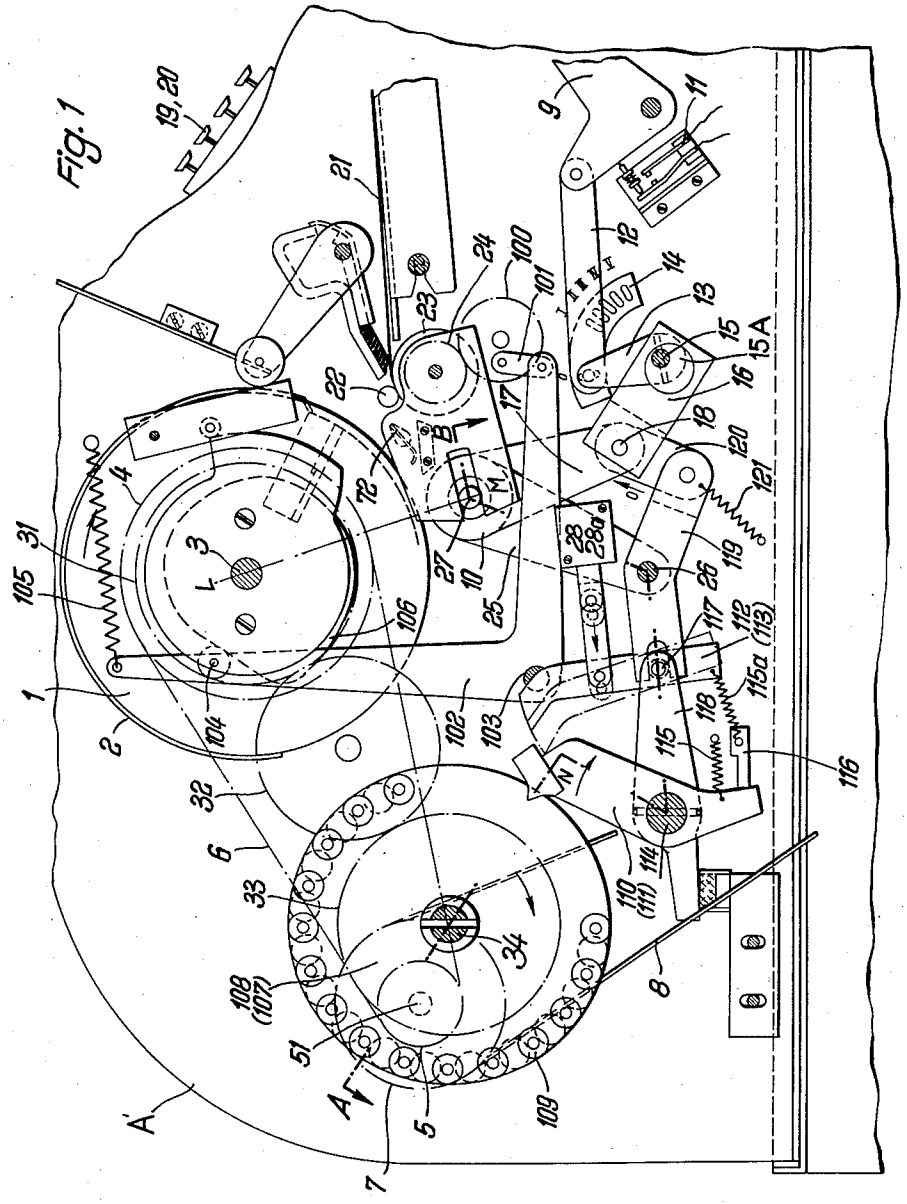
Dec. 30, 1958 W. RITZERFELD ET AL 2,866,406

ROTARY PRINTING APPARATUS FOR THE REPRODUCTION OF SECTIONS OF PRINTING FORMS

Filed Nov. 7, 1956 21 Sheets-Sheet 1

Fig. 1



Inventors

Wilhelm Ritzerfeld

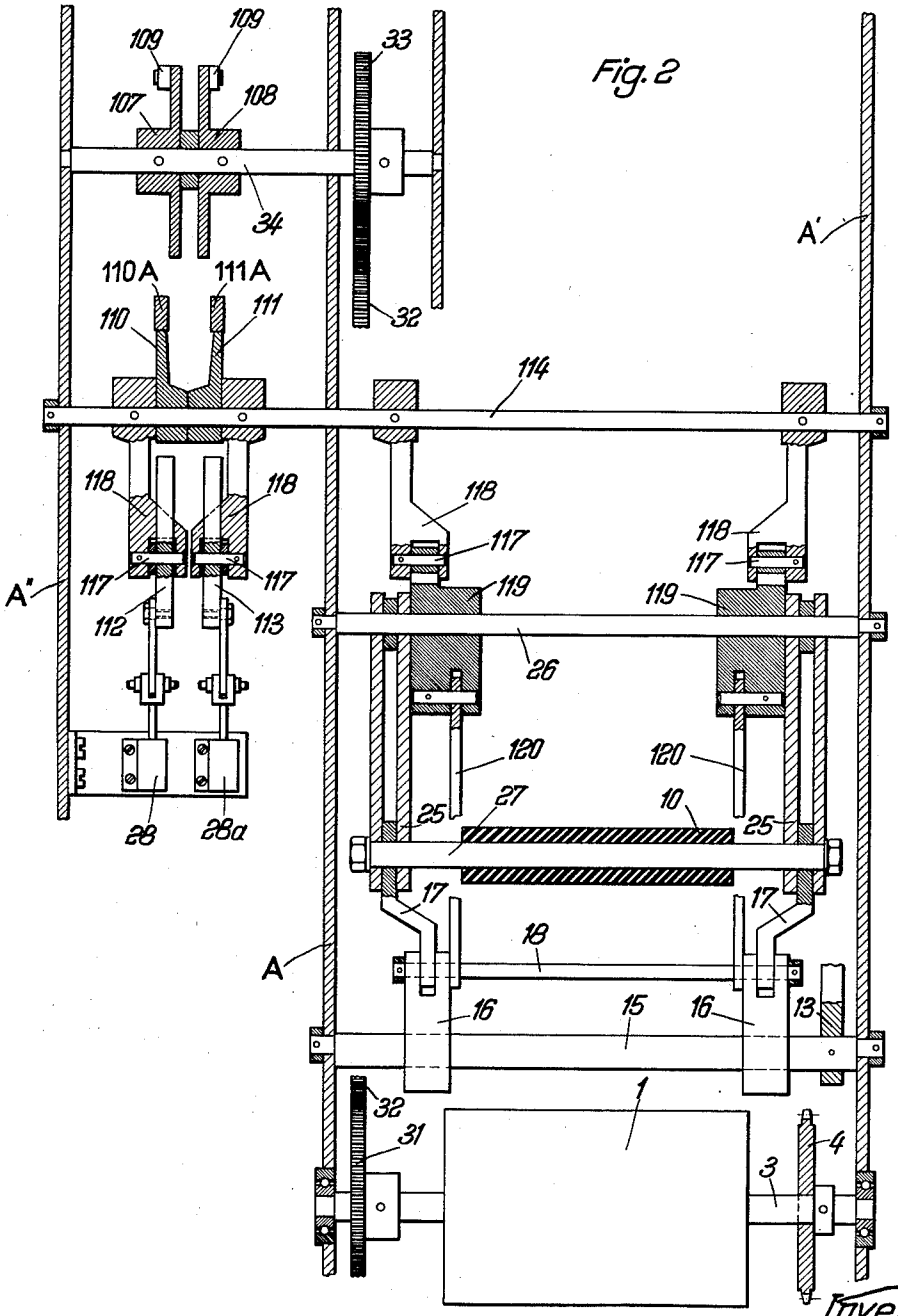
Gerhard Rückgauer

Dec. 30, 1958 W. RITZERFELD ET AL 2,866,406

ROTARY PRINTING APPARATUS FOR THE REPRODUCTION OF SECTIONS OF PRINTING FORMS

Filed Nov. 7, 1956 21 Sheets-Sheet 2

Fig. 2



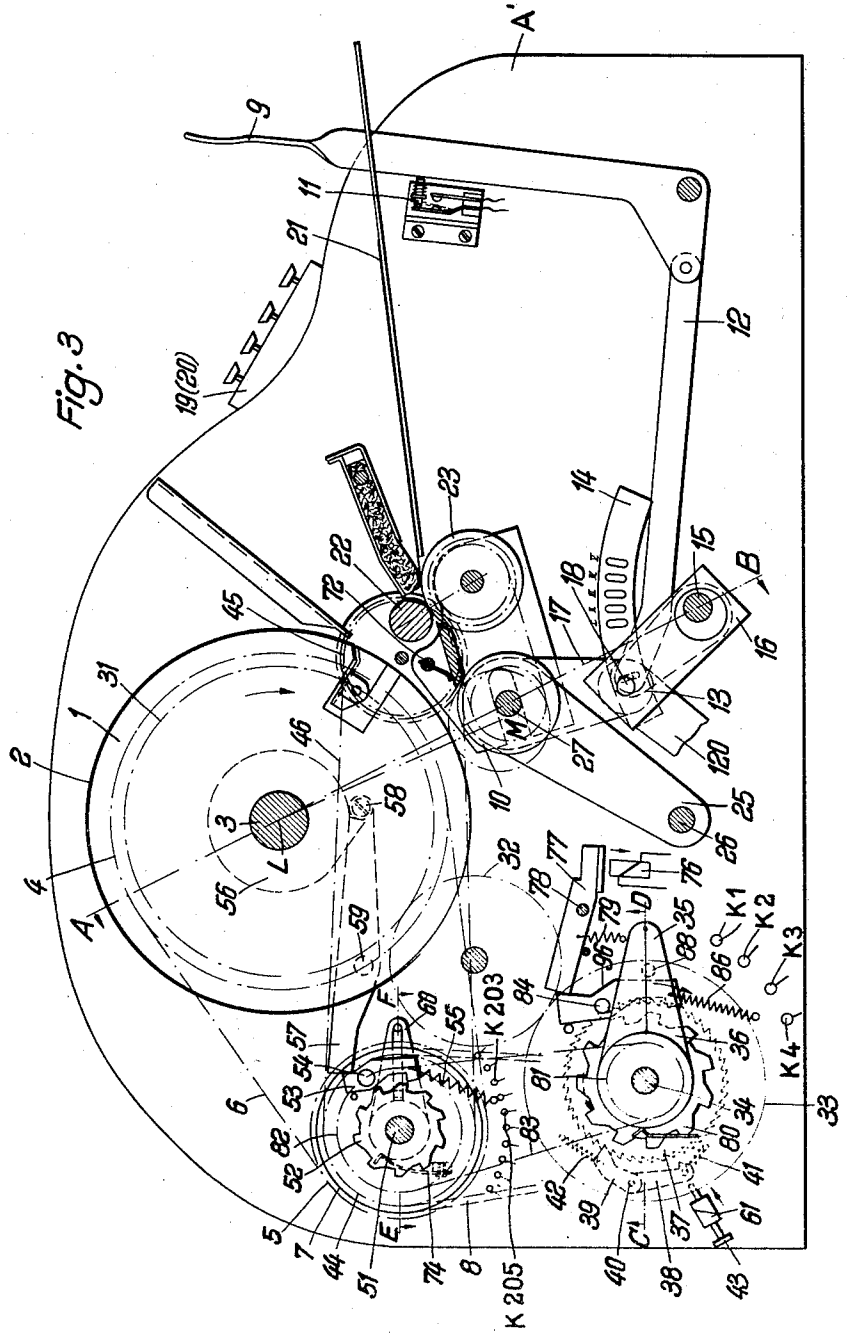
Inventor:
Wilhelm Ritzerfeld
Gerhard Ritzerfeld

Dec. 30, 1958 W. RITZERFELD ET AL 2,866,406

ROTARY PRINTING APPARATUS FOR THE REPRODUCTION OF SECTIONS OF PRINTING FORMS

Filed Nov. 7, 1956 21 Sheets-Sheet 3

Fig. 3



Inventors:

Wilhelm Ritzerfeld

Gerhard Ritzerfeld

Dec. 30, 1958 W. RITZERFELD ET AL 2,866,406
ROTARY PRINTING APPARATUS FOR THE REPRODUCTION OF SECTIONS OF PRINTING FORMS
Filed Nov. 7, 1956 21 Sheets-Sheet 4

Fig. 4

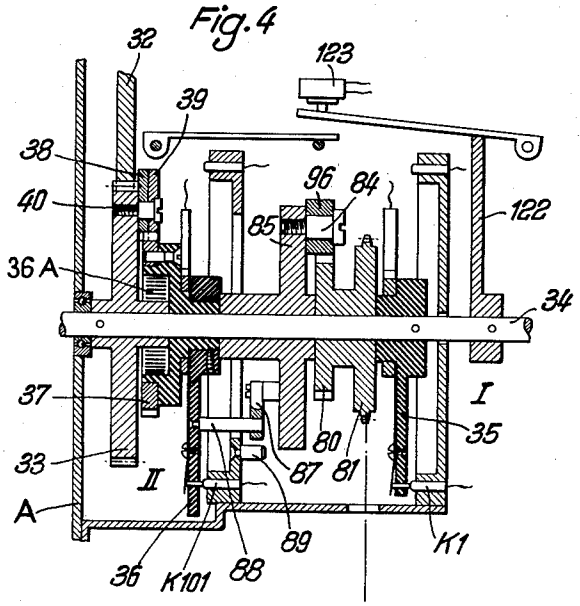
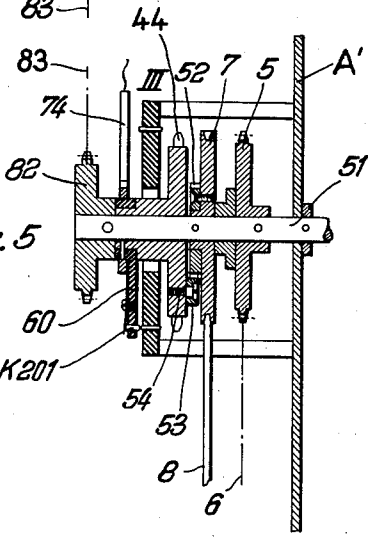


Fig. 5



Inventor:
Wilhelm Ritzerfeld
Gerhard Ritzerfeld

Dec. 30, 1958 W. RITZERFELD ET AL 2,866,406

ROTARY PRINTING APPARATUS FOR THE REPRODUCTION OF SECTIONS OF PRINTING FORMS

Filed Nov. 7, 1956 21 Sheets-Sheet 5

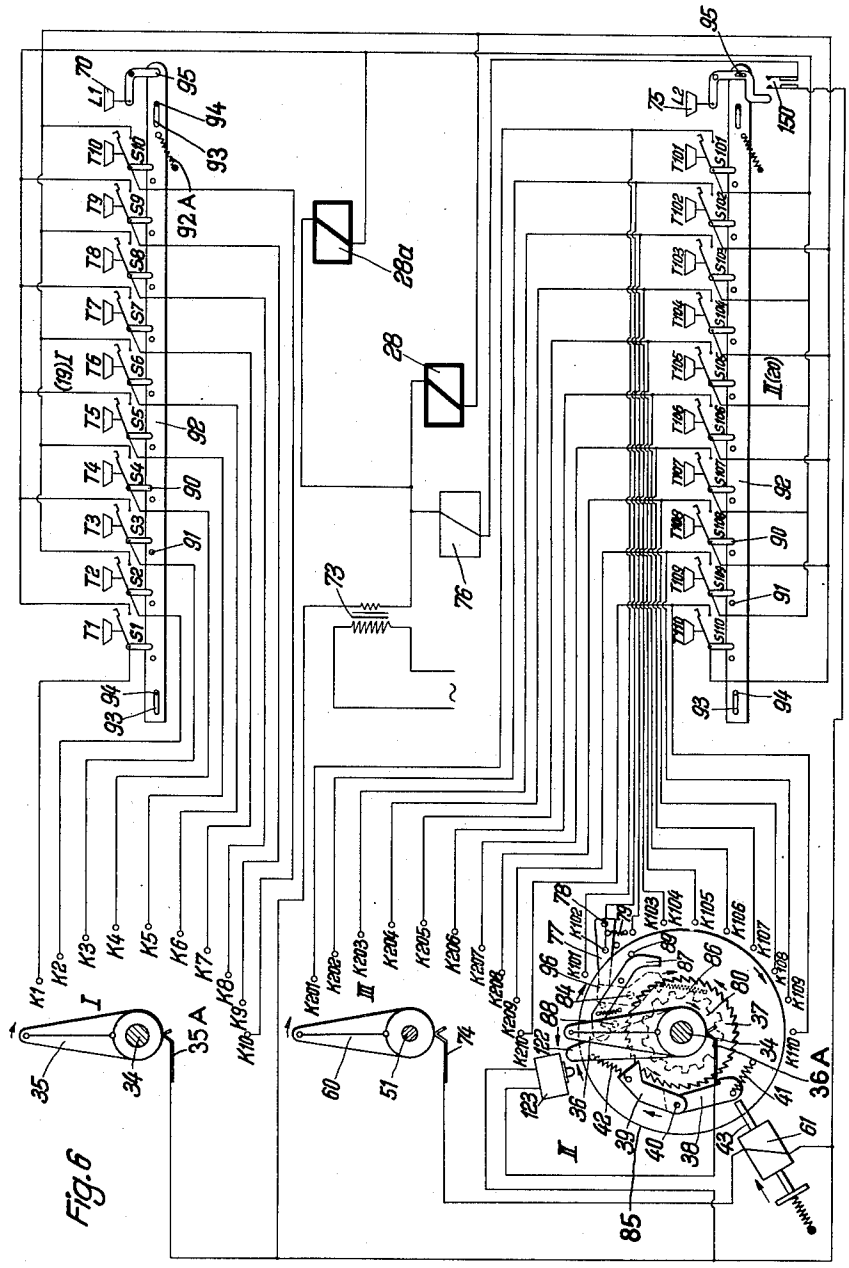


Fig. 6

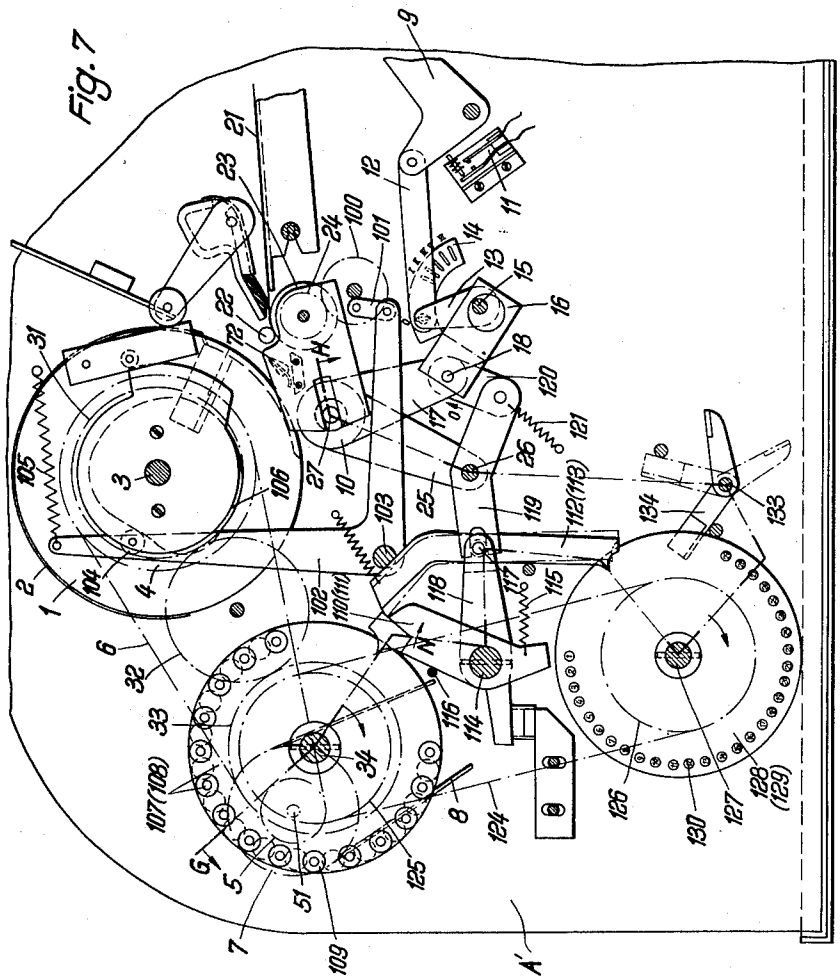
Inventor:
Wilhelm Ritzerfeld
Johann Ritzerfeld

Dec. 30, 1958 W. RITZERFELD ET AL 2,866,406

ROTARY PRINTING APPARATUS FOR THE REPRODUCTION OF SECTIONS OF PRINTING FORMS

Filed Nov. 7, 1956 21 Sheets-Sheet 6

Fig. 7



Inventor:

Wilhelm Ritzerfeld

Gerhard Ritzerfeld

Dec. 30, 1958 W. RITZERFELD ET AL 2,866,406

ROTARY PRINTING APPARATUS FOR THE REPRODUCTION OF SECTIONS OF PRINTING FORMS

Filed Nov. 7, 1956

21 Sheets-Sheet 7

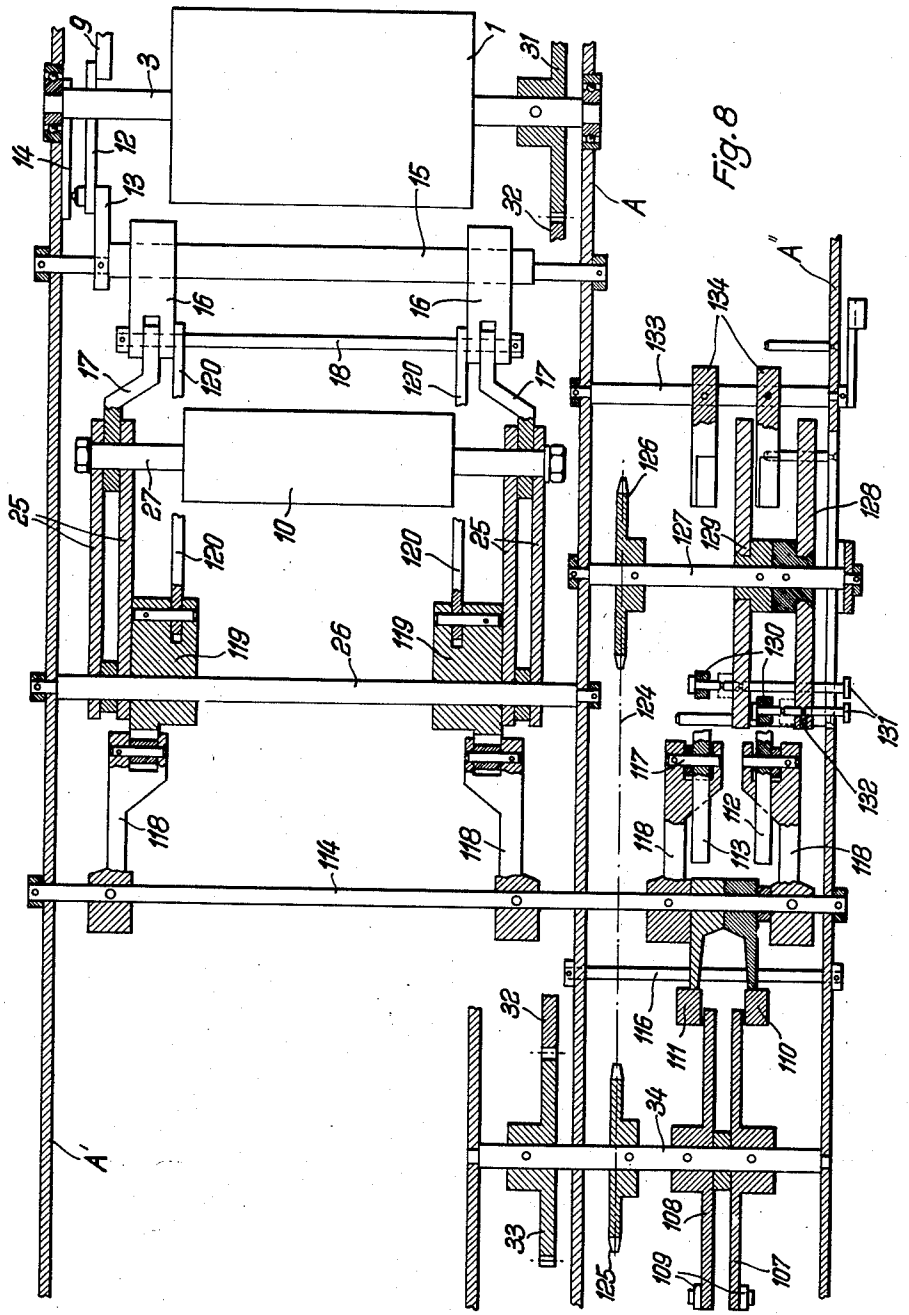


Fig. 8

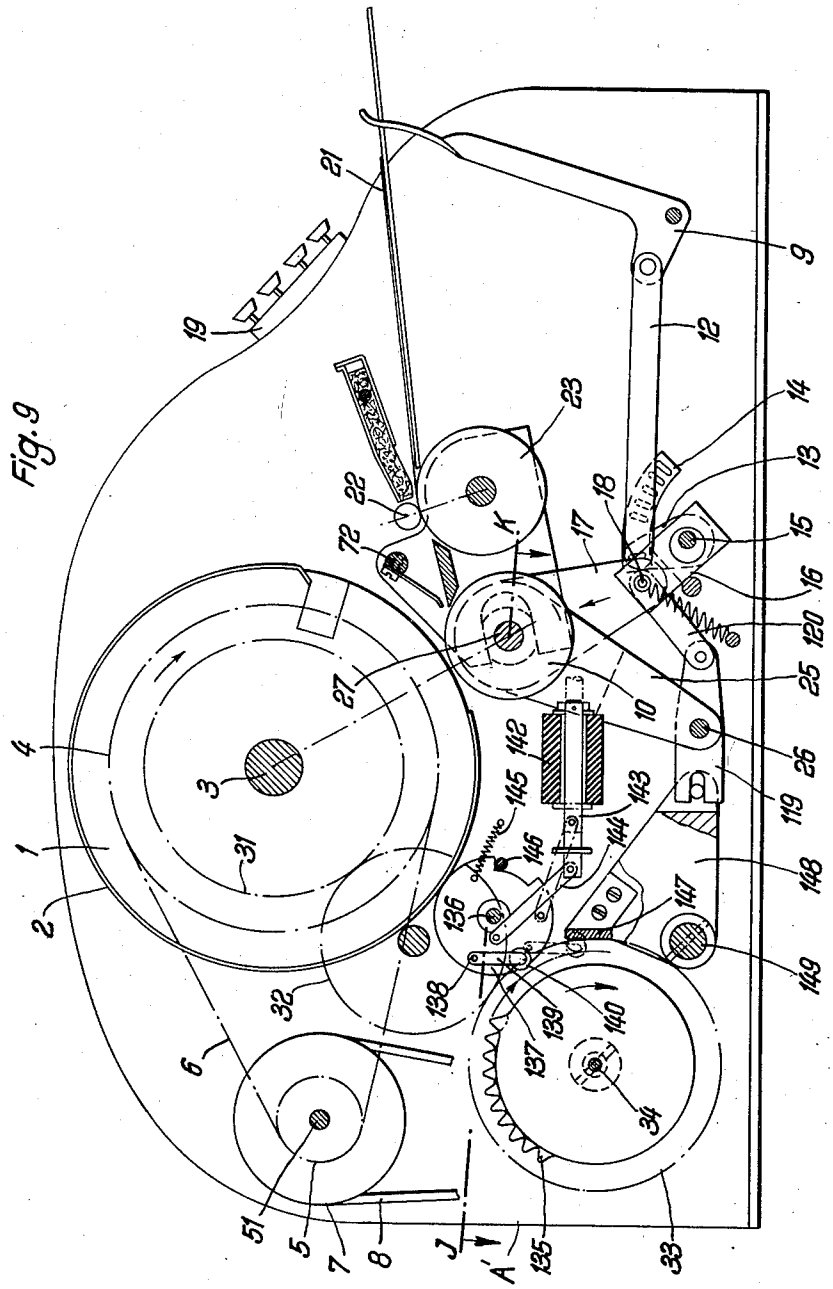
Inventor:
Wilhelm Ritzerfeld
Gerhard Ritzerfeld

Dec. 30, 1958 W. RITZERFELD ET AL 2,866,406

ROTARY PRINTING APPARATUS FOR THE REPRODUCTION OF SECTIONS OF PRINTING FORMS

Filed Nov. 7, 1956 21 Sheets-Sheet 8

Fig. 9



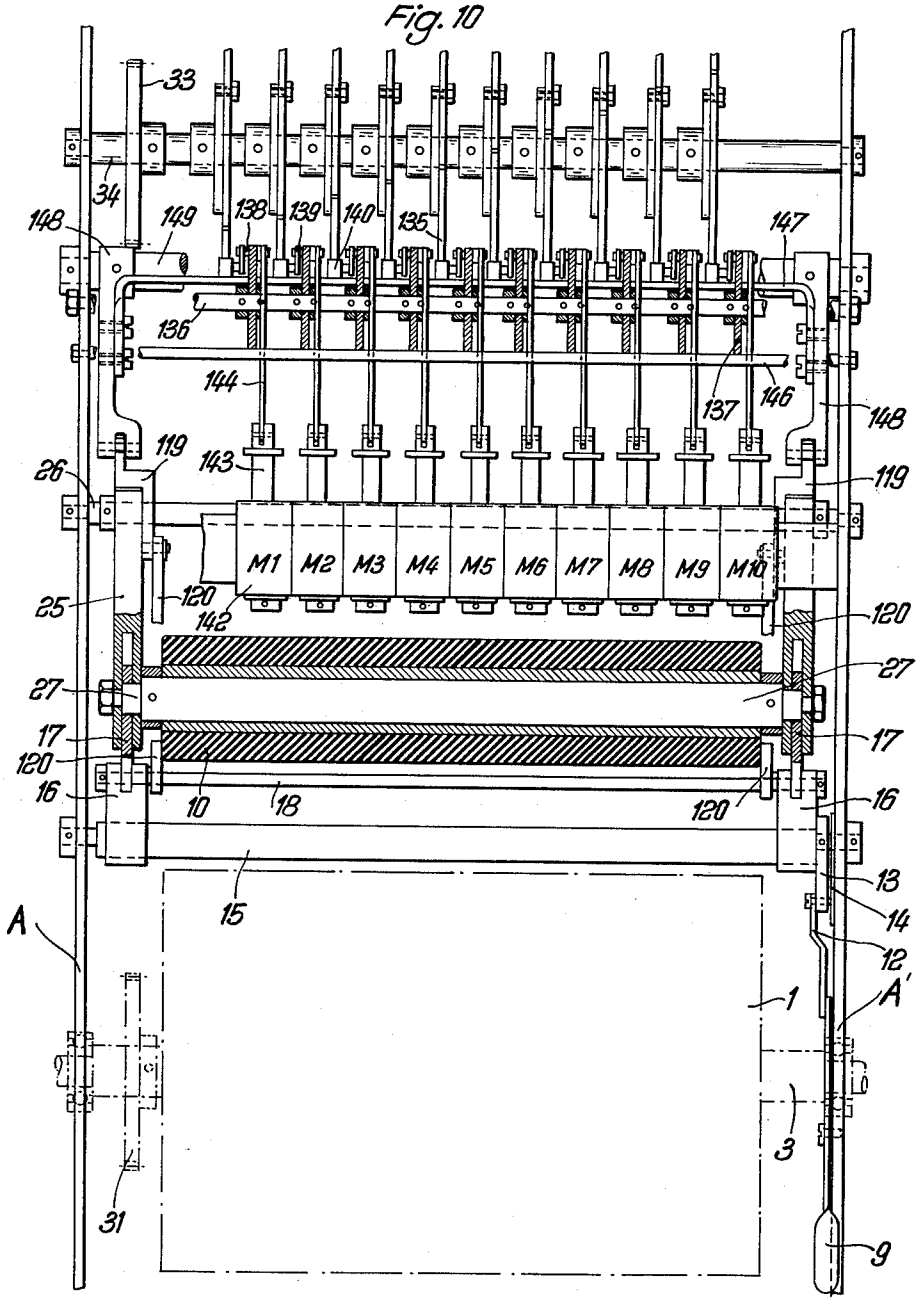
Inventor:
Wilhelm Ritzerfeld
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Dec. 30, 1958 W. RITZERFELD ET AL 2,866,406

ROTARY PRINTING APPARATUS FOR THE REPRODUCTION OF SECTIONS OF PRINTING FORMS

Filed Nov. 7, 1956 21 Sheets-Sheet 9

Fig. 10



Inventor:

Wilhelm Ritzerfeld

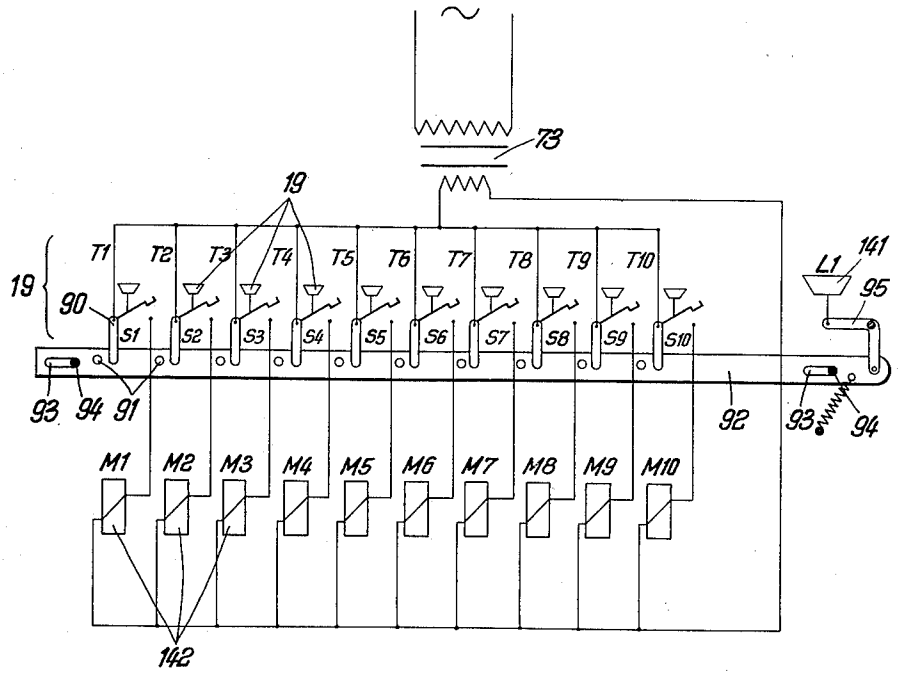
Gerhard Ritzerfeld

Dec. 30, 1958 W. RITZERFELD ET AL 2,866,406

ROTARY PRINTING APPARATUS FOR THE REPRODUCTION OF SECTIONS OF PRINTING FORMS

Filed Nov. 7, 1956 21 Sheets-Sheet 10

Fig. 11



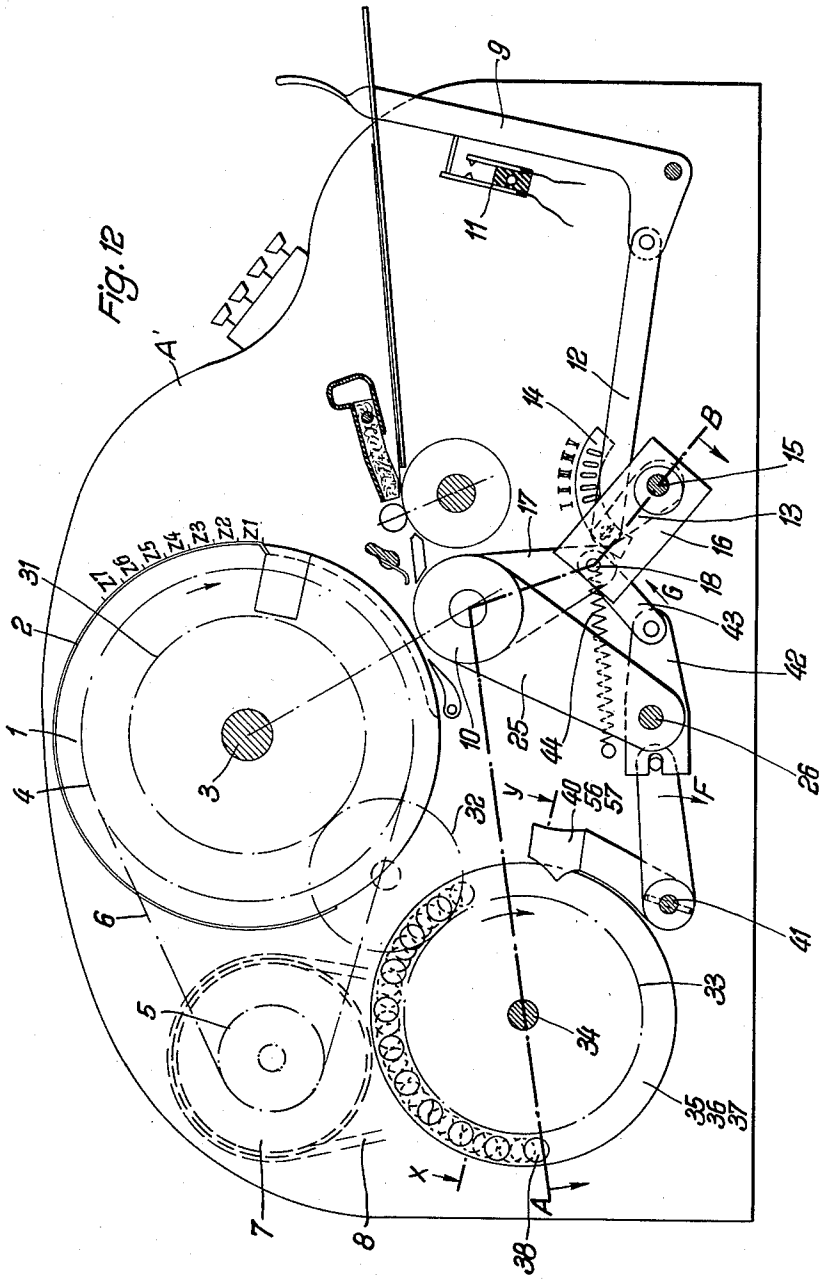
Inventors:
Wilhelm Ritzerfeld
Gerhard Ritzerfeld

Dec. 30, 1958 W. RITZERFELD ET AL 2,866,406

ROTARY PRINTING APPARATUS FOR THE REPRODUCTION OF SECTIONS OF PRINTING FORMS

Filed Nov. 7, 1956 21 Sheets-Sheet 11

Fig. 12



Inventor:
Wilhelm Ritzerfeld
Gerhard Ritzerfeld

Dec. 30, 1958 W. RITZERFELD ET AL 2,866,406

ROTARY PRINTING APPARATUS FOR THE REPRODUCTION OF SECTIONS OF PRINTING FORMS

Filed Nov. 7, 1956 21 Sheets-Sheet 12

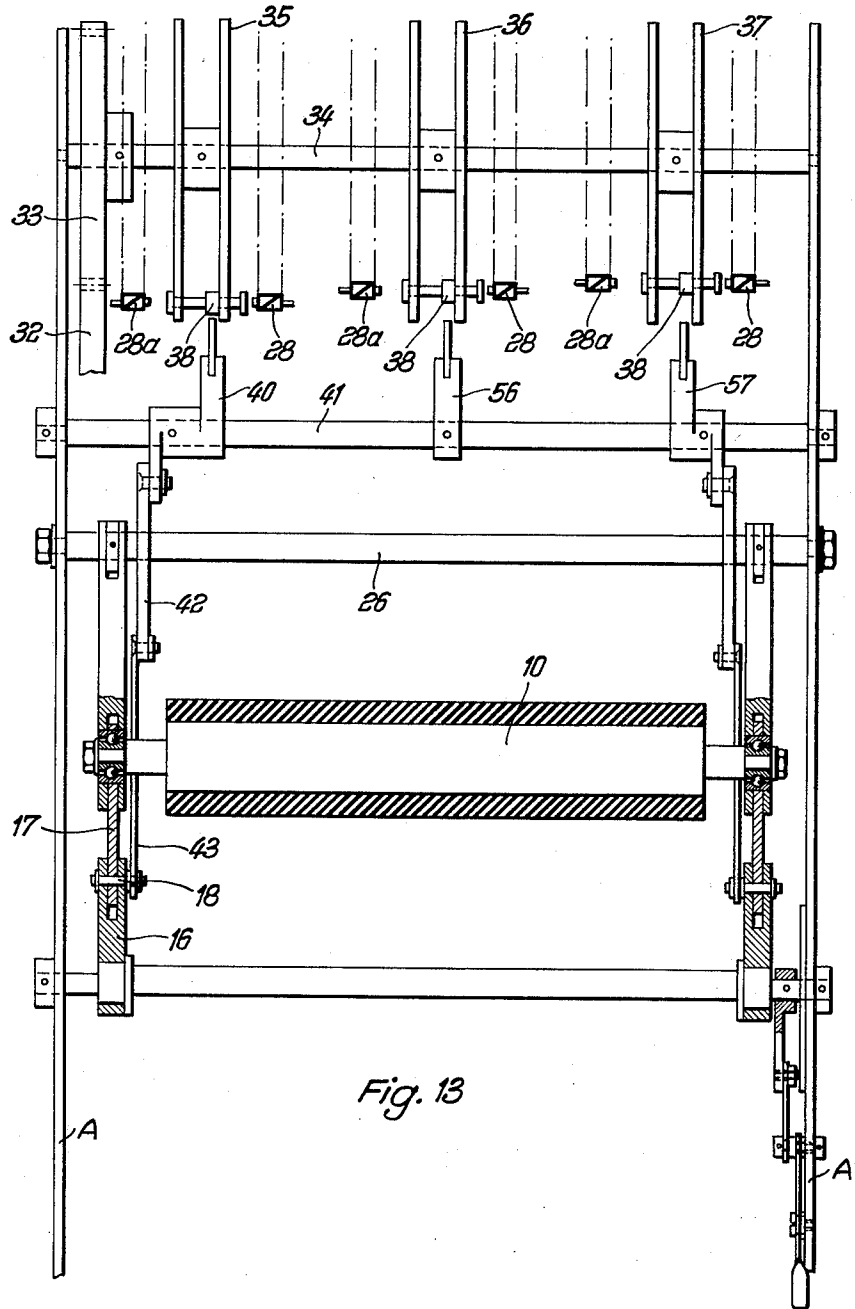


Fig. 13

Inventors:
Wilhelm Ritzerfeld
Gerhard Rückfeld

Dec. 30, 1958 W. RITZERFELD ET AL 2,866,406

ROTARY PRINTING APPARATUS FOR THE REPRODUCTION OF SECTIONS OF PRINTING FORMS

Filed Nov. 7, 1956

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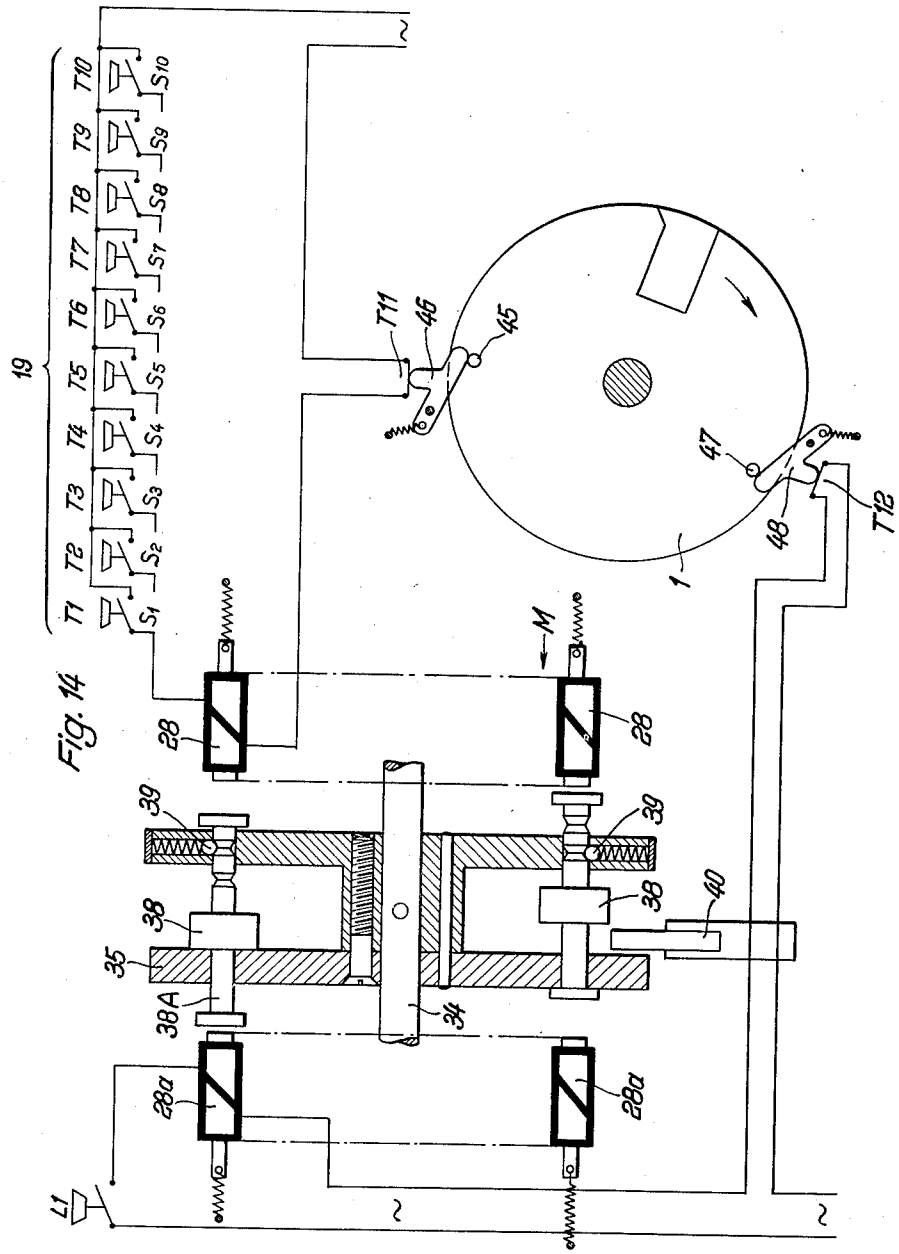


Fig. 14

Inventor:

Wilhelm Ritzerfeld

Gerhard Richter

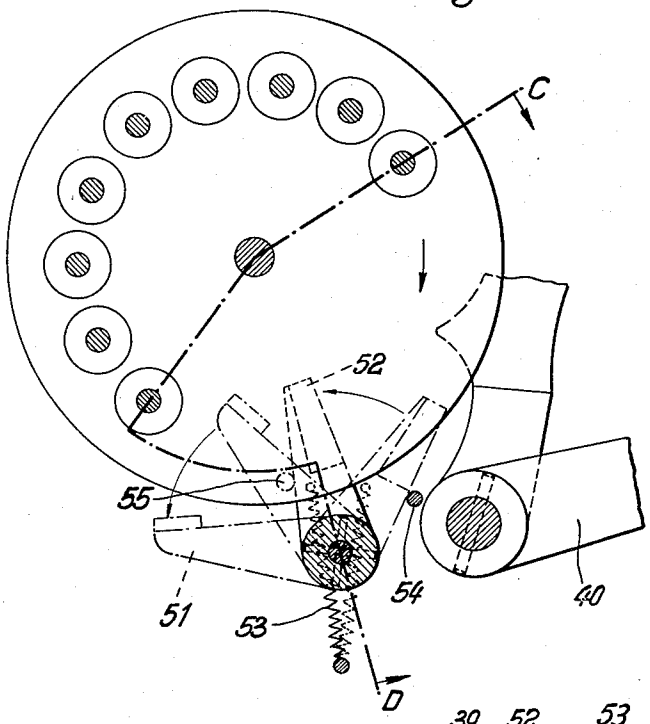
Dec. 30, 1958 W. RITZERFELD ET AL 2,866,406

ROTARY PRINTING APPARATUS FOR THE REPRODUCTION OF SECTIONS OF PRINTING FORMS

Filed Nov. 7, 1956

21 Sheets-Sheet 14

Fig. 15



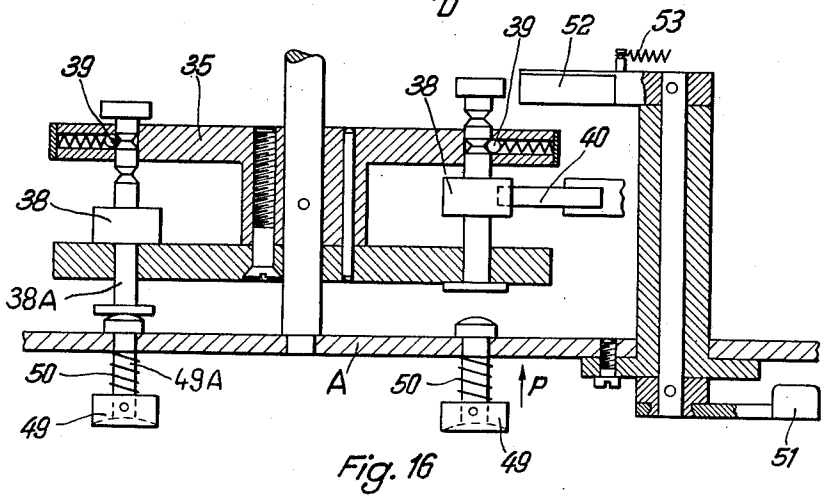


Fig. 16

Inventors:

Wilhelm Ritzerfeld

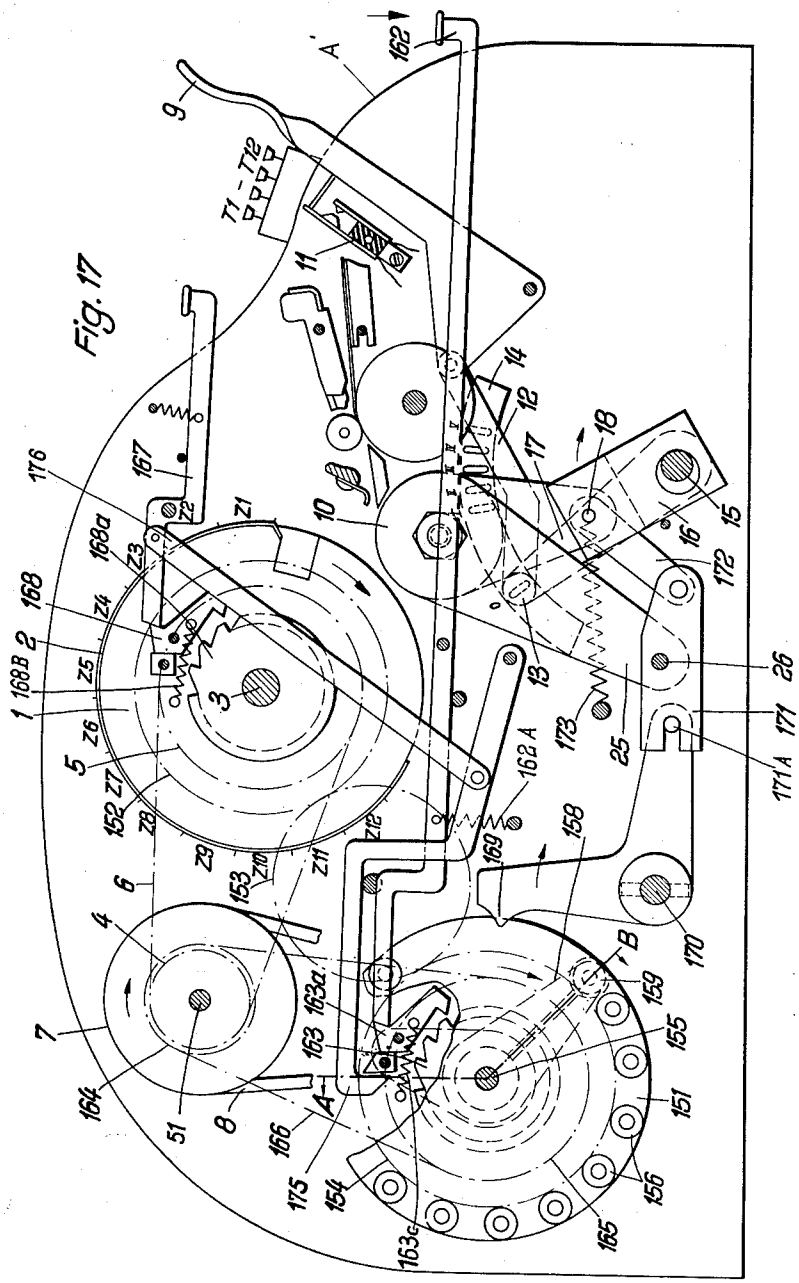
Gerhard Ritzerfeld

Dec. 30, 1958 W. RITZERFELD ET AL 2,866,406

ROTARY PRINTING APPARATUS FOR THE REPRODUCTION OF SECTIONS OF PRINTING FORMS

Filed Nov. 7, 1956 21 Sheets-Sheet 15

Fig. 17



Inventor:
Wilhelm Ritzerfeld
Gerhard Ritzerfeld

Dec. 30, 1958 W. RITZERFELD ET AL 2,866,406
ROTARY PRINTING APPARATUS FOR THE REPRODUCTION
OF SECTIONS OF PRINTING FORMS
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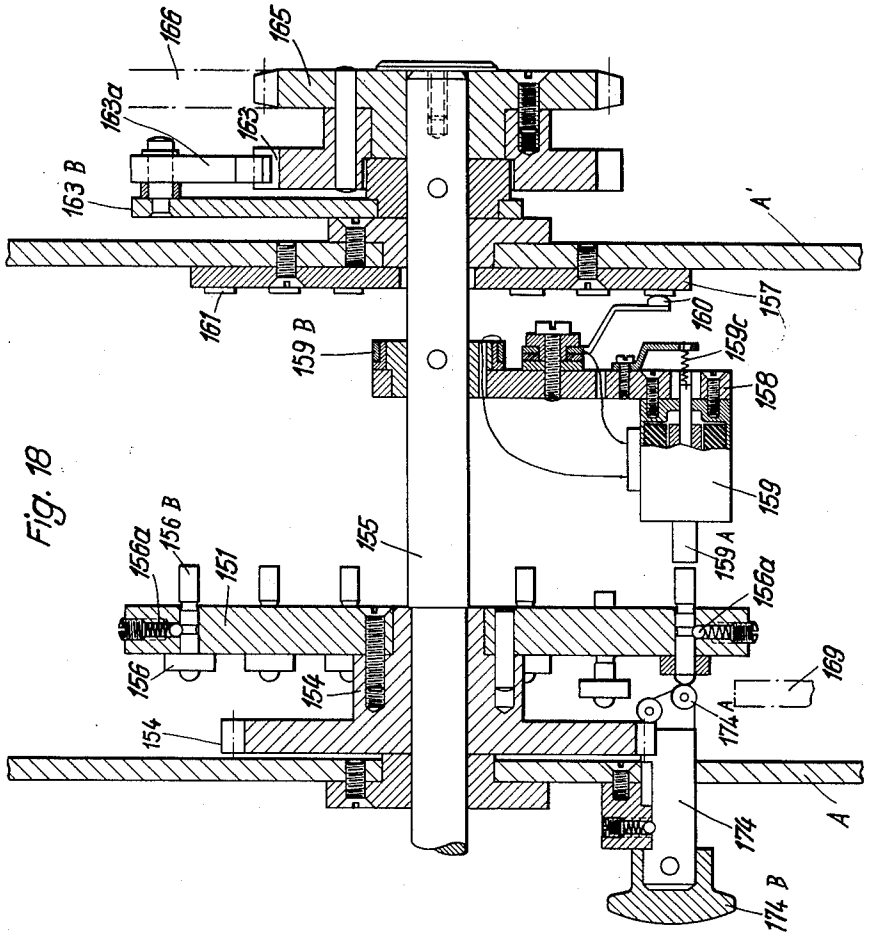


Fig. 18

Inventor:
Wilhelm Ritzerfeld
Gerhard Richard Reisfeld.

Dec. 30, 1958 W. RITZERFELD ET AL 2,866,406
ROTARY PRINTING APPARATUS FOR THE REPRODUCTION OF SECTIONS OF PRINTING FORMS
Filed Nov. 7, 1956 21 Sheets-Sheet 17

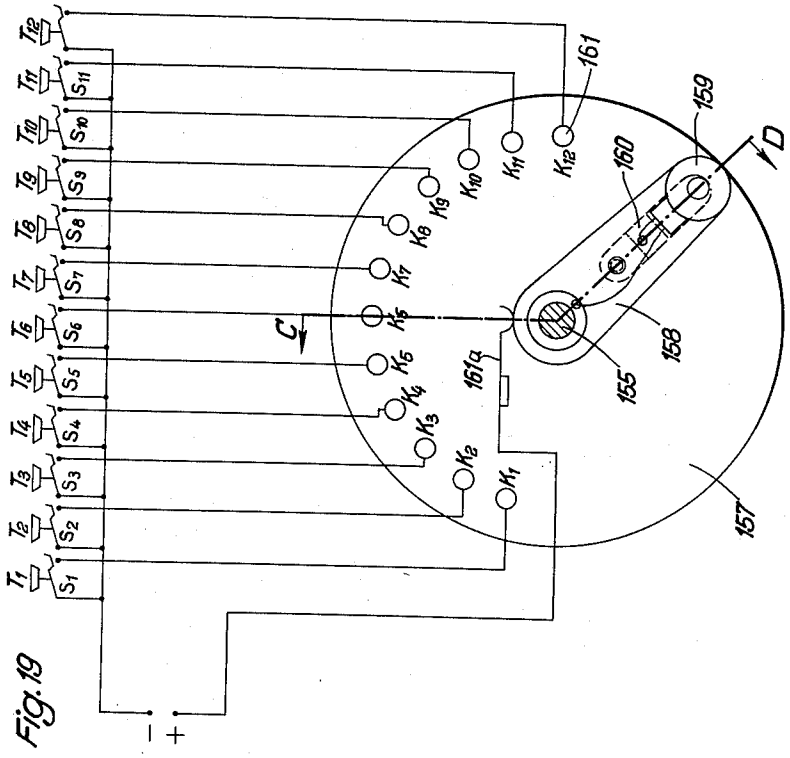


Fig. 19

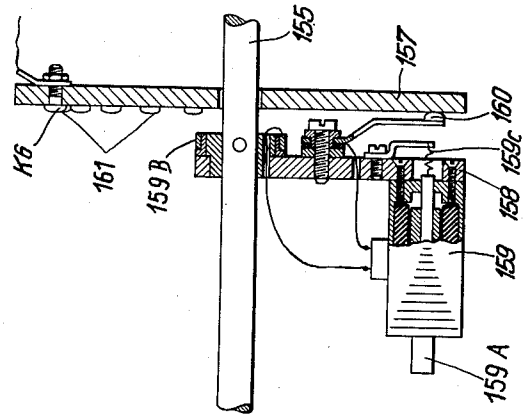


Fig. 20

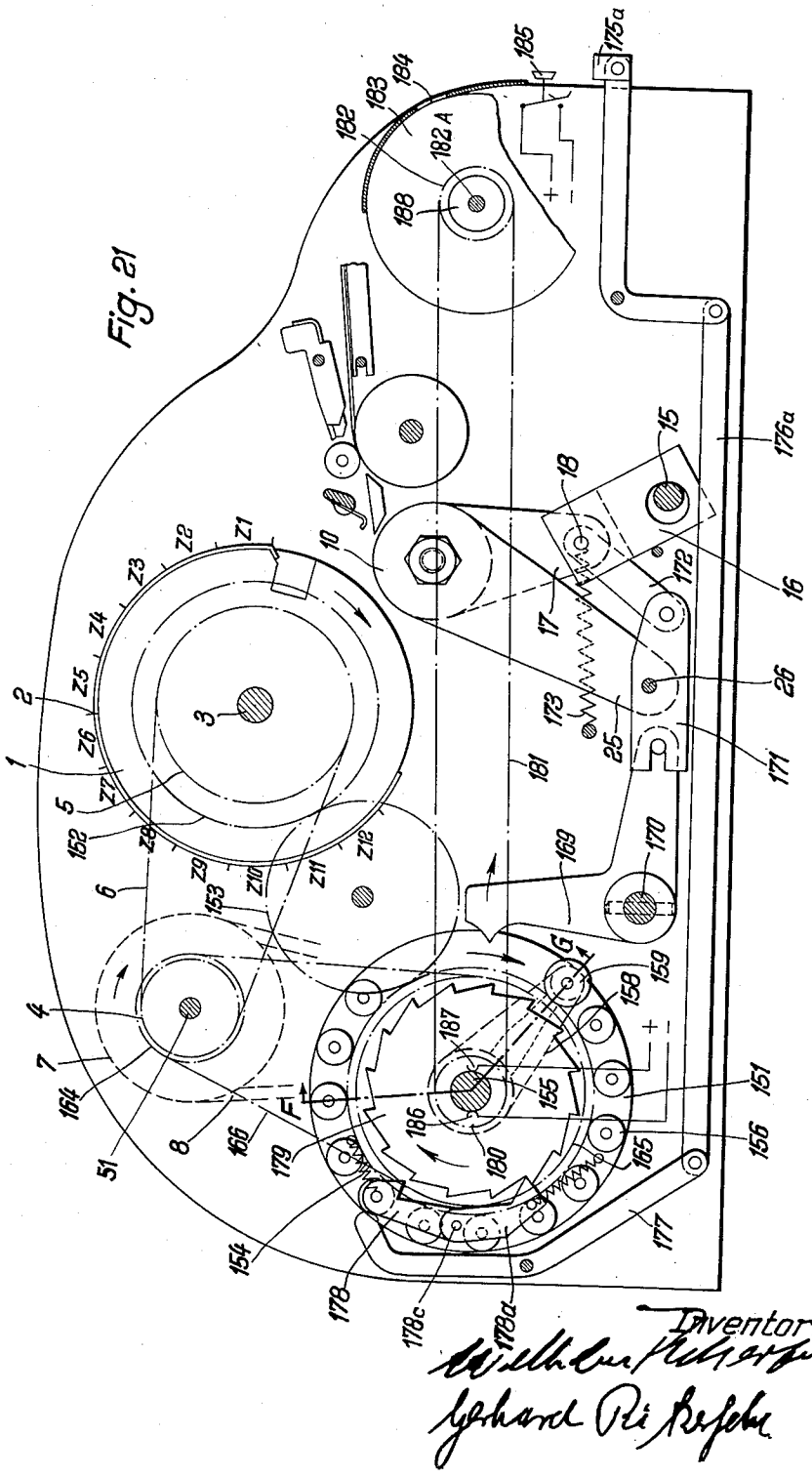
Inventor:
Wilhelm Ritzerfeld
Gerhard Ritzerfeld

Dec. 30, 1958 W. RITZERFELD ET AL 2,866,406

ROTARY PRINTING APPARATUS FOR THE REPRODUCTION OF SECTIONS OF PRINTING FORMS

Filed Nov. 7, 1956 21 Sheets-Sheet 18

Fig. 21



Inventor:
Wilhelm Ritzerfeld
Gerhard Dr. Reschke

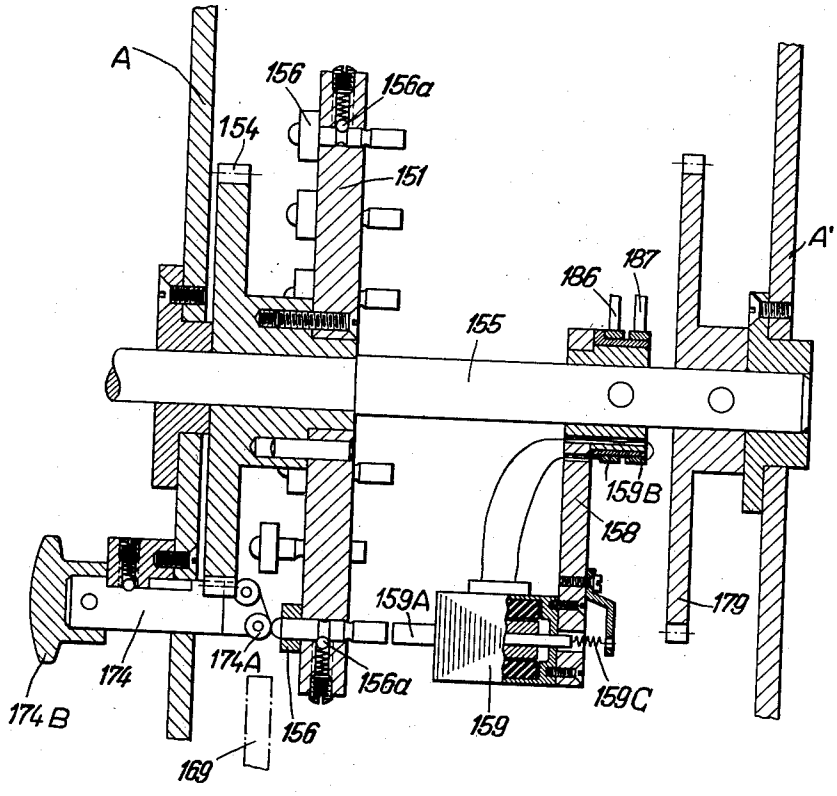
Dec. 30, 1958 W. RITZERFELD ET AL 2,866,406

ROTARY PRINTING APPARATUS FOR THE REPRODUCTION OF SECTIONS OF PRINTING FORMS

Filed Nov. 7, 1956

21 Sheets-Sheet 19

Fig. 22



Inventor:
Wilhelm Ritzerfeld
Gerhard Ritzerfeld

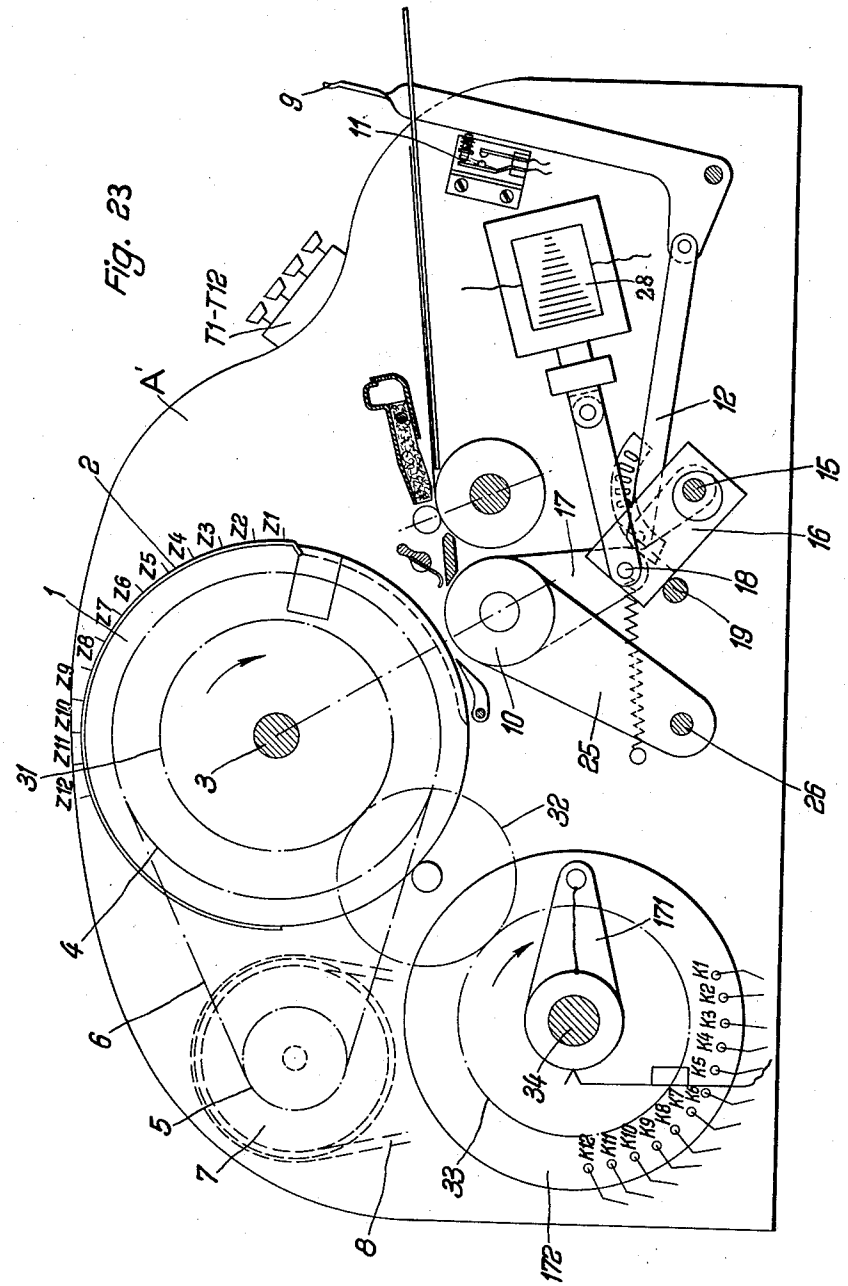
Dec. 30, 1958 W. RITZERFELD ET AL 2,866,406

ROTARY PRINTING APPARATUS FOR THE REPRODUCTION OF SECTIONS OF PRINTING FORMS

Filed Nov. 7, 1956

21 Sheets-Sheet 20

Fig. 23



Inventor:

Wilhelm Ritzerfeld

Gerhard Ritzerfeld

Dec. 30, 1958 W. RITZERFELD ET AL 2,866,406

ROTARY PRINTING APPARATUS FOR THE REPRODUCTION OF SECTIONS OF PRINTING FORMS

Filed Nov. 7, 1956

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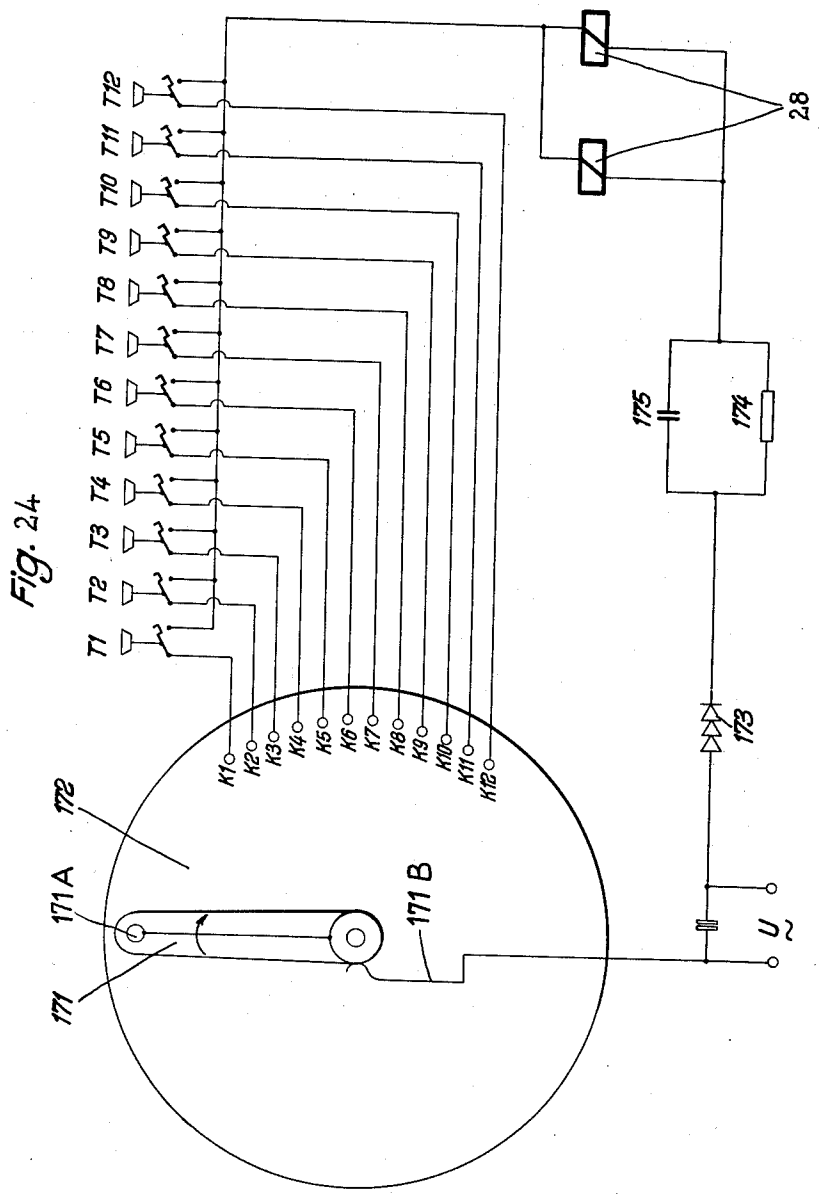


Fig. 24

Inventor:

Wilhelm Ritzerfeld

Gerhard Rispeth

United States Patent Office 2,866,406 Patented Dec. 30, 1958

2,866,406

ROTARY PRINTING APPARATUS FOR THE REPRODUCTION OF SECTIONS OF PRINTING FORMS

Wilhelm Ritzerfeld, Berlin-Dahlem, and Gerhard Ritzerfeld, Berlin-Grunewald, Germany

Application November 7, 1956, Serial No. 620,939

Claims priority, application Germany November 8, 1955

31 Claims. (Cl. 101—132.5)

The present invention refers to rotary printing or duplicating machines and more specifically to that type in which sections or lines separate from each other on a printing form are reproduced as a narrowed or closed sequence of lines or sections, by means of a counter roll element intermittently moved into contact and out of contact with said printing roll.

The present invention refers to rotary duplicating or printing machines in which reproducible mirror-inverted printing forms are transferred to moistened sheets, and also to rotary duplicating or printing machines in which the printing form is continuously re-inked in the manner known from the raised form, stencil or electric method printing processes.

It is a main object of this invention to provide a printing apparatus for selective intermittent printing in which certain lines or sections of the printing form can be selected before starting the printing operation so that in operation of the printing apparatus these selected lines or sections are reproduced on a copy sheet in the desired sequence thereof.

It is another object of this invention to provide an apparatus of the type set forth with control means permitting presetting the selected sections either manually or by electromagnetic means.

It is another object of the invention to provide a printing apparatus in which certain sections or lines of the printing form can be selected by correspondingly presetting the control or selector means and in which in a subsequent cycle of operation of the apparatus other lines or sections are reproduced automatically without any special setting of the control means for these other selected lines or sections of the form.

It is still another object of the invention to provide a printing or duplicating apparatus which is throughout composed of ruggedly constructed means which are entirely reliable in operation.

With the above objects in view, an embodiment according to this invention includes a printing roll carried for rotation in a frame and adapted to have a printing form attached thereto, and a counter roll movable into and out of engagement with the printing form for pressing a copy sheet against the printing form for causing an impression thereof. The apparatus further includes a movable device adapted to move the counter roll in accordance to the action of actuator means which cause the movable device to act on the counter roll, the actuator means acting upon the movable device by the intermediary of coupling means interposed between the actuator means and the movable device. The actuator and coupling means function in close relation to the rotation of the printing form and are selectively controlled by presetting selector elements which control their action. In alternative embodiments the selection is effected by either electromagnetic means or by purely mechanical means.

In some of the embodiments of this invention which include electromagnetic means for the selective control of the operation, electromagnetic means are employed for

controlling the action of the coupling means. In other embodiments of the electromagnetic type, the electromagnetic means are employed for moving the actuator means in and out their operative positions so as to set them for cooperation with coupling means and to control the movement of the counter roll.

In embodiments of the type which uses mechanical means for selective control, selector elements are moved in and out of operative position for controlling the coupling means, in other embodiments of this type the actuator means are moved directly and manually in and out of operative position for cooperation with the coupling means and for operating the counter roll causing the actual reproduction of the sections of the printing form.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

Fig. 1 is a lateral view of an apparatus according to the present invention, one wall of the frame being removed for better showing of the electromagnetically controlled mechanism;

Fig. 2 is a section along line A—B of Fig. 1 showing in greater detail the elements of the mechanism for moving the counter roll;

Fig. 3 shows in a lateral view the same embodiment of the invention however showing in more detail the electromagnetic switch means for controlling the counter roll;

Fig. 4 is a section along line C—D of Fig. 3 showing details of part of the control means used in this embodiment;

Fig. 5 is a section along line E—F of Fig. 3 showing details of another part of the control means used in this embodiment;

Fig. 6 is an electric diagram showing the circuits used in this embodiment and also some of the control means used in this embodiment;

Fig. 7 is a lateral view of another embodiment of the invention, one wall of the frame being left out to show the details of the mechanism of this embodiment;

Fig. 8 is a section along lines G—H of Fig. 7;

Fig. 9 is a lateral view of another embodiment of this invention one wall of the frame being left out to show more clearly details of the inner mechanism thereof;

Fig. 10 is a sectional view taken along line J—K of Fig. 9;

Fig. 11 is an electrical diagram of the circuits used in this embodiment;

Fig. 12 is a lateral view of still another embodiment of this invention, without one wall of the frame for better showing the electromechanical control of the elements of this embodiment;

Fig. 13 is a section taken along line A—B of Fig. 12;

Fig. 14 is an electrical diagram and partial cross section taken along lines X—Y of Fig. 12 for the purpose of showing details of the electromagnetic control of this embodiment;

Fig. 15 is a partial view of control elements of another embodiment of this invention;

Fig. 16 is a partial section taken along lines C—D of Fig. 15;

Fig. 17 is a lateral view of still another embodiment of the invention, one wall of the frame being left out for showing more clearly the mechanism of this embodiment;

Fig. 18 is a partial sectional view at larger scale taken along line A—B of Fig. 17;

Fig. 19 is an electric diagram and an elevation of one control element of the electrical means used in this embodiment;

Fig. 20 is a partial section taken along line D—C of Fig. 19;

Fig. 21 is a side view of another embodiment of this invention, the one wall of the frame being left out for showing the details of the mechanism in this embodiment;

Fig. 22 is a section taken along lines F—G of Fig. 21;

Fig. 23 is a side view of still another embodiment of the invention similar to the embodiment shown in Figs. 1–6; and

Fig. 24 is a wiring diagram pertaining to this embodiment.

Referring now to Figs. 1–6, a printing roll **1** is mounted for rotation between the walls A and A′ of a frame and is supported by a shaft **3**. A printing form **2** is attached to the roll **1**. The printing roll **1** is driven by means of a chain **6** running over chain sprockets **4** and **5** respectively. Sprocket **5** is mounted on an intermediate shaft **51** also supported in the frame, and this intermediate shaft **5** is driven from a motor, not shown, over a belt **8** and a pulley **7** mounted on the intermediate shaft **51**.

Copy sheets **21** are fed between feed rollers **22** and **23** and through these feed rollers further into a gap between printing roll **1** and a counter roll **10**. When the printing roll **1** is rotated with its form **2** attached thereto then no impression is made on the copy sheet **21** unless the counter roll **10** is moved towards the printing roll **1** so as to exert the required pressure for pressing the sheet **21** against the form **2**.

For starting the printing operation a main control lever **9** is turned in clockwise direction as seen in the drawing so that first of all a main switch **11** which was held in open position is permitted to close the circuit for the motor and all electric elements of this apparatus. At the same time through a connecting rod **12** a lever **13** is swung in clockwise direction around its pivot **15** for presetting the pressure to be exerted by the counter roll **10** in the printing operation.

For this purpose the following linkage is provided for the operation of counter roll **10**. The counter roll **10** is carried by a shaft **27** mounted in a bracket or lever **25** which is rotatable around a stationary pivot **26** mounted in the frame. A toggle lever device consisting of levers **16** and **17** is interposed between the pivot **15** and the shaft **27**. The two toggle levers **16** and **17** are joined by a pivot pin **18**. A two-armed lever **119** is also turnable on pivot **26**. The one end of lever **119** is connected by a link **120** to the connecting pivot **18**. Whenever the two-armed lever **119** is swung around pivot **26** in counterclockwise direction against the action of a spring **121** the link **120** is moved in direction of arrow O so that the two levers **16** and **17** are moved in the corresponding direction and thereby the lever **25** with the roller is rotated in counterclockwise direction around pivot **26**. Through this movement the counter roll **10** is forced against the printing roll **1** and form **2**.

For the above-mentioned purpose of adjusting the amount of pressure to be exerted by counter roll **10** the lever **16** is provided with an eccentric bushing **15***a* mounted over the pivot **15** and attached to the above-mentioned lever **13**. Therefore turning the lever **13** in clockwise direction will result in moving the center of rotation of lever **16** to the left whereby the movement of counter roll **10** is affected. Various positions of lever **13** may be set and held by notches provided in an arcuate strip **14**.

The above-described basic elements of the apparatus according to the invention apply to all the embodiments described further below.

A secondary shaft **34** is mounted for rotation between the walls A, A′ and A″ of the frame. This shaft **34** is

connected for rotation with the shaft **3** of the printing roll **1** by means of a gear train **31**, **32** and **33**. Since the gears **31** and **33** are shown as having the same diameter the rotation of shaft **34** will be synchronous with that of shaft **3**.

For moving the starting portion of copy sheet **21** by means of the feed rollers **21** and **23** into the bight between the printing roll **1** and counter roll **10**, the roll **23** is provided with a gear **24** which meshes with another gear **100**. This gear **100** is connected by a link **101** with a two-armed lever **102** turnable around the stationary pivot **103**. The opposite end of lever **102** carries a roller **104** engaging a cam **106** connected to the printing drum **1**. A spring **105** forces lever **102** into engagement with said cam **106**. Whenever the rotation of the printing roll **1** has been started the action of the cam **106** on roller **104** and lever **102** results in a certain amount of rotation of gear **100** and therefore also of roller **23** which is sufficient to move the sheet **21** into the bight between printing roll **1** and counter roll **10**. A free wheel device interposed between link **101** and gear **100** permits the lever **102** to return into its starting position after a certain amount of rotation of printing roll **1**, without interfering with the position of the copy sheet **21**. Also the sheet **21** can be moved further during the printing operation by means of the pressure exerted by counter roll **10** on the printing roll **1**, without interference with the feed rollers **22** and **23**. On the other hand, between the intermittent printing operations described below the sheet **21** is held in any position reached during this series of printing operations, by a friction device **72**.

For the purpose of controlling the movement of the counter roll **10** into printing position actuator means are mounted on the secondary shaft **34**. These actuator means comprise, in this particular example, a pair of discs **107** and **108**. Each one of these discs is provided with actuating means consisting of small rollers **109** which are angularly displaced along the circumference of the discs **107** and **108**, respectively. The angular spacing of the rollers **109** corresponds to the spacing of sections of the printing form **2** that are to be reproduced selectively and intermittently. In this particular example the sections of the printing form may be individual lines. In this case the spacing of the rollers **109** on disc **107** may correspond to double line spacing of the lines forming the sections of form **2**. On the other hand the rollers **109** on disc **108** may have the same double line spacing, however the rollers **109** of disc **108** are angularly offset against those of disc **107** by one line spacing. Therefore, in operation single line spacing of reproduced sections may be obtained in spite of the double line spacing of the rollers **109** on each of the discs **107** and **108**, respectively.

Coupling means are interposed between the above-described actuator means and the moving means described for the operation of counter roll **10**.

The coupling means in this example comprise two feeler elements **110** and **111** respectively which are mounted on a shaft **114** supported in the frame. The feeler members **110**, **111** are two-arm levers. One end of these levers is provided with a cam-like pick-up element **110***a* and **111***a*, respectively, which projects into the circular path of the rollers **109**. Whenever during rotation of the discs **107** and **108** any one of the rollers **109** engages said cam element the lever **110** or **111** respectively is swung in clockwise direction as seen in the drawing. The opposite end of the levers **110** and **111**, respectively, is connected to a spring **115** which tends to hold the cam-like end **110***a*, **111***a*, respectively, in the position in which it projects into the circular path of the rollers **109**. A stop **116** limits the counterclockwise movement of levers **110**, **111** under the action of spring **115**. Attached to shaft **114** is another lever **118** provided at its other end with a pivot pin **117**. Mounted

on this pivot pin **117** for limited rotation is a coupling element consisting of a lever **112** and **113** respectively. One free end of this lever **112, 113**, respectively, is in its inoperative position out of engagement with the feeler element **110, 111**, respectively. However, when turned or swung in counterclockwise direction around pivot **117** this outer end of lever **112, 113**, respectively, will engage a notch of the cam-like end piece of feeler element **110, 111**, respectively. The opposite end of coupling element **112, 113**, respectively, is connected by a spring **115***a* to the stop **116** so as to be held out of engagement with the cam-like end **110***a*, **111***a*, respectively. One end of the above-described two-armed lever **119** engages with a fork-shaped end the pivot **117**. A point of the coupling element **112, 113**, respectively, between pivot **117** and its free engaging end is connected by a link to a solenoid **28, 28***a*, respectively. Upon energization of any one of the solenoid **28, 28***a*, the last-mentioned link will be moved in the direction of the arrow Z so that the free end of the coupling element **112, 113**, respectively, is moved into engagement with the notch of the feeler element **110, 111**, respectively.

It will now be evident that whenever during rotation of the discs **107, 108**, one of the rollers **109** engages the cam ends **110***a* or **111***a*, the feeler element **110, 111**, respectively, will be moved in clockwise direction without any further effect on the remaining mechanism of this apparatus. However whenever one of the solenoids **28, 28***a* has been energized and the coupling element **112** or **113** has been swung into operative position, then the clockwise movement of feeler element **110** or **111** will swing the lever **118** with shaft **114** in clockwise direction and thereby rotate the two-armed lever **119**. Consequently, the counter roll **10** will be advanced into printing position and exert the required pressure on the sheet **21** against form **2** of the printing roller and thereby cause an impression on the sheet **21** from the form **2** until the feeler member **110** or **111**, respectively, swings back into its starting position under reaction of spring **115**. In this moment the pick-off lever **112, 113** respectively is also disengaged from the notch of lever **110, 111**, respectively, and now all the levers of the moving device are moved back into their starting positions under the action of springs **115***a* and **121**.

For the purpose of selectively reproducing individual lines or sections of the printing form **2** by intermittent printing a selector device is provided in this embodiment of the invention. This selector device includes a keyboard **19** which is mainly composed of a set of keys indexed T1, T2, T3, etc. A switch or contact S1, S2, S3, etc. is respectively associated with each of these keys. The just-mentioned switches have contact of the type which remain closed after they are moved into closed position. Each one of the switch contacts is provided with an arm **90** the purpose of which will be explained further below.

One terminal of each of the above-mentioned contacts is connected, as shown in Fig. 6, in series with solenoids **28** and **28***a*, respectively, and with a suitable source of electrical energy formed in this case by a transformer **73**. On account of the fact that, as explained above, the actuator means is provided with two sets of actuating means or rollers **109** and that the linkages mentioned above for operating the moving device for the counter roll **10** are provided in duplicate, two separate solenoids **28** and **28***a* are provided, and therefore the switches and keys of the keyboard **19** are divided into two separate groups of which one is connected to solenoid **28** while the other one is connected to solenoid **28***a*.

The selector device furthermore comprises a rotary switch including a rotary contact arm **35** mounted on the previously mentioned shaft **34**. A set of contacts K1, K2, K3 etc. is associated with the contact arm **35** and each of these contacts is connected to the second terminal of the corresponding switches of the keyboard **19**. A sliding contact on contact arm **35** serves to connect operatively contact arm **35** with the transformer **73**.

In operation, the contact arm **35** rotates together and synchronously with the printing roll **1**. If any one of the keys **19** of the keyboard **19** have been operated for presetting the desired selection of sections of the printing form **2** to be reproduced, during the revolution of arm **35** the individual contacts K1, K2, K3 etc. of the associated set of contacts are successively scanned and every time when a contact of this set of contacts is engaged by the contact pick-off arm **35** a circuit is closed provided that the corresponding switch S1, S2, S3, etc. has been preset by operation of the corresponding key. Therefore the solenoid **28** or **28***a* will be energized exactly in the moment when the contact arm **35** is in line or is aligned with one of the contacts put into connection with solenoid by the corresponding switch and key of the keyboard **19**. In exactly the same moment the corresponding section Z1, Z2, Z3, etc. of the printing form will be in position for printing on the sheet **21** under the action of the counter roll which is in the same moment pressed against the sheet **21**.

With this arrangement and with a particular setting of certain selected keys of the keyboard **19** a particular number of lines or sections of the printing form **2** may be reproduced and this reproduction may be repeated as often as required.

Whenever it is desired to change the selection and set the keys for a different selection, the previous setting has to be cleared from the apparatus. For this purpose clearing means are provided. These clearing means include a clearing key **70** indexed L1, which operates through a connection **95** a clearing bar **92** which is slidably held by means of a slot **93** and pins **94** and which is provided with actuating pins **91** which move on a path into which the free ends of the above-mentioned contact arms **90** project. Therefore, whenever the clearing key L1 is operated all the pins **91** move with the bar **92** and strike those levers **90** which pertain to switches that had been closed previously by setting the corresponding key of the keyboard **19**. In this manner all contacts are moved into open position and the apparatus is clear for a different setting. A spring **92***a* returns the slide bar **92** into its starting position.

The embodiment illustrated in Figs. 1–6 is, however, also provided with means for operating the apparatus differently for the purpose of reproducing from printing form **2** in a first setting of the keys a number of sections or lines of the form **2** and in the next revolution of the printing roll **1** an equal number of sections of the form **2** following the first number of sections, and so forth. This is done without setting manually the keyboard for the reproduction of the second number of sections.

The keyboard **20** is composed similarly to the keyboard **19** and comprises a set of keys **T101, T102, T103**, etc. and corresponding switches **S101, S102, S103**, etc. These switches or contacts are connected likewise with one terminal to the transformer **73** in series with the above-mentioned solenoids **28** and **28***a*. Again the contacts and keys of the keyboard **20** are grouped into two groups according to the duplicate arrangement of the actuator means so that one group of contacts is connected with solenoid **28** and the other group with solenoid **28***a*. The other terminal of each switch is connected to the other terminal of the transformer **73** but in series with selector means described below.

The just-mentioned selector means comprise a second contact arm **36** and a third contact arm **60**. The arm **36** is rotatably mounted also on the above-mentioned shaft **34** and is associated with a set of contacts **K101, K102, K103**, etc. while the arm **60** is associated with a set of contacts **K201, K202, K203**, etc. The contacts just mentioned are connected in pairs to the second terminal of the corresponding switches of keyboard **20** as for instance contact **K201** and contact **K101** are both con-

nected to a terminal of switch S101. The circuits are completed from arm 60 through a sliding contact 74 and from arm 36 through a sliding contact 36*a*, the latter being connected to the remaining part of the circuit through a switch 123 the purpose of which will be described later.

On the continuously rotating intermediate shaft 51 a chain sprocket 44 is mounted for rotation independently of shaft 51. This sprocket 44 is connected by a one-turn clutch 52 with the driving pulley 7. Clutch 52 cooperates with a pawl 53 mounted on a pin 54 attached to sprocket 44. A spring 55 tends to move the pawl 53 into engaging position with clutch 52. However, this engaging movement is prevented by the engagement of the rear end of pawl 53 with a two-arm lever 57. The opposite end of lever 57 engages a cam 56 mounted and rotating with the shaft 3 of the printing roll 1. As can be seen from Fig. 3, shortly before the end of a revolution of the printing roll 1 the cam 56 operates lever 57 through a roller 58 engaging the cam 56, so that at this moment the operative end of lever 57 frees the pawl 53 so that the pawl engages the clutch 52 and thereby causes rotation of sprocket 44. This sprocket 44 is connected by a chain 46 and a sprocket 45 with the previously described feed rollers 22 and 23. Through the just-described engagement of the clutch 52 the feed rollers 22 and 23 are set in motion together with the counter roll 10 which is now not in printing position, and thereby eject the tail end of sheet 21 which was not intended to be provided with an impression.

As shown in Figs. 4 and 6, the second contact arm 36 is mounted for rotation on the shaft 34 which rotates together with the printing roll 1. Therefore, whenever any one of the keys of the keyboard 20 is operated for closing selected circuits for the solenoids 28 or 28*a*, the function of the second contact arm 36 is exactly the same as the one described previously with respect to contact arm 35. The arm 36 will successively scan the various contacts K101, K102, K103, etc. In this manner in successive operation the solenoids 28 and 28*a*, respectively, are operated and the counter roll 10 is moved into printing position in accordance with the selection made by setting the various keys of the keyboard 20.

As is shown in Figs. 3 and 5, a third contact arm 60 is mounted for rotation around shaft 51 and is firmly attached to the sprocket 44. Since the clutch consisting of parts 52—55 makes only one revolution after having been put into engagement, the contact arm 60 also will make a single revolution after the printing roll 1 has completed one revolution. During the rotation of contact arm 60 its contact tip scans the associated set of stationary contacts K201, K202, K203, etc.

In operation, the selector switch or contact arm 60 will during its rotation along the set of associated contacts, close the circuit for a second electromagnetic means, namely a solenoid 61 with spring controlled armature 43. The solenoid 61 will be energized as often as the contact arm 60 reaches one stationary contact which is connected to a switch of the keyboard 20 that had been closed by setting the keyboard for the previous cycle of operation of the apparatus. Assuming that for instance three of the keys of the keyboard 20 had been set previously then the contact arm 60 will during its rotation close the circuit for solenoid 61 three times.

The solenoid 61 operates a ratchet and pawl device mounted on shaft 34. The ratchet wheel 37 is attached, as shown in Fig. 4, to the contact arm 36 and is connected by a spring 36*a* with the shaft 34 by means of the gear 33 attached to the shaft. A locking pawl 39 and a step controlling pawl 38 are mounted for turning movement on a pin 40 which is fixed in the gear 33. Springs 41 and 42, respectively, control the pawls 38 and 39.

Whenever the solenoid 61 is energized it will, as can be seen from Fig. 6 and Fig. 3, actuate the pawls 38, 39 with the effect that with every stroke of the armature

43 the ratchet wheel 37 and therefore the arm 36 will make a step in opposite direction to the rotation of shaft 34. Each such step equals an angle to the angular spacing of the stationary contacts associated with the arm 36. This means that in case for instance three keys of the keyboard 20 have been set for selective operation of the apparatus for the previous revolution of the printing roll 1, now in the scanning operation of the arm 36 three contacts will be in operative connection in the circuit and therefore the solenoid 61 will be energized three times. This results in moving the arm 36 back three steps.

Consequently, in the next following scanning revolution of arm 36, the individual contacts of the stationary contact set associated with this arm 36, will be reached three steps later than they had been reached if the arm 36 had not been set back by three intervals. Therefore, if in the first printing operation three sections of the form of the printing form 2 have been reproduced, in this second operative cycle of operation again three sections will be reproduced. However these three sections will not be the same as the ones reproduced in the previous cycle. Since the contact arm 36 has been set back three intervals the now reproduced sections will be the next three following ones after the previously reproduced three sections of tne form 2. This means that if for instance in the first cycle of operation the sections Z4, Z5, and Z6 have been reproduced on account of setting the keys T104, T105 and T106, now without changing the setting of these keys the contact engagement with the contacts K104, K105 and K106 will result in reproduction of the sections Z7, Z8 and Z9.

A safety device is provided for preventing an unintentional or undesirable closing of the above-mentioned circuits during the just-described back-setting operation of contact arm 36. For this purpose a switch 123 is stationary arranged in the neighborhood of the control parts mounted on shaft 34. This switch 123 is connected into the circuit between the contact arm 36 and the transformer 73. The switch 123 is of that type which by one operation is moved into closed position and by the next operation moves into open position and so forth.

A cam member 122 is fixedly mounted on shaft 34 and in such a manner that its operative tip travels on a circular path into which projects the actuating member of switch 123. Therefore the arm or cam 122 passing by the switch will operate the switch to change its position. The relative arrangement of the switch is such that its sensitive part also projects into the circular path of the outer tip of the second contact arm 36 so that the switch can be operated by either one of these members that is of the cam arm 122 or the contact arm 36. When the shaft 34 with its fixed arm 122 and the adjustable contact arm 36 rotates, the either one of these two members will strike the actuating part of the switch 123 just shortly before the arm 122 returns into its starting position shown in Fig. 6. Therefore, in this instance the switch 123 being moved into open position, interrupts the circuit through contact arm 36 and the associated stationary contact to the solenoids 28, 28*a*, respectively. If the contact arm 36 is positioned, in clockwise direction which is the direction of rotation of shaft 34, ahead of the fixed arm 122, then the arm 36 will first interrupt the circuit and the following cam arm 122 will close this same circuit again through operation of switch 123. If, however, the contact arm 36 has been set back for a certain amount then the cam arm 122 has interrupted the circuit already and only after the beginning of the new cycle of operation the circuit is closed again by the contact arm 36 hitting the switch 123, before this contact arm 36 reaches the first one of the associated stationary contacts.

For the purpose of clearing the second keyboard 20 a clearing key 75, indexed L2, is provided. This key operates via lever and connection 95 a slide bar 92 of

the same type as was described with respect to keyboard 19, and any switch that had been set previously for operation is moved back into open position by the levers 9 and pins 91. However the key 75 also operates a clearing switch 150 which is normally open and connected with one terminal to a third electromagnetic means which is a solenoid 76. The other terminal of switch 150 is connected to the transformer 73.

As is shown in Figs. 3 and 6, the solenoid 76 operates a control lever 77 turnable around a pivot pin 78. When energized the solenoid 76 moves the lever 77 against the action of spring 79 out of engagement with a pawl 96. The pawl 96 is turnable around a pivot pin 84 which is attached to a disc 85 mounted for rotation on shaft 34 independently thereof. The pawl 96 cooperates with a toothed clutch member 80 which in turn is attached to the chain sprocket 81 rotated continuously by the intermediate shaft 51. This is done against the action of a spring 86.

Whenever the solenoid 76 is energized and thereby the control lever 77 moves out of engagement with pawl 96 the latter swings into engagement with the clutch wheel 80 and thereby causes the disc 85 to rotate. As long as lever 77 is in engagement with the pawl 96, the disc 85 is held in its position.

When during standstill of the printing roll 1 the disc 85 is rotated as explained above, then a second pawl 87 mounted on disc 85 engages the pin 88 attached to contact arm 36. Thereby the contact arm 36 is returned from any position to which it had been moved previously, back into its starting position. At the same time the spring 36a is wound for future operation. When the arm 36 reaches its starting position the stop pin 89 of the pawl 87 is lifted and thereby clears the way for arm 36. Referring now to Figs. 7 and 8, the embodiment illustrated by these figures differs from the previously described one by the fact that in this case the control of the feeler and actuating members is mechanical and that also the selector device does not contain any electromagnetic means.

The operation of the printing drum and of the counter roll as well as the feeding means is the same as described above with reference to Figs. 1–6.

A fourth shaft 127 is mounted for rotation in the frame A, A''. This shaft 127 is connected by a sprocket wheel 126 and a chain 124 to a sprocket wheel 125 mounted on the shaft 34 which carries the actuator means previously described. Since in this embodiment likewise the actuator means are composed of two units 107, 108 offset against each other angularly, the selector means are also provided in two units 128 and 129 both mounted on the same shaft 127.

The selector means include discs 128 and 129, respectively, each being provided with a set of angularly displaced actuating means, formed in this example by small rollers 30 mounted on control pins 131. The pins 131 which are indexed on the outer flat end with numbers corresponding to the sections of the printing form, are movable in direction transverse to their carrier discs 128, 129, respectively. The pins 131 are held in operative or inoperative position by disengageable locking means 132 comprising for instance a ball with spring supports and adapted to engage a corresponding groove in the pin 131. The pins 131 are angularly displaced in the same manner as the corersponding rollers 109 on the actuator discs 107, 108, respectively. They correspond each therefor to the corresponding sections of the printing form 2.

In operation, the rollers 130, if in operative position travel on a circular path around the axis of shaft 127. The free end of the coupling element 112, 113, respectively, is so positioned that it projects into this circular path. Therefore whenever any one of the selector elements 130 is placed before operation into operative position then during the operation the particular actuating member 130 will engage the end of the pertaining coupling element 112, 113, respectively, and thereby cause the operation of the actuator means 107, 108, 109, respectively, so as to move the counter roll 10 into printing position and in order to cause the reproduction of the particular section of form 2 which has been selected by moving the corresponding selector element 130 into operative position.

The reproduction of the selected portions of form 2 may be repeated as often as desired without changing the setting of the selector elements 131, 130. If, however, a new setting is desired, the whole apparatus can be cleared by means of a clearing device. This device includes a clearing lever 134 turnable around a stationary pivot 133. The lever 134 projects also into the circular path of the selector elements 130 and is provided with a beveled end portion so that during a rotation of the disc 128, 129, respectively, the levers 134, if swung into opeartive position, will serve to move every one of the elements 130 back into inoperative position.

Referring now to Figs. 9, 10, and 11, in this embodiment the arrangement of the printing roll 1 with the form 2 and of the feed rollers 22, 23 is generally the same as in the previous embodiments. The same applies to the means for driving the intermediate shaft 51 and the printing roll as well as the actuator means mounted on shaft 34.

However, in this embodiment the means for coupling the actuator means with the movable device including the counter roll 10 is done by electromagnetic means.

The actuator means includes a number of discs each with one cam 135, all mounted for rotation on shaft 34. One cam disc 135 is provided for each line of the printing form 2. The individual cams 135 of the various discs are offset against each other angularly so that the angular interval from cam to cam in the different discs corresponds to the space from line to line of the printing form. This means that in operation one cam 135 will be used for obtaining the printing of each individual line.

Each one of the cam discs 135 is associated with one coupling means including a rotary disc 137 to which is attached a coupling element 139 provided with a small roller 140. The arrangement is such that these individual rollers 140 can be moved by a limited turn of the coupling disc 137 into the circular path of the corresponding cam 135. Each arm 139 swings freely around a pivot pin 138 attached to the corresponding disc 137.

A feeler member 148 is turnably mounted on a shaft 149 and is common to all the coupling elements and actuating means described above. This feeler member 148 has a pressure plate 147 attached to it and located close to the circular path of the cams 135. Whenever the roller 139 is moved into the circular path of any cam 135 the cam engages the roller 139 and in passing exerts pressure against the plates 147 whereby the feeler member 148 is tilted around shaft 149 so that its opposite end engages the forked end of lever 119 and thereby causes the counter roll 10 to advance into printing position in the same manner as described previously.

The individual coupling discs 137 are moved into operative position by electromagnetic means which are in turn selectively controlled from a keyboard 19. For this purpose every one of the coupling discs 137 is connected by a link 144 to the armature 143 of a solenoid 142. Whenever the solenoid 142 is energized then the disc 137 is moved in counterclockwise direction, as seen in Fig. 9, until the roller 139 engages the corresponding cam and the plate 147. The disc 137 is moved back into inoperative position by a spring 145 and is stopped in this position by a stationary pin 146.

As shown in the wiring diagram, Fig. 11, the keyboard 19 includes a set of keys indexed T1, T2, T3, etc., each key being associated with a switch S1, S2, S3, etc. One terminal of each switch is connected in parallel with the others to a transformer 73. Each other terminal of

each switch is connected to a corresponding solenoid 142, marked in Fig. 11 as M1, M2, M3, etc. The other terminal of the individual solenoids 142 are connected in parallel to the other terminals of the transformers 73. Therefore whenever any one of the keys of the keyboard 19 is operated, the corresponding solenoid 142 is energized and thereby moves the corresponding coupling disc into operative position.

It is evident, that in this manner by presetting the individual keys for selected sections of the printing form 2 the apparatus in operation will reproduce only the selected sections because only those coupling means 139 will cause operation of the counter roll 10 through engagement between the respective cam 135 with the roller 140 and the feeler member 148 for which the corresponding key has been set previously.

In order to clear the apparatus of the previous setting of the keys, a clearing key 141 marked L1 is provided. It operates in the same manner as in the previous embodiments via a lever 95 and a slide bar 92 so as to move any switch that has been set for closed position, back into open position by means of the engagement of the switch arms 90 and the pins 91 of the bar 92.

Referring now to Figs. 12–16 again the general arrangement of the printing roll 1, form 2, drive means 7, 8, 5, 4, 6, and 31, 32, 33 as well as of the movable means for operating the counter roll 10 are the same as in the previously described embodiments. However, in this case a set of actuator means is arranged on a rotary support and each actuator element is movable in transverse direction to these supports. The selected movement of the individual actuator elements is obtained either by manual operation or by electromagnetic means.

On shaft 34 rotating together with the printing roll 1, a rotary support 35 is mounted. In this rotary support 35 a set of actuating members 38 formed as rollers is mounted on pins 38*a* which are movable in transverse direction that is parallel with the axis of shaft 34. Each pin 38*a* is provided with a flat head at either end limiting its movement. The rotary support 35 is provided with a recess within which the individual roller 38 may be shifted by the movement of the pins 38*a* into an operative position or into an inoperative position respectively. To hold the individual pin 38*a* in operative and inoperative position, respectively, disengageable locking means including a spring supported ball 39 is provided which may snap into corresponding grooves of the pin 38*a*.

During rotation of the support 35 with shaft 34 the rollers 38, when in operative position, travel on a circular path around the axis of shaft 34. The feeler member 40 swinging around shaft 41 is again provided with a cam-like end which projects into the said circular path of the rollers 38. Whenever one of the rollers 38 engages said cam the lever 40 is turned around shaft 41 with the result of operating the movable device and to advance the counter roll 10 into printing position, in the same manner as previously described.

As is illustrated in detail in Fig. 14, a set of electromagnetic means comprising solenoids 28 are located on a circle of the same diameter as the circular path of the pins and rollers 38. One solenoid 28 is provided for each one of the actuating elements 38, 38*a*. The individual actuating elements 38 are angularly displaced on the rotary support 35 in the same intervals as the corresponding solenoids 28. Therefore, when the rotary support 35 is at a standstill in its starting position each pin end 38*a* is aligned with is corresponding solenoid 28. Energization of one of the solenoids 28 results then in pushing the opposite pin 38*a* with its roller 38 into the operative position.

A keyboard is provided which includes a set of keys marked T1, T2, T3, etc. each being associated with a switch or contact S1, S2, S3, etc. One terminal of each switch is connected in parallel with the corresponding terminals of the other switches and to a source of electric energy. The other terminal of each switch is connected to one terminal of the corresponding solenoid 28. The other terminals of the solenoids 28 are connected in parallel to a normally open switch T11 and the other terminal of this switch is connected also to the other pole of the source of energy.

Assuming that switch T11 is in closed position, the operation of any one of the keys T1, T2, T3, etc. will result in energizing the corresponding solenoid 28 and thereby move the associated actuating member 38 into operative position. In this manner, by presetting the selected keys of the keyboard 19 in the following operation of the apparatus only those sections of the printing form 2 will be reproduced for which the corresponding actuating member 38 has been moved into operative position.

For operating the switch T11 a switch actuating member 46 is mounted for cooperation therewith and in such a manner that one part of the member 46 is engaged during rotation of the printing roll 1 by a corresponding pin 45 travelling on a circular path into which the end of actuating member 46 projects. The pin 45 is located on roll 1 in such a position that when the roll 1 is in its starting position the member 46 moves the switch T11 into closed position. In this manner it is impossible to attempt to set actuating members or to operate the solenoids unless the rotary support 35 with all its actuating members is in its starting position which means that all the members 38 are aligned with their corresponding solenoid 28.

For the purpose of moving the individual actuator member 38 and pins 38*a* from operative position into inoperative position a second set of solenoids 28*a* is provided. These solenoids 28*a* are also angularly displaced in the same manner as the solenoids 28 and are also located along a circle of the same diameter as that of the path of the actuating elements 38. A clearing switch L1 is provided in a circuit which includes all the solenoids 28*a* in parallel. Thereby all the solenoids 28*a* can be energized at the same time by operation of the key L1 which is associated with a corresponding switch T12 in said circuit. Whenever the key L1 is operated all those actuating members 38 which had been moved into operative position are moved back into their inoperative position.

In order to prevent premature operation of the clearing circuit including the solenoids 28*a* a switch T12, normally open, is connected in the circuit of the solenoids 28*a*. This switch T12 is also controlled by a switch actuating member 48 which projects with one end into the circular path of a second pin 47 attached to the printing roll 1. The arrangement is again chosen in such a manner that only when the printing roll 1 and therefore also the rotary support 35 is in starting position the pin 47 engages the member 48 and thereby closes the contact T12.

In this particular embodiment of the invention, the angular spacing of the individual actuating element 38 on its support 35 corresponds to three line spaces of the printing form 2. Therefore three sets of support 35 with the corresponding sets of actuating member 38 and solenoids 28 and 28*a* are provided as shown more clearly in Fig. 13. The angular position of each set of the just-mentioned parts is offset against the position of the corresponding parts on the next neighboring set by one interval corresponding to the spacing between two consecutive lines of the printing form.

Figs. 15 and 16 illustrate an alternative to the just-described embodiment. In this case the only difference consists in the fact that the individual actuating elements 38 and their pins 38*a* are not moved by electromagnetic means. Instead on the frame A a corresponding number

of selector means are arranged along a circle of the same diameter as the path travelled by the members **38**. This circle is coaxial with the support **35**. Each selector element consists mainly of a pin **49***a* provided with a key or button **49** on the outside and movable in axial direction parallel with shaft **34** so as to engage the flat outer end of the corresponding pin **38***a*. Whenever one of the buttons **49** is operated to move the pin **49***a* towards the corresponding actuator element **38**, **38***a*, the latter is moved from an inoperative position into an operative position. A spring **50** arranged between the frame A and the button **49** returns the selector elements into their inoperative position.

In order to return those actuator elements **38** which had been moved into operative position, back into their inoperative position a clearing lever **51**, **52** is turnably mounted in the wall A of the frame. This lever **52** is provided with a chamfered or bevelled surface which projects into the path of an end portion of the pins **38***a* when the latter are positioned in operative position. When the lever **51** is operated so as to move the end portion **52** into the path of the ends of pins **38***a* then all those pins are moved by engagement with the bevelled surface **52** back into inoperative position. A spring **53** holds the clearing lever **52** in either one of its operative and inoperative positions which are otherwise defined by stop pins **54**, **55**, respectively.

Referring now to Figs. 17–20, in this embodiment again the general arrangement of printing roll **1**, form **2**, shaft **3**, intermediate shaft **51**, and the drive means connecting these shafts as well as the means for moving the counter roll **10** into and out of engagement with the printing roll are the same as in the previously described embodiment.

Actuator means are mounted for rotation on a shaft **155** independently of the rotation of this shaft. These actuator means are connected by a gear train **152**, **153** and **154** with the printing roll so that they always rotate together with the printing roll **1**. Since the gears **152** and **154** are shown as being of the same diameter, the actuator means will always rotate synchronously with the printing roll.

The actuator means just mentioned comprises a disc **151** which is provided along its circumference with a series of actuator elements consisting of individual rollers **156** mounted on pins **156***b* which are movable transversely to the disc **151**. When the disc **151** is rotated the individual rollers **156** travel on a circular path concentric with the axis of shaft **155**. The individual actuator elements **156** can be moved in and out of operative positions. In either one position they are held by disengageable locking means consisting mainly of a spring supported ball **156***a* which snaps into corresponding grooves of the pins **156***b* in either position.

A feeler member **169** of cam-like shape projects into the circular path of the actuating elements or rollers **156** when in operative position. Therefore, whenever during rotation of disc **151** any one of the rollers **156** engages the cam-like end of the feeler member **169**, the latter is moved in clockwise direction as seen in Fig. 17, around its stationary shaft or pivot **170** and engages with its other end at **171***a* the lever **171**. The lever **171** is part of the already previously described linkage adapted to rotate the counter roll **10** into printing position.

The angular spacing of the actuating elements or rollers **156** corresponds to the angular spacing of the various sections **Z1**, **Z2**, **Z3**, etc. of the printing form **2** attached to the printing roll **1**. For selectively reproducing any one of the sections of the printing form the corresponding actuating roller **156** is brought into operative position by electromagnetic selector means.

An arm **158** is attached to the shaft **155** and carries at its outer end a solenoid **159**. Its armature **159***a* is controlled by a spring **159***c*. The shaft **155** is rotated by means of a chain drive comprising a sprocket wheel **165** mounted on shaft **155**, a chain **166** and a chain sprocket wheel **164** mounted on the intermedite shaft **51**. However, the drive becomes effective only when clutch means attached to the shaft **155** are moved into engaging position. The clutch means consist of a toothed clutch wheel **163** attached to the sprocket **165** which is freely turnable on shaft **155**. A pawl **163***a* is mounted on an extension arm **163***b* attached to the shaft **155** and is adapted to engage in its operative position the clutch wheel **163**. A spring **163***c* tends to move the pawl **163***a* into engaging position. However the pawl **163***a* is prevented from moving into engaging position by its rear end engaging a control lever **162**. One end of this lever **162** projects to the outside of the apparatus. A spring **162***a* tends to move and hold the lever **162** in its engaging position with pawl **163***a*. Whenever by pressing down the lever **162** the engagement between this lever and the rear end of pawl **163***a* is eliminated, the pawl engages the clutch **163** and then the operation of the machine is started because now the general drive from the motor is transmitted over intermediate shaft **51** to the shaft **155**.

The radial distance of the armature **159***a* of the solenoid **159** from the axis of shaft **155** is the same as the radial distance of the individual actuating elements **156**, **156***b* from the same axis. Therefore when the solenoid **159** is travelling on a circular path around the axis of shaft **155** its armature **159***a* will pass through positions in which it is aligned exactly opposite the individual actuating pins **156***b*. Attached to the solenoid arm **158** is a sliding contact **160** suitably connected with one terminal of the solenoid **159**. The other terminal of the solenoid **159** is connected to a contact ring **159***b* which in turn is in continuous contact with a sliding contact **161***a* shown in Fig. 19. During its rotation the sliding contact **160** passes over a set of stationary contacts **161** mounted on a contact plate **157** which in turn is attached to the frame wall A'. The individual contacts **161**, marked **K1**, **K2**, **K3**, etc. in Fig. 19, are angularly displaced from each other at the same intervals as the actuating elements **156** on the disc **151**. Therefore whenever the armature **159***a* of solenoid **159** is in alignment with one of the actuating pins **156***b* the sliding contact **160** is at the same moment in contact with the corresponding stationary contact **161**.

As is shown in Figs. 17 and 19, a set of keys in a keyboard, marked **T1**, **T2**, **T3**, etc. is provided for actuating corresponding switches or contacts **S1**, **S2**, **S3**, etc. which in turn are connected in the following manner: One terminal of each contact **S1**, etc. is connected to the corresponding stationary contact **161**, marked **K1**, etc. The other terminal of all the switches **S1**, etc. are connected in parallel to the source of electric energy. On the other hand the sliding contact **161***a* is connected to the same source for completing a circuit.

The above-described keyboard and the associated contacts are used for presetting the selective printing operation. If for instance the keys **T1**, **T4**, **T7** are operated and the corresponding switches **S1**, **S4** and **S7** closed, then during the rotation of the solenoid **159** and its associated sliding contact **160**, the operating circuit for the solenoid **159** will be closed momentarily every time the sliding contact **160** meets the contacts **K1**, **K4** and **K7**, respectively. In this moment of closing the circuit an electrical impulse will be sent into the solenoid with the effect that the armature **159***a* will push the opposite pin **156***b* and thereby the attached roller **156** from its inoperative position into its operative position.

After, through operation of control lever **162** and engagement of the clutch means **163**, **163***a*, the shaft **155** with the attached pawl **163***a* has been put into motion and the arm **158** has completed its rotation for scanning the contacts **161**, the rear end of pawl **163***a* engages the bevelled ends of another lever **175** which is connected by a connecting rod **176** to a control lever **167**. This lever **167** controls clutch means interposed between the

drive shaft 3 of the printing roll and the printing roll 1 itself. These clutch means consist of a toothed clutch wheel 168*a* and a pawl 168. This pawl is at its rear end in engagement with the tip of lever 167 as long as this lever is in engaging position therewith. Now, when the lever 167 is lifted out of this engaging position through the action of the connecting rod 176 the pawl 168 under the action of its spring 168*b* moves into engagement with the clutch wheel 168*a* and thereby causes the printing roll 1 to start its revolution. During this rotation of the printing roll 1 the actuating elements 156 which had been set into operative position engage the cam end 169 of the feeler element, as described above, and thereby selectively advance through the previously described linkage, the counter roll 10 into printing position whereby the selected sections Z1, Z4 and Z7 are reproduced on the copy sheet in close line sequence.

The reproduction of the three sections mentioned in this example can be repeated as often as desired. If a different setting of the apparatus for reproduction of other sections is desired, the setting of the actuating members 156 can be cleared from the apparatus by means of a clearing device.

The clearing device is shown in Fig. 18 and consists mainly of a control rod 174 mounted in the wall A of the frame and provided at its outer end with a hand knob 174*b* and at its inner end with a small roll 174*a*. This rod 174 is movable parallel with the axis of shaft 155 from an outer inoperative position into an inner operative position. In its operative position as shown in the drawing the roller 174*a* projects into the circular path of the actuating rollers 156 if in operative position. Therefore during a rotation of the disc 151 of the actuating means, the clearing device is placed in operative position will engage successively all those actuating rollers 156 which were in operative position and push them back into inoperative position.

Referring now to Figs. 21 and 22, this embodiment is generally very similar to the one previously described with reference to Figs. 17–20.

In this embodiment the shaft 155 is not rotated for the purpose of setting the actuator elements 156, by a chain drive from the intermediate shaft 51 but in the following manner. A ratchet wheel 179 is attached to the shaft 155. A holding pawl 178*a* and a step controlling pawl 178 are turnably mounted on a pin 178*c* attached to the frame A'. A chain sprocket 180, not shown in Fig. 22, is also attached to the shaft 155 and connected by chain 187 to a sprocket 182 mounted on a stationary shaft 182*a* in the frame. A windable spring is interposed between the shaft 182*a* and the sprocket 182. This spring is not shown in Fig. 21. It may be rewound any time by an outside hand knob 188. This spring tends to rotate the ratchet wheel 179 on clockwise direction as seen in Fig. 21. For operating the ratchet and pawl drive for the shaft 155 a control lever 175 projecting to the outside of the apparatus is connected by linkages 176 to a control lever 177 which engages with its free end the pawls 178, 178*a*. Whenever the control lever 175 is operated the ratchet and pawl means move the shaft 155 through an angle corresponding to the angular interval between two consecutive actuating rolls 156. In this manner the solenoid 159 with its armature 159*b* can be moved selectively into predetermined positions where it is in alignment with one of the actuating pins 156*b* while the disc 151 is in its starting position. Whenever the solenoid 159 has been positioned in this manner for moving the selected actuating roller 156 into its operative position, a circuit is closed for the solenoid 159 by means of an outside key 185 which operates an associated switch. This switch is connected by suitable circuit means with the two sliding contacts 186 and 187 which continuously are in contact with the corresponding contact rings 159*b* mounted on the hub of the arm 158. These two rings 159*b* are connected to the solenoid 159. In this manner, whenever the solenoid 159 is positioned for operation on the selected actuating member 156, by closing the circuit as described, the particular selected actuating roller 156 is moved into its operative position.

In order to enable the operator to observe in which position the solenoid 159 is in relation to the actuating rollers 156, after operating the control lever 175, an indicator means is provided which comprises a disc 183 attached to the sprocket 182 and carrying a set of numbers indicating the particular serial number of the individual actuating rollers 156. The numbers of the indicator 183 are visible through a window 184 in the corresponding cover.

Figs. 23 and 24 illustrate an alternative arrangement generally similar to the one described with reference to Figs. 1–6. More specifically, the embodiment shown by Figs. 23, 24 corresponds to that portion of the first embodiment shown in the upper part of Fig. 6. Referring to Figs. 23, 24 the arrangement of the printing roll 1 and of the counter roll 10 in the frame and of the moving means for operating the counter roll 10 are similar to those described above. A solenoid 28 is arranged in the frame A and operatively connected to the moving means for counter roll 10. The actuating means include a rotary switch arm 171 mounted on shaft 34 which is connected for rotation together with printing roll 1 by means of a gear train 31, 32, 33. The gears 31 and 33 being of equal diameter, the rotation of shaft 34 is synchronous with that of the printing roll. The switch arm 171 cooperates with a set of stationary contacts K1, K2, K3, etc. mounted on a plate 172 along a circle concentric with the axis of shaft 34 and angularly spaced from each other so as to respectively correspond to the individual sections Z1, Z2, Z3, etc. of the printing form 2. The sliding contact 171*a* of the arm 171 travels on a circular path equal to the circle along which the stationary contacts are located.

Selector means consist of a set of keys T1, T2, T3, etc. associated with normally open contacts which are respectively connected by circuit means to the set of stationary contacts K1, K2, K3, etc. on plate 172. Other circuit means connect the switches of the keyboard with solenoid 28 and a source of electric energy, which, on the other hand, is connected to a sliding contact 171*b* serving to complete the circuit to the sliding contact 171*a*.

In operation, when the printing roll 1 is set in motion and the switch arm 171 rotates accordingly, the contact 171*a* successively engages the stationary contacts K1, K2, K3, etc. whereby an operative circuit for solenoid 28 is closed whenever the contact 171*a* engages a stationary contact for which the corresponding keys T1, T2, T3, etc. has been operated for selectively presetting the apparatus in order to reproduce selected sections of the printing form 2.

For the purpose of increasing the permissible speed of operation of the apparatus and for energizing the solenoid 28 as rapidly as possible an arrangement is provided whereby the solenoid 28 is supplied with a direct current of higher voltage than that voltage which would regularly apply to the particular solenoid. For this purpose the following means are connected into the above-described circuit between the source of energy and the solenoids 28. The connecting line between the source of energy and the solenoids 28 contains a selenium rectifier 173 and, in series therewith, a resistance 174 and a condenser 175 in parallel arrangement. In operation, when a circuit is closed by the contact arm 171, a voltage build up takes place on account of the combined action of resistance 174 and the condenser 175 and due to the action of the rectifier 173 preventing flow of current in the opposite direction; an electrical impulse is generated after the current has increased sufficiently, which results in a very rapid build-up of a magnetic field in the solenoid 28. Due to the fact that the electrical impulse is of very short duration the solenoid 28 is not damaged by the raised voltage impulse. By suitably choosing the values of resistance 174 and condenser 175, namely the RC values or the time

constant of the parallel network 174, 175, the magnetic field will be caused to collapse very rapidly so that already after a few milliseconds the solenoid 28 is ready for another cycle of operation.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of printing apparatus differing from the types described above.

While the invention has been illustrated and described as embodied in rotary printing apparatus for selective intermittent reproduction, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. In a printing apparatus for selective intermittent printing, in combination, a printing roll carried for rotation by said frame and adapted to have a printing form attached thereto; a counter roll supported on said frame for movement to and from a printing position in close proximity to said printing roll for pressing against said printing form a copy sheet passing between said rolls; a movable device supported on said frame and being connected to said counter roll for moving the same to and from said printing position; at least one rotary actuator connected to said printing roll for rotation therewith and including a set of angularly spaced actuating means, each actuating means being associated with a section of said printing form; coupling means including at least one feeler element and at least one coupling element movable between an inoperative position and a coupling position, one of said elements being connected to said movable device, and the other of said elements being successively engaged by said actuating means during rotation of said actuator, said movable device being actuated to move said counter roll to said printing position when said actuating means successively engage said other of said elements while said coupling element is in said coupling position; a selector device including a set of manually operated control means respectively associated with different sections of said printing form and with said actuating means, and circuit means connected with said manually operated control means and including electromagnetic means controlled by said manually operated control means for moving said coupling element to said coupling position thereof whereby selected actuating means become effective to operate said movable device for printing selected sections of the printing form.

2. In a printing apparatus for selective intermittent printing, in combination, a printing roll carried for rotation by said frame and adapted to have a printing form attached thereto; a counter roll supported on said frame for movement to and from a printing position in close proximity to said printing roll for pressing against said printing form a copy sheet passing between said rolls; a movable device supported on said frame and being connected to said counter roll for moving the same to and from said printing position; rotary actuator means connected to said printing roll for rotation therewith and including at least one set of angularly spaced actuating means respectively associated with sections of said printing form; at least one movable feeler element mounted on said frame and having a portion located in the path of movement of said actuating means in operative positions during rotation of said actuator means; at least one coupling element movable between an inoperative position and a coupling position, said coupling element being connected to said movable device and coupling in said coupling position thereof said movable device with said feeler element, said movable device being actuated to move said counter roll to said printing position whenever an actuating means engages said feeler element with said coupling means in coupling position; and a selector device for selectively moving said coupling element to said coupling position thereof whereby selected actuating means become effective to operate said movable device for printing selected sections of the printing form.

3. In a printing apparatus for selective intermittent printing, in combination, a printing roll carried for rotation by said frame and adapted to have a printing form attached thereto; a counter roll supported on said frame for movement to and from a printing position in close proximity to said printing roll for pressing against said printing form a copy sheet passing between said rolls; a movable device supported on said frame and being connected to said counter roll for moving the same to and from said printing position; rotary actuator means connected to said printing roll for rotation therewith and including at least one set of angularly spaced actuating means respectively associated with sections of said printing form; at least one movable feeler element mounted on said frame and having a portion located in the path of movement of said actuating means in operative positions during rotation of said actuator means; at least one coupling element movable between an inoperative position and a coupling position, said coupling element being connected to said movable device and coupling in said coupling position thereof said movable device with said feeler element, said movable device being actuated to move said counter roll to said printing position whenever an actuating means engages said feeler element with said coupling means in coupling position; and a selector device including a set of key members respectively associated with sections of the printing form, a set of key-actuated contacts respectively associated with said key members, electromagnetic means for operating said coupling element to move to said coupling position and circuit means connecting said electromagnetic means with said set of contacts and including a rotary contact arm connected to said printing roller for rotation therewith and consecutively connecting said electromagnetic means with each of said contacts whereby said electromagnetic means is energized and said coupling element is moved to said coupling position whenever said contact arm connects said electromagnetic means to a contact moved to a circuit-closing position by the associated key member.

4. In a printing apparatus for selective intermittent printing, in combination, a printing roll carried for rotation by said frame and adapted to have a printing form attached thereto; a counter roll supported on said frame for movement to and from a printing position in close proximity to said printing roll for pressing against said printing form a copy sheet passing between said rolls; a movable device supported on said frame and being connected to said counter roll for moving the same to and from said printing position; a plurality of rotary actuator means connected to said printing roll for rotation therewith and each including a rotary support carrying one set of angularly spaced actuating means, the actuating means of said sets being respectively associated with consecutive sections of said printing form; a plurality of movable feeler elements mounted on said frame for movement to and from an operative position and being respectively associated with said sets of actuating means, said feeler elements having a portion located in the path of movement of the associated actuating means in operative position thereof; a plurality of coupling elements respectively associated with said feeler elements and

being movable between an inoperative position and a coupling position, said coupling elements being connected to said movable device and coupling in said coupling position thereof said movable device with said feeler elements, said movable device being actuated to move said counter roll into said printing position whenever an actuating means engages one of said feeler elements with said coupling element in coupling position; a selector device including a set of key members respectively associated with sections of the printing form, a set of key-actuated contacts respectively associated with said key members, a plurality of independent electromagnetic means for moving the corresponding coupling element to said coupling position, and circuit means connecting said electromagnetic means with said set of key-actuated contacts and including a rotary contact arm connected to said printing roller for rotation therewith and consecutively connecting said electromagnetic means with each of said key-actuated contacts whereby one of said electromagnetic means is energized and a coupling element is moved to said coupling position whenever said contact arm connects said electromagnetic means to a key-actuated contact moved to a circuit-closing position by the associated key member so that said movable device is advanced into printing position.

5. An arrangement as set forth in claim 3, including clearing means associated with said set of key members and said set of key-actuated contacts and including means for moving said key-actuated contacts to a circuit-interrupting position and said key members to an inoperative position.

6. In a printing apparatus for selective intermittent printing, in combination, a printing roll carried for rotation by said frame and adapted to have a printing form attached thereto; a counter roll supported on said frame for movement to and from a printing position in close proximity to said printing roll for pressing against said printing form a copy sheet passing between said rolls; a movable device supported on said frame and being connected to said counter roll for moving the same to and from said printing position; rotary actuator means connected to said printing roll for rotation therewith and including at least one set of angularly spaced actuating means respectively associated with sections of said printing form; at least one movable feeler element mounted on said frame and having a portion located in the path of movement of said actuating means in operative positions during rotation of said actuator means; at least one coupling element movable between an inoperative position and a coupling position, said coupling element being connected to said movable device and coupling in said coupling position thereof said movable device with said feeler element, said movable device being actuated to move said counter roll to said printing position whenever an actuating means engages said feeler element with said coupling means in coupling position; a selector device including a set of key members respectively associated with sections of the printing form, a set of key-actuated contacts respectively associated with said key members, electromagnetic means for operating said coupling element to move to said coupling position and circuit means connecting said electromagnetic means with said set of contacts and including a rotary contact arm connected to said printing roller for rotation therewith and consecutively connecting said electromagnetic means with each of said contacts whereby said electromagnetic means is energized and said coupling element is moved to said coupling position whenever said contact arm connects said electromagnetic means to a contact moved to a circuit-closing position by the associated key member; a shaft supported in said frame and connected to said printing roll for rotation therewith; a second contact arm turnably mounted on said shaft for stepwise movement about said shaft; spring means interposed between said shaft and said contact arm tending to move said arm in a direction opposite to the rotation of said shaft; ratchet and pawl means for connecting said contact arm with said shaft for rotation therewith and for controlling said stepwise movement of said arm in the opposite direction into positions respectively associated with sections of said printing form; an intermediate shaft supported in said frame for rotation independently of said printing roll; clutch means connected with said intermediate shaft; a third contact arm turnably mounted on said intermediate shaft and connected by said clutch means for rotation with said intermediate shaft when said clutch means are in engaging position; cam means connected with said printing roll and operatively connected with said clutch means for moving said clutch means into engaging position, whereby in a given position of said printing roll said third contact arm is turned; two sets of stationary contacts corresponding each to the same consecutive sections of said printing form and being respectively associated with said second and third contact arms; and a second selector device including a second set of key members respectively associated with sections of the printing form, a second set of key-actuated contacts respectively associated with said second set of key members, and second circuit means including electromagnetic means for operating said ratchet and pawl means and connecting said second set of key-actuated contacts with said sets of stationary contacts and with both said electromagnetic means respectively for operating said coupling elements and said ratchet and pawl means, whereby in case of selective operation of said first set of key members during a revolution of said printing roll selected sections of said form are printed, and in case of operation of said second set of key members in a first revolution of said printing roll selected sections of said form and in the next following revolution or said printing roll the next following sections of said form are printed.

7. In a printing apparatus for selective intermittent printing, in combination, a printing roll carried for rotation by said frame and adapted to have a printing form attached thereto; a counter roll supported on said frame for movement to and from a printing position in close proximity to said printing roll for pressing against said printing form a copy sheet passing between said rolls; a movable device supported on said frame and being connected to said counter roll for moving the same to and from said printing position; rotary actuator means connected to said printing roll for rotation therewith and including at least one set of angularly spaced actuating means respectively associated with sections of said printing form; at least one movable feeler element mounted on said frame and having a portion located in the path of movement of said actuating means in operative positions during rotation of said actuator means; at least one coupling element movable between an inoperative position and a coupling position, said coupling element being connected to said movable device and coupling in said coupling position thereof said movable device with said feeler element, said movable device being actuated to move said counter roll to said printing position whenever an actuating means engages said feeler element with said coupling means in coupling position; a shaft supported in said frame and connected to said printing roll for rotation therewith; a contact arm turnably mounted on said shaft for stepwise movement about said shaft; spring means interposed between said shaft and said contact arm tending to move said arm in a direction opposite to the rotation of said shaft; ratchet and pawl means for connecting said contact arm with said shaft for rotation therewith and for controlling said stepwise movement of said arm in the opposite direction into positions respectively associated with sections of said printing form; an intermediate shaft supported in said frame for rotation independently of said printing roll; clutch

means connected with said intermediate shaft; another contact arm turnably mounted on said intermediate shaft and connected by said clutch means for rotation with said intermediate shaft when said clutch means are in engaging position; cam means connected with said printing roll and operatively connected with said clutch means for moving said clutch means into engaging position, whereby in a given position of said printing roll said other contact arm is turned; two sets of stationary contacts corresponding each to the same consecutive sections of said printing form and being respectively associated with said contact arms; a selector device including a set of key members respectively associated with sections of the printing form, a set of key-actuated contacts respectively associated with said key members, and circuit means including electromagnetic means for operating said ratchet and pawl means and connecting said set of key-actuated contacts with said sets of stationary contacts and with both said electromagnetic means respectively for operating said coupling elements and said ratchet and pawl means, whereby in case of operation of said key members in a first revolution of said printing roll selected sections of said form and in the next following revolution of said printing roll the next following sections of said form are printed.

8. An arrangement as set forth in claim 6, and including a cam member mounted on said shaft adjacent to said second contact arm for rotation with said shaft; and switch means connected into said second circuit means and projecting into the circular path of said cam member and of said second contact arm so that said switch means is actuated whenever said cam member or said second contact arm during their rotation engages said switch means for interrupting said circuit at the first actuation thereof and for closing said circuit at the second actuation thereof.

9. An arrangement as set forth in claim 7, including a cam member mounted on said shaft adjacent to said contact arm for rotation with said shaft; and switch means connected into said circuit means and projecting into the circular path of said cam member and of said contact arm so that said switch means is actuated whenever said cam member or said contact arm during their rotation engages said switch means for interrupting said circuit at the first actuation thereof and for closing said circuit at the second actuation thereof.

10. An arrangement as set forth in claim 6 including clearing means associated with said sets of key members and said sets of key-actuated contacts, said clearing means comprising means for moving said key-actuated contacts to a circuit-interrupting position and said key members to an inoperative position, clutch means for connecting said second contact arm with said shaft, and circuit means including a switch and electromagnetic means for moving said clutch means into engaging position, whereby said second contact arm is returned from any operative position to its initial position.

11. An arrangement as set forth in claim 7 including clearing means associated with said set of key members and said set of key-actuated contacts, said clearing means comprising means for moving said key-actuated contacts to a circuit-interrupting position and said key members to an inoperative position, clutch means for connecting said contact arm with said shaft, and circuit means including a switch and electromagnetic means for moving said clutch means into engaging position, whereby said contact arm is returned from any operative position to its initial position.

12. In a printing apparatus for selective intermittent printing, in combination, a printing roll carried for rotation by said frame and adapted to have a printing form attached thereto; a counter roll supported on said frame for movement to and from a printing position in close proximity to said printing roll for pressing against said printing form a copy sheet passing between said rolls; a movable device supported on said frame and being connected to said counter roll for moving the same to and from said printing position; rotary actuator means connected to said printing roll for rotation therewith and including at least one set of angularly spaced actuating means respectively associated with sections of said printing form, said actuator means being mounted on a shaft supported in said frame; at least one movable feeler element mounted on said frame and having a portion located in the path of movement of said actuating means in operative positions during rotation of said actuator means; at least one coupling element movable between an inoperative position and a coupling position, said coupling element being connected to said movable device and coupling in said coupling position thereof said movable device with said feeler element, said movable device being actuated to move said counter roll to said printing position whenever an actuating means engages said feeler element with said coupling means in coupling position; a second shaft supported in said frame for rotation together with said shaft; and selector means mounted on said second shaft and including selector elements associated with sections of said printing form and with the actuating means of said actuator means, said selector elements being movable to and from an operative position and located in operative position along a circular path, said coupling means projecting with one portion thereof into said circular path of said selector elements when in operative position, whereby said coupling means are moved into coupling position whenever one of said selector elements in its operative position engages said coupling means so that a corresponding actuating means becomes effective to operate said movable device for printing selected sections of the printing form.

13. An arrangement as set forth in claim 12, including clearing means comprising a manually operated member movable to and from an operative position, a portion of said member projecting in operative position into the circular path of said selector elements for moving them into inoperative position during the rotation of said selector means.

14. In a printing apparatus for selective intermittent printing, in combination, a printing roll carried for rotation by said frame and adapted to have a printing form attached thereto; a counter roll supported on said frame for movement to and from a printing position in close proximity to said printing roll for pressing against said printing form a copy sheet passing between said rolls; a movable device supported on said frame and being connected to said counter roll for moving the same to and from said printing position; a plurality of rotary actuator means connected to said printing roll for rotation therewith and each including a rotary support carrying one set of angularly spaced actuating means, the actuating means of said sets being respectively associated with consecutive sections of said printing form, said actuator means being mounted on a shaft supported in said frame; a plurality of movable feeler elements mounted on said frame for movement to and from an operative position and being respectively associated with said sets of actuating means, said feeler elements having a portion located in the path of movement of the associated actuating means in operative position thereof; a plurality of coupling elements respectively associated with said feeler elements and being movable between an inoperative position and a coupling position, said coupling elements being connected to said movable device and coupling in said coupling position thereof said movable device with said feeler elements, said movable device being actuated to move said counter roll into said printing position whenever an actuating means engages one of said feeler elements with said coupling element in coupling position; a second shaft supported in said frame for rotation together with said shaft; and selector means mounted on said second shaft and including groups of selector elements respectively as-

sociated with consecutive sections of said printing form and with the actuating means of said actuator means, said selector elements being movable to and from an operative position and located in operative position along a circular path, said coupling means projecting with one portion thereof into said circular path of said selector elements when in operative position, whereby said coupling means are moved into coupling position whenever one of said selector elements in its operative position engages said coupling means so that a corresponding actuating means becomes effective to operate said movable device for printing selected sections of the printing form.

15. An arrangement as set forth in claim 14, including clearing means comprising a manually operated member movable to and from an operative position, a portion of said member projecting in operative position into the circular path of said selector elements for moving them into inoperative position during the rotation of said selector means.

16. In a printing apparatus for selective intermittent printing, in combination, a printing roll carried for rotation by said frame and adapted to have a printing form attached thereto; a counter roll supported on said frame for movement to and from a printing position in close proximity to said printing roll for pressing against said printing form a copy sheet passing between said rolls; a movable device supported on said frame and being connected to said counter roll for moving the same to and from said printing position; a shaft supported in said frame for rotation with said printing roll; a number of actuator means mounted on said shaft for rotation therewith, each of said actuator means being provided with a projecting cam, the individual cams of said actuator means being angularly offset against each other so as to correspond each to a different section of said printing form; a feeler member connected to said movable device and extending with one portion thereof into close proximity to said cams; a second shaft supported in said frame; a corresponding number of coupling members turnably mounted on said second shaft and each including a coupling element movable by turning of said coupling member to and from an operative position located in the path of movement of one of said cams, whereby said movable device is moved for advancing said counter roll into printing position whenever one of said coupling elements is moved into operative position between the circular path of said cam and said feeler member; a selector device including a set of key members respectively associated with sections of the printing form, a set of key-actuated contacts respectively associated with said key members, and electromagnetic means for moving said coupling member and the pertaining coupling element into operative position whereby said counter roll is advanced into printing position whenever one of said coupling elements is moved into engaging position between one of said cams and said feeler member.

17. An arrangement as set forth in claim 16, including clearing means associated with said set of key members and said set of key-actuated contacts and including means for moving said key-actuated contacts to a circuit-interrupting position and said key members to an inoperative position.

18. In a printing apparatus for selective intermittent printing, in combination, a printing roll carried for rotation by said frame and adapted to have a printing form attached thereto; a counter roll supported on said frame for movement to and from a printing position in close proximity to said printing roll for pressing against said printing form a copy sheet passing between said rolls; a movable device supported on said frame and being connected to said counter roll for moving the same to and from said printing position; rotary actuator means connected to said printing roller for rotation therewith and including a set of angularly spaced actuating means respectively associated with sections of said printing form, each of said actuating means being movable to an operative position; coupling means connected to said movable device and having a portion located in the path of movement of said actuating means in operative positions during rotation of said actuator means, said movable device being actuated to move said counter roll to said printing position whenever an actuating means in operative position engages said coupling means; and a selector device for selectively moving said actuating means to said operative position thereof in selected positions of said rotary actuator means while said printing roll is standing still whereby selected actuating means become effective to operate said movable device during subsequent rotation of said printing roll for printing selected sections of the printing form.

19. An arrangement as set forth in claim 18 wherein said selector device includes a set of key members respectively associated with sections of the printing form, a set of key-actuated contacts respectively associated with said key members, at least one electromagnetic means for moving selected actuating means to said operative position independently of the other actuating means, and circuit means connecting said key-actuated contacts with said electromagnetic means so that said electromagnetic means are energized whenever selected key members are operated whereby whenever one of said actuating means engages the corresponding coupling means said movable device is actuated by said coupling means to operate said movable device for printing a selected section of the printing form.

20. In a printing apparatus for selective intermittent printing, in combination, a printing roll carried for rotation by said frame and adapted to have a printing form attached thereto; a counter roll supported on said frame for movement to and from a printing position in close proximity to said printing roll for pressing against said printing form a copy sheet passing between said rolls; a movable device supported on said frame and being connected to said counter roll for moving the same to and from said printing position; rotary actuator means connected to said printing roll for rotation therewith and including angularly displaced actuating means associated with sections of said printing form, said actuating means being movable transversely of said actuator means to and from an operative position and located in operative position along a circular path concentric with the axis of rotation of said actuator means; a set of stationary electromagnetic means located along a circle of the same diameter as said circular path and being angularly displaced at the same intervals as said actuating members so that when said printing roll and said actuator means are in starting positions each one of said electromagnetic means is aligned with a corresponding actuating means; coupling means connected to said movable device and having a portion located in the path of movement of said actuating means in operative positions during rotation of said actuator means, said movable device being actuated to move said counter roll to said printing position whenever an actuating member in operative position engages said coupling means; a selector device including a set of key members respectively associated with sections of said printing form, a set of contacts respectively associated with key members, and circuit means respectively connecting said set of electromagnetic means with said key-actuated contacts and including a normally open switch; and switch actuator means including a member rotating with said printing roll and a switch actuating element for moving said switch into closed position when said printing roll reaches its starting position after rotation thereof so that during standstill of said printing roll operation of selected key members causes selected electromagnetic means to move a corresponding actuating means into operative position whereby selected actuating means become effective to operate said movable device

during subsequent rotation of said printing roll for printing selected sections of the printing form.

21. An arrangement as set forth in claim 20, including a second set of stationary electromagnetic means for moving said actuating members from an operative into an inoperative position and located along a circle of the same diameter as said circular path and being angularly displaced at the same intervals as said actuating members so that when said printing roll and said actuator means are in starting positions each one of said second electromagnetic means is aligned with a corresponding actuating means, second circuit means connecting all the electromagnetic means of said second set with each other and including one manually operated clearing switch and a second normally open switch, said switch actuator means including a second switch actuating element for moving said second normally open switch into closed position when said printing roll and said actuator means reach their starting positions after rotation thereof so that during standstill of said printing roll operation of said key members is only effective in the starting position of printing roll and actuator means and operation of said clearing switch in this position energizes the said second set of electromagnetic means for moving any number of said actuating members from their operative position into an inoperative position.

22. An arrangement as set forth in claim 20, said printing apparatus including a plurality of said actuator means and of respectively associated electromagnetic means and a corresponding number of coupling means, the angular positions of said actuator means being offset against each other between the various actuator means so that the individual actuating means of one actuator means are associated with consecutive sections of said printing form.

23. In a printing apparatus for selective intermittent printing, in combination, a printing roll carried for rotation by said frame and adapted to have a printing form attached thereto; a counter roll supported on said frame for movement to and from a printing position in close proximity to said printing roll for pressing against said printing form a copy sheet passing between said rolls; a movable device supported on said frame and being connected to said counter roll for moving the same to and from said printing position; rotary actuator means connected to said printing roll for rotation therewith and including angularly displaced actuating means associated with sections of said printing form and located in operative position along a circular path concentric with the rotary axis of said actuator means, said actuating means being movable transversely of said actuator means to and from an operative position; coupling means connected to said movable device, at least one of said means being movable to an operative position in which said actuating means are thereby successively coupled with said movable device during rotation of the rotary actuator, said movable device being actuated when an actuating means is coupled with said movable device to move said counter roll to said printing position; a selector device including a number of selector elements angularly displaced on said frame along a circle of the same diameter as that of said circular path and at the same intervals as said actuating means so that when said printing roll and said actuator means are at a standstill each one of said selector elements is aligned with a corresponding actuating member, said selector elements being movable to an operative position for moving an associated actuated means into the operative position thereof, whereby selected actuating means become effective to operate said movable device during subsequent rotation of said printing roll for printing selected sections of the printing form.

24. An arrangement as set forth in claim 23 including clearing means mounted on said frame and comprising a manually operated turnable arm movable to and from an operative position and projecting in its operative position into the circular path of a portion of said actuating means in operative position so that during rotation of said actuator means said arm in its operative position engages said portions and moves said actuating means into their inoperative position.

25. In a printing apparatus for selective intermittent printing, in combination, a printing roll carried for rotation by said frame and adapted to have a printing form attached thereto; a counter roll supported on said frame for movement to and from a printing position in close proximity to said printing roll for pressing against said printing form a copy sheet passing between said rolls; a movable device supported on said frame and being connected to said counter roll for moving the same to and from said printing position; rotary actuator means connected to said printing roll for rotation therewith and including angularly displaced actuating means associated with sections of said printing form, said actuating means being movable transversely of said actuator means to and from an operative position and located in operative position along a circular path concentric with the rotary axis of said actuator means; electromagnetic means for moving said actuating means from an inoperative position into an operative position and supported in said frame for rotation along a circular path of the same diameter as that of said actuating means and coaxially therewith independently of the rotation of said printing roll; a selector device including a set of key members respectively associated with sections of said printing form, circuit means including a set of key-actuated contacts respectively associated with said key members, a rotary selector switch electrically and operatively connected to said electromagnetic means for rotation therewith and associated with a set of stationary contacts angularly displaced at the same intervals as said actuating means and relatively connected with said key-actuated contacts, whereby selective operation of said key members causes said electromagnetic means to move each actuating means into operative position whenever during standstill of said printing roll said selector switch during its rotation closes the circuit between said electromagnetic means and one of said key-actuated contacts whereby selected actuating means become effective to operate said movable device during subsequent rotation of said printing roll for printing selected sections of the printing form.

26. An arrangement as set forth in claim 25 including clearing means mounted on said frame and comprising a manually operated member movable to and from an operative position thereof, projecting in its operative position into the circular path of a portion of said actuating means so that during rotation of said actuator means said member in its operative position engages said portions and moves said actuating means into their inoperative position.

27. An arrangement as set forth in claim 25, including an intermediate drive shaft supported in said frame for rotation independently of said printing roll; a secondary shaft carrying said actuator means and said selector switch for rotation independently from each other; first clutch means associated with said secondary shaft and said rotary selector switch for setting it in motion when said clutch means are moved into engaging position; release means for automatically moving said clutch means into disengaged position when one revolution of said secondary shaft is completed; drive means connecting said intermediate drive shaft with said clutch means for rotating said shaft when said clutch means are in engaging position; control means for moving said first clutch means into engaging position so as to move said selector switch independently of said printing roll and of said actuator means; a third drive shaft rotating said printing roll and drive means connecting said intermediate drive shaft with said third drive shaft; second clutch means coupling said printing roll and said third drive shaft when in engaged position; connecting means associated with said first clutch

means and said second clutch means for moving said second clutch means into engaging position whenever said secondary drive shaft has substantially completed one revolution, whereby said rotary selector switch during standstill of said printing roll and of said actuator means operatively engages said associated stationary contacts successively and thereby energizes said electromagnetic means to move selected actuating means into operative position, and whereby thereafter said printing roll and said rotary actuator means are connected with said intermediate drive shaft and said movable device is successively advanced by selected actuating means to move said counter roll into printing positions.

28. In a printing apparatus for selective intermittent printing, in combination, a printing roll carried for rotation by said frame and adapted to have a printing form attached thereto; a counter roll supported on said frame for movement to and from a printing position in close proximity to said printing roll for pressing against said printing form a copy sheet passing between said rolls; a movable device supported on said frame and being connected to said counter roll for moving the same to and from said printing position; rotary actuator means connected to said printing roll for rotation therewith and including angularly displaced actuating means associated with sections of said printing form, said actuating means being movable transversely of said actuator means to and from an operative position and located in operative position along a circular path concentric with the rotary axis of said actuator means; electromagnetic means for moving said actuating means from an inoperative position into an operative position and supported in said frame for rotation along a circular path of the same diameter as that of said actuating means and coaxially therewith independently of the rotation of said printing roll; a selector device including one manually operated key, a contact associated with said key, circuit means connecting said contact with said electromagnetic means for energizing the same; a ratchet and pawl device associated with said rotary electromagnetic means and said secondary drive shaft for moving said electromagnetic means stepwise about said secondary drive shaft; windable spring means interposed between said ratchet and pawl device and said secondary drive shaft, tending to move the first relative to the latter, and means for winding said spring means; moving means for operating said ratchet and pawl device so as to move said electromagnetic means stepwise into selected positions opposite any one of said actuating means during standstill of said printing roll and said actuator means so that whenever said electromagnetic means is moved into a selected position operation of said key energizes said electromagnetic means to move the corresponding actuating member into its operative position, whereby during subsequent rotation of said printing roll and said actuating means said movable device is successively advanced by selected actuating means to move said counter roll into printing position.

29. An arrangement as set forth in claim 28, including indicator means associated with said rotary electromagnetic means and said moving means for indicating after operation of said moving means the relative position of said rotary electromagnetic means with respect to said actuating means.

30. In a printing apparatus for selective intermittent printing, in combination, a frame; a printing roll carried for rotation about its axis by said frame and adapted to have a printing form fixed thereto; a counter roll carried by said frame for movement to and from a printing position in close proximity to said printing roll for pressing against said printing form a copy sheet passing between said rolls; a movable device supported on said frame and being connected to said counter roll for moving the same to and from said printing position; rotary switch means carried in said frame and connected to said printing roll for rotation therewith, said rotary switch including a contact arm and a sliding contact carried by said arm for movement along a circular path, and a set of cooperating stationary angularly displaced contacts located along said circular path and respectively associated with sections of said printing form; electromagnetic means mounted on said frame and operatively connected to said movable device for moving said counter roll into printing position; a set of selector means carried by said frame and including a set of keys and a set of switches respectively associated therewith and with said stationary contacts; circuit means respectively connecting said selector switches and said stationary contact with said electromagnetic means for causing an electrical impulse to flow through said electromagnetic means whenever said circuit is closed, said circuit means including a resistor and a capacitor connected in parallel, and a rectifier in series therewith and with said electromagnetic means, for accelerating the action of said electromagnetic means upon receiving said impulse, by building up an electrical impulse of direct current at raised voltage; and drive means operatively connected to said printing roll.

31. In a printing apparatus for selective intermittent printing, in combination, a printing roll carried for rotation by said frame and adapted to have a printing form attached thereto; a counter roll supported on said frame for movement to and from a printing position in close proximity to said printing roll for pressing against said printing form a copy sheet passing between said rolls; a movable device supported on said frame and being connected to said counter roll for moving the same to and from said printing position; at least one rotary actuator connected to said printing roll for rotation therewith and including a set of angularly spaced actuating means, each actuating means being associated with a section of said printing form; coupling means including at least one feeler element and at least one coupling element movable between an inoperative position and a coupling position, one of said elements being connected to said movable device, and the other of said elements being successively engaged by said actuating means during rotation of said actuator, said movable device being actuated to move said counter roll to said printing position when said actuating means successively engage said other of said elements while said coupling element is in said coupling position, said feeler element including two arms mounted on said frame for turning movement about a common axis, one of said arms having means for engaging said actuating means and means for engaging said coupling element, the other arm operatively engaging said movable device and turnably carrying said coupling element, said coupling element being a lever movable to and from an operative position for engaging with a portion thereof said one arm, so that when said coupling element is moved to its operative position, a movement of said one arm caused by engagement with an actuating means is transmitted to said movable device for advancing said counter roll into printing position; and a selector device for moving said coupling element to said coupling position in selected positions of said rotary actuator whereby selected actuating means become effective to operate said movable device.

References Cited in the file of this patent

UNITED STATES PATENTS

2,787,212 Delplanque ---------- Apr. 2, 1957