No. 742,104. PATENTED OCT. 20, 1903.

F. E. VANDERCOOK.

METAL FEED MECHANISM.

APPLICATION FILED MAY 19, 1903.

NO MODEL. 4 SHEETS—SHEET 1.

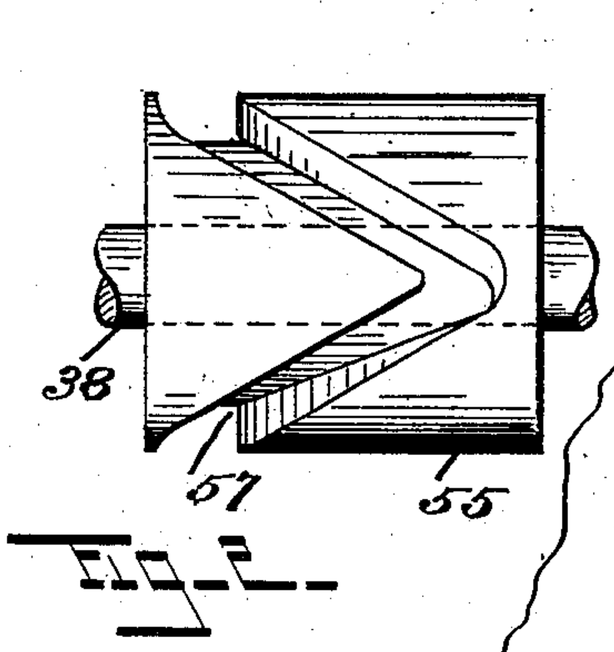

Fig. 2.

Fig. 1.

Witnesses.
William O'Brien
J. P. Dejon

Inventor.
Frank E. Vandercook
by George C. Hall
Attorney

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NO MODEL. 4 SHEETS—SHEET 2.

Fig. 3

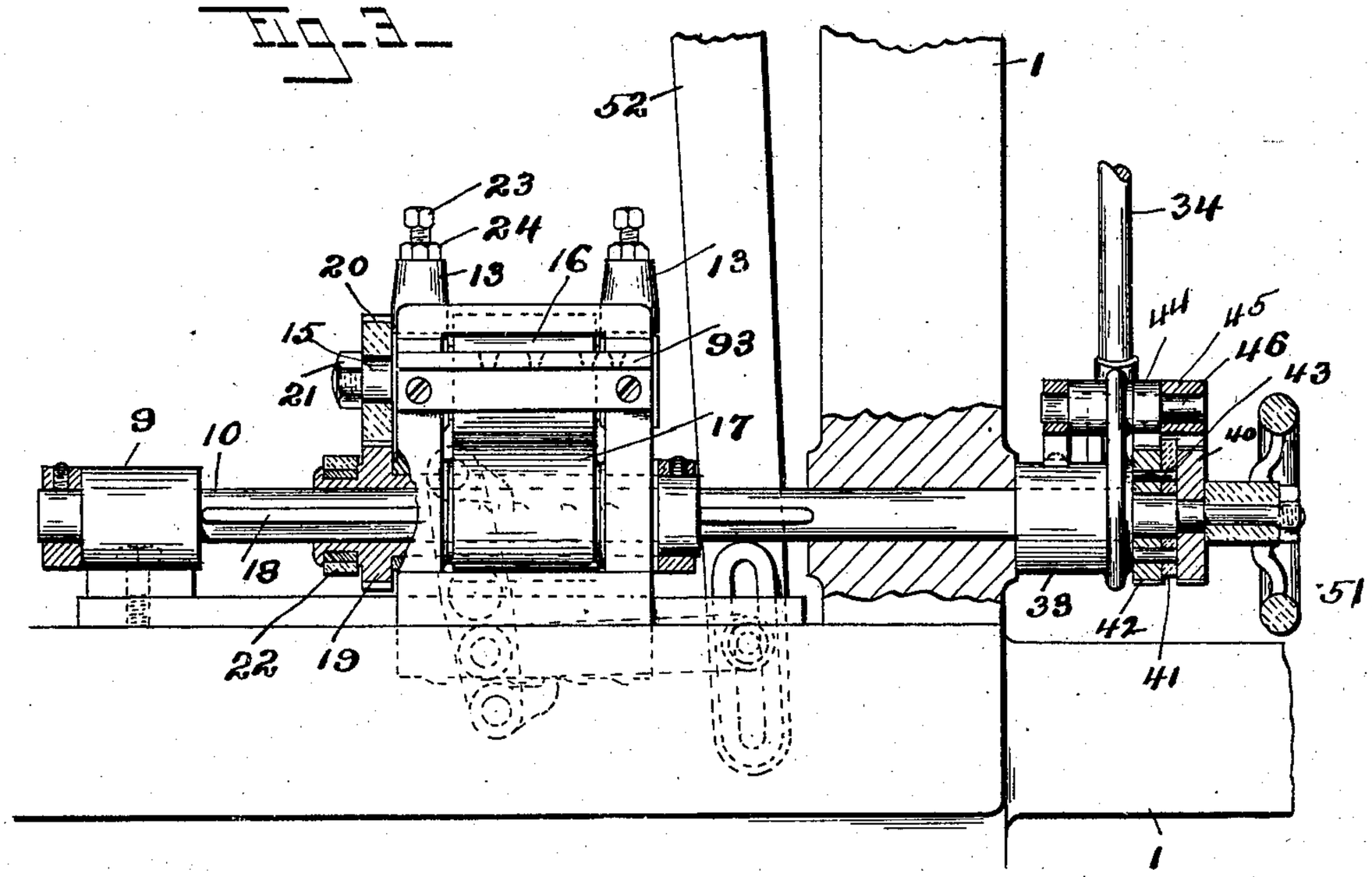


Fig. 4

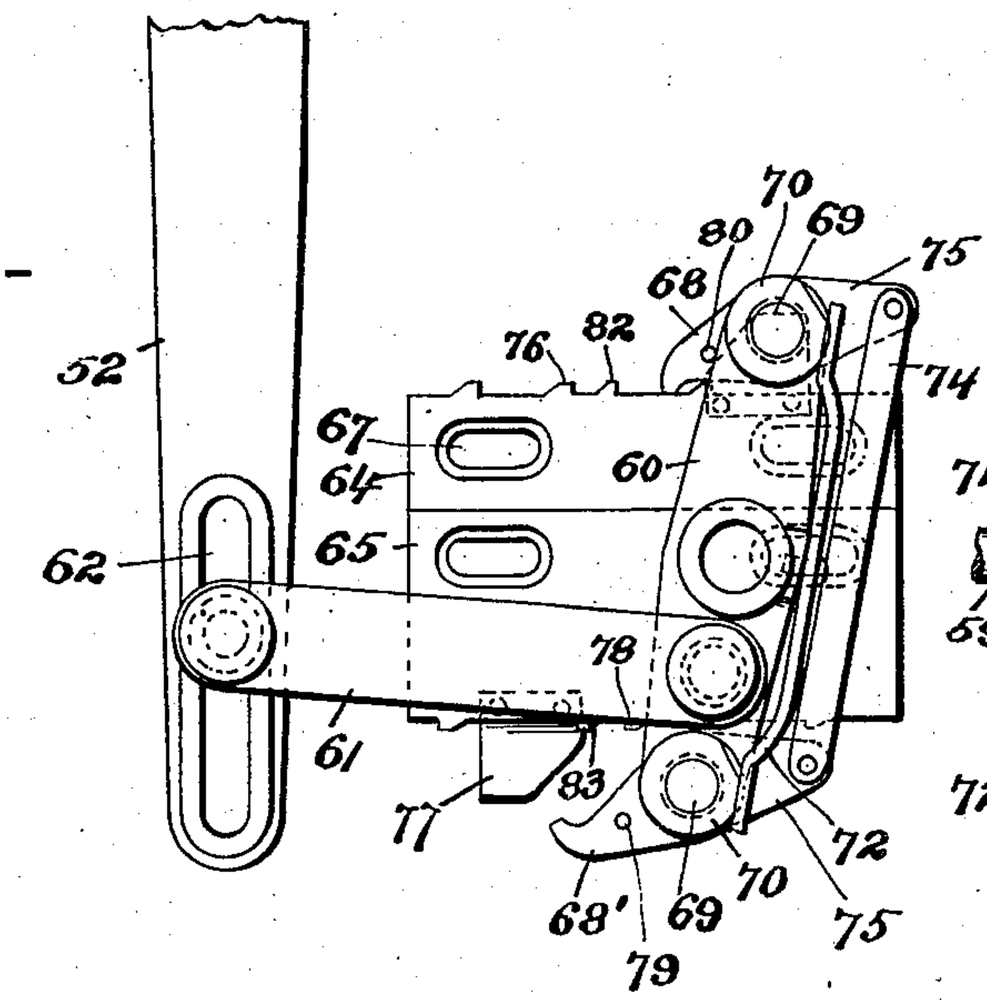
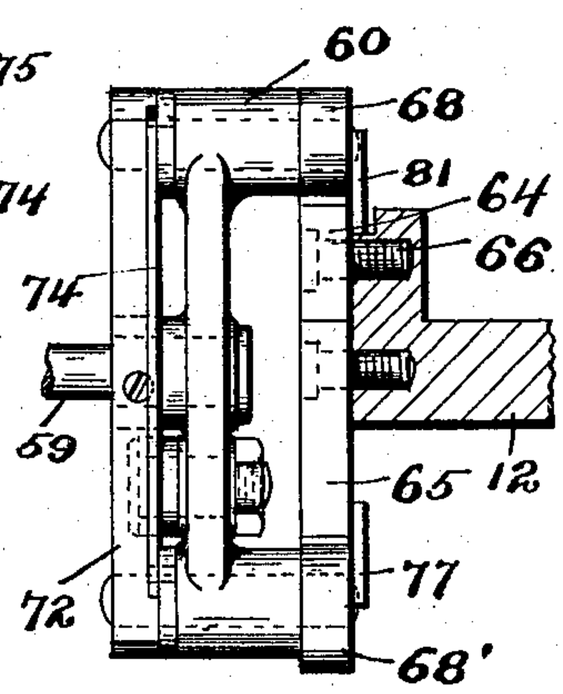


Fig. 5



Witnesses:
William O'Brien
J. P. Dejon

Inventor.
Frank E. Vandercook
by Lyon & Lyon
Attorney

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NO MODEL. 4 SHEETS—SHEET 3.

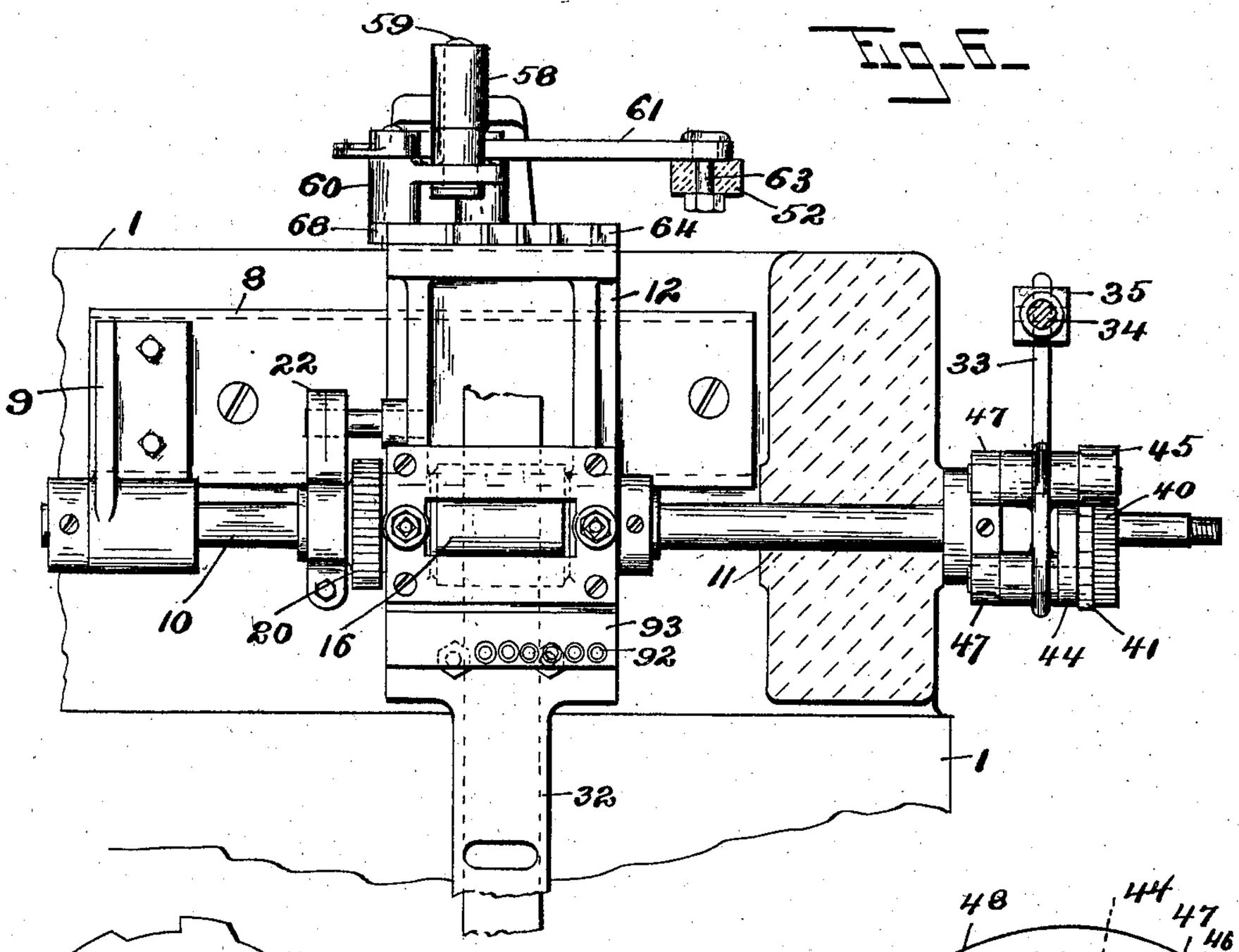

Fig. 6.

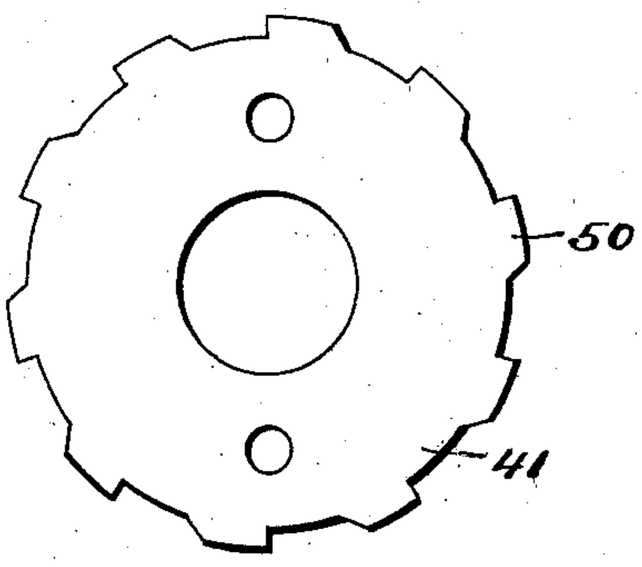

Fig. 8.

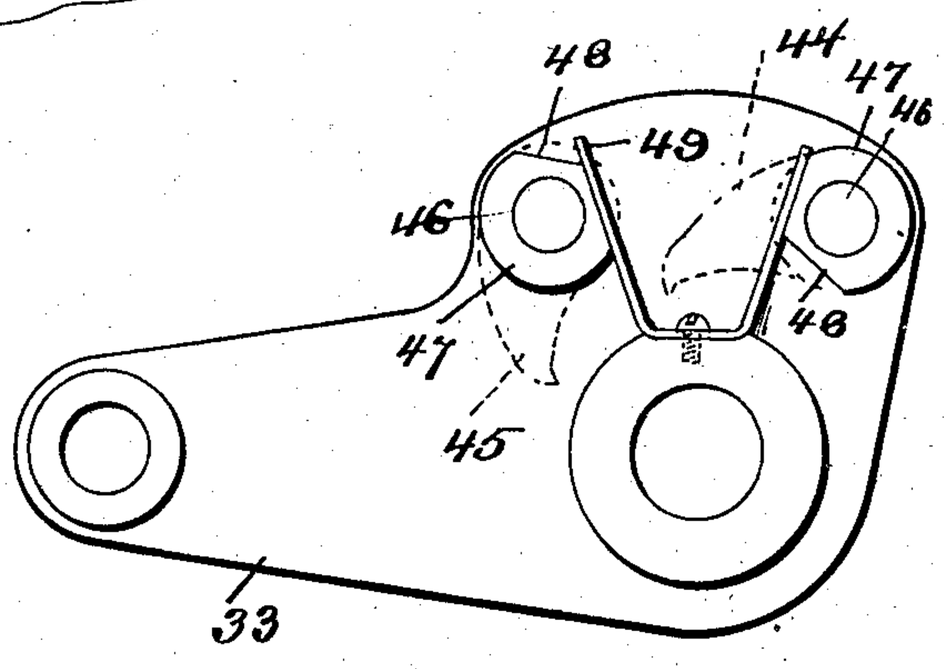

Fig. 7.

Witnesses.
William O'Brien
J. P. Dejon

Inventor.
Frank E. Vandercook
by George C. Hall
Attorney

No. 742,104. PATENTED OCT. 20, 1903.

F. E. VANDERCOOK.

METAL FEED MECHANISM.

APPLICATION FILED MAY 19, 1903.

NO MODEL. 4 SHEETS—SHEET 4.

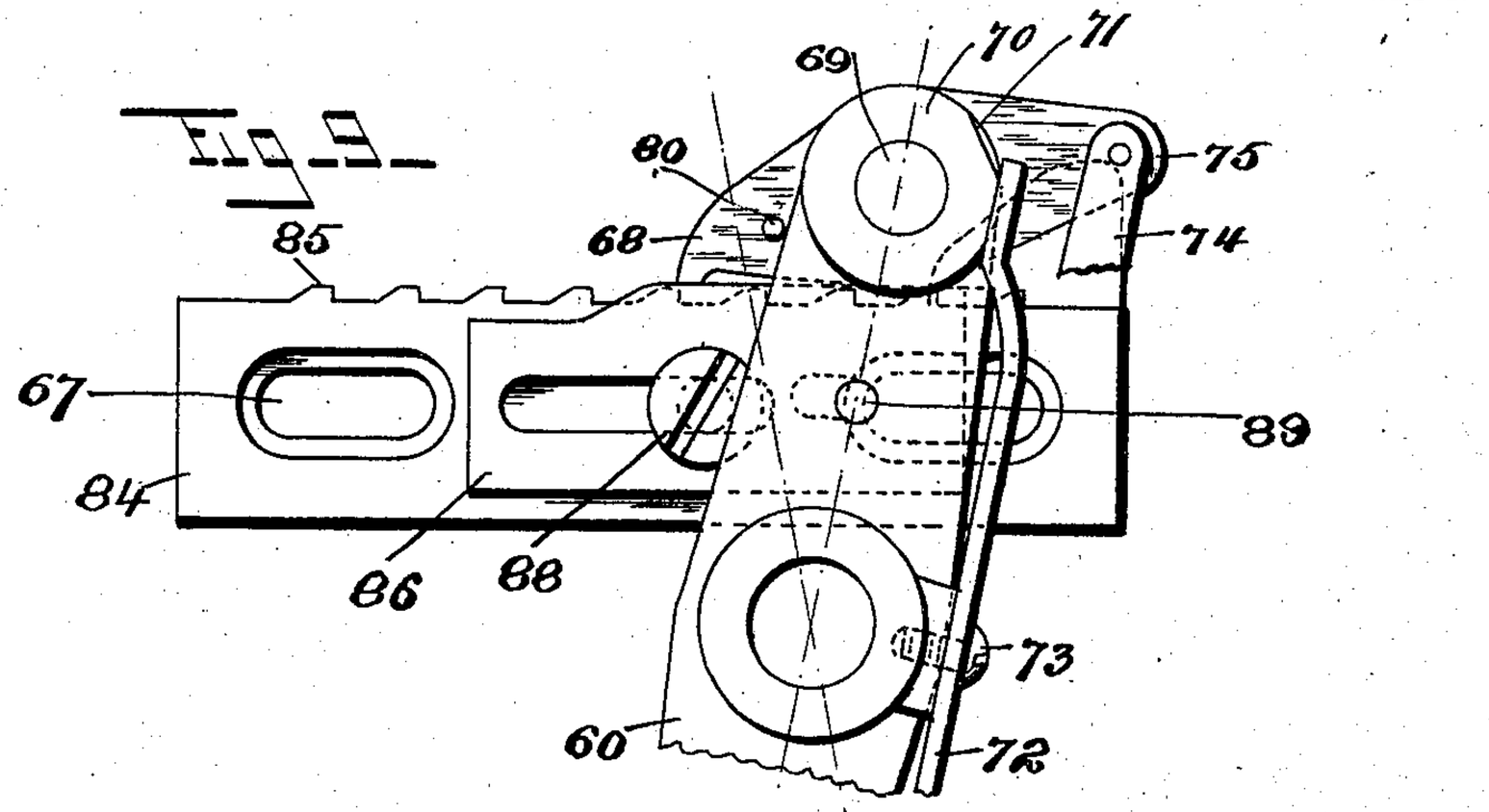

Fig. 9.

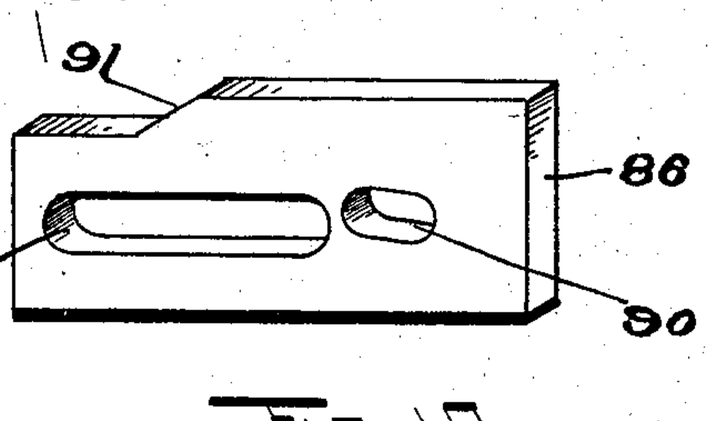

Fig. 10.

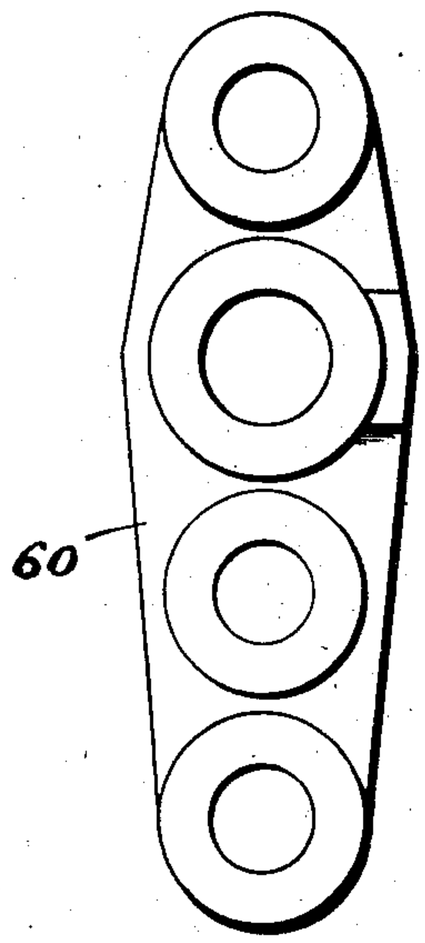

Fig. 11.

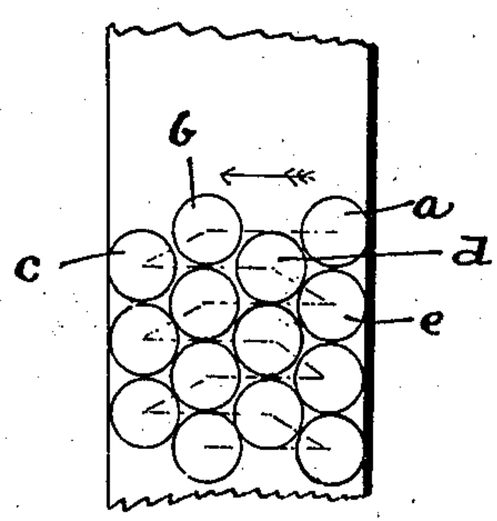

Fig. 12.

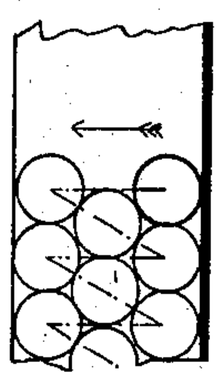

Fig. 13.

Witnesses.
William O'Brien
J. P. Dyon

Inventor.
Frank E. Vandercook
by George P. Daly
Attorney

No. 742,104. Patented October 20, 1903.

UNITED STATES PATENT OFFICE.

FRANK E. VANDERCOOK, OF WATERBURY, CONNECTICUT.

METAL-FEED MECHANISM.

SPECIFICATION forming part of Letters Patent No. 742,104, dated October 20, 1903.

Application filed May 19, 1903. Serial No. 157,785. (No model.)

To all whom it may concern:

Be it known that I, FRANK E. VANDERCOOK, a citizen of the United States, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Metal-Feed Mechanism, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to new and useful improvements in metal-feeds, and relates more particularly to that type of metal-feed which is attached to a power or other press and which automatically shifts the position of the metal between successive punching-strokes.

The object of my invention, among other things, is to construct a metal-feed of this character which will move the stock automatically sidewise and endwise, whereby the full length of the strip may be pierced by a single pass between the rolls, thereby overcoming the objection to the old method wherein a strip of metal is passed between the feed-rolls and press several times before all of the stock has been blanked out; to provide means whereby the metal will be moved laterally any number of successive times between the successive endwise movements; to move the metal lengthwise and laterally at one and the same time, and to construct my improved feed of the fewest possible parts so designed as to be economically constructed and readily assembled.

To these and other ends my invention consists in the metal-feed having certain details of construction and combination of parts, as will be hereinafter described, and more particularly pointed out in the claims.

Referring to the drawings, in which like numerals designate like parts in the several views, Figure 1 is a fragmentary side elevation of a power-press having my improved metal-feed attached thereto. Fig. 2 is a front view of the feed-operating cam. Fig. 3 is a front view, partly in section, of my improved feed. Fig. 4 is a view of the feed mechanism looking from the rear. Fig. 5 is an end elevation thereof. Fig. 6 is a plan view. Fig. 7 is an enlarged detailed elevation of the pawl-carrier. Fig. 8 is an enlarged view of the trip-dial. Fig. 9 is a fragmentary view of a portion of the feed mechanism with the three-hole attachment applied thereto. Fig. 10 is a perspective view of the trip-plate. Fig. 11 is an elevation of one form of the feed-pawl lever. Fig. 12 is a view of a strip of metal, showing the manner of blanking the same for four holes, with the path of movement of the strip through the machine designated thereon by broken lines; and Fig. 13 is a similar view of a three-hole strip.

In the metal-feeds heretofore constructed the metal is passed through the press in a path parallel to its length and a line of holes punched therethrough. It is then passed through again and a new series of holes punched therethrough adjacent to the first row of holes. These operations are continued until the strip has been entirely blanked out. This method is of course objectionable in that it requires the metal to be run through the press several times. Another method sometimes used in the endeavor to overcome the above objections is to pass the metal strip through the press at an angle of substantially thirty degrees. While this necessitates but a single passage through the machine to entirely blank out the metal, the thirty-degree angle prevents the end corners of the strip from being blanked out, and with the mechanism at this angle an unusually wide and cumbersome machine is required to accommodate the feed mechanism. I have overcome these and other objections in the prior art by providing a metal-feed which advances through the machine in a path parallel to the length thereof and is moved laterally between the several successive punching-strokes, piercing a row of holes through the strip at right angles to the side thereof, and after the last hole has been pierced at the full width of the blank a return lateral movement and a forward movement are imparted to the strip, so that the next hole punched will be between the last two holes in the last preceding row. The metal is then fed in the reverse direction laterally until it comes to the last hole to be pierced in the width of the strip, when the metal is fed forward to the next row of blanks and half a feed sidewise. By this mechanism I am enabled to blank out the entire strip from end to end by one passage through the machine, the path of movement being parallel to the length of the strip,

and the smallest possible space is required to attach my device to a power or other press.

In the drawings the numeral 1 designates the body of a power-press, and 2 the gate carrying the punch-holder 3 and the centering-punch 4 within the plunger 5, which is mounted within a bearing 6, fixed within said gate. The spring 7, which bears against the end of the centering-punch, normally holds the said punch in its downward position.

Fixed to the bed of the press 1 is a plate 8, and fixed to one end of said plate is the standard 9, within which is journaled one end of the shaft 10, the other end of which is journaled in the bearing 11 in the body 1. Slidable upon said plate 8 is the roll-carrier 12, having the two uprights 13 13 thereon, within which are vertically adjustable the journal-boxes 14, forming journals for the shaft 15 integral with the upper roll 16. The lower roll 17 is fixed upon the hub of the gear 19, said gear being slidably secured to the shaft 10 by means of a feather 18, of the ordinary type, projecting into a spline in the bore of said gear. This connection between the parts permits the roll 17 to be moved sidewise upon the said shaft and rotate with it. The roll 16 is rotated through the gear 19, meshing into the gear 20, fixed on the shaft 15 of the upper roll and held against endwise movement by the nut 21. Overthrow of these rolls is prevented by means of the friction-strap 22, of the ordinary type, which encircles a projecting hub upon the gear 19, as shown in Fig. 3. Vertical adjustment of the journal-boxes 14 is obtained through the screws 23 and check-nuts 24 in a manner well known to the art. The tension by which the roll-carrier engages the plate 8 is variable by means of the screw 25, spring 26, and gib 27, as shown in Fig. 1. Fastened to the front of the roll-carrier is a guide-bracket 28, having a guide-plate 29 screwed thereto, this guide-bracket being in the same horizontal plane as the die-holder 30, which is either formed integral with or secured to the body of the press, with a die 31 secured therein in any preferred manner and having a guide-plate 32 thereon for holding the metal strip in alinement.

The construction of the guide-brackets, plates, and holders is not material to my invention, as any form or style of this mechanism common to the art can be used equally as well as the one shown.

An intermittent feed is imparted to the shaft 10 by means of the following mechanism: Rotatable upon the shaft 10 is a pawl-carrier 33, which is given a rocking movement upon said shaft by means of the connection-rod 34, which is threaded at its lower end into a yoke-block 35, pivotally secured to said pawl-carrier by the pintle 36 and secured at its upper end to a crank-plate 37, which is fixed upon the shaft 38, rotatable within the body 1. This crank-plate is of the usual form, being slotted and provided with a threaded rod 39, by which the length of stroke of the rod 34 may be varied. Fixed to the shaft 10 is a ratchet-wheel 40, and between said ratchet-wheel and the hub of the pawl-carrier 33 is the trip-dial 41, having a plurality of trip-lugs 50 thereon, and a ratchet-wheel 42, the ratchet-wheel 42 and trip-dial 41 being secured together by means of the pins 43. Connected with the pawl-carrier upon the rods 46 are the pawls 44 and 45, and upon said rods are fixed the collars 47, having the flattened faces 48, as shown in Fig. 7, which are normally engaged by a flat spring 49, secured to the hub of the pawl-carrier. The pawl 45 is substantially the same width as the ratchet-disk 40 and trip-plate 41, and the pawl 44 is substantially the same width as the ratchet-disk 42. The flattened faces upon the collars 47 are so located that the spring 49 normally holds the said pawls either in engagement with or disengaged from the said ratchet-disks.

The roll-feed is an intermittent one, it being only necessary to advance the strip in the line of its length when a row of holes have been punched therethrough laterally, and this intermittent feed is obtained by means of the mechanism before described.

In operation the engagement of the pawl 45 with the ratchet-disk 40 rotates the shaft 10 and through it the rolls 16 and 17, imparting a lengthwise movement to the strip. The pawl 44 is also in engagement with the ratchet-disk 42 at the same time as the pawl 45 is in engagement with the ratchet-disk 40, the pawl 44 advancing the trip-dial 41 with the said disk 42. When the necessary lengthwise movement has been imparted to the metal strip, the ratchet-disk 42 has advanced the trip-dial 41, so that the pawl 45 rides out of engagement with the pawl 40 and onto one of the trip-lugs 50 of said dial-plate, and during the successive punching operations said pawl rides upon the said lug and out of engagement with said pawl-plate and the shaft 10 remains stationary. The pawl 44 during this time is rotating the trip-dial 41, so that when it is desired to advance the strip again the pawl 45 drops into engagement with the ratchet-disk 40 between two of the trip-lugs 50 and imparts a rotary movement to said shaft 10, as before described. The peripheral length of the lugs 50 is varied in accordance with the number of strokes requisite to pierce the width of the strip. The greater the number of holes the longer the said lugs will be, and vice versa.

Any form of approved friction or other mechanism may be used to prevent overthrow of the ratchet-disk 42 and dial-plate 41.

The shaft 10 is rotated by hand when desired through the hand-wheel 51, which is made fast to said shaft.

The lateral-feed mechanism comprises a lever 52, which is fulcrumed midway of its length upon a stud 53, mounted within a block 54, made fast to the body 1; a barrel-cam 55, fixed to said shaft 38; a cam-roll 56, rotatably

secured to one end of said lever 52 and operative within the groove 57 in said cam; bracket 58, secured to the body 1 and having fixed therein a stud 59, upon which is rotatable the pawl-lever 60; a link 61, pivotally secured to said pawl-lever at one end and to the lever 52 by the stud 63 at the other end within the elongated slot 62; feed-plates 64 and 65, which are secured to the rear end of the roll-carrier 12 by the screws 66, these plates having the elongated slots 67 to provide for the lengthwise adjustment thereof; pawls 68 and 68′, which are pivotally secured to the ends of the lever 60 upon the studs 69; collars 70, fixed on the ends of the studs 69 and having flattened faces 71; springs 72, secured to the lever 60 by the screw 73 and bearing at either end against one of the faces 71 of the collars 70, as shown in Figs. 4 and 9, and link 74, connecting the arms 75, which project radially from the collar 70. The edges of the said plates 64 are provided with lugs 76 and 82 and plate 65 with lugs 78 and 83. The lugs upon the edges of said plates are so arranged that the interval between said notches is either substantially the same as that between the centers of the holes to be pierced in the metal strip or substantially one-half of said interval. Adjustably secured to said plates 64 and 65 are the trip-cams 77 and 81.

Referring now to Fig. 12, which illustrates a four-hole strip which has been partially pierced, the hole *a* in said figure is first pierced, and as the punch rises the lever 52 is oscillated through the engagement of the cam-roll with the barrel-cam before described and the pawl-lever 60 is given an oscillating movement upon the stud 59, the pawl 68′ engaging the lug 78 on the plate 65 and moving said plate and the roll-carrier to which it is attached laterally, shifting the metal strip, so that that portion of the plate through which the hole *b* is cut being presented directly below the punch. After the hole *b* is punched the strap is fed laterally one-half of the distance of the last feed and lengthwise one-half of the diameter of the hole by the intermittent feed above described. The one-half lateral feed is accomplished by placing the lug 83 upon the plate 65 away from the lug 78 just one-half of the feed, so that one-half of the movement of the pawl is lost motion, this bringing the portion through which the hole *c* is cut below the punch. At the last feeding operation in this row, which results in the cutting of the hole *c*, the pin 79 in the pawl 68′ engages the stationary cam 77, and said pawl is oscillated upon the stud 69 and disengaged from the lugs upon plate 65, and through the link 74 the pawl 68 is oscillated upon its pivot-mounting and thrown into engagement with the lug 76 upon the plate 64. The then position of the pawl 68 is shown by dotted lines in Fig. 4, the nose engaging the lug 76. At the next oscillation of the lever 60 the pawl 68 by its engagement with lug 76 moves the rolls laterally in the reverse direction than that when they are operated by the plate 65, thus presenting the strip below the punch, so that the hole *d* will be pierced therethrough. The next feed is only a one-half feed, and therefore the lug 82 is located for such feed, the movement of the pawl 68 being one-half lost motion, and thus presenting the strip below the punch 64, so that the hole *d* will be pierced therethrough. At the end of this movement the pin 80 engages the cam 81 on said plate, throws the pawl 68 out of engagement with the lug upon the plate 64, and through the link 74 the pawl 68′ is thrown into line with the lugs upon the plate 65 and the movements are continued as before. The notches 50 upon the trip-dial 41 are so arranged that a lengthwise-feeding movement of the metal strip occurs at about the same time that the one-half lateral feed of the strip is taking place, and, as previously stated, the wider the strip the longer the peripheral dimension of the lug 50. The plates 64 and 65, as shown, are illustrated for piercing a four-hole strip; but it is obvious that by a slightly-different arrangement of the lugs thereon any number of holes may be pierced in the width of a metal strip.

To prevent overthrow of the lateral movement of the roll-carrier, I have provided a mechanism for alining the said rolls, which mechanism comprises a plate 82, having a plurality of tapered holes 83 therein. These holes are so located upon said plate that the centering-punch 4 will enter the same and bring said roll-carrier into its proper position even though it may have been thrown laterally farther than the feeding movement required.

The levers 60 are preferably fulcrumed midway of their length, giving a uniform feed at both ends of the lever; but for a three-hole blank it is necessary to fulcrum the lever two to one, as illustrated in Fig. 11. To obviate the use of this two-to-one lever when cutting a three-hole blank, I have provided a plate 84, upon which the lugs 85 are spaced for one-half feeds, a trip-plate 86, having an elongated hole 87 therethrough, through which passes the screw 88, by which said trip-plate is held against the plate 84, and a pin 89, fixed in the lever 60 and projecting into the slot 90 in said plate 86. The movement of the pawl 68 each time is a full stroke and must be reduced to a one-half movement to cut a three-hole blank. This operation is obtained in the following manner: As the pawl moves forward it rides upon the top of the trip-plate 86 and down the cam-face 91, engaging one of the lugs 85 just in advance thereof. During this movement of the pawl the trip-plate 86 is stationary, the pin 89 moving from one end of the slot 90 to the other. Thus far the movement of the pawl 68 is lost motion; but for the balance of its forward movement it pushes the plates 84 and 86 with it. During the first half of the return movement of the

pawl 68 the trip-plate 86 remains stationary as the pin 89 is moving through the slot 90, which is the same length as the interval between the lugs 85, and the pawl rides up the cam-face 91 and out of the path of the said lugs. For the balance of the movement of the pawl the trip-plate 86 moves with it and said pawl rides over the top of the notches 85. These operations, it will be noted, reduce a full movement of the pawl 68 to a one-half movement of the plate 84.

There are many minor changes and alterations that can be made within my invention aside from those herein shown and suggested, and I would therefore have it understood that I do not limit myself to the exact construction herein shown and described, but claim all that falls fairly within the spirit and scope of my invention.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a device of the character described, the combination with a press; of means for feeding a metal strip therethrough in a path parallel to its length; a positively-actuated twin-pawl mechanism for moving said metal strip laterally; and means for moving said strip lengthwise and laterally at one and the same time.

2. In a device of the character described, the combination with a press; of a roll-carrier slidable thereon; parallel rows of lugs fixed to said roll-carrier; a lever mounted upon a fixed part; twin pawls mounted upon opposite ends of said lever and having engagement with said lugs; and means for oscillating said lever.

3. In a device of the character described, the combination with a press; of feed-rolls; means for intermittently rotating said rolls; and positively-actuated twin-pawl mechanism for moving said rolls in a path substantially parallel to their axis.

4. In a device of the character described, the combination with a press; of feed-rolls; and means for moving said rolls forward and backward in a path substantially parallel with the axis thereof, said means comprising two rows of lugs fixed to the roll-frame, two pawls having engagement with said lugs, and an oscillating lever to which said pawls are secured.

5. In a device of the character described, the combination with a press; of feed-rolls; a positively-actuated twin-pawl mechanism for moving said rolls forward and backward in a path substantially parallel with the axis thereof; and means for automatically shifting the direction of said movement at a predetermined time.

6. In a device of the character described, the combination with a press; of feed-rolls; means for intermittently rotating said rolls; positively-actuated twin-pawl mechanism for moving said rolls in a path parallel to the axis thereof; and means for shifting said pawls whereby said rolls can be moved in reverse endwise directions.

7. In a device of the character described, the combination with a press; of a roll-carrier slidable thereon; rolls mounted within said roll-carrier; means for intermittently rotating said rolls; and positively-actuated pawl mechanism connected with a stationary part engaging a rack upon said roll-carrier whereby a lateral movement is imparted thereto.

8. In a device of the character described, the combination with a press; of a roll-carrier having lugs thereon and slidable upon said press; rolls mounted within said roll-carrier; an oscillating lever mounted upon a fixed part; and a pawl connected with said lever and engaging said lugs whereby a lateral movement is imparted thereto.

9. In a device of the character described, the combination with a press; of a roll-carrier 12; rolls 16 and 17 rotatable therein; plates 64, 65 fixed to said roll-carrier; oscillating lever 60; pawls 68 68′ mounted on said lever; means for actuating said lever; and means for intermittently rotating said rolls.

10. In a device of the character described, the combination with a press; of a roll-carrier 12; rolls 16 and 17 rotatable therein; plates 64, 65 fixed to said roll-carrier; oscillating lever 60; pawls 68 68′ mounted on said lever; link 74 connecting said pawls; cams 77 and 81 for shifting the positions of said pawls; and means for actuating said lever.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK E. VANDERCOOK.

Witnesses:
GEORGE E. HALL,
ADOLPHUS DELAGE.