Jan. 8, 1935. J. G. LOY 1,987,575

BY-PASS FOR HIGH TENSION ELECTRICITY

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Fig. 2

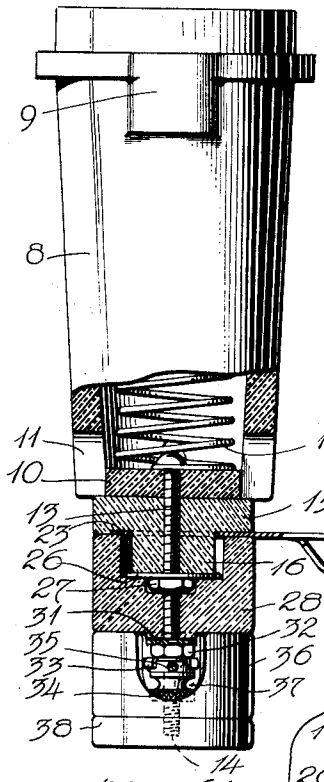


Fig. 1

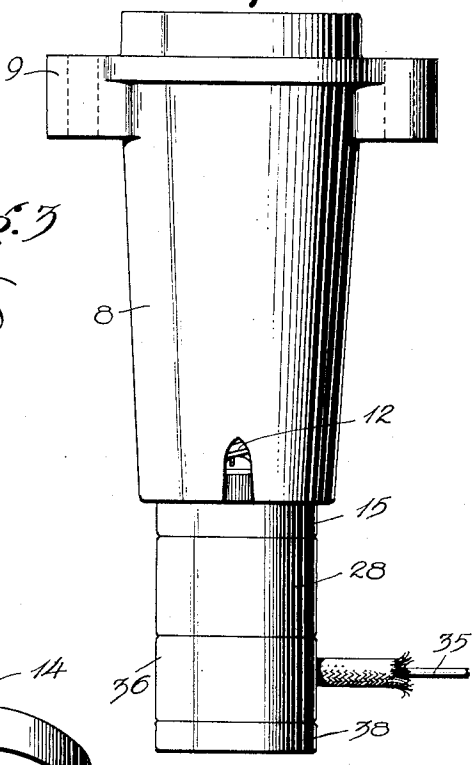


Fig. 3

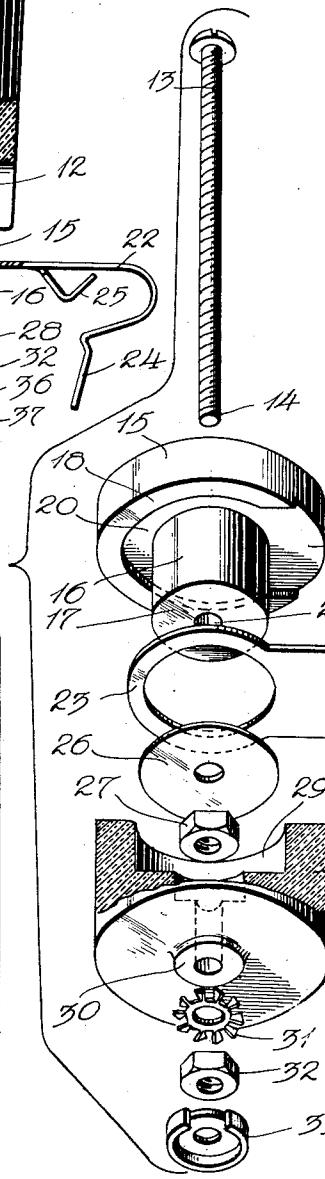
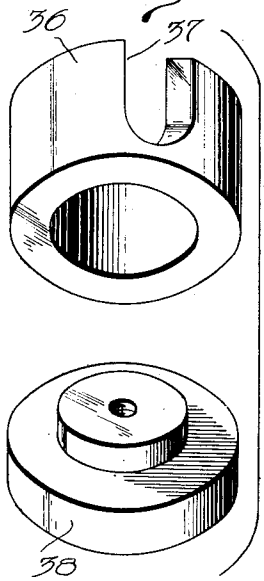


Fig. 4



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Fig. 5

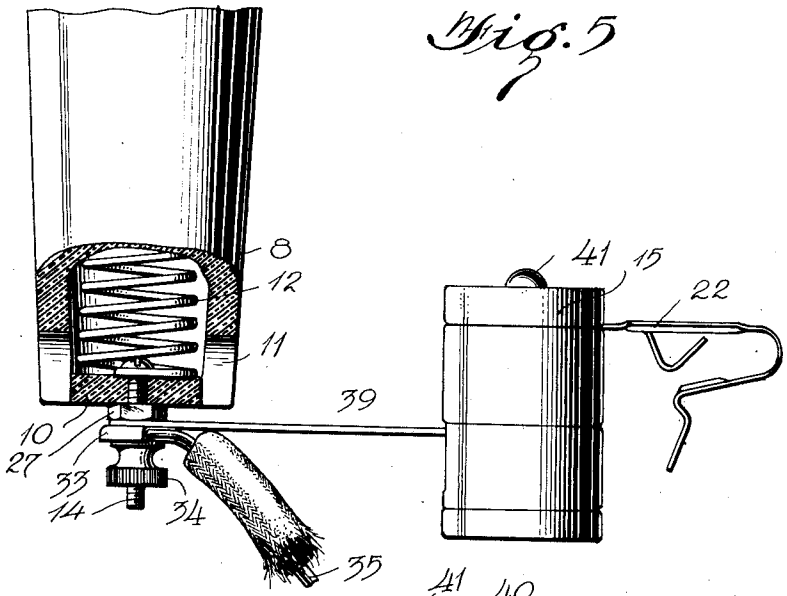


Fig. 6

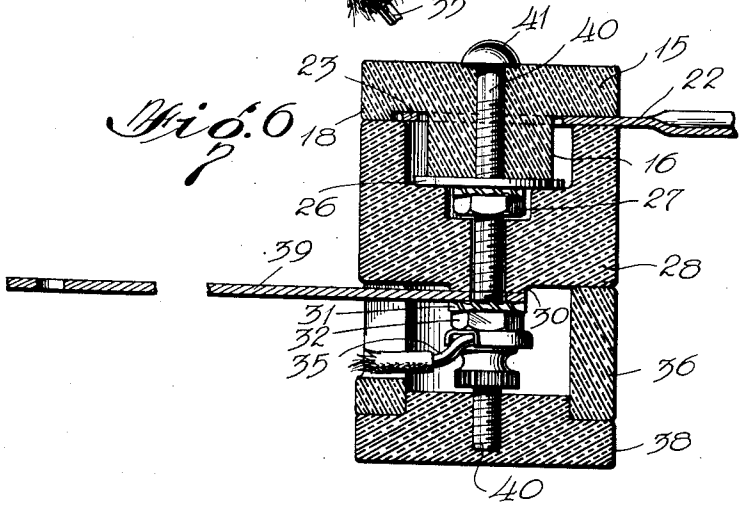
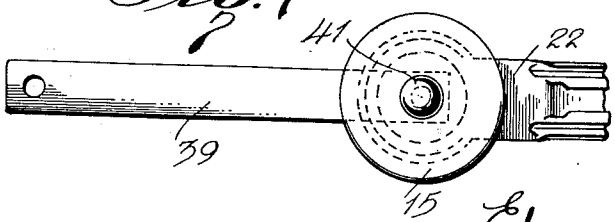


Fig. 7



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UNITED STATES PATENT OFFICE

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BY-PASS FOR HIGH TENSION ELECTRICITY

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Application March 12, 1934, Serial No. 715,218

8 Claims. (Cl. 200—118)

This invention deals with improvements in by-passes, shunts or auxiliary discharge paths for high-tension electricity. While the development applies primarily to such equipment in the high-tension circuits of gaseous tube lighting systems nevertheless the invention is in such form as to permit its utilization wherever it is desired to provide an emergency by-pass or discharge for high-tension currents.

Where such high-tension electricity is necessary it sometimes occurs that the normal circuit for the current is interrupted either temporarily or permanently and the remaining parts of the circuit impressed with an abnormal voltage. This abnormal condition may disturb the operating characteristics of the other parts of the circuit or may even lead to break-down of insulation and consequent short-circuit, fire hazard, danger to persons or the like.

This invention seeks to provide a by-pass around the normal circuit which by-pass will have stable operating characteristics under all conditions and be proof against deterioration from the effect of exposure, weather or other abnormal operating circumstances.

The invention also provides a device which offers no added risk to either the equipment or the persons who may be called upon to handle it.

This invention has for a further object the provision of such a device which may be installed in any one of a number of selected and desirable locations in the normal lighting system and thus adapt itself to existing conditions of space and wiring arrangements. In the furtherance of this object the device may be arranged on an independent support at any intermediate point in the wiring circuit and thus contribute to the stability of the latter. Where it is desired to make use of existing equipment the invention can be mounted on the latter in such way as to come within the existing clearance space.

Among the objects of my invention is to provide a by-pass of the nature described which may be incorporated in the conventional design for housings in high-tension lamp circuits and thus be supplied and assembled with the housings themselves to insure satisfactory operation and compliance with approved standards of equipment.

It will be apparent from the following description that this device provides a by-pass in which the conductors through which the discharge occurs are entirely concealed and completely protected from exposure. In this way the terminal of the by-pass under normal conditions does not carry the voltage impressed on the lighting tube at this point but on the contrary is more analogous to a ground.

The device disclosed by this invention is simple in design, easy to apply and economical to manufacture.

A full understanding of the above and other advantages of this invention will be had from the following description of its preferred form as illustrated in the accompanying drawings in which

Fig. 1 is a side elevation of the high-tension by-pass assembled on the housing of a gaseous tube lamp;

Fig. 2 is a side elevation of the same assembly partly in longitudinal section;

Fig. 3 is an enlarged perspective view partly in longitudinal section showing the high-tension by-pass as a separate article of manufacture;

Fig. 4 is an enlarged perspective view of the two-part protective cap;

Fig. 5 is a side view partly in section of the high-tension by-pass mounted laterally of the lamp housing;

Fig. 6 is an enlarged longitudinal section of the by-pass illustrated in Fig. 5 and

Fig. 7 is a top plan view of the same.

By way of illustration rather than limitation, I have shown in the drawings the invention to be used in any one of several arrangements. Where the by-pass can be assembled with the housing during the manufacture of the latter, the arrangement shown in Figs. 1, 2 and 3 is feasible. The housing 8 is a porcelain socket of the conventional type adapted to be attached to the front wall of a lamp sign by means of the ears 9. It is to be understood that this housing is one of a pair in which the ends of a tubular gaseous lamp are mounted. The lamp itself relies upon the passage of high-tension current through rare gas such as neon, argon or like gases for the production of illumination in the known manner.

The bottom of the housing 8 is a transverse partition 10 formed integral with the side wall of the housing 8. Suitable vents 11 are provided at the juncture of the bottom and the side wall for the removal of dirt, moisture or the like. A spiral wire electrode 12 extends longitudinally through the housing 8 to make contact with the end of the lamp tube. This spiral or coil 12 is held at the center of the bottom by a screw-threaded rod 13. This screw extends outwardly of the bottom 10 of the housing and its end forms a binding post 14.

The by-pass proper consists of an insulated

spark gap assembly mounted on the screw 13 intermediate the head of the latter and the high-tension binding post. In the form shown in Figs. 1, 2 and 3 this assembly includes a base 15 of suitable insulating material preferably porcelain. As more particularly shown in Fig. 3 this base has an outwardly extending center projection 16. This projection is cylindrical in form with a flat top 17 parallel to the top of the base 15. This top has a part-circular rim 18 which is broken at one point to form a flat step 19. The groove 20 extends around the projection 16 between the latter and the rim 18 and forms a seat for the conductor of the by-pass discharge.

The base 15 and the projection 16 have an axial hole 21 by which the base is mounted upon the screw 13.

The discharge electrode or conductor consists of a metal strap 22, one end of which has a ring 23. This ring 23 is proportioned to fit within the groove 20 while the main portion of the strap 22 rests in the step 19. The outer end of the strap 20 has a spring clip 24 slotted to cooperate with a bent tongue 25 in a known manner to provide a holding means for an electric wire or cable.

A metallic conducting disk 26 having a diameter slightly greater than that of the projection 16 is also mounted on the screw 13 and rests against the flat top 17. The periphery of the disk 26 extends beyond the edge of the projection 16 as shown in Fig. 2.

A nut 27 screw-threaded on 13 holds the disk 26 tightly on the projection 16 and maintains the disk 26 with all points of its periphery equidistant from the nearer surface of the ring 23.

A shell 28 also made of porcelain or like insulating material is provided to fit over the base and the above described conducting members in the manner shown in Fig. 2. This shell has an internal recess 29 accommodating the projection 16, disk 26 and nut 27. In its mounted position the shell 27 fits against the disk 26 and has its outer face resting against the rim 18. The inner edge of this outer face overlies a portion of the ring 23. If desired, a suitable bond or cement may be used to provide a permanent attachment between the shell 28 and the rim 18. As shown in Fig. 2 the shell 28 provides the confined air space around the projection 16 and this maintains a uniform air gap between the conductor 23 and the disk 26.

The outer face of the shell 28 has a central boss 30 through which the screw 13 projects to form a binding post 14. A lock washer 31 and a nut 32 are drawn up over the screw 13 against the boss 30 and thus maintain the parts in fixed position.

Outwardly of the nut 32 any suitable means may be used to provide the customary binding post. As illustrated this is shown as a flanged washer 33 and a knurled nut 34 by which the conducting wire is held against the screw 13.

In order to suitably house the binding post 14 and the parts carried by the latter, a two-part protective cap is provided. This cap consists of a collar 36 having a side opening 37 through which the conductor 35 passes. The outer end of the collar 36 is closed by means of a stepped disk 38 which is centrally screw-threaded to fit the free end of the binding post 14. In this way the cap is provided to protect the binding post.

It will be readily apparent that the assembly and operation of the by-pass may be successfully carried out without relying upon the specific support of the tube housing 8. Where it is desired to apply the by-pass device to the conventional housing without increasing the over-all length of the latter, the arrangement shown in Fig. 5 may be used. In this case, the screw 13 ends in the binding post 14 directly back of partition 10 to which it is fastened by nut 27. The binding post carries the same flanged washer 33 and knurled nut 34 by which the conductor 35 is held in position. Between the washer 33 and the nut 27 a strap or bus bar 39 of brass or other suitable material is provided.

The by-pass is mounted on the free end of the strap 39 in the manner shown in Figs. 5, 6 and 7. In this case a central screw-threaded rod 40 is provided. The base 15 is held by the head 41 of the screw 40. The strap 22 with its interior ring 23 rests within the rim 18 as already described. The disk 26 is likewise held on the projection 16 by means of the nut 27.

The shell 28 is likewise retained in position on the rim 18 in the manner already described by the nut 32.

The strap 39 which is in this instance a carrier of the same high-tension current found in the screw 13 is held between the boss 30 and the lock washer 31. Where convenience suggests it, the screw 40 may be used as the binding post for the high-tension cable 35 as shown in Fig. 6 in place of the form of attachment shown in Fig. 5.

In either event the two-part protective cap 36, 38 may be used to protect the binding post 40.

In normal operation the high-tension current applied through the conductor 35 passes through the binding post and the screw 39 being then conducted to one terminal of the lamp tube. So long as the lamp forms a suitable normal discharge path for the high-tension current the strap 22 is unaffected.

However, when the circuit through the tube is broken the abnormal potential imposed on the disk 25 by the characteristics of the lighting circuit, is sufficient to break down the air gap between the disk and the ring conductor 23. The result is an emergency by-pass or discharge shunted from disk 25 to ring 23 the strap 22 and the clip 25. The clip 25 is of course connected to the conductor at the opposite housing of the tube. In this way the current normally used in the tube is consumed in the shunt around it. The remaining lighting elements in the circuit are, therefore, maintained in normal operation without disturbance due to the inability of this tube section to operate.

As soon as the tube is replaced by another unit of normal lighting operation then the shunt path no longer operates but is in condition to operate without further attention if the same abnormal condition recurs.

In the operation of the by-pass the spark gap is protected from outside influences and will not deteriorate in service.

Such a safety device can of course be installed and operated as I have described above but nevertheless may be applied in other operative conditions and localities and for other purposes without departing from the scope of the invention as defined in the following claims.

What I claim is:—

1. A by-pass for high-tension electricity comprising a base, a discharge conductor on the base, a conducting disk, means for supporting said disk in uniformly spaced relation to the discharge conductor, an insulating shell resting on the base and enclosing both conductor and disk

and a current conducting screw passing through said disk and holding the shell on the base.

2. A by-pass for high-tension electricity comprising a base, a discharge conductor on the base, a conducting disk, means for supporting said disk in uniformly spaced relation to the discharge conductor, an insulating shell resting on the base and enclosing both conductor and disk, a current conducting screw passing through the base, disk and shell, and terminal means on the screw beyond the shell.

3. A by-pass for high-tension electricity, comprising a base having an outstanding central projection, a part-circular rim on the end of the base concentric with the projection, a conductor on the end of the base within the rim, a conducting disk resting on the projection in a plane parallel to said rim and conductor, an insulating shell resting on the rim and surrounding said projection and disk, and a conducting screw extending centrally through the base and shell and in contact with the disk.

4. A by-pass for high-tension electricity, comprising a base having an outstanding central projection, a part-circular rim on the end of the base concentrically spaced from the projection, a conductor on the end of the base within the rim, a conducting disk resting on the projection with all points of its periphery equidistant from the conductor, an insulating shell resting on the rim and surrounding said projection and disk, and a conducting element extending centrally through the base and shell and in contact with the disk.

5. A by-pass for high-tension electricity, comprising a base having an outstanding central projection, a part-circular rim on the end of the base concentric with the projection, a conductor on the end of the base within the rim, a conducting disk resting on the projection, and an insulating shell resting on the rim and overlying the outer portion of said conductor.

6. A by-pass for high-tension electricity, comprising a base having an outstanding central projection, a part-circular rim on the end of the base concentrically spaced from the projection, a conductor on the end of the base within the rim, a conducting disk resting on the projection with all points of its periphery equidistant from the conductor, an insulating shell resting on the rim and extending outwardly over the disk, said shell being spaced from said projection to provide a confined circular air-gap between said conductor and said disk.

7. A by-pass for high-tension electricity, comprising a base having an outstanding central projection, a part-circular rim on the end of the base concentric with the projection, a conductor on the end of the base within the rim, a conducting disk resting on the projection in a plane parallel to said rim and conductor, an insulating shell resting on the rim and surrounding said projection and disk, a conducting screw extending centrally through the base and shell and in contact with the disk, terminal means on the screw beyond the shell and means mounted on the end of the screw for shielding said terminal means.

8. A by-pass for high tension electricity comprising a base member, a conducting element running axially therethrough, a discharge conductor on the base, a current conducting disk, means for clamping said disk on the base in spaced relation to the discharge conductor, an insulating shell resting on the base and enclosing both the discharge conductor and disk, wire attaching means on the first named conducting element beyond the shell, a collar, and a cap mounted on the end of the conducting element and clamping said collar to said shell concentrically spaced around said conducting element and terminal means.

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