

April 19, 1949.

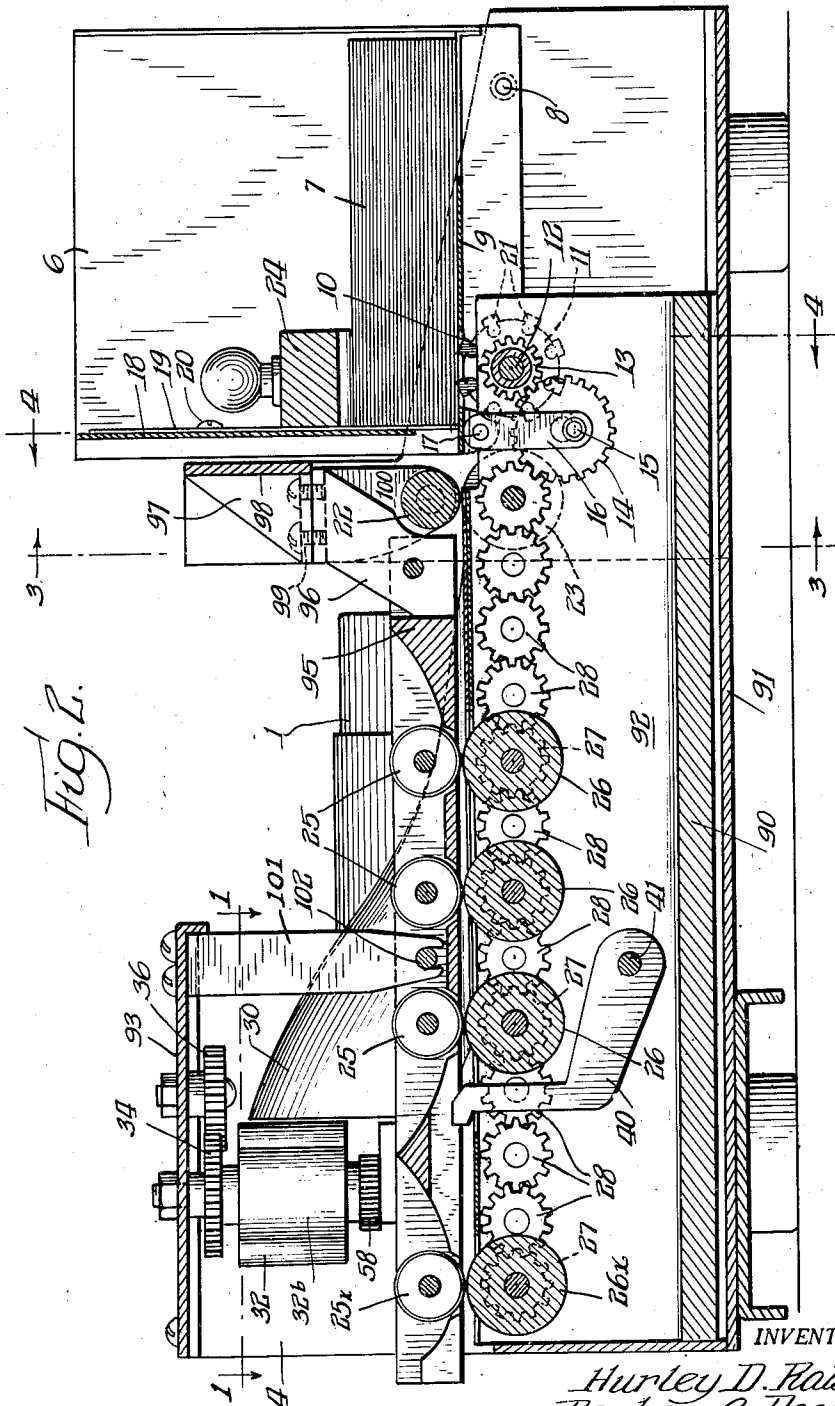
H. D. RALSTON ET AL

2,467,697

MACHINE FOR PRINTING ON STENCIL CARDS

Filed April 19, 1944

4 Sheets-Sheet 2



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4 Sheets-Sheet 3

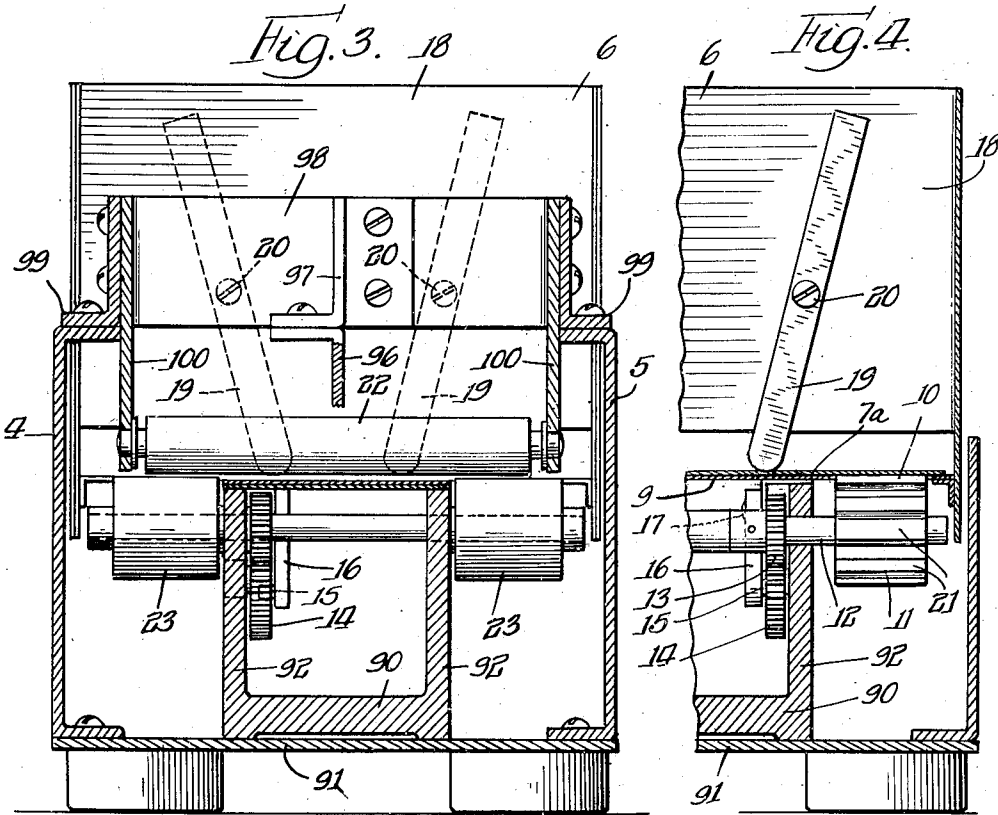
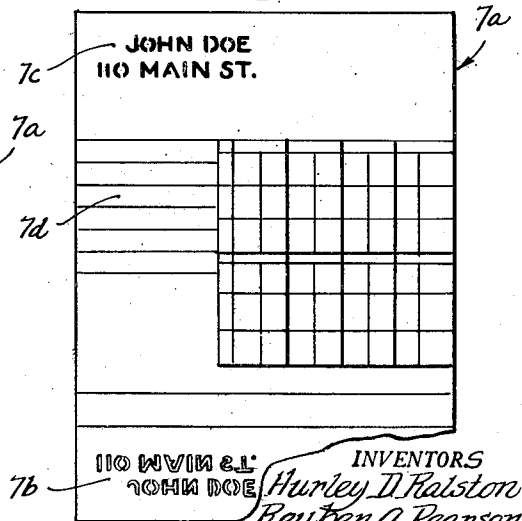
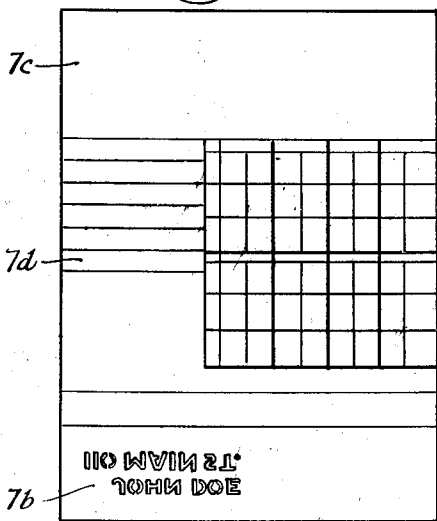


Fig. 9.

Fig. 10.



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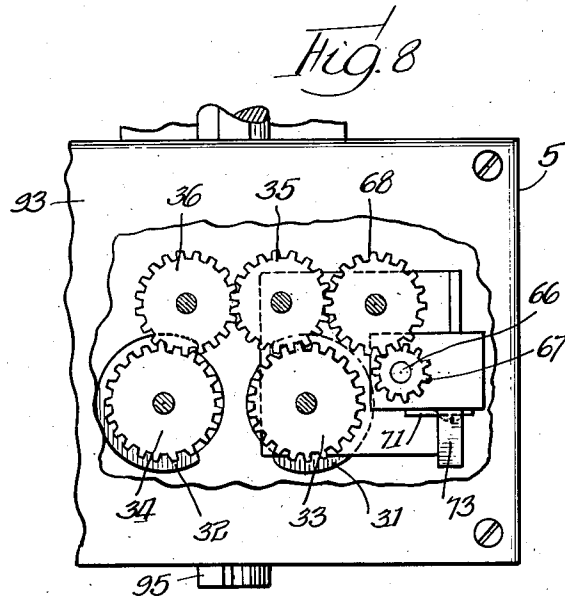
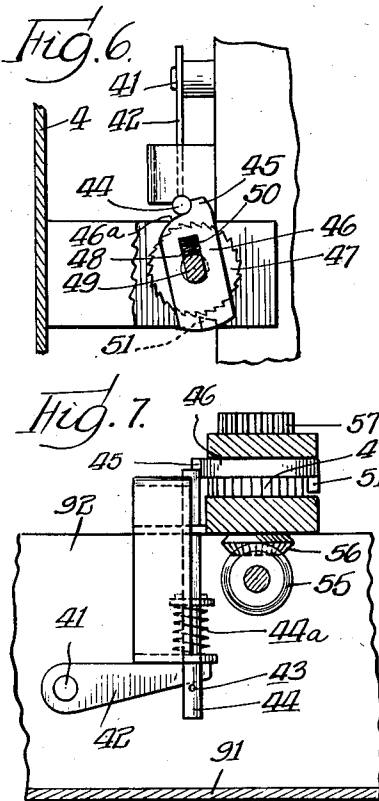
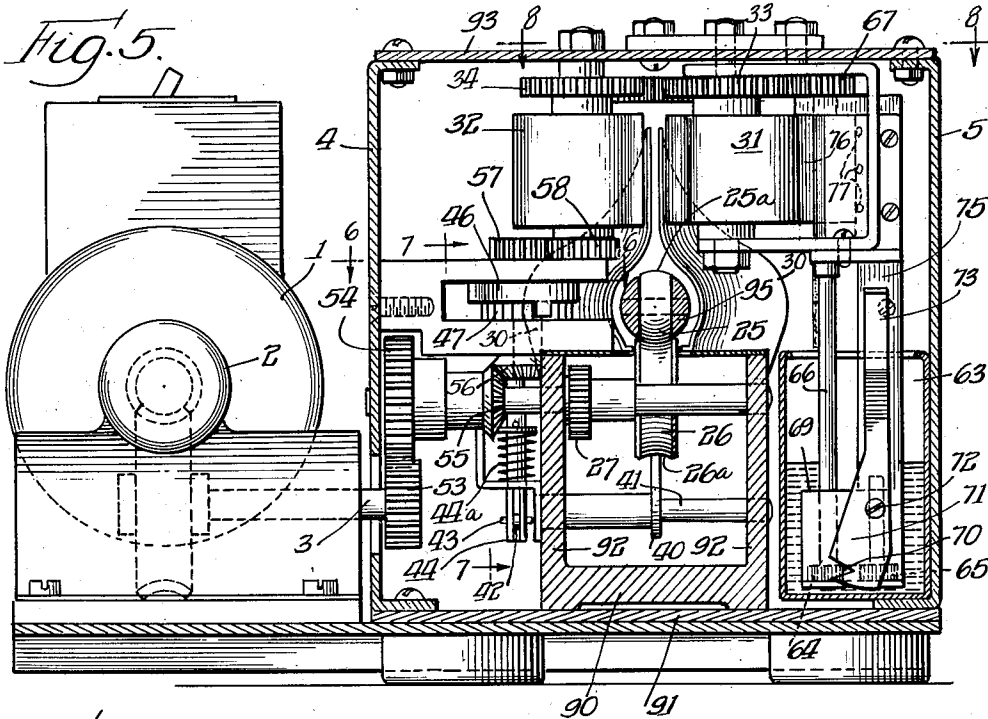
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MACHINE FOR PRINTING ON STENCIL CARDS

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UNITED STATES PATENT OFFICE

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MACHINE FOR PRINTING ON STENCIL CARDS

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7 Claims. (Cl. 101—114)

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This invention relates to a special type of machine for printing from a stencil and particularly for employing a stencil formed in a flexible sheet and causing an imprint to be made from the stencil on the same sheet. In connection with large mailing lists which must be frequently reproduced or from which selected names may be required to be printed at any time, one method is to prepare stencils of cardboard or like flexible material which may be fed into a suitable printing mechanism for making up labels, bill heads, addressing circulars and letters, or printing the name and address on various types of record cards. The stencil card itself is most conveniently stored in a card index drawer or box and since the cut-out lettering of the stencil is not always easy to read it is preferable to have the stencil card marked elsewhere with the name and address corresponding to the cut-out stencil so that it may be readily identified and selected.

The present machine is designed for reproducing on the stencil card itself an imprint of the stencil which it carries. Most conveniently the stencil itself is cut at one end of the card and the imprint is impressed upon the opposite end leaving the intervening area available for any desired form of record to be kept with reference to the name at the head of the card.

Accordingly one object of the invention is to provide a new and improved stencil printing mechanism.

Another object of the invention is to provide card feeding and guiding means arranged to flex a card so as to superimpose its stencil-bearing portion over another area of the same card, together with means for making an imprint through the stencil upon said other area.

It is also an object of the invention to provide a stencil printing machine including an inked roll and a pressure roll cooperating therewith, together with feeding means for passing a stencil between the rolls and a trip mechanism controlled by the passage of the stencil to prevent direct contact of the pressure roll with the inked roll.

Other objects and advantages of the invention will appear from the following description taken in connection with the drawings in which:

Fig. 1 is a top plan view of a stencil printing machine embodying this invention without any enclosing case, and with the top wall of the frame omitted and with parts shown in section as indicated at line 1—1 on Fig. 2.

Fig. 1^a is a fragmentary vertical section taken

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at the same plane as Fig. 5, and showing the parts in stencil printing position.

Fig. 2 is a vertical longitudinal section taken substantially as indicated at line 2—2 on Fig. 1.

Fig. 3 is a transverse sectional view taken as indicated at line 3—3 on Fig. 2 to show the card-feeding mechanism adjacent the supply hopper.

Fig. 4 is a fragmentary transverse section taken as indicated at line 4—4 on Fig. 2.

Fig. 5 is a transverse sectional view through the printing mechanism, being taken as indicated at line 5—5 on Fig. 1.

Fig. 6 is a detail sectional view taken at line 6—6 on Fig. 5.

Fig. 7 is a detail section taken as indicated at line 7—7 on Fig. 5.

Fig. 8 is a detail plan view with a portion broken away and shown in section as indicated at line 8—8 on Fig. 5.

Fig. 9 is a face view of the combination stencil and record card before the print of the stencil has been impressed thereon.

Fig. 10 is a similar view of the card after the printing operation performed by the machine embodying this invention.

While there is shown and described herein certain specific structure embodying the invention, it will be manifest to those skilled in the art that various modifications and re-arrangements of the parts may be made without departing from the spirit and scope of the invention, and that the same is not limited to the particular form herein disclosed, except insofar as indicated by the appended claims.

Fig. 1 shows the machine equipped with a driving motor 1 connected to any suitable form of speed-reducing gearing housed at 2 with a drive shaft 3 extending therefrom through the side frame member 4 of the printing machine. A similar frame member 5 is shown at the opposite side. The drive shaft 3 is located near one end of the printing machine and at the opposite end there is mounted a rectangular hopper 6 from which a supply of stencil cards, shown at 7 in Fig. 2, is automatically fed through the machine, one at a time. To effect this feeding of the cards the hopper 6 is rockably mounted on pivot pins 8 and the floor 9 of the hopper is formed with openings 10, 10 registering with feed rolls 11, 11 which are constantly rotated by drive connections with the shaft 3. The shaft 12, which carries the feed rolls 11, carries also a gear 13 which meshes with a larger gear 14 having a crank pin 15 from which a link or pitman 16 extends for pivotal connection at 17 to the

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hopper 6. Thus, while the feed rolls 11 revolve, the crank motion of the pin 15 rocks one end of the hopper up and down so that the floor 9 of the hopper is intermittently lowered to a position at which the feed rolls 11 can engage the under surface of the lowest card in the pile 7, as seen in Fig. 2.

The lower edge of the front wall 18 of the hopper 6 is spaced above the floor 9 to provide an outlet opening through which the cards may be fed by the rotation of the feed rolls 11, and to insure that the cards will be fed one at a time a pair of stop fingers 19 extend downwardly past the lower edge of the wall 18 within a distance of the floor 9 which is less than the thickness of two cards, but greater than the thickness of one card. Thus the frictional engagement of the feed rolls 11 with the bottom card of the pile 7 will slide it under the stops 19, while the stops restrain the cards above it. As shown in Fig. 4, each stop member 19 is secured to the wall 18 by a single clamp screw 20, permitting the stop to be swung pivotally about this screw to adjust its lower end accurately at the desired distance from the bottom wall 9 of the hopper, whereupon the screw 20 may be tightened to clamp the stop in adjusted position. Preferably the feed rolls 11 are shod with circumferentially spaced blocks 21 of rubber or like material to provide the desired frictional surface for feeding the cards from the hopper.

The crank motion of the pin 15 permits contact between the feed rolls 11 and the bottom card of the pile 7 long enough for the card to be advanced from the hopper 6 into the cooperating feed rolls 22 and 23 located outside the hopper and adjacent its forward wall 18. To insure satisfactory frictional engagement of the card with the feed rolls 11 during this period, a weight block 24 may be placed on the pile of cards 7 in the hopper as seen in Fig. 2. As the forward edge of the card is gripped between the cooperating rolls 22, 23 the crank motion of the pin 15 lifts the bottom wall 9 of the hopper into a plane above the surface of the feed rolls 11 so that said rolls cannot contact the next card of the pile until the first card has been carried entirely out of the hopper; and it will be evident that the ratio between the gears 13 and 14 may be chosen so as to secure any desired timing in delivery of the cards from the hopper 6.

From the rolls 22, 23 the card is passed along by pairs of feed rolls 25, 26, the rolls 25 being idlers engaging the upper surface of the card, and the rolls 26 being preferably of rubber or like frictional material for engagement with the lower surface of the card and being provided with suitable drive gears 27 connected by idler gears 28 in a continuous train, as seen in Fig. 2. Preferably the feed rolls 26 are made with transversely concave surfaces 26^a, while the idler rolls 25 are formed with convex faces 25^a, as seen in Fig. 5. The reason for this is that as the card advances through the machine it is flexed so as to bring its two opposite edges and marginal portions into contact, this flexing being accomplished by means of guide plates 30, 30 having warped surfaces which gradually swing the opposite sides of the card from their original positions in a horizontal plane to positions in closely adjacent vertical planes for passage between the printing roll 31 and the pressure roll 32. Fig. 1 shows a portion of a card 7^a as it lies in the hopper 6 and indicates that the stencil 7^b is cut in the portion of the card disposed at one side of the machine, while the plain area 7^c is disposed at the opposite side. Thus, as

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the card is advanced by the feed rolls 25, 26 between the warped guide plates 30, 30, the stencil-bearing portion 7^b is brought into face to face contact with the plain portion 7^c and as these parts of the card pass between the inked surface of the printing roll 31 and the cooperating surface of the pressure roll 32, the ink is forced through the stencil openings at 7^b onto the surface 7^c, thus producing an imprint at this end of the card which will be readily legible when the card is placed with this end up in the tray or drawer of a card index file.

The ink-bearing surface 31^a of the printing roll 31 does not extend through the full circumference of the roll, the latter having a portion 31^b of slightly smaller diameter than the inked surface 31^a. Similarly, the pressure roll 32 has a portion 32^a which operates as a platen to support the card during the printing operation, but this portion 32^a does not extend through the full circumference of the roll 32, and the remainder of the roll is cut back to a smaller diameter at 32^b. By means of suitable gears 33 and 34 on the upper ends of the rolls 31 and 32, respectively, and intermeshing gears 35 and 36 connecting them, the rolls 31 and 32 are driven in timed relation so that their larger portions 31^a and 32^a will register with each other for the printing operation, and the smaller portions 31^b and 32^b will register when there is no card passing between the rolls. To insure that the rolls 31 and 32 shall operate only when there is a stencil card between them, a trip finger 40 projects upwardly into the path of the card through the feed rolls 25, 26 so as to engage its forward bent edge as it approaches the rolls 31, 32. Such contact of the card with the projecting end of the trip finger 40 rocks the shaft 41 to which the finger is secured. This shaft 41 carries an arm 42, as seen in Fig. 7, engaging a cross pin 43 in a rod 44, said rod being slidably mounted with its upper end normally engaging a lug 45 of a clutch plate 46, as seen in Fig. 6. The clutch plate is slidable radially over the face of a ratchet gear 47, said plate having a guide slot 48 which embraces the shaft 49 with which the plate 46 is rotatively engaged. A spring 50 yieldingly urges the clutch plate in a direction for engagement of its dog 51 with a tooth of the ratchet gear 47. Hence, when the trip finger 40 is depressed so as to rock the shaft 41, it causes the arm 42 to withdraw the rod 44 downwardly away from the lug 45 thus permitting the spring 50 to shift the clutch plate 46, causing its dog 51 to engage with the ratchet gear 47. The shaft 49 of the clutch plate 46 is aligned with the shaft of the ratchet gear 47, but unconnected therewith, except through the dog 51 of the clutch plate. The ratchet gear 47 is continuously rotated by the shaft 3 operating through drive gears 53 and 54 and bevel gears 55 and 56. When the connection is established between the ratchet gear 47 and the clutch plate 46 the shaft 49, with which the clutch plate is rotatively engaged, operates the gear 57 which in turn drives the gear 58 at the lower end of the pressure roll 32 and the rolls 32 and 31, being geared together, as already described, are thus rotated through one revolution. The portion 31^a of the printing roll which is of the larger diameter has a circumferential extent which approximates the length of the card in the direction of its feed, thus being the width of the card as viewed in Figs. 9 and 10. The circumferential extent of the portion 32^a of the roll 32 is also about equal to the length of the card so that by

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the time the card has passed between the rolls 31 and 32 and has contacted the extent of these two roll surfaces its leading edge will have entered between the final pair of feed rolls 25^x and 26^x and its trailing edge will have passed the trip finger 40. This will allow the finger to rise to its initial position under the force of the spring 44^a which operates to return the rod 44 to its initial position so that it will be encountered by the cam edge 46^a of the clutch plate 46 forcing the clutch plate to be shifted to the position shown in Fig. 6 with its dog 51 disengaged from the ratchet wheel 47 and with its lug 45 arrested by the rod 44. During the final portion of each single rotation of the rolls 31 and 32 their cut-back areas 31^b and 32^b will register opposite each other, thus avoiding contact after the card has passed from between the rolls. As the card leaves the rolls 25^x and 26^x, it will be ejected from the machine and may be dropped into any suitable receiver, not shown. In addition to the cut-out stencil, in the area 7^b, the card will then bear the imprint made through the stencil at its opposite end, on the area 7^c as shown in Fig. 10. The area of the card between the imprint at 7^c and the stencil portion 7^b may be utilized for any desired record form such as that indicated at 7^d.

For supplying ink to the surface 31^a of the printing roll, an ink reservoir 63 is mounted in the lower portion of the frame or housing below the level of the printing rolls, as seen in Figs. 1 and 5. In the lower portion of this reservoir a simple type of gear pump is arranged with its gears 64 and 65 arranged to rotate in a horizontal plane, the gear 64 being driven by a shaft 66 extending downwardly from a gear 67 which is connected by a gear 68 with the gear 35 in the train which drives the printing roll 31 (see Fig. 8). The block 69 which forms the housing of the pump has an intake port 70 through which ink may enter from the tank or reservoir 63 to a point between the gears of the pump, and to regulate the flow of ink the size of this port may be graduated by shifting a valve plate 71 which covers it and which is pivoted at 72 and provided with an adjusting arm 73 extending through the top wall of the reservoir 63. The ink fed by the gear pump rises in a vertically extending passage 74 formed in a member 75 which extends adjacent an inking roll 76 and the ink is distributed to said roll through a series of transverse ports 77 leading from the passage 74. The inking roll turns in contact with a wiper 78 which may be of felt or like material and it removes any excess ink from the surface of the roll 76 and allows such excess to drain back through a duct 79 into a return channel 80 leading to the lower portion of the pump. As the surface 31^a of the printing roll leaves the inking roll 76 in its rotation it encounters a felt surfaced idler roll 81 which serves to distribute the ink more evenly just before it comes in contact with the stencil card. This roll 81 is supported by an arm 82 which may be adjusted about the axis of its clamp screw 83 for varying the pressure of the distributing roll 81 against the printing roll.

A convenient frame structure for supporting the feed rolls 26 with their gears 27 and 28 and some other portions of the feed train includes a channel-shaped frame or chassis member 90 which extends longitudinally along the center line of the machine resting on the floor or bed plate 91 with the flanges 92 of the channel extending upwardly. The shafts for the rolls and gears are thus journaled in these channel flanges

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92 and the side walls 4 and 5 connected by a top plate 93 provide auxiliary support for the drive gears such as 53 and 54 and for the train which actuates the printing mechanism. The upper feed rolls 25 are journaled in a slotted cylindrical member 95 which is supported at one end by a bracket arm 96 attached to a second bracket 97 which extends forwardly from a bridge plate 98 extending across the machine just in front of the hopper 6. The bridge plate includes foot flanges 99 supported on intumed marginal flanges of the side walls 4 and 5, and it also carries downwardly extending hangers 100 in which the idler roll 22 is journaled. The member 95 is additionally supported and steadied by a downwardly extending strut 101 secured to the top wall 93 and engaging a cross pin 102 in said member 95. By reason of its cylindrical shape the part 95 acts as a former for the card as it passes between the rolls 25 and 26, the convex surfaces 25^a of the rolls 25 being formed with substantially the same radius as that of the cylindrical member 95 and the terminal portions of the plates 30 being curved around said member 95, as seen in Fig. 5.

With the construction described the process of imprinting a name and address or other data on one end of the card by inking it through the stencil already cut in the other end becomes a simple automatic process which can be performed at a rapid rate and with a minimum of attention from the operator, and it not only adapts the stencil cards to be conveniently filed and conveniently located when wanted, but also permits them to serve an additional function as records of sales, shipments, mailings, or for providing other information in connection with each of the names which they carry.

We claim:

1. In combination with a sheet having a stencil cut in one end portion, means to produce an imprint through said stencil upon the opposite end portion of the sheet including feeding means arranged to advance the sheet with its end portions projecting respectively at opposite sides of said feeding means, guide means serving to bend said end portions toward each other as the sheet is advanced, and pressure means between which the said end portions are fed, one of said pressure means having an inked surface from which ink is transferred through the stencil openings onto the opposite end portion of the sheet.

2. In combination with a sheet having a stencil cut in one end portion, means to produce an imprint through said stencil upon the opposite end portion of the sheet including feeding means arranged to advance the sheet with its end portions projecting respectively at opposite sides of said feeding means, guide means serving to bend said end portions toward each other as the sheet is advanced, and a pair of rolls between which said end portions are fed, one of said rolls having inked surface from which ink is transferred through the stencil openings onto the opposite end portion of the sheet, and both rolls having mating portions of their peripheries of reduced radius to avoid contact between said rolls during a portion of each revolution thereof.

3. In the combination defined in claim 1, said pressure means being normally spaced apart and inoperative, driving means for bringing said pressure means into operative relation with a normally disengaged clutch for connecting the driving means to the pressure means, and a trip

arm disposed in the path of the sheet as it is advanced by the feeding means, said trip arm being connected for causing engagement of said clutch to render the pressure means operative as the sheet advances.

5 5. In combination with a sheet having a stencil cut in one end portion, means to produce an imprint through said stencil upon the opposite end portion of the sheet including a series of narrow feed rolls engaging only a limited portion of the sheet at the middle thereof, warped guide surfaces flanking said rolls to bend the end portions of the sheet toward each other as it travels between said surfaces, a pair of rolls journaled on parallel axes perpendicular to the axes of said feed rolls and disposed beyond said guide surfaces in position to receive said lateral portions of the sheet between them as the sheet advances, and means supplying ink to the roll of said pair which engages the stencil-cut end of the sheet, whereby the ink is transferred through the stencil openings onto the opposite end portion of the sheet.

25 6. In the combination defined in claim 5, the feed rolls serving to advance the sheet between said pair of rolls independently of the latter, and means operative to drive said pair of rolls at a peripheral speed substantially equal to the speed of travel of said sheet between them, said means including a continuously rotating member, drive gearing for the pair of rolls, a normally disengaged clutch device to connect said gearing with said shaft, and a trip finger disposed in the path of advance of the sheet through the feed rolls with means connecting said finger with the clutch device and operative to cause engagement of the clutch as the sheet strikes the trip finger.

7. In the combination defined in claim 5, the feed rolls serving to advance the sheet between

said pair of rolls independently of the latter, and means operative to drive said pair of rolls at a peripheral speed substantially equal to the speed of travel of said sheet between them, said means including a continuously rotating member, drive gearing for the pair of rolls, a normally disengaged clutch device to connect said gearing with said shaft, and a trip finger disposed in the path of advance of the sheet through the feed rolls with means connecting said finger with the clutch device and operative to cause engagement of the clutch as the sheet strikes the trip finger, together with spring means returning the trip finger to normal position when the sheet has passed over it and serving also to disengage the clutch, said pair of rolls being dimensioned and geared to make only a single revolution during the passage of the sheet between them, and at least one of said rolls having a portion of its periphery of reduced diameter to avoid engagement with the opposing roll when the sheet is not interposed between them.

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Certificate of Correction

Patent No. 2,467,697.

April 19, 1949.

HURLEY D. RALSTON ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 7, line 5, claim 3, after the words and period "the sheet advances." insert the following claim:

4. *In a sheet feeding mechanism, a substantially cylindrical bar having a longitudinal slot with feed rolls journaled in said slot, said rolls having transversely convex faces conforming approximately to the cylindrical cross-sectional curvature of said bar, cooperating rolls having concave faces opposing said convex roll faces, whereby a sheet fed between said rolls tends to be bent around said bar, laterally disposed guide surfaces serving to assist such bending of the sheet and converging in the direction of feed to bring the opposite lateral portions of the sheet toward each other as the sheet is advanced by the feed rolls, a pair of feed rolls journaled in parallel axes perpendicular to the axes of said feed rolls, said pair of rolls being spaced to engage and press together said lateral portions of the sheet as it is advanced between them by the feed rolls, and means enabling said pair of rolls to perform a printing operation upon said sheet as a result of such pressure, together with driving means for said pair of rolls with a normally disengaged clutch for connecting said driving means to said rolls, and a trip finger disposed in the slot of said bar and projecting in the path of a sheet as it is advanced by the feeding rolls, said trip finger being connected to cause engagement of the clutch to render said pair of rolls operative for performing their printing operation.*

and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 30th day of August, A. D. 1949.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.