Oct. 9, 1956 D. B. CHERRY 2,766,355

COAXIAL SWITCH

Filed Aug. 25, 1953 2 Sheets-Sheet 1

Fig. 1

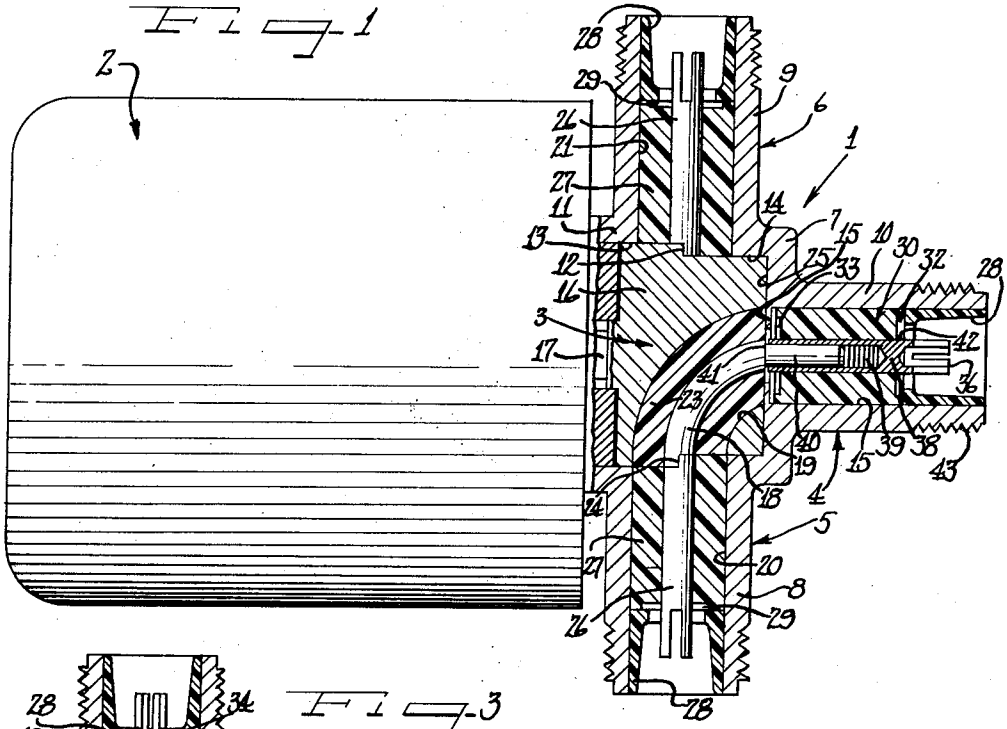


Fig. 3

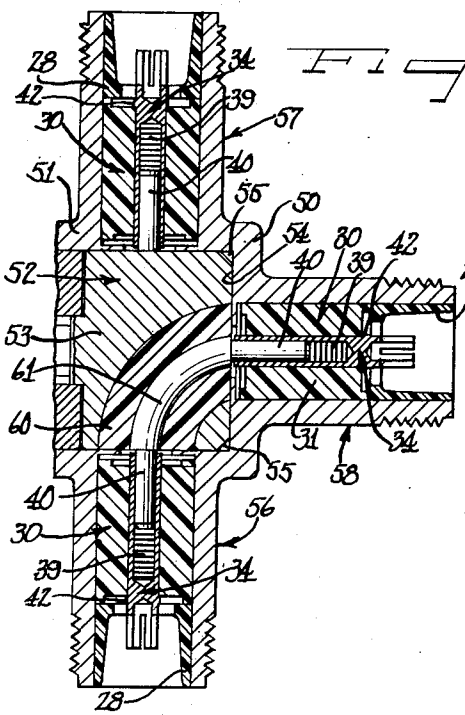
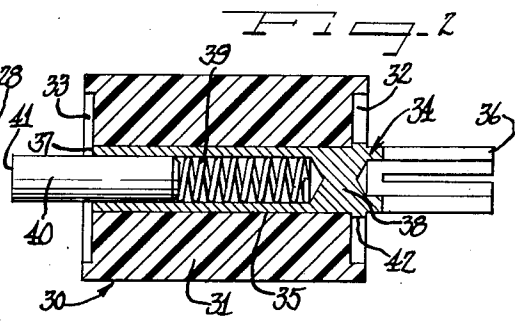


Fig. 2



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Fig. 4

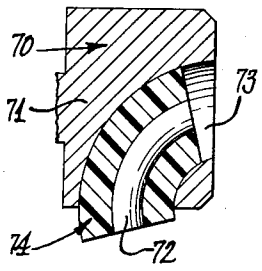


Fig. 5

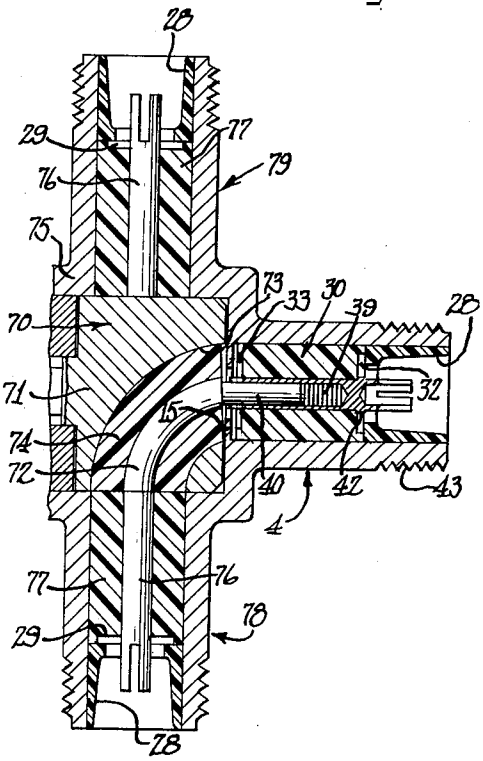


Fig. 7

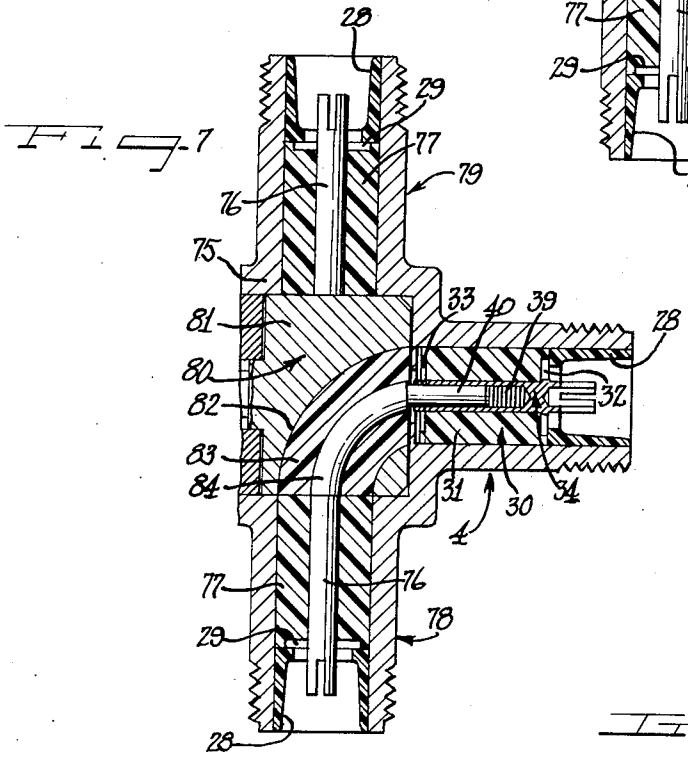
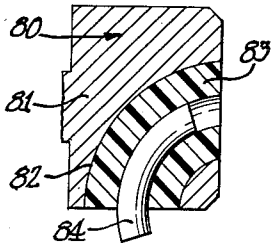


Fig. 6



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Attys

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2,766,355

COAXIAL SWITCH

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Application August 25, 1953, Serial No. 376,424

8 Claims. (Cl. 200—153)

The present invention relates to a coaxial switch. More particularly, the present invention relates to a coaxial switch with bias coupled center conductors.

Coaxial switches, as they are known in the art, are systems for selectively connecting one high frequency transmission line to selected individual of a plurality of other transmission lines. That is, coaxial switches are multiple channel systems adapted to selectively connect one of the channels to a main channel and to selectively couple the main channel to any one of the desired other channels.

These switching systems have been termed coaxial switches because they have found their greatest use in connection with selective coupling of coaxial transmission lines. Until recently, most coaxial switches inherently, by virtue of their construction, were plagued with such problems as having high input VSWR values (voltage standing wave ratio values) and characteristics, the requirements of extremely close manufacturing mechanical tolerances, and short life due to excessive wear on the contacting conductor elements.

The poor VSWR characteristics, which are an indication of poor conductance and high loss values, were due principally to the numerous discontinuities which were present in the switch construction. These discontinuities in equivalent circuit analysis fundamentally amounted to capacitance shunting of the input wave. Attempts to avoid high VSWR characteristics indicating high losses were usually unsuccessful even though it was assumed to be helpful to machine the component parts of the switches to extremely close tolerances. These extremely close tolerances became standard practice in the manufacture of these switches and resulted in very expensive construction of the same.

In addition to being almost excessively expensive, close tolerance construction resulted in switches of short life due to wear on the closely fitting component parts of the switches. Further, this close tolerance construction required that the switches be manipulated relatively forcefully and that a relatively high torque be applied to rotary type coaxial switches. The requirement of high torque or force manipulation also represented a further increase in the construction cost and additional power losses.

Close machining and mechanical tolerances were not the only cause for the requirement of high manipulation force or torque since rotary type coaxial switches generally included a sleeve type coupling between the center conductor of the rotor and the end conductor or principal or main transmission line connector. Such sleeve type connection was naturally attended with considerable friction between the two members. Also, many prior coaxial switches of the rotor type incorporated slot and flange connection between the center conductor of the rotor and the center conductor of each of the remaining connectors which were usually radially disposed about the rotor and radially extending from the switch.

Numerous of the aforementioned difficulties and problems, and particularly the problems of high discontinuity

and reflection losses, high VSWR characteristic values, have been obviated in the development of the coaxial switch developed by Carl F. Schunemann and Theodore R. Thoren, described and claimed in their application for patent entitled "Coaxial Switch," Serial No. 267,246, filed January 19, 1952. The features and advantages of the coaxial switch invented by Messrs. Schunemann and Thoren are therefore incorporated into the coaxial switch system of my invention insofar as they are compatible with the principles of my invention.

By the principles of my invention, I have obviated numerous of the remaining difficulties and problems attending the construction of coaxial switch systems; construction of a coaxial switch system in accordance with the principles of my invention provides a coaxial switch not dependent upon extremely close machining tolerances, of long useful life, and requiring only minimum torque in the range of very few inch-ounces to manipulate the rotor mechanism thereby to change the channel coupled to the end conductor connector.

By the system of the present invention another difficulty, not mentioned above, is also obviated. This problem was the frequent existence of poor contact coupling and connection between the several inner conductors of the lines to be coupled together selectively by the switch mechanism. Since, as stated, the usual practice in the construction of coaxial switches was to interconnect the center conductors of the same through tight friction fitting ends of the conductors thereby subjecting them to excessive wear without compensation therefor.

By the system of the present invention, the numerous forms of slot and flange or plug type coupling connection of the center conductors may be eliminated and wear on the connecting surfaces of these inner conductors is compensated for.

In accordance with the principles of the present invention, the center conductor connections are preferably spring loaded or otherwise biased for insuring not only wear compensation but also a good connection and proper coupling between these inner or center conductors.

It is therefore an important object of the present invention to provide a new and improved coaxial switch system having improved and reduced VSWR values and improved coupling between the center conductors coupled together by the switch system.

It is another important object of the present invention to provide an improved coaxial switch system with new and improved connector sections including biasing of the center conductors of the switch system thereby providing the same with compensation for wear and insuring good center conductor contact.

Still another important object of the present invention is to provide a new and improved coaxial switch mechanism permitting increased manufacturing and construction tolerances.

Still another object of the present invention is to provide a new and improved coaxial switch system with construction features permitting the same to be operated by reduced torque on the rotor of the system.

Yet another object of the present invention is to provide an improved coaxial switch rotor with a slidably arranged center conductor.

Still another object of the present invention is to provide a new and improved coaxial switch connector with a biased center conductor member.

Still another object of the present invention is to provide a new and improved coaxial switch connector assembly including an improved center conductor construction.

Still other objects, features and advantages of the present invention will readily present themselves to those skilled in the art from the following detailed description

of a preferred embodiment of the present invention, from the amended claims, and from the accompanying drawings from form an integral part of this specification and fully disclose each and every detail shown and illustrated thereon, in which like reference numerals refer to like parts, and in which:

Figure 1 is an elevational view, partially in section, of a coaxial switch embodying the principles of the present invention coupled to a rotor operator therefor;

Figure 2 is a sectional view of a connector center conductor assembly and the dielectric spacer therefor embodying the principles of the present invention;

Figure 3 is an elevational sectional view of another preferred embodiment of a coaxial switch embodying the principles of the present invention;

Figure 4 is a sectional view of a preferred form of coaxial switch rotor embodying the principles of the present invention;

Figure 5 is a sectional view of a coaxial switch constructed in accordance with the principles of the present invention and embodying the rotor as shown in Figure 4;

Figure 6 is a sectional view of another preferred form of coaxial switch rotor embodying the principles of the present invention; and

Figure 7 is a sectional view of still another preferred form of coaxial switch embodying the principles of the present invention and incorporating the rotor of Figure 6 therein.

There is illustrated in Figure 1 a preferred form of coaxial switch, indicated generally at **1**, embodying the principles of the present invention and readily adapted to be manipulated to interconnect desired channels by a rotor operator mechanism **2** coupled to the switch mechanism and arranged to incrementally rotate a rotor **3** forming a part of the switch mechanism. The switch **1**, in Figure 1, is illustrated in section to more clearly present the features of this embodiment of the present invention and the construction thereof. As the switch **1** is illustrated, it is provided with an end conductor connector **4** extending axially from the switch mechanism and a plurality of other channel conductor connectors **5** and **6**. Only two such other channel conductor connectors are illustrated in Figure 1 but it should be understood that there may be any desired number of these radially extending connectors such as the conectors **5** and **6**. The number of other channel radially extending connectors is not critical to the present invention and is limited only by the dimensions desired for the switch and for the component parts thereof. The switch **1** has been illustrated with only two such other channel radially extending connectors for purposes of convenience.

An outer housing **7** having a plurality of radially extending pipe-like portions **8** and **9** and a similarly dimensioned axially extending pipe-like portion **10** is constructed from a conductive material and forms the outer conductor of each of the connector assemblies **4**, **5** and **6**. The pipe-like portions **8**, **9** and **10** are preferably axially hollow and are joined at a hub portion **11** which is also hollow to provide an appropriate cavity for the rotor **3**. Of course, the cavity in the hub **11** is joined with the hollows in each of the connector outer conductor portions **8**, **9** and **10**. It will be understood also that the unitary construction for the housing **7** is preferred but not essential and the housing **7** may be constructed from a plurality of appropriately machined or otherwise constructed parts fitted and secured together to provide the housing assembly with a construction resembling that illustrated and described here.

The rotor cavity in the hub **11** is preferably substantially circular in cross-section in a plane perpendicular to the plane of the drawing of Figure 1, substantially cylindrical to accept the switch rotor **3** in rotatable bearing relation therein. The particular cavity in the hub section **11** of the switch housing **7** is stepped as at **12** providing the cavity with an enlarged cylindrical section **13** in the vicinity of the rotor operator **2** and with a reduced diameter section **14** joining with the axial hollow **15** and air match section **15'** in the end conductor connector section **4**. The shoulder **12** is axially positioned in the cavity at about the center plane for the radially extending connectors **5** and **6**, etc.

The rotor assembly **3** includes a substantially cylindrical rotor block **16** formed of a conductive material which is preferably the same as the material for the housing and outer conductor assembly **7** but which may be of any other desired material selected at random or in accordance with design calculations and conductivity. The rotor block **16** is formed to fit rotatably and bearingly within the cavity in the hub **11** and is therefore substantially cylindrical having a reduced diameter in the area of the section **14** of the cavity in the hub **11** and an enlarged diameter in the area **13** of the cavity in the hub **11**. Similarly, a shoulder portion joins the reduced diameter section and enlarged diameter section in the vicinity of the shoulder **12** in the cavity in the hub **11**. A shaft or the like **17** interconnects the rotor block **16** and the rotor operator mechanism within the operator **2**.

The conductor rotor block **16** forms the outer conductor coupling member for the switch rotor **3**. The switch rotor assembly **3** is also provided with an inner conductor coupling member **18** which is concentric within a right angle passage **19** within the block **16**. The passage **19** is substantially of the same normal plane diameter as the diameter of the passage or hollow **15** and the end conductor connector outer conductor **10** and a similar passage **20** in the portion **8** of the housing **7** and the passage **21** in the portion **9** of the housing **7**. In addition, the passage **19** terminates at one end thereof concentrically with the passage **15** and at its other end concentric with the opening passage through the coaxial connector with which it is contiguous. A dielectric insulator spacer **23** positions the inner conductor **18** of the rotor assembly **3** properly within the passage **19** and is preferably formed of a moldable material having good dieletric qualities such as the material commonly known as "Kel-F," polytrifluorochloroethylene resin. This insulating elbow **23** has good molding characteristics as well as good dielectric characteristics (the dieletric constant of "Kel-F" being about 2.3) and may be molded right in place in the elbow passage **19** in the rotor block **16**. Other materials for the insulator elbow **23** may be employed in this particular embodiment but it is preferred to use "Kel-F" for numerous reasons not least among which is that it provides good dielectric matching for other insulators in the connectors further described hereinbelow and the fact that it has proper temperature expansion characteristics which are utilized in accordance with the principles of the present invention further defined hereinbelow.

At the ends thereof which are to mate with the appropriate parts of the radial connectors **5** and **6**, the elbow insulator **23** and rotor center conductor **18** are appropriately shouldered as at **24**. At their other ends, the dielectric "Kel-F" insulator **23** and rotor center conductor **18** of this embodiment of the present invention are preferably finished flush with the face **25** of the rotor block and outer conductor **16**, which face **25** is the end conductor face thereof adjacent to the end conductor **4**.

The radial connectors **5** and **6** for coaxial type transmission lines each include a center conductor member **26**, a dielectric insulator **27** and a thrust insert **28**. The center conductor **26** of each of these radial connectors is axially disposed within the passages in the outer conductors **8** and **9** respectively and maintained in that position by the dielectric insulators **27** which are preferably preformed plugs of the preferred dielectric material "Teflon," polytetrafluoroethylene, which is a preferred construction material for the plug insulator and spacer **27**. The "Teflon" insulator plugs **27** for the radial connectors **5** and **6** also have good dielectric characteristics and insulation characteristics and may be matched with the

"Kel-F" insulator elbow through control of the diameters thereof respectively. It was described above that the passage **19** in the rotor block **16** and the passages **15**, **20** and **21** should be of substantially the same diameter; these diameters, as stated, should be substantially the same but may be modified in accordance with coaxial line discontinuity considerations permitting matching of the insulators and coaxial lines and the connectors. Also, of assistance in matching these several lines and compensating for the discontinuities present in the switch, air match gaps are provided by recesses in an end or ends of the several insulators such as the air match recesses **29** in the insulators **27** illustrated. The inserts **28** in the connectors **5** and **6** which radially extend about the hub **11** and rotor **16**, are also preferably formed to maintain the insulators **27** of each of these connectors in proper axial position.

The end conductor connector **4** has an inner conductor and insulator assembly illustrated in enlargement in Figure 2 and identified generally by the numeral **30**. This inner conductor and insulator assembly **30** is held in place in the axial passage **15** and against the air match section **15'** in the outer conductor member **10** by an additional insert **28** which is preferably cup-shaped and which may be identical with the inserts **28** of the radial connectors **5** and **6**.

The inner conductor and insulator assembly **30** includes an insulator **31** which is also preferably formed of "Teflon" of substantially cylindrical construction and provided with air match recesses **32** and **33** in each end thereof respectively. The insulator **31** is provided with an axial passage therethrough of substantially the same diameter as the calculated diameter of an inner conductor for this connector. An inner conductor spool-like member **34** is fixed within the axial passage **35** of the dielectric insulator **31** and is axially bored from both of its ends **36** and **37** so that it is substantially hollow except for a center solid portion **38** therein. At the coaxial transmission line connector end **36** thereof, the spool-like center conductor member **34** is slotted in quadrature for resilient coupling to a coaxial connector plug (not shown). In the hollow extending inwardly from the rotor coupling end **37** of the spool-like inner conductor member **34** there is disposed an axially resilient member such as a compression spring **39** seated against the solid portion **38** and an inner conductor plunger **40** seated against the axially resilient member **39** telescopingly within the member **34**. The rotor coupling end **37** of the center conductor **34** also may be slotted to provide fingers biased into highly conducting contact with the plunger **40**. Crimping or the like provides the bias to these fingers and the conductive contact between fingers and the plunger prevents inductive effects in the spring **39** at high frequencies. It will be understood, of course, that so long as there is good conductive contact between the plunger **40** and the spool **34**, inductive effects at the spring **39** will be avoided.

Seated within the axial passage **15** of the outer conductor portion **10** of the end conductor connector **4**, the inner conductor and insulator assembly **30** abuts the elbow dielectric insulator **23** and the elbow inner conductor **18** of the rotor assembly **3**. The coupling end **41** of the inner conductor plunger **40** abuts the flush end of the elbow inner conductor **18** and is pressurably resiliently urged thereagainst by the spring member **39**. To insure against axial movement of the spool-like inner conductor member **38**, it is provided with a small radial shoulder **42** which abuts against the face of the recess **32** in the Teflon plug **31** and has an axial dimension substantially the same as that of the recess **32**. The spool-like center conductor member **34** has a length from its shoulder **42** to its rotor coupling end **37** slightly greater than the axial dimension of the Teflon block **31** so that the coupling end thereof may be disposed as closely as possible to the plane of coupling with the elbow center conductor **18**.

Thus, by the arrangement of Figure 1, it will be understood that when the rotor **3** is rotated by the mechanism of the rotor operator **2**, the center conductor **18** thereof will remain in constant positive coupling with the center conductor of the connector **4** by pressure of the plunger **40** thereagainst at face **41** due to the spring **39**. Any wear on the abutting faces of the conductors **18** and **40** will be compensated for automatically by the spring member **39**. Axial movement of the center conductor spool **34** is prevented by its pressed interfilling relation with the insulator **31**.

From the above, it will also be seen that the heretofore required close tolerances for many of the component parts of coaxial switches may be eliminated since the center conductors are in pressure contact. Therefore, and since plug-type and slot-type center conductor connections may be avoided in accordance with the principles of the present invention, very low torque is necessary to rotate the rotor **3**. Only a torque in the range of a very few inch ounces need be applied to effect rotation of the rotor **3**. By rotating the rotor **3** between preselected positions defined by the position of each of the connectors radially disposed thereaobut, such as the connectors **5** and **6**, the end conductor connector **4** may be coupled to individual of these radially extending connectors and the coaxial transmission lines to which they are connected, not shown, selectively. The system may be provided with an indicator or with automatic stop means if so desired since the rotation operator mechanism **2** may be a rotary solenoid or the like or any other desired type of rotor operator mechanism merely operable to effect rotation of the rotor between the radially extending connectors individually and selectively.

In systems of this nature, the power signal may be fed in from the end conductor **4** and distributed selectively to any one desired of the radially extending conductors and their associated coaxial transmission lines or differing signals may be provided to each of the radially extending connectors and they may be selectively taken to the end conductor assembly **4** as desired for any desired purpose.

Another preferred embodiment of the present invention is illustrated in cross-section in Figure 3. In this coaxial switch system the housing **50** is substantially identical to the housing **7** of the switch **1** except that the cavity in the hub portion **51** thereof is substantially uniform in diameter and is not provided with the shoulder **12** of the cavity in the hub **11** in the housing of switch **1**. Also, the rotor assembly **52** has a rotor block **53** which is preferably cylindrical and substantially uniform in diameter throughout its axial length except that the forward face **54** thereof is slightly chamfered or tapered circumferentially thereabout as at **55** for purposes hereinafter described.

The coaxial switch system of Figure 3 is similar to the system of Figure 1 in that it is provided with a plurality of connectors such as connectors **56** and **57** extending radially therefrom about the rotor assembly **53**, and further has an end conductor connector **58** thereon extending axially therefrom.

In this embodiment of the present invention, it is preferred that all of the several connectors such as the connectors **56**, **57** and **58** be formed substantially identically with the connector **4** of the switch of Figure 1, thereby including in each thereof a center conductor and insulator assembly **30** such as the one illustrated in Figure 2. By providing each of the connectors such as connectors **56**, **57** and **58** with "Teflon" dielectric insulators **31** and shoulder **42**, spool-like center conductor members **34** carrying spring **39**, biased center conductor plungers **40** and center conductor positioning and securing inserts **28**, all of the center conductor plungers **40** are urged into pressure contact and wear-compensating contact with the rotor assembly **52**. This construction is particularly advantageous since it insures good contact of low friction

thereby allowing the rotor to be manipulated by a very small torque and further eliminating any necessity for any contact shoulders or the like for the center conductor members.

Assembly of the coaxial switch of Figure 3 is conducted in a very similar manner to the system of assembly and construction of the coaxial switch system of Figure 1 and insertion of the rotor assembly **52** carrying the rotor outer conductor **53**, the "Kel-F" elbow dielectric insulator **60** and the rotor elbow inner conductor **61** after fitting the connector assemblies **56**, **57** and **58** together is easily and efficiently facilitated without damage to the plungers **40** of the radially extending connectors **56** and **57** by camming them onto the cylindrical surface of the rotor block **53** over chamfered camming leading edges **55**.

The coaxial switch system of Figure 3, forming a preferred embodiment of the present invention, thus provides a coaxial switch wherein all of the center conductors are very definitely individually pressure-urged into proper coupling engagement without the difficulties attending plug and recess or slot and flange type high friction, high reaction coupling terminals.

Another important embodiment of the present invention is illustrated in Figures 4 and 5; Figure 4 illustrating a new and improved form of rotor and Figure 5 illustrating a new and improved coaxial switch mechanism incorporating the rotor of Figure 4.

As was previously pointed out, the dielectric insulating material which is preferred for the dielectric elbow in the rotor is a material which is commonly known as "Kel-F" and more technically known as polytrifluorochloroethylene resin since this material has good dielectric characteristics and may be molded in place. Another characteristic of "Kel-F" is that it has a relatively high thermal expansion value and upon cooling and setting following molding has a tendency to contract or shrink to a considerably reduced volume.

Heretofore, this shrinkage and contraction of the "Kel-F" dielectric elbow has been thought of as creating a problem and has been compensated for in numerous ways. I have found, however, that the shrinkage of the "Kel-F" elbow may be most advantageously employed in a coaxial switch rotor.

The coaxial switch rotor **70** of Figure 4 has a rotor block **71** which may be, if desired, identical to the rotor block **53** of the rotor assembly **52** of the coaxial switch system of Figure 3. A center conductor member **72** of elbow configuration and squared off ends like the center conductor **61** of the switch in Figure 3 is coaxially arranged within an elbow passage **73** in the rotor block **71** and a dielectric insulator formed of "Kel-F" is molded about the center conductor **72** within the passage **73**. Upon cooling and setting the "Kel-F" elbow **74** shrinks and contracts somewhat and therefore is loose to arcuately slide within the passage **73** unless some other provision is made to hold the "Kel-F" insulator and center conductor **72** in place in the rotor block **71**.

The coaxial switch system of Figure 5 is substantially identical to the coaxial switch system **1** of Figure 1 but incorporates the rotor **70** which is one without shoulders on the peripheral surface thereof and the cavity in the hub **75** is similarly without shoulders thereon, but is preferably smoothly cylindrical as in the similarly constructed assembly of Figure 3. The end conductor connector of the switch assembly of Figure 5 is also identified by the numeral **4** indicating that it is the same as the end conductor connector assembly **4** of the system of Figure 1 including the insulator and center conductor assembly **30** of Figure 2. In this preferred embodiment, the plunger **40** biased outwardly by the axial biasing spring **39** is forced against the center conductor **72** of the rotor **70** and slidably urges the center conductor **72** and the "Kel-F" insulator **74** into engagement with the center conductor **76** and Teflon plug dielectric insulator **77** of one of the radially extending connectors **78** and **79**, respectively. Since the "Kel-F" elbow dielectric insulator **74** is arcuately slidable within the passage **73** of the insulator block **70**, any wear on the ends, either of them, of the center conductor **72** or center conductors **76** or center conductor plunger **40** is compensated for through movement of the plunger **40** and the elbow conductor and insulator **72** and **74** under the biasing force of the spring **39**.

This preferred improved arrangement in accordance with the principles of the present invention provides a very efficient long-life positive contacting coaxial switch mechanism which in addition to its other features is also rotatable under a very small torque within the range of a very few inch ounces just as the other of the preferred systems described and illustrated in accordance with the principles of the present invention.

Another form of coaxial switch taking advantage of this slidably arranged center conductor system, is illustrated in Figures 6 and 7. A rotor assembly **80** is illustrated in Figure 6 wherein the rotor block **81** has an elbow passage **82** in which a "Kel-F" insulator elbow **83** is so molded as to be fixedly secured in position within the elbow passage **82**. The elbow insulator **83** is also so molded that the center conductor **84** coaxially therein is arcuately slidable therethrough and is shown in an offset position in Figure 6.

The coaxial switch system embodying this rotor assembly **80** is shown in section in Figure 7 and aside from the coaxial switch rotor assembly **80** is preferably substantially identical to the system described above in connection with Figure 5. That is, the cavity in the hub **75** is regularly cylindrical and the connector **4** incorporates the "Teflon" insulator and biased center conductor assembly **30** of Figure 2.

In this preferred embodiment biasing of the plunger **40** operates to arcuately slide only the center conductor **84** of the rotor assembly **80** into proper coupling contact in connection with the center conductor **76** of a selected one of the radial connectors **78** and **79**, etc. The coaxial switch system of Figure 7 is a most efficiently operating one and constitutes a valuable preferred embodiment of my invention.

It should be noted in connection with the coaxial switch systems of Figures 1, 5 and 7 that the radially extending connectors may be equipped with the biased center conductor system as illustrated in Figures 2 and 3 if so desired without departing from the spirit and scope of the present invention since that biased center conductor system constitutes an important feature of the present invention.

Thus, it will be understood that the principles and novel concepts of the present invention are not limited to the precise embodiments shown and described but are applicable to various types of coaxial switches such as those where connection is made only between selectable radial connectors etc.

It will also be understood that various other details of construction may be varied through a wide range, depending upon the conditions, without departing from the true principles of this invention and the scope thereof, and it is, therefore, not the purpose hereof to limit the patent granted hereon otherwise than by the scope of the claims.

I claim as my invention:

1. A coaxial switch system comprising, a plurality of radially arranged coaxial line connectors, an axially disposed coaxial line connector, a rotor assembly having a coaxial line coupling member incorporated therein and positioned to couple said axial connector selectively with individual of said radially arranged connectors, and spring-loading biasing means insuring proper connection coupling of inner conductors of said connectors through said rotor assembly, said rotor assembly including an outer conductor member and a coaxially arranged inner

conductor member slidably disposed therein for arcuate sliding thereof under force from said biasing means.

2. A coaxial switch system comprising a plurality of radially arranged coaxial line connectors, an axially disposed coaxial line connector, a rotor assembly having a coaxial line coupling member with an axially extending end for continuity with the axially disposed coaxial line connector and with a radially extending end for selective continuity with the radially arranged coaxial line connectors, and biasing means acting at least on the axial end of the coaxial line coupling member and thereby urging the radial end of the coaxial line coupling member toward a selected radially arranged coaxial line connector for insuring proper coupling of said axial connector with the selected radial connector through said rotor assembly.

3. A coaxial switch system comprising a plurality of radially arranged coaxial line connectors, an axially disposed coaxial line connector, a rotor assembly having an inner conductor member incorporated therein, said rotor assembly having a passage defining an outer conductor, and said inner conductor member being movable axially of said passage so as to maintain coaxial alignment of said inner conductor member relative to the outer conductor in spite of axial shifting thereof, said inner conductor member being positioned to couple said axial connector selectively with individual of said radially arranged connectors, and spring-loading biasing means acting on at least one end of said inner conductor member for urging the inner conductor member to shift axially of said outer conductor for insuring proper coupling of said connectors through said rotor assembly.

4. A coaxial switch mechanism for coupling coaxial lines, comprising a switch body, a pair of coaxial line connectors in said body each having an inner conductor and an outer conductor, a coaxial switch member movable relative to said switch body and constructed for establishing continuity between said pair of connectors in one position thereof, said switch member having an outer conductor and having an inner conductor mounted for shifting axially of the switch member outer conductor, and one of the switch body inner conductors acting on at least one end of the switch member inner conductor to urge the opposite end of the switch member inner conductor toward the other of the switch body inner conductors when the switch member is disposed to interconnect said switch body coaxial line connectors.

5. A coaxial switch mechanism for coupling coaxial lines, comprising a switch body, a pair of coaxial line connectors in said switch body each having an inner conductor and an outer conductor, a coaxial switch member movable relative to said switch body and constructed for establishing continuity between said pair of connectors in one position thereof, said switch member having an outer conductor and having an inner conductor mounted for shifting axially of said switch member outer conductor, an insulating sleeve carrying said switch member inner conductor in insulated relation to the switch member outer conductor and slidable in said switch member as a unit with said switch member inner conductor, and one of the switch body inner conductors acting on one end of the switch member inner conductor toward the other of the switch body inner conductors when the switch member is disposed to interconnect said switch body coaxial line connectors.

6. A high frequency switch mechanism comprising a switch body, a switch member movable relative to said switch body and having an arcuate coupling member with a substantially constant radius of curvature slidable in said switch member on an arcuate path defined by said radius, connector means carried by the switch body for registration with opposite ends of said coupling member in said one position of said switch member, and biasing means urging at least one of said connectors against the corresponding end of the coupling member to tend to slide the coupling member toward the other of said connectors without displacing said coupling member from the arcuate path defined by said radius of curvature.

7. A coaxial switch mechanism comprising a switch body, a switch member movable relative to said switch body and having an arcuate passage with a substantially constant radius of curvature, an inner conductor of corresponding radius of curvature disposed coaxially in said arcuate passage and movable in an arc on said radius, said switch body providing a pair of coaxial connectors for registration with the opposite ends of said arcuate passage in one position of the switch member, and the coaxial connectors including inner conductors for registration with the opposite ends of the switch member inner conductor, and at least one of the switch body inner conductors acting on the corresponding end of the switch member inner conductor to urge the switch member inner conductor to move in said arc and to urge the opposite end thereof toward the other switch body inner conductor.

8. A coaxial switch mechanism comprising a switch body, a switch member movable relative to said switch body and having an arcuate passage with a substantially constant radius of curvature, an elongated insulating sleeve slidably disposed in said arcuate passage and having a corresponding conforming curvature, an inner conductor of radius of curvature corresponding to said arcuate passage and carried by said insulating sleeve for movement in an arc on said radius, said switch body providing a pair of coaxial connectors for registration with the opposite ends of the passage in one position of the switch member, the coaxial connectors including inner conductors for registration with the respective opposite ends of the switch member inner conductor, and at least one of the switch body inner conductors acting on the corresponding end of the switch member inner conductor to urge the switch member inner conductor to move in said arc and to urge the opposite end thereof toward the other switch body inner conductor.

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