Nov. 13, 1934. F. J. BECKER 1,980,251

ARTIFICIAL TAPER

Filed Nov. 10, 1932

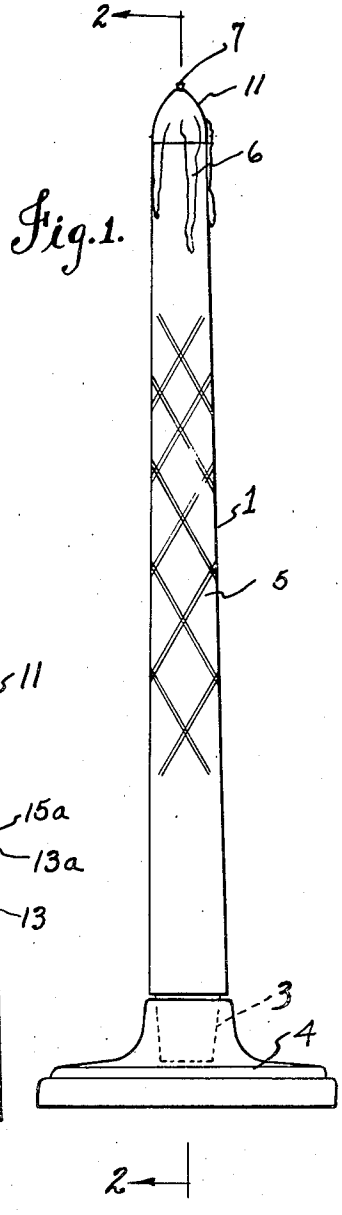


Fig. 1.

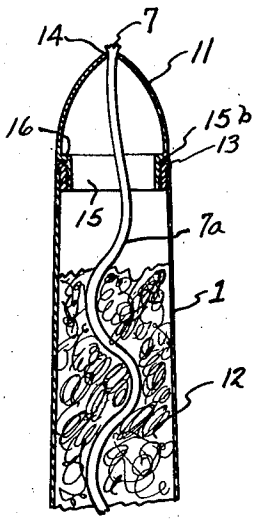


Fig. 2.

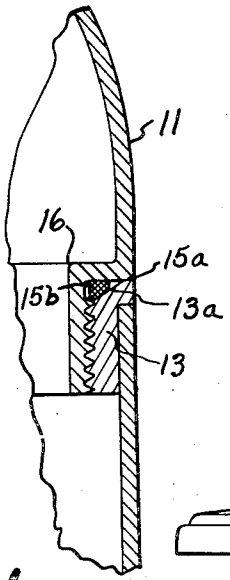
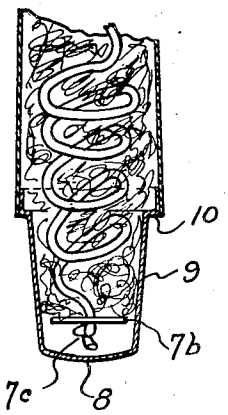


Fig. 3.



INVENTOR.
Frederick J. Becker
BY
Allen & Allen
ATTORNEYS.

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ARTIFICIAL TAPER

Frederick J. Becker, Cincinnati, Ohio

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3 Claims. (Cl. 67—36)

My invention relates primarily to the production of illuminating devices, more particularly in the form of candle tapers and the like, the use of which for decorative as well as utilitarian purposes appears to be increasing, and immediate commerical application of my invention is in the provision of taper, preferably a decorative taper which will have both a permanent utility and a permanent decorative character, and is not subject to the disadvantages of the ordinary taper, including the disadvantage of being consumed by burning. While my invention is not restricted to the production of illuminating devices in the form of tapers, yet I shall describe my invention in connection with an exemplary embodiment thereof, which is a taper.

The general advantages of the construction of my invention include durability since my artificial taper does not deteriorate with use, and does not become distorted or unsightly under the influence of heat; economy because my device is not expended by burning and because the cost of fuel for my device per unit of burning time is less than the cost per unit of burning time of decorative candles; beauty, since my device is capable of receiving a wider variety of artistic decoration, and of receiving this decoration in a more permanent form.

While devices designed to produce a flame from a combustible material which is drawn up into a wick have been suggested in a wide variety of forms, yet it is a specific object of my invention to solve those peculiar problems which are connected with economy of structure, the maintenance of an adequate reserve of combustible material, the control of the combustible material, the control of the flame, and the solution of other problems which will be clear upon reading this specification.

Reference is now made to the drawing:

Figure 1 is an elevational view of an exemplary form of my taper inserted within a simple form of holder.

Fig. 2 is a sectional view of the taper itself taken along the lines 2, 2 in Fig. 1.

Fig. 3 is an enlarged section of the cap and body joint.

The illustrated form of my invention shows a body 1 which may be made to conform to accepted styles of decorative candles, but will ordinarily be somewhat conical in form. I prefer to give the lower part of my device a reduced end formation indicated in dotted lines at 3 in Fig. 1, also of tapered form so that it may fit into and be snugly engaged by any of the ordinary candle holders, candle sticks, or candelabra. A simple form of candle holder is indicated at 4 to illustrate the manner of use of my device; but it forms no part of my invention. The taper body may be provided with any suitable color scheme in any suitable form of decoration 5, and it also may be provided with a decoration such as that at 6, simulating the dripping of wax from a burning wax taper. A wick is provided as at 7 and completes the external appearance of my device.

I prefer to form the body of my device of metal, and while other structures may be adopted I prefer to form the body 1 by rolling sheet metal, such as brass, to a tapered cylindrical form and brazing the edges thereof together. While my device may be constructed, if desired, with a filling opening at the bottom, I prefer to make the bottom fully closed and leak-proof. Of necessity the fuels used in a device of this character are relatively highly volatile, extremly fluid, and appear to have a highly penetrating character, for which reason unless bottom filling openings are very carefully constructed and maintained they have a tendency to leak. In a preferred form of my invention, therefore, the bottom member is in the form of a drawn structure from sheet metal, having a bottom member 8, a tapered cylindrical bottom portion 9, and an annular flange 10 about the upper end thereof, which flange is of a size to fit snugly within the lower edge of the body member 1. The body member and the bottom member are assembled in the relationship shown in Fig. 2, and are brazed or soldered together, giving a fluid-tight construction. The top of my device is closed by a cap-shaped member indicated broadly in Fig. 1 by the numeral 11. This is perforated for the passage of the wick 7, which has a main portion 7*a* extending down into the body member 1. I prefer to fill the body member substantially full of a packing material 12, which may be cotton, or the like, and which is packed about the extension of the wick member 7*a*, there being enough slack in this member to permit the removal of the cap 11 for filling purposes. The wick portion 7*a* is usually of greater length than the overall height of my device. This permits its being packed into the body portion with the packing or filling material, and also permits of the wick being withdrawn as it is expended. For a wicking I prefer to employ a double braided structure in which both sets of braiding comprise a mixture of cotton and silk threads.

It is highly important to control both the fuel and the composition in a device of this character.

The fuel itself is a volatile liquid which is drawn up into the wicking by capillary attraction. Since this force is effective only over a certain distance vertically, usually about six inches, it is necessary to keep the fuel level in my device above the minimum level. While it would be possible to provide a partition in the body of my device, still the filling of the body with the packing material and the use of sufficient fluid substantially to fill the body reservoir is not uneconomical since my device is so constructed that there is substantially no loss thereof by evaporation when my taper is not lighted. If, after long burning the flame becomes lower than is desired, it is possible temporarily to up-end my structure so as to cause excess fuel to saturate dried out portions of the wicking and/or packing, and thus to bring the flame back to its normal height for a considerable length of time without the addition of further fuel.

While the removal of fuel from the body of my device in the operation of burning tends to reduce the atmospheric pressure therein, yet I have found that, providing means are taken to assure an air pocket in the device, the reduction of pressure which occurs in this way will not prevent the proper feeding of fuel. I have not found it necessary therefore to provide means for the admission of external air to the body of my device. So long as the fuel level does not fall below the minimum for proper capillary feeding, the flame will be sufficiently fed. It is a greater problem to prevent the feeding of too much fuel to the flame, as might occur if the fuel reservoir or associated parts were subjected to such a heat as would produce undue volatilization of the fuel within the container. Hitherto illuminating or flame producing devices have had relatively heavy metal parts adjacent to or surrounding the wicking. Frequently the wicking is held in a relatively heavy metal tube. These metal parts become heated and transmit their heat to the fuel and volatilize it very rapidly. Where the flame is to be employed for an extremely short interval this is not important. My device, however, is designed for continuous use. I have burned my tapers, where the body portion is not too thin, continuously for over eight hours without sensible diminution of the flame size; and with slight diminution of the flame size they will burn for very much longer periods. Burning requirements of this character are of importance where the devices are to be used as table decorations, or for illuminating purposes in the dining rooms of hotels and the like, where continuous burning of as much as five to six hours is frequently desired.

If there are any metal parts of relatively heavy character associated with or located near the flame of a device of this character there will be produced excessive evaporation of the fuel, which tends to bring the flame size beyond control. Moreover, the evaporation of fuel increases the pressure within the container, forcing out the fluid fuel through the wick or through such other openings as may exist. An excess of fuel fed in this way may run down the sides of the device and produce a very dangerous condition, particularly since such fuel will usually be ignited by the flame.

I avoid these disadvantages and danger by providing a construction which at the same time provides an air pocket in my device and keeps all heavy metal parts away from the flame so that the body portions of my device are never heated to any appreciable degree. This construction is found in the cap member 11, the construction of which I shall now describe in detail. This cap member is designed to screw into the body of my device, and for this purpose the upper edge of the body member 1 may have let into it a ring 13, which will usually be brazed thereto. This ring is internally threaded as shown. The cap 11 is a structure preferably produced by machining. It has dome shaped walls, which are quite thin and which are merely perforated as at 14 for the passage of the wicking. The cap has a tubular extension 15 of reduced diameter, which is externally threaded as shown so that it may be screwed into the threaded ring 13. The juncture of this reduced extension and the dome walls of my device produces an interior shoulder 16, which is not a limitation upon my invention, but indicates that every precaution has been taken to keep the walls of the cap 11 as thin as possible. I prefer to entirely avoid the use of tubes in the wick, and there are adjacent the flame only the relatively very thin walls of the cap 11. These walls in the ordinary use of my device are so little heated that they never become uncomfortable to the fingers. Consequently excessive evaporation of the fuel is prevented. Moreover, the interior portion of the cap 11 provides the air pocket aforesaid so that even if the body member 1 should be filled level full of the liquid fuel there still will be provided above it a pocket of air when the cap has been screwed in place. A suitable washer or backing device may, of course, be placed between the cap and the body member to prevent leakage. Even if such leakage should occur, however, it will occur at a point separated from the flame by the length of the cap 11. The joint between the cap and the body member will ordinarily be unnoticeable.

The perforation 14 in the dome will be of such a size as to hold the wicking snugly. Since the wicking is engaged only by the edges of relatively thin walls there are in my structure no such extent of surface as to cause excessive capillary action, and when my device is not ignited there is no excess flowing of fuel to the wick. Hence my candles may be stored unlighted for great periods of time without a sensible diminution of the fuel supply, even though the wick is exposed to moving air.

Where the cap 11 is removably connected to the body 1 a gasket is used to make an air and vapor tight joint. If this gasket, which usually is of material which will not take the lacquer or other finishing material in the same way as the metal of the cap and body, is exposed at the outer finished surface, it appears as a distinct ring, which detracts from the appearance of the device as a taper or candle. To avoid this I prefer to bevel the rim of the threaded ring 13 to slant downwardly and inwardly, as shown best in Fig. 3, at 13*a*, leaving a very narrow flat upper edge portion with which the outer shoulder 15*a* of the cap extension 15 makes such accurate contact that the joint is hardly visible when the finished cap and body are screwed together. This leaves a triangular space between this contact of the cap and body, and the threaded connecting portions thereof, in which the gasket 15*b* is compressed.

It will be noted in Fig. 1 that the wick portion 7*a* has most of its surplus length coiled in the bottom portion of the packing material 12. The situations of the wick in the upper portions of the packing 12 are such as are made incidentally to packing the material 12 and wick together in

the body 1. It is preferable to have the wick lead fairly directly to the cap opening 14 from the packing 12, for effective capillary action, and the cap should not be pulled out far from the body when removed for renewing the fuel supply. A disk 7b through which a lower part of the wick extends, with a knot 7c therebelow, affords added anchorage of the wick at the bottom of the body of packing 12. This disk, by its engagement in the packing, also aids in removing the packing 12 if necessary, as for instance if a fuel may have been used which leaves a deposit in the packing. My preferred fuel, is one that will not leave any appreciable deposit; but users may substitute fuels which do leave a deposit, clogging the packing and wick so as to partly or practically entirely render the device inoperative, requiring renewal of the packing and wick.

It is desirable to employ a fuel evaporating without leaving a residue, as above noted, and also which does not attack the decorative covering of the device if spilled thereon. I have used with entire success a highly and completely volatile material derived from the distillation of petroleum. I prefer to mix with the fuel some oil soluble in the fuel, such as an essential oil or perfume. If a perfume is used it may be one producing no odor as a result of burning but nevertheless gives the fuel a pleasant odor upon mere evaporation. The oil tends to lubricate the wick, promoting greater capillary action in the wick. If desired, materials may be mixed with the fuel which will develop a pleasant odor upon burning.

The various portions of the device may be finished in any way desired. They may be such as to give the device partly or wholly the usual metal finishes, or the device may be coated with paint, lacquer, bronze or enamel in whatever designs are found attractive. A representation of drips as at 6 in Fig. 1 may be made by employing a heavy bodied coating substance, and additional decoration or decorative elements may be applied, as is frequent in the manufacture of decorative wax tapers. With the close contact of the cap and body afforded by a connection such as has been described, and by applying the finish and decorative elements, such as the drip representations 6, to these parts while thus closely connected, a practically complete simulation of a wax candle or taper is had. My device has been found entirely satisfactory as a substitute for wax candles as decorations for tables in homes or restaurants, or in other locations.

What I claim is:

1. In a long-burning illuminating device using a highly volatile fuel, comprising a fuel enclosure and a wick therein, said enclosure and its top having a tightly fitted connection whereby they are separable for placing fuel in the container, the rims of said top and said enclosure having portions in direct contact at their outer surfaces to preserve the appearance of continuity of said surface, and having their mutually fitting attachment parts spaced in from said direct contact portions, leaving a space therebetween, and gasket means compressed in said space.

2. In a long-burning illuminating device using a highly volatile fuel, comprising a fuel enclosure and a wick therein, said enclosure having its top imperforate except for an opening in which the wick is gripped and from which the wick extends and said top having walls of single thickness less than the thickness of the wick, including the edge of the wick opening, said top being in the form of a dome extending up with every vertical cross section in the form of an outwardly bowed curve, so that it presents only its thin edge to the wick and thereby and by its thinness provides a minimum of conductivity for heat between the wick opening and the fuel, to minimize fuel evaporation in the enclosure, and so that a free flow of the air is allowed to the wick above the opening.

3. In a long-burning illuminating device using a highly volatile fuel, comprising a fuel enclosure and a wick therein, said enclosure having its top imperforate except for an opening in which the wick is gripped and from which the wick extends and said top having walls of single thickness less than the thickness of the wick for the major portion of the upward extent of said top, said top being in the form of a dome extending up with every vertical cross section in the form of an outwardly bowed curve, so that it has a large interior space relative to its thickness, and by its thinness provides a minimum of conductivity for heat between the wick opening and the fuel, to minimize fuel evaporation in the enclosure, and so that a free flow of the air is allowed to the wick above the opening.

FREDERICK J. BECKER.