July 10, 1923. 1,461,358

C. A. KLOMAN

PLATE FEEDING MECHANISM

Filed May 25, 1921 2 Sheets-Sheet 1

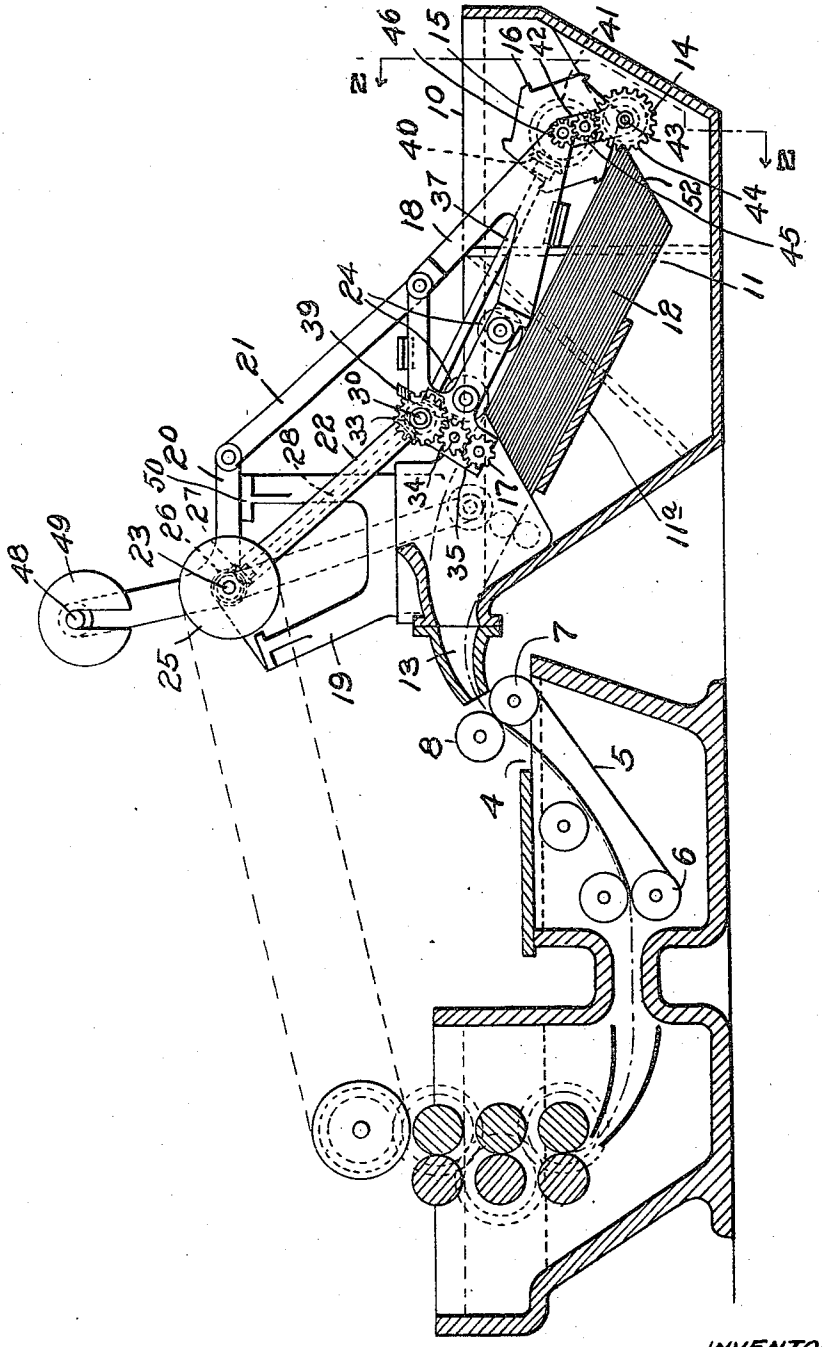


FIG. 1.

WITNESSES

J. Herbert Bradley.

INVENTOR

Charles A. Kloman

by Drew & McCalister

his attorneys in fact.

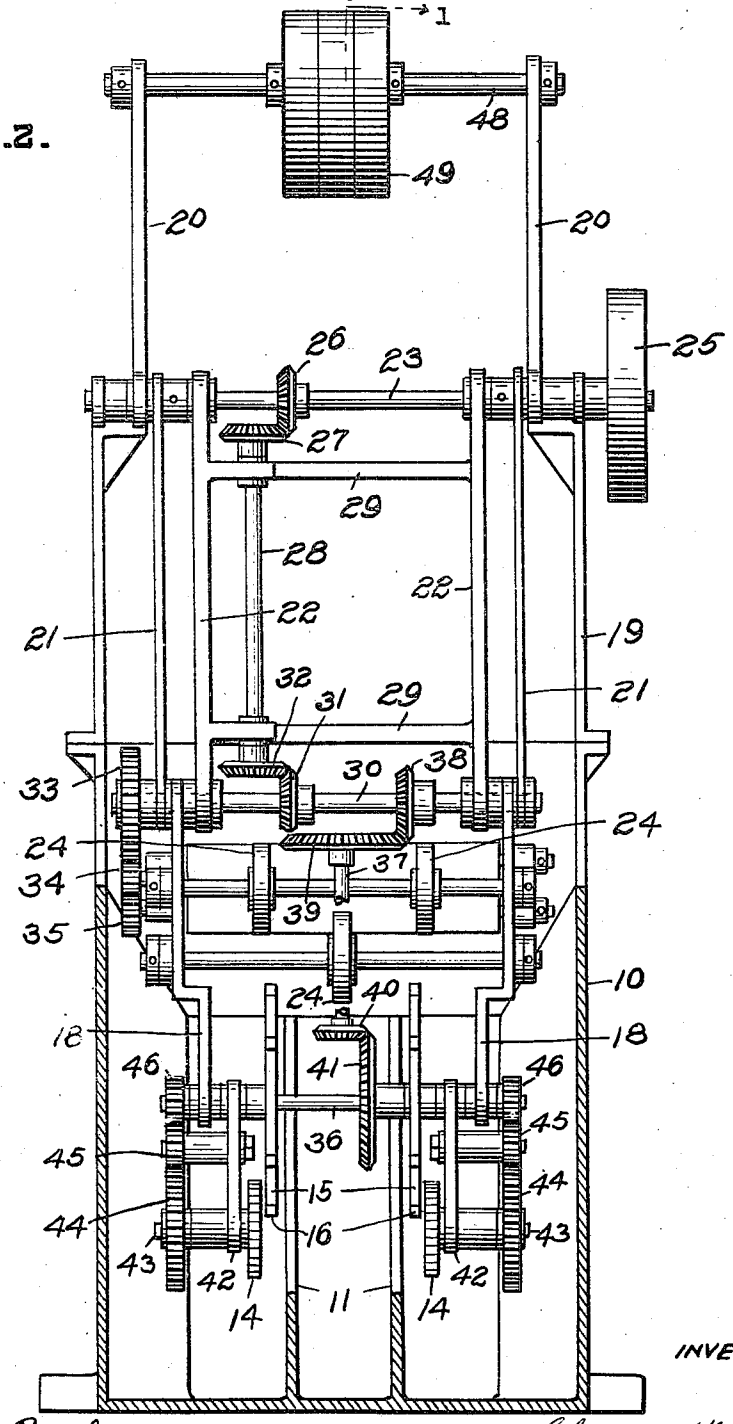
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PLATE FEEDING MECHANISM

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FIG. 2.



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UNITED STATES PATENT OFFICE.

CHARLES A. KLOMAN, OF BELLEVUE, PENNSYLVANIA, ASSIGNOR TO THE COLONIAL ENGINEERING COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF DELAWARE.

PLATE-FEEDING MECHANISM.

Application filed May 25, 1921. Serial No. 472,496.

To all whom it may concern:

Be it known that I, CHARLES A. KLOMAN, a citizen of the United States, and a resident of Bellevue, in the county of Allegheny and State of Pennsylvania, have made a new and useful Invention in Plate-Feeding Mechanism, of which the following is a specification.

This invention relates to means for feeding metal sheets or similar material to a machine or apparatus for treating them.

An object of the invention is to produce simple and improved means for feeding separate sheets or metal plates from a stack of sheets or plates to an apparatus such as a tinning machine.

A further object is to produce a sheet or plate-feeding machine which will feed sheets or plates from a stack and automatically adjust itself with relation to the sheet or plate to be fed as the supply diminishes.

A further object is to produce a sheet or plate-feeding apparatus which eliminates the necessity of handling separate sheets or plates and which will deliver successive plates to rolls or other receiving devices.

A further object is to produce a feeding mechanism for sheets or plates which is adapted to receive a stack of sheets or plates to feed the plates, one at a time, from the top thereof and to automatically adjust its position to compensate for the diminishing height of the stack.

A further object is to produce a tinning machine in which means are employed for automatically feeding sheets or plates from a stack and for delivering the sheets, one at a time, through the tin pot of the machine in such a way as to obtain the advantages gained by hand feeding sheets or plates to the tin pot of such a machine.

These and other objects are attained by means of apparatus herein described and illustrated in the drawings accompanying and forming a part hereof.

In the drawings, Figure 1 is a longitudinal section along the line 1—1 of Fig. 2. Fig. 2 is a sectional view along the line 2—2 of Fig. 1, a portion of the plan being distorted for convenience of illustration.

In the drawings, I have diagrammatically illustrated a tin box provided with a sheet or plate-feeding mechanism. The tin box is similar in details of construction to the apparatus disclosed in a co-pending application Serial No. 414,857, filed by me October 5, 1920. The apparatus includes a flexible conveyor which extends from a feed port 5 downwardly through the tin pot and is mounted on driving rollers 6 and 7. A roller 8 co-operates with the driving roller 7 in receiving and delivering plates to the flexible conveyor 5. The feeding mechanism illustrated is adapted to feed separate plates or sheets to the rollers 7 and 8 or to any other device arranged to receive and deliver sheets or plates.

The feed mechanism illustrated includes a box 10 having inclined ribs 11 located therein which are adapted to receive a stack of plates and to so support them that the axis of the stack is inclined to the vertical and the forward edge of each plate projects beyond the forward edge of the plate next below it. The ribs are spaced apart, the plate supporting edges of each rib forming at an angle, such that the rear portion is inclined downwardly toward the front of the box 10 and the forward portion is inclined upwardly toward the front of the box, for the purpose of forming guides against which the forward edges of the plates abut. A plate 11^a is inset in the downwardly-extending portion of the ribs for the purpose of forming a support for the major portion of the stack and thereby preventing sagging. The box is adapted to contain water and is provided with a guide-way or delivery passage 13 through which the plates are delivered to the plate-receiving devices 7 and 8. As shown in the drawings, feeding devices are so arranged that they will engage the uppermost plate of the stack 12 and propel it through the guide-way or passage 13 to the devices 7 and 8. As illustrated, the feeding device includes two rolls 14 which are adapted to engage the forward edge of the uppermost plate and to lift the edge of the plate off the stack to a position where it is engaged by rotatable discs 15 having plate-engaging fingers or teeth 16 formed thereon. The discs 15 are so located that their teeth engage the plates at points adjacent the lateral edges thereof and slide the plates across the stack into engagement with a pair of feed rollers 17 which are driven in such direction as to continue the movement of the

plate in the direction imparted to it by the discs 15 and to finally deliver it through the passage 13 to the rollers 7 and 8.

For the purpose of causing the feed mechanism to automatically adjust itself with relation to the uppermost plate of the stack, I have so mounted it that its position is determined by the height of the stack of plates and its movement in response to the decreasing size of the stack is in a direction substantially parallel to the inclination of the stack as determined by the position of the forward edges of the plates composing the stack. This is accomplished by operatively connecting the feed mechanism to a stationary frame by means of a system of links and levers designed to occasion a straight line movement of the feed mechanism.

As shown, the discs 15 and the feed rolls 17 are mounted on a frame 18 which is pivotally secured to a stationary frame 19 by means of a pair of pivoted bell cranks 20 and parallel links 21 and 22. Each link 21 is pivotally connected to the forward end of one of the bell cranks 20 and is also pivotally connected to the frame 18. The bell cranks are pivotally mounted on a shaft 23 journaled on the stationary frame 19 and extending transversely of the frame 18. The links 22 are pivotally mounted on the shaft 23 and are pivotally connected to the frame 18. The arrangement is such that each co-operating pair of links 21 and 22 is so located and arranged with reference to the frame 18 that the points of pivotal connection of those links with the frame 18 define a line parallel to the points of pivotal connection of the link 22 with the shaft 23 and the links 21 with the bell cranks 20. With such an arrangement, the pivotal points of the links will always define a parallelogram and the frame 18 will move in a straight line as long as the bell crank 20 is held stationary.

The frame 18 is normally supported on the uppermost plate of the stack 12 by means of rollers 24, three of which are shown in Fig. 2. As illustrated, power is delivered to the feed mechanism by means of the shaft 23, which may be equipped with a pulley 25 for that purpose. As shown, a bevel gear 26 is rigidly mounted on the shaft 23 and engages a bevel gear 27 mounted on a shaft 28. The shaft 28 is journaled in a rigid frame composed of links 22 and cross members 29 rigidly securing those links together. As clearly shown in Fig. 2, the lower ends of the links 22 engage a shaft 30 which is journaled in the frame 18 and which is provided with a bevel gear 31 meshing with a bevel gear 32 mounted on the lower end of the shaft 28. The feed rollers 17 are journaled on the frame 18 and are driven by means of a gear 33 mounted on the shaft 30 and intermeshing gears 34 and 35 mounted on the axles of the rollers 17. The discs 15 are mounted on a shaft 36 journaled in the frame 18. Power is delivered to this shaft from the shaft 30 by means of a transverse shaft 37 and bevel gears 38, 39, 40 and 41. The bevel gears 39 and 40 are mounted on opposite ends of the shaft 37, whereas the bevel gear 38 is mounted on the shaft 30 and the bevel gear 41 is mounted on the shaft 36. The pick-up rolls 14 are driven from the shaft 36 but each roll is journaled on a separate hanger 42 which is pivotally mounted on the forward end of the frame 18, the pivot point of each hanger 42 being concentric with the shaft 36. As shown, each hanger is pivoted on the shaft 36 or a sleeve through which that shaft extends. Each pick-up roll 14 is mounted on a shaft 43 which is journaled in a suitable bearing carried by the hanger 42 and is provided with a gear 44 which meshes with an idler gear 45 also journaled on the hanger. The idler gear meshes with a gear 46 mounted on the shaft 36.

With this arrangement of driving mechanism, the pick-up rolls, the plate-advancing discs and the feed rollers 17 are operatively connected to the drive shaft 23 for all positions of the frame 18 and consequently are adapted to feed successive plates from the top of the stack as long as the rollers 24 are in engagement with the stack.

As shown in Fig. 2, the bell cranks 20 are secured together by means of a transverse bar 48 which is adapted to receive counterbalancing weights 49. A stationary rest 50 is provided on the frame 19 for limiting the forward swing of the bell crank and for holding it in the normal operating position. The rest is so positioned with relation to the stack-supporting elements of the box 10 that the frame 18 will move in the desired direction in response to the decreasing size of the stack.

The operation of the feed mechanism is as follows: The frame 18 is lifted out of the box for the purpose of giving free access to the interior of the box. This lifting movement causes the bell cranks to turn about the shaft 23, raising their forward arms off the rest 50. The counterweights 49 are adapted to hold the bell cranks in this position and to thereby hold the frame 18 elevated. A stack of plates is then placed in the box 10 on the inclined ribs 11, the forward edges of the plates being moved into engagement with the forward and upwardly-inclined portion of the ribs which are designed to hold the stacks in position and at the same time to permit the frame and the associated devices to move downwardly between them. Power is then applied to the feed mechanism through the pulley 25 and the frame 18 is swung downwardly until the

rollers 24 engage the uppermost plate of the stack. The hanger bars 43 are so located that the pick-up rollers 14 normally swing into engagement with the forward edge of the uppermost plate. These pick-up rolls are so geared that their plate-engaging surfaces move upwardly and, while this surface is capable of sliding with relation to the edge of the plate engaged, it lifts the forward edge of the plate above the stack and holds it in the line of travel of the teeth or fingers 16 formed on the discs 15. The discs are so driven by the shaft 36 that they propel the plates engaged by them rearwardly across the stack until they are engaged by the oppositely rotating feed rolls 17. The feed rolls continue the motion of the plate and deliver it at an increased speed through the passage 13 as has been described. The speed of rotation of the discs 15 is such that each plate is delivered to the feed rolls immediately after the preceding plate has left the feed rolls. As the successive plates move out from below the rollers 24, the frame 18 drops down to a new position, thereby moving the discs 15 and the pick-up rolls 14 downwardly. Under such conditions the discs 15 are incapable of engaging a plate until the plate previously engaged by them has passed beyond the supporting rollers 24.

By inclining the stack in the manner disclosed so that each plate is inclined upwardly towards the guideway 13, the delivery of each plate is greatly facilitated, since each plate rests in the plane of its initial motion, thereby obviating the necessity of changing the direction of its motion after it starts to move. In addition to this, the plate is moved edgewise through the water in the box and this materially reduces its resistance to motion.

It will, of course, be apparent that the feed mechanism may be built in multiple so that several units such as illustrated and described may be located side by side and operate to deliver plates from separate stacks located in the box 10. With such an arrangement the separate units may be driven from the shaft 23. It will, of course, be apparent that any suitable means may be employed for delivering water to the box 10 and for maintaining a desired water level.

While I have described and illustrated but one embodiment of my invention, it will be apparent to those skilled in the art that various changes, modifications, additions, omissions and substitutions may be made in the apparatus illustrated without departing from the spirit and scope of the invention, as set forth by the appended claims.

I claim as my invention:

1. In a plate-feeding machine, means for supporting a stack of plates, pick-up rolls for engaging one edge of the upper plate of the stack and for lifting it above the stack, and means for engaging the elevated edge of the plate and for sliding the plate across the stack.

2. In a plate-feeding machine, means for supporting a stack of plates so that the edge of each plate on one side of the stack projects beyond the edge of the next lower plate, a pick-up roll for engaging the projecting edge of the uppermost plate and for holding it elevated above the stack, and means for engaging the elevated edge and for moving the uppermost plate across the stack.

3. In a plate-feeding machine, means for supporting a stack of plates so that the edge of each plate on one side of the stack projects beyond the edge of the next lower plate, a pick-up roll for engaging the projecting edge of the uppermost plate and for holding it elevated above the stack, means for engaging the elevated edge and for moving the uppermost plate across the stack, and feed rollers for engaging the plate so moved and for delivering the plate from the stack.

4. In a plate-feeding machine, means for supporting a stack of plates with an edge of each plate overhanging the adjacent edge of the plate next below, a plate-feeding mechanism adapted to engage the uppermost plate of the stack and including means for lifting the overhanging edge of the uppermost plate above the stack, means for engaging the elevated edge and feeding the plate across the stack, and means for causing the feeding mechanism to move relatively to the stack in a line substantially parallel to the plane defined by the overhanging edges of the plates.

5. In a plate-feeding machine, a liquid container, means for supporting a stack of plates in an inclined position within said container and below the liquid therein, with each plate inclined to the horizontal and with an edge of each plate overhanging the adjacent edge of the plate next below, a plate-feeding mechanism engaging the uppermost plate of the stack and movable towards the bottom of the stack a pick-up device carried by the feeding mechanism for elevating the overhanging edge of the uppermost plate above the stack and plate-propelling means for engaging the elevated edge of the uppermost plate and for propelling the plate across the stack.

6. In a plate feeding mechanism, means for supporting a stack of plates, so that the edge of each plate on one side of the stack projects beyond the edge of the next lower plate, a pick-up roll for engaging the projecting edge of the uppermost plate and for holding it elevated above the stack, means for engaging the elevated edge of the up-

permost plate while said plate is engaged by said pick-up roll and for moving the plate across the stack, and means engaging the plate while being so moved and for delivering it from the stack.

7. In a plate feeding machine, means for supporting a stack of plates in inclined relation so that one edge of each plate overhangs the edge of the plate next below, a continuously rotating pick-up roll adapted to engage the overhanging edge of the topmost plate, and to elevate the edge above the pile, a rotating conveyor adapted to engage the elevated edge of the plate, move it across the pile, and means receiving the plate so moved for continuing the motion thereof and thereby delivering the plate from the pile.

8. In a plate feeding machine, means for supporting a stack of plates in inclined relation so that one edge of each plate overhangs the adjacent edge of the plate next below, a frame supported by said stack, pick-up roll adapted to engage the overhanging edge of the uppermost plate, a member pivotally mounted on the frame in which said pick-up roll is journaled, a rotatable plate conveyor mounted on the frame, for engaging the elevated edge of the plate engaged by the pick-up roll and for conveying the plate so engaged across the stack, and means mounted on the frame for driving pick-up roll and said conveyor.

9. In a plate feeding machine, means for supporting a stack of plates in inclined relation so that the forward edge of each plate overhangs the forward edge of the plate next below, a movable frame, a depending member pivotally mounted on said frame, a pick-up roll journaled on said member and adapted to swing into engagement with the forward edge of the uppermost plate, a rotatable conveyor for engaging the forward edge of the plate and for moving the plate rearwardly across the stack, and means mounted on the frame for rotating the conveyor and the pick-up roll.

10. In a plate feeding machine, means for supporting a stack of plates in inclined relation, so that one edge of each plate overhangs the edge of the plate next below, a frame, a rotatable conveyor mounted on the frame, a rotatable pick-up roll mounted on the frame and adapted to engage and lift the overhanging end of the uppermost plate of the stack and hold it in the path of said conveyor, and means for moving the frame parallel with the projected axis of the inclined stack as plates are removed from the stack.

11. In a plate feeding machine, means for supporting a stack of plates in inclined relation, so that a corresponding edge of each plate of the stack overhangs the edge of the plate next below, a frame movable along a line parallel with the axis of the inclined stack, a rotatable conveyor mounted on the frame, and a rotatable pick-up roll mounted on the frame and adapted to engage and lift the top plates in the path of travel of the conveyor as the stack diminishes.

12. In a plate feeding machine, means for supporting a stack of plates in inclined relation, so that a corresponding edge of each plate of the stack overhangs the edge of the plate next below, a frame, a conveyor mounted on the frame, a rotatable picker-roll mounted on the frame and adapted to successively engage and move the topmost plate of the stack into the line of travel of the conveyor, means for guiding the movement of the frame parallel to the overhanging edges of the stack and means mounted on the frame for driving the picker-roll and conveyor.

13. In a plate feeding machine, means for supporting a stack of plates in inclined relation, so that a corresponding edge of each plate of the stack overhangs the edge of the plate next below, a pivotally mounted frame, a conveyor carried by the frame, for moving plates across the stack, a picker-roll mounted on the frame, means for guiding the motion of the frame parallel to the line defined by the overhanging edges of the stack and means for counterbalancing the weight of the pivoted frame.

In testimony whereof, I have hereunto subscribed my name this 23rd day of May, 1921.

CHARLES A. KLOMAN.