June 26, 1923.

1,460,038

E. C. POOL

DEFLECTOR FOR PLATE FEEDING MECHANISMS

Filed July 28, 1922

5 Sheets-Sheet 1

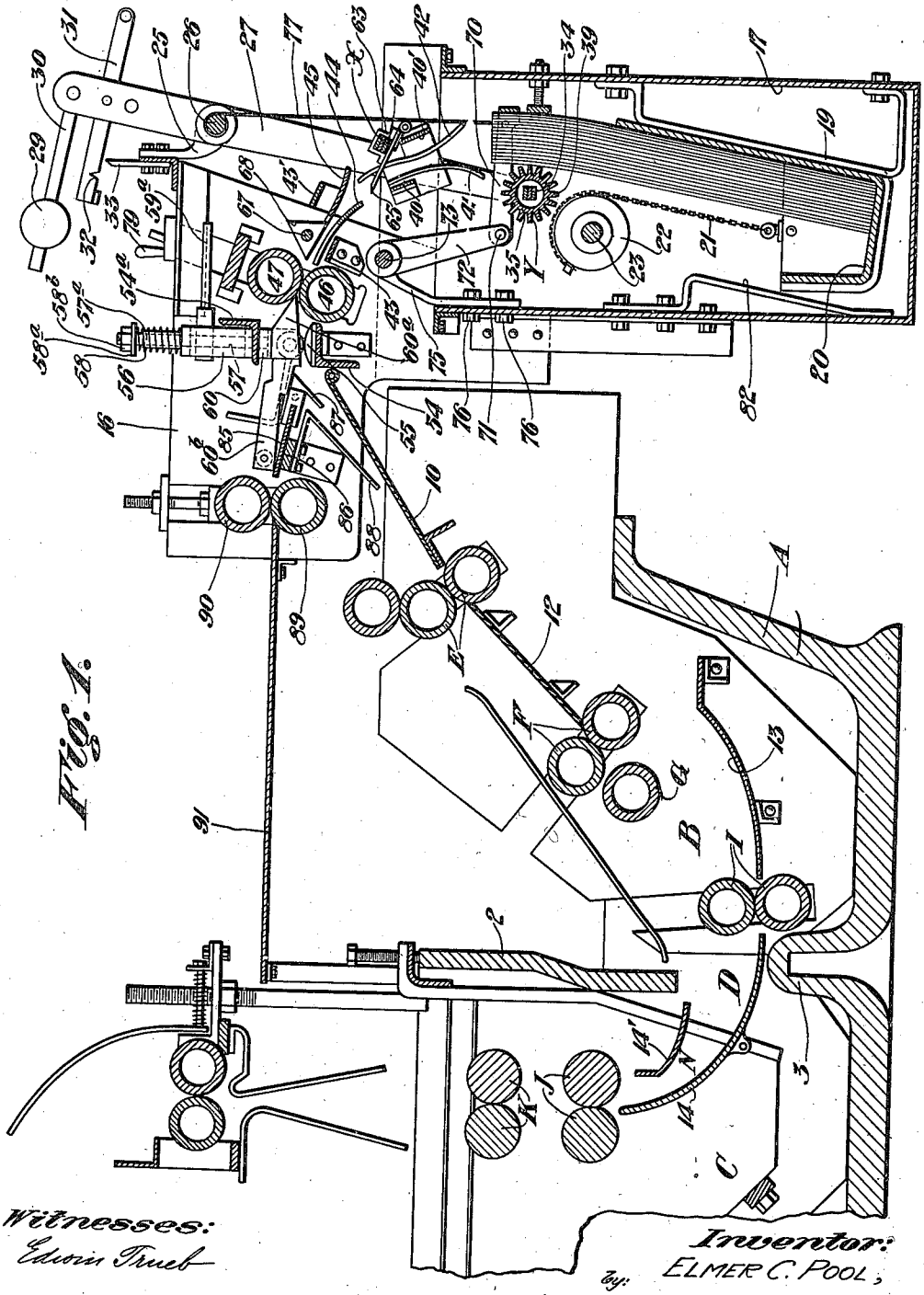


Fig. 1.

Witnesses:
Edwin Trueb

Inventor:
ELMER C. POOL,
by: D. Anthony Usina
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June 26, 1923.

1,460,038

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DEFLECTOR FOR PLATE FEEDING MECHANISMS

Filed July 28, 1922 5 Sheets-Sheet 2

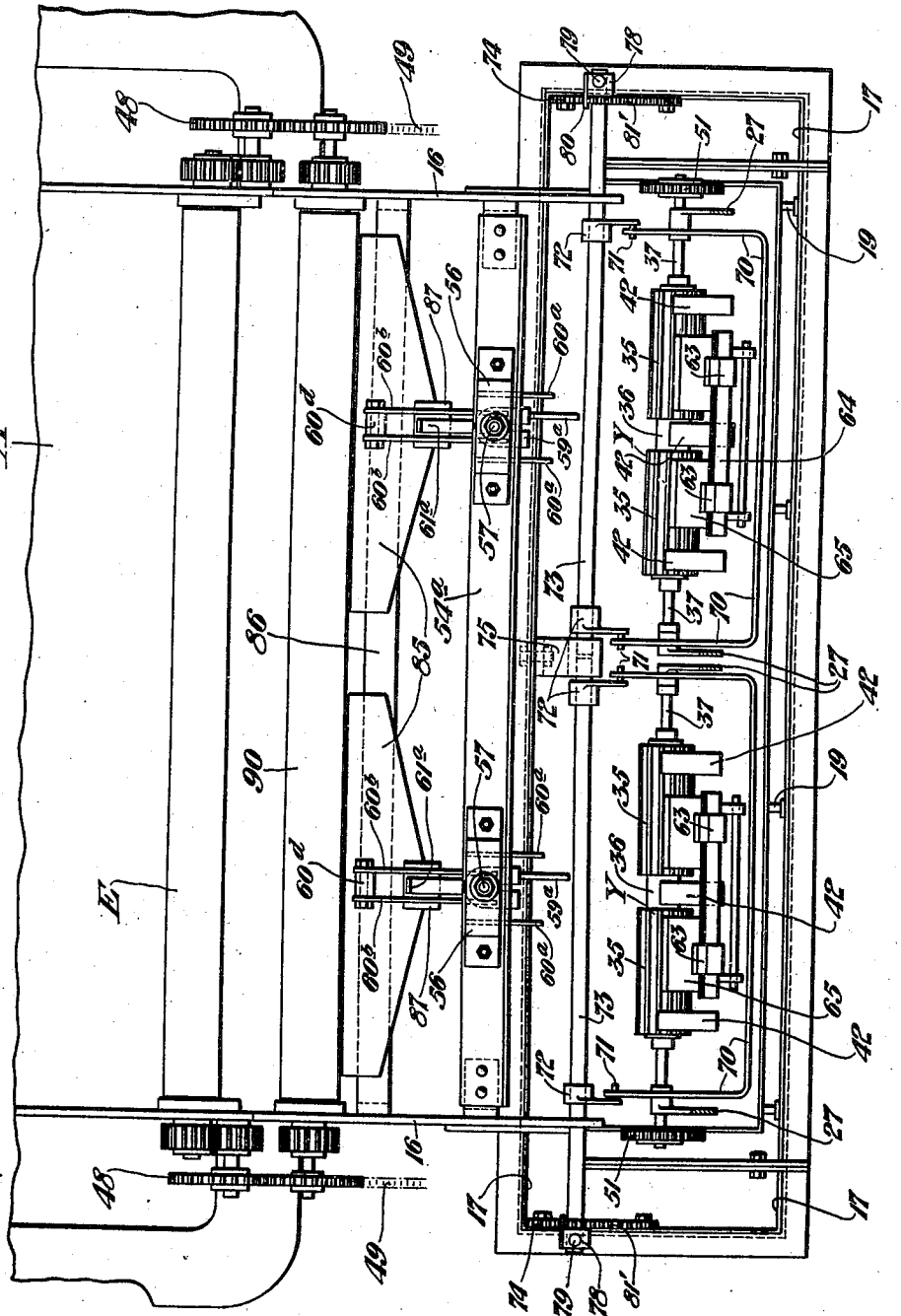


Fig. 2.

Witnesses:
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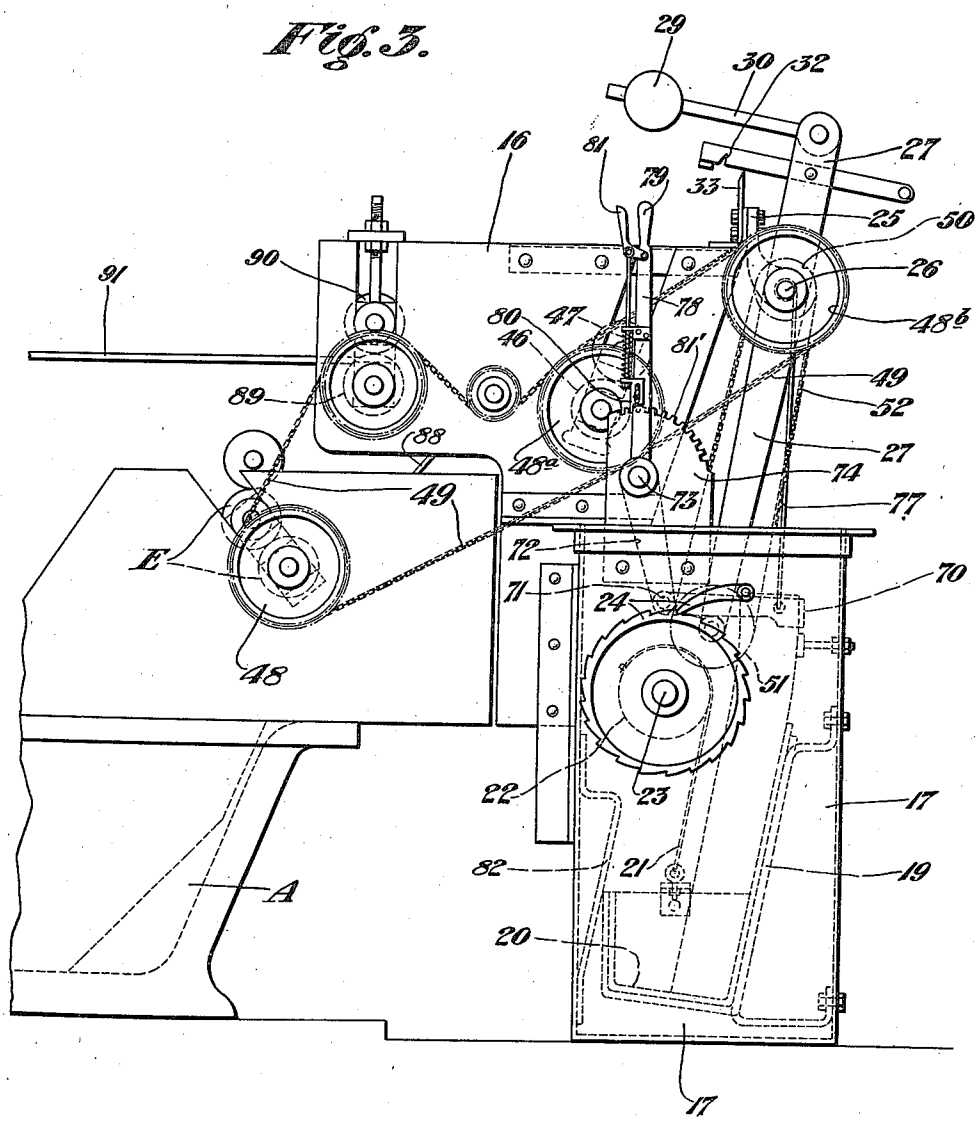
1,460,038

E. C. POOL

DEFLECTOR FOR PLATE FEEDING MECHANISMS

Filed July 28, 1922 5 Sheets-Sheet 3

Fig. 3.



Witnesses:
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June 26, 1923.

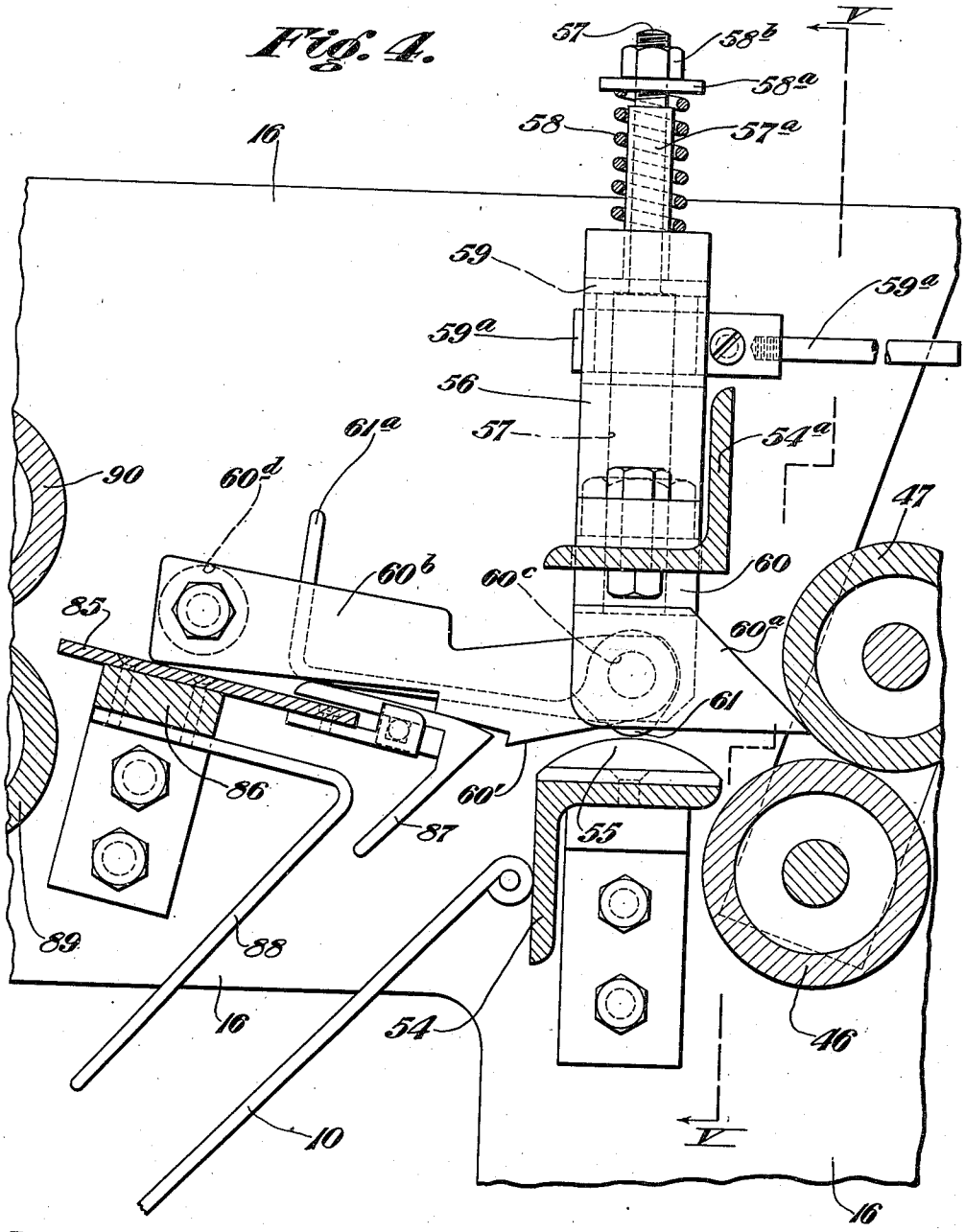
E. C. POOL

1,460,038

DEFLECTOR FOR PLATE FEEDING MECHANISMS

Filed July 28 1922 5 Sheets-Sheet 4

Fig. 4.



Witnesses:
Edwin Trueb

Inventor:
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June 26, 1923.

1,460,038

E. C. POOL

DEFLECTOR FOR PLATE FEEDING MECHANISMS

Filed July 28, 1922 5 Sheets-Sheet 5

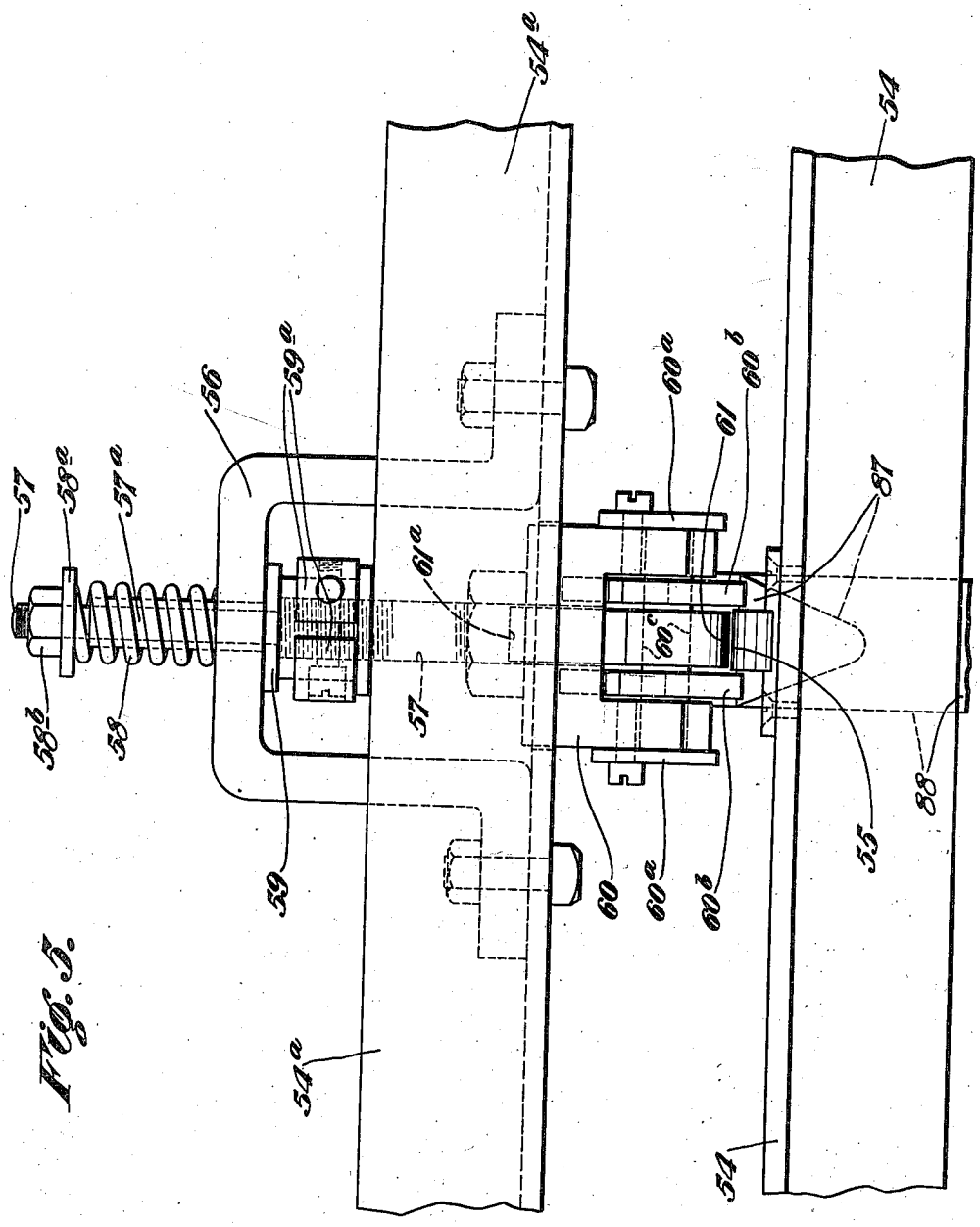


Fig. 5.

Witnesses:
Edwin Trueb

Inventor:
ELMER C. POOL,
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his Attorney.

Patented June 26, 1923. 1,460,038

UNITED STATES PATENT OFFICE.

ELMER C. POOL, OF NEW CASTLE, PENNSYLVANIA.

DEFLECTOR FOR PLATE-FEEDING MECHANISMS.

Application filed July 28, 1922. Serial No. 578,187.

To all whom it may concern:

Be it known that I, ELMER C. POOL, a citizen of the United States, and resident of New Castle, in the county of Lawrence and State of Pennsylvania, have invented certain new and useful Improvements in Deflectors for Plate-Feeding Mechanism, of which the following is a specification.

My invention relates to the manipulation of metal sheets and plates, and more particularly to the feeding of such sheets or plates, automatically, one at a time, from a pile to a tinning machine, and has for one of its objects the provision of an improved feeding mechanism such as that described in my Patent No. 1,448,711, dated March 13, 1923, having means for positively preventing more than one plate entering the tinning machine.

In automatically feeding metal plates by magnetic feeding devices or otherwise, two or more plates are often carried upward by the feeding device, and when these plates enter the tinning machine they are not properly tinned, and must be scrapped. With the present invention, means are provided for preventing more than one plate entering the tinning machine.

Another object of the present invention is to deflect or throw out the plates when a plurality of plates is fed to the tinning machine prior to their entry into the tin bath, thus preventing the scrapping of such plates since they may be again fed singly through the machine.

Referring to the drawings, Figure 1 is a sectional side elevation of my improved feeding mechanism applied to a tinning machine.

Figure 2 is a top plan of the apparatus of Figure 1.

Figure 3 is a detail side elevation of the rear portion of the device.

Figure 4 is an enlarged fragmentary sectional detail of the calipering and switching mechanism.

Figure 5 is a sectional elevation on the line V—V of Figure 4.

In the accompanying drawings, the letter A designates a tinning pot, in itself an old and approved form. The pot is separated transversely by a vertical wall or partition 2, into compartments B and C. The lower edge of this partition or septum 2, which terminates above the bottom of the tinning pot, and the upper edge of a rib or projection 3 on the bottom of the pot defines the width or vertical dimension of a narrow passage or opening D, through which the plates, while submerged in the bath of molten tin, pass from the compartment B into the compartment C of the pot A. The particular pot shown is of a width which permits of two or more plates, side by side, being passed through the tinning pot.

Located immediately above the upper edge of the compartment B, at the plate entering side of the tinning pot, are two sets of feed rollers E and F, which are arranged to receive the plates from my improved feeding mechanism to be described, and to move them forwardly and downwardly into the tin pot at an angle to the horizontal.

The feed rollers F are at a somewhat lower level than the rollers E, and an adjustable roller G is located on the discharge side of the set F to guide and direct the front end of the successive plates forwardly and downwardly and into the molten tin in compartment B, as they emerge from between the rollers F.

Positioned within the compartment B, closely adjacent to the passage D, is a set of pressure rolls I. These pressure rolls feed the plates from compartment B into the compartment C.

Two sets of feed-out rollers J and K are provided in the compartment C of pot A to feed-out the plates and also to squeeze off surplus tin from the plates.

An inclined apron plate 10 is provided at the entrance end of the compartment B of the pot to receive the plates as they are delivered from my improved feeding mechanism. Other guide plates, 12 and 13, are arranged to guide the plates through the rolls F and I, and curved guide plates 14 and 14′ form a guide N which directs the forward end of the plates emerging from the set of pressure rolls I upwardly into the bite of the lower set J of the feed-out rollers J and K.

My improved feeding mechanism is adapted to be located directly at the rear of the tinning pot and comprises a double set of parts arranged side by side so as to act on two piles of plates at one time, thereby feeding two plates, side by side, into the tinning machine.

A framework or supporting structure 16 is secured to and extends rearwardly from the tinning pot A and supports the several

parts comprising my feeding mechanism. A bosh or receptacle 17 is secured to and extends below the framework 16 and is adapted to contain a vertically adjustable plate pile holder. The plate holder comprises a back rest member 19 which is secured to the back wall of the bosh 17 and projects inwardly and downwardly on an angle, so as to slidably support an L-shaped plate retainer 20 which is of sufficient width to hold two piles of plates side by side. The plate retainer 20 is adjustably held in position and adapted to be vertically adjusted by means of a pair of chains 21, one of which is secured on each end thereof and passes upwardly over suitable sheaves 22 splined on a shaft 23 journaled in the bosh. The shaft has a ratchet and dog operating mechanism 24 on one end outside of the end wall of the bosh.

Mounted on the rear edge of the supporting framework 16 at each end and center thereof is a bracket 25 supporting a shaft 26, having four arms 27 loosely mounted thereon for pivotal movement.

The arms 27 have a plurality of cylindrical magnetic plate lifters Y journaled and supported in their lower ends, and the center arms have their upper ends counterweighted by adjustable counterweights 29 mounted on a projecting arm 30. A locking lever 31 is pivoted on the arms 27, having the counterweights adjacent their upper ends, and such lever is provided with a notch 32 to engage with the projecting tongue 33 on the frame 16 so as to hold the magnetic plate lifters Y out of plate engaging position when desired.

The magnetic plate lifters Y each comprises a permanent magnetic member 34 mounted within a pair of hollow cylindrical casings 35 which have their inner ends spaced apart and joined by a non-magnetic, cylindrical tubular member 36. Stub shafts 37 are threaded into the outer ends of the casings 35 and support the whole structure in suitable bearings formed in the lower ends of the arms 27.

The hollow cylindrical casing members 35 are formed of soft iron or other material which will readily convey the circuit or attracting forces from the permanent magnet 34, thus forming unlike poles through which a circuit will be completed when they contact with a plate.

The outer surface or periphery of the members 35 is fluted, forming a series of knife edge ribs or projections 39. It will thus be seen that each of the ribs or projections 39 will successively engage a plate as the magnet is rotated, and that projections on the opposite casings will form opposite or unlike pole contacts, and that such projections will contact with the face of the outermost plate of the pile in the retainer 20. The effect of the knife edge contacts will be to concentrate the forces of the magnet in the immediate plate and prevent the spreading of the forces through and into the next adjoining plate.

Suitable cross-beams 40—40′ are arranged from one end of the frame support 16 to the other immediately above the upper edge of the bosh, and carry suitable curved guide strips 41—42 arranged to form an upwardly and inwardly inclined passageway to guide the plates being conveyed.

A second pair of cross-beams 43—43′ is arranged forward and above the cross-beams 40, and carry other guide strips 44—45 forming a second passage-way adapted to receive the plates from the passage-way between the strips 41—42, and direct them forwardly and upwardly between suitable pinch rollers 46 and 47 of any well-known construction.

The lower one of the pair of pinch rollers E is driven by a suitable source of power and carries a sprocket 48 on each end. Pinch roller 46 also carries a sprocket 48^a on each end in line with the sprocket 48, and a third sprocket 48^b is mounted on each end of the shaft 26 in line with the sprockets 48 and 48^a A link chain 49 is trained about the sprockets 48, 48^a, 48^b, thus driving the pinch rollers E, pinch rollers 46 and 47, and shaft 26 at the same speed. It will be understood that if found desirable in practice, one set of drive sprockets may be used on one side of the machine.

A pair of sprockets 50 of somewhat smaller diameter than the sprockets 48, 48^a, 48^b is mounted on the ends of the shaft 26, and a sprocket 51, of greater diameter than the sprockets 50, is mounted on the end of the outside stub shafts 37 of each magnetic conveyer, and a chain 52 is trained over the sprockets 50 and 51 to constantly drive the conveyer members, which will necessarily revolve at a lesser speed than the pinch rollers E and pinch rollers 46, 47, due to the difference in size of the sprockets 50 and 51.

Magnetic separators X are mounted above each of the magnetic plate lifters Y and comprise a rectangular casing member 63 hingedly or pivotally supported on the cross-beam 40. The casings 63 contain a permanent magnet 64 and are provided with blade or knife edge poles 65 which extend into the path of the lifted plates and contact with the rear faces thereof. The magnet 64 is of less strength than the magnets of the plate lifter Y, and, therefore, will not materially retard the movement of the plates, yet it is of sufficient strength that if two plates should stick or in some manner be lifted together, it will retard the movement of the second plate, and thus separate them.

A further means for preventing the feed-

ing of more than a single plate into the tinning pot is located just to the rear of the pinch rollers 46—47, and comprises a shaft 67 journaled in the frame support 16 and having a plurality of locking fingers 68 secured thereon of triangular shape, and of such size that their flat sides will extend past the guide strips and into the path of the lifted plates. As the plates are guided between the strips 44 and 45, they will bear against the upper strips 44 due to the direction of their travel, and in this position they will strike the fingers 68 and cause the shaft and fingers to rotate one-third of a revolution, thereby presenting one of the other faces of the fingers against the plate. If a second plate is overlapped on the first in such a manner that its forward edge is disposed to the rear of the forward edge of the first plate, it will strike the fingers and be held, since the fingers cannot again rotate until the first plate has passed from under the fingers.

Another feature and function of these fingers is that they will cause an even feed of the plates from both of the magnetic feed rollers Y, since if one roller feeds a plate in advance of the other, the first to reach or strike the fingers 68 will rotate them the one-third turn, and then lock them against rotation until it has passed from thereunder, and the plate that is in the rear will be held until the fingers are again freed when another plate will be presented by the other magnetic feed roller to follow the one just clearing the fingers, thus causing the newly presented plate, and the held plate to pass together to the rollers 46—47.

A still further means for preventing the feeding of double sheets to the tinning pot is located forward of the fingers 68 and this means acts as a trap so that if more than one plate passes therethrough they will be trapped and thrown out so they may be salvaged and again fed through the machine.

This mechanism, which is in the form of a calipering mechanism, comprises a pair of supporting angle members 54—54ª. The lower member 54 is provided with a pad 55 forming the bottom calipering surface. The upper member 54ª has an inverted U-shaped supporting bracket member 56 secured to its upper face which serves to form a supporting bearing for a calipering bolt 57 which passes through a suitable flanged sleeve 57ª mounted in an aperture in the upper side of the member 56. A spring 58 is mounted around the sleeve 57ª and has its lower end bearing against the bracket 56 and its upper end bearing against a suitable bearing disk or washer 58ª mounted on the bolt 57 and adjustably held in position by a nut 58ᵇ.

A caliper adjusting nut 59 is mounted on a finely threaded section of the bolt 57 immediately below the member 56 and its upper end bears against the flange of sleeve 57ª. A suitable handle 59ª is secured to the nut 59 so that it may be readily turned. It will be readily seen that any movement of the nut will raise or lower the bolt 57.

An inverted U-shaped supporting member 60 is mounted on the lower end of the bolt 57 and serves as a support for the trapping and upper plate calipering mechanism. The member 60 has plate guides 60ª secured to the outer faces of its side portions, which guides serve to deflect and guide the plates between the calipering mechanism.

A pair of sheet deflectors 60ᵇ are pivotally mounted on a pivot pin 60ᶜ mounted in the member 60. The deflectors 60ᵇ extend rearwardly an appreciable distance and have a counterweight 60ᵈ secured thereto which normally tends to hold them in their lowermost position. The lower faces of the deflectors 60ᵇ have their forward portions inclined downwardly to form a deflecting surface.

A calipering cam 61 is mounted on the pin 60ᶜ and forms the upper calipering surface. A counterweighting lever portion 61ª of the cam 61 extends rearwardly and serves to normally hold the cam in its lowermost position and also bears against the switch tongue 87 to hold it in raised position.

With the bolt 57 adjusted so that the cam 61 is spaced just sufficiently above the pad 55 to permit a single plate to pass therethrough, if more than one plate is passed under the cam they will engage and rock the cam, thus causing the cam to rotate around sufficiently to clear the plates and allow them to pass freely between the calipering surfaces. Also when the cam is rotated the lever portion 61ª will be lifted from the switch tongue 87 and allow it to drop into the path of the oncoming plates.

The switch tongue 87 is a part of the trapping mechanism which comprises a switch plate 85 rigidly secured on a supporting bar 86, and having the switch tongue 87 pivotally mounted on the forward end thereof for vertical movement relatively thereto. The switch tongue is normally held in raised position. That is, in a plane above the portion 60′ of the deflectors 60ᵇ by the lever portion 61ª of the cam 61 which rests upon the rear edge of the tongue.

It will be readily seen that when two or more plates pass between the calipering faces of the mechanism the cam 61 will be rocked so as to lift the lever portion 61ª and allow the switch tongue to drop, thus intercepting the plates and guiding or deflecting them over the switch plate 85.

A guide plate 88 is secured to the under side of the bar 86 and extends downwardly on an angle to guide the single plates into the bite of the rolls E.

The switch plate 85 serves to guide the deflected or trapped plates into the bite of

a pair of pinch rollers 89—90 which in turn feed them onto a suitable retainer or platform 91 from which they may be taken by the operator and again fed through the machine.

It will be, of course, understood that the above calipering and trapping mechanism is duplicated for each tinning pot. That is, each set of feeding mechanism has its own calipering and trapping mechanism. Therefore, since a double tinning pot and double set of feeding mechanism is shown in the drawings there is also shown two sets of the calipering and trapping mechanism.

As the plate lifters Y are rotated to feed the plates from the pile or pack, it becomes necessary to renew the pack from time to time and in order to do so without interfering with the operation of the machine, I have provided a pack shifting or handling mechanism which comprises a pair of U-shaped yoke members 70 having their side arms pivotally mounted as at 71 to the lower ends of levers 72, which have their other ends keyed or otherwise secured to operating shafts 73 which have their outer ends journaled in rack plates 74 and their inner ends journaled in a single double bracket 75 which bracket is secured to the forward wall of the bosh 17 by bolts 76 or the like.

Each of the operating shafts 73 extends beyond the rack plates 74 which are bolted to and extend upwardly from the end walls of the bosh 17.

A suitable operating lever 78 is secured to the outer end of each of the shafts 73 and is provided with a hand grip 79 for the operator to grasp.

The side arms of the U-shaped yoke members 70 normally rest upon and ride across the shoulders or bearing bosses 27^a on the lower ends of arms 27, in which the stub shafts 37 of plate lifters Y are journaled.

It will be readily apparent that when the operator grasps the lever 78 and rocks it in a forward direction it will so rotate the shaft as to move the yoke 70 rearwardly. As the yoke is moved rearwardly the operator will either grasp the yoke itself and manually lift it upwardly to clear the pack of plates being fed into the machine and then let it drop behind said pack, or he will grasp the flexible cable or chain 77 which has its one end secured to the one side bar of the yoke and its other end secured to the shaft 26, and thus lift the yoke.

In order to hold the yoke in various adjustable positions, a spring-pressed pawl 80 having operating handle or drop 81 is mounted on the lever 78 and is adapted to be engaged in the upper serrated or toothed edge 81′ of rack plate 74.

When the operator desires to renew the pack of plates he will move the yoke for that pack rearwardly and lift it over the pack as described above. He will then move or rock the lever 78 rearwardly so as to move the yoke forwardly, which will pull the remaining plates of the pack with it, and when the pack has been moved forward to the desired position, he will release the pawl 80 and lock the yoke in position. He may then renew the pack by adding plates to the rear of the original pack. When sufficient plates have thus been added, the yoke will be moved rearwardly and disengaged from the original pack.

A forward rest 82 is secured to the forward wall of the bosh 17 to prevent the plates being tilted forward beyond a point where they may be operatively engaged by the plate lifters Y.

The operation of my improved feeding mechanism will be readily understood from the above description taken with the accompanying drawings. The peculiar and novel construction of magnetic plate lift will cause the magnetic forces to be concentrated on a single plate of the pile and will lift it through the guide passages to the pinch rollers 46—47, which will in turn feed it to the pinch rollers E of the tinning pot.

The operations of the three separate mechanisms for preventing more than one plate being carried to the tinning pot, have also been fully described above, and will not be gone into again, although these mechanisms are important features and are distinct improvements over any devices heretofore known. The calipering trip and trapping mechanism being particularly novel and forming the subject matter of the following claims.

It will be readily understood that while I have described my invention in combination with a tinning pot, it is not limited to such use, but may be used wherever it is desired to feed single plates, and therefore I do not wish to be limited to such a combination.

I claim:—

1. In an automatic plate feeding mechanism, a pair of calipering members, means for feeding said plates from a pack, a switch member pivotally mounted for vertical movement at a point forward of said calipering members, said switch member being normally held in its upper position out of the path of travel of said plates by one of said calipering members, said calipering member being adapted to be moved upwardly away from said switch by the plates when more than one plate passes between the calipering members, whereby said switch member will fall into the path of travel of the plates and deflect them out of their normal path.

2. In an automatic plate feeding mechanism, a pair of calipering members, means

for feeding said plates from a pack, a switch member pivotally mounted for vertical movement at a point forward of said calipering members, said switch member being normally held in its upper position out of the path of travel of said plates by one of said calipering members, said calipering member being adapted to be moved upwardly away from said switch by the plates when more than one plate passes between the calipering members, whereby said switch member will fall into the path of travel of the plates and deflect them out of their normal path, means for receiving the plates deflected by said switch, and pinch rollers for conveying the deflected plates away from said switch.

3. In an automatic plate feeding mechanism, a pair of calipering members, means for feeding said plates from a pack, a switch member pivotally mounted for vertical movement at a point forward of said calipering members, said switch member being normally held in its upper position out of the path of travel of said plates by one of said calipering members, said calipering member being adapted to be moved upwardly away from said switch by the plates when more than one plate passes between the calipering members, whereby said switch member will fall into the path of travel of the plates and deflect them out of their normal path, a switch plate forward of said switch adapted to receive and support the deflected plates, a pair of pinch rollers adapted to receive and convey the plates forwardly away from said switch, and a platform for receiving the plates from said rollers.

4. In an automatic plate feeding mechanism, a pair of calipering members, the lower of said members being rigid and the upper of said members being vertically adjustable, said last named member being cam shaped and revolvable about a fixed horizontal axis, a counterweighting lever on said cam shaped member, a switch member pivotally mounted for vertical movement forward of said calipering members and normally held out of the path of travel of the plates passing between said calipering members by said counterweighting lever, said lever being adapted to be rocked upwardly from said switch and thereby release said switch for downward movement into the path of travel of the plates when more than one plate passes between said calipering members.

5. In an automatic plate feeding mechanism, a pair of calipering members, the lower of said members being rigid and the upper of said members being vertically adjustable, said last named member being cam shaped and revolvable about a fixed horizontal axis, a counterweighting lever on said cam shaped member, said cam shaped member being adapted to be rocked about its fixed axis by the friction of two or more plates passing between the calipering members, a switch member pivotally mounted for vertical movement forward of said calipering members and normally held against downward movement by said lever on said cam shaped calipering member, said switch being adapted to automatically move downwardly into the path of the plates when said upper cam shaped member is rocked by two or more plates passing between the calipering members, and means for receiving the plates deflected out of their normal path by said switch.

6. In an automatic plate feeding mechanism, a pair of calipering members, the lower of said members being rigid and the upper of said members being vertically adjustable, said last named member being cam shaped and revolvable about a fixed horizontal axis, a counterweighting lever on said cam shaped member, said cam shaped member being adapted to be rocked about its fixed axis by the friction of two or more plates passing between the calipering members, a switch member pivotally mounted for vertical movement forward of said calipering members and normally held against downward movement by said lever on said cam shaped calipering member, said switch being adapted to automatically move downwardly into the path of the plates when said upper cam shaped member is rocked by two or more plates passing between the calipering members, pinch rollers for receiving and conveying the plates deflected out of their normal path by said switch, and means for receiving the plates from said pinch rollers.

7. In an automatic plate feeding mechanism, a pair of calipering members, means for feeding said plates from a pack, a switch member mounted forward of said calipering members and normally tending to intercept the plates passing between said calipering members, one of said calipering members being adapted to lock said switch member in position out of the path of travel of said plates and to automatically release said switch when two or more plates pass between said calipering members and means for adjusting one of said calipering members to accommodate plates of varying thickness.

In testimony whereof I have hereunto signed my name.

ELMER C. POOL.