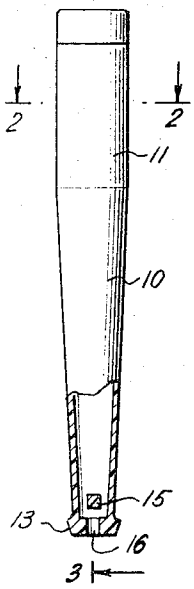
April 4, 1967 J. M. BARNETT 3,312,227

FILTER HOLDER FOR SMOKERS

Filed Aug. 21, 1964

FIG. 1



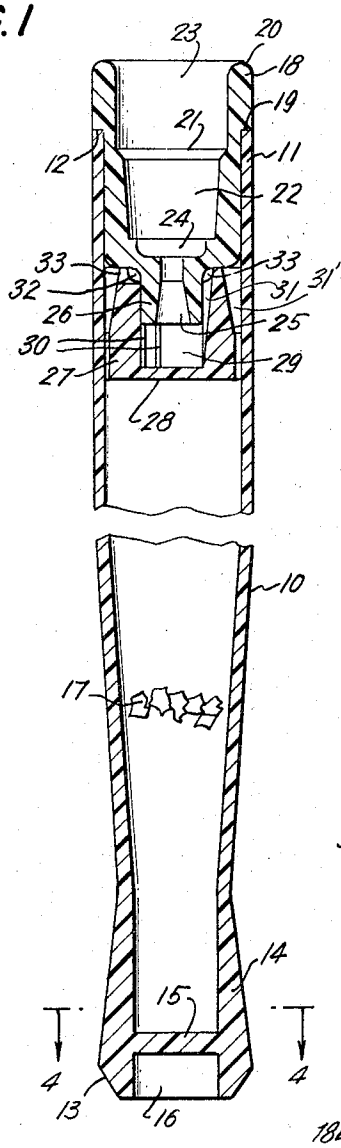


FIG. 3

FIG. 3a

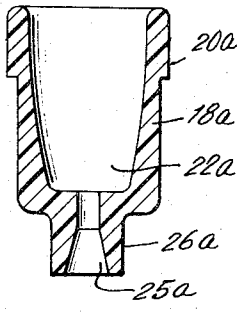


FIG. 5

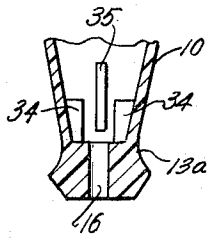
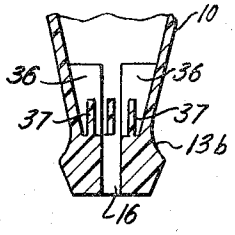


FIG. 6



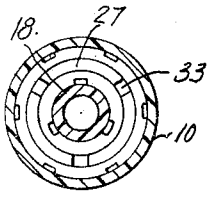


FIG. 2

FIG. 7

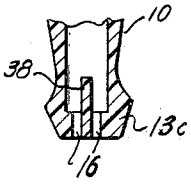
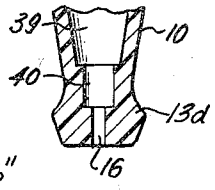


FIG. 8



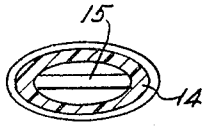
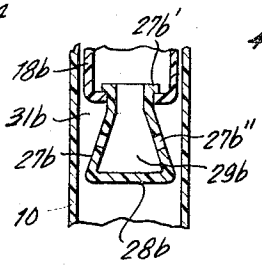


FIG. 4

FIG. 3b



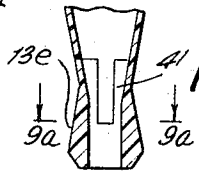


FIG. 9

FIG. 9a

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FILTER HOLDER FOR SMOKERS

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3 Claims. (Cl. 131—187)

The present invention relates to filter holders for use with cigarettes and cigars whereby toxic and noxious components of cigarette or cigar smoke are substantially eliminated thereby protecting the smoker, especially the smoker who inhales cigarette smoke. More particularly, the invention resides in a specially designed filter holder of novel construction and having numerous advantages over previously known filters and filter holders.

In general, the action of the new filter holder is based upon the principle of reducing the temperature of the smoke, causing it to follow labyrinthine paths during which the smoke is caused to deposit undesirable constituents and thereafter the smoke passes through an elongated body portion containing or filled with a filtering material or system, so that when it reaches the smoker's mouth, it is in a comparatively harmless and non-injurious condition with tars, nicotine and the like almost completely absent, without, however, losing the taste and fragrance of the smoke since at least in part it is caused to pass through the compressed end of the cigarette which is adapted to be inserted in one end of the holder.

FIGURE 1 is an external view partly in section of a filter holder in accordance with the present invention;

FIGURE 2 is a transverse sectional view taken on line 2—2 of FIGURE 1;

FIGURE 3 is a longitudinal medial section taken on line 3—3 of FIGURE 1;

FIGURES 3*a* and 3*b* are fragmentary sectional views of modified forms of socket construction;

FIGURE 4 is a transverse sectional view taken on line 4—4 of FIGURE 3; and

FIGURES 5 to 9*a* are fragmentary sectional views of modified forms of mouthpiece ends.

Referring first to FIGURES 1 to 4, the new filter holder of the present invention comprises a long and relatively slender body portion **10**, the forward end **11** of which is substantially cylindrical terminating in a flat annular edge surface **12** and which then tapers toward the mouthpiece end **13** while at the same time changing from cylindrical to oval cross section, as will be seen from FIGURES 2 and 4, whereat the wall is thickened as at **14** and is provided with a cross bar **15** which, as will be seen from FIGURE 4, is relatively narrow or thin so that it only partially obstructs the mouthpiece opening **16** for a purpose hereinafter described but which essentially constitutes a barrier for the filtering material **17** in body portion **10** and which may take many different specific forms, such as granules, fibers, filaments, or even liquids or semi-liquids or any desired combination thereof and examples of which filtering materials are granules of silica gel, activated carbon, ion exchange resins, cellulose, paper, fibrous material such as cotton, wool and bristles, artificial materials such as glass wool, cellulose acetate and other cellulosic fibers, natural and artificial spongy materials such as reeds, sponges, polyurethane, polystyrene, etc., or any of a wide variety of filtering materials so long as they conform to the cavity of the filter holder and form tortuous or labyrinthine paths along and through the filtering material without escape paths which do not go through the filtering material or end in cul-de-sacs. The filter can also include a liquid adequately held in a vehicle such as aqueous solutions, alcoholic solutions, acidic solutions, neutral solutions, alkaline solutions, solutions of ferric chloride, picric acid, citric acid, tannic acid, sodium hydroxide, etc., or any desired combination thereof capable of absorbing, adsorbing or retaining undesirable components of cigarette and cigar smoke.

Fitted into the cylindrical end of tubular body portion **10** is a main socket **18** of metal, Bakelite, etc., having an annular shoulder **19** abutting edge surface **12** and projecting forwardly to a rounded or otherwise formed guide curve **20** to aid the insertion of an end of a cigarette or cigar. Somewhat rearwardly of shoulder **19**, there is a funnel-shaped diametrally narrowed portion **21** leading to a compaction chamber or space **22** which is, for example, a little smaller than a cigarette end so as to compress the same when it is inserted, it being noted that chamber **22** is smaller in diameter than the cavity **23** and tapers gradually in a rearward direction toward the spherical cap cavity **24** which communicates with axial opening **25** in cylindrical projection **26** over which rear socket **27** with closed base **28** is disposed in such manner as to provide a condensation chamber **29** and conduits **30** in the wall of the rear socket. Due to the dimensions and configurations of the parts, there is formed a chamber **31** communicating with the interior of body portion **10** via annular canal **32**, groove **33** and rearwardly tapering chamber **31'**.

It is to be understood that while a preferred form of main socket **18** and rear socket **27** have been illustrated and described, both of these elements may be varied as to their structural detail and configuration. The main socket **18** may, for example, be provided with a rounded or squared bead at its forward edge or it may be provided with body recesses or projections on its outer wall for cooperation with the cylindrical end of the tubular body portion to prevent rotation or undesired relative displacement and also the forward edge of said socket may be beveled, chamfered or provided with a wall which thickens somewhat in a rearward direction. Similarly, the rear socket **27** may take specifically different shapes, such as cylindrical or frustoconical and may be provided with grooves, slots or channels so as to provide or improve communication between the main socket cavity and the interior of the tubular body portion.

In FIGURE 5 there is shown a modified form of mouthpiece end **13***a* of tubular body portion **10** wherein the dike is made up of concentric radial fins **34**, together with an intermediate fin **35**, which is located somewhat forwardly of fins **34** and in staggered relationship thereto so as to provide a suitable retaining element or barrier for the filtering material while still allowing adequate access of cigar or cigarette smoke to the aperture **16** in the mouthpiece. FIGURE 6 shows a further variation of the arrangement of FIGURE 5 wherein the mouthpiece **13***b* is provided with a plurality of higher or longer spaced fins **36** and lower or shorter spaced fins **37**, thereby providing somewhat more surface area for confining the filtering material and for directing the travel of smoke through the opening **16** in the mouthpiece. In FIGURE 7, the mouthpiece **13***c* is provided with a partition **38** which divides the opening **16** into two smaller openings while at the same time providing adequate confining of the filtering material in the tubular body portion. FIGURE 8 represents a further modification wherein the mouthpiece **13***d* has its opening **16** communicating with stepped diametral reductions **39** and **40** in the cavity of the tubular body portion. This construction has the advantage that it provides unusually good barrier action for the filtering material, especially when it is in granular form and also protects the opening **16** better against being blocked by any of the filtering granules. Even though it is understood that when filtering granules are used in any of the forms of the invention, they are larger than

the openings to which they have access so that they do not pass out of said openings accidentally, at the same time, the configuration of the parts bounding the filtering material at each end is such that the filtering material may be somewhat compacted without compressing it so much as to increase induly resistance to the passage of smoke therethrough or may be loose randomly arranged granules. It will also be understood that the mouthpiece end of the holder can be further varied as to detail and particularly by having the outlet opening to the smoker's mouth of cruciform shape by a suitable fin shape.

As noted above, the socket construction is susceptible of variation and modifications thereof are illustrated by way of example in FIGURES 3*a* and 3*b*. In FIGURE 3*a*, the main socket **18***a* has a squared bead or lip **20***a* for cooperation with edge surface **12** and has a wall which gradually thickens in a rearward direction but which is smooth and uninterrupted on its inner surface to form a single chamber **22***a* without the plurality of chambers of FIGURE 3. It also has the hollow rearward projection **26***a* as in FIGURE 3 but the opening **25***a* leads directly to the bottom of chamber **22***a*. In FIGURE 3*b*, the main socket **18***b* has no hollow rearward projection and, instead, the rear socket **27***b* is of somewhat frustoconical shape with a closed end **28***b* but the forward portion is narrowed or pinched and projects through a hole in the bottom of the main socket and may have small lugs or a flange **27***b'* to prevent disassembly. Since the plastic parts have some flexibility or yieldability there is no problem in assembling them. The rear socket wall has inclined apertures **27***b''* which afford communication between condensation chamber **29***b* and tapering chamber **31***b* and thence to the cavity of tubular body portion **10** with its content of filtering granules.

In FIGURE 9, there is shown a preferred form of mouthpiece **13***e* with a fin or partition **41** so shaped as to provide a cruciform opening **42** which holds back filtering granules well and gives a larger area for the passage of smoke.

A filter holder constructed in accordance with the present invention is simple and efficient in use, can be readily assembled or disassembled whenever desired and is sufficiently inexpensive that it could be discarded and yet is of such nature that it is capable of use over prolonged periods of time if desired, in which event the filtering material can be removed and changed or cleaned and the socket construction can be removed and cleaned. The tubular body portion itself can be replaced if desired or can be cleaned, although normally it does not become very soiled, even after considerable use. A filter holder in accordance with the present invention is characterized by great usefulness and versatility and has been found in use to give exceptionally good smoke filtration without rendering the smoke flat and tasteless. During use the smoke, as from a cigarette, is filtered, cooled, and given directional and velocity changes during its passage through the holder and thus the smoke does not have such a deleterious effect upon the mucous membranes of the mouth, throat and nose and, in particular, is less drying and less irritating and due to the lowered combustion temperature of the cigarette, harmful or noxious components are minimized, such as the formation of benzpyrene and its derivatives. The smoke taken into the smoker's mouth is practically free from nicotine and tarry matter and, hence, smoking can be made pleasant and relatively harmless. It is further to be understood that the various component parts of the filter holder may be made of any suitable or available material and that the present invention is not limited to the use of any specific material or to any specific type of filtering material.

What is claimed is:

1. A filter holder for smokers comprising a tubular body portion tapering from a cylindrical receiving end to a mouthpiece end, a main socket fitted in the receiving end and extending a short distance toward the mouthpiece end terminating in a closed end having a central aperture, and a rear socket having a flanged end projecting through the central aperture and having its flange resting on the closed end of the main socket around the central aperture therein and said rear socket flaring therefrom with an outwardly inclined wall having inclined wall apertures therein and terminating in a closed end to form a condensation chamber within the rear socket, the size and shape of the rear socket forming a tapering chamber between the rear socket and the adjacent portion of the tubular body portion.

2. A filter holder as defined in claim **1**, wherein the mouthpiece end construction for said holder adjacent to a solid terminal portion, having an aperture therethrough for the passage of smoke to a smoker's mouth, merging into the adjacent tapered part of the tubular body portion, a plurality of circumferentially spaced radial fins extending inwardly from the said tapered part of the tubular body portion just above the said terminal portion and terminating short of one another to form a space therebetween in which is disposed an internal fin at a right angle to the radial fins and extending from a point above said terminal portion to a point beyond said radial fins.

3. In a filter holder for smokers having a tubular body portion tapering to a mouthpiece end, a mouthpiece end construction for said holder comprising a solid terminal portion, having an aperture therethrough for the passage of smoke to a smoker's mouth, merging into the adjacent tapered part of the tubular body portion, a plurality of circumferentially spaced radial fins extending inwardly from the said tapered part of the tubular body portion adjacent to the said terminal portion and terminating short of one another to form a space therebetween and a plurality of spaced fins rising from the terminal portion where it joins the tubular body portion and disposed perpendicularly to the radial fins but being shorter in length than the radial fins.

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