Nov. 21, 1950 C. F. MATTKE 2,530,891

ROTARY MULTICONTACT DEVICE

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FIG. 1

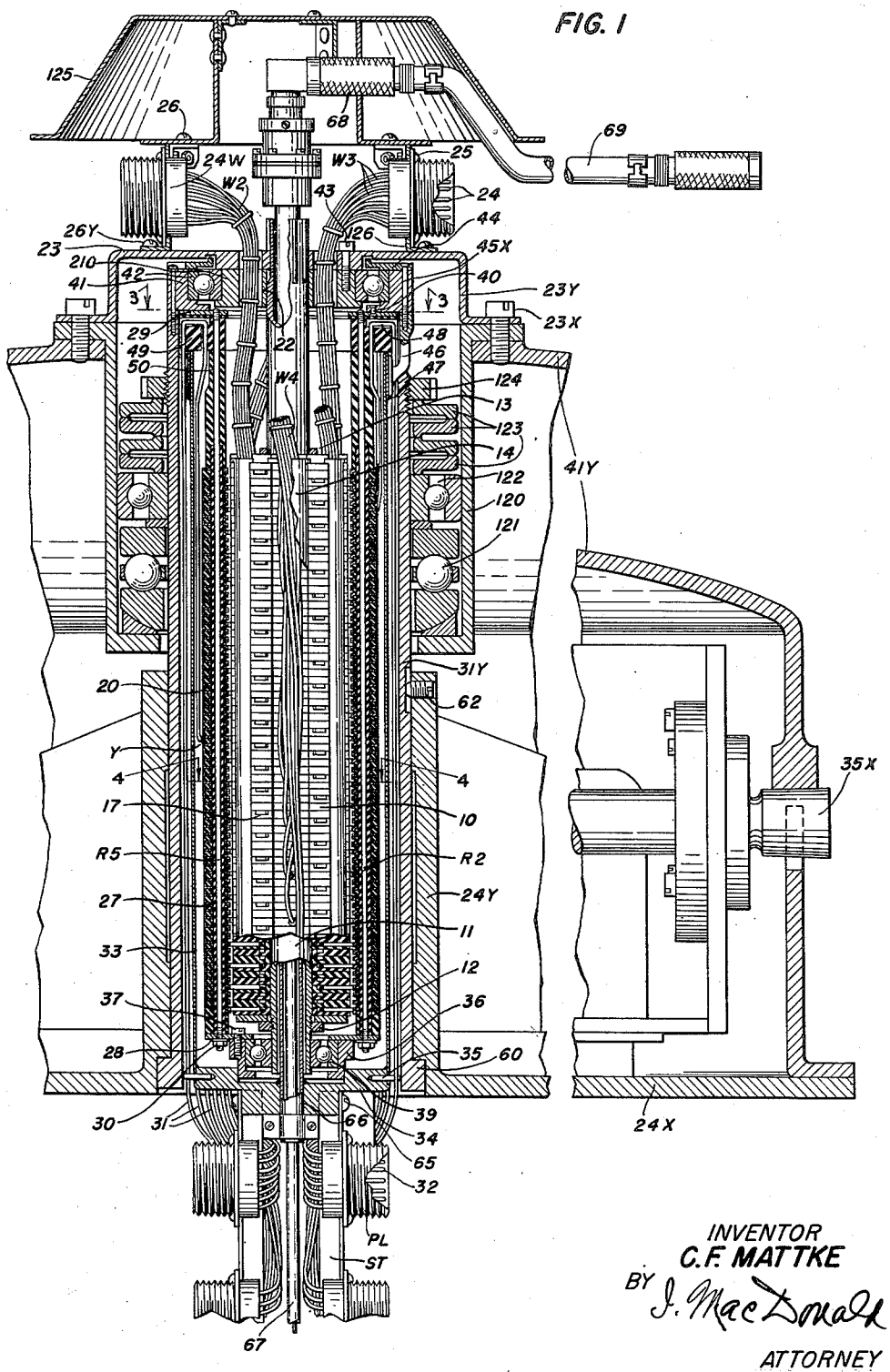

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FIG. 2

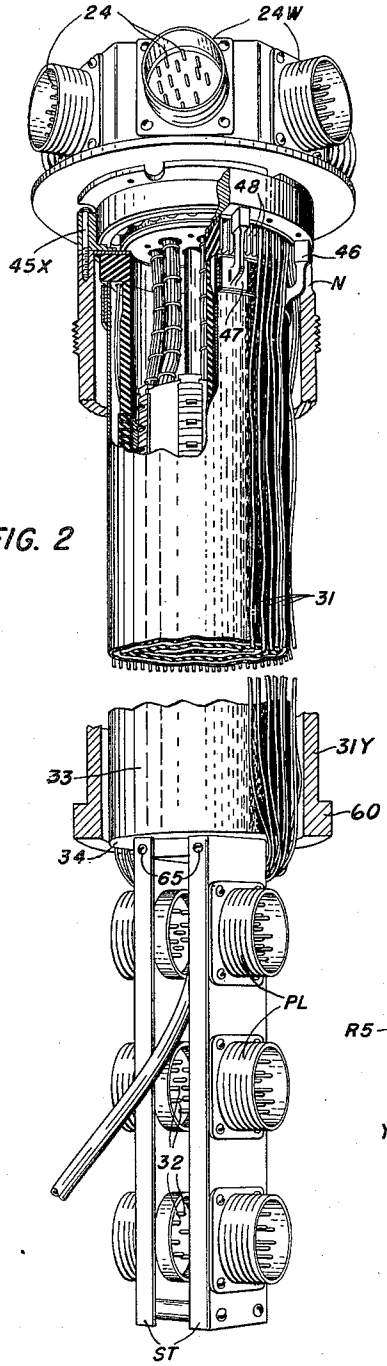


FIG. 3

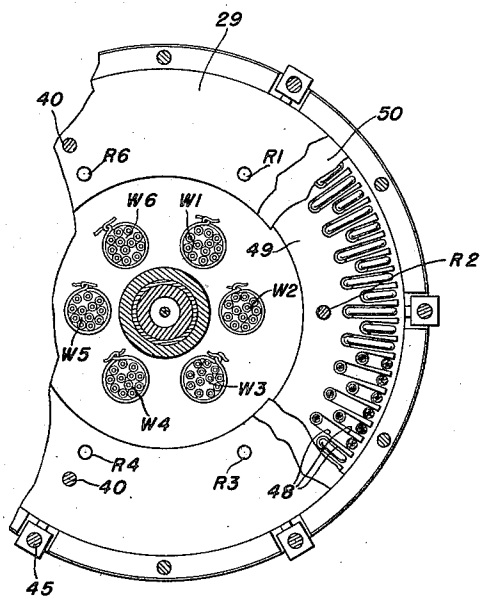
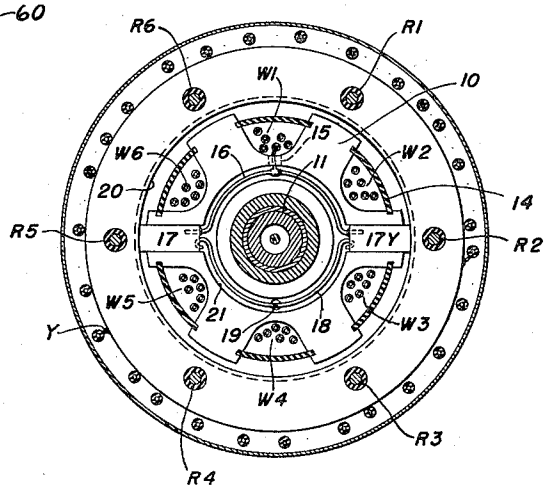


FIG. 4



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Patented Nov. 21, 1950 2,530,891

UNITED STATES PATENT OFFICE

2,530,891

ROTARY MULTICONTACT DEVICE

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Application January 2, 1948, Serial No. 111

6 Claims. (Cl. 173—324)

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This invention relates to multicontact devices and more particularly to a multicontact device which is well adapted for use, for example, in a radio signaling apparatus of the type disclosed in a copending application Serial No. 763,968 filed July 26, 1947 in the name of C. F. Mattke.

In said application a radio signaling device is disclosed in which a stationary cylindrically-shaped casing section is provided for rotatably mounting a second casing section in the form of a turntable on which an energy reflector is mounted together with its electrical controlling apparatus, and scanning mechanism, such an arrangement necessitating the use of a great number of wire connections extending from terminals on banks located in the stationary casing section or support to the turntable, and to the electrical apparatus carried by such turntable, while permitting the operation of the turntable relative to the stationary casing section either clockwise or counterclockwise from a few degrees to a number of continued unidirectional revolutions.

The object of the present invention is the provision of a multicontact device for use in a radio signaling apparatus of the type above-mentioned which will be simple in construction and in which connections between the different sets of relatively movable wires are effected in an efficient and positive manner.

In the drawing,

Fig. 1 is an assembly view shown with a number of parts in vertical longitudinal section;

Fig. 2 is an assembly view in perspective shown with a number of operating parts with portions broken away;

Fig. 3 is a cross-sectional view taken on line 3—3 of Fig. 1; and

Fig. 4 is a cross-sectional view taken on line 4—4 of Fig. 1.

According to the construction of the multicontact device of this invention, a rotor element consists of a plurality of spider-shaped members 10 of insulating material mounted in superposed relation to each other on a hollow shaft 11 and clamped securely in a pile-up arrangement between a collar portion 13 formed at the top disposed end of this shaft and a nut 12 engaging a similar screw-threaded portion at the lower disposed end of hollow shaft 11. These spider-shaped members are held against movement relative to each other by a plurality of arcuate-shaped strips 14 having their longitudinal edges fitted in adjacently disposed notches in the arms of the spider-shaped members as best seen in Fig. 4.

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The strips 14 which are constructed of insulating material, form in cooperation with the arms of spider-shaped member 10, conduits for sets of wires as W1, W2, W3, W4, W5 and W6 as best shown in Figs. 1 and 4.

Each spider-shaped member 10 is provided with a drilled hole 15 for receiving one end of a wire in a group as W1 in Fig. 4 leading to a so-called pigtail lead 16 to which this end of the wire is connected as by soldering. The ends of lead 16 are connected to movable contact members 17, 17*y* longitudinally movable in guiding elements formed in two diametrically disposed arms of its respective spider-shaped member 10. An arcuate spring 18 is provided with a bent portion forming a tab as 19 fitted into a drilled hole in the spider member 10 and its opposite ends tensioned against the slidable arms 17, 17*y* for forcing them in contacting relation with their respectively associated conducting ring 20, while a circular recess, as 21, is formed in each spider member to one side thereof for receiving the pigtail connector 16 and the spring 18.

The wires of each set W1, W2, W3, etc. extend from their respective connectors 16 to the upper disposed end of the rotor element into an annular opening formed by the inside diameter of a ring member 210 and the periphery of a sleeve 22 fitted on hollow shaft 11 and into respective openings in a mounting plate or disc 23 for connection with respective terminals 24 disposed in sets in respective plugs as 24*w* shown in Figs. 1 and 2, these plugs being secured in radial position to the wall of a cylindrically-shaped casing 126 by a plurality of screws 25 and to a dust guard 125 which is in turn secured to the cylindrical casing 126 as by a plurality of screws 26, while a number of screws 26*y* secure the cylindrical housing to the mounting plate or disc 23 formed with an arm 23*y* having its free end portion secured to a cup-shaped casing 120 as by a screw 23*x*.

The stator element consists of a plurality of conducting rings 20 above-mentioned and a plurality of rings 27 of insulating material disposed in alternate superposed relation to each other and clamped in adjusted position between two flat ring members 28 and 29 and spacer rings 49 and 50 of insulating material by a plurality of rods R1, R2, R3, R4, R5 and R6, these rods having their upper disposed ends threadedly engaging the flat ring member 29 while their lower ends are fitted with nuts as 30 bearing against the underside of flat ring 28. A plurality of wires 31 corresponding in number to that of the sets W1, W2, etc., have their lower disposed ends connected to

sets of terminals as 32 in plugs PL shown on Figs. 1 and 2 mounted on downwardly extending supporting strips ST, having their upper disposed ends secured to the hub portion of a disc 34 as by a number of screws 65. These wires extend upwardly in a circular row in an annular space formed by a tubing 33 having its lower disposed end secured as by soldering over the periphery of disc member 34. This disc is provided with a bore centrally thereof for receiving the reduced portion of a ring 36 to which the flat ring member 28 is secured as by a plurality of screws 37, the ring 36 serving for mounting a ball bearing 39 the inner ring of which is fitted over the lower end of hollow shaft 11 for holding the rotor and stator elements in concentric relation to each other at this end.

Onto the flat ring member 29 which in cooperation with flat ring 28 serves for clamping the conducting rings 20 is superposed relation to each other is secured, as by a number of screws 40, a cup-shaped ring 41 into which is fitted the outer ring of a ball bearing 42, the inner ring of which is fitted over the periphery of ring 21, in turn secured to the mounting plate or disc 23 by a plurality of screws 43. The ball bearing 42 serves for holding the stator and rotor elements in concentric relation at this end, while a dust guard in the form of a flat ring 44 is secured to ring 41 by a plurality of screws 45x. A plurality of screws, as 45, threadedly engage into respective arms, as 46, extending upwardly from tubing 33 for holding the latter in abutting relation with the insulating ring 49 to form a leak-proof joint therebetween.

The wires 31 at the point adjacent the underside of flat ring 29 are bent into respective radially disposed notches 48 formed in the insulating ring 49 at the top disposed edge thereof and bent back in parallel relation into a common annular space formed by the periphery of the conducting rings 20 and the insulating rings 27 thus assembled, and the interior of tubing 33 for connection with respective conducting rings at the periphery thereof as by soldering at a point as Y shown in Figs. 1 and 4.

The contact assembly thus constructed of the rotor and stator elements is disposed in a cylindrically-shaped casing 31y having longitudinally equally disposed notches N, Fig. 2, at its upper disposed end for receiving the arms 46 carried by tubing 33, while the lower disposed end of the contact assembly is held in concentric relation in the cylindrical housing 31y by a plurality of pins 35 also serving for keying the tubing 33 to the disc member 34 prior to the soldering operation.

A nut 124 which is fitted to the top disposed end of tubular housing 31y serves for tensioning the spring washers 123 against the inner disposed ring of ball bearing 122 fitted into the cup-shaped casing 120 in superposed relation to a thrust bearing 121 shown in Fig. 1, the tension of the spring washers 123 being exerted against a collar 60 formed at the lower disposed end of the tubular housing 31y and fitted in a bore in the sleeve portion 24y of the stationary support 24x, the tubular housing 31y being held against rotation in the sleeve 24y by a set screw 62 fitted in a key way in the cylindrical housing 31y.

According to this construction the tension of spring washers 123 serves to hold the turntable 41y in firm frictional contact with its driving rollers 35x as set forth in the copending application above-mentioned.

A tubing member 66 extends in concentric relation to hollow shaft 11 with its lower disposed end secured as by soldering into an opening drilled centrally of disc 34. Tubing 66 in cooperation with tubing 33 and disc member 34 forms a container adapted to be filled with oil to a small distance beyond the slip ring assembly for the lubrication of the bearings 39 and that of the contacts formed by the conducting rings 20 and the conducting arms 17, tubing 66 in addition serving as a guide for a coaxial cable 67 extending to a rotary joint 68 connecting with a conductor 69 leading to the electrical apparatus not shown and which forms no part of the present invention.

In the operation of the multicontact device of this invention, the rotation of the turntable 41y relative to stationary supporting casing section 24x is imparted to the mounting plate or disc 23 through its arm 23y secured to the cup-shaped casing 120 as by screws 23x. Rotation of mounting plate 23 and the plugs 24w carried thereby is imparted to the rotor element thus constructed through a spline engagement of shaft 11 with mounting plate 23, while the stator element as above-mentioned is held from rotation by the set screw 62, engaging the key way formed at the periphery of tubular casing 31y which is fitted in the hub 24y formed with the base of the stationary cylindrical casing section.

What is claimed is:

1. A multicontact device comprising a shaft, a plurality of spider-shaped insulating elements mounted in superposed relation on said shaft, means for collectively securing the arms of said spider-shaped elements in adjusted angular relation to each other on said shaft, a plurality of rings of conducting material disposed in superposed relation to each other, one of said rings for each of said elements, insulating means interposed between said conducting rings, a plurality of means for securing said conducting rings and said insulating means in superposed relation to each other, and conducting means carried by said arms for engaging said conducting rings.

2. In a radio signaling system having a stationary cylindrically-shaped base and a turntable mounted for rotation thereon, the table supporting the radio signaling apparatus, a multicontact device comprising a stator element supported by the stationary support, a rotor element mounted for operation in position concentric to said stator element and actuated by the movement of the turntable, said rotor element comprising a shaft and spider-shaped insulating elements mounted on said shaft, said stator element comprising a plurality of insulating rings and a plurality of rings of conducting material mounted in superposed relation to each other, conductor members carried by the arms of said spider-shaped insulating elements, and spring means tensioned against said conductor members to cause the latter to engage with said conducting rings with a predetermined pressure contact.

3. A multicontact device comprising a rotatable shaft, a plurality of spider-shaped members of insulating material, means for collectively securing said members in superposed relation to each other on said shaft, each of said members having diametrically opposite guiding means formed therein, a contact element mounted for sliding movement in each of said guiding means,

a plurality of insulating and conducting rings disposed in superposed relation to each other concentric to said spider-shaped members, one of said conducting rings for each of said spider-shaped members, means for collectively securing said insulating and said conducting rings in superposed alternate relation to each other in engageable relation with said contact elements, insulating means for holding said spider-shaped members against movement relative to each other, said insulating means cooperating with the arms of said spider-shaped members to form conduits for sets of wires having one of their ends connecting with said contact members, and means for connecting another set of wires with said conducting rings respectively.

4. A multicontact device comprising a rotatable shaft, an insulating member mounted on said shaft for rotary movement therewith, a pair of longitudinally aligned guiding means carried by said member, a circular channel formed in said insulating member connecting with said guiding means, a contact member mounted for sliding movement in each of said guiding means, a stationary ring of conducting material disposed for engagement by said contacts, resilient means disposed in said circular channel for effecting a predetermined contact pressure between said contacts and said conductor ring and means disposed in said circular channel electrically connecting said oblong-shaped contacts.

5. A multicontact device comprising a disc having a centrally disposed opening, a tubing having one of its ends secured into the opening of said disc, a tubing having one of its ends secured to the periphery of said disc in concentric relation with the first-mentioned tubing, a hollow shaft mounted for rotation in concentric relation to the first and second-mentioned tubings, a plurality of contacts insulatedly carried by said shaft, a plurality of rings of conducting material, one for each pair of said contacts mounted in superposed relation in concentric relation to said first and second-mentioned tubings, said tubings cooperating with said disc to form a lubricant container into which said contacts move relative to said conducting rings.

6. In a radio signaling apparatus having a circular stationary base, a table for the signaling apparatus mounted for rotation on the base, a hub member extending perpendicularly from the base at the center thereof, and a cup-shaped casing mounted for rotary movement as a unit with the turntable, a multicontact device comprising a cylindrically-shaped casing keyed into said hub member and extending in concentric relation to the cup-shaped member, a rotor element having means operatively connecting with the cup-shaped member, a shaft for said rotor element keyed to said means, a plurality of spider-shaped members securely mounted on said shaft in superposed relation to each other, means for holding said members in aligned relation on said shaft, a pair of movable contacts carried by each of said spider-shaped members, a stator element having a plurality of conducting rings disposed for engagement by said movable contacts at diametrically opposite points thereof and wire connectors extending from said conducting rings and said contacts.

CHARLES F. MATTKE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,596,557	Scholes	Aug. 17, 1926
1,649,276	Adam	Nov. 15, 1927
2,309,316	Hollander	Jan. 26, 1943
2,323,575	Snowberger	July 6, 1943
2,376,370	Lombardi	May 22, 1945
2,436,949	Anderson	Mar. 2, 1948

FOREIGN PATENTS

Number	Country	Date
22,138	England	of 1911
317,313	Germany	Dec. 17, 1919