(No Model.) 4 Sheets—Sheet 1.

F. TEAGUE.

ELECTRIC LOCKED SWITCH.

No. 454,087. Patented June 16, 1891.

FIG. 1.

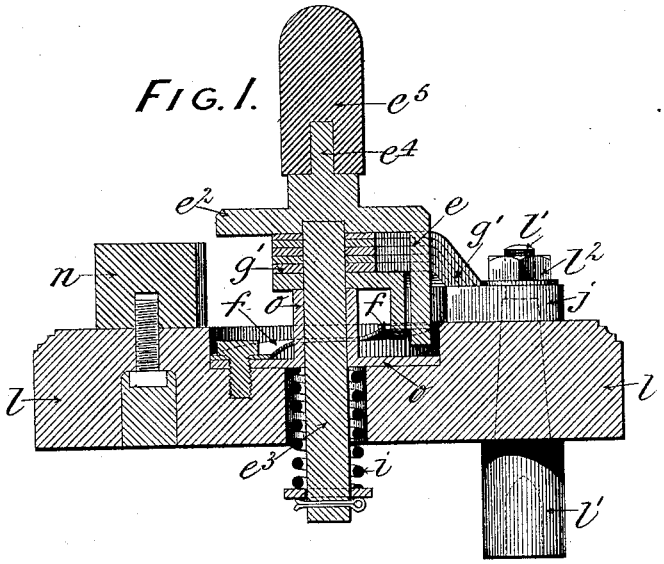


FIG. 3.

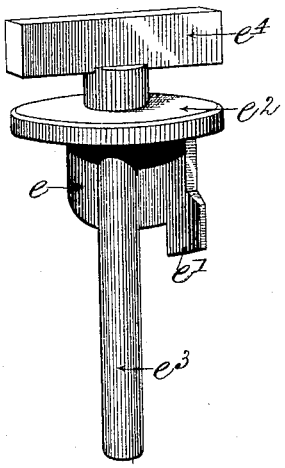


FIG. 2.

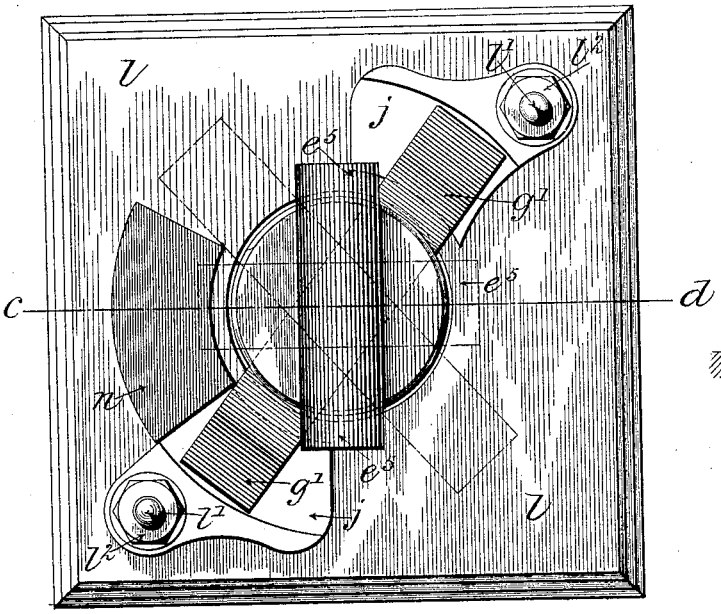
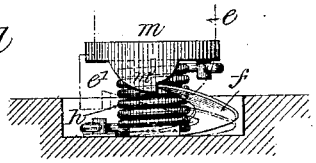


FIG. 5.



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(No Model.) 4 Sheets—Sheet 2.

F. TEAGUE.

ELECTRIC LOCKED SWITCH.

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FIG. 6.

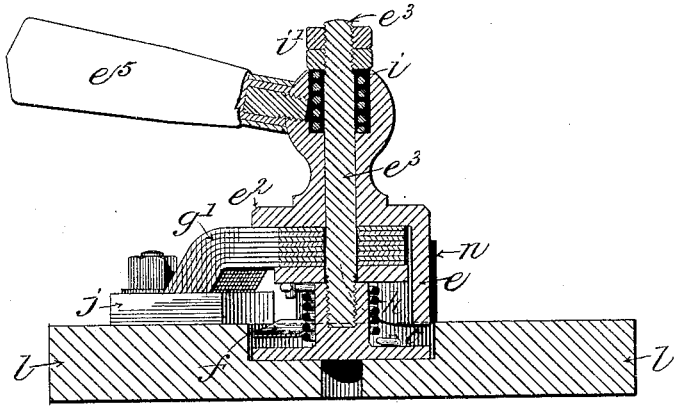


FIG. 4.

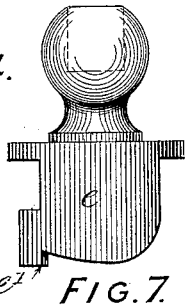
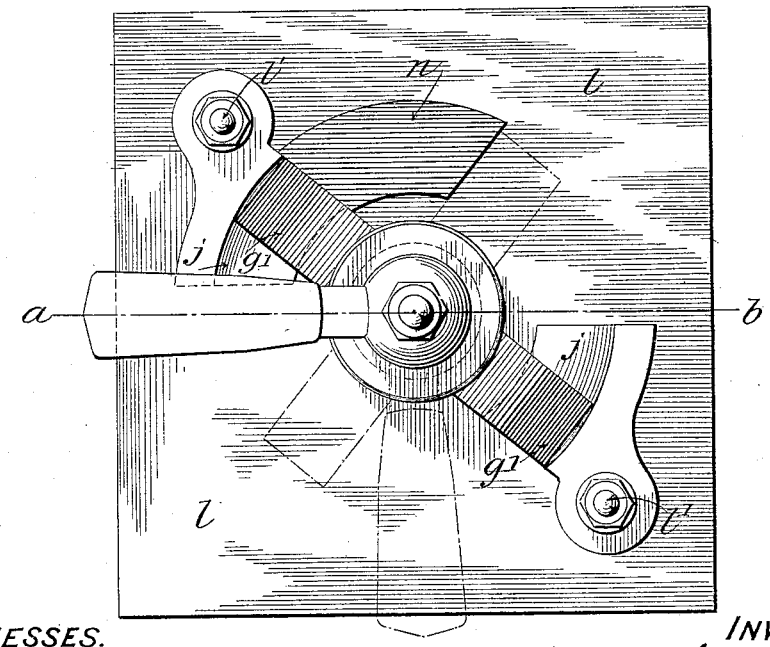


FIG. 7.



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ELECTRIC LOCKED SWITCH.

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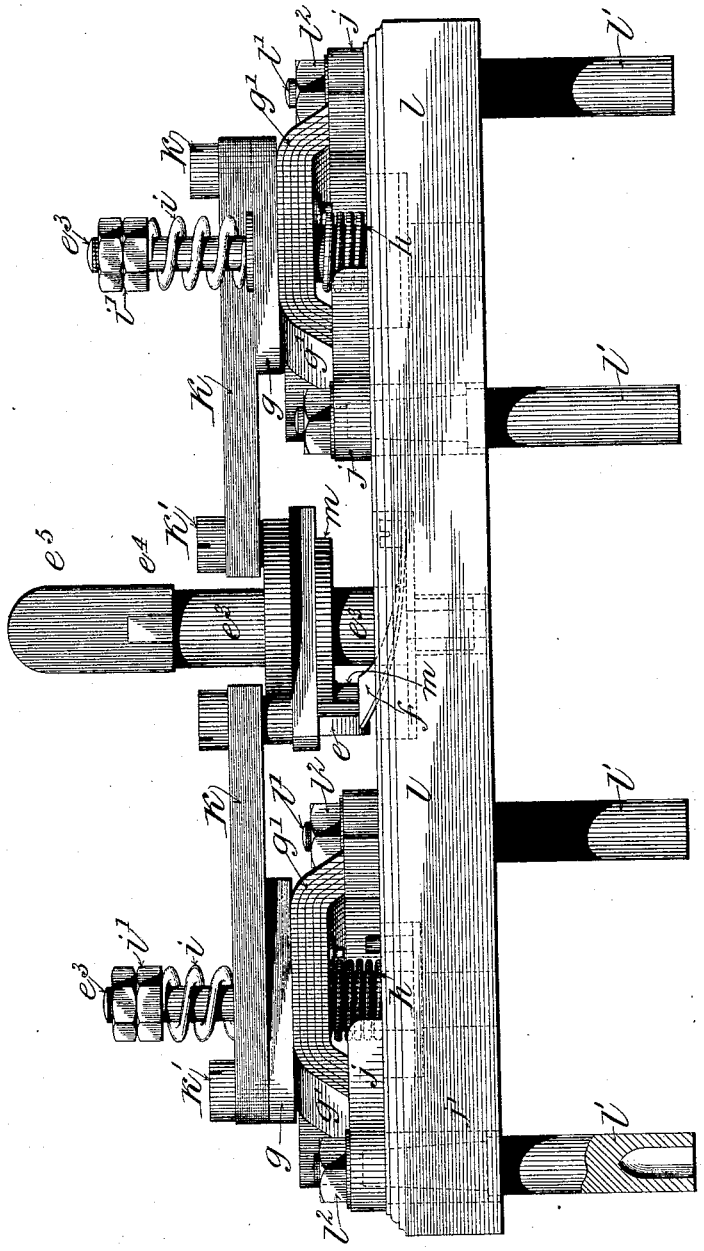
FIG. 8.



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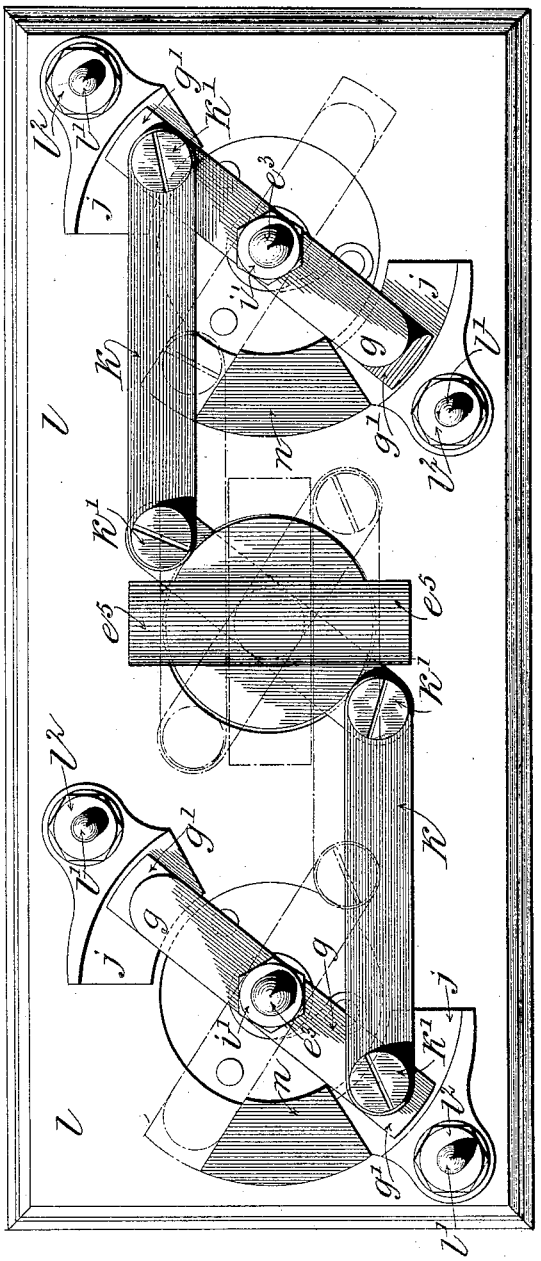

FIG. 9.

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UNITED STATES PATENT OFFICE.

FRANCIS TEAGUE, OF LONDON, COUNTY OF MIDDLESEX, ENGLAND, ASSIGNOR TO JOHN ABBOTT ILIFFE, OF SAME PLACE.

ELECTRIC LOCKED SWITCH.

SPECIFICATION forming part of Letters Patent No. 454,087, dated June 16, 1891.

Application filed December 15, 1890. Serial No. 374,795. (No model.) Patented in England October 1, 1890, No. 15,547.

To all whom it may concern:

Be it known that I, FRANCIS TEAGUE, a subject of the Queen of England, residing at Ferdinand Street, London, in the county of Middlesex, England, have invented certain new and useful Improvements in Locked Switches for Electric-Current Circuits, (for which British Letters Patent have been applied for by an application dated 1st day of October, 1890, No. 15,547,) of which the following is a specification.

This invention relates to certain improvements in that class of electric switches known as "lock-switches;" and it constitutes improvements upon the invention covered by British Letters Patent No. 6,267, dated April 29, 1887, and No. 18,825, dated December 24, 1888.

The object of the present invention is to avoid or remove certain difficulties found in the practical working of the above specified inventions and to make the same more complete and efficient.

In the specifications to the above-named Letters Patent devices were described to insure a safely-locked connection combined with a quick break of contact when disengaged, the latter thereby lessening the heat action of the current upon the separating contact parts. The devices comprised a spindle with an outer arm and actuating-handle, a switch-arm turning freely on the spindle and caused to slide upon the terminal contact-plates by the outer arm and actuating-handle, an inner arm also freely turning upon the spindle but secured to the switch-arm, and a broad flat spring at right angles to the spindle and acting vertically against the bottom portions of the inner and outer arms. A spiral spring coiled round the base of the handle-spindle was caused to act thereon in the direction of contact-breaking. In making contact the partial rotation of the handle caused the outer arm to carry with it the switch-arm until it was fully seated upon the terminal contact-plates and winding up the spiral spring. The inner arm, also partaking of the movement of the attached switch-arm, depressed the flat spring by sliding over it until the switch-arm was fully seated, when the end of the flat spring came against a detent formed on the bottom of the inner arm, which firmly locked the latter and its attached switch-arm in the contact position, thus securely establishing the circuit connection. By reversing the operation the handle, with its attached outer arm, has a certain amount of free movement until the sloping bottom of the outer arm rides over and depresses the flat spring from its locking position, when the spiral spring immediately acts upon the spindle and outer arm and causes the switch-arm to fly off, thus rapidly breaking the contacts. It was found in practice that sometimes when the friction between the switch arm or brush and terminal contact-plates was very great that the switch-arm would not fly back when released, and that force had to be applied for the purpose. This was not only a cause of danger and delay, but frequently led to the breaking of the handle, when the switch practically became useless.

This invention is illustrated by the accompanying drawings, in which—

Figure 1 is a vertical section, and Fig. 2 a plan, of a single switch, the section being taken upon the line *c d*. Fig. 3 is a perspective view of the improved handle and outer or releasing arm. Fig. 4 is an elevation of the said outer or releasing arm, but varied at the top or handle portion in accordance with the section thereof in Fig. 6. Fig. 5 is a detail view of the inner or locking arm in its relative position to the locking or broad flat spring. Fig. 6 is a vertical section on the line *a b*, and Fig. 7 a plan of the same kind of switch as that shown in Figs. 1 and 2, but with the vertical pressure-spring placed in the modified handle instead of beneath, as in Fig. 1. Fig. 8 is an elevation, and Fig. 9 a plan, of a double switch having the vertical pressure-spring placed above each brush.

The outer or releasing arm *e* is made wider and the stop *e'* is carried farther back from the curved front, which first rides over the flat or locking spring *f*, than formerly. By this same means the locking-spring *f* is not only depressed for a relatively longer time in turning the handle, but the face of the releasing-arm *e* engages with the switch-arm *g* or brush *g'* in the direction of release, (which was not the case formerly,) and causes the brush *g'* to slide upon the terminal contact-

plates until near the edge, when the spiral spring h, (shown in Figs. 5, 6, 8, and 9, but omitted in Fig. 1 for clearness,) acting upon the brush, arms, and handle with an accelerating force, rapidly breaks the contacts.

The releasing-arm e, cap e^2, spindle e^3, and T-handle e^4 are either cast in one solid piece, as shown in Fig. 3, or the spindle is brazed to the other portions, as shown in Fig. 1. The handle e^4 is let into a grooved block of vulcanite e^5 and riveted together.

In the single switch, Figs. 6 and 7, and in the double switch, Figs. 8 and 9, are shown upon the upper part of the spindles a spiral spring i, which presses the brush g vertically upon the terminal contact-plates $j\,j$. In Fig. 1 this vertical pressure-spring i is placed on the lower part of the spindle; but the former arrangement is more convenient for adjusting the pressure by means of the nuts i' upon the screwed spindle e^3. In Fig. 6 the spring i is let into a recess in the ball-top of the releasing-arm e, (shown also in Fig. 4,) to which the handle e^5 is secured. When two or more switches are compounded, the handle is more conveniently placed between the switch-arm or brush-spindles and connected to the switch-arms $g\,g$ by connecting-rods $k\,k$ of insulating material working on crank-pins $k'\,k'$, secured at one end to the switch-arms $g\,g$ and at the other to one or more corresponding crank-arms or disks g^2, secured to the handle-spindle e^3, as shown in Figs. 8 and 9.

Fig. 5 represents the inner or locking arm m in the locked position against the locking-spring f when the circuit is connected, as shown in the plans, Figs. 2 and 7. In this case the detent m' of the locking-arm m has been caused to ride over the locking-spring f until it passed the detent, when the spring f, assuming the position shown, locked the arm m and brush g', (which are connected together,) the releasing-arm e also passing over the spring f at the same time, (as indicated by the dotted lines,) being actuated by the handle e^5. When the handle is turned back to break the circuit connection, the arm e is caused to travel with it, and the rounded front edge thereof rides over the spring f and depresses it clear of the detent m', when the coiled turning-spring h, being free to act upon the arm m, turns it, together with the brush g', arm e, and handle e^5, and the circuit is rapidly broken. The stop e', coming in contact with the end of the spring f, serves to arrest the handle at right angles to its position when the circuit is connected.

Each terminal contact-plate j has a socket or sleeve j', (shown by dotted lines in Fig. 8,) which is let into the slate or other insulating-base b. This socket slightly tapers to receive a correspondingly-turned terminal-post l'. The latter is drilled up a portion of its length from the bottom to receive the wire-conductor which is soldered therein, and two of the terminals are placed in the position they are to occupy. The base, with the tapering sockets, is slipped over, and with a nut screwed down firmly upon each contact-plate $j\,j$ good contact is secured.

In Fig. 2 a stop of vulcanized fiber or other suitable material is shown and adapted to arrest the motion of the brush g when the circuit connections are made, and for this purpose the stop n is secured to the base l by a screw from the bottom, (shown in Fig. 1,) which is afterward cemented over. The stop is placed solidly against one edge of a contact-plate along a radial line from the center of the switch. The other end of the stop is also cut to a similar radial line, and this arrangement has been hitherto used; but it was open to the objection that it indented the edge of the brush from the latter striking the stop at the inner angle, especially upon the side which received the sudden blow when the circuit is broken. My improved arrangement to avoid this is shown in Fig. 7, in which the lines followed by the edges of the contact-plates $j\,j$ and fiber-stop n are not along the radial lines, as before, but parallel thereto at a distance of one-half of the width of the brush, so that the latter is arrested by the whole width of the stop in both positions, either on or off, the relative place of the brush being exactly at right angles in the two positions, (which was not the case formerly,) and this latter advantage of placing the brush exactly midway between the contacts is obtained by the length of the arc or segment of the stop n.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. A locked electric switch comprising an insulated base carrying contact-plates $j\,j$, a metallic base o, a spindle e^3, having upon it a locking-arm m, engaging at a part of its revolution with a locking-spring f, a laminated brush g', a releasing-arm e, with curved front to depress said locking-spring and stop e', remotely placed thereon to allow said releasing-arm to engage with said brush, cap e^2, turning-spring h, vertical pressure-spring i, and actuating-handle e^5, operating substantially in the manner and for the purpose described.

2. In a locked electric switch, the combination of a spindle e^3, actuating-handle e^5, and releasing-arm e, all turning together, with a brush g' and locking-arm m, placed loosely upon said spindle and turning therewith when making contact, a locking-spring f, engaging with detent m', turning-spring h, and stop e', placed remotely from the curved front of releasing-arm e to arrest the brush engaged therewith midway between contacts, substantially as described.

3. In a locked electric switch, the combination of a releasing-arm e, having a stop e' thereon at a point remote from the curved front thereof, a cap e^2, spindle e^3, and handle e^4, all connected and turning simultaneously to actuate terminal contact devices, substantially as and for the purpose herein described.

4. In a locked electric switch, the combination of a spindle e^3, a bent laminated brush g', centrally suspended and free to turn on said spindle, a cap e^2 above the said brush, a spring i on the upper part of said spindle, pressing both cap and contact brush toward the terminal contacts j j, and an actuating-handle e^5, adapted to engage with and turn said brush, substantially as and for the purpose herein described.

5. In a locked electric switch, the combination of a spindle e^3, a bent laminated brush g', centrally suspended and free to turn on said spindle, a switch-arm g above the said brush, a connecting-rod k, crank-pin k', downward-pressure spring i, and adjusting-nuts i' on the upper part of said spindle pressing both switch-arm and brush toward the terminal contacts j j, an actuating-handle e^5, and means to engage with the said connecting-rod, substantially as and for the purpose herein described.

6. In a locked electric switch, the combination of a spindle e^3, a base or support o therefor, a bent laminated brush g', centrally suspended and free to turn on said spindle, a cap e^2 above the said brush, a spring i on the upper part of said spindle pressing both cap and contact-brush toward the terminal contacts j j, adjusting-nuts i', and an actuating-handle e^5, substantially as and for the purpose described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

FRANCIS TEAGUE.

Witnesses:
K. TREECE,
E. C. BARKER.