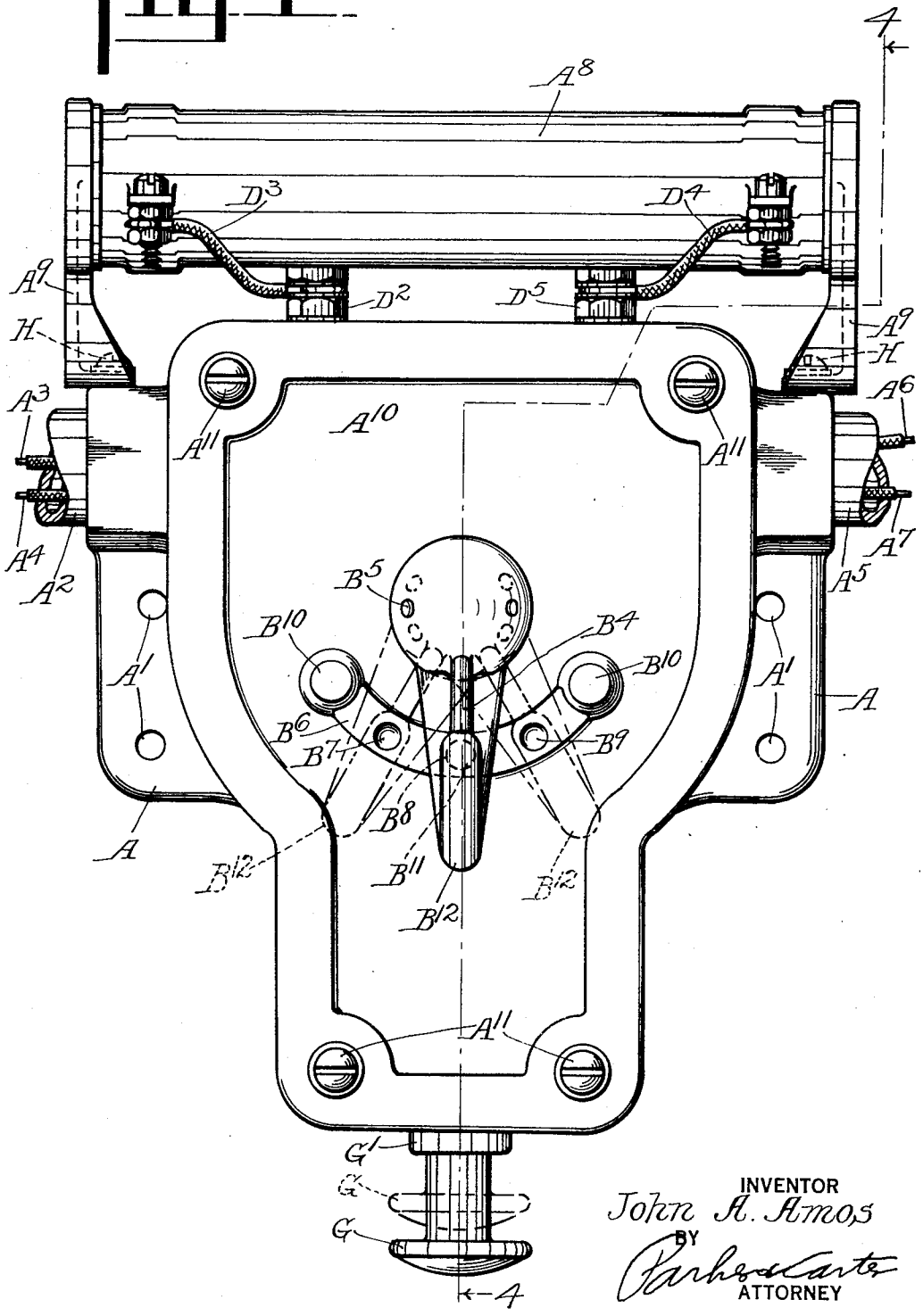
April 19, 1932. J. A. AMOS 1,854,919

ELECTRIC SWITCH

Original Filed Aug. 9, 1926 4 Sheets-Sheet 1

Fig. 1



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ELECTRIC SWITCH

Original Filed Aug. 9, 1926 4 Sheets-Sheet 2

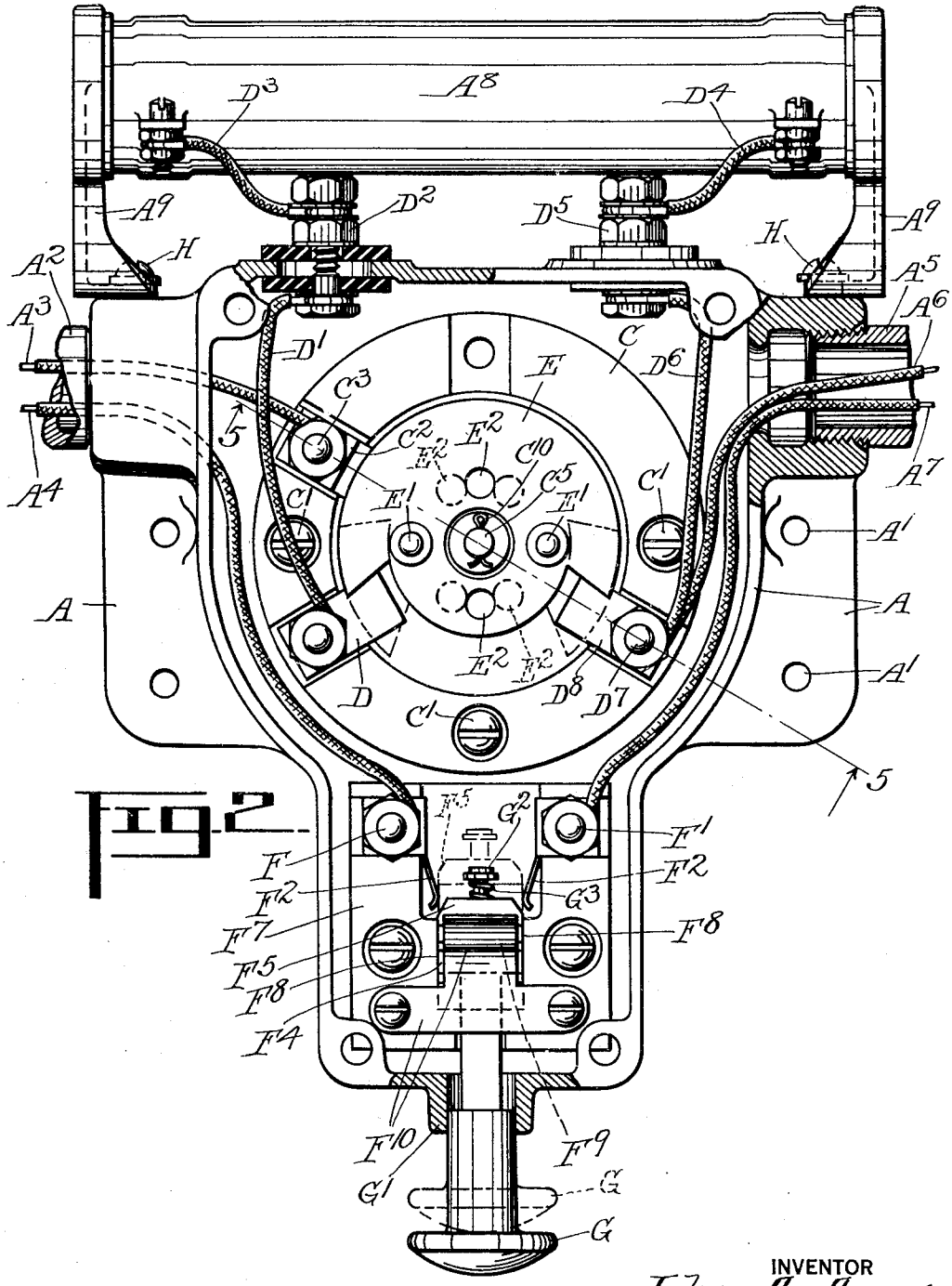

Fig 2

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ELECTRIC SWITCH

Original Filed Aug. 9, 1926 4 Sheets-Sheet 3

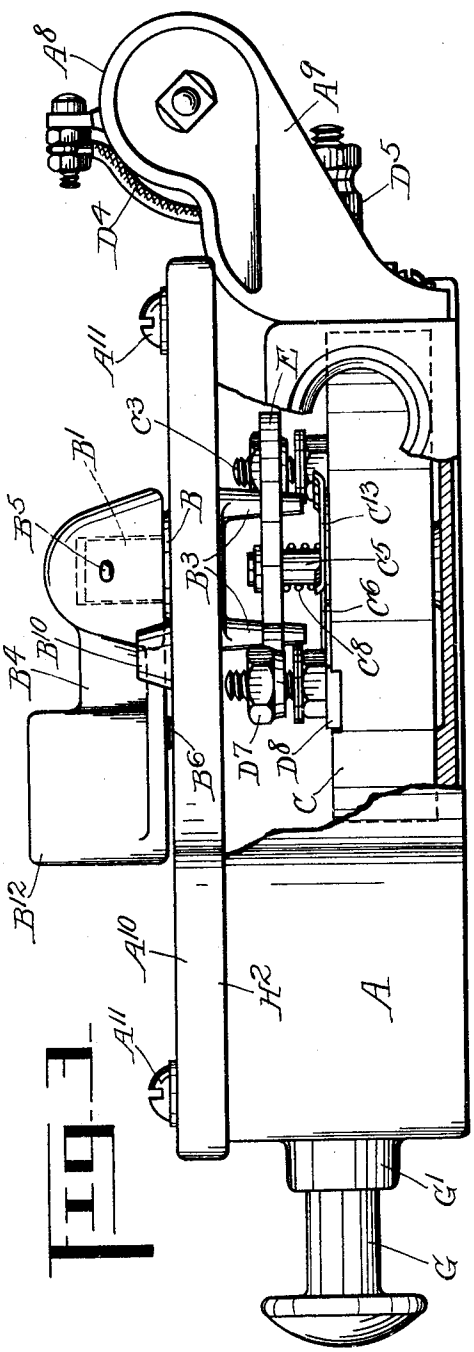

Fig. 3

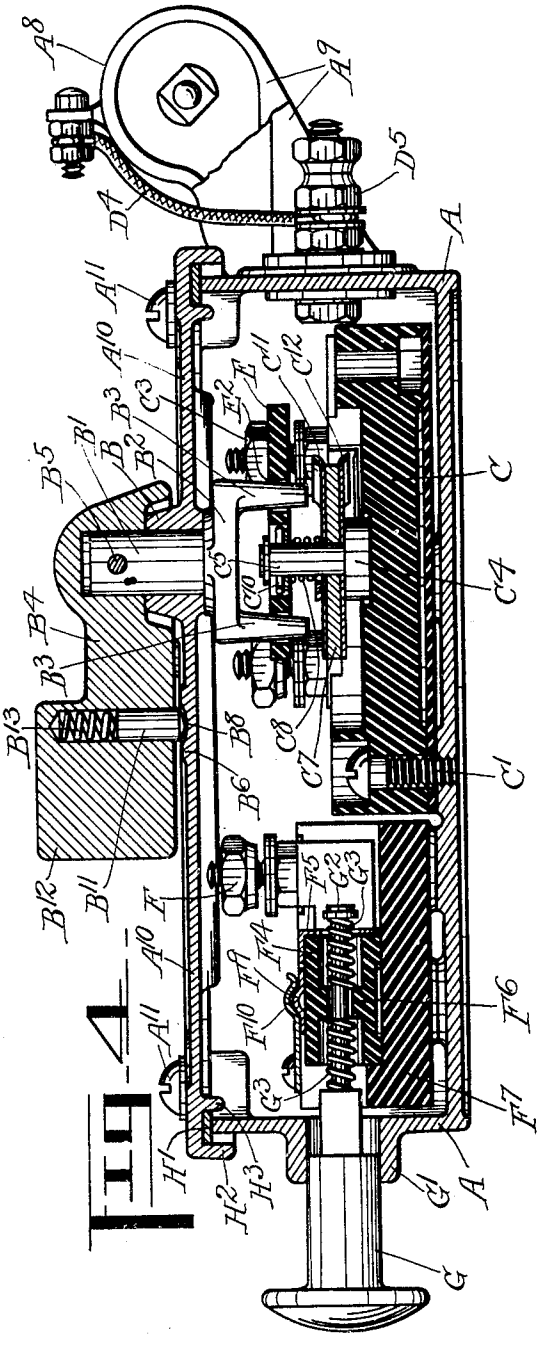

Fig. 4

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ELECTRIC SWITCH

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Fig. 5

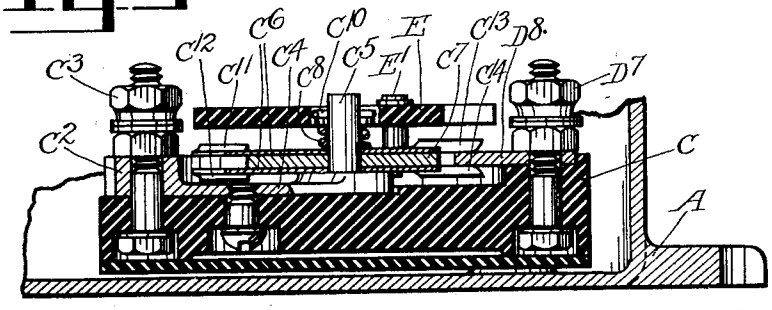


Fig. 7

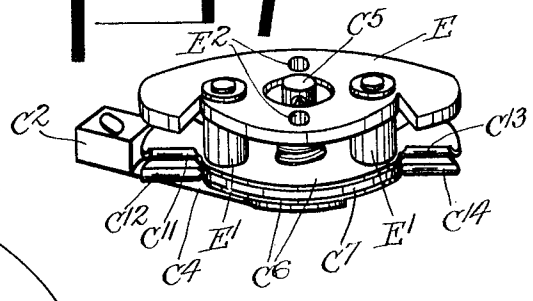
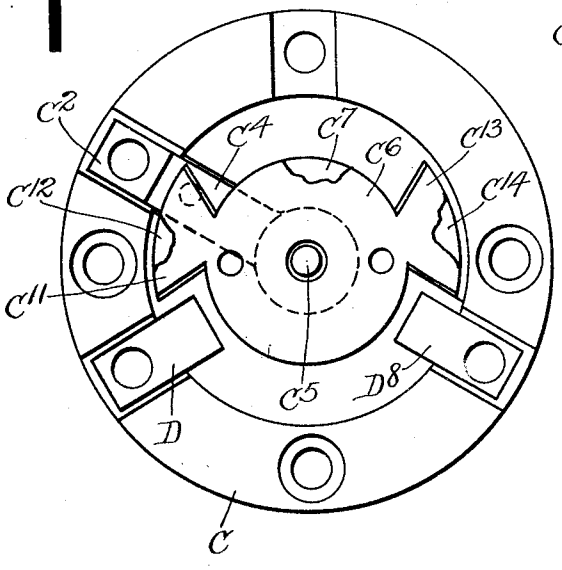


Fig. 6



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UNITED STATES PATENT OFFICE

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ELECTRIC SWITCH

Original application filed August 9, 1926, Serial No. 128,112. Divided and this application filed December 17, 1926, Serial No. 155,369. Renewed August 28, 1931.

My invention relates to improvements in electric switches particularly for use in connection with electric lighting systems of a locomotive and has for one object to provide a new and improved form of switch which combines the dimmer element and control means for the headlight and the control means for the running and cab lights in a single unitary housing. Another object of my invention is to provide a switch arrangement and switch housing which will be foolproof and durable and of such strength as to stand up under railroad service. Other objects of my invention will appear from time to time throughout the specification and claims.

My invention is illustrated more or less diagrammatically in the accompanying drawings, wherein—

Figure 1 is a plan view;

Figure 2 is a plan view with parts omitted and parts broken away;

Figure 3 is a side elevation with parts in section and parts broken away;

Figure 4 is a section along the line 4—4 of Figure 1;

Figure 5 is a section with parts omitted and parts broken away along the line 5—5 of Figure 2;

Figure 6 is a plan view of the headlight switch contact elements;

Figure 7 is a perspective view showing the headlight contact elements and control means.

Like parts are indicated by like characters throughout the specification and drawings.

A is the base or housing adapted to be held in place by bolts not shown, through the bolt holes A^1 at any suitable point in the locomotive cab. It may be supported vertically or horizontally as the case may be. A^2 is a conduit leading into the housing to contain conductor wires A^3 A^4 leading from the generator. A^5 is a conduit communicating with the housing to contain conductor wires A^6 A^7 leading to the headlight and to the cab lights. A^8 is the resistance unit provided with legs A^9 bolted to the housing A. A^{10} is a cover for the housing held in place by the screws A^{11}.

B is a boss in the cover A^{10} to provide a bearing for the switch pin B^1 which pin has a switch fork B^2 terminating in driving fingers B^3 B^3 inside the housing. The pin B^1 projects outwardly beyond the boss B to engage the handle B^4 being held against rotation thereon by means of the pin B^5 which passes through the handle head and the pin and holds the pin and switch handle in position on the cover. B^6 is a quadrant recessed on the face of the cover. A plurality of notches or pockets B^7, B^8 and B^9 are formed in the cover A^{10} arranged in arcuate relation. Stops B^{10} are disposed at each end of the row of notches, serving as stops for the handle B^{12} as the same is swung to and fro as hereinafter described for establishing different circuit relations in the switch. A lock plunger B^{11} is slidable in the hand piece B^{12} of the handle and is pressed outwardly against the quadrant by the spring B^{13}. When the pin engages the pocket B^8 as shown in Figure 1, the headlight switch is in off position. When it has been swung to the left and engages the pocket B^7. the headlight switch is in on position. When it is swung to the right engaging the pocket B^9 the headlight switch is in the dim position.

C is an insulating block fastened in the housing by means of the screws C^1. C^2 is a conductor piece bolted to the block C. It has a binding post C^3 at which terminates the cable A^3. It also has an arm C^4 extending to the center of the block C and carrying the pin C^5 on which is rotatably mounted the switch member C^6. This switch member comprises two opposed plates disposed one on either side of a filler block C^7 held yieldingly together by a spring C^8 surrounding the pin C^5 and held under tension by the cotter pin C^{10}. These switch plates C^6 have at opposed sides spaced spring fingers C^{11} C^{12} C^{13} C^{14}.

Mounted on the insulating block C is a dimmer contact D which, when the parts are in the position shown in dotted lines at the left hand side of Figure 2 is gripped between the members C^{11} C^{12} to close a circuit through the cable A^3, binding post C^3, pin C^5, finger C^{11} C^{12}, contact member D, conductor D^1, binding post D^2, conductor D^3 to

the resistance unit A^8. Under these conditions a current leads from the other bolt through the resistance unit A^8, conductor D^4, binding post D^5, conductor D^6, binding post D^7 through the conductor A^6 to the headlight, thus reducing the current and giving a dim light. When on the other hand the parts are in the position shown in full lines in Figure 2, the blade C^{13} is in contact with the terminal member D^8 associated with the binding post D^7 and in this case current leads from A^3, through C^3, C^5, C^6, the finger C^{13}, the member D^8 direct to the conductor A^6 and the full current pressure is supplied to the light thus short circuiting the resistance element. When the parts are in the position shown in Figure 6, however, both the terminals D and D^8 are idle and the light is turned completely off.

E is a driving plate concentric with the plate C^6, spaced thereabove by means of holding pins E^1 E^1. This plate has a pair of diametrically opposed apertures E^2 E^2 adapted to engage the prongs or forks B^3 B^3 so that rotation of the hand switch causes rotation of the switch members.

Referring now to the cab light switch, the conductor A^4 comes into the housing to the binding post F. The conductor A^7 leads out through the housing from the binding post F^1. F^2 F^2 are springs associated with said binding posts extending inwardly toward each other. F^4 is a slidably mounted contact block which, when pushed forward to the dotted line position in Figure 2 engages both springs and when drawn to full line position, is out of contact with the spring F^2. This block has a conducting surface F^5 to engage these spring fingers F^2 while the body F^6 thereof is of insulating material. This block slides on an insulating block F^7 traveling between the guides F^8 and has on its surface an upwardly bent lug strip F^9 to engage the upwardly bent portion of a spring F^{10}, which spring serves to hold the block either in or out of contact with the spring F^2.

G is a switch handle slidable in a boss G^1 in the housing having a pin G^2 extending through the block F^4. Springs G^3 G^3 are interposed between this rod and this block so as to provide a flexible driving connection to insure that the operator will not move the block too far in either direction if he hits the handle G too hard.

The resistance element A^8 is removably mounted on the brackets A^9 by means of the screws H which may be released to permit the exchange of the element. The binding posts D^2 D^5 disposed outside of the housing and associated with the conductors D^3 D^4 make it possible to remove and replace the resistance element without opening the housing and therefore without admitting dirt, dust and moisture to enter. The housing itself is closed by means of the packing member H^1 engaging the upper edge of the housing wall and contained between the outer rib H^2 and the inner rib H^3 on the cover A^{10}.

This application is a division of my copending application Ser. No. 128,112 August 9, 1926.

I claim:

1. A rotary switch for electric lights and the like, comprising an insulating block, a conductor pin projecting upwardly therefrom, a switch element rotatably mounted on and in electric connection therewith, a plurality of contact fingers on the block, pairs of opposed contact fingers on the switch element adapted to grip the contact fingers on the block, the relative position of fingers on block and switch element being such that in one position they are all out of contact with each other, and in other positions one pair only of the fingers on the switch element are in contact with a finger on the block, the parts being so arranged, however, that the switch element is never simultaneously in contact with both fingers on the block.

2. A rotary switch for electric lights and the like, comprising an insulating block, a conductor pin projecting upwardly therefrom, a switch element rotatably mounted on and in electric connection therewith, a plurality of contact fingers on the block, pairs of opposed contact fingers on the switch element adapted to grip the contact fingers on the block, the relative position of fingers on block and switch element being such that in one position they are all out of contact with each other, and in other positions one pair only of the fingers on the switch element are on in contact with a finger on the block, the parts being so arranged, however, that the switch element is never simultaneously in contact with both fingers on the block; an insulating driving plate mounted upon the switch element and insulated therefrom, said driving plate having apertures therein and a switch handle, a connector pin mounted to rotate with the handle and adapted to loosely engage an aperture in the driving plate.

3. A rotary electric switch comprising a central conducting pin, a switch element mounted for rotation thereon, contact members in the path of the switch element, an apertured insulating driving plate mounted for rotation on the pin and rotatably connected to the switch element, a fork loosely engaging the aperture and means to rotate the fork to operate the switch; a housing containing the switch, a removable cover therefor, the fork and the operating means being mounted as a unit on the cover and adapted to operatively engage the driving member only when the cover is in place.

4. An electric switch comprising a pair of conductor plates, having each a pair of contact fingers projecting from its periphery, superposed in pairs and spaced apart, contact fin-

gers fixed adjacent the peripheries of the plate and engageable by the spaced peripherial fingers, an insulating plate parallel with the conductor plates and spaced above them, a driving connection between the insulating plate and the conductor plate, a terminal member, a pin projecting upwardly therethrough, a spring encircling such pin and holding the plates against the terminal member, means in cooperation with the insulating plate for limiting the angular movement of said plate, a handle above the plate having a driving pin adapted to engage apertures in the insulating plate whereby rotation of the handle will cause rotation of the conductor plate.

5. An electric switch comprising a pair of conductor plates having each a pair of contact fingers projecting from its periphery, superposed in pairs and spaced apart, contact fingers fixed adjacent the peripheries of the plates and engageable by the spaced peripherial fingers, an insulating plate parallel with the conductor plates and spaced above them, and a driving connection between the insulating plate and the conductor plate.

6. An electric switch comprising a pair of conductor plates, having each a pair of contact fingers projecting from its periphery, superposed in pairs and spaced apart, contact fingers fixed adjacent the peripheries of the plate, and engageable by the spaced peripherial fingers, an insulating plate parallel with the conductor plates and spaced above them, a driving connection between the insulating plate and the conductor plate, a terminal member, a pin projecting upwardly therethrough, a spring encircling such pin and holding the plates against the terminal member.

7. An electric switch comprising a pair of conductor plates, having each a pair of contact fingers projecting from its periphery, superposed in pairs and spaced apart, contact fingers fixed adjacent the peripheries of the plate, and engageable by the spaced peripherial fingers, an insulating plate parallel with the conductor plates and spaced above them, a driving connection between the insulating plate and the conductor plate, a terminal member, a pin projecting upwardly therethrough, a spring encircling such pin and holding the plates against the terminal member, means in cooperation with the insulating plate for limiting the angular movement of said plate.

Signed at Chicago, County of Cook, and State of Illinois, this 10th day of December, 1926.

JOHN A. AMOS.