March 17, 1970 E. CAPELLARI 3,501,761

REMOTE-CONTROLLED DISPLAY DEVICE FOR SELECTIVELY DISPLAYING SIGNS OR WORDS

Filed June 7, 1966 2 Sheets-Sheet 1

Fig.1

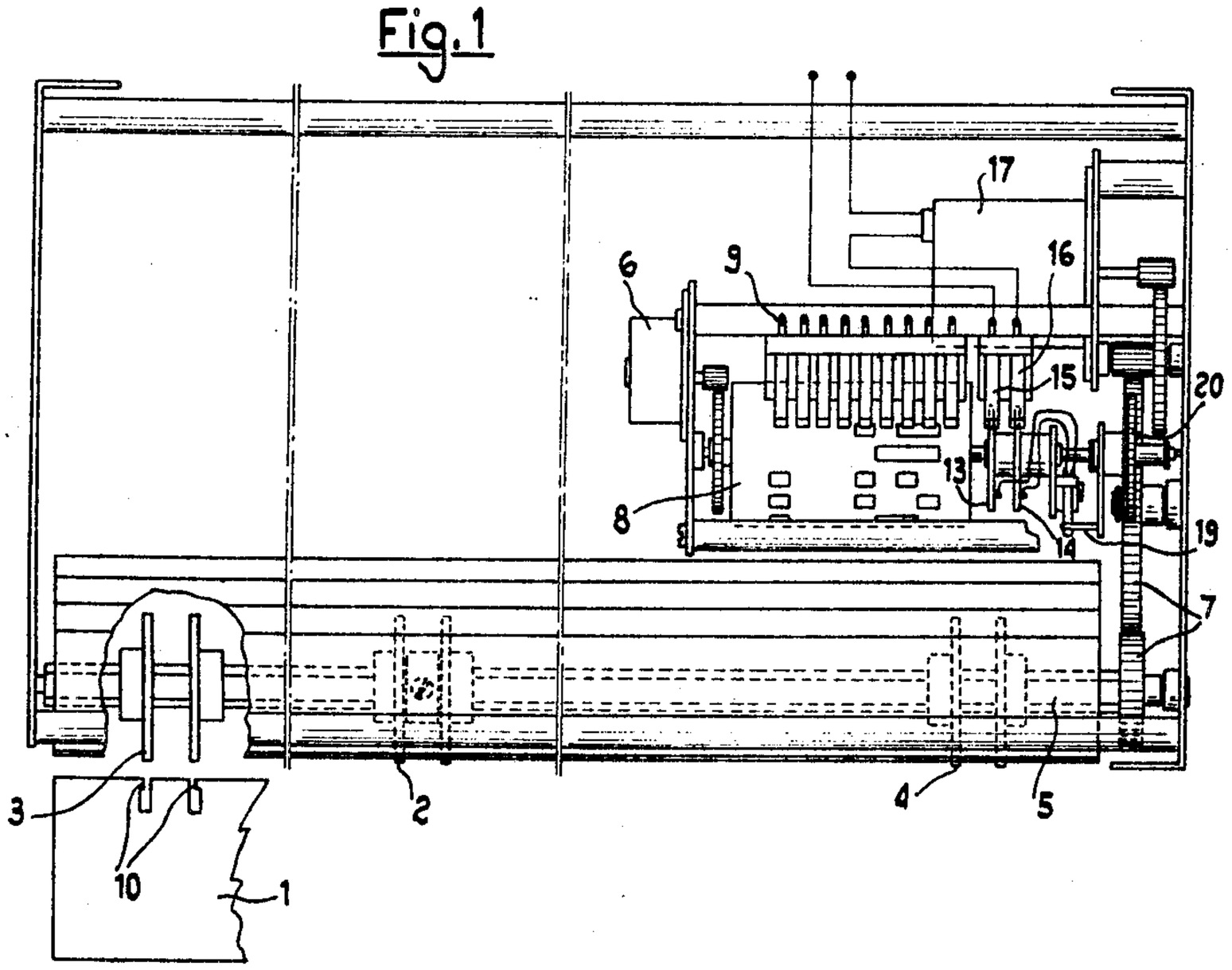


Fig.2

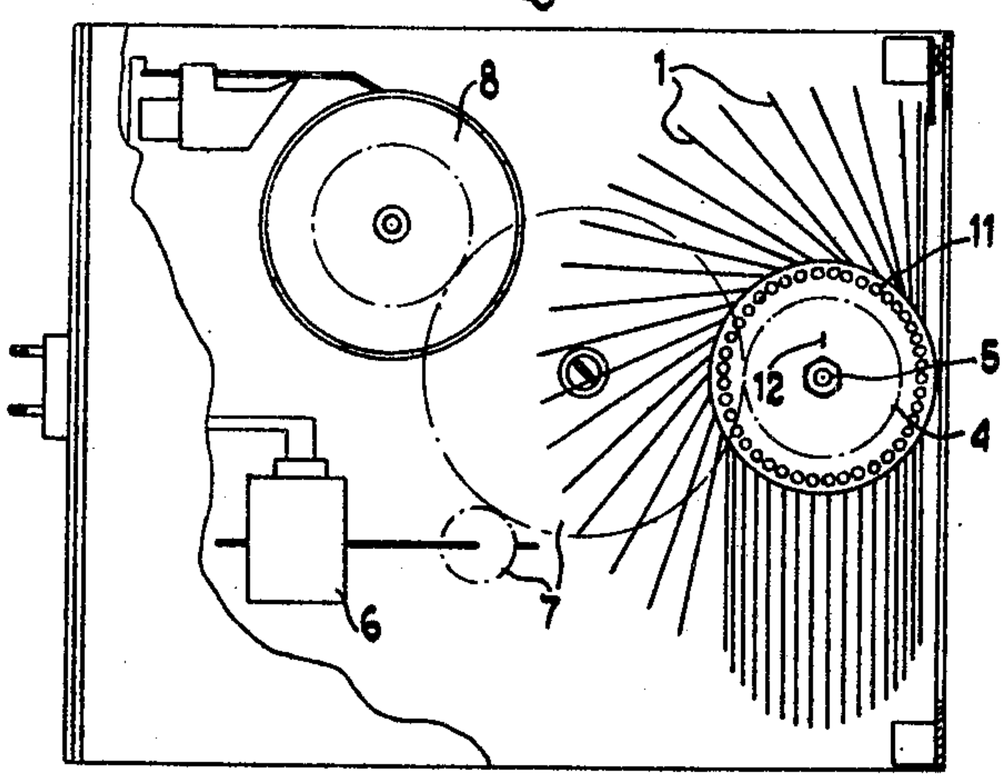
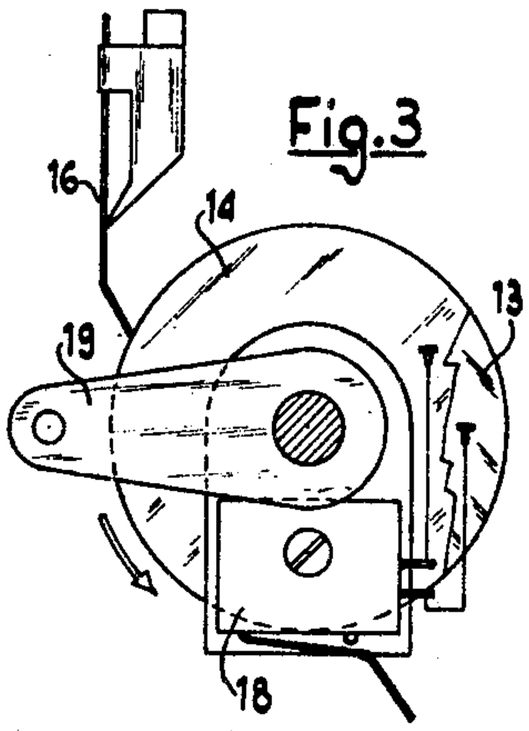


Fig.3



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REMOTE-CONTROLLED DISPLAY DEVICE FOR SELECTIVELY DISPLAYING SIGNS OR WORDS

Filed June 7, 1966 2 Sheets-Sheet 2

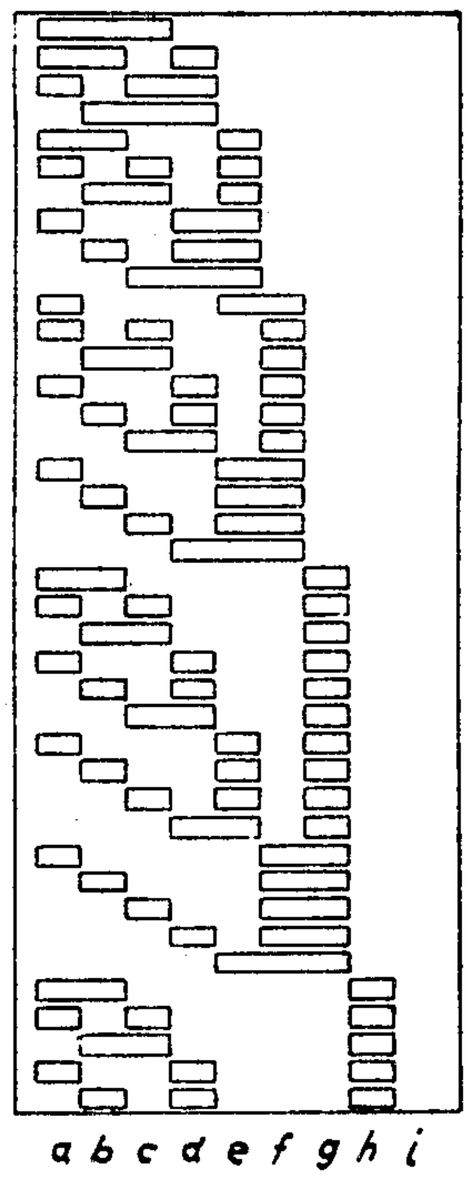
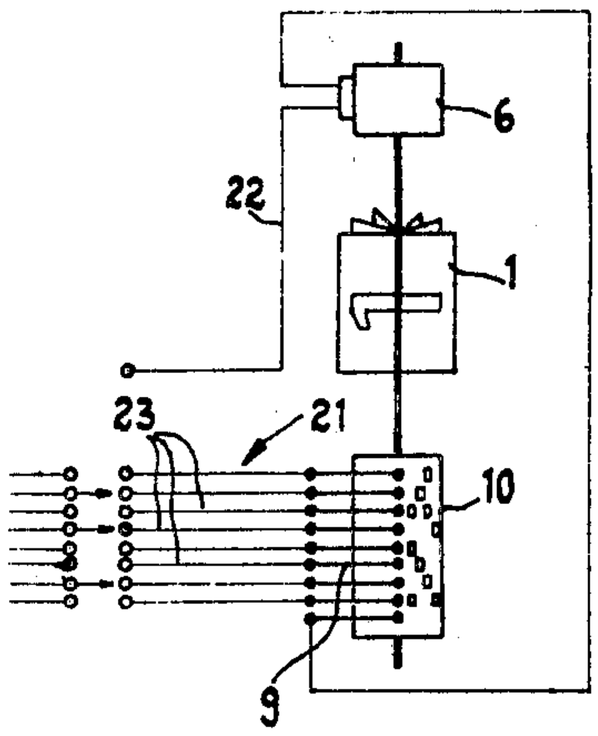


Fig.4

Fig.5



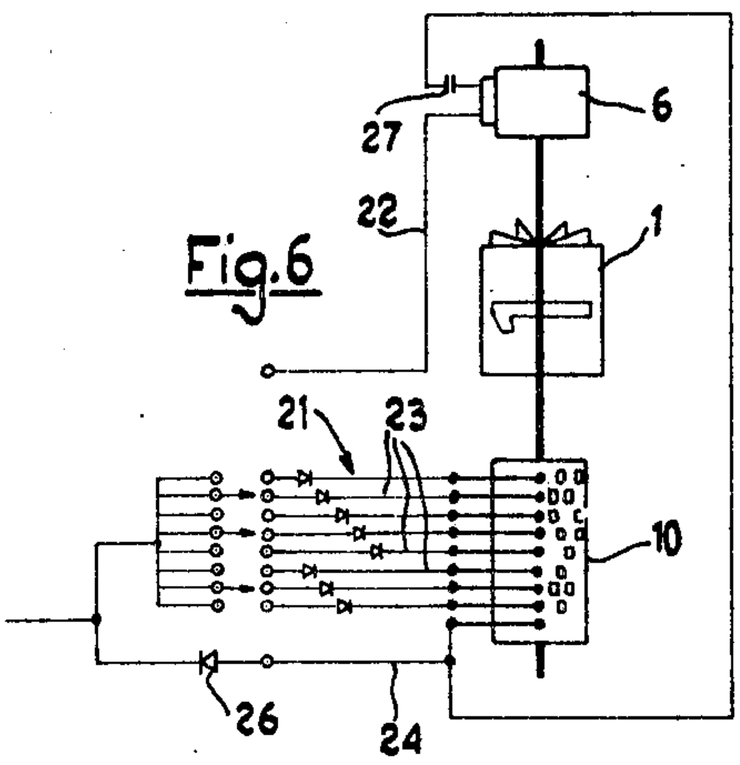


Fig.6

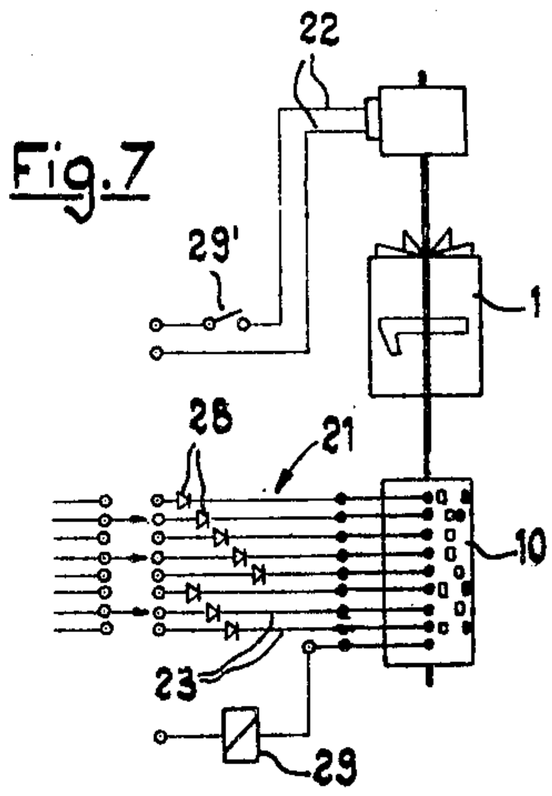


Fig.7

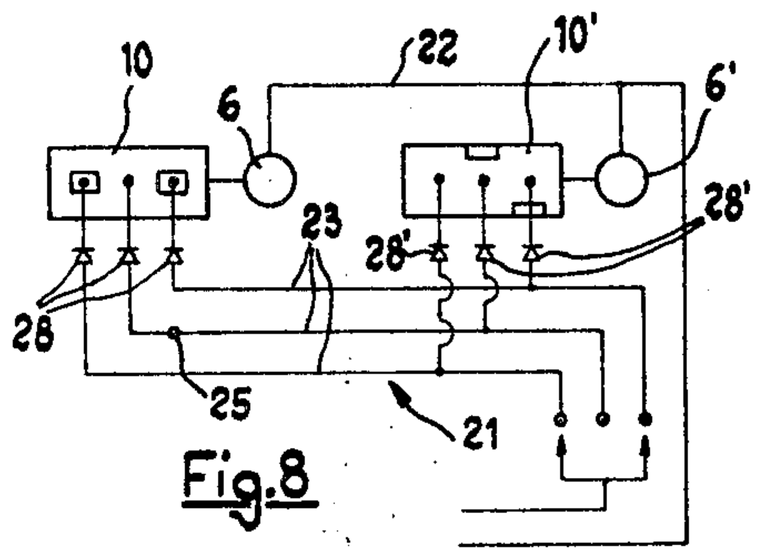


Fig.8

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REMOTE-CONTROLLED DISPLAY DEVICE FOR SELECTIVELY DISPLAYING SIGNS OR WORDS

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Int. Cl. G08b *23/00, 5/00*
U.S. Cl. 340—324 2 Claims

ABSTRACT OF THE DISCLOSURE

A remotely controlled display device comprises a rotary carrier having a plurality of indicia displaying vanes hingedly mounted thereon for selectively displaying the indicia at each position of a plurality of rotational positions, the carrier being connected to a motor which has a remote control supply circuit. Connected to the supply circuit is a control circuit which has a given number of leads adapted for relative parallel connection each including a contact end individually contacting portions of a rotary roller type switch assembly having the given number of circular switch portions each with conductive and non-conductive segments, said assembly being rotatably connected to the carrier for phased concurrent rotation therewith. The connection between the supply circuit and the control circuit is such that as a potential is applied to a remotely selected group of leads and as the control circuit is opened by simultaneously contacting of all contact ends of the group on non-conductive segments, the supply to the motor is cut off, thereby stopping the carrier at a remotely predetermined indicia displaying position.

This invention relates to an indicator or display device, of the type having movable blades, whereon signs or words or other indicia are marked, said blades being pivotally connected to a motor-driven rotary carrier about an axis thereof, such indicator comprising one or more operating and remote-control means, by which different coded systems are utilized.

Substantial savings can be attained, over already known indicator systems, by said indicator, owing both to the simplified design and to the easy operation thereof, as well as to the small number of means that are required for its remote controlled operation, in addition to a better and faultless operation and service.

An object of the invention is to provide a remotely controllable device for selectively operating a carrier having a plurality of blades, which are roll-like pivotally connected to a central shaft, and by which different indicia or indications are shown at each one of a plurality of angular positions, said central shaft being operated by an electric motor, which is in turn controlled by a circuitry comprising a motor feeding circuit, a selective remotely controlled circuit, having a plurality of leads that can be parallel-connected, and that terminate with contacts designed to operate on different sections of a drum contactor having conductive segments and non-conductive segments, and that is torsionally connected with the blade roll, and said control circuit being connected, in turn, with the motor feeding circuit, in such a manner that said motor is started by applying a voltage to a remotely selected given group of leads of the latter circuit, and keeps running as long as the at least one of the contacts associated with the leads of said group are contacting one conductive segment of said drum contactor and deactivated when all said contacts abut non-conductive parts, such condition corresponding to a pre-established angular position of blade roll.

According to the invention, the control circuit comprises one of the phases of the motor feeding circuit, or one phase of the circuit by which the coil of a relay is fed, the movable contacts of said relay being connected in the motor feeding circuit, whereas in another embodiment of the invention, said control circuit comprises diodes, and is parallel-connected with a second circuit having a diode directed opposite to said first diodes, the motor being fed by both phases of an A.C. source, and stopped when, due to the disconnection of all leads of said group, one phase of the A.C. is cut off.

The device according to the invention advantageously actuates a carrier having a plurality of blades pivotally connected with spaced supports distributed along the axis of said carrier, at least a part of said supports being slidingly fitted on the shaft of the carrier. In addition, the device may be provided with a motor, that is remote controlled by said control circuit, and that is torsionally connected with a positioning mechanism through which extends the feeding circuit of a further motor, by which at least one blade roller display assembly is operated, and that can be stopped in a given angular position, corresponding to a stop position of the positioning mechanism, and that correspond, on turn, to the stop position of said blade roll.

Further features and advantages of the invention will be apparent from a consideration of the following, detailed description, taken with the accompanying drawings, both description and drawings being given as a non-restrictive example only. In the drawings:

FIG. 1 is a fragmentary plan view of the device according to the invention.

FIG 2. is a section, taken on a plane perpendicular to that of FIG. 1.

FIG. 3 shows a positioning mechanism, that is preferably designed to act in the case of concurrent remote control of at least two blade rollers.

FIG. 4 is a development on a plane of the controller of the device according to the invention.

FIGS. 5, 6 and 7 show examples of wiring diagrams of the device.

FIG. 8 shows a parallel connection of two devices, shown in simplified form and each connected to a three-lead control circuit.

Referring now to above drawings, the remote controlled display device, as shown, is fitted with forty movable blades **1**, that are pivotally connected to disks **2**, **3** and **4**, supported and rotated by a shaft **5**, which is operated by a motor **6** through the gearing **7**. When said motor **6** is activated the movable blades—of which the upper one is kept in a vertical position by a spring—are sequentially brought before the front window of the device, whereby the indications carried by the blades becomes visible. The control drum **8**, that is driven by the motor **6**, consists of a cylinder made of an insulating material, whereon an apertured coating made of a conductive material is fitted, the apertures of said coating defining a plurality of insulating sections, arranged according to a code, as shown by the development in a plane of said drum (see FIG. 4).

Resting on control drum **8** are a series of stationary contacts or brushes **9**, which number depends on the selected code; in the particular case of a 3/8 code (as shown in the figure) eight contacts or brushes are provided, while an additional contact or brush serves for the return of current. In fact, when the circuit by which the motor **6** is fed, is closed on the drum **8**, the motor keeps turning, until the current, which is fed to the drum through a remotely selected given group of leads and contacts—three in the considered case—is not open until an insulating sector is encountered by all each one

of the contacts of said group, being the control group selected and operated by means of known devices (see for example, U.S. Patent 3,366,751), which are located at a given distance from the remote controlled indicator.

Further details can be seen in FIGS. 1 and 2: the blades **1** are individually connected to the disks **2**, **3** and **4** by means of pins **10**, which extend into holes **11** of said disks. The disks **3** and **4** are free to axially slide along said shaft **5**, in order to compensate for thermal expansion. For such a purpose, a polygonal shaped central aperture, similar to the cross sectional shape of the shaft, is formed on said disks. The reference mark **12**, carried by the disks, allows to have the related holes **11** to be accurately aligned, said disks being identical and made from a single die.

FIGS. 1 and 3 show a device by which the master apparatus can be relayed to the remote controlled indicator when a substantial time is required for positioning the blades thereof, which is the case when use is made of heavy long blades. In such a case, a short-blade device (not shown) and the control drum **8** are driven, possibly directly, by the motor **6**. Keyed on the shaft of said control drum **8** are conductive disks **13**, **14**, which are connected by sliding contacts **15** and **16** with an auxiliary motor **17** to serve as the control circuit of latter motor. Motor **17** is closed by a microswitch **18**, and drivingly connected with the shaft of drum **8** which is electrically connected with the disks **13** and **14**. Said microswitch **18** is in turn operated by a lever **19**, secured to a gear **20**, which forms a part of the gear train by which the motor **17** is connected with the shaft **5** of the blades or vanes carrier and which gear is loose fitted on the shaft of the drum **8**. The starting of motor **6** results in a quick rotation of drum **8**, whereby the microswitch **18** is pulled apart from the lever **19**, with consequent starting of motor **17**, that keeps turning until the lever **19**, rotated together with the gear **20**, comes again into engagement with the microswitch **18**, which in the meantime has been stopped, thereby cutting off the supply to the motor **17**.

FIG. 5 shows a wiring diagram of the device, wherein it is assumed that an alternating voltage is fed to brushes **9**, through a group of leads selected amongst the leads **23** of circuit **21**, for example to the brushes that are designed to contact the tracks *b-d-g* of drum **10** (see FIG. 4); a voltage is therefore applied to motor **6**, that is connected with the feeding circuit **22**, as long as even one brush only, is into contact with a conductive part of the control drum **10**, while said motor is stopped only when the three insulated sections of codedly apertured coating of drum are encountered by all the three brushes.

When more than one display devices are to be simultaneously remotely controlled by one master apparatus, the diagram of Fig. 6 is preferably utilized. In such embodiment, an alternating current is alternately fed through the code leads **23** by diodes **28**, and said circuit **21** is parallel connected with a second circuit **24**, which comprises a diode **26**, directed opposite to said diodes **28**, whereby the motor **6**, which is fed through the two parallel-connected circuits with both phases of an alternating current, is stopped when, on disconnecting all leads of the remotely selected group, the feed of one of the A.C. polarities is discontinued, while the other polarity is interrupted by a capacitor **27**. Thus, by means of said diodes **28** and **28'**, a return of current through the central lead **25** to already positioned drum **10**, which may be caused by a delay in the positioning by the part of one of drums **10'**—as diagrammatically shown in FIG. 8—is positively prevented, thus excluding also a further, undesired rotation of drum **10**.

Finally, if direct current operation is required or preferred, e.g. in the case of transistorized control devices, the wiring diagram of FIG. 7 may be used where the motor **6** is controlled not directly by the control system, but through a relay **29**, having movable contacts **29'**. Even in this latter case, the diodes are series connected with each code lead, and designed to prevent mutual current reversals, when more remote controlled indicators are to be simultaneously operated.

What is claimed is:

1. A remotely controlled display device comprising a rotary carrier having a plurality of indicia displaying vanes hingedly mounted thereabout for selectively displaying different indicia in each position of a plurality of rotational positions of said carrier, an A.C. motor drivingly connected to said carrier, a remotely controlled supply circuit for said motor and comprising one lead connected between a first terminal of an A.C. current source and a first terminal of said motor and another lead connecting the second terminal of said source to a first connection point, and a control circuit comprising a first lead connected between said first connection point and a second connection point and including a first rectifier preventing the passage of one polarity, a second lead connecting said second connection point to the other terminal of said motor, and a given number of leads adapted for relative parallel connection, a rotary roller-type switch assembly rotatively connected to said carrier for concurrent phased rotation therewith, said switch assembly including a plurality of circular switch portions equal in number to said given number of leads, each of the latter leads having a contact end individually contacting circular switch portions of said switch assembly, each circular switch portion having conductive and non-conductive segments, each lead of said given number of leads comprising a further rectifier connected for passage of polarity opposite to said one polarity, whereby both polarities of A.C. current are applied to said motor until the contacting end of at least one of said leads remotely and selectively connected to said first connecting point contacts a conductive segment of said switch assembly, and a pulsing current of said one polarity is supplied to said second connecting point when all contacting ends of said remotely selected leads simultaneously contact nonconductive segments, for cutting off A.C. current to said motor thereby stopping said carrier at a remotely predetermined indicia displaying position.

2. A device as claimed in claim **1**, comprising a condenser connected in said second lead to prevent passage of said pulsing current to said motor.

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U.S. Cl. X.R.

340—176, 187, 325, 378