Aug. 24, 1943. H. W. GOFF 2,327,782

CALLING DIAL DEVICE

Filed April 16, 1942 2 Sheets-Sheet 1

FIG. 1

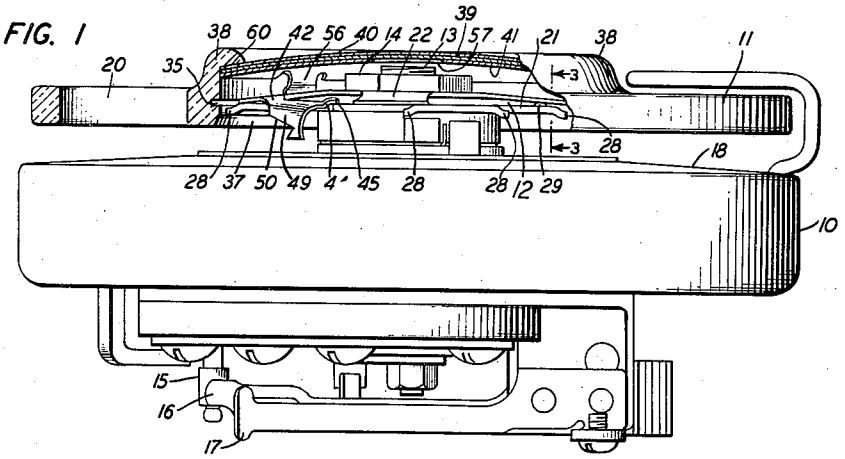
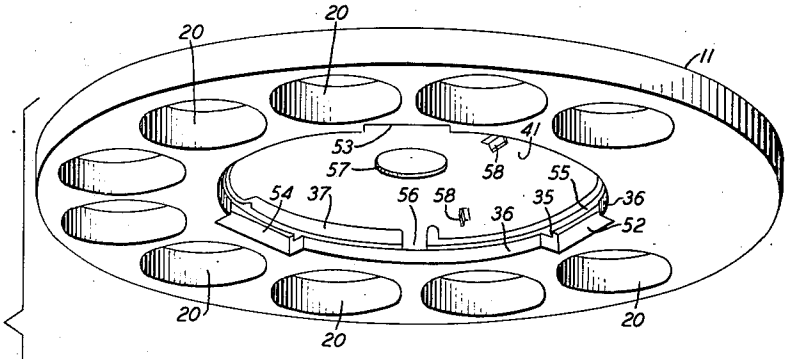


FIG. 2



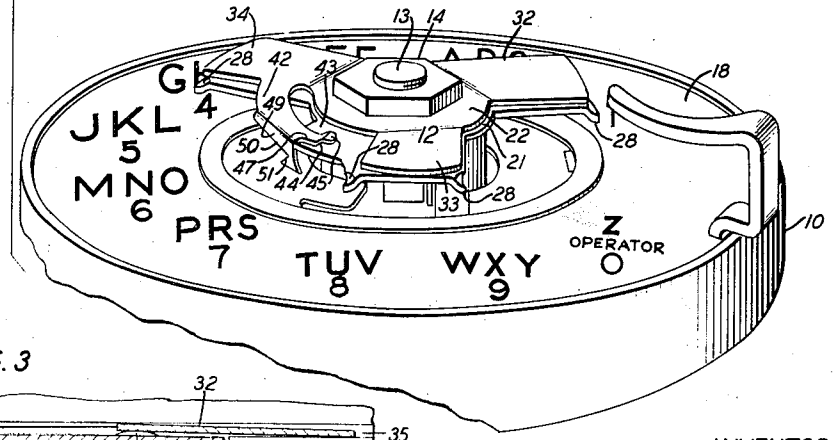


FIG. 3

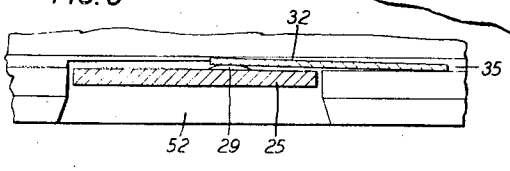


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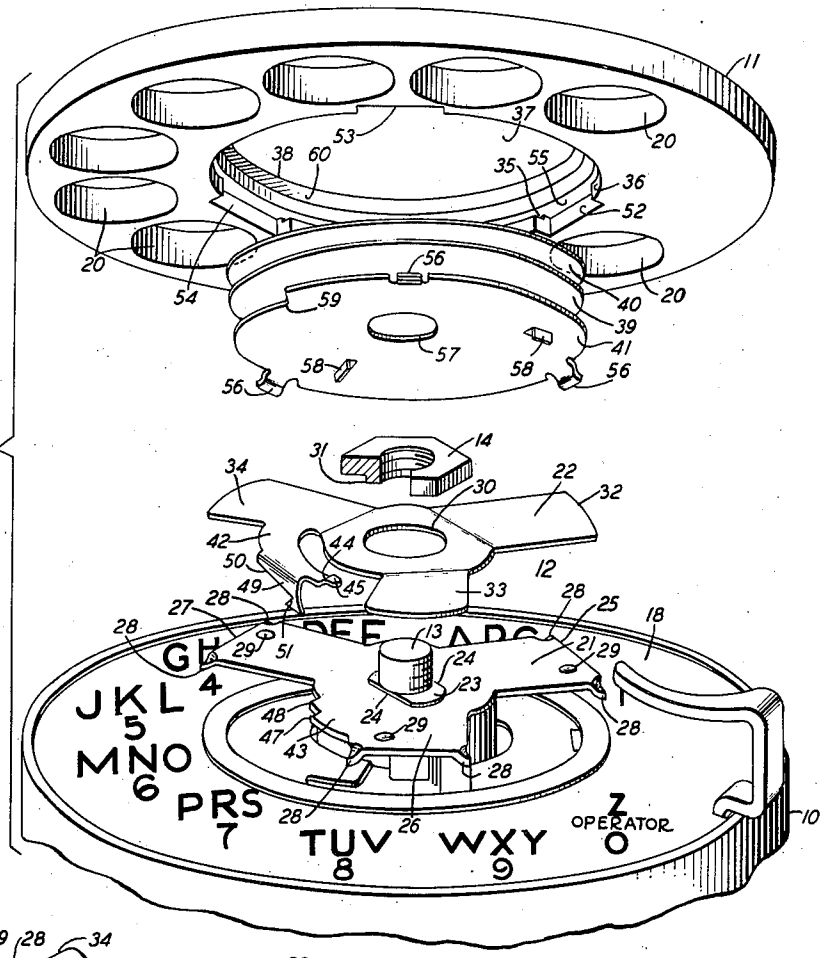
FIG. 4



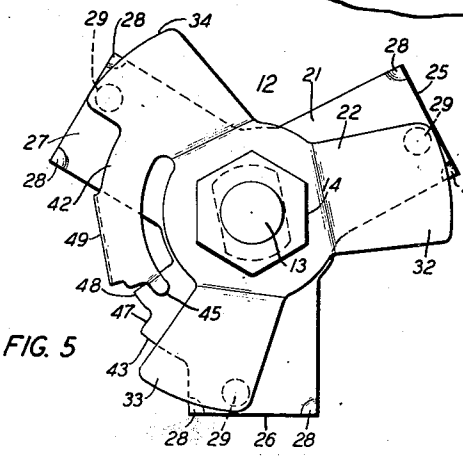


FIG. 5

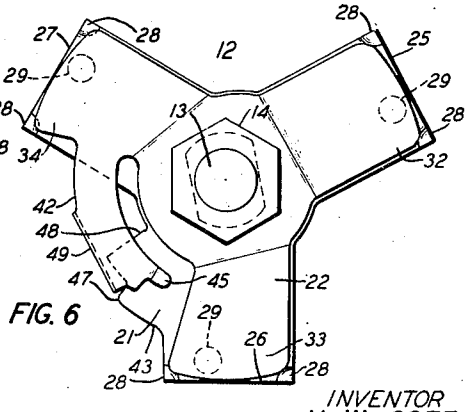


FIG. 6

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CALLING DIAL DEVICE

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Application April 16, 1942, Serial No. 439,229

5 Claims. (Cl. 179—90)

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

The finger wheel in a telephone calling dial device sometimes becomes broken or marred in service and must be detached from the device and replaced by another finger wheel. This is particularly true in the case where the finger wheel is made of molded plastic material.

It has been found that breaking of the finger wheel may be prevented in some measure by providing a flexible support for the finger wheel.

It is an object of this invention to provide a flexible support for the finger wheel and one that permits ready application of the finger wheel to the calling dial device and removal therefrom.

A feature of the invention resides in a spider type support for the finger wheel.

Another feature resides in the finger wheel structure.

In the drawings:

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

Fig. 2 is a view in perspective of the calling dial device shown in Fig. 1, and with the finger wheel separated from the spider type support;

Fig. 3 is an enlarged view, partly in section, of a fragmentary portion of the finger wheel and parts of the spider type support taken on the line 3—3 of Fig. 1;

Fig. 4 is a view corresponding to Fig. 2 but with parts of the spider type support separated and with a station identification card and associated members separated from each other and from the finger wheel;

Fig. 5 is a top plan view of the spider type support mounted on the shaft of the calling dial device and with one part of the spider type support rotated relative to the other and latched in the position taken when the finger wheel is secured in place; and

Fig. 6 is a top plan view of the parts shown in Fig. 5 but in unlatched condition.

The telephone calling dial device as shown in Fig. 1 comprises a casing 10 and a finger wheel 11. The finger wheel 11 is located above the casing 10 and is supported by a two part flexible spider type support 12, the structure of which will be subsequently described. The spider type support 12 is supported on the rotatable operating shaft 13 of the calling dial device and is held on the shaft 13 by means of the 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 understood in the art is part of a spring motor which serves to return the finger wheel to normal position and as a driving means for a contact controlling device 15 operating 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 for separate observance through finger holes 20 provided in the finger wheel 11.

To simplify the description and not in the sense of limiting the invention, it will be assumed that the finger wheel 11 is made of molded plastic material and that the parts of the spider type support 12 are made of sheet metal. It will be obvious, however, that the parts described may be made of other materials without departing from the spirit of the invention.

As shown in the drawings, the spider type support 12 comprises two separable plates 21 and 22 supported on the operating shaft 13 of the calling dial device and held thereon by means of the nut 14 which is screw-threaded on shaft 13. The plates 21 and 22 are of spider-like form, apertured at the center to receive the shaft 13 and having outwardly extending leg members to extend into recesses provided in the finger wheel 11. The central aperture of the plate 21 is formed to fit over a shouldered enlargement 23 on the shaft 13 which as shown in Fig. 4 has flat sides 24—24 so that the plate 21 will not turn relative to the shaft 13. The legs 25, 26 and 27 on the plate 21 have downwardly turned corners 28 and are provided with upwardly extending embossments 29, located near the outer ends of the legs and in an advanced position relative to the center line of each leg. The central aperture 30 in the plate 22 is formed to accommodate the upper threaded end portion of the shaft 13 and a downwardly extending annular boss 31 formed on the lower surface of the nut 14. The legs 32, 33 and 34 of the plate 22 are bent slightly downward from the plane of the central portion of the plate and have smooth upper and lower surfaces so that they may slide in an annular groove 35 formed in an annular wall 36 which defines a central opening 37 in the finger wheel 11. The opening 37 extends from the under surface of the finger wheel 11 into an annular boss

38 formed on the upper portion of the finger wheel 11 and which serves as a receptacle for a station identification number card 39, a transparent cover disc 40 for the card 39 and a retainer disc 41.

The plates 21 and 22 are provided with releasable latch means to hold the plate 22 rotated relative to the plate 21. The latch means comprise a flexible arm 42 on the plate 22 and a step-notched enlargement 43 on the plate 21. The enlargement 43 on the plate 21 is an enlargement of a portion of the central portion of the plate 21 and is located between the legs 26 and 27 of the plate 21. The flexible arm 42 of the plate 22 extends in the form of an arc from the rear edge of the leg 34 and toward the leg 33 and is located about half way along the leg 34. The free end of the arm 42 is bent upwardly at 44 and then in a plane parallel to and slightly above the plane of the main portion of the arm 42 to provide a toe 45 to overlie the upper surface of the enlargement 43 which is notched on one edge to provide the steps 47 and 48. Along the outer edge of the arm 42, a lug 49 is provided to engage the step 47 on the enlargement 43 when the plate 22 is in one position relative to the plate 21, the lug 49 extending downwardly from the plane of the main portion of the arm 42 and below the lower surface of the plate 21 when the plate 22 is mounted over the plate 21. The lug 49 is offset from the main run of the arm 42 and from the toe 45 and is located between the toe 45 and the leg 34. The lug 49 is shaped along one edge to provide a downwardly sloping cam surface 50 terminating at the lower end in a V-notch 51 into which a screw-driver or other suitable tool may be inserted to lift the arm 42 relative to the plate 21 and rotate the plate 22 in a counter-clockwise direction. The same tool may be applied to the opposite edge of the lug 49 and below the plate 21 to rotate the plate 22 in a clockwise direction.

In the finger wheel 11 spaced recesses 52, 53 and 54 are formed to receive the outer end portions of the legs of the spider type support 12, the recesses 52, 53 and 54 being open at the bottom and terminating at the top in the upper wall 55 of the annular groove 35. The annular groove 35 is only of sufficient width to readily accommodate the outer end portions of the legs 32, 33 and 34 and serves as a receptacle for the outer end portions of the legs 32, 33 and 34 and also as a receptacle for ears 56 provided on the retainer disc 41, the structure and arrangement of which I will now describe.

The retainer disc 41 serves to retain the station identification number card 39 in required position in the finger wheel 11. The disc 41 may be made of sheet metal or other suitable material and is dished so that it presents a convex surface on its upper face to the under surface of the number card 39. Spaced ears 56 are provided on the outer edge of the disc 41 to engage in the annular groove 35 in the finger wheel 11, the ears 56 having offset end portions to extend into the groove 35. The disc 41 is apertured at 57 to accommodate the upper end of the shaft 13 and tabs 58—58 are formed on the under surface of the disc 41 to facilitate turning the disc 41 to bring the ears 56 into the groove 35. A notch is made in the disc 41 at 59 to accommodate a projection (not shown) but which is formed in the inner portion of the finger wheel 11, the projection being used to prevent the number card 39 from being rotated relative to the finger wheel 11.

The parts above described are assembled in the following manner. The transparent cover disc 40 is placed within the finger wheel 11 and so that the outer edge of the cover disk 40 bears against an overhang 60 extending inwardly from the annular boss 38 as shown in Fig. 1. The station identification number card 39 is placed against the transparent cover disk 40 and so that the number on the upper surface of the card may be viewed through the transparent cover disk 40, the card retainer disk 41 is then placed against the number card 39, the ears 56 being passed upwardly through the recesses 52, 53 and 54 in the finger wheel 11 and until the ears 56 are in the same plane as the groove 35. The retainer disk 41 is then rotated relative to the finger wheel 11 by manually pressing against the tabs 58 and rotating the retainer disk 41 until the ears 56 pass a considerable distance in the annular groove 35. When the ears 56 are in the groove 35 as shown in Fig. 2, the retainer disk 41 prevents the card 39 and the transparent disk 40 from dropping out of the finger wheel 11. The overhang 60 as shown in Fig. 1 prevents removal of the transparent disk 40 and the card 39 through the top of the finger wheel 11.

The spider type support 12 is assembled by placing the plate 21 on the rotatable shaft 13 as shown in Fig. 4 and so that the plate 21 cannot turn relative to the shaft 13. The plate 22 is then placed directly over the plate 21 and so that it rests on the embossments 29 and with the legs 32, 33 and 34 in register with the respective legs 25, 26 and 27 of the plate 21. In this position as shown in Figs. 2 and 6, the lug 49 of the arm 42 is in engagement with the step 47 on the plate 21, and the free end of the arm 42 rests on the upper surface of the enlargement 43 of the plate 21 and with the toe 45 elevated relative to the upper surface of the plate 21. The nut 14 is then applied to the upper end of the shaft 13 and is screwed down until the annular boss 31 on the lower surface of the nut 14 is within the aperture 30 in the plate 22 and the nut 14 is holding the plate 22 clamped to the plate 21. The boss 31 on the nut 14 being slightly longer than the thickness of the plate 22 and bearing against shoulder 23 on the shaft 13, the boss 31 on the nut 14 serves as a bearing for the plate 22. When the nut 14 is tightened, it presses the central portion of the plate 22 slightly downward from its normal plane and more nearly in the plane of the outer ends of the legs of the plate. It will be seen therefore that some slight spring tension is developed in the plate 22. There is also some spring tension developed in the arm 42 since the lower surface of the free end of the arm 42 is resting on the upper surface of the plate 21.

When the spider type support 12 is assembled and mounted on the shaft 13 as shown in Figs. 2 and 6, the finger wheel 11 may be applied to the spider type support 12 by placing the finger wheel 11 over the spider type support 12 and so that the legs of the spider type support pass upwardly within the recesses 52, 53 and 54 and the legs 32, 33 and 34 of the plate 22 are in engagement with the top wall 55 of the annular groove 35. To secure the finger wheel 11 in place, the plate 22 is then rotated in a clockwise direction to slide the legs 32, 33 and 34 along the annular groove 35 and past the respective recesses 52, 53 and 54. The clockwise rotation of the plate 22 is accomplished by manually forcing the lug 49 on

the arm 42 away from the step 47 on the plate 21. The plate 22 is rotated in a clockwise direction until the offset bend 44 near the toe 45 snaps into engagement with the step 48 on the plate 21. In moving the plate 22 in the clockwise direction a screw-driver or other suitable tool may be used to apply the necessary force to the lug 49. Since the outer end of the toe 45 is still in overlapped condition relative to the upper surface of the plate 21 there is still sufficient spring tension in the arm 42 to retain the offset 44 of the arm 42 pressed down against the step 48. During the rotation of the plate 22 relative to the plate 21, the legs of the plate 22 ride on the embossments 29. This construction reduces the friction between the plates 21 and 22 and holds the legs 32, 33 and 34 sufficiently elevated from the respective legs 25, 26 and 27 and relative to upper corners of the recesses 52, 53 and 54 so that the legs 32, 33 and 34 may readily pass into the groove 35. The downwardly turned corner portions 28 on the legs 25, 26 and 27 of the plate 21 prevent these legs from entering the groove 35. The plate 22 as shown in Fig. 5 cannot be rotated too far in a clockwise direction and relative to the plate 21 because the lug 49 is made sufficiently long to engage the leg 27 before the toe 45 can pass entirely off the plate 21.

It will be seen that the finger wheel 11 as shown in Fig. 1 is held mounted on the spider type support 12 when the legs 32, 33 and 34 of the plate 22 are in the groove 35 and the plates 21 and 22 are in the relative positions shown in Fig. 5, and that accidental counter-clockwise rotation of the plate 22 to bring the legs 32, 33 and 34 out of the groove 35 is prevented by engagement of the offset bend 44 of the arm 42 against the step 48. The finger wheel 11 may be manually rotated in a clockwise direction to rotate the shaft 13 in the well-known manner to dial the telephone call.

Release of the finger wheel 11 from the spider type support 12 may be readily accomplished by pressing the lug 49 upwardly until the bend 44 of the arm 42 comes above the upper surface of the plate 21 and out of engagement with the step 48 and then by forcing the plate 22 in a counter-clockwise direction until the legs 32, 33 and 34 come out of the groove 35 and into the respective recesses 52, 53 and 54 in the finger wheel 11. In this case the plates 21 and 22 are in the positions shown in Fig. 6 and the finger wheel 11 may be lifted off the spider type support 12 as shown in Fig. 2. Too far turning of the plate 22 in a counter-clockwise direction over the plate 21 is prevented by engagement of the lug 49 with the step 47.

In releasing the finger wheel 11 from the spider type support 12, the lug 49 may be readily lifted and the plate 22 rotated in a counter-clockwise direction by inserting a screwdriver or other convenient tool between the finger wheel 11 and the dial 18 and into engagement with the cam surface 50 and then forcing the tool along the cam surface 50 toward the notch 51. This will result in lifting the arm 42 to release the bend 44 from the step 48. Further pressing of the tool in the notch 51 will result in counter-clockwise rotation of the plate 22 to the released position shown in Fig. 6.

The spider type support 12 provides a flexible support for the finger wheel 11 and will allow the finger wheel 11 to move slightly downward toward the dial 18 when undue heavy pressure is applied to the finger wheel 11 by a person dialing a telephone call. The flexible support 12 will therefore, in some measure, prevent fracture of the finger wheel when undue heavy pressure is applied to the finger wheel.

Since the two parts of the spider type support 12 are only held in position to hold the finger wheel operatively mounted on the calling dial device by means of the latch comprising the arm 42, the bend 44 and the step 48 and the finger wheel 11 may be unlatched by simply lifting the arm 42 and rotating the plate 22 into matching relation with the plate 21, the finger wheel 11 may be readily removed and replaced by another finger wheel.

What is claimed is:

1. A spider type support comprising a fixed plate and a rotatable plate, said plates being of spider-like form, means holding said plates in face-to-face relation, latch means comprising a flexible arm on one of said plates and a notched enlarged central portion on the other of said plates providing a step engaged by said arm, and said latch means cooperating to releasably hold said plates in relatively rotated positions.

2. A spider type support comprising a shaft, a plate fixedly mounted on said shaft, a second plate rotatably mounted on said shaft and in face-to-face relation with the first plate, said plates being of spider-like form, means holding said plates on said shaft, an enlarged central portion on one of said plates, formed to provide a step, a flexible arm on the other of said plates and extending over said enlarged central portion, and means on said flexible arm and engaging the step on said enlarged central portion and cooperating therewith to hold said plates in relatively rotated positions.

3. In a telephone calling dial device involving a rotatable shaft and a manually operated finger wheel to rotate said shaft, spaced recesses formed in the lower surface of said finger wheel and opening toward the center of said finger wheel, an annular groove formed in said finger wheel and extending to said recesses, a flexible spider type support mounted on said shaft and having legs to enter said recesses, said spider type support comprising two plates arranged one above the other, the lower plate being fixedly supported on said shaft and the upper plate being rotatable relative to the lower plate so that the legs on the upper plate will pass from said recesses and into said annular groove to hold said finger wheel mounted on said spider type support, and releasable latch means on the plates of said spider type support and operating to hold the upper plate in advanced rotated position relative to the lower plate.

4. In a telephone calling dial device involving a rotatable shaft and a manually operated finger wheel to rotate said shaft, spaced recesses formed in the lower surface of said finger wheel and opening toward the center of said finger wheel, an annular groove formed in said finger wheel and extending into said recesses, a spider type plate mounted on said shaft and arranged to turn with said shaft, legs on said spider type plate engaging in said recesses, a second spider type plate of flexible material disposed above said plate, legs on said second spider type plate slanting downwardly from the central portion of said second plate and into frictional engagement with the legs of the first spider type plate, said second plate being arranged for rotation relative to the first plate and so that the legs will move from said recesses into said annular

groove to hold said finger wheel in operating position, a flexible arm extending from one of the legs of said second plate and into overlapping engagement with the first plate, a step formed on the first plate and said arm engaging said step and operating to releasably latch said second plate against backward rotation relative to the first plate.

5. In a telephone calling dial device involving a rotatable shaft and a finger wheel for rotating said shaft, a two-part flexible spider type support for operatively connecting said finger wheel to said shaft, said spider type support comprising a fixed spider plate mounted on said shaft and having its leg members in driving engagement with said finger wheel, a second spider plate of flexible material disposed above said fixed plate and rotatable thereover and having its leg members in clamping engagement with said finger wheel, means holding said spider plates mounted on said shaft, a flexible arm on said second spider plate extending into engagement with said fixed spider plate and overlapping a portion of said fixed spider plate, an offset on said flexible arm engaging an edge of said fixed plate and cooperating therewith to hold said plates in relatively rotated positions, and a lug on said flexible arm extending below said fixed plate and below said finger wheel to facilitate release of said flexible arm from holding engagement with said fixed plate.

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