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TO ALL WHOM IT MAY CONCERN:

Be it known that WE, EARL ALEXANDER PETITHORY of 36 Dartmouth Road, Forest Hill, London S.E.23, England, and JOHN EDWARD COLLYER of 1 Bournemouth Villas, Wickham Lane, Plumstead, Kent, England, Electrical Engineers, have jointly invented certain new and useful "Improvements in number dials for automatic and semi-automatic telephone systems and the like", of which the following is a specification:-

The invention relates to improvements in number dials for automatic and semi-automatic telephone systems and the like.

Such number dials are provided at the subscriber's or operator's position and in setting up a connection with the usual form of dial the subscriber, or operator as the case may be, inserts a finger in holes corresponding to the digits of the number of the wanted line, rotates the finger disc until stopped by the finger catch and withdraws the finger, repeating this until the complete number of digits has been dealt with. During each return of the finger disc to its normal position the impulse circuit is broken and made at the impulse springs thus causing current impulses to be transmitted along the line.

In order that sufficient time is allowed between the sending of successive sets of current impulses to allow the requisite switching and operations by the exchange apparatus to take place, number dials have been devised which have "lost

motion" members which ensure a minimum pause between successive sets of impulses independently of the manipulation of the dial. Number dials of this kind have been described in specification Serial No. 260142 of 1921

The present invention refers to number dials in which the notches of a member usually known as an impulse wheel are responsible for the opening of the impulse circuit and according to the invention the number dial is provided with a slipping cam or mask which keeps the impulse circuit closed during a portion of the return motion of the dial so that a period of "lost motion" is provided for.

In the preferred form of number dial according to the invention, the cam or mask takes the form of a metal segment in frictional engagement with the impulse wheel so that it tends to revolve with it. Stops are, however, provided to limit its motion. Furthermore, the cam or mask is so shaped that when it reaches its end (normal) position on the return motion of the dial, a depressed part of the cam or mask is opposite a bulge in a member connected to an impulse spring. This depression limits the opening movement of the impulse spring when a notch in the impulse wheel passes under the said bulge.

The accompanying drawing shows by way of example, a number dial constructed according to the invention.

Fig.1 is a front view of the number dial; Fig.2 is a rear view of the same and Fig.3 is a sectional side view on the line X X of Fig.1.

Referring to the drawing, 1 denotes the finger disc through holes in which the numbers are visible, 2 is the finger catch or stop. The finger disc 1 is rigidly fixed on the spindle 3, which is journalled in bearing 5 fixed in the casing 6. Fixed on spindle 3 is a gear wheel 4 which

gears with the pinion 24. The main driving spring is indicated by 7, the inner end of the spring being anchored to the bearing 5, the other end being anchored to the spring box 8, which latter is secured to the spindle 3 and revolves with it. On rotating the finger disc 1, spring 7 is wound up and returns the disc to normal on release. The speed of return of the number disc is controlled by the governor 22 of known form, which is driven by the governor driving wheel 23 through a worm. The governor driving wheel 23 is mounted loosely on the arbor of pinion 24, and one end of the spring 25 is attached to the wheel. The other end of the spring is free. The spring is coiled tightly round the arbor of pinion 24, tends to unwind when the dial is wound up by the subscriber, but grips the arbor when the dial starts its return motion and the driving wheel 23 revolves with the said arbor driving the governor 22.

Fixed on the spindle 3 is also the impulse wheel 9 which is provided with a number of teeth adapted to act on the member 21 of the impulse spring set. The impulse spring set comprises the springs 15 and 16 at which the impulse circuit is made and broken, also hinged member 21 which is connected to the end of spring 16 by an insulating stud 32.

Loosely mounted on a sleeve 20 on spindle 3 and separated from impulse wheel 9 by a washer 11, is a cam or mask 10. The screw 14 clamps a finger 13 and a spring disc 12 to the sleeve so that washer 11, spring disc 12 and finger 13 and sleeve move with the impulse wheel whilst cam 10 is kept in frictional engagement with the washer 11. Member 21 is broad enough to rest on both impulse wheel 9 and cam 10.

The impulse springs are mounted and insulated in bracket 38 as also are the change-over springs 17, 18 and 19.

The cam or mask 10 is of segmental shape and has a nose 34 at one edge which, with the cam in its normal position, rests against a stop 35. The outer edge of the cam is flush

with the outer periphery of the impulse wheel but has a depression 36 at one end.

The instruction plate 30 is secured to the finger disc by the screw 31. The number plate 26 is kept in the casing 6 by a spring-ring 37. The complete dial is held in its mounting by a three point fixing by two lugs 27 and 28 and the spring catch 29.

The operation of the dial is as follows:- The subscriber or operator inserts a finger in the hole of the finger disc where the required digit is visible and winds up the disc until stopped by the finger catch 2. During this operation the impulse wheel 9 rotates but the governor wheel 23 slips. Furthermore, finger 13 rotates and a change-over occurs at springs 17, 18 and 19 opening the transmitter circuit and short-circuiting the receiver in known manner. The impulse wheel in rotating carries cam 10 with it until projection 34 of the cam comes into contact with bulge 33 of member 21. Slipping then takes place whilst the impulse wheel continues to move until the finger stop is reached. During the above described operation the outer edge of cam 10 keeps the impulse circuit closed at springs 15 and 16, although the notches in the impulse wheel have been passing under bulge 33 of member 21.

On the release of the finger disc the spindle 3 with its various attachments rotates back to its normal position by reason of the tension on driving spring 7. The governor 22 revolves due to the clutch action of spring 25 and controls the speed of return. Both cam 10 and impulse wheel return together but no impulses are sent out, owing to the masking action of cam 10 until it reaches stop 35. In this position depression 36 comes under bulge 33 and the notches in the impulse wheel (which continues its motion) allow member 21 to drop under the action of spring 16, until bulge 33 rests on the edge of depression 35 opening the impulse circuit at

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springs 15 and 16. A tooth succeeding a notch closes the circuit so that impulses are sent out corresponding to the digit dialled. When the finger disc reaches its normal position the circuit at springs 15 and 16 is closed as now no notch is underneath bulge 33. Finger 13 restores the transmitter and receiver circuit to its normal speaking condition.

What we claim as our invention is:-