Feb. 15, 1955 H. DAHLHAUS ET AL 2,702,377

HOLDER WITH RETAINING MEANS FOR ELECTRICAL DISCHARGE TUBES HAVING PIN CONTACTS ON THEIR BASES

Filed July 3, 1951 3 Sheets-Sheet 1

Fig.1

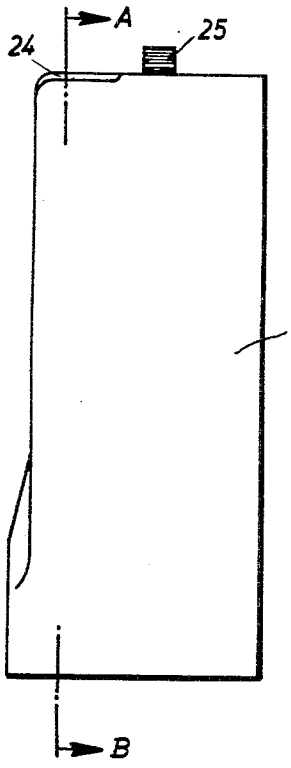


Fig.2

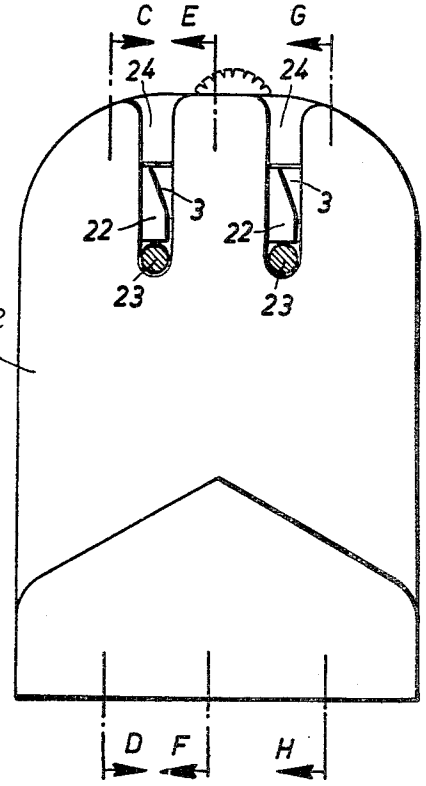
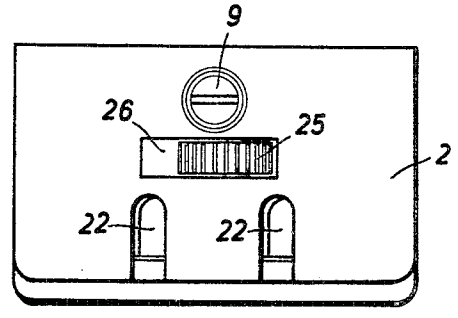


Fig.3



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Filed July 3, 1951 3 Sheets-Sheet 2

Fig.4

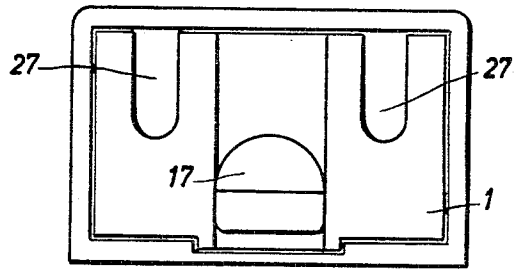


Fig.8

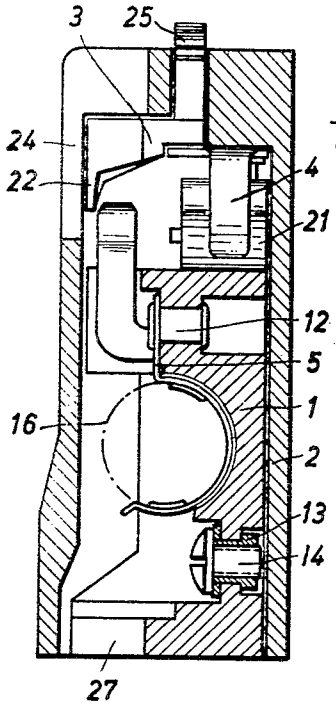


Fig.9

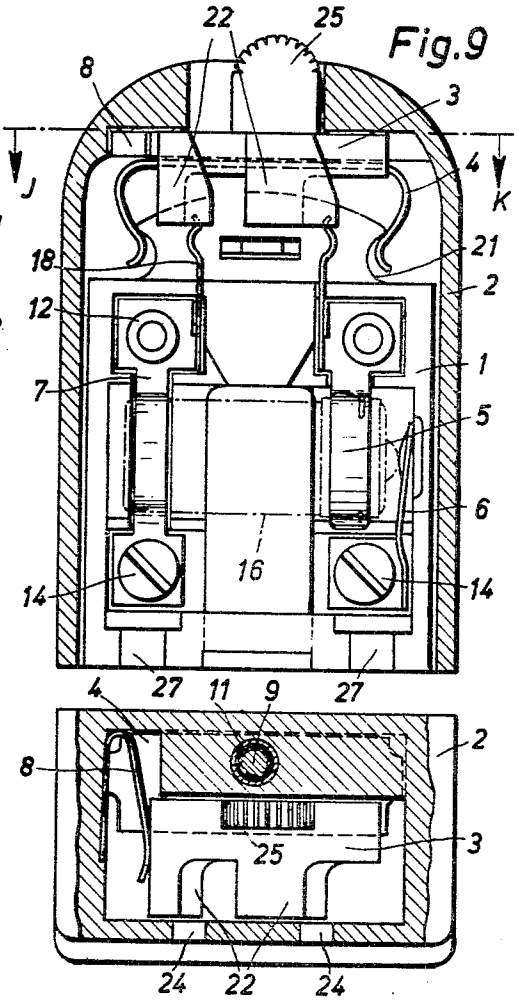


Fig.10

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Filed July 3, 1951 3 Sheets-Sheet 3

Fig.5

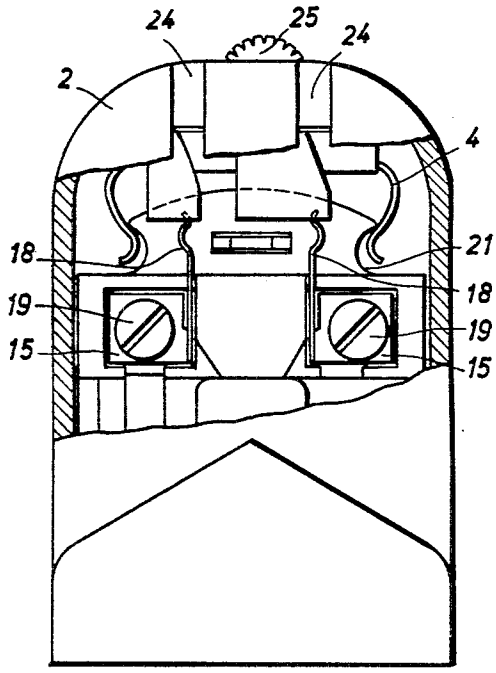
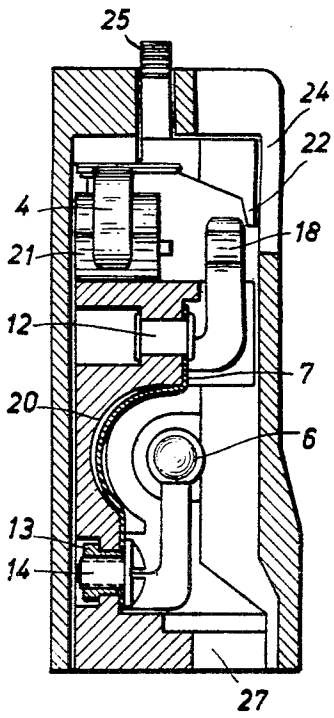


Fig.6



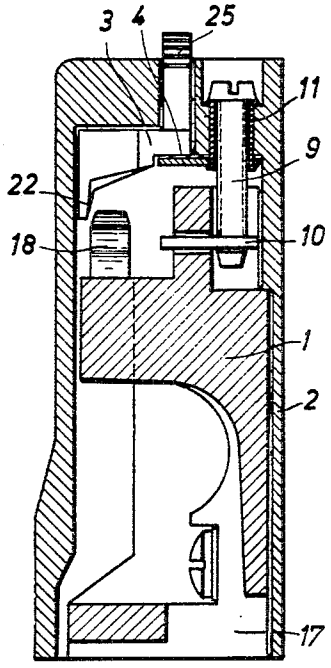


Fig.7

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HOLDER WITH RETAINING MEANS FOR ELECTRICAL DISCHARGE TUBES HAVING PIN CONTACTS ON THEIR BASES

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8 Claims. (Cl. 339—75)

This invention concerns the construction of holders for electrical discharge tubes, the bases of which have axially extending plug-like pins. Known holders for pin bases of this type are provided with a straight groove for introducing the two base pins, the pins are first being pushed into this groove, and also with an annular groove which permits turning of the tube with the base pins until said pins bear against contact springs inside the annular groove and engage this position. The rotation which is necessary for inserting the tube with the pin bases provided at both its ends into two oppositely disposed holders has the disadvantage that, depending on the force necessary to secure in the holders, a more or less large turning moment has to be transmitted through the tube and the pin bases connected with it. Thus there exists the danger, especially with inexpert manipulation, that such strong stresses will arise at the connection, which is made by means of cement, between the glass tube and the metal base, and also on the glass tube itself or on the pins, that the base or the pins will become loose, or the tube may even be broken.

A further drawback consists in the lack of protection against physical contact with one or more of the pins since it is possible for the base pin first introduced to bear on a current-carrying contact spring while the other base pin can still be touched.

The same drawbacks are associated with other known holders, in which the introducing slit is not in communication with an annular groove but issues for instance into a heart-shaped widened portion. With this type of holder the tube is inserted in such a way that, the discharge tube being rotated through about 45°, the base pin first introduced is brought into connection with one contact spring, while the second pin is at the same time introduced through the introducing slit, and then, through further rotation of the tube, comes to bear on the other contact spring. Physical contact with the pins is thus again possible.

It is an object of the present invention to avoid the aforesaid drawbacks by a new construction of holders for electrical discharge tubes and to obtain further advantages, particularly in manufacturing technique, as compared with the holders hitherto known.

According to the present invention a holder for electrical discharge tubes, the bases of which each have two axially extending plug-like pins is provided with one or two parallel introducing grooves for pushing in the base pins and a locking mechanism which can be moved transversely to the direction of insertion, said locking mechanism being adapted to secure the base pins in the contact position. In one form of construction of the invention the holder is provided with a slidably mounted transverse locking bar which is urged by spring means towards one side of the holder and is adapted to lock the base pins of a tube, when inserted into the holder, in the two introducing grooves. This transverse locking bar may be provided with a handle projecting through a slot in the cover of the holder, so that the bar can be pushed back against the action of its spring. When the base pins are being introduced into the contact position, the locking of the pins can be brought about automatically e. g., by providing two projecting lugs on the bar, which engage in the introducing grooves, with abutments at an acute angle to the direction of insertion of the pins, so

that on insertion into the grooves, the base pins push the bar back until the latter, after the base pins have reached the contact position, springs back behind said base pins into the locking position under the action of its spring.

The invention will be described further, by way of example with reference to the accompanying drawings, in which:

Fig. 1 is a side elevation of a pin base holder constructed according to the invention.

Fig. 2 is a plan view of the holder shown in Fig. 1,

Fig. 3 is a front elevation of the holder shown in Fig. 1,

Fig. 4 is a rear elevation of the holder shown in Fig. 1,

Fig. 5 is a plan view similar to Fig. 2, but showing the cover of the holder partly broken away,

Fig. 6 is a longitudinal section on the line C—D of Fig. 2,

Fig. 7 is a longitudinal section on the line E—F of Fig. 2,

Fig. 8 is a longitudinal section on the line G—H in Fig. 2,

Fig. 9 is a section on the line A—B of Fig. 1, and

Fig. 10 is a cross-section taken on the line J—K of Fig. 9.

Since only one glow starter is required for the operation of each tube, it is sufficient if, of the two holders necessary for the connection of a tube, only one such holder should be arranged for the reception of a glow starter, whilst every second holder need contain only contact springs. A holder of the last-mentioned type is shown in Fig. 5, whilst Figs. 6 to 10 show the construction of the holder fitted with a glow starter.

Referring now to the drawings, a holder consists substantially of a base member **1**, cover or cap **2**, a locking bar **3**, and various current-carrying contact parts. The base **1** can be made from pressed insulating material or a ceramic material such as porcelain, and is provided with recesses **21** for the engagement of the ends of a leaf spring **4**, and recesses for securing the current-carrying contact spring member **5**, **6**, **7** and **15**, it further contains an opening **17** for the introduction of the wires and recesses **27** for the securing means for fitting the holder to support. In the case of a holder provided with a glow starter **16**, which is shown in dash and dot lines in Figs. 8 and 9, the base also has a suitable recess for the reception of said glow starter. In this case, the wires are connected directly behind the opening **17** by means of the clamping screws **14**, whilst in the construction without a glow igniter (Fig. 5) the wires are connected to the clamping screws **19**. The screws **14** are received by internally threaded hollow rivets **13** while hollow rivets **12** without a thread serve for securing the contact springs **5** and **7** to base **1**.

In the construction with a glow starter three contact springs are required. Firstly, the contact spring **7**, which is provided with a resilient extension **18** extending from one clamping screw **14** beyond the hollow rivet **12**, said extension having an angularly bent portion adapted to bear against a base pin, secondly the base contact **6**, which extends from the other connecting screw **14** as far as the base and hence one pole, of the glow starter **16**, and thirdly the contact spring **5**, which is provided with one annularly formed end adapted to bear on the base sleeve forming the second pole of the glow starter, said spring **5** possessing an extension **18** similarly formed to that on spring **7**, but adapted to bear on the second base pin. At the point of insertion of the glow starter, the contact spring **7** is also bent to conform to the shape of the cylindrical glass body of the starter, and is located in a groove **20** in the base, as can be seen from Fig. 6, so that the glass part of the glow igniter has no contact with spring **7**.

In the case of holders without glow igniters (Fig. 5), the ends of the two incoming supply wires are connected by means of the clamping screws **19** with the two spring contact members **15**, which are provided with similar resilient extensions to those in the construction described above.

Although the cover may be made of ceramic material, it is preferable to use pressed insulating material. In the example of construction shown, the cover **2** is so

formed, that it surrounds the base 1 on all sides except the side for introducing the wires. A slot 26 for the passage of a handle 25 of the locking bar 3 is provided in the cover together with two slots 24 which form the grooves for introducing the two base pins, shown sectioned in Fig. 2.

The locking mechanism provided for the base pins is connected with the cover 2 in such a manner that the locking bar 3, which likewise consists of pressed insulating material, can slide to and fro behind the spring 4, which is secured to the cover 2 by means of the hollow rivet 11. Spring 4 is formed with two resilient ends adapted to engage in corresponding recesses in the end of the base, thus serving to secure the cap to the base. The bar 3 is ordinarily held in the locking position by a U-shaped leaf spring 8. The body of the bar has two extending lugs 22 which lock the base pins 23 (Fig. 2) in the contact position. The lugs 22 on the bar have abutments formed thereon and disposed at an acute angle to the direction of insertion of the base pins, so that the base pins on being inserted into the two introducing grooves 24 push back the bar 3 against the pressure of the spring 8. After the base pins 23 have reached the contact position, the bar 3 springs forward again, and its lugs 22 secure the base pins in the contact position. The handle 25 enables the bar 3 to be pushed back out of the locking position in order to take the discharge tube out of the holder.

The method of operation when fitting the holder and when inserting the discharge tube into the holder is as follows:

After the base 1 has been secured on its support, the cover 2 is pushed over. The free ends of the spring 4 then spring into the recesses 21 in the end of the base, whereby the cover is held firmly in position. To hold the cap even more firmly on the base, a screw 9 is screwed into nut 10 secured to the base. When the two holders for one discharge tube are secured at the correct spacing from each other and in the correct position, so that the guide slots 24 present in the caps are opposite to each other, the tube is introduced into the slots, the bar being pushed to one side, tensioning the spring 8, owing to the inclined sliding surfaces provided on the lugs 22 of the bar. As soon as the base pins snap into the angularly bent portions at the ends 18 of the contact springs 5, 7 or 15, the locking bar is released again and returns under the action of the spring 8 into the locking position, so that the base pins are fixed securely.

For taking out the tube, it is only necessary to move back the locking bar against the pressure of the spring 8 by actuating the knob 25 projecting on the front side of the cap, in order that the base pins may emerge freely from the guide groovers 24.

A substantial advantage of the holder constructed according to the invention consists in the fact that any kind of rotation of the tubes and thus any torsional stress on the tubes themselves and on their bases and pins is avoided. Further, the new kind of construction and method of introducing permits greater tolerances in the fitting or in the mutual placing of the two holders for one tube. A slight misplacing of the introducing grooves, which in the known holders can lead to considerable difficulties when inserting the tube, is without disadvantage in the holders constructed according to the invention.

A further advantage lies in the fact that the contact parts are disposed in a manner permitting good general observation, and are firmly connected with the base of the holder by hollow rivets, without any parts being accessible to physical contact by a person handling a tube. Simplicity in the manufacture of the dies for the pressed parts is obtained. There is no need to work with special devices, such as lateral slides for producing securing holes. In certain known holders, the contact parts are only clamped in slots or other recesses in the base and are only held therein by their own resilient force. Such a securing is, however, uncertain, particularly since even similarly manufactured springs do not always possess the same tension, so that the springs are introduced either too slackly or too stiffly. This can result in the contact parts falling out when the holders are being conveyed, or in difficulties in the later use of the holder. In contrast, with the holder constructed in accordance with the invention, all the contact parts can be riveted fast, without increase of difficulty in the manufacture of the holder parts.

On account of the accuracy required for the shaping and mutual positioning of the bearing surfaces for the contact springs, the conventional holders could be made from practically no other material than pressed insulating material. The tolerances permissible with the holder according to the present invention on the other hand allow the base also to be made from porcelain or other ceramic materials which are liable to a certain shrinkage.

Through the connection of the wires close to the point of entry into the base any possibility of a hindrance occurring through the ends of the wires when the cap is being pushed on is avoided. Also, the supply wires do not need to be excessively bent when being connected. Hitherto, it could happen that when fairly thick supply wires are used, the cap with its part being on the contact springs become placed upon the bends of the wires at the connection point and was thereby pushed forward, so that the pin about which the tube had to be rotated was not exactly in the centre of the hole in the cap. Difficulties of this kind cannot arise with holders constructed in accordance with the invention.

We claim:

1. A holder for an electrical discharge tube the ends of which are provided each with two lengthwise projecting plug-like pins, comprising a base member, a cover encasing said member and being releasably secured thereto, a pair of contact springs secured to said base member and including concavely bent free ends in opposition to each other to engage therebetween said two pins of a discharge tube, said cover being provided with two parallel slots for receiving said pins, said slots being spaced from each other according to the spacing of said spring ends and extending from the periphery of said cover towards said spring ends, respectively, a locking bar in said cover, said cover including guiding means whereby said bar is shiftable between two end positions in a path transverse with respect to said slots, said bar including two projections, said projections overlapping said slots respectively, in the first one of said end positions of said bar so as to prevent the withdrawal of said pins when the latter are engaged by said spring ends, said projections being removed from said slots in the second end position of said bar, a third spring between said cover and said bar so as to urge said bar into its first end position, a grip on said bar projecting to the outside for manually shifting said bar from its first into its second end position, and a pair of terminals secured to said base and connected to said contact springs, respectively.

2. A device as claimed in claim 1, the bottom ends of said slots being so located that the coordinate pins are engaged substantially simultaneously by said slot bottoms and said spring ends, and said projections, in said first end position of said bar, extending to points spaced from said slot bottoms a distance approximately equal to the thickness of said pins, so that said pins, when inserted, are enclosed each from three sides, by said slot bottoms, said spring ends and said bar projections.

3. A device as claimed in claim 1, said projections including faces inclined with respect to the direction of said slots, said faces being in the path of said pins when said bar is in its first end position and said pins are pushed into said slots, whereby said pins when engaging said faces will shift said bar against the restraint of said third spring towards its second end position to permit said pins to pass said projections and to engage said contact springs.

4. A device as claimed in claim 1, said cover being open at one of its ends, and said base being provided with recesses extending from the side of said open cover end to said terminals for the introduction of electric leads.

5. A device as claimed in claim 1, said base member being provided with at least one lateral recess, a fourth spring being secured within said cover said fourth spring having a curved free end and extending with said curved free end thereof into said cover so as to snap into said recess when said base member is pushed into said cover.

6. A holder for an electrical discharge tube provided at each of its ends with a pair of lengthwise projecting plug-like pins, comprising a base member, a cover encasing said member and being releasably secured thereto, a pair of contacting springs secured to said base member and including concavely bent free ends in opposition to each other to engage therebetween said two pins of a discharge tube, said cover being provided with two parallel slots for receiving said pins, said slots being spaced from each other according to the spacing of said spring ends and

extending from the periphery of said cover towards said spring ends, respectively, a locking bar movable in said cover to lock said pins in the slots when in engagement with said springs, said bar having portions extending across the slots in a first, locking position of the bar and disposed clear of the slots in a second, unlocking position of the bar, a part cylindrical recess in said base member to receive therein a glow starter, the first one of said contact springs including a resilient annular extension so located as to hold said glow starter in said recess and to contact one of the poles of said starter, a third contact spring secured to said base member in a position to contact the second pole of said starter, and a first and second terminal secured to said base and connected to said second and said third contact springs, respectively.

7. In a holder of the type described the combination of a base member, a cover encasing said member, a pair of contact springs secured to said base member and including concavely bent free ends in opposition to each other for the engagement therebetween of the two pins projecting from an end of a discharge tube for which the holder is destined, said cover being provided with two parallel slots for receiving the pins, said slots being spaced from each other according to the spacing of said spring ends, said slots extending from the periphery of said cover to the spring ends, respectively, and ending in registry with the latter, whereby said pins laterally engaged by said spring ends will bear on the bottoms of said slots, a shiftable locking member having spaced portions respectively extending adjacent the respective slots, and guiding means for said locking member included in said cover to guide said locking member between two end positions in the one of which positions said portions of the locking member extend across the slots in spaced relation to said bottoms of the slots, so as to be in engagement with pins on the sides of the pins opposite to said slot bottoms, and in the other one of which said portions are clear of the slots, whereby the pins are free to be moved along said slots.

8. A device as claimed in claim 1, said base member being movable into said cover and including an end portion which is the first part of the base member to move into the cover when the base member is inserted into said cover, said base member being provided with two opposite recesses in the sides, respectively, of said end portion, and said device further comprising a fourth spring of substantially U-shape having its center portion secured to said cover and its free ends inwardly curved so as to snap into said recesses.

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