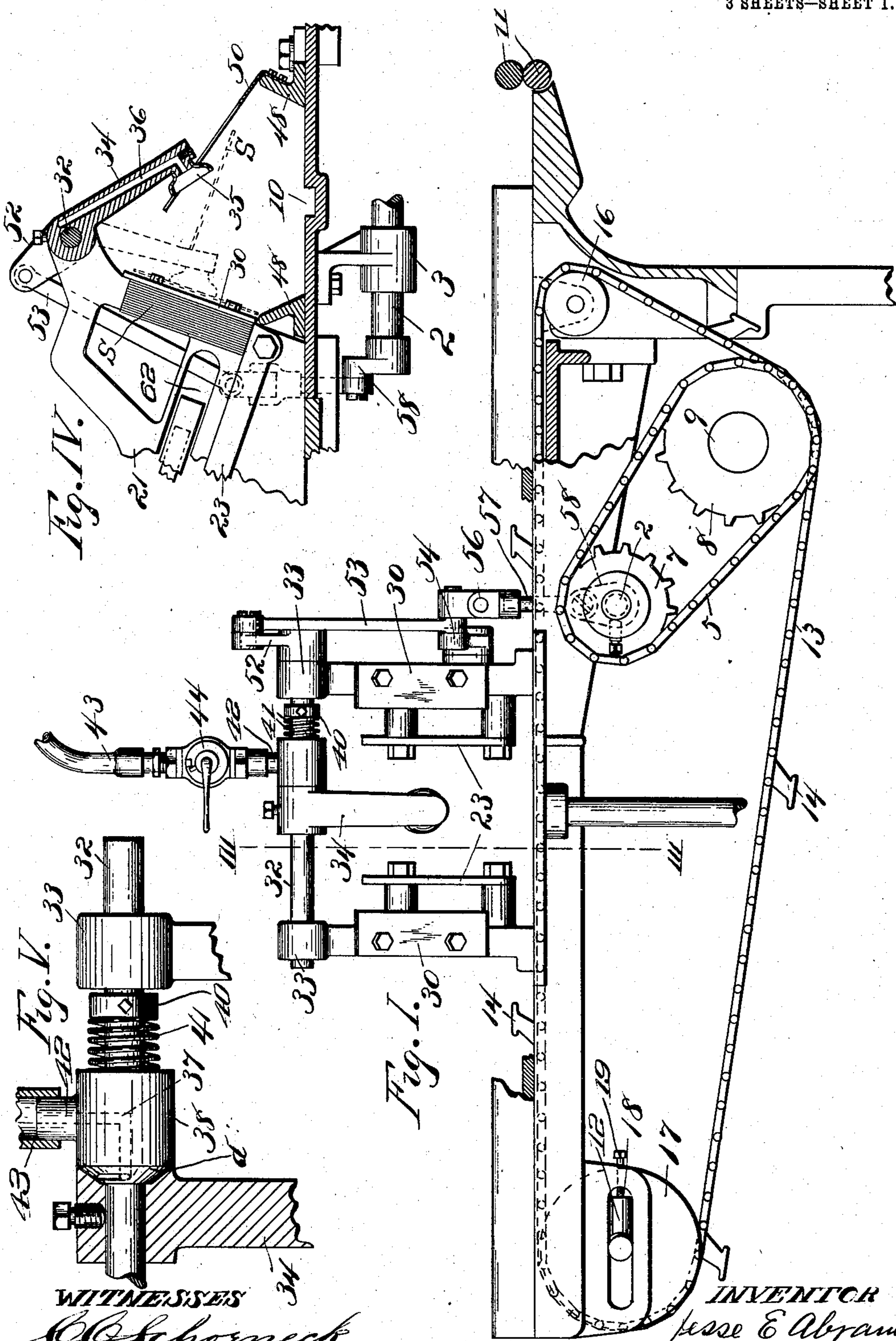


J. E. ABRAMS.  
 BLANK FEEDING MACHINE.  
 APPLICATION FILED APR. 27, 1907.

907,944.

Patented Dec. 29, 1908.  
 3 SHEETS—SHEET 1.



WITNESSES  
*W. Schornack*  
*J. W. Millward.*

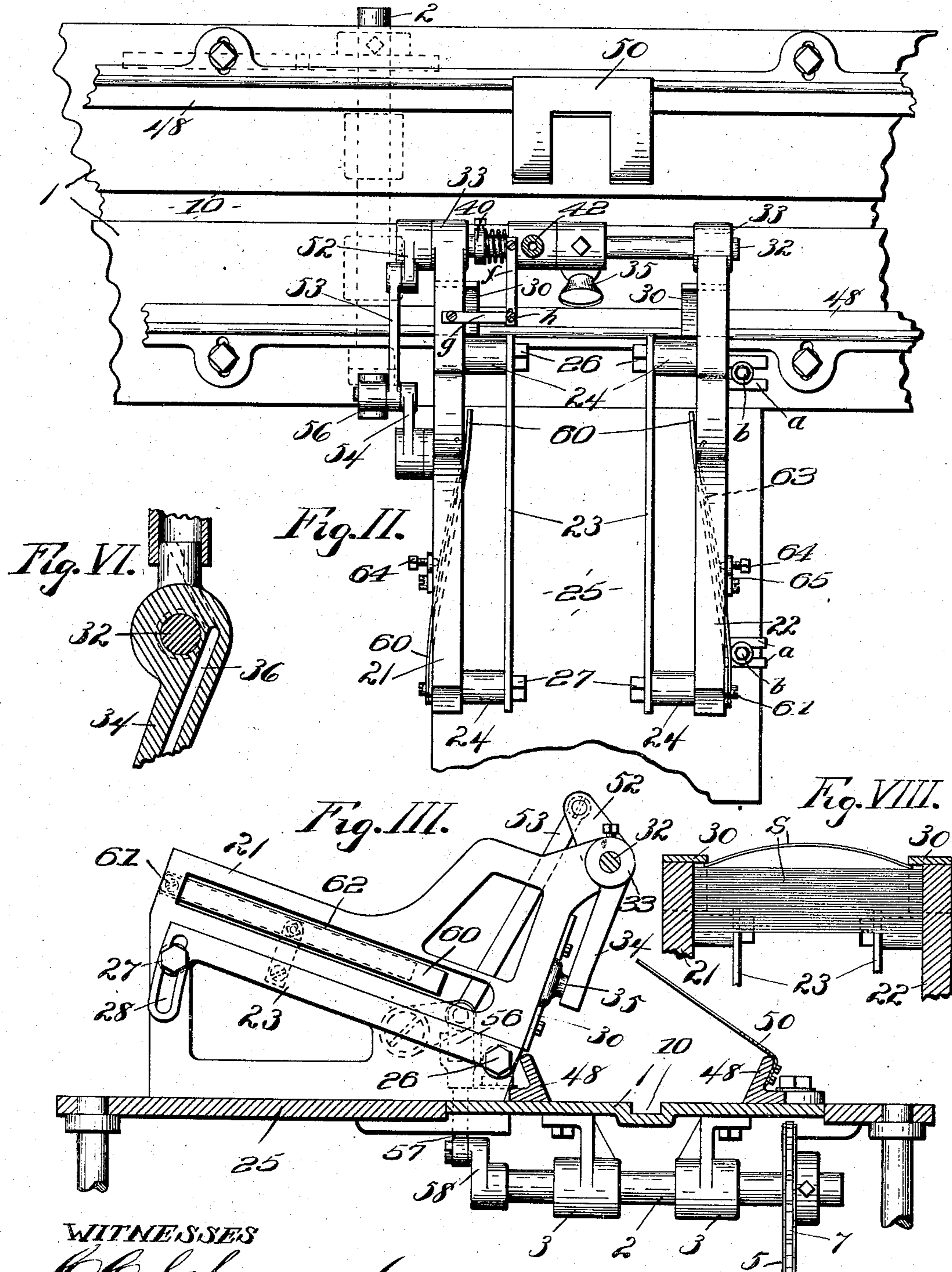
INVENTOR  
*Jesse E. Abrams*  
 BY *Alfred Wilkin*  
 ATTORNEY

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3 SHEETS—SHEET 2.



WITNESSES  
*C. Schoenck*  
*J. M. Millward.*

INVENTOR  
*Jesse E. Abrams*  
 BY *Alfred Wilkinson*  
 ATTORNEY

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3 SHEETS—SHEET 3.

Fig. VII.

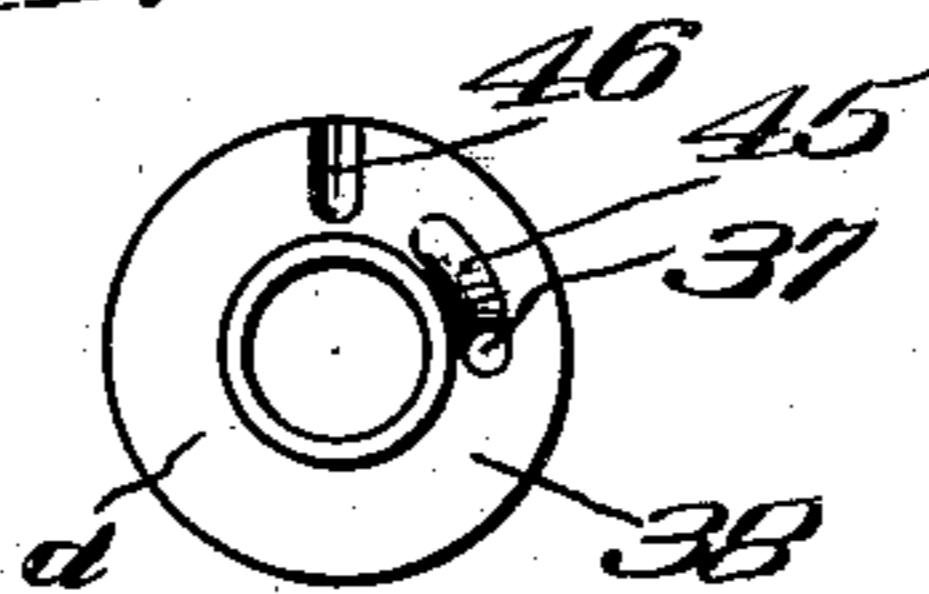


Fig. IX.

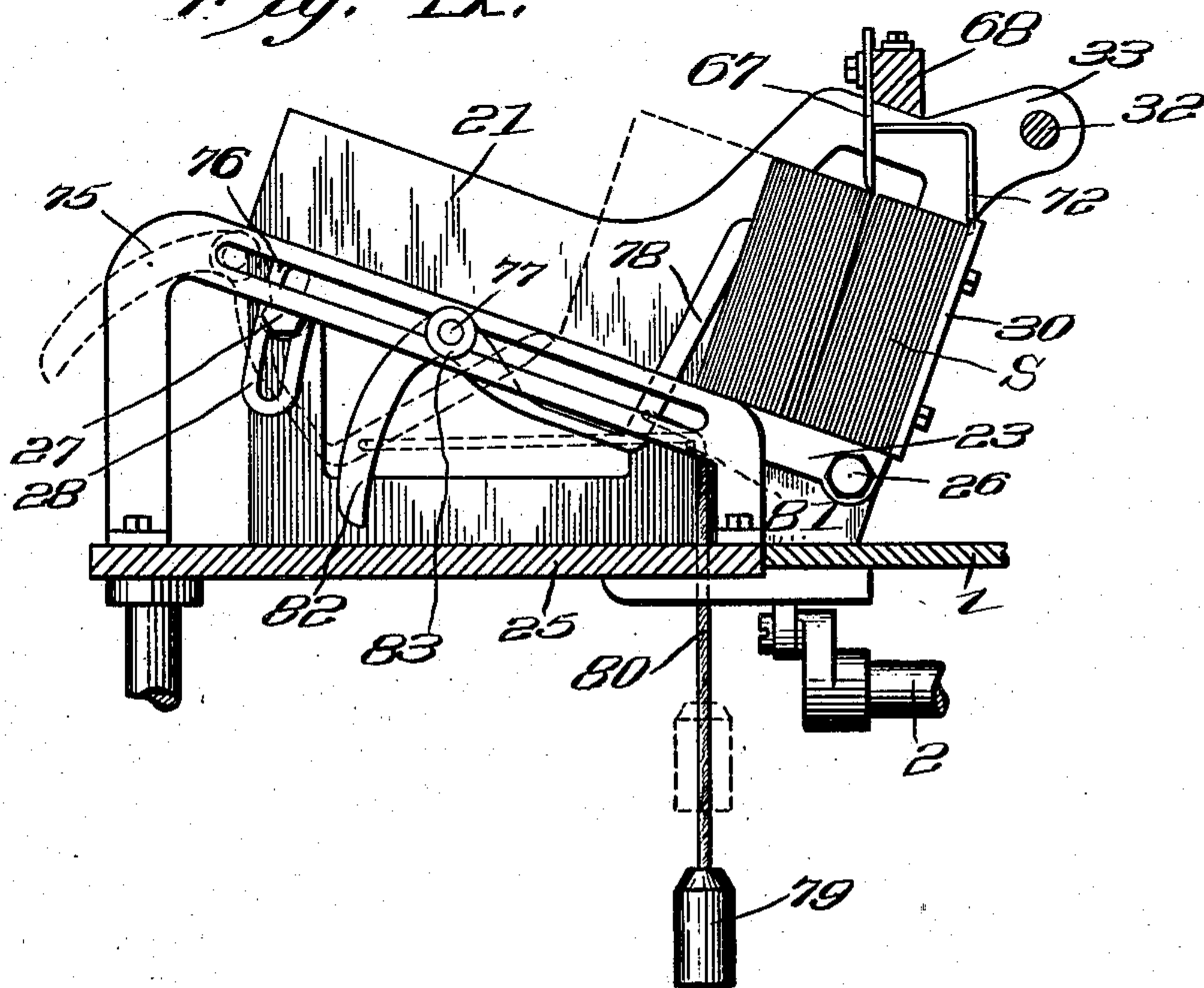
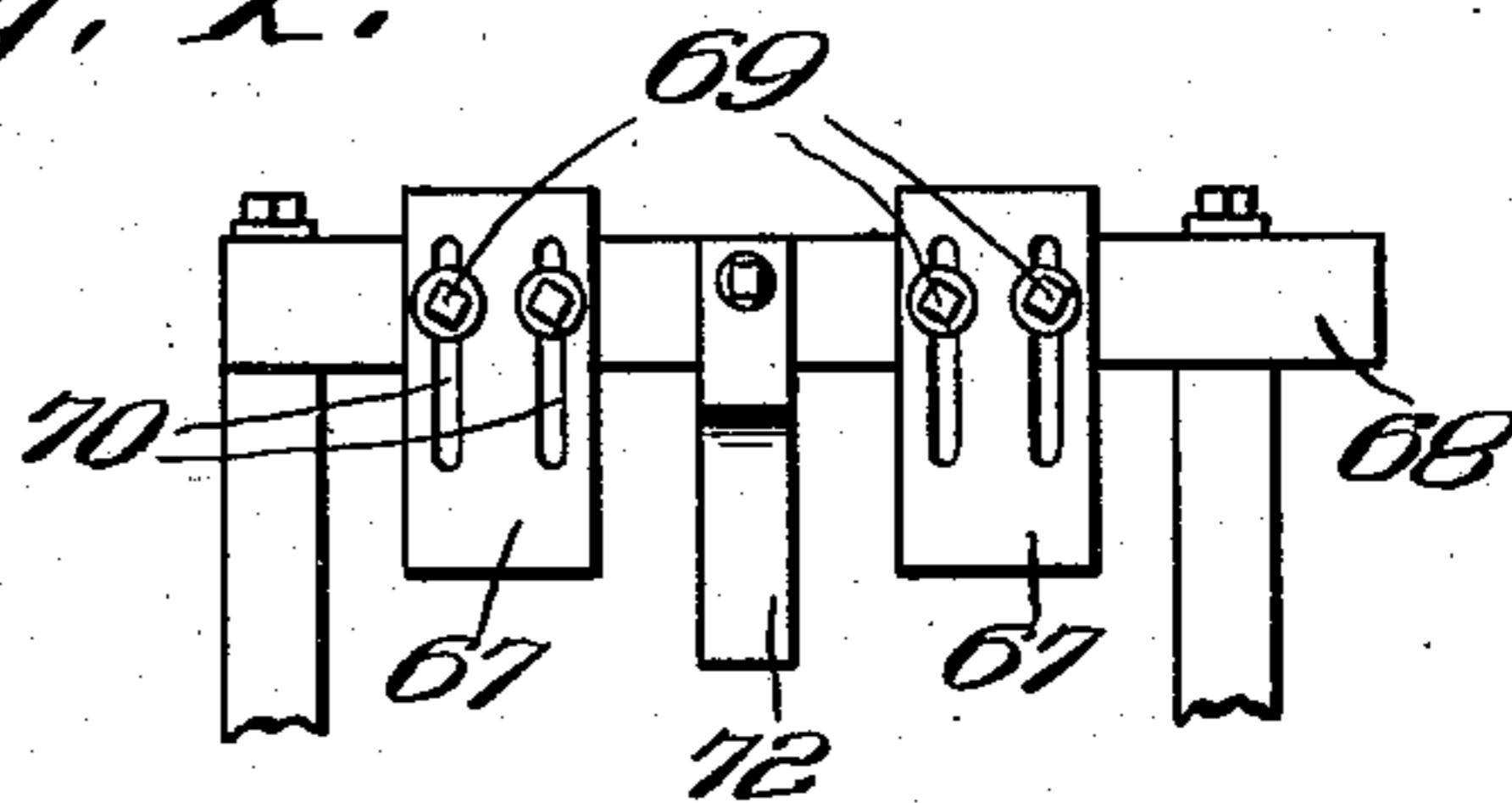


Fig. X.



WITNESSES

W. Millward.  
A. M. Parker

INVENTOR

Jesse E. Abrams  
BY  
Alfred Wilkinson  
ATTORNEY

# UNITED STATES PATENT OFFICE.

JESSE E. ABRAMS, OF SYRACUSE, NEW YORK, ASSIGNOR TO CONTINENTAL CAN COMPANY,  
OF SYRACUSE, NEW YORK, A CORPORATION.

## BLANK-FEEDING MACHINE.

No. 907,944.

Specification of Letters Patent.

Patented Dec. 29, 1908.

Application filed April 27, 1907. Serial No. 370,672.

*To all whom it may concern:*

Be it known that I, JESSE E. ABRAMS, citizen of the United States, residing at Syracuse, in the county of Onondaga and State of New York, have invented a new and useful Blank-Feeding Machine, of which the following is a specification.

My invention relates to a feeding mechanism, whereby thin sheets of metal or other material are withdrawn with certainty, one at a time, from the pile, and delivered, rapidly and continuously, to the point at which the sheets are operated upon.

I have here shown my invention embodied in a form of machine particularly adapted for handling the body blanks of which tin cans are made, but it will be understood that the form and arrangement of parts may be modified to adapt the invention to other similar purposes.

The important elements of my invention are a magazine for the pile of sheets, a vacuum cup, means to move the cup into engagement with the outer sheet of the pile and means simultaneously to exhaust the air from within, and means then to retract the cup to strip the outer sheet from the pile. The vacuum is then cut off and the sheet delivered to any convenient receptacle, for instance, a horizontally arranged feed-table, provided with a carrier, whereby the sheets are carried forward and delivered in succession to the body forming machine.

One important feature of my invention is some means slightly to resist the action of the cup in withdrawing the sheet, so that the sheet is slightly bent before it is withdrawn. By this, the danger is avoided of the second sheet clinging to the first either by air pressure or by engagement of the rough edges, and the two sheets being withdrawn together.

My invention is shown in the drawing herewith in which—

Figure I is a front elevation of the machine; Fig. II, a top plan; Fig. III, a cross section on line III of Fig. I; Fig. IV, a partial section parallel to Fig. III showing the parts in different positions. Figs. V, VI and VII are enlarged details showing the arrangement and connections of the vacuum-arm, valve etc. Fig. VIII is a diagram somewhat exaggerated to show how the sheet is bent by the pull of the cup before it is separated from the pile. Figs. IX and X are respec-

tively a section similar to Fig. IV and a partial rear elevation, showing certain modifications.

In the various figures of the drawing, 1 indicates the feed-table arranged intermediate of the feeding mechanism and the can-body forming machine.

2 is the counter shaft for the feeding mechanism arranged in bearings 3 3 and operated from any suitable source of power, as by chain 5 engaging sprocket 7 and sprocket 8 on main shaft 9. The main chain 13, running in the longitudinal groove 10 in the feed-table, is provided with the fingers 14 to engage with the body blanks and deliver them through the rollers 11 to the body forming mechanism. This main chain may be fitted to a sprocket similar to sprocket 8 on shaft 9 and is carried over rollers 16 and 17. One or both of these rollers may be grooved, and to regulate the chain tension, the pintles of roller 17 may be fitted to a slot 18, and adjusted therein by block 12 and screw 19.

21 and 22 are the side plates of the magazine arranged to extend substantially at a right angle to the feed chain over an extension 25 of the table. Plate 21 is preferably fixed to the table and plate 22 adjustable in reference thereto by means of lugs *a a* and bolts *b b*, to vary the width of the magazine for sheets or blanks of different sizes.

The bottom of the magazine is formed of bottom bars 23 bolted to lugs 24 24 on the inner face of the side plates. 26 indicates the front bolts and 27 the rear bolts; the latter are fitted to the slotted ends 28 of the bars 23, so that the inclination of these bars may be varied to promote more or less the down feed of the sheets against the stripping gages 30 secured to the front edges of the side plates.

32 is a rock-shaft fitted to bearings 33 at the front and in the upper portion of the side-plates. On this rock-shaft is secured the vacuum-cup arm 34 carrying the vacuum cup 35, made of rubber or other material suitable for engagement with the sheets to be removed one by one from the magazine. Said arm is provided with a channel 36 connecting the cup to a channel 37 in a valve-piece 38 and thence by a nozzle 42 to an exhaust pipe 43, whereby the air may be exhausted by a suitable air pump and a strong suction created within the cup, when the parts are in the dotted line position of Fig.

IV. Channels 36 and 37 are then in alignment, but as the cup is swung out toward the position shown in full lines in Fig. IV, the end of channel 36 moves along the port or channel mouth 45, connected to the end of channel 37, until the connection with said port and therefore with the exhaust pipe is broken, and when finally the arm and cup are in the full line position of Fig. IV, channel 36 is in alignment with port 46, communicating with the outer air, and the vacuum in the cup is destroyed, permitting the sheet to drop on the feed-table and be carried forward by the chain fingers, between the guides 48. On one of these guides there may be arranged a forked-stripper 50 to insure the disengagement of the sheet from the cup at the proper time.

The valve-piece is formed with a tapering end *d* fitted to a corresponding depression in the cup-arm 34, (best shown in Fig. V) and is held against said arm by means of a spring 41 and collar 40 on the shaft 32. The valve-piece is fitted to the shaft 32 but is prevented from turning therewith by arm *f* connected to arm *g* on the side-plate by screw *h*; arm *f* is preferably slotted to permit adjustment of the valve-piece on the shaft, with reference to the cup-arm.

44 is a three-way valve in the exhaust pipe 42, whereby the exhaust may be shut off, and the feed mechanism stopped independently of the body forming machine.

The rock-shaft, cup-arm and cup are operated by a crank-lever 52 on the rock-shaft connected by a connecting-rod 53 to a crank 54, journaled on the side of the machine, substantially parallel to said lever, and also connected by a knuckle-joint connection 56 to a rod 57 connected to a crank 58 on the end of the countershaft 2.

Some form of weight breaking finger is desirable to engage with the pile of sheets *S* indicated in Figs. IV, VIII and IX, and sustain a portion of the weight, relieving the pressure of the gages. Otherwise, the excessive weight on the front sheet might make the withdrawal thereof difficult.

As shown in Figs. II and III, 60 are fingers secured to the side-plates at 61 and extending in through slots 62 to engage with the sides of the pile. 63 are tension springs for the fingers, whose tension may be regulated by set-screws 64 in brackets 65.

In Figs. IX and X is shown a modification of these fingers. Here the fingers 67 are secured on a cross bar 68 between the side-plates and are made vertically adjustable by means of bolts 69 and slots 70 to engage with the pile at the top of the sheets. 72 is a protecting finger secured to said cross-bar, which may be used to engage with the upper edge of the sheet to prevent it from pulling away and dropping out of the magazine.

As shown in Fig. IX, there is secured on

the extension 25 between the bars 23 23, a bracket 75 having a longitudinal inclined slot 76. To said slot is fitted pin 77 of holding arm 78 drawn down by weight 79 on cord 80 running over bearing 81 to engage with the pile and promote a steady feed down thereof in the magazine, without danger of the sheets falling back.

82 is a handle on the holding arm and 83 a washer on the pin. With this arrangement, the sheets are held in position and forced down positively with sufficient firmness. When the pile in front of the holding-arm has diminished, another pile may be put in the magazine, and the holding arm rocked down from between the two and drawn back to the end of the slot as shown in dotted lines in Fig. IX. It is then released, to assume its normal position engaging with the rear of the total pile, to retain it and force it down as before.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a feeding mechanism for delivering thin metal sheets one by one from a pile, the combination with a feed-table having a longitudinal groove in its upper surface, an endless chain arranged in said groove and suitably supported, means to operate said chain, fingers on said chain, an inclined magazine arranged at a right angle to said feed-table and chain, stripping gages on the front of the magazine to support the pile of sheets, the opening between said stripping gages being slightly less than the width of the sheets, and means adapted to engage with the front sheet of the pile by suction, means to move said suction means into engagement with said front sheet and then to withdraw said suction means to draw out the front sheet between the gages and deliver it to the chain.

2. In a feeding machine for delivering sheets one by one from a pile, the combination with an inclined magazine for the pile composed of side-plates and bottom bars, of means to vary the inclination of the bottom bars, stripping gages secured to the side-plates at the front and extending slightly inwardly, a rock-shaft arranged in bearings near the front and at the top of the side-plates, a cup-arm secured on said shaft, a vacuum cup on said arm, said arm and cup being formed with a channel communicating with the interior of the cup, an exhaust pipe connected with said channel, means to rock the arm and move the cup into engagement with the front sheet of the pile, and then to withdraw the cup and the front sheet between said gages, and means connected with the pipe first to create a vacuum in the cup and then to destroy the vacuum when the cup and sheet have been withdrawn.

3. In a feeding machine for delivering thin metal sheets one by one from a pile, the com-

bination with a feed table having a longitudinal groove in its upper surface, an endless main chain arranged in said groove and suitably supported, fingers on said chain means  
 5 to operate the chain, an extension on said table, parallel side plates arranged on said extension at a right angle to the feed table and the chain, bottom bars arranged within the side-plates, stripping gages secured to the  
 10 front faces of the side-pieces and extending slightly inwardly, a rock-shaft arranged in bearings in the upper portion of the side-plates, a downwardly depending cup-arm on said rock-shaft, a cup on said arm, a valve-  
 15 piece fitted to the shaft, and having one end fitting against the cup-arm, a nozzle on the side of the valve-piece, an exhaust pipe connected to said nozzle, an elongated port in said end of the valve-piece adjacent to the  
 20 cup-arm, a channel from said port to the nozzle, an outer air port in said end of the valve-piece, a channel from the cup through the cup-arm adapted to connect first with the elongated port and then with the outer air  
 25 port in the valve-piece as the shaft and cup-arm are rocked, and means to rock the rock-shaft.

4. In a feeding machine for delivering thin metal sheets one by one from a pile,  
 30 parallel side plates on a suitable support, inclined bottom bars to support the pile arranged on the inner surfaces of the side-plates, stripping gages secured to the front faces of the side-plates and extending slightly  
 35 inwardly, a rock-shaft arranged in bearings in the upper portion of the side-plates, a downwardly depending cup-arm on said rock-shaft, a cup on said arm, a valve-piece fitted to the shaft and having a tapering end  
 40 fitting a corresponding depression in the cup-arm, a collar fixed on the rock-shaft, a spring between the collar and the valve-piece to hold the latter against the cup-arm, means to prevent the valve-piece from rotating  
 45 with the shaft, a nozzle on the side of the valve-piece, an exhaust pipe connected to said nozzle, an elongated port in said tapering end of the valve-piece, a channel therefrom to the nozzle, an outer air port in the  
 50 tapering end of the valve-piece, a channel from the cup through the cup-arm adapted to connect first with the elongated port and then with the outer air port in the valve-piece as the shaft and cup-arm are rocked,  
 55 and means to rock the rock-shaft.

5. In a feeding machine for delivering thin metal sheets one by one from a pile, the combination with a feed table having a longitudinal groove in its upper surface, of parallel  
 60 guides on the table on opposite sides of the groove, an endless main chain arranged in said groove and supported on suitable rotating parts, fingers on said chain, an extension on said table, parallel side  
 65 plates arranged on said extension at a right

angle to the feed table and the chain, one side-plate being fixed and the second adjustable in reference thereto, inclined bottom bars to support the pile arranged on the inner faces of the side-plates, means to vary  
 70 the inclination of the bars, stripping gages secured to the front faces of the side-plates and extending slightly inwardly, weight-carrying fingers on the side-plates to engage with the pile, a rock-shaft arranged in bearings  
 75 at the upper portion of the front ends of the side-plates, a downwardly depending cup-arm on said rock-shaft, a cup on said arm, a valve-piece fitted to the shaft and having a tapering end fitting a corresponding  
 80 depression in the cup-arm, a collar fixed on the rock-shaft, a spring between the collar and the valve-piece to hold the latter against the cup-arm, arms connected respectively to the valve-piece and the adjacent side-  
 85 plate and an adjustable connection between said arms, to prevent the valve-piece from rotating with the shaft, a nozzle on the side of the valve-piece, an exhaust pipe connected to said nozzle, a three-way valve in said  
 90 pipe, an elongated port in said tapering end of the valve-piece, a channel therefrom to the nozzle, an outer air port in the tapering end of the valve-piece, a channel from the cup through the cup-arm adapted to connect  
 95 first with the elongated port and then with the outer air port in the valve-piece as the shaft and cup-arm are rocked, a forked stripper arranged on one of the guides in the path of the cup and cup-arm to insure dis-  
 100 engagement of the sheet from the cup, and means to rock the rock-shaft, cup-arm, and cup, substantially as described and shown.

6. In a feeding machine for delivering thin metal sheets one by one from a pile, the  
 105 combination with a feed-table having a longitudinal groove in its upper surface, of parallel guides on the table on opposite sides of the groove, a main shaft, a sprocket on said shaft, rollers journaled below the table, a  
 110 main chain arranged in said groove and carried on said sprocket and rollers, fingers on said chain, a countershaft, operative connections between said shafts, an extension on said table, parallel side plates arranged on  
 115 said extension at a right angle to the feed-table and the chain, one side-plate being fixed and the second adjustable in reference thereto, front and rear lugs on the inner faces of the side-plates, bottom bars having  
 120 slotted rear ends, bolts for bolting said bottom bars to the lugs, stripping gages secured to the front faces of the side-plates and extending slightly inwardly, weight-carrying fingers secured at the rear of the side plates  
 125 and extending inwardly through slots to engage with the pile, flat tension springs engaging with said fingers, adjusting screws bearing on said springs, a rock-shaft in bearings at the upper portion of the front ends of  
 130

the side-plates, a downwardly depending cup-arm on said rock-shaft, a cup on said arm, a valve-piece fitted to the arm and having a tapering end fitting a corresponding depression in the cup-arm, a collar fixed on the rock-shaft, a spring between the collar and the valve-piece to hold the latter against the cup-arm, retaining arms connected respectively to the valve-piece and the adjacent side-plate and an adjustable connection between said retaining arms to prevent the valve-piece from rotating with the shaft, a crank-lever on the rock-shaft, a corresponding lower crank on the side-plate, a connecting-rod connecting the two cranks, a rod and knuckle-joint connection from the connecting-rod to the countershaft, a nozzle on the side of the valve-piece, an exhaust pipe connected to said nozzle, a three-way valve in said pipe, an elongated port in said tapering end of the valve-piece, a channel from said port to the nozzle, an outer air port in the tapering end of the valve-piece, a channel from the cup through the cup-arm adapted to connect first with the elongated port and then with the outer air port in the valve-piece, as the shaft and cup-arm are rocked, a forked stripper arranged on one of the guides, in the path of the cup and cup-arm to insure disengagement of the sheet from the cup, a cross-bar between the tops of the side-plates, a protecting finger on said bar to engage with the upper edge of the front sheet, a bracket having a longitudinal inclined slot arranged between the bottom bars, a holding arm adapted to engage with the rear of the pile and having a pin engaging with said inclined slot, a downwardly and rearwardly extending handle on the holding arm and a weight and cord connected to said holding arm to draw the arm against the pile, substantially as described and shown.

7. In a feeding mechanism for delivering sheets one by one from a pile, the combination with a suitable support, of parallel side-plates thereon, inclined bottom bars arranged within the side plates to support the pile, stripping gages extending within the front faces of the side plates to retain the pile, a rock-shaft journaled in the upper part of the side plates, a cup-arm on the shaft, a rubber cup on the lower end of the arm, means to rock the shaft to bring the cup into engagement with the outer sheet of the pile and then to withdraw the cup, means to exhaust the air from the cup, a bracket, having a longitudinal inclined slot, arranged between the bottom bars, a holding arm adapted to engage with the rear of the pile, and having a pin engaging with said inclined slot,

a downwardly and rearwardly extending handle on the holding arm, and a weight and cord connected to said holding arm to draw the arm against the pile, substantially as described and shown.

8. In a feeding mechanism for delivering thin metal sheets one by one from a pile, the combination with a feed-table having a longitudinal groove in its upper surface, an endless chain arranged in said groove and suitably supported, means to operate said chain, fingers on said chain, an inclined magazine arranged at a right angle to said feed-table and chain, stripping gages on the front of the magazine to support the pile of sheets, the opening between said stripping gages being slightly less than the width of the sheets, and means adapted to engage with the front sheet of the pile by suction, means to move said suction means into engagement with said front sheet and then to withdraw said suction means to draw out the front sheet between the gages and deliver it to the chain.

9. In a feeding mechanism for the body blanks of cans, the combination with a horizontal feed table to receive the sheets flat, of a carrier to move the sheets forward on the table, a magazine to receive the pile of sheets on edge, said magazine being inclined downwardly toward the table gages spaced apart to engage with the front and lower sheet of the pile and hold the pile back in the magazine, means to engage the front and lower sheet of the pile and withdraw it between the gages; and means to disengage the sheet from the engaging means when the sheet has been so withdrawn.

10. In a feeding mechanism for the body blanks of cans, the combination with a horizontal feed table to receive the sheets flat, of a carrier to move the sheets forward on the table, a magazine to receive the pile of sheets on edge, said magazine being inclined downwardly toward the table gages spaced apart to engage with the front and lower sheet of the pile and hold the pile back in the magazine, means to engage the front and lower sheet of the pile and withdraw it between the gages; means to break the engagement of said engaging means with the sheet when the sheet has been so withdrawn and an arm arranged in the path of the sheet when being withdrawn to insure said disengagement.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JESSE E. ABRAMS.

Witnesses:

F. P. ASSMANN,  
FRANK J. O'NEILL.