J. G. PETERSON.

ELECTRIC SWITCH.

APPLICATION FILED MAY 18, 1909.

954,462.

Patented Apr. 12, 1910.

2 SHEETS—SHEET 1.

FIG. 1

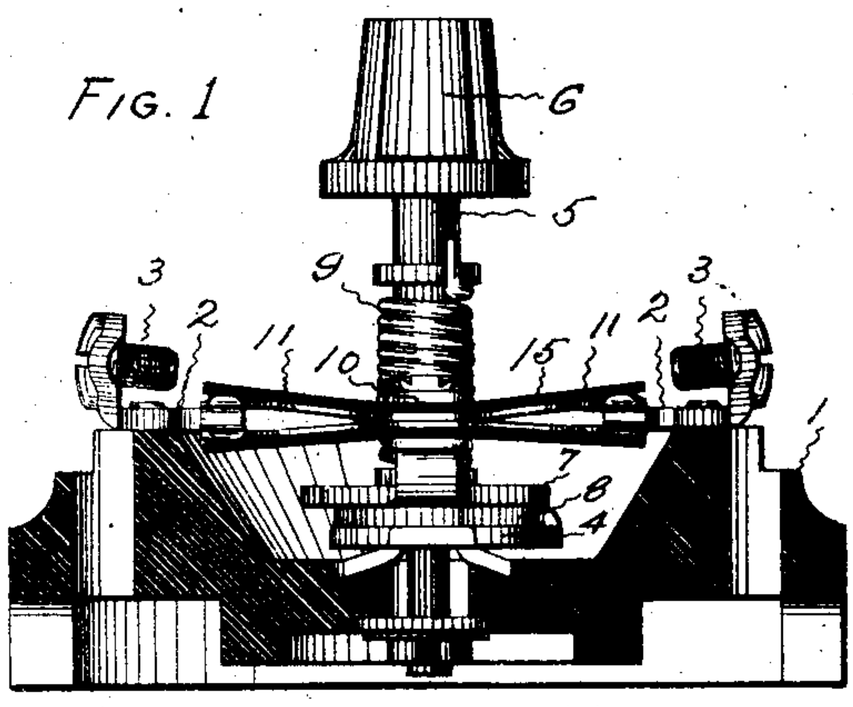


FIG. 2

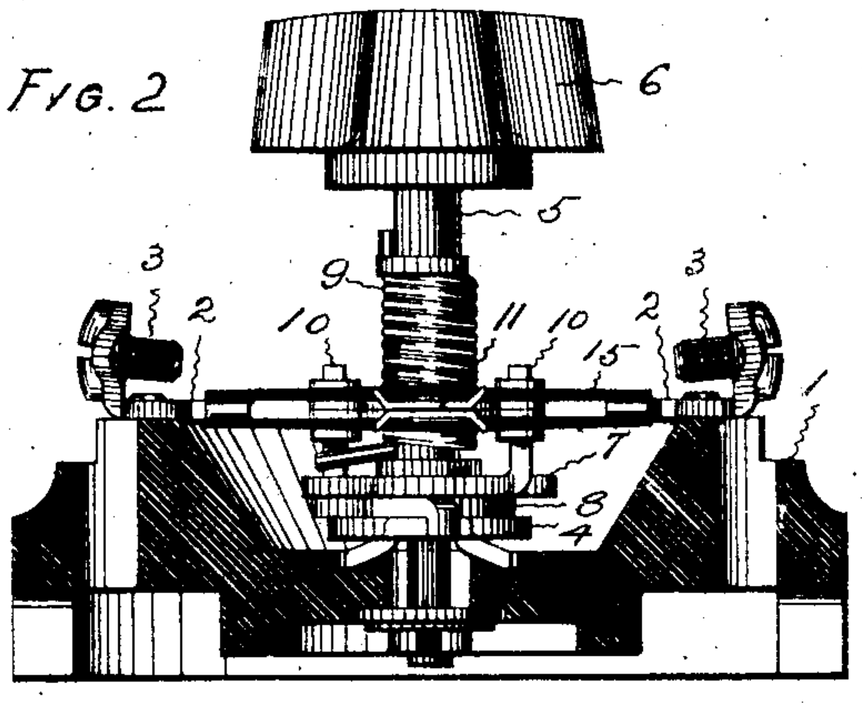


FIG. 3

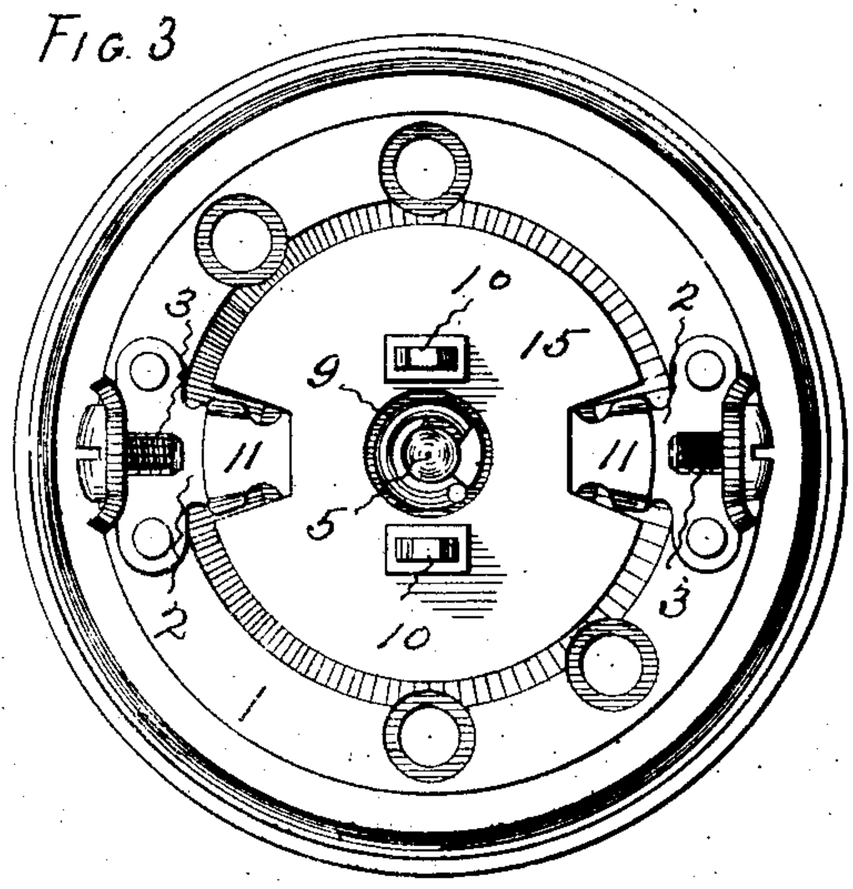


FIG. 4

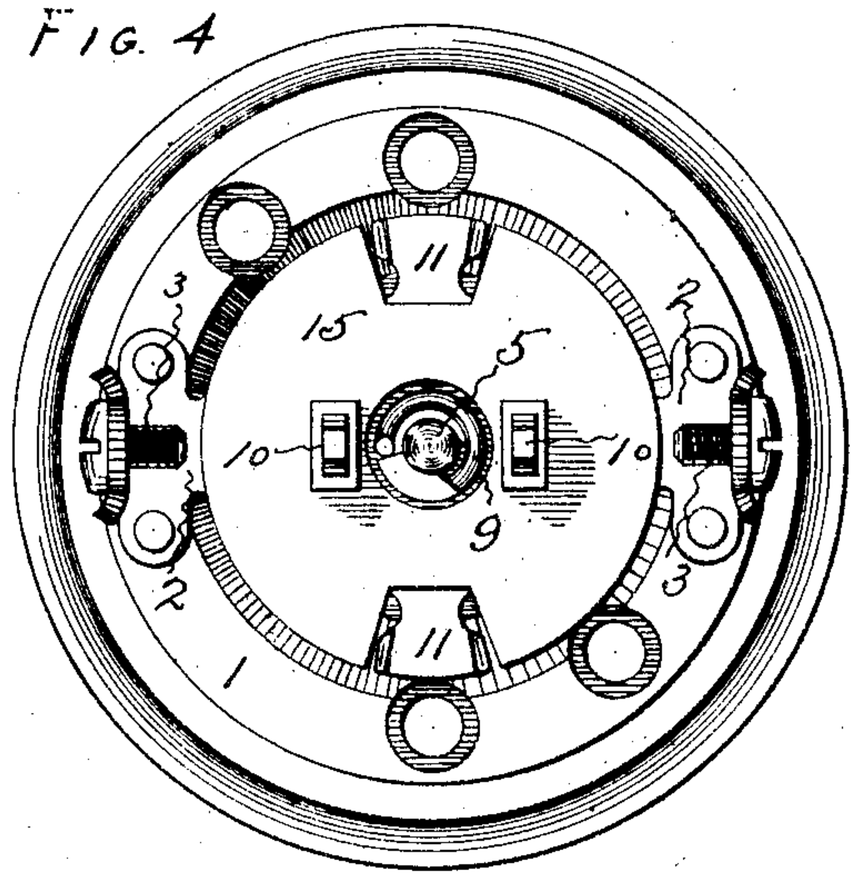


FIG. 5

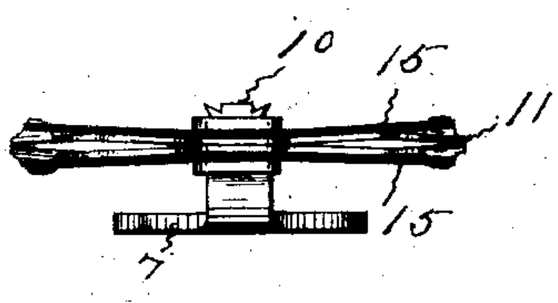
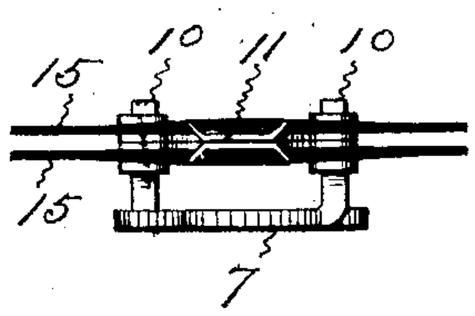


FIG. 6



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2 SHEETS—SHEET 2.

FIG. 7

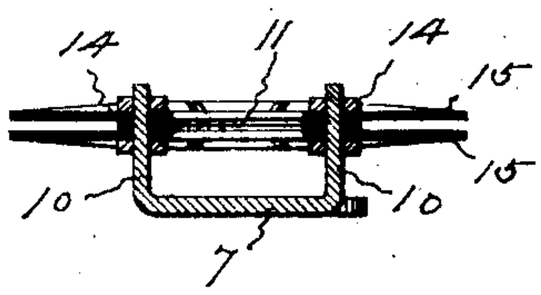


FIG. 8

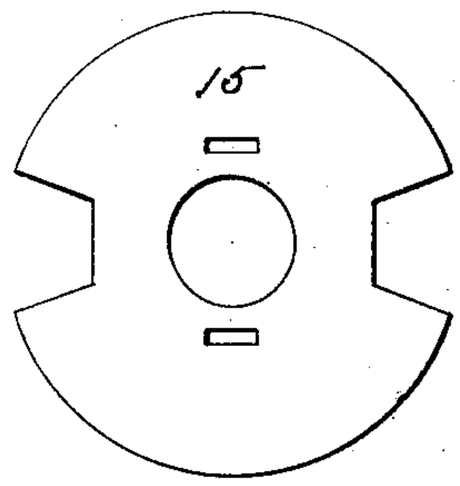
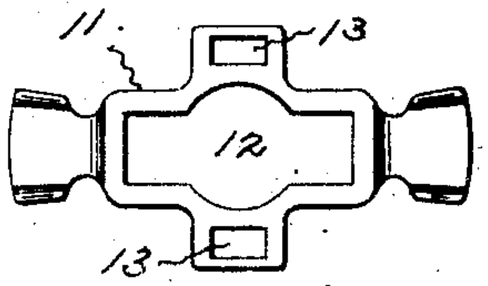


FIG. 9

FIG. 10



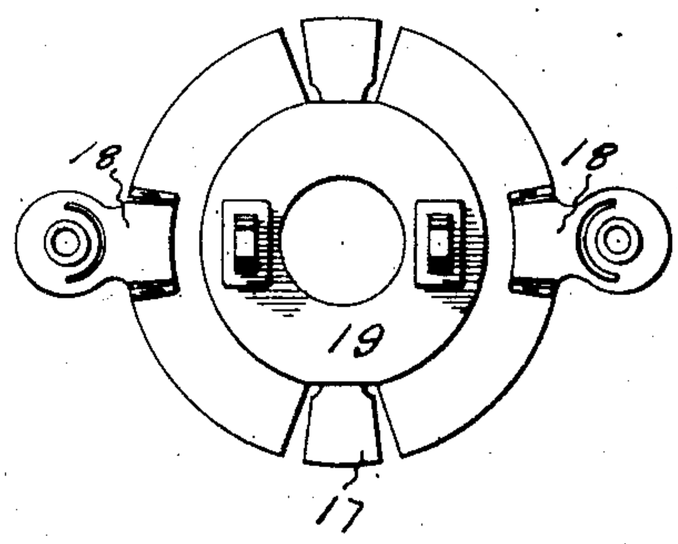
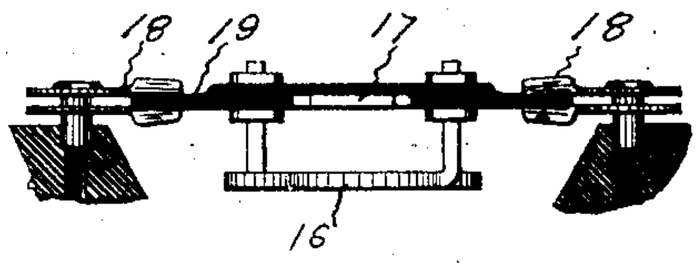


FIG. 11



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UNITED STATES PATENT OFFICE.

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ELECTRIC SWITCH.

954,462. Specification of Letters Patent. Patented Apr. 12, 1910.

Application filed May 18, 1909. Serial No. 496,774.

To all whom it may concern:

Be it known that I, JOHANN G. PETERSON, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented a new and useful Improvement in Electric Switches, of which the following is a specification.

This invention relates to the construction of a commutator, or that part of a snap switch, which is thrown by the actuating spring when the handle is turned or pushed, for the purpose of opening and closing the electric circuit controlled by the switch.

The object of this invention is to provide a simple, light and cheap commutator for a snap switch, which is so organized that when thrown for opening a circuit, insulating material is interposed between the poles, or movable conducting contacts, and the contacts fixed to the base, in such manner that an arc will not be drawn as the contacts are separated, so as to burn the contacts and damage or destroy the switch.

In the accompanying drawings the invention is illustrated in connection with a single pole, rotatory snap switch, but it is applicable to single, double or three-way rotatory turn button and oscillatory push button switches.

Figure 1 of the accompanying drawings shows a central vertical section of the base and an elevation of the actuating mechanism of a rotary turn button snap switch, provided with a commutator having double plate contacts, which embodies the present invention. Fig. 2 shows a similar view of the same, with the commutator turned ninety degrees. Fig. 3 shows a plan of the switch mechanism with the commutator in such position that the movable poles or contacts are engaged with the fixed contacts, as when the circuit is closed. Fig. 4 is a plan of the same with the commutator turned so that the movable poles are out of engagement with the fixed contacts, as when the circuit is open. Fig. 5 shows an edge view of the commutator. Fig. 6 shows an edge view of the same turned ninety degrees. Fig. 7 shows a vertical section of the commutator. Fig. 8 shows a plan of one of the insulating disks that are used with this form of commutator. Fig. 9 shows a plan of one of the movable pole or contact plates of this commutator. Fig. 10 shows a plan of a commutator having a single plate contact, adapted to engage double plate fixed contacts. Fig. 11 shows an edge view of the form shown in Fig. 10.

The base 1, shown in the drawings, is formed of porcelain in the usual manner. Attached to the upper surface of the base are the fixed contact plates 2, to which the circuit wires are adapted to be fastened by the screws 3. As is common in this form of switch, there is a ratchet or lock plate 4 applied to the bottom of the recess in the upper face of the base. The spindle 5, with its turn button 6, is rotatably mounted centrally of the base and extends through the ratchet plate. Mounted on the spindle is the commutator plate 7. Between the commutator plate and the ratchet plate is the pawl plate 8. The pawl plate is connected with the commutator plate and is adapted to be engaged with and released from the teeth of the ratchet plate, as the commutator is thrown, in the manner common with snap switches. A spring 9, coiled about the spindle, has one end connected with the commutator plate and its other end connected with the spindle, so that by turning the button the spring is made tense and tends to throw the commutator. As the details of this actuating mechanism and the locking and releasing mechanism are common and are fully understood by all who are familiar with snap switches, and as they form no feature of the present invention, they are not more fully described herein.

The commutator plate shown has lugs or studs 10 that project upward from its edges. On these lugs, but insulated therefrom, are mounted the movable poles or contact plates 11. These plates are preferably stamped to shape from thin spring metal, such as bronze, with a central opening 12 through which the spindle and actuating spring extend, and perforations 13 which fit upon the insulation 14 that is placed upon the lugs projecting from the commutator plate. When the commutator is thrown by the actuating spring, the ends of these pole plates, as they rotate, pass onto and off of the fixed contacts, for the purpose of making and breaking the circuit.

Secured on the lugs or studs that extend upwardly from the commutator plate, above and below the pair of movable spring pole plates that are also mounted thereon, are

insulating disks 15. These disks are preferably formed of thin, hard fiber, although of course they could be formed of mica, or other suitable insulating material. These insulating disks are separated a distance equal to the thickness of the pole plates, and are desirably made very thin and hard so that they are somewhat yielding. The diameter of the insulating disks is preferably the same as the longest diameter of the pole plates. The edges of the disks adjacent to the ends of the pole plates are preferably notched so as to allow the extreme ends of the pole plates free play, and permit them to separate without material restriction when they pass upon the fixed contacts. A commutator constructed in this manner is very light in weight and is of uniform balance. When the pole plates pass upon the fixed contacts, the plates yield and separate for this purpose, and the insulating disks also slightly spring apart. When the pole plates snap off from the fixed contact plates, they spring toward each other. The insulating disks also spring together and wipe the upper and lower surfaces of the fixed contact plates, keeping them bright, and so restrict the direct passage between the movable poles and the fixed contacts that an arc cannot form and remain burning between them. The insulating disks add the force of their resiliency to that of the pole plates and thus increase the pressure of contact between the surfaces of the pole plates and the fixed contacts, eliminating all danger of heating, and they also insulate the pole plates from the actuating mechanism. The light disks of insulating material do not add sufficient momentum to the parts, when they are thrown, to bring undue strain upon the locking mechanism, and they do not restrict the rapid action of the parts when snapped. It has been found in practice that the light yielding insulating disks arranged in this manner so smother any arc that tends to form between the ends of the pole plates and the fixed contacts when these are being separated, that a switch provided with a commutator which embodies this invention will carry a very much greater current or a current of very much higher pressure than the same switch without this particular form of commutator.

In the form previously described the commutator has two yielding pole plates, which are adapted to engage rigid fixed contact plates. The invention however can be applied to a commutator 16 having a single stiff pole plate 17 adapted to engage with the surfaces of double yielding fixed contacts 18, as shown in Figs. 10 and 11. In this form the insulating disk 19 has its edge shaped so as to be in the plane of the ends of the pole plate and to pass between the fixed contacts and interpose insulation between them and the pole plate when the circuit is opened.

The invention claimed is:

1. A commutator for an electric switch comprising a supporting plate, a pair of yielding pole plates mounted thereon, and a yielding insulating disk mounted on said supporting plate above and below the pole plates.

2. A commutator for an electric switch comprising a supporting plate, a pair of yielding pole plates mounted thereon, and a yielding insulating disk mounted on said supporting plate above and below the pole plates, said disks having notches in their edges opposite the ends of the pole plates.

3. A commutator for an electric switch comprising a supporting plate, lugs projecting upwardly from the supporting plate, a pair of pole plates mounted on said lugs, and a thin disk of insulating material mounted on said lugs above and below said pole plates.

4. A commutator for an electric switch comprising a supporting plate, a pair of yielding pole plates mounted thereon, and a yielding insulating disk, having a diameter substantially the same as the longest diameter of the pole plates, mounted on said supporting plate above and below the pole plates.

5. A commutator for an electric switch having a pole plate, an insulating disk movable therewith, said disk being substantially the same diameter as the longest diameter of the pole plate, and having its edge in practically the same plane as the ends of the pole plate.

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Witnesses:
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