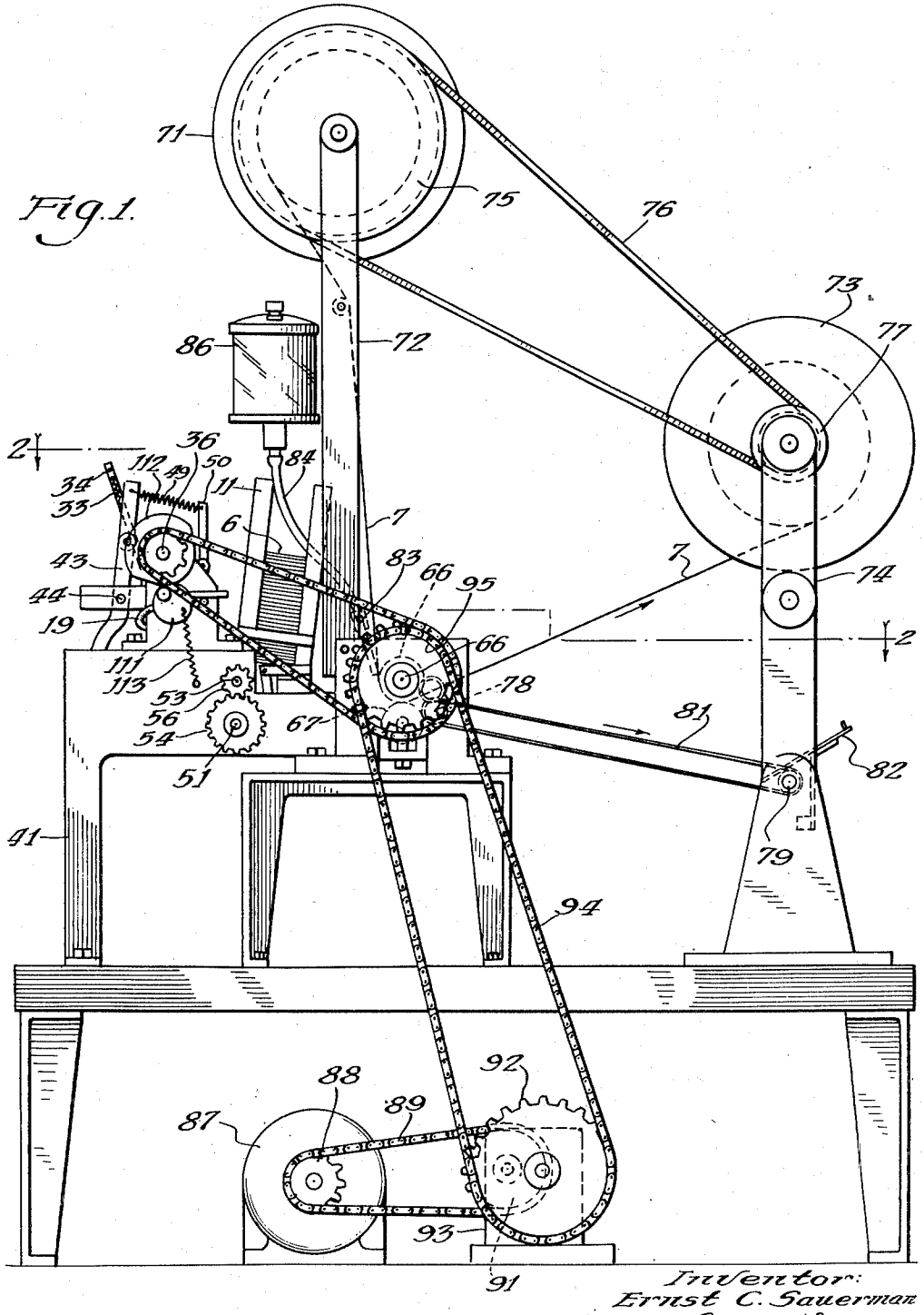
May 15, 1951 E. C. SAUERMAN 2,552,869

STREAMLINE FEEDING MEANS IN PRINTING MACHINES

Filed March 10, 1945 6 Sheets-Sheet 1

Fig. 1.



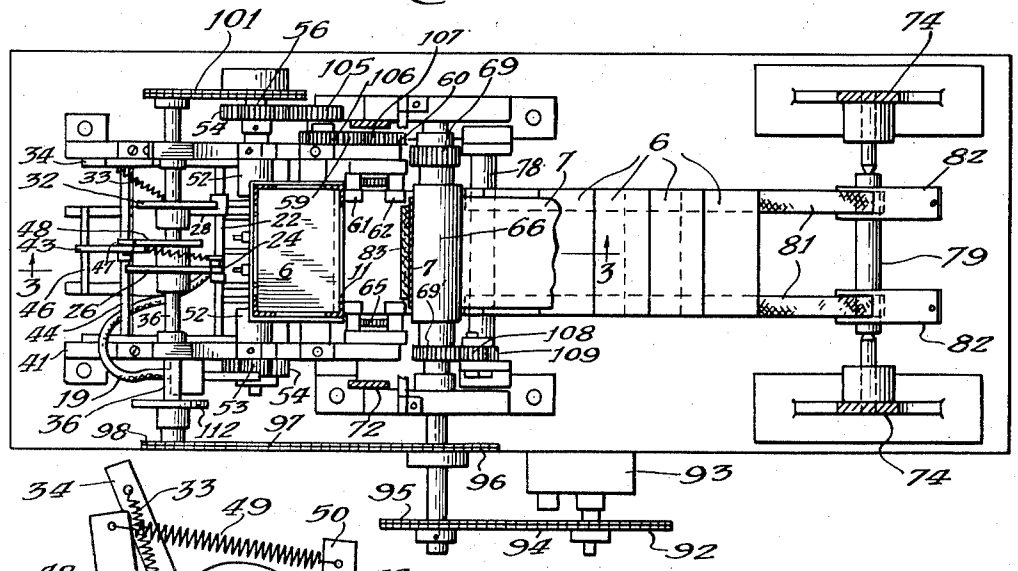

Inventor:
Ernst C. Sauerman
By: Lee J. Gary
Attorney

May 15, 1951 E. C. SAUERMAN 2,552,869

STREAMLINE FEEDING MEANS IN PRINTING MACHINES

Filed March 10, 1945 6 Sheets-Sheet 2

Fig. 2.



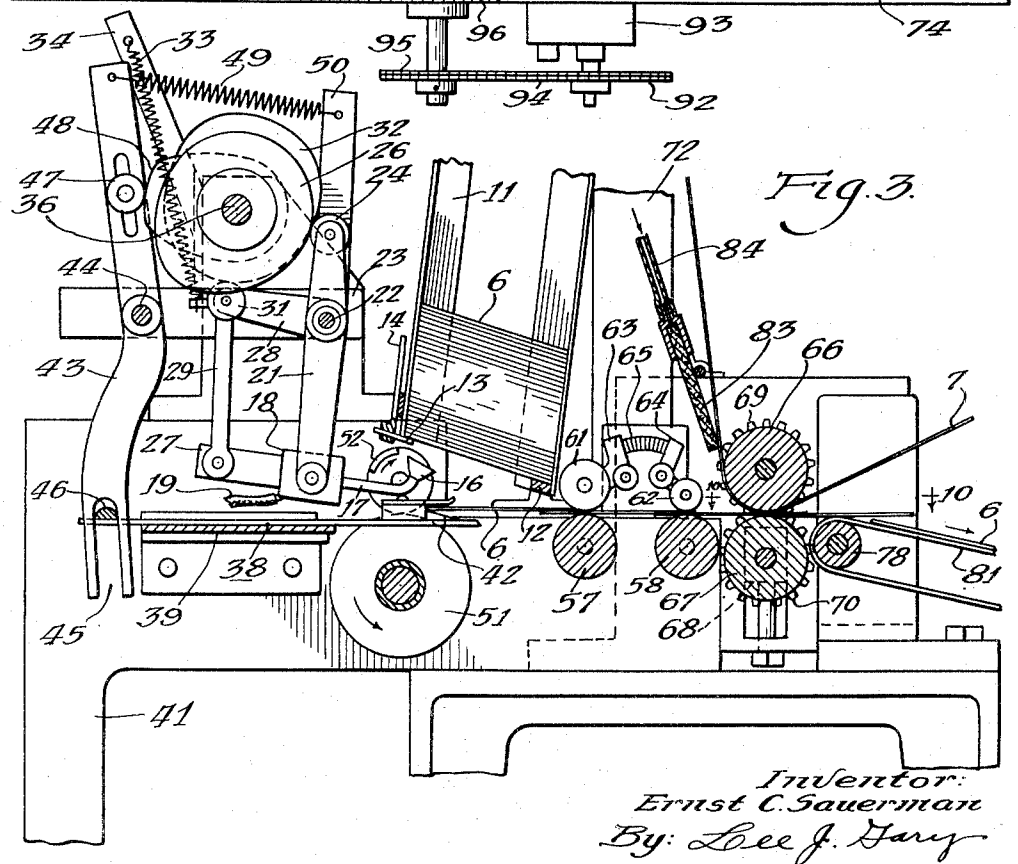


Fig. 3.

Inventor:
Ernst C. Sauerman
By: Lee J. Gary
Attorney:

May 15, 1951 E. C. SAUERMAN 2,552,869

STREAMLINE FEEDING MEANS IN PRINTING MACHINES

Filed March 10, 1945 6 Sheets-Sheet 3

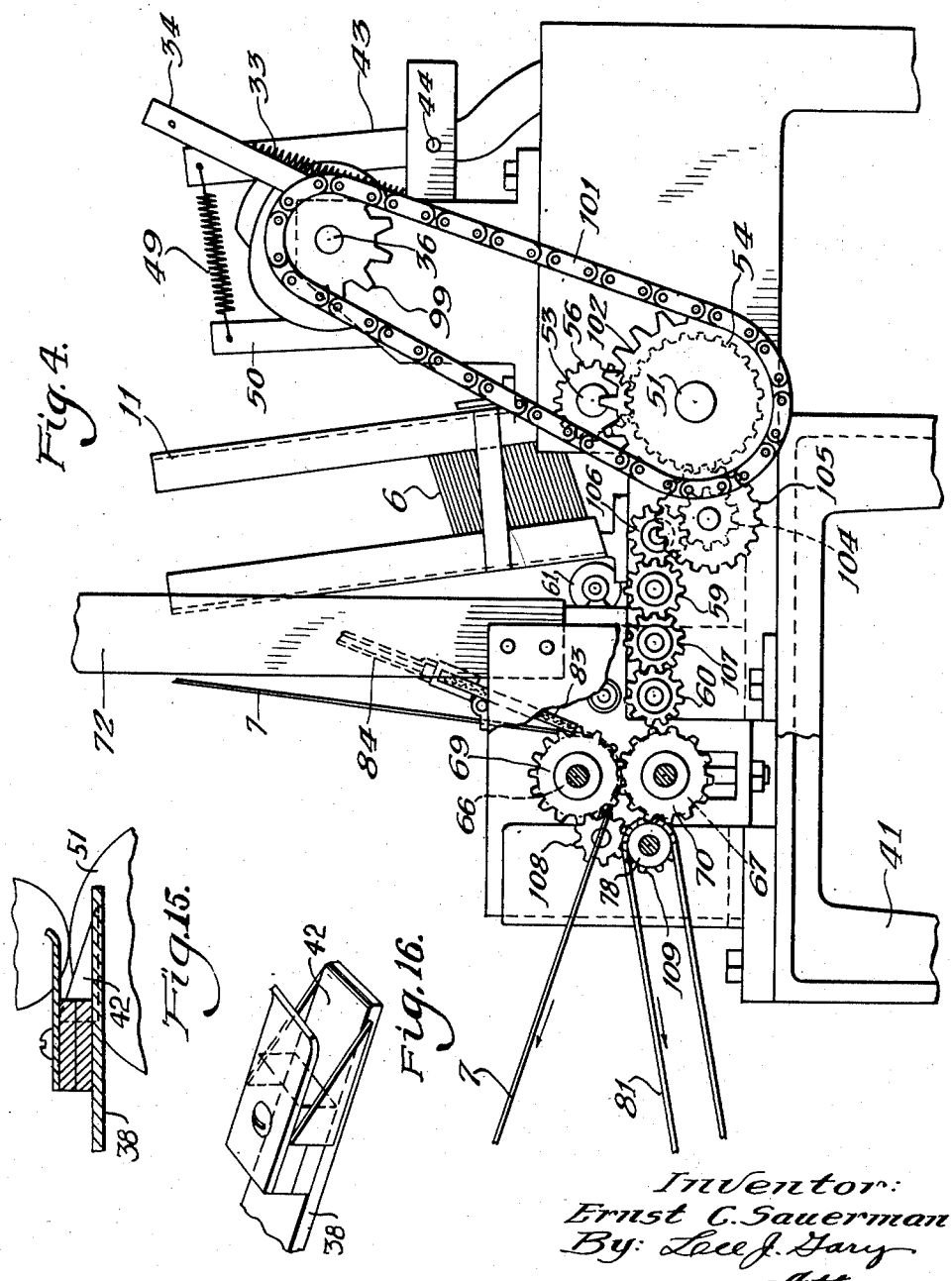



Fig. 4.




Fig. 15.




Fig. 16.

Inventor:
Ernst C. Sauerman
By: Lee J. Gary
Attorney.

May 15, 1951 E. C. SAUERMAN 2,552,869

STREAMLINE FEEDING MEANS IN PRINTING MACHINES

Filed March 10, 1945 6 Sheets-Sheet 4

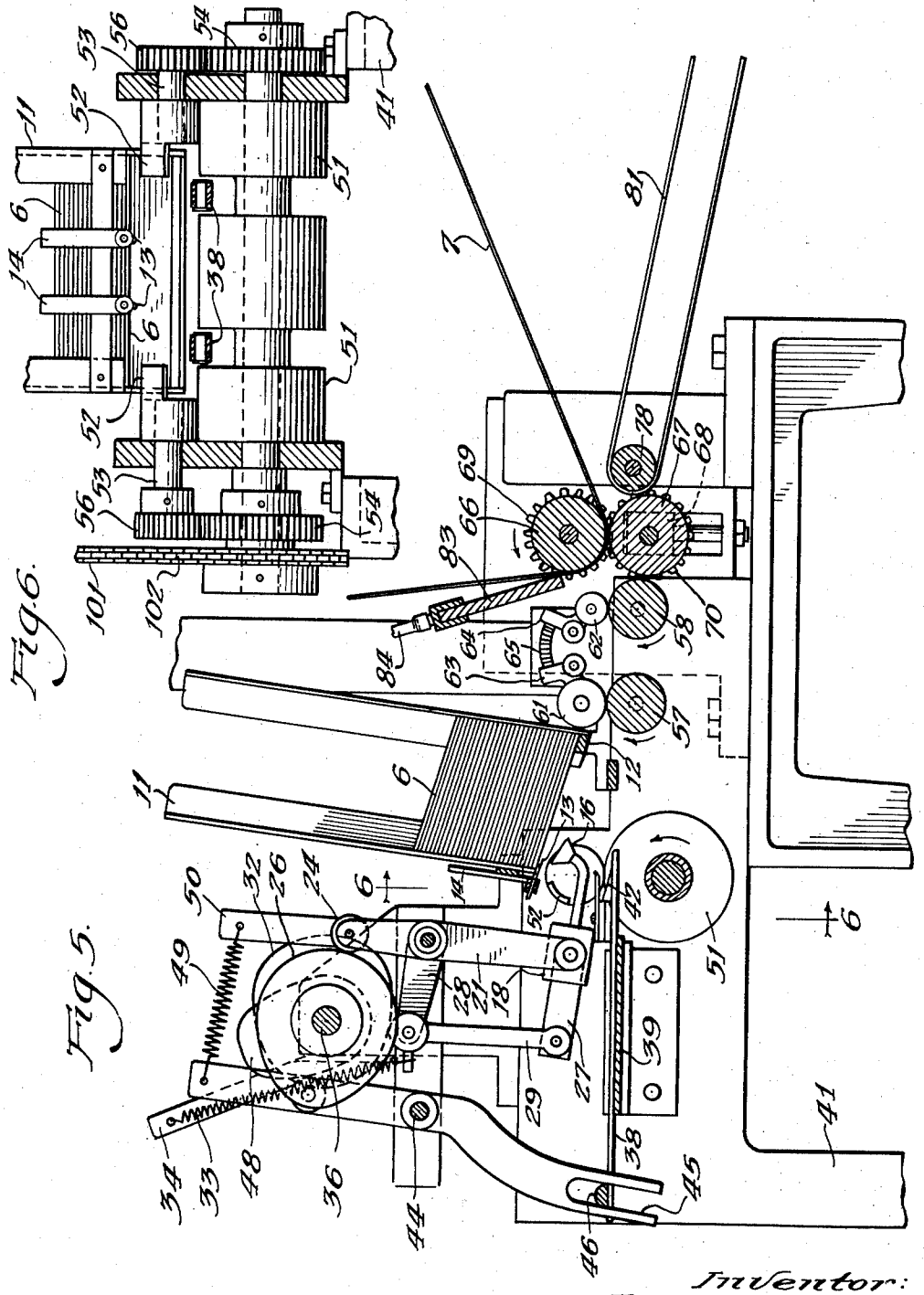


Fig. 6.



Fig. 5.

Inventor:
Ernst C. Sauerman
By: Lee J. Davy
Attorney.

May 15, 1951 E. C. SAUERMAN 2,552,869

STREAMLINE FEEDING MEANS IN PRINTING MACHINES

Filed March 10, 1945 6 Sheets-Sheet 5

Fig. 7.

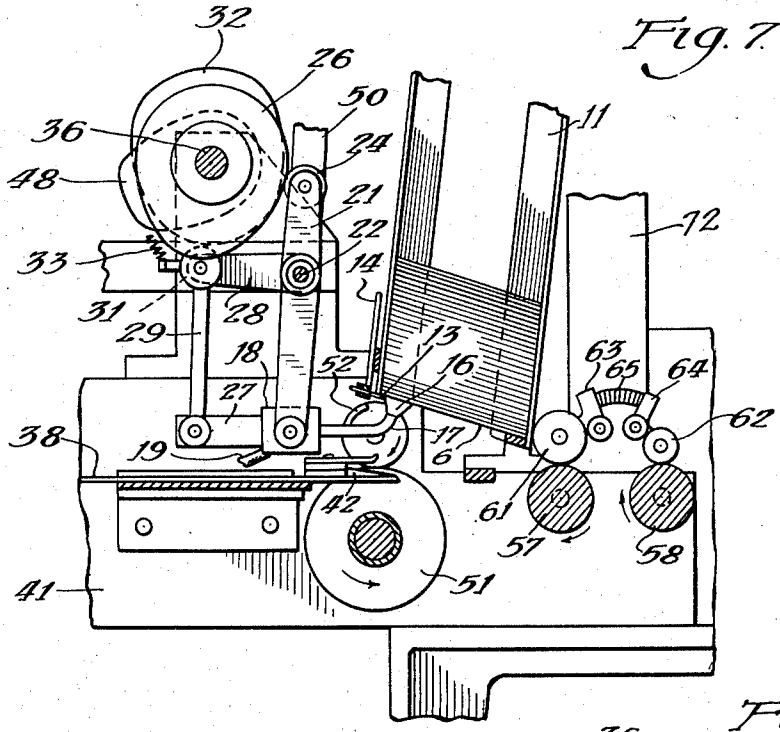



Fig. 8.

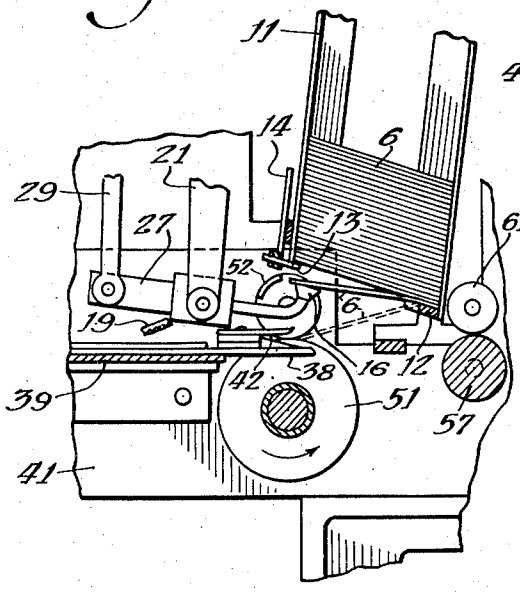
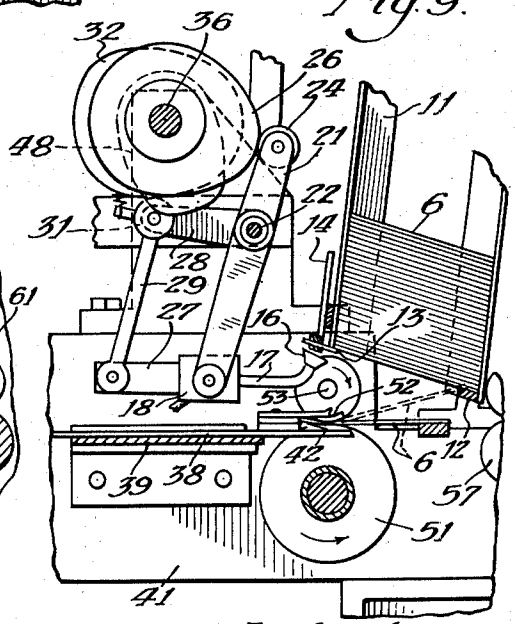



Fig. 9.




Inventor:
Ernst C. Sauerman
By: Lael J. Gary
Attorney.

May 15, 1951 E. C. SAUERMAN 2,552,869

STREAMLINE FEEDING MEANS IN PRINTING MACHINES

Filed March 10, 1945 6 Sheets-Sheet 6

Fig. 12.

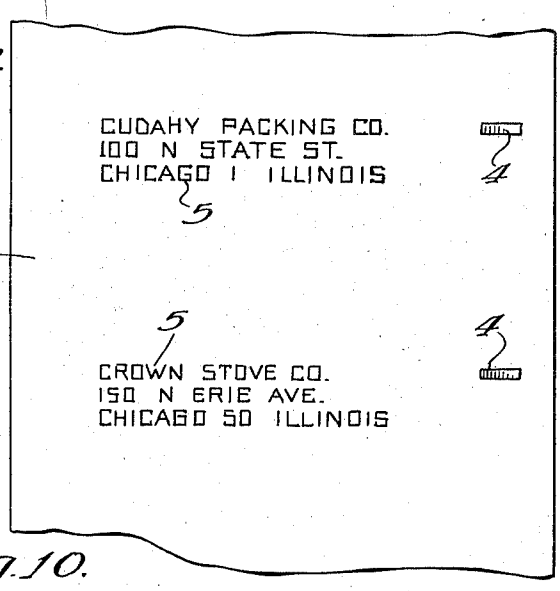



Fig. 10.

Fig. 13.

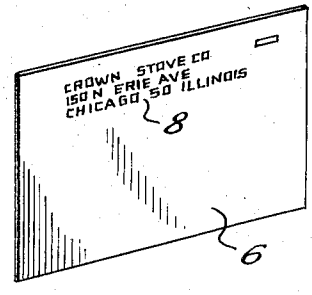
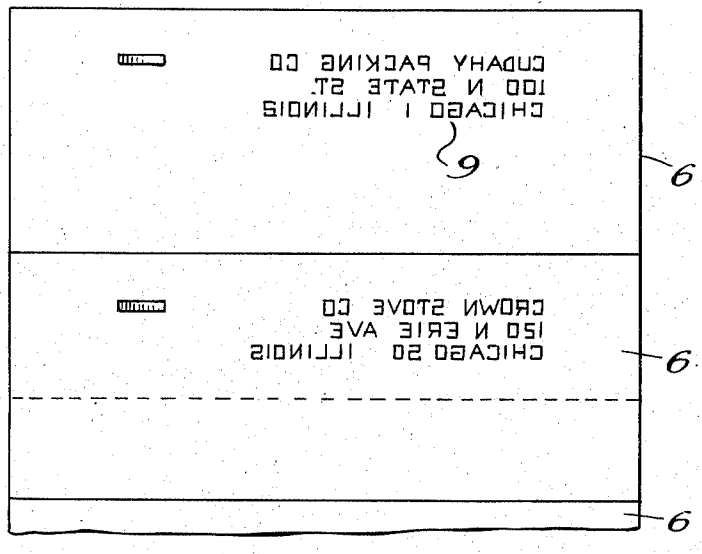



Fig. 11.







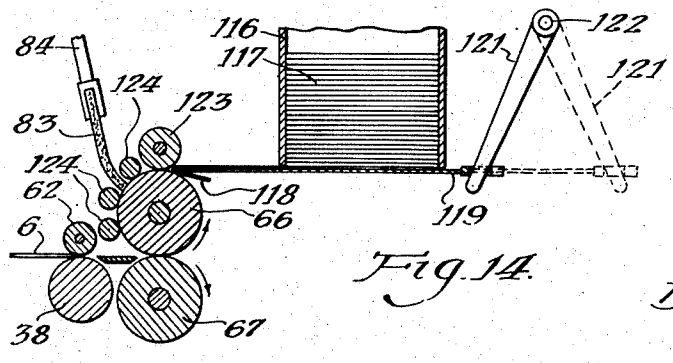



Fig. 14.

Inventor:
Ernst C. Sauerman
By: Lee J. Gary
Attorney

Patented May 15, 1951 2,552,869

# UNITED STATES PATENT OFFICE

2,552,869

## STREAMLINE FEEDING MEANS IN PRINTING MACHINES

Ernst C. Sauerman, Chicago, Ill.

Application March 10, 1945, Serial No. 581,975

5 Claims. (Cl. 271—32)

1

This invention relates to printing apparatus, and is more particularly concerned with the provision of an apparatus of this type in which a plurality of flexible, fibrous cards serve as printing plates and are fed through the apparatus for printing information, such as names and addresses, onto material to be printed.

Briefly, this invention contemplates the provision of a plurality of printing cards which are preferably formed of relatively lightweight, fibrous sheet material such as paper stock having the rear face thereof formed with a dull, glazed finish suitable to receive pigment coated printing characters which are transferable to the surface of other material, such as paper, by the use of a suitable solvent. The apparatus hereinafter described is particularly adapted for use in printing means and addresses, or other information, provided on each of the several printing cards onto a relatively long strip of paper which may thereafter be cut transversely intermediate each set of names and addresses to provide individual slips suitable for attachment to articles to be mailed or for insertion in window-type envelopes.

This invention further contemplates the provision of a printing apparatus of this type embodying means for arranging a plurality of printing cards in a row and in predetermined overlapping relation for movement into printing engagement with a strip of paper. By arranging the cards in overlapping relation, the spacing between the sets of printed matter on the strip material may readily be varied to suit the operator by merely adjusting the overlapping relation of the cards.

This invention further contemplates the provision of improved means for withdrawing printing cards, one at a time, from the bottom of a hopper provided to receive the cards in superimposed, stacked relation, together with improved means for positioning the withdrawn printed card in proper alignment for delivery between suitable feed rolls.

This invention further contemplates the provision of a plurality of printing cards bearing individual names and addresses, or other printed matter, and wherein said cards are adapted to serve the dual function of separate printing plates and also as a part of a record card system.

This invention further contemplates the provision of an apparatus of this type which is relatively inexpensive in construction, simple in operation and which will not readily get out of order.

2

This invention embodies other novel features, details of construction and arrangement of parts which are hereinafter set forth in the specification and claims and illustrated in the accompanying drawings wherein:

Fig. 1 is a side elevational view showing an apparatus embodying features of this invention.

Fig. 2 is a sectional view taken along the line 2—2 of Fig. 1.

Fig. 3 is a sectional view taken along the line 3—3 of Fig. 2, showing a printing card pusher mechanism in its forward position for delivering a printing card between a pair of feed rollers.

Fig. 4 is a fragmentary side elevational view showing the opposite side of the machine from that shown in Fig. 1.

Fig. 5 is a longitudinal sectional view corresponding to Fig. 3, showing printing card pusher mechanism in its rearward position.

Fig. 6 is a fragmentary transverse sectional view taken along the line 6—6 of Fig. 5.

Fig. 7 is a fragmentary longitudinal sectional view corresponding to Fig. 5, showing the relative position of parts after commencement of the operation for withdrawing a printing card from the bottom of the card hopper.

Fig. 8 is a fragmentary longitudinal sectional view corresponding to Fig. 7, showing the relative position of parts after a card has been partly withdrawn from a card hopper.

Fig. 9 is a fragmentary sectional view corresponding to Figs. 7 and 8, showing the relative position of parts and the means employed for moving the back edge of a printing card into aligning engagement with a pusher mechanism.

Fig. 10 is a plan view showing the rear side of a plurality of printing cards arranged in overlapping relation as viewed along the line 10—10 of Fig. 3.

Fig. 11 is a side elevational view of same.

Fig. 12 is a plan view showing a portion of a strip of paper after same has been printed.

Fig. 13 is a perspective view showing the front side of a printing card.

Fig. 14 is a schematic sectional view showing a modified form of apparatus for feeding envelopes into printing position with the printing cards.

Fig. 15 is a fragmentary sectional view of the card carrier illustrating particularly the card-engaging converging recess.

Fig. 16 is a fragmentary detailed perspective view of the card carrier as shown in Fig. 15.

Referring now to the drawings for a better understanding of this invention, the machine illustrated therein is adapted to employ a plurality of cards 6 for transferring information

provided thereon onto a strip of paper 7. The cards 6 are preferably formed rectangular in shape and of relatively thin, flexible, fibrous material such as paper stock. Printing information 8, such as names and addresses, may be formed on the face thereof by means of a typewriter, and pigment coated printing characters are provided at the same time on the reverse side of the card as indicated at 9, in Fig. 10, by interposing a hectograph ribbon or the like between the card and the platen of the typewriter. During the printing operation, the surface of the strip 7 to be printed is coated with a suitable pigment solvent which acts to transfer a portion of the pigment from the pigment coated characters 9 onto the strip material 7. As this method of printing is well known to those skilled in this art, it is believed unnecessary to describe further the kind of paper of which cards 6 may be formed, or a particular type of pigment or pigment solvent which may be employed to accomplish the transfer of printed information from the cards onto the strip.

The printing machine comprises a hopper 11 adapted to receive a plurality of printing cards 6 in superimposed stacked relation. The hopper is open at the bottom and provided with a ledge 12 and a pair of fingers 13 for engagement with the front and back edges, respectively, of the bottom printing card within the hopper. The fingers 13 are mounted for longitudinal adjustment in recesses formed in the lower end of brackets 14 secured to the back side of the hopper.

Pneumatic means are employed for engagement with the printing cards 6 for withdrawing same, one at a time, from the bottom of the hopper 11, and comprises a suction nozzle 16 formed of rubber or other suitable resilient material and connected at the outer end of an air conduit 17. The air conduit 17 is carried at the forward end of a pivot block 18 provided with a suitable air passage therethrough (not shown) leading to a flexible air conduit 19. The block 18 is pivotally supported at the lower end of a lever 21 which is secured intermediate its ends on a shaft 22 journaled in bearing brackets 23. A roller 24 is journaled on the upper end of the lever 21 for engagement with the operating surface of a cam 26 for moving the pivot block 18 and the nozzle 16 longitudinally of the machine.

The pivot block 18 is formed with a rearwardly disposed arm 27 which is pivotally connected to an actuating arm 28 journaled on the shaft 22 by means of a connecting link 29. A suitable roller 31 is journaled at the connection between the actuating arm 28 and the connecting link 29 for engagement with the operating surface with a cam member 32. The roller 31 is maintained in engagement with the cam 32 by means of a spring 33 having its one end connected to a connecting link 29 and its upper end connected to a bracket 34. The cams 26 and 32 are secured to a cam shaft 36 which is journaled in bearing brackets 23.

A card carrier 38 is mounted upon suitable guide members 39 for reciprocable movement longitudinally of the machine. Guide members 39 are supported between side frame members 41. The forward end of the card carrier 38 is provided with a converging recess 42 adapted to receive the back edge of a printing card 6. An actuating lever 43 is journaled intermediate its ends on a shaft 44 and has its lower end bifurcated at 45 for engagement with a transverse bar 46 provided on the card carrier 38. A roller 47 is journaled on the upper end of the lever 43 for engagement with the surface of a cam 48 and is maintained in engagement therewith by means of a tension spring 49 having its one end connected to the lever 43 and its other end connected to a lever 50 which is secured to the shaft 22. It will thus be seen that the spring 39 serves to hold the rollers 23 and 47 in operative engagement with their respective cams 26 and 48.

An alignment roll 51 is journaled for counterclockwise rotational movement on the frame 41, and a pair of card alignment fingers 52 are disposed adjacent opposite ends of the roll 51 for clockwise rotational movement. Fingers 52 are carried upon collars 51' which are mounted upon the inner ends of shafts 53 which are journaled on the frame 41 above the roll 51. A pair of driving gears 54 are secured on the ends of the roll 51 for driving respective gears 56 secured to the shafts 53. In operation the fingers 52 coact with the roll 51 to engage the side edges of the cards 6 to move same rearwardly into engagement in the converging recess 42 provided in the forward end of the reciprocable card carrier 38 when the latter is in its rearward position.

Two sets of feed rolls are provided on the frame 41 to receive and engage the sides of printing cards delivered thereto by the reciprocable card carrier 38. The lower feed rolls 57 and 58 are provided with gears 59 and 60, respectively, and driven in a clockwise direction as viewed in Fig. 5, by means hereinafter described. Two pairs of idler rolls 61 and 62 are journaled on stud shafts provided on brackets 63 and 64, respectively, which in turn are journaled on the sides of the frame 41 to move their respective idler rolls 61 and 62 along an arcuate path. The idler rolls 61 and 62 are urged into operative engagement with their respective feed rolls to engage printing cards adjacent their side edges only by means of a compression spring 65 interposed between the brackets 63 and 64.

A pair of printing rolls 66 and 67 are journaled, one above the other, to receive printing cards 6 and the strip 7 therebetween. The upper roll 66 is journaled on the frame 41 and the lower roll 67 is journaled in a pair of floating bearings 68 which are arranged for vertical movement on the frame 41. The floating bearings 68 are normally urged upwardly by means of suitable compression springs (not shown) to maintain the lower roll 67 in tight operative engagement with the upper roll 66. The printing rolls are driven in timed relation by means of intermeshing gears 69 and 70 mounted on the ends of the rolls 66 and 67, respectively.

The strip 7 to be printed is preferably mounted in rolled form on a suitable reel 71 journaled on a pair of upright members 72. After the strip passes through printing rolls 66 and 67 it is wound upon a reel 73 journaled on a standard 74. A driving pulley 75 is secured to the reel 71 and acts through a suitable belt 76 to drive a pulley 77 secured to the reel 73. The belt 76 and pulley 77 are constructed to permit slippage due to the constantly changing diameters of the rolls of strip material on the reels 71 and 73.

A card stacking mechanism is disposed to receive the printing cards 6 from the printing rolls 66 and 67 and comprises a driving roll 78, a driven roll 79 and a belt 81. The belt 81 slopes downwardly towards a card stacking plate 82 which is arranged to receive and stack cards

carried by the belt 81. As the printing cards are disposed in overlapping relation as they pass through the printing rolls, it will be seen that the belt 81 and plate 82 causes the cards to become stacked in an inclined plane against the plate 82.

A wiping strip 83 formed of absorbent material is disposed for engagement with the printing surface of the strip 7 prior to its passage between the printing rolls, and a suitable pigment solvent liquid is supplied thereto through a conduit 84 from a supply reservoir 86.

The several parts of the apparatus adapted to be actuated for withdrawing the printing cards 6 from the hopper, for aligning the cards, for feeding the cards and for transferring printed information from the cards onto the strip 7 are driven in timed relation by means of an electric motor 87. The motor 87 acts through a sprocket 88, drive chain 89, a gear box 93 and driven sprocket 91 to drive a sprocket 92 which, in turn, acts through a chain 94 to drive a sprocket 95 secured to the upper feed roll 66. A sprocket 96 is also secured to the upper printing roll 66 to drive the cam shaft 36 through a chain 97 and a sprocket 98. Another sprocket 99 is secured on the opposite end of the cam shaft 36 and acts through a chain 101 to drive a sprocket 102 secured to the alignment roll 51. One of the gears 54 acts through three idler gears 104, 105 and 106 to drive the gear 59 secured to the feed roll 57. The gear 59, in turn, acts through an idler gear 107 to drive the gear 60 provided on the feed roll 58. The card stacking belt 81 is driven from the gear 69 secured to the upper printing roll 66 through an idler gear 108 which meshes with a driven gear 109 secured to the roll 78.

A rotary type air valve, generally indicated at 111, is connected to the air conduit 19 and to a vacuum pump (not shown) and is mounted on the frame 23 below one end of the cam shaft 36 for operative engagement by a cam 112, the cam 112 acting to rotate the valve in one direction and a tension spring 113 being employed to return the valve to its normal position.

In the operation of the machine thus described, printing cards 6 are withdrawn from the bottom of the hopper 11 one at a time by the engagement of the suction nozzle 16 with the bottom card, as illustrated in Fig. 7. When the suction nozzle 16 is thus engaged the cam 112 acts to open the rotary valve 111 to exhaust air from the conduits 17 and 19 and the pivot block 18. When the lower card is thus engaged to the suction nozzle 16, the cams 26 and 32 act through their respective levers 21 and 28 to move the suction head 16 downardly and rearwardly to the position shown in Fig. 8. Due to the inherent flexibility of the printing cards, they may readily be bent to permit the movement of the rearward edges thereof past the stop fingers 13.

After the rear edge of the printing card has been lowered to the position shown in Fig. 8, the alignment fingers 52 rotate into engagement with the upper surface of the disengaged card to move same into engagement with the alignment roll 51, as illustrated in Fig. 9. The fingers 52 then coact with the roll 51 to move the printing card rearwardly into the converging recess 42 formed on the forward end of the reciprocable card carrier 38.

The card carrier 38 is then moved from its rearward position indicated in Fig. 9 to its forward position as shown in Fig. 3, by means of the cam 48 which acts through the lever 43 and crossbar 46. As illustrated in Figs. 3, 10 and 11, the card carrier operates to move each printing card 6 into superimposed overlapping relation with the preceding cards. This overlapping relation of cards permits variable spacing between the pigment coated characters 9 on one card with respect to the printing characters provided on the adjacent card. The spacing between the printing characters on the adjacent cards may be varied by merely adjusting the vertical position of the roller 47 on the lever 43 in order to either increase or decrease the stroke of the card carrier 38.



The card carrier 38 is adapted to move each printing card forwardly for engagement between the coacting feed rolls 57 and 61 which, in turn, deliver the cards in overlapping relation to the second set of feed rolls 58 and 62. The printing cards move from the feed rolls 58 and 62 between the printing rolls 66 and 67 for transverse line printing engagement with the surface of the strip 7. A suitable pigment solvent is applied to the surface of the strip 7, by means of the brush 83, immediately prior to printing engagement with the printing cards in order that a portion of the pigment provided on the pigment coated printing characters 9 may be transferred onto the strip 7 to provide names and addresses, generally indicated at 5, arranged at predetermined spaced intervals, as illustrated in Fig. 12. If desired, a suitable pigment mark of the type shown at 4 in Fig. 12 may be printed in alignment with the printed matter 5 provided on the strip 7. The marks 4 are adapted for registry with an electric eye employed in a machine devised to cut the strip 7 transversely between each set of addresses.

After the printing cards leave the printing rolls 66 and 67 they are carried in overlapping relation down the belt 81 and thence upwardly into stacked relation against the stacking plate 82 for removal from the machine.

Fig. 14 illustrates a modified form of this invention comprising a hopper 116 adapted to receive a plurality of envelopes 117 in stacked relation for delivery one at a time into printing engagement with the printing cards 6. In the form of envelope feeding apparatus shown, the envelopes are arranged in the hopper with their flap portions 118 disposed downwardly and rearwardly for engagement by a reciprocable feed arm 119. The feed arm 119 is reciprocated by means of an actuating arm 121 secured to a rocker shaft 122 which is adapted to be driven in timed relation with the card feeding apparatus by any suitable means (not shown).

In operation, the forward end of the feed arm engages under the flap 118 of the bottom envelope in the hopper to move the envelope forward and between the upper printing roll 66 and an idler roll 123, afterwhich the envelope is delivered between the rolls 66 and 67 for printing engagement with a card 6 by the idler rolls 124. The surface of the envelope to be printed is coated with a suitable liquid pigment solvent by means of the wiper 83.

In the printing of envelopes, it will be noted that the printing card 6 will be arranged in spaced apart relation rather than in overlapping relation. The amount of spacing between the printing card may readily be varied by merely changing the ratio of the sprocket wheel 96 with respect to the driven sprocket wheel 98.

While the apparatus has been shown and described as being adapted for the printing of a relatively narrow strip 7, it is contemplated that a relatively wide strip of wrapping paper could be substituted in place of the narrow strip 7. After printing names and addresses upon a relatively wide strip of wrapping paper, the paper could be cut transversely at spaced intervals for application to a magazine, catalog or the like. In the printing of names and addresses on wrapping paper it would of course be necessary to arrange the printing cards 6 at suitably spaced intervals to correspond with the length of the wrapper to be cut from the strip of wrapping paper.

In the operation of the apparatus thus described, it will be noted that the pigment coated printing characters provided on the card 6 are not at anytime brought into wiping contact with any part of the apparatus. This feature of the invention is essential as a wiping contact against the pigment coated printing characters acts to smear same and to thereby produce unsatisfactory printing impressions upon the strip or other material being printed. This feature of the invention is accomplished by always engaging the printing cards adjacent their side edges by means of the fingers 52 and idler rolls 61 and 62.

While this invention has been shown in but two forms, it is obvious to those skilled in the art that it is not so limited but is susceptible of various changes and modifications without departing from the spirit and scope of the claimed invention.

I claim as my invention:

1. In a printing apparatus for transferring information from printing cards on to sheet material, comprising a hopper for holding a stack of said printing cards, suction means for removing the lowermost card from said stack one at a time, means for moving said suction means downwardly from said stack and means for moving said suction means laterally from said stack to effect substantial normal movement of said lowermost card with respect to the card next above in said stack, a pair of coacting pressure rolls, reciprocating means for delivering cards removed from said stack in a row and in overlapping relation between said pressure rolls, means for feeding sheet material between said pressure rolls for printing engagement with said printing cards.

2. In a printing apparatus for transferring information from printing cards on to sheet material, comprising a hopper for holding a stack of said printing cards, suction means for removing the lowermost card from said stack one at a time, card delivery means, rotary means for carrying said card from said suction means to said delivery means, said delivery means comprising a reciprocating pusher member for pushing said cards forwardly in a row and in overlapping relationship, a pair of coacting pressure rolls between which said cards are carried by said pusher member, means for feeding sheet material between said pressure rolls for printing engagement with said printing cards.

3. In a printing apparatus for transferring information from printing cards on to sheet material, comprising a hopper for holding a stack of said printing cards, suction means for removing the lowermost card from said stack one at a time, card delivery means, rotary means for carrying said card from said suction means to said delivery means, said delivery means comprising a



reciprocating pusher member for pushing said cards forwardly in a row and in overlapping relationship, a pair of coacting pressure rolls between which said cards are carried by said pusher member, means for feeding sheet material between said pressure rolls for printing engagement with said printing cards, and means for changing the stroke of said reciprocating pusher member to change the degree of overlap of said cards.

4. In a printing apparatus for transferring information from printing cards on to sheet material, comprising a hopper for holding a stack of said printing cards, suction means for removing the lowermost card from said stack one at a time, cam means for moving said suction means downwardly from said stack and cam means for moving said suction means laterally from said stack to effect substantially normal movement of said lowermost card with respect to the card next above in said stack, a pair of coacting pressure rolls, reciprocating means for delivering cards removed from said stack in a row and in overlapping relation between said pressure rolls, means for feeding sheet material between said pressure rolls for printing engagement with said printing cards.

5. In a printing apparatus for transferring information from printing cards on to sheet material, comprising a hopper for holding a stack of said printing cards, suction means for removing the lowermost card from said stack one at a time, card delivery means, rotary means for carrying said card from said suction means to said delivery means, said delivery means comprising a reciprocating pusher member for pushing said cards forwardly in a row and in overlapping relationship, a pair of coacting pressure rolls between which said cards are carried by said pusher member, means for feeding sheet material between said pressure rolls for printing engagement with said printing cards, and means for changing the stroke of said reciprocating pusher member to change the degree of overlap of said cards, said last mentioned means comprising a lever, a cam for operating said lever, and means for changing the effective length of said lever.

ERNST C. SAUERMAN.


## REFERENCES CITED

The following references are of record in the file of this patent:

### UNITED STATES PATENTS

| Number | Name | Date |
|---|---|---|
| 1,077,755 | Rogers | Nov. 4, 1913 |
| 1,196,815 | Slauson | Sept. 5, 1916 |
| 1,325,576 | Pierson | Dec. 23, 1919 |
| 1,349,807 | Debrayer | Aug. 17, 1920 |
| 1,448,314 | Pedrick | Mar. 13, 1923 |
| 1,636,405 | Brandt | July 19, 1927 |
| 2,054,344 | Storck | Sept. 15, 1936 |
| 2,184,362 | Sauerman | Dec. 26, 1939 |
| 2,185,014 | Elliott | Dec. 26, 1939 |
| 2,220,300 | Tathwell | Nov. 5, 1940 |
| 2,228,109 | Gates | Jan. 7, 1941 |
| 2,237,363 | Ritzerfeld | Apr. 8, 1941 |
| 2,255,084 | Pflanze | Sept. 9, 1941 |
| 2,274,590 | Cook | Feb. 24, 1942 |
| 2,288,149 | Williams | June 30, 1944 |
| 2,419,345 | Elliott | Apr. 22, 1947 |

### FOREIGN PATENTS

| Number | Country | Date |
|---|---|---|
| 492,755 | Great Britain | Sept. 27, 1938 |