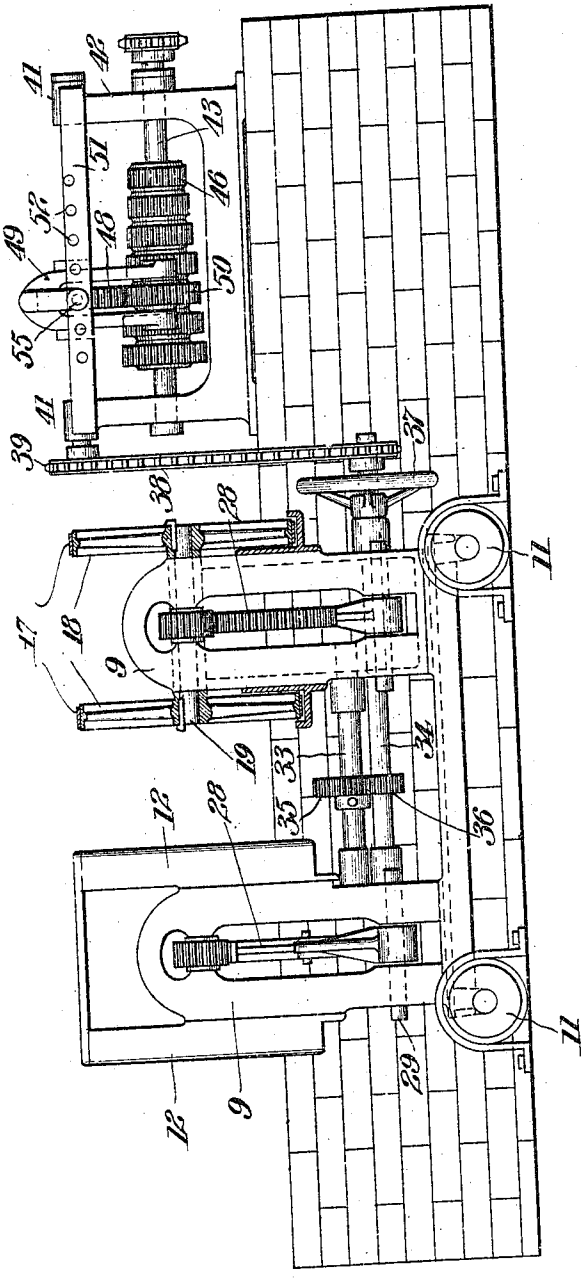

Fig. 2.

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3 SHEETS—SHEET 3.

Fig. 6.

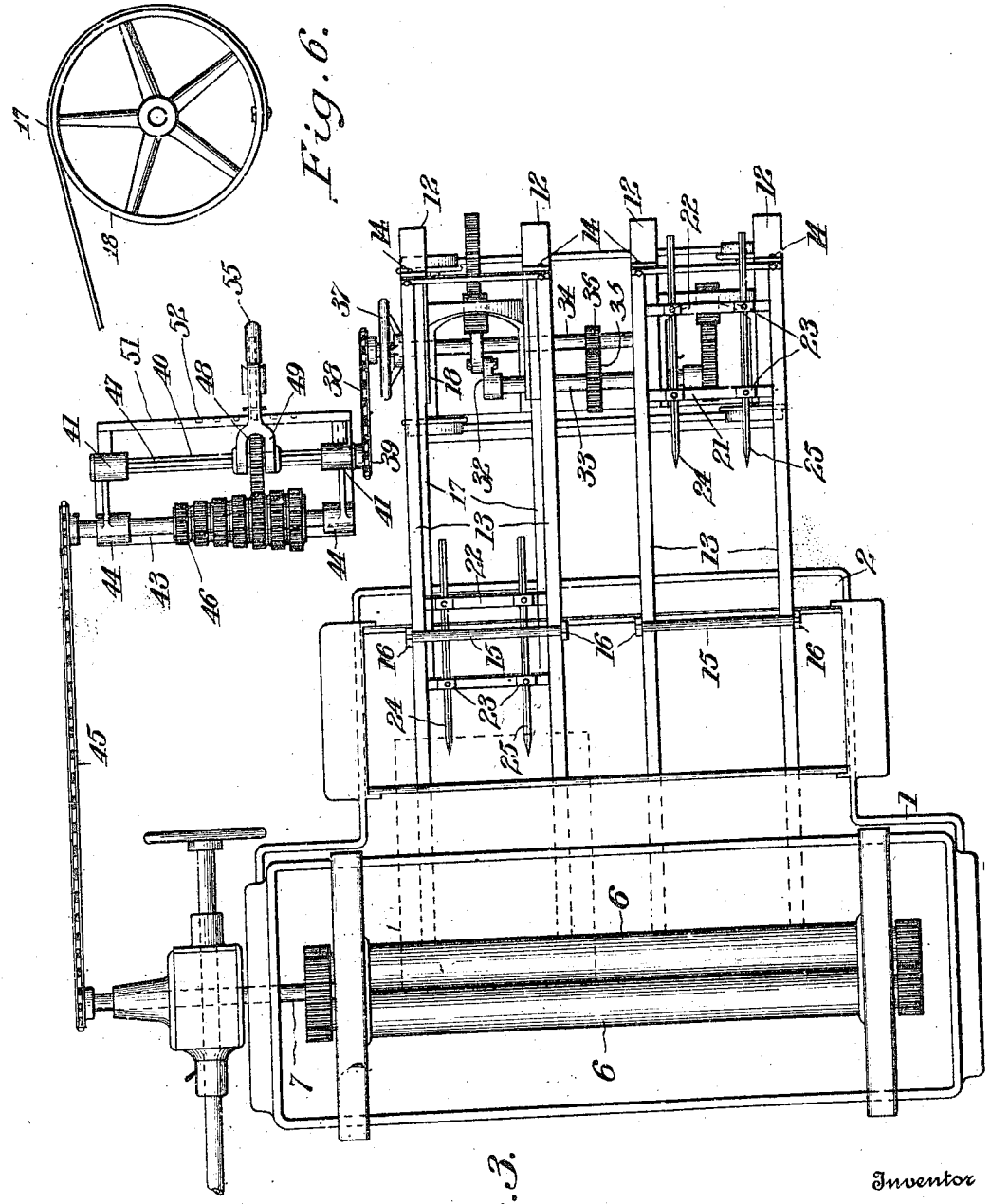

Fig. 3.

Witnesses

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UNITED STATES PATENT OFFICE.

EDWIN KENNETH NORTON, OF NEW YORK, N. Y.

SHEET-FEEDING MECHANISM FOR TINNING-POTS.

1,045,878. Specification of Letters Patent. Patented Dec. 3, 1912.

Application filed January 12, 1911. Serial No. 602,339.

To all whom it may concern:

Be it known that I, EDWIN KENNETH NORTON, a citizen of the United States, residing at New York, in the county of New York, State of New York, have invented certain new and useful Improvements in Sheet-Feeding Mechanism for Tinning-Pots, of which the following is a description, reference being had to the accompanying drawing and to the letters and figures of reference marked thereon.

My invention relates to new and useful improvements in devices for feeding sheets of steel in regular and uniform succession to a tinning pot, and more especially to devices of the character shown and described in the patent granted to Edwin Norton and myself December 27th, 1910, No. 979,549.

In feeding sheets of steel to a tinning pot, it is essential to the most efficient operation of the tinning machine that the sheets of steel should be fed so that one will follow the other with only a small clearance space between the sheets, so that the oil-finishing rolls are kept constantly filled with the sheets of steel. Otherwise, when the oil-finishing rolls run in contact with one another, said rolls become covered with patches of oil and scruff, which will be transferred to the plates following, thus causing "wasters" or imperfectly coated sheets, which must be sold at a reduced price, causing great loss.

In the machine above referred to, sheets of given width may be properly fed and the oil-finishing rolls kept filled with the sheets of steel, so that only first class work is turned out by the machine.

An object of the present invention is to provide means whereby the feeding mechanism may be readily adjusted so as to feed sheets of varying widths at the proper speed or number per minute, so as to keep the oil-finishing rolls filled with the sheets of steel.

A further object of the invention is to provide means for changing the working position of the feeding-in pusher, so that when sheets of different sizes are fed to the tinning pot they may be carried forward until properly gripped by the oil-finishing rolls, so as to be carried through and delivered from the machine.

A still further object of the invention is to provide guides for temporarily supporting the sheets of steel which are to be tinned, and a pusher for pushing the sheets of stee which are to be tinned, which guides anc pusher are so disposed relative to the supporting framework and operating mecha: nism that there is a free space provided above the guides to allow the operator standing in front of the machine to readily place the sheets of steel on said guides.

These and other objects will in part be obvious, and will in part be hereinafter more fully described.

In the drawings which show by way of illustration one embodiment of the invention,—Figure 1 is a vertical sectional view through a tinning pot, showing my improved feeding mechanism in side elevation; Fig. 2 is a partial front view and partial sectional view of my improved feeding mechanism; Fig. 3 is a top plan view of the same; Fig. 4 is a sectional detail, showing the manner of temporarily holding the sheets on the guides, and also the manner of adjusting the arms on the pusher which engage the metal sheets; and Fig. 5 is a transverse sectional view through the guides, showing the supporting bars connecting the flexible bands and the pusher arms mounted on the bars. Fig. 6 is a detail showing the connection of the flexible band to the wheel for operating the same.

The tinning machine, as herein shown, is merely for the purpose of illustrating my present improvements, and it will be understood that my improved sheet-feeding mechanism may be used in connection with any of the well known types of tinning machines now in common use; either single or duplex; or those in which two or more sheets are fed alternately through oil-finishing rolls of a suitable length to operate upon them side by side.

The tinning machine herein illustrated, consists of a tinning pot 1 in which the sheets are brought into coating contact with the molten tin. A flux box 2 extends down into the molten tin and the acid or flux 3 rests on the molten tin. An oil pot 4 is also secured to the tin pot in any desired way, and extends downwardly into the molten tin, as clearly shown in Fig. 1 of the drawings. Within this oil pot is placed the oil 5.

Running in the oil pot are oil-finishing rolls 6, 6, which as herein shown are arranged in two pairs. These oil rolls are

driven from a main shaft 7 in the well known way in this type of machine. The flux box is extended and curved as at 8, so as to assist in guiding the sheets of steel through the flux into and out of the molten tin, and between the oil-finishing rolls. These parts are of the usual construction, and will not need further description, in order that a clear understanding may be had of my sheet-feeding mechanism.

The sheet-feeding mechanism consists of a main frame 9, which, as herein shown, is mounted on a suitable truck 10, supported by wheels 11 running on suitable rails. I have shown herein my sheet-feeding mechanism as consisting of two feeding devices which work alternately, and I have, therefore, provided a frame 9 at each end of the truck 10. Each of said frames consists of two parallel standards with a connecting yoke at the top thereof. At each side of the frame 9 is located curved brackets 12, which are bolted to the side standards of the frame 9 and extend upwardly above the same.

Guides 13 on which the sheets of steel rest and are moved, are secured at their upper ends to the curved brackets 12 by suitable bolts 14, and said guides extend downwardly and are adapted to be inserted in the tinning pot, as clearly shown in Fig. 1. These guides, as herein shown, rest on the flux box and are curved at their lower ends, so that the sheet resting thereon will be carried down through the flux and the molten tin and then directed upwardly, so as to pass through the oil-finishing rolls. The sheets of steel are temporarily held on the guides by weighted rollers 15. These rollers are journaled in brackets 16, so that they may move bodily vertically, and said rollers normally rest on the guides which support the sheets of steel. The sheet of steel to be coated is placed with its lower edge against said rollers 15, and it will readily be seen that the sheet may be easily pushed underneath the rollers, which will thus roll along the upper face of the sheets and allow said sheets to be moved along the guides into the tinning pot.

As a means for pushing the sheets along the guides, I have provided a flexible pusher which is similar to that shown in the patent above referred to. Said pusher consists of flexible bands 17, which are guided in grooves formed in the sheet guides 13. These flexible bands at their upper ends are secured to pusher wheels 18, by suitable bolts and said wheels are keyed to a cross shaft 19, mounted in the frame 9. Said wheels 18 are located within the brackets 12, which, as above noted, are curved, and these brackets conform to the curvature of the wheel, and serve to house the same and prevent the flexible band from leaving the flange of the wheel. The curved brackets 12 also, as above noted, serve as a means for supporting the upper ends of the guides 13.

The guides 13 consist of spaced members 20, and the flexible pushers 13 are so disposed that one edge thereof runs between said spaced members 20, while the sheets of steel to be coated with tin rest on the upper member and are moved along the same. The flexible bands 17 are connected by two spaced cross bars 21 and 22 near the lower ends thereof. On each cross bar near the ends thereof, are mounted two brackets 23. An arm 24 extends through one pair of brackets, and an arm 25 extends through the other pair of brackets. These arms may be secured in adjusted position by set screws 26. The outer end of each of these arms is forked as at 27. One member of the fork 27 extends above the plane of the guides 13, while the other member of the fork extends below said plane. It will thus be seen that as the flexible bands are moved back and forth in the guides 13, the pusher arms 24 and 25 will engage the sheets of steel on the supporting guides 13, by means of the forked ends 27 thereof, and the sheets will be pushed underneath the temporarily supporting rollers, and into and through the tin pot, in the manner fully set forth in the patent above referred to.

As a means for operating the pusher wheels 18, I have provided a segmental gear 28. Said gear 28 is mounted, as herein shown, on a bearing pin 29, which is supported by the frame 9 of the machine. The segmental gear 28 meshes with a pinion 30 keyed on the shaft 19 which supports the pusher wheels 18. The segmental gear is oscillated by a link 13. One end of this link is pivotally connected to the supporting arm for said segmental gear, and the other end of the link is pivoted to a crank arm 32 on a shaft 33, which shaft is journaled in bearings in the frames 9, 9.

The crank arm 32 for operating the segmental gear at one end of the machine, is oppositely disposed from the crank arm operating the segmental gear at the other end of the machine, so that as the shaft 33 is rotated, the segmental gears will be oscillated in opposite directions, and, therefore, while one pusher is carrying a sheet through the tinning pot into the oil-finishing rolls, the other pusher is being retracted to receive a sheet. The shaft 33 is rotated by a shaft 34, which is connected thereto by suitable pinions 35 and 36, (see Fig. 3). Said shaft 34 is also mounted in suitable bearings in the frames 9. Said shaft 34 is provided with a hand wheel 37, so that the machine may be turned when desired by hand.

The shaft 34 is operated, as herein shown, through a sprocket chain connection 38 with a sprocket wheel 39, mounted on the end of

a shaft 40, which is journaled in bearings 41 carried by a frame 42. This frame 42 as herein shown is separate and independent from the truck 10, and supports the variable speed mechanism for giving different speeds to the pushers, so that sheets of different sizes may be fed to the tinning pot in proper timing, relative to the speed of the oil-finishing rolls. A shaft 43 is also journaled in bearings 44 carried by the frame 42. The shaft 43 is connected by a sprocket chain 45 with the main shaft 7, as clearly shown in Fig. 3. On the shaft 43 are keyed a series of gears 46, which are of different diameters. The shaft 40 carries a spline 47, and the gear wheel 48 is mounted on the shaft 40, and is free to slide along the spline 47 thereon. Said gear wheel 48 is located between the arms of a yoke-shaped bracket 49. The arms of the yoke-shaped bracket 49 extend downwardly, and a pinion or gear wheel 50 is journaled in the lower end of said arms and is in mesh with the gear wheel 48. The bracket 49 may be swung about the shaft 40 as an axis, and the gear wheel 50 brought into mesh with one of the gear wheels 46.

The frame 42 carries a cross bar 51, which is provided with a series of apertures 52. The yoke-shaped bracket 49 carries a locking pin 53, which is adapted to engage one of the apertures 52 and thus lock the bracket with the gear 50 in mesh with one of the gears 46. The pin not only holds the bracket with the gears in mesh, but will also prevent the bracket from sliding longitudinally on the shaft 40. Said pin, as herein shown, is normally spring pressed into engagement with the apertures by a spring and may be readily withdrawn from the apertures by the handle 55.

The operation of my machine will be obvious from the above description. The sheets of steel to be coated with tin are laid by the operator on the guides 13 against the rolls 15. The bracket 49 is released by pulling the pin 53 from the aperture 52 in the bar 51 and the gear 48 slid laterally on the shaft 40 until brought into proper relation with the gear 46 on the shaft 43, which will give the proper speed to the pusher for feeding the sheets of the length which it is desired to feed to the tinning pot. The gear 50 is then thrown into mesh with the gear 46, and the bracket locked in this position. As the main shaft 7 of the tinning pot rotates, the shaft 43 will rotate, and through the sprocket chain connection 38 and shaft 34 impart a rotation to the shaft 33. This shaft will oscillate the segmental gears, which in turn will reciprocate the pushers on the supporting guides 13. First one pusher and then the other will move forward, bringing the forked arms into contact with the edge of the sheet of steel, and thus convey the same underneath the temporary holding rollers down into the molten tin and through the molten tin to a point where it will be gripped by the oil-finishing roll and carried from the pushers and delivered from the machine. When different sized sheets are to be fed to the tinning pot, the bracket 49 is adjusted so as to bring the gear 50 into mesh with the proper gear 46 on the shaft 43.

By the above mechanism, it will be seen that I am able to feed sheets of varying sizes at such a speed as to keep the oil-finishing rollers constantly filled with the sheets of steel, and thus regardless of the size of the sheets, I have constructed a sheet-feeding mechanism which will cause the tinning pot to turn out sheets which are comparatively free from "wasters".

In order that the sheets of different widths may be carried forward a sufficient distance to be gripped by the oil-finishing rolls, I have provided means for varying the working position or reciprocating position of the engaging ends of the pusher. As herein shown, I may accomplish this by loosening the locking set screws 26 and shifting the position of the arms 24 and 25 relative to the flexible bands which reciprocate said arms. By moving these arms outward, I am able to carry a narrower sheet forward until it is gripped by the oil-finishing rolls, while by moving the arms in the opposite direction, I am able to regulate the reciprocation of the pusher so as to avoid any possible buckling of the sheet by the reason of any variation in the speed of travel of the pusher, and the surface speed of the oil finishing rolls. As another means for varying the working position of the engaging end of the pusher, I may remove the supporting pin 29 for the segmental gear 28, thus dropping the segmental gear out of mesh with the pinion 30, so that the pinion 30 may be turned and the pusher properly positioned, after which the segmental gear will be again brought into mesh with the pinion and the pin 29 replaced. By this means I am able to change the entire working position of the pusher and approximately adapt the same for any size sheet of steel. It will also be seen that by my structure wherein the supporting frames 9 and the curved brackets 12 which support the curved guides 13 are below the upper ends of the guides, and all the operating mechanism is also below the upper ends of the guides, I have formed a machine wherein the operator may stand in front of the same and place the sheets of steel on the guides. In other words, this construction of frame and location of operating parts is such that a free space is provided above the guides which allows for the easy feeding of the machine.

As above noted, the feeding machine is mounted on wheels which are supported on

rails. Any suitable means may be provided for holding the machine in proper position relative to the tinning pot. As herein illustrated, I have provided straps which encircle the wheels and hold the same from movement on the rails. By the removing of said straps and the removal of the sprocket chain for driving the shaft of the feeding mechanism, I am able to move the entire feeding mechanism to one side, so that free access may be had for the cleaning or repairing of the tinning machine.

It will be obvious that minor changes in the details of construction may be made, without departing from the spirit of my invention, as 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. A device for feeding metal plates to a tinning machine including in combination, guides on which the plates rest and are moved, a pusher for engaging and moving the plates on the guides, means for reciprocating the pusher, and means whereby the periodicity of the pusher may be changed for feeding different size plates, so that the plates of one size may be kept substantially the same distance apart as the plates of another size.

2. A device for feeding metal plates to a tinning machine, including in combination, guides on which the plates rest and are moved, a pusher for engaging and moving the plates on the guides, means for giving the pusher reciprocations of a constant length, and means whereby the reciprocating position of the work-engaging end of the pusher may be changed for different size plates, whereby plates of varying sizes may be fed into gripping contact by the rollers of the tinning machine.

3. A device for feeding metal plates to a tinning machine including in combination, guides on which the plates rest and are moved, a pusher for engaging and moving the plates on the guides, means for giving said pusher reciprocations of a constant length, whereby sheets of varying sizes are brought into gripping contact by the rollers of the tinning machine, and means whereby the periodicity of the pusher may be changed for feeding different size plates, so that the plates of one size may be spaced substantially the same as the plates of another size.

4. A device for feeding metal plates to a tinning machine, including in combination, guides on which the plates rest and are moved, a pusher for engaging and moving the plates on the guides, means for reciprocating said pusher, including a segmental gear, means for oscillating said gear, and means whereby the speed of travel of said segmental gear may be changed whereby the periodicity of the pusher may be changed for feeding different size plates, so that the plates of one size may be kept substantially the same distance apart as the plates of another size.

5. A device for feeding metal plates to a tinning machine, including in combination, guides on which the plates rest and are moved, rollers for temporarily holding said sheets on said guides, means for supporting said rollers, whereby they may yield vertically, a pusher for engaging said plates and moving the same beneath said rollers, and means for reciprocating said pusher.

6. A device for feeding metal plates to a tinning machine, including in combination, guides on which the plates rest and are moved, a pusher for moving the plates on said guides, said pusher including flexible members, bars connected to the free ends of said flexible members, brackets supported by said bars, and arms adjustably mounted in said brackets, and having means for engaging said plates.

7. A device for feeding metal plates to a tinning machine, including in combination, guides on which the plates rest and are moved, a pusher for moving the plates on said guides, said pusher including flexible members, bars connected to the free ends of said flexible members, brackets supported by said bars, and arms adjustably mounted in said brackets, and having a forked end, one member of which extends above the plane of said guides for engaging said plates.

8. A device for feeding metal plates to a tinning machine, including in combination, guides on which the plates rest and are moved, a pusher for moving said plates on said guides, means for operating said pusher including a plurality of gears of different diameters, and an adjustable gear adapted to be brought into coöperation with any one of said first named gears, whereby the periodicity of the pusher may be changed for feeding different size plates, so that plates of one size may be kept substantially the same distance apart as plates of another size.

9. A device for feeding metal plates to a tinning machine, including in combination, guides on which the plates rest and are moved, a pusher for moving said plates on said guides, means for operating said pusher including a plurality of gears of different diameters, an adjustable gear adapted to be brought into coöperation with any one of said first named gears, whereby the periodicity of the pusher may be changed for feeding different size plates, so that plates of one size may be kept substantially the same distance apart as plates of another size, and means for shifting said adjustable gear and for locking the same in adjusted position.

10. A device for feeding plates to a tinning machine, including in combination,

guides on which the plates rest and are moved, a pusher, means for reciprocating said pusher including a shaft, a gear splined on said shaft and movable longitudinally thereof, a bracket fulcrumed on said shaft and movable with said gear, a second gear carried by said bracket and meshing with said first named gear, a second shaft, a plurality of gears of different diameters mounted on said second shaft, and means whereby said bracket may be shifted so as to bring said second gear into mesh with any one of said gears on said second shaft whereby the periodicity of the pusher may be changed for feeding different size plates, so that plates of one size may be kept substantially the same distance apart as plates of another size.

11. A device for feeding plates to a tinning machine, including in combination, guides on which the plates rest and are moved, a pusher, means for reciprocating said pusher including a shaft, a gear splined on said shaft and movable longitudinally thereof, a bracket fulcrumed on said shaft and movable with said gear, a second gear carried by said bracket and meshing with said first named gear, a second shaft, a plurality of gears of different diameters mounted on said second shaft, means whereby said bracket may be shifted so as to bring said second gear into mesh with any one of said gears on said second shaft, and means for locking said bracket with said second gear in mesh with one of the gears on said second shaft whereby the periodicity of the pusher may be changed for feeding different size plates, so that plates of one size may be kept substantially the same distance apart as plates of another size.

12. A device for feeding plates to a tinning machine, including in combination, guides on which the plates rest and are moved, a pusher, means for reciprocating said pusher including a shaft, a gear splined on said shaft and movable longitudinally thereof, a bracket fulcrumed on said shaft and movable with said gear, a second gear carried by said bracket and meshing with said first named gear, a second shaft, a plurality of gears of different diameters mounted on said second shaft, means whereby said bracket may be shifted so as to bring said second gear into mesh with any one of said gears on said second shaft, means for locking said bracket with said second gear in mesh with one of the gears on said second shaft, said locking means including a spring-pressed member and a handle for releasing said spring pressed member, said handle also serving as a means for shifting said bracket whereby the periodicity of the pusher may be changed for feeding different size plates, so that plates of one size may be kept substantially the same distance apart as plates of another size.

13. A device for feeding metal plates to a tinning machine, including in combination, guides on which the plates rest and are moved, a pusher for moving said plates including flexible bands, wheels to which said bands are connected, a shaft on which said wheels are supported, a pinion carried by said shaft, a segmental gear engaging said pinion, a shaft carrying a crank, a link connecting said crank to said segmental gear, and means for rotating said shaft.

14. A device for feeding metal plates to a tinning machine, including in combination, a plurality of sets of guides on which the plates rest and are moved, a pusher for each set of guides including flexible bands, wheels to which said bands are attached, a shaft on which the wheels are mounted, a pinion on each shaft, a segmental gear engaging each pinion, a shaft having oppositely disposed cranks, and links connecting each of said cranks to the respective segmental gears.

15. A device for feeding metal plates to a tinning machine including in combination, guides on which the plates rest and are moved, flexible pushers for moving the plates on said guides, wheels to the peripheries of which said flexible pushers are concerned, and curved brackets located adjacent the periphery of each wheel for holding said flexible pushers on said wheel.

16. The combination of a tinning machine including a tinning pot and oil-finishing rolls, of means for feeding plates to said tinning-pot, including guides on which the plates rest and are moved, pushers for moving the plates on said guides, mechanism for reciprocating said pushers, and means whereby said mechanism may be adjusted so that plates of different sizes may be fed into gripping contact with the oil-finishing rolls, and the distance between successive plates kept substantially constant.

In testimony whereof I affix my signature, in presence of two witnesses.

EDWIN KENNETH NORTON.

Witnesses:

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J. V. CLARK.