

(No Model.)

H. A. FOSTER.
SWITCH BOX.

No. 461,239.

Patented Oct. 13, 1891.

Fig: 1.

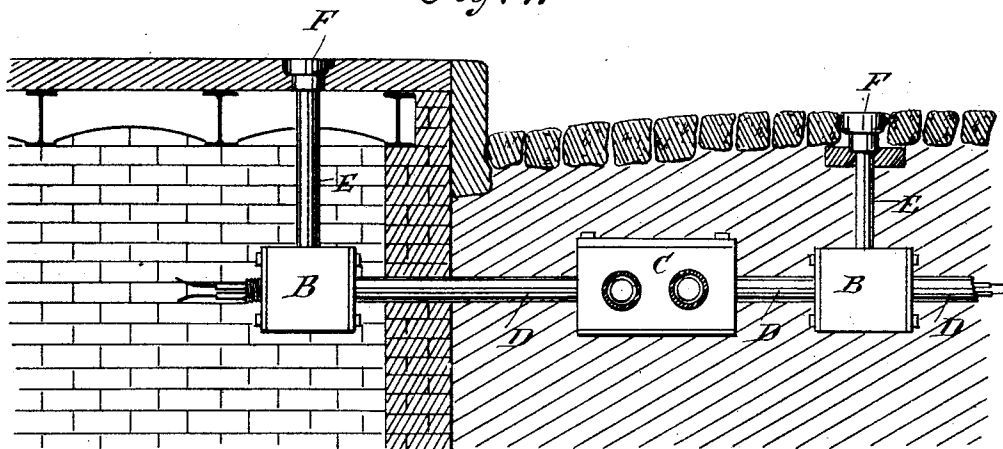


Fig: 2.

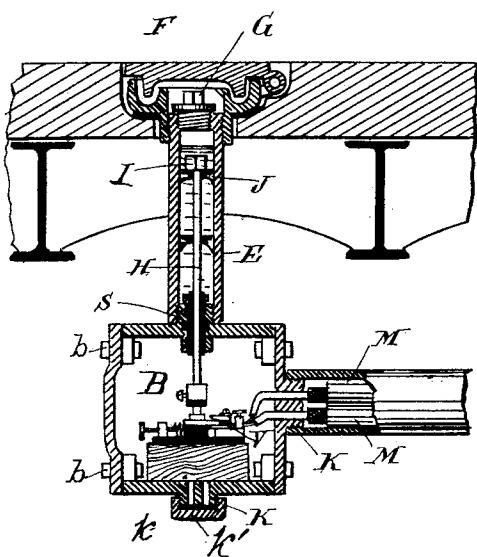


Fig: 4.

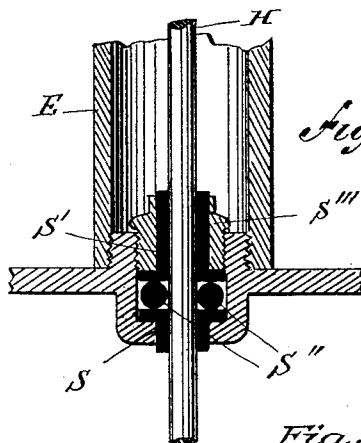


Fig: 5.

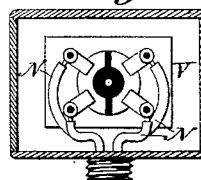
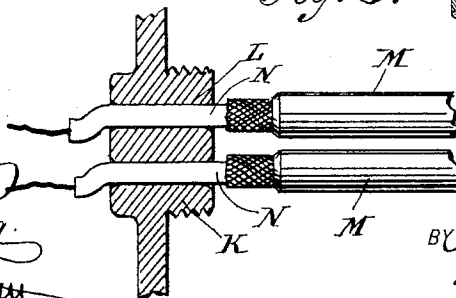


Fig: 3.



WITNESSES:

Chas. Nida
Harold Simay

INVENTOR:

Horatio A. Foster

BY *W. P. Thompson*

ATTORNEY

UNITED STATES PATENT OFFICE.

HORATIO A. FOSTER, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO
JOHN J. MOORE, OF SAME PLACE.

SWITCH-BOX.

SPECIFICATION forming part of Letters Patent No. 461,239, dated October 13, 1891.

Application filed October 24, 1890. Serial No. 369,196. (No model.)

To all whom it may concern:

Be it known that I, HORATIO A. FOSTER, a citizen of the United States, and a resident of New York, in the county of and State of New York, have invented a new and useful Improvement in Switch-Boxes, of which the following is a specification.

My improvement relates, particularly, to subway switch boxes, wherein it is desirable to exclude moisture and to thoroughly insulate the parts, at the same time allowing ready operation of the switch and an easy access to the interior of the box for adjustments, repairs, &c.

To these ends my invention consists in the method of constructing certain parts and in the several apparatus constructed, arranged, and combined in the manner herein shown, described, and claimed, reference being had to the accompanying drawings, wherein—

Figure 1 is an elevation of my complete apparatus. Fig. 2 is a section of one type of the same. Figs. 3, 4, and 5 are detail views.

Like letters of reference indicate like parts in the several views.

B B are the switch-boxes in position. They may be placed in any convenient locality and used for any system of conductors. I have, however, in Fig. 1 shown them in use under the road-bed and under the sidewalk, where they receive the conductors from the distributing or section box C through pipes D.

In Figs. 2, 3, and 4 are shown the various parts and attachments. The details of the switch itself being immaterial are for greater clearness merely indicated by V in Fig. 2, and one well-known form of switch is shown in Fig. 5.

On one or more faces of the box are nipples K, to each of which may be threaded or otherwise secured the conductor-pipes D.

For introducing my conductors I first bore holes L in the nipples of such size as to snugly fit the rubber or other insulation N of the conductors. I then lay bare the insulation N and cover it with rubber or other cement capable of causing it to closely adhere to the sides of the holes L, or I may simply wet the surface of the rubber with benzine or like solvent of rubber. After this I introduce the wire and insulation into the respective holes, where they are presently firmly secured by the cement. Instead of this I may cement

my junction after inserting the conductor by applying heat, as by a blow-pipe, to the nipple. By this cementing I obtain a simple yet secure junction of my conductors and switch-box that not only firmly secures and insulates my conductors, but also effectually seals the junction against the admission of moisture and gases.

In practice I usually select conductors having an inner insulation of the best rubber, wrapped or braided in the usual way and protected by a lead cover M. I also find that if the bare insulation N be forced into the hole L the pressure and the expansion at the ends of the hole serve firmly to retain the conductor. These several parts are clearly shown in Fig. 3, where also it is to be noticed that the sharp edges of the holes L are carefully rounded off to prevent abrasion of the insulation. In many cases, as for house-wires, neither lead covering M nor piping D is needed and may be accordingly omitted. This is shown in Fig. 1. If a nipple K be not in use, it will be preferably closed by a washer *k* and cap *k'*.

From the upper side of my switch-box extends the piping E, containing my switch-operating device. The upper end of this is closed by a screw-plug G, covered and protected by the surface-trap F, of any desired form. The lower end of tube E, I screw to the threaded nipple S, though many other ways will be equally applicable. This nipple S is shown in detail in Fig. 4. The center is bored out to form a stuffing and insulating box for my switch-rod H, and within are placed the flanged insulating sleeves S', projecting above and below the nipple, with the elastic insulating-ring S'' interposed between the flanges. Around the upper insulated sleeve is now placed the externally-threaded follower-nut S''', which fits a thread in the nipple and when screwed down expands the packing S'' closely around the switch-rod. This rod extends upward nearly to the end of the piping E, where, after passing through any desirable number of insulating-guides J, it terminates in a nut I, of size equal to that of screw-plug G, while its lower end carries the moving parts of the switch.

I fill my tube E with a heavy insulating-oil—such as resin-oil—to somewhat above the level of the head of my switch-rod. Thus

any water that may accumulate in the head of the tube will be quite harmless, as it cannot come in contact with the rod. It will now be seen that, closing my box by a closely-fitting plate secured by bolts *b*, I have a hermetically-sealed and thoroughly-insulating case inclosing my switch and an operating-rod projecting into convenient proximity to the surface equally well insulated.

10 To operate my switch, it is only necessary to lift the trap *F*, unscrew the plug *G*, and, inserting the same handle used for plug *G* into the oil, turn the nut *I*. The plug may then be put back and trap closed.

15 When access to the switch is desired, it is, in case the box is in the area-way under the sidewalk or in a man-hole, merely necessary to remove the side to fully expose the parts. The box may be also embedded in the roadway, as its working parts are thoroughly protected, and will then be uncovered only when repairs, renewals, adjustments, or like matters require it.

By my simple method of securing the conductors and switch-rod I am enabled to make up my boxes at very small cost and adapt them to many locations where other boxes would be neither convenient nor reliable.

I have not set forth any separate means of supporting my boxes. Where they are embedded there is no other support needed, and where they are used in area-ways simple attachment of any sort or even that afforded by the pipes *E* and *D*, when these are both present, will usually suffice. This matter is not, however, material and may be arranged as the exigencies of each case may require.

I am aware that stuffing-boxes have been used with insulated conductors, and I do not show or claim such feature. Indeed, by my cemented junction they are rendered unnecessary. I am not, however, aware that both insulating and stuffing boxes for metallic rods have been formed in one in the manner I have set forth. I am also aware that many modifications in the details of my devices may arise as various uses suggest. I have, however, fully set forth one form of each and how the same may be made and operated; and therefore

I claim, without limiting myself to further details—

1. In combination, a hermetically-closed box, an electrical mechanism therein, an operating-rod therefor projecting from the box and terminating in a nut, a packing-box therefor, a tube surrounding the projecting part of said rod and filled to above the head of the rod with an insulating-liquid, a plug for closing the head of said tube, a trap for protecting the tube and plug secured to the upper end of the tube, and insulating-conductors leading from said mechanism through snugly-fitting orifices and cemented therein, as set forth.

2. In combination, a closed box, a switch therein, an operating-rod extending from the box, a chamber filled with insulating-liquid

surrounding said rod, means for closing said chamber, and insulated conductors leading from said switch and box through orifices in which they are closely cemented, substantially as set forth.

3. The combination of a rod or wire, two flanged insulating-sleeves, a stuffing-ring interposed between the flanges, a stuffing-box inclosing the flanges, a packing-nut surrounding one sleeve, and a flange in the box surrounding the other, substantially as set forth.

4. The combination of a conductor and its insulating-covering with a wall having an orifice therein snugly fitting the said insulation and cemented thereto, substantially as set forth.

5. The method of forming and securing the junctions of conductors and switch-boxes, which consists in laying bare the insulating medium about the conductor, forming a snugly-fitting orifice therefor, and cementing the insulated conductor in the orifice so formed, substantially as set forth.

6. The method of securing the junction of conductor and switch-box wall, which consists in wetting the surface of the insulated conductor with a cementing-fluid, inserting the insulated conductor in a snugly-fitted orifice, and cementing it therein, substantially as set forth.

7. The combination of a closed box, a switch-operating rod extending therefrom, and a chamber of insulating-liquid surrounding said rod and in which the upper end of the rod is wholly immersed, substantially as set forth.

8. The combination of a closed subway switch-box having an operating-rod extending upward through suitable packing toward the surface and inclosed by a tube terminating in a trap at or about the surface filled with an insulating-liquid, means for closing the tube, and means for operating the switch-rod, substantially as set forth.

9. The combination of a closed subway switch-box, an operating-rod extending therefrom to or near the surface, and a protecting-tube surrounding the said rod and terminating in a surface trap, substantially as set forth.

10. The combination of a main distributing-box, a subway switch-box connected therewith, and means for operating the switch extending from the switch-box to the surface, inclosed in and protected by a chamber or tube extending from the switch-box to the surface and terminating in a surface trap, substantially as set forth.

In testimony whereof I hereunto set my hand, this 20th day of October, 1890, in the presence of two subscribing witnesses.

HORATIO A. FOSTER.

Witnesses:

I. W. HENRY,
BERNARD LEVEY.