

July 22, 1947.

O. TSCHÜMI

2,424,423

CONTACT DEVICE FOR CALLING DIALS

Filed May 12, 1944

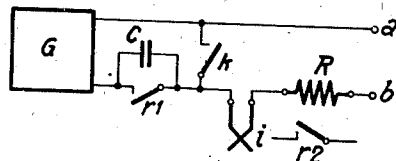


Fig. 1.

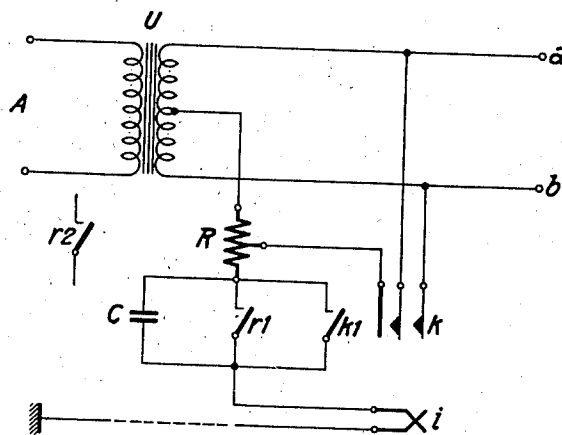


Fig. 2.

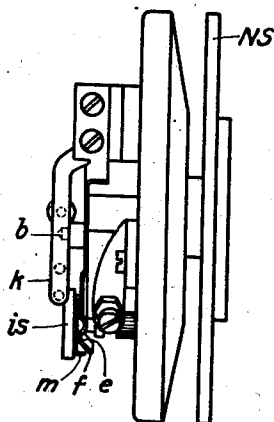


Fig. 3.

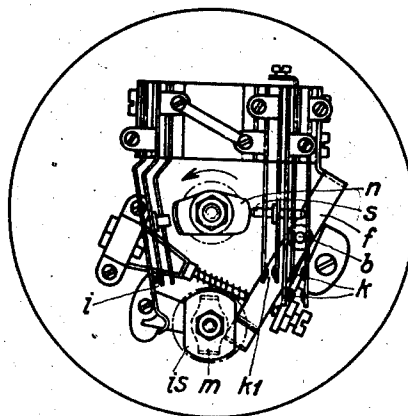


Fig. 4. Inventor  
O. Tschumi  
By *Glenn Brown* (attorney)

# UNITED STATES PATENT OFFICE

2,424,423

## CONTACT DEVICE FOR CALLING DIALS

Otto Tschümi, Soleure, Switzerland, assignor to  
Autophon Aktiengesellschaft, Soleure, Switzer-  
land, a joint-stock company of Switzerland

Application May 12, 1944, Serial No. 535,300  
In Switzerland May 21, 1943

2 Claims. (Cl. 179-81)

1

This invention relates to contact devices for calling dials.

Calling dials of known construction have, besides the impulse contact, an auxiliary contact short-circuiting the speaking set. This auxiliary contact, on the advance movement of the call disc, was up to date closed by special means and remained in this closed position until the return movement of the call disc was accomplished. Thereby the speaking set was short-circuited from the beginning of the advance movement of the call disc up to the moment when the rest position was again reached, so that the selecting impulses were not audible in the receiver of the calling subscriber. This resulted in the fact that after the operation of the receiver contact one had to wait for the selecting signal before the selecting operation could be commenced by advancing the call disc, because the speaking set was short-circuited by the above-mentioned auxiliary contact immediately after the beginning of the advance movement of the call disc.

Another disadvantage of this known arrangement resides in the fact that, during the operation of the call disc, i. e. during the short-circuiting of the speaking set, even the busy tone could not be heard by the calling subscriber. This busy tone was only audible in the short periods of rest position of the call disc, so that, on a quick selecting of the different figures, this tone was not caught by the calling person and could thus only be heard when the selection was already accomplished. This resulted in too long a seizure of the main station and in the risk of making faulty switching operations.

The contact device according to the invention is characterised in that it comprises a contact which, on the advance movement of the call disc, short-circuits the speaking set for, at most, a short time.

According to the invention, the contact is not closed before the return movement of the call disc begins. In this way not only the requirements made with regard to the subscriber's selection are satisfied but, besides this, many advantages are obtained. It is, for instance, quite immaterial whether the establishment of connection is commenced by the operation of the receiver contact or of the call disc. A busy tone can be heard in the rest position or during the advance movement of the call disc. Besides this, the subscriber can bring the call disc at once into the advanced position so that, on receiving the selecting sign, he can immediately give out the im-

2

pulses by letting the call disc go, the time of seizure being thereby considerably reduced and the establishment of the connection accelerated.

The accompanying drawing illustrates, by way of examples, different embodiments of the object of invention.

Fig. 1 is a diagrammatic view of a first, and

Fig. 2 is similar view of a second embodiment,

Figs. 3 and 4 show a mechanical part of a third example in different views.

Fig. 1 represents an application in remote-controlled devices. The speaking set *G* is connected to the subscriber's line *a-b* which can be short-circuited by the auxiliary contact *k* operated according to the invention. In the *b*-core the relay *R*, the impulse contact *i* and the relay contact *r*<sub>1</sub>, bridged-over by the condenser *C*, are connected in series to the speaking set *G*. Contact *k* is arranged in such a way that it is closed during the advance movement of the call disc for a short time and during the whole return movement of the disc.

The manner of operation is as follows:

In the case of remote control an alternating current impulse, for instance, is given to the device (over the condenser *C* an alternating current circuit is closed) which causes relay *R* to come into action and contact *r*<sub>1</sub> to be closed. By closing contact *r*<sub>1</sub>, the speaking set *G* is connected to the subscriber's line *a-b* and the connection establishment can be commenced.

If the connection is to be established by the subscriber himself, he dials his call disc in accordance with the figure to be selected. According to the operation of the contact *k* provided in this example of application this contact *k* is closed for a short time before the dialling is accomplished. Thereby, relay *R* comes into action and the speaking set, by closing contact *r*<sub>1</sub>, is connected to the subscriber's line *a-b*.

The selecting operation now takes place in a known manner but with the above-mentioned advantages. The dialling being accomplished, the subscriber waits for the selecting signal and then causes the return of the disc, during which the contact *k* remains closed. An eventual sign for busy line can be perceived during the relatively long period of advancing the call disc. This example of application shows how, besides the other already mentioned advantages, the operation of the contact *k* permits the additional use of the call disc for other purposes than for the subscriber's self-connection only.

Fig. 2 shows another example of application of the contact operation according to the invention

3

in a remote-controlled subscriber's station, in which the call disc carries out the additional operation of changing the speaking direction.

The subscriber's amplifier and electro-acoustic transformer are connected to the terminals A while the opposite side of the repeater U leads to the transmission conductor  $a-b$  which can be short-circuited by the contact  $k$ . The middle of the transmission winding lying on the side of the network is earthed over relay R, contact  $r_1$  and the impulse contact  $i$ . Contact  $r_1$  is bridged-over, both by the condenser C and the contact  $k_1$ .

The remote control and the control by the subscriber himself are analogous to that of the example in Fig. 1, however, with the difference that contact  $k$  only short-circuits the speaking set during the return of the calling disc, while contact  $k_1$ , owing to its short-time action during the advance movement of the calling disc, causes the closing of the direct current path and thereby the subscriber's self-connection. The transmission of the impulses to the earth takes place by means of the impulse contact  $i$ , while the speaking and selecting signals go over the line  $a-b$  and the repeater U to the terminals A. The short-circuiting of the line  $a-b$  is, in the first place, not effected with regard to the selecting impulses which in the case of complete symmetry are, at all events, not audible, but with regard to the surges which, during the switching-over operations, would be transmitted to the line.

The contact operation according to the invention which, in this example, is characterised in that the contact  $k$  short-circuiting the line  $a-b$  is not closed during the whole operation of the call disc but only during the return movement of the latter, presents the additional advantage that the time necessary for changing over the speaking direction (by a corresponding operation of the call disc) is considerably reduced.

Figs. 3 and 4 illustrate the mechanical part of another example in which the contact  $k$  is closed during the return movement of the call disc until the latter is at rest.

The rotation of the call disc NS is transmitted to the cam  $n$  which, in rest position, is in contact with the insulated support  $s$ . This latter separates the springs of the contact  $k_1$  as well as those of the contact  $k$ . Between the outer springs of the contact  $k$  an insulated pin  $b$  is inserted which can be operated by the spring  $f$ . The nose  $e$  of this spring  $f$  is in contact with the driver  $m$  rigidly fixed to the underside of the impulse disc  $i$  taking along the driver.

The manner of action is as follows:

4

If the call disc is advanced in the direction of the arrow indicated in Fig. 4, the ridge of the cam  $n$  leaves the position shown and the insulated support  $s$  is released, thereby allowing the contact  $k_1$  to be closed. Contact  $k$  would also be closed if the insulated pin  $b$  should not keep the springs of this contact in separated position. It may thus be seen that during the advance movement of the call disc the contact  $k_1$  is closed, while contact  $k$  remains open. When the return movement of the call disc begins, the impulse disc  $i$  with the driver  $m$  is put into rotation in a known manner. Thereby the nose  $e$  of the spring  $f$  comes into contact with the driver  $m$  in such a way that the insulated pin  $b$  is removed from its position between the outermost springs of contact  $k$  so that these springs can close the contact. When the cam  $n$  arrives at the rest position, its ridge comes again into contact with the support  $s$  and presses the latter to the right, whereby both contacts  $k$  and  $k_1$  are opened.

By these simple mechanical means it is possible to obtain the operation of the contact  $k$  according to the invention.

What I claim is:

1. In a contact device for calling dials of a speaking unit, two springs forming a contact for shortcircuiting the speaking unit, a pin between said springs adjusted to keep said contact open, and a means for actuating the said pin to close the contact at most a short time during the advance movement and during the whole return movement of the calling dial.

2. In a contact device for calling dials of a speaking unit, two springs forming a contact for shortcircuiting the speaking unit, a pin between said springs adjusted to keep the said contact open, a member connected with said pin to withdraw the latter from the space between said springs, an impulse disc, a driver connected with said impulse disc and adjusted to cooperate with said member to withdraw said pin during the whole return movement of the calling dial.

OTTO TSCHÜML.

#### REFERENCES CITED

The following references are of record in the file of this patent:

#### UNITED STATES PATENTS

Number	Name	Date
1,652,645	Shull -----	Dec. 13, 1927
1,551,626	Smith -----	Sept. 1, 1925
1,424,368	Martin -----	Aug. 1, 1922