July 14, 1964 R. T. CLEARY ETAL 3,141,068

ARRANGEMENT FOR LIGHTING A LAMP AT A SUBSTATION

Original Filed Jan. 15, 1957 2 Sheets-Sheet 2

FIG. 3

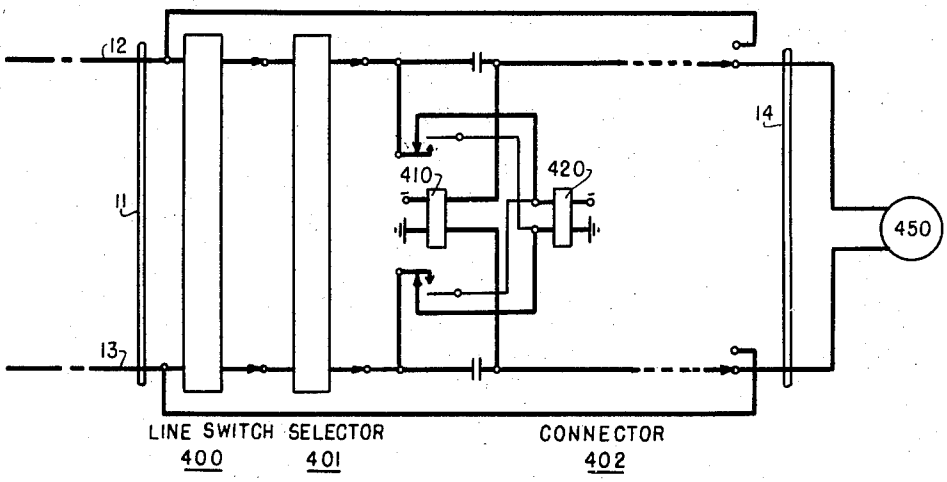
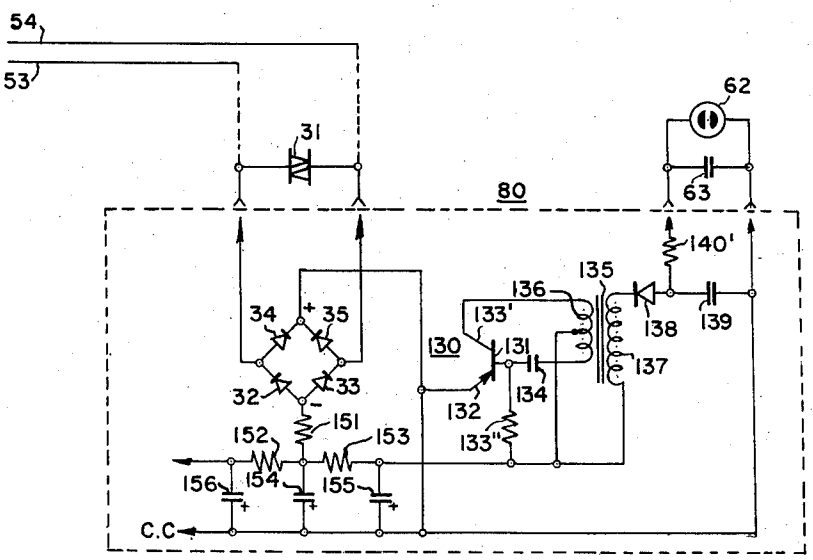


FIG. 2



INVENTORS
ROBERT T. CLEARY
ROBERT V. BURNS
ROBERT F. HUCKSTADT

BY C. A. Culbrandson
ATTY.

United States Patent Office 3,141,068 Patented July 14, 1964

3,141,068

ARRANGEMENT FOR LIGHTING A LAMP AT A SUBSTATION

Robert T. Cleary, Lockport, Robert V. Burns, Markham, and Robert F. Huckstadt, Chicago, Ill., assignors to Automatic Electric Laboratories, Inc., Northlake, Ill., a corporation of Delaware

Original application Jan. 15, 1957, Ser. No. 634,184, now Patent No. 3,028,452, dated Apr. 3, 1962. Divided and this application May 10, 1961, Ser. No. 109,065

5 Claims. (Cl. 179—81)

The invention relates to telephone systems, and more particularly to an arrangement for indicating an operational condition at a substation by means of a lamp. The present application is a division of our copending application Serial No. 634,184 filed January 15, 1957, now United States Patent 3,028,452.

The use of incandescent lamps as indicating lamps in substation apparatus presents difficulties. The powering of such a lamp by means of a commercial power supply at the substation has the drawback that the lamp is inoperative in the case of a power failure. In addition commercial power supplies are usually bulky and in some cases present a potential hazard to the user of the substation. Attempts have been made to power incandescent lamps from the central office battery over the subscriber line but this technique is usually not feasible because of the relatively high current consumption of lamps of this kind and also because of the variations in the resistance and the leakage of subscriber lines.

In some substations of the prior art gas tubes have been employed as indicating lamps at substations. Gas tubes have the advantage of relatively low power consumption. However the use of this type of lamp has been limited in the past to those instances where the high voltage, 80 volts or more, for firing these lamps was available. More particularly arrangements are known wherein neon tubes for visually indicating the receipt of a ringing signal are powered by the relatively high voltage ringing current transmitted from the central office.

Broadly speaking it is an object of the present invention to provide an arrangement for lighting an indicating lamp at a substation which avoids the above disadvantages of prior art techniques.

A more specific object of the invention is the provision of an arrangement for indicating an operational condition of a substation by means of a gas tube thereat without the need for this purpose for a local commercial power supply or for the transmission of high voltages over the line.

In accordance with the principal feature of the invention, a supervisory lamp of the gas tube type is powered by a transistor blocking oscillator at the substation which is supplied with direct current from the central battery by way of the subscriber line. In the preferred arrangement the gas tube is part of a gas tube oscillator supplied by the aforementioned blocking oscillator through a diode. The resultant flashing type operation of the neon tube has the advantage that it provides a more distinct supervisory signal, particularly in bright surroundings and that it further reduces the power consumption of the lamp.

In the embodiment described herein the invention is illustrated in connection with the loudspeaking telephone of the "selective" type, that is of the type arranged both for "distant talking" by means of a microphone and loudspeaker and for regular or "close range" communication by means of a handset.

In the previously proposed selective loudspeaking systems the "on" condition of the loudspeaking components, in particular the amplifiers, is indicated to the user by a pilot or supervisory lamp the power for which is derived from the commercial power line. In the system disclosed

herein the advantages of an "on" indicating lamp are retained in spite of the fact that no commercial power is employed for the purpose of feeding this lamp.

This is accomplished by using a neon lamp connected to the output of a small transistor type blocking oscillator which, as indicated above, furnishes the high-voltage low-current power required to supply the neon tube. The transistor oscillator, in turn, is powered with the relatively low voltage required for its operation by way of the subscriber line, namely through the medium of a diode bridge which guards against line polarity reversal and through which the two voice amplifiers of the loudspeaking telephone system also are powered. This aspect of the embodiment shown herein has been claimed in the above-mentioned parent application Serial No. 634,184.

The invention both as to its organization and method of operation together with other objects and features thereof will best be understood by the following specification taken in connection with the accompanying drawings. In these drawings:

FIGS. 1 and 2 combined show only the circuit of the loudspeaking telephone needed to explain the present invention. More particularly:

FIG. 1 shows the subset components which are required for handset operation and for switching from one type of operation to the other.

FIG. 2 shows the lamp lighting arrangement which is mounted in the subset itself.

FIG. 3 is a schematic drawing of the central office equipment.

FIGS. 1–3 form a unified circuit diagram of the lamp lighting arrangement and central office equipment, if FIGS. 2 and 3 are placed to the right of FIG. 1.

Referring to FIG. 1, the transmission circuit shown in the left-hand portion of this figure is patterned after the transmission circuit disclosed in copending United States patent application Serial No. 592,401, filed by H. C. Pye on June 19, 1956, now United States Patent 2,912,512 granted November 10, 1959, and also shown in the patent application Serial No. 624,765, now United States Patent 2,885,484.

FIG. 1 also shows a combination push and turn key **40**. When plunger **45** by means of its handle end **45'** is rotated by 90 degrees, actuating spring **50** rides up on its cylindrical surface **46'** of the plunger and is thereby displaced to the left in FIG. 1 so that contacts **41, 43** are closed and contact **42** is opened.

The components shown in FIG. 2 include neon tube **62** which serves to indicate that the system has ben conditioned for loudspeaking operation and which, together with condensers **63**, forms part of the gas tube oscillator; and they also include printed circuit card **80** which is of the plug-in type.

As will be noted from FIG. 2, printed circuit card **80** mounts the following portions of the lamp lighting arrangement: diode bridge **32–35** which serves to maintain the bias voltage for the oscillator at the proper polarity irrespective of current reversal on the line; compensating resistor **151** and filter elements **152–155** which are connected to the output of the diode bridge; the transistor blocking oscillator which includes, in particular, transistor **130** and transformer **135**; diode **138** and filter condenser **139** connected to the output winding of this transformer; and resistance **140'** which forms part of the gas tube oscillator.

The loudspeaking telephone is connected by way of subscriber line **11** to the central office equipment shown in FIG. 3, the switching equipment in this office including line switch **400**, selector **401** and connector **402**. Also shown in FIG. 3 is a substation **450** to which a connection from the substation, FIG. 1, may be extended by means of the aforementioned central office equipment.

gas tube oscillator including a gas tube requiring a higher operating voltage than that of said central office battery, and a timing resistance and a timing capacitance both connected to said gas tube for flashing said tube at a frequency determined by the values of said resistance and said capacitance; means for powering said gas tube from said central battery, said means including a transistor oscillator; a step-up transformer having primary and secondary windings; circuit connections from the output of said oscillator to said primary winding, and from said secondary winding to said gas tube; rectifier means serially interposed in said connections between said secondary winding and said gas tube; other circuit connections between said line and said transistor oscillator; and switching means interposed within said other connections for

supplying said transistor oscillator with direct current from said central battery by way of said other connections, said oscillator being activated and sustained by first operation of said switching means and deactivated by a second operation of said switching means.

References Cited in the file of this patent

UNITED STATES PATENTS

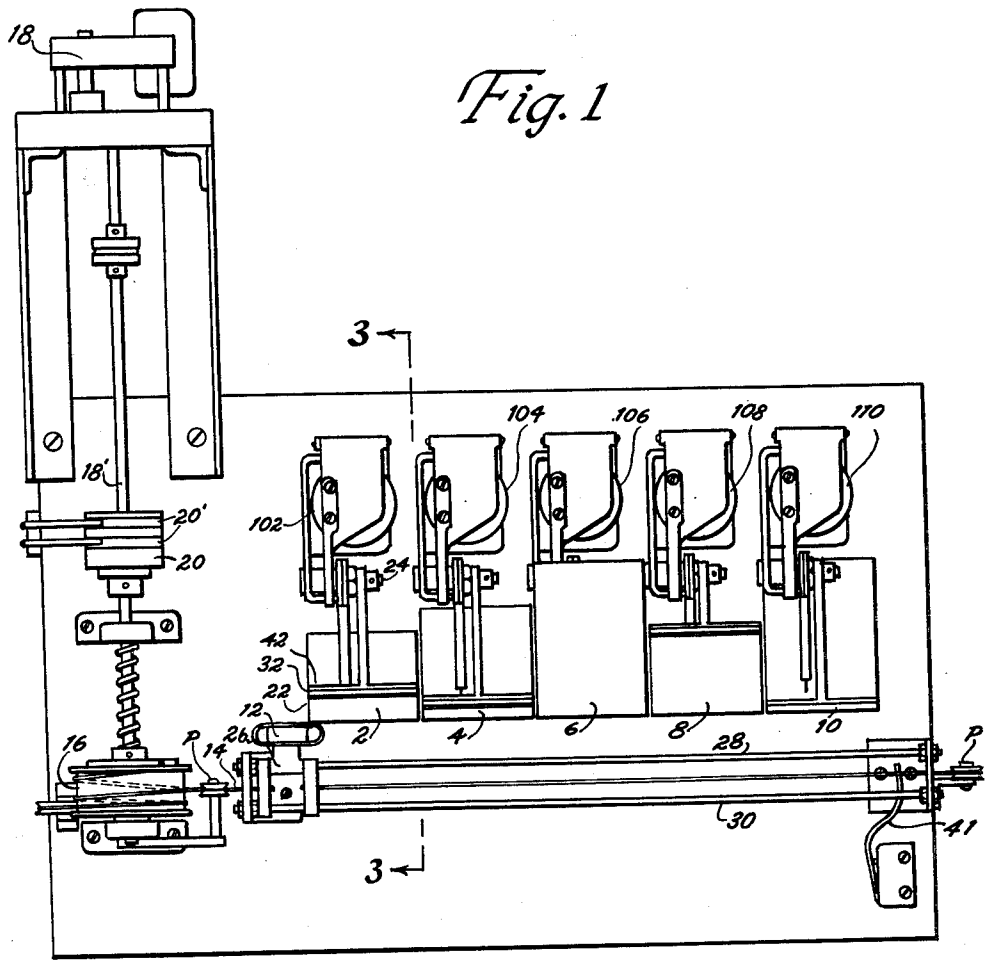
1,955,972	Muse	Apr. 24, 1934
2,608,614	Williams	Aug. 26, 1952
2,854,615	Light	Sept. 30, 1958
2,904,740	Rongen	Sept. 15, 1959
3,004,105	Goodale et al.	Oct. 10, 1961
3,063,004	Vic	Nov. 6, 1962

July 14, 1964 E. L. WITHEY 3,141,069

METHOD OF AND APPARATUS FOR RECORDING AND REPRODUCING INFORMATION

Filed April 7, 1959 3 Sheets-Sheet 1

Fig. 1



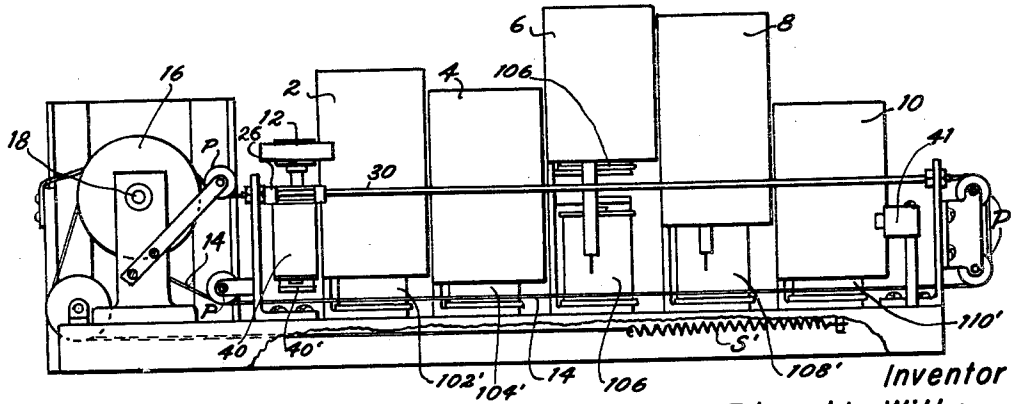


Fig. 2

Inventor
Edward L. Withey
by Lines and Lines
Attorneys