Sept. 2, 1958 F. LEBER 2,850,594

SELECTOR APPARATUS

Filed Nov. 25, 1955 2 Sheets-Sheet 1

FIG. 1

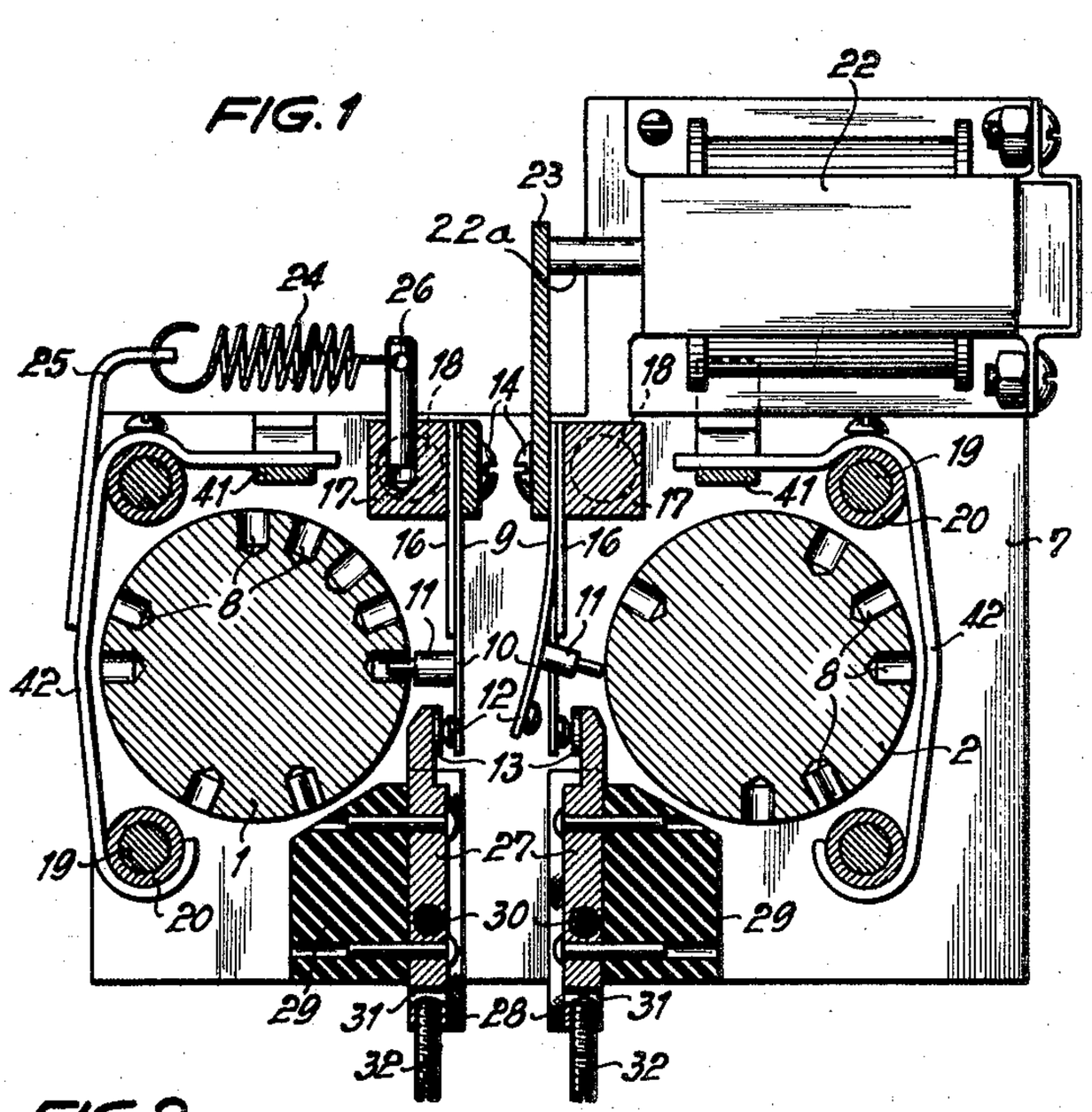
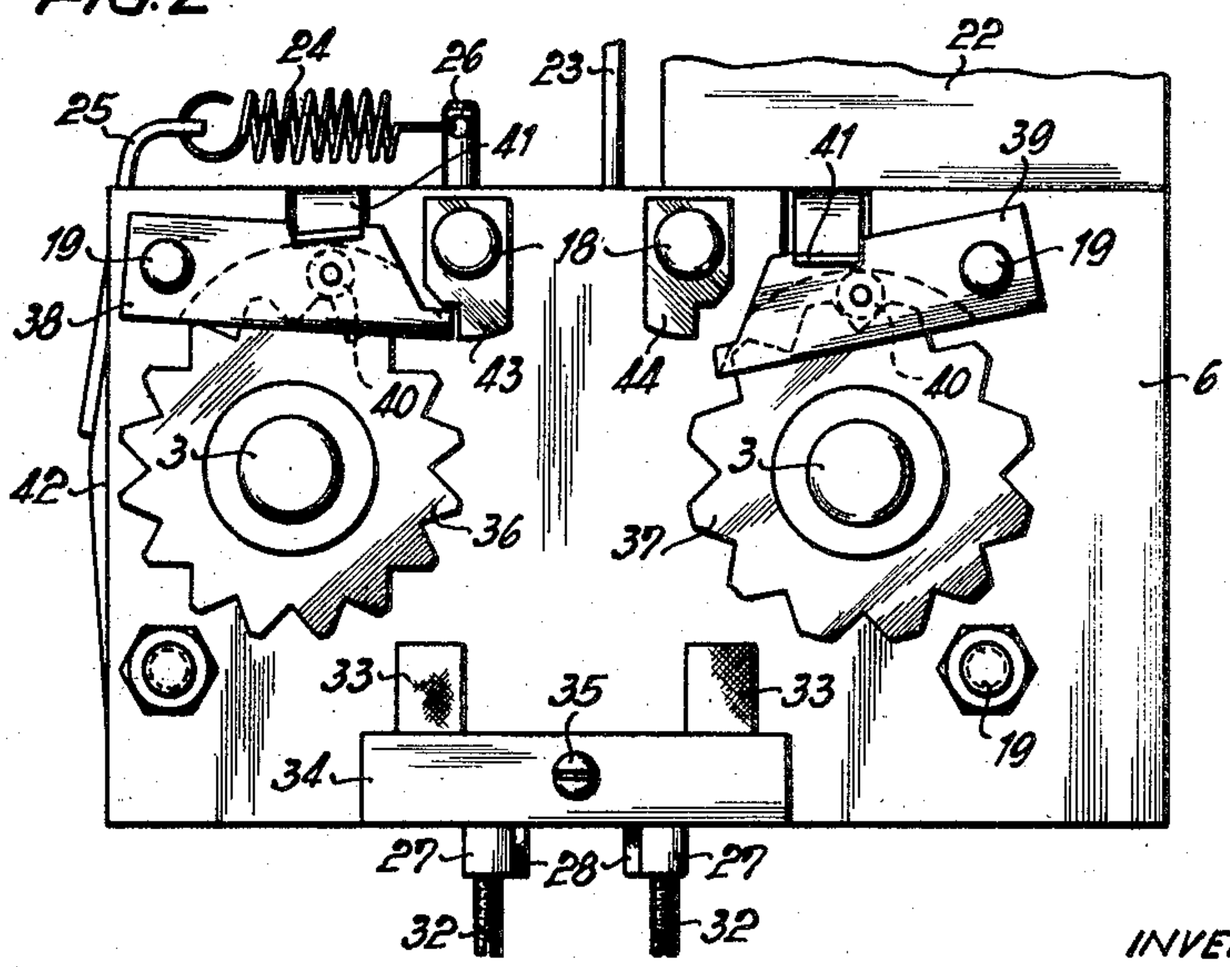


FIG. 2



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SELECTOR APPARATUS

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FIG. 3

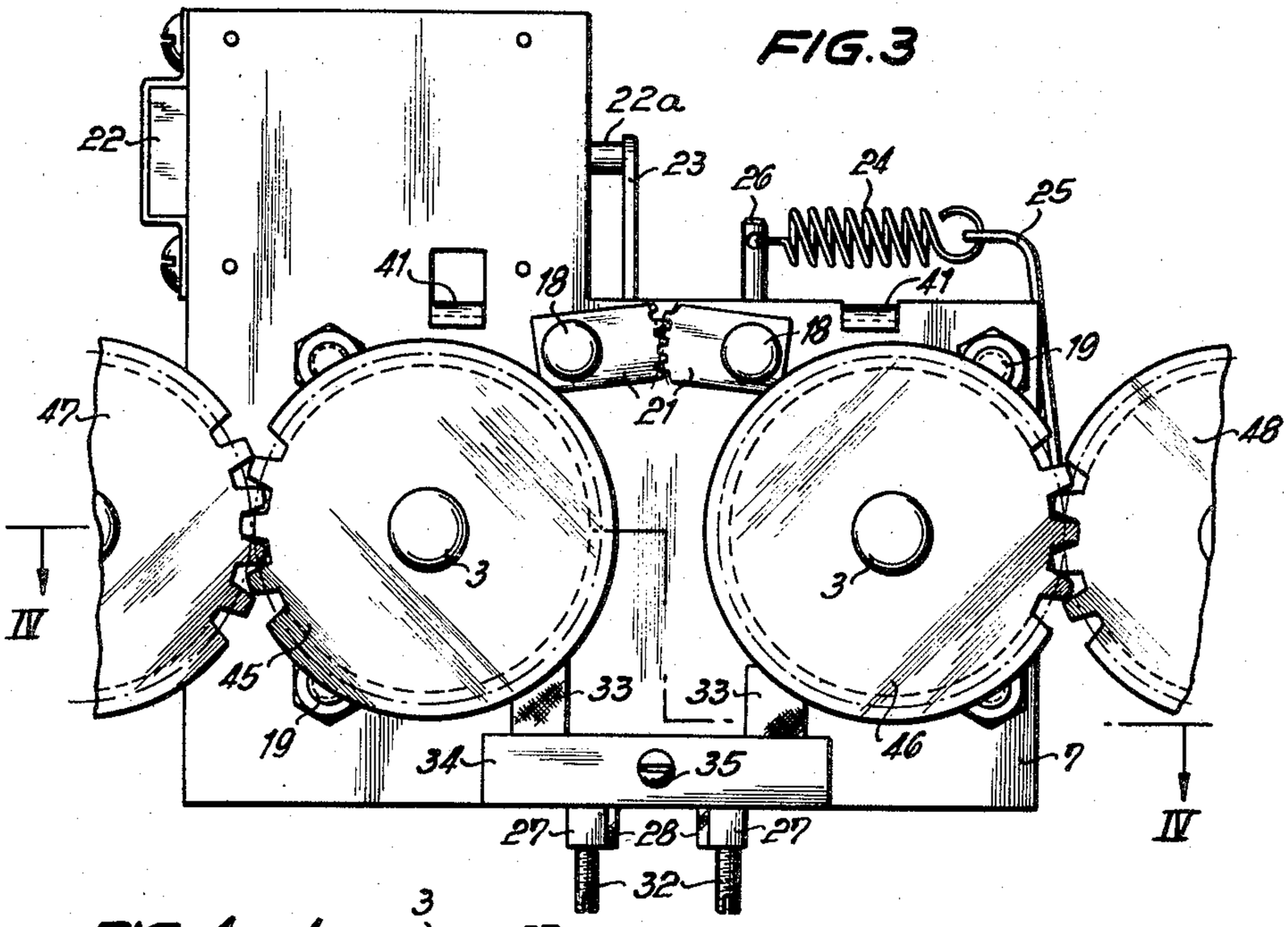


FIG. 4

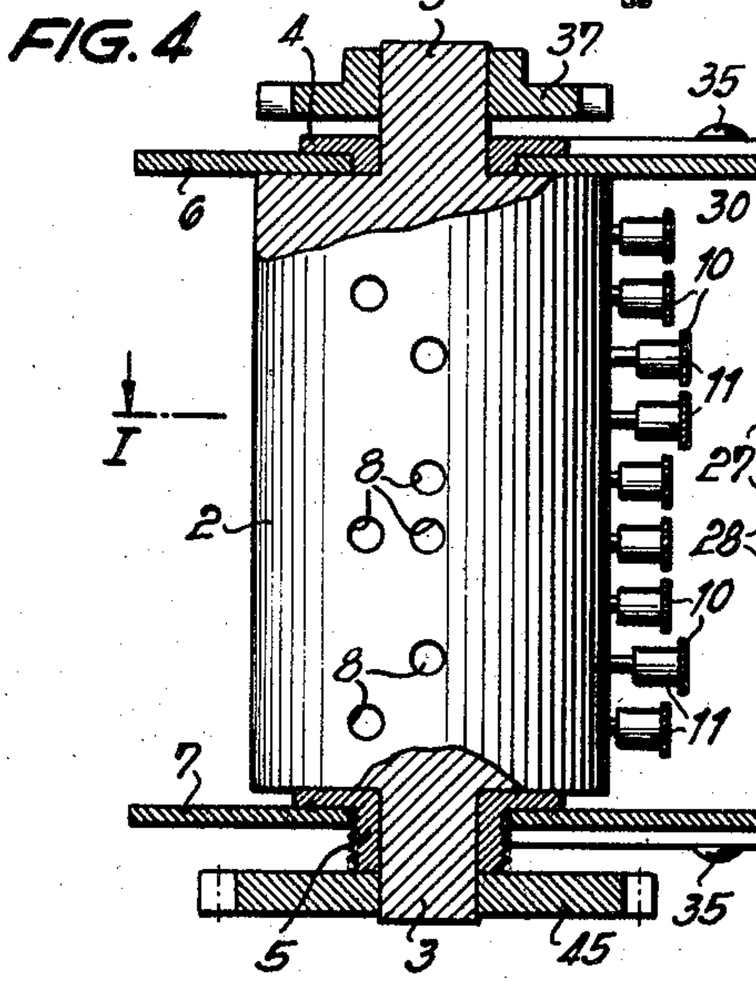
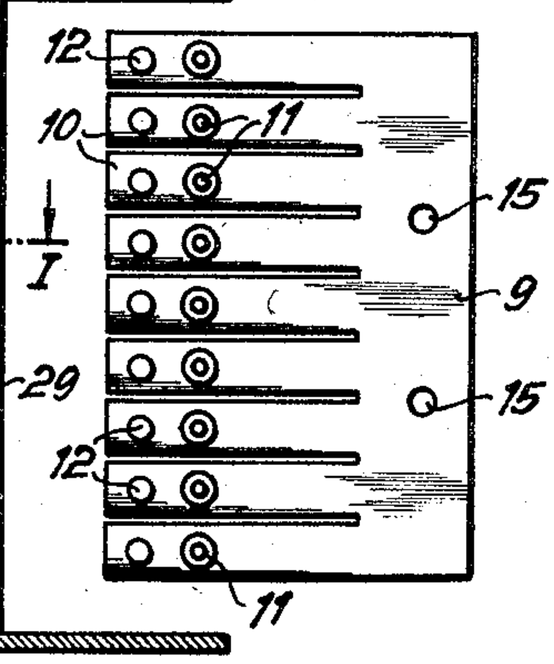


FIG. 5



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SELECTOR APPARATUS

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Claims priority, application Germany November 29, 1954

4 Claims. (Cl. 200—87)

The present invention relates to a new and improved selective actuating arrangement. More particularly, the present invention relates to a selector apparatus capable of operating in a plurality of different positions and of providing a plurality of different switching combinations

Conventional selector and switching mechanisms are provided with some sort of control mechanism such as a rotary drum which has on its surface either axial or radial cam arrangements. Each of the cams can be used for operating a particular electrical switch, for example. In order to obtain different switching combinations, with the conventional switching mechanisms, it is necessary to rotate the control mechanism through a plurality of different operating positions. In each position a different combination of switches may be operated.

Since the cams located on the control mechanism directly operate the electrical switches associated therewith, it is necessary that these switches open and close during the rotation of the control mechanim. That is, while the control mechanism is being moved from one operative position into another operative position, the cams of the control mechanism continuously open and close the switches as they make contact therewith. Accordingly, even though a particular switch may not have a circuit function for the next operating position of the control mechanism, it is still necessary for each and every switch associated with the control mechanism to be operated regardless of the first or final operative position in which the control mechanism is placed.

Therefore, in conventional selecting arrangements there is considerable wear between the contacts of the switch since they are continually being opened and closed whether or not they are to be used in the electrical circuit. This is because the positioning of the control mechanism and the electrical connections controlled by the control mechanisms both take place simultaneously. That is, as the control mechanism is being moved to its next operative position the originally closed switch is opened and when the control mechanism reaches its final desired position, the respective switches are simultaneously closed.

It is clear that with the above conventional arrangements the switches were continuously opened and closed regardless of whether or not they are to be used in the electrical circuits. Accordingly, it is an object of the present invention to overcome the disadvantages of conventional selecting and switching mechanisms.

Another object of the present invention is to provide a new and improved selective actuating arrangement.

A further object of the present invention is to provide a new and improved selective actuating arrangement capable of operating in a plurality of different positions and for providing a different switching combination in each of its positions.

Still another object of the present invention is to provide a new and improved selective actuating apparatus having a control mechanism which is free to move between a plurality of different operative positions without the operation of any of the electrical switches associated therewith.

Still a further object of the present invention is to provide a new and improved selective switching arrangement wherein the control mechanism may be moved freely between its various operative positions and the switches associated with the control mechanism are closed after the control mechanism has reached its desired position.

Yet another object of the present invention is to provide a new and improved selective switching arrangement wherein a plurality of control mechanisms and a plurality of switch mechanisms may be simultaneously operated by one actuating member.

With the above objects in view the present invention mainly consists of a selective actuating arrangement including a common support means movable between an inoperative and an operative position, a plurality of actuating members mounted on the common support means, each of the actuating members having a controlling portion forming part thereof and being movable along a path between a first and second position relative to the common support means, each of the actuating members being adapted to actuate when the common support means is in its operative position, and common controlling means movably mounted in the path of the controlling portions of the actuating members, the common controlling means including a series of sets of controlling elements adapted to cooperate in at least one position of the controlling means with the controlling portions of the actuating members, the controlling elements being constructed so that in a cooperating position some of them permit free movement of the controlling portions of their respective actuating members from their respective first position into their respective second position during movement of the common support means from inoperative into operative position, and the remainder of the controlling elements being constructed so as to prevent, in a cooperating position, free movement of the controlling portions of their respective actuating elements and thereby to prevent movement of the actuating elements from their respective first positions into their respective second positions during movement of the common support means from inoperative into operative position.

In another form of the present invention, contact pairs are respectively associated with the actuating members so that the contact pairs are moved between circuit opening positions and circuit closing position when the actuating members are moved respectively between their first and second positions.

Another feature of the present invention is a blocking device which prevents movement of the common support means of the common controlling means is not properly positioned in one of its fixed angular positions.

Still another feature of the present invention is the use of electromagnetically operated means for moving the common support means from its inoperative position into its operative position when the electromagnetic means is energized.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

Fig. 1 is a transverse cross sectional view of one em-

bodiment of the invention taken along the line I—I of Fig. 4;

Fig. 2 is a rear elevational view of the apparatus shown in slightly different operating position from Fig. 1;

Fig. 3 is a front elevational view of the apparatus;

Fig. 4 is a sectional view of the apparatus taken along the line IV—IV of Fig. 3; and

Fig. 5 is a plan view of the common support member used with the present apparatus.

Referring now to the drawings and more particularly to Figs. 1 and 4, it can be seen that in the illustrated embodiment two control mechanisms are provided for the selective actuating apparatus. These two control mechanisms are in the form of control drums **1** and **2**. In Fig. 4 it can be seen that the control drum **2** is formed with two opposite axial end extensions **3**.

The end extensions **3** of the drum **2** are respectively mounted within bushings **4** and **5** that in turn are mounted in end plates **6** and **7**. It is apparent that the control drum **2** is rotatably mounted in its cooperating end bushings. Similarly, the second control drum **1** is also rotatably mounted between the end plates **6** and **7** but this is not indicated in the drawings in order not to unnecessarily complicate the drawings.

From Fig. 1 it can be seen that the outer surface of the control drums **1** and **2** are formed with a plurality of angularly spaced recesses **8**. The recesses **8** which are shown in Fig. 1 are merely the number of recesses appearing in the particular cutting plane of the section lines of Fig. 4. These recesses **8**, as can be best seen in Fig. 4, extend in an axial direction along the surface of the cylinders **1** and **2**. Each of the series of recesses **8** together with the portion of the surface of the cylinders **1** and **2** between them operate as one set of controlling elements in a manner to be described hereinbelow.

In Fig. 5 can be seen a common support member **9** which is substantially planar in shape and which has a plurality of actuating finger-like members **10** so that the total common support member **9** forms a comb-shaped member. Mounted on each of the actuating members **10** is a controlling portion **11** which is projecting and which can best be seen in Figs. 1 and 4. At the free end portion of the actuating member **10** is an electrical contact **12**. Accordingly, the common support member **9** is formed with a plurality of actuating members **10** which are preferably formed of a resilient material so that they are movable relative to the main portion of the member **9**. In the embodiment illustrated in Fig. 5 all of the actuating members **10** are electrically conducting and are connected together through the common main portion of the common support member **9**.

The common support means **9** is mounted, as shown in Fig. 1, in a direction substantially tangential to the respective control drums **1** and **2**. That is, there are two common support means **9** shown in Fig. 1, each of which is mounted substantially tangential to one of the drums **1** and **2** respectively. The upper end of the common support means **9** is mounted by means of screws **14** to a shaft **18**.

Each of the shafts **18** of the respective common support means **9** is surrounded by an electrically insulating lock **17** to which the screws **14** are connected so as to maintain the common support means **9** in an electrically insulating condition with respect to the shaft **18**.

Connected adjacent the upper portion of each of the common support means **9** are stiffening plates **16** which provide a proper stiffening for the operation of the common support means **9**. The ends of the shafts **18** can be properly pivotally supported in the end plates **6** and **7** in a manner similar to the manner shown for the control drum **2**.

In Fig. 1 it can be seen that the controlling portions **11** of each actuating member **10** is free to cooperate with and project into a corresponding recess **8** in the surface of the drum. It can be seen that the member **9**

at the left of Fig. 1 has a controlling portion **11** of the actuating member **10** which projects into the recess **8** while the controlling portion **11** of the member **9** on the right has no recess corresponding to the position of the control drum **2** so that this controlling portion **11** remains in contact with the outer surface of the drum **2**.

Beneath each of the common support means **9** is arranged a plurality of fixed, spaced contacts **13**. Each of the fixed contacts **13** is mounted at the upper end of an electrically conductive strip element **27**. As can be seen in Fig. 4, each of the strip elements **27** is electrically insulated from the adjacent elements by means of electrically insulating spacers **28**. The elements **27** are mounted in turn on an electrically insulated block **29**, as shown in Fig. 1, so that they are electrically insulated from the plates **6** and **7** of the selecting apparatus. At the lower end of each of the elements **27** is an opening **31** into which is threaded a set screw **32**. In order to make electrical connection to any of the elements **27** it is simply necessary to insert a conductor into the space **31** and to tighten the set screw **32** to fix the conductor with respect to the respective elements **27**. Also shown in Fig. 1 for connecting together the elements **27** and the insulators **28**, is an insulated rod **30**.

Each of the fixed contacts **13** is adapted to engage one of the movable contacts **12** to form a contact pair. It can be seen in Fig. 1 that the left hand member **9** is positioned so that the illustrated contact **12** makes electrical contact with its respective fixed contact **13** so that this contact pair is said to be in circuit closing position. On the other hand, one of the contacts **12** of the right hand member **9** is shown to be out of engagement with its respective fixed contact **13**. This contact pair is said to be in circuit open position. Behind the open contact pair can be seen the next contact pair of the right hand member **9**, which next contact pair is in circuit closing position.

From the above it can be seen that when the controlling portion **11** of the actuating member **10** projects into its respective recess **8** on the control drum, it is possible for its respective movable contact **12** to make electrical contact with its respective fixed contact **13**. As shown with respect to the right hand member **9**, when the controlling portion **11** of the actuating member **10** is not projecting into its respective recess **8**, its respective movable contact **12** will be out of electrical contact with its respective fixed contact **13**.

As indicated hereinabove the contact support means or members **9** are pivotally mounted about their respective shafts **18**. In Fig. 1, connected to the left hand shaft **18** is shown a pin **26** which is fixedly mounted in the shaft **18**. The upper end of the pin **26** has an opening through which is inserted one end of a spring **24**, the other end of which is inserted through an opening in a mounting member **25**. The mounting member **25** may be fixedly mounted on either of the side brackets **6** or **7** of the apparatus. Because of the biasing action on the spring **24** the upper end of the pin **26** is permanently urged towards the member **25** so that the common support means **9** is pivoted about the shaft **18** and the actuating members **10** associated therewith are urged away from the control drum **1**.

The second common support means illustrated is also urged away from its respective control drum **2** because the two common support means **9** are coupled to each other at one of the respective ends thereof. This is as shown in Fig. 3 wherein a toothed segment **21** is shown mounted on the end of the shaft **18** projecting through the end plate **7**. Therefore, as one of the shafts **18** is pivoted, the other shaft **18** is pivoted a like amount in the opposite direction. Accordingly, in the view of Fig. 3 the right hand shaft **18** is normally urged in a clockwise direction while the left hand shaft **18** is normally urged in a counterclockwise direction by means of the gear segments **21**.

In order to urge the common support means 9 into contact with their respective drums 1 and 2, a plate 23 is provided, as shown in Figs. 1 and 3, which makes contact with the shaft 22*a* of a solenoid 22. As is well known the solenoid 22 is an electromagnetically operated relay which when energized can either attract or expel its axially located shaft. In the illustrated embodiment the solenoid 22 ejects its shaft 22*a* upon energization of the solenoid. The shaft 22*a* of the solenoid 22 is shown in the energized position so that the shaft 22*a* is shown ejected from the solenoid 22. When the solenoid is de-energized, a spring, not shown, returns the shaft 22*a* to its original position within the solenoid 22.

In operation, the control drums 1 and 2 can be simultaneously or individually rotated through any one of a plurality of fixed angular positions by means to be described hereinbelow. When the particular control drum is in its desired final operative position, the solenoid 22 is energized by connecting the same to a potential source, not shown. Therefore, the shaft 22*a* of the solenoid is ejected into contact with the member 23 to pivot the shafts 18 and the respective common support means 9 mounted thereon against the action of the spring 24 and into cooperating relationship with the respective control drums. The common support means 9 are therefore moved from their respective inoperative positions which is normally maintained by the spring 24 into their respective operative positions by means of the solenoid 22.

In the final operative position of the common support means 9, each of the actuating members 10 is capable of assuming a first or a second position. The first position is the position shown in the Fig. 1, with the right hand support means 9. In this position the controlling portion 11 of the respective actuating member 10 contacts the outer surface of the control drum 2 so that its respective movable contact 12 is out of electrical contact with the fixed contact 13 and accordingly this contact pair is in circuit opening position.

The second position which the actuating member 10 can take with respect to the common support means 9 is shown by the left hand support means 9. In Fig. 1 this actuating member 10 is shown with its controlling portion 11 projecting into its corresponding recess 8 on the surface of the drum 1 so that the respective movable contact 12 is in electrical contact with its respective fixed contact 13 and the contact pair is in circuit closing position. Accordingly, any electrical potential applied through the left hand common support means 9 will be applied to the fixed contact 13 of the closed contact pair while this same electrical potential applied to the right hand support means 9 will not be applied to the fixed contact 13 of the contact pair in circuit opening position.

Therefore, upon energization of the solenoid 22 the common support means are moved from their inoperative position into operative position and each of the individual actuating members 10 moves from its first position to its second position or it remains in its first position. Wherever a controlling portion 11 cooperates with and projects into a recess 8 in the surface of the respective control drum, the actuating member 10 will be moved into its second position and the corresponding contact pair 12 and 13 will be placed in circuit closing position. Wherever the surface of the control drum is presented to the controlling portion 11, instead of the recess 8, the controlling portion 11 of the actuating member will be prevented from projecting into the control drum and the respective contact pair 12 and 13 will remain in circuit opening position.

It is clear that for each angular position of each of the control drums 1 and 2, it is possible to provide a different combination of closed and opened contact pairs so that different switching combinations may be provided. As is shown in Fig. 4, in one of the operative positions of the control drum 2 five recesses 8 are provided aligned along the surface of the control drum 2 in

axial direction thereof. These five recesses 8 are free to cooperate, in the proper angular position, with the nine actuating members 10. It can accordingly be seen that the recesses 8 together with the portion of the surface of the control drum located between the recesses in axial direction form controlling elements on the control drum which determine the combination of the switches which are closed and which are opened. In Fig. 4 of the nine illustrated actuating members 10, three of them are shown in circuit opening position while the remaining six are shown in circuit closing position. The number of switching combinations that are available depends on the axial length of the control drums, the diameter thereof and the respective diameters of the controlling portions 11 and the recesses 8.

In order to rotate the control drums 1 and 2, gears 45 and 46 are respectively connected to the front ends of the control drums. These gears can best be seen in Figs. 3 and 4. Meshed with the gear 45 is a second gear 47 and meshed with the gear 46 is a second gear 48. It is apparent that the gears 47 and 48 may be hand operated or automatically rotated in some mechanical manner to rotate the respective control drum to a desired final angular position. Either the gears 45 and 46 or the gears 47 and 48 may be provided with cover plates on which are provided indexing marks to indicate the particular position at which the respective control drum is placed.

In order to obtain the best mechanical advantage it is desirable to provide gears 47 and 48 which have a larger diameter than the gears 45 and 46. In this manner little effort would be required to position the control drums.

In order to make certain that the control drums are movable through a plurality of fixed positions it is desirable to provide detent means for properly stopping the control drum at a fixed position. These means are best seen in Figs. 1 and 2. In Fig. 2 a star wheel 36 is shown mounted on the extension 3 of the control drum 1. Similarly, a star wheel 37 is mounted on the extension of the control drum 2. In Fig. 4 it is clear that these star wheels are mounted on the opposite side of the plate 6 from the respective control drums.

Cooperating with the outer periphery of the star wheel 36 is a roller 40 which is mounted on a lever member 38. The lever 38 is pivotally mounted in turn about the pin 19 which is fixedly mounted in the end plate 6 of the apparatus.

It can be seen that the roller 40 and the lever 38 are free to move up and down as the star wheel 36 is rotated. That is the roller moves down into the spaces between the teeth on the star wheel and back up when it moves out to the point of the teeth of the star wheel. In order to fix each position of the control drum at a definite angular position, the roller 40 is normally urged downwardly into the space between the teeth of the star wheel 36 by a leaf spring 41. As can best be seen in Fig. 1, the leaf spring 41 is mounted on a second leaf spring 42 which in turn is fixedly mounted on shafts 19 which are fixed in the end plate 6 of the apparatus. The leaf spring 42 is constructed to permanently urge the leaf spring 41 downwardly and the leaf spring 41 in turn biases the lever member 38 in a downward direction to force the roller against the periphery of the star wheel 36.

Accordingly, as the star wheel 36 is rotated, the roller is moved around the periphery of the star wheel and in order to turn the control drum 1, the force exerted by the leaf spring 41 must be overcome. Therefore, once the control drum is moved to a position where the roller 40 is in a space between two gear teeth, the control drum will remain in that position until the actuating gear 48 is rotated. It can be seen that the star wheel 37 also cooperates with a second roller mounted on a lever member 39 which in turn is pivotally mounted about a pin in the end plate 6. Therefore, both of the control drums

are movable through a plurality of fixed angular positions, which positions are fixed by the cooperation of the leaf spring and roller members with the gear teeth on the star wheels.

Another feature of the present invention is a blocking member which prevents the common support means **9** from being moved into their operative position when the respective control drum is not in its fixed angular position. Referring to Fig. 2 it can be seen that this blocking member for the control drum **1** consists of the free end portion of the lever **38** and a blocking lever **43** which is mounted on one end of the shaft **18**. The blocking member **43** is fixedly mounted on the shaft **18** to be pivotal therewith. Since the shaft **18** pivots with the common support means **9**, it is clear that if the shaft **18** is prevented from being pivoted, then the common support means **9** connected thereto can also not be moved from its inoperative into its operative position.

It can be seen that the free end portion of the lever **38** moves up and down with the respective position of the roller **40**. When the roller is at the point of a gear tooth on the star wheel **36** as is illustrated in Fig. 2, then the free end portion **38** will move into blocking position with respect to the blocking lever **43**. On the other hand when the roller is in the space between the gear teeth, as is illustrated for the star wheel **37** and the lever **39**, then the free end portion of the lever **39** is moved out of blocking position with its respective blocking lever 44 and permits the shaft **18** to be rotated, thereby permitting its respective common support means **9** to be moved from inoperative into operative position.

The positions of the star wheels **36** and **37** and their respective roller members are shown in Fig. 2 merely to illustrate the two different positions of cooperation between the rollers and the star wheels and the lever members **38** and **39** with their respective locking levers **43** and **44**. Actually, as has been indicated hereinabove, Fig. 2 represents a rear view of the apparatus shown in a slightly different operating position from the other views. It is apparent that since Fig. 1 shows the common support means **9** in its operative position, it is not possible for the star wheel **36** to have the illustrated position at the same time. Therefore, the Fig. 2 is meant to illustrate a position wherein the star wheel **36** has been rotated an angular amount corresponding to half the width of one gear tooth with respect to Fig. 1.

Another feature of the present invention is the ease with which the various parts of the apparatus may be removed from the mounting plates **6** and **7**. It can be seen, in Figs. 1, 2 and 4 that the insulating members **29** have extending end portions **33** which extend through a slot in the end plates **6** and **7**. These insulating members **29** are accordingly fixedly mounted between the end plates **6** and **7** by means of side bars **34** which are fixedly connected to the end plates **6** and **7** with screws **35**.

It can be seen, that in order to remove the insulating members **29**, it is merely necessary to loosen the screws **35** and remove the side bars **34**. The insulating members **29** can then be slid out from the apparatus together with the conducting elements **27**.

Accordingly, from the above description it is apparent that the present invention provides a selective actuating arrangement and a selecting switching arrangement. It is not necessary that the actuating members **10** actually operate electrical circuits. That is, it would be possible for the free end portions of the actuating members **10** to operate valves in hydraulic lines. In this manner for different fixed angular positions of the control drums, a different combination of valves would be opened and closed. In any event, whether the present apparatus is used for mechanical or electrical actuation, it is possible for an operator to first rotate the control drums to a desired fixed angular position and then to operate a switch for energizing the solenoid. In this manner, while the

control drums are being actuated there is no abrasion or wearing of the various contact or valve elements.

Instead of using control drums it is apparent that any type of control means be used which incorporates controlling elements for cooperation with the controlling portions on the common support means **9**. For example, the control means **1** and **2** may have projecting elements while the common support means has cooperating holes. It should be noted that the surface of the control drums **1** and **2** axially arranged between the aligned sets of recesses 8 are also part of the control elements since, if no recess is present, the controlling portion **11** of the respective actuating member will contact this portion of the surface and will be prevented from moving from its first into its second position. In addition, the common support means illustrated in Fig. 5 may include a plurality of actuating members **10** which are electrically insulated from each other. It is clear that this can be provided by merely including electrical insulating strips between each of the actuating members **10** on the common support member **9**.

As indicated hereinabove the biasing means **24** is arranged to always keep the common support means in its inoperative position. This can be considered a "fail-safe" feature. That is, the spring **24** normally maintains the common support means **9** in their respective inoperative positions. When the solenoid **22** is energized, the action of the spring **24** is overcome and the various circuits are closed. However, in the event that there is a power failure, it would be desirable to open all of the circuits in order to avoid any serious damage to the equipment to which the selector is connected. With the present invention it is clear that the spring **24** will overcome the action of the deenergized solenoid **22** to move the common support means back into their inoperative position and to disconnect all of the connected equipment in the event of a power failure.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of selecting apparatus differing from the types described above.

While the invention has been illustrated and described as embodied in a selective switching apparatus, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. Selective actuating arrangement comprising, in combination, a common support means movable between an inoperative and an operative position; a plurality of actuating members mounted on said common support means, each of said actuating members having a controlling portion forming part thereof and being movable along a path between a first and a second position relative to said common support means, each of said actuating members being adapted to actuate when said common support means is in its operative position; cylindrical common controlling means rotatable between a plurality of different fixed angular positions in said path of said controlling portions of said actuating members, said common controlling means including a series of sets of controlling elements adapted to cooperate in at least one position of said controlling means with said controlling portions of said actuating members, said controlling elements being

constructed so that in a cooperating position some of them permit free movement of the controlling portions of their respective actuating members from their respective first position into their respective second position during movement of said common support means from inoperative into operative position, and the remainder of said controlling elements being constructed so as to prevent, in a cooperating position, free movement of the controlling portions of their respective actuating elements and thereby to prevent movement of said actuating elements from their respective first positions into their respective second positions during movement of said common support means from inoperative into operative position; stopping means for fixing said cylindrical controlling means in any one of its angular positions; and blocking means for blocking movement of said common support means from its inoperative position into its operative position whenever said cylindrical controlling means is not in one of its fixed angular positions.

2. A selective switching arrangement comprising, in combination, a base member; a common support means mounted on said base member and movable between an inoperative and an operative position; a plurality of actuating members mounted on said common support means, each of said actuating members having a controlling portion forming part thereof and being movable along a path between a first and a second position relative to said common support means, each of said actuating members being adapted to actuate when said common support means is in its operative position; common controlling means rotatable in said path of said controlling portions of said actuating members, said common controlling means including a series of sets of controlling elements adapted to cooperate in at least one position of said controlling means with said controlling portions of said actuating members, said controlling elements being constructed so that in a cooperating position some of them permit free movement of the controlling portions of their respective actuating members from their respective first position into their respective second position during movement of said common support means from inoperative into operative position, and the remainder of said controlling elements being constructed so as to prevent, in a cooperating position, free movement of the controlling portions of their respective actuating elements and thereby to prevent movement of said actuating elements from their respective first positions into their respective second positions during movement of said common support means from inoperative into operative position; a plurality of contact pairs movable between circuit opening position and circuit closing position, each of said contact pairs being operatively associated with one of said actuating members to be moved between the circuit opening position thereof into the circuit closing position thereof when its respective actuating member moves from its first position into its second position; stopping means mounted on said base member for holding said controlling means at one of a plurality of different fixed positions; and blocking means for blocking movement of said common support means from its inoperative position into its operative position whenever said controlling means is not in one of said plurality of different fixed positions.

3. Selective actuating arrangement comprising, in combination, a base member; a common support means mounted on said base member and movable between an inoperative and an operative position, said support means having a projecting free end portion; a plurality of actuating members mounted on said common support means, each of said actuating members being adapted to actuate when said common support means is in its operative position; a shaft rotatably mounted on said base member; cylindrical common controlling means mounted on said shaft and rotatable therewith between a plurality of different fixed angular positions in said path of said controlling means including a series of sets of controlling elements adapted to cooperate in at least one position of

said controlling means with said controlling portions of said actuating members, said controlling elements being constructed so that in a cooperating position some of them permit free movement of the controlling portions of their respective actuating members from their respective first position into their respective second position during movement of said common support means from inoperative into operative position, and the remainder of said controlling elements being constructed so as to prevent, in a cooperating position, free movement of the controlling portions of their respective actuating elements and thereby to prevent movement of said actuating elements from their respective first positions into their second respective positions during movement of said common support means from inoperative into operative positions; an arresting wheel mounted on said shaft and rotatable therewith, said arresting wheel having a plurality of recesses in the annular periphery thereof; and detent means normally urged against said annular periphery of said arresting wheel and cooperating with said recesses as said arresting wheel is rotated by said shaft, each of the positions in which said detent means cooperates with one of said recesses determining one of said fixed angular positions of said cylindrical controlling means, said detent means including a blocking member pivotally mounted on said base member and cooperating with said projecting free end portion of said common support means to prevent movement of said common support means from said inoperative to said operative position thereof when said detent means is not cooperating with one of said recesses of said arresting wheel.

4. Selective actuating arrangement comprising, in combination, a base member; a common support means mounted on said base member and movable between an inoperative and an operative position, said support means having a projecting free end portion; a plurality of actuating members mounted on said common support means, each of said actuating members being adapted to actuate when said common support means is in its operative position; a shaft rotatably mounted on said base member; cylindrical common controlling means mounted on said shaft and rotatable therewith between a plurality of different fixed angular positions in said path of said controlling portions of said actuating members, said common controlling means including a series of sets of controlling elements adapted to cooperate in at least one position of said controlling means with said controlling portions of said actuating members, said controlling elements being constructed so that in a cooperating position some of them permit free movement of the controlling portions of their respective actuating members from their respective first position into their respective second position during movement of said common support means from inoperative into operative position, and the remainder of said controlling elements being constructed so as to prevent, in a cooperating position, free movement of the controlling portions of their respective actuating elements and thereby to prevent movement of said actuating elements from their respective first positions into their second respective positions during movement of said common support means from inoperative into operative positions; an arresting wheel mounted on said shaft and rotatable therewith, said arresting wheel having a plurality of recesses in the annular periphery thereof; and detent means normally urged against said annular periphery of said arresting wheel and cooperating with said recesses as said arresting wheel is rotated by said shaft, each of the positions in which said detent means cooperates with one of said recesses determining one of said fixed angular positions of said cylindrical controlling means, said detent means including a blocking member pivotally mounted on said base member and cooperating with said projecting free end portion of said common support means from said operative to said inoperative position thereof when said

detent means is cooperating with one of said recesses of said arresting wheel.

References Cited in the file of this patent

UNITED STATES PATENTS

1,118,024 Lawrence ---------- Nov. 24, 1914
1,172,364 Kaisling ---------- Feb. 22, 1916
1,431,912 Smith ---------- Oct. 10, 1922
1,616,684 Evans ---------- Feb. 8, 1927
2,656,109 Lindars ---------- Oct. 20, 1953
2,692,966 Hommel ---------- Oct. 26, 1954
2,762,952 Bruderlin ---------- Sept. 11, 1956