Sept. 3, 1940. G. F. BAHR 2,213,373

CIGAR LIGHTER

Filed June 16, 1936

Fig. 1

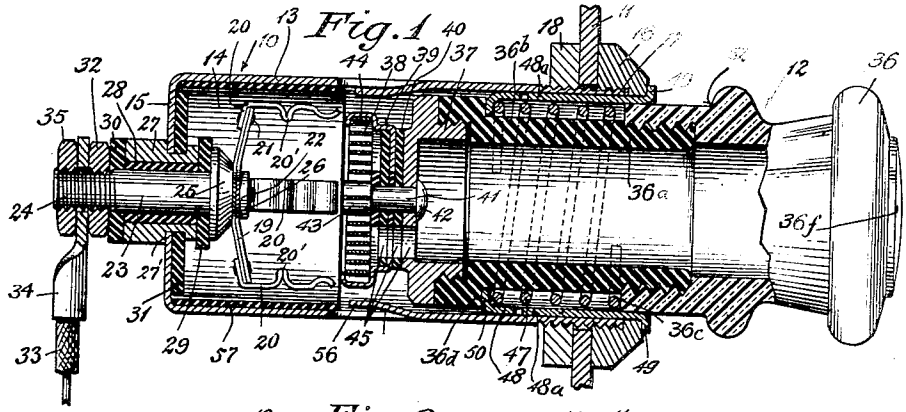


Fig. 2

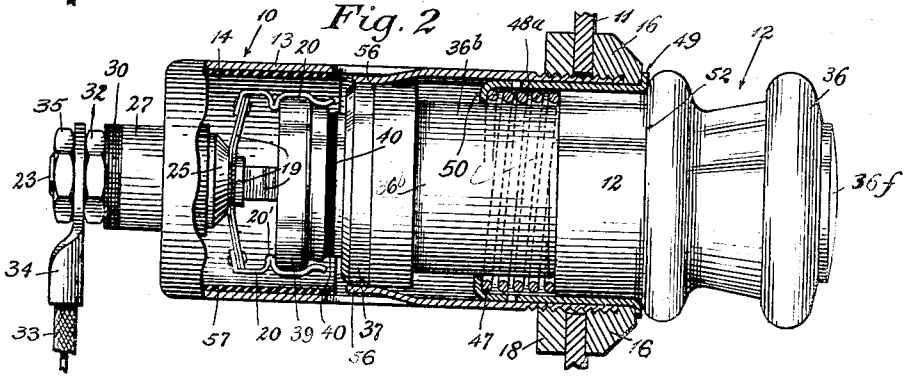


Fig. 3

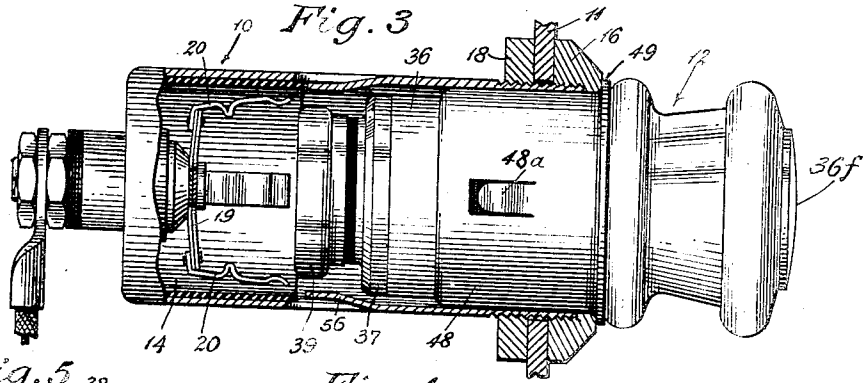


Fig. 5

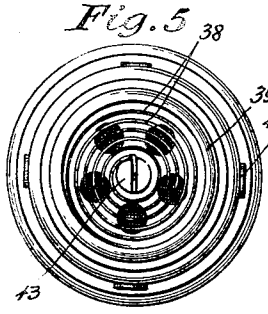
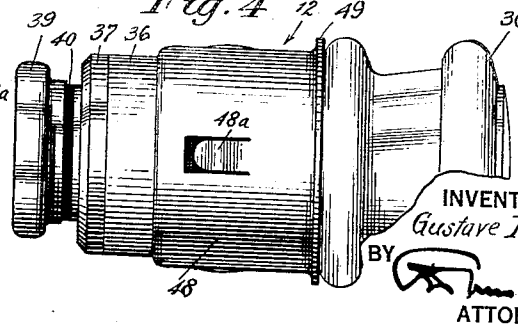


Fig. 4



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CIGAR LIGHTER

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10 Claims. (Cl. 219—32)

This invention relates to cigar lighters, and more particularly to devices of this character as used in automobiles and elsewhere.

Lighters for cigars, cigarettes, and the like, of the kind just indicated, commonly comprise a holding device providing a well electrically served by connections from a source of current such that in the well there is a gap in an otherwise complete circuit, and an igniting unit in the form of a plug adapted to be held in and removed from the well for storage and use respectively. The igniting unit has a heating element carrying contacts, and while the unit is in storage position in the well, the supply circuit is open, but while the unit is in a deep or operative position in the well the gap is closed through the contacts on the unit to place said heating element in the circuit for heating to incandescence.

More specifically, the type of lighter to which the invention pertains is that wherein automatic means is incorporated, so operating that when the removable igniting unit is positioned relative to the holder for electrical energization of the heating element of said unit, the unit is held in such position until its element is heated to a predetermined extent, whereupon the circuit through the element is automatically broken.

An object of the present invention is to provide a lighter of the kind described which has extremely uniform and satisfactory operating characteristics.

Whereas in prior thermostatic lighters the thermostat has been so shaped and constituted as to act as a detent to hold the igniting unit in deep or operative position until heated to the desired degree of incandescence, and to act also as a contact to connect in circuit the heating element of the unit when the latter is in deep or operative position in the socket, by the present arrangement the thermostat acts merely as a heat-responsive actuating member, there being provided a different type of metallic element to act as the detent and contact.

According to the present invention, the bimetallic and contact elements, the latter preferably including a detent means for holding the unit in operating position, are separate parts and of different materials, although mechanically and electrically joined to form a single structure.

One advantage attained is the provision of a simpler bimetallic element, the operation of which is, as a result, more uniform and satisfactory. Another advantage, in aid of uniformity of operation is the fact that it is possible to employ for the contacting element a material chosen particularly for its contact qualities. Also, by providing an arrangement wherein the thermostatic element and contact element of the lighter, although finally structurally joined, are first individually fabricated as separate parts, there is made possible the use of a bimetallic element of a shape and construction such that the entire final structure is exceedingly inexpensive to produce.

Another object of the present invention is to provide an improved thermostatic lighter which is proof against accidental short-circuit or other electrical trouble, so that the electrical system of the automobile to which the lighter is attached is protected against injury and the thermostatic element is protected against unintended heating. In attaining this object there is provided, in a lighter the holder of which is of the well type, a cylindrical sleeve of insulating material carried within the metallic shell establishing the well of the lighter so as to encircle the thermally actuated contacting elements positively to preclude contact of these elements with the shell.

Other features and advantages will hereinafter appear.

In the accompanying drawing, showing a preferred embodiment of the invention as applied to a holder presenting a well:

Figure 1 is an axial sectional view thereof, with the removable igniting unit in shallow, inoperative or storage position in the well or socket, the bimetallic heat-responsive element of the lighter being partially broken away for greater clearness.

Fig. 2 is a similar view, but with fewer parts in section, and showing the removable igniting unit in deep or operative position.

Fig. 3 is a similar view, but with the igniting unit, here shown in elevation, in shallow or storage position.

Fig. 4 is a side elevation of said unit, removed.

Fig. 5 is an end elevation of said unit, looking toward the right in Fig. 4.

The cigar lighter of the present invention, in the exemplary embodiment thereof shown in the drawing, is of the so-called sleeve type, for use in automobiles, and comprises a socket-carrying base member 10 for attachment to a panel 11 of an automobile, and a removable igniting unit 12 which is normally supported by the base member, but which may be mechanically and electrically disconnected for manual transportation within the car and for handling by various occupants therein for the purpose of lighting cigars, cigarettes and the like.

Before taking up in further detail the illustra-

tive structure shown in the drawing, it should be explained that the removable igniting unit 12, as the parts are so shown, would ordinarily rest in the base member 10 so as slightly to protrude therefrom as indicated in Figure 1, and the unit would be in fully inserted position as shown in Fig. 2 only when manually thus disposed by a person desiring to place the unit in operating or energizing position for its heating element, thereby to condition the unit for removal from said base member and for manual handling to light a cigar or cigarette.

As shown, the base member 10 comprises a sleeve 13 forming a deep socket 14, such sleeve being closed at its inner end by an integral transverse wall 15. This sleeve is adapted to pass through a suitable aperture in the selected panel 11, as the instrument board, and is held in this position by a cap 16 screwed onto the outer end of the sleeve. The thread 17 for this cap also takes a nut 18. In mounting such a base member, it is convenient to have the cap 16 removed but the nut 18 in place, so that the outer end of the sleeve for a length thereof ahead of the nut can be inserted endwisely into the panel opening from the rear of the panel, and so that after such length is inserted through said opening, the cap 16 can be applied and screwed up tight, and, after this, the nut can be screwed up against the rear of the panel to clamp the base member securely in position.

The base member 10, preferably formed of sheet metal, serves as a conductive element of the grounded portion of the circuit for the energizing current when the removable igniting unit is in operative position in the socket 14.

According to the present invention, there is provided within the sleeve 13 and insulatedly supported on the rear transverse wall 15 of said sleeve a thermostatic means and a separate electrical contact means; said thermostatic means being responsive to the heat from the igniting unit to actuate the contact means, after the latter has made electrical connection to said unit, thereby to break such connection.

As shown, the thermostatic means comprises a bimetallic plate 19 which is cruciform in shape. However, in the broader aspects of the invention, the bimetallic element 19 may have other suitable shapes, such as that of a disk, or that of an elongate strip, depending on the desired operating characteristics of the lighter.

Also as shown, the bimetallic element 19 carries four contact arms 20, attached to said element by rivets 21 applied to the four arms of the cruciform element. By this arrangement, the contact arms 20 can be selected of a material having desirable contact qualities, while the bimetallic element 19 can be fabricated of metals of desirably differing coefficients of expansion. Thus, a bimetallic element can be used which can be designed solely from the standpoint of heat responsiveness, without regard to other characteristics, the incidental requirement of being electrically conductive needing little consideration. Also, the contact arms 20 can be chosen for their contact and corrosion-resisting qualities, without especial regard to their coefficients of expansion.

The bimetallic element 19 is of extremely simple shape, and therefore can be fabricated, with a minimum of manufacturing operations, with corresponding economy. Further, since the bimetallic element is of such simple shape, its operating characteristics will be extremely uniform throughout its life, as compared with bimetallic elements having included in their shape bends or corners which cause mechanical and structural stresses in the element, resulting in unreliable and uncertain operation where responding to heat.

In this last connection, it will be noted that each contact arm 20, as here shown, is crimped intermediate its ends, so as to form an inwardly extending, sharply bent, ledge or rib 20'. This rib acts as a stop for the removable igniting unit 12, providing a limit for the inward movement of said element.

The removable igniting unit 12 carries within the same a heating element, the heat of which causes bending of the bimetallic element 19. Normally the bimetallic element 19 is curved forwardly, as shown in Figure 1, so that the contact arms 20 extend substantially parallelly. This is the cold contact-making position of the structure. Under the influence of heat, the bimetallic element 19 straightens or flattens out as shown in Fig. 3, and in so doing the contact arms 20 are moved to the position shown in this view. Upon cooling, the bimetallic element again resumes its normal shape, as in Figure 1, returning the contact arms 20 to their normal parallel relation.

The bimetallic element 19 is conveniently mounted, as illustrated, on a metal stud 22. As shown, this stud has a shank 23 the rear end of which is threaded at 24, said stud carrying at its front end a head 25 having a cylindrically reduced extension passing through a central aperture in the element 19, said extension being headed-over on said element at 26.

The stud 22 is supported in a shouldered metal sleeve 27, but insulated therefrom and from the base member 10 by an insulation sleeve 28 between the stud-shank and the sleeve 27, by a washer 29 between the stud-head 25 and the adjacent end of the sleeve 27, by a similar washer 30 at the other end of the sleeve 27, and by an annular disk 31 of insulating material between the wall 15 at the inner end of the sleeve 13 and the headed-over inner end of the sleeve 27. The heading-over of such end rivets the sleeve 27 securely in place on the base member 10, due to the shoulder 27' of the sleeve; the reduced portion of said sleeve, ahead of this shoulder, passing with snug fit through the central opening of the disk 31 and through a matching aperture in the wall 15.

The stud 22 is rigidly secured in the sleeve 28 by application of a primary nut 32 to the threaded end 24 of the stud. A feed wire 33 is connected to the stud by a terminal clip 34, the latter being clamped in place by tightening up a secondary nut 35 on the threaded end of the stud.

Thus the base member 10 is provided with contact members (the socket sleeve 13 and the contact arms 20) terminating at both sides of the car circuit, and insulated from each other.

The removable igniting unit 12 is shown as including a knob or handle 36, screwed to a hollow tube 36a of suitable insulating material. Within the inner end of this tube is secured a hollow metal carrier 37 for the heating element, marked 38, and for a metal cup 39 within which said element is positioned.

The cup 39, and a centrally apertured insulating disk 40, are clamped on the rear end of carrier 37, by means of a stud 41, headed-over at 42 within the carrier, and carrying a slotted or kerfed head 43 within the cup 39. The stud 41 is insulated by suitable washers from the cup 39,

which latter is insulated from the carrier 37 by the disk 40, all in the well-known manner. The heating element 38 is shown as in the form of a nichrome or other suitable resistance element shaped as a spirally wound band connected at its outer end with the cup 39 at 44 (Fig. 1) and at its inner end set in the kerf of the head 43 of the stud 41.

The hollow tube 36*a* of the igniting unit 12 has a cylindrically reduced body portion 36*b* which carries a helical compression spring 47, the front end of which presses against a shoulder 36*c* formed by the handle portion of the unit. Disposed around the body portion 46 of the tube 36*a* is a cylindrical metal sleeve 48 adapted to slide easily within the shell 13, said sleeve having at its forward end an outwardly extending flange 49 and at its rearward end an inwardly extending flange 50 which abuts a circumferential shoulder 36*d* of the tube 36*a*. The rear end of the spring 47 bears against the inner face of the flange 50 so that the sleeve 48 is yieldingly urged toward a position of rest as shown in Figure 1. The outwardly extending flange 49 is adapted to engage the front surface of the cap 16, so that the igniting unit 12 is held thereby normally in shallow or storage position within the holder.

The sleeve 48 has integral therewith a plurality of tongues 48*a* lanced therein and biased outwardly to frictionally engage the shell 13 in order to hold the igniting unit 12 in shallow or storage position against casual displacement therefrom due to vibration or other causes.

When it is desired to cause energization of the igniting unit 12, said unit is moved into deep or operative position by pressure against the handle 36, this causing the tube 36*a* to move inwardly relatively to the shell 48 and holder 10, and causing the spring 47 to compress. This position is shown in Fig. 2.

Upon movement of the igniting unit 12 to deep or operative position, the metal cup 39 will cause the contact arms 20 to spread and finally to close over said cup, as shown in Fig. 2, thereby to grip the cup and hold the entire igniting unit in energized position and against the action of the spring 47. For this closed-circuit position, the heating element 38 will receive energy on the one hand from the wire 33 through the stud 23, bimetallic element 19, contact arms 20, and metallic cup 39, and on the other hand through the stud 41, metal carrier 37, and through inwardly biased spring fingers 56 lanced in the shell 13 so as to electrically engage said carrier, and thence through the metal dash board 11 of the automobile. It will be noted that when the parts are arranged as in Fig. 2 the outwardly extending flange 49 of the shell 48 is adjacent and substantially juxtaposed to the circumferential shoulder 52 on the handle portion 36 of the unit 12, to prevent undue pressure on the bimetallic and contact structure of the lighter.

Movement of the igniting unit 12 to the deep operative position shown in Fig. 2 results in energization of the heating element 38, and upon such energization heat will be radiated by said element and will act on the bimetallic element 19 so that after a certain predetermined elapse of time, as for instance to bring the heating element 38 to incandescence, said element 19 will flatten out sufficiently to move the contact arms 20 outwardly and away from the cup 39 to release the igniting unit. Thereupon, said unit will move outwardly to the position shown in Figure 1 under the action of the spring 47, thereby breaking the circuit through the heating element, and projecting the unit to indicate that the same is ready for use. At the same time, a distinct click will be sounded, as the inturned flange 50 of the sleeve 48 is struck by the shoulder of the unit marked 36*d* in Fig. 1.

As indicated at 45 in Figs. 1 and 5, the cup 39 and carrier 31, and the insulating washers associated therewith are matchingly apertured at a plurality of points around the stud 41, so that a translucent portion 36*f* of the handle 36 will become illuminated from the glow of the heating element 38 as the latter reaches incandescence, thus to give a visual signal when the removable unit 12 is ready, or approaching readiness, for removal from the socket 14.

In satisfaction of one of the objects of the invention, the metal sleeve 13 is shown as carrying in the rear portion of its well 14 an insulating sleeve 57 enclosing the fields of operation of the contact arms 20. This insulating sleeve, which preferably is made of a heat resistant insulating material, positively precludes any possibility of the contact arms 20 ever touching the metal shell 13.

Variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

I claim:

1. In an electric cigar lighter, the combination of a base structure providing a holder; an igniting unit supported by and completely removable from said holder for storage and use respectively, said unit being manually movable relative to the holder to a position for energization of the unit; contacting means for closing a circuit through the igniting unit when in said energizing position; and means, including a carrier for said contacting means, for opening the circuit in response to heat from the igniting unit when the latter is ready for use, the carrier for said contacting means comprising a bimetallic spider mounted in said holder, the contacting means being a plurality of contact elements separate from but carried by said spider.

2. In an electric cigar lighter, the combination of a base structure providing a holder; an igniting unit supported by and completely removable from said holder for storage and use respectively, said unit being manually movable relative to the holder to a position for energization of the unit; contacting means for closing a circuit through the igniting unit when in said energizing position; and means, including a carrier for said contacting means, for opening the circuit in response to heat from the igniting unit when the latter is ready for use, the carrier for said contacting means comprising a bimetallic cruciform plate mounted in said holder, the contacting means comprising a plurality of contact elements separate from but carried by said plate, each arm of said plate carrying a contact element.

3. In an electric cigar lighter, the combination of a base structure providing a holder; an igniting unit supported by and completely removable from said holder for storage and use respectively, said unit being manually movable relative to the holder to a position for energization of the unit; an electrical contact at the inner end of said unit; a circuit-making detent carried by the holder comprising a heat-responsive bimetallic element having a plurality of monometallic jaws secured directly thereto and carried thereby adapted, when in normal position, to resiliently yield to pressure on the jaws thereof by contact

of the igniting unit so as to embracingly receive said contact, said jaws engaging the contact of the igniting unit for a substantial distance along the length thereof and being non-deformable by heat and each provided with a ledge to limit the movement of the igniting unit, said detent adapted to release said contact upon reaching a predetermined temperature.

4. In an electric cigar lighter, the combination of a base structure providing a hole; an igniting unit supported by and completely removable from said holder for storage and use respectively, said unit being manually movable relative to the holder to a position of energization of the unit; an electrical contact at the inner end of said unit; a circuit-making detent carried by the holder comprising a heat-responsive bimetallic element having a plurality of jaws directly carried thereby adapted when in normal position to resiliently yield to pressure on the jaws thereof by the contact of the igniting unit so as to embracingly receive said contact, said jaws engaging said contact for a substantial distance of their length and being non-deformable by heat and each provided with a ledge to limit the movement of the igniting unit, said ledge projecting from the plane of the jaw intermediate the ends thereof and being formed by reversely bending each jaw, said detent adapted to release said contact upon reaching a predetermined temperature.

5. In an electric cigar lighter, the combination of a base structure providing a holder; an igniting unit couplable to and completely removable from said holder for storage and use respectively, said unit having a contact thereon and being manually movable relative to the holder to a position for energization of the unit; and means for closing the circuit through the igniting unit when in said energizing position, and including an elongate thermostatic element and a pair of contact arms, non-deformable by heat, secured thereto and carried thereby, and movable by the thermostatic element in response to heat from the igniting unit for opening the circuit, said thermostatic element being supported substantially at its center in the holder so as to extend substantially normal thereto, the arms being supported one on each end of the element so as to extend substantially normal thereto whereby the arms function as floating jaws to move toward or away from each other when the element responds by deformation to heat from the igniting unit, said jaws engaging said contact for a substantial distance in the direction of movement of the unit.

6. In an electric cigar lighter, the combination of a base structure providing a holder; an igniting unit couplable to and completely removable from said holder for storage and use respectively, said unit being manually movable relative to the holder to a position for energization of the unit; contacting means including a contact carried by said igniting unit and cooperable mono-metallic contacts carried by said holder and engaging said contact for a substantial distance along its length for closing a circuit through the igniting unit when in said energizing position; and means carried by said holder for opening the circuit in response to heat from the igniting unit when the latter is ready for use, said means including a bimetallic element deformable to cause said circuit to be opened in response to heat from the igniting unit and forming a support for the monometallic non-deformable contacts of the holder, said contacts being directly carried by said element for movement thereby and adapted when said element is in normal position to exert a pressure on the contact of said igniting unit when moved to energizing position in a direction normal to the path of movement of the same, and moved by said element to release the holding pressure upon deformation of said element in response to heat from the igniting unit.

7. In an electric cigar lighter, the combination of a base structure providing a holder; an igniting unit couplable to and completely removable from said holder for storage and use respectively, said unit being manually movable relative to the holder to a position for energization of the unit; contacting means operative on movement of the unit to said energizing position for closing a circuit through the igniting unit and to releasably retain the same in said position; and means for opening the circuit in response to heat from the igniting unit when the latter is ready for use, said means including a bimetallic element extended generally in a plane substantially perpendicular to the direction of movement of the unit toward energizing position, said contacting means being directly attached to said element and disposed substantially normal thereto.

8. In an electric cigar lighter, the combination of a base structure providing a holder; an igniting unit couplable to and completely removable from said holder for storage and use respectively, said unit being manually movable relative to the holder to a position for energization of the unit; contacting means for closing a circuit through the igniting unit when in said energizing position; and means for opening the circuit in response to heat from the igniting unit when the latter is ready for use, said means including a bimetallic element having a plurality of radially extending arms extended generally in a plane substantially perpendicular to the direction of movement of the unit toward energizing position, a fixed support carried by said holder to which said element is centrally secured, said contacting means being directly connected to said arms adjacent the free ends thereof and disposed substantially normal thereto whereby the free ends of said contacting means are adapted to releasably engage said igniting unit when the same is moved to the energizing position on said holder.

9. In an electric cigar lighter, the combination of a base structure providing a holder; an igniting unit couplable to and completely removable from said holder for storage and use respectively, said unit being manually movable relative to the holder to a position for energization of the unit; contacting means for closing a circuit through the igniting unit when in said energizing position; and means for opening the circuit in response to heat from the igniting unit when the latter is ready for use, said means including a fixed support, and a secondary support in the form of a bimetallic substantially planiform element secured to a fixed support at a point intermediate the expanse of said element, said contacting means being in the form of a plurality of separate monometallic non-deformable pieces each constituting a separate contact, said contacts being carried by said planiform element at points spaced from each other to be movable thereby upon deformation thereof upon being heated and said contacts being so disposed as to extend substantially normal to said element whereby the same are adapted to releasably engage said igniting unit when the same is moved to the energizing position on the holder for a substantial distance in the direction of the length

of the contact and exert a pressure thereon substantially normal to the path of movement of the same thereby retaining said unit in the energizing position.

10. In an electric cigar lighter, a holder; an igniting unit mounted on the holder for complete removal for use; a heating element mounted on the igniting unit; means for closing a circuit through the heating element when the igniting unit is moved to an energizing position relative to said holder and for retaining said unit in said energizing position, said means including a plurality of contact elements non-deformable by heat adapted to resiliently engage said heating element for a substantial distance along the length of the contact elements and exert a pressure thereon substantially normal to the path of movement of the igniting unit to the energizing position on the holder; and means for causing said contact element to release their grip on said heating element and opening the circuit thereto when the heating element is ready for use, said means including a bimetallic element supported in said holder and carrying said contact elements at the ends thereof whereby slight movements of said bimetallic element cause large movements of the contacts to quickly release the heating element.

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