Oct. 10, 1944. C. J. HUEBER 2,359,857

PRINTING MACHINE

Original Filed May 6, 1941 13 Sheets-Sheet 1

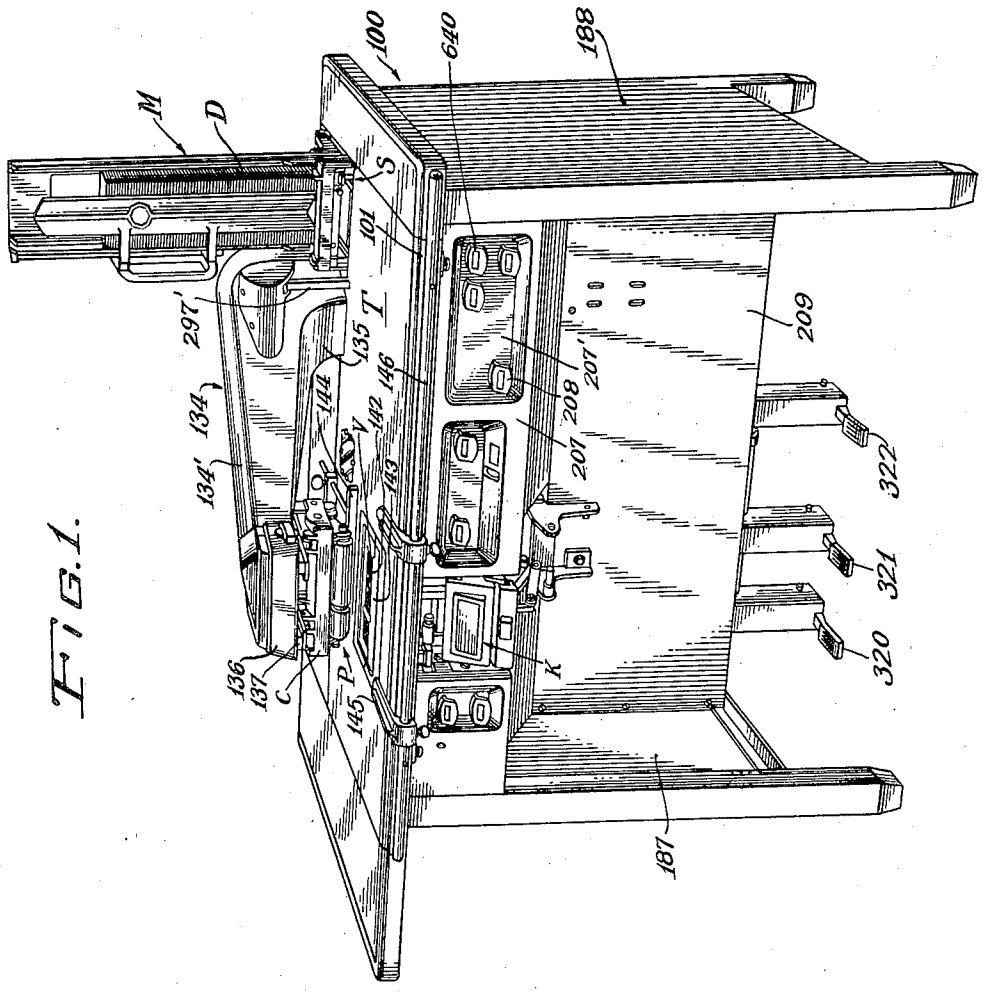


FIG. 1.

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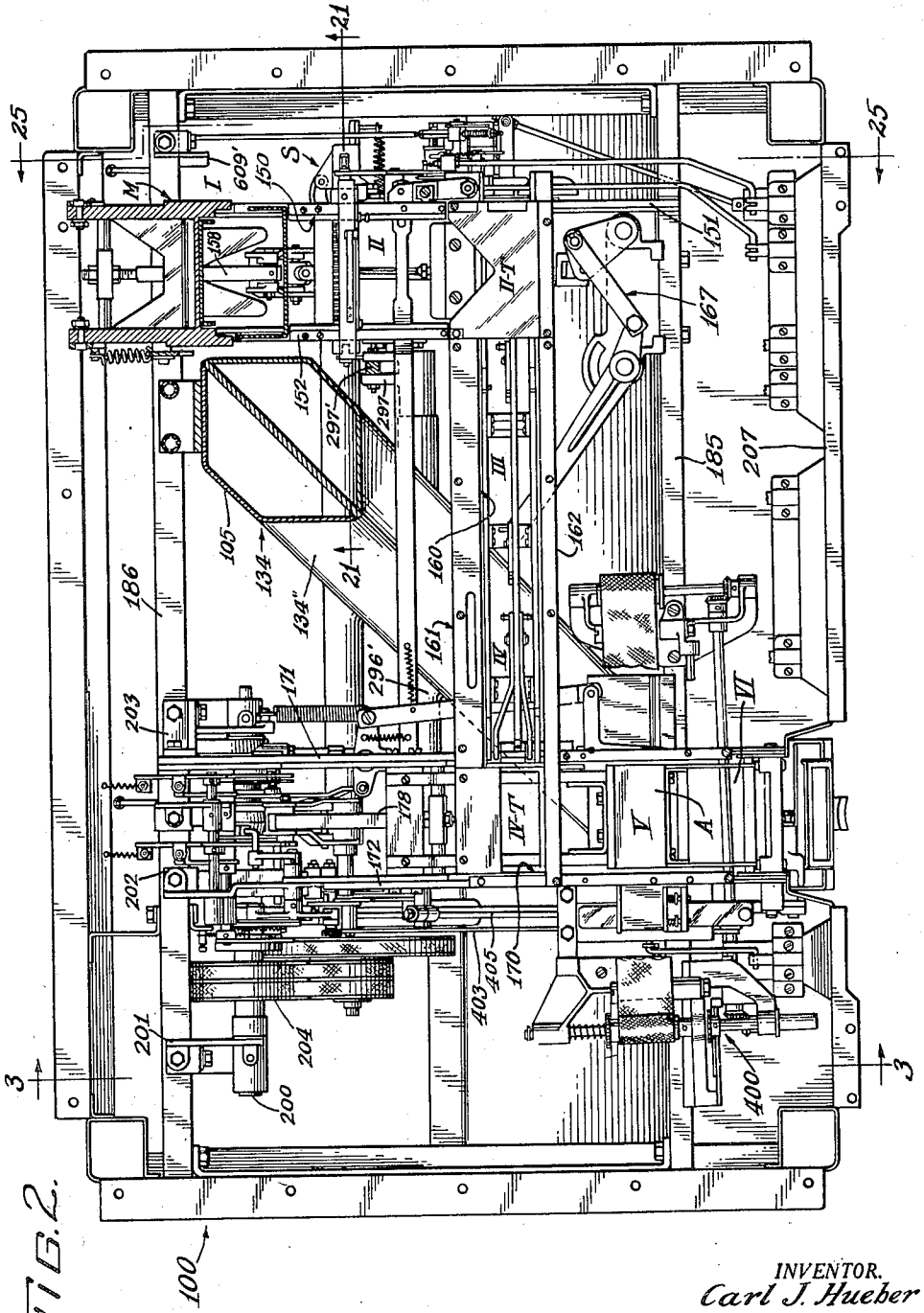


FIG. 2.

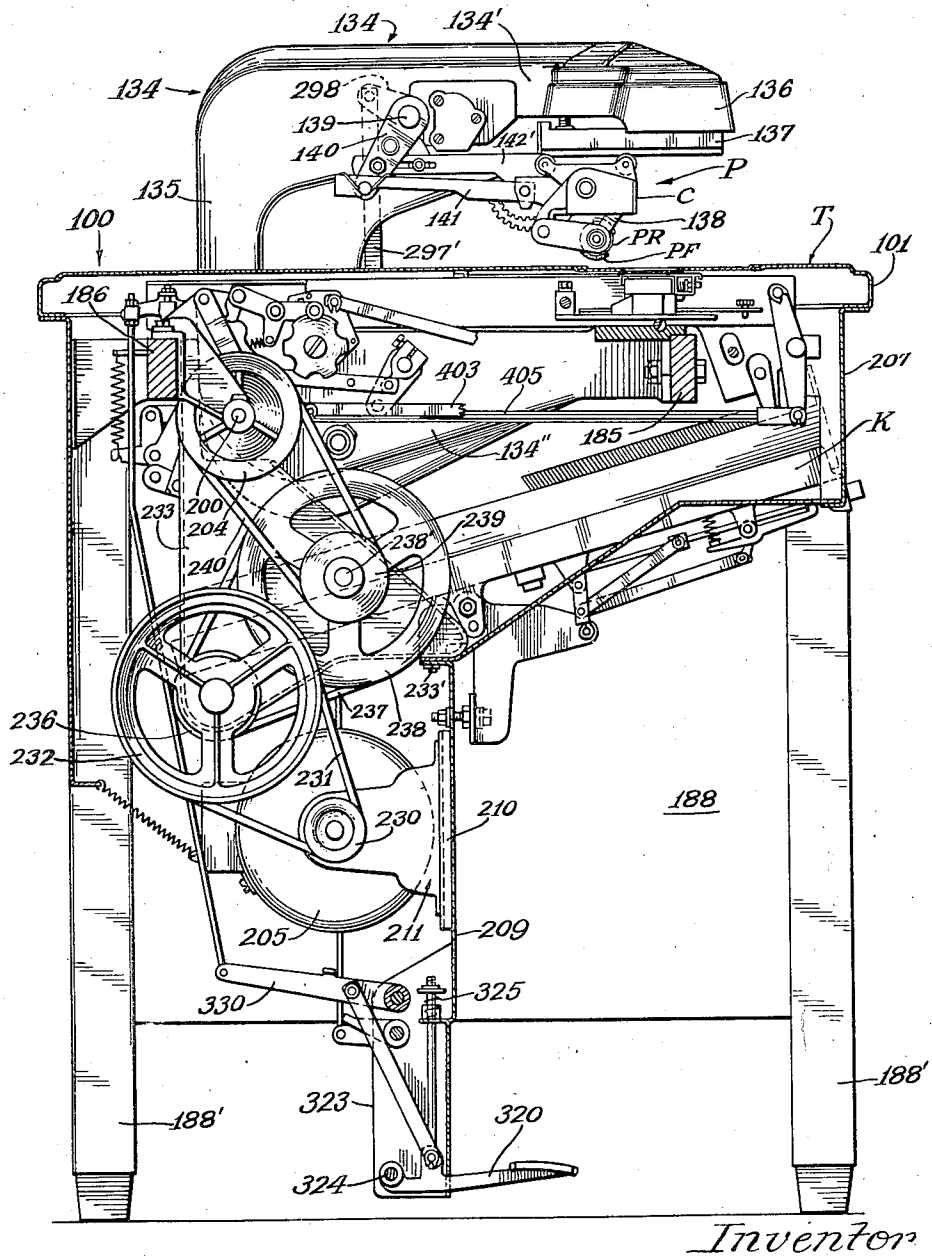
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Oct. 10, 1944. C. J. HUEBER 2,359,857

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FIG. 3.



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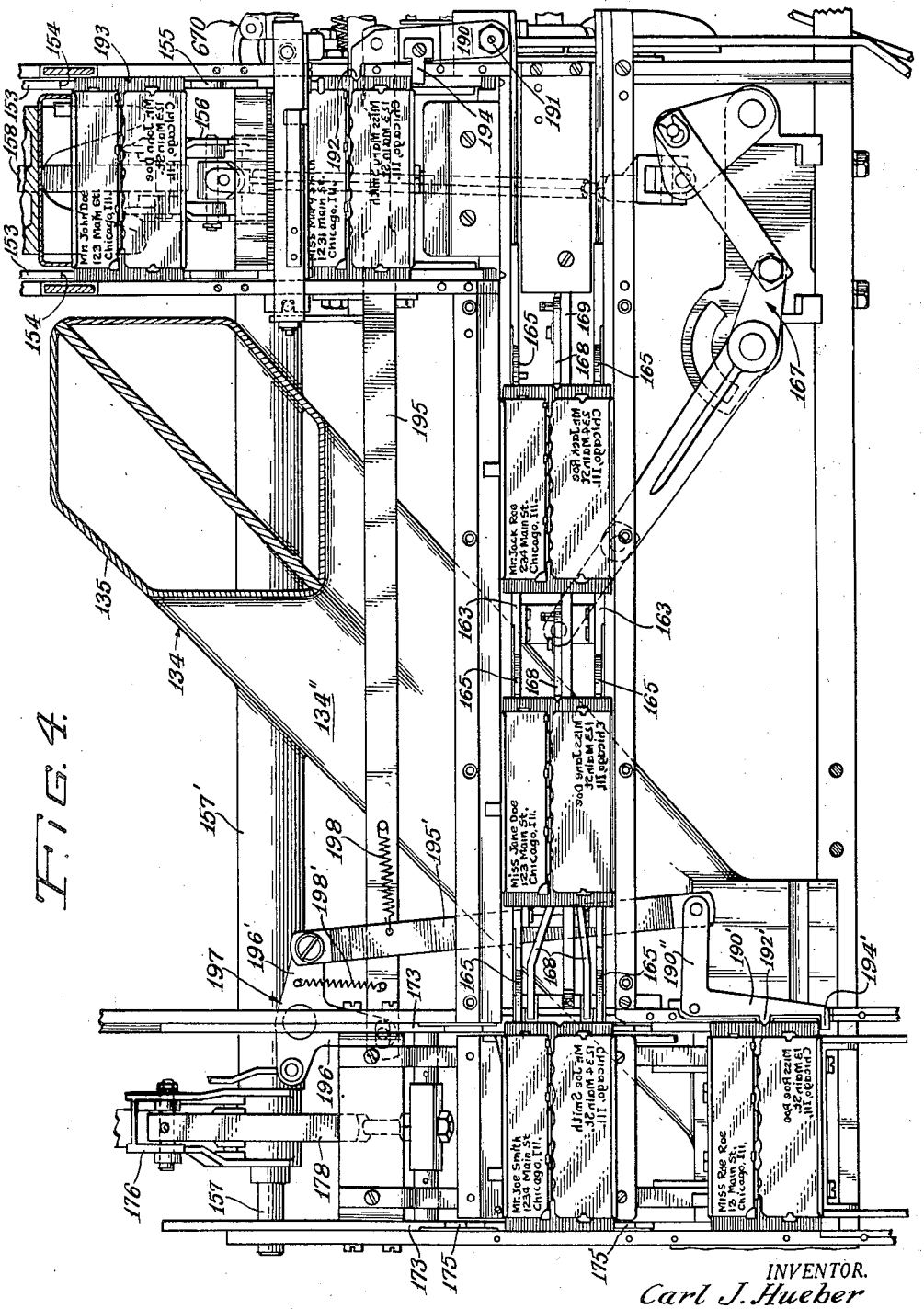


FIG. 4.

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FIG. 7.

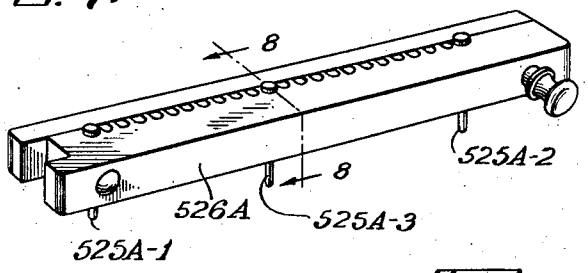


FIG. 8.

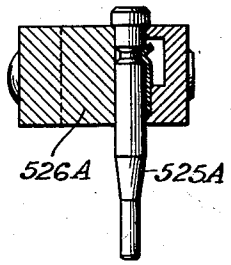


FIG. 5.

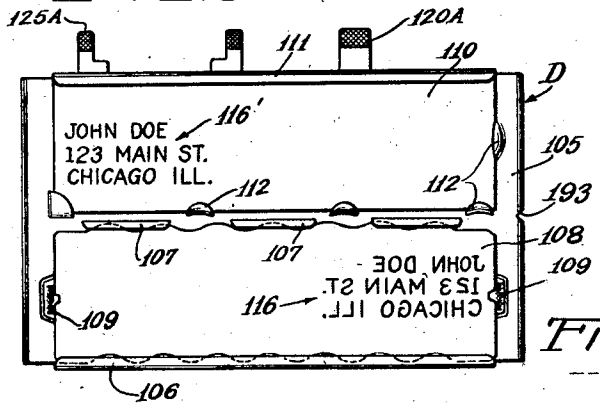


FIG. 9. FIG. 10. FIG. 11.

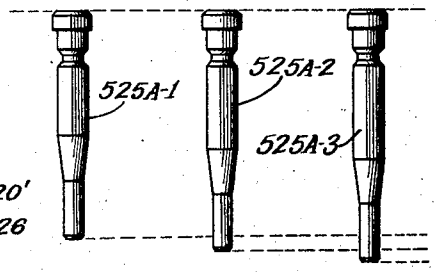
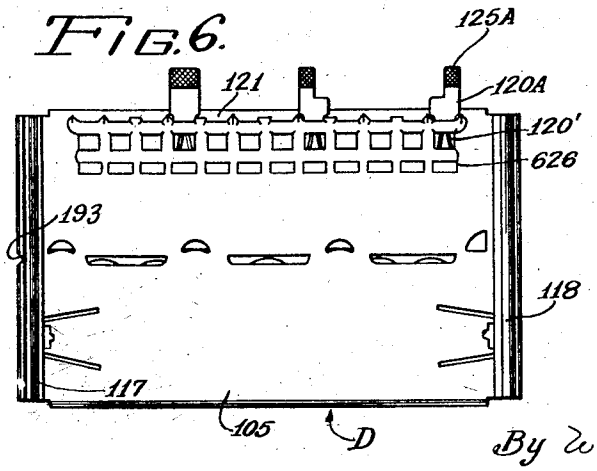


FIG. 6.



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FIG. 12.

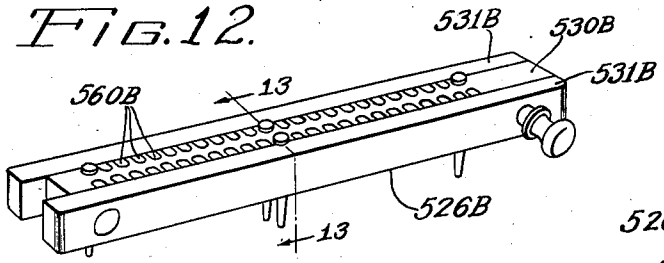


FIG. 13.

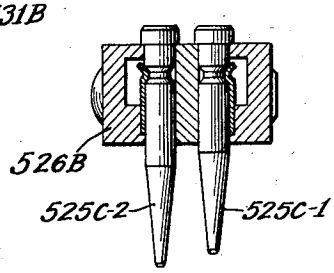


FIG. 14.

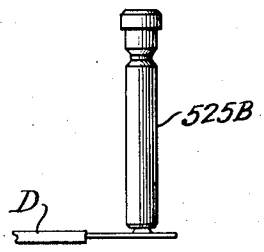


FIG. 15.

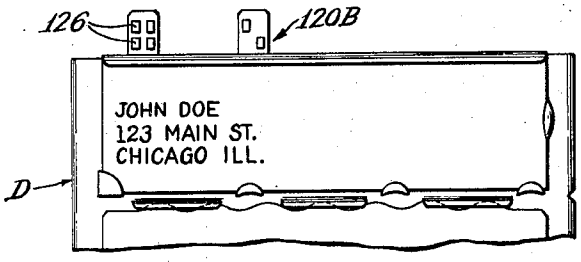


FIG. 16.

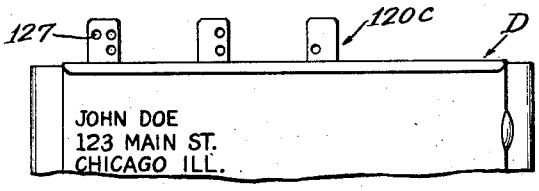


FIG. 17.

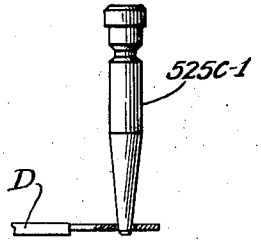


FIG. 18.

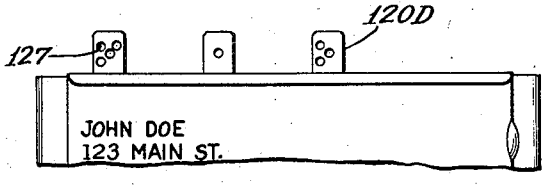


FIG. 19.

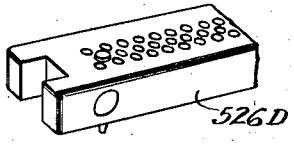
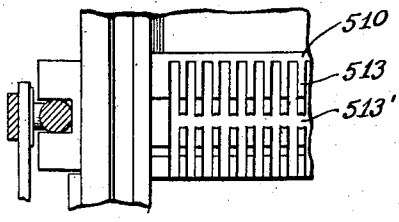


FIG. 20.



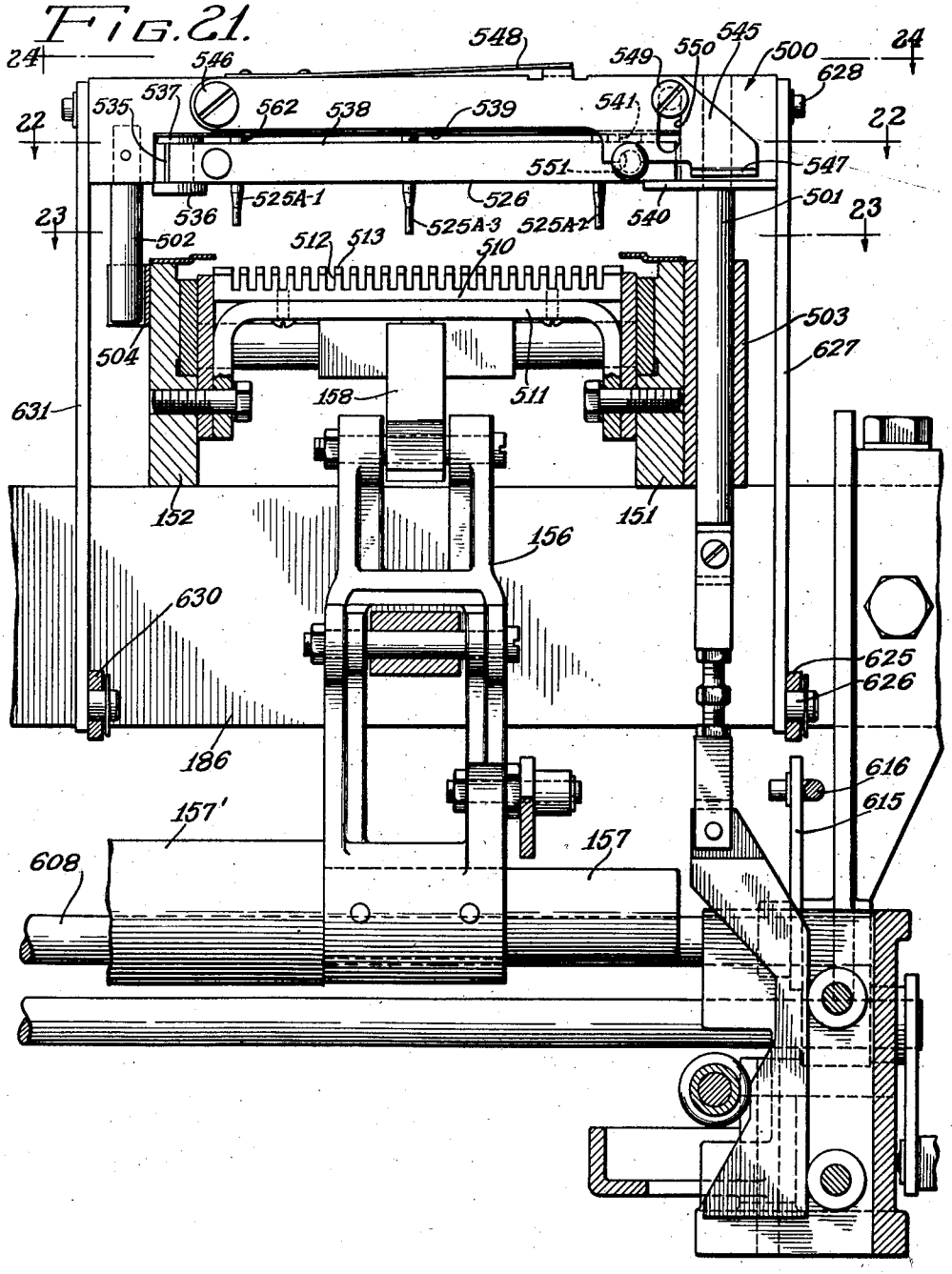
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Fig. 21.



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FIG. 22.

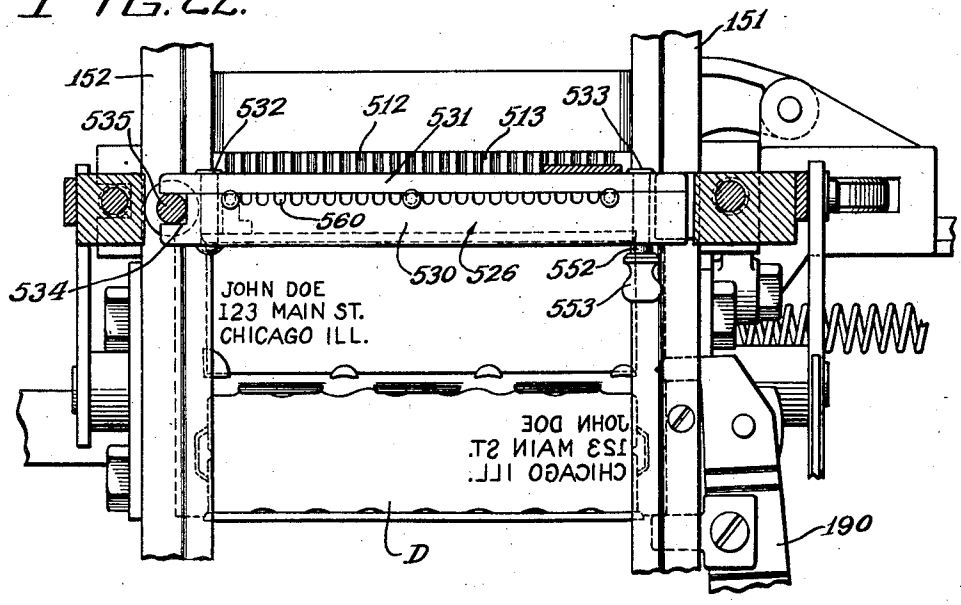
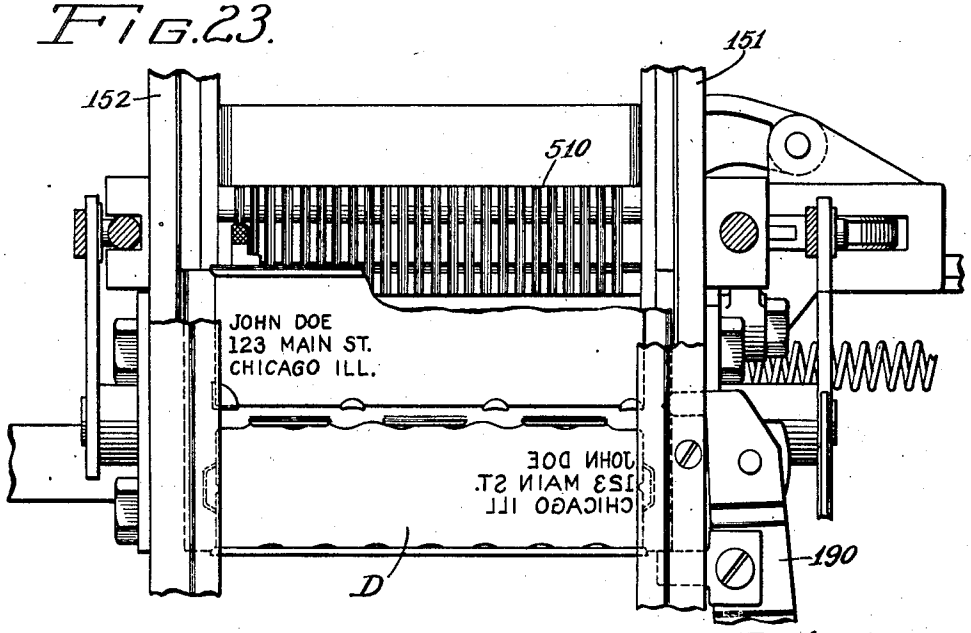


FIG. 23.



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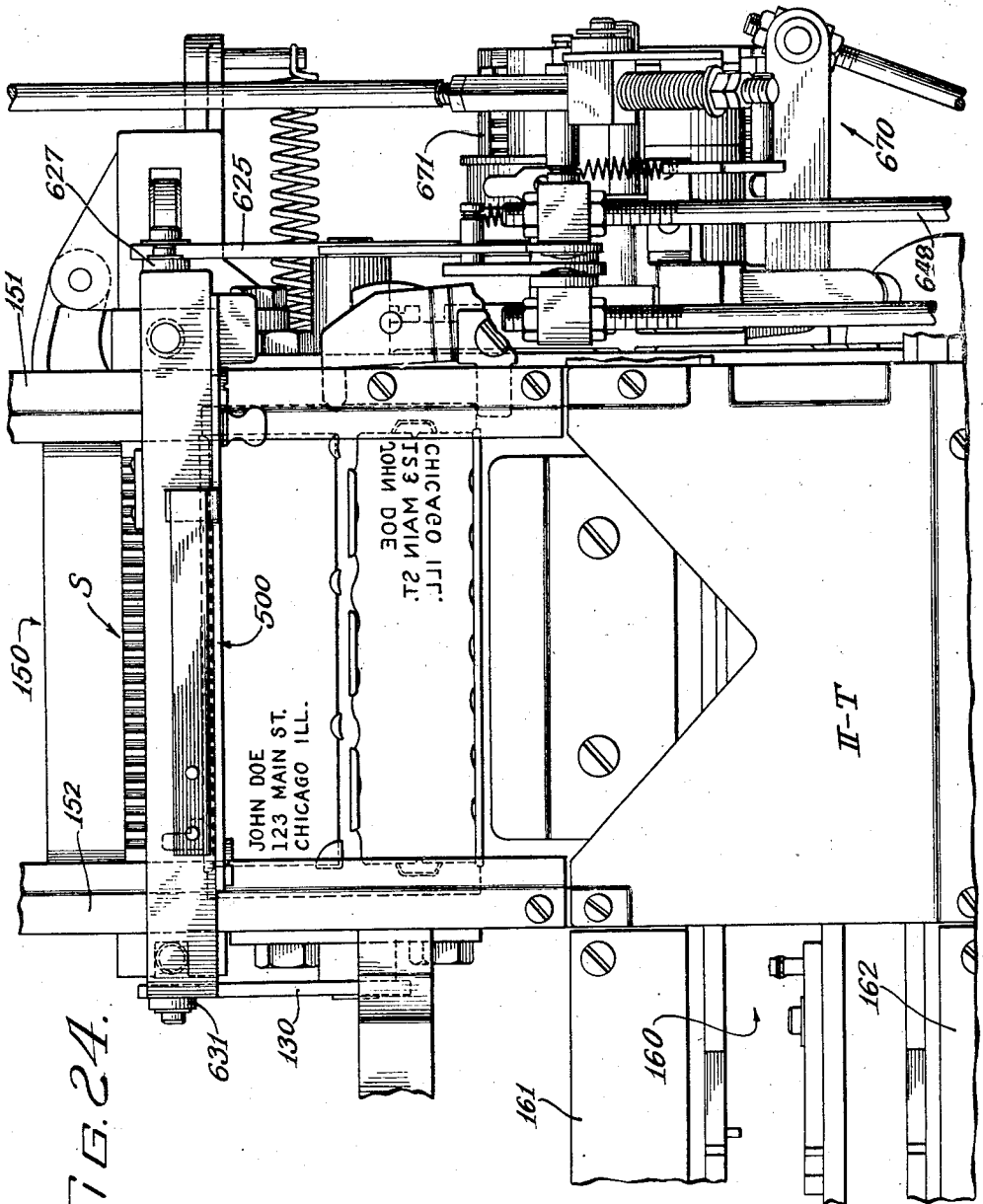


FIG. 24.

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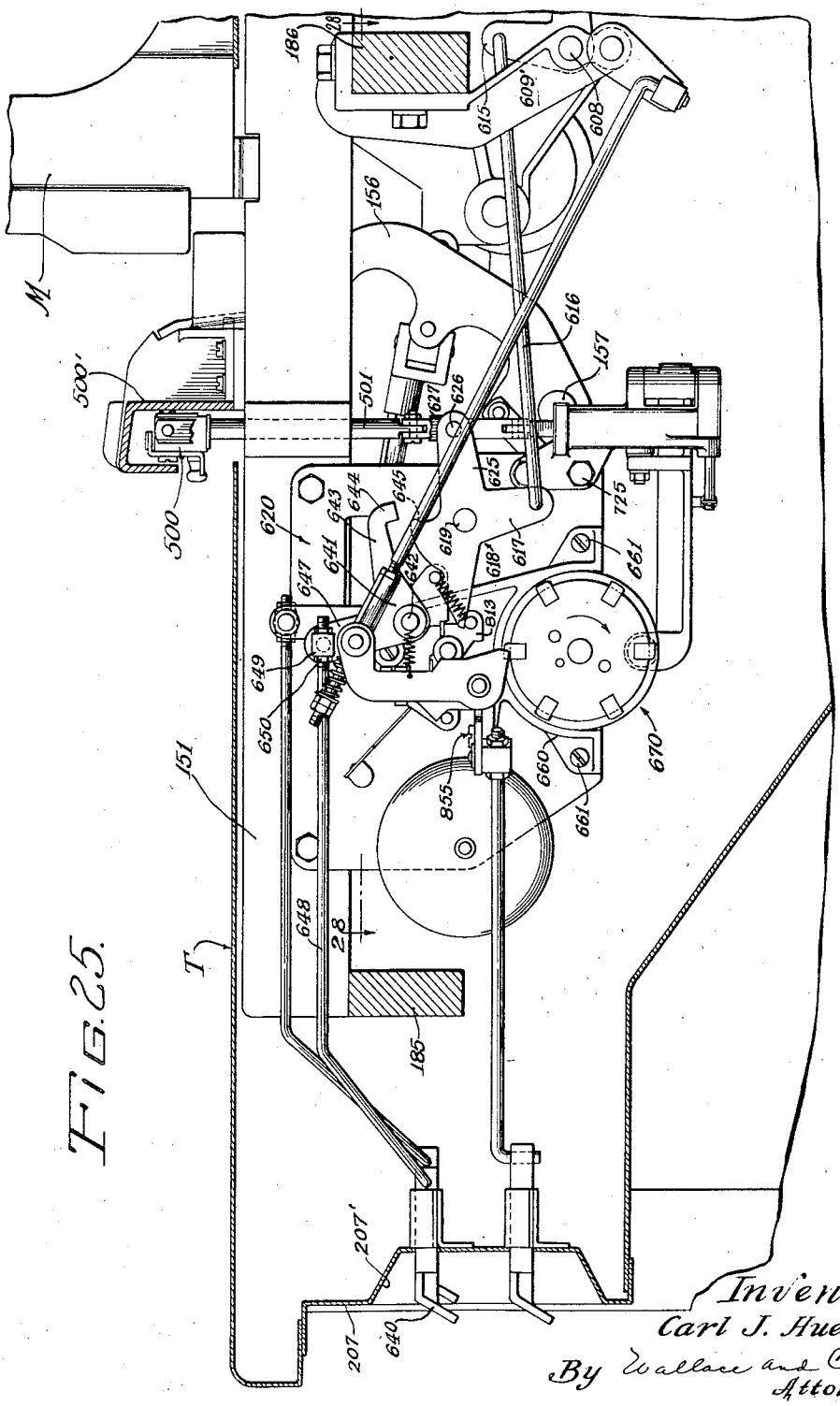


FIG. 25.

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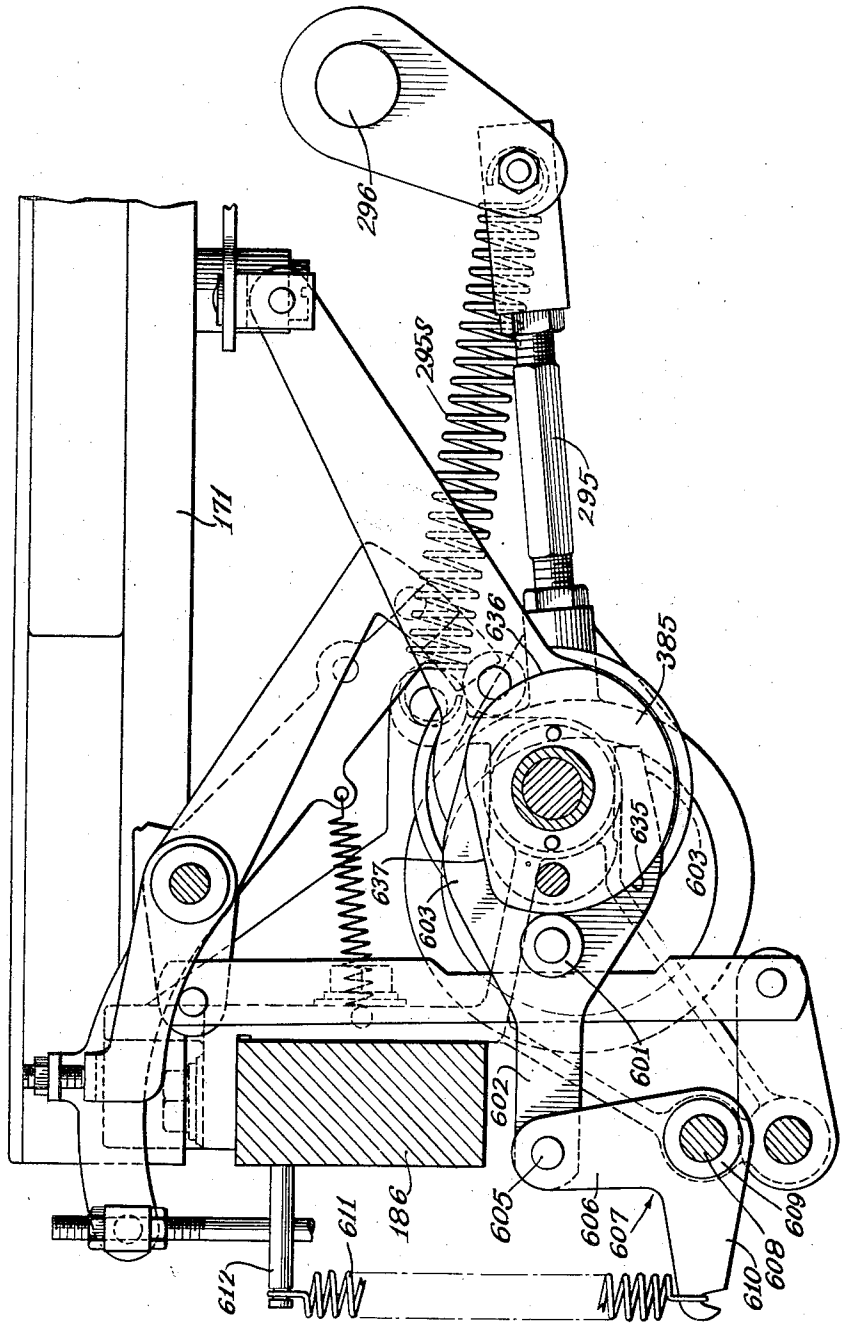


FIG. 26.

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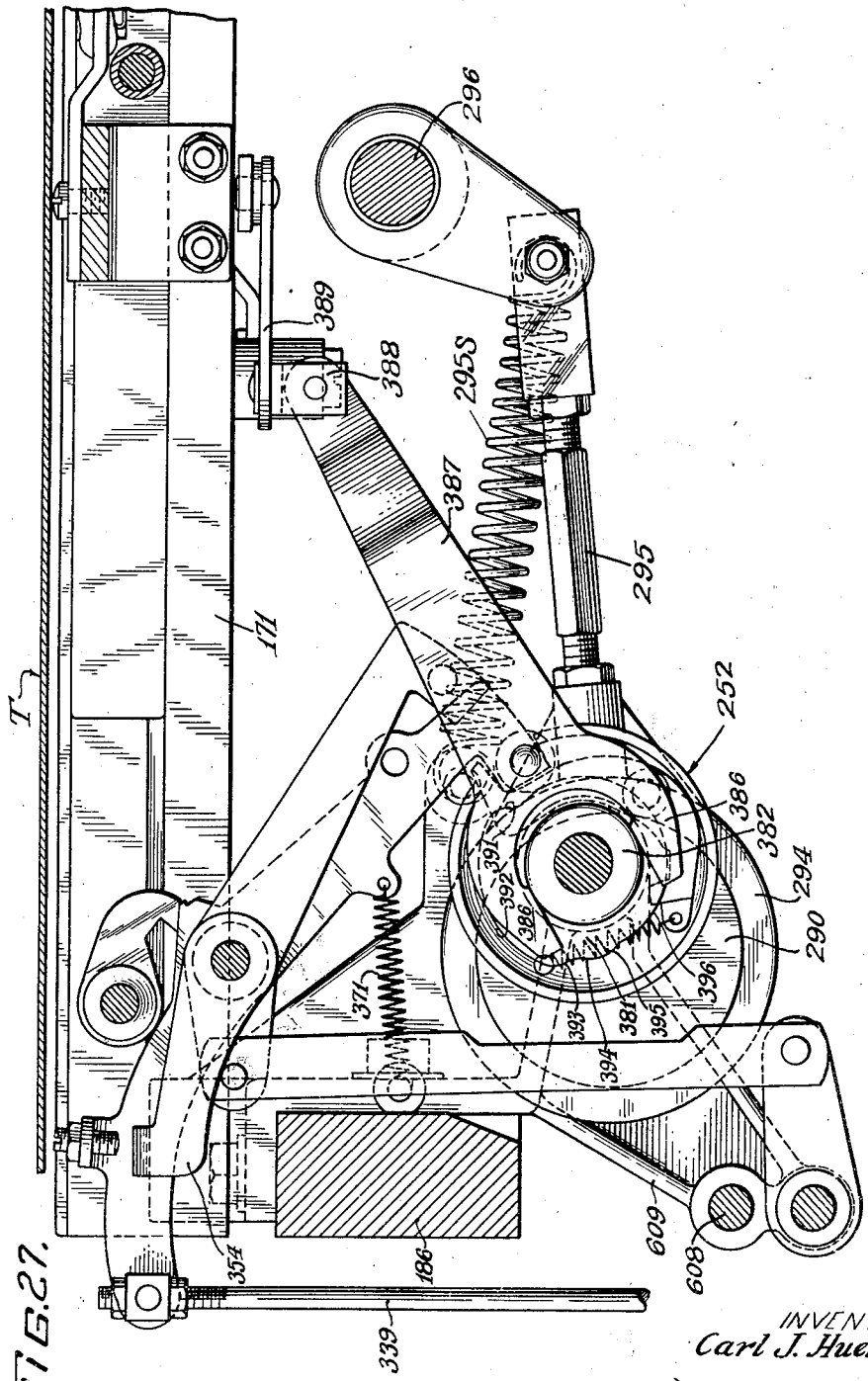


FIG.27.

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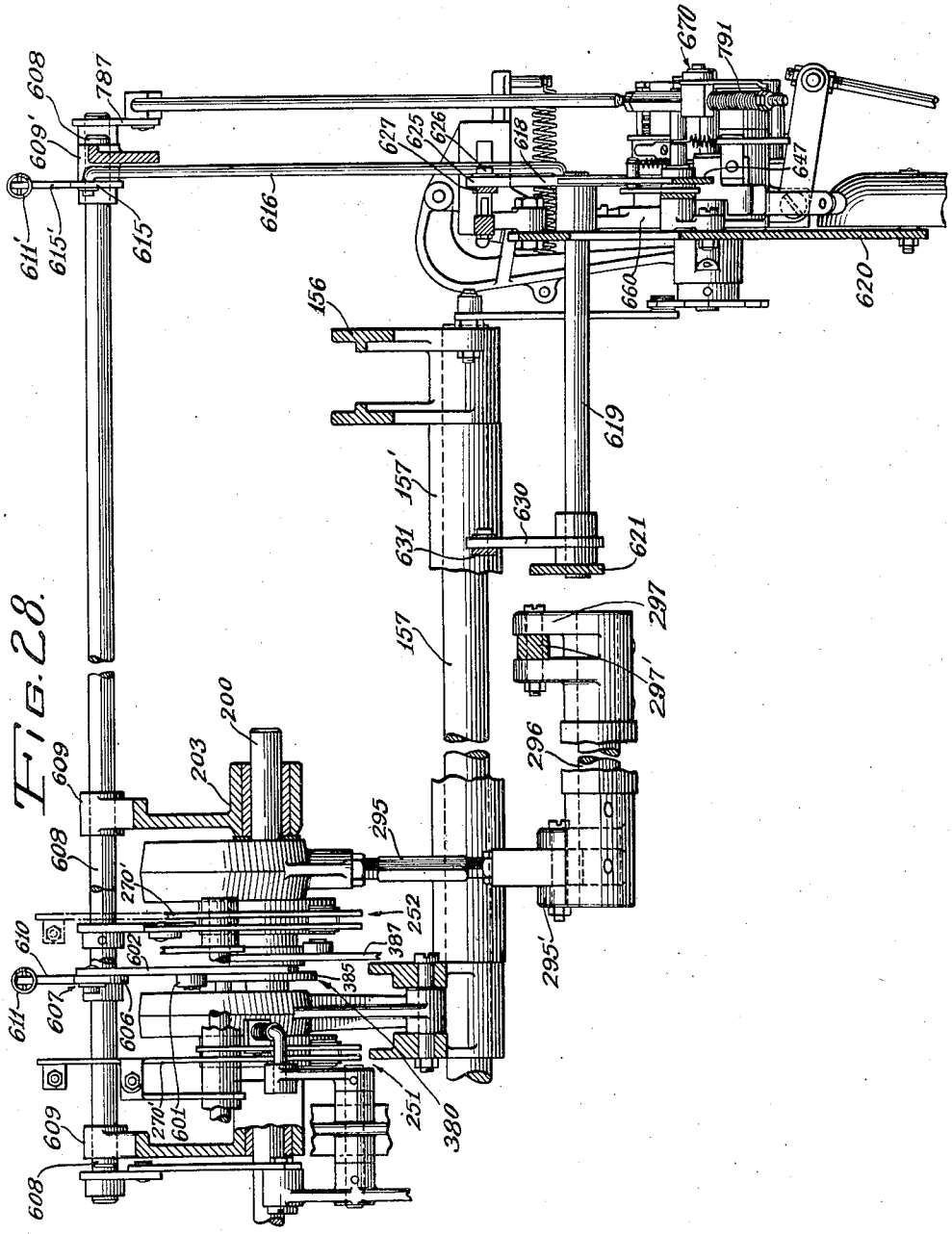


FIG. 28.

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Patented Oct. 10, 1944

2,359,857

UNITED STATES PATENT OFFICE

2,359,857

PRINTING MACHINE

Carl J. Hueber, Euclid, Ohio, assignor to Addressograph-Multigraph Corporation, Cleveland, Ohio, a corporation of Delaware

Original application May 6, 1941, Serial No. 392,151. Divided and this application June 5, 1944, Serial No. 538,751

3 Claims. (Cl. 101—58)

This application is a division of my copending application Serial No. 392,151, filed May 6, 1941.

This invention relates to printing machines of the kind through which printing devices are sequentially passed, and more particularly to selectively controlling operation of one or more mechanisms embodied in the machine under control of identifying means included on the printing devices.

In machines of the aforesaid character the printing devices are customarily advanced in a step by step manner from a magazine, into which the printing devices are introduced, to a printing position or other place in the machine whereat operations are performed directly therefrom or under control thereof, and thereafter the printing devices are collected in the same sequence as that in which they were arranged when introduced into the magazine.

While the present invention may be used with any of a wide variety of printing devices, the illustrated form of the invention is adapted for use with printing devices of the character disclosed, for example, in Gollwitzer Patent No. 2,132,412, patented October 11, 1938, printing devices of this character being arranged to have index tabs detachably connected thereto so as to project beyond one edge thereof at selected positions along such edge, this particular arrangement being shown and described in detail in Gollwitzer Patent No. 2,049,439, patented August 4, 1936. However, the invention may also be used with other printing devices, as for example, those of the character shown in Gollwitzer Patent No. 1,992,661, patented February 26, 1935, which is to say, printing devices of the one piece variety that have notches or other lacuna selectively located along one edge thereof to afford identifying means on the printing device. Furthermore the invention may also be used with printing devices of character comprising a frame enclosing a thin sheet of stencil paper or the like and in which frame perforations, notches or other lacuna may be selectively located to afford identifying means on such printing devices.

In those instances where the printing devices such as the foregoing, or other equivalent devices, are equipped with identifying means and the operation of various mechanisms embodied in the machine are to be controlled in accordance with the characteristics imparted to the respective printing devices by the identifying means included thereon, each such printing device is passed to a sensing station in the machine whereat detecting means cooperate with the identifying means on such printing device and such detecting means are caused to assume various positions in accordance with the characteristics of the identifying means with which the detecting means cooperate in a particular operation thereof. Other means are provided in the machine that are responsive to the various positions that may be assumed by the detecting means and such other means are customarily arranged to selectively control the operation of one or more mechanisms included in the machine.

The means in the machine responsive to the identifying means of the printing devices including the aforesaid detecting means is commonly known as a selector mechanism and such a mechanism may be employed to selectively govern or control many different operations or operative mechanisms of a printing machine in accordance with the identifying means carried by the individual printing devices which are passed through the machine.

For example, the selector mechanism may be employed to warn the operator by means of a suitable signal such as a light or a bell when a printing device having identifying means thereon at a particular position is being advanced to an operative position in the machine. Such a warning may be desirable for a variety of reasons, as for example when the operator desires to utilize a particular or different type of form or letter in connection with all printing devices bearing particular identifying means. In other instances the selector mechanism may be utilized to selectively control the operation of the printing means of the printing machine so as to print or skip each printing device in accordance with the sensed presence or absence of certain identifying means on the printing devices. In other instances it may be desirable to control other operative mechanisms of the machine, as for example, a numbering machine, or the selector mechanism may in some instances govern the final disposal of the printing devices after they have passed printing position in such a manner as to remove selected ones of the printing devices from the series thereof which has been passed through the machine. It is to be understood that the foregoing are merely typical examples of uses to which a selector mechanism may be put and that there are many other machine operations that may be controlled by a selector mechanism.

An important object is to enable the identification or classification areas required on printing devices used in printing machines of the aforesaid character to be materially reduced in size, thereby to enable the number of possible classifications to be increased with respect to printing devices of any given or selected size; and a further object is to confine the sensing means in such a printing machine to a relatively small area while at the same time enabling a large number of sensing positions to be employed.

A further object is to enable a high degree of accuracy to be obtained in the sensing of the identification means of printing devices used in

printing machines of the aforesaid character; and a further object related to the foregoing is to relate the sensing means and the control means of a selector mechanism in a novel and advantageous manner.

Other and further objects of the invention are to utilize a vertically reciprocable sensing in the selector mechanism of printing machines of the aforesaid character; to shield the moving parts of the sensing means while providing for convenient setting thereof; to insure accuracy of the sensing operations in such a machine through interrelated means for accurately positioning the printing devices during the sensing operation; and to actuate the sensing means in a simple and expeditious manner and to conveniently control the operative condition or adjustment of the sensing means.

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 a preferred embodiment and the principles thereof and what I now consider to be the best mode in which I have contemplated applying those principles. Other embodiments of the invention embodying the same or equivalent principles 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 perspective view illustrating a printing machine embodying the features of my invention;

Fig. 2 is a plan view taken partially in section and illustrating the machine with the table top removed so as to expose the internal mechanism;

Fig. 3 is a vertical sectional view taken substantially along the line **3—3** of Fig. 2;

Fig. 4 is an enlarged fragmental plan view, similar to Fig. 2, and illustrating further details of construction;

Fig. 5 is an elevational view showing the forward or operative face of one form of printing device adapted to be used in the machine disclosed herein;

Fig. 6 is an elevational view of the rear or reverse face of the printing device;

Fig. 7 is a perspective view of a pin carrier or selector bar of the 24-position type;

Fig. 8 is a vertical sectional view taken along the line **8—8** of Fig. 7;

Figs. 9, 10 and 11 are similar elevational views showing the different types of selector pins adapted for use with identifying means such as the tabs shown on the printing device in Figs. 5 and 6;

Fig. 12 is a perspective view of a 48-position pin carrier or selector bar adapted for use in the present machine;

Fig. 13 is a sectional view taken along the line **13—13** of Fig. 12;

Fig. 14 is an elevational view showing a selector pin of a different type in an operative relationship to an index tab of the embossed type;

Fig. 15 is a fragmental elevational view showing a printing device having embossed tabs in position thereon;

Fig. 16 is a fragmental elevational view of a printing device having perforated index tabs thereon;

Fig. 17 is an elevational view of a selector pin adapted for use with perforated tabs such as those shown in Fig. 16;

Fig. 18 is a view showing a printing device having index tabs of the perforated type mounted thereon, the index tabs shown in Fig. 18 having five classification or identifying areas rather than four classification areas as shown in Fig. 16;

Fig. 19 is a fragmental perspective view of a 60-position pin carrier or selector bar adapted for use in connection with perforated tabs such as those shown in Fig. 18;

Fig. 20 is a fragmental plan view showing a tab support adapted for use with the pin carrier;

Fig. 21 is a fragmental vertical sectional view taken along the line **21—21** of Fig. 2 and showing a portion of the sensing means and the related mechanism;

Fig. 22 is a fragmental plan section taken along the line **22—22** of Fig. 21;

Fig. 23 is a fragmental plan section taken along the line **23—23** of Fig. 21;

Fig. 24 is a fragmental plan view taken as viewed from the line **24—24** of Fig. 21;

Fig. 25 is a fragmental vertical sectional view taken substantially along the line **25—25** of Fig. 2 and showing portions of the sensing means, the storage means and the associated control means;

Fig. 26 is a fragmental vertical elevational view taken substantially along the line **26—26** in Fig. 2;

Fig. 27 is a fragmental vertical sectional view taken substantially along the line **27—27** of Fig. 2; and

Fig. 28 is a fragmental plan view taken substantially along the line **28—28** of Fig. 25 and illustrating in a diagrammatic manner the connection of the various parts of the selector mechanism.

The machine generally

For purposes of disclosure the invention is herein illustrated as embodied in a printing machine having a desk-like frame **100** providing a table top T upon which envelopes, letters, forms, or the like may be positioned for the performance of a printing operation thereon. The machine frame **100** is so constructed and arranged that an operator may be seated in front of the frame **100** and adjacent to a forward edge **101** of the table top T, and while seated in this working position the operator may place the sheet or form over a printing position V which is provided in the table top T adjacent to the forward edge **101** thereof.

The present machine is of the character through which a plurality of printing devices D are advanced along a printing device guideway in series and in a step by step manner by suitable feeding means from a supply magazine M to the printing position V, and thence to a collector means K wherein the printing devices D are refiled in their original sequence. When a printing device D comes to rest at printing position V, a suitable printing means such as a platen mechanism P is operable through a printing stroke to form the desired printing impression on the sheet.

The printing devices D employed in a printing machine of this character are so constructed and arranged that index or identifying means representing one or more classifications to which a printing device may pertain may be incorporated in or carried by each printing device, and var-

iantly settable selector means are incorporated in the present machine for controlling various operative mechanisms of the machine in accordance with the characteristics imparted to the printing devices by identifying means thereon. The selector means embodies a variantly settable sensing means S which senses the identifying means of each printing device D as it comes to rest at a sensing station II, and in accordance with the sensed indication pertaining to each printing device, the operation of various operative mechanisms may be controlled. Such controlling action may be exerted in various ways, as for example afford a warning signal, or in the control of the platen mechanism P to either print or skip the particular printing device when it reaches printing position.

The printing devices

While the selector means of the present invention is, in most of its aspects, independent of the particular form or type of printing device and independent of the particular type of identifying means employed to represent the identity or classification of such printing devices, it will be understood that the specific form and relationship of the elements and mechanisms of the printing machine are influenced by the character of the printing means and identifying means to be employed therewith. Thus the printing machine disclosed herein is constructed and arranged particularly for the use of printing devices D such as those shown in Figs. 5 and 6 of the drawings, and for the selection of such printing devices D for print or skip operation of the machine in accordance with identifying means in the form of projecting index tabs **120** adapted to be carried in selected positions along the upper edge of each printing device.

One form of such a printing device D is illustrated and claimed in the patent to Gollwitzer, No. 2,132,412, patented October 11, 1938, and is shown in Figs. 15 and 16 hereof. The printing device D comprises a rectangular sheet metal frame **105** having a curled lower edge **106** and lugs **107** forming a guideway on the operative face thereof into which an embossable printing plate **108** may be inserted by an endwise movement. Spring latches **109** formed from the metal of the frame **105** engage the ends of the printing plate **108** to retain the same releasably in position on the frame. Along the upper portion of the operative face of the printing frame an index card **110** may be positioned as by a curled upper edge **111** and a plurality of lugs **112** formed on the frame; and an index impression **116'** may be made on the card **110** from the type characters **116** embossed on the printing plate **108**. Such embossure of the type characters on the printing plate **108** may be accomplished by means of an embossing machine such as that shown in Duncan Patent No. 1,518,904, patented December 9, 1924. At its opposite ends the frame **105** is reversely bent to provide spacing flanges **117** which project rearwardly from the frame so as to space the printing devices one from the other and thereby prevent damage to the type characters **116** of the printing plate during storage, handling or feeding of the printing devices. When the printing devices are stacked one against or on top of the other, the spacing flanges **117** of a particular frame **105** engage flat areas **119** formed on the upper or operative face of the adjacent frame **105** beyond the ends of the printing plate **108**.

The printing devices D as herein shown are adapted for identification through the use of identifying means such as index tabs **120** which may be selectively disposed in a projecting relation along the upper edge of the printing frame **105** in any selected one or more of a plurality of spaced positions defined by mounting sockets **121** formed on the frame **105**. The mounting sockets **121** are preferably formed by stamping from the metal of the frame **105** so that bases or stems **120'** of the tabs **120** may be inserted along the reverse face of the frame so that the heads of the tabs project from or beyond the upper edge thereof. In the present instance the printing device D has twelve tab receiving sockets **121** disposed in uniformly spaced relation, thereby to afford twelve primary index or identification positions and enable any one or more of twelve primary classifications of a printing device to be indicated by selective mounting of one or more index tabs **120** in the appropriate socket or sockets **121**.

As will hereinafter be described in detail, the heads of the tabs **120** in a sense may be subdivided into a plurality of subordinate control identifying areas, each of which may represent either a primary or a subordinate classification of a particular printing device, and thereby the number of available primary classifications may be rendered substantially greater than the number of tab-mounting positions provided by the sockets **121**.

Thus the tabs **120** may be of the character shown in Figs. 5 and 6, which are known in the art as notched tabs, and in this instance one-half of the width of the head of certain tabs **120** may be cut away or notched as in tab **120A** in Fig. 5, thereby to provide what may be termed a half-width projection or tab portion **125A**. With such half-width tab portions **125A**, the number of possible available identifying or classification areas provided by the twelve sockets **121** is doubled, or in other words, twenty-four primary classifications are rendered available.

In certain other instances a larger number of possible identifying areas or primary classifications may be provided by means of tabs, and one such method of providing a larger number of classifications is by means of tabs **120B** shown in Figs. 14 and 15 of the drawings. The tabs **120B** are known in the art as embossed tabs and the projecting area of each tab is divided into four areas in any one or more of which an embossure **126** may be formed. Thus the fact that a particular printing device D relates to a particular classification may be indicated by either the presence or the absence of an embossure **126** on the related area of a particular tab **120B**. With this construction the twelve sockets **121** along the upper edge of each printing device D provide for the mounting of twelve tabs **120B**, thereby to enable forty-eight primary classifications to be indicated by selective positioning of the suitably formed tabs in such sockets.

A forty-eight unit classification may also be attained by the use of tabs **120C** shown in Figs. 16 and 17 of the drawings. The tabs **120C** are known in the art as perforated tabs and the projecting area of the tab may be in effect divided into four classification areas. With this arrangement the fact that a printing device pertains to a particular classification may be indicated by the presence or absence of a perforation **127** in a particular area of a properly positioned tab **120C**.

Through the use of selector mechanism such

as that which will hereinafter be described, the number of possible classifications obtainable with tabs of a particular size may be materially increased, and in Fig. 18 of the drawings there is illustrated a series of tabs 120D of the perforated type wherein the area assigned to each identifying means or classification is materially smaller than with the tabs 120C. Thus the tabs 120D are each divided in effect into five identifying areas, thereby enabling sixty primary classifications to be obtained through the use of but twelve mounting sockets 121.

The printing means

While the printing or impression means, which is operative in each printing cycle, may take many different forms, and is influenced as to form and construction by character and form of the printing devices D, I have herein shown a printing means in the form of a platen mechanism P which constitutes one form of impression means adapted for cooperation with embossed type such as the type characters 116. The platen mechanism P chosen for disclosure herein is of the geared roller type, and is fully described in my copending application, Ser. No. 361,530, filed October 17, 1940, and reference may be had to said copending application for details of structure and operation thereof. The platen mechanism P, as herein shown, is supported over a printing position V by means of a printing frame 134 having an upstanding connecting portion 135 which projects upwardly from table top T. The upwardly projecting portion 135 of the printing frame has an arm 134' formed integrally thereon so as to project toward the printing position V in upwardly spaced relation with respect to the table top T, and at its forward end the arm 134' has a supporting head 136 beneath which the platen mechanism P is mounted. The form and construction of the printing frame 134 is fully disclosed in my copending application, Ser. No. 350,678, filed August 3, 1940, now issued as Patent No. 2,275,439, patented March 10, 1942. In the present instance the platen mechanism P embodies a carriage C which is mounted for reciprocation in a direction from front to rear of the machine upon a track which is formed on a vertically adjustable mounting plate 137.

Beneath the carriage C a platen roller PR is supported for vertical movement through the medium of a toggle mechanism 138 so that the platen roller PR may be moved from its elevated inactive position of Fig. 3 to a lower or active position. When the platen roller PR is in its lower or active position, it may be moved with a rolling action across the upper face of a sheet or form so as to press the sheet into printing cooperation with a printing device D located at printing position, as described in my aforesaid copending application Ser. No. 361,530.

In a printing cycle, the platen mechanism P is actuated so that the carriage C moves forwardly through a conditioning stroke in the course of which the toggle mechanism 138 is actuated so as to move the platen roller PR to its lower or active position. Such actuation of the carriage C is accomplished by means which includes a rock shaft 139 mounted in the upper arm 134' parallel to the forward edge 101 of the frame. The rock shaft 139 has an arm 140 fixed thereto, rearwardly of the carriage C and this arm is connected by means of links 141 so as to actuate the carriage C. The required actuation of the toggles 138 is effected in timed relation to the reciprocation of the carriage C by means including a link 142'. After the carriage C has reached the forward limit of its movement, it is started through its return or operative stroke, and during this operative stroke the toggle mechanism 138 is maintained in its extended position, thereby to maintain the platen roller PR in its lower or active position. As the platen roller is moved rearwardly, a resilient platen face PF formed thereon is rolled across the top of the sheet so as to press the sheet into printing cooperation with an inking ribbon IR which overlies the printing device D then located at the printing position.

Such printing cooperation of the sheet with the inking ribbon with the printing device D is permitted by reason of a printing opening 142 which is provided in a sectional shield 143 mounted in the table top T. In the performance of such printing operations the sheet is preferably positioned through the medium of a rear guide or sheet stop 144 and one or more side guides 145, the side guides being adjustably mounted on a forward rail 146 which is disposed along the forward edge 101 of the table top T.

As described in my copending application Ser. No. 388,998, filed April 17, 1941, the machine which is herein illustrated is so constructed and arranged that an unusually deep throat is provided beneath the printing frame 134, and the construction is such that the throat possesses substantial depth not only in a direction from front to rear of the machine but also in a direction laterally of the machine or in other words parallel to the forward edge 101. Thus it will be observed that the printing frame 134 is so disposed that while the supporting head 136 thereof is located over the printing position V, the upwardly extending portion 135 of the printing frame is located a substantial distance rearwardly and to the right of the printing position, as will be evident in Figs. 1 and 2 of the drawings. Hence it will be clear that a relatively wide sheet may, when the sheet stop 144 is removed, be shifted rearwardly past the left-hand side of the portion 135 of the printing frame. Similarly an even wider sheet may be extended in a rearward direction for a considerable distance from printing position V until such sheet engages the forward face of the portion 135 of the printing frame. With this construction the capacity of the machine is substantially increased and the usefulness of the machine is materially extended. With the connecting portion of the printing frame 134 thus located a substantial distance rearwardly and laterally of the printing position V, the arm 134' extends in an angular direction along or across the table top T. When the elements of the machine are disposed as hereinabove described, the magazine M may be located adjacent to the connecting portion 135 of the printing frame, and when so located the magazine M is positioned adjacent to the right-hand end of the table top T to thereby facilitate the loading of the magazine.

The printing device advancing and guiding means

When the machine is to be operated, the magazine M is loaded with a stack of printing devices D in the manner described in my aforesaid copending application Ser. No. 388,998, so that the printing devices D are supported in a stacked relationship in the magazine M with their operative printing faces facing upwardly and with their upper or tab-receiving edges facing rearwardly.

The printing devices D are then withdrawn or advanced one by one from the bottom of the magazine M, and are advanced in a step by step manner along a printing device guideway to the printing position V whereat each printing device D, in turn, comes to rest over an anvil A in position to have a printing impression made therefrom.

In the present printing machine printing devices D are withdrawn from the magazine M along a guideway concealed beneath the table top T, and in attaining the desired throat capacity as well as other desirable features of operational and structural convenience and simplicity in the machine, as fully set forth in my aforesaid copending application Ser. No. 388,998, this guideway is preferably constructed and arranged in the manner illustrated in said copending application.

In such an arrangement of the printing device advancing and guiding means, the printing devices D are, in one cycle of the machine, advanced forwardly from a station I, Fig. 2, in the magazine M along an initial printing device path or guideway 150 to a sensing station II whereat the printing device comes to rest so that means S may sense any tabs which may be carried by the printing device; and in the next advancing cycle, the printing device is advanced forwardly along the initial path or guideway 150 and comes to rest at a transfer station II—T. The advancing movement of a printing device from the sensing station II to the transfer station II—T takes place, in the present embodiment, in the first half of the machine cycle, and in the second half of the cycle, the printing device is advanced to the left in Fig. 2 along an intermediate guideway 160 to an intermediate station III. The intermediate guideway 160 extends parallel to the forward edge 101 of the table top 100 to a point located rearwardly of the printing station V, at which point it intersects with a final guideway 170 which extends forwardly through and past printing position.

In the next cycle of machine operation the printing device D at station III is advanced to the left to an intermediate station IV located in the intermediate guideway 160, while the next cycle of advancing operation further advances this printing device to the left along the intermediate guideway 160 to a transfer station IV—T formed at the juncture of the intermediate guideway 160 and the final guideway 170. The present machine is such that in the next cycle of operation of the advancing means the printing device D at the transfer station IV—T is advanced forwardly into printing position at the printing station V, and if a printing operation is to be performed from this printing device, the platen mechanism P operates through its forward or conditioning stroke while the particular printing device is being advanced to printing position. After the printing device D has come to rest on the anvil A, the platen mechanism P operates through its return or operative stroke so as to produce a printing impression from the printing device during the last half of the machine cycle.

In the next advancing cycle, the printing device at printing station V is advanced forwardly and is allowed to drop downwardly along a curved guideway 180 and into the forward end of the collector means K. This collector means includes a drawer holder or carrier 181 which supports a filing drawer as shown in Fig. 3 so that suitable packer means may pack the printing devices in the drawer in their original filing order or sequence, as described in my aforesaid copending application Ser. No. 388,998.

The associated printing device guideways 150, 160 and 170 are preferably provided by a girder system which is supported immediately beneath the table top T upon spaced front and rear mounting or support bars 185 and 186, as shown in Fig. 2, the mounting bars 185 and 186 being disposed parallel to the forward edge 101 of the frame 100 and being supported at their opposite ends on end panels 187 and 188 of the frame. The girder system as herein shown has a pair of spaced parallel girders 151 and 152 which form the initial guideway, a pair of spaced girders 161 and 162 which form the intermediate guideway 160, and a pair of spaced girders 171 and 172 which form the final guideway 170; and suitable guide surfaces and upper retaining flanges or strips are provided along the upper edges of the various girders to guide the printing devices D in their advancing movements.

The advancing means for imparting the desired advancing movement to the printing devices D preferably comprises a plurality of sets of carrier bars 153, 163 and 173 associated with and reciprocable along the guideways 150, 160 and 170 respectively, and having engaging means thereon for engaging and advancing the printing devices along the guideways. On the carrier bars 153 a pair of forwardly facing shoulders 154 serve to engage and advance the printing devices from the magazine to sensing station II; while a pair of spring biased pawls 155 serve to engage and advance printing devices from station II to the transfer station II—T. On the carrier bars 163, three pairs of spring biased pawls 165 are provided at properly spaced points so that in an advancing or left-hand movement of the carrier bars 163, the pairs of pawls 165 each engage one of the printing devices D in the guideway 160 and advance each printing device to the next station. On the carrier bars 173 two pairs of spring biased pawls 175 are provided which operate similarly to impart advancing movements to the printing devices in the final guideway 170.

The carrier bars 153 of the initial guideway 150 and the carrier bars 173 of the final guideway are actuated in unison by means of similar actuating arms 156 and 176 which are fixed on opposite ends of a rock shaft 157. The shaft 157 is mounted on a bearing sleeve 157' fixed in the lower arm 134'' of the printing frame 134 so that the arm 156 is supported beneath the guideway 150 while the arm 176 is located beneath the guideway 170, and the arms 156 and 176 are operatively connected to the carrier bars 153 and 173 respectively by means such as connecting links 158 and 178. Thus when the shaft 157 is rocked, the carrier bars 153 and 173 are first moved forwardly through their advancing strokes, and are then returned rearwardly through their idle strokes, in unison. The carrier bars 163 of the intermediate guideway 160 are actuated in timed relation to the carrier bars 153 by means of a link and lever connection 167 which is provided between the arm 156 and the carrier bars 163, as described in detail in my aforesaid copending application Ser. No. 388,998. The link and lever connection 167 is such that the carrier bars 163 move through

their idle strokes to the right from the position of Fig. 4 during the active or forwardly advancing strokes of the carrier bars **153** and **173**, and are moved to the left or through their active strokes while the carrier bars **153** and **173** are moving through their rearward or idle strokes.

Means is provided in association with the several guideways to prevent retrograde movement of the printing devices therein, this means in the intermediate guideway comprising a plurality of detent pawls **168** mounted on a stationary bar **169** along the central portion of the guideway **160**.

At the sensing station II and at the printing station V, such undesired retrograde movement is prevented by means which also serves to accurately position the printing devices for the performance of the sensing and printing operations respectively. Thus at the sensing station II a positioning pawl **190** is pivoted at its forward end **191** on the girder **161** and has a pointed positioning tooth **192** adapted to engage a positioning notch **193** formed in the adjacent end of the frame of the printing device. Forwardly of the tooth **192** the pawl **190** has a stop finger **194** which may also project into the guideway **150** to prevent overfeeding or overthrow of the printing device past sensing station. At printing position V a generally similar positioning pawl **190'** is pivoted at its rear end at **191'** on the rail **171**, and has a positioning tooth **192'** thereon adapted to project into the guideway **170** to engage the notch **193** of the printing device at printing position. At its forward end the pawl **190'** has a stop finger **194'** which is adapted to be positioned in the guideway **170** to prevent overfeeding of the printing devices past printing position.

The two positioning pawls **190** and **190'** are actuated in timed relation to the reciprocatory movements of the carrier bars **153** and **173** by means of a pair of links **195** and **195'** which are connected to arms **196** and **196'** of a bell crank **197**. The bell crank **197** is mounted beneath a rear portion of the girder **171**, and the link **195** extends to the right from a pin and slot connection with the forward end of the arm **196** and is connected at its right-hand end to the forward end of the pawl **190**. The link **195'** extends forwardly from the arm **196'** and is connected at its forward end to an arm **190''** of the pawl **190'**. A spring **198** acting longitudinally of the link **195** and between this link **195** and the link **195'** serves to impart a yielding actuating force to the pawl **190** at certain points in its cycle; while a spring **198'** acting longitudinally with respect to the link **195'** and between the arm **196'** and the link **195** serves to impart a similar yielding force to the pawl **190'** at certain points in its cycle of movement.

As will hereinafter be described in detail, the bell crank **197** is so actuated that the positioning teeth and the stop fingers of the two pawls **190** and **190'** are completely withdrawn from the associated guideways **150** and **170** before the advancing movements of the printing devices in these guideways are initiated. As soon as the printing devices at the printing and sensing stations have been advanced past the adjacent stop fingers, the pawls **190** and **190'** are returned toward the positions of Fig. 4 so that the positioning teeth are still outside of the guideways, while the stop fingers thereof are projected a short distance into the guideways. Hence the advancing printing devices may strike the stop fingers so as to be positioned in a preliminary sense at the sensing and printing stations. After the forward advancing movements of the carrier bars **153** and **173** have been completed, the positioning pawls **190** and **190'** are shifted further toward their active positions of Fig. 4, this action being accomplished through the yielding action of springs **198** and **198'**. Hence the positioning teeth **192** and **192'** are forced into the V-shaped positioning notches **193** of the printing devices D at the sensing and printing stations, thereby to impart a final positioning action to these printing devices which accurately locates each printing device. Thus the desired registry of the printing impression is invariably attained; while the accuracy of location of the printing device at the sensing station is effective to produce accurate sensing operation of the sensing means S in each instance.

The main drive mechanism

The main actuating or drive assembly of the present machine is located in the generally triangular space rearwardly of the lower arm **134''** of the printing frame; and the actuating assembly includes a drive shaft **200** rotatably mounted in a horizontal position immediately forwardly of the rear supporting bar **134** by means of a plurality of bearing brackets **201**, **202** and **203** each of which is bolted to and carried by the bar **186**. Adjacent the left-hand end (Fig. 2) of the shaft **200** a constantly rotating source of power such as a pulley **204** is provided, the pulley in the present instance being rotatably mounted on the shaft **200**. During periods of use of the printing machine the pulley **204** is constantly driven by means such as an electric motor **205**, there being a suitable speed reducing drive connection between the motor **205** and the pulley **204**. The motor **205** is controlled by a switch **206** mounted within the frame **100** behind the upper front panel **207** thereof, and this switch is actuated and controlled by means of a control slide **208** (Fig. 1) which extends forwardly through the panel **207** and into the right hand **207'** thereof. The control slide **207** is so arranged that when the slide is positioned inwardly the motor **205** is stopped and when the slide is pulled outwardly the switch **206** is closed and the motor is started. In the present instance the motor **205** is mounted on the rear side of a skirt **209** which defines the rear extent of the kneehole of the desk like frame **100** and is connected between the end panels **187** and **188** of the frame **100**.

The mounting for the motor **205**, which is best illustrated in Fig. 3, comprises a pair of spaced vertical channel members **210** secured as by welding to the back of the skirt **209** and having bolt and slot connections which support a motor mounting bracket **211**. The bracket **211** is preferably formed from sheet metal to provide a body or base portion with projecting arms at opposite ends thereof. The arms are formed at their ends to cooperate with clamping bands in engaging resilient rubber mounting sleeves which surround the axially projecting bearing hubs of the motor **205**.

The speed reducing belted drive connection between the motor **205** and the pulley **204** is best shown in Fig. 3 and comprises a small pulley **230** fixed on the motor shafts and connected by a belt **231** to a large pulley **232** which is rotatably mounted on a bearing stud **232'** carried on a mounting plate **233**. The mounting plate **233** is generally triangular in form and is located in a vertical plane. A small pulley **236** mounted

on the stud 232' and rigid with the pulley 232 is connected by a belt 237 to a large pulley 238 rotatably mounted on a bearing stud 238' projecting from the plate 233; and rigid with the pulley 238 is a double pulley 239 of small diameter which is connected by a pair of parallel belts 240 to the pulley 204.

Thus the pulley 204 is constantly driven at reduced speed during the operation of the motor 205, and this constantly available source of driving power is, through the medium of properly interrlated actuating and control mechanism, utilized to actuate the various operative parts and mechanisms of the machine. In the present machine it is often desirable that certain mechanisms or groups of mechanisms be capable of operation independently of certain other mechanisms or groups of mechanisms, as for example, in what is known as "multiple" or "repeat" operation of the machine where the platen mechanism P is to be operated through a plurality of printing operations while the same printing device D remains stationary at printing position; or as another instance, in what is known as "skip" operation of the machine wherein the platen mechanism P remains inoperative while one or more printing devices D are passed through printing position. In order that such selective operation may be attained a plurality of independently connectible driving connections are provided in association with drive pulley 204 and the shaft 200, such selective driving connections in the present instance being provided through the medium of a plurality of one revolution clutches 250, 251 and 252 disposed at spaced points along the shaft 200 as shown in Fig. 2.

The clutches 250, 251 and 252, are generally similar in form, and as shown in Fig. 2, the clutch 250 constitutes a main or master clutch and is utilized to connect the pulley 204 to the shaft 200 so as to rotate the shaft through one revolution each time some portion of the mechanism is to be actuated, while the clutches 251 and 252 constitute secondary clutches and are operatively associated respectively with the printing device advancing means and the platen mechanism P. The secondary clutches 251 and 252 are so arranged that they may be selectively utilized to connect the printing device advancing mechanism or the platen mechanism individually or concurrently to the shaft 200 for actuation thereby. The particular form of the clutches 250, 251 and 252 is described in detail in my aforesaid copending application, Ser. No. 388,998, wherein it is pointed out that these clutches are generally similar in construction and operation. Thus each clutch has a hub-like driving member and a driven member in the form of a hollow hub partially surrounding the driving hub and adapted to be connected to the driving hub by a clutch pawl carried on the driven member.

While the operative connection of the drive mechanism to the platen mechanism P is described in detail in my copending application Ser. No. 361,530, filed October 17, 1940, it will be observed in Fig. 28 of the drawings that the forward end of the connecting rod 295 is pivotally connected to the end of an arm 295' which is fixed to the left-hand end of a shaft 296. The shaft 296 is mounted in a bearing sleeve 296' which extends through and is rigid with the lower arm 134'' of the printing frame 134 in the manner described in detail in my aforesaid copending application Ser. No. 350,678, filed August 3, 1940. At its right-hand end the shaft 296 has an arm 297 fixed thereto and rocking movement of the arm 297 is imparted to a vertically extending link 297' which is connected at its lower end to the arm 297. At its upper end the link 297' is connected to an arm 298 which is fixed to the right-hand end of the shaft 139 which is mounted in a bearing sleeve (not shown) that extends through and is rigid with the upper arm 134' of the printing frame 134 as described in my aforesaid copending application Ser. No. 350,678. At its left-hand end the shaft 139 has the arms 140 fixed thereto and the arms 140 are operatively connected to the carriage C of the platen mechanism through the medium of a pair of links 141. The details of the drive connection are fully described in my aforesaid copending application Ser. No. 361,530 and, therefore, reference may be had to said application for details of form and function. The arrangement, however, is such that each time the clutch 252 drives the eccentric 290 through a complete revolution, the carriage C of the platen mechanism is reciprocated through an operative printing stroke and is returned to the retracted or rearward position shown in Fig. 28 of the drawings, and in order that smooth operation of the eccentric 290 and the associated mechanism may be assured, a contractual spring 295s is connected between the arm 295' and an anchoring pin on the mounting bracket 203. Thus the spring 295s is tensioned during the forward or idle stroke of the platen mechanism and during the return or work-performing stroke of the platen mechanism the spring 295s serves to supply additional power for operating the platen mechanism.

For the purpose of controlling the machine to produce print, skip or repeat operation thereof, a plurality of manually actuatable means such as foot pedals 320, 321 and 322 are provided. These pedals are similar in form and mounting and are so located as to be capable of convenient actuation by an operator seated in front of the machine. To support the foot pedals 320, 321 and 322, a channel 323 is provided for each of the pedals mounted in a depending relation from the lower edge of the skirt 209 of the frame. Each pedal is pivoted at its rear end to its supporting channel 323, as indicated at 324 in Fig. 3, and has a spring return means 325 associated therewith to urge the pedal to its normal elevated position. The arrangement of the pedals 320, 321 and 322 is such, in the present instance, that the pedal 320 constitutes the "skip" pedal and is operative to cause engagement of the printing device advancing clutch 251; the pedal 321 constitutes the "repeat" pedal and is operative to cause engagement of the platen clutch 252; while the pedal 322 constitutes the "consecutive" pedal and is operative in the normal or usual adjustment of the machine to cause concurrent engagement of the advancing and platen clutches 251 and 252.

As an incident to the operation of the printing device advancing means, the positioned pawls 190 and 190' are actuated as hereinbefore described, and such actuation is attained in timed relation to the movement of the printing devices D. To this end a cam assembly 380 is rotatably mounted on the drive shaft 200 between the eccentric of the printing device feed and the clutch 252, and the cam assembly 380 is fixed, by means such as a pinned connection, to said eccentric so as to be rotated each time the feed clutch 251 operates through its one revolution cycle. The cam assembly, as shown in Figs. 26

and 28, comprises a plurality of disks 381, 382, 383, 384 and 385. The disk 382 is concentric with the shaft 200, as shown in Fig. 27, and is embraced by bifurcations 386 on one end of a link 387. The other end of the link 387 is connected by a swivel block 388 to an arm 389 formed on the bell crank 197.

The bifurcations 386 are guided laterally between the disks 381 and 383, and a roller 390 on the link 387 is urged into contact with the periphery of the disk 381 by the action of the spring 198'. The disk 381 therefore, constitutes a cam disk, and is formed with a leading surface 391 (Fig. 27) which acts on the roller 390 soon after the clutch 251 has engaged to withdraw the positioning teeth and stop fingers of the pawls 190 and 190' completely from the printing device guideways. A dwell surface 392 of the cam 381 then maintains the positioning pawls 190 and 190' in their completely withdrawn relationship until the printing devices have been advanced from stations II and V beyond the associated stop fingers, after which a receding surface 393 on the cam 381 allows the stop fingers of the positioning pawls to move into their active positions. Such movement is limited by a dwell surface 394 on the cam. After the advancing movement of the printing devices into the printing and sensing stations has been completed, a receding surface 395 on the cam 381 permits the pawls 190 and 190' to shift to their final positions, after which a dwell surface 396 on the cam 381 rides against the roller 390. The pawls 190 and 190' are therefore, free to act under the influence of their springs 198 and 198' to produce an accurate positioning of the printing devices at sensing and printing stations.

The selector mechanism

Since the present printing machine embodies a relatively large number of stations along the printing device guideway, the selector means of the present invention is arranged to embody a storage mechanism 670 so that the identifying means of each printing device D may be sensed by the sensing means S several stations in advance of the printing position, and by reason of this construction it is possible to locate the sensing means at station II of the printing device guideway, thereby to facilitate the provision of large and unobstructed working areas on the table top T and at the same time locate the variantly settable elements of the sensing means S in a convenient and readily accessible position.

In attaining such a desirable construction and arrangement in the selector mechanism, the sensing means S of the present machine has a sensing head 500 which extends across to the rear portion of the sensing station II so as to overlie the positions which are occupied by the tabs 120 of a printing device D when such a printing device is in position at sensing station II. The sensing head 500 is preferably in the form of a bar, and is mounted for movement through a sensing stroke in such a manner as to cooperate with the positioning pawl 190 in enabling an unusually large number of identifying positions or classifications to be accurately and efficiently sensed. The sensing head 500 is in the present instance arranged to reciprocate beneath a guard casting 500' which also serves as a drawer guide in the loading of the magazine M. The sensing head 500 is mounted for movement through a vertical straight-line sensing stroke by means such as a pair of guide rods 501 and 502 to the upper ends of which the sensing head 500 is fixed. The guide rods 501 and 502 are slidably guided as by means of bores formed in guide blocks 503 and 504 secured on opposite or outer sides of the girders 151 and 152. When a printing device D is in sensing position, and has been accurately located through the action of the positioning pawl 190, the tabs 120 of the printing device are arranged to overlie a tab support formed by a plate 510 which is, in turn, secured to the top of a transverse spacing member 511 extending between the two girders 151 and 152 beneath the sensing position. The tab support plate 510 has a plurality of spaced grooves 512 formed therein parallel to the initial path or guideway 150, and these grooves are of such a width that a plurality of spaced supporting ribs 513 are provided which will in every instance underlie and support one or more portions of each tab 120 which may be carried by a printing device.

The sensing operation is accomplished by sensing the presence or absence of identifying means such as a tab, or a particular area of a tab, at any one or more of the available identifying positions provided on or in relation to the printing device. Such sensing is in the present instance accomplished by means of selectively positioned selector pins 525 which are adapted to be mounted in a selector bar 526 which is removably positioned on the selector head 500 so that the pins 525 project downwardly from the selector head in a direction parallel to the path of movement of the sensing head. Since different types of tabs 120, as hereinbefore described, require selector pins 525 of different forms, the pins which are employed with the different types of tabs will be identified by the use of the same reference letter. Thus the notched tabs 120A of Figs. 5 and 6 require the use of selector pins 525A such as those shown in Figs. 18 to 21; the embossed tabs 120B of Fig. 15 require the use of selector pins 525B such as that shown in Fig. 14; while the perforated tabs 120C of Fig. 16 or 120D of Fig. 18 require the use of selector pins 525C such as those shown in Figs. 12, 13, 17 and 20. When sensing pins 525A are employed, they are supported in a sensing bar 526, Fig. 7, while sensing pins 525B or 525C may be mounted in a 48-position sensing bar 526B, shown in Figs. 12 and 13. When tabs 120D are to be used, the sensing pins 525C are supported in a 60-position sensing bar 526D, Fig. 19. The construction and operation of the mechanism will first be described with relation to tabs 120A and selector pins 525A, after which the operation with other types of tabs and selector pins will be described. Thus when a selector pin 525A is mounted in any one of a plurality of positions which are provided on the selector bar 526, and the selector head 500 is moved downwardly along the straight-line path determined by the guide rods 501 and 502, the selector pin 525A will engage any solid area of a tab 120A which may be aligned with the pin 525A. In the event that a solid area of a tab 120A is not located in the path of the selector pin 525A, the lower end of the pin 525A moves downwardly into the aligned groove 512. Thus the downward movement of the selector head 500 is controlled by the presence or absence of a solid area of a tab 120A in the path of a selector pin such as the pin 525A carried on the selector bar 526. Hence when a tab 120A is not sensed by a selector pin 525A, the selector head 500 moves downwardly to the limit of its movement

to a lower level which for purposes of description herein will be termed the level 1. Similarly, when a tab is encountered by a selector pin 525A—1 of a particular length which will herein be termed a regular length pin or regular pin the selector head 500 is limited in its downward movement and comes to rest at a somewhat higher level which will hereinafter be termed level 2. It will be clear, therefore, that the termination of the downward movement at level 1 indicates that the presence of a solid area of a tab 120A has not been sensed, while the termination of the downward movement of the sensing head 500 at level 2 indicates that a solid area of a tab 120A has been sensed by a regular selector pin 525A—1.

In the use of a selector mechanism in a printing machine of this character it is often desirable to automatically sense and select printing devices pertaining to one or more selected classifications and to warn the operator or to perform another or different type of control operation when a printing device bearing identifying means corresponding to such a selected classification has been sensed. In other instances it may be desirable to detect printing devices pertaining to certain classifications and to provide for still another indication or controlling operation which is different from the controlling operation which is effected when a particular identifying means on a printing device is sensed by a sensing pin such as a regular pin 525A—1. Thus as shown in Figs. 9, 10, 11 and 21 of the drawings, the selector bar 526 may have selector pins of different lengths mounted therein. The left-hand selector pin 525A—1 shown in Fig. 31 (and in Fig. 9) is of the regular length, while the right-hand pin shown in Fig. 21 (and in Fig. 10) is identified by the reference numeral 525A—2 and is somewhat longer than the regular pin 525A—1. The central pin illustrated in Fig. 21 (and in Fig. 11) is even longer than the pin 525A—2 and is identified by the reference numeral 525A—3.

Thus the pin 525A—1 may be termed a regular pin, the pin 525A—2 may be termed an intermediate pin, and the pin 525A—3 may be termed a long pin. When a tab 120A is located in the path of an intermediate pin 525A—2, the downward movement of the sensing head 500 is terminated at a level which will hereinafter be termed level 3 and which is somewhat higher than level 2 hereinbefore described. When a tab is encountered by a long pin 525A—3 the downward movement of the sensing head 500 is terminated at a fourth level which is higher than level 3 and which will hereinafter be identified as level 4.

The selector pins 525A, or the pins of any of the other types, are mounted in an appropriate selector bar 526 by downward insertion of the pins into the appropriate vertical bores or passages formed in the selector bar. The selector bar 526 is, therefore, formed so as to be readily removable from its operative positions, and in such removal is withdrawn forwardly beneath the overhanging forward edge of the guard casting 500'. The selector bar 526 is adapted for use with notched tabs and has 24 possible positions provided thereon for the mounting of selector pins 525, and the bar 526 is formed from a front section 530 and a rear section 531 which are secured together by rivets 532 and 533. At its left-hand end the selector bar 526 has a mounting notch 534 opening endwise thereof so as to be engageable with a downwardly projecting mounting pin 535 carried on the sensing head adjacent to the left-hand end thereof. The mounting pin 535 has a lower flange 536 which engages the lower face of the selector bar 526 to support the same, while an upper flange 537 is provided on the mounting pin 535 to properly space the upper face 538 of the sensing bar 526 downwardly from the downwardly facing abutment surface 539 of the sensing head 500. After moving the notch 534 into engagement with the mounting pin 535, the right-hand end of the sensing bar 526 is moved rearwardly and onto a supporting shelf 540 which is provided at the right-hand end of the sensing head 500. A stud 541 on the lower surface 539 of the sensing head 500 engages the top of the sensing bar 526 adjacent to the right-hand end thereof so as to properly space the sensing bar 526 downwardly from the surface 539. The sensing bar 526 is accurately positioned on the sensing head 500 by means of a locking lever 545 which is pivoted adjacent its left-hand end at 546 on the forward face of the sensing head 500. The right-hand end of the locking lever 545 may be elevated by means of a finger piece 547 against the force of a spring 548, such upward movement being necessary to permit mounting or dismounting of the sensing bar 526. In the upward movement of the right-hand end of the locking lever 545, this end of the locking lever is guided by a stud 549 which is threaded into the sensing head 500 through an arcuate slot 550 formed in the locking lever 545. After the sensing bar 526 has been mounted in position on the mounting pin 535 and the shelf 540, the locking lever 545 is returned to its lower position of Fig. 31 so that a downwardly facing notch 551 formed in the locking lever 545 engages a reduced or shouldered portion 552 formed on the forward end of the rivet 533. Beyond the shoulder 552 the rivet 533 is provided with a handle portion 553 which may be utilized by the operator in mounting and dismounting the sensing bar 526.

For the purpose of mounting the selector pins 525 in the selector bar 526 a plurality of similar vertical bores or openings 560 are provided in the selector bar, these openings being disposed in positions which correspond with the several available classification areas which are or may be provided on the printing device D. Thus the selector bar 526 as shown in Fig. 22 of the drawings has a single row of openings 560 and there are 24 such openings in this row. The selector bar 526 of Fig. 22 may, therefore, be said to constitute a 24-position selector bar.

The selector pins 525 are mounted in the selector bar 526 by downward insertion through the openings 560, and such downward movement of each pin is limited by a head 562 which is provided on each of the pins 525. The selector pins are yieldingly retained in position on the selector bar 526 by spring latch devices 563 which are mounted within the selector bar and are adapted to cooperate with annular latching grooves 564 formed in each of the selector pins 525. The heads 562 of the selector pins 525 are of such a height that when the selector bar 526 is in position on the selector head 500, the upper faces of the heads 562 are firmly seated against the downwardly facing abutment surface 539 of the sensing head.

The sensing head 500 is reciprocated through a straight-line vertical sensing stroke each time a sensing operation is to be performed, and this reciprocation is imparted to the sensing head 500 in such a manner that the upward or idle movement of the sensing head 500 is positive while

the downward or active stroke of the sensing head is imparted thereto by yielding means. Thus when one of the sensing pins **525** encounters a solid area of a tab **120** in the course of the downward stroke of the sensing head **500** such downward movement of the sensing head **500** is terminated at a level which is dependent upon the type or length of the sensing pin which is encountered by a tab **120**.

For the purpose of imparting such controlled movement to the sensing head **500**, means is associated with the feed clutch **251** so that the sensing head may be moved through its operative sensing stroke each time the printing device advancing clutch operates through its one revolution cycle. For this purpose the disk **385** of the cam assembly which is pinned to the driven member of the advancing clutch **251** is formed as an actuating cam, as shown in Fig. 26 and is engaged by a roller **601** mounted on a bifurcated link **602**. The bifurcations **603** of the link **602** ride on the upper and lower faces of the concentric surface of the adjacent disk **384** which is located on the right-hand side of the cam **385**. Thus the link **602** is guided between the cam **385** and the disk **383**, and the roller **601** is thereby maintained in a proper plane for engagement with the cam **385**. The other or rear end of the link **602** is connected by a pivot pin **605** to an upwardly projecting arm **606** of a bell crank **607**, and the bell crank **607** is fast on a rock shaft **608** which extends along the rear portion of the machine beneath the mounting bar **186**. The shaft **608** is supported in bearings **609** formed on downwardly projecting portions of the mounting brackets **202** and **203**, and at its right-hand end the shaft **608** is additionally supported in a depending bearing bracket **609'** carried on the mounting bar **186**. The bell crank **607** has an arm **610** projecting rearwardly from the axis of the shaft **608** in a generally horizontal direction and a spring **611** connected between the arms **610** and an anchoring pin **612** projecting rearwardly from the mounting bar **186** urges the shaft **608** in a clockwise direction, as viewed in Fig. 36, thereby to maintain the roller **601** in contact with the cam **385**. Adjacent to its other or right-hand end the shaft **608** has an upwardly projecting lever arm **615** fixed thereto, as shown in Fig. 25, and this arm **615** is operatively connected to the sensing head **500** so that when the shaft **608** rocks under the joint influence of the cam **385** and the spring **611**, such rocking movement is transmitted to the sensing head **500** to reciprocate the same through an operative sensing stroke. The operative connection is provided by a link **616** which extends forwardly from the arm **615** and is connected to the downwardly projecting arm **617** of a rocking frame **618**. The rocking frame **618** is mounted on a shaft **619** which is, in turn, mounted in and projects to the left through a vertical bearing plate **620**. The plate **620** is bolted to the right-hand side of the girder **151** so as to project downwardly therefrom as shown in Fig. 25. The left-hand end of the shaft **619** (as shown in Fig. 28) is supported by a bearing member **621** which is carried by and extends downwardly from the other or left-hand girder **152**. The rocking frame **618** has an arm **625** which projects rearwardly therefrom, as shown in Fig. 25, and the arm **625** is connected by a pivot pin **626** to the lower end of a link **627** as shown in Fig. 21. The upper end of the link **627** is connected to a pivot pin **628** which propects from the right-hand end of the sensing head **500**. The other or left-hand end of the shaft **619** has an arm **630** fixed to and projecting rearwardly therefrom, as shown in Figs. 31 to 34, and the end of the lever **630** is connected by a link **631** to the left-hand end of the sensing head **500**. The link **631** is connected and mounted in the same general manner as the link **627**. Thus when the cam **385** permits the spring **611** to rock the shaft **608**, the arm **615** is moved to the left in Fig. 25, or forwardly. Since the link **616** is connected to the downwardly projecting arm **617**, this action imparts a clockwise rocking movement to the shaft **619** and through the connection afforded by the two links **627** and **631**, the sensing head **500** is shifted downwardly with a yielding force. In the event that one of the selector pins **525** carried in the sensing head **500** encounters a tab **120** at the corresponding index position on a printing device D located at sensing station, the yieldingly induced downward movement of the sensing head **500** is terminated, and the point or level of such termination is determined by the length of the selector pin.

When the cam **385** is in its rest position as shown in Fig. 26 of the drawings, the cam roller **601** rides against a relatively long dwell portion or surface **635** and after the rotation of the cam is started in a clockwise direction as shown in Fig. 36 the dwell surface **635** remains in engagement with the cam roller throughout substantially 180°, thereby to maintain the shaft **608** stationary during substantially the entire first half of the cycle of movement of the printing device advancing means. A receding surface **636** of the cam **385** then moves into engagement with the cam roller **601** so as to permit movement of the cam roller **601** to the right in Fig. 26. This right-hand movement of the cam roller **601** causes clockwise rocking movement of the shaft **608**, and such movement continues throughout slightly more than 90° of the rotative cycle of the cam **385**. A leading surface **637** then engages the cam roller **601** so as to shift the roller **601** to the left and thereby actuate the shaft **608** through a return or counterclockwise rocking movement to its normal or rest position of Fig. 26. Thus it will be clear that the selector head **500** is maintained in its elevated position of Figs. 21 and 25 while the printing device is being advanced from the magazine to the sensing station and the downward movement of the sensing head **500** starts at substantially the time that the printing device reaches sensing station. The actual sensing of the identifying means or tabs of the printing device at sensing station takes place during the return movement of the carrier bars **153** of the initial guideway, and it will be observed that during this period the positioning tooth **192** of the positioning pawl **190** is engaged with the notch **193** formed in the printing device so that the printing device is accurately positioned and accurate sensing of the identifying means is thereby assured.

It will be evident that in many instances the operator will not desire to use the selector mechanism of the present invention, and control means in the form of a control plunger **640** is therefore provided for rendering the selector mechanism inactive. The control plunger **640** is mounted so as to extend through the upper right-hand portion of the recess **207'** of the front panel **207** and when the plunger **640** is withdrawn in a forward direction the sensing head **500** is rendered opera-

tive. When the plunger 640 is shifted to its inward or rearward position, the actuating means, which normally tends to reciprocate the sensing head 500 through its operative stroke, is disabled. In the present instance the downward stroke of the sensing head 500 is attained through the yielding action of the springs 611 and 611' acting on the shaft 608, and the disabling means as herein shown is therefore in the nature of a detent means which resists the yielding action of the springs 611 and 611'. Thus as shown in Fig. 25, a detent bell crank 641 is mounted on a horizontal pivot pin 642 located upwardly and somewhat forwardly of the shaft 619. The bell crank 641 has an arm 643 which projects rearwardly and has a hook-like end 644 which is adapted to be engaged with an upwardly projecting and rearwardly facing tooth 645 formed on the rocking plate 618. The bell crank 641 also has an upwardly projecting arm 647, and a link 648 which is pivoted at its forward end to the control plunger 640, has its rear end adjustably connected to the upper end of the arm 647. This connection includes a swivel block 649 carried on the arm 647 and having a nut and bolt connection 650 with the rear end of the link 648. When the control plunger 640 is withdrawn in a forward direction, the end 644 of the bell crank 641 is withdrawn to its inactive position of Fig. 25 and the sensing head 500 is free to operate in each operative cycle of the printing device feeding means. When, however, the plunger 640 is pushed to its rearward position the bell crank 641 acts to prevent clockwise rotation of the rocking plate 618. Thus the sensing head 500 is disabled and remains inactive in its upper position of Fig. 25. The mounting of the pivot pin 642 is in the present instance provided by a mounting casting 660 which as shown in Fig. 25, is secured by means of bolts 661 to a central portion of the mounting plate 620. The pivot pin 642 is fixed in a projecting boss formed on the mounting casting 660 adjacent to its upper end.

When the selector mechanism is rendered operative by withdrawing the control plunger 640 to its position of Fig. 25, and the sensing head 500 is operated through its sensing stroke, the storage means indicated generally by the reference numeral 670 is set up in accordance with the sensed identifying means or indication pertaining to the printing device D which is then at sensing position. This sensed indication which is thus stored in the storage mechanism 670 is retained in the storage mechanism for a plurality of machine cycles, or until such time as this stored information is to be rendered effective to perform a control operation. Since the details of structure and operation of the storage mechanism 670 do not form a part of the present invention, specific description thereof is not included in this application, but reference may, of course, be made to the parent application, Serial No. 392,151.

From the foregoing description it will be apparent that sensing means of the selector as afforded by the present invention is so constructed and associated with the printing device advancing and positioning means that great accuracy of sensing action is attained, and by reason of this novel relationship it has been found that extremely small identifying areas may be employed on the printing devices. Through the use of such small identifying areas it has been possible to materially increase the number of identifying positions or areas available on any given size or type of printing device, thereby to increase the utility of the selector mechanism and of the printing machine as a whole.

While I have illustrated and described a preferred embodiment of my invention it is to be understood that this is capable of variation and modification and I therefore do not wish to be limited to the precise details set forth but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. In a printing machine having a plurality of operative mechanisms and through which a series of printing devices each adapted to bear identifying means at one or more selected identifying positions thereon are adapted to be advanced past sensing and printing positions, advancing means for advancing such printing device through the machine in a step by step manner such that each printing device comes to rest at sensing and printing positions, sensing means movable through a straight-line sensing stroke into sensing cooperation with the identifying means of a printing device at sensing station, positioning means shiftable between inactive and active positions and operable in its active position to accurately locate the printing device at sensing station, and coordinated actuating means for said sensing and positioning means operable upon said positioning means to effect accurate positioning of the printing device at sensing station just prior to and during sensing cooperation of the sensing means with the identifying means thereof.

2. In a printing machine having a plurality of operative mechanisms and through which a series of printing devices each adapted to bear identifying means at one or more selected identifying positions thereon are adapted to be moved past sensing position, advancing means for advancing such printing devices through the machine in a step by step manner such that each printing device comes to rest at sensing and printing positions, sensing means movable along a straight-line sensing path with a yielding force and under the control of said advancing means into sensing cooperation with the identifying means of a printing device at sensing station, positioning means movable with a yielding force under the control of said advancing means into an active position to accurately locate the printing device at sensing station just prior to and during sensing cooperation of the sensing means with the identifying means of such a printing device.

3. In a printing machine having a printing device guideway along which sensing and printing positions are provided and along which a series of printing devices, each adapted to bear identifying means at selected identifying positions thereon, are adapted to be advanced in a step by step manner so as to come to rest at said sensing and printing positions, advancing means for imparting such advancing movement to the printing devices, positioning means to engage and accurately position the printing device at sensing station, sensing means mounted for movement along a straight line sensing path and having at least one elongated sensing element mounted thereon and extending parallel to said sensing path, and operating means coordinating the operation of said sensing means and said positioning means to effect sensing cooperation of said sensing element with the identifying means of a printing device at sensing station while said printing device is accurately positioned by said positioning means.

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