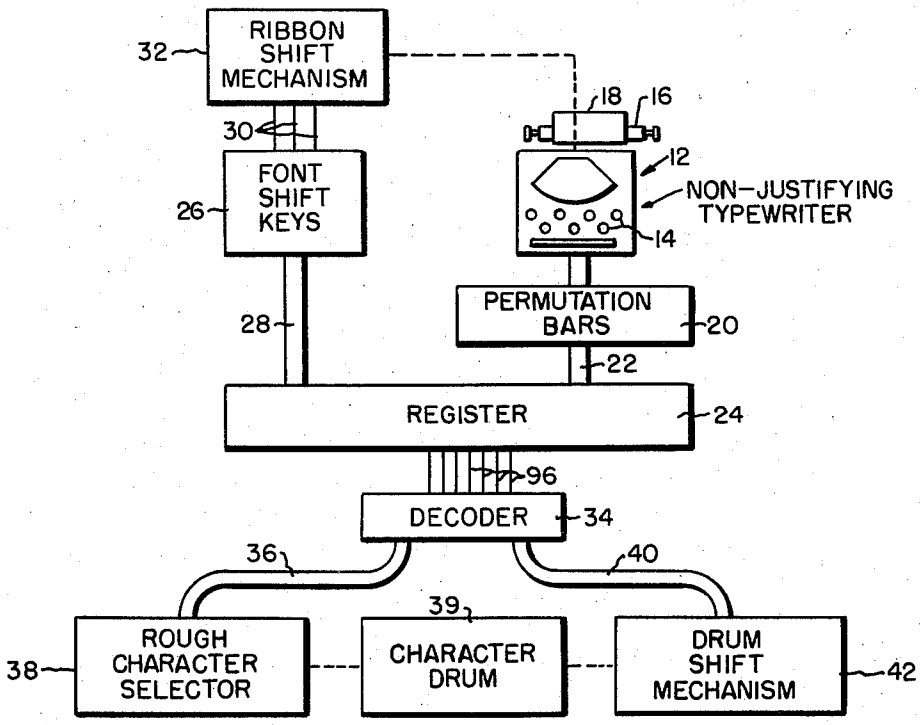
Aug. 4, 1959 R. HIGONNET ET AL 2,897,940

CARRIAGE SHIFTING DEVICE

Original Filed Aug. 23, 1947 5 Sheets-Sheet 1

Fig. 1



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CARRIAGE SHIFTING DEVICE

Original Filed Aug. 23, 1947 5 Sheets-Sheet 2

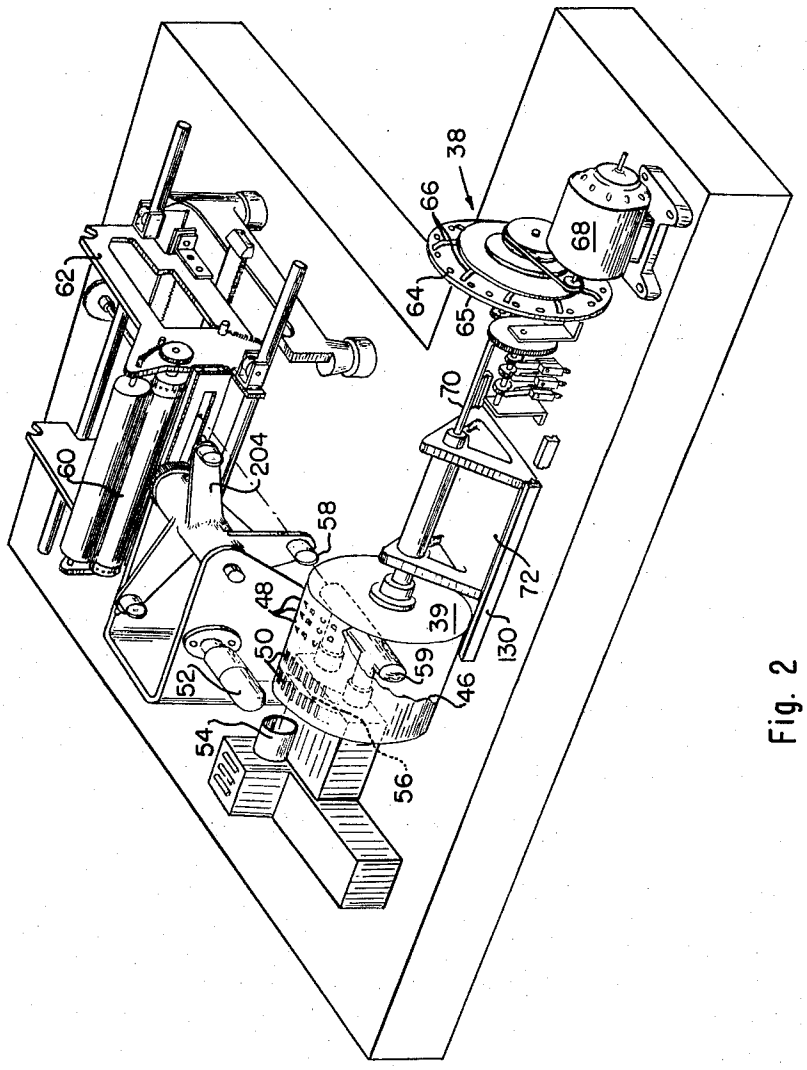


Fig. 2

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CARRIAGE SHIFTING DEVICE

Original Filed Aug. 23, 1947 5 Sheets-Sheet 3

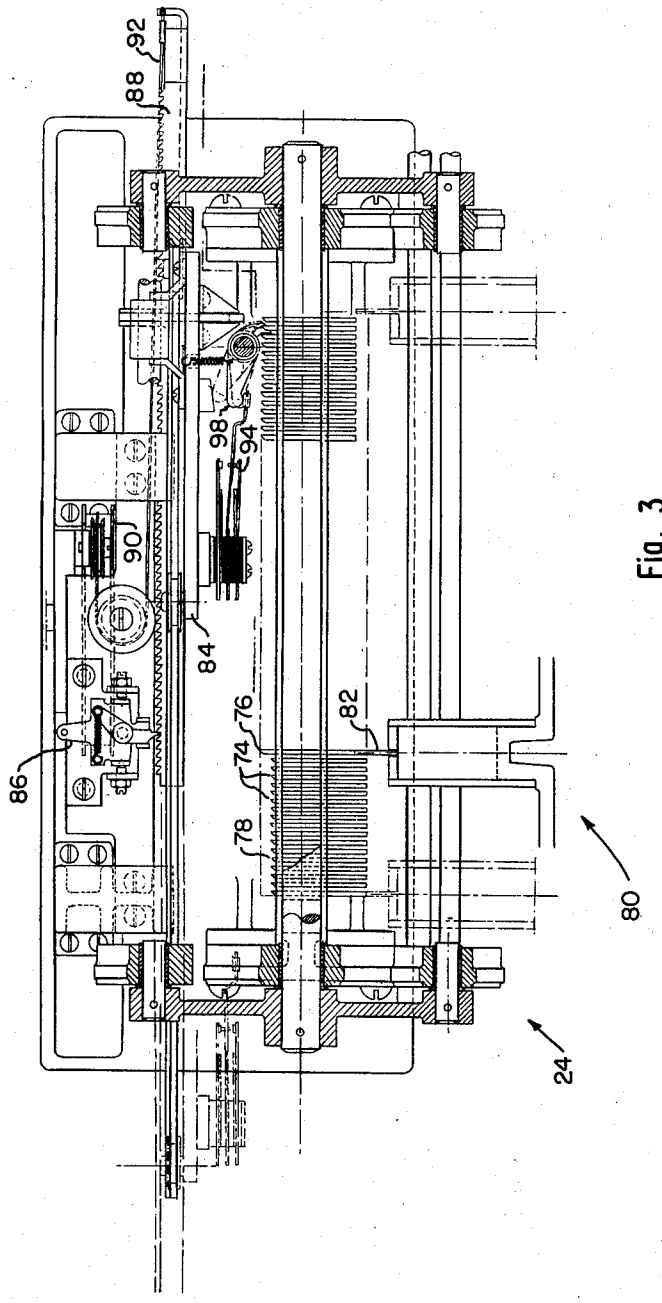


Fig. 3

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Aug. 4, 1959 R. HIGONNET ET AL 2,897,940

CARRIAGE SHIFTING DEVICE

Original Filed Aug. 23, 1947 5 Sheets-Sheet 4

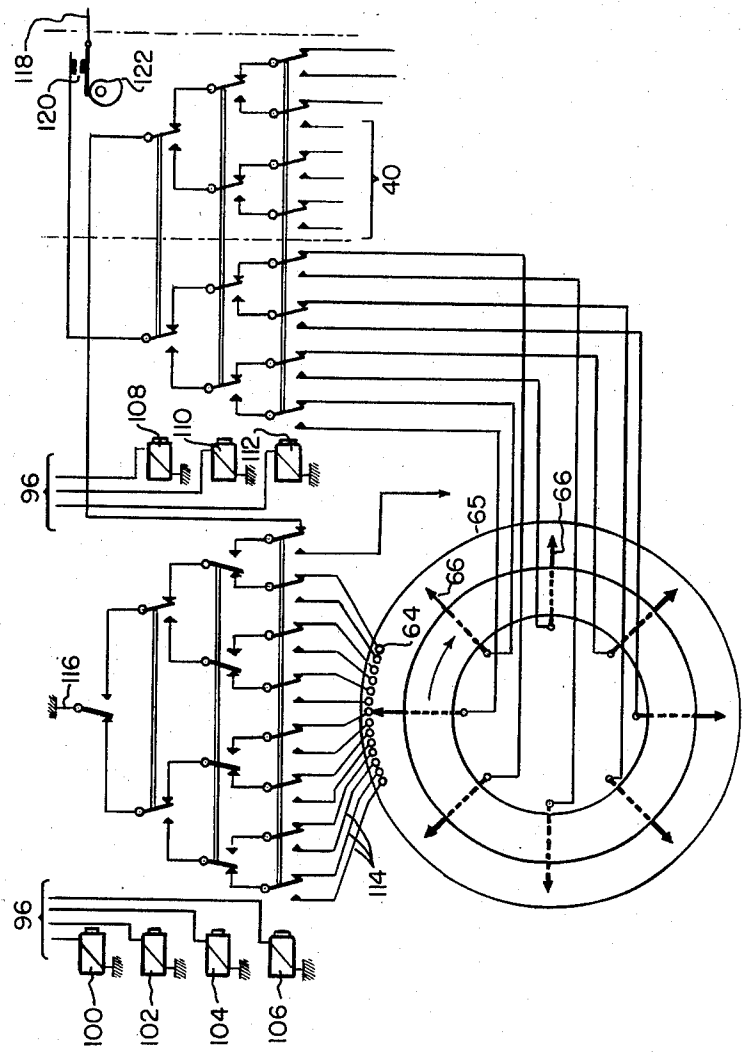


Fig. 4

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CARRIAGE SHIFTING DEVICE

Original Filed Aug. 23, 1947 5 Sheets-Sheet 5

Fig. 5

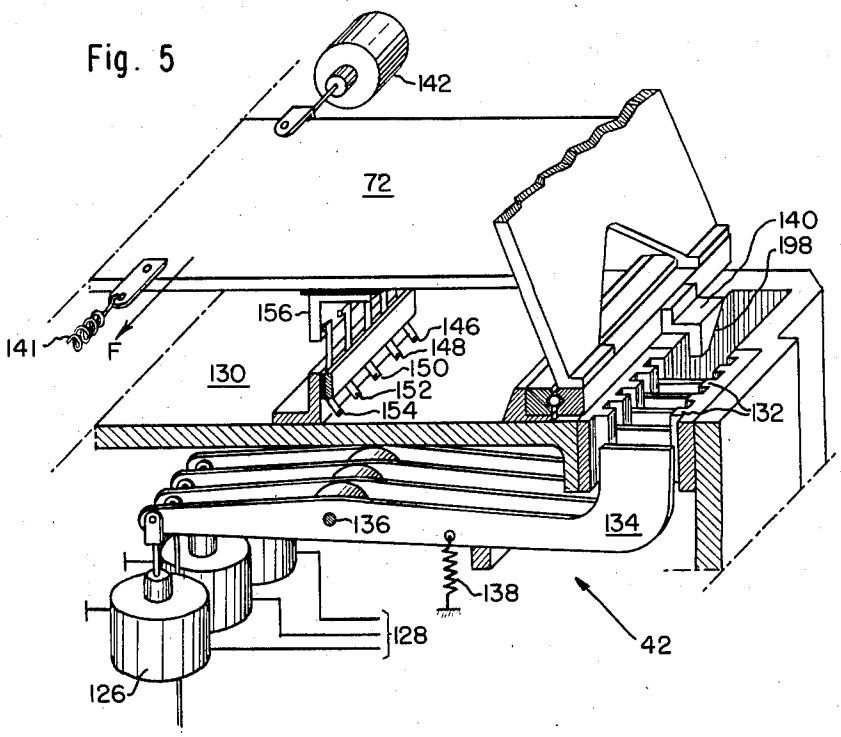


Fig. 6

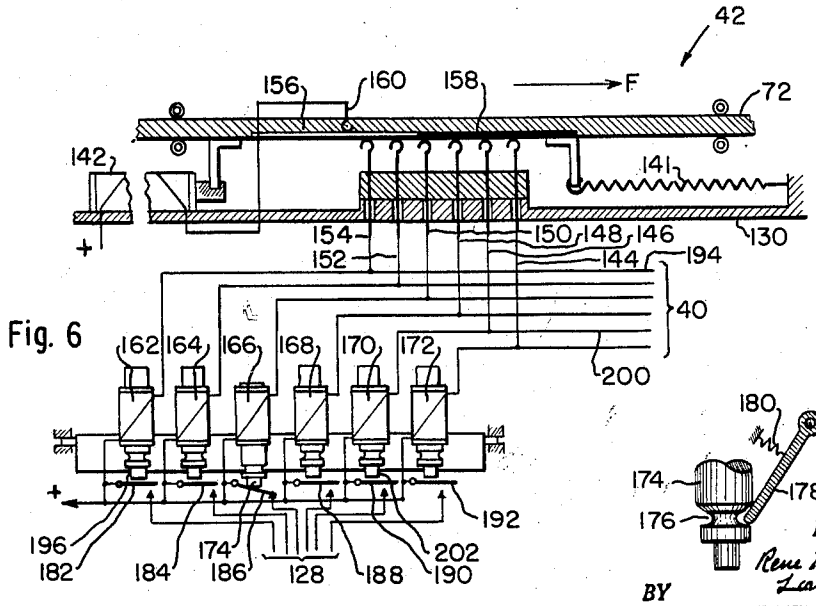


Fig. 6a

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2,897,940

CARRIAGE SHIFTING DEVICE

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Original application August 23, 1947, Serial No. 770,320, now Patent No. 2,790,362, dated April 30, 1957. Divided and this application March 7, 1957, Serial No. 644,643

Claims priority, application France March 20, 1947

11 Claims. (Cl. 197—12)

The present invention relates generally to type composing apparatus, and more particularly to mechanism for shifting a carriage or the like from one predetermined position to another, the mechanism being adapted for shifts between two or more positions.

This application is a division of our copending application Serial No. 770,320, filed August 23, 1947, now Patent No. 2,790,362.

Said application describes a photographic type composing machine having a continuously rotating drum on which a character stencil is supported. The characters are transcribed by projection on to a sensitized sheet while in motion by an intermittent flash device. The sheet is supported on a carriage having variable spacing means for spacing the characters in each line according to the variable widths thereof.

The characters are arranged on the drum in bands or rows, there being a separate band or row for each of a number of fonts. During transcription in a particular font, the corresponding band or row is located in relation to the projection apparatus so that all of the characters thereon pass successively through a fixed projection position.

It is an object of this invention to provide means available to the machine operator for readily shifting the drum to present any desired font in the projection position.

Another object is to provide keyboard-operated means to register instructions for a change of font, and means actuated according to the registered instructions to shift the drum to present a different font for projection.

A further object is to provide means operative to permit the use of more than one font in a single line of type.

With the foregoing and other objects in view, the features of the invention include a mechanism operable at any desired point in the projection of a line to shift the drum in either longitudinal direction, dependng on the position of the new font on the drum in relation to that previously used.

Other features reside in certain features of construction, modes of operation and arrangements of the parts which will be evident from the following description of the preferred embodiment thereof, having reference to the appended illustrative drawings, in which—

Fig. 1 is a block diagram of a photographic type composing machine embodying the invention;

Fig. 2 is a view in perspective showing the character drum; and associated parts;

Fig. 3 is a partial plan view of the register;

Fig. 4 is a schematic circuit diagram showing the decoder circuit;

Fig. 5 is a view in perspective illustrating the font change mechanism;

Fig. 6 is a schematic circuit diagram illustrating certain electrical components associated with the font change mechanism; and

Fig. 6a is a detail view of an electromagnet plunger retaining device.

Block diagram

Referring to Fig. 1, a non-justifying typewriter **12** is provided with a keyboard **14** and the usual platen carriage **16** over which a sheet of paper **18** is inserted. The keys are connected with permutation bars **20** as described in said application, whereby for each depressed key, a combination of seven wires in a cable **22** is energized, this combination comprising a code representing the particular character. The code for each selected character is stored in a register **24** comprising a number of rows and columns of depressable pins, as described in detail in said application.

The register **24** also receives code information from a set of font shift keys **26**, these keys being connected with the register as indicated at **28**. The font shift keys are also connected by three wires **30** with a ribbon shift mechanism **32**. The ribbon shift mechanism determines the color of the character that is typed on the sheet **18** and is fully described in said application.

The coded information corresponding to characters and fonts is stored in the register **24** a line at a time. When the line is ready for transcription, the information is read into a decoder **34**. The decoder determines whether a particular code relates to character selection or to a change of font. Appropriate wires in a cable **36** leading to a rough character selector **38** are energized. The rough character selector is mechanically associated with a character drum **39** and determines the moment when the selected character on the drum is in projection position since, as previously indicated, the characters are continuously moved through this position during the operation of the machine. If the decoded information relates to a change of font, appropriate connections through a cable **40** are made to a drum shift mechanism **42** hereinafter more fully described. The drum shift mechanism determines the longitudinal position of the rows of characters on the drum **39** in relation to the projection position.

It will thus be seen that selection of a font shift key has two functions: first, to enter an appropriate code in the register **24**, and second, to operate the ribbon shift mechanism **32**, thereby causing the characters subsequently selected to appear in a corresponding color upon the copy sheet **18**.

Photographic unit

The character selector **38** and drum shift mechanism **42** (Figs. 5 and 6) are mechanically associated with the character drum **39** shown in Fig. 2. The drum may be constructed of transparent plastic. As described in said application, a master character sheet **46** is wrapped over the surface of the drum. A number of such sheets may be made available for use on the machine alternatively. The sheet **44** may be opaque except for a number of rows **48** of characters, each row containing a different font, and a similar number of rows **50** of transparent slits. The purpose of the slits is to generate light impulses whenever a character on the master sheet passes in photographic position, as described in said application. It will suffice for present purposes to say that a photocell **52** is arranged opposite one of the rows **50** with a light source **54** disposed so as to project light to a reflector **56** within the cylinder, the reflected light striking the photocell **52** each time the beam is intercepted by a slit. There is a slit for each character of the row **48** disposed opposite a projection lens **58**, whereby a photoelectric impulse is generated by a slit at the precise moment when its corresponding character is in projection position opposite the lens **58**. An intermittent flash device **59** is energized

only when a photoelectric impulse occurs during the period when the character selector **38** is operated, as fully shown and described in said application. The image of the selected character illuminated by the flash device is projected onto a sensitized sheet **60** supported on a film carriage **62**. The carriage is arranged for variably spacing the characters in a line as well as for line spacing.

The selection of the desired character for projection is accomplished by the rough character selector **38** which includes an array of terminals **64** on a stationary disk **65** and a plurality of brushes **66** adapted to be revolved by a motor **68** which also rotates the drum **39**. The brushes **66** are secured to a shaft **70** revolved by the motor **68**. The drum is mounted on a carriage **72** for longitudinal translation in accordance with the font selected.

Register

As previously indicated, the typing of selected characters at the keyboard **12** causes energization of corresponding combinations of seven leads in a cable **22** leading from the permutation bars **20** to the register **24**. The structure of the register is more fully described in said application, but its operation may be ascertained for present purposes from Fig. 3 which is a plan view thereof. There is provided a flat support having a number of rows and columns of depressable pins **74**. Each pin may be moved independently to either of two stable positions, an "actuated" position as indicated at **76** and an "unactuated" position as indicated at **78**. Assuming that the field of pins is oriented in a vertical plane, a hammer carriage **80** is supported on one side of the field, and is provided with a vertical column of seven hammers **82** adapted to align with the pins a column at a time. The seven hammers **82** are energized through the leads in the cable **22**. After each character is selected, the hammer carriage **80** is advanced to the next column as described in said application.

On the other side of the field of pins **76** is supported a reading carriage **84**. This carriage is moved one step at a time independently of the hammer carriage **80** by actuation of an escapement mechanism **86** cooperating with a rack **88** rigidly connected to the carriage **84** and constantly urged by a spiral spring enclosed in a casing **90**, the spring acting on a cord **92** through deflecting rollers. A series of seven contacts **94** arranged in a vertical column cooperate with the decoder **34**, being connected thereto by corresponding leads **96**. These contacts are mounted on the carriage **84** and are actuated by feelers **98** each provided with a tail which is rocked when it meets on its path a protruding pin, that is to say, a pin in the "actuated" position.

Since the present invention is not concerned with the details of the construction of the register, reference is merely made to the above-mentioned application, the description in which is incorporated herein by reference.

Decoder

Referring to Fig. 4, it will be seen that the leads **96** from the register are connected with a corresponding set of seven decoder magnets **100** to **112**. The reading carriage **84** advances step by step and thus energizes the relays of the decoder in successive code combinations corresponding to the letters of the stored line. The flashing of the characters through the control of the decoder relays is controlled so that it can occur only during alternate cycles of the master drum. The carriage **84** is stepped during opposite alternate cycles of the drum, during which no photography occurs.

The relays **100** to **112** are provided with fanning-out contacts leading to a number of wires **114**, each wire being connected with an individual terminal **64**. The contacts of the relays **100** to **106** are connected with a ground connection **116**, while those of the relays **108**, **110** and **112** are connected with the brushes **66**. An output lead **118** may thus be grounded through contacts **120** operated by a timing cam **122**, contacts of the relays **108**, **110** and **112**, the brushes **66** and contacts **64**, contacts of the relays **100** to **106**, and the connection **116**. The ground on the output lead **118** occurs at a selected moment depending upon the combination of the relays **100** to **112** that is energized, this combination causing the ground to occur during the time interval when the selected character is in projection position. The connection of the lead **118** to the flash control circuit and the details of the controls thereof are fully described in said application.

As has been previously explained, the font of the characters is also controlled by a code combination recorded in the register. At the decoding stage, when a registered code combination corresponding to a change of font is read, the relays **100** to **112** are energized in an appropriate combination to connect the ground **116** with one of the group of leads **40**. This code combination is registered in a separate column of pins and controls the font of the characters in the following columns, until a new font change combination is reached.

Drum shift mechanism

The wires **40**, which are selectively energized when the reading unit of the register finds a registered code representing a change of font, are connected with a font change device as indicated in Fig. 6. The circuit of Fig. 6 is connected with a row of electromagnets such as **126** (Fig. 5) by a set of wires **128**. The apparatus of Figs. 5 and 6 comprises the mechanism **42** to slide the drum carriage **72** and lock it in the selected position. The carriage **72** slides on a base **130**. (See also Fig. 2.) A series of combs **132** cooperate with a series of stop levers **134** to stop the carriage in a predetermined position. The stop levers **134** are pivoted at **136** and normally held by springs **138** clear of a stop **140** attached to the carriage **72**. Each lever may be rocked counterclockwise as illustrated in Fig. 5 by a corresponding solenoid such as **126**. The carriage **72** is constantly urged in one direction by a spring **141** as indicated by the arrow F in Figs. 5 and 6, but an electromagnet **142** may be energized to move the carriage in the opposite direction. A series of insulated brushes **144** to **154**, one for each of the possible positions of the drum, are secured to the base **130**. Each solenoid such as **126** is controlled by a corresponding code combination stored in the register, and the selected solenoid is energized during two cycles of the character drum to permit a new row of characters to be brought opposite the photographic lens. The timing of this control is provided by the cam means fully described in said application.

A pair of plates **156** and **158**, the former conducting and the latter insulating, are mounted on the carriage **72**. The plate **156** is connected, for all positions of the drum, to one terminal of the solenoid **142** by means of a brush **160**. The other terminal of this solenoid is connected to a battery. Each of the brushes **144** to **154** is connected on the one hand to one of the wires **40** leading from the decoding relays (Fig. 5), and on the other hand to a winding of one of a set of electromagnets **162** to **172**, there being one of these electromagnets for each of the solenoids such as **126**. The other terminal of the electromagnets **162** to **172** are connected in common to a battery. Each of these electromagnets is provided with a plunger such as **174** (Fig. 6*a*), the plunger having a groove **176** cooperating with a plate **178**. The plate is pressed against all of the plungers by a spring **180**. The plate **178** holds in the operated position any plunger of an electromagnet that has been momentarily energized, such as for example the plunger **174** in Fig. 6. The diameter of the plunger is such that when another plunger is operated it will disengage the plunger held in operated position by the plate **178**. In this way, there may be only one plunger in operated position at a time. The plungers close corresponding contacts **182** to **192** when in operated

position, the contacts being connected at one terminal in common to a battery, and at the other terminal to corresponding electromagnets such as **126**, by wires **128** (Figs. 5 and 6).

The arrangement is such that when one of the electromagnets **162** to **172** is operated, the carriage **72** will move either in the direction of arrow F or in the opposite direction depending on which of the electromagnets **112** to **172** was previously in operated position. If, for example, the code combination corresponding to bold face types is such that a ground is applied by the decoding relays (Fig. 4) to a wire **194** (Fig. 6) this ground will cause a plunger **196** to be energized, closing contacts **182** and releasing the plunger **174** which opens its associated contacts. The contacts **182** supply a battery current to an electromagnet such as **126** and this electromagnet rocks a stop lever such as **134** which moves into the path of member **140**. On the other hand, the wire **194** also connects a ground to the brush **154** leading through the plate **156** to the electromagnet **142**.

The last-mentioned electromagnet will be energized as long as contact continues between the brush **154** and the plate **156**. It pulls the carriage **72** in the direction opposite the arrow F and, due to inertia, continues to pull until a short time after the brush **154** ceases to make contact with the plate **156**. Thereafter, the spring **141** will bring the carriage **72** back in the direction of the arrow F into contact with the actuated stop such as **134**. The member **140** is provided with a cam surface **198** so that it may continue to move in the direction opposite the arrow F as mentioned above, even if it meets the actuated stop member such as **134**.

If, instead of applying a ground on the wire **194** this ground is applied to a wire **200**, a plunger **202** releases the plunger **174** from the locking plate **178** and closes its contacts **190**. The corresponding stop lever rocks and moves into the path of the member **140**. On the other hand, a ground is applied to the brush **146**, but this ground is ineffective since this brush is then in contact with the insulating plate **158**. The carriage **72** is released by the stop lever associated with the contacts **186** and moves until the member **140** abuts the stop lever associated with the contacts **190**, under the force of the spring **141**. As may be seen in the drawing, when the carriage is at rest in any of its different positions, the brush corresponding to this position is not in contact with the conductive plate **156**. The stop positions of the carriage **72** may be determined with a high degree of precision since the spring **141** brings it to its final position and the stop mechanism is independent of play which may be present in the mechanism.

The device described above may also be used to control the displacement of other members of the machine, for example a lens turret **204** (Fig. 1) for bringing any one of a number of selectable lenses into photographic position, or a set of gears associated with the spacing movements of the film carriage, fully described in said application.

From the above description, it will be appreciated that we have provided means operable by a coded signal in a register to shift the drum for font selection. The mechanism is characterized by simplicity of construction consistent with the precise requirements of positioning the drum in relation to the projection apparatus. The shifting movements are very fast because the direction thereof is the same as the longitudinal direction of the new font in relation to the old one.

Having thus described the invention, we claim:

1. Apparatus for accurately indexing a movable carriage comprising, in combination, a stop member on the carriage, a number of accurately positioned interference members supported for selective interposition in front of said stop member, a circuit to actuate said interference members according to a selected position of the carriage, means continuously tending to urge the carriage in one direction, and means operative to move the carriage in the opposite direction if and only if the selected position is in said opposite direction from the previous position.

2. Apparatus for accurately indexing a movable carriage comprising, in combination, a stop member on the carriage, a number of accurately positioned interference members supported for selective interposition in front of said stop member, a circuit to actuate said interference members to interpose one member and withdraw a member previously interposed simultaneously according to a selected position of the carriage, means continuously tending to urge the carriage in one direction, and means operative to move the carriage in the opposite direction if and only if the selected position is in said opposite direction from the previous position.

3. Apparatus for accurately indexing a movable carriage comprising, in combination, a stop member on the carriage, a number of accurately positioned interference members supported for selective interposition in front of said stop member, a circuit to actuate said interference members according to a selected position of the carriage, means continuously tending to urge the carriage in one direction, and means including a device to move the carriage in the opposite direction, a conductive element on the carriage and a number of brushes in spaced relation to said conductive element, said element and brushes completing a circuit to energize said last-mentioned device if and only if the selected position is in said opposite direction from the previous position.

4. Apparatus for accurately indexing a movable carriage comprising, in combination, a stop member on the carriage, a number of accurately positioned interference members supported for selective interposition in front of said stop member, a circuit to actuate said interference members according to a selected position of the carriage, means continuously tending to urge the carriage in one direction, and means including a device to move the carriage in the opposite direction, conductive and nonconductive elements on the carriage and a number of spaced brushes to make contact with one or the other of said elements according to the position of the carriage, said conductive element and brushes completing a circuit to energize said last-mentioned device if and only if the selected position is in said opposite direction from the previous position.

5. Apparatus for accurately indexing a movable carriage comprising, in combination, a stop member on the carriage, a number of accurately positioned interference members supported for selective interposition in front of said stop member, a circuit to actuate said interference members according to a selected position of the carriage, means continuously tending to urge the carriage in one direction, and means operative to move the carriage in the opposite direction if and only if the selected position is in said opposite direction from the previous position, said stop member having a cam surface operative to permit it to pass any interposed interference member while moving in said opposite direction.

6. Apparatus for accurately indexing a movable carriage comprising, in combination, a stop member on the carriage, a number of accurately positioned interference members supported for selective interposition in front of said stop member, a circuit comprising a number of leads selectively energizable according to a selected position of the carriage, conductive and nonconductive elements on the carriage, a number of spaced brushes connected with the last-mentioned leads to make contact with one or the other of said plates according to the position of the carriage, interlocking magnet means connected with the last-mentioned leads and having contacts, each magnet means being adapted when energized to release any previously energized magnet and to hold its own contacts closed, said contacts of the magnet means having circuits to operate corresponding interference members, means continuously tending to urge the carriage in one direction, and a

device to move the carriage in the opposite direction, said conductive element and brushes completing a circuit to energize said last-mentioned device if and only if the selected position is in said opposite direction from the previous position.

7. Apparatus for accurately indexing a movable carriage comprising, in combination, a stop member on the carriage, a number of accurately positioned interference members supported for selective interposition in front of said stop member, a circuit to actuate said interference members according to a selected position of the carriage, means continuously tending to urge the carriage in one direction, and means including a device to move the carriage in the opposite direction, conductive and nonconductive elements on the carriage and a number of brushes spaced in a manner corresponding to said interference members to make contact with one or the other of said elements according to the position of the carriage, said conductive element and brushes completing a circuit to energize said last-mentioned device if and only if the selected position is in said opposite direction from the previous position.

8. Apparatus for accurately indexing a movable carriage comprising, in combination, a stop member on the carriage, an accurately positioned interference member supported for interposition in the path of said stop member to engage it accurately in a selected position of the carriage, a circuit permitting said interference member to engage said stop member when the carriage is in said selected position, means operative to move the carriage in one direction, means including a device to move the carriage in the opposite direction, the carriage having a conductive element with a nonconductive area adjacent to the conductive element, and a number of brushes spaced in a manner corresponding to the selectable positions of the carriage to make contact with the conductive element or to reach said nonconductive area according to the position of the carriage, said conductive element and brushes completing a circuit to energize said last-mentioned device if and only if the selected position is in said opposite direction from the previous position.

9. Apparatus according to claim 8 including circuits for selectively energizing the brushes according to corresponding selected positions of the carriage.

10. Apparatus according to claim 8 in which the device to move the carriage in the opposite direction, when energized, continues to move said carriage until the corresponding selected brush moves from the conductive element to the nonconductive area.

11. Apparatus according to claim 8 in which the device to move the carriage in the opposite direction, when energized, continues to move said carriage until the corresponding selected brush moves from the conductive element to the nonconductive area, the boundary of said conductive element with said nonconductive area roughly determining the position of the carriage, said stop member and interference member being operative to determine the precise position of the carriage.

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