Mar. 13, 1923. 1,448,716

E. C. POOL

DEFLECTOR FOR PLATE FEEDING MECHANISMS

Filed Aug. 17, 1921 5 sheets-sheet 1

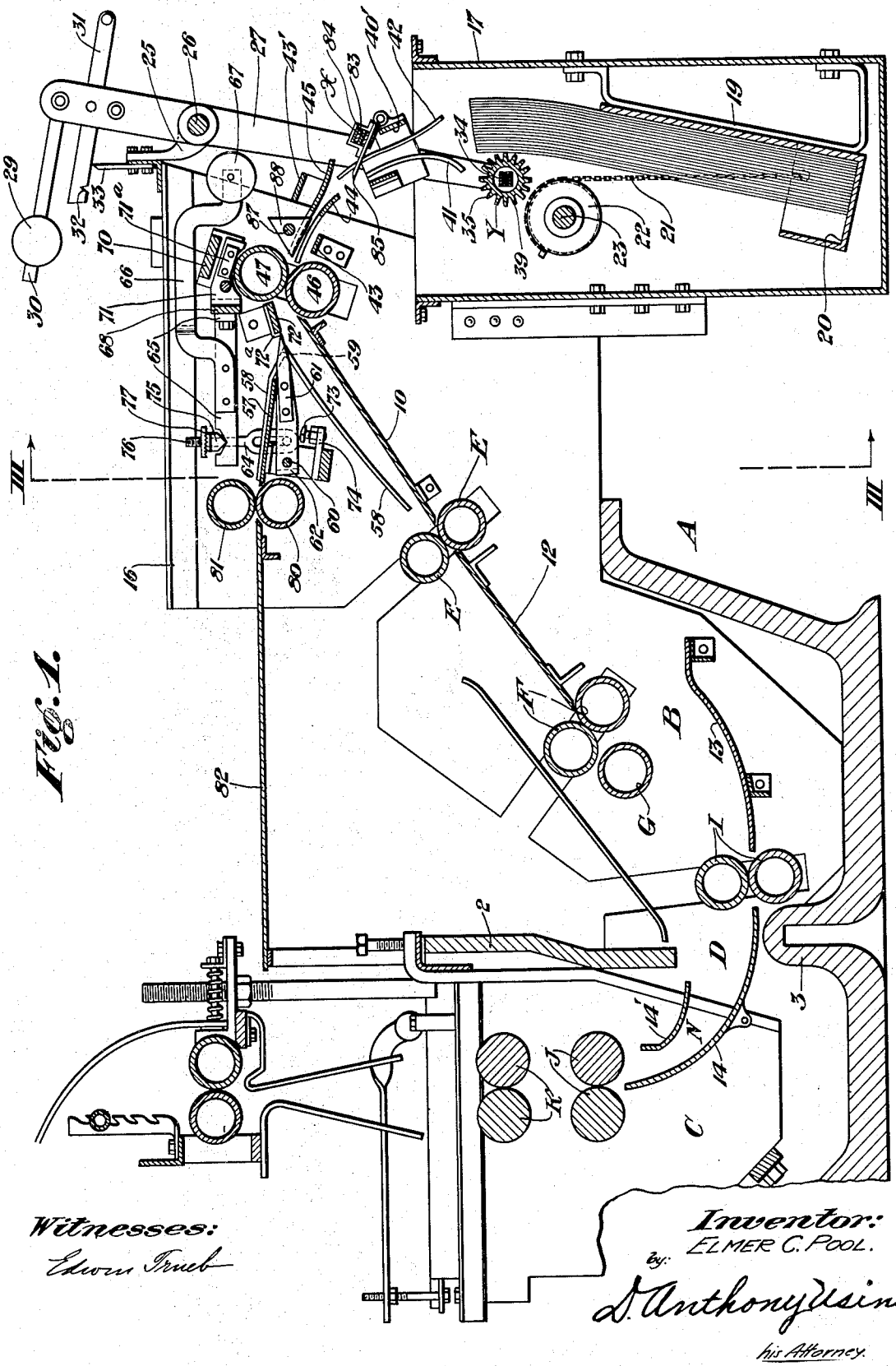


Fig. 1.

Witnesses:
Edwin Trueb

Inventor:
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D. Anthony Iusina
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DEFLECTOR FOR PLATE FEEDING MECHANISMS

Filed Aug. 17, 1921 5 sheets-sheet 2

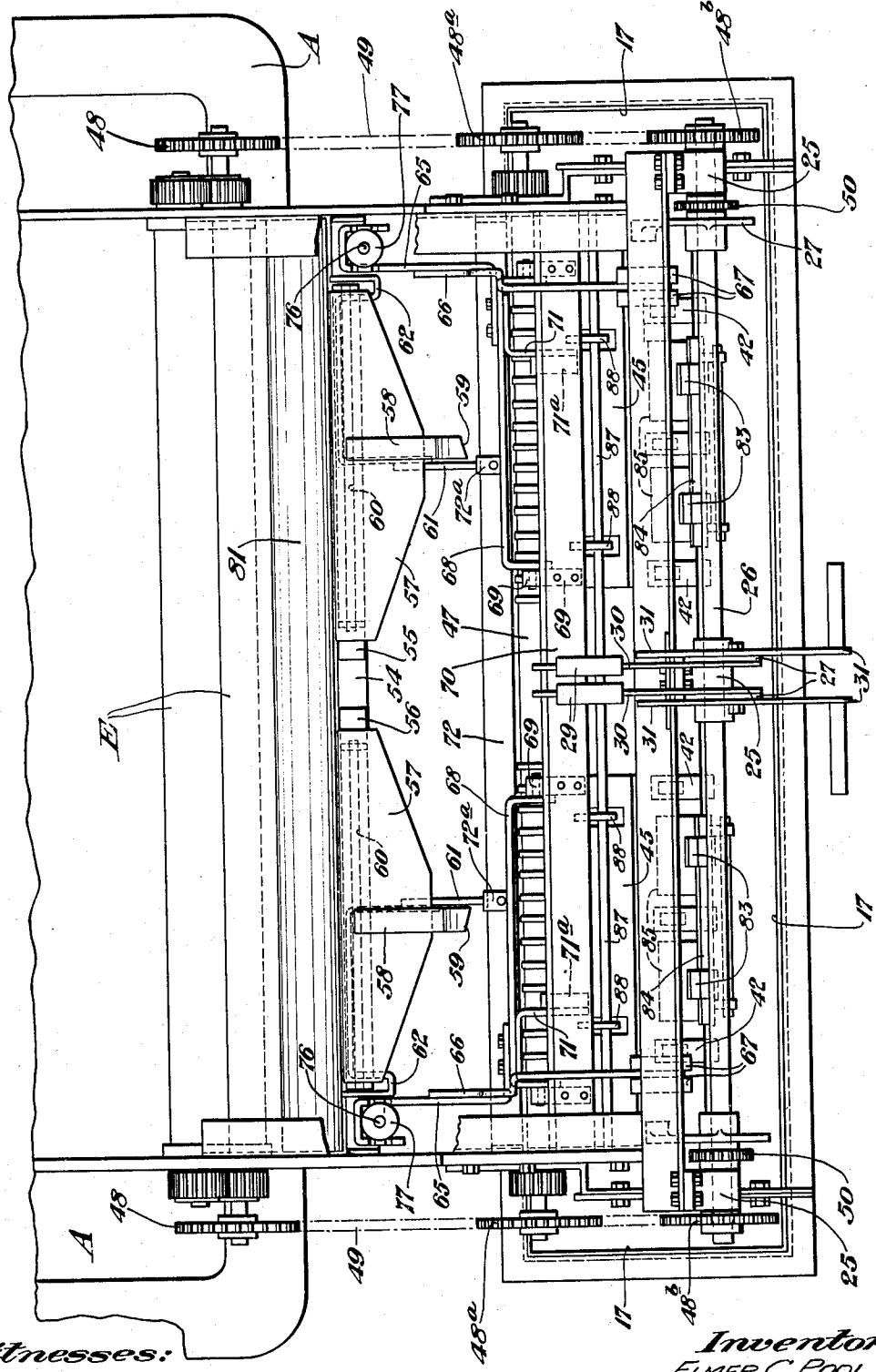


Fig. 2.

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DEFLECTOR FOR PLATE FEEDING MECHANISMS

Filed Aug. 17, 1921 5 sheets-sheet 3

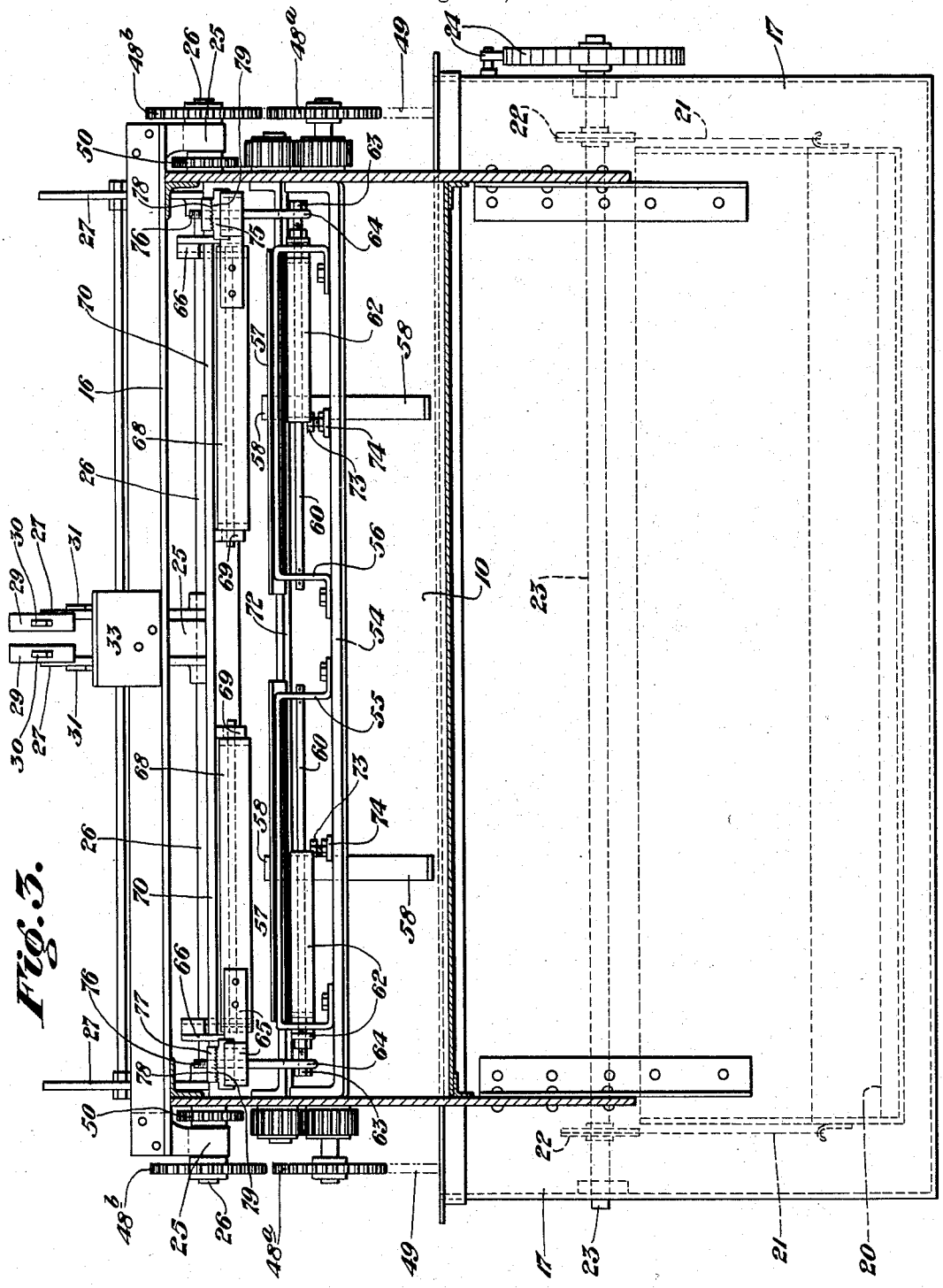


Fig. 3.

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DEFLECTOR FOR PLATE FEEDING MECHANISMS

Filed Aug. 17, 1921 5 sheets-sheet 4

Fig. 4.

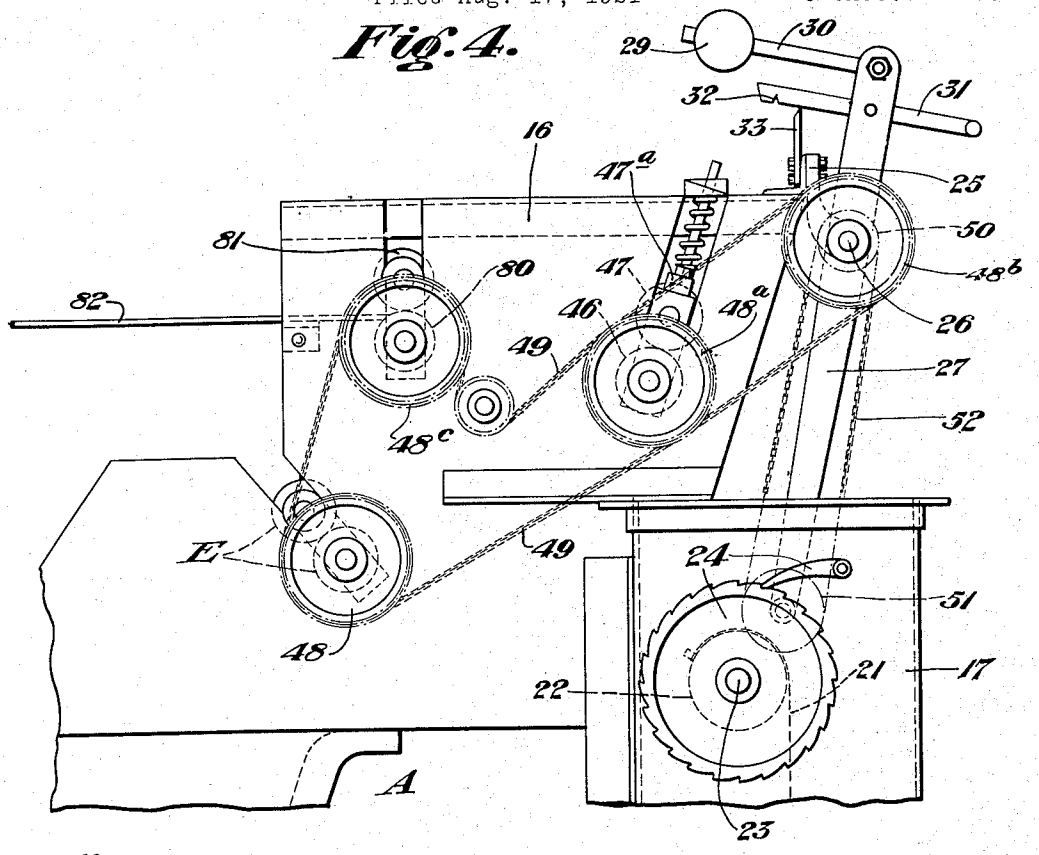
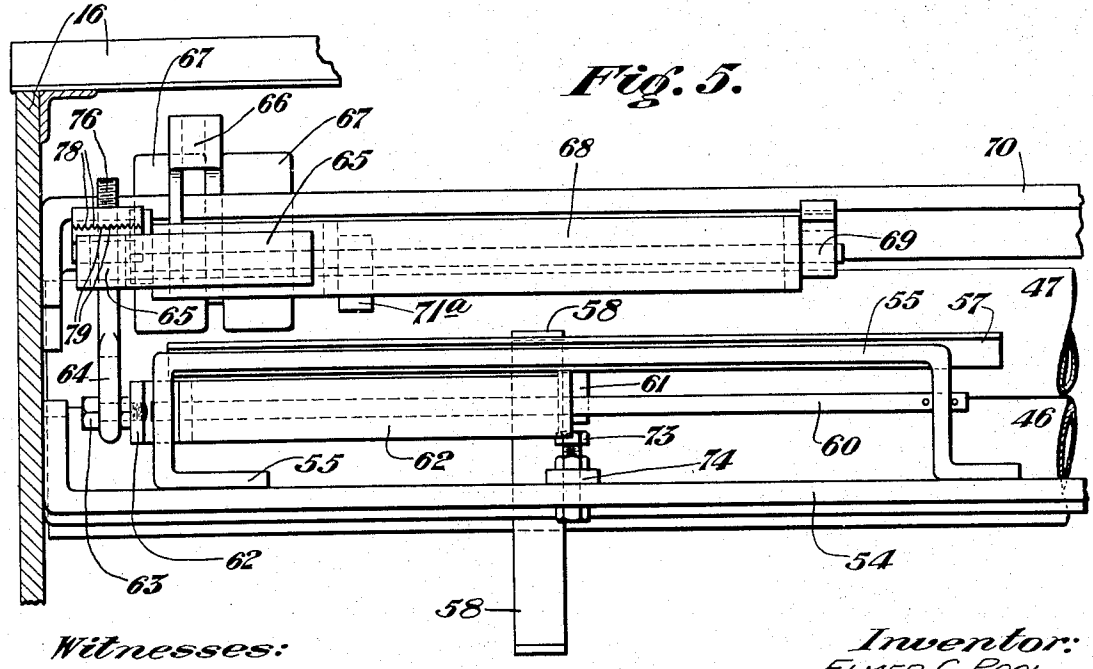


Fig. 5.



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DEFLECTOR FOR PLATE FEEDING MECHANISMS

Filed Aug. 17, 1921 5 sheets-sheet 5

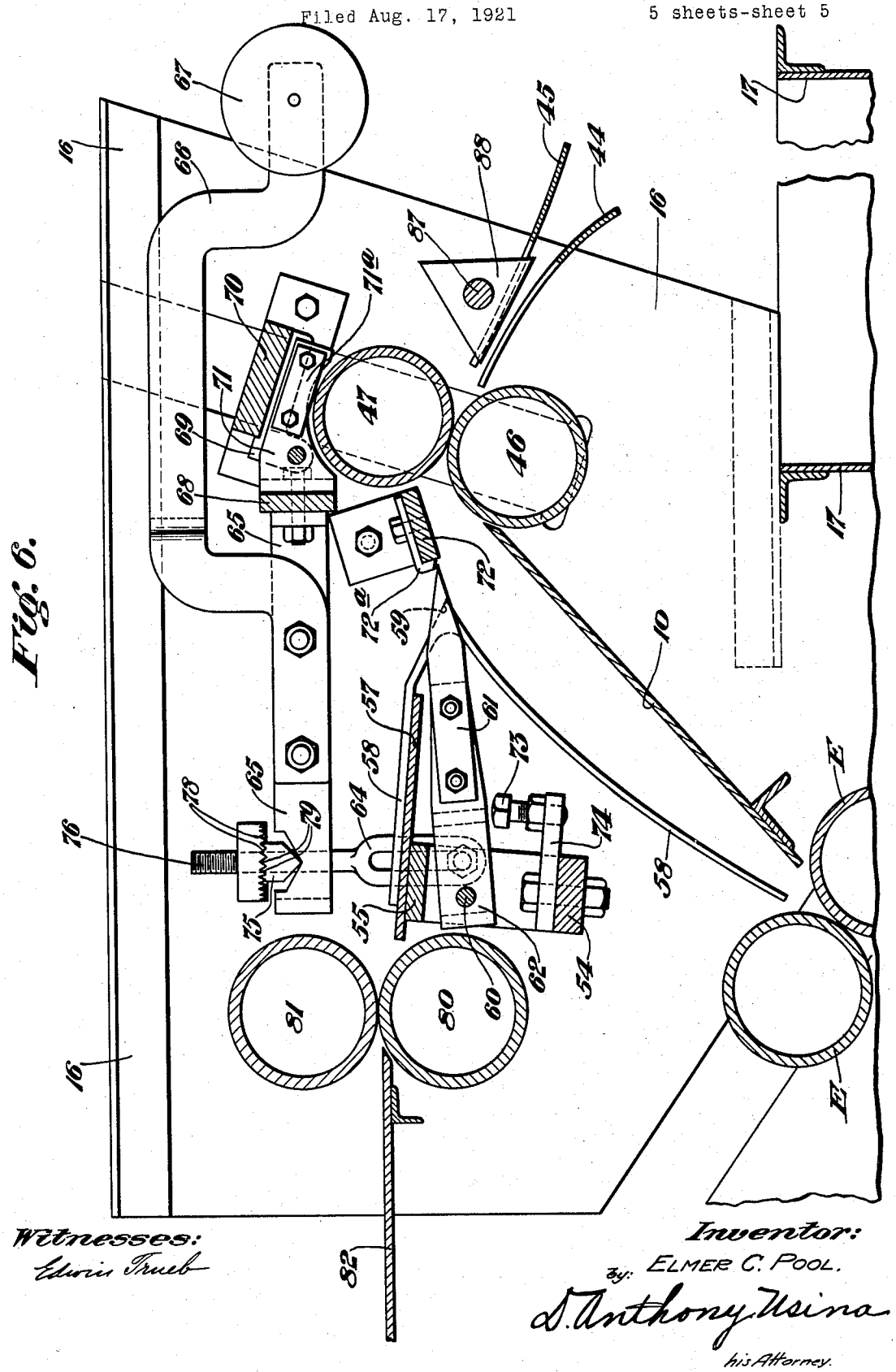


Fig. 6.

Witnesses:
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Patented Mar. 13, 1923. 1,448,716

UNITED STATES PATENT OFFICE.

ELMER C. POOL, OF NEW CASTLE, PENNSYLVANIA.

DEFLECTOR FOR PLATE-FEEDING MECHANISMS.

Application filed August 17, 1921. Serial No. 493,148.

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 Mechanisms, 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 producing of an improved feeding mechanism such as that described in my copending application, Serial No. 426,627, filed November 26, 1920, 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 prior to their entry into the tin bath when a plurality of plates is fed to the tinning machine thus preventing the necessity of scrapping 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 sectional end elevation on the line III—III of Figure 1.

Figure 4 is a partial side elevation of the apparatus of Figures 1, 2, and 3.

Figure 5 is a sectional end elevation, on a larger scale, showing details in the construction of the deflector mechanism forming part of this invention.

Figure 6 is a sectional side elevation showing details in the deflector mechanism of my improved apparatus.

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 the 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 to 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 retain 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 at 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 passed upwardly over suitable sheaves 22 splined on a shaft 23. The shaft 23 is journaled in the bosh and having a ratchet and dog operating mechanism 24 on one end outside 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 pair of cylindrical magnetic plate lifters Y journaled and supported in the lower ends thereof 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 their 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 hollow 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 from 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 plate as the magnet is rotated, that pro. ctions 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[1] which are arranged to extend from one end to the other of the frame support 16 immediately above the upper edge of the bosh, 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[1] arranged forward and above the cross-beams 40, carry other guide strips 44—45. The guide strips 44—45 form a second passageway adapted to receive the plates from the passageway between the strips 41—42, and direct them forwardly and upwardly between suitable pinch rollers 46 and 47, the upper roller 47 being mounted in a spring pressed, vertically adjustable housing 47[a], usual in such rolls.

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. The 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]. An endless 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, a single set of drive sprockets may be used.

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. A link chain 52 is trained over the sprockets 50 and 51 to constantly drive the conveyor 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.

A cross-beam 54 is arranged forward of the rollers 46—47 and secured to the side plates of the machine. Supporting bars 55 and 56, spaced above the beam 54, have end portions bent downwardly at right angles and secured to the beam 54. Suitable guide plates 57, which are secured to the bars 55 and 56, are provided with guide

bars 58 which are of a two-wing construction. That is, one portion or wing extends up over the plates 57, while the other portion or wing extends downwardly to guide plates between the rollers F, both wings meeting at a point slightly above the passage between rolls 46—47 in a pointed or sharp nose portion 59.

A shaft 60, mounted below each of the bars 55 and 56, is journaled in bearings in the end portions thereof. A deflector finger 61 is pivotally mounted on each of the shafts 60 adjacent the center thereof and has an integral rocking bar portion 62 extending from the rear end thereof toward the side wall or plate of the machine. That is, each finger 61 has its rocking bar 62 extending toward the opposite or nearest side wall of the machine.

The rocking bars 62 each have their outer ends secured to duplicate operating mechanisms. Therefore, only one of such mechanisms will be described, the same reference numerals being applied to both mechanisms.

The free end of the rocking bar 62 is loosely supported by a bolt 63 or the like, in the slotted end of an eyebolt 64 which has a knife edge pivoted connection at its upper end with a lever 65 which is normally held in raised position by a counterbalancing lever 66 secured to the lever 65 intermediate its ends and carrying counterweight 67 at its rear end.

The lever 65 extends rearwardly to a point just forward of the rolls 46—47 and is there bent at right angles and secured to a rocking bar 68 which is pivoted in bearing blocks 69 secured to the under side of a cross-beam 70 which extends transversely between the side walls or plates of the machine.

An angle-shaped feeler arm 71 is secured to the rocking bar 68 and extends back over the roll 47 and carries a feeler block 71^a which has a concave lower face adapted to contact with the roll 47.

A second transverse or cross-beam 72, which extends between the side walls or plates of the device just forward and below the beam 70, carries adjustable stop members 72^a for limiting the upward movement of the deflecting finger 61. The member 72^a is so positioned that it will limit the up position of the finger 61 to a position where it will just clear the plates coming from between the rolls 46—47.

An adjustable stop screw 73, mounted in a bar 74 which is secured to and extends outwardly from each of the bars 55 and 56, is adapted to limit the downward movement of the finger 61.

The lever 65 has its end, which is connected to the bolt 64, bent U-shaped, forming a bearing portion for the knife edge member 75 which is apertured to fit over the threaded shank 76 of the bolt 63 and fits into suitable knife edge receiving slots in the upper face of the U-shaped end of the lever 65. The knife edge member 75 is adjustably held in position by a nut 77 threaded on the threaded shank 76 of the bolt 64. The nut 77 is provided on its under face with a plurality of notches 78 which interlock with projecting teeth 79 on the top face of the knife edge member 75. The notches 78 and teeth 79 are small and close together, so that by rotating the nut 77 one notch at a time, a very fine adjustment may be had, since the adjusting nut 77 will rock the lever 65, the rock bar 68, and the lever or feeler arm 71, thereby positioning the feeler block 71^a relative to the roll 47.

The inclined apron 10 of the tinning pot is located below the lower wings of the guide bars 58, so as to form a guideway to the rollers F.

The deflector finger 61 forms a trap for a plurality of plates passing through the rolls 46—47, since if more than one plate passes between the rolls 46—47, they will raise the roll 47 sufficiently to engage the feeler block 71^a, thus rocking the lever mechanism described above so as to lift the counterweight 67 and allow the finger 61 to drop into deflecting position, where it will intercept any plates coming through the rolls 46—47, and cause them to travel up over the guide plates 57.

Each guide plate 57 has its upper rear edge so positioned that they will deliver the intercepted or deflected plates to a pair of pinch rolls 80—81 which are journaled in the side plates of the machine, these rolls gripping the plates and feeding them forwardly to a suitable support such as the platform 82.

Magnetic separators X, which are mounted above each of the magnetic plate lifters Y, comprise a rectangular casing member 83 pivotally supported on the cross-beam 40. The casings 63 contain a permanent magnet 84 and are provided with blades or knife edge poles 85 which extend into the path of the plates and contact with the rear faces thereof. The magnet 84 is of less strength than the magnets of the plate lifters Y, and, therefore, will not materially retard movement of the plates, yet the magnet 84 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 still further means for preventing feeding of more than a single plate into the tinning pot, which is located just to the rear of the pinch rollers 46—47, comprises a shaft 87 journaled in the frame support 16 and having a plurality of locking fingers 88 of triangular shape secured thereon. The fingers 88 are of such size that their flat

sides will extend past the guide strips 44, 45 and into the path of the lifted plates. The plates when guided between the strips 44 and 45, will bear against the upper strips 44 due to the direction of their travel and when in this position they will strike the fingers 88 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, such second plate will strike the fingers and be held thereby, since the fingers can not again rotate until the first plate has passed from under and is clear of 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 88 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.

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 the 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.

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.

It will also be understood that while I have shown and described one embodiment of my invention with great particularity, I do not wish nor do I intend to limit my invention to such structure, since various modifications in structure and combination of parts may be made without departing from the spirit of my invention as defined in the appended claims. For instance, wound active magnets may be substituted for the permanent magnets shown, or other such substitutions of equivalents made as found necessary or desirable.

I claim—

1. In an automatic plate feeding mechanism, a pair of rolls, one of said rolls being vertically movable, means for feeding plates from a pack through said rolls, a deflector member forward of said rolls, and means operated by said vertically movable roll for moving said deflector into the path of the plates while passing from said rolls when more than one plate is fed between said rolls.

2. In an automatic plate feeding mechanism, a pair of rolls, one of said rolls being movable, means for feeding plates from a pack through said rolls, a deflector member forward of said rolls, a feeler block spaced from said movable roll a distance sufficient to clear said roll when a single plate only is fed between said pair of rolls and yet sufficiently close to be engaged and moved by said movable roll when a plurality of plates are fed between said pair of rolls, and lever mechanism connecting said deflector member and said feeler block adapted to move said deflector into the path of the plates while passing from said rolls when said feeler block is moved by said movable roll.

3. In an automatic plate feeding mechanism, a pair of rolls, one of said rolls being vertically movable, means for feeding plates from a pack through said rolls, a deflector finger pivotally mounted forward of said rolls, means for limiting the downward movement of said finger, a feeler block spaced above said vertically movable roll a distance sufficient to clear said roll when a single plate only is fed between said pair of rolls and yet sufficiently close to be engaged and moved by said vertically movable roll when two or more plates are fed between said pair of rolls, and counterweighted lever mechanism connecting said deflector finger and said feeler block adapted to normally hold said finger in its extreme upper position and to allow said finger to drop downwardly into the path of the plates while passing from said rolls when said feeler block is raised by said vertically movable roll.

4. In an automatic plate feeding mechanism, a pair of rolls, one of said rolls being vertically movable, means for feeding plates from a pack through said rolls, a deflector finger pivotally mounted forward of said rolls, means for limiting the downward movement of said finger, a feeler block spaced above said vertically movable roll a distance sufficient to clear said roll when a single plate only is fed between said pair of rolls and yet sufficiently close to be en-

gaged and moved by said vertically movable roll when two or more plates are fed between said pair of rolls, counterweighted lever mechanism connecting said deflector finger and said feeler block adapted to normally hold said finger in its extreme upper position and to allow said finger to drop downwardly into the path of the plates while passing from said rolls when said feeler block is raised by said vertically movable roll, and means for adjusting the position of said feeler block relative to said vertically movable roll.

5. The combination with an automatic plate feeding mechanism having a pair of feed rolls, one of said rolls being movable vertically, of a deflector finger pivotally mounted forward of said rolls, a feeler block spaced above said vertically movable roll a distance to clear said roll when a single plate only is fed between said pair of rolls and yet sufficiently close to be engaged and moved by said vertically movable roll when two or more plates are fed between said pair of rolls, a lever mechanism connecting said deflector finger and said feeler block adapted to move said finger into deflecting position when said feeler block is raised by said vertically movable roll, means for receiving the plates deflected by said finger, a pair of rolls for conveying said plates away from said finger, and means for receiving said plates from said rolls.

6. The combination with an automatic plate feeding mechanism having a pair of feed rolls, one of said rolls being movable vertically, of a deflector finger pivotally mounted forward of said rolls, a feeler block spaced above said vertically movable roll a distance to clear said roll when a single plate only is fed between said pair of rolls and yet sufficiently close to be engaged and moved by said vertically movable roll when two or more plates are fed between said pair of rolls, a lever mechanism connecting said deflector finger and said feeler block adapted to move said finger into deflecting position when said feeler block is raised by said vertically movable roll, and means for returning said finger to non-deflecting position.

7. The combination with an automatic plate feeding mechanism having a pair of feed rolls, one of said rolls being movable vertically, of a deflector finger pivotally mounted forward of said rolls, a feeler block spaced above said vertically movable roll a distance to clear said roll when a single plate only is fed between said pair of rolls and yet sufficiently close to be engaged and moved by said vertically movable roll when two or more plates are fed between said pair of rolls, a lever mechanism connecting said deflector finger and said feeler block adapted to move said finger into deflecting position when said feeler block is raised by said vertically movable roll, means for returning said finger to non-deflecting position, and a pair of pinch rolls adapted to receive the plates deflected by said finger and convey them forwardly.

In testimony whereof I have hereunto signed my name.

ELMER C. POOL.