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J. FIZET
SMOKE PURIFIER FOR CIGARETTE HOLDERS, PIPES
AND OTHER SMOKING APPARATUS

3,520,307

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Fig. 1.

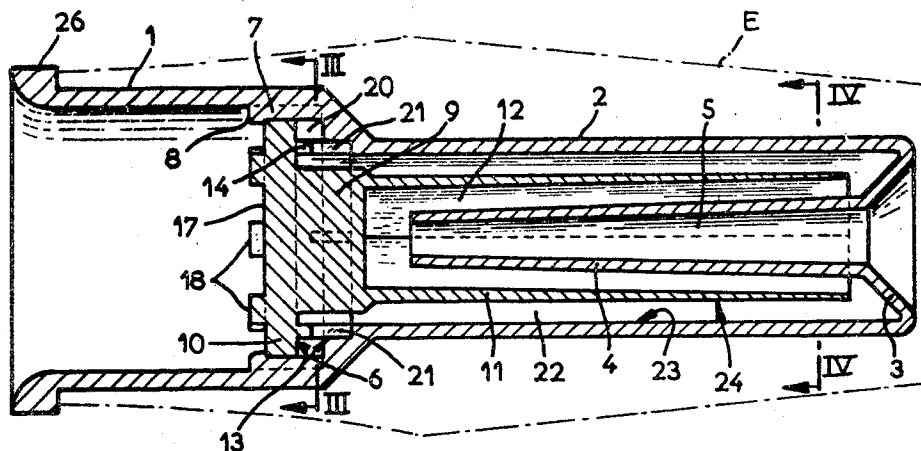


Fig. 5.

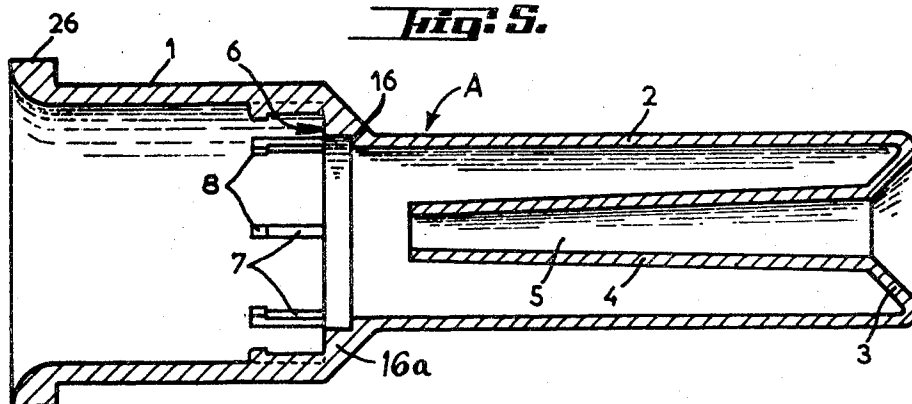


Fig. 3.

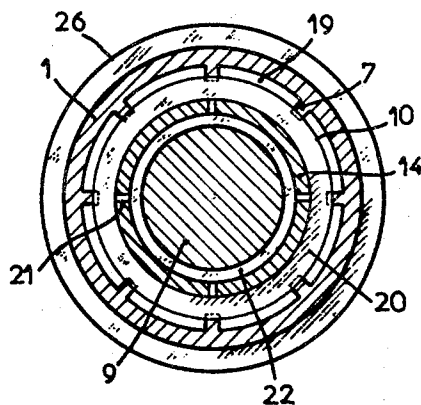
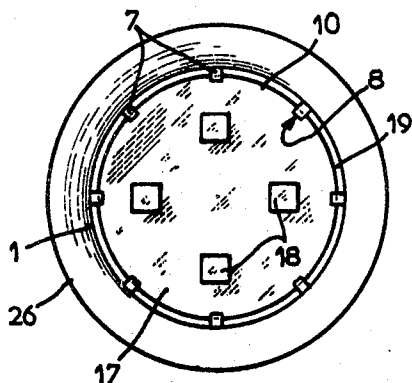


Fig. 2.



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Fig. 4.

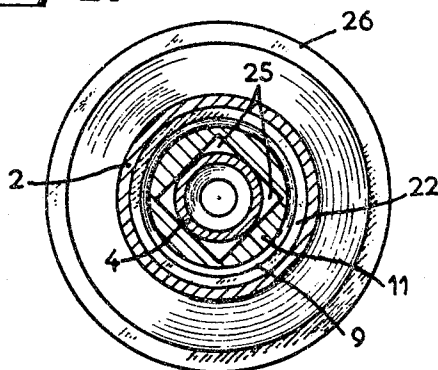
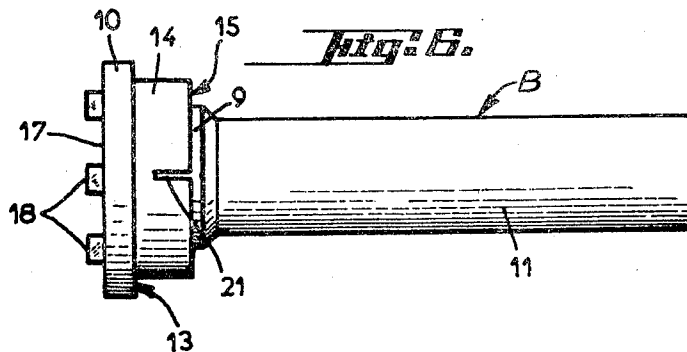


Fig. 7.

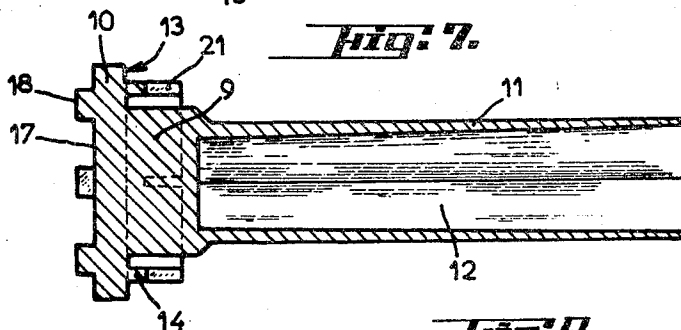


Fig. 8.

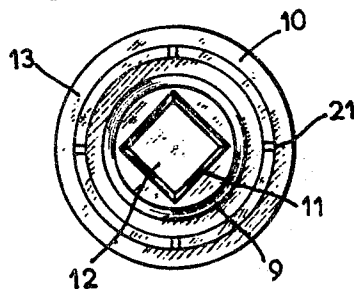
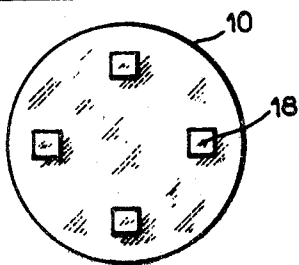


Fig. 6.



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**SMOKE PURIFIER FOR CIGARETTE HOLDERS,
PIPES AND OTHER SMOKING APPARATUS**

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Continuation-in-part of application Ser. No. 551,082,
May 18, 1966. This application June 26, 1967, Ser.
No. 648,573

Claims priority, application France, Aug. 8, 1966,
72,466; Aug. 11, 1966, 72,838

Int. Cl. A24f 7/04, 1/16

U.S. Cl. 131—187

1 Claim

ABSTRACT OF THE DISCLOSURE

A smoke treating device for cigarette-holders, pipes and other smoking apparatus comprising a first tubular member and a removable inner element fitted in said tubular member arranged to provide plural concentric ducts for reversing the flow of smoke through the device. One of the ducts comprises a tubular member having a polygonal section and a radially outwardly tapering inner wall, the planar faces of which are tangent to and contact a central circular sectioned tubular duct to provide smoke channels therebetween. The first tubular member has a cylindrical socket having an annular shoulder at its inner end and radially inwardly directed ridges that are angularly spaced and extend partially outwardly therein and terminate in radially inwardly directed lugs at their outer ends. The inner element has a head at its outer end having a peripheral flange that seats between the lugs and the shoulder, bosses on its outer face for spacing the unlit end of a cigarette from the outer face, a skirt having slits on the inner end of the head for permitting smoke to be drawn beyond the head into an annular passage between the inner wall of the first tubular member and the outer wall of the polygonal tubular member, through the smoke channels and then through the central duct, the central duct having an exit for the smoke at the inner end thereof.

This is a continuation-in-part of the application Ser. No. 551,082 filed on May 18, 1966 and now abandoned.

This invention relates to a smoke treating device or purifier intended for use in a smoking apparatus, such as a pipe or a cigarette-holder.

The object of the invention is to provide a smoke treating device or purifier in which the condensation of impurities is effective without producing clogging or substantial restriction of the passages for the smoke. Cleaning of the purifier is required only after a long period of use, or, alternatively, the purifier may be discarded after being used for a comparatively long time.

The important features and advantages of the invention will become apparent as the following description of the invention proceeds with reference to the accompanying drawings, in which:

FIG. 1 is a longitudinal sectional view of a smoke treating device according to one embodiment of the present invention;

FIG. 2 is a left end elevational view of said device;

FIG. 3 is a transverse, sectional view taken substantially upon a plane passing along reference line III—III of FIG. 1;

FIG. 4 is a transverse, sectional view taken substantially upon a plane passing along reference line IV—IV of FIG. 1;

FIG. 5 is a longitudinal sectional view of the tubular socket of the device of FIG. 1;

FIG. 6 is an elevational view of the inner element of the device of FIG. 1;

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FIG. 7 is a longitudinal sectional view of the inner element shown in FIG. 6;

FIG. 8 is a left end elevational view of the inner element shown in FIG. 6;

FIG. 9 is a right end elevational view of the inner element shown in FIG. 6.

Referring now to FIGS. 1 to 9, the smoke treating device which is preferably made of transparent or translucent molded plastic material, comprises a first tubular member A having a cylindrical wall defining a cigarette receiving socket 1 at the outer end thereof. The inner end of the cylindrical wall has a first radially inwardly directed annular shoulder 6 which is provided with angularly spaced ridges 7 extending outwardly therefrom along the internal surface of the cylindrical wall. Each ridge 7 terminates at its outer end in a radially inwardly directed lug 8. The radial dimension of each ridge 7 is substantially less than that of said shoulder 6. Said first tubular member A has also a tubular extension 2 extending inwardly beyond said cigarette receiving socket 1. The tubular extension 2 has a diameter substantially less than that of the socket 1.

The inner end of extension 2 has a radially inwardly directed annular member 3, said member being inclined outwardly of the device and provides a frustoconical wall at said inner end, and a tapering tubular member 4 which extends outwardly of the device from the inner end portion of the frustoconical wall of member 3 to a position adjacent to and inward of the inner end of socket 1. A junction element 16a in said first tubular member has an external frustoconical form. A second outwardly facing annular shoulder 16 is formed in said junction element, the outer diameter of said second shoulder 16 being equal to the inner diameter of the first shoulder 6.

The smoke treating device according to the invention also comprises an insert B for the first tubular member A.

Insert B comprises a head 15 at the outer end portion, i.e., the portion thereof which is nearest to the outer end of the device. The head 15 has a radially outwardly extending flange 10 adapted to fit between the inner ends of lugs 8 and the outer face of the first shoulder 6 by which it is held in position when said insert B is inserted into the first tubular member. The diameter of the circle formed by the inner ends of the lugs 8 in relation to the diameter of the flange 10 is such that the resilience of the plastic or other material used for the production of these parts will permit the flange to be forced in and out of its position between ridges 7, without damaging any of the parts.

The outer surface 17 of head 15, i.e., the surface directed towards the outer end of the device is provided with a plurality of bosses 18 protruding into the cigarette receiving socket 1 and thus limiting the extent to which a cigarette may be inserted into said socket 1, thereby spacing the unlit end of such a cigarette from the outer surface 17.

When insert B is in position inside of the first tubular member and head 15 is held by ridges 7 an annular channel 19 is formed which is divided into a plurality of channel sections by ridges 7.

Head 15 is also provided with a cylindrical skirt 14 extending inwardly of the device and having an inner edge adapted to contact the second shoulder 16. Skirt 14 has a plurality of radially extending and angularly spaced longitudinal slits 21 extending therethrough.

Skirt 14 is spaced radially outwardly of a central solid portion 9 of the insert B and extends inwardly of the device from said flanged portion of the head 15 and provides a space between the skirt and the solid portion 9. Skirt 14 has an external diameter that is less than the inner diameter of said first shoulder 6 and thus a space 20 is provided between the skirt and the internal portion

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of the junction element 16A. The head 15 has a polygonal extension member 11 extending inwardly therefrom and a radially outwardly tapering inner wall, said polygonal extension member terminating adjacent to and outwardly of the frustoconical wall of member 3 at the inner end of the first tubular member A. The dimensions of the polygonal extension member are such that the outer surface of the tapering tubular member 4 is in contact with the angularly spaced portions of polygonal extension member adjacent to the inner end portion of the device thereby providing plural channels 25 for smoke which may pass from a cigarette, held in socket 1, inwardly through channels 19, formed between ridges 7, into the annular space 20, adjacent to the periphery of skirt 14, through slits 21 in skirt 14 into the space between the skirt and the central core of the head 15, inwardly through a first annular passage 22, formed between the polygonal tubular extension and the extension 2 from the socket 1, outwardly through the first annular passage 12 located between the tubular extension 11 and the tapering tubular member 4, and inwardly through the passage 5 in the tubular member 4.

A condensation chamber is thus constituted by the first annular passage 22, the second annular passage 12 and a third passage 5 formed inside of the tubular member 4. The second annular passage 12 is divided into four longitudinal channels 25 defined by the inner contour of the polygonal extension members and the outer wall of member 4.

A filter element not shown in the drawing may be inserted in the device preferably in the tubular extension 2.

The smoke treating device as shown in FIGS. 1 to 9 may be used directly as a cigarette holder and a portion thereof may be inserted in a separate outside holder E outlined diagrammatically in FIG. 1 with a dash-dot line.

The operation of the smoke treating device of FIGS. 1 to 9 is as follows:

Under the effect of aspiration, exerted by the smoker, the mouth of which may be applied to the end 3 of the tubular socket, the smoke to be purified is drawn through the smoke-deflecting bosses 18 towards the peripheral channels 19 and then admitted through the annular space 20.

The smoke then passes through radially-disposed slits 21 at the smoke-admitting or outer ends of which exists a slight overpressure due to the restricted cross-sectional area of said slits with respect to that of the annular space 20. Conditions propitious to condensation are present in said slits and in the aforesaid second annular passage. More particularly, condensation is facilitated by the two changes in direction of the smoke between the areas where it flows longitudinally and the slits 21 where it flows transversely, and, by the restricted cross-sectional area of said slits. However, the aforesaid over-pressure forces the impurities which would tend to form deposits in said slits towards the condensation chamber where the conditions are propitious, for the first time, to condensation and to deposition of the condensed impurities such as tars. Said conditions are due to the fact that the cross-sectional area offered to the passage of the smoke is greater than in the part of the path of the smoke in the device and that the surfaces in contact with the smoke in said condensation chamber are colder and more extended than in the aforesaid part. In fact practically all the condensable impurities are condensed and deposited in the first passage 22 of the condensation chamber.

The inner wall of the central solid portion 9 of insert B, which defines one end of the second annular passage 12 and forces the smoke, which is moving through that passage, to reverse its direction, also facilitates deposition of condensable impurities.

The inner contour of the projecting member 11, favors the centering of the inner element 9 in the tubular socket

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2 without the latter preventing the passage of the smoke already well purified after its passage in the first annular passage 22.

The aforesaid cigarette-holder is of very low cost and may be used a sufficiently long time without requiring a cleaning operation. Its low cost permits it to be discarded after use, at any time before cleaning becomes necessary.

It should be noted that the different components of the device according to the invention may be made of any appropriate material, as for instance plastic material, metal, etc., formed by molding, by injection or by any similar process.

What I claim is:

1. A smoke treating device adapted for use in a cigarette holder comprising a first tubular member having a cylindrical wall defining a cigarette receiving socket at the outer end thereof, the inner end of the cylindrical wall having a first radially inwardly directed annular shoulder having angularly spaced ridges extending outwardly therefrom along the internal surface of the cylindrical wall, each ridge terminating at its outer end in a radially inwardly directed lug, the radial dimension of each ridge being substantially less than that of said shoulder, said tubular member having a tubular extension extending inwardly beyond said socket, said extension having a diameter substantially less than that of said socket, the inner end of said extension having a radially inwardly directed annular member that is inclined outwardly of the device providing a frustoconical wall at said end, and a tapering tubular member extending outwardly of the device from the radially inner end portion of said frustoconical wall to a position adjacent to and inward of the inner end of said socket, said first tubular member having a junction element having an external frustoconical form, and having a second outwardly facing annular shoulder having an outer diameter equal to the inner diameter of the first shoulder, said device also including an insert for said first tubular member, the insert comprising a head at the outer end portion thereof, the head having a radially outwardly extending flange adapted to fit between the inner ends of said lugs and the outer face of said first shoulder and to be retained therein thereby, the outer surface of said head having bosses adapted to limit the extent to which a cigarette may be inserted in said socket and to space the unlit end of such a cigarette from the outer face of said head, said head having a cylindrical skirt extending inwardly of the device and having an inner edge adapted to contact said second shoulder, said skirt having radially extending and angularly spaced longitudinal slits extending therethrough, said skirt being spaced radially outwardly of a central solid portion extending inwardly of the device from said flanged portion providing a space therebetween, the skirt having an external diameter that is less than that of the inner diameter of said first shoulder providing a space between the skirt and the internal portion of the junction element between said first and second shoulders, the head having a polygonal extension member extending inwardly therefrom and a radially outwardly tapering inner wall, said polygonal extension terminating adjacent to and outwardly of the frustoconical wall at the inner end of the first tubular member, the dimensions of said polygonal extension member being such that the outer surface of the tapering tubular member is in contact with angularly spaced portions of polygonal extension member adjacent to the inner end portion of the device thereby providing plural channels for smoke which may pass from a cigarette in said socket, inwardly through the channels between said ridges into the annular space adjacent to the periphery of the skirt, through the slits in the skirt into the space between the skirt and the central core of the head, through an annular passage formed between the polygonal tubular extension and the extension from said socket, outwardly through said channels into an annular passage between

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the tubular extension and the tapering tubular member,
and outwardly through said tapering tubular member.

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U.S. Cl. X.R.

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