March 2, 1943. G. R. LUM 2,312,566

TELEPHONE CALLING DIAL DEVICE

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FIG. 1

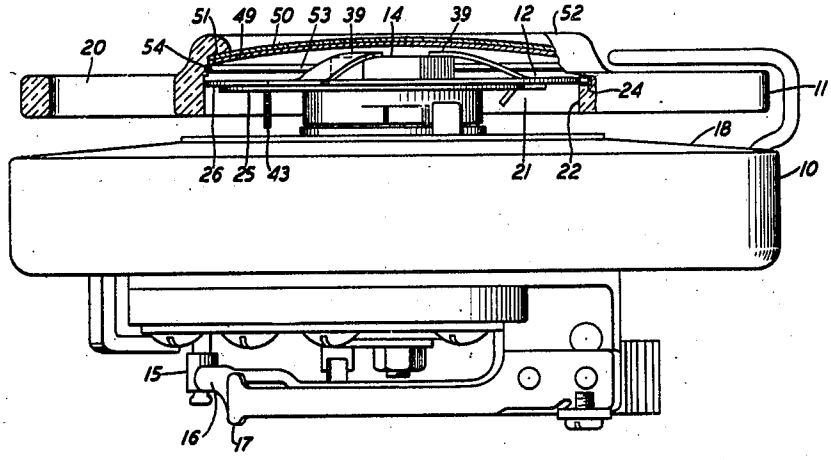
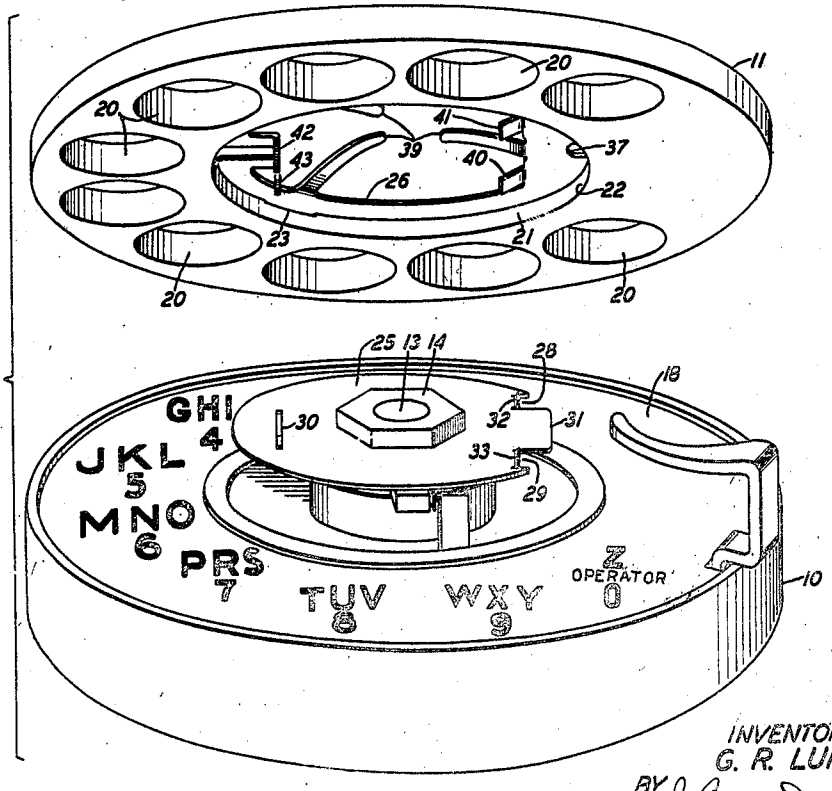


FIG. 2



INVENTOR
G. R. LUM
BY J. MacDonald
ATTORNEY

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FIG. 3

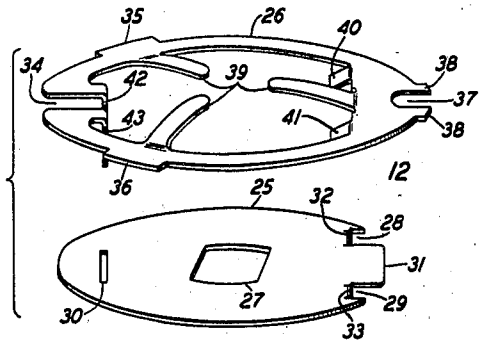


FIG. 4

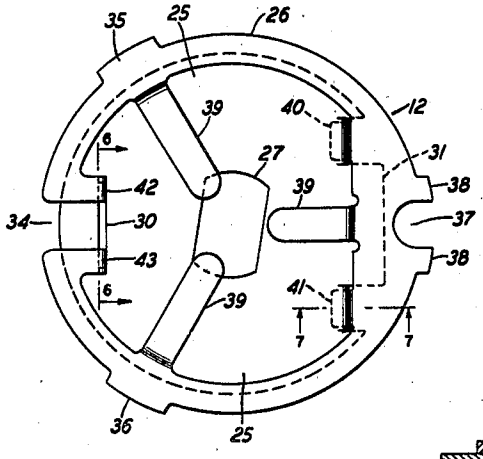


FIG. 7

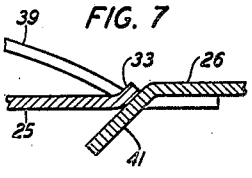


FIG. 6

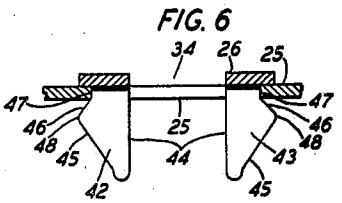
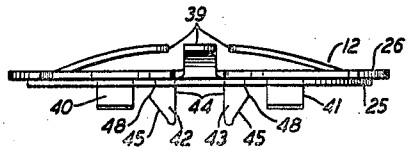


FIG. 5



INVENTOR
G. R. LUM
BY J. MacDonald
ATTORNEY

Patented Mar. 2, 1943 2,312,566

UNITED STATES PATENT OFFICE

2,312,566

TELEPHONE CALLING DIAL DEVICE

George R. Lum, New York, N. Y., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York

Application February 28, 1942, Serial No. 432,839

4 Claims. (Cl. 179—90)

This invention relates to telephone calling dial devices and more particularly to calling dial devices in which a finger wheel is provided to facilitate manual operation of the device.

An object of the invention is to provide an improved structure and arrangement for flexibly supporting the finger wheel and which permits ready application of the finger wheel to the device and removal therefrom.

A feature of the invention resides in a two-part support for the finger wheel.

In the drawings:

Fig. 1 is a side elevational view, partly in section, of the calling dial device embodying the invention;

Fig. 2 shows, in exploded arrangement, the calling dial device and the finger wheel, one of the parts of the two-part support being mounted on the rotatable shaft of the device and the other being supported in the finger wheel;

Fig. 3 shows, in perspective, the two parts of the two-part support and with the parts separated;

Fig. 4 is a top view of the two-part support;

Fig. 5 is a side view of the two-part support taken from the left of Fig. 4;

Fig. 6 is an enlargement, partly in section, of a fragmentary portion of Fig. 5 and taken on the line 6—6 in Fig. 4; and,

Fig. 7 is a view, partly in section, of fragmentary portions of the two-part support and taken on the line 7—7 in Fig. 4.

It is common practice to make finger wheels for telephone calling dial devices of metal and to directly mount the finger wheel on the rotatable shaft of the device, the finger wheel being held in place by means of a nut, screw-threaded on the shaft. The trend is now, however, to make the finger wheel of molded plastic material. Finger wheels of molded plastic material are not as strong as metal finger wheels and it is not good practice to directly mount a molded plastic finger wheel on the rotatable shaft of the device since the finger wheel might be rather easily fractured in service, particularly if an undue downward pressure is applied to the finger wheel during operation of the device. The finger wheel might also be fractured in assembling the parts if the holding nut on the shaft is turned too far in securing the finger wheel to the shaft. Fracturing of the finger wheel may be prevented to a large extent by mounting the finger wheel on a flexible support instead of directly on the rotatable shaft of the device.

In this invention a two-part support is provided for the finger wheel. One of the parts is directly secured to the shaft and the other part is made of flexible material and supported in the finger wheel and is releasably connected to the first part.

The telephone calling dial device as shown in Figs. 1 and 2 comprises a casing 10, and a finger wheel 11 supported above the casing 10. The finger wheel 11 is supported by means of the two-part support 12, the structure of which will be subsequently described. One of the parts of the two-part support 12 is supported on the rotatable shaft 13 and is held in place thereon by means of a nut 14. The shaft 13 extends downward through the casing 10 and may be manually operated by means of the finger wheel 11 to wind up a spring (not shown) but which as well-known in the art, is part of a spring motor located in the casing 10. The spring motor serves to return the finger wheel 11 to normal position and also as a driving means for a contact controlling device 15 which operates spring contacts 16 and 17 to control the sending of signal pulses over a line system to obtain a desired telephone call connection.

A ring-shaped dial 18 bearing groups of letters and numbers on its upper face is supported in the top of the casing 10, the groups being arranged in positions to be separately observed through finger holes 20 provided in the finger wheen 11, all of which is well-known and understood in the art.

The finger wheel 11 is provided with the usual finger holes 20 to facilitate manual rotation of the finger wheel in dialing a telephone call and has a circular indentation 21 formed in its central portion and extending upwardly from the under surface of the finger wheel. The indentation 21 is defined by a circular side wall 22 which is recessed at spaced points 23 and 24 to receive portions of one of the parts of the two-part support 12.

The two-part support 12 comprises a disc 25 and an incomplete ring 26. The disc 25 is apertured at 27 to receive the shaft 13 and is mounted on the shaft 13 and secured in place by means of the nut 14. The disc 25 is made of rather stiff material and as clearly shown in Fig. 3, is provided with notches 28 and 29 and a rectangular opening 30 to receive portions of the ring 26. A material found suitable for the disc 25 is sheet fiber. The notches 28 and 29 are spaced apart and a tab portion 31 is left between the notches 28 and 29. At the base of the notches 28 and 29, lugs 32 and 33 are formed

and bent upwardly from the plane of the upper surface of the disc 25. The lugs 32 and 33 extend across the base portions of the respective notches 28 and 29 and may be conveniently formed when the notches are made by extending the cuts made in forming the notches a little deeper into the material of the disc than is required for the notches and then bending the material between the extended cuts so that the material between the cuts will extend slightly above the plane of the upper surface of the disc 25. The rectangular opening 30 is located inwardly of the peripheral edge of the disc 25 and diametrically opposite from the tab portion 31 and extends in parallel relation with the outer end portion of the tab portion 31.

The ring 26 is made of flexible material and is larger in diameter than the disc 25 and may be formed, for instance, from sheet metal or fiber or any other suitable material. The ring 26 has an opening 34 in its outer edge so that the ring 26 may be, in effect, reduced in diameter by pressing the parts on the opposite sides of the opening 34 toward each other. Spaced projections 35 and 36 are provided on the outer edge of the ring 26 to fit into corresponding recesses 23 in the finger wheel 11, the projections 35 and 36 being disposed near the opening 34 and arranged so that when the ring 26 is, in effect, reduced in diameter, the projections 35 and 36 are drawn more closely together. Diametrically across from the opening 34, the outer edge of the ring 26 is cut away at 37 to reduce the material in the ring at this point and two spaced teeth 38 are formed on the edge of the ring 26 and on opposite sides of the cut 37 to fit into corresponding recesses 24 in the finger wheel 11. The ring 26 is equipped with spaced tongues 39 which extend inwardly of the rim of the ring 26. The tongues 39 are curved upwardly from the upper surface of the ring 26 and the free ends of the tongues 39 are arranged to extend over the nut 14 on the shaft 13 as shown in Fig. 1. The ring 26 is equipped with two downwardly and inwardly extending ears 40 and 41 which are arranged to slide under the respective lugs 32 and 33 on the disc 25 as illustrated in Fig. 7, which shows the ear 41 extending angularly below the plane of the lower surface of the disc 25 and under the lug 33. Two spaced latch legs 42 and 43 are provided on the ring 26 to latch the ring 26 to the disc 25. The legs 42 and 43 extend inwardly of the ring 26 and then downwardly below the plane of the ring 26 and are of such length that they will extend a considerable distance below the disc 25 when the two parts of the two-part support 12 are latched together. The legs 42 and 43 are disposed on opposite sides of the opening 34, the inner edges of the legs 42 and 43 are straight but the outer edges are shaped and arranged to provide cam surfaces defined by an upwardly sloping portion 45 terminating in a projection 48 and continuing in an inwardly and uuwardly sloping cam portion 46 which terminates in a straight portion 47 running parallel with the straight inner edge 44. When the legs 42 and 43 are placed in the aperture 30 and the ring 26 is pressed toward the disc 25, the cam surfaces 45 bearing against the opposite ends of the aperture 30 will have the effect of reducing the ring 26 in diameter until the projections 48 pass through the aperture 30. Further pressing of the ring 26 toward the disc 25 will bring the straight portions 47 of the legs against the opposite ends of the aperture 30. When the disc 25 and ring 26 are being pressed toward each other, the cam surfaces 45 bearing against the ends of the aperture 30 will cause the legs 42 and 43 to be moved toward each other until the high spots 48 on the legs 42 and 43 pass through the aperture 30, the ring 26 being, in effect, reduced in diameter during this operation by the camming of the legs 42 and 43 toward each other. Further pressing of the parts 25 and 26 together will bring the straight portions at 47 into the ends of the aperture 30 and the ring 26 into face-to-face engagement with the disc 25. The length of the aperture 30 and the spacing of the legs 42 and 43 are such that there will be some spring tension remaining in the ring 26 when the ring 26 is brought into final engagement with the disc 25. It will be seen by looking at Fig. 6 that the legs 42 and 43 can be withdrawn only by forcing the legs 42 and 43 toward each other a sufficient distance to get the high spots 48 past the ends of the aperture 30 in the disc 25. In the position shown in Fig. 6, the legs 42 and 43 form latched legs to latch the ring 26 to the disc 25. It will be seen, therefore, that when the parts 25 and 26 are assembled as shown in Figs. 4, 5 and 6, the legs 42 and 43 in cooperation with the ends of the aperture 30 form latch means to latch the ring 26 to the disc 25 on one side of the assembly and as shown in Figs. 4 and 7, the disc 25 and the ring 26 are held together on the other side of the assembly by means of the ears 40 and 41 engaging under the lugs 32 and 33, respectively.

In the mounting the finger wheel 11 on the calling device, the finger wheel 11 may be readily brought into operative condition by mounting the disc 25 on the shaft 13 and mounting the ring 26 in the finger wheel 11 and then by placing the ring 26 on the disc 25 and latching the ring 26 to the disc 25. The ears 40 and 41 are placed under the lugs 32 and 33, respectively just prior to the forcing of the ring 26 against the disc 25. The ring 26 may be readily applied to the finger wheel 11 by placing the teeth 38—38 of the ring 26 in the recesses 24 in the finger wheel 11, then pressing the legs 42 and 43 together to, in effect, reduce the diameter of the ring 26 sufficient to let the ring 26 pass entirely into the indentation 21 to bring the projections 35 and 36 into line with the recesses 23 and letting the ring 26 expand under the pressure of the spring tension developed in the ring until the projections 35 and 36 extend into the recesses 23. When the ring 26 is mounted in the finger wheel 11 and the disc 25 is mounted on the shaft 13 and is retained thereon by means of the nut 14, the finger wheel 11 may be readily mounted in operative condition by simply snapping the ring 26 into latched condition on the disc 25 as above described.

The legs 42 and 43, as above mentioned, project below the lower surfaces of the finger wheel 11 as shown in Fig. 1. The finger wheel 11 may, therefore, be readily released from the calling dial device by simply reaching beneath the finger wheel 11 with a pair of pliers or other suitable means and pressing the legs 42 and 43 toward each other, a sufficient amount to allow the legs 42 and 43 to pass upwardly through the aperture 30 in the disc 25 and then by raising the finger wheel 11 relative to the disc 25 until the ears 40 and 41 come out of engagement with the lugs 32 and 33, respectively. If a new finger wheel 11 is required, the ring 26 may be readily sprung

out of the finger wheel 11 and applied to the new finger wheel.

Since the ring 26 is larger in diameter than the disc 25 and is made of flexible material, the finger wheel 11 is flexibly supported. The tongues 39 bearing at their free ends on the nut 14 help somewhat to steady the ring 26 but not to such an extent as to make the support 12 too rigid for the purpose. The tongues 39, it will be also observed, extend almost to the central portion of the undersurface of a substation identification card 49 which, together with a transparent covering 50, is placed beneath an overhand 51 in a hub portion 52 of the finger wheel 11. The card 49 is held in place by means of a split ring 53 snapped into a groove 54 formed in the finger wheel 11. Since the tongues 39 extend almost into engagement with the central portion of the under surface of the card 49 and above the plane of the outer edge of the card 49, the card 49 cannot be snapped downwardly at its center portion past dead center. It cannot therefore be permanently distorted out of the desired dome-shaped form shown in Fig. 1.

What is claimed is:

1. In a telephone calling dial device having a rotatable shaft and means controlled by operation of said shaft for controlling the sending of signal pulses, in combination, a finger wheel and a two-part support for said finger wheel, said finger wheel having recesses formed therein to receive one of the parts of said two-part support and said two-part support comprising an apertured disc mounted on said shaft, an incomplete ring of flexible material mounted in said finger wheel and latch means formed in said ring and engaging said disc to latch said ring to said disc.

2. In a telephone calling dial device having a rotatable shaft and means controlled by operation of said shaft for controlling the sending of signal pulses, in combination, a finger wheel and a two-part support for said finger wheel, said finger wheel having spaced recesses formed therein to receive one of the parts of said two-part support and said two-part support comprising a notched and apertured disc mounted on said shaft, an incomplete ring of flexible material mounted in said finger wheel and engaging in the recesses formed in said finger wheel, said ring being larger in diameter than said disc and being sprung into said finger wheel and ears and latch legs on said ring engaging said disc and releasably holding said ring on said disc.

3. In a telephone calling dial device having a rotatable shaft and means controlled by operation of said shaft for controlling the sending of signal pulses, in combination, a finger wheel with a central indentation formed therein and extending from the under surface of said finger wheel, spaced recesses formed in said finger wheel and opening into said indentation, a notched and apertured disc secured to said shaft, retaining means mounted on said shaft and holding said disc on said shaft, a ring of flexible material mounted in said finger wheel and having spaced projections extending into said recesses, spaced ears on said ring extending into the notches in said disc and angularly beneath the lower surface of said disc, an opening formed in said ring to make said ring of incomplete ring form, spaced latch legs on said ring and located on opposite sides of the opening in said ring, said latch legs extending below the normal plane of said ring and being integral with said ring and being formed and arranged to snap through the aperture in said disc and latch said ring to said disc and spaced tongues integral with said ring and extending inwardly of the ring and over said retaining means.

4. In a telephone calling dial device having a rotatable shaft and means controlled by operation of said shaft to control the sending of signal pulses, in combination, a finger wheel with a central indentation formed therein and extending from the under surface of said finger wheel, spaced recesses formed in said finger wheel and opening into said indentation, a space-notched and apertured disc secured to said shaft, spaced lugs in the notched portions of said disc and bent upwardly from the plane of said disc, a ring of flexible material releasably mounted in said finger wheel and having spaced projections extending into said recesses, spaced ears on said ring extending into the notches formed in said disc and beneath the upturned lugs of said disc, an opening formed in said ring to enable said ring to be sprung into said indentation in said finger wheel, spaced latch legs integral with said ring and extending through the aperture in said disc and below the lower surface of said finger wheel and said latch legs being disposed on opposite sides of the opening formed in said ring and being formed and arranged to latch said ring to said disc.

GEORGE R. LUM.