Dec. 3, 1929. H. SENGEBUSCH 1,737,807

SWITCH MECHANISM

Filed Jan. 27, 1928

Fig. 1

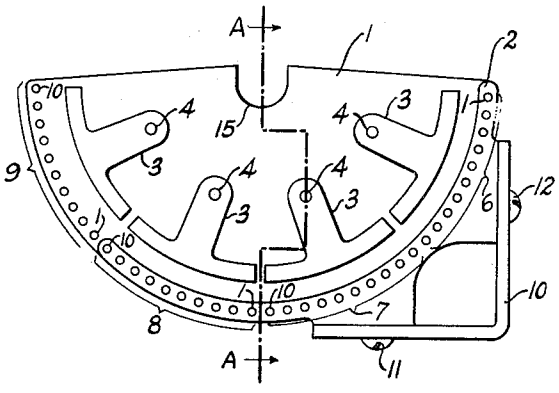


Fig. 2

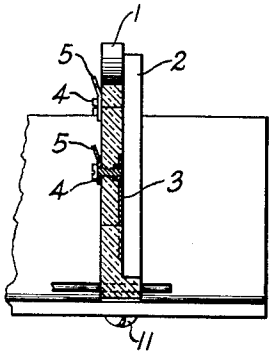


Fig. 3

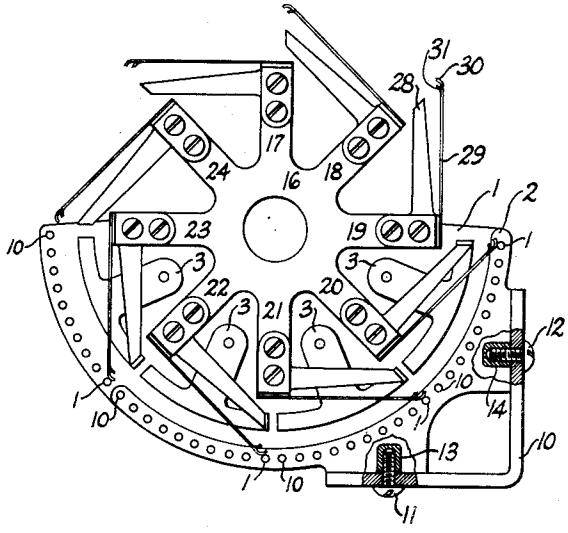


Fig. 4

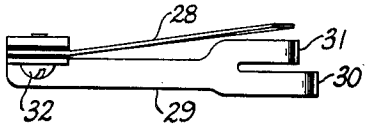


Fig. 5

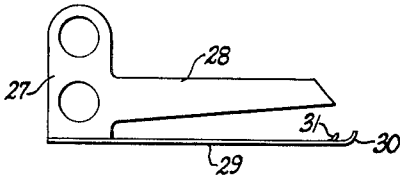
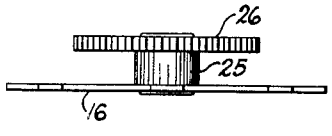


Fig. 6



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UNITED STATES PATENT OFFICE

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SWITCH MECHANISM

Application filed January 27, 1928. Serial No. 249,815.

The present invention, generally stated, relates to a novel switching mechanism and is, more particularly, concerned with a new and improved type of non-numerical trunking switch for use in automatic telephone systems.

It will be advisable to recall first the operation of the usual rotary non-numerical switching mechanism, so that the description of the improved switch, which serves the same purpose, but operates upon different principles, may be readily understood.

Such a switch as intimated above, is described on pages 28 and 61, and illustrated in Figs. 33, 34, and 91 of the book entitled "Automatic Telephone Practice," by Harry E. Hershey, fourth edition, published by the author. In view of the fact that such switching mechanism is well known in the art I shall limit myself to a brief account thereof.

Referring now to Fig. 34 of the above publication, it will be seen that the apparatus, known as a rotary lineswitch, is provided individual to a subscriber's line and serves to connect a calling subscriber automatically to a switch adapted to operate under directive control of the usual calling device. This is accomplished by an automatic rotary movement of the wipers which have access to trunk lines terminating in numerical switches. The automatic movement is initiated by a subscriber removing the receiver from the hook in order to extend a call. Upon the wipers encountering an idle trunk line, the rotary movement terminates and the calling subscriber's line is connected through to the seized numerical switch, whereupon the connection is extended in the usual manner under the calling party's control by means of the calling dial. Upon the termination of a call, the switch either returns to its normal position with the wipers withdrawn from the trunk line, or the switch is left in the position with the wipers engaging the terminals of the trunk line last used, depending upon the circuit adopted for operating the switch.

As has been stated above, my invention is concerned with a non-numerical trunking switch serving the same purpose as the rotary lineswitch referred to, but operating on entirely different principles.

The chief object of the invention is to simplify the manufacture of the mechanism and to improve its operating qualities, tending to reduce the cost of the switch and to reduce maintenance expenses to a minimum without impairing the reliability of its operation.

I shall now discuss briefly the various features of the invention, so that the detailed description, which is to follow, may be easily understood.

Instead of locating the terminals of the trunk line in semi-circular rows in banks, one bank for each switch, and using insulated flexible bank wiring between the adjoining switches, I employ non-insulated conductors extending in a vertical plane common to a plurality of switches. The individual terminal banks are thereby entirely eliminated. Considering the complicated manufacturing process of the terminal banks and the great number of soldering points necessary for connecting the banks by means of flexible, insulated conductors, it will be realized that my arrangement presents a decided advantage.

The wipers, or rather to say, metallic terminal plates used as equivalents for the usual wipers are arranged stationary on a supporting plate made of insulating material, the bare wire terminals being also stationary and arranged on the periphery of the supporting plate. Rotatably mounted on the supporting plate is an insulating carrier member with a plurality of projections, and on each projection is mounted a contact maker comprising two wipers, one for successively brushing over the metallic terminal plates, and the other for simultaneously brushing over the bare wire terminal conductors. The terminal wires are divided into sections, each section corresponding to a certain terminal plate, and each section comprising a like plurality of wires.

In the usual rotary switch, there are a plurality of wipers, each adapted to brush over corresponding terminals in the contact bank. In the present case, there are a plurality of

stationary terminal plates, and a corresponding plurality of bare wire sections, each section comprising a plurality of conductors. Each section and each terminal plate serve a specified purpose. Two sections are provided for extending the conductors of the line to the talking conductors of a selected trunk, similar to an ordinary rotary switch in which there are two line wipers for making connection with corresponding line conductors of a trunk line. One section and one plate represent the private conductors, and one plate and its corresponding wire section may be used for metering or for other purposes.

To describe the apparatus somewhat differently, instead of having wipers adapted to move over corresponding contacts, there are stationary metallic plates and corresponding bare wire conductors located in sections opposite these plates. In order to effect a connection between said plates, and any one of the conductors in their respective sections, moving contact makers are provided which brush over the plates and wires simultaneously.

Assuming that the switch is used as a subscriber's lineswitch, upon the initiation of a call, the magnet will operate intermittently and rotate the carrier and with it the contact makers mounted thereon. The contact makers are spaced so as to engage the plate and the wires simultaneously and successively. Therefore, while the contact makers rotate, the various terminal plates will be connected successively to the various bare wire conductors in their corresponding sections. Since a set of wires, one in each section, represents a trunk line, the rotation will continue until an idle trunk line is encountered. Circuits for operating the switch under actual working condition have not been shown, since it is readily apparent that existing circuits may be modified and applied to operate the present switch.

The above and other objects and features will appear clear from the following detailed account of the apparatus, reference being had to the accompanying single sheet of drawings which forms a part of this specification.

Fig. 1 shows a top view of the switch with the contact makers and the carrier removed;

Fig. 2 is a cross-section seen on line AA in Fig. 2;

Fig. 3 is a top view of the entire mechanism illustrating the contact makers and the carrier in place in relation to the terminal plates of the switch and to the bare wire terminal conductors;

Figs. 4 and 5 are views of the contact maker;

Fig. 6 shows the driving mechanism consisting of a ratchet attached to the carrier.

Like parts are numbered alike throughout the drawings, and a certain figure will be referred to only if it is necessary for a clear understanding.

Referring now to the drawings, numeral 1 indicates a supporting plate made of insulating material such as a compound of rubber. Mounted on this supporting plate are a number of metallic terminal plates indicated by the reference numeral 3. These terminal plates are pressed into the supporting plate 1 as is best illustrated in Fig. 2, and are internally threaded, to receive screws indicated by reference numeral 4 for attaching terminals 5, which may be used for wiring the switch. On the periphery of the supporting member 1 are provided holes for receiving bare wire conductors. These conductors are arranged in sections marked on Fig. 1 with reference numerals 6, 7, 8, and 9; each section corresponding to the oppositely located terminal plate. The supporting member 1 is provided with two metallic inserts 13 and 14, best seen in Fig. 3, for mounting the supporting member on an angle iron 10 by means of screws 11 and 12. Thus, it will be seen that a plurality of supporting members 1 may be mounted on a vertically extending angle iron 10, one below the other, the bare wire terminals extending vertically and semi-circularly through all of the supporting members in a row, deriving their support from each of the supporting members.

Referring now to Figs. 3 and 6, it will be seen that the carrier 16, which is made of insulating material, such as a compound of rubber, is provided with a plurality of projections 17 to 24, inclusive. This carrier is mounted on a hub 25, to which is attached a ratchet 26. The hub 25 extends through the semi-circular opening 16 in the supporting member 1, and may be rotatably fastened in the supporting member 1 in any well known and desirable manner. The magnet for operating the ratchet 26 may be mounted on the lower side of the supporting member 1. The mounting of the rotary magnet has not been shown, since it has no bearing on the invention.

Attached to each of the projections on the carrier 16 is a contact maker as illustrated in Figs. 4 and 5. It consists of a wiper 28, and of a wiper 29. The first is adapted to wipe over the terminal plates 3, and the second is adapted to simultaneously wipe over the bare wire terminal conductors corresponding to the various terminal plates. It will be seen that the wiper 29 has two projections, one designated by reference numeral 30 and the other designated 31. The supporting member 1 is provided with a ledge 2 which extends over the bare wire terminal sections 6, 7, and 8. During the operation of the switch, the wiper 29, with its projection 31, slides on the ledge 2 of the supporting member 1, and with its projection 30 wipes successively over the terminal conductors in the sections 6, 7, and

8. It is readily apparent from the above, that a contact maker is, by the provision of the ledge 2 and the projection 31, prevented from establishing contact with two terminals at the same time. This is a necessary provision with regards to terminals representing line conductors and metering conductors. With regard to the private terminals of the switch, it is immaterial whether a wiper establishes connection with two terminals simultaneously. Therefore, the ledge on the supporting member 1 does not include the section 9 which is assumed to comprise only the private terminals of the trunk lines accessible to the switch.

While I have shown the principles of my invention incorporated in a lineswitch, it will be realized that the invention is capable of more or less application in other kinds of switching apparatus, and, accordingly, that I do not want to be limited to the precise manner of carrying out the invention, as shown and explained in the foregoing description. What is considered new and is desired to have protected by Letters Patent shall be appointed out in the following claims.

What is claimed is:

1. In a switch mechanism, a stationary base plate, a terminal plate mounted thereon, a plurality of terminal conductors projecting through said plate, a rotatable short circuiting member adapted to short circuit said terminal plate and said conductors one after another, said short circuiting member comprising a unitary wiper having two projections adapted to exert pressure at right angles to each other, one to exert pressure on said terminal plate, the other to exert pressure on said conductors, and means to prevent the projection from engaging more than one of said conductors at a time.

2. In a switch mechanism, a stationary base plate having a projection thereon, a terminal plate mounted on said base plate, a plurality of terminal conductors projecting through said base plate, a short circuiting member adapted to be rotated to short circuit said plate and said conductors one after another, said short circuiting member comprising two wipers formed of one piece of conducting material and adapted to exert pressure at right angles to each other, one to exert pressure on said terminal plate and the other to exert pressure on said conductors, said other wiper carrying means for engaging the projection on said base plate to prevent the wiper's engaging more than one conductor at a time.

3. In a switch mechanism, a plurality of terminal conductors, and a wiper adapted to rotate to engage said conductors one after another, said wiper comprising a fork-shaped spring, one member of which engages said conductors, the other member of which rides upon insulation to prevent the other member's engaging more than one of said conductors at a time.

In witness whereof, I hereunto subscribe my name this 24th day of January, A. D. 1928.

HANS SENGEBUSCH.