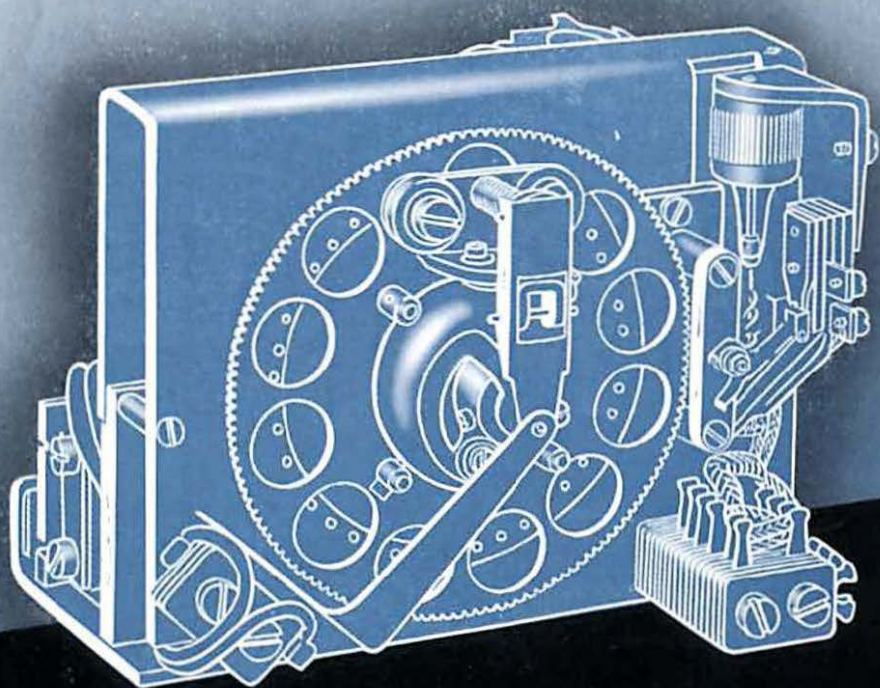


THE  
STROWGER



DIAL REPEATER

( B. P. O. REGENERATOR NO. 1 )

# THE STROWGER DIAL REPEATER

( B. P. O. REGENERATOR NO. 1 )

**I**NVENTED and developed in the Strowger Works laboratories the Dial Repeater is an ingenious mechanical impulse regenerator which provides a reliable and economic solution of problems arising out of the expansion of automatic telephone switching areas. It has many and varied applications which comprise all classes of impulse storage, impulse repetition and impulse conversion involved by inter-exchange dialling, long distance dialling and the provision of zone and time-zone metering.

# SUMMARY OF *Advantages*

THE principal advantages of the Dial Repeater may be summarised thus:—

- ❶ It is very compact and readily adaptable.
- ❷ It offers a complete solution to the problems arising from impulse repetition and enables dialling to be effected through any number of exchanges in tandem. The maximum total resistance of junctions in tandem is not therefore determined by impulse repetition but by speech transmission losses.
- ❸ Long distance impulsing may be accomplished by D.C. or A.C. according to the characteristics of the junctions.
- ❹ A wider variation in the standard adjustments of apparatus is tolerable, which reduces maintenance.
- ❺ Provision for zone or time-zone metering is simplified.
- ❻ Economies in junction lines and equipment may be effected.
- ❼ Inter-connection between systems of different design and operating characteristics is facilitated.

A technical description of the dial repeater with particular reference to its use for any specific purpose will be furnished on request.

# *The* STROWGER DIAL REPEATER ( B. P. O. R E G E N E R A T O R   N O. 1 )

## GENERAL DESCRIPTION

THE Dial Repeater is a mechanical storing and transmitting device which first receives and stores trains of impulses (any or all of which may be distorted) and then transmits corresponding trains of perfect impulses.

The Dial Repeater mechanism is usually associated with a number of controlling relays and its use is advocated on the grounds of overall economy on all inter-exchange junctions over which selector-stepping impulses have to be repeated. Its use is indispensable in automatic exchange areas where impulsing conditions between exchanges approach the tolerance limits.

Whilst the primary function of the Dial Repeater mechanism is the correction of attenuated and distorted impulses, the associated controlling relays also serve to transmit the metering and supervisory signals over the usual two wire junctions.

The Dial Repeater mechanism is very compact and affords a convenient and important economic means of performing a variety of operations. It is the ideal form of impulse regenerator and is used to facilitate the introduction of zone metering, to convert impulses from D.C. to A.C. or from one impulse ratio to another, to facilitate maintenance, and to assist P.A.B.X. operators, etc.

### IN EXCHANGE NETWORKS:

**Impulse Regeneration:** In telephone areas where automatic equipment has been adopted, the tendency is to increase the range of calls dialled direct by subscribers. This development increases the speed and efficiency of the service and results in more economical operation; but the problem of satisfactory dialling conditions must first be solved.



In most areas there are considerable differences in the electrical characteristics of the junctions between the several exchanges. Automatic apparatus with standard adjustments will, within limits, tolerate differences in the electrical characteristics of inter-exchange junctions. The cumulative effect of differences if junctions are used in tandem is, however, likely to be adverse to satisfactory operation, there being a definite limit to the number of junctions that can be employed in tandem. The impulses transmitted by subscribers' dials vary to some extent both as regards speed and impulse ratio and more or less impulse distortion is inseparable from any junction.

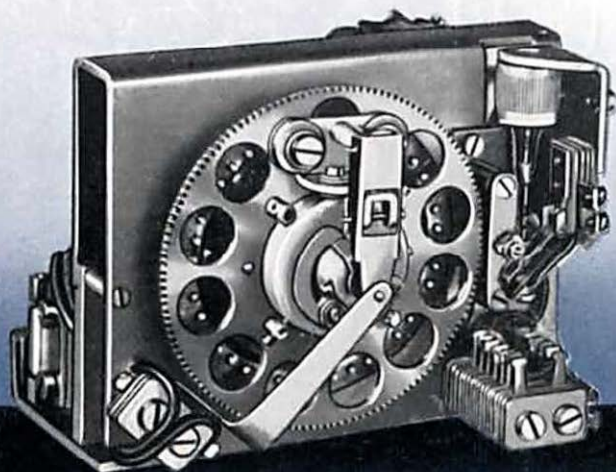
If Dial Repeaters are associated with the junctions, however, perfect impulses are transmitted at each tandem stage and the cumulative effects of impulse distortion are thus eliminated.

In operating long distance services the introduction of Dial Repeaters and voice frequency impulsing has enabled longer distances to be dialled direct by the operators, thus simplifying and accelerating the establishment of toll connections.

**Zone-Metering:** Where the charge for service to subscribers is based on a measured rate tariff, an area is usually divided into zones and an appropriate fee must be recorded on the calling subscriber's meter for each call made, according to whether the call is made to a telephone within the same or another zone.

The difficulties of introducing comprehensive zone-metering in some telephone areas have militated against the adoption of a measured

Showing  
each side  
of the  
Dial Repeater  
mechanism.



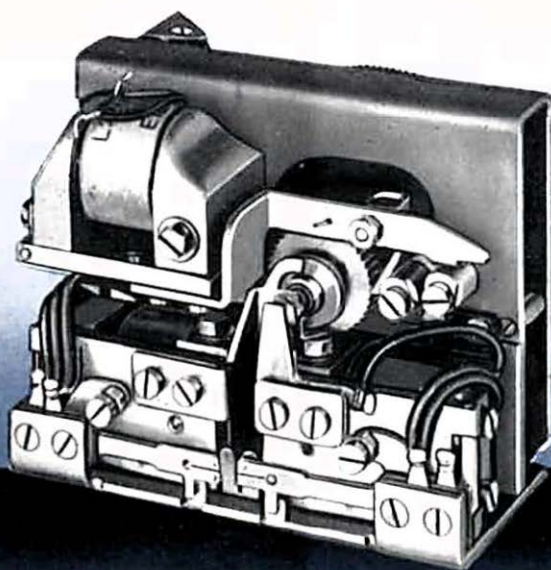
rate tariff, but a circuit embodying the Dial Repeater has been developed particularly to facilitate the introduction of zone-metering in an area whenever development or policy renders it desirable.

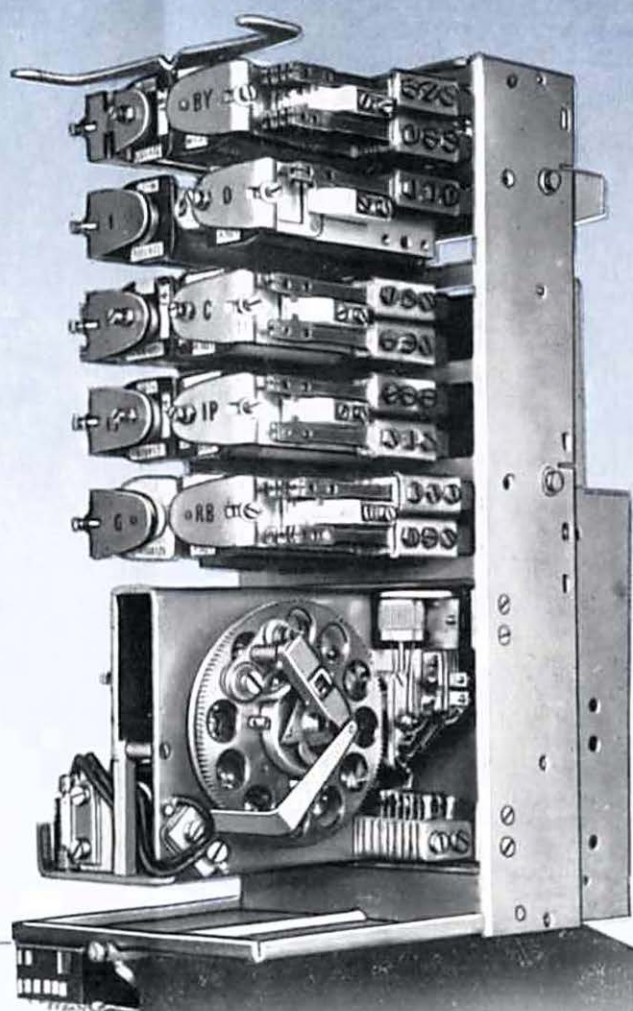
**Impulse Conversion—D.C. to A.C. and V.F.** To extend the range of dialled impulses the practice of transmitting A.C. or V.F. impulses is now generally accepted and the introduction of Dial Repeaters provides a very efficient and economic means of practical application. The apparatus receives the D.C. impulse trains in the normal manner and enables perfect A.C. or V.F. impulse trains with any desired characteristics to be transmitted.

**Impulse Conversion—Ratio alteration :** In areas where impulses of non-standard ratio are already in use, the administrations are enabled readily to add modern equipments of the Strowger type.

#### **ON PRIVATE AUTOMATIC BRANCH EXCHANGE SWITCHBOARDS :**

Numbers dialled from the extension telephones of a P.A.B.X. for subscribers on the public exchange are stored by the Dial Repeater until connection is established with an exchange line by the P.A.B.X. operator, whereupon the stored impulses are automatically transmitted to the public exchange equipment. As the operator is only called upon to establish a connection between the extension and an exchange line, there is a considerable saving in both time and labour.





Showing Dial Repeater mechanism and Associated Relays.

# **AUTOMATIC TELEPHONE & ELECTRIC CO. LTD.**

Export Sales :

**NORFOLK HOUSE, NORFOLK STREET, STRAND, LONDON, W.C.2**

Telephone No. : Temple Bar 9262

Telegraphic Address : "Autelco, Estrand." London

**MELBOURNE HOUSE, ALDWYCH, LONDON, W.C.2**

Telephone No. : Temple Bar 4506

Telegraphic Address : "Strowger Estrand." London

**STROWGER WORKS, LIVERPOOL, 7**

Telephone No. : Old Swan 830

Telegraphic Address : "Strowger." Liverpool

## **Associated Companies :**

**BRITISH INSULATED CABLES, LTD.**

Prescot, Lancs.

**TELEPHONE & GENERAL TRUST, LTD.**

Donington House, Norfolk Street, Strand, London, W.C.2

**AUTOMATIC ELECTRIC COMPANY.**

1033 West Van Buren Street, Chicago, U.S.A.

**ELEXCEL LIMITED,**

Victor Works, Broad Green, Liverpool. 14

**AUTOMATIQUE ELECTRIQUE DE BELGIQUE, S.A.**

22 Rue du Verger, Antwerp, Belgium.

## **Associated Distributing Companies :**

**AUTOMATIC ELECTRIC SALES CO., LTD.**

1027 West Van Buren Street, Chicago, U.S.A.

**AUTOMATIC ELECTRIC SALES CO., S.A.,**

22 Rue du Verger, Antwerp, Belgium

### **Australia**

**AUTOMATIC ELECTRIC CO. (AUSTRALASIA) PROPRIETARY, LTD.,**

84/88 William Street, Melbourne, C.1

### **Brazil**

**AUTOMATIC TELEPHONES LTD. OF BRAZIL,**

Caixa Postal 3394, Sao Paulo

### **Canada**

**CANADIAN TELEPHONES & SUPPLIES LTD.,**

1920 Wylie Street, Vancouver, B.C.

284 King Street West, Toronto, Ontario

### **China**

**AUTOMATIC TELEPHONES OF CHINA, FED. INC. U.S.A.,** 236 Sassoon House, Jinkee Road, Shanghai

### **Italy**

**AUTELCO MEDITERRANEA S.A.T.A.P.,**

Head Office: 4 Via E. Petrella, Milan

Branch Office: 104 Via Montebello, Rome

Via XX Settembre, 28, Genoa

### **Japan**

**AUTOMATIC TELEPHONES LTD. OF JAPAN,**

508 Toyo Buildings, Tokio

### **Poland**

**AUTOMATIC SALES & INSTALLATION CO.,**

Mokotowska 51, 53 M 33, Warsaw

### **South Africa**

**AUTOMATIC TELEPHONES (SOUTH AFRICA) LTD.,**

701-4 Kelvin House, Corner Holiard and Marshall Streets, Johannesburg

**Agents in**—Albania, Arabia, Argentine, Bahamas, Bermuda, Bolivia, Canary Islands, Ceylon, Chile, Colombia, Cyprus, Czechoslovakia, Dutch East Indies, Egypt, Esthonia, Finland, France, Greece, Holland, Honduras, Hungary, India, Iran, Isle of Crete, Jamaica, Kenya, Latvia, Lithuania, Malta, Mexico, Morocco, Tangier Zone and Gibraltar, Mozambique (P.E.A.), New Zealand, Norway, Palestine, Peru, Porto Rico, Portugal, Portuguese West Africa, Roumania, Sarawak, Siam, Spain, Straits Settlements, Federal and Unfederated Malay States, Sudan, Switzerland, Syria, Turkey, Uruguay, Yugoslavia,



# **AUTOMATIC TELEPHONE & ELECTRIC CO., LTD.**

## **STROWGER WORKS, LIVERPOOL 7**