

Dec. 16, 1958

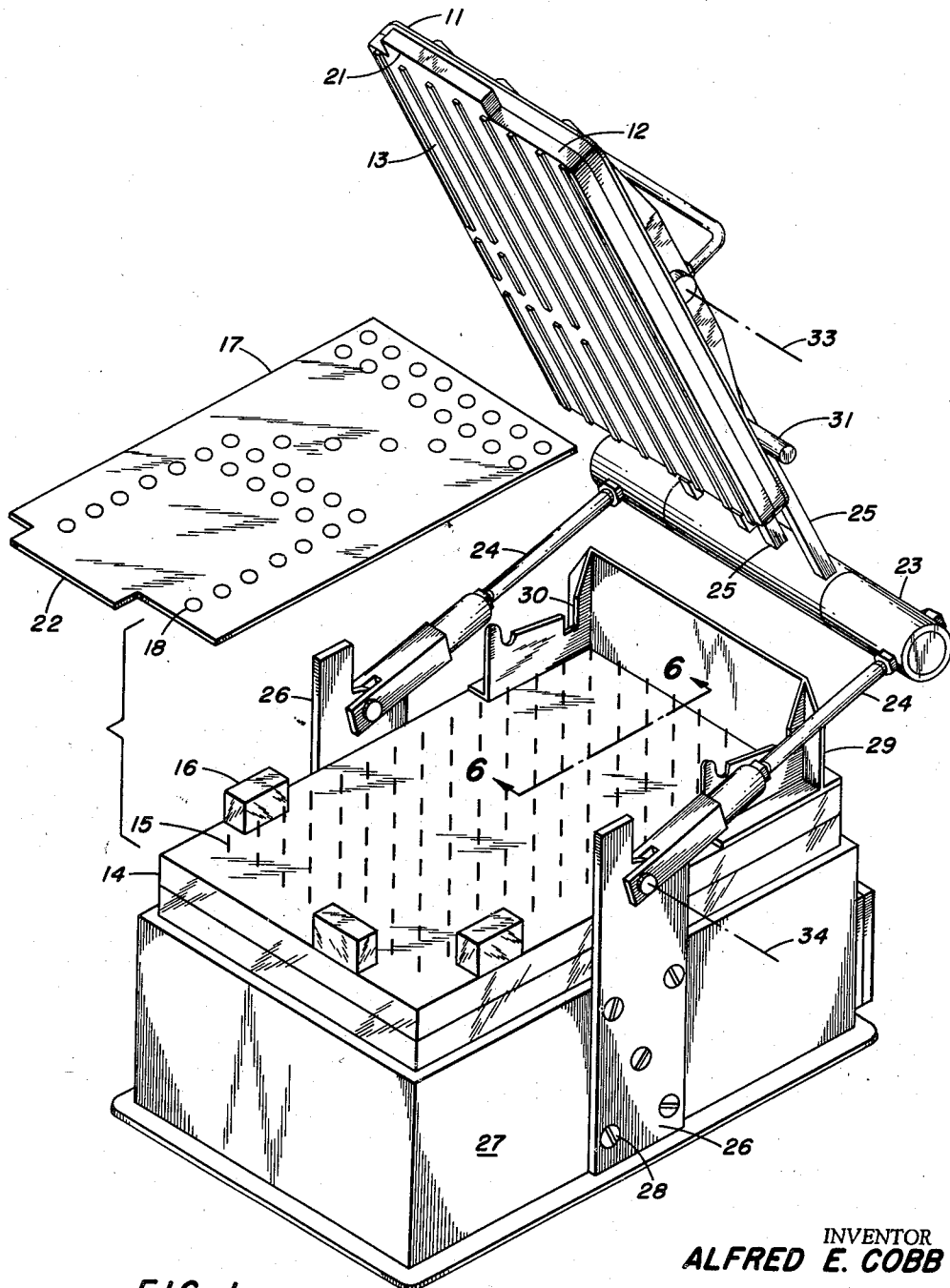
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2,864,909

SWITCH

Original Filed Jan. 18, 1955

3 Sheets-Sheet 1



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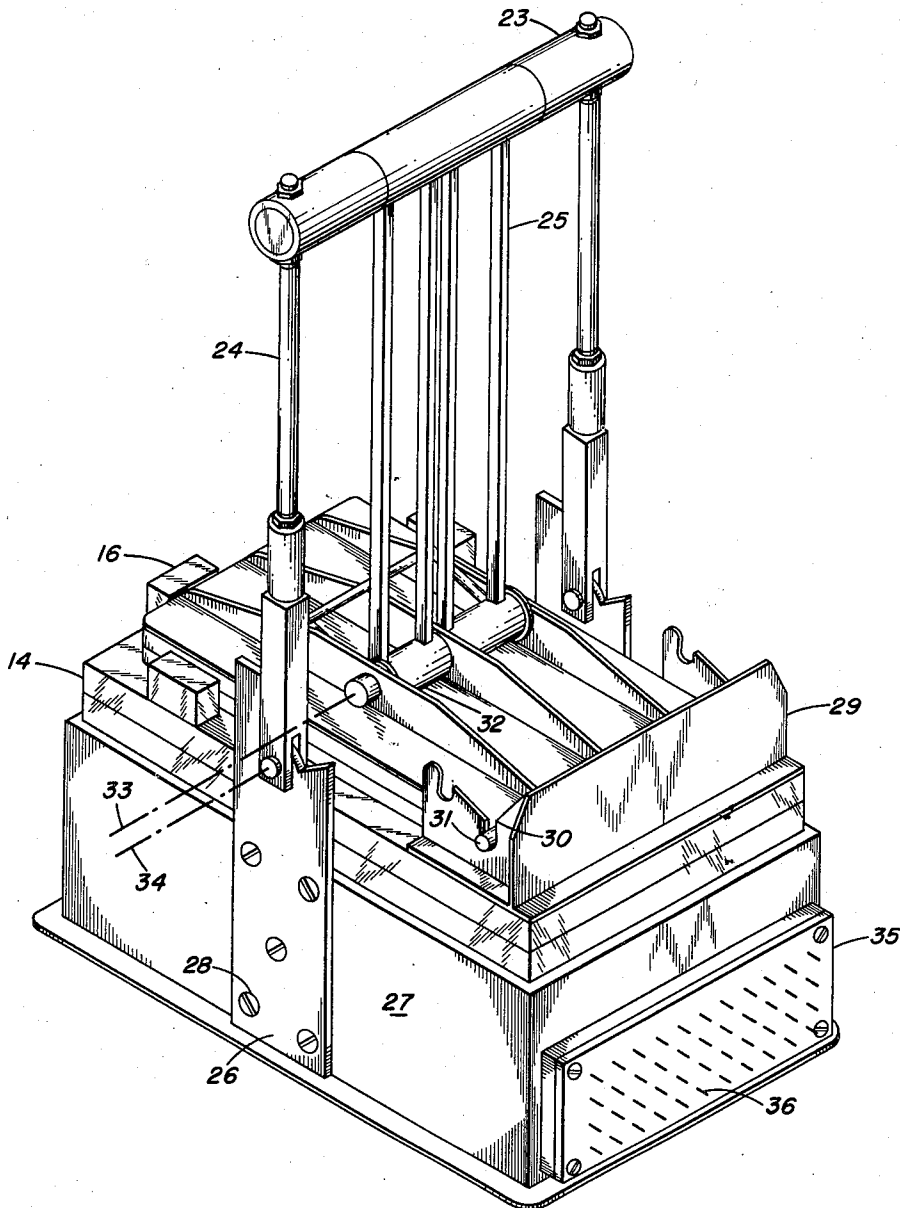


FIG. 2

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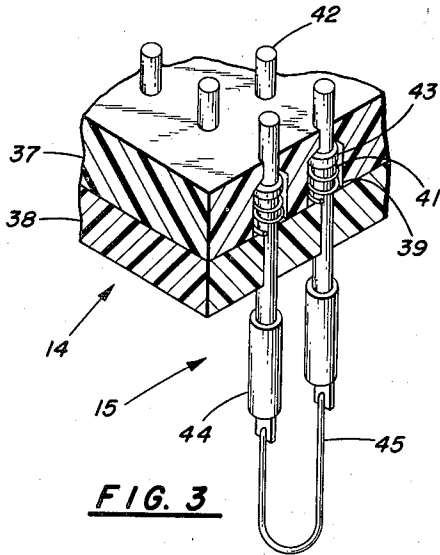


FIG. 3

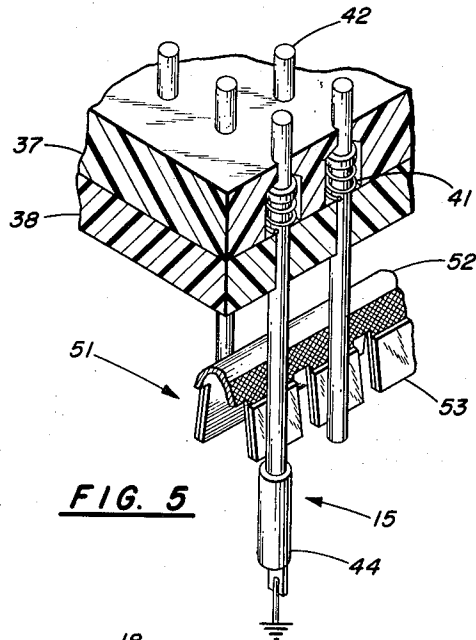


FIG. 5

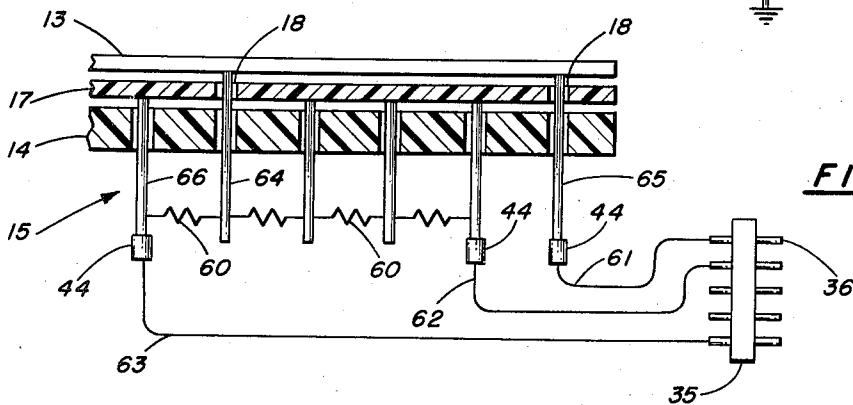


FIG. 6

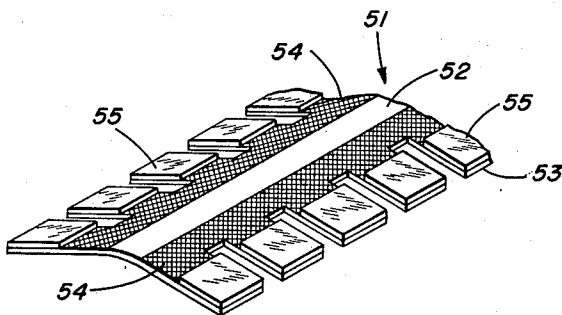


FIG. 4

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SWITCH

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Original application January 18, 1955, Serial No. 482,688; now Patent No. 2,847,543; dated August 12, 1958; Divided and this application June 10, 1957, Serial No. 664,859

7 Claims. (Cl. 200—46)

(Granted under Title 35, U. S. Code (1952), sec. 266)

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.

The present invention relates to a switch and more particularly to a switch used in a card switch system.

In many circuits numerous simultaneous switching operations occur which operations must be varied depending upon the use of the circuit. Examples of such circuits appear in identification equipment, computing machines, training devices and tube testers. A tube tester presents probably the simplest example of these circuits. Tube testers require simultaneous switch connections for the plate circuit, grid circuit, cathode circuit and etc., and different switching connections are required for different tubes. As a result, switching equipment for conventional tube testers have a multitude of complicated dials and switches and can be used only by a skilled operator.

The card switch of this invention has a pressure plate with a plurality of conducting, insulated and parallel-mounted bars and a fixed bed with a plurality of insulated, spring-loaded conducting contacts. A card constructed of insulating material having apertures punched therein, the position and number of the apertures being dependent on the switching operation desired, is adapted to be placed between the pressure plate and bed so that when the pressure plate is forced down on the card, only those contacts aligned with the apertures make contact with the conducting bars. This simple switching operation requires minimum operator skill and a minimum amount of time and the switching operations can be easily and speedily changed with little chance for error by a mere change of cards. There are many ancillary advantages of this switch, two of which are: compactness of the system and adaptability for a novel painted resistor. A novel resistor has been provided that is an integral part of the card switch and thus the requirement for external resistors is obviated in some circuits and lessened in number in all circuits. Resistance material is painted on a piece of springy plastic material and is inserted on the underside of the spring contact bed and by construction and position is made to touch a whole row of spring loaded contacts. Thus, a variable resistor is formed since a varying amount of resistance can be tapped off by a varying selection of spring-loaded contacts.

This application is a division of application Serial No. 482,688, filed January 18, 1955, now Patent No. 2,847,543, August 12, 1958, for Card Switch System.

Accordingly an object of the present invention is the provision of a switch for making numerous, varied and simultaneous switching operations.

Another object is to provide a compact switch for making simultaneous, numerous and selectable switching operations.

A further object of the present invention is the provision of a compact switch for making simultaneous,

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numerous and selectable switching operations and providing a variable amount of resistance.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

Fig. 1 shows an isometric front and side view of a preferred embodiment of the apparatus of the invention.

Fig. 2 is an isometric rear and side view of the apparatus shown in Fig. 1.

Fig. 3 is a representative sectional isometric view of a portion of the apparatus.

Fig. 4 illustrates an isometric view of a resistor which is adapted to be used in the apparatus.

Fig. 5 is an isometric view of the resistor of Fig. 4 in formed and assembled relationship as used in the apparatus in form slightly modified from the showing in Fig. 3.

Fig. 6 shows a section of the apparatus taken on the line 6—6 of Fig. 1 looking in the direction of the arrows.

Referring now to the drawings, wherein like reference characters designate like or corresponding parts throughout the several views there is shown in Fig. 1 (which illustrates a preferred embodiment) a pressure plate 11 to which there is attached insulating material 12 for holding conducting bars 13. An insulating bed 14 contains rows of spring loaded contacts 15 and stops 16. An insulating card 17 having apertures 18 is shown ready for placement between the bed 14 and plate 11. Due to projection 22, which corresponds to projection 21 on plate 11, in cooperation with stops 16 on bed 14 an incorrect placement of the card 17 is prevented. Handle 23 is joined by connecting rods 25 to plate 11 and by connecting rods 24 to brackets 26. Brackets 26 are secured to base 27 by any suitable means such as bolts 28. A bracket 29 with slot 30 is provided at the rear of the bed 14 for holding pin 31 when the switch is in a closed position. In Fig. 2, which shows the switch in a closed position, it is seen that connecting rods 25 are rotatably mounted by means of a conventional structure 32 about axis 33. The specific type of structure 32 that is employed is a matter of discretion, there being many suitable structures that are well known in the art. It is to be noted that the axis of rotation 34 of connecting rods 24 is displaced beneath axis 33. An insulating panel 35 is provided to the rear of the base 27 on which are rows of connecting pins 36. Each pin 36 is connected to a selector spring-loaded contact and is adapted to connect the contact with an external circuit terminal. In Fig. 3 a portion of the bed 14 and two of the spring-loaded contacts are shown in detail. Bed 14 consists of an upper insulating sheet 37 and lower insulating sheet 38. Sheet 37 is countersunk at 39 to provide space for spring 41 of spring-loaded contact 15. Spring 41 bears against collar 43 which is affixed to rod 42. Clips 44 are provided to electrically join rod 42 to a resistance or conducting wire 45 for connection to other clips or to pins 36 (supra). The resistor 51 of Fig. 4 has main body portion 52 and teeth 53 which are formed from one sheet of springy insulating material, such as a non-conducting plastic. Two insulated strips of resistance material 54 are painted on main body portion 52 and a conducting paint coating 55 is provided for teeth 53. In Fig. 5 resistor 51 is shown situated among the undersides of spring-loaded contacts 15. It may be desired to employ the resistor as a potentiometer in which case the end contact would probably require grounding by a connection to clip 44. Only the pressure obtained by the spring action of the resistor 51 provides contact between rods 42 and teeth 53. In Fig. 6 some of the details of the system have been omitted which otherwise would

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have encumbered an explanation of the system. In this figure, wires 61, 62 and 63 are shown connected to clips 44 on the contact rods numbered 64, 65 and 66. Rods 64 and 65 are shown extended through holes 18 to join bar 13. Resistors 60 connect the various rods 15, these resistors can be a resistance wire such as 45 of Fig. 3 or resistance 51 of Fig. 4 or any other suitable type.

In operation, insulating card 17 with selected intelligence in the form of apertures 18 is placed on bed 14, then pin 31 of pressure plate 11 is placed in the slots 30 of bracket 29. Handle 23 is moved into a vertical position as shown in Fig. 2. This movement performs two functions: to apply pressure to the card 17 and to provide a wiping action which cleans the top surface of contacts 15. This wiping action is the result of the displacement of axes 33 and 34, by which a slight forward movement of plate 11 on contacts 15 is produced when handle 23 is moved to a vertical position. Pin 31 will be slightly bent in the process but no damage is done inasmuch as the highly elastic character of the pin will ensure only a temporary deformity. Pressure plate 11 presses on card 17, and card 17 presses down on all the spring-loaded contacts with the exception of those aligned with apertures 18, and those contacts connect with bars 13. Thus, the bars connect selected spring-loaded contacts which give the desired switching operations through connecting pins 36 to external circuits. The switch can be used to obtain variable resistors and various voltages by means of a potentiometer. From Figs. 3 and 5 it is seen that if resistor wire 45 or resistor 51 is used, a definite amount of resistance exists between the contacts. Of course if it is desired to use the system only for switching, no resistors will be employed, but in general use part of the system will be used to obtain resistance. To obtain a variable resistance from the switch, best shown in Fig. 6, connections are required to the pins 36 which are connected to wires 61 and 62. The resistance path extends from wire 61 through rod 65 to bar 13 along bar 13 to contact 64, from contact 64 through resistors 60 to wire 62. It is obvious that the resistance can be varied by merely changing the contact 64 that joins bar 13. If it is desired to have a potentiometer, the voltage supply is placed between wires 62 and 63 through suitable pins 36 and wire 61 then has the variable voltage output. It is thus seen that through use of the disclosed switch, an unskilled operator can perform numerous, simultaneous, selected, switching operations and also obtain a variable resistance or potentiometer by the insertion of the disclosed novel resistor in this switch.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. A card switch comprising in combination a bed containing a plurality of parallel rows of spring-loaded insulated contacts, a plate containing a plurality of parallel conducting insulated bars having the same spacing as the parallel rows of said bed, hinge means for connecting said bed to said plate upon operation of which said bars can be placed in a pressure relationship with said spring-loaded contacts, means for providing a wiping action between said bars and said contacts upon the occurrence of a pressure relationship therebetween, and an insulated card adapted to be placed on said bed and having apertures that are alignable with chosen spring-loaded contacts whereby only those contacts alignable with said apertures make contact with said bars upon an operation of said hinge means.

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2. A switch for making numerous simultaneous switching connections comprising first means for holding parallel conducting bars in an insulated relationship, second means for holding a plurality of rows of spring-loaded conducting rods in an insulated relationship, third means mechanically connecting said first and second means whereby upon operation said bars and rods can be placed in a wiping and pressure relationship, an insulated panel holding a plurality of pins some of which are connected to chosen spring-loaded conducting rods whereby connections to external circuits can be made through said pins, and fourth means adapted to be placed upon said rods whereby only desired rods make connection with said bars upon operation of said third means.

3. A card switch comprising in combination a base member, a bed mounted on said base member and containing a plurality of parallel rows of spring loaded insulated contacts, a plate containing a plurality of parallel conducting insulated bars having the same spacing as the parallel rows of contacts on said bed, a handle pivotally connected to said base member and said plate, said pivotal connections being along parallel spaced axes whereby, upon rotation of said handle, said bars are placed in a pressure relationship with said spring loaded contacts with a wiping action, and an insulated card adapted to be placed on said bed and having apertures that are alignable with chosen spring loaded contacts whereby only those contacts alignable with said apertures make contact with said bars upon an operation of said plate upon said bed.

4. The card switch of claim 3 including a projection on said plate and a corresponding co-extensive projection on said card whereby the proper location of the card upon said bed is insured.

5. The card switch of claim 4 including a plurality of stops mounted upon said bed for abutting the edges of said card to further insure proper location of said card.

6. A card switch comprising in combination: a base member, a bed mounted on said base member and containing a plurality of parallel rows of spring loaded insulated contacts, a plate containing a plurality of parallel conducting insulated bars having the same spacing as the parallel rows of contacts on said bed, a first pair of brackets mounted on said base member, a pair of rods, each pivotally connected to a corresponding bracket, a second pair of rods pivotally connected to said plate, said pivotal connections of said rods to said brackets and plate respectively being along parallel spaced axes, said first and second pair of rods also being connected to a common handle, whereby, upon rotation of said handle, said bars are placed in a pressure relationship with said spring loaded contacts with a wiping action, and an insulated card adapted to be placed on said bed and having apertures that are alignable with chosen spring loaded contacts whereby only those contacts alignable with said apertures make contact with said bars upon an operation of said plate upon said bed.

7. The card switch of claim 6 and further comprising a U-shaped bracket mounted along one edge of said bed, said bracket having a side and a pair of arms, a slot within each of said arms, a pin on the plate extending the width of said bed adapted to be placed into said slots when said card switch is in operative position.

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