(No Model.) 2 Sheets—Sheet 1.

A. D. PAGE.

CIRCUIT CHANGING APPARATUS.

No. 481,281. Patented Aug. 23, 1892.

Fig. 1.

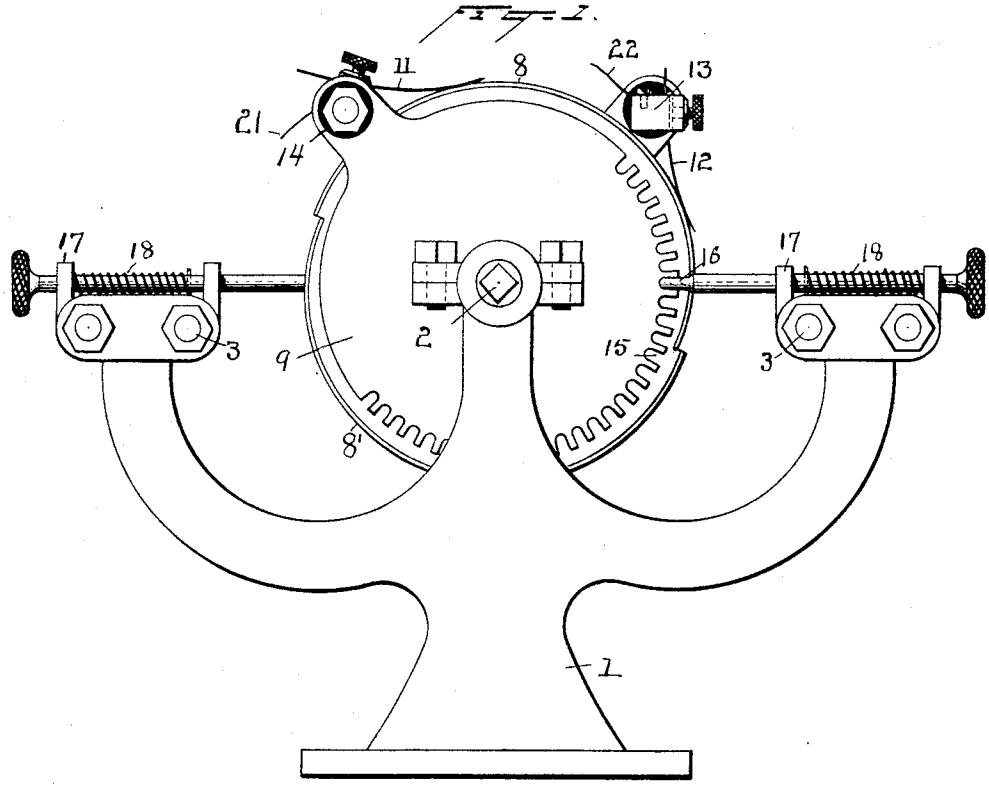
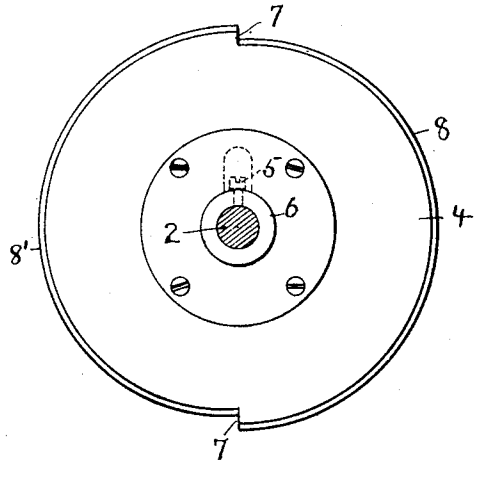


Fig. 2.



Witnesses
Norris A. Clark.
W. H. Eberle

Inventor
A. D. Page
By his Attorneys
Dyer & Seely.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

A. D. PAGE.

CIRCUIT CHANGING APPARATUS.

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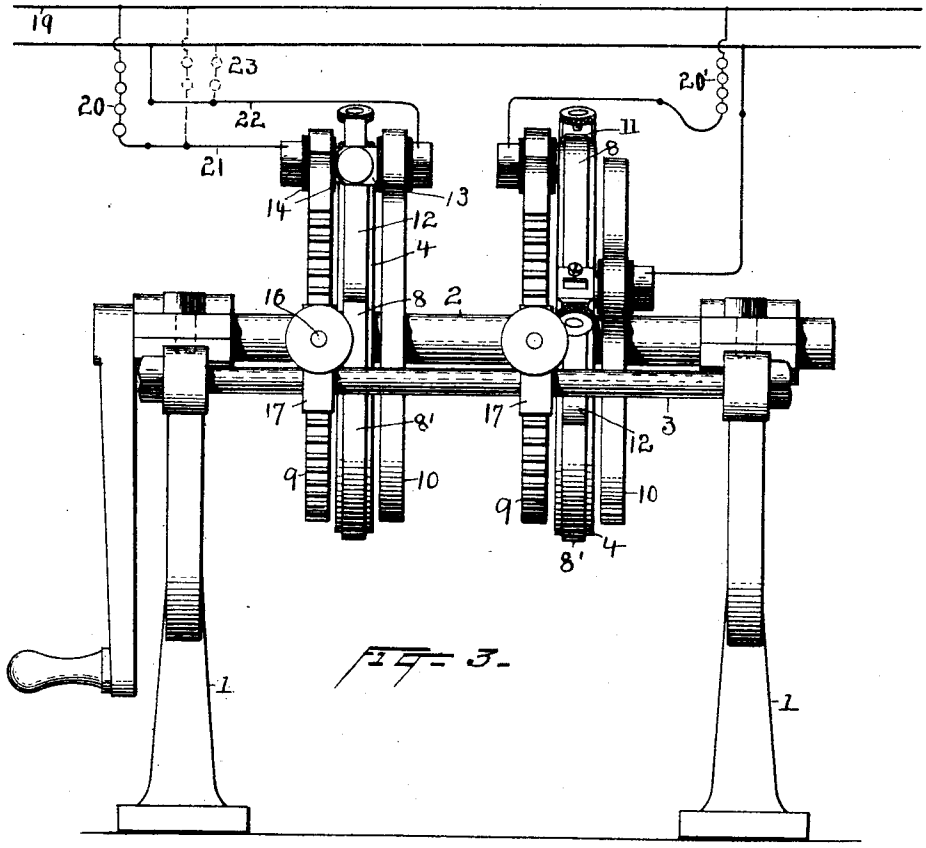

Fig. 3.

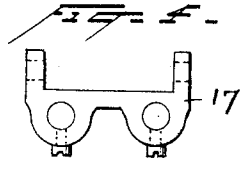

Fig. 4.

Witnesses
Norris A. Clark.
W. F. Oberly

Inventor
A. D. Page
By his Attorneys
Dyer & Seely.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ALMON D. PAGE, OF NEWARK, NEW JERSEY.

CIRCUIT-CHANGING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 481,281, dated August 23, 1892.

Application filed May 14, 1892. Serial No. 432,964. (No model.)

To all whom it may concern:

Be it known that I, ALMON D. PAGE, a citizen of the United States, residing at Newark, county of Essex, State of New Jersey, have invented a certain new and useful Improvement in Circuit-Changing Apparatus, of which the following is a specification.

The present invention relates to an apparatus adapted to change the condition of a circuit or of circuits at intervals, the apparatus being adjustable, so that the intervals between the changes can be varied.

The main object of the invention is to provide a simple and efficient device of the character indicated, having the desired range of adjustability and which shall not be liable to get out of adjustment or repair; and the invention consists in the apparatus and in the several combinations hereinafter described, and pointed out by the claims.

In connection with many electrical devices it is sometimes desirable to alternately close and open the circuit or circuits or to otherwise change the same, sometimes at one degree of frequency and sometimes at a different degree. As an illustration, I may mention flash signal-lights, which are alternately illuminated and extinguished, in some cases the illumination occurring one number of times per minute, while in other cases it is desirable to have the illuminations occur a different number of times per minute. The apparatus to be described is adapted to make all the circuit changes necessary to accomplish the results mentioned. Another use to which the apparatus may be put is to flash signs composed of letters or characters made up of electric lamps or others signs which are electrically illuminated for the purpose of calling attention to said signs, the circuit-changer being adapted to simultaneously extinguish all of the electric lamps by opening their circuit, to hold the circuit open a definite time, and then to close the same for a definite time, and being adapted also to open the circuit of a part of the lamps for intervals of one length and the circuit of other lamps for periods of a different length. Many other situations in which the circuit-changer may be used could be mentioned; but those above given will serve sufficiently to indicate the nature and design of the apparatus.

In the accompanying drawings, which illustrate the circuit-changer, Figure 1 is an end view of the preferred form. Fig. 2 is a side view of a disk or body used in the circuit-changer. Fig. 3 is a view at right angles to Fig. 1, showing, also, circuit connections and translating devices controlled by the circuit-changer; and Fig. 4 is a view of a detail to be described.

1 are standards or supports, each preferably having a central and two laterally-extending arms, the former supporting a central shaft 2, which may be rotated in any suitable manner — for example, by a crank such as shown, although it would generally be driven by a motor—and the latter arms each supporting two stationary rods 3. On the shaft 2 is secured the mechanism of one or more circuit-changers, each consisting, essentially, in the form illustrated of an insulating disk or body 4, fixed on the shaft 2—for example, by the set-screw 5, passing through the metal hub 6, secured to said disk. The disk is preferably stepped at two diametrical points 7, as indicated in Fig. 2, and on the two semi-circumferences extending from 7 to 7 are conducting strips or sections 8 8′. At either side of the body 4 is a disk or plate 9 10, loose on the shaft, which are of the same shape, and each of which carries a contact device 11 12, adapted to bear on the conducting-sections 8 8′, and to which contact devices the circuits to be controlled are connected. Said contact devices are carried by arms 13, insulated from the disks 9 10 by insulating-bushings 14. In the peripheries of the disks 9 10 are formed notches 15, in which the detent pawls or stops 16 are adapted to engage to hold said disks and their contact devices in the positions to which they are adjusted. Said pawls or detents are supported in yokes 17, which are mounted on the side rods 3 at points in line with the disks.

18 are springs normally holding the pawls forward, but allowing the same to be withdrawn when it is desired to adjust the contact devices.

In Fig. 3, 19 is a supply-circuit extending from any suitable generator (not shown) and

constituting a source of supply for the translating devices 20, which may be, for example, flash signal-lamps or the lamps illuminating or forming a sign. The wires 21 22 extend, respectively, to the two brushes 11 12. In practice these will be flexible conductors and so supported as not to prevent movement of the disks 9 10. If desired, another series of lamps may be controlled by the same circuit-changer—for example, by connecting such devices in a branch 23. (Shown in dotted lines.) At the right of the figure is shown another series of lamps 20′, the circuit of which is connected to the contact devices of the second circuit-changer, (shown on the same shaft 2,) although this is not essential. In this circuit-changer the brush 11 is left in the same position which it occupies in Fig. 1 and at the circuit-changer at the left in Fig. 3, while the disk 10 has been turned on the axis 2 to carry the contact-brush 12 down, so that in the position shown the brush 12 rests on the section 8′, while brush 11 rests on section 8. It is evident that when both brushes rest on the same conducting-section 8 or 8′ the circuit of the translating devices will be closed; but when one brush rests on section 8 and the other rests on section 8′ the circuit will be opened, and also that when the distance between the contact brushes or devices is varied by withdrawing the pawl 16 and moving one of the disks 9 10, or by withdrawing both pawls 16 and moving both disks, the length of time during which both brushes will remain on the same conducting-section as the disk 4 rotates will be correspondingly varied. If the brushes bear on the disk at points one hundred and eighty degrees apart, the circuit will never be closed, since one brush will snap onto section 8 just as the other snaps onto section 8′. The nearer together the brushes bear on the sections 8 8′ the longer will the circuit remain closed. By changing the speed of rotation of the disk the periods of the circuit changes will be further varied.

The number of circuit-changers used can be increased indefinitely. The number necessary will depend on the number of circuits to be changed at different intervals, since, as above indicated, one circuit-changer can serve to simultaneously control several circuits or branches in which the changes are to be made at the same rate. While both contact devices are described as adjustable and while this construction is preferred, since it is sometimes more convenient to adjust the two devices through ninety degrees each or less than to adjust one contact device alone through a larger arc, it is not essential that both be adjustable; neither is it essential that both of the conducting-sections 8 8′ be employed, although both are desirable. The form of the body 4, carrying the conducting-sections, is immaterial, so long as said sections are in such position that the contact devices can make and break contact therewith in the manner described when there is relative motion between said body and contact devices.

What I claim is—

1. The combination, with a supply-circuit or source of electric current, of translating devices the circuit of which is to be changed periodically, and a circuit-changer having contact devices the distance between which can be varied at will, a body having a conducting-section against which said contact devices are adapted to bear, and means for producing relative motion between said contact devices and said body, whereby the circuit can be changed and the frequency of the changes can be varied, substantially as described.

2. A circuit-changing apparatus having, in combination, contact devices the distance between which can be varied at will, a body having a conducting-section against which said contact devices are adapted to bear simultaneously, and means for producing relative motion between said contact devices and body, substantially as described.

3. A circuit-changing apparatus having, in combination, contact devices carried by adjustable disks or plates, whereby the distance between the contact devices can be varied at will, a disk or body having conducting-sections against which said contact devices are adapted to bear, and means for moving said body, substantially as described.

4. The combination, in a circuit-changing apparatus, of a rotatable body on which is a conducting-section, and contact devices, each bearing or adapted to bear thereon, such contact devices being adjustable toward and from each other, whereby the duration of closure of the circuit may be varied, substantially as described.

5. The combination, in a circuit-changing apparatus, of a body having one or more conducting-sections, contact devices bearing or adapted to bear thereon, said contact devices being adjustable with relation to each other to vary the intervals at which the changes are made, and means for moving the body relatively to the contact devices, substantially as described.

6. The combination, in a circuit-changing apparatus, of a disk on the periphery of which are one or more conducting-sections, means for rotating said disk, contact devices bearing or adapted to bear on the conducting section or sections, said contact devices or either of them being carried on a disk or plate loosely mounted on the axis of the first-mentioned disk and having a stop or detent pawl for holding it in the position to which it is adjusted, whereby the distance between the contact devices can be adjusted and maintained, and thereby the duration of closure of the circuit varied at will, substantially as described.

7. The combination, in a circuit-changing apparatus, of a stepped disk having two conducting-sections, each substantially one hun-

dred and eighty degrees in extent, a rotatable shaft on which said disk is fixed, contact devices bearing or adapted to bear on said sections, and means for varying the distance between said contact devices, substantially as described.

8. The combination, in a circuit-changing apparatus, of a rotatable shaft, several disks secured thereto and carrying conducting-sections, and contact devices adapted to bear on said sections at each disk, the distance between the contact devices at the several disks being independently adjustable, substantially as described.

9. The combination, in a circuit-changing apparatus, of standards, a rotatable shaft supported thereby, a circuit-changer having a disk with conducting-sections on the shaft and an adjustable contact device, rods supported by said standards, a yoke on said rods, and a detent-pawl for securing the adjustable contact device in the position in which it is set, mounted in said yoke, substantially as described.

This specification signed and witnessed this 7th day of May, 1892.

ALMON D. PAGE.

Witnesses:
CHAS. H. HEELEY,
JAMES FINDLAY.