P. T. McNALLY.

ELECTRIC SWITCH.

APPLICATION FILED DEC. 21, 1909.

981,452. Patented Jan. 10, 1911.

2 SHEETS—SHEET 1.

Fig. 2.

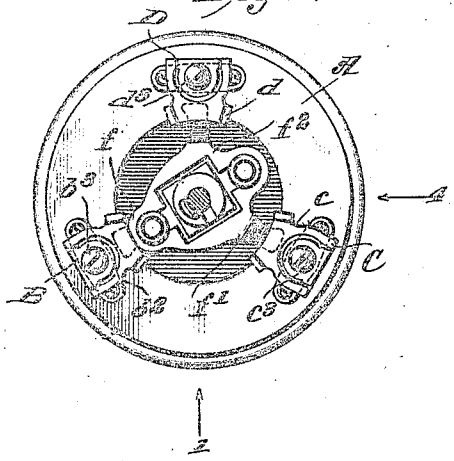


Fig. 3.

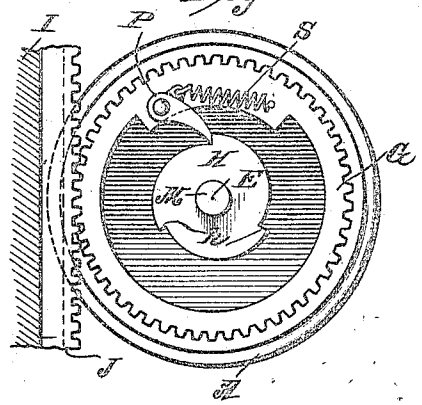


Fig. 1.

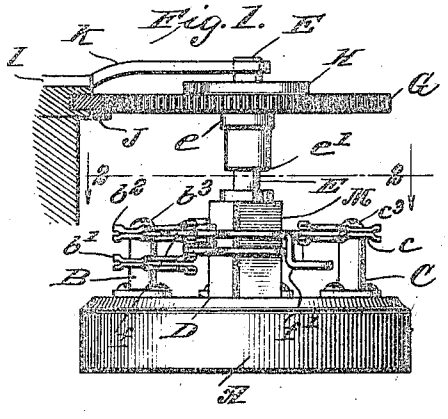
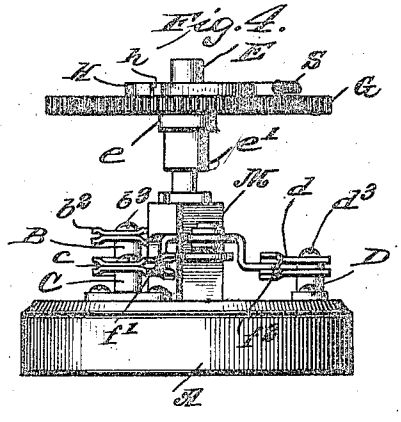


Fig. 4.



WITNESSES

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INVENTOR

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2 SHEETS—SHEET 2

Fig. 7.

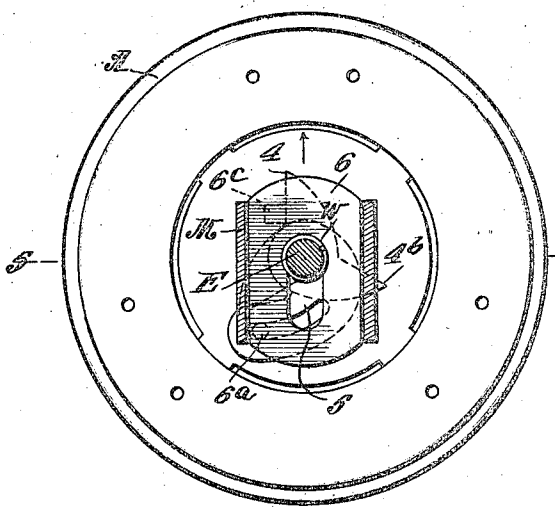

Fig. 8.

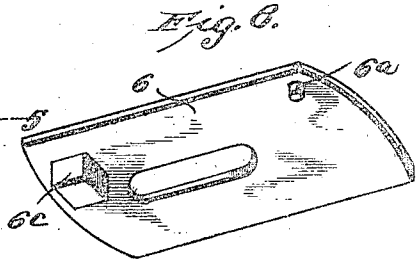

Fig. 9.

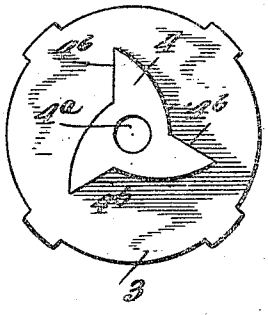

Fig. 6.

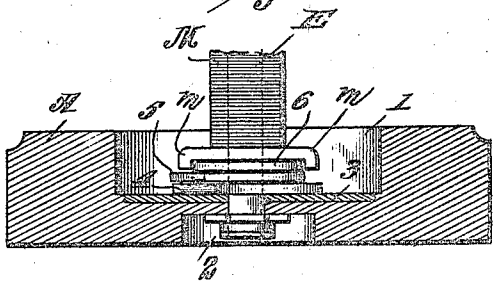

Fig. 5.

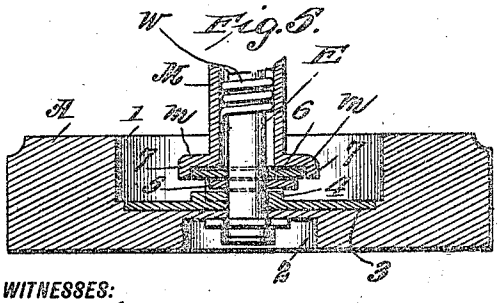

Fig. 10.

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UNITED STATES PATENT OFFICE.

PHILIP THOS. McNALLY, OF MANDAN, NORTH DAKOTA.

ELECTRIC SWITCH.

981,452. Specification of Letters Patent. Patented Jan. 10, 1911.

Application filed December 21, 1909. Serial No. 534,364.

To all whom it may concern:

Be it known that I, PHILIP T. McNALLY, a citizen of the United States, and resident of Mandan, in the county of Morton and State of North Dakota, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

My invention relates to snap switches for electric circuits, and it consists in the constructions and arrangements hereinafter described and claimed.

The snap switch herein disclosed is similar in form to that set forth in my prior application No. 520,354, filed Sept. 30, 1909, but differs from the latter in certain particulars which will be mentioned hereinafter.

An object of my invention is to provide a switch whereby one or more branch circuits may be successively brought into and out of use by a continuous rotation of the switch, or may be cut off entirely.

A further object of my invention is to provide a simple form of apparatus employing high and low contacts arranged to be engaged by a series of arms disposed on the switch spindle. In certain positions, these arms engage certain contacts, and in other positions, other contacts, the various contacts, being connected with the branch circuits to be controlled.

Further objects and advantages will appear in the following specification and the novel features of this device will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings, in which:

Figure 1 is a side view, showing the operative parts of the switch, the actuating mechanism therefor being shown in section, Fig. 2 is a section on the line 2—2 of Fig. 1, looking in the direction of the arrows, Fig. 3 is a plan view of the switch, Fig. 4 is a side view of the device at right angles to that shown in Fig. 1. Fig. 5 is an enlarged vertical section along the line 5—5 of Fig. 7. Fig. 6 is a similar view showing the barrel and plates in elevation, Fig. 7 is a horizontal section along the line 7—7 of Fig. 5, Fig. 8 is a perspective view of the sliding plate, Fig. 9 is a plan view of the detent and retaining plate, and Fig. 10 is a plan view of the cam plate.

In carrying out my invention, I provide an insulating base portion A of porcelain or other suitable material, to which are secured the three uprights B, C and D, respectively. The upright B is provided with lower and upper spring contacts b' and b^2, respectively. These contacts are secured to the upright B by means of clamping screws b^3. The upright C is provided with the spring contacts c which are on a line with the spring contacts b^2 on the upright B. The upright D is provided with the spring contacts d which are below the contacts c, being in line with the contacts b', as clearly shown in Fig. 4. The uprights, as will be seen from Fig. 2, are spaced 120° apart.

The construction of the release mechanism of the switch is best seen from the detail Figs. 5 to 10, inclusive. From these figures it will be seen that I have provided a recess 1 on the upper part of the base, and a smaller recess 2 on the lower part. In the bottom of the upper recess 1 is secured a retaining plate 3 (see Fig. 9) bearing an integral detent 4. The detent is provided with an opening 4^a through which the shaft E extends. This shaft also passes through the opening 5^a of a cam plate 5 of the shaft shown in Fig. 10, which is disposed immediately above the detent and is secured rigidly to the shaft. The plate 5 is provided with a slot 5^b arranged to receive a pin 6^a of a plate 6 which lies above the plate 5. The plate 6 is arranged to slide back and forth between the lower flanges m of the barrel M. The plate 6 is provided with a downwardly projecting stop lug 6^c which is arranged to engage the edges 4^b of the detent 4. A spring W is provided, one end of which is attached to the barrel M and the other to the shaft E, as shown in Fig. 5. The lower end of the shaft E is journaled in the base A, the end of the shaft being detachably secured thereto.

The barrel M bears the three laterally extending arms f, f', and f^2. These arms are carried on a plate which is secured to the barrel, being suitably insulated from the plate, but all being in electrical connection with each other. The arm f is an upper arm on a line with the high contacts b^2 and c, while the arms f' and f^2 are both low arms on a line with the contacts b' and d.

In order to show the use to which my switch may be put, I have illustrated certain parts of a switch actuating device which may or may not be used with my improved switch. This actuating device consists of an annular

gear G, loosely carried on the actuating shaft E, between the collar *e* on the enlarged portion *e'* of the shaft E, and the ratchet wheel H, which is secured to the shaft E. The outer end of the shaft is journaled in an arm K projecting from a support I. The latter is provided with a rack J having teeth arranged to mesh with the teeth of the gear G, and the rack may be reciprocated by any suitable means. The gear G carries a pivoted pawl P which is under the tension of the spring S, the latter serving to keep the end of the pawl in engagement with the teeth on the ratchet H.

The shaft E actuates the snap switch mechanism which releases by an eccentric movement. As the main switch spindle E is turned, the arms are carried around into and out of engagement with the stationary spring contacts on the base, as will be hereinafter explained.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood.

As stated before, the switch is primarily designed for use with a reciprocating rack, the double movement of the rack operating to turn the switch 120°, or a complete cycle in three successive movements. Fig. 3 shows the rack engaging the teeth of the gear. A downward movement of the rack in this figure simply results in the gear being turned loosely on the shaft E, the end of the pawl riding over the tooth *h* of the ratchet H. In this figure I have shown the ratchet H as being provided with three teeth. It might be provided with any number of teeth, since the throw of the rack is regulated to turn the gear practically a third of a revolution. On the return stroke of the rack, the pawl, which has engaged the ratchet, causes the rotation of the shaft E and this in turn causes the turning of the barrel M with a snap action.

From an inspection of Fig. 7, it will be seen that as the shaft E is turned, the spring W is put under tension, thereby tending to rotate the barrel M. The latter is kept from rotation by the plate 6 whose stop 6^c is held by the detent 4. As the shaft E is turned, however, the plate 5 which engages the pin 6^a moves the latter and the plate in the direction of the arrow. On turning the shaft still further, the tension of the spring increases, and when the stop lug 6^c clears the end of the detent 4, the barrel bearing the arms flies around until the stop strikes the edge 4^b of the adjusting teeth of the detent. Since these teeth are 120° apart, the turning of the switch is exactly one-third of a revolution.

In Fig. 2, the high arm *f* is in engagement with the high contact b^2, while the low arm f^2 is in engagement with the low contacts *d*. The low arm *f'* is below and therefore not in engagement with the high contacts *c*.

Figs. 1, 2, and 4 illustrate the position of the switch when the circuit is completed between the standards B and D. The double reciprocation of the rack results in the high arm *f* being swung around above the low contact *d*, the low arm *f'* will engage the low contacts *b'*, while the arm f^2 will pass under the high contacts *c*. In this position, there is no connection between any of the standards B, C and D, and hence the circuit through these terminals will be broken. A further turn of the switch brings the arm *f* into engagement with the high contact *c*, the low arm *f'* into engagement with the low contacts *d*, while the low arm f^2 will engage the low contacts *b'*. Both of the standards C and D will then be connected to the standard B, thus switching in two branch circuits through the standards C and D. It will thus be seen that by turning the switch, one or more lights may be switched on, or the lights may be cut off entirely. It is obvious that instead of using a reciprocating rack, a button may be attached directly to the actuating shaft E and the switch may be operated in the ordinary manner by manual means.

I claim:

1. A snap switch comprising an insulating base member, standards carried by said base member and disposed 120° apart, a high and a low contact carried by one of said standards, a high contact carried by another of said standards, and a low contact carried by the third standard, a main switch spindle provided with a high arm and a pair of low arms, all of said arms being in electrical connection and adapted to engage the respective high and low contacts.

2. A snap switch comprising an insulating base member, standards carried by said base member and disposed 120 degrees apart, a high and a low contact carried by one of said standards, a high contact carried by another of said standards, a main switch provided with a high arm and a pair of low arms, all of said arms being in electrical connection and adapted to engage the respective high and low contacts, and a three point detent for limiting each movement of said arms to 120 degrees.

PHILIP THOS. McNALLY.

Witnesses:
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E. A. THORBERG.