

April 3, 1945.

H. B. PHILLIPS ET AL

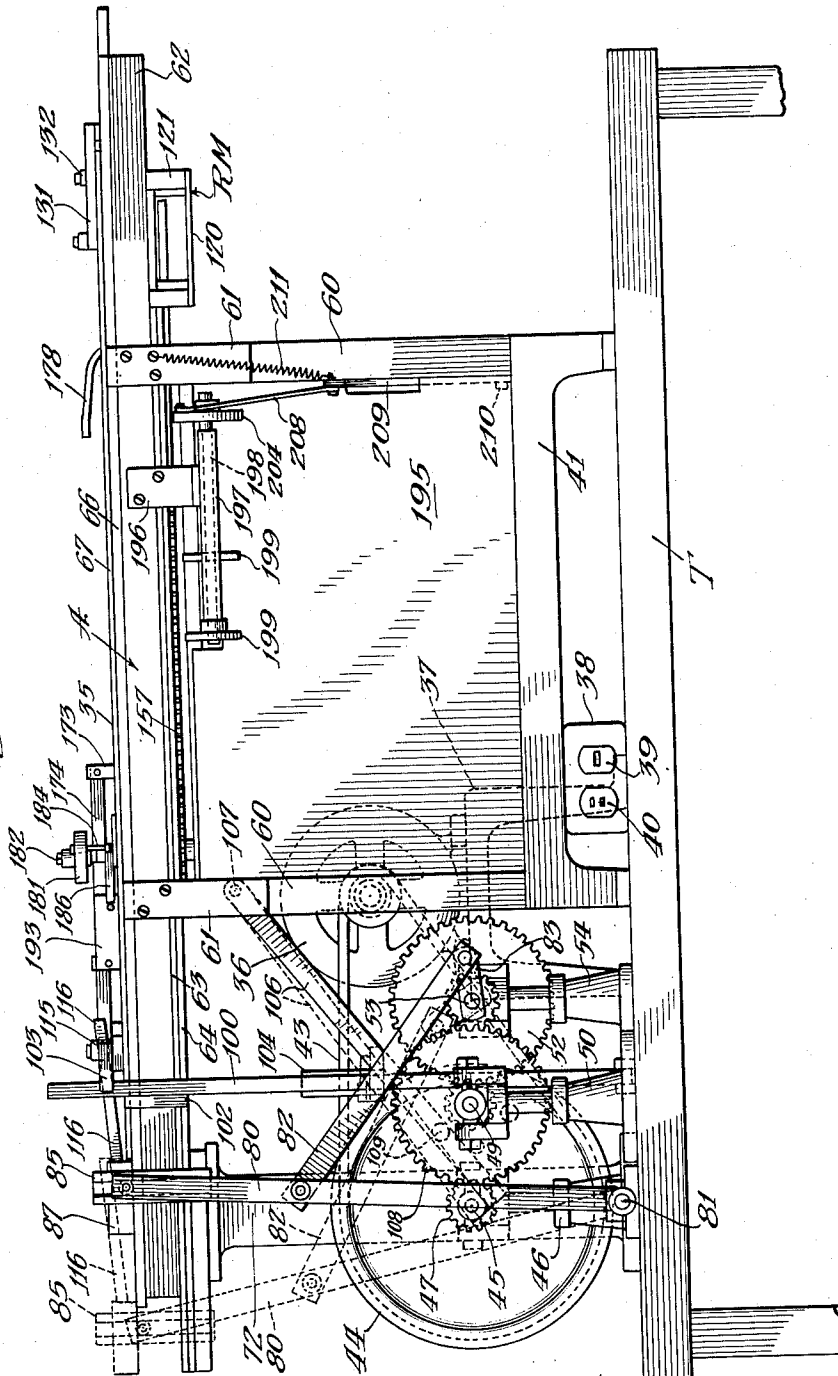
2,372,736

PRINTING MACHINE

Filed April 9, 1942

11 Sheets-Sheet 1

Fig. 1.



Inventors:
Hervey B. Phillips
Hazen F. Springer
By Wallace & Cannon
Attorneys

April 3, 1945.

H. B. PHILLIPS ET AL

2,372,736

PRINTING MACHINE

Filed April 9, 1942

11 Sheets-Sheet 2

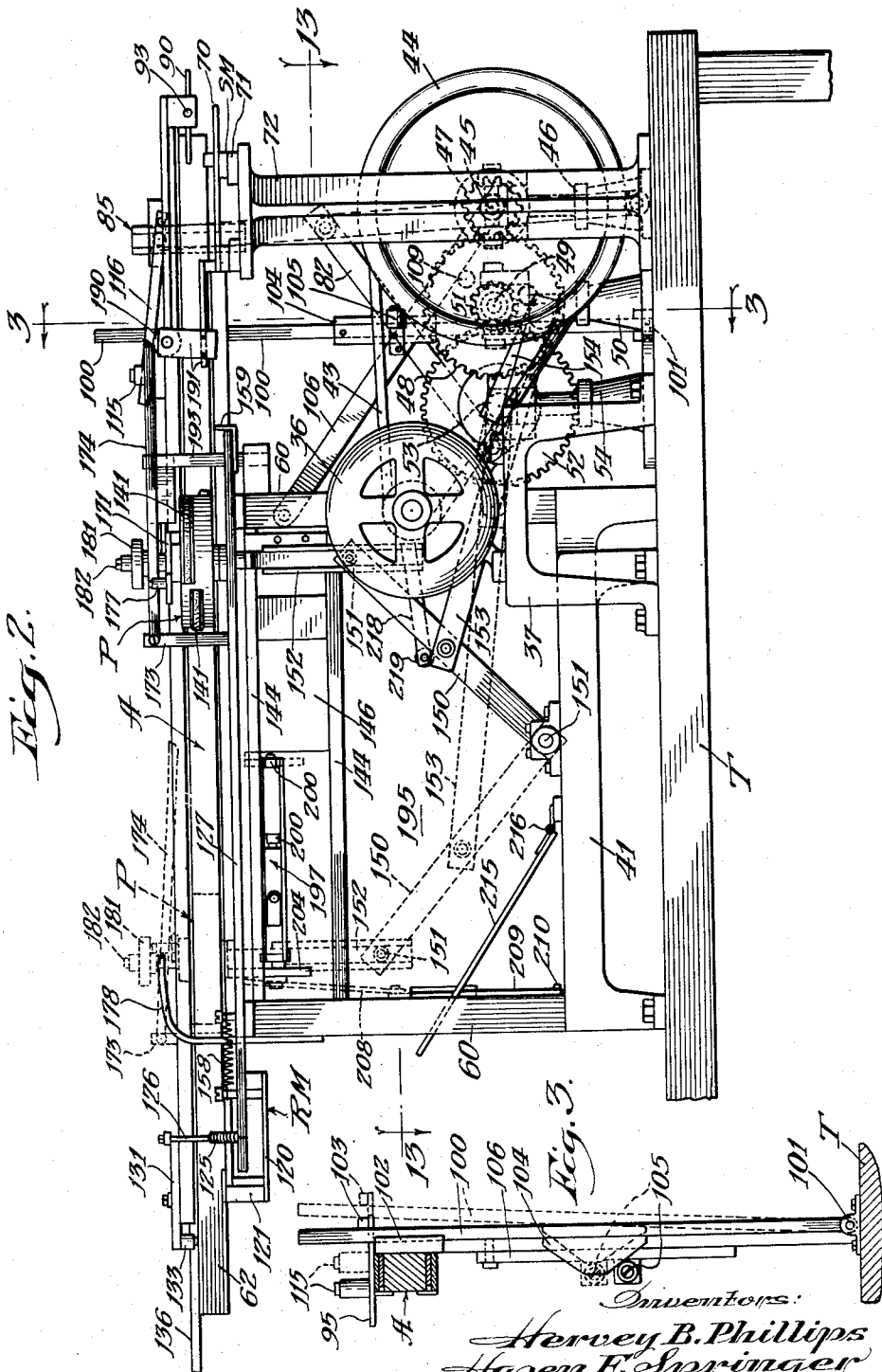


Fig. 3.

Inventors:
Hervey B. Phillips
Hazen F. Springer
By Wallace & Cannon
Attorneys

April 3, 1945.

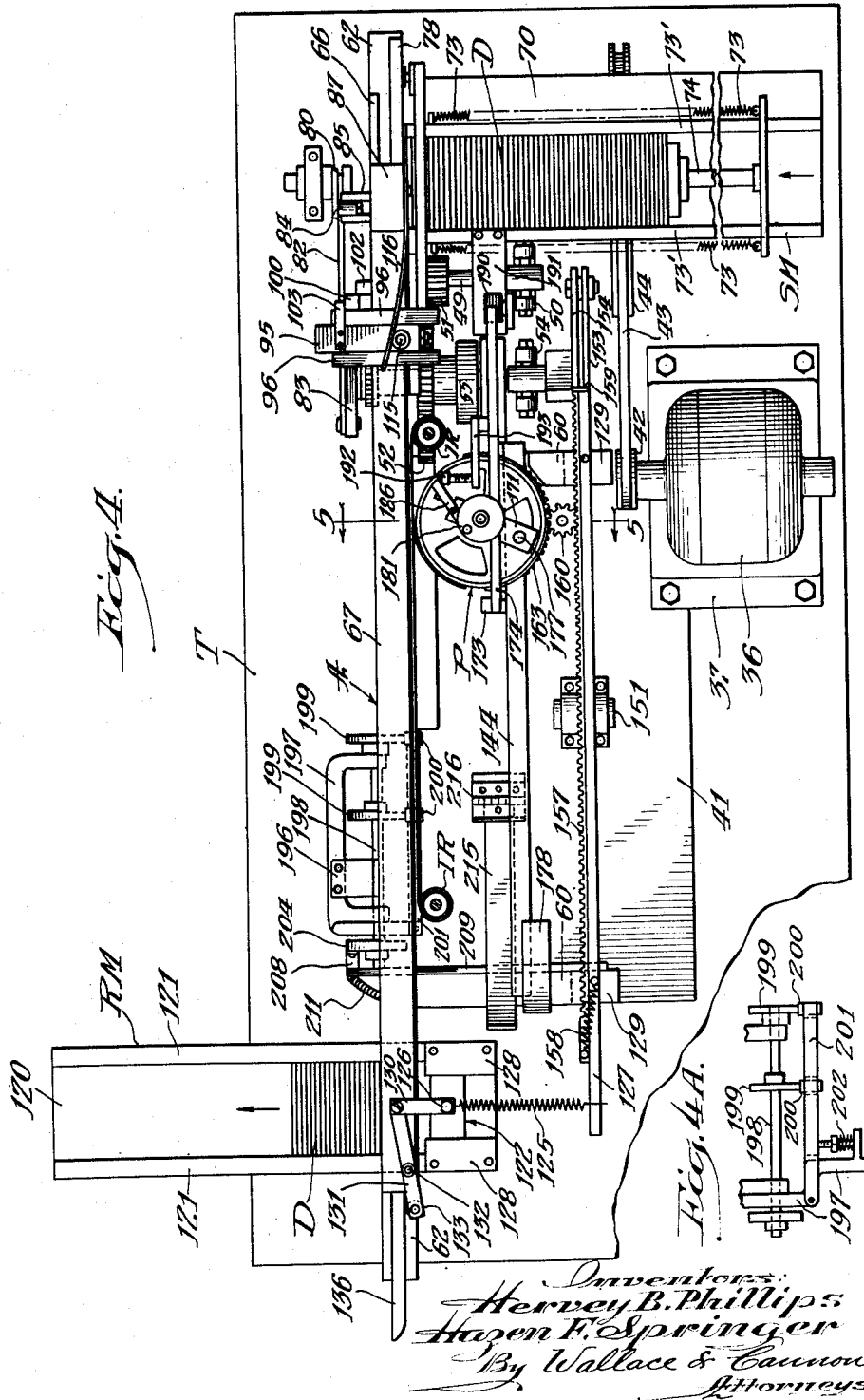
H. B. PHILLIPS ET AL

2,372,736

PRINTING MACHINE

Filed April 9, 1942

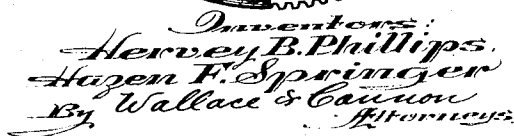
11 Sheets-Sheet 3



2,372,736

11 Sheets-Sheet 4

11 Sheets-Sheet 4



April 3, 1945.

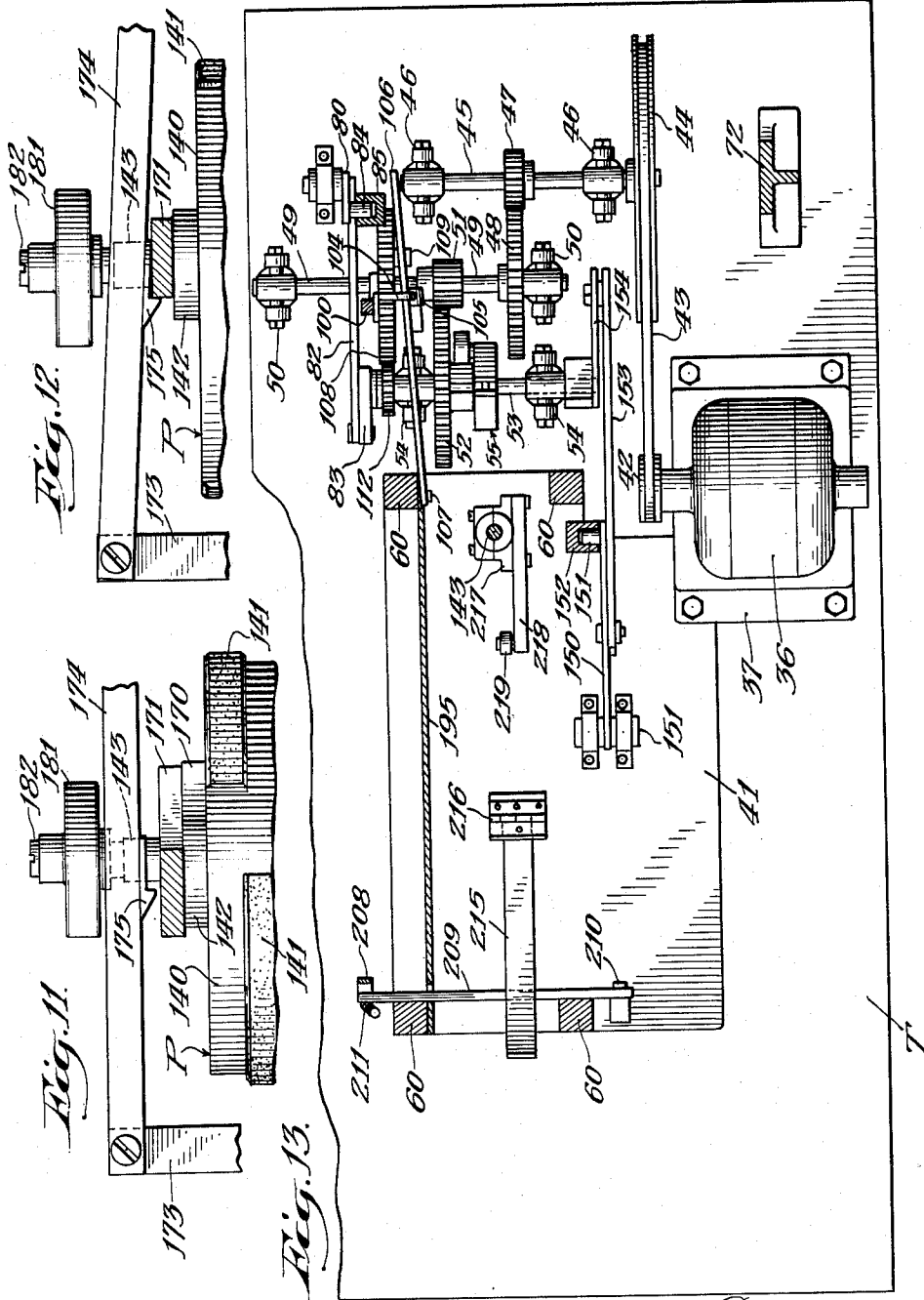
H. B. PHILLIPS ET AL

2,372,736

PRINTING MACHINE

Filed April 9, 1942

11 Sheets-Sheet 6



Inventors
Hervey B. Phillips
Hazen F. Springer
By Wallace & Cannon
Attorneys

April 3, 1945.

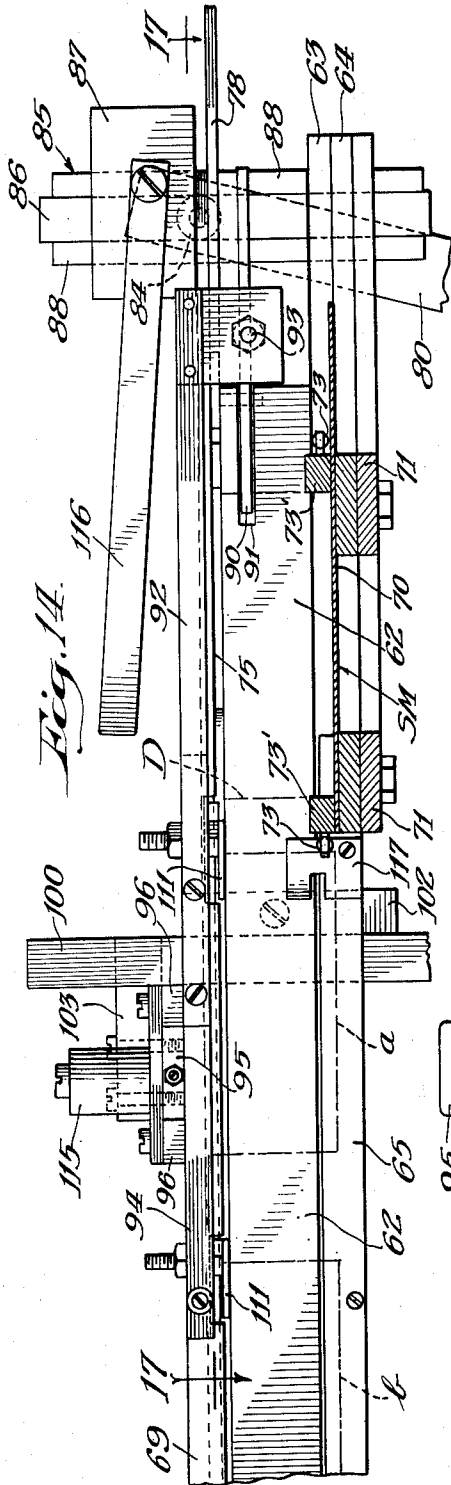
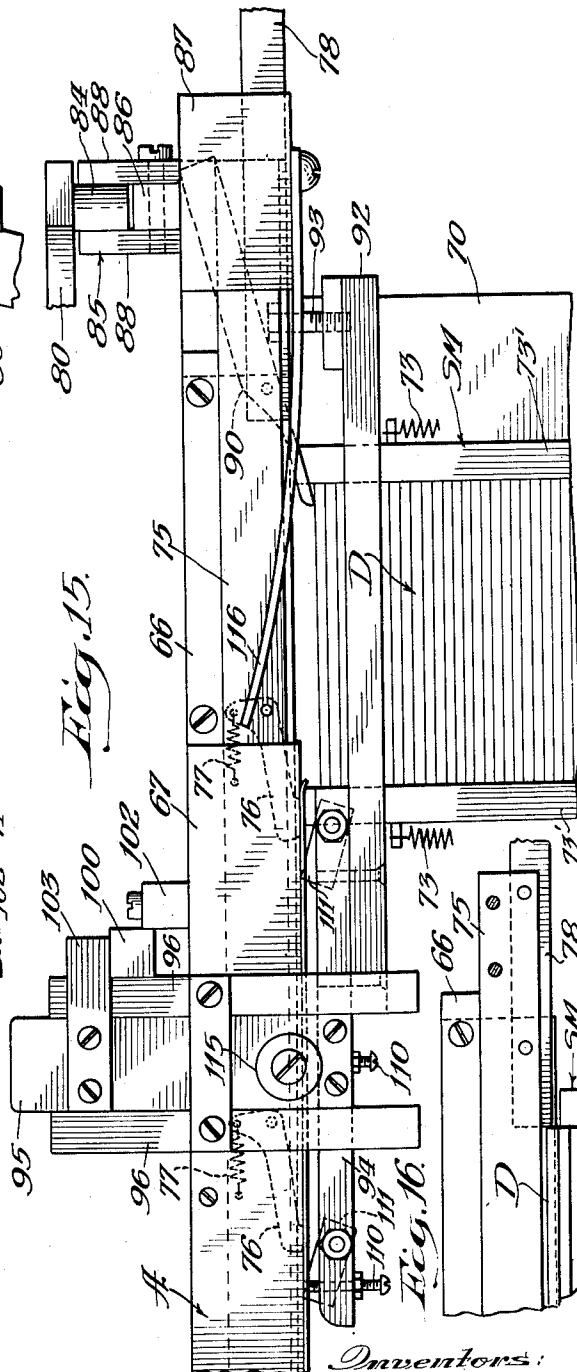
H. B. PHILLIPS ET AL

2,372,736

PRINTING MACHINE

Filed April 9, 1942

11 Sheets-Sheet 7



Inventors:
Hervey B. Phillips
Hazen F. Springer
By Wallace & Cannon
Attorneys

April 3, 1945.

H. B. PHILLIPS ET AL

2,372,736

PRINTING MACHINE

Filed April 9, 1942

11 Sheets-Sheet 8

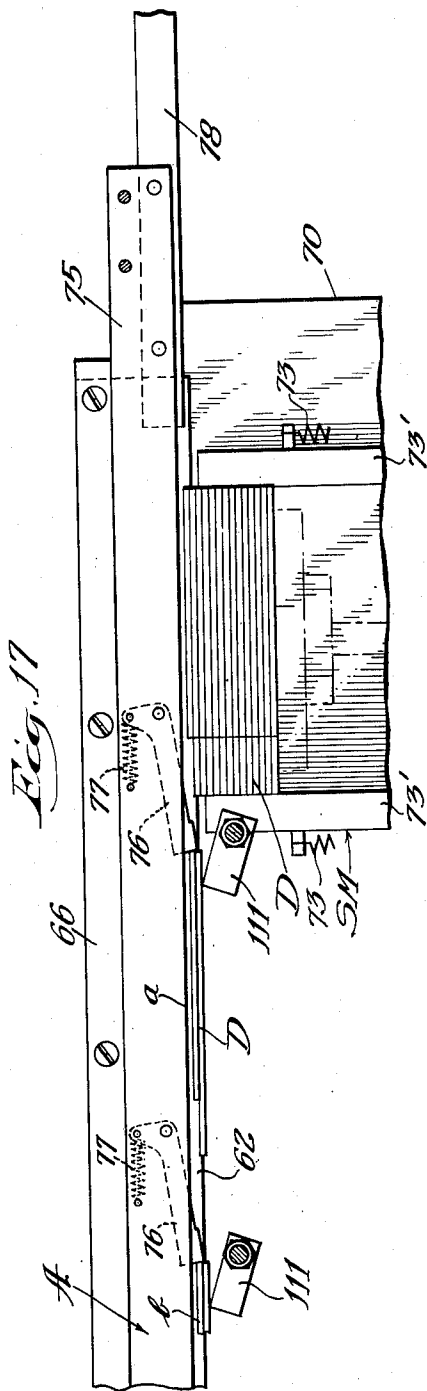


Fig. 18.

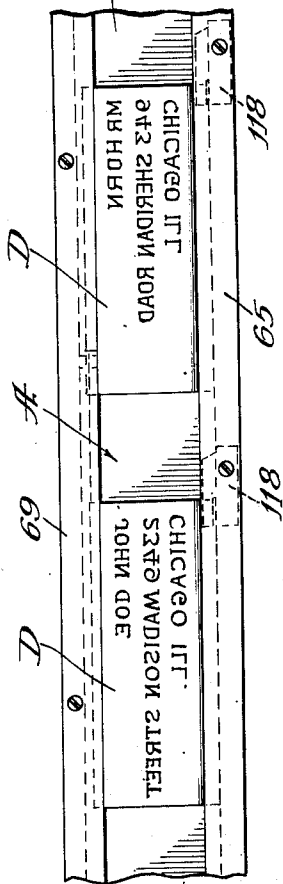
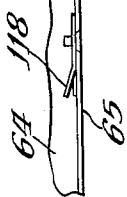
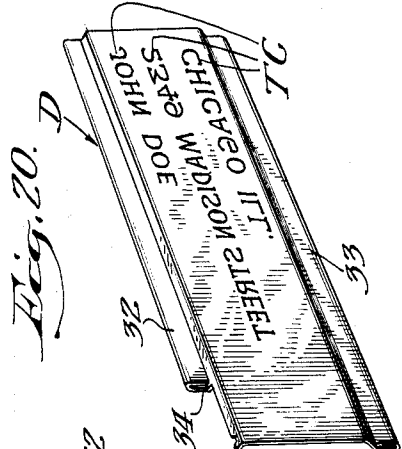


Fig. 19.



Inventors:
Hervey B. Phillips
Hazen F. Springer
By Wallace & Cannon
Attorneys

April 3, 1945.

H. B. PHILLIPS ET AL

2,372,736

PRINTING MACHINE

Filed April 9, 1942

11 Sheets-Sheet 10

Fig. 24.

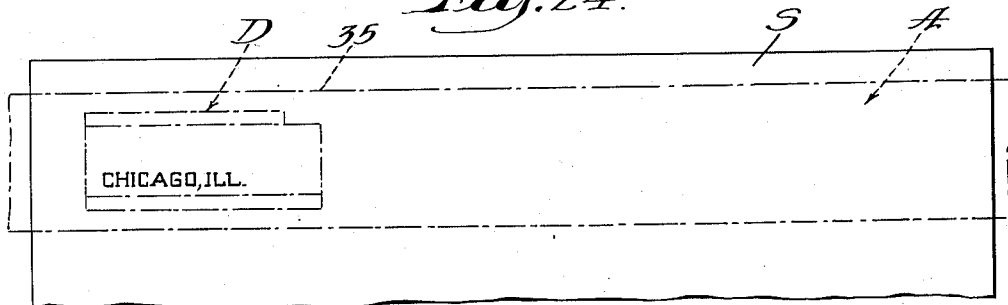


Fig. 25.

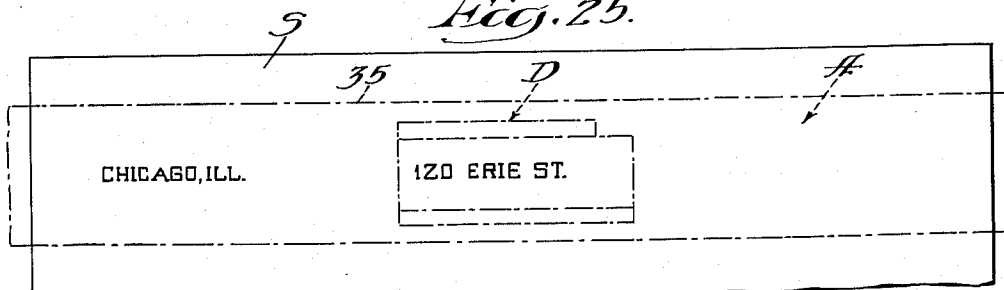


Fig. 26.

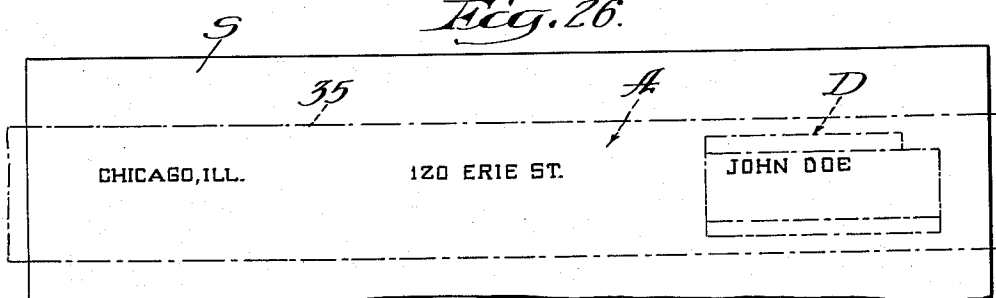
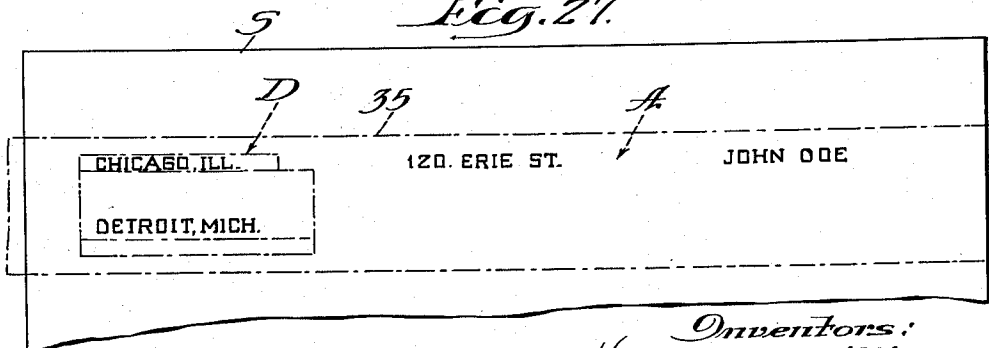


Fig. 27.



Inventors:
Hervey B. Phillips
Hazen F. Springer
By Wallace & Cannon
Attorneys

April 3, 1945.

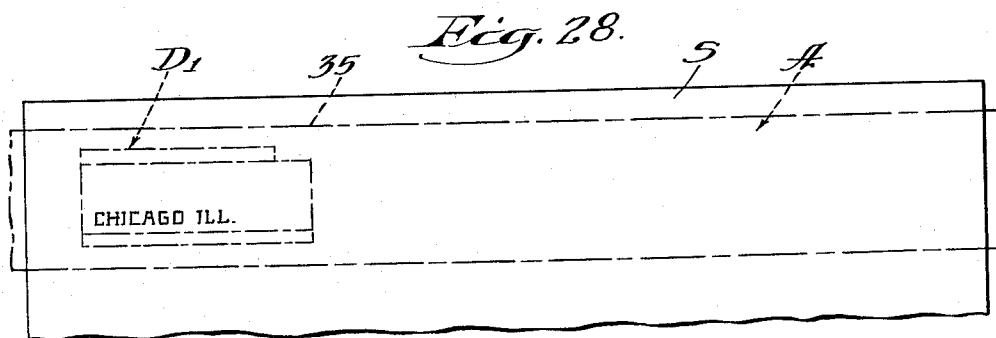
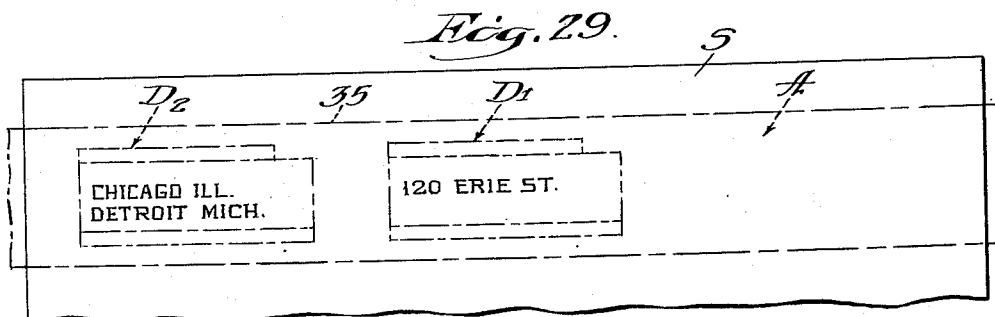
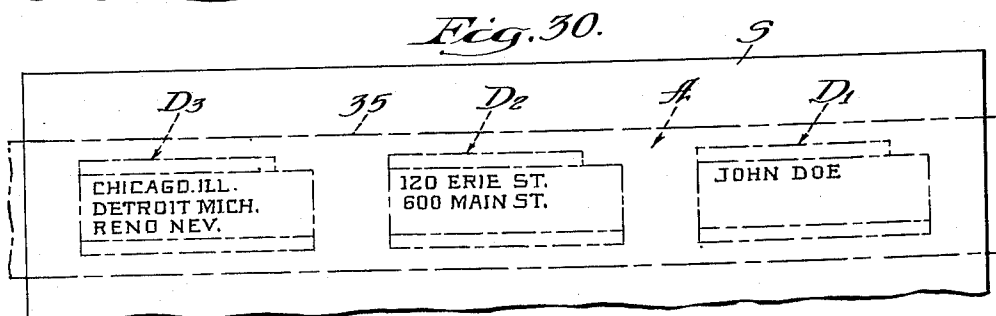
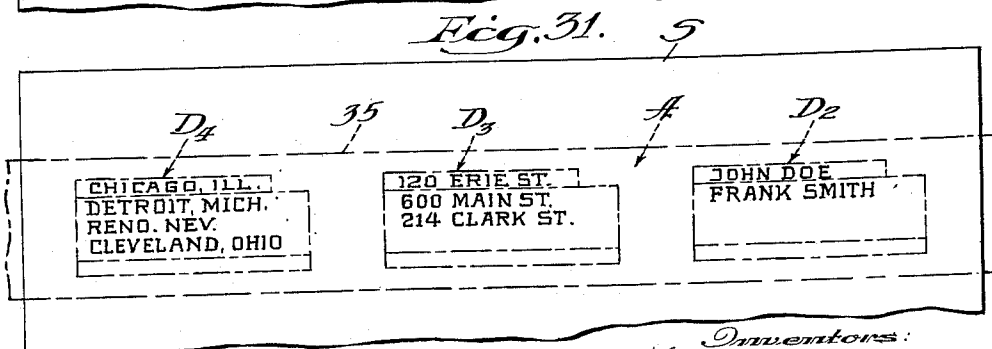
H. B. PHILLIPS ET AL

2,372,736

PRINTING MACHINE

Filed April 9, 1942

11 Sheets-Sheet 11



Inventors:
Hervy B. Phillips
Hazen F. Springer
By Wallace & Cannon
Attorneys

UNITED STATES PATENT OFFICE

2,372,736

PRINTING MACHINE

Hervey B. Phillips, South Orange, and Hazen F. Springer, Bloomfield, N. J., assignors to Addressograph-Multigraph Corporation, Wilmington, Del., a corporation of Delaware

Application April 9, 1942, Serial No. 438,238

14 Claims. (Cl. 101—47)

This invention relates to printing machines of the kind through which printing devices or the like are fed seriatim to have impressions made therefrom.

In some printing machines of the aforesaid character as heretofore constructed, the printing devices have been so fed therethrough that the printing means afforded on the devices were so located with reference to the sheets or the like on which impressions were made from such printing means that the impressions were made on the underside of the sheets wherefore, before the impressions could be inspected, it was necessary to turn over the sheet, and oftentimes this could not be expeditiously effected, particularly in those instances where a plurality of impressions were made one after the other on a single sheet. It is, however, oftentimes desirable, particularly in instances where a plurality of impressions are being made on a single sheet, to enable inspection of the impressions from time to time to insure that proper relation is being maintained between the impressions. Hence among the important objects of this invention is to afford a novel arrangement of coacting elements in a printing machine and to so relate the elements one to the other that impressions produced in the machine may be inspected when and as desired. More specifically, it is among the objects of this invention to enable impressions to be made from raised type characters on printing devices sequentially fed through a printing machine in such a manner that the impressions may be inspected immediately after completion of printing operations whereby what is referred to in the art as visible printing may be effected from such printing devices.

In printing machines of the aforesaid character the printing devices sequentially fed therethrough move into association with a reaction member, commonly referred to as an anvil, when and as impressions are to be made therefrom, and the sheets or the like onto which the impressions are to be made move into operative association with the printing devices as they move into operative position on the anvil. A movable impression-making member such as a platen intermittently coacts with the printing devices and the anvil to produce impressions upon the sheet or sheets from the printing devices. Heretofore the arrangement has been such that impressions produced on the sheets were concealed from view because of the fact that the anvil was so disposed that the sheets were positioned over or in front of the impression face of the anvil, that is in-

intermediate the raised type characters on the printing devices and the normal operator's position so that the impressions were made on the back or reverse side of the sheets, as the sheets were normally viewed by the operator of the machine. In view of this, it is a further object of the present invention to so position and size an anvil or like reaction member in a printing machine that an impression produced on a sheet from a printing device disposed on the anvil or the like may be inspected immediately after completion of the printing operation and advance of the sheet relative to the anvil or the like.

Printing devices to the kind adapted for use in machines of the character to which the present invention pertains frequently have the type characters or other printing means arranged thereon in rows disposed in substantially parallel but spaced apart relation, and yet in some instances it is desirable to have impressions, made from the type characters or the like so arranged, more or less in endwise alignment with each other, and to enable this to be effected in a novel and efficient manner is yet another important object of the present invention, and a further and related object is to facilitate variation of the order in which impressions are made in more or less endwise alignment from substantially parallel but spaced apart rows of type characters or the like on printing devices.

Further objects of the present invention are to produce impressions from type characters or the like on printing devices that are sequentially fed through a printing machine by causing a platen or other impression making means to roll over the type characters in a novel manner and in such relation with the type characters that impressions may be made from all or only selected of the type characters on a particular printing device; to so pass printing devices through a printing machine that impressions may be made therefrom in a substantially vertical plane; to so relate successive printing devices one to the other and to the means operable to make impressions therefrom that impressions may be made from a plurality of printing devices in the course of a single operation of the impression-making means; and an object ancillary to the foregoing is to relate a plurality of printing devices one to the other and to an impression-making means that may be rolled thereover, as, for example, what may be called a roller platen, that in the course of a single operation of the impression-making means, or the roller platen, impressions may be made onto a sheet or the like from a plurality of

printing devices, and yet another object related to this is to enable the impression means, as the roller platen, to make impressions from but selected portions of the printing devices operatively related thereto and to each other in the course of an operation of the impression making means.

In those instances where impressions are to be made from printing devices bearing type characters arranged in substantially parallel but spaced apart rows in such manner that the impressions will be arranged in substantially endwise alignment, it is essential to so relate the printing devices and the impression means adapted for cooperation therewith and the sheet or the like onto which the impressions are to be made that the impressions will be produced in the desired arrangement on the sheet or the like, and so to do usually entails advancing the sheet relative to the printing devices and the impression means adapted for cooperation therewith, and thus yet another object of the present invention is to relate the printing devices and the impression means adapted for cooperation therewith and the means controlling movement of the sheet or the like onto which the impressions are to be made in such a manner that in the course of the operative functioning of the machine the impressions will be made on the sheet in the desired arrangement, and a more specific object is to so relate a plurality of printing devices and the impression means adapted for cooperation therewith and the means controlling movement of the sheet or the like onto which the impressions are to be made that unrelated impressions will be made on the sheet or the like from the respective printing devices in the course of a single operation of the impression-making means, and an ancillary object is to so relate the advance of the sheet to the impression operations so performed that related impressions will be produced on the sheet or the like in a desired arrangement as a result of a plurality of operations of the impression-making means.

Still further objects are to so arrange the anvil and coating platen of a printing machine that clear, firm and readily observable impressions may be taken from the printing devices in a rapid and efficient manner and with a minimum of strain upon the machine structure; to distributively list the lines of data taken from the printing devices, and particularly to accomplish this by a roller platen adapted to make impressions of selected lines of data from a printing device or devices; to successively feed the printing devices on edge, with their impression surfaces substantially in a vertical plane, to one or more printing stations where they are supported against the vertical face of a stationary anvil; to advance a list sheet or the like upwardly past the impression surfaces of the printing devices; to make successive impressions from printing devices disposed as aforesaid upon a sheet so arranged; and to so relate the cooperating elements in the machine that the portion of the sheet on which the impressions are made will be exposed to the view of the operator a comparatively short time following the printing of the impressions thereon.

An additional object of a preferred form of the invention is to cause impressions of various items of data to be made from different selected lines of type characters on related printing devices in a plurality of successive printing operations of the machine in side by side relation on a sheet or the like without jogging or shifting the sheet transversely of the direction of ad-

vancing movement thereof that affords spacing between the parallel lines of impressions thereon.

Another embodiment of the invention has as its object the listing of separate items of data substantially concurrently from a plurality of printing devices disposed side by side on the anvil, the items from each printing device being successively printed in a single and separate line on the sheet while such device is intermittently advanced across the face of the anvil.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show preferred embodiments and the principle thereof and what we now consider to be the best mode in which we have contemplated applying that principle. Other embodiments of the invention embodying the same or equivalent principle may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings,

Fig. 1 is a front elevational view of our novel printing machine;

Fig. 2 is a rear elevational view of the machine;

Fig. 3 is a vertical sectional view taken substantially on the line 3—3 on Fig. 2;

Fig. 4 is a top plan view of the machine;

Fig. 4A is a plan detail view of a portion of the sheet feeding means;

Fig. 5 is a vertical sectional view taken substantially on the line 5—5 on Fig. 4;

Fig. 6 is a plan view of the roller platen, taken substantially on the line 6—6 on Fig. 5;

Fig. 7 is a sectional detail view taken substantially on the line 7—7 on Fig. 6;

Fig. 8 is a sectional detail view taken substantially on the line 8—8 on Fig. 5;

Fig. 9 is a fragmentary plan view of a part of the structure shown in Fig. 4;

Fig. 10 is a plan view similar to Fig. 9 but showing the parts in different operative positions;

Figs. 11 and 12 are sectional detail views taken substantially on the lines 11—11 and 12—12 on Figs. 9 and 10, respectively;

Fig. 13 is a plan sectional view taken substantially on the line 13—13 on Fig. 2;

Fig. 14 is a fragmentary elevational view of certain mechanisms associated with the printing device supply magazine;

Fig. 15 is a plan view of the structure shown in Fig. 14;

Fig. 16 is a plan detail view of the printing device feeding arrangement;

Fig. 17 is a plan sectional view taken on substantially the line 17—17 on Fig. 14;

Fig. 18 is a fragmentary elevational view (looking from the same direction as that in which Fig. 2 is viewed) of the printing device guideway and anvil;

Fig. 19 is a plan view of a retaining member shown in Fig. 18;

Fig. 20 is a perspective view of a typical printing device employed in our machine;

Fig. 21 is a fragmentary plan view of the printing device receiving magazine and associated mechanisms.

Fig. 22 is a vertical sectional view taken substantially on the line 22—22 on Fig. 12;

Fig. 23 is a view similar to Fig. 22 but showing the parts in different operative positions;

Figs. 24 to 27, inclusive, are schematic views illustrating the manner in which the various items of data are progressively printed upon a sheet in the preferred form of our invention; and

Figs. 28 to 31, inclusive, are schematic views similar to Figs. 24 to 27 but illustrating the operation of a modified form of the invention.

The machine illustrated in the drawings is adapted to be mounted at a convenient height upon a suitable supporting member such as the table T, Fig. 1, or if desired upon a separate base plate supported by such a table. The printing devices such as D, Fig. 20, utilized in this machine are introduced into and are then successively withdrawn from a supply magazine SM, Figs. 4 and 17, and are advanced in a step-by-step manner along a guideway which extends in a substantially horizontal direction across the vertically disposed impression face of an anvil A, Figs. 2, 5 and 18, and thence the devices pass to a receiving magazine RM, Figs. 4 and 21 to 23. A sheet S, Figs. 5 and 24, is advanced vertically in a step-by-step manner by suitably feeding means past the face of the anvil A, this sheet overlying an inked ribbon IR, Figs. 4, 5 and 9, and the printing device or devices as D disposed on the anvil A and underlying the ribbon IR. A roller platen P, Figs. 4, 6, 9 and 10 is adapted to move back and forth in a horizontal path parallel to the printing device guideway, traversing the portion of the sheet S overlying the anvil A and the printing device or devices D thereon, this platen being rotated about a vertical axis as it travels and effecting impressions of selected lines of data from each printing device upon the sheet S during intervals when both the sheet and the printing device are at rest. The arrangement is such that after a certain number of advancing movements of the sheet have taken place following the taking of an impression from related printing device on the anvil A, the data printed from such device will be clearly visible to the operator upon that portion of the sheet projecting above the upper edge 35 of the anvil A, Fig. 1.

A typical printing device D is shown in Fig. 20, this device being of well-known construction and in the present instance having three separate lines of type characters TC embossed thereon. The printing device is also provided with rolled marginal portions of spacing flanges which may be referred to as the upper flange 32 and the lower flange 33 as viewed in Fig. 20, this being the position of the device D when it is disposed upon the anvil A, Fig. 18. The flanges 32 and 33 are offset with respect to the body of the printing device, and the flange 32 may be cut away as indicated at 34 for purposes well understood in the art.

The operative parts of the machine are driven by suitable means such as the motor 36, Figs. 1, 2 and 4, mounted on a bracket 37 secured to the table T. A switch box 38 fastened to the base 41 of the main portion of the machine embodies a receptacle 40, adapted for connection with a source of electrical current, and a switch 39 for controlling operation of the motor 36. A pulley 42, Fig. 4, fast on the shaft of the motor 36 is connected by a belt 43 to a pulley 44, Figs. 1, 2 and 13, fixed on a shaft 45 journaled in bearings carried by brackets 46 on the table T. The gear 47 on the shaft 45 meshes with a gear 48 on another shaft 49 journaled in bearings carried by brackets 50 on the table T. The shaft 49 carries a gear 51 which meshes with a gear 52 rotatably mounted on a shaft 53, which may be referred to as

the drive shaft of the machine, journaled in bearings in the brackets 54.

A clutch generally designated 55, Fig. 13, serves to interconnect the constantly rotating gear 52 with the shaft 53. The particular construction of this clutch 55 and the means for controlling its operation are not illustrated in detail herein inasmuch as any clutch suitable for the purpose may be employed. The shaft 53 driving both the platen P and the means for feeding the printing devices D through the machine, and it will be noted that the mechanical interconnections between the shaft 53 and the motor 36 are such as to afford a high speed-reduction ratio.

The framework of the machine, exclusive of the parts of the driving mechanism just described, includes a base 41, previously referred to, upon which posts or uprights 60, Figs. 1, 2 and 13 are supported, there being four of these members 60 arranged at the corners of the rectangular base 41. The anvil A is supported by two of the posts 60, Fig. 1, at the front of the machine or nearest the operator, while the platen P, Fig. 4, and associated parts are carried by the other two posts 60 to the rear of the anvil A.

The anvil A is supported on top of the aforesaid posts 60 and is secured thereto by straps 61, Fig. 1. The anvil proper consists of an elongated bar 62, Figs. 1 and 5, which extends the length of the machine transversely of the drive shaft 53, Fig. 13. Secured to the underside of the bar 62 is a strip 63 having a width slightly less than that of the bar 62, and secured to the underside of this strip 63 is another strip 64 of substantially the same width as the bar 62. A narrow strip 65 attached to the rear edge of the strip 64 overlies the strip 63, Fig. 5, so as to define a channel for receiving the lower flanges as 33, Fig. 20, of the printing devices D. In a similar manner a narrow strip 66, Figs. 1 and 5, is disposed on the upper surface of the bar 62, and overlying the strip 66 is a strip 67 of substantially the same width as the bar 62, the strips 66 and 67 being fastened to the bar 62 by screws 68, Figs. 5 and 9. A retaining strip 69 attached to the strip 67 extends downwardly to engage the upper flange as 32, Fig. 20, of the printing devices D. The body of each printing device D is supported in vertical position against the rear or impression face of the anvil A remote from the view of the operator of the machine, with the raised type characters TC, Fig. 20, of such device projecting away from the bar 62.

The supply magazine SM, Figs. 2, 4, 14, 15 and 17, comprises a flat plate 70 upon which the printing devices D introduced into this magazine are stacked so as to rest on their lower edges or flanges 33, Fig. 20. This plate 70 is supported by bars 71, Figs. 2 and 14, bolted or otherwise secured at one end thereof to the strips 64 on the anvil A, these bars 71 being also supported near the other ends thereof by a post 72, Figs. 1, 2 and 13, on the table T. The stack of printing devices D is yieldingly urged toward the anvil A by suitable means including the springs 73 and a plunger 74, Fig. 4. Strips 73' screwed to the plate 70 held to support and guide the stack of printing devices D in the advancing movement thereof toward the anvil A.

The means for withdrawing the printing devices D successively from the magazine SM and advancing them intermittently through the above described guideway on the anvil A includes an elongated slide 75, Figs. 5, 9, 15 and 17, which is disposed in the space between the bar 62 and

strip 67 of the anvil A. The slide 75 is arranged to be reciprocated through a limited distance by means presently to be described, and is provided with pawls 76 pivotally mounted at spaced intervals thereon, and a stationary pawl or dog 78 at the extreme right-hand end, Fig. 17, of the slide 76 adjacent the magazine SM. Springs 77 act upon the pawls 76 to urge the noses thereof into the printing device guideway for engaging and moving the printing devices D through this guideway during what may be referred to as the feeding stroke of the slide 75, or to the left as viewed in Fig. 9. On the return or idle stroke of the slide 75, to the right as viewed in Fig. 9, these pawls 76 are ineffective to move the printing devices D. Moreover, each time the slide 75 advances through its feeding stroke the stationary pawl 78, Fig. 17, is disposed in position to engage the forwardmost printing device D in the magazine SM and initiate movement of such printing device through the aforesaid guideway, provided this printing device is not retained in the magazine SM by other means as will be explained.

The means for effecting advance and retraction of the slide 75 includes the lever 80, Fig. 1, that is pivotally mounted at 81 on the table T and connected by a link 82 to a crank 83, Figs. 1 and 13, on the drive shaft 53. The upper end of the lever 80 carries a pin 84, Fig. 15, which is received in a channel member 85 attached to the slide 75. This member 85 comprises a bar 86 secured to a block 87, Figs. 14 and 15, attached to the slide 75, and two plates 88 secured to and maintained in spaced relation by the bar 86. As the crank 83 rotates the lever 80 is rocked and causes the slide 75 to reciprocate, the aforesaid pin 84 riding in the channel defined by the plates 88 on the member 85.

In one embodiment of the present invention it is proposed to withdraw a printing device D from the supply magazine SM only on certain feeding strokes of the slide 75, in the present instance every third stroke. For this purpose a finger 90, Figs. 14 and 15, is pivotally mounted in a slot 91 in the anvil bar 62 near the magazine SM and is arranged to be actuated by a reciprocatory member 92 at predetermined intervals to prevent withdrawal of a printing device D from the supply magazine SM except on every third feeding stroke of the printing device advancing means. Thus, a stud 93 is positioned on the member 92 so as to engage and rock the finger 90 when the member 92 is advanced toward the front of the machine, causing one end of the finger 90 to engage the front of the stack of printing devices D in the magazine SM and push the stack slightly rearwardly against the action of the yieldable plunger 74, Fig. 4, so that the dog 78 on the slide 75 cannot engage the forwardmost printing device D. The member 92 is secured to a bar 94 attached to a sliding block 95 which is disposed in a guideway defined by spaced strips 96, Figs. 4, 14 and 15, mounted on the top of the anvil A. The block 95 is adapted to move transversely of the printing device guideway to a forwardmost position in which the stud 93 actuates the finger 90, as shown in Fig. 15, to a rearward position in which it causes the stud 93 to be withdrawn from engagement with the finger 90, whereupon the yieldable means acting on the stack of printing devices D urges the stack forwardly so that the forwardmost device D may be engaged by the dog 78 on the next feeding stroke of the slide 75 as illustrated in Fig. 16.

For the purpose of actuating the sliding block

95 and associated member 92 a lever 100, Figs. 1, 2 and 3, pivoted at 101 on the table T, is provided, this lever extending vertically and passing between a guide block 102 on the anvil A and one of the strips 96 and being disposed adjacent a lug 103 screwed to the sliding block 95 forwardly of the lever 100. A cam plate 104, Fig. 3, on the medial portion of the lever 100 cooperates with a roller 105 on a lever 106, Figs. 1, 2 and 13, which is pivoted at 107 on one of the uprights 60 supporting the anvil A. This lever 106 rides on pins as 109, Figs. 2 and 13 on the face of a gear 108 which is rotatably mounted on the shaft 49. The gear 108 meshes with and is driven by a gear 112 on the drive shaft 53, the ratio between these two gears, and the relative spacing of the pins 109, being such that the lever 106 is elevated by the revolving pins 109 during two out of every three feeding strokes of the printing device advancing slide 75, Fig. 15. Each time the lever 106 is so elevated by a pin 109 the roller 105 thereon engages the cam plate 104, Fig. 3, on the lever 100 and pivots the lever 100 into its broken line position, causing the slide block 95 to be advanced forwardly and move the member 92 into position to pivot the finger 90 and force the stack of printing devices D slightly rearwardly in the magazine SM so that the dog 78 cannot effect withdrawal of the forwardmost printing device D from the magazine SM. It will be noted, Fig. 13, that the free end of the lever 106 is disposed adjacent the end of the shaft 49 to brace the lever 106 when the roller 105 is acting against the cam plate 104.

The slide block 95, Figs. 14 and 15, has a roller 115 mounted thereon which is adapted to cooperate with a curved flexible plate 116 attached at one end to the block 87 on the slide 75. When the slide 75 nears the limit of its advancing movement during a feeding stroke thereof, the curved plate 116 rides over the roller 115, and if the lever 100 is not restrained against movement by the roller 105 on the lever 106, the plate 116 is effective to cam the block 95 rearwardly thereby retracting the member 92 and stud 93 and releasing the finger 90, whereupon the stack of printing devices D in the magazine SM is urged forwardly against the pawl 78. Then, as the slide 75 is retracted and the pawl 78 moves past the magazine SM, the forwardmost printing device D occupies a position such that on the succeeding feed stroke of the slide 75 the pawl 78 engages such device D and advances it out of the magazine SM through the printing device guideway to the left, Figs. 14 and 15, into the position indicated at *a*, Figs. 14 and 17. Reverse movement of the printing device D from position *a* toward the magazine SM is prevented by a retaining device 117, Fig. 14.

When the forwardmost printing device D has been withdrawn from the magazine SM the lever 100 again becomes effective to advance the slide block 95 and member 92 to prevent withdrawal of any more printing devices D from the magazine SM for two feeding strokes of the slide 75. It should be noted that when the lever 100 is acting to maintain the block 95 in its forward position, the restoring plate 116 is ineffective to cause retraction of the block 95, this plate merely flexing when it engages the roller 116. Moreover, it is desirable to prevent the printing device at position *a* from being further advanced until such time as another printing device D is ready to be withdrawn from the magazine SM. To this end cams 111 secured to the bar 94, Fig.

15, are disposed in position to extend into the path of movement of the first two pawls 76 on the slide 75. The first of these pawls 76 normally serves the purpose of advancing a printing device from position *a* to position *b*, Figs. 14 and 17. However, when the slide block 95 is in its forward position the cam 111 is effective to cause the nose of the first pawl 76 to be retracted out of the printing device guideway as this pawl rides onto the cam 111. Hence concurrently with the prevention of advancing movement of a printing device D from the magazine SM to the position *a*, the printing device in position *a* is prevented from moving to position *b*. However, when the finger 90, Fig. 15, is released to enable the printing device D to be withdrawn from the magazine SM, the cam 111 likewise is rendered ineffective so that the first pawl 76 can engage the printing device in position *a* and advance it to position *b*.

Such operation as has just been described is immediately followed by two more ineffective feed strokes of the slide 75, the printing devices at positions *a* and *b* remaining in or near these positions until another device D is withdrawn from the magazine SM. Thereupon the printing device in position *b* is advanced to the first printing position on the anvil A where it is instrumental in causing an impression of data to be made on the sheet S, Fig. 5. Thereafter, during each feeding stroke of the slide 75, this first printing device D is successively engaged and advanced by pawls 76 through a series of printing positions or stations on the anvil A, there being three of these printing positions or stations in the present arrangement. During the time that the first printing device D is being advanced through these printing positions, however, the second printing device remains at or near the position *b*, Figs. 14 and 17, and it is not until the first printing device is fed out of the last printing position that the second printing device is advanced into the first printing position, whereupon it, too, receives intermittent advancing movement across the face of the anvil A, to the left as viewed in Fig. 2. Retaining devices as 118, Figs. 18 and 19, prevent reverse movement of the printing devices D through the guideway as the pawls 76 move across these devices during the idle stroke of the advancing means.

After the printing devices have successively passed through the three printing positions on the anvil A they are delivered to a receiving magazine RM, Figs. 1, 2, 4 and 21 to 23. This magazine is a trough-like structure comprising a bottom plate 120 and side plates 121 which are secured to the underside of the anvil bar 62. When a printing device D has attained the position immediately above the magazine RM, it is introduced into this magazine and there stacked with other printing devices by a packer mechanism which will now be described. Referring to Figs. 21 and 22, the packer 122 rests on the bottom plate 120 of the magazine RM and is arranged to slide back and forth therein. A spring 125 connected at one end to a pin 126 extending upwardly from the packer 122 is anchored at its other end to a bar 127, Fig. 4 (which bar is part of the platen structure to be described hereinafter), and this spring 125 tends to retract the packer 122 into the position shown in Fig. 23. Strips 128 on the side plates 121 of the magazine RM serve to retain the packer 122 against accidental upward displacement from the magazine RM.

To effect movement of the packer 122 into the

position shown in Fig. 22, which is the position occupied by the packer each time a printing device D attains the position from which it is to be discharged to the magazine RM, a link 130 connects the pin 126 to a lever 131 pivotally mounted at 132 on the anvil A. A roller 133 carried by the lever 131 rides on a cam plate 134 disposed on the end of the printing device advancing slide 75. As the slide 75 nears the end of its feed stroke, the roller 133 rides onto the high portion of the cam plate 134 and this causes the packer 122 to move into the position shown in Fig. 22. As the printing device D attains discharge position, it is brought to rest with its lower edge supported by a horizontal plate 135 on the packer 122. During the succeeding restoring movement of the slide 75 the roller 133 rides down the incline of the cam 134, under the influence of the spring 125 acting on the lever 131, and rides onto an extension 136 of the slide 75. This enables the spring 125 to retract the packer 122 into the position shown in Fig. 23, causing the printing device D to drop into the magazine RM as shown in this view. The printing device D then either falls onto the stack of devices in the magazine RM or is pushed onto this stack by the packer 122 on its next forward movement.

The sheet S, Fig. 5, is fed upwardly across the impression face of the anvil A past the ribbon IR and the printing positions or stations on the anvil, this sheet being advanced intermittently by means described hereinafter. The ribbon IR is intermittently advanced by conventional ribbon feeding means, not shown.

The platen P, Figs. 5 and 6, comprises a flanged wheel 140 having on its rim, in the present instance, three impression members or platen faces 141 which consist of arcuate strips of rubber or other suitable material equally spaced circumferentially on the wheel 140 and also being axially spaced with respect to each other. Each platen face 141 is of a width slightly greater than the height of the type characters TC, Fig. 20, in a single line thereof on a printing device D, and is of sufficient length to effect printing of data from a line of type characters on the device D by rolling over the portion of the sheet S opposite such line of characters. Since, in the present instance, three lines of type characters TC are afforded on each printing device D, three platen faces 141 are provided on the wheel 140, each being allocated to one of the lines of type characters.

The platen P is rotatably mounted on an eccentric bushing 142, Figs. 5, 6 and 7, disposed on a vertical shaft or rod 143 which is supported in the following manner: As shown in Figs. 2 and 4, parallel horizontally extending rails 144 are secured to the uprights 60 located to the rear of the uprights 60 on which the anvil A is mounted, these rails extending parallel to the anvil. A block 145, Fig. 5, is positioned between the rails 144 and is secured to a pair of plates 146 which embrace each of the rails 144 on opposite sides thereof. The block 145 and the plates 146 together comprise a unit adapted to slide along the rails 144, which are preferably lubricated to minimize friction. The aforesaid shaft 143 is carried by clamp blocks 147 attached to one of the plates 146, these clamp blocks securing the shaft 143 in a vertical position against rotation.

Reciprocating movement is imparted to the platen structure by a lever 150, Figs. 2, 5 and 13, which is pivoted at 151 on the base 41 of the machine frame. The lever 150 carries a roller 151 that is received in a channel member 152 attached

to one of the plates 146, Fig. 5, on the sliding unit. A link 153 connects the lever 151 to a crank 154, Figs. 2 and 13, on the drive shaft 53. As the crank 154 rotates it causes the lever 150 to move back and forth between the broken and full-line positions thereof indicated in Fig. 2, driving the platen mechanism through a printing stroke in one direction and an idle stroke in the other. The movement of the platen is so interrelated with that of the printing device feeding means that the platen P moves through its printing stroke, or to the left as viewed in Figs. 2 and 4, during the time that the printing device advancing slide 75 is moving through its idle or return stroke, or to the right as viewed in Figs. 9 and 17. While the platen P is moving through its idle stroke, or to the right as view in Figs. 2 and 4, the printing device advancing slide 75 moves to the left, Figs. 9 and 17, through its feeding stroke. Thus the printing devices are stationary while the platen P is going through its printing stroke and are advanced only when the platen P is being returned through its idle stroke.

It is necessary that the platen face 141 make rolling contact with the sheet S and to this end means are provided for positively driving the platen P rotative as it is moved bodily along the rails 144. The bar 127, to which reference has been made hereinabove, is attached by lugs 129 to the upper ends of the posts 60 supporting the rails 144, this bar extending parallel to the anvil A. An elongated rack 157 is supported by the lugs 129 adjacent the bar 127, and a spring 158 extended between the rack 157 and the bar 127 urges this rack into intimate engagement with the bar 127 and against a lug 159, Figs. 2, 4 and 9, on one end of the bar 127. A pinion 160, Figs. 4, 5 and 9, is rotatably mounted on a vertical pin 161 anchored in a bracket 162 on one of the plates 147 of the platen slide mechanism. This pinion 160 meshes with the rack 157 and also with a gear 163 rotatably mounted on the vertical shaft 143 of the platen structure. The gear 163 is seated on the upper clamp block 147, and a ball bearing 164 seated on the hub of the gear 163 supports the eccentric bushing 142 on which the wheel 140 is mounted. An interconnection between the gear 163 and the wheel 140 is afforded by a roller 165 on the face of the gear 163 which is received in the slot of a channel member 166 attached to and extending downwardly from a rib of the wheel 140. As the platen structure slides along the rails 144 the pinion 160 rolls over the teeth of the rack 157 and imparts rotation to the gear 163, thereby driving the platen P rotative as it is advanced bodily.

As the platen P advances through its printing stroke the platen faces 141 are successively brought into operative relation with the anvil A, the manner in which one of these faces cooperates with a line of type characters on a printing device D being illustrated in Fig. 5. In the preferred embodiment of our invention, only one of these platen faces 141 is effective in any one printing stroke of the platen P since there will be only one printing device D disposed in any one of the three printing positions at a single time. These platen faces 141 are respectively allocated to the various lines of type characters on a printing device, and in each of three successive printing operations a different line of characters is rendered effective to print data upon the sheet S, as will be explained in greater detail presently.

When the platen P is going through its idle

stroke, during which time the printing devices are advanced along the guideway on the anvil A, it is necessary that the impression faces of the platen be maintained out of contact with the sheet S. To this end certain mechanism has been provided for retracting the platen slightly rearwardly while it is moving through its idle stroke or to the right as viewed in Fig. 4. It has been mentioned hereinabove that the platen wheel 140, Fig. 5, is rotatably mounted upon an eccentric bushing 142 on the shaft 143. This bushing has an arm 170, Figs. 5 and 11, to which a lever arm 171 having a notch 172 thereon is secured, Figs. 5, 9 and 10. A post 173, Figs. 2, 9 and 11, attached to one of the sliding plates 160, Fig. 5, has a latching lever 174 pivotally mounted thereon, this lever 174 extending in a generally horizontal direction and normally resting on the arm 171 as shown in Fig. 12. A dog 175 on the lever 174 is adapted to seat in the notch 172, Figs. 10 and 12, in the arm 171, and when the arm 171 is so held by the latch 174 the bushing 142 is maintained in a position such that the platen faces 141, Figs. 5 and 6, are ineffective to cause an impression to be made upon the sheet S from any printing device D. In order to bring about such interengagement of the dog 175 and the arm 171, a roller 177, Figs. 4, 5 and 10, is disposed on the arm 171 in position to engage a bracket 178, Figs. 12 and 4, on the post 60 near the end of the printing stroke of the platen P, or to the left as viewed in Figs. 2 and 4. This causes the arm 171 to be swung to enable the dog 175 to drop into the recess 172 and latch the arm 171 in the position shown in Fig. 10, whereby the platen faces 141 are retracted out of engagement with the sheet S.

Spring tension is applied to the arm 171 by a spiral spring 180, Fig. 8, which tends to urge the arm 171 in a clockwise direction as viewed in Figs. 9 and 10. This spring 180 is contained within a disc-shaped cover or housing 181, Figs. 5 and 10, and the outer terminal of this spring is fastened to a pin 183, Fig. 8, secured to the cover 181. The inner terminal of the spring 180 is anchored in a screw 182 which is threaded into a tapped opening in the upper end of the vertical shaft 143. A screw 184 extends downwardly through the cover 181, Figs. 5, 8 and 9, and has a nut 185 at its lower end which bears against a lug 186 on the arm 171, thereby applying the yielding force of the spring 180 to the arm 171.

As the platen P nears the end of its idle stroke (to the right in Fig. 4) the free end of the lever 174 rides up on a roller 190, Figs. 2 and 4, journaled in a bracket 191 extending from the magazine SM. As the lever 174 is elevated in this manner (see Fig. 11) the dog 175 is withdrawn from engagement with the arm 171, and the spring 180, Fig. 8, causes the arm 171 to swing clockwise as viewed in Fig. 9, until the lug 186 strikes an adjusting screw 192 which is threaded in an arm of the bracket 193, Figs. 2 and 9, fastened to the exterior of one of the sliding plates 146, Fig. 5. The eccentric bushing 142, Figs. 5, 6 and 7, is thus rocked to bring the axis of the platen wheel 140 forwardly sufficiently to enable the platen faces 141 to roll over the surface of the sheet S as the platen P advances through its printing stroke. It should be noted that when the platen P is traveling through its idle stroke it is caused to rotate about its axis on an amount equivalent to the amount of rotative movement of this platen when it travels through its printing

stroke, but in a reverse direction, and hence the platen is always in a predetermined angular position when it commences its printing stroke.

The sheet S, Figs. 5 and 24, is fed upwardly in a step-by-step manner over a vertical bed plate 195, Figs. 1 and 13, extending between the posts 60 on which the anvil A is mounted, the plate 195 terminating a short distance below the anvil. A bracket 196, Figs. 1 and 4, depending from the anvil A supports the frame 197 of the sheet feeding mechanism. A shaft 198 journaled in the frame 197 carries knurled feed rolls 199, Figs. 1, 4 and 5, the peripheries of which project through an opening in the bed plate 195. Clamping rolls 200 rotatably mounted on a pivoted arm 201 of the frame 197 are yieldingly urged by a compression spring 202, Fig. 4A, into cooperation with the feed rolls 199. The paper S is passed over the plate 195 through the bite of the rolls 199 and 200 and extends upwardly past the inked ribbon IR which is disposed intermediate the sheet S and the printing device or devices D on the anvil A. The upper end of the paper may be held erect, if desired, by any suitable means.

For the purpose of imparting intermittent movement to the sheet S a ratchet wheel 203, Fig. 5, is fast on the shaft 198 adjacent a disc 204, Figs. 1 and 5, rotatably mounted on said shaft. A pawl 205 on the disc 204 is urged by a leaf spring 206 toward the teeth of the ratchet wheel 203, but normally is prevented from engaging with these teeth by a guard or shield 207 mounted on the frame 197. A link 208 depending from the disc 204 is pivotally connected to a lever 209, Figs. 1, 2, 4 and 13, pivotally mounted at 210 on the base 41 of the machine frame, this lever 209 being disposed diagonally with respect to the base 41. A spring 211 extended between the lever 209 and the post 60 urges the disc 204, Fig. 5, into an idle position in which the pawl 205 rests on the shield 207. A rocker 215, Figs. 2, 4 and 13, which is hinged at 216 to the base 41 extends upwardly at an incline and rests on the lever 209.

The vertical rod 143, Fig. 5, of the platen P carries on arm 218, Figs. 2 and 13, which is secured by a clamp block 217 to the lower end of the rod 143, and this arm 218 carries a roller 219 in alignment with the rocker 215 in the direction of advancing movement of the platen structure. As the platen attains the end of its printing stroke (to the left, Figs. 2 and 4) the roller 219 engages and depresses the rocker 215 thereby actuating the lever 209 and link 208 and causing the disc 204, Fig. 5, to be rocked clockwise as viewed in this figure. The pawl 205 rides off the shield 207 and onto the toothed periphery of the ratchet wheel 203, advancing the feed rolls 199 in a predetermined amount to thereby impart a step of upward movement to the sheet S. It is manifest that the amount of movement of the sheet S is determined by the instant when the pawl 205 moves into engagement with the ratchet 203, and this in turn is dependent upon the effective length of the shield 207. Hence, by adjusting the angular position of the shield 207 the amount of feed of the sheet may be regulated.

In describing the operation of the machine it will be assumed that the platen P is initially in the position shown in Fig. 10 or as indicated in broken line in Fig. 2. As the drive shaft 53 rotates, the platen structure is moved to the right toward the position thereof indicated in full lines in Fig. 2, this being an idle stroke of the

platen. Meanwhile, the printing device advancing slide 75, Figs. 14 to 17, is advancing to the left as shown in these views. Assuming that the slide block 95 carrying the member 92 is in its retracted position (it being shown in its advanced position in Fig. 15) the retarding finger 90 is ineffective and the dog 78 on the slide 75 therefore engages the first printing device D, as shown in Fig. 16, and advances it from the supply magazine SM to position a, Figs. 14 and 17.

When the platen P attains the end of its idle stroke, the latching mechanism thereof is tripped and the wheel 140 is released so that it may occupy the position shown in Figs. 5 and 9 relative to the sheet S, the platen then being conditioned for printing. However, inasmuch as the first printing device D has not yet attained a printing position on the anvil A, no impression is made upon the sheet S as the platen P goes through its printing stroke. As the platen nears the end of its printing stroke it actuates the sheet advancing mechanism and is latched into its non-print position, Fig. 10, and is then returned through its idle stroke in the manner previously described.

It will be recalled that the printing device advancing mechanism is not effective upon the printing devices at the supply end of the printing device guideway during certain machine cycles. Thus, after the first printing device D has been advanced in the position a, Figs. 14 and 15, the member 92 advances into the position thereof shown in Fig. 15 and rocks the finger 90 to prevent any printing devices D from being fed out of the magazine SM for two successive feed strokes of the slide 75. Likewise cams 111 are operative to prevent the printing device in position a from being advanced to position b during this time. Thereafter the member 92, Fig. 15, is retracted and releases the finger 90 to enable the printing device advancing means to move the forwardmost printing device D out of the magazine SM to the position a, and the printing device formerly in position a is advanced to position b.

There then follows two more machine cycles in which the printing devices at positions a and b and in the magazine SM remain in or near these positions. Thereafter the printing device advancing means again becomes effective to move the first printing device D from the position b through the guideway on the anvil A into the first printing position, this taking place while the platen P is going through an idle stroke. The machine is now ready for normal printing operation.

In the following description of the printing operations of the machine, reference will be made to "cycles" of the machine, and by this is meant the cycles of rotation of the drive shaft 53, Fig. 13, commencing with the platen P in its extreme righthand position as shown in Figs. 4 and 9. During the first half of each such machine cycle the platen P goes through its printing stroke while the printing device advancing mechanism makes an idle stroke. In the second half of each cycle the platen P makes an idle stroke while the printing device advancing means goes through its feeding stroke.

Referring now to Figs. 24 to 27, these views are taken from the front of the machine looking through the anvil A, which is indicated in broken outline as is also the first printing device D, the latter being indicated in Fig. 24 as occupying the

first printing position on the anvil A. The sheet S is shown in full lines, although it will be understood, of course, that the operator of the machine would not be able to see that portion of the sheet S which is obscured by the anvil A. However, to facilitate explanation of the invention the operation of the machine is described as though it were possible for the operator to view that portion of the sheet S in back of the anvil A.

Assuming that the first printing device bears the address "John Doe, 120 Erie St., Chicago, Ill.," the platen P operates in the first printing cycle to print one line of this address, for example the third line "Chicago, Ill." as illustrated in Fig. 24. For this purpose the wheel 140, Fig. 5, of the platen P is arranged in such an angular relation on its axis that the lowermost platen face 141 rolls across the bottom line of type characters TC, Fig. 20, on the printing device D which is disposed at the first printing station. The sheet S is then advanced a step upwardly and the printing device D is moved into the second printing station on the anvil A. As a result of the advance of the sheet S the previously printed item "Chicago, Ill." is brought into alignment with the second or middle line of type characters TC on the printing device D.

The platen P again operates, and this time the medially located platen face 141 becomes effective upon the printing device D at the second printing station to make an impression of the item "120 Erie St." on the sheet S in alignment with the item "Chicago, Ill." Fig. 25. Following this, the sheet S is moved upwardly one step and the first printing device D advances to the third printing station.

In the third printing cycle the uppermost face 141 of the platen P is effective to make an impression of the item "John Doe" from the first line of type characters TC on the printing device D at the third printing station, Fig. 26. Thus the three items of name, street address and city respectively represented by the three lines of type characters TC on the printing device D are printed on the sheet S in a single line across the sheet.

Following printing of the first complete line on the sheet S, the first printing device D is advanced away from the third printing station toward the receiving magazine RM and the second printing device D advances into the first printing station. The platen P again operates to print the item of city and state from the third line of type characters on the second printing device D at the first printing station, as illustrated in Fig. 27.

Printing of the second line of data upon the sheet S proceeds in a manner similar to that described above for the first line. Because of the fact that the sheet S receives three steps of advancing movement intermediate the printing of an item from one printing device and the printing of a corresponding item from the succeeding printing device, the lines of data on the sheet S are separated from each other by two blank lines. Because of this spacing of the lines, the first line of the printed data may, in the illustrated construction, appear over the top edge 35 of the anvil A by the time the second line is completely printed and thereupon the operator may observe the first line of data.

If it is desired to change the order in which the items of data are printed from the printing devices D onto the sheet S, it is merely necessary to change the sequence in which the platen faces 141, Figs. 5 and 6, make contact with the sheet S

while the platen P is rolling over the sheet. This may be expeditiously accomplished by lifting out the rack 157, Figs. 4 and 9, to enable the platen P to be turned about its axis by hand into a position in which the desired sequence of engagement of the platen faces 141 with the sheet S is insured, after which the rack 157 may be replaced. If a reversed sequence is desired, the platen structure is partially disassembled by removing the screw 182, Figs. 5 and 10, and spring 180, Fig. 8, whereupon the wheel 140 and eccentric bearing 142 may be lifted off the vertical rod 143. The bushing 142 is then removed and the wheel 140 is turned upside down after which the bushing 142 is replaced. The channel member 166, Figs. 5 and 6, is located on the opposite face of the wheel 140 so that it projects downwardly and the wheel assembly is then installed on the rod 143. The wheel 140 may be manually adjusted in the manner described hereinabove to produce the desired sequence of printing of the various items of data from each printing device, and the machine operates in the same manner as before but with a reversed sequence of printing the items of data.

It will be recognized that if the sequence or order of printing the items of data is altered from that shown in Figs. 24, 25 and 26, the sheet feeding mechanism will need operate in such a manner as to properly align the printed items on the sheet, and inasmuch as the simple form of sheet feeding mechanism illustrated in Fig. 5 will not be suitable for this purpose, provision should be made for feeding the sheet S in various ways in order to obtain alignment of the items under all conditions. This may be accomplished, for example, by the use of changeable gearing or other well-known mechanisms, and since these are familiar expedients to those skilled in the art, no detailed explanation thereof is here undertaken.

It may be desirable in some instances to increase the speed of production of the machine by printing the items of data substantially concurrently from a plurality of printing devices in each printing stroke of the platen P. Where this is desired, the means for suspending the feeding of printing devices from the magazine SM is disabled by eliminating the lever 100, Fig. 3, or removing the detachable lug 103, Fig. 15, from the sliding block 95, so that the lever 100 can no longer act upon the block 95. The member 92 is then pushed into its ineffective position where it remains throughout the operation of the machine so that the finger 90 and cams 111, Fig. 15, are no longer effective. Under these circumstances the printing devices are advanced from the magazine SM to the position a and from position a to position b, and from position b to the first printing station in each feeding stroke of the slide 75. With this arrangement of the printing device feeding means the machine may operate to dispose a plurality of printing devices D at the several printing stations on the anvil A, as shown in Figs. 9, 18 and 30.

The operation of the modified form of the invention is diagrammatically shown in Figs. 28 to 31. In the first printing cycle of the machine the third line of data is printed from the first printing device D1 onto the sheet S at the first printing station, Fig. 28. The sheet S is then advanced a step and device D1 is moved to the second printing station while the second printing device D2 is advanced into the first printing station. The second line or item of data is thereupon printed from the device D1 upon the sheet S in align-

ment with the third item which was previously printed from the device D1, Fig. 29.

The printing device D1 is advanced to the third printing station as indicated in Fig. 30, the second printing device D2 moves into the second printing station and the third printing device D3 is moved into the first printing station. In the course of the next printing stroke of the platen P the third item is printed from the device D3, the second item from the device D2, and the first item is printed from the device D1 in alignment with the second and third items previously printed from this device.

Thereafter the machine operates in each printing cycle to make impressions of three items of data from three different printing devices at the three printing stations of the machine. In this manner a complete line of data consisting of three separate items is printed on the sheet S for each printing operation of the platen P.

Fig. 31 illustrates the appearance of the sheet S when impressions have been taken from the second printing device D2 at the third printing station, the third printing device D3 at the second printing station, and the fourth printing device D4 at the first printing station, there then being two complete lines of data printed upon the sheet S, and portions of the third and fourth lines of data. After a certain number of lines of data have been printed, the first line appears over the top edge 35 of the anvil A.

From the foregoing description it is apparent that our invention affords numerous advantages. For instance, we have made it possible for the operator of the machine to observe the data printed upon the sheet S from the printing devices D almost immediately or a short time after the impressions of such data have been made on the sheet, thereby facilitating detection of errors in printing the sheets or forms. So far as we are aware, this feature has not been available heretofore in machines utilizing printing devices having raised or embossed type characters thereon. Moreover, the arrangement of the anvil, platen, and the means for handling the printing devices is simple and economical and enables the machine to be readily serviced or adjusted. A further advantage is that data may be printed on several columns on the sheet without the necessity of shifting the sheet transversely with respect to its direction of advancing movement. This affords increased speed of operation and more accurate registration of the sheets or forms than is in many instances possible with other types of list printers. In the modified form of the invention, the operation of which is illustrated in Figs. 28 to 31, impressions of selected lines of data may be made substantially concurrently from a plurality of printing devices. It is likewise manifest that printing devices of greater than the standard length may be accommodated by the machine, such devices being employed for example to print upon several forms at once. The platen is so arranged that the sequence in which the lines or items of data are printed from the printing devices may be varied in a simple and expeditious manner.

It will be understood that while we have illustrated and described selected embodiments of our invention, these are capable of variation and modification and we therefore do not wish to be limited to the precise details set forth but desire to avail ourselves of such changes and alterations as fall within the purview of the following claims.

We claim:

1. In a printing machine through which a series of printing devices each having a plurality of lines of printing characters are adapted to be passed, means for intermittently advancing each such printing device through a plurality of printing stations in succession, means for feeding a sheet into position to be printed upon by said printing device at all of said stations in a sequence of printing operations, and a roller platen traversing all of said printing stations in each operative movement thereof and parallel to the lines of printing characters on the printing device and having relatively displaced arcuate impression faces cooperating with said printing device at each of said stations to make impressions upon said sheet from different lines of such devices at the different stations.

2. In a machine for printing data from printing devices passed sequentially therethrough, each of such devices being provided with a plurality of lines of printing characters respectively related to various items of data, means for intermittently advancing each such printing device through a plurality of printing stations in succession, means for feeding a sheet into position to have printed impressions formed thereon by said printing device at all of said stations, and a roller platen traversing all of said printing stations by movement in a direction parallel to the lines of printing characters and having a plurality of relatively displaced impression faces each adapted to cooperate with a particular line of printing characters on a printing device at a particular printing station, and positive drive means for rotating and traversing said roller platen to maintain predetermined relationships between the several impression faces and the respective printing stations, whereby impressions of the various items of data are made upon said sheet from each printing device at the respective printing stations.

3. In a machine for printing data from printing devices passed sequentially therethrough, each of such devices being provided with a plurality of lines of printing characters respectively related to various items of data, means for intermittently advancing each such printing device through a plurality of printing stations in succession, means for feeding a sheet into position to have printed impressions formed thereon by said printing device at all of said stations, and a roller platen traversing all of said printing stations by movement in a direction parallel to the lines of printing characters and having relatively displaced arcuate impression faces thereon adapted in a plurality of operations with respect to a particular printing device to cooperate with the printing device at each of the successive stations and to effect such cooperation with a different line of characters at each station whereby impressions of the various items of data are made upon said sheet from each printing device at the respective printing stations.

4. In a machine for printing data from printing devices passed sequentially therethrough, each of such devices being provided with a plurality of lines of printing characters related to various items of data, means for intermittently advancing a series of said printing devices through a plurality of successive printing stations, means for feeding a sheet into position to be printed upon by printing devices at all of said stations, and a roller platen traversing all

of said printing stations by movement in a direction parallel to the lines of printing characters on the printing devices at said stations and having a plurality of relatively displaced impression faces each adapted to cooperate with a particular line of printing characters on a printing device at a particular printing station, and positive drive means for rotating and traversing said roller platen to maintain predetermined relationships between the several impression faces and the respective printing stations, whereby impressions of selected items of data are made upon said sheet at all of the printing stations in the course of a continuous advancing movement of said platen.

5. In a machine for printing data from printing devices passed sequentially therethrough, each of such devices being provided with a plurality of lines of printing characters related to various items of data, means for intermittently advancing a series of said printing devices through a plurality of successive printing stations including first and last stations, means for feeding a sheet into position to be printed upon by printing devices at all of said stations, a roller platen traversing all of said printing stations by movement in a direction parallel to the lines of printing characters on the printing devices located at such stations and having a plurality of relatively displaced arcuate impression faces each adapted to cooperate with a particular line of printing characters on a printing device at a particular printing station whereby impressions of selected items of data are made upon said sheet at all of the printing stations in the course of a continuous advancing movement of said platen, and means forming part of said advancing means operable to delay advancing of a printing device into said first printing station until the previously advanced printing device is being discharged from said last printing station.

6. In a printing machine for making impressions from printing devices passed seriatim through the machine, each such device having a plurality of lines of printing characters thereon, means affording a guideway for said printing devices, means for intermittently advancing printing devices through said guideway in the direction of the lines of printing characters on such devices and for positioning each of said devices successively in a plurality of printing positions in the machine, means for feeding a sheet into cooperative relation with said printing positions to be printed upon by a printing device at each of said positions, a rotary platen having relatively displaced arcuate impression faces thereon adapted to cooperate with said printing devices for making impressions from different lines thereof at different stations, means for moving said platen bodily in a direction parallel to the direction of movement of said devices, and means for positively driving said platen rotatively as it is moved bodily to effect cooperation of said impression faces successively with printing devices disposed at the successive printing stations.

7. In a printing machine for making impressions from printing devices passed seriatim through the machine, each such device having a plurality of lines of printing characters thereon, means affording a guideway for said printing devices, means for intermittently advancing printing devices through said guideway in the direction of the lines of printing characters on such devices and for positioning each of said

devices successively in a plurality of printing positions in the machine, means for feeding a sheet into cooperative relation with said printing positions to be printed upon by a printing device at each of said positions, and geared roller platen means having relatively displaced arcuate impression faces thereon adapted for printing cooperation with the respective printing devices at all of said printing stations by movement parallel to the lines of printing characters on the printing device located at such stations to produce impressions from different lines of such printing characters at different stations and movable bodily during such printing cooperation in a direction parallel to the direction of movement of said devices to effect cooperation of said impression faces successively with the printing devices disposed at the successive printing stations.

8. In a printing machine for making impressions from printing devices passed seriatim through the machine, each such device having a plurality of lines of printing characters thereon, means affording a guideway for said printing devices, means for intermittently advancing printing devices along said guideway in the direction of the lines of printing characters on such devices and for positioning each of said devices successively in a plurality of printing positions in the machine, means for feeding a sheet into cooperative relation with said printing positions to be printed upon by a printing device at each of said positions, a rotary platen adapted to cooperate with said printing devices for making impressions therefrom and having a plurality of relatively displaced arcuate impression faces each related to a respective line of characters on said printing devices and to a respective one of said stations, means for moving said platen bodily in a direction parallel to the direction of movement of said printing devices, and positive driving means for driving said platen rotatively as it is moved bodily and in such a manner that each impression face thereon may make an impression from the line of printing characters to which it relates on a printing device disposed at the respective station.

9. In a printing machine having a printing station through which a series of printing devices are adapted to be moved along a predetermined path, one by one and in a step by step manner such that each printing device comes to rest at said printing station, sheet feeding and guiding means operable to feed a sheet past said printing station transversely of the path of movement of said printing devices, and impression means including inking means located at said printing station and having spaced cooperating parts so disposed that such a sheet and a printing device at printing station are located therebetween, means for operating said impression means to make a printing impression from a printing device at printing station onto a selected face of such a sheet, said part of said impression means which is located in opposed relation to said selected face of the sheet being so formed and disposed that in subsequent advancing movements of the sheet the portion of said selected face of said sheet upon which an impression is made is advanced to a visible position shortly after such impression is made.

10. In a printing machine having a machine frame and means thereon providing a printing position, sheet feeding and guiding means operable to feed a sheet of paper or the like past

said printing position in a step by step manner and in such a relation that after movement past said printing position a selected face of such a sheet is located in a visible reading position in a relatively accessible position close to one edge of said machine frame, means for advancing and guiding printing devices one by one in a step-by-step manner to said printing position for printing cooperation with said selected face of such a sheet to form printing impressions on said face, and impression means operable to produce such printing cooperation and disposed in an out-of-the-way relation with respect to said visible reading position whereby printed impressions on said selected face of such a sheet may be easily read when such impressions reach said reading position.

11. In a printing machine adapted to sequentially utilize printing devices bearing raised type characters, an anvil having an impression face, disposed substantially in a vertical plane, a guideway extending in a substantially horizontal direction and along which printing devices may be advanced to a position against said impression face of said anvil, means for advancing printing devices one by one and in a step-by-step manner along said guideway with the type characters thereof facing away from said impression face, means for intermittently feeding a sheet in a substantially vertical plane past said printing device guideway and said anvil, and a platen coacting with printing devices located at said anvil for making successive impressions upon said sheet from such printing devices, said anvil terminating closely adjacent said printing device guideway in the direction of advancing movement of said sheet whereby the data printed upon said sheet from said printing devices are exposed to the view of the operator shortly after the making of the impressions of such data.

12. In a printing machine through which a series of printing devices having raised type characters are adapted to be passed, an elongated and narrow printing device guideway including a plurality of printing stations and supporting said printing devices for movement into said printing positions with the printing faces of the type characters of each printing device exposed in a substantially vertical plane, means for supporting a sheet in opposed relation to the raised type characters thus located, and impression means operable to effect printing cooperation between the sheet and such raised type characters.

13. In a printing machine through which a series of printing devices having raised type characters are adapted to be passed, an elongated and narrow printing device guideway including a plurality of printing stations and supporting said printing devices for movement into said printing positions with the printing faces of the type characters of each printing device exposed in a substantially vertical plane, impression means for effecting printing from the printing devices at said printing stations, and sheet supporting and feeding means operable to feed a sheet upwardly past said printing stations in a succession of line spacing movements whereby the feeding movements of such a sheet move the printing impressions thereon successively into an exposed position above said guideway.

14. In a printing machine through which a series of printing devices having raised type characters are adapted to be passed, an anvil having an impression face disposed in a substantially vertical plane, means for supporting a printing device against said impression face of said anvil with the raised type characters exposed in a substantially vertical plane, means for supporting a sheet in opposed relation to the raised type characters of the printing device, and impression means operable to effect printing cooperation between said raised type characters and said sheet.

HERVEY B. PHILLIPS.
HAZEN F. SPRINGER.