carries by tight engagement with the shaft the linear actuator **111** per se. The actuator comprises two sections of which only the top section **118** is illustrated in FIG. **15** of the annexed drawings; the bottom section cooperating with the top section **118** for housing six free-wheeling rollers, not shown, three to an end, that are angled relative to the long axis of shaft **112** and spring-loaded by means of compression springs on posts **121** and **122** to urge the rollers, not shown, against the shaft. As the shaft turns, the rollers describe a helical path along the shaft and move the actuator forward and backward depending upon the direction of rotation of dial disc **116** and connected shaft **112.** Screw-bolts **123** are provided for securing the actuator **111'** to the under side of the book-holder **4** and thereby effects, by turning of the dial disc **116,** the movement of book-holder away from the operator or toward the operator as desired.

Since the number of lines per inch in any given text carrying delineated characters will vary from, say, 4 lines per inch to 10 lines per inch, we have provided raised numerals **4, 4.5, 5, 5, 6, 7, 8** and **10** on the face of dial **16** which can be tactually sensed by the blind person. Upon being told what text he is about to read, he locates the raised numeral and turns the dial with the finger on say **10,** until his finger engages a stop **124.** And, per force, the turning movement of the shaft **112** and the linear movement of book holder **4** is accomplished. The raised numbers, as above mentioned, are delineated on dial **116** by a scale **125** on the face of the dial which shows the range of numbers of lines per inch of text and serves as a guide for the finger of the blind person and limited by the stop **124.** The blind person can, after all the lines of a page of text 46 have been scanned which can be indicated to such blind person by the sounding of a buzzer, not shown, insert a finger in notch **117** and rotate the disc or dial **116** in the opposite direction to bring the book-holder **4** into its initial position with the top line of the next page of text **46** underlying the sensor head **5.** This movement of the dial or disc **116** can also be done by placing the hand on the circumference of the disc.

As particularly illustrated in FIG. **17** of the annexed drawings, we provide a conventional photo-electronic scanning unit or sensor including a head **5** housing aligned lenses **126** and **127;** the lens **126** conveniently constituting a 12 mm diameter, 24 mm FL double convex lens and the lens **127** constituting a 17 mm diameter, 50 mm FL double convex lens for projecting light energy from a source, such as one or more excitor lamps **128** which are adjustable in the usual manner to permit pre-adjustment of differential amplifiers, and which afford reflected light to a required light level from the pages of the text **46.** The optical magnification afforded by the lenses **126** and **127,** using focussed miniature excitor lamps **128** is sufficient to illuminate a relatively wide area within the head **5** wherein there may be accommodated a minimum of 11 photo-transistors **129,** as shown, which are interconnected individually into each one of 11 amplifier circuits all similar to the amplifier circuit **7,** see FIG. **11,** by means of a series of energy conductors **131** conveniently encased in a flexible cable **132,** see FIGS. **17** and **18** for preventing damage thereto upon to and from movement of the sensor head **5** on carriage **6.** The moving sensor assembly provides sequential scanning and output indications of all segments of each character scanned, when the reflected light from the surface of a page of text **46** is lessened by the presence of the darker-than-page characters. Each of the arranged photo-transistors **129** in the scanning unit **5** is so placed as to sense its relative part of each character, and is connected to a related amplifier.

In FIG. **11** of the annexed drawings, we have diagrammatically illustrated one of the amplifier circuits **7** which, when its transistor voltage is increased by reduced light input from transistors **129** energizes the solenoid **36** to cause one or more of the balls **21** to be dropped from the outlet **33** of hopper **9** and to enter one or more of the perforations **22** of perforated belt **8,** see FIG. **5.** Thus, energization of the amplifier circuits **7** are controlled by the substantial reduction of the light input from the photo-transistors **129** in head **5,** as indicated by the arrows **135** in FIG. **11.** Circuit **7** has a 117 volt, alternating current supply, indicated at **7'** which is reduced by transformer **134** to approximately 26 volts alternating current and then rectified by rectifier **136** to provide a pulsating direct current supply applied across the terminals of each solenoid **36** through the series connected silicon controlled rectifier **152.**

Each of the amplifiers thus contains a minimum of low cost components and only one small regulated direct current supply, designated by the reference numeral **138** in FIG. **11** is used to supply direct current to each amplifier, and includes one integrated circuit regulator and several resistors and capacitors. The 20-volt direct current supply **138,** and the reduced 26-volt alternating current rectified to pulsating direct current, indicated at **139** and **136** are common to all amplifiers; the power amplifier **152** consisting of a silicon-controlled rectifier which can easily be triggered into a heavily-saturated current conduction during the positive portion **141** of an alternating current cycle, and the conduction continues until the pulse returns to the zero voltage point on its wave form, see FIG. **12.** No conduction normally could take place during the negative portion of the cycle. And, because the negative pulses occur in half the time, some signals might be lost during these periods of non-conduction. This possibility of lost data is corrected by applying the alternating current output of a low-voltage transformer secondary **139,** to full-wave bridge type rectifier **136.** The rectifier inverts the negative pulses and inserts them in the gaps between the former positive pulses **141,** as shown in detail in FIG. **13,** forming a continuous train of positive pulses and leaving a negligible time area of conduction in which the silicon-controlled rectifier cannot conduct.

The amplifier circuits **7** each functions as follows: the sensitivity of each photo-transistor **143** is adjusted to a suitable threshold of the reflected light by the setting of collector resistor **144;** the resistor **146** serving to limit the maximum current applied to photo-transistor **143.** When a darker portion of a given page of text **46** is scanned (as in the presence of an inked character) the light input decreases to photo-resistor **143** and the resistance of such photo-transistor increases, causing the voltage to rise at the emitter **147** of the unifunction transistor **148** at a frequency of several thousand cycles per second, much higher than the frequency of pulses shown in FIG. **13** and causing a train of short triggering pulses to appear at its lower base lead **149** which is connected to the gate terminal **151** of silicon-controlled rectifier **152.** This high rate of trigger pulses applied to