(No Model.) 5 Sheets—Sheet 1.

J. HIRSCHMANN.

TINNING MACHINE.

No. 520,428. Patented May 29, 1894.

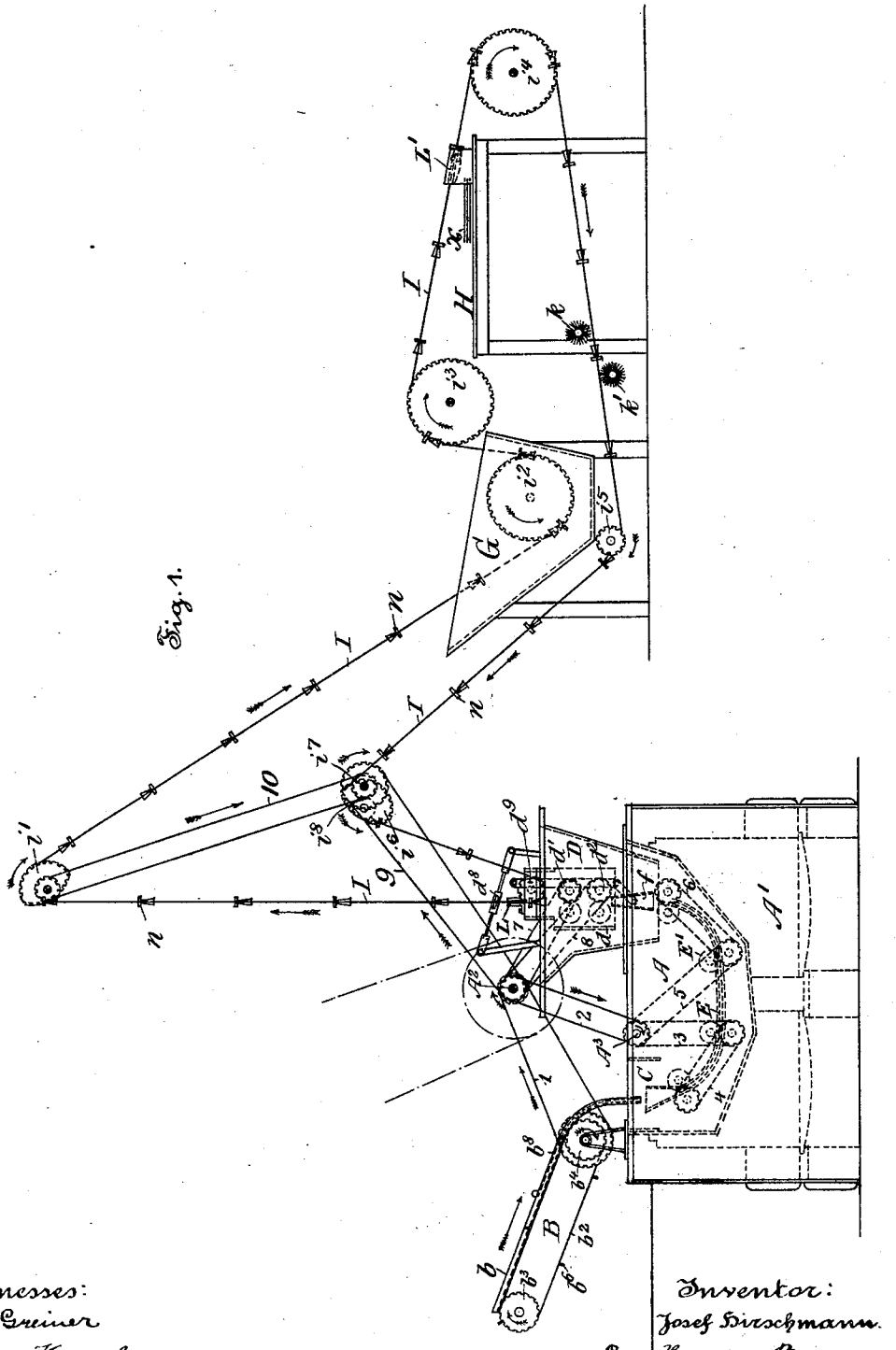

Fig. 1.

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Att'y.

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(No Model.) 5 Sheets—Sheet 2.

J. HIRSCHMANN.

TINNING MACHINE.

No. 520,428. Patented May 29, 1894.

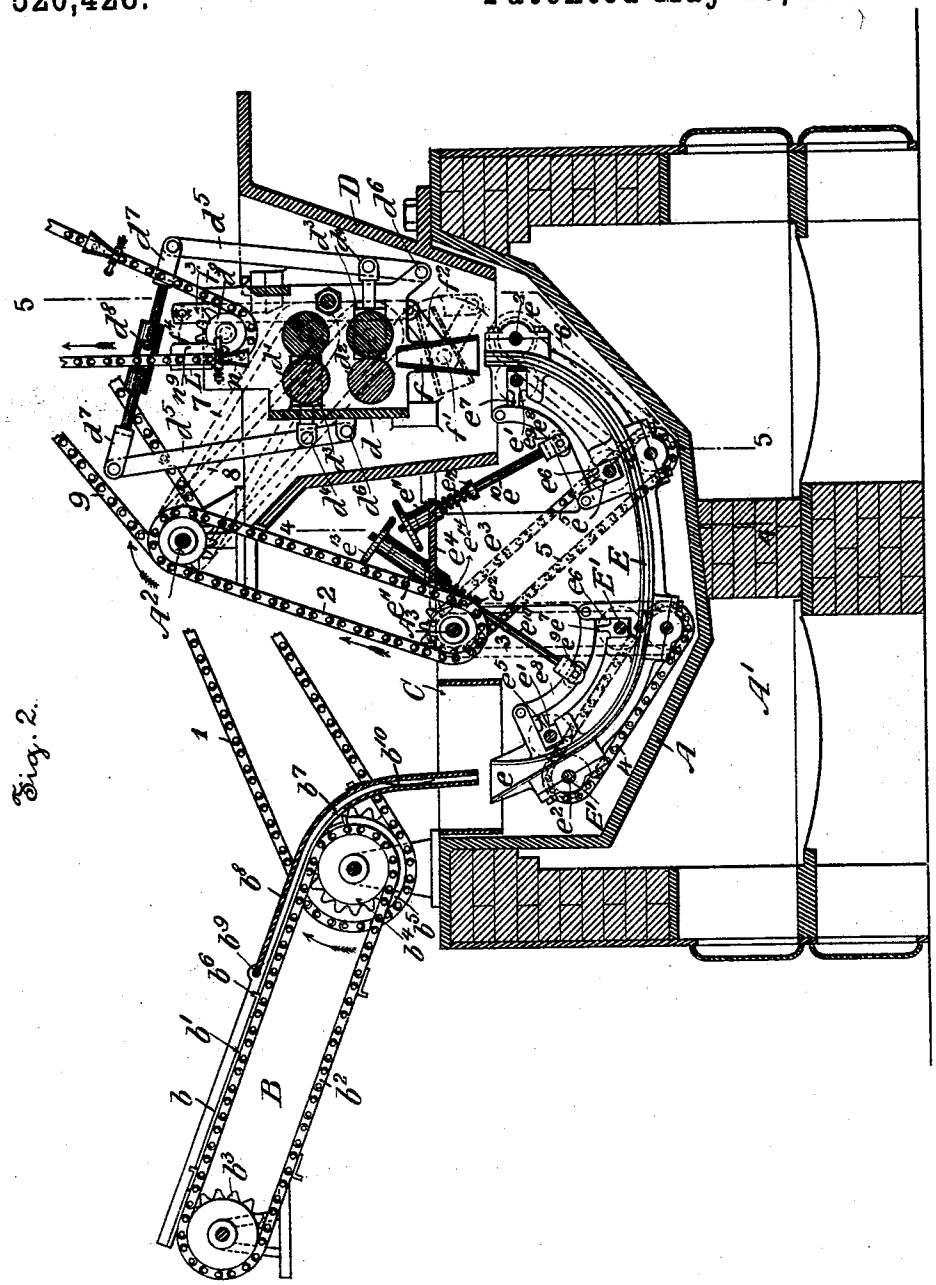

Fig. 2.

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TINNING MACHINE.

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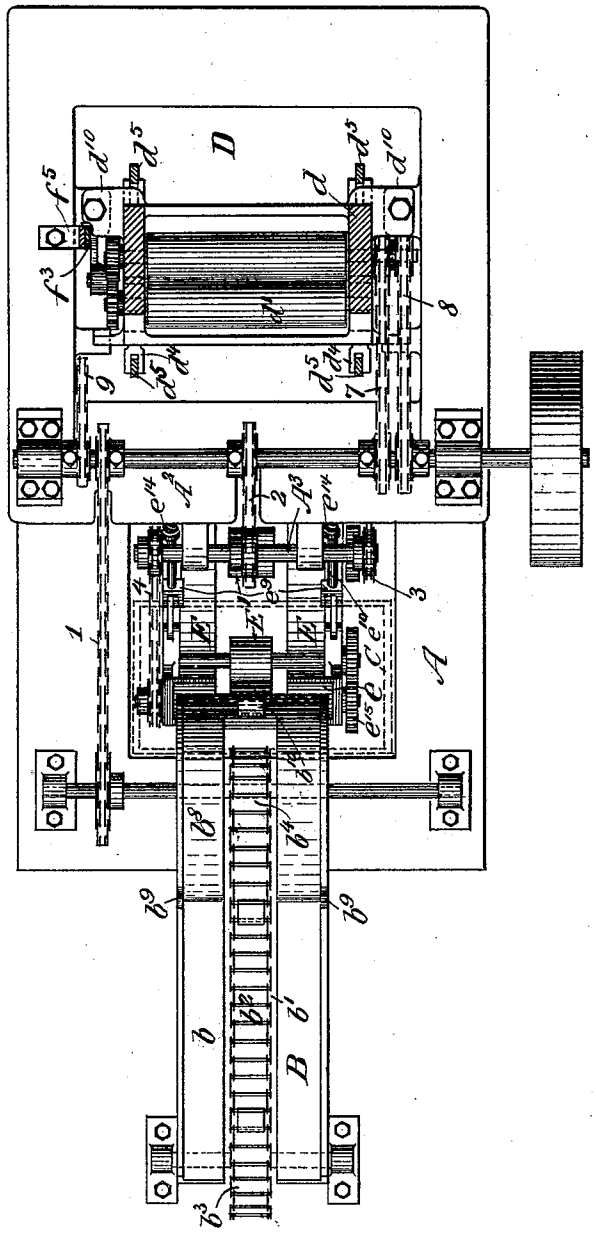

Fig. 3.

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J. HIRSCHMANN.

TINNING MACHINE.

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Fig. 4.

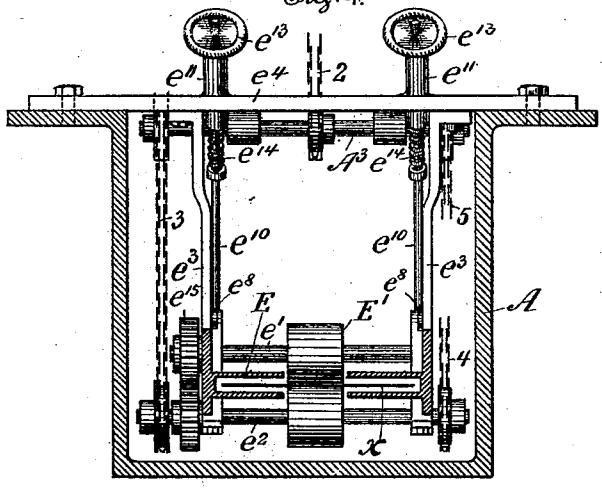
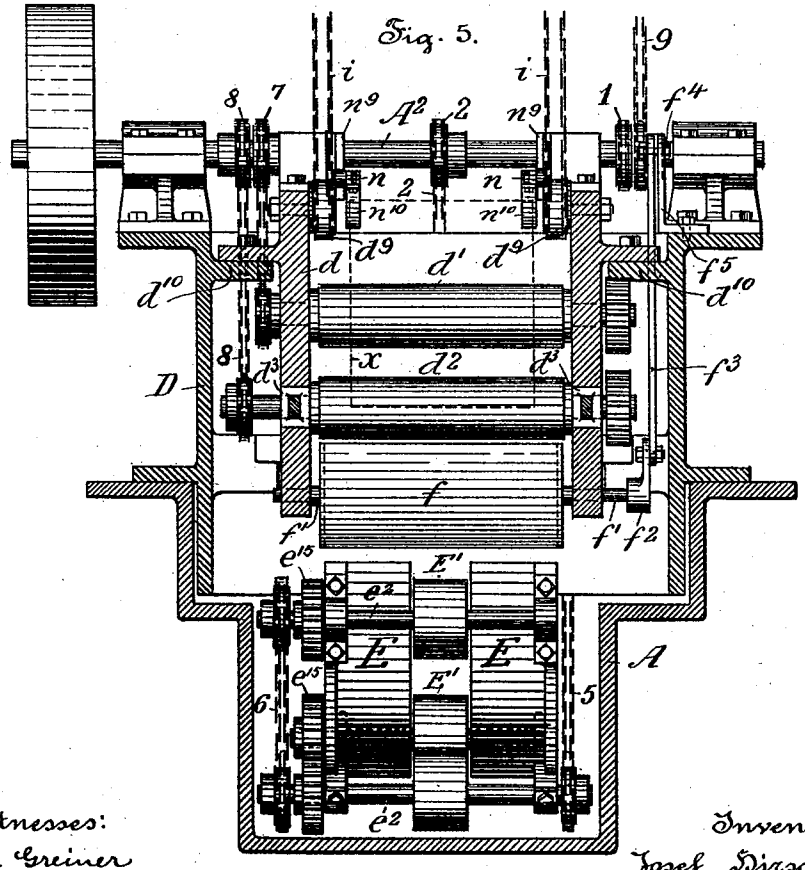


Fig. 5.



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TINNING MACHINE.

No. 520,428. Patented May 29, 1894.

Fig. 12.

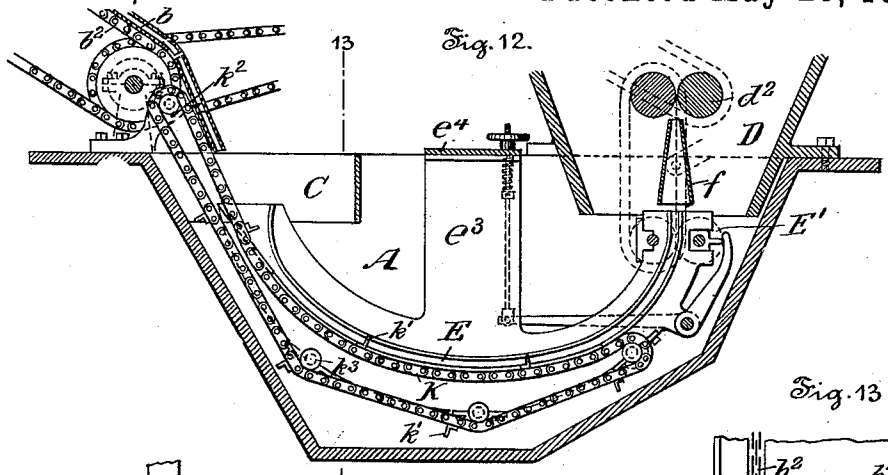


Fig. 13

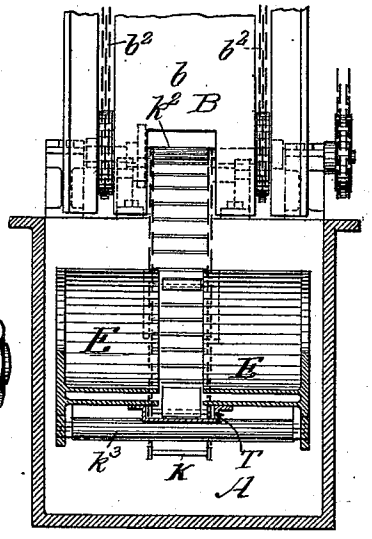


Fig. 6.

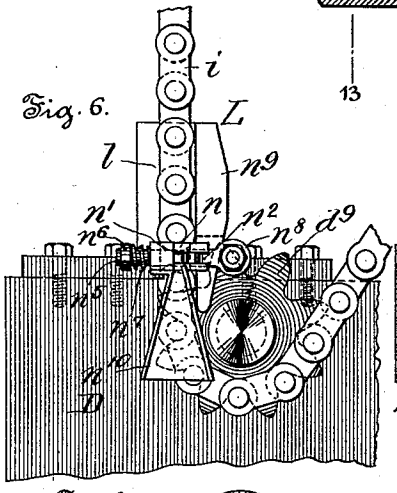


Fig. 7.

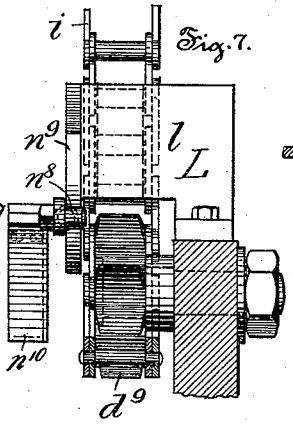


Fig. 8.

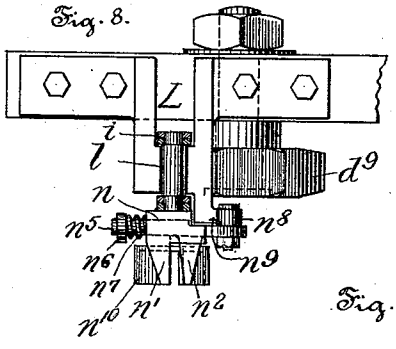


Fig. 9.

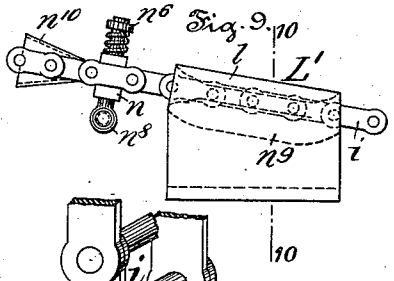


Fig. 10.

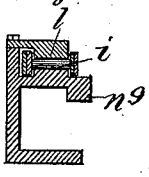
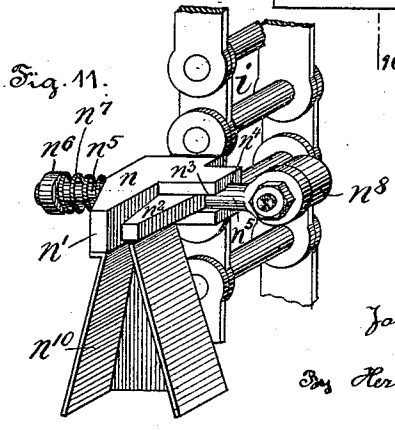


Fig. 11.



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UNITED STATES PATENT OFFICE.

JOSEF HIRSCHMANN, OF LINFIELD, PENNSYLVANIA.

TINNING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 520,428, dated May 29, 1894.

Application filed January 9, 1894. Serial No. 496,319. (No model.)

To all whom it may concern:

Be it known that I, JOSEF HIRSCHMANN, a subject of the Emperor of Austria-Hungary, residing at Linfield, in the county of Montgomery and State of Pennsylvania, have invented new and useful Improvements in Tinning-Machines, of which the following is a specification.

My invention relates to such machines, in which thin charcoal iron plates are tinned after they have been scoured, cleaned and pickled in the usual or any preferred manner. With the machines heretofore constructed, many difficulties were experienced in the operation thereof, owing to the imperfect guiding and feeding mechanism for the plates as they were carried through the tin-bath but with my improved machine such difficulties are removed.

In my improved machine hereinafter more fully described, I employ continuous guides for the plates, transferring or feed rolls between them to take hold of each plate at its center, whereby a uniform and straight motion of the plate is obtained and any edgewise feeding of the plates is obviated, while the continuous guides prevent any winding or curling of the plates around the said feed rolls.

In my improved machine and by the use of chain carriers and automatic clutches, which latter carry the plates through a flux-bath, a tin-bath and an oil-bath and then through bran contained in a box and automatically deliver the finished tin-plate, without having received any marks whatever, on a table, the number of attendants is reduced to a minimum.

My invention consists of devices assembled and operated to constitute a tinning plant, and it further consists of certain improvements in the feeding, guiding and cleaning devices as will be hereinafter more fully described and pointed out in the claims.

The invention will be more fully understood taken in connection with the accompanying drawings forming part hereof, and in which—

Figure 1, is a view illustrating my improved tinning plant, and showing at the left, chain carriers for the feeding of the iron or other plates into the melting pot supported over a furnace, and at the right of the sheet the bran box, depositing table, &c., and also the operating mechanism for the different devices. Fig. 2, is a sectional view of the furnace supporting the melting pot containing the improved plate guides and feeders, and also showing the oil reservoir with improved delivery mechanism, a rotatably mounted funnel for guiding the plates between the finishing rolls, and the operating devices for the different parts. Fig. 3, is a plan view of the melting pot with its plate operating mechanism, showing also the plate feeding table and chain carrier and the oil reservoir with the finishing rolls. Fig. 4, is a vertical section on the line 4—4 of Fig. 2. Fig. 5, is a similar section on the line 5—5 of Fig. 2. Fig. 6, is an elevation of a plate clutch attached to the links of a chain carrier, the chains of which are held in stationary guides provided with opening wedges or devices for the said clutches. Fig. 7, is a side elevation of the clutch and opening devices shown in Fig. 6. Fig. 8, is a plan view of the chain guide showing the chain with clutching mechanism in position. Fig. 9, is a similar view to Fig. 6, with the exception that here are shown the stationary opening devices for the clutches, which cause the disengagement of the plate from the chain carrier. Fig. 10, is a section on the line 10—10 of Fig. 9. Fig. 11, shows in perspective a portion of a chain carrier adapted to carry the tinned sheets from the oil reservoir through the bran box and showing attached thereto spring clutches as illustrated in Figs. 6, 7 and 8. Fig. 12, is a section of a melting pot with modified plate carrying or forwarding devices, the plates being carried by hooks on an endless chain through the continuous guides immersed in the tin bath. Fig. 13, is a vertical section on the line 13—13 of Fig. 12.

Referring now to the drawings for a further description of my invention, A is the melting pot of cast iron or other material, supported on the furnace A′, and this pot A carries one end of the plate feed B, the flux box C and the oil reservoir D.

The plate feed B comprises a slanting table b provided with a central slot b' and an endless chain b^2 passed over two sprocket wheels b^3 and b^4, the latter being driven from the

main shaft A^2, by a chain 1 and wheel b^5 on the shaft of the plate feed supported by the melting pot A. The chain b^2 is provided with hooks or projections b^6, which move the iron plates along the table b; the latter is curved at b^7 so as to extend into the flux box C and directly above the funnel e of a guide to be presently described. The table b is further provided at the curved end b^7 with a hinged cover b^8, which may be fastened at its free end by any suitable catches to the table b, to guide the plates around the curved end b^7 of the table b and into the funnel e. The object of hinging this cover b^8 at b^9 is to allow cleaning of the chute formed by the table b and cover b^8 and to prevent any sticking together of the two parts by the solidification of the flux contained in the box C, should the machine be out of operation during night or other times. b^{10} is a spring, which may be employed to regulate the feed of the plates into the funnel and guides before mentioned.

In the melting pot A is provided on each side thereof one continuous curved guide E extending about the whole length of the pot A, and at the left hand terminal the guides on both sides are opened to form a funnel e, which is directly below the chute aforesaid. At certain points closer in distance than the length of the plates to be tinned are sets of feed rolls E′, in the present instance four in number, which are mounted centrally between the guides E and upon shafts e' and e^2, the lower shafts e^2 are journaled in bearings provided in the guides E, which are held in place in the pot A by the depending plates e^3 and cross plate e^4 fastened to each other and the pot A by bolts. The upper shafts e' however are journaled in slide bearings e^5 the ways e^6 of which are formed with the guides E, and the rolls E′ of the shafts e' can be adjusted with reference to the lower rolls E′ to accommodate different thicknesses of plates to be tinned or to produce more or less pressure on the said plates; the roll adjusting devices are as follows, each slide bearing e^5 is provided with a projection e^7 with which a lever e^8 hinged to one side of the way e^6 engages; two such levers e^8 of adjacent bearings are coupled by slotted connections e^9 to a rod e^{10} projecting beyond a bearing e^{11} of the roll and guide frame supporting plate e^4, and between this bearing e^{11} and an adjustable collar e^{12} is placed a pressure spring e^{14}, which tends to press the top rolls onto the lower rolls, and this pressure may be increased or decreased by turning the screw hand wheels e^{13} to adjust the springs e^{14}.

The rolls of each set of feed rolls E′ are geared together by wheels e^{15}, and the shafts e^2 of the lower rolls are driven by suitable sprocket wheels and the chains 3, 4, 5 and 6 from the counter shaft A^3, which receives motion from the main shaft A^2 by the sprocket wheels and the chain 2. All the guides and rolls with their adjusting devices and operating mechanism, together with the shaft A^3 are held on the cross plate e^4, so that by removing the latter, the whole apparatus can be lifted out of the melting pot A for repair, cleaning or for any other purpose.

At the left hand side of Fig. 2, is provided the usual flux-box C, which is detachably connected to the melting pot A, and at the opposite end of the melting pot and extending into the same, is detachably fastened the oil reservoir D. The walls of the latter carry a removable frame d, in which the sets of finishing rolls d' and d^2 are held, one roll of each set is journaled directly in the frame d, while the other is journaled in slide bearings d^3 properly guided in ways of the frame; each slide bearing is provided with a bifurcated stem d^4, which engages with a lever d^5. The latter are hinged with their lower ends at d^6 on opposite sides of the frame d and are provided at their upper or free ends with clevises d^7, and each two opposite levers d^5 on one end of the two sets of rollers d' and d^2, have one turnbuckle d^8 for the clevises d^7 to draw together or separate at will the free ends of the levers d^5, and thereby the rolls d' and d^2 to adjust the pressure of the rolls or to accommodate different thicknesses of plates. The sets of finishing rolls d' and d^2 are driven from the main shaft A^2 by sprocket wheels and the chains 7 and 8.

Directly below the finishing rolls d^2, is provided a rotatable funnel f having trunnions f' which are journaled in extensions of the frame d. This funnel f guides the plates as they issue from the guides E and rolls E′ into the frame d respectively into the oil reservoir and between the finishing rolls d' and d^2, and the object of making the funnel rotatable is, to gain access to the dividing line of the molten tin and the oil, as there are always collecting impurities of either substance and the attendant in charge should be able to remove the same, when it becomes necessary and without having to remove most of the machinery contained in the oil box. On one of the trunnions f' is provided an arm f^2, to which a shifter f^3 is hinged, and at the upper end of the shifter is provided a cotter pin f^4 engaging a bracket f^5, to which the shifter f^3 may be safely locked by the pin, when the funnel is in position to act as a guide.

In same cases of accident or repair, the finishing rolls and their connecting devices must be removed and this can easily be done by unscrewing the frame d from the brackets d^{10} as all such devices are mounted on the frame d which then may be lifted out of the oil, which may remain in the reservoir undisturbed, in contradistinction to the old make of such machines where the oil had to be pumped out of the reservoir and the latter had to be removed and replaced, &c.

To carry the tinned plates from the finishing rolls d' and d^2 to and through the bran box G and deposit them automatically onto the table H Fig. 1, I employ a chain carrier I,

which passes around the studded chain wheels d^9 Figs. 2 and 5 to 8, then upward and around the set of eccentric wheels i', then over the wheels i^2 in the bran box G, the wheels i^3 i^4, through the brushes k and k', around the idlers i^5, the eccentric wheels i^6 and back to the wheels d^9. The wheels pertaining to a set for instance the eccentric wheels i' or i^6 are each keyed to a shaft, so that an equal movement of the carrier chains i is insured; the chain carrier I is operated from the main shaft A^2 by the chain 9 leading to the counter shaft i^7, which is geared to the shaft of the eccentric wheels i^6 by the wheels i^8 to reverse the motion of the said eccentric wheels i^6; and the upper eccentric wheels i' are driven from the counter shaft i^7 by the chain 10. This chain carrier I consists of the chains i provided with automatic clutches n, fastened or formed on links of the chains i at certain distances, the length of the plates to be tinned plus a clearing space of about one or two inches; the clutch n comprises a jaw n' fixed to a link of the chain i and a sliding jaw n^2, the former is provided with a slot n^3 and a bore n^4, in which latter the stock n^5 of the sliding jaw n^2 moves. This stock n^5 is provided with a collar n^6 and a spring n^7, which presses against the fixed jaw n' to normally hold the sliding jaw n^2 against the jaw n' and clamp a sheet between them; on the other end of the stock n^5, is attached a roller n^8, which when brought into contact with a wedge n^9 and moved along the same, separates the two jaws to either allow a sheet of tin or other plate to enter the jaws or to be released from its grip. To guide the plates as they leave the finishing rolls d' into these clutches n, funnel shaped projections n^{10} are provided on the fixed jaws n'. Wherever the opening of the jaws n' and n^2 has to be accomplished either for gripping or releasing a plate x, the chains i are led through guides l fastened to brackets L attached to the oil reservoir D and brackets L' on the table H respectively, to insure the proper engagement of the rollers n^8 on the stock n^5 of the sliding jaws n^2 with the wedge n^9 of the said brackets L or L'.

The eccentric wheels i' and i^6 are provided to cause the chain carrier I to move at intervals slower or faster, *i. e.* the plates x are fed quite a distance into the clutches, before the latter are allowed to grip the said plate, and the clutches move at such feeding quite slow being almost motionless; but as soon as the chain carrier passes onto and over the major axis of the eccentric wheels i' it makes up for the speed lost, while gripping the plate, as will be readily understood.

In Figs. 12 and 13, I have shown a modified form of forwarding mechanism in the melting pot for the sheets to be tinned. In this instance the guides E and mechanism in the oil reservoir D remain the same, the only difference being, that instead of feed rolls E' being employed, use is made of an endless chain K provided with hooks k' to engage the plates as they leave the feed table b, which in this instance is provided with two feed chains b^2; the chain K is mounted around a driving wheel k^2 driven from the chain feed shaft by suitable gearing k^4 and passes around idlers or rollers k^3. The chain K drags along the under edges of the guides E insuring thereby the engagement of any plate, which may have been fed between the guides E from the table b and bringing the said plate through the tin-bath, to the delivery rolls E' and the finishing rolls d' and d^2, which are adjustably mounted as before described.

If preferred or found necessary, a guide or trough T may be attached to the guides E, to carry the chain K and make sure of the projecting of the hooks k' beyond the guides E.

The operation of my improved machine or rather tinning plant is as follows: Motion is imparted to the main shaft A^2, which operates all the parts hereinbefore described, and the charcoal iron or other plates are placed on the table b from which they are conveyed into the flux box C and guides E by the chain feed B, and before the hook b^6 releases the plate, the first set of feed rolls E' have taken hold of the plate and fed it to the next set of rolls E' and so on until it passes the finishing rolls. It is evident that the speed of these rolls should be the same as the feed of the chain feed B, or in other words, the plates must be forwarded as fast as they are fed into the guides E by the chain feed B. From the finishing rolls d', the plates are taken as before described by the clutches n of the chain carrier I, and are carried through the bran box G where most of the oil is wiped off, and are then brought above the table H where the clutches n are automatically opened by the brackets L', to allow the plates x to be deposited on the table H. The chains i and clutches n of the chain carrier I then pass through the brushes k and k' where the former are cleaned, so as not to bring any bran or other impurities into the oil reservoir D.

It will be understood by those skilled in the art to which my invention pertains, that modifications may be made without departing from the spirit of the invention.

Having thus described the nature and objects of my said invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a tinning machine the combination of a melting pot, a detachable frame comprising a cross plate and two side plates, the latter suspended in the said pot and having two continuous guides, extending from each side plate toward the center of the pot, feed-rolls between the said guides, said rolls driven by suitable gearing and chain motion from a main shaft of the machine, a plate feed comprising a table a hinged cover and a feed chain, the latter adapted to feed the plates

into the continuous guides and between the centrally located rolls, substantially as and for the purposes set forth.

2. In a tinning machine the combination of a melting pot, a detachable frame comprising a cross plate and two side plates, the latter suspended in the said pot and having two continuous plate guides extending from the side plates toward the center, rolls between the said continuous guides and adapted to engage the plates to be tinned at their center to insure a straight motion of the plate while the continuous guides prevent the said plates from curling, substantially as and for the purposes set forth.

3. In a tinning machine the combination of a feed table, a hinged cover applied thereto, a feed chain or traveler in said table for feeding the plates to be tinned, a melting pot, a detachable frame suspended in the said pot, continuous guides extending from said frame toward the center of the said pot and leaving a central slot, feed rolls located between them and supported by the said guides, means for operating the said feed rolls from a main shaft to forward the plates fed into the machine by the said chain carrier, substantially as and for the purposes set forth.

4. In a tinning machine the combination of a melting pot, a removable frame therein, continuous guides extending the full length of the melting pot and projecting from the said frame toward the center so as to leave a slot, feed rolls located in said central slot and journaled in the frame, said rolls receiving motion from a main shaft by suitable chain gearing, a plate feed partially supported by the melting pot and comprising a slotted feed table, a feed chain traveling in said slotted table, a hinged cover applied to said table, a spring between said cover and table to regulate the feed of the plate, and means for driving the said feed chain, all as described and for the purposes set forth.

5. In a tinning machine the combination of a melting pot, a removable frame suspended therein, continuous guides extending the full length of the said pot and communicating with a plate feed at one end and a removable oil reservoir at the other, the plate feed comprising a table proper, a traveling chain supported thereby and a hinged cover, the latter adapted to guide the plates to be tinned into the said continuous guides, the removable oil reservoir supported by the said melting pot, a frame in said oil reservoir, a set or sets of finishing rolls journaled in said frame and a swinging funnel attached to the said frame and below the finishing rolls, substantially as and for the purposes set forth.

6. In a tinning machine the combination of a melting pot, a removable frame suspended therein, continuous guides extending the full length of said pot, a plate feed communicating at one end with the said guides and an oil receptacle communicating with the other end of the same continuous guides, the plate feed comprising a table partly supported by the melting pot, a traveling chain, a hinged cover and means for regulating the feed of the plates into the continuous guides, a frame detachably connected with the oil receptacle, finishing rolls journaled in said frame, a movable funnel on said frame, said funnel adapted to guide the tinned plates from the said continuous guides between the said finishing rolls substantially as and for the purposes set forth.

7. In a tinning machine, in combination with a melting pot supported by a furnace, a feed table, comprising a slotted table, a chain feed, a hinged cover over the table and chain, said cover provided with a spring for adjusting the movements of the plates as they are fed into the melting pot, substantially as and for the purposes set forth.

8. In a tinning machine, the combination of a melting pot, a removable frame suspended therein, continuous guides extending the full length of the melting pot and projecting from the said frame toward the center of the pot leaving a space at the center of the said guides, sets of forwarding rolls, whose lower rolls are journaled in slide bearings adapted to be adjusted from the exterior of the said frame, an oil reservoir detachably connected with said pot, a frame within said reservoir and carrying sets of finishing rolls, substantially as and for the purposes set forth.

9. In a tinning machine in combination with a melting pot having suspended therein continuous guides and plate feeding mechanism between them, an oil reservoir detachably secured to said pot, a frame provided with finishing rolls removably connected to said reservoir, and a rotatable funnel to direct the plates from the said guides between the said finishing rolls, substantially as and for the purposes set forth.

10. In a tinning machine, in combination with a melting pot having suspended therein continuous guides and plate feeding mechanism, a detachable oil reservoir and a detachable frame within said reservoir, sets of two finishing rolls, whereof one roll is journaled in said frame and the other in slide bearings, levers hinged to said frame and bearing against the said slide bearings, clevises on the free ends of the levers, turnbuckles on two of said clevises, to adjust the said finishing rolls, a rotatable funnel located between the said guide and finishing rolls and mechanism for operating the same from the outside, substantially as and for the purposes set forth.

11. In a tinning machine comprising a feed table, chain feed and a melting pot having guides and plate-forwarding mechanism within the same, the combination of an oil reservoir detachably connected to said melting pot, a removable frame within said reservoir, said frame carrying sets of finishing rolls and a rotatable funnel, whose trunnions are journaled in said frame and disposed between

the said guides and finishing rolls, a crank on one of said trunnions, a bracket on said reservoir and an operating bar hinged to said crank and adapted to lock the said bar and funnel in place, substantially as and for the purposes set forth.

12. In a tinning machine an oil reservoir detachably fastened to the melting pot of the machine, a detachable frame within said reservoir, sets of two finishing rolls, whereof one is journaled in the frame and the other in slide bearings operated by levers hinged to opposite sides of the frame, clevises on the free ends of the levers and turnbuckles, one for each set of two levers, substantially as and for the purposes set forth.

13. In a tinning plant the combination of a feed table, a melting pot having plate forwarding mechanism therein, a flux box, an oil reservoir, a detachable frame in said oil reservoir, finishing rolls in said frames, a funnel between said finishing rolls and the forwarding mechanism in the melting pot, a bran box, a table and a chain carrier to carry the tinned plates from the finishing rolls through the bran box and to the table, substantially as and for the purposes set forth.

14. In a tinning plant comprising a tinning machine having an oil reservoir and finishing rolls, in combination with a bran box a depositing table and a plate chain carrier, the latter composed of two link chains and spring clutches on certain of the links of the said chains, to carry the plates as they leave the finishing rolls through the bran box and deposit them onto said table, substantially as and for the purposes set forth.

15. In a tinning plant comprising a tinning machine, a bran box, a depositing table and a plate carrier, the latter composed of a traveling belt or chain moving over a series of pulleys and a set or sets of eccentric wheels, the plate carrier leading from the tinning machine upward and around one or one set of said eccentric wheels, thence through the bran box, over the depositing table and back over the other eccentric wheel or set of eccentric wheels and to the tinning machine, and means for operating said tinning machine and carrier, substantially as and for the purposes set forth.

16. In a tinning plant comprising a tinning machine, operating mechanism therefor, a bran box, a depositing table, a plate carrier leading from the tinning machine to and through the bran box and over the depositing table, said plate carrier provided with automatic spring clutches to grip a tinned plate, said table provided with releasing devices for said clutches, and cleaning brushes disposed along the return way of the said plate carrier, substantially as and for the purposes set forth.

17. In a tinning plant, a chain carrier comprising two link-chains, certain links of each chain provided with a spring clutch comprising a fixed jaw attached to said chain links, an open funnel on said fixed jaw, a sliding jaw guided in the fixed jaw, said sliding jaw tending to close upon the fixed jaw, a shouldered stem on the sliding jaw, a spring around the same and between the shoulder of said stem and fixed jaw and a roller on said sliding jaw, substantially as and for the purposes set forth.

18. In a tinning plant, a chain carrier comprising two link chains, a set of eccentric forwarding wheels, a set of eccentric idle wheels and sets of guide wheels, certain of said links of each chain provided with clutches composed of two jaws whereof one is formed integral with said chain link and the other is provided with a stock adapted to slide in the fixed jaw, a collar on the said stock, a spring between said collar and fixed jaw, a roller on the opposite end of the stock, and means such as described for opening said jaws, substantially as and for the purposes set forth.

In witness whereof I have hereunto set my signature in the presence of two subscribing witnesses.

JOSEF HIRSCHMANN.

Witnesses:
HERMANN BORMANN,
HARRY J. FRANZ.