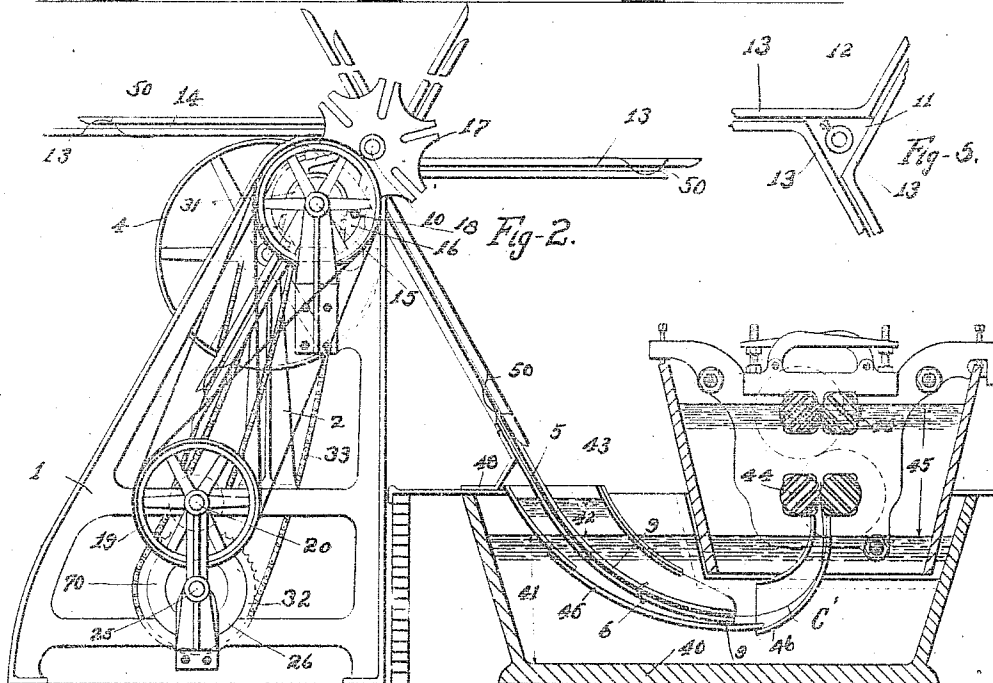
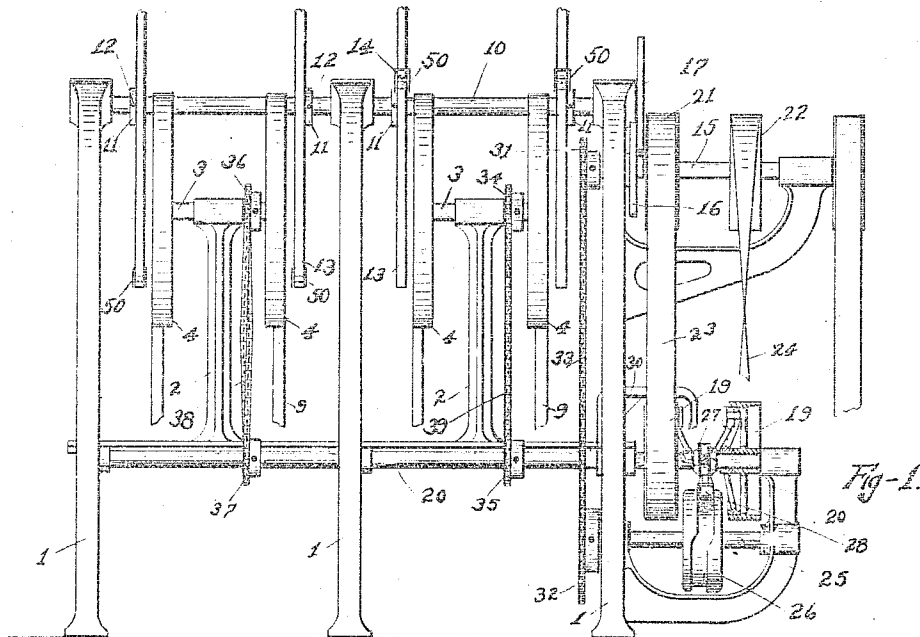


E. & E. K. NORTON.
SHEET FEEDING MECHANISM.
APPLICATION FILED DEC. 30, 1909.

979,549.

Patented Dec. 27, 1910.

2 SHEETS—SHEET 1.



WITNESSES:
H. J. Bowne

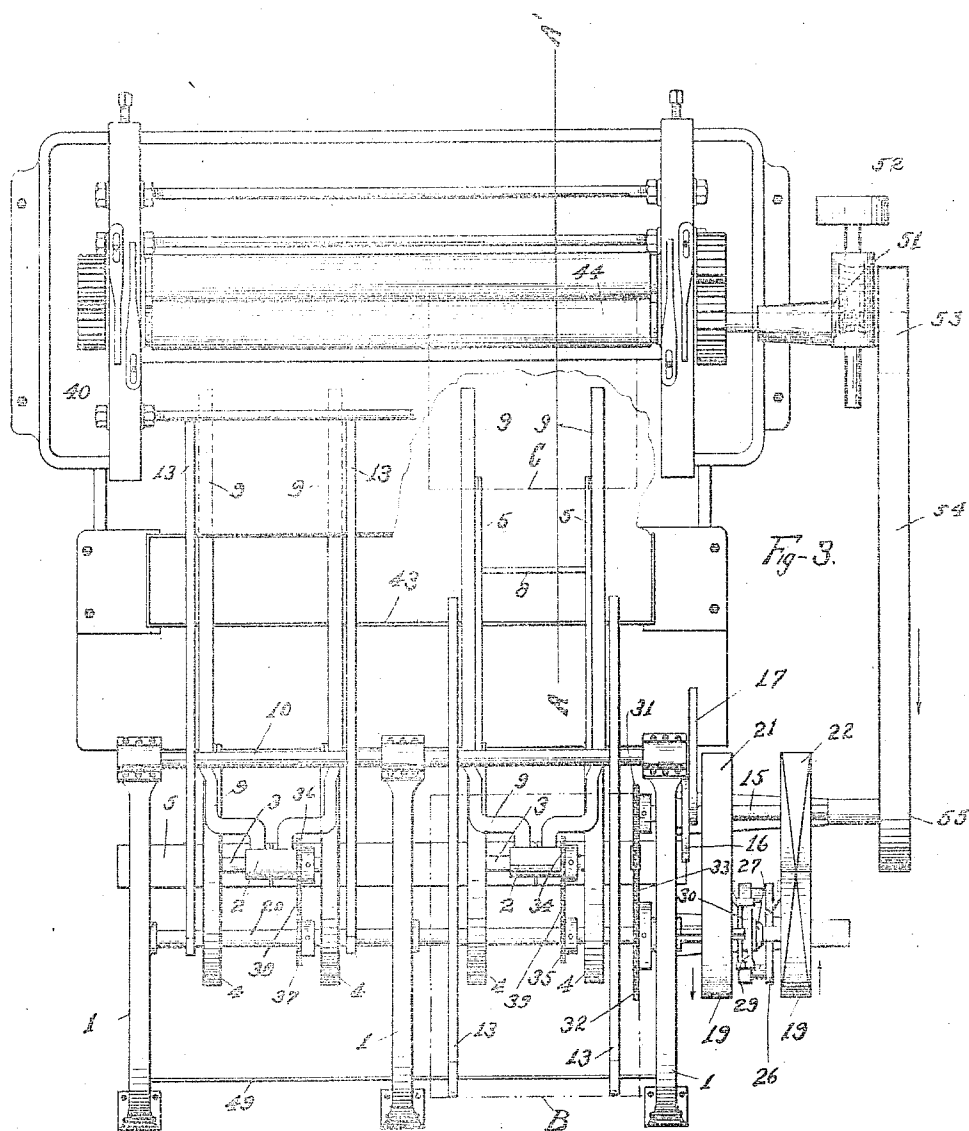
INVENTORS
Edwin Norton,
Edwin Kenneth Norton.
BY
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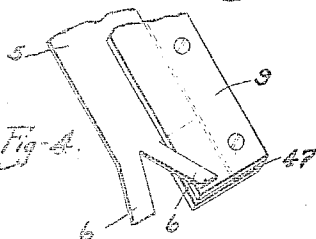
7 SHEETS—SHEET 3.



WITNESSES:

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Fig. 4.



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UNITED STATES PATENT OFFICE.

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

SHEET-FEEDING MECHANISM.

979,549.

Specification of Letters Patent.

Patented Dec. 27, 1910.

Application filed December 30, 1909. Serial No. 535,629.

To all whom it may concern:

Be it known that we, EDWIN NORTON and EDWIN KENNETH NORTON, citizens of the United States, residing at New York city, in the county of New York and State of New York, have invented new and useful Improvements in Sheet-Feeding Mechanism, of which the following is a specification.

Our invention consists in a new apparatus for automatically delivering sheets of steel in regular and uniform succession to a tinning pot, whereby the sheets are pushed through the flux box down into the molten tin, thence through the molten tin upward into the bite of the oil finishing rolls, which are located in the oil pot above the molten tin.

By means of our invention the skilled tin man now employed may be dispensed with and the output of each tinning machine may be greatly increased; by reason of the continuous and uniform supply of sheets, the oil finishing rolls will be kept in proper condition for finishing the sheets, whereby the plates will be more uniformly coated and their quality much improved.

Heretofore it has been proposed to provide a tin pot with one or more mechanically operated swinging pushers for pushing the sheets through the molten metal, after they were placed in position by the operators; but this device was not successful. There has also been heretofore used to some extent, a tin pot having two or more pairs of rolls and their gear wheels revolving in the molten tin, to convey the sheets of steel through the tin, the sheets being dropped into the feed hopper of the tin pot, from a fluxing machine located above it. These were found unsatisfactory because of the fact that the rolls and gears running in the molten tin were too complicated and expensive, and the use of such machines has also been abandoned. And so far as we know, all tinning machines are now fed by men, who place the sheets in position, and guide them with one hand, while by means of a forked stick, held in the other hand, they push the wet sheets down through the hot muriatic acid flux and the molten tin, into the bite of the oil finishing rolls, located in the open bottom palm oil box (at the back of the machine). As the tin man is compelled to stand almost directly over the fumes or "stife," as it is called by the work-

men, which rise in dense clouds from the heated flux, as each wet sheet is plunged into it, it is practically impossible for them to continue constantly feeding the machine, as they must stop frequently to get fresh air; and as a result of these conditions, it has always been impossible to secure the maximum possible output from the tinning machines. When the supply of sheets is thus cut off from the tinned oil finishing rolls, they frequently get "out of condition;" i. e., covered with patches of oil, and scruff, which, coming in contact with the plates which follow, cause "wasters," or imperfectly coated sheets, which must be sold at a reduced price, causing great loss. A continuous supply of sheets not only produces many more boxes of tin plate in a day, but reduces the losses from wasters mentioned.

These serious defects, as well as others that will be apparent to those skilled in the art to which our invention relates, are entirely done away with by the use of our invention, which consists in the combination with a tin pot and oil finishing mechanism, of means whereby the pickled sheets of steel (which are kept in a tank of water, to preserve their surface from oxidation) may be placed in suitable receptacles in the feeding mechanism by a boy, who stands back of the same, out of range of the fumes from the flux box, and removes them one by one, from the water box for that purpose; the receptacle is then advanced intermittently from the feeding station, carrying the steel sheets (preferably by a rotary movement of the sheet conveying or feeding device) into a position directly over the flux box, which is supported above the molten tin. While the sheet is held by the feeding device in this position, one or more pushers, preferably of a flexible type, are advanced from the back of the sheet, and engaging with the rear edge of same, push it down through the flux box and molten tin (the sheet being properly directed during its passage by a curved guide way, which leads through the tin pot up to the oil finishing rolls) and into the bite of the lower pair of the said rolls, which by their rotary motion withdraw the sheet from the pushers, and carry it forward up through all the pairs of oil finishing rolls in the oil pot, and deliver them one by one, to the riser, or catcher, who removes them from the tinning mecha-

nism, and passes them to the cooling conveyor leading to the cleaning machine.

Our invention further consists in the combination with a rotary delivery wheel, having suitable sockets, properly distanced apart, for supporting and conveying the sheets, with means for imparting an intermittent motion to the conveying wheel, and one or more flexible pushers, located below the feeding-in station of the wheel, and means for advancing the pushers at the proper time to extract the sheets from the feed wheel, and deliver same through the flux and tin into and through the curved passage, provided for that purpose; and means for receiving the sheets from the pushers, and conveying them up through the oil finishing rolls in the oil pot, to the riser or catcher; and means for retracting the said pushers into position for advancing the next sheet in like manner.

Our invention also consists in the combination with a sheet conveying device with one or more pushers, for retracting the sheets from the conveying device, and delivering them into and through a tinning pot, of means for reciprocating the pusher device, located below the plane of the feeding-in station of the conveying device; so as not to interfere with the feeding of the sheets into the conveying device, or with the travel of the sheets from the feeding-in station to the point where the sheets are extracted by the pushers, and fed by them into and through the tinning pot.

Our invention is fully shown in the drawings herewith, in which the reference letters and numerals of the description indicate the corresponding parts in all figures.

Figure 1 shows a rear elevation of the complete machine. Fig. 2 is a side elevation of the complete machine, attached to the standard Jumbo tinning pot. The latter is cut through the line A A' in Fig. 3, to show clearly the path of the sheets through the pot. Fig. 3 shows a plan view of the complete machine attached to the tin pot. Fig. 4 shows a detail view of the curved guide tracks with end of pusher. Fig. 5 shows detail of triangular hub, with the arms attached.

In the figures, 1 indicates the frames, which are bolted together by means of the pusher wheel brackets 2, and through which run separate shafts 3, on which are mounted the pusher wheels 4. Around the periphery of these pusher wheels are wound the flexible pushers 5, of some flexible or springy material, such as steel; being secured thereto in any suitable manner, the ends of which are forked 6, as in Fig. 4. The pushers 5 are preferably connected in pairs by a brace 8, which causes them to run parallel in the curved guide tracks 9. The ends of the pushers which enter the molten tin may be

covered with some non-tinning material, as aluminum. This prevents the tin from adhering to the pushers.

On the main shaft 10 are mounted four triangular hubs 11, in Fig. 5, fastened with set screws 12, and to these hubs are fastened, by screws, three arms suitably bent 13, so as to form three slots 14, in the present case at an angle of 120 degrees apart. These arms form the sheet conveying fingers, and comprise essentially the rotary delivery wheel, mentioned in the foregoing description. On these fingers are fastened the tension springs 50, which temporarily hold the sheet in position, until it is delivered by the feed wheel at the feeding-in station, and acts as a frictional retard for the sheets, during the forward motion of the pushers. This method of construction of the fingers permits an easy alinement of the sheets with the pushers for operation in feeding the tinning pot.

The power is applied to the drive shaft 15, on which is mounted the index plate 16, which engages with the step motion wheel 17, by means of roller 18, Fig. 2. The step motion wheel 17 being mounted on the main shaft 10 imparts one sixth of a revolution to the conveying fingers 13; thereby bringing one set of conveying fingers into position for the pushers to advance the sheet into the tin pot; while at the same time bringing the adjoining pair of conveying fingers into position for charging. In this particular machine it is understood that the sheets are fed into the two sets of fingers alternately; but, as before mentioned, the machine can be adapted to the ordinary duplex or triple tin pot, with slight variations in construction, without departing from the character of our invention.

The mechanism for automatically advancing and retracting the flexible pushers consists of two friction-clutch pulleys 19, mounted side by side on the reversing shaft 20, and driven from the drive shaft 15, by pulleys 21 and 22, and belts 23 and 24, one belt being crossed so that the clutches run in opposite directions.

Below the reversing shaft 20, is located the cam shaft 25, on which is mounted the cam 26, which operates the double cone 27, sliding on the reversing shaft, by means of a roller 28, running in the groove of the cam and attached to the cone shifter yoke 29, Fig. 3, which is held in place by being mounted on the fork bracket 30. The cam shaft is driven from the drive shaft by sprockets 31 and 32, and chain 33. The pusher wheels are driven from the reversing shaft by sprockets 34, 35, 36 and 37, and chains 38 and 39, the latter chain being crossed, so as to enable one set of pusher wheels to be advanced, while the other set is being retracted.

Our automatic feeder is so constructed as to allow us to place it directly in front of the ordinary tin pots, without material alterations thereto. No. 40 is the tin pot, in which is the molten tin 41, on which rests the acid or flux 42, contained within the flux box 43. The oil pot is secured within the tin pot, but having no bottom, the level of the tin comes inside the oil pot. The palm oil 45, rests upon and is supported by the molten tin. The oil finishing rolls 44, with their mountings, run in the oil. Within the flux box is secured the curved sheet guide 46, which is made in sections, to facilitate removal; when it is necessary to clean out the pot.

The curved guide tracks 9, in Fig. 4, are constructed of some suitable material, preferably hand steel, or iron. Two strips are screwed onto a separating piece 47, which forms the slot in which the pushers travel. The curved guides are fastened to the top of the tin pot by the bracket 48, and to the pusher wheel bracket 3, and lie close to the periphery of the pusher wheels, so as to form a continuous passage, in which the pushers travel. The tie rod 49 assists in holding the frames together. The tinning rolls are driven from the worm and wheel 51, and pulley 52. The auto feeder may be driven from the worm shaft by pulley 53 and belt 54, connecting to drive shaft 15, by pulley 55.

In Fig. 3, the dotted lines represented by B indicate the position of a sheet of 20x28 plate, inserted between the fingers at the charging station. The dotted lines represented by C indicate the position of the sheet at the end of the stroke of the pushers, and in Fig. 1, C' shows the same sheet entering the bite of the rolls.

The operation of the machine is as follows:—The operator places a sheet between the conveying fingers on the right side, while they are stationary. The conveying fingers then make one sixth of a revolution, bringing the next pair of fingers on the adjoining side into the stationary position. These are charged with a sheet of steel, and at the next forward motion of the feed wheel another sheet is placed in the adjoining pair of fingers; and so on, the operator keeping the feed wheels constantly full; there being always four sheets in their respective positions, and one sheet being fed into the tinning pot by means of the pushers. When the sheet reaches the feeding-in station, the first set of pushers on the right side advance and push from the slot the sheet, which has been temporarily held in place, by the springs 50, which are fastened to the ends of the fingers by screws, as described. The sheet is followed down by the pushers in the sheet guide through the flux into the molten tin, and up to the bite of the

finishing rolls. The moment the sheet leaves the fingers, the fingers, by the action of the step motion, advance again one sixth of a revolution, and the sheet on the adjoining side is brought into position, as well as the adjoining pushers, which have just reached the top of their stroke, and in this manner the sheets are continuously and alternately fed into the tin pot.

Our automatic feed mechanism is adapted, with slight modifications, to feed 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 suitable length to operate on them side by side.

When the principle and operation of our automatic feeder is made known to those skilled in the art, no invention is required to make the slight mechanical changes necessary to adapt it to any of the types of tinning machines now in use.

By our invention, the cost of tinning is greatly reduced, as there is no necessity for employing skilled workmen; as a boy or girl, by means of our automatic feeding device, can turn out much more finished product in a given time, than the best of skilled workmen, operating in the usual way, feeding by hand. And the operators are protected from the injurious fumes of the flux, which it is well known by the present means of operation they can not be.

By the use of our flexible pushers, which advance in a curved track to push the sheets forward one by one into the tin pot, all necessity for feed rolls running in the molten tin is avoided, and as they operate to feed the sheets following each other closely, there is no time lost, as in hand feeding, and thereby the quantity of plate produced on each machine in a given time is greatly increased.

Our automatic feeder is adapted to feeding sheets of steel, wood, paper, or the like, wherever a continuous supply of large unwieldy sheets is required to be delivered at a given point, with precision and regularity, quite as well as for feeding such sheets of steel into a tin plate coating machine.

So far as we know, there is no successful mechanical feeder for tin plate machines, in use at the present time, adapted to operate in connection with the tinning machines in common use. All are fed by skilled workmen, as described.

While we consider the means shown and described for feeding the sheets into position to be pushed down through the flux box and molten tin, the best that can be used for that purpose; and while we consider the flexible pushers for extracting the sheets one after another from the feeding mechanism and pushing them positively and accurately

through the tin pot, which feeding mechanism is timed in unison with the speed of the oil finishing rolls in the oil pot, the best and most simple construction for the purpose, it is obvious that both these features may be varied mechanically without departing from the spirit or character of our invention, and we do not wish to be limited to the exact means shown and described for performing these important functions, unless the state of the art discloses the fact that we are not entitled to the broadest construction of our invention and claims.

Having thus described our invention, what we claim is,

1. In a machine of the character described, the combination with a suitable socket for receiving each sheet, of a curved guide therefrom and a flexible pusher for advancing the sheet through the socket and thence through the guide.

2. In a plate tinning machine, the combination with tinning rolls, of radially extending arms suitably journaled and spaced for receiving the sheets between them, and means for rotating the arms intermittently, combined with means for delivering the sheets from the arms to the rolls.

3. In a plate tinning machine, the combination with tinning rolls, of radially extending arms suitably journaled and spaced to form sockets for receiving the sheets, retaining springs on said arms for engaging the sheets in the sockets, means for operating the arms intermittently to bring the sheets into delivery position and means for advancing the sheets from the arms to the rolls.

4. In a plate tinning machine the combination with tinning rolls, of radially extending arms suitably journaled, said arms being arranged in pairs and spaced to form sockets for receiving the sheets, means for operating the arms intermittently to bring the sheets into position of delivery, and means for advancing the sheets from the arms to the rolls.

5. In a machine of the character described the combination with tinning rolls and with a pot for molten tin and for a flux bath, of a suitable standard, a series of sockets journaled on the standard for receiving plates in succession, means for rotating the sockets intermittently, a guide from the end of the sockets in delivery position through the flux bath and the molten tin to the rolls, pushers, and means for reciprocating the pushers first to push the sheets forward to the bite of the rolls and then to retract the pushers to engage with a new sheet.

6. In a machine of the character described the combination with a pot for molten tin and for a flux bath and with tinning rolls, of a suitable standard, a series of

sockets journaled on the standard for receiving sheets in succession and transferring them one by one from receiving position to delivering position, a curved guide extending from the socket in the delivering position down through the flux bath and the molten tin and upwardly to the rolls, flexible pushers, and means for reciprocating the pushers first to push the sheets forward to the bite of the rolls and then to retract the pushers in position to engage with a new sheet.

7. In a machine of the character described, the combination with a tinning pot for molten tin and means for receiving sheets, said means having a delivery end, of actuating means for operating said receiving means to bring the sheets into delivery position, a guide from the delivery end of the receiving means in delivery position extending through the tin, pushers to engage the sheets near both sides, said pushers being formed of a single flat piece of flexible metal having a forked end, and means for actuating the pushers to push the sheets through the guide, said last means being arranged below the plane of the feeding-in position of the sheets to the receiving means.

8. In a machine of the character described, the combination with tinning rolls and means for receiving metallic sheets, of means operating said receiving means to bring the sheets into position of delivery, flexible pushers provided with bifurcated ends to engage the sheets and with marginal portions fitted to guides, guides for said marginal portions, and means for actuating the pushers to advance the sheets from said receiving means to the rolls.

9. In a machine of the character described, the combination with tinning rolls and with a pot for molten tin and for a flux bath; of a suitable standard, radially extending arms journaled on the standard, said arms being arranged in pairs and spaced to form sockets for receiving sheets, the sockets so formed being oppositely arranged to engage the sides of said sheets, means for rotating the sockets intermittently to transfer the sheets from a receiving position to a delivering position, a curved guide extending from the sockets in delivering position down through the flux bath and the molten tin and upwardly to the rolls, pushers, and means for reciprocating the pushers, first to push the sheets forward to the bite of the rolls and then to retract, said latter means being arranged below the plane of the feeding-in position of the sheets to the sockets.

10. In a plate tinning machine, the combination with tinning rolls and a tinning pot for molten tin and for a flux bath and a suitable standard, of radially extending arms suitably journaled on the standard, said

arms being arranged in pairs and spaced to form sockets for receiving metallic sheets, the sockets being oppositely arranged to engage the sides of the sheets, retaining springs carried on the ends of said arms for engaging with the sheets and retarding their withdrawal from the sockets, means for rotating the sockets intermittently to bring the sheets into an inclined delivery position, a curved guide extending from said delivery position down through the flux bath and the molten tin and upwardly to the rolls, pushers and means for reciprocating the pushers first to push the sheets forward to the bite of the rolls and then to retract the pushers to engage with a new sheet.

11. In a machine of the character described, the combination with a tinning pot for molten tin and finishing rolls suitably journaled above the tin, of a guide extending downwardly into the tin and then upwardly toward the rolls, a suitable socket adapted to receive a single sheet only, a pusher to advance the sheet through the socket and thence through the guide to the rolls, and means to operate the pusher.

12. In a plate tinning machine, the combination with a tinning pot and finishing rolls, of a guide extending downwardly into the pot and then upwardly toward the rolls, a series of movable sockets each adapted to receive a single sheet, means to bring the sockets in turn into alinement with the guide, and means to advance the sheet through the socket to the guide and through the guide to the rolls.

13. A device for feeding metal plates to a tinning machine, including in combination a frame, guides mounted on said frame and projecting into the tinning pot on which the plates rest and are moved, a pusher carried by said frame and having means for engaging and pushing a plate along said guides

into and through the tinning pot, means mounted on said frame for reciprocating said pusher, and means extending along said guides for engaging said pusher adjacent its free end for guiding the same along said guides.

14. A device for feeding metal plates to a tinning machine including in combination, a frame, guides mounted on said frame and projecting into the tinning pot on which the plates rest and are moved, means for temporarily holding the plates on said guides, a pusher carried by said frame and having means for engaging and pushing a plate along said guides and through the tinning pot, means mounted on said frame for reciprocating said pusher, and means extending along said guides for engaging said pusher adjacent its free end, for guiding the same along said guides.

15. A device for feeding metal plates to a tinning machine including in combination, curved guides extending into the tinning pot on which the plates rest and are moved, means for temporarily holding said plates on said guides, and a flexible pusher having means on its free end for engaging and pushing a plate along said curved guides into and through the tinning pot, means connected to the other end of said flexible pusher for reciprocating the same, and means extending along said guides for engaging said pusher adjacent its free end, for guiding the same along said guides.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

EDWIN NORTON.

EDWIN KENNETH NORTON.

Witnesses:

H. I. BOWNE,

E. A. ASSMANN.