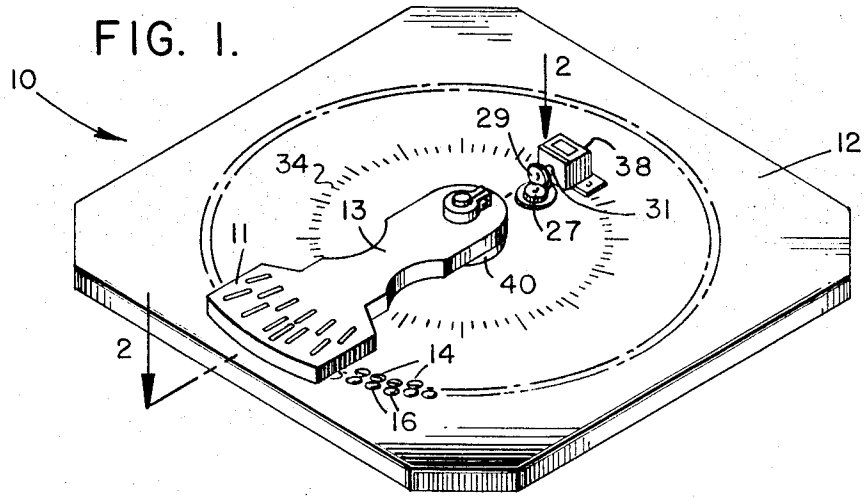
Nov. 3, 1970 E. T. LONG 3,538,269

SCANNING SWITCH

Filed July 30, 1968

FIG. 1.



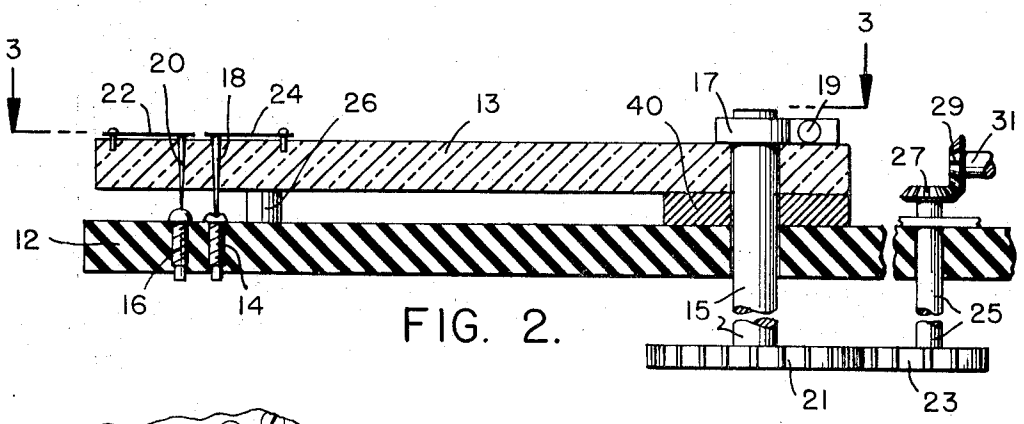


FIG. 2.

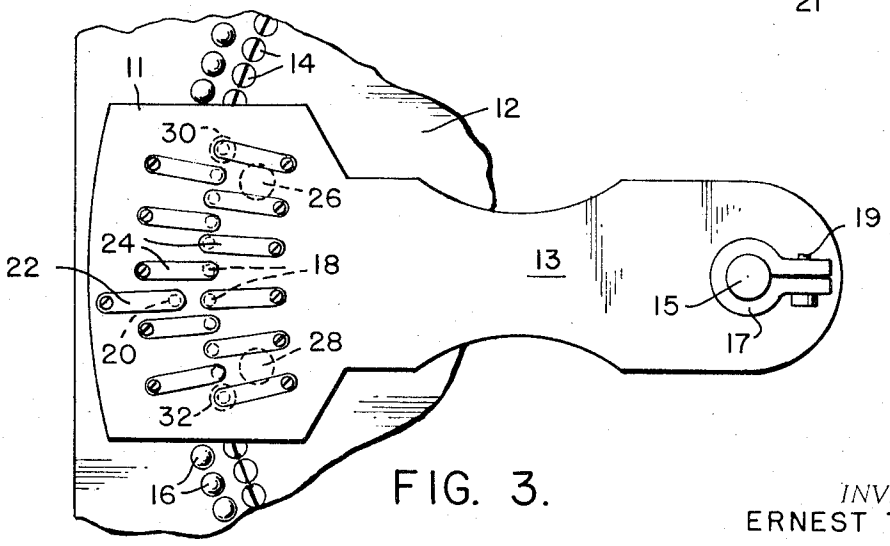


FIG. 3.

INVENTOR.
ERNEST T. LONG

BY ROY MILLER
ATTORNEY.
GERALD F. BAKER
AGENT.

United States Patent Office 3,538,269 Patented Nov. 3, 1970

3,538,269

SCANNING SWITCH

Ernest T. Long, China Lake, Calif., assignor to the United States of America as represented by the Secretary of the Navy

Filed July 30, 1968, Ser. No. 748,838
Int. Cl. H01h 19/58
U.S. Cl. 200—11 7 Claims

ABSTRACT OF THE DISCLOSURE

A mechanical switch is provided which connects to a plurality of channels simultaneously. The switch comprises a rotary arm carrying a plurality of contacts and a base plate comprising a double circle of fixed contacts. One of the contacts on the rotary arm mates with a contact of the outer circle on the plate and the remaining contacts on the arm mate with contacts on the inner circle. As the arm is moved by one contact increments, an attached mechanical counter indicates the position.

GOVERNMENT INTEREST

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

BACKGROUND OF THE INVENTION

Electronic scanning switches are, of course, available in many forms. Many available switches are capable of scanning multiple input terminals but give only one channel of output. When a need arose for a specialized switch to scan a plurality of input terminals and which would provide multiple output terminals, none could be found.

Thus, the switch according to the present invention is designed to scan a plurality of input terminals in a circular array and, at the same time, makes contact with a plurality of fixed contacts in a second array of output contacts. In the development of this switch, a number of innovations appear which make for simplicity, efficiency and economy in the fabrication of such switches.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a scanning switch according to the invention;

FIG. 2 is a cross sectional view of the switch of FIG. 1 taken along line 2—2; and

FIG. 3 is a plan view taken along line 3—3 of FIG. 2 with portions broken away for simplicity.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The scanning switch **10** shown in FIG. 1 comprises a contact plate **12** fabricated from a sheet of fiber glass, for example, and carrying a double row of contacts **14**, **16** in concentric circular array. A switch arm **13** is mounted on a shaft **15** for rotation about the center of the contact array. The contact arm **13** rides on a bushing **40** and two pads **26**, **28** of Teflon or the like. The arm **13** may be force-fit onto shaft **15** or may be retained thereon by a clamp **17** held in place in a well known and obvious manner by means of screw **19**. The outer end **11** of arm **13** has a number of substantially identical leaf springs **24** fastened to the arms by means of self-tapping screws or the like. On the end opposing the fastening screws, each leaf spring **24** carries a contact pin or brush such as **18** and **20** (FIG. 2). The brush **20** is situated to ride on contacts **16** in base member **12** and the brushes **18** are situated to ride on contacts **14**. The two end pins are not contact pins but carry detent cups

30, **32** which fit over successive pins **14** to hold the arm **13** in the desired position. Pins **14** and **16** are, advantageously, steel drive pins frictionally held in holes drilled in fiber glass base member **12**.

Arm **13** may be moved manually or may be moved by a power source through gear **21**, for example. Movement of arm **13** also causes movement of shaft **25** through gear **23** which meshes with gear **21**. Movement of shaft **25** in turn causes movement of shaft **31** of, for example, an odometer type counter **38** through beveled gears **27**, **29**.

The pins **14**, **16** are preferably copper plated and then cadmium plated after installation. This plating not only protects the pins from corrosion but also provides a better surface for soldering the necessary wiring to the lower portions of the pins. Wire leads are also fastened in any well-known manner to all of the spring members **22** except those operating to bias the detent members **30**, **32**.

In addition to, or in place of, the odometer counter, the position of switch arm **13** may be indicated by placing on the base member **12** a number of radial lines as shown at **34** in FIG. 1. As will be obvious to workers in this field the base **12** may form the cover of a box containing the necessary connecting wiring or may be incorporated as a part of a switch board or the like.

In operation, when arm **13** is moved, the brush **20** moves onto another of pins **16** thus selecting a new input circuit. All of the brushes **18** ride on contact pins **14** and sequentially provide a plurality of output circuits. Where a plurality of contact brushes are required to ride over a like plurality of pins, it has been found desirable to flatten the heads of the pins and cut a guide groove therein to reduce friction.

Although the odometer counter **38** is shown situated inside the circle of contact points, if 360° movement of arm **13** were desired, it is considered obvious that the counter **38** could be situated without the circle or recessed in plate **12**.

From the foregoing it will be obvious that the applicant has provided a multicontact, multiposition switch which is capable of selectively changing one or more input circuits and simultaneously providing a plurality of output circuits and which can be easily manufactured from readily obtainable materials without the use of special tools. The switch in use has proven to be easily operated, rugged and dependable.

What is claimed is:

1. A rotary switch comprising a contact plate of insulating material provided with at least one inner row of serially spaced individual contacts arranged in circular array and at least one outer row of individual contacts arranged in circular array;

said circular arrays of contacts being arranged concentrically in said plate around a central point on said plate;

an arm pivoted to said contact plate at said central point and rotatable over said contacts;

at least one outer brush on said arm positioned to contact successive ones of said outer contacts;

a plurality of inner brushes arranged and positioned on said arm along an arc of a circle positioned over said inner contacts;

so that when said outer brushes are moved to a new position on said outer contacts said plurality of inner brushes will be moved to a new position contacting different ones of said inner contacts.

2. Apparatus in accordance with claim **1**, wherein means is provided for indicating the position of said contact arm with respect to said contacts.

3. Apparatus in accordance with claim **2**, wherein said means for indicating comprises an odometer type counter.

4. Apparatus in accordance with claim 2, wherein said indicating means comprises a radial scale on said plate.

5. Apparatus in accordance with claim 1, wherein said plate is of fiber glass or the like and said contacts comprise steel drive pins.

6. Apparatus in accordance with claim 5, wherein certain of said contact pins have heads flattened and grooved to facilitate movement of the brushes thereover.

7. Apparatus in acocrdance with claim 1 including cup shaped detent means positioned at each end of the arc of said inner brushes to successively engage with said individual contacts.

References Cited

UNITED STATES PATENTS

2,240,997	5/1941	McMaster.
2,985,726	5/1961	Handel.
3,024,334	3/1962	Rhodes.
3,098,129	7/1963	Lynch et al.
3,246,089	4/1966	Lieberman et al.

ROBERT K. SCHAEFER, Primary Examiner

J. R. SCOTT, Assistant Examiner