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(54) Improved structure of telephone connector

(57) The present invention provides an improved structure of telephone connector comprising a rotary head and a fixed plug, which are sleeved together and can turn with respect to each other. The fixed plug has a circular disk having conductive rings of different radii. The conductive rings contact corresponding contact terminals in a plug body. The rotary head has through holes therein. Each of the through holes has a metal ball or

an assembly of a metal ball, a sleeve part, and a spring disposed therein to contact a corresponding contact terminal in the rotary head. The characteristic of low friction coefficient of the balls is exploited so that the rotary head can smoothly turn with respect to the fixed plug, hence not entangling the telephone wire. Therefore, the connector of the present invention can provide more stable quality of signal transmission, and is more durable in use.

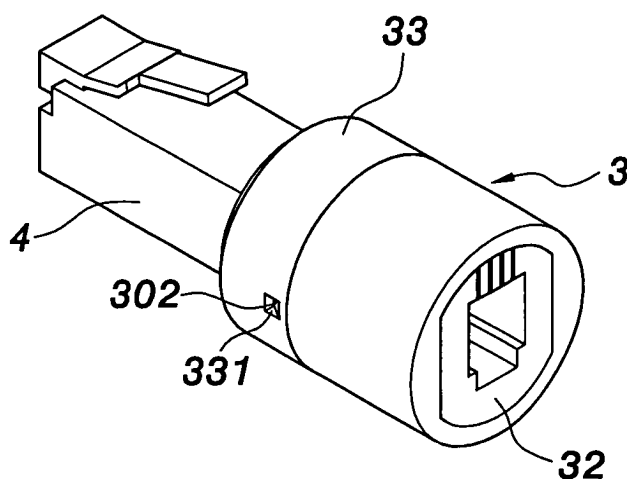


FIG. 3

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Description

Field of the invention

[0001] The present invention relates to a connector structure and, more particularly, to an improved structure of telephone connector installed at the socket of a mouthpiece or a telephone host to prevent entanglement of telephone wire, to increase the flexibility of rotation, and to extend the lifetime of use.

Background of the invention

[0002] Generally speaking, a spirally wound and resiliently retractable telephone wire is connected between a telephone host and a mouthpiece thereof so that a user can take the mouthpiece away from the host a certain distance to communicate by telephone. However, entanglement of the telephone wire often occurs when he puts the mouthpiece back on the host, hence being indelicate and influencing use of the mouthpiece. The user needs to repeatedly put the telephone wire in order, resulting in trouble and inconvenience.

[0003] Accordingly, many connectors, which are installed at the socket of a mouthpiece and can rotate along the pulled direction of a telephone wire to prevent entanglement of the telephone wire, have been proposed. U.S. Pat. No. 5,082,448 discloses a telephone connector structure shown in Fig. 1, which comprises a rotary head 1 and a fixed plug 2. A plurality of isolated contact terminals 11 are disposed in an insertion hole 10 of the rotary head 1. The bottom of the rotary head 1 has a plurality of through holes 12 to respectively receive connection parts (springs) 13 so that one end of each spring 13 contacts the corresponding contact terminal 11. The fixed plug 2 comprises a plug body 20 and a circular disk 21. The circular disk 21 has a plurality of through holes 211 penetrated through by springs 210 and disposed at different distances from the center of the circular disk 21 on the same radial line. Conductive rings 212 are correspondingly fixed to contact the springs 210. The plug body 20 has a plurality of contact terminals 200 therein, and is used to fix the circular disk 21 so that the other end of each spring 210 contacts the corresponding contact terminal 200. After the fixed plug 2 is installed into the rotary head 1, a gasket 201 and a C-shaped fastener 202 are then sleeved in to complete the assembly of the connector so that the rotary head 1 can rotate with respect to the fixed plug 2.

[0004] When the connector is plugged into an insertion seat of a mouthpiece with the fixed plug 2, the contact terminals 200, the springs 210, and the conductive rings 212 at the one side of the circular disk 21 adjoining the plug body 20 will achieve static electric connection. The contact terminals 11, the springs 13, and the conductive rings 212 at the other side of the circular disk 21 adjoining the rotary head 1 also achieve static electric connection when the rotary head 1 is stationary. When

the rotary head 1 is turned, because the circular orbits of the springs 13 are exactly the same as those of the corresponding conductive rings 212, the springs 13 can keep contacting the conductive rings 212, hence achieving dynamic electric connection. Therefore, when a mouthpiece is practically used with a plug of a telephone wire plugged into the insertion hole 10 of the rotary head 1, pull of the telephone wire will lead the rotary head 1 to turn accordingly so that the telephone wire will not be entangled, and communication state can be continually kept.

[0005] However, the turn of the rotary head 1 is not smooth, and the rotary head 1 is easily damaged in practical use for this kind of telephone connector. The reasons are as follows. During the turn process of the rotary head 1, the springs 13 at the end face thereof will constantly rub against the corresponding conductive rings 212. Because the distal ends of the spring 13 are not smooth structures but have sharp tips and spiral undulating structures, the friction coefficient will be very large. Therefore, the springs 13 cannot slide smoothly on the surface of the conductive rings 212 microscopically, and the rotary head 1 cannot turn smoothly with respect to the fixed plug 2 macroscopically. Especially, due to large friction, the surfaces of the conductive rings 212 will easily be scraped by the springs 13, resulting in bad contacts. On the other hand, the springs 13 may cause unstable transmission of signals because of constant jumps, or the springs 13 may even be wedged in the through holes 12 due to distortion, bringing about malfunction and damage.

Summary of the invention

[0006] The primary object of the present invention is to provide an improved structure of telephone connector, wherein a connection part is received in each through hole of a rotary head of the connector. The connection part can be only a ball, or after a spring and a sleeve part having a planar end face are received, a ball is then disposed at the front end thereof. The characteristic of low friction coefficient of perfectly round surface of the ball is exploited. The rotary head will turn smoothly so as not to entangle a telephone wire. Also, the conductive rings will not be damaged, and the phenomenon of jumps can be avoided, hence providing more stable quality of signal transmission. Moreover, the connector of the present invention is more durable in use.

[0007] The various objects and advantages of the present invention will be more readily understood from the following detailed description when read in conjunction with the appended drawing, in which:

Brief description of the drawings:

[0008]

Fig. 1 is an exploded perspective view of a prior art

telephone connector;

Fig. 2 is an exploded perspective view according to a first embodiment of the present invention;

Fig. 3 is a perspective view according to the first embodiment of the present invention;

Fig. 4 is a side cross-sectional view according to the first embodiment of the present invention;

Fig. 5 is a reference diagram showing the application state of the first embodiment of the present invention;

Fig. 6 is an exploded perspective view according to a second embodiment of the present invention;

Fig. 7 is a reference diagram showing the application state of a third embodiment of the present invention;

Fig. 8 is an exploded perspective view according to a fourth embodiment of the present invention; and

Fig. 9 is a perspective view according to the fourth embodiment of the present invention.

Detailed description of the preferred embodiments

[0009] As shown in Figs. 2 to 4, an improved structure of telephone connector of the present invention comprises a rotary head 3 and a fixed plug 4.

[0010] The rotary head 3 comprises a rotary tube 30, a turntable 31, and a plug 32. The rotary tube 30 is a hollow tube. One end of the rotary tube 30 forms a separated end portion 33, which is a hollow ring. The end portion 33 has locking holes 331 at predetermined positions on the inner wall thereof. The end portion 33 fixedly locks locking blocks 302 with the locking holes 331 to be fixed at one end of the rotary tube 30. The inner peripheral edge at one end of the end portion 33 has a stop block 300 or a stop edge. The rotary tube 30 has locking holes 301 at predetermined positions on the inner wall thereof. The end portion 33 of the present invention can be lengthened to sheathe outside the rotary tube 30, as shown in Figs. 8 and 9.

[0011] The turntable 31 is integrally formed and fixed inside the rotary tube 30. The turntable 31 has through holes 310 disposed at different distances from the center thereof on the same radial line. A connection part is received in each of the through holes 310. The connection part can be only a metal ball 311, or after a spring 312 and a sleeve part 313 having a positioning projective pole 314 and a planar or arc end face are received, the metal ball 311 is then received therein. The sleeve part 313 can stick into the end portion of the spring 312 with the positioning projective pole 314 thereof and be positioned, and then contact the ball 311 with the planar or arc end face thereof.

[0012] The plug 32 is fixed in the rotary tube 30 with locking blocks 322 fixedly locked in the locking holes 301. The plug 32 has a plurality of contact terminals 321 fixed thereon. One end of each contact terminal 321 burrows against one end of the through hole 310 to contact the ball 311 or the spring 312. The other end thereof

sticks into an insertion hole 320 of the plug 32 to connect a plug of a telephone wire plugged into the insertion hole 320.

[0013] The fixed plug 4 is formed by fixedly joining a plug body 40 and a circular disk 41. The fixed plug 4 can be movably received in the rotary tube 30 and restricted by the stop block 30 so as not to escape out. The fixed plug 4 can turn with respect to the rotary tube 30. The circular disk 41 has a plurality of insertion holes 410 thereon. Conductive rings 413 of different radii and having a plurality of insertion sheets 411 and a resilient sheet 412 extending from the periphery thereof can be joined on the circular disk 41 with the insertion sheets 411 and the resilient sheet 412 inserted into the insertion holes 410. Therefore, the surface of each conductive ring 413 can contact the corresponding ball 311 of the turntable 31 to achieve dynamic electric connection. The plug body 40 has a plurality of parallel and isolated contact terminals 400 so that the corresponding resilient sheets 412 of the conductive rings 413 can penetrate through the insertion holes 410 to contact one end of the contact terminals, hence achieving static electric connection.

[0014] A telephone connector of the present invention can thus be formed, as shown in Fig. 3. When the telephone connector is used, the fixed plug 4 is inserted into an insertion seat of a mouthpiece 5 (shown in Fig. 5) or a telephone host, or is fixed in the mouthpiece 5 or the telephone host (shown in Fig. 7). The plug 32 of the rotary head 3 is then plugged by a plug of a telephone wire 50. When the mouthpiece 5 is moved so that the telephone wire 50 pulls the rotary head 3 to turn with respect to the fixed plug 4, the turntable 31 will turn with respect to the circular disk 41 of the fixed plug 4. At this time, the balls 311 will move along the circular orbits of the turntable 31 to exactly roll on the correspondingly contacted conductive rings 413, hence constantly keeping dynamic electric connection. Because the resilient sheets 412 of the conductive rings 413 on the other side face of the circular disk 41 fixedly contact the corresponding contact terminals 400, static electric connection can be achieved to stably transmit signals, as shown in Fig. 4.

[0015] Between the rotary head 3 and the fixed plug 4, i.e., between the turntable 31 and the circular disk 41, free roll of the balls 311 is exploited. Because the balls 311 are themselves round and smooth structures of low friction coefficient, the friction between them and the conductive rings 413 is small. On the other hand, if springs 312 are disposed, sleeve parts 313 each having a planar end face are sandwiched between the springs 312 and the balls 311. The springs 312 do not directly contact the balls 311. Point contact of low friction is generated between the spherical balls 311 and the planar end faces of the sleeve parts 313. Therefore, the rotary head 3 can more easily and flexibly turn, hence preventing entanglement of the telephone wire 50. Moreover, the abrasion of the conductive rings 413 due to the balls 311 will be lessened, and the phenomenon of abnormal

jump or block can be avoided. Therefore, the improved structure of the present invention is more durable in use and will not easily malfunction. Moreover, stability and quality of signal transmission can be ensured.

[0016] As shown in Fig. 6, a plurality of parallel and isolated contact terminals can also be disposed in the plug body 40 of the present invention. The contact terminals 400 are conductive wires each with an insulating layer 42 sheathing outside to let the plug body 40 have flexibility. The corresponding resilient sheets 412 of the conductive rings 413 on the circular disk 41 can penetrate through the insertion holes 410 and be soldered to one end of the contact terminals 400, hence achieving static electric connection.

[0017] To sum up, the present invention discloses an improved structure of telephone connector, wherein springs are replaced with balls to effectively improve the problems of the conventional telephone connector.

[0018] Although the present invention has been described with reference to the preferred embodiment thereof, it will be understood that the invention is not limited to the details thereof. Various substitutions and modifications have been suggested in the foregoing description, and other will occur to those of ordinary skill in the art. Therefore, all such substitutions and modifications are intended to be embraced within the scope of the invention as defined in the appended claims.

Claims

1. An improved structure of telephone connector, comprising:

a fixed plug comprising a plug body and a circular disk fixedly joined together, said plug body having a plurality of parallel and isolated contact terminals therein, said circular disk having conductive rings at different distances from the center thereof, said conductive rings contacting said corresponding contact terminals, respectively;

a rotary head joined with said fixed plug and capable of turning with respect to said fixed plug, said rotary head having a plurality of parallel and isolated contact terminals therein, said rotary head having a plurality of through holes connected with said contact terminals on an end face thereof, a connection part being received in each of said through holes, said connection part being a metal ball so that one end of said connection part can contact said corresponding contact terminal and the other end thereof can contact said corresponding conductive ring of said circular disk.

2. The improved structure of telephone connector as claimed in claim 1, wherein a spring is further re-

ceived in each of said through holes so that said spring contacts said corresponding contact terminal of said rotary head and said ball contacts said corresponding conductive ring.

3. The improved structure of telephone connector as claimed in claim 2, wherein a sleeve part having a positioning projective pole and a planar or arc end face is further provided between said spring and said ball so that said sleeve part can be positioned at an end head of said spring through said positioning projective pole and contact said ball through said planar end face.
4. The improved structure of telephone connector as claimed in claim 1, wherein one side of each said conductive ring extends to form a resilient sheet, and said circular disk has insertion holes at corresponding positions so that said resilient sheets can penetrate through said insertion holes to contact said corresponding contact terminals of said plug body.
5. The improved structure of telephone connector as claimed in claim 1, wherein the periphery of each said conductive ring extends to form insertion sheets, and said circular disk has insertion holes so that said conductive rings can be fixed on said circular disk with said insertion sheets inserted into said insertion holes.
6. The improved structure of telephone connector as claimed in claim 1, wherein said rotary head further comprises a rotary tube, a plug, and a turntable formed in said rotary tube so that one end of said rotary tube can receive said fixed plug, and the other end thereof can fix said plug.
7. The improved structure of telephone connector as claimed in claim 6, wherein said rotary tube forms a separated end portion firmly fixed at one end of said rotary tube.
8. The improved structure of telephone connector as claimed in claim 1, wherein said contact terminals are conductive wires each with an insulating layer sheathing outside.
9. The improved structure of telephone connector as claimed in claim 1, wherein said fixed plug can be plugged into an insertion seat of a mouthpiece or a telephone host, or can be fixed in the mouthpiece or the telephone host.

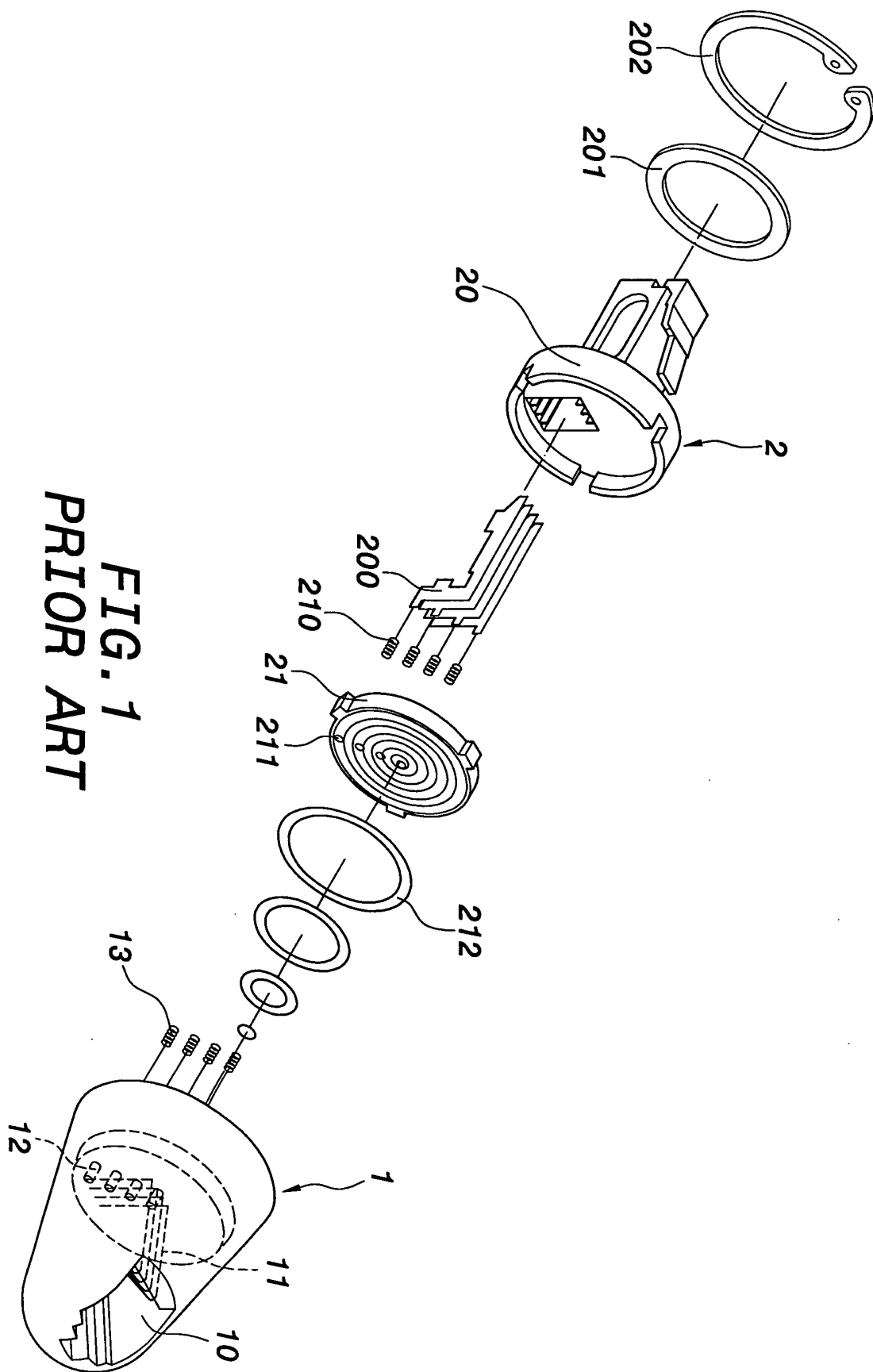
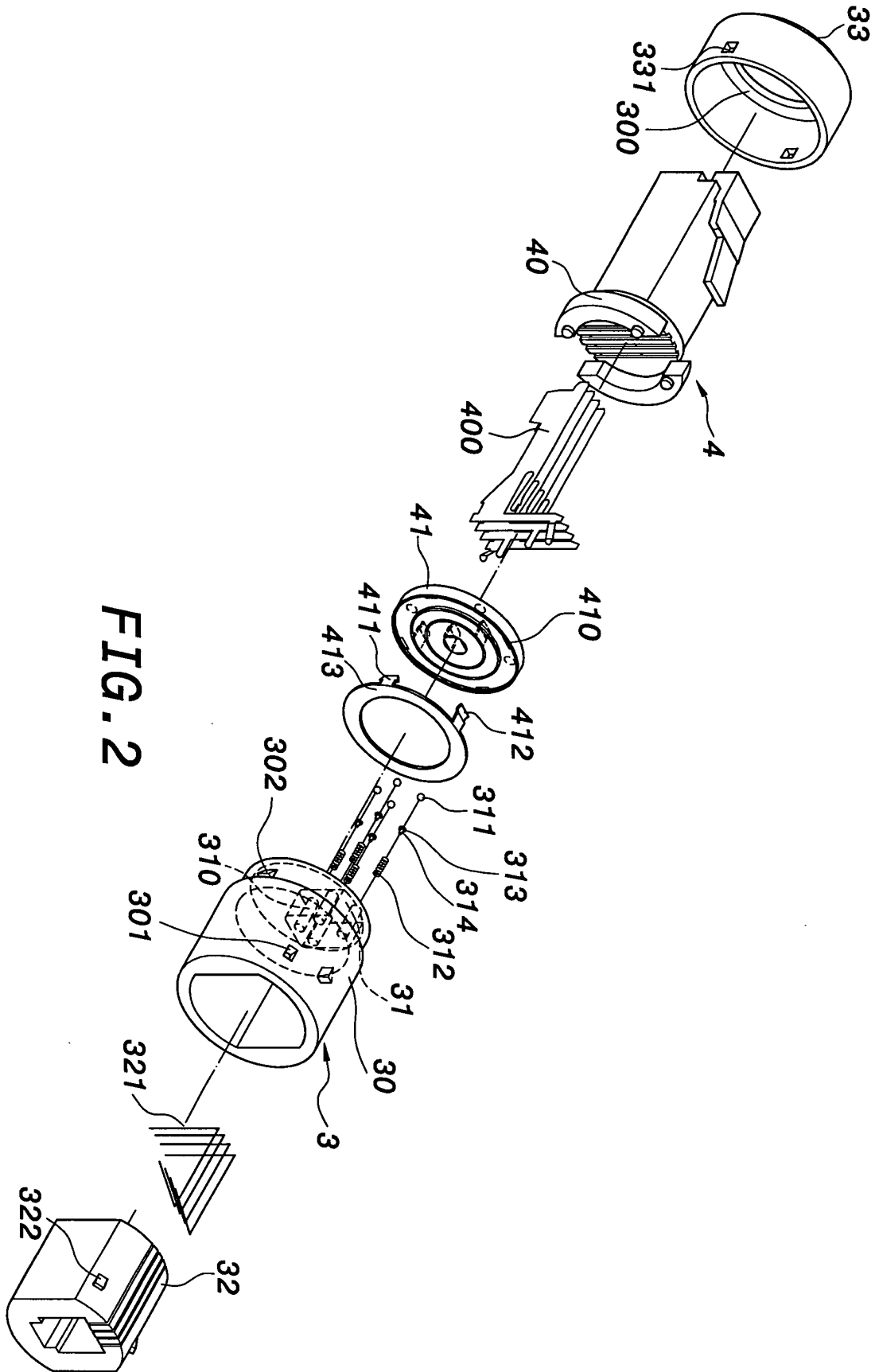
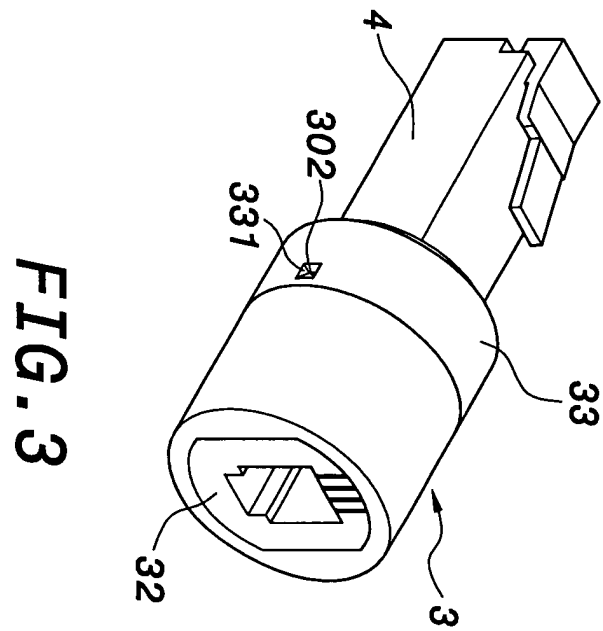


FIG. 1
PRIOR ART





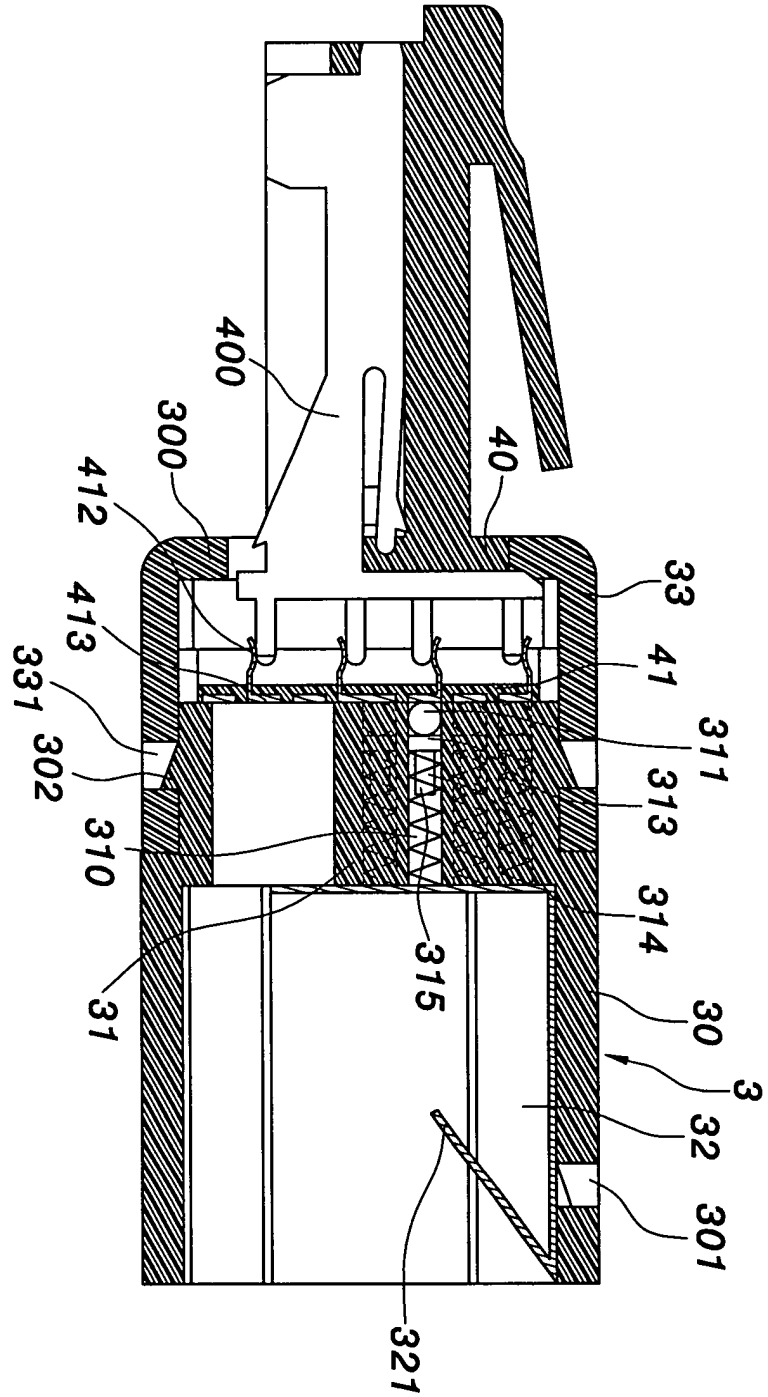
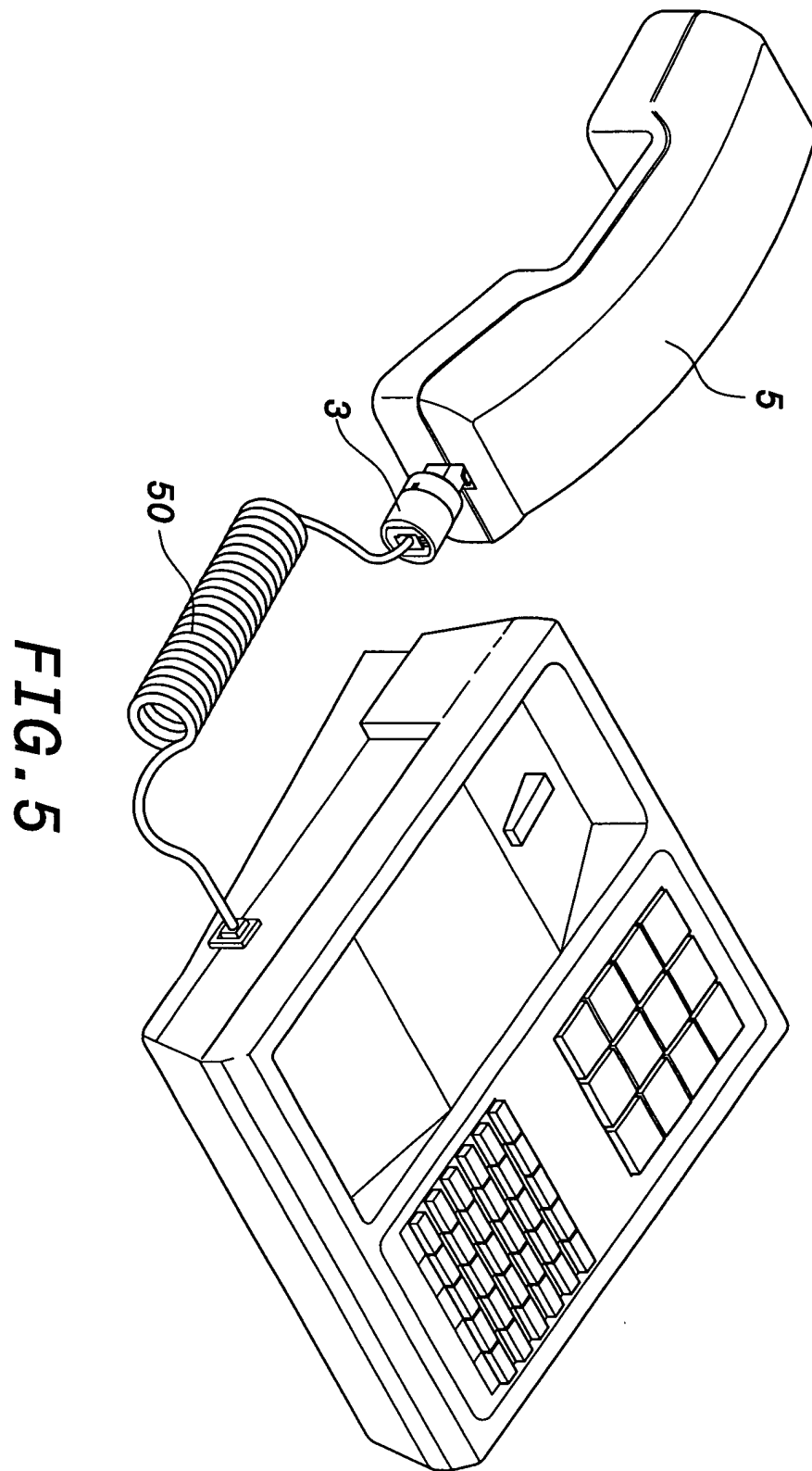
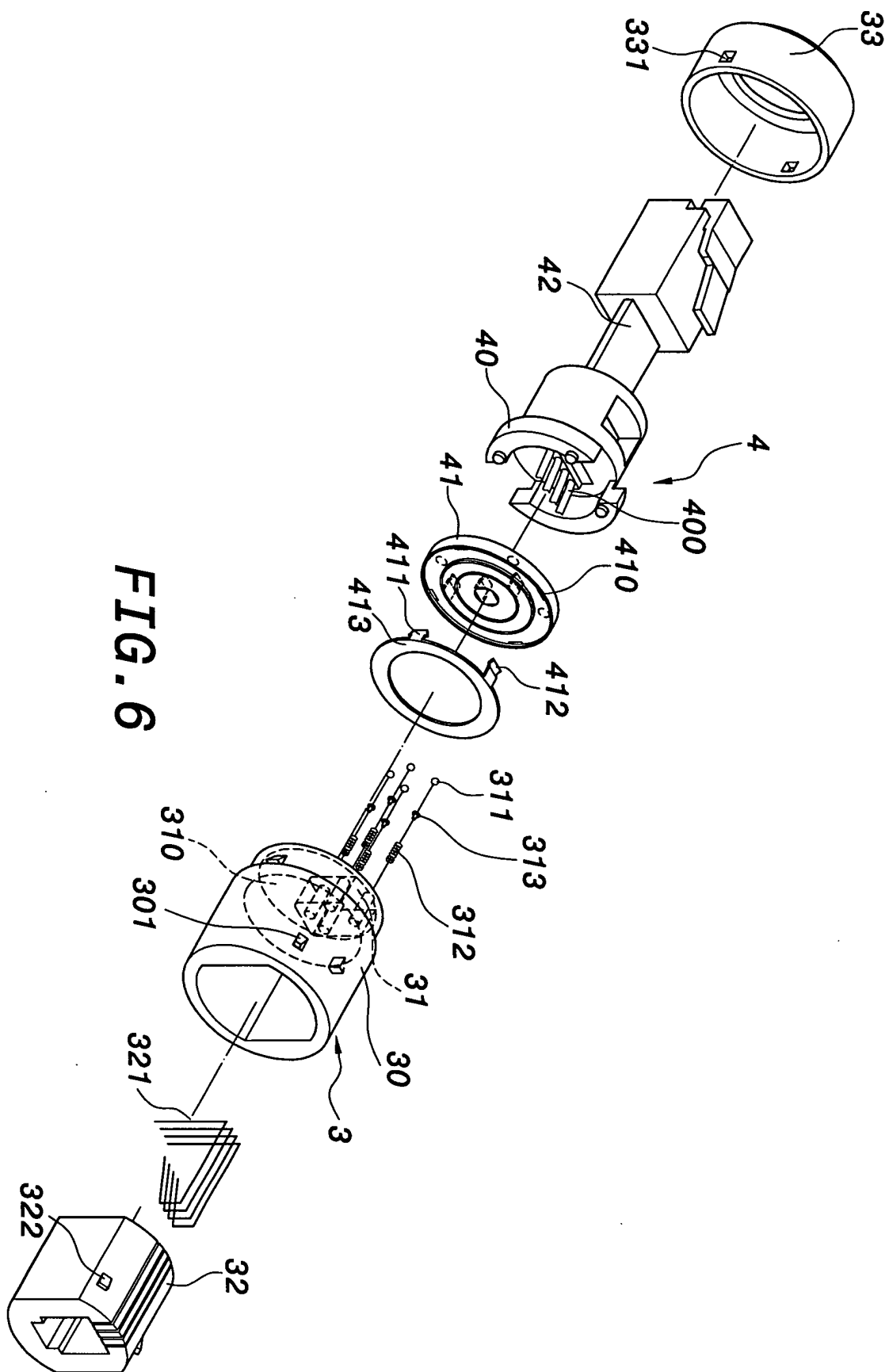
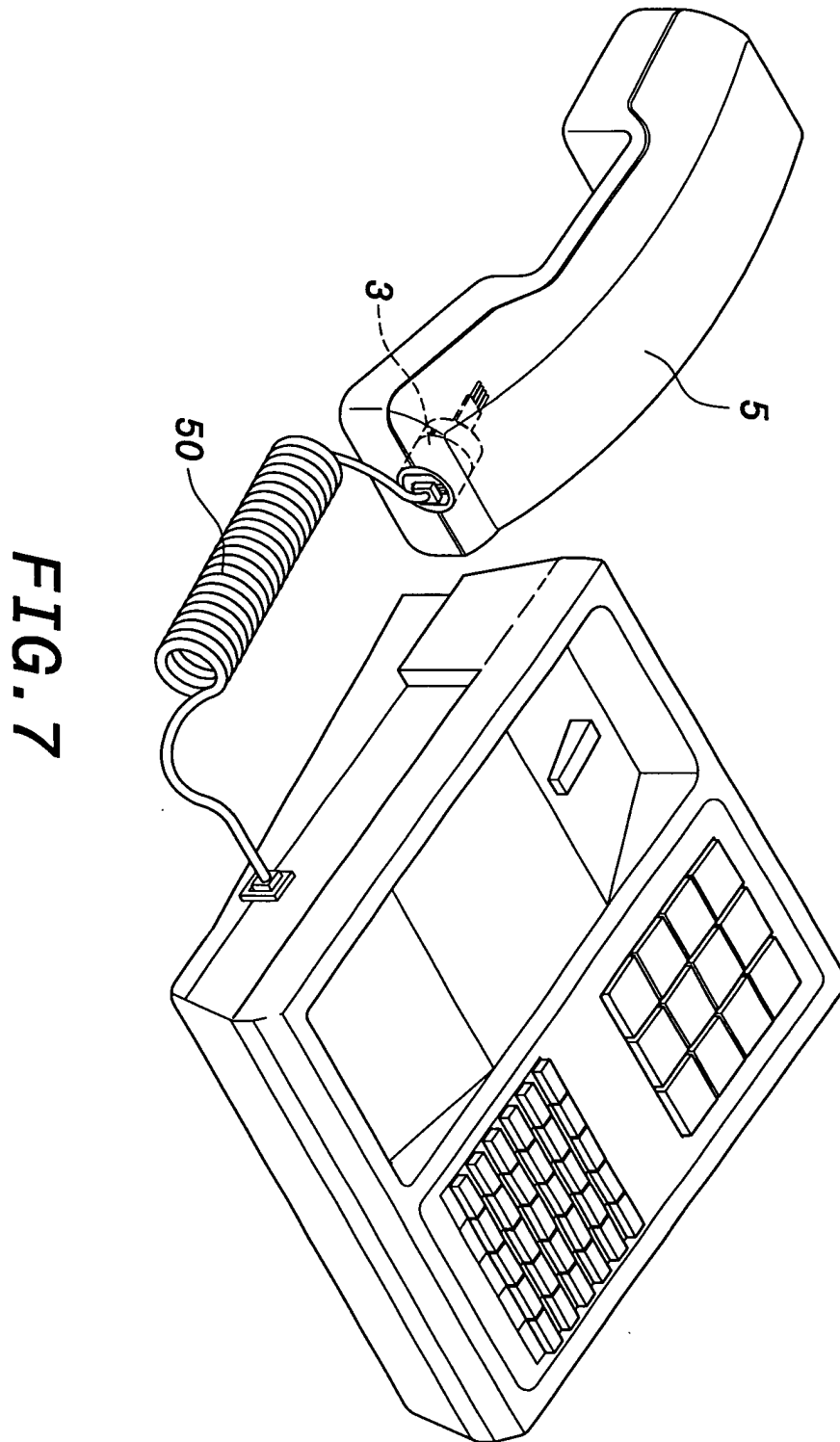
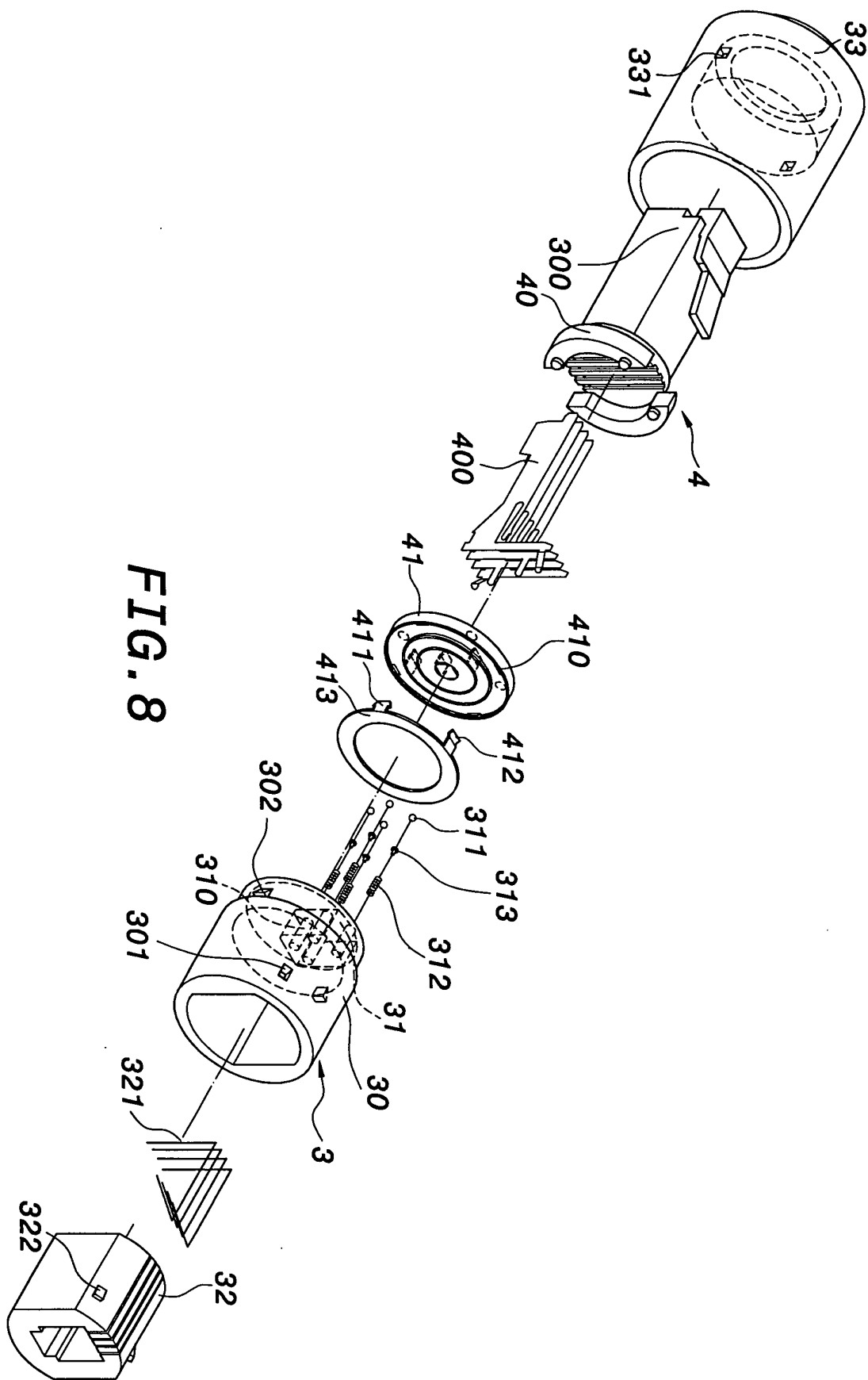


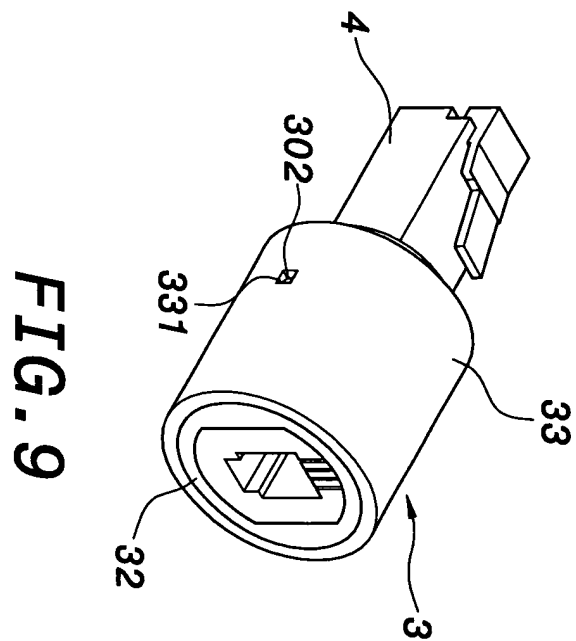
FIG. 4













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EUROPEAN SEARCH REPORT

Application Number
EP 01 11 5313

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 6 162 062 A (LIAO SHENG HSIN) 19 December 2000 (2000-12-19) * column 2, line 49 - column 4, line 31; figures 2-6 *	1-9	H01R39/64
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7) H01R
Place of search MUNICH		Date of completion of the search 7 November 2001	Examiner Tappeiner, R
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03 82 (P04001)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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