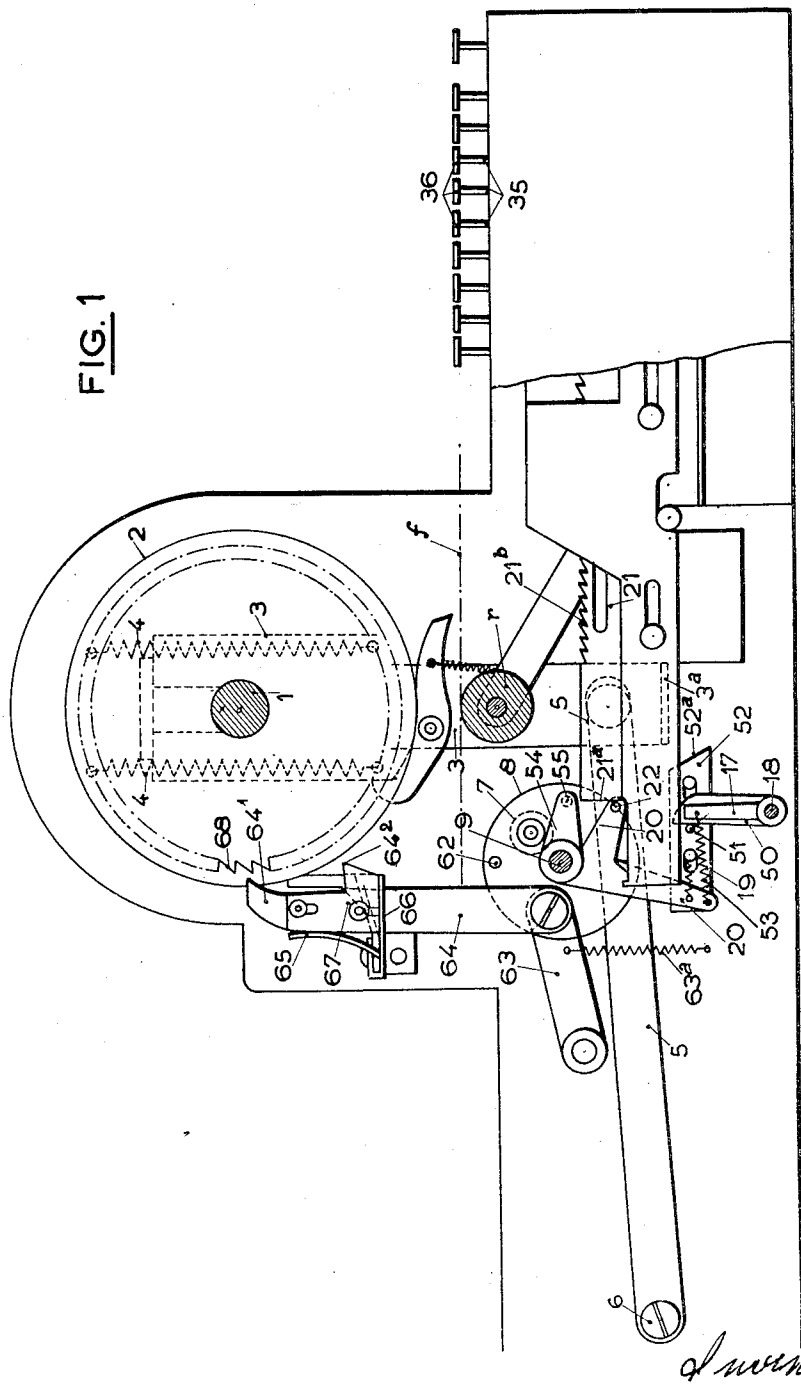
Jan. 2, 1951 N. GRETCHIKHINE 2,536,276

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 1

FIG. 1



Inventor:
N. Gretchikhine
By E. F. Vanderoth Atty

Jan. 2, 1951 N. GRETCHIKHINE 2,536,276

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 2

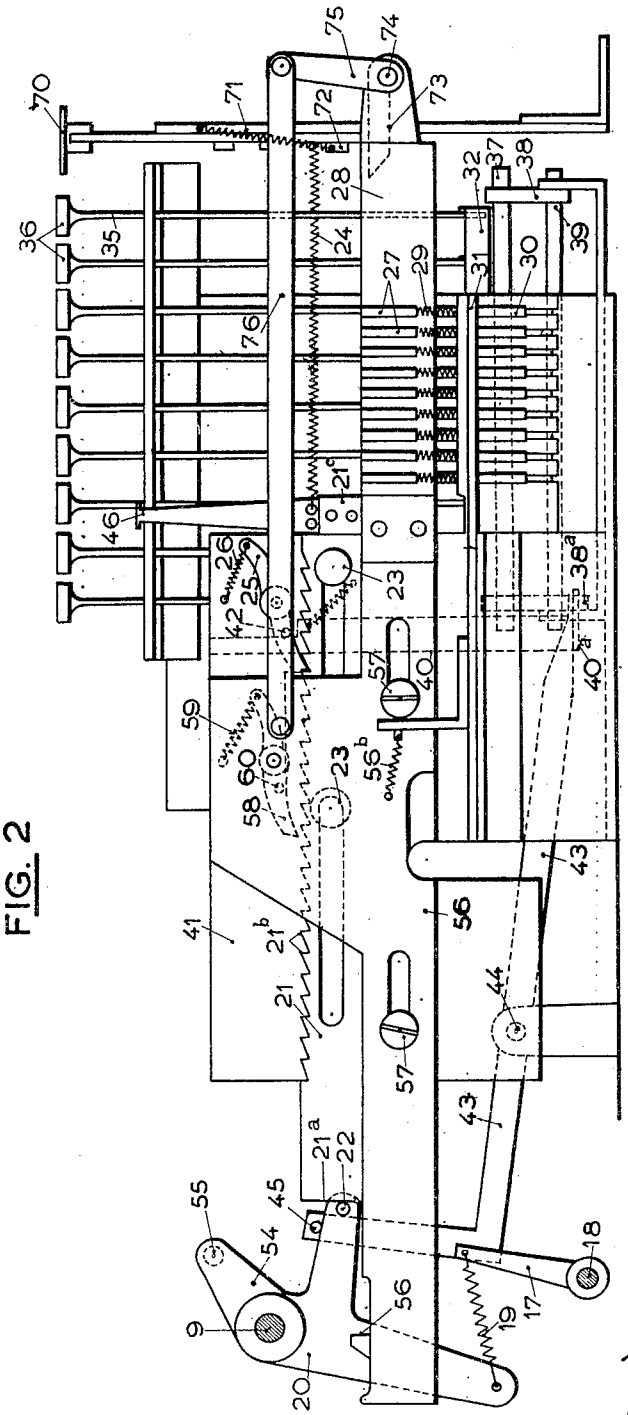


FIG. 2

Inventor:
N. Gretchikhine
By E. F. Wendroth
Atty

Jan. 2, 1951 N. GRETCHIKHINE 2,536,276

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 3

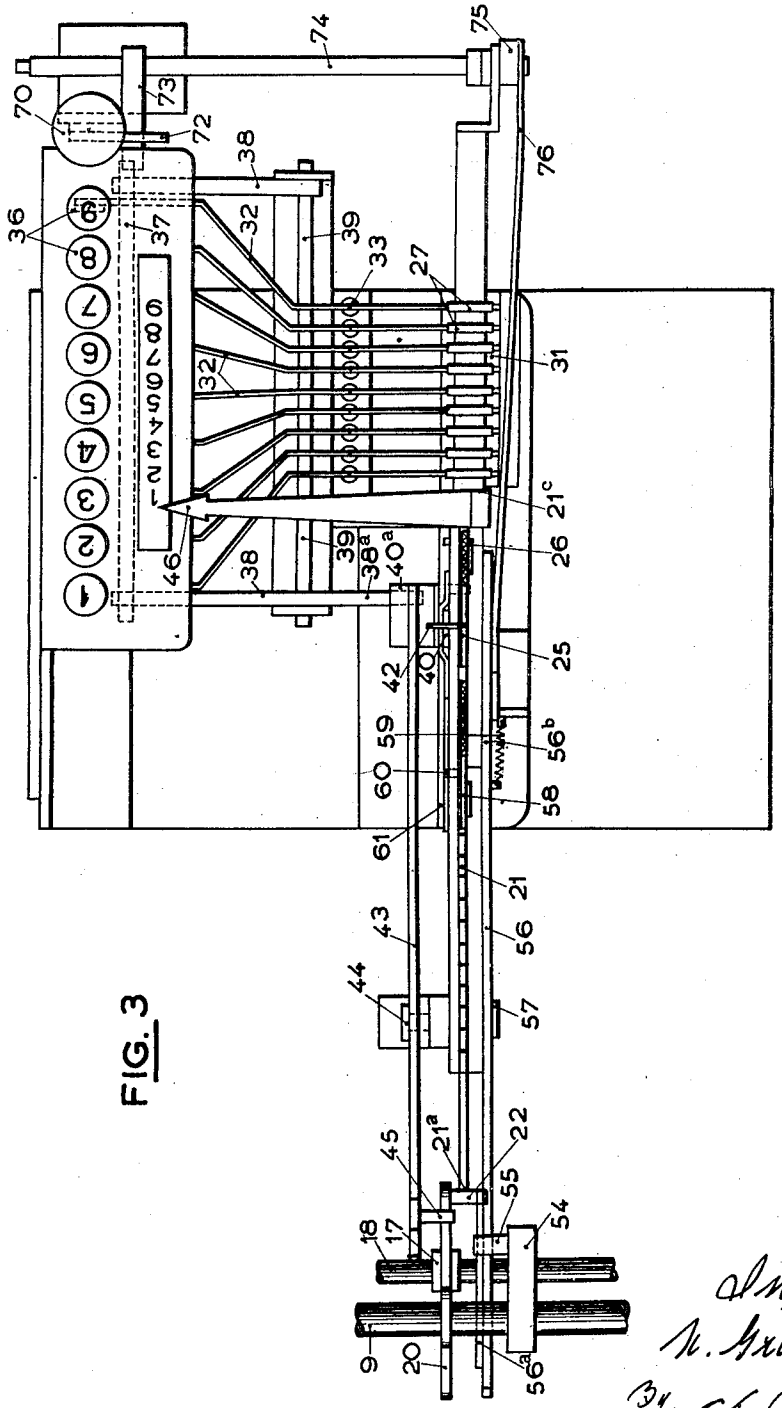


FIG. 3

Inventor:
N. Gretchikhine
By E.F. Wunderoth
Atty

Jan. 2, 1951 N. GRETCHIKHINE 2,536,276

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 4

FIG. 4

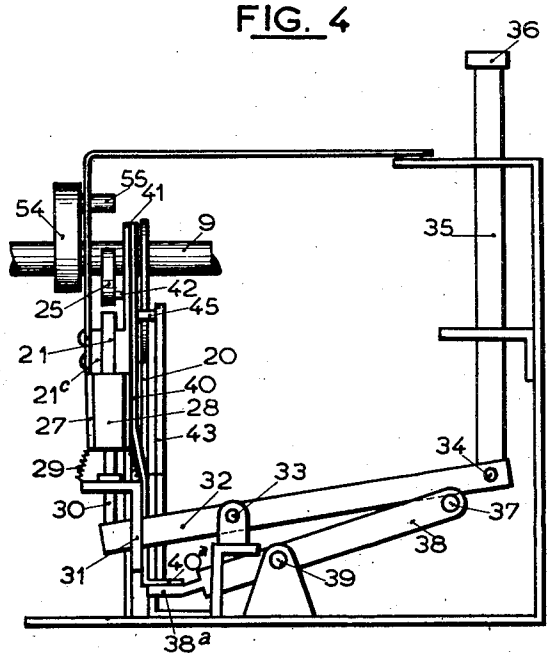


FIG. 7

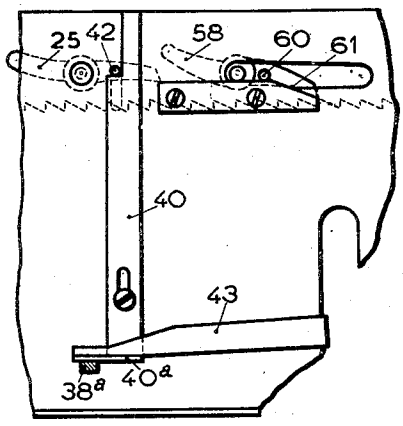
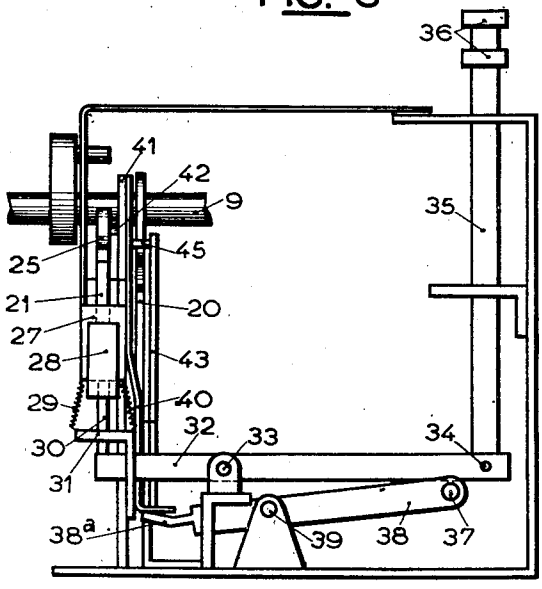


FIG. 6



Inventor:
N. Gretchikhine
By E. F. Neuderoth
Atty

Jan. 2, 1951 N. GRETCHIKHINE 2,536,276

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 5

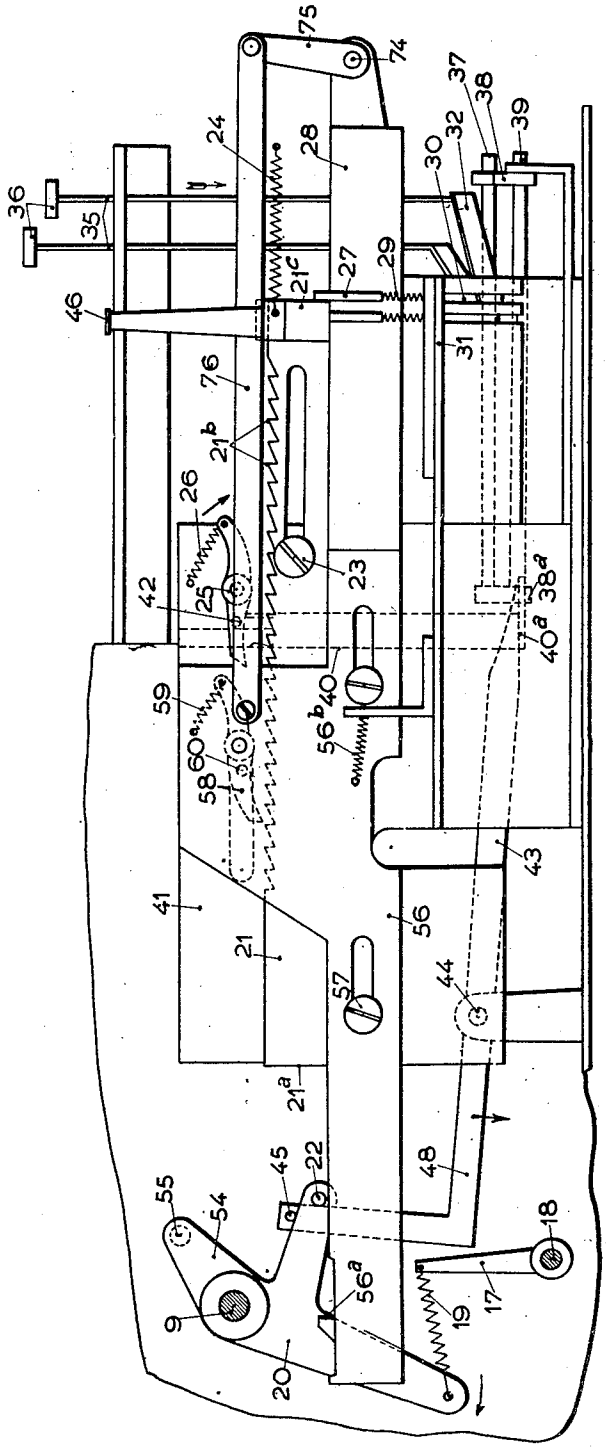


FIG. 5

Inventor:
N. Gretchikhine
by E. F. Neuderott
Atty

Jan. 2, 1951 N. GRETCHIKHINE 2,536,276

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 6

FIG. 9

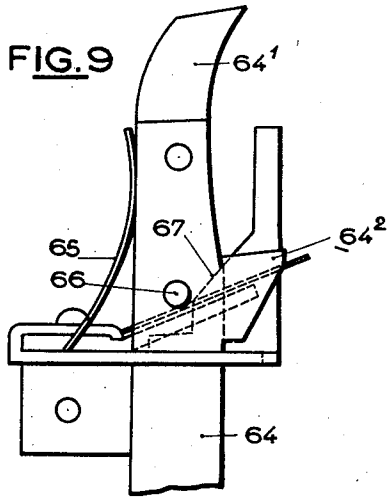
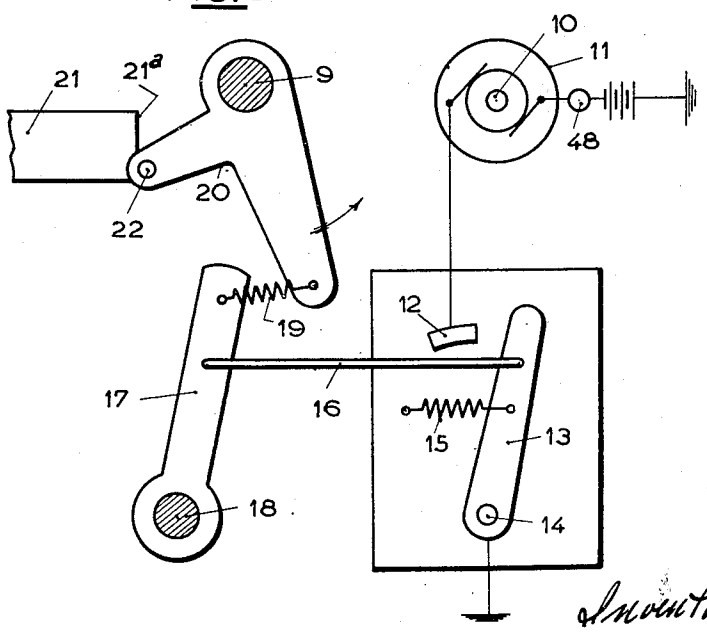


FIG. 8



Inventor:
N. Gretchikhine
By E. F. Woodcroft
Atty

Jan. 2, 1951 N. GRETCHIKHINE 2,536,276

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 7

FIG. 10

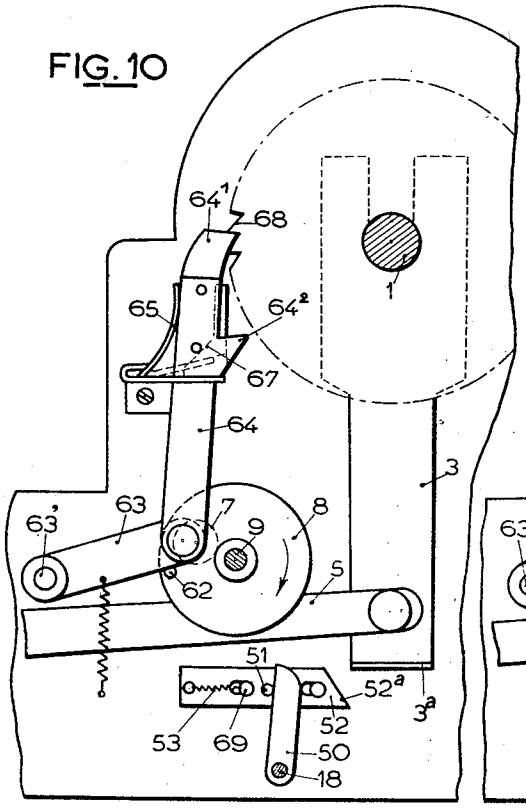
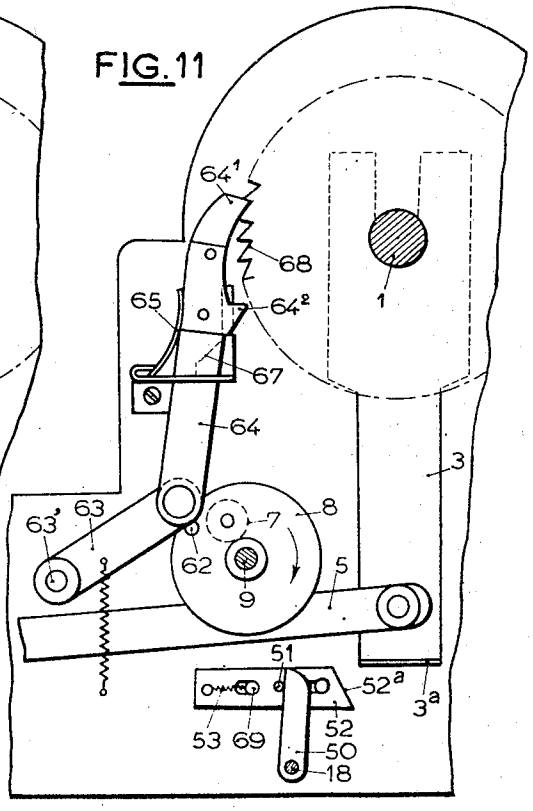


FIG. 11

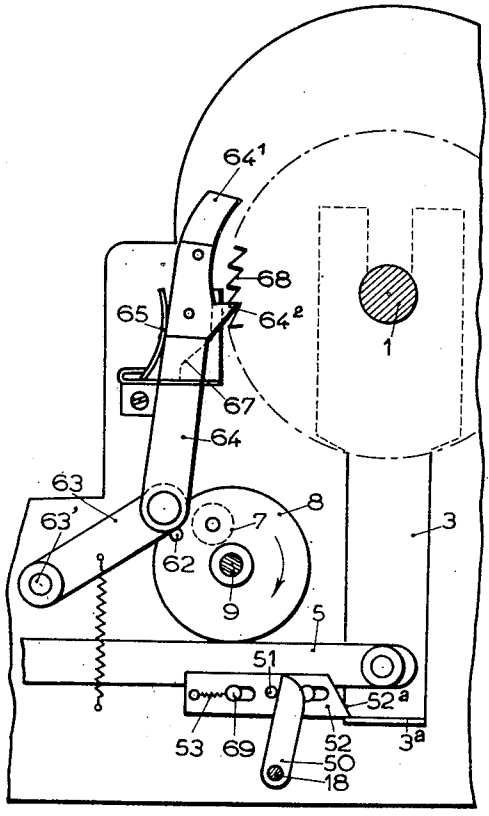


Inventor:
N. Gretchikhine
By E. F. Neudecker
Atty.

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 8

FIG. 12



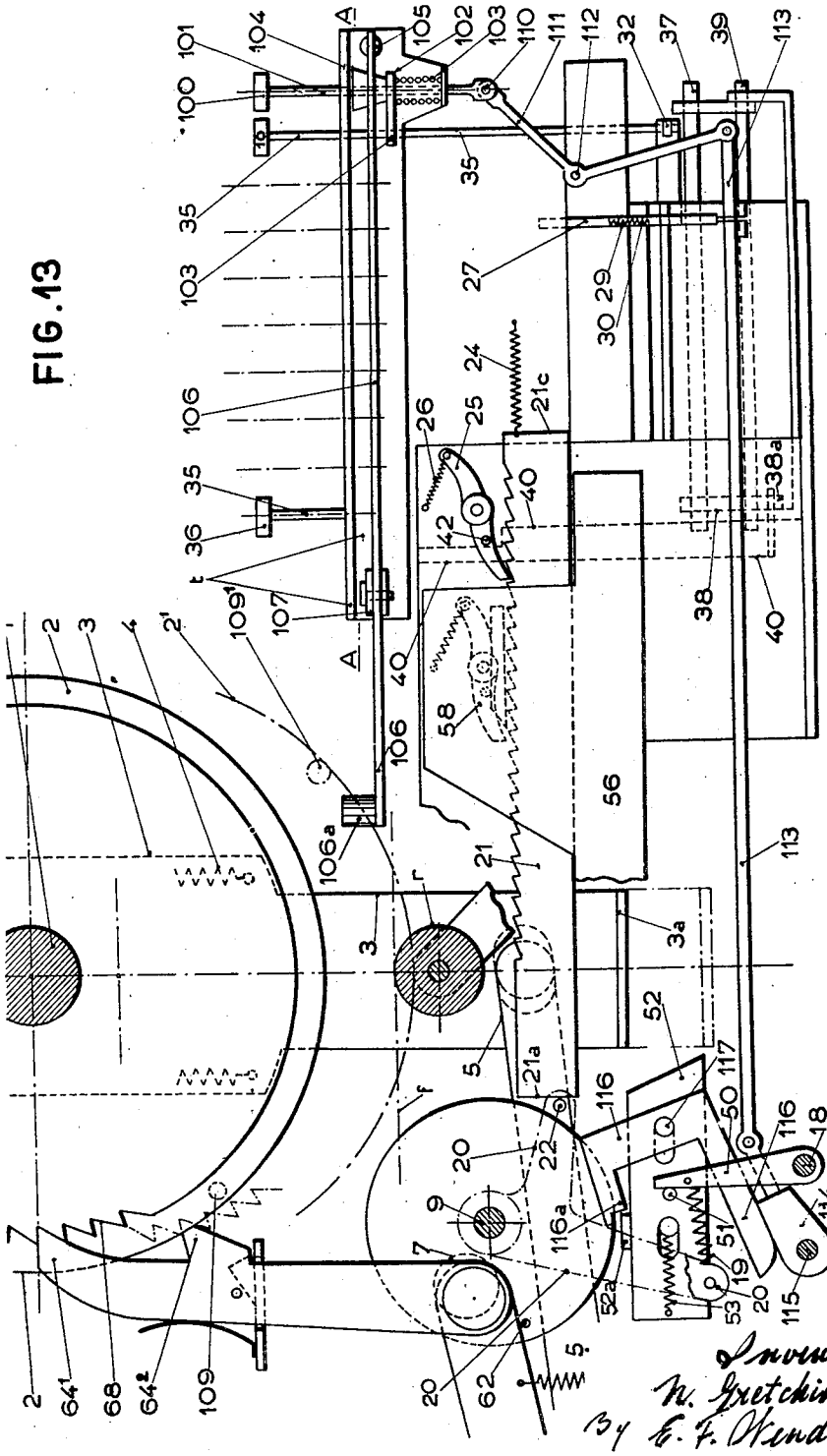
Inventor:
N. Gretchikhine
By E. F. Wenderoth
Atty

Jan. 2, 1951 N. GRETCHIKHINE 2,536,276

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 9

FIG. 13



Inventor:
N. Gretchikhine
By E. F. Kenderoth, Atty

Jan. 2, 1951 N. GRETCHIKHINE 2,536,276

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 10

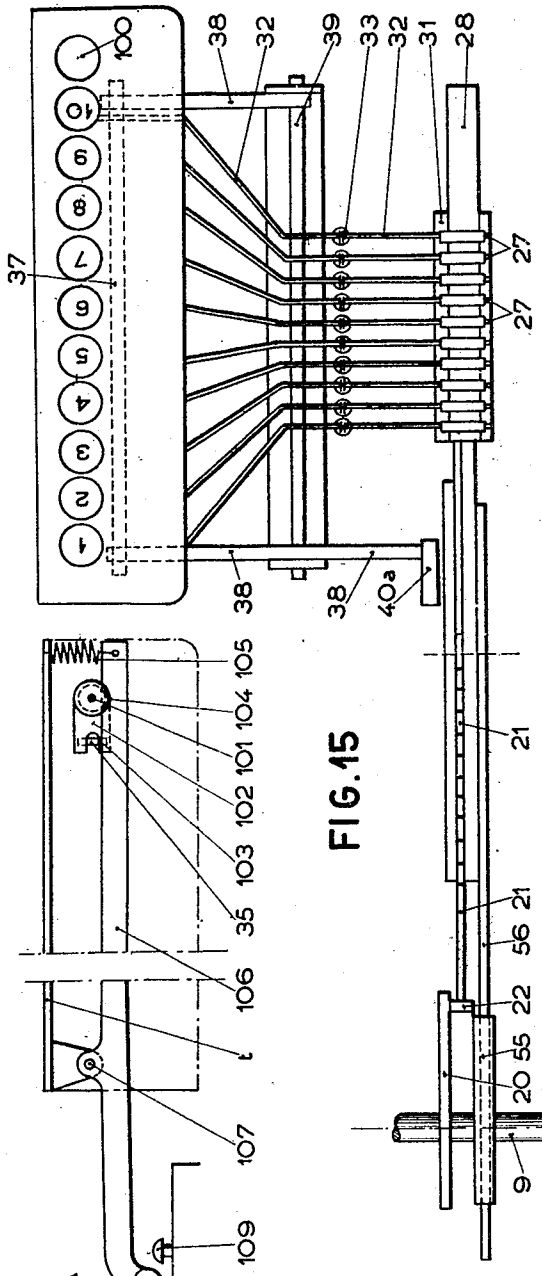


FIG. 15

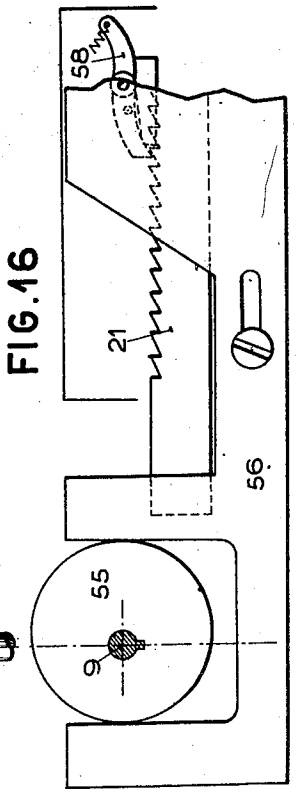


FIG. 16

FIG. 14

Inventor:
N. Gretchikhine
By E. F. Wunderoth
Atty

Jan. 2, 1951 N. GRETCHIKHINE 2,536,276

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 11

FIG. 17

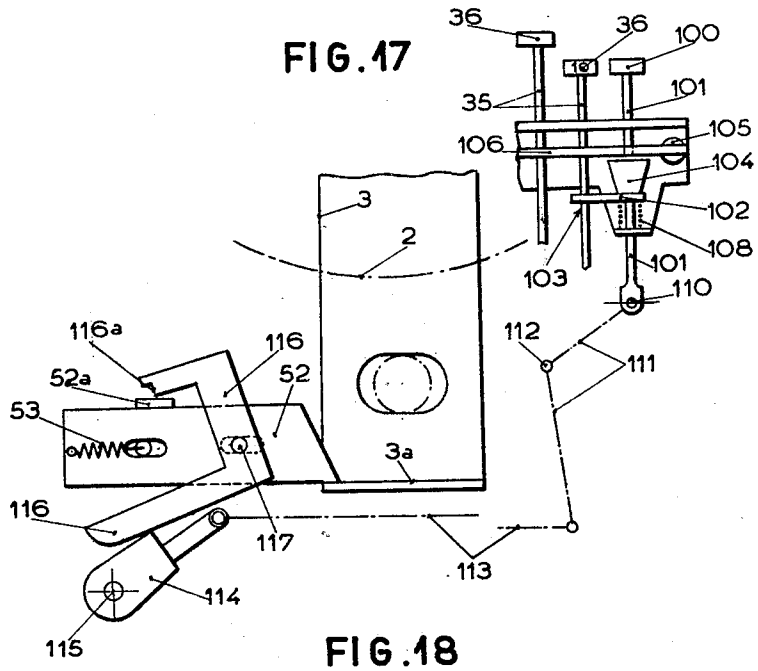
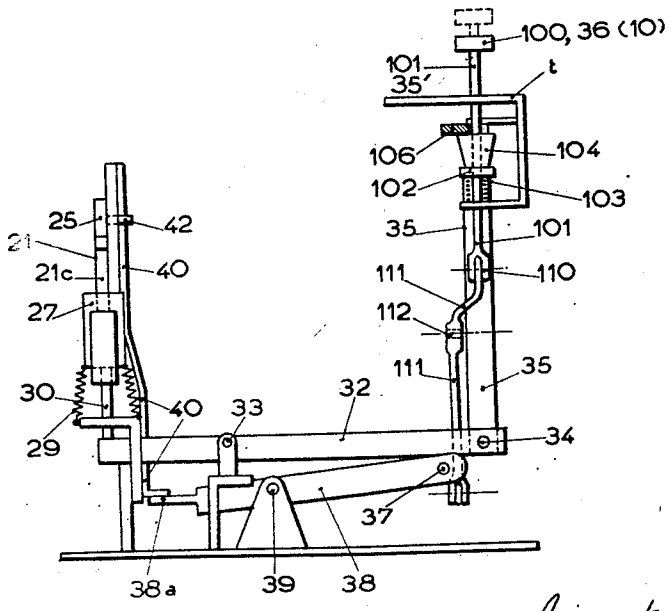


FIG. 18



Inventor:
N. Gretchikhine
By K. F. Wendroth
Atty

Jan. 2, 1951 N. GRETCHIKHINE 2,536,276

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 12

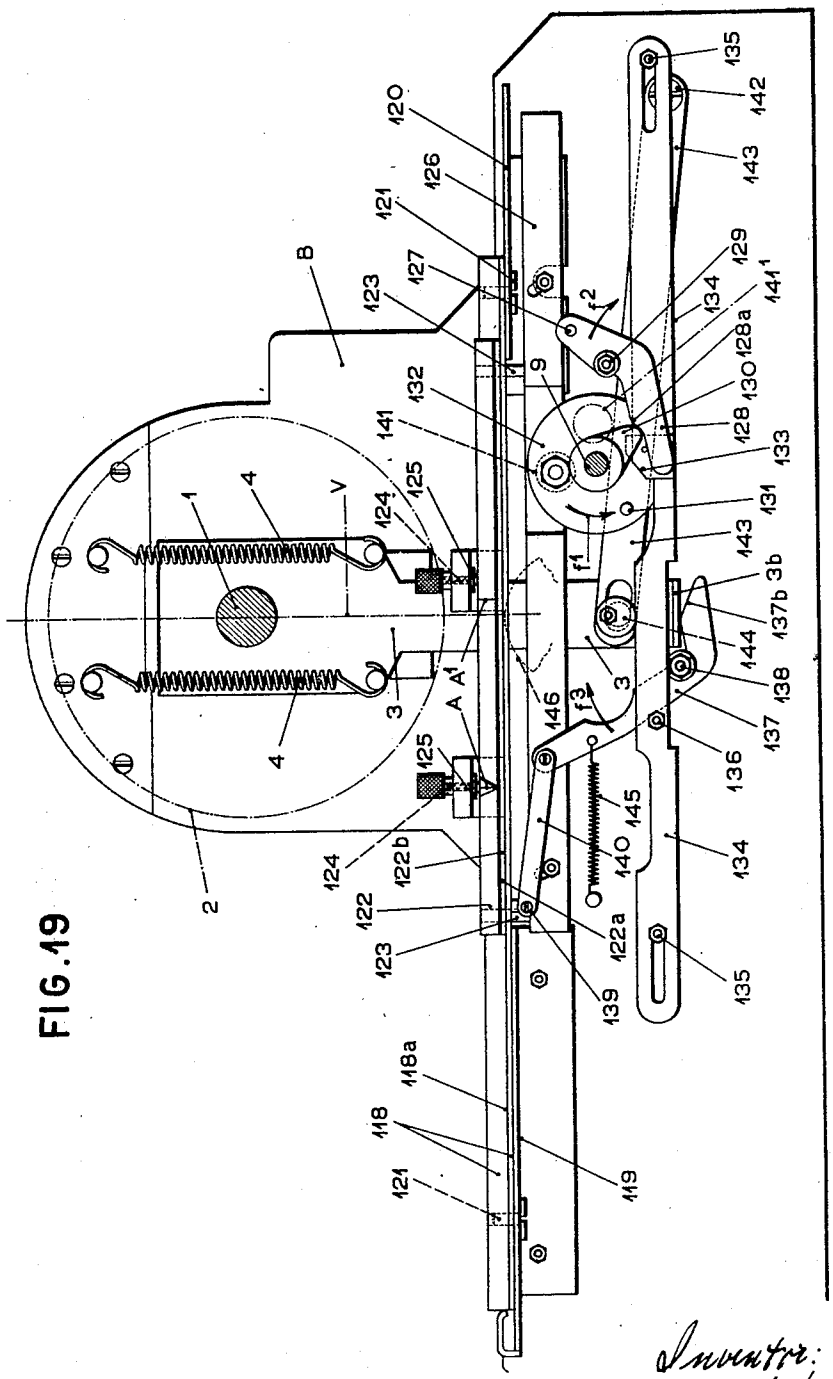


FIG. 19

Inventor:
N. Gretchikhine
By E. F. Vanderwerth
Atty

Jan. 2, 1951 N. GRETCHIKHINE 2,536,276

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 13

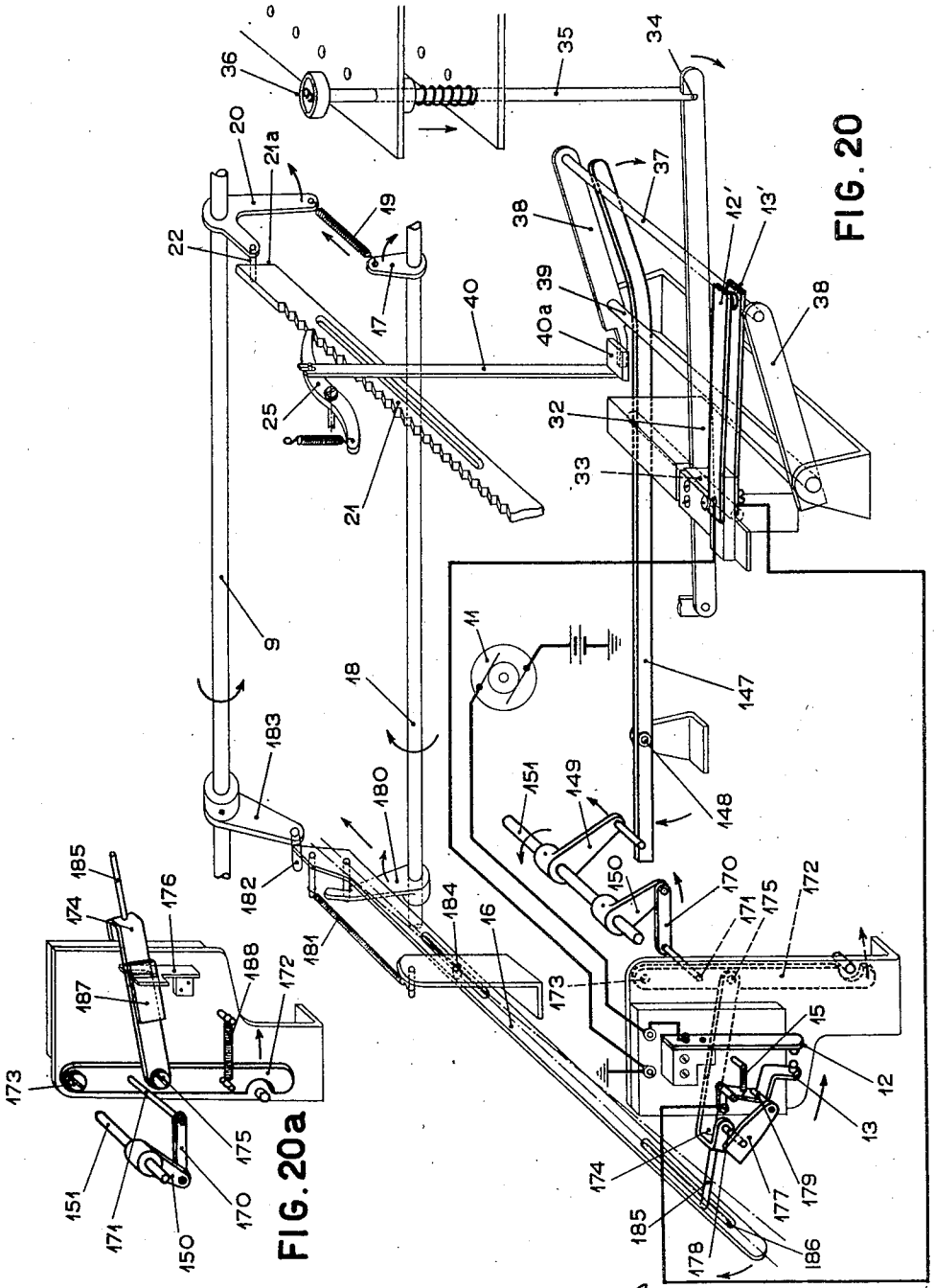


FIG. 20

FIG. 20a

Inventor:
N. Gretchikhine,
By E. F. Wanderotte
Atty

Jan. 2, 1951 N. GRETCHIKHINE 2,536,276

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 14

FIG. 21

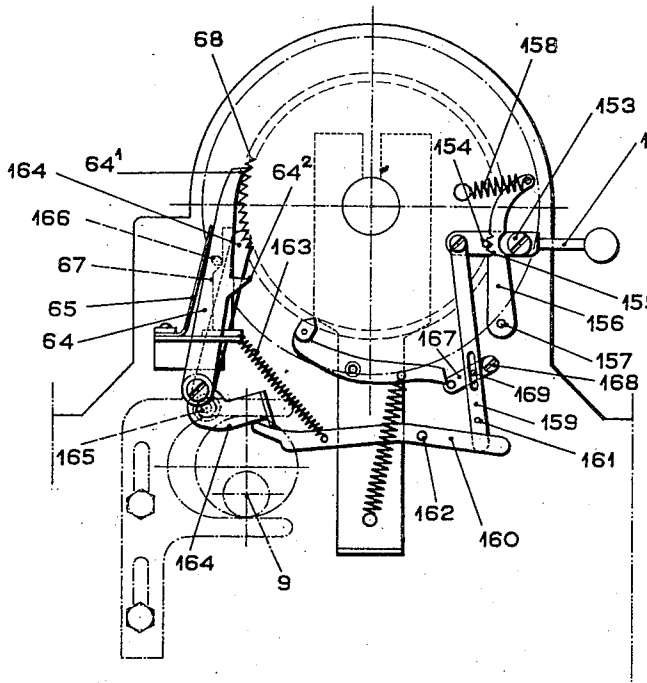


FIG. 22

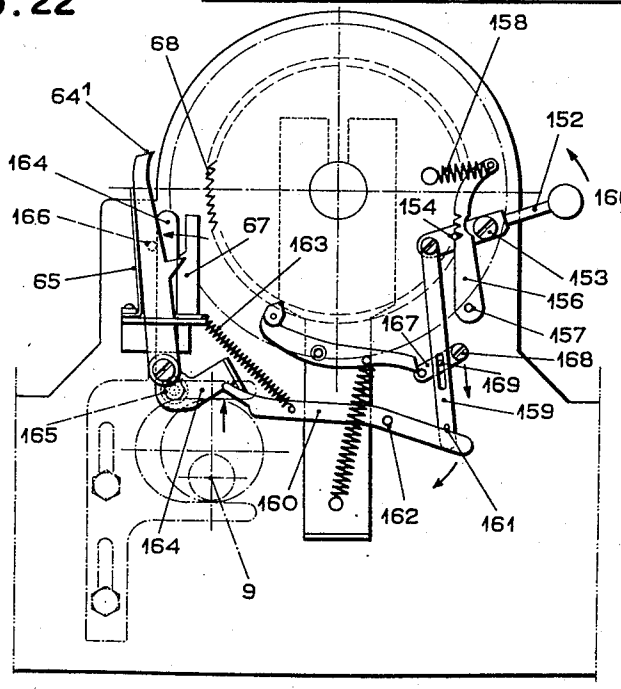
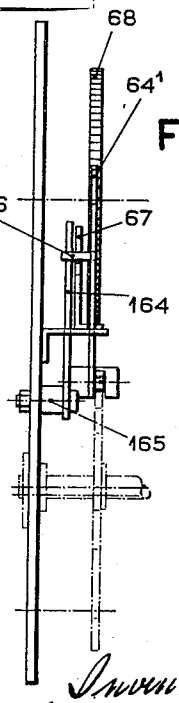


FIG. 23

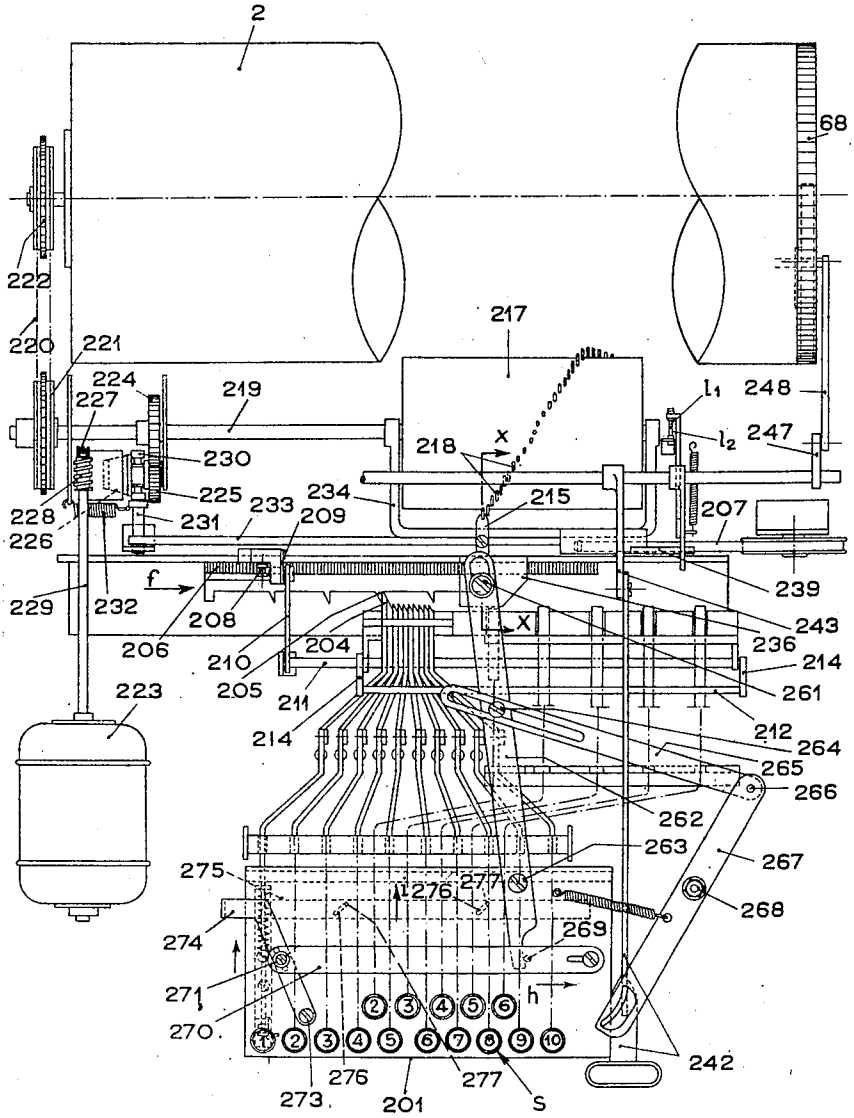


Inventor:
N. Gretchikhine
By E. F. Wenderoth
Atty

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 15

FIG.24



Inventor:
N. Gretchikhine
By E. F. Vandeventh
Atty

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 16

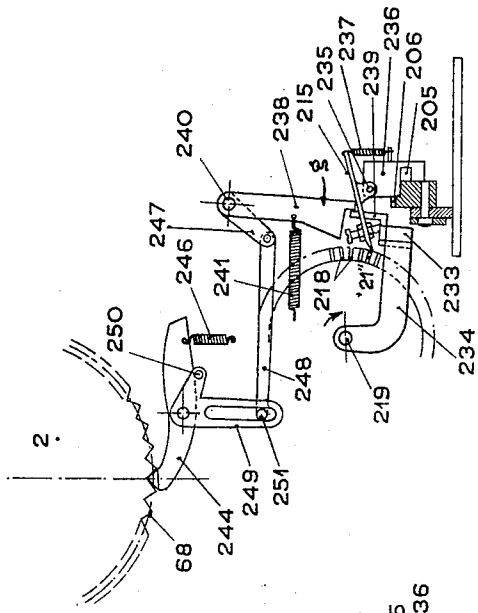


FIG. 26

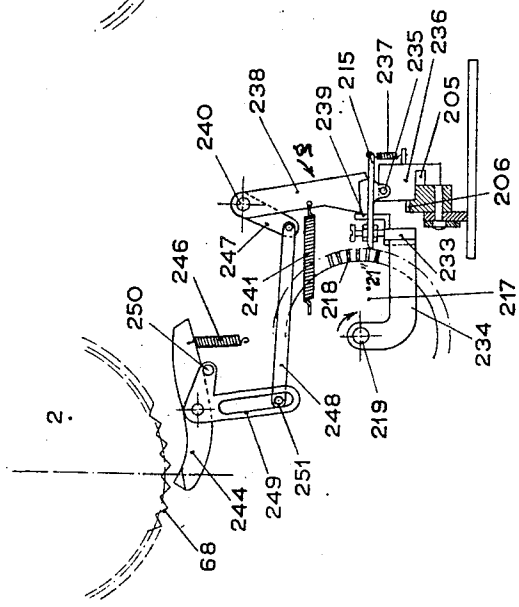


FIG. 25

Inventor:
N. Gretchikhine
By E. F. Wenderoth
Atty

Jan. 2, 1951 N. GRETCHIKHINE 2,536,276

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 17

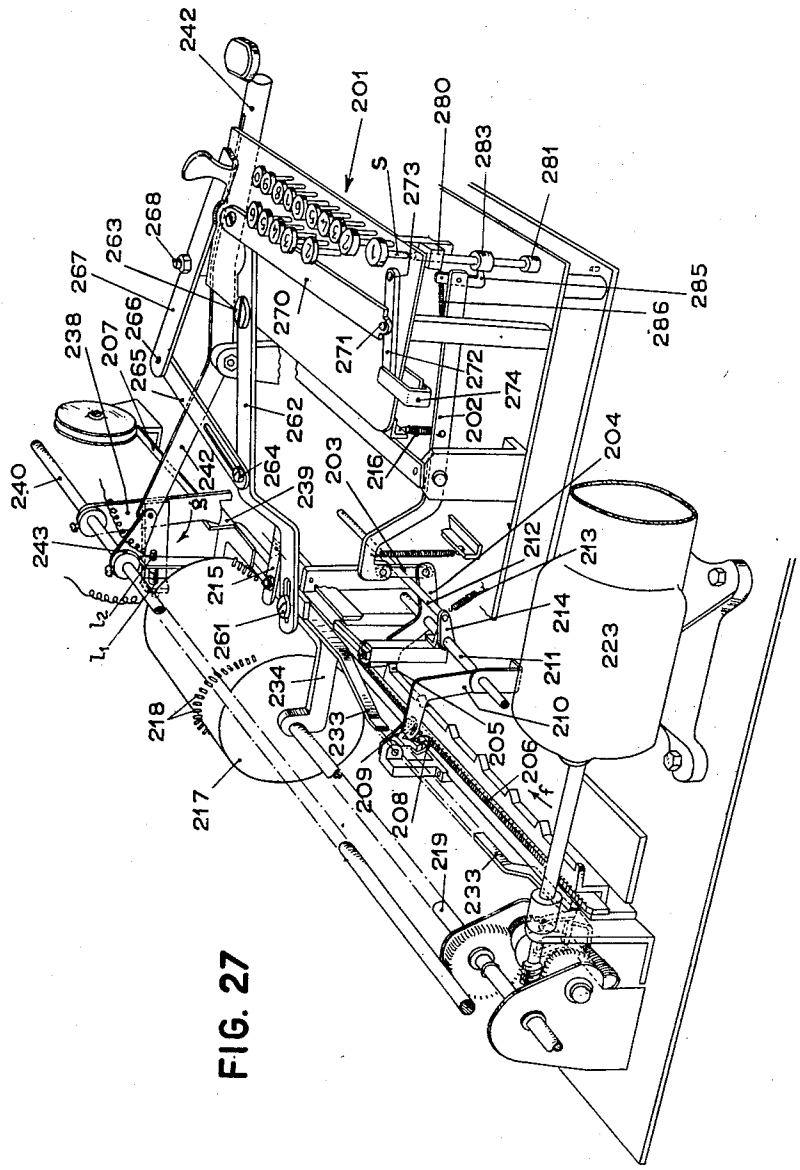


FIG. 27

Inventor:
N. Gretchikhine,
By E. F. Wenderoth
Atty

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 18

FIG. 28

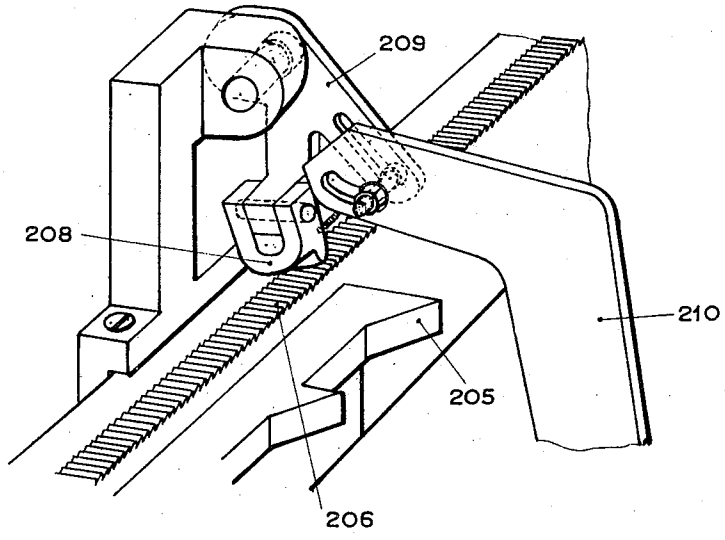
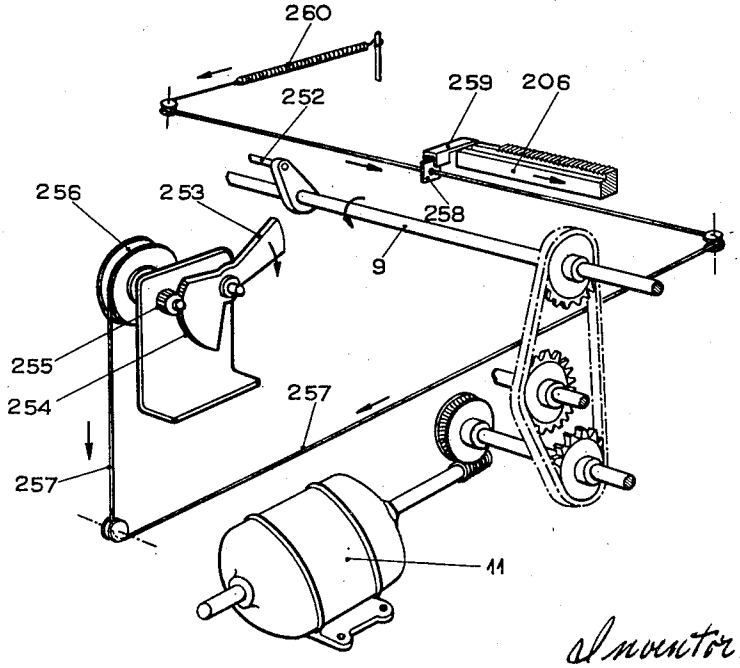


FIG. 29



Inventor:
N. Gretchikhine
By E. F. Neuerouth
Atty

Jan. 2, 1951 N. GRETCHIKHINE 2,536,276

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 19

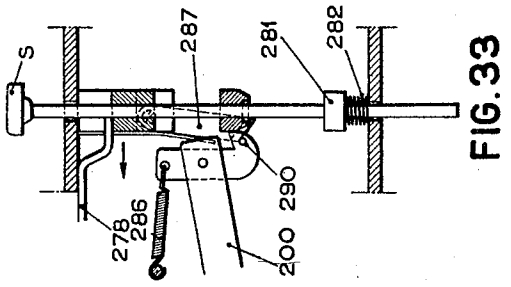


FIG. 33

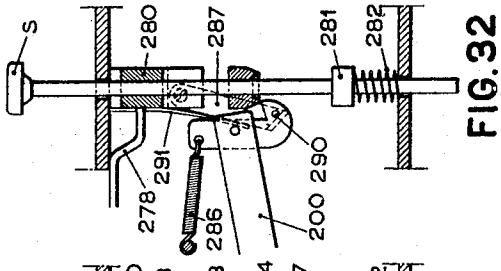


FIG. 32

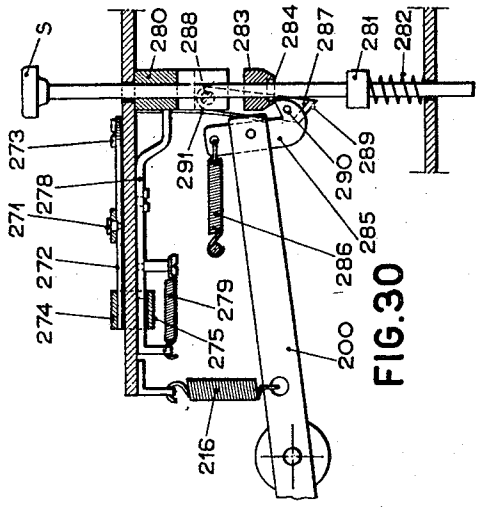


FIG. 30

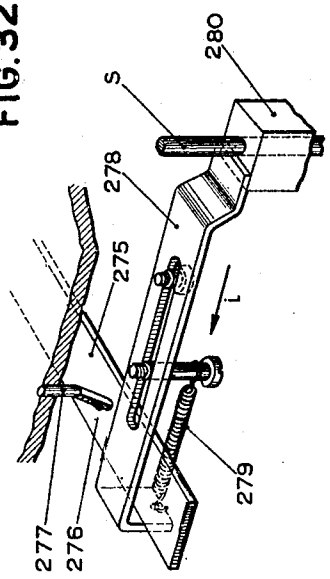


FIG. 31

Inventor:
N. Gretchikhine
By E. F. Wenderoth
Atty

Jan. 2, 1951 N. GRETCHIKHINE 2,536,276

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 20

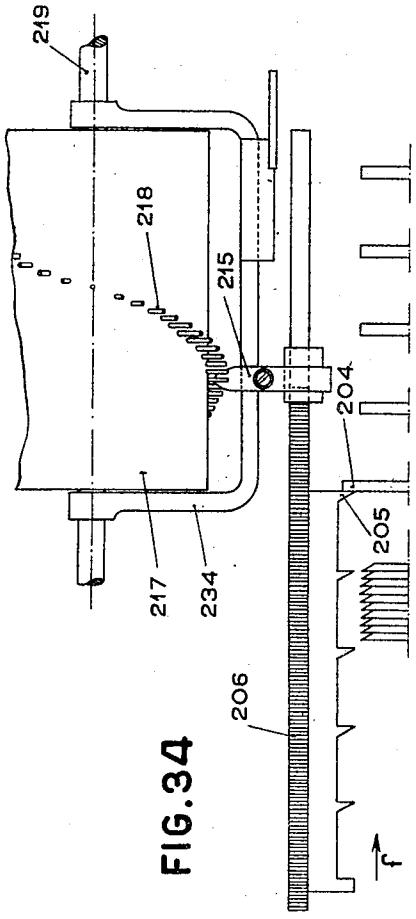


FIG.34

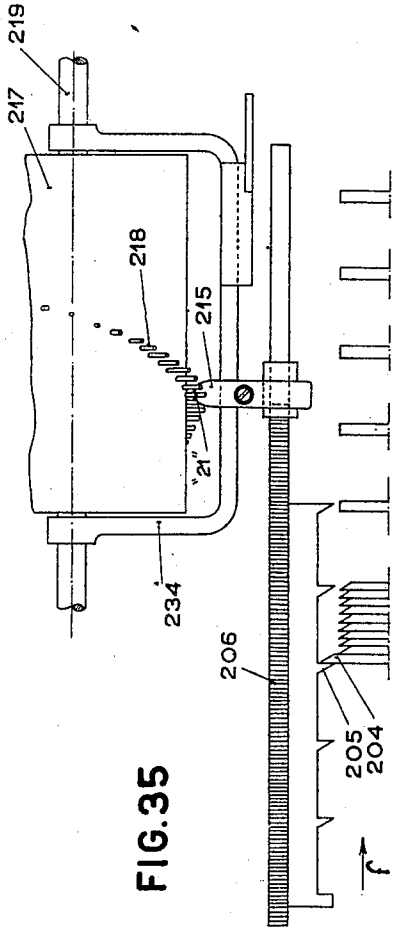


FIG.35

Inventor:
N. Gretchikhine
By E. F. Kenworth
Atty

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 21

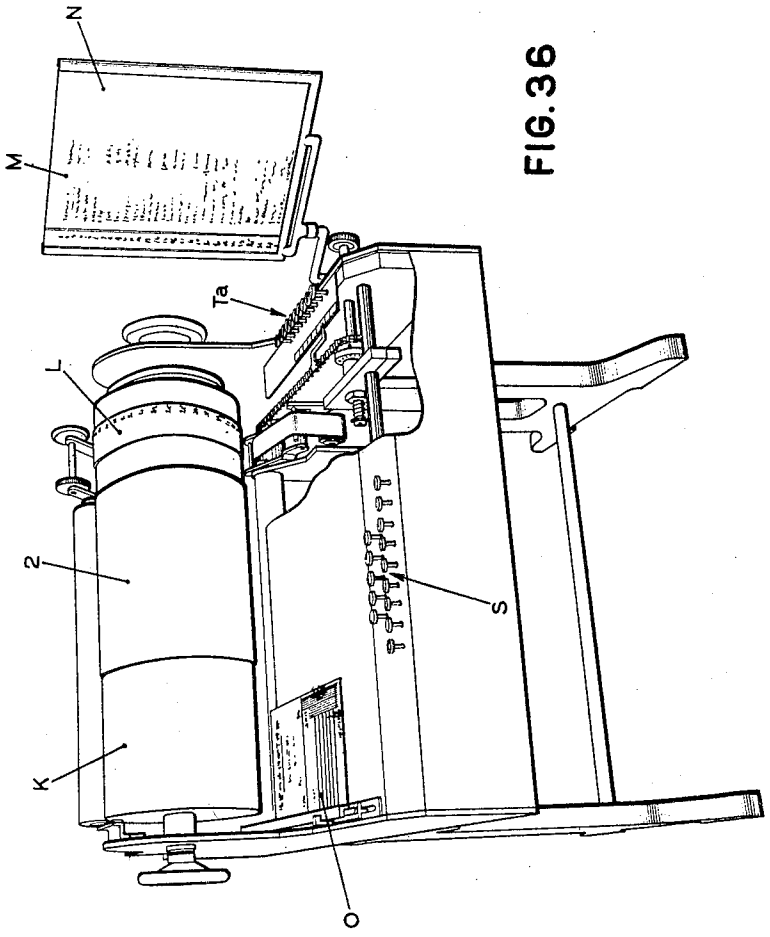


FIG. 36

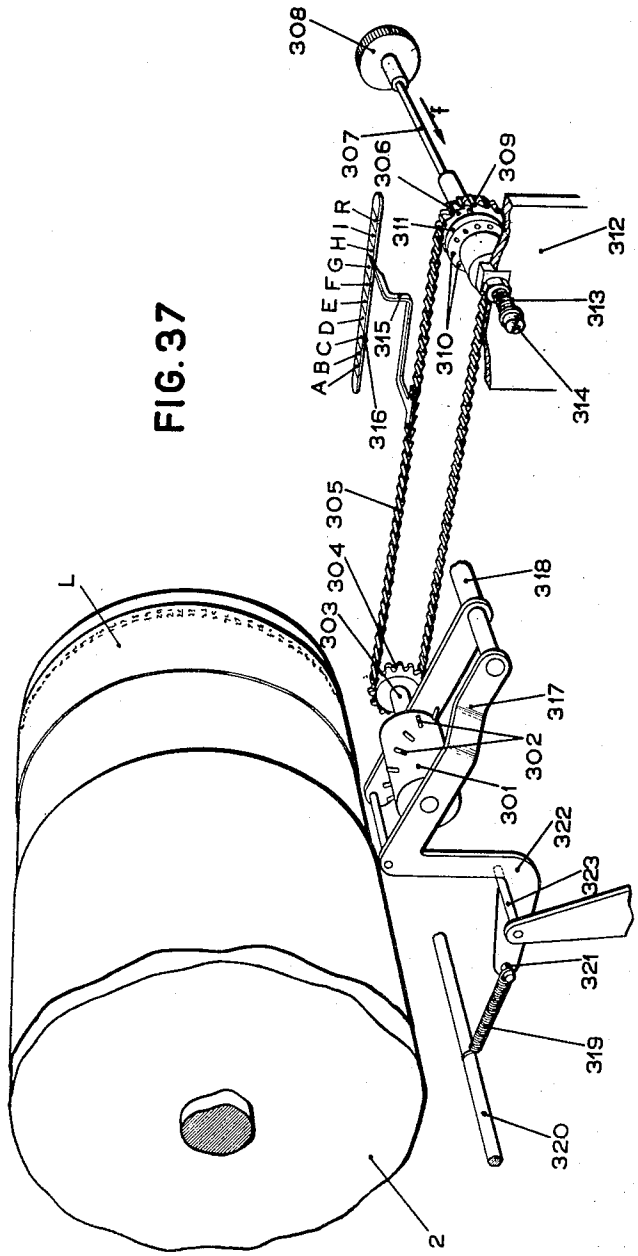
Inventor:
N. Gretchikhine
By E. F. Neudecroth
Atty

Jan. 2, 1951 N. GRETCHIKHINE 2,536,276

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 22

FIG. 37



Inventor:
N. Gretchikhine
By E. F. Neudeck
Atty

Jan. 2, 1951 N. GRETCHIKHINE 2,536,276

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 23

FIG. 38

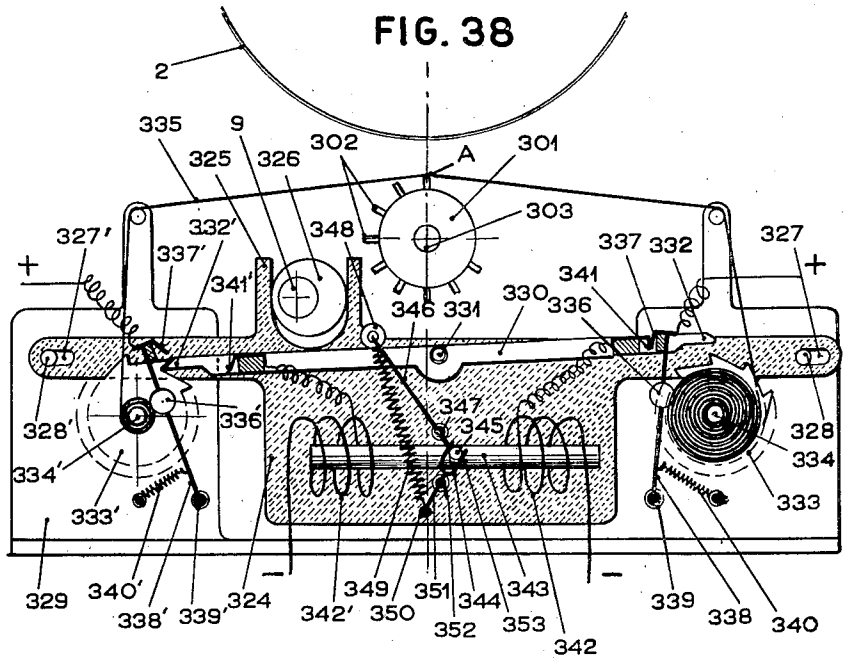
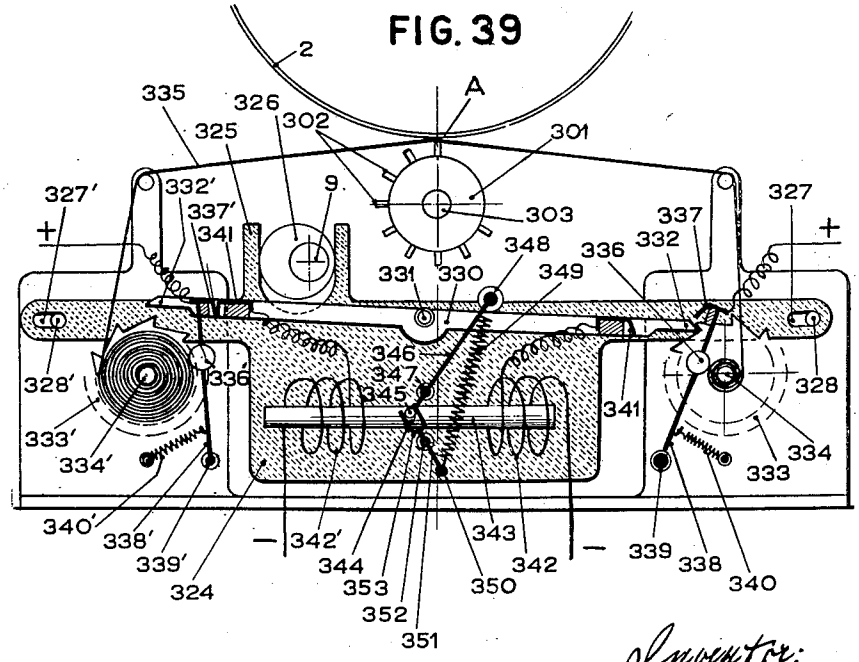


FIG. 39



Inventor:
N. Gretchikhine
By E. F. Wendroth
Atty

Jan. 2, 1951 N. GRETCHIKHINE 2,536,276

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 24

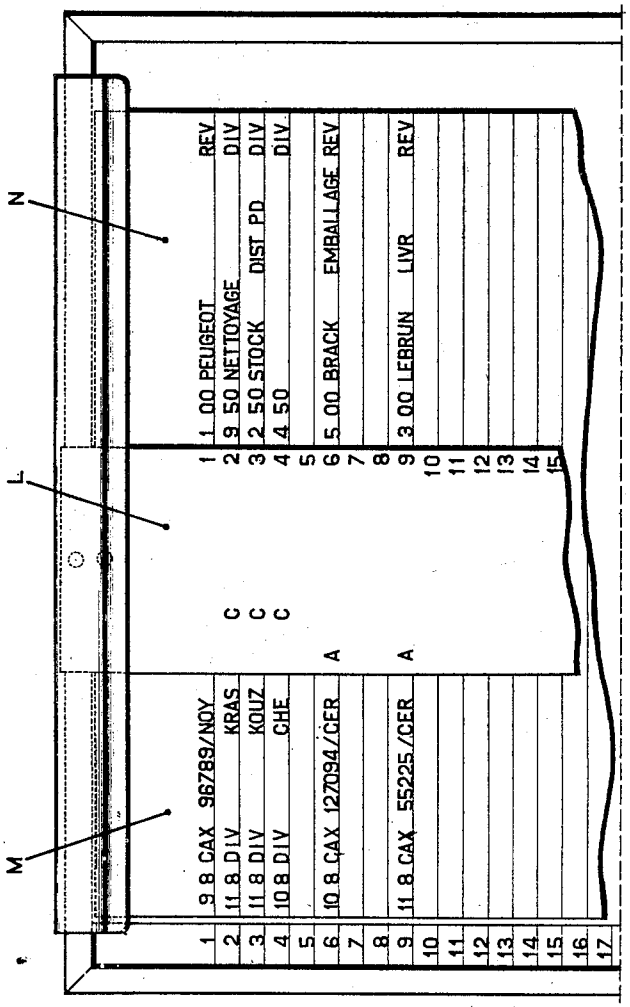


FIG. 42

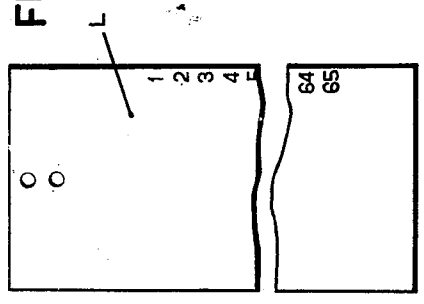


FIG. 40

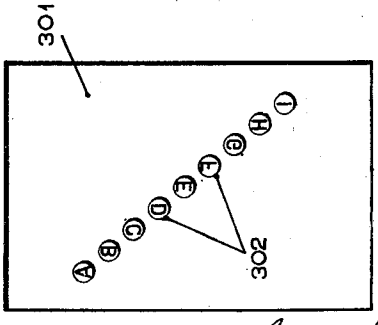


FIG. 41

Inventor:
N. Gretchikhine
By E. F. Henderson
Atty

Jan. 2, 1951 N. GRETCHIKHINE 2,536,276

SELECTIVE BED AND CYLINDER PRINTING MACHINE

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FIG. 43

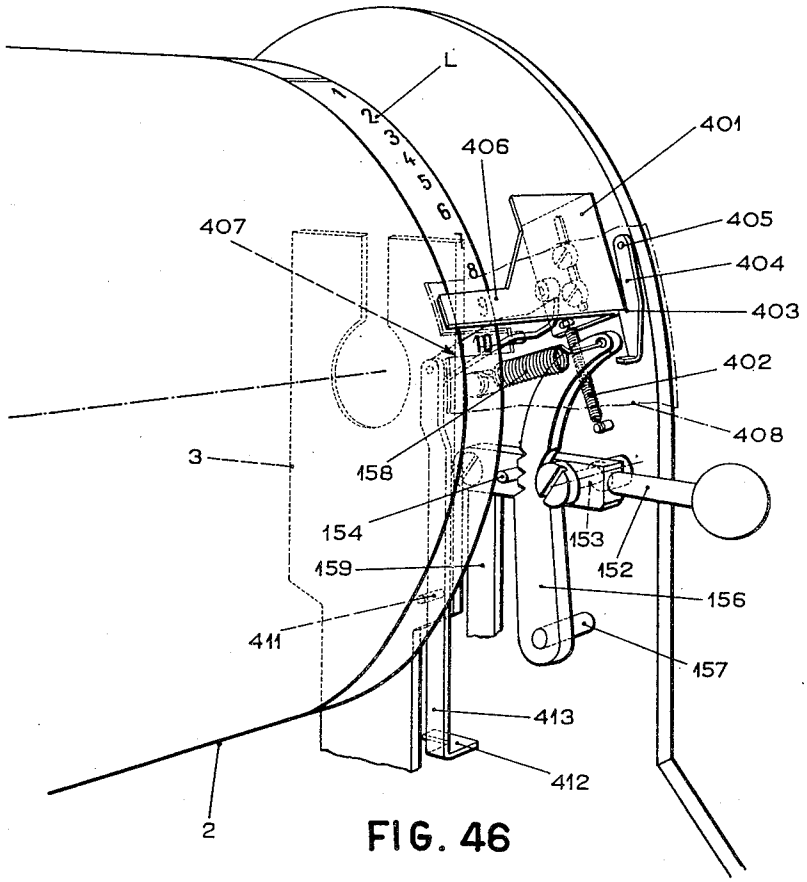
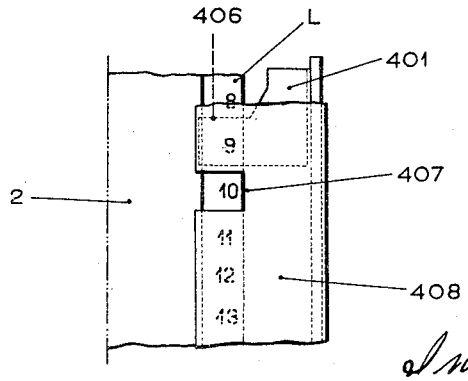


FIG. 46



Inventor:
N. Gretchikhine
By E. F. Kenderoth Atty

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 26

FIG. 44

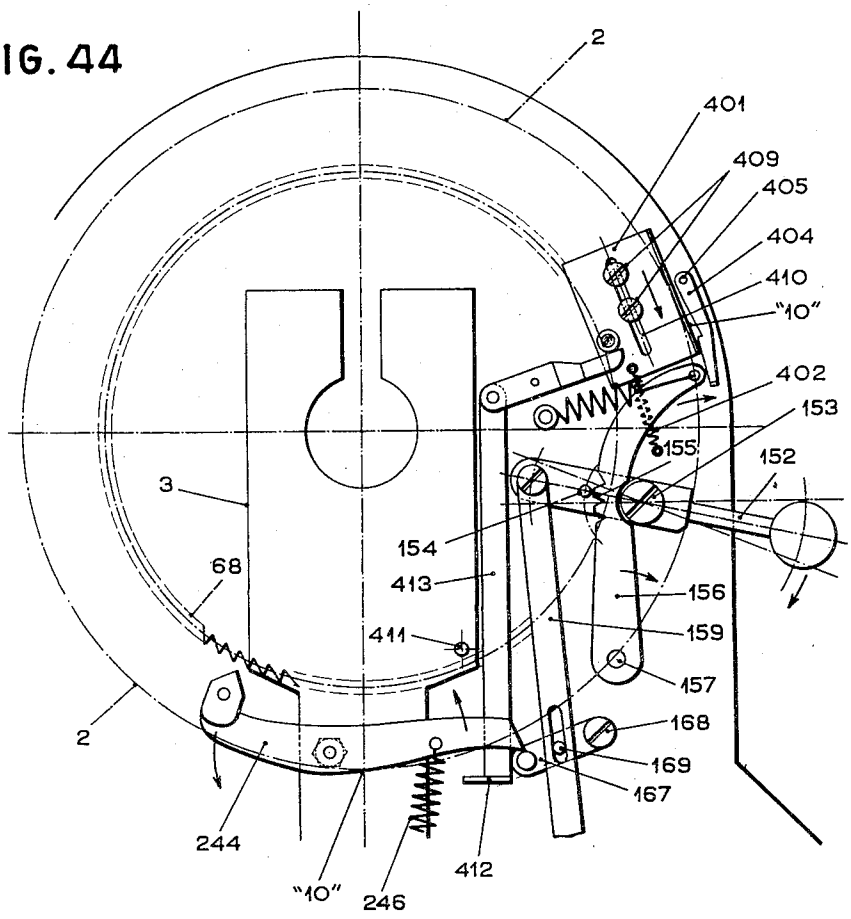
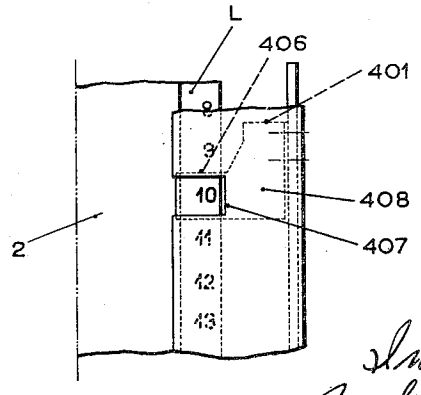


FIG. 47



Inventor:
N. Gretchikhine
By E. F. Neuderth
Atty

Jan. 2, 1951 N. GRETCHIKHINE 2,536,276

SELECTIVE BED AND CYLINDER PRINTING MACHINE

Filed July 16, 1945 27 Sheets-Sheet 27

FIG. 45

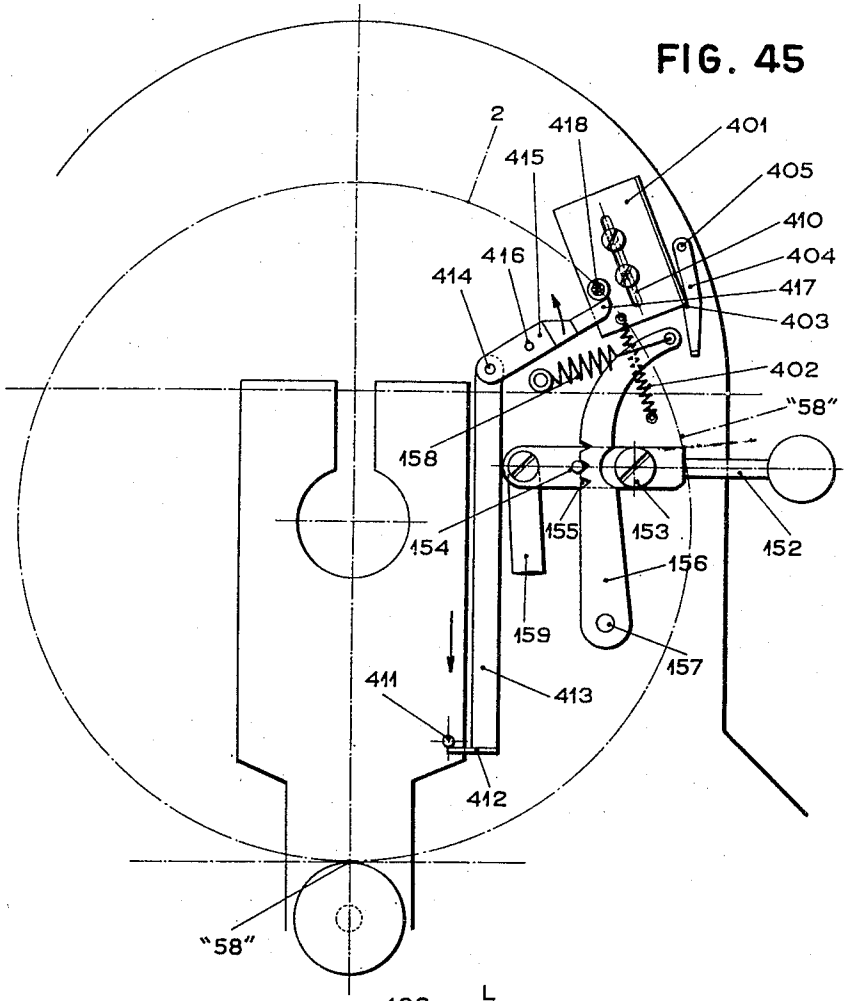
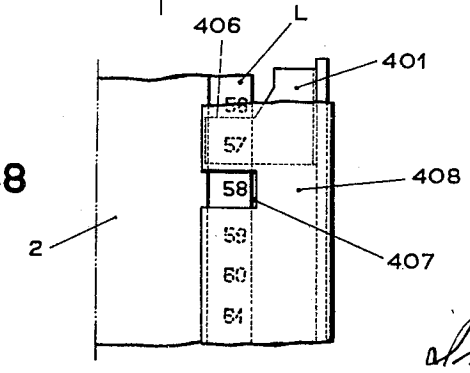


FIG. 48



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SELECTIVE BED AND CYLINDER PRINTING MACHINE

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This invention relates to a duplicating printing machine having a rotary printing cylinder carrying a stereotype, master sheet or document capable of printing.

An object of the invention is to provide a mechanism having a printing cylinder upon which are carried a number of lines to be printed from which a selected line, a selected series of consecutive lines or selected separated lines may be chosen as desired and printed upon a sheet.

A further object of the invention is to provide control means for the rotary printing cylinder which may be displaced a predetermined distance proportional to the number of lines to be printed and then returned step by step by a mechanism operated from the drive of said cylinder so that upon termination of the return of said control means after the desired lines have been printed the cylinder will again be locked in position.

A still further object of the invention is to provide a first selecting mechanism for selecting a predetermined line to be printed or the starting line of a series of consecutive lines to be printed.

A further object of the invention is to provide a second selecting mechanism whereby after the starting line to be printed has been selected the extent of the series of consecutive lines to be printed is predetermined.

A still further object of the invention is to provide means for intermittently rotating the rotary printing cylinder through angular distances corresponding to the step by step movements of the above mentioned control means.

A still further object of the invention is to provide means for holding the rotary printing cylinder in its lower position during the printing of a series of lines under the control of said control means so that during the printing of such series of lines the sheet being printed will be fed by said cylinder and upon termination of such printing the cylinder will be released. Means are also provided for securing the intermittent rotation of the cylinder while in its lower printing position.

With the above and other objects in view which will become apparent from the detailed description below an embodiment of the invention is shown in the drawings, in which:

Fig. 1 is a general cross-sectional view with parts in elevation through a plane parallel to the longitudinal central plane of the printing machine.

Fig. 2 is an elevational view showing the rack

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system controlling the number of lines to be printed in succession.

Fig. 3 is a plan view of the parts shown in Fig. 2.

Fig. 4 is a side view taken from the right hand side of Fig. 3.

Fig. 5 is a view similar to Fig. 2, showing certain parts after actuation of the key illustrated in Fig. 4.

Fig. 6 is a side view similar to Fig. 4 showing the parts after actuation of the key shown therein.

Fig. 7 is a detail view showing how the rack may be released from its pawl.

Fig. 8 is an elevational view of certain parts of the machine seen from a direction opposite to that of Fig. 1 and showing diagrammatically the main switch controlled by the rack and the motor with its circuit.

Fig. 9 is a detail view, showing the ratchet pawls for causing the intermittent movement of the printing cylinder.

Figs. 10 and 11 show in elevation respectively the start and finish positions of the parts causing intermittent movement of the printing cylinder when the latter is in its upper position.

Fig. 12 is a similar view illustrating the position of the same parts when the printing cylinder is locked in its lower position for the consecutive printing of predetermined lines.

Fig. 13 is a partial view perpendicular to the axis of the printing cylinder showing the keyboard on the selecting device in longitudinal side view with its cooperating parts, said keyboard comprising, in the form of execution shown, ten ordinary keys and an extra or special key.

Fig. 14 is a partial plan view partly sectional through line A—A of Fig. 13, showing the locking device for the special key.

Fig. 15 is a plan view of the keyboard.

Fig. 16 is a partial elevational view showing the means for reciprocating the slide for returning the rack to its starting or inactive position.

Fig. 17 is a partial elevational view with parts shown diagrammatically showing the means for locking the printing cylinder in its lower or printing position as controlled by the special key.

Fig. 18 is an elevational view at right angles to Fig. 17 showing the special key in association with the last key of the keyboard for initiating displacement of the rack prior to printing.

Fig. 19 is a cross-sectional view of the printing machine showing the sheet feeding device with

the printing cylinder removed, the parts being in their inactive position.

Fig. 20 is a perspective view showing the control of the electric circuit for the motor of the printing machine by the return movement of a previously depressed key.

Fig. 20a is a rear elevational view of the main switch of the control means illustrated in Fig. 20.

Figs. 21 and 22 are side views illustrating respectively the operative and inoperative positions of the interlinear spacing mechanism.

Fig. 23 is a partial front view of the same mechanism.

Fig. 24 is a plan view with parts omitted for clarity of a second selecting mechanism showing particularly the connection with the printing cylinder.

Figs. 25 and 26 are partial cross-sectional views, through section line X—X of Fig. 24, showing the arrangement showing the locking of the printing cylinder by the pivoting of a lever by a pin on the drum of the selecting mechanism.

Fig. 27 is a partial perspective view showing the general arrangement of the second selecting mechanism.

Fig. 28 is a view on a larger scale of a detail of Fig. 27 showing the arrangement of the pawl cooperating with the teeth of the rack of the selecting device.

Fig. 29 is a perspective view showing the automatic zero return device for the rack, said return being performed under the control of the motor of the printing machine.

Fig. 30 is a cross-sectional view showing a key of the selecting mechanism with its locking bolt controlled by the zero return device.

Fig. 31 is a perspective view showing a portion of the control means for the locking bolts of the selecting mechanism.

Figs. 32 and 33 show views similar to Fig. 30 showing the parts in different positions.

Figs. 34 and 35 are partial plan views showing the position of the rack and of the movable stops of the selecting mechanism after depression by the operator of the key having indicium "2" of the tens and of the key having indicium "1" of the units respectively.

Fig. 36 is a perspective view with parts removed showing the printing machine provided with a document carrying board, a control strip, both selecting means, a verifying means and a copy or stereotype on the cylinder.

Fig. 37 is a partial perspective view showing the control of the verifying means and pointer together with the manner of mounting same, the printing cylinder and its control strip being shown in their upper position i. e. before the printing operation.

Figs. 38 and 39 are cross-sectional views showing electro-mechanical reversing means for the inked ribbon, said means being shown respectively in its two reversing positions, the printing cylinder lying in its upper position in Fig. 38 and in its lower position in Fig. 39.

Fig. 40 is a broken plan view of an unprinted control strip.

Fig. 41 shows a development of the verifying cylinder showing the staggered type.

Fig. 42 is a partial plan view showing the upper part of the document carrying board provided with a daybook and a control strip.

Fig. 43 is a partial perspective view of the device for visually controlling the operation in its normal operative position, the shutter adapted to cover the scale on the control strip being shown in its raised position.

Fig. 44 is an elevational side view of the parts shown in Fig. 43 showing the shutter as it begins moving downwardly upon manual disconnection of the printing cylinder.

Fig. 45 is a similar view showing the shutter in its upper position due to the downward movement of the printing cylinder.

Figs. 46, 47 and 48 are partial plan views on a larger scale of a portion of the printing cylinder of the sight provided in the cover hiding the control strip, said views corresponding respectively to the positions illustrated in Figs. 43, 44 and 45.

In the drawings like reference characters refer to like parts in the various figures.

Referring to Fig. 1, 1 is the shaft of the printing cylinder 2. The shaft 1 is mounted at each end in the carriage members 3 normally held by the springs 4 in its upper position away from the sheet to be printed. The carriages 3 may be moved downwardly to bring the cylinder into printing position by a lever 5 pivotally secured to each carriage. Lever 5 is pivotally secured to the frame at 6 and its movement is controlled by a roller 7 on a plate 8 fixed to control shaft 9.

Shaft 9 is driven by shaft 10 of electric motor 11 through a suitable reduction transmission. (Fig. 8.) The circuit of the motor includes a switch comprising a stationary contact 12 and a movable contact 13 pivotally mounted at 14 to the frame and insulated therefrom. The contact 13 is normally urged to circuit closing position by spring 15. It is connected on the other hand by a link 16 with another arm 17 keyed to an intermediary shaft 18 parallel to the control shaft. The arm 17 is connected by a spring 19 with the bell crank lever 20 mounted loosely on the control shaft 9.

First selecting device

When the machine is at starting position and inactive, the end surface 21a of the control member for selecting the number of lines to be printed is formed, in the example illustrated, as a rack 21 abutting a projection 22 on the lever 20 so as to hold said lever so that the switch 12—13 remains open. The action exerted by the spring 19 on the arm 17 and consequently on the arm 13 is greater than that exerted in the opposite direction by the spring 15.

Thus in its inactive position, the rack 21 prevents the machine from operation by holding the switch 12—13 open.

The rack 21 is guided horizontally by the screws 23 and is normally urged towards the right hand side of Figs. 1 and 2 by a spring 24, but is held in the inactive position shown by the retaining pawl 25 urged by the spring 26 into engagement with the teeth 21b of the rack (Fig. 2).

Beyond the other end surface 21c of the rack when in inactive position, there are arranged at intervals stops 27 (Figs. 2 and 3) vertically slidable in grooves provided in a horizontal stationary bar 28. The stops are normally withdrawn in said grooves out of the path of the end surface 21c of the rack by two small springs 29 acting on each stop (Figs. 2 and 4).

These stops are equidistant from one another and the distance between the surface 21c in the inactive position of the rack and the first stop is equal to the spacing between any two successive stops, said spacing being also equal to the interval between two teeth of the rack.

Each of the stops has associated therewith and may be raised by a small piston 30 (Figs. 2 and 4)

guided vertically by a carrier 31 and the bar 28. Each piston 30 is in contact with one end of a lever 32 pivotally secured at 33 to a horizontal axis and having the other end 34 pivoted to the stem 35 of a key 36. The stem is suitably guided for vertical movement. There are for instance nine keys such as 36 and consequently nine mechanisms comprising a stop 27, a piston 30, a lever 32 and a stem 35. The different keys have indicia thereon from felt to right, of: "1," "2," "3," "4," "5," "6," "7," "8" and "9" which correspond with the number of consecutive lines to be printed.

Under the levers 32, a horizontal bar 37 mounted upon two arms 38 pivoted at 39 (Figs. 4 and 6) is disposed. One of the arms 38 is provided with an extension 38a to engage the underside of the flange 40a of the slide 40 guided so as to move over the plate 41 carrying the pawl 25 and the screws 23 acting as guiding and carrying means for the rack (Fig. 2). This slide 40 will, as it ascends, meet a projection 42 on the pawl 25 so as to disengage the pawl from the rack. To make this disengagement easier, there is provided a lever 43 (Figs. 2 to 7) pivotally secured at 44 having one end engaging the upper side of the flange 40a of the slide 40 so as to be pivoted by the arms 38, 38a at the same time as said slide is raised.

The other end of this lever 43 carries a projection 45 to make the lever 20 rock when said lever 43 is pivoted, the lever 20 rocking then in a direction to move the projection 22 away from the surface 21a of the rack. This releases the pawl 25 from the pressure of the rack produced in the inactive position by the spring 19. The parts are designed so that this release of the retaining-pawl 25 occurs before the projection 42 on said pawl is raised by the slide 40.

Under such conditions, for instance the key having indicium "9" is depressed (Figs. 3 and 5), the corresponding lever 32 depresses the bar 37 and raises at the same time the corresponding piston 30 and stop 27. The bar 37 produces through the arms 38, 38a the disengagement of the retaining-pawl 25 and the rack 21 is then moved by the spring 24 towards the right as shown in Fig. 2 until it abuts again at the raised stop 27 (Figs. 5 and 6). When the key is released, the pawl 25 first reengages the rack which is thus held stationary while the stop 27 moves again into its groove in the bar 28 under the action of its spring 29 thereby raising the key to its starting position.

It is apparent from what has been said as concerns the spacing between the stops and the arrangement of the keys, that the actuation of any of said keys causes the rack to move, starting from its inactive position, through a path which is proportional to the number of lines to be printed corresponding to the indicium on said key. It is of advantage to provide a pointer 46 (Figs. 2 and 3) secured to the right hand side of the rack and moving over a small graduated plate 47, whereby once the key has returned into its starting position, the position of the pointer continues to indicate the indicium of the key which has been actuated.

As soon as the key has been released, the retaining pawl 25 has reengaged the teeth of the rack while the bar 37 has risen and the slide 40 has moved again downwardly. The projection 45 on the lever 43 has thus released the lever 20, the projection 22 of which is no longer in contact with the end surface 21a of the rack. Consequently, spring 15 (Fig. 8) closes the switch 12, 13. The machine may then be started by closing manually switch 48 (Fig. 8).

Returning to Fig. 1, there is keyed to the intermediary shaft 18 an arm 50 which, when the rack is in inactive position, bears against a stud 51 on a bolt 52 against the action of spring 53 thereby holding the bolt 52 out of the path of carriage 3. A similar arrangement is provided for the other carriage 3.

When a key has been depressed, and the rack has left its inactive position, the switch 12, 13 closes and the arm 50, which rocks together with the arm 17 releases the bolt 52 which under the action of its spring 53 enters consequently the path of the carriage 3.

The machine being started, the roller 7 pivots the lever 5 downwardly and the carriage 3 by means of its flange 3a contacting the sloping wall of bolt 52 moves it away from its path after which the bolt (Fig. 12) snaps into place above the flange 3a. When the carriage is in its lowermost position when printing takes place, the flange 3a lies a few tenths of a millimeter underneath the bolt 52 for reasons which will be disclosed hereinafter.

Once the roller 7 has passed beyond the lowermost position and has thus printed the first line, an arm 54 carrying a projection 55 (Figs. 1, 2, and 5) draws towards the left a projection 56a on a horizontal slide 56 guided by the screws 57 extending through slots in the slide, (Fig. 3). This slide 56 carries a pawl 58 urged by a spring 59 towards rack 21. The pawl 58 is provided with a projection 60 cooperating with cam 61 (Fig. 7) to cause a step by step return of rack 21 towards the left as seen in Fig. 2.

When the projection 55 releases the projection 56a, the slide returns under the action of the return spring 56b and this reciprocating movement is repeated on each revolution of the main shaft.

Since the key with the indicium "9" was actuated and the rack originally displaced through a distance of 9 teeth, the return thereof towards its inactive position takes place at the rate of one tooth for each revolution of the control shaft.

From the description above the rack which constitutes the control member of the selecting device is moved from its inactive position forwardly through a number of teeth corresponding to the indicia upon the key depressed which equals the number of lines which are to be printed consecutively and then is returned step by step by a pawl 58 carried by a slide 56 which is in turn reciprocated under the action of an arm carrying a projection 55 upon the main control shaft 9.

The rack 21 is normally maintained in its inactive position against the action of a spring 24 which tends to urge it through the distance which corresponds to the maximum number of lines to be consecutively printed for which the machine may be designed. This is accomplished through the pawl 25 which is released upon depression of any of the keys of the selecting device thereby permitting the rack to move until stopped by the stop 27 associated with the particular key actuated.

The printing cylinder 2 normally held in its upper non-printing position by the springs 4 is lowered to printing position by the roller 7 carried by the disc 8 fixed to the control shaft 9. When in the lower position the bolt 52 comes into action and maintains the printing cylinder in such position for the predetermined time.

As above described the bolts 52 are maintained out of the paths of the carriages 3 by the contact of the end 21a of the rack 21 with the stud 22 upon the bell crank lever 20 which brings about the reaction between the arm 50 fixed to shaft 18 and the stud 51 upon the bolt 52. However as is obvious this reaction only takes place when the rack 21 is in its inactive position or in its extreme left hand position as shown in Fig. 2. Therefore the bolt 52 will maintain the printing cylinder 2 in its lower position after the rack 21 has been actuated through the depression of a key until the end 21a of the rack 21 under its step by step return again comes into contact with the stud 22.

As above indicated the roller 7 coacting with the lever 5 for causing the downward movement of the carriage of the printing cylinder is so designed as to move said carriage downwardly a slightly greater distance than is necessary for the engagement of the bolt 52. Such a slight lowering of the carriage will take place upon each revolution of the shaft 9. Also the parts are so organized that the small downward movement of the carriage takes place at the same time as the step by step return of the rack 21. Due to the above construction when the end 21a of the rack finally actuates the bell crank lever 20 the pressure of the carriage against the bolt 52 has been released and thereby the bolt 52 may be easily withdrawn by the action of the arm 50 against the stud 51.

Mechanism for interlinear spacing

Also, on each revolution of the shaft 9, a projection 62 carried by the plate 8 (Fig. 1) raises against the action of a return spring 63a, a lever 63 and thereby two pawls 64^1 and 64^2 (Figs. 9 to 12). During this movement, and under the action of a spring 65, a projection 66 on said pawls slides over a guideway 67. The lower pawl 64^2 (see Fig. 12) engages a tooth of the ratchet wheel 68 fixed to the printing cylinder which is held in its lower position by the bolt 52. This rotates the cylinder through one interlinear space whereby, the cylinder being in its lower position in contact with the sheet of paper *f* to be printed and bearing against the yielding roller *r*, the cylinder will feed the sheet forwardly each time by one interlinear space into position for the printing of the following line.

Thus, each time a line is printed, the control shaft causes simultaneously the return of the rack through a one tooth interval towards its inactive position and the rotation of the printing cylinder through an angle corresponding to one interlinear space.

The key having indicium "9" having been depressed, the rack will return step by step through nine teeth in its return movement while the cylinder prints nine lines. When the rack begins its last return step for the printing of the ninth line, its end surface 21a will begin acting on the stud 22.

The machine is designed so that this action on the stud 22 and consequently on the shaft 18 and on the arm 50 controlling the bolt 52 follows the passage of the roller 7 through its vertical alignment with the shaft 9. Consequently the flange 3a of the carriage is lowered through a few tenths of a millimeter underneath said bolt so that when the bolt is urged towards the left hand side of Fig. 12, it will no longer be subjected to the action of the springs 4 and said bolt will thus easily slide back over its guiding pins 69.

As soon as the bolt has released the flange 3a (Fig. 10), the carriage 3 and the printing cylinder will rise and the projection 62 on the plate 8 will cause the pawls 64^1, 64^2 to rise. At the end of its movement, the upper pawl 64^1 will cause the ratchet wheel 68 (Fig. 11) to rotate through a ninth interlinear space. During this rotation, the bolt will have moved completely outside the path of the carriage 3 and consequently the contact arm 13 pivoting together with the arms 17 and 50 will open the switch 12, 13. The machine will then stop and a brake is provided for stopping the motor immediately after the switch has been opened.

When only one line is to be printed, i. e. when previously to the starting of the machine, the key having indicium *"1"* has been actuated, the rack returns only through a distance of one tooth. After printing the single line, the arm 54 will return the rack to its inactive position, which will cause, as above described, the withdrawal of the bolt 52, the upward movement of the cylinder and its rotation through one interlinear space under the action of the upper pawl 64^1 and the breaking of the motor circuit. In this case consequently, the cylinder does not remain in its lower position and rises immediately after the printing of one line.

The operation of the above elements is believed to be clear. The main control shaft 9 through the projection 62 on each revolution brings about the upward movement of the two pawls 64^1 and 64^2 designed to coact with the ratchet wheel fixed to the printing cylinder so that when the printing cylinder is in upper position one of said pawls will react therewith while when the printing cylinder is in lower position the other pawl will react therewith to advance the cylinder through one interlinear space.

Correcting device

It will be understood that when one of the keys 36 is depressed for selecting the number of consecutive lines to be printed, an error may sometimes be made. If a key having a lower indicium number such as that having indicium "6" instead of that having "8" has been accidentally actuated, it is corrected by simply depressing immediately the key having indicium "8."

When it is desired to correct a mistake, it is necessary to resort to the particular device described hereinafter which brings about manually controlled return of the rack tooth by tooth towards its inactive position.

Referring to Fig. 2 in which such device is shown, depression of the key 70 causes a lug 72 to move downwardly against the action of spring 71 to rock a lever 73 keyed to an axis 74. This axis rocks in turn a link 75 which actuates a rod 76 connected to the horizontal slide 56. This causes the advance of the rack by one tooth towards its inactive starting position. It is thus sufficient to actuate the key 70 as many times as the number of teeth through which the rack has been moved above the correct number, in order to correct the error made.

Special key

In the modification illustrated in Figures 13 to 16 and in particular Figs. 13 and 15 there is provided beyond the last key of the ordinary keyboard i. e. key having indicium "10" in the present example, a special key 100 the stem 101 of

which is suitably guided and carries a small cross bar 102 which when inoperative lies above a shoulder 103 located upon the stem 35 of the above mentioned key having indicium "10." A depression of this special key produces also a depression of the key having indicium "10."

The stem 101 carries also a conical ring 104 against the side surface of which a horizontal lever 106 is applied under the action of the spring 105 (Fig. 14) when the key 100 is in its upper position. The horizontal lever 106 is adapted to pivot round a stationary point 107 forming an axis suitably carried by the body *t* of the keyboard. Thus when the special key 100 is depressed against the action of the return spring 108, the lever 106 moves automatically into position above the upper side of the ring 104. The key 100 is thus locked in its lower position and the key having indicium "10" which has followed it in its downward movement is also locked. This position is illustrated in Figs. 17 and 18.

Returning to Figs. 13 and 14, the lever 106 extends beyond its pivot 107 and is provided with a projection 106*a* adapted to be deflected in the direction of the arrow of Fig. 14 by a boss 109 carried by the printing cylinder 2, so that the lever 106 when rocked by said boss releases the special key 100.

The position of the projection 106*a* in height is such that this meeting between the boss 109 and the projection 106*a* will occur while the cylinder 2 rotates when locked in its lower printing position as shown in dot and dash lines at 2^1 in Fig. 13. On the other hand, the boss 109 is angularly positioned on the cylinder 2 so as to activate the lever 106 the number of lines before the end of the stereotype corresponding to the indicium of the key associated with the special key, in this instance 10.

The stem 101 of the special key 100 is pivotally secured at 110 to a V-shaped lever 111 pivoting round point 112 and pivotally secured at its end to a connecting rod 113 controlling a cam 114 adapted to rock on its axis 115. As long as the extra key 100 is in its higher position, this cam holds a stirrup shaped part 116 pivotally secured at 117 in the position shown in Fig. 13 in which a notch 116*a* of this stirrup engages a projection 52*a* on the bolt 52, which prevents the latter from entering the path of the carriage 3 even if the rack 21 leaves its inactive position.

Consequently, the locking of the carriage 3 in its lower position is produced, in the case of the present form of execution, only in the case where the machine is to print the entire stereotype.

The operation of the above described device is as follows:

When it is desired to print the entire stereotype or the like copy, it is necessary to depress the special key 100. The latter, as explained hereinabove, produces the depression of the last key having indicium "10" of the keyboard; this initiates movement of the rack towards the right hand side of Fig. 13 through an amount corresponding normally to the printing of ten lines in the present example. But as the key having indicium "10" remained locked with the special key as illustrated in Figs. 17 and 18, the pawl 25 remains raised by the slide 40, so that on each reciprocating movement of the slide 56, the rack is also reciprocated without returning positively towards its inactive position.

If the stereotype or copy has 64 lines, the machine will print under such conditions the first 54 lines. But as soon as the key 100 has been depressed, the cam 114 will have rocked about its axis and caused the notch 116*a* of the stirrup 116 to disengage the projection 52*a* of the bolt 52. The latter has therefore moved towards the right so as to lock the carriage 3 as soon as the cylinder has moved downwardly for printing the first line (Fig. 17) with the projection 52*a* engaging the underside of the notch 116*a* (Fig. 17). The printing continues therefore without the cylinder rising after each line, which reduces the strain on the different parts and allows the cylinder to frictionally feed the sheet *f* against the counterpressure of roller *r*.

When the 54th line has been printed, the boss 109 on the printing cylinder meets the projection 106*a* of the lever 106 thereby releasing the key 100 and also the key having indicium "10." Then, referring to Fig. 18, the bar 37 is released from the pressure of the lever 32 and the lever 38*a* allows the slide 40 to move again downwardly. Consequently the pawl 25 reengages the rack 21 which, as soon as the 55th line has been printed, will return step by step to reach finally its inactive position shown in Fig. 13 and initiate the stopping of the machine after the printing of the 64th line.

It should be noted that, when the key 100 has risen under the action of the spring 108, the cam 114 is no longer in contact with the stirrup shaped part 116 and the latter remains disengaged and raised without support while the bolt continues to hold the carriage 3 and the cylinder 2 in their lower position so that the printing of the ten last lines is also provided for without the cylinder rising after the printing of each line. Therefore it is only when the rack has reached its inactive position that it will act on the projection 22 which displaces the lever 20. The lever 20 returns the bolt 52 into its inoperative position through the spring 19 and the lever 50. The stirrup-shaped part 116 is then allowed to fall freely and to reengage with its notch 116*a* the projection 52*a* on the bolt 52.

As disclosed hereinabove, the depression of a usual key of the keyboard does not lock the cylinder in its lower position. The feed of the sheet of paper *f* may then be obtained automatically for instance through the sheet feeding means which will now be described.

With the above described arrangement it is possible with a machine having a limited number of keys to print or to reproduce in a single operation the entire stereotype without enlarging the machine.

Sheet feeding means

Referring to Fig. 19, B designates the left hand flange of the machine and 118 a slide adapted to rest on and slide over the supports 119 and 120. The guiding of the slide is ensured by the screws 121 moving inside grooves provided in said supports.

The paper or cardboard sheet to be printed rests on the table of the machine, not shown, and has one of its longitudinal edges extending a certain width over the upper surface 118*a* of the slide 118 which surface is flush with the table. The upper end of the sheet or else according to the case the last line already printed is located at the mark A formed on the jaw element 122 while the above mentioned longitudinal edge of the sheet is urged against the vertical surface 122*b* of the jaw element so as to lie underneath the flange 122*a* forming the gripping surface of the jaw element.

The jaw element 122 is vertically movable with reference to the slide 118 and may be guided by the studs 123 carried by said jaw element and adapted to slide vertically in corresponding apertures of the slide 118 so that the edge of the sheet to be printed may be either gripped between the cooperating surfaces 122*a* and 118*a* of the jaw element and of the slide respectively, or else released from this action. The studs 123 are not only intended for guiding the jaw element 122 so that its gripping surface 122*a* may remain parallel with the corresponding surface 118*a* of the slide but they also ensure the longitudinal connection between these two parts 118 and 122.

Springs 124 acting on the upper part of the jaw element through the agency of pusher elements 125 constantly urge the surface 122*a* against the surface 118*a*. When inoperative and at the moment at which the sheet of paper to be printed is engaged in the manner disclosed hereinabove, the surface 122*a* of the jaw element is moved away from the surface 118*a* of the slide and said jaw element is held raised by a raising bar 126 on the upper surface of which the studs 123 rest at their lower ends. In this position the bar 126 is raised in its turn by a projection 127 on a lever 128 pivotally secured at 129 to a stationary point while an extension of said lever is subjected to the action of a cam 130 keyed to the control shaft 9.

When, the machine being started, the shaft 9 begins rotating in the direction of the arrow f^1, the cam 130 rides over the boss 128*a* of the lever 128 and the pressure of the springs 124 makes the whole system 122—126—127 move downwardly, the lever 128 rocking in the direction of the arrow f^2. The sheet of paper to be printed is then gripped between the cooperating surfaces 122*a* and 118*a* of the jaw element of the slide.

During this time, a projection 131 carried by a disc 132 fixed to the shaft 9 continues rotating in the direction of the arrow f^1 and meets a boss 133 provided on a slide 134 guided over the screws 135. The slide 134 is thus driven towards the right hand side of Fig. 19 and this movement of the slide causes the projection 136 on said slide to make a lever 137 rock in the direction of the arrow f^3. The lever 137 pivotally secured at 138 is pivotally connected with the point 139 of the slide 118 through the link 140. The system constituted by the slide 119, the jaw element 122 and the sheet to be printed moves therefor towards the rack and the mark A comes into the position A^1 which is spaced with reference to the vertical printing plane one interlinear space. The paper sheet is then in the position for printing.

A little after the projection 131 has engaged the projection or boss 133, a roller 141 carried by the cam shaped disc 132 causes the lever 143 to rock around its axis 142. The lever 143 is slidingly connected at 144 with one of the carriages 3 carrying one end of the shaft 1 of the printing cylinder 2. A similar arrangement exists on the other side of the machine. Thus the carriage moves downwardly against the action of return springs 4 and the printing cylinder prints a line in the plane V as the jaw element and slide system has ceased advancing once it has arrived into its printing position, by reason of the presence of the circular portion of the boss 133 in a position concentric with the shaft 9.

When there is only one line to be printed, the carriage rises through the action of the springs 4 at the same time as the lever 143 follows the roller 141 while the jaw and slide system return together with the sheet of paper into starting position under the action of the return spring 145 acting on the lever 137 due to release of the boss 133 by the projection 131. After the cylinder has been raised i. e. after the roller 141 has passed beyond the position shown at 141^1 and the system 122 and 118 has returned into its starting position, the cam 130 meeting again the lever 128 raises the bar 126 and the jaw element 122 so that the sheet of paper is thus freed and may be replaced by another sheet.

As apparent from inspection of Fig. 19, the carriage 3 on the left hand side of the machine is provided at its lower end with a flange 3^b which, when the carriage moves downwardly, engages at the end of its travel, the upper side of an extension 137^b of the lever 137 which has rocked as explained under the action of the slide 134.

In the case where the machine is designed for printing only line by line and for raising the cylinder after each line so as to operate in the manner disclosed hereinabove, this arrangement may be omitted. In this case, as a matter of fact, said arrangement would have no other interest than that of making the raising step of the operation of the printing cylinder coincide in time with the return step of the system including the jaw element 122 and the slide 118 into its starting position. In fact, the lever 137, 137^b follows the carriage 3, 3^b in its rising motion while said carriage follows under the action of its springs 4 the rising movement of the lever 143 which remains in contact with the roller 141 during this movement and is abandoned by said roller after the end of said movement.

This arrangement assumes its full importance when, as shown more particularly in Fig. 12, the invention is applicable to a machine adapted to print a plurality of successive lines on the same sheet without the cylinder rising after the printing of each line.

As shown in Fig. 12 when the right hand carriage 3 similar to that illustrated in Fig. 19 moves downwardly, its flange 3*a* is engaged at the end of its movement under the automatically operating bolt 52. A similar bolt acts on the carriage 3 shown in Fig. 19 but it has not been shown in order to avoid any crowding of the drawing. During the entire time corresponding to this locking of the carriages, the flange 3^b of the carriage of Fig. 19 holds the lever 137^b in a position for retaining the system comprising the jaw element, slide and sheet to be printed in printing position.

After the printing of the first line, as the carriage is locked, the roller 141 leaves the lever 143 and passes through the position 141^1 corresponding to the normal rise of this lever and of the carriage and consequently to the normal return of the system 122—118 into its starting position. As in the preceding case, i. e. as in the operation disclosed with reference to the printing of a single line, the nose of the cam 130 after a certain rotation of the shaft 9 following the passage of the roller 141 through its position 141^1 produces a rising movement of the jaw element 122.

But, during the travel of the roller 141 corresponding to the normal rising of the cylinder, which rising movement is not performed in the present case, a projection 62 (Fig. 12) formed on the plate 8 which is symmetrically placed on

the right hand side of the machine with reference to that illustrated for the left hand side of the machine in Fig. 19, causes the rising of the two pawls 64[1] and 64[2] under the action of a lever 63 pivotally secured at 63'. At the precise moment or preferably immediately after the nose 130 of the lever 128 of Fig. 19 has raised the jaw element 122, the pawl 64[2] moves through one tooth interval corresponding to one interlinear space the ratchet wheel 68. As the sheet has been released by the rising of the jaw element 122, it is fed by the printing cylinder as it rotates and advances also one interlinear space in order to have another line printed on it.

The feeding of the sheet of paper by the cylinder may be made easier by providing in front of the axis of the cylinder a gap in the table of the machine, while any suitable yielding support 146 (Fig. 19) is arranged in said gap. The yielding support may be a rubber bar or roller adapted to hold tightly the sheet along its printing line between the cylinder and said support.

Thus each time the cylinder advances by one interlinear space, the sheet will advance an equal extent for receiving the printing of a further line. In the machine shown, this printing is produced when the roller 141 passes again through the vertical plane of the axis 9. The locking position of the bolt 52 is such that at this moment the carriages 3 move downwardly a few tenths of a millimeter.

It has been described above that some time before the passage of the roller 141 through the vertical plane of the shaft 9 at the moment of the lowering of the carriage, the cam 130 has released the lever 128 and has allowed the jaw element 122 to again engage the paper sheet. This will be performed also in the present case so that the lifting step in the operation of the jaw element will come to an end after the rotation of the cylinder, during a stop in the angular intermittent displacement thereof and before the printing is effected, so that the paper sheet is thus held fast during the printing.

When, after the printing of the last line, the carriages are unlocked through the release of the bolts 52, the carriages will rise again and the spring 145 as in the preceding case will return the system comprising the slide, the jaw element and the sheet of paper to starting position, after which the paper sheet is again released.

The means described above for feeding, inserting and advancing the sheet of paper to be printed thereby avoiding handling of the paper permits a very rapid operation which is an important advantage in the case of a transfer in bookkeeping operations.

As described the sheet to be printed is freely inserted between two parts which grip the sheet and move such sheet to printing position before the printing cylinder is lowered to printing position. Then the parts return the sheet backwardly after printing and separate so as to release the sheet.

Automatic control device for the motor

As stated above, the machine does not start automatically upon the rise of the previously depressed key of the selecting device.

When the operator wishes to start the motor of the machine, he must manually operate contact 48. In the form of execution which is now to be described, the manual operated contact 48 is omitted, which avoids a loss of time and makes the operation easier. The starting of the machine is in this form performed automatically by the return of the previously depressed key of the selecting device to its original position.

Referring to Figures 20 and 20*a*, each key 36 of the selecting device and in particular the key having indicium "9" initiates when it is depressed the opening of a contact 12', 13' which is arranged in series with the contact 12, 13 in the circuit of the electric motor 11. The depression of the key 36 produces as a matter of fact the lowering of the point 34 connecting the stem 35 with the lever 32, the pivoting of said lever 32 round its horizontal axis 33, and consequently the lowering of the horizontal cross-bar 37 carried between the two arms 38 adapted to pivot round their axis 39 and finally the release of the movable blade 13' which produces the opening of the contact 12', 13'.

On the other hand and at the same time the lowering of the horizontal cross-bar 37 produces the rocking movement of the lever 147 round its axis 148. The other end of said lever 147 produces when it moves, the closing of the contact 12, 13 under the action of its spring 15 through the levers 149 and 150 secured to a common shaft 151, a link 70 pivotally secured at 171 to a lever 172 pivotally secured in its turn at 173 to a stationary plate, a stirrup-shaped part 174 pivotally secured to the lever 172 at 175 and guided over a fork-shaped support 176 (see Fig. 20*a*), a lever 177 pivotally secured at 178 to the stirrup 174 and carrying a finger 179 bearing against the inner surface of the movable blade 13 of the principal contact 12, 13.

The direction of motion of the different abovementioned parts illustrated in full lines in Figs. 20 and 20*a* is shown by the arrows.

The machine does not start however immediately as the circuit of the electric motor is open at 12', 13'. It is only when the operator releases the key 36 that the latter rising under the action of its associated spring, allows the cross-bar 37 to follow its rising motion by reason of the downward motion of the slide 40 cooperating with the retaining-pawl 25 of the rack 21 of the reproducing machine, said slide 40 acting on the extension 38*a* of the arm 38 through the flange 40*a* provided at its lower end.

As soon as the key 36 has returned into its original position, the cross-bar 37 is engaged underneath the blade 13' so as to close the contacts 12', 13'. At this moment, as the switch 12, 13 has been previously closed and remains closed through the action of the spring 15, the circuit of the electric motor 11 which is shown in full lines in Fig. 20 is closed, which allows the operation of the machine.

After the nine successive lines corresponding to the depression of the key having indicium "9" have been printed on the sheet, the opening of the main switch 12, 13 is ensured mechanically by the link 16 of a device similar to that already described and the machine stops.

Figs. 20 and 20*a* show the arrangement for opening the main switch 12, 13 when the rack 21 has returned to its inactive position.

In the drawings, the rack is shown in its inactive position and the principal switch is open. The projection 22 carried by the bell crank 20 mounted loosely on the control shaft 9 is moved back by the face 21*a* of the rack 21. The spring 19 connected to the arm 17 keyed to the inter-

mediary shaft 18 causes the arm 180 keyed to the same shaft to rock so that the link 16 is driven against the action of its spring 181 as illustrated by the arrow in Fig. 20. One end of the link 16 is thus brought into the path of the projection 182 carried by the lever 183 fixed to the shaft 9. As soon as the projection 182 abuts against the end of the link 16, the latter rocks round its axis 184 and causes the above mentioned stirrup 174 to rock round its pivot 175 through the agency of the rod 185 fixed to said stirrup and engaging a slot 186 provided in the link 16. This slight pivoting motion of the stirrup allows the release of the small plate 187 (Fig. 20a) the edge of which formed a stop through its abutting against the support 176 so as to prevent the opening of the switch. As soon as this small plate 187 secured to the stirrup has passed between the arms of said support 176, an adjustable spring 188 causes the lever 172 to move in the direction of the arrow in Fig. 20a which causes the opening of the switch 12, 13 against the action of the spring 15.

By the arrangement above described there is provided an automatic control for the motor of the machine. This control is operated upon the return of a depressed key thereby eliminating the necessity of the manually operated switch 48. Upon depression of a key a first main switch in the circuit of the motor is closed and a second switch in such circuit in a series with the first switch is opened. Then upon the return of the key the second switch is closed thereby starting the machine. The first switch is again opened upon the return of the rack to its inactive or starting position.

Disabling mechanism for the line by line progress or for interlinear spacing

It is of interest in certain cases to repeat several times the same line of a text to be printed. In order to perform this in a convenient manner, the mechanism for advancing the cylinder line by line should be rendered inoperative.

Referring to Figures 21 and 22, a disabling lever 152 is pivotally secured to the frame at 153 and carries a stud 154, for engaging selectively one of the three notches 155 provided on the lever 156 pivotally secured at 157 and held against the stud 154 by a spring 158. To the end of the disabling lever opposite its hand-operated end is pivotally secured an arm 159 adapted to engage on one hand the pawl for disconnecting the printing cylinder through a lever 167 pivotally secured at 168 and provided with a stud 169 while on the other hand said arm 159 engages a lever 160 through a stud 161 adapted to bear against one end of said lever 160. The other end of the lever 160 pivotally secured at 162 is caused to bear through the action of the spring 163 against the bent edge on one arm of the two armed lever 164. This lever 164 is pivoted to an axis 165 secured to the frame and cooperates with a projection 166 carried by the rear surface of the lever 64 carrying the upper and lower pawls 64^1 and 64^2 (see Fig. 23).

In contradistinction to the form of execution described hereinabove, the lever 64, instead of being raised at each revolution of the shaft 9 by the projection 62 on a plate fixed to said shaft, is pivotally secured to a slide driven by an eccentric carried by the shaft 9 and engaging an arm of the slide. These parts controlling the movement of the lever 64 have been shown in dot-and-dash lines in Figs. 21 and 22.

The operation of the above described device is as follows:

For operation in normal position, i. e. with a line by line progress, the upper pawl 64^1 engages the ratchet wheel 68 of the printing cylinder when the latter rises after the printing of a line. The pawl-carrying lever 64 driven by the slide controlled by the shaft 9 is guided by its projection 166 sliding over the stationary slope 67 against which it is caused to bear by its spring 65. The disabling lever 152 and the parts associated therewith occupy the position shown in Fig. 21.

When it is desired to operate without any line by line progress and to repeat the same line, the lever 152 is caused to rock upwards in order to occupy the position illustrated in Fig. 22. The stud 154 engages then the lower notch 155 of the lever 156 and the projection 161 on the lever 159 causes the lever 160 to rock round its axis 162 whereby the nose of the lever 160 engages the lower arm of the disconnecting lever 164 which is caused to rotate round its axis 165.

The lever 164 assumes the position appearing in Fig. 22 and the projection 166 is urged back by said lever together with the lever 64 and its pawls towards the left-hand-side of the figure. Therefore the nose of the pawl 64^1 can no longer engage the teeth of the ratchet wheel 68 and at each revolution of the control shaft 9, the printing cylinder no longer rotates round its shaft. It is adapted simply to receive a reciprocating vertical movement which produces at each revolution the printing of the same line, as long as the lever 152 remains in its raised position.

It should be noted that the mechanism producing the line by line progress may be controlled by a lever other than the lever disconnecting the printing mechanism.

Line selecting device

Referring now to Figures 24 and 27, it is apparent that the chief parts of the line selecting device comprise in the first place a key-board 201 the keys *s* of which correspond to the lines of the text to be printed. In practice and for simplifying the machine the keys are distributed into two groups of which one corresponds to the units and the other to the tens from 2 to 6 inclusive.

For making the machine easier to assemble, in the form of execution described, one of the tens keys having indicium "10" is arranged at the end of the line of the units keys immediately to the right of the key having indicium "9."

The depression of a given key *s* produces through an arrangement of pivoted levers 202 and 203 the projection out of its recess of a corresponding movable stop 204 which enters thus the path of a shoulder 205 provided on a rack 206. At the same time the displacement of the stop 204 produces the release of the rack 206 which is held in place against the spring 207 by a pawl 208 which is laterally collapsible in a direction parallel to the teeth of the rack by reason of its being mounted in the rocking support 209 carried by an axis fixed to the frame.

The rocking of the support 209 and of the pawl 208 is produced through a bell crank 210 fixed to the shaft 211 which serves as a common pivot for all the movable stops 204. The shaft 211 itself is rotatively controlled by any of the movable stops 204 through the agency of the longitudinal bar 212 engaging the upper edge of the movable stops 204 under the action of the spring 213, said

bar being fixed to the shaft 211 by the connecting arm 214.

It is thus apparent that the raising of any of the movable stops 204 under the action of the depression of the corresponding key will cause a displacement of the rack 206 under the action of the spring 207 in the direction of the arrow *f* until a shoulder 205 on the rack comes into engagement with the movable stop 204 lying in its path. The pivoted lever 215 moves with the rack and the displacement thereof is proportional to the location of the line having a number which corresponds to that of the indicia of the key *s* which has been depressed. The position therefor assumed by said lever 215 shows visually which line is selected.

The rack 206 and consequently the lever 215 associated therewith are held in the position they have thus entered by a pawl 208 the nose of which reengages the teeth of the rack while the movable stop 204 moves back into its original location under the cooperating action of the springs 213 and 216 (see Figs. 27 and 30.)

The raising of the lever 202 under the action of the spring 216 is rendered possible by reason of the particular arrangement of the key *s* which when depressed is no longer fixed to the lever 202 as will be disclosed hereinafter.

The selecting device according to my invention includes moreover a drum 217 on the surface of which are distributed along a helical line of suitable pitch studs or pins 218 the number of which is equal to the number of lines contained in the text which is to be printed. In the example described, there are 64 pins corresponding respectively to the 64 lines of the text.

The drum 217 is keyed to a shaft 219 and drives, through a chain 220, the gearwheels 221 and 222 and the printing cylinder 2 of the machine shown in Figs. 24, 25 and 26. The drive of the drum 217 is ensured by the motor 223 through the agency of the gear wheels 224 and 225, the cone clutch 226 and the worm gear arrangement 227, 228 driven by the shaft 229 rotated by the motor 223.

The control of the cone clutch is provided by a fork 230 pivotally secured to a stub shaft 231 and cooperating with a spring 232. To the stubshaft 231 is secured a disconnecting arm 233 secured at the end remote from said stubshaft to a stirrup-shaped part 234 fixed to the shaft 219.

The lowering of the arm 233 is produced by the rocking of the lever 215 round its pivot 235 on the carriage 236 borne by the rack 206. This rocking of the lever 215 is performed against the spring 237 when the stud 218 on the drum 217 engages the end of said lever. This arrangement is such that the engagement of the stud 218 with the lever 215 causes the lowering of disconnecting arm 233 which is held against said lever 215 by the above mentioned spring 232. This leads to the disengagement of the cone clutch 226 whereby the motor 223 stops driving the drum 217 and the printing cylinder 2.

At the same time, the lowering of the disconnecting arm 233 produces through the cooperation of the cam-shaped lever 238 with an angle bar 239 integral with said arm, both the breaking of the circuit feeding the motor 223 and the locking of the printing cylinder 2.

Referring to Fig. 27, the cam-shaped lever 238, pivotally secured to a shaft 240 carries one of the blades l_1 of a contact switch in the circuit of the motor 223. The lever 238 moves in the direction of the arrow *g* under the action of the spring 241 when the angle bar 239 and the arm 233 carrying same is depressed. As shown in Fig. 27, this movement separates the contact blades l_1 and l_2, the engagement between said blades being previously provided through the lowering of the starting lever 242 of the selecting device, which lever acting on the lever 243 caused the lever 238 to move in a direction opposed to that of the arrow *g* so as to bring the blades l_2 and l_1 into contact.

It will be understood from Figs. 25 and 26 how it is possible to automatically lock the printing cylinder 2. The rotation of the rocking lever 238 round its shaft 240 in the direction of the arrow *g* causes the nose of the pawl 244 to engage the teeth 68 on the printing cylinder due to the action of the spring 246 through the agency of the leverage 247, 248 and 249.

It should be noted that the rocking of the pawl 244 round its axis is controlled in a positive manner by a stud 250 carried by the lever 249 in which is a slot for the axis pin 251 upon the lever 248.

The return to zero of the selecting device is obtained through the return into its original position of the rack 206 when the machine is started. To this end, the control shaft 9 of the machine carries a projection 252 adapted to engage a cam 253 integral with a toothed sector 254 controlled by the pinion 255. A grooved pulley 256 keyed to the axis of the pinion 255 drives the rack 206 through a yielding transmission 257 (Fig. 29).

The return of the rack 206 into its original position is controlled positively by a plate 258 carried by the transmission 257 and engaged between the jaws of a stirrup-shaped part 259 secured to the rack. The yielding transmission 257 is secured at one end to the pulley 256 and at the other to a spring 260 hooked on to the frame of the machine. The arrows in Fig. 29 show the direction of movement assumed by the different parts during the return of the rack into its original position, said return being effected at the same time as the downward movement of the printing cylinder 2 into its printing position under the control of the motor 11 of the machine.

The rack also carries, see Figs. 24 and 27, a pivot 261 adapted to move inside a slot provided at the end of the lever 262 pivotally secured at 263 to the upper plate of the key-board of the selecting device. The lever 262 carries in its turn a pivot 264 adapted to move inside a slot provided in a lever 265 pivotally secured at 266 to the correcting lever 267 used for operating the return to zero by hand, said lever 267 rocking round a pivot 268 fixed to the frame.

The return into its original position of the rack 206 in a direction opposite to that of the arrow *f* of Fig. 24 produces thus the displacement in the direction of the arrow *h* of the pointed end of the lever 262. The nose or beak-shaped end of the lever 262 engages a stud 269 carried by the arm 270 suitably guided so as to be capable of executing a translational movement parallel with the arrow *h* (Fig. 24). The arm 270 carries at one end a pivot 271 engaging a mortise provided in the lever 272 pivotally secured at 273 to the upper plate of the key-board. The other end of this lever 272 is provided with a bent element 274 folded underneath said upper plate so as to engage an arm 275 provided with two mortises 276 parallel with one another and at 45° with the axis of said arm, said mortises engaging two studs 277 secured to the upper plate of the key-

board underneath said plate (see Figs. 24 and 31).

Under such conditions, the translational movement of the arm 270 in the direction of the arrow *f* produces a displacement of the arm 275 perpendicular thereto as shown by the arrow *i*.

On the other hand the arm 275 cooperates through its rear edge with the bolts 278 which are suitably guided and urged by a spring 279 hooked on to a stationary point on the upper plate of the key-board. As shown in Figs. 30 to 33 these bolts 278 engage the corresponding keys *s*.

The displacement of the arm 275 in the direction of the arrow *i* produces thus the rearward motion of the bolts 278 with reference to the key *s*, which permits the return of the latter under the action of the return spring as illustrated in Fig. 33.

The return of the keys *s* may also be performed by hand in case of error by acting on the correcting lever 267 which controls the return of the rack 206 into its starting position through the arm 265 and the pivot 264 on the lever 262.

The control of the selection may be performed through a visual signal owing to the fact that the key *s* which has been depressed by the operator is held in its depressed position by the bolt 278 until the machine has been returned to zero automatically or by hand. To this end each key *s* carries an upper square-shaped part 280 and a lower ring-shaped part 281 serving as a bearing for the return spring 282 carried by the lower plate of the key board (Fig. 33). The key *s* carries also an intermediary ring 283 provided in its lower face with a groove 284 engaging the end of a hook 285 pivotally secured to the lever 202 corresponding to the key considered. The end of the hook 285 is normally held in engagement with the groove 284 by a spring 286 hooked on to the frame.

Lastly the supports inside which the keys are adapted to slide comprise for each key a lever 287 pivotally secured at 288 (Fig. 30) to the support and provided with a sloping surface 289 cooperating with a stud 290 on the hook 285. A spring blade 291 carried by the support urges the slope 289 on the lever 287 against said stud 290.

When the operator depresses a key, the downward motion of the ring 283 causes the lowering of the lever 202 under the action of the hook 285. During its downward movement, the square shaped part 280 provides a passage for the bolt 278 the end of which urged by the spring 279 engages the upper surface of the square shaped part 280 as shown in Fig. 33 in order to keep the key in its depressed position. At the same time the stud 290 on the hook 285 bears against the sloping surface 287, which releases the end of the hook 285 with reference to the groove 284 so as to make the lever 202 free with reference to the key *s*.

During the return to zero operation the bolt 278 moves in the direction of the arrow *i* so as to release the key which rises under the action of the previously compressed spring 282. The parts return then into their relative positions as shown in Fig. 30.

In order that the operation of the selecting device may be understood, I will first suppose that the operator wishes to select line 21 and to automatically print in succession the four lines 21, 22, 23 and 24.

Preparation

The operator begins by depressing the key 2 of the row of tens. He produces thus through the lowering of the control lever 202, the projection out of its recess of the corresponding movable stop 204 and the release of the rack 206 which under the action of the spring 207 moves rapidly in the direction of the arrow *f* until its first shoulder 205 starting from the right hand side of Fig. 24 abuts against said movable stop 204. The rack occupies then the position shown in Fig. 34. The lever 215 is thus brought into the path of the pin 218 corresponding to the number 20 on the drum 217. The position of lever 215 corresponds with the position of the line 20.

The key having indicium 2 of the tens remains depressed by reason of the bolt 278 arriving above the square 288 on the key rod *s*. The control lever 202 which is now independent of the key rises under the action of the spring 216 and causes the movable stop 204 to reengage its recess. The rack 206 remains however, in the position it has reached by reason of the prior engagement of the pawl 208 with the rack teeth.

The operator depresses then the key having indicium "1" of the scale of units. He produces thus a complementary displacement of the rack in the direction of the arrow *f*. This displacement corresponds to a further unit i. e. to the interval between the line 20 and the line 21. The travel of the rack is limited by the engagement with the movable part corresponding to the digit 1, of the third shoulder 205 counted from the extreme right hand shoulder. The rack occupies thus the position shown in Figure 35.

The lever 215 is then brought into the desired position in the path of the pin 218 which corresponds on the drum 217 with the line 21 selected. The lever 215 and the rack 206 are held in this position by the pawl 208.

The position of the lever 215 is visualized through the keys "2" of the tens and "1" of the units remaining depressed. The operator ascertains thus that he has made no error and that the machine is ready to operate in order to select the line 21.

Selection

When it is desired to bring the line 21 of the printing cylinder to printing position, the operator acts on the handle of the starting lever 242 which closes the contacts l_1—l_2 thereby energizing the motor 223 of the selecting device at the same time as the printing cylinder 2 is released by the pawl 244 disengaging the teeth 68, while the lever 238 rocks in a direction opposed to the arrow *g* under the control of the lever 242.

As soon as the motor is started, the drum 217 and the printing cylinder 2 are driven through clutch 226. This drive lasts until the pin 218 in the path of which is located the lever 215 abuts against the latter. At this moment the lever 215 rocks round its axis 235 against the action of the return spring 237.

This rocking has a treble action. In the first place it produces a disconnection of the clutch through the depression of the arm 233. The drum 217 and the printing cylinder stop.

Then the lever 238 which was held, up to the moment considered, by the upper flange of the angle bar 239 is freed. The printing cylinder is thus bolted in the position corresponding to the printing of the line 21 by movement of the lever 238 in the direction of the arrow *g*.

Finally, in such movement, the lever 238 moves

the contact blade l_1 away from the blade l_2 so as to break the circuit of the motor 223.

Consequently the rocking of the lever 215 produces the desired disconnection of the drive of the printing cylinder and of the drum, the locking of the printing cylinder in its printing position and the breaking of the circuit feeding the motor of the selecting device.

The printing machine is then ready for operation.

Automatic return to zero

The operator depresses the key having indicium "4" of the first described selecting device of the printing machine and then closes the switch 43 for starting the machine which then prints on the sheet of paper lines 21, 22, 23 and 24 as described above.

As soon as the printing cylinder 2 moves downwardly for printing the line 21, the projection 252 carried by shaft 9 of the printing machine initiates the return of rack 206 to starting position through the yielding control 257. The keys having indicia "2" of the tens and "1" of the units then rise under the action of the return springs 282 due to withdrawal of bolts 278 by the rod 275, the lever 262, the arm 270 and the lever 272.

If the operator has made an error and has depressed for instance the key having indicium "8" of the tens instead of the key having indicium "1" of the units, and if he notices this error before he starts the printing machine which would then print four lines in succession starting from the line 28, he can correct this error by hand by returning the selecting device to zero. To this end he simply draws the lever 267 towards the right hand side of Figure 27 against the action of the spring associated with this lever. He acts thus both on the rack 206 and on the lever 262 by link 265 cooperating with the pivot 264 of the lever 262.

Of course, many modifications may be made in the selecting device which has just been described.

In particular, it is possible to control the displacement of the rack 206 by electromechanical means through the agency of suitable relays. On the other hand, the number of shoulders 205 on the rack may vary with the number of tens included in the total number of lines of the text to be printed. A movable adjustable stop may be used for stopping the rack at variable distances corresponding to the last line of various texts having different lengths.

It is also possible to replace the rack by a drum similar to the drum 217. The pins which would be carried by such a drum would then cooperate with the parts for bringing about the printing of the different lines of the text, the operation of said parts being controlled by the rotation of the printing cylinder under the action of the motor of the selecting device.

The control of the selecting device may be ensured by the motor of the printing machine through the agency of an electromagnetic clutch.

Numerous modifications may also be brought to the form of execution described provided the line to be selected is always positively selected, both in space and in time, through the action of two parts controlled respectively by the depression of the key corresponding to the selected line and by the rotation of the printing cylinder in a manner such that, when the operation is concluded, the line to be selected is in the printing position.

From the above it is believed that the operation of the line selecting device is clear. The arrangement described permits the operator to select through the depression of a few keys the particular line from which he desires to print the entirety or a portion of a document and to place such selected line into printing position.

As will be noted the depression of a few keys initiates the unlocking of the printing cylinder, then its rotation through an angle so that the selected line will occupy the printing position and finally the locking of the printing cylinder in such printing position. The return to zero of the line selecting device is automatically secured upon starting the printing machine by the switch 43.

Also as described a correction device permits a manual return of the line selecting mechanism in case the operator has made an error in the keys depressed.

It will also be noted that the lines selecting device comprises a key board similar to that used in the previously described selecting device of the printing machine of which it forms a part. The keys of this key board control means for releasing rack 206 and the displacement of such rack until stopped by a stop entering the path of the rack. Such displacement is proportional to the lever or the number of the line selected. The lines of the documents to be printed are numbered consecutively.

It will also be noted that the rack 206 has mounted thereon a pivoted lever 215 which cooperates with the drum 217 which in turn is connected both to the printing cylinder 2 and the motor 223 through a clutch which is controlled by the lever 215. The document 217 has disposed upon its surface in a helical line a series of studs or pins 218 to engage the lever 215. The number of the pins 218 is equal to the number of lines on the electrotype to be printed and the helical distribution around the document is to control the rotation of the printing cylinder in such a manner that such cylinder will rotate under the action of the motor 223 of the selecting device until the pin 218 on drum 217 corresponding to the selected line meets lever 215 which has previously been displaced to a predetermined position by the depression of a key or keys. Contact between such pin and lever 215 produces a stoppage of the document and the printing cylinder and also a breaking of the circuit of the motor 223 and a locking of the printing cylinder 2 in printing position.

Line verifying device

This device is constituted by the verifying part itself shown in Fig. 17 and by the removable control strip L appearing in Figures 36, 37, 40 and 42.

As apparent in Fig. 37 the verifying part is formed by a cylinder 301 on which are mounted type-carrying pins 302 distributed helically over the surface of the cylinder and adapted to print a letter on the strip L mounted on the printing cylinder 2.

The verifying cylinder 301 has a pinion 304 secured to its axis 303. A chain transmission 305 connects said pinion 304 with the pinion 306 fixed to a spindle 307 carrying a milled control knob 308. The pinion 306 is provided with a lateral stud 309 adapted to engage apertures 310 in a small drum 311 secured to the frame 312.

The spindle 307 slides freely inside the small drum 311 and is constantly urged back in the direction of the arrow f by a coi'ed spring 313 which is held between the frame 312 on one hand and a screw 314.

To the chain 305 is secured a pointer 315 to move in front of scale 316 comprising as many divisions as there are type-carrying pins while a complementary division R is provided for bringing the part of the verifying cylinder 301 which carries no type, in front of the line to be printed on the cylinder 2.

The object of said complementary division will be disclosed hereinafter.

In order to prevent too great a pressure upon the types, the cylinder 301 may follow the downward movement of the printing cylinder 2. To this end, the cylinder 301 is mounted in a stirrup 317 pivoting on a stationary stub-shaft 318. The stirrup is returned by a helical spring 319 secured to a stay 320 on the machine frame and to a stud 321 on the arm 322 of the stirrup 317. The upward movement of the stirrup 317 is stopped by the projection 323 fixed to the frame of the machine and against which the arm 322 abuts.

The operation of the verifying device is as follows:

The stereotype or copy K of the accounting day-book or the like document is first suitably mounted on the cylinder 2 together with the unimpressed control strip L (Fig. 36). The day-book M or the like has been laid on the other hand on the board N arranged at the right hand side of the machine, the day-book being a duplicate of the stereotype.

I will first suppose, by way of example, that line No. 6 corresponding to the writing of a given book-keeping document O is to be extracted from the day-book M. I will use in an arbitrary manner a letter, say letter A for designating the line corresponding to the calculation of the cost price. In such case, I rotate the milled knob 308 so as to bring the pointer 315 in front of the letter A on the scale 316. This results in bringing the type A carried by one of the type carrying pins into printing position (Fig. 38). The key having indicium "6" of the line selecting device S is then depressed and the machine started by closing switch 48 as soon as the selecting device has automatically brought the line 6 of the stereotype into printing position.

The lowering of the printing cylinder 2 produces both the printing of the line 6 of the stereotype K on the book-keeping document O and the printing of the letter A on the control strip L in front of the digit 6 on this strip. The same operation is begun over again for the line 9 also corresponding to the cost price account REV without modifying the location of the pointer 315 and the key having indicium "9" of the se ector S is depressed before the machine is started as above. The letter A is printed again in front of the digit 9 on the control strip L at the same time as the line 9 of the stereotype, and consequently of the day-book, is printed on the document O under the line 6 previously printed from the stereotype.

If it is desired now to extract from the day-book M the lines relating to the sundries account shown as DIV in the day-book, namely lines 2, 3 and 4 which lines are to be printed on a further book-keeping document, another letter such as C is chosen in an arbitrary manner for designating the same. The pointer 315 is brought in front of the letter C on the scale 316 whereby the pin carrying the type C moves into printing position. The operator depresses then the key having indicium "2" of the line selector S and the key having indicium "3' of the selector Ta of the machine. The line 2 of the stereotype K is brought by the selecting device S into printing position. Then the operator starts the machine which prints consecutively, lines 2, 3 and 4 of the stereotype and at the same time the letter C on the control strip in front of the digits 2, 3 and 4 of the latter.

At the end of the operation, I superpose on the board N in order to verify that no omission has been made, the control strip on to the day-book, by bringing the figures carried respectively by the day-book and by the control strip opposite one another.

If, opposite a line relating for instance to one of the accounts which has just been taken up, the corresponding letter serving for the identification of the account considered does not appear, it is certain that this line has been omitted by the operator. This is what has happened in the case illustrated for the line 1 of the cost price account (Fig. 42).

As apparent in Figs. 38 and 39, a certain portion of the verifying cylinder 301 carries no type for the case when it is desired to print the entire stereotype. The pointer 315 is then brought in front of the division B of the scale 316, which brings in printing position the portion of the verifying cylinder 301 which carries no type. If this step is not taken, there is a risk of damaging the control strip and the inked ribbon cooperating with the verifying cylinder.

The movement of the inked ribbon should change direction when a spool is almost completely unwound.

As shown in Figs. 38 and 39, the electromechanical ribbon-reversing device comprises a carriage 324 which receives a reciprocating motion through the fork 325 inside which rotates a cam 326 secured to the control shaft 9. The carriage 324 is guided in its rectilinear reciprocating movement by two slots 327, 327' in which slide two studs 328, 328' fixed to the plate 329. The carriage 324 carries a beam 330 adapted to rock round an axis 331 fixed in the carriage 324. The ends 332 and 332' of this beam are bevelled so as to form control pawls for the ratchet wheels 333 and 333' fixed to the axes 334 and 334' carrying the spools over which is alternatingly wound the inked ribbon 335. This produces the displacement of the ribbon after each printing operation in synchronism with the intermittent rotation of the printing cylinder.

When the inked ribbon 335 which is wound for instance round the axis 334 forms a spool of a certain diameter, it controls through the agency of a roller 336 against which it bears, the closing of a contact. One of the blades 337 of this contact is carried by the lever 338 pivotally secured to the stationary pin 339. This lever is held against the spool by a spring 340. The other blade 341 of the contact is carried by the beam 330. The engagement between the blades 337 and 341 produces the energization of the electromagnet 342 which shifts the core 343 which was previously in the position illustrated in Fig. 39.

This core 343 drives as it moves a stud 345 extending through a slot 344 provided in the central portion of the core, said stud 345 being fixed to one of the ends of the lever 346 pivotally secured at 347. The lever 346 which was first in the position illustrated in Fig. 39 carries at its other end a roller 348 which passes from the position shown in Fig. 39 to that shown in Fig. 38 which causes the beam 330 to rock. This frees the ratchet wheel 333 and the nose 332' of

the beam 330 engages the ratchet wheel 333', which reverses the direction of motion of the ribbon 335.

The lever 346 is held in either of positions by a helical spring 349 which is constantly under tension. The spring is hooked at one end to the axis of the roller 348 and at the other end to one of the ends 350 of the lever 351 pivotally secured at 352 and carrying a fork 353 between the arms of which the stud 345 is located.

The removable type of the verifying cylinder may be replaced by a stereotype. Also the reversing means for the movements of the inked ribbon may be purely mechanical as on typewriters.

Safety device for preventing a hand operated selection

Referring to Fig. 43, it is apparent that in normal position i. e. when the disconnecting lever 152 occupies the horizontal position, a shutter 401 with an L-shaped cross-section is held in its higher position, against the action of its spring 402, by a shoulder 403 provided on a bolt 404 pivotally secured at 405 to the frame, against which shoulder the lower edge of the shutter is adapted to bear.

In this position, the lateral extension 406 of the shutter 401 frees a sight 407 cut out in the screen 408 secured to the frame. This screen, of which only a portion has been illustrated in the accompanying drawings, covers entirely the control strip L secured to the cylinder 2 whereby the operator may see only through the sight 407 the number of the line which is to occupy the printing position.

In the position shown in Figs. 43 and 46, the operator may see the numeral 10 corresponding to the tenth line of the stereotype starting from the upper end through the sight 407. Such line is in printing position. When the operator for any reason, for instance for repairing the stereotype, wishes to rotate manually printing cylinder 2, he disconnects it by lowering the lever 152 as shown in Figure 44. The rocking of the lever 152 in the direction of the arrow acts on a connecting rod 159 pivotally secured to the other end of the lever 152 and provided with a slot cooperating with the stud 169 carried by a lever 167 pivotally secured to the frame at 168, this produces the release of the pawl 244 from the teeth of the ratchet wheel 68 on the printing cylinder. The movement of the pawl 244 is ensured as apparent from Fig. 44 by the link 167 against the action of a spring 246.

At the same time as this disconnection is made, the stud 154 of the lever 152 leaves the central notch 155 of lever 156 and enters the upper notch 155. At the moment at which said stud 154 rides over the tooth separating the upper and central notches, the lever 156 is rocked slightly in the direction of the arrow about its axis 157. This movement is effected against the action of a spring 158, which produces the displacement towards the right of the head of the lever which impinges on the lower end of the bolt 404 and frees the shutter 401. The latter urged by its spring 402 leaves its upper position shown in Fig. 43 and enters its lower position shown in Fig. 44. It is guided by the stems of the two screws 409 secured to the frame and passing through a slot 410 in its side face.

The extension 406 of the shutter covers then the sight 407 so that the scale on the control strip L is hidden. The operator cannot therefore, after disconnecting the printing cylinder, select a predetermined line by rotating the cylinder by hand as the scale showing the numbers of the different lines is no longer visible.

When the desired operation has been performed, the operator reengages the printing cylinder by returning the lever 152 into its horizontal position and he is constrained, before he begins his work, to select a line by using the line selecting device.

As soon as the printing machine is operative i. e. as soon as the selection has been made and a given key on the selecting device has returned into its original position after it has been depressed, the printing cylinder 2 moves downwardly and, during this movement, the projection 411 carried by one of the carriages 3 impinges as shown in Fig. 45 the bent end 412 of a lever 413 pivotally secured at 414 to a lever 415 adapted to pivot round an axis 416 carried by the frame. The nose 417 of the lever 415 is in contact with a stop 418 constituted for instance by the head of a screw carried by the side face of the shutter 401. It is thus apparent that the downward movement of the printing cylinder produces through the levers 413 and 415 the rising motion of the shutter 401 against the action of the spring 402 together with the locking of the shutter in its upper position by the bolt 404, the shoulder 403 of which engages underneath the lower edge of the shutter 401 through a rotation of said bolt round its axis 405 under the action of gravity.

The scale of the control strip L is then again visible through the sight 407 as soon as the printing cylinder has printed the line selected and has returned into its upper position.

In Fig. 45, I have supposed that the operator has selected the line 58 and he sees the corresponding number appear through the sight 407 as soon as the printing cylinder has risen into its upper position.

Although the arrangement of the device described and illustrated in accompanying drawings allows a perfect execution of the various objects of my invention, it should be well understood that the said invention is by no means limited to said single form of execution and that it is capable of being improved in various manners falling within the spirit and scope of the following claims.

The word stereotype as used throughout the above specification and in the following claims covers not only the limited meaning given to stereotype but also any copy of a document which is capable of being used as a printing agency under the conditions disclosed.

I claim:

1. In a printing machine, in combination, a rotary stereotype-carrying printing cylinder, means for applying the cylinder against a sheet to be printed, mechanism rotating said cylinder intermittently through an angle corresponding to the interval between two lines after the printing of each line and controlling means for said applying means and said mechanism including a keyboard and keys to control automatically the printing of a predetermined number of consecutive lines of the stereotype on said sheet.

2. In a printing machine, in combination, a rotary stereotype-carrying printing cylinder, means for applying the cylinder against a sheet to be printed, mechanism rotating said cylinder intermittently through an angle corresponding to the interval between two lines after the printing of each line, a selecting system including a keyboard and a series of keys having numerically

consecutive indicia thereon equal in number to the maximum number of lines at normal spacing which are to be printed and a positively operating transmission controlled by said keys initiating the automatic printing of consecutive lines corresponding in number to the indicium of the key operated.

3. In a printing machine, in combination, a rotary stereotype-carrying printing cylinder, means for applying the cylinder against a sheet to be printed, mechanism rotating said cylinder intermittently through an angle corresponding to the interval between two lines after the printing of each line, selecting means including a keyboard and keys having consecutive numerical indicia thereon, means controlled by said keys for setting the machine to print automatically a series of lines equal in number to the indicium of the key operated including a movable control member displaced by each key when operated a distance proportional to the number of lines to be printed, said number of lines corresponding with the indicium on said key.

4. A printing machine comprising a rotary printing cylinder having a stereotype mounted thereon containing a series of lines, means for reciprocating said cylinder to and from printing position, means for advancing said cylinder intermittently the space between two adjacent lines on said electrotype to bring consecutive lines into printing position, line selecting means cooperating with said cylinder to select a predetermined line from said series of lines and set the machine for the printing of said line, means for selecting a group of consecutive lines from said series of lines beginning with said selected line and setting the machine for the printing of said group, said last named means including a displaceable control member and selectively operated stops controlling the displacement of said control member and means for operating said cylinder to print such selected line or lines.

5. A printing machine comprising a rotary printing cylinder having a stereotype mounted thereon containing a series of lines, a motor for driving said cylinder, means for advancing said cylinder intermittently the space between two adjacent lines on said electrotype to bring consecutive lines into printing position, a circuit for said motor, selecting means including a keyboard and keys having consecutive numerical indicia thereon, a movable control member controlled by said keys, means coactive with said control member for breaking said circuit when said control member is in starting position, means for returning said control member step by step after it has been displaced by actuation of one of said keys a distance proportional to the indicium on said key, said step by step return of said control member corresponding with the intermittent advances of said cylinder and means for operating said cylinder to print such selected line or lines.

6. A printing machine comprising a rotary printing cylinder having a stereotype mounted thereon containing a series of lines, means for reciprocating said cylinder to and from printing position, means for advancing said cylinder intermittently the space between two adjacent lines on said electrotype to bring consecutive lines into printing position, line selecting means cooperating with said cylinder to select a predetermined line from said series of lines and set the machine for the printing of said line, means for selecting a group of consecutive lines from said series of lines beginning with said selected line and setting the machine for the printing of said group, means for operating said cylinder to print such selected line or lines and means controlled by said means for selecting a group of consecutive lines for disabling said reciprocating means for said cylinder and maintaining said cylinder in printing position during the printing of the selected group of lines.

7. A printing machine comprising a rotary printing cylinder having a stereotype mounted thereon containing a series of lines, means for reciprocating said cylinder to and from printing position, means for advancing said cylinder intermittently the space between two adjacent lines on said electrotype to bring consecutive lines into printing position, line selecting means cooperating with said cylinder to select a predetermined line from said series of lines and set the machine for the printing of said line, means for selecting a group of consecutive lines from said series of lines beginning with said selected line and setting the machine for the printing of said group, means for operating said cylinder to print such selected line or lines and means controlled by said means for selecting a group of consecutive lines for disabling said reciprocating means for said cylinder and maintaining said cylinder in printing position during the printing of the selected group of lines, and means for releasing said cylinder actuated during the printing of the last line of said group.

8. A printing machine comprising a rotary printing cylinder having a stereotype mounted thereon containing a series of lines, a carriage for said cylinder, a vertical slideway for said carriage, a motor controlling the vertical movement of the carriage to its lower printing position inside said slideway, means urging the carriage into its upper non-printing position, carriage locking means arranged transversely with reference to said slideway, a spring urging said locking means into engagement with said carriage, means for selecting a group of consecutive lines from said series of lines and setting the machine for the printing of the lines of said group, said selecting means including a keyboard and keys having consecutive numerical indicia thereon, a movable control member adapted to be moved by a key into a position corresponding to the number of lines to be printed, a lever engaged by the end of said movable control member, a part connecting said lever with said locking means for holding normally said locking means in inoperative position and allowing it to enter its operative position when the movable control member has been moved by said key, means for returning said control member step by step to starting position, said movable control member when it reaches again its starting position moving said lever to return said locking means into inoperative position, means for advancing said cylinder intermittently the space between two adjacent lines on said electrotype to bring consecutive lines into printing position, and means for operating said cylinder to print such selected line or lines.

9. In a printing machine, the combination of a rotary printing cylinder, a stereotype mounted on said cylinder having a series of lines thereon, manual line selecting means cooperating with said cylinder to select a predetermined line from said series of lines and move said line to printing position, a second manual selecting means also cooperating with said cylinder to select a predetermined group of consecutive lines from said

series of lines beginning with said predetermined line selected by said line selecting means, and means for imparting a straight-line displacement to said cylinder to print such selected line or lines.

10. A printing machine comprising a rotary printing cylinder having a stereotype mounted thereon containing a series of lines means for reciprocating said cylinder to and from printing position, means for rotating said cylinder intermittently the space between two adjacent lines on said stereotype to bring consecutive lines into printing position, selecting means including a keyboard and keys having consecutive numerical indicia thereon for selecting a group of consecutive lines from said series of lines and setting the machine for the printing of the lines in said group, said selecting means including a displaceable control rack, spring means for urging said rack to its home position, stop means respectively cooperating with a related key for displacing said rack a distance proportional to the number of lines to be printed as defined by the numerical indicium on the depressed key, pawl means for locking said rack in its starting position, means operated by the depression of any key in said keyboard for releasing said pawl means, means for returning the actuated key and its corresponding stop means to normal position, thereby engaging said pawl with said control rack; and means responsive to the setting of said rack for rotating said cylinder to place the selected line in printing position.

11. A printing machine comprising a rotary printing cylinder having a stereotype mounted thereon containing a series of lines, means for reciprocating said cylinder to and from printing position, means for advancing said cylinder intermittently the space between two adjacent lines on said stereotype to bring consecutive lines into printing position, key-controlled line selecting means cooperating with said cylinder to select a predetermined line from said series of lines and set the machine for the printing of said line, second key-operated means for selecting a group of consecutive lines from said series of lines beginning with said selected line and setting the machine for the printing of said group, said second key-operated means including latching means adjustably controlled by the rotation of said cylinder for maintaining the same in printing position, visual means including a pointer controlled by said second selecting means and a cooperating scale attached to the frame of the machine for indicating the group of consecutive lines selected, and means for operating said cylinder to print said selected line or lines.

12. A printing machine comprising a rotary printing cylinder having a stereotype mounted thereon containing a series of lines, a carriage carrying said cylinder, a vertical slideway for said carriage, a motor for rotating said cylinder, a cam controlled by said motor and acting on said carriage for lowering the same along its slideway into its lower printing position in contact with a sheet to be printed, return means urging said carriage into its upper inoperative position, and key-operated selected means for determining the number of lines to be printed in sequence, said last named selecting means including a latch adapted to block said carriage in its lower operative position, a pin angularly adjustable on said cylinder in response to the actuation of a key of said selecting means, and cam means operated by said pin for releasing said latch.

13. A printing machine comprising a rotary printing cylinder having a stereotype mounted thereon containing a series of lines, means for reciprocating said cylinder to and from printing position, means for advancing said cylinder intermittently the space between two adjacent lines on said stereotype to bring consecutive lines into printing position, said last-named means including a member formed with a pair of spaced pawls and a ratchet on said cylinder so that said advancing means is operative in both the printing and non-printing position of said cylinder, and key-operated means for selecting a group of consecutive lines from said series of lines and maintaining said cylinder in printing position during the printing of said group of consecutive lines.

14. A printing machine comprising a rotary printing cylinder having a stereotype mounted thereon containing a series of lines, means for reciprocating said cylinder to and from printing position, means for advancing said cylinder intermittently the space between two adjacent lines on said stereotype to bring consecutive lines into printing position, key-actuated line-selecting means including a reciprocable member provided with regularly spaced projections, means for urging said reciprocable member to normal position, stop means controlled by said keys for engagement with said projections to stop the return displacement of said reciprocable member, and means for manually correcting errors in the actuation of said keys, including cooperating levers to free said reciprocable member for step by step return to its starting position.

15. A printing machine comprising a rotary printing cylinder having a stereotype mounted thereon containing a series of lines, means for reciprocating said cylinder to and from printing position, pawl and ratchet means associated with said cylinder for advancing the same intermittently the space between two adjacent lines on said stereotype to bring consecutive lines into printing position, means for selecting a group of consecutive lines from said series of lines and setting the machine for the printing of said group, said selecting means including a keyboard and keys having consecutive numerical indicia thereon corresponding with the number of lines in the selected group, a special key controlling the depression of that key on said keyboard having the higher numerical indicium, a latch operated by the depression of any said keys for maintaining said cylinder in its printing position, blocking means controlled by said special key for blocking said latch, means controlled by said cylinder for releasing said blocking means, and pin means, adjustably controlled by said key having the higher numerical indicium for releasing said latch, whereby said cylinder is kept in its printing position until the last line in said series on said stereotype is printed.

16. In a printing machine as set forth in claim 8, a sheet carrier, a presser plate adapted to hold the sheet on said carrier, first automatically operated means responsive to the intermittent rotation of said cylinder for urging said presser plate against said carrier, a cam carried by said main shaft of the machine, second automatically operated means responsive to said cam for horizontally shifting said carrier integrally with said presser plate, said cam having such an angular position that said horizontal shifting occurs at

the time where said presser plate is urged against said sheet carrier in the intervals between the printing of different lines on said stereotype.

17. In a printing machine as set forth in claim 8, an electric motor for operating the machine, a main switch in the supply circuit for said motor, common means operable by said selecting means to close said switch, a second switch inserted in said supply circuit in series with said main switch, means responsive to the depression of any key in said selecting means for opening said second switch, whereby the machine is kept out of action during completion of the line selection, means responsive to the actuation of any key in said selecting means for closing said main switch, and means including a lever cooperating with said control member for opening said main switch when said control member again reaches its starting position.

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