June 20, 1950 E. S. BROTHERS 2,511,898

CIGARETTE HOLDER

Filed Oct. 24, 1947

Fig 1

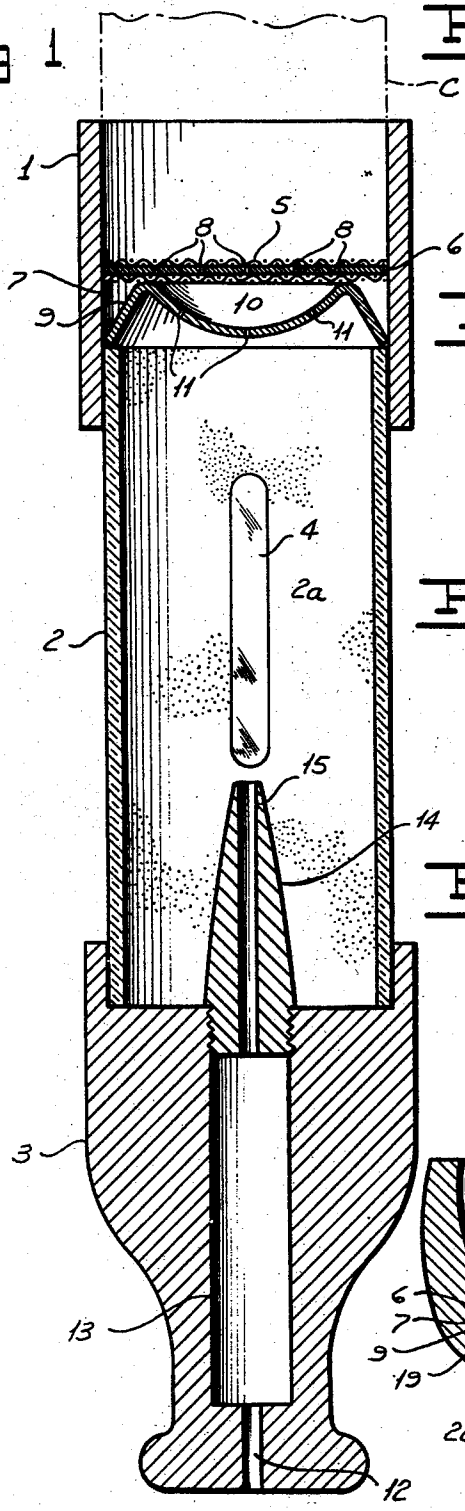


Fig 2

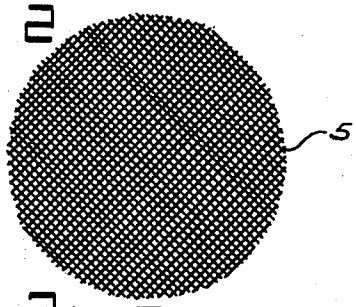


Fig 3

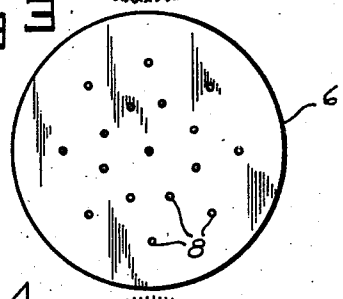


Fig 4

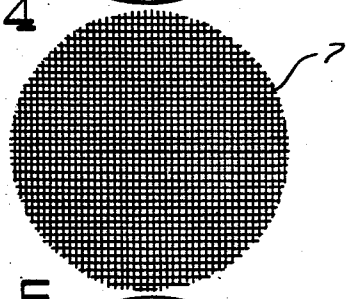


Fig 5

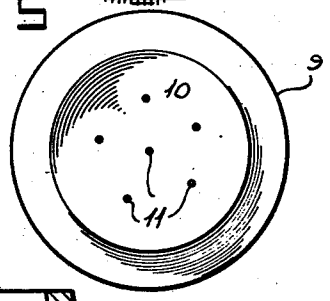
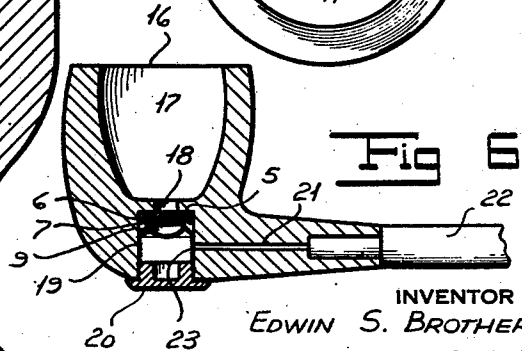


Fig 6



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CIGARETTE HOLDER

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7 Claims. (Cl. 131—202)

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This invention relates primarily to cigarette holders, but may be incorporated in cigar holders and smoking pipes.

It is directed more particularly to efficient means for extracting from the smoke, nicotine and other deleterious products of combustion, so that the smoke enters the mouth of the user divested in a large measure of these undesirable impurities incident to the combustion of tobacco.

Atmospheric air contains more or less moisture depending upon concurrent humidity. As this air is drawn through the burning end of a cigarette, the relatively high temperature of combustion at this point transforms this moisture into aqueous vapor. Simultaneously the combustion of the tobacco produces certain by-products including nicotine, tars and resins and ash in the form of dust. The nicotine, tars and resins and other volatile constituents of these products of combustion are volatilized in the combustion zone and in the normal operation of smoking, without proper safeguards, they are carried along with the smoke and aqueous vapor directly into the mouth, throat and lungs of the smoker where they condense or liquefy in the form of a dark brown mobile liquid, injurious to the health of the smoker. The use of filters of absorbent material heretofore sometimes employed may remove some small part of these products of combustion by absorption, but the passage of such products through these absorbent filters is so rapid and unobstructed that they are extremely inefficient and a very considerable quantity of these unhealthy by-products enter the mouth of the smoker.

I have discovered, however, that while the atmospheric moisture content and the waste products of combustion are in highly heated vaporous state, they may be caused, by proper manipulation, to commingle in such manner that the major portion of the waste products of combustion can be brought into solution with or absorbed by the water vapor at relatively high temperature, and that subsequent condensation of this water vapor will precipitate with it and divest the smoke of the major portion of the unhealthy and injurious waste products of combustion along with considerable quantities of tobacco ash.

I have discovered that, in order to do this, it is necessary to bring the moisture while in highly heated vaporous form into finely divided condition and into the most intimate contact with similarly finely divided waste products of combustion, so as to obtain the most intimate contact

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between these products of combustion and the aqueous vapor. When both of these products are in this attentuated form, they physically combine with great efficiency, and if the water aqueous vapor is thereafter condensed before it enters the mouth of the smoker, it will drop out of the smoke and carry with it the major portion of the by-products of combustion.

The present invention provides apparatus hereinafter described in detail for accomplishing this result and in an efficient and highly satisfactory manner.

Features of the invention, other than those adverted to, will be apparent from the hereinafter detailed description and appended claims when read in conjunction with the accompanying drawing.

The accompanying drawing illustrates one practical embodiment of the invention, but the construction therein shown is to be understood as illustrative, only, and not as defining the limits of the invention.

Figure 1 is a central longitudinal section through a cigarette holder embodying the present invention.

Figures 2, 3, 4 and 5 are face views of parts used in the holder shown in Figure 1 which parts are shown in these figures as removed from the holder.

Figure 6 shows the present invention associated with a pipe illustrated in section in this figure.

The cigarette holder shown in Figure 1 of the drawing comprises a cigarette holding portion 1 adapted to support one end of a cigarette indicated at C. Back of this cigarette holding portion 1 is positioned a condenser portion 2 and at the rear end of the condenser portion 2 is positioned a bit portion 3 whereby the holder may be held in the mouth of the smoker. Portions 1, 2 and 3 of the holder may be made of any suitable material and, if desired, one or more of these parts may be made integral with one another. However, for the purpose of illustration, the condenser portion 2 is shown in the form of a tube, the opposite ends of which are respectively fitted into the portions 1 and 3. A sliding fit, tapered or otherwise, or screw threaded connections may be used for this purpose, but, in any event, the connection should be such as to permit material accumulating within the interior of the tube 2 to be removed from time to time after it has accumulated therein.

The interior of the tube 2 constitutes a condensation chamber 2a. This tube may be made of transparent or opaque material, but a sight

opening 4 is preferably provided therein so that the accumulation of extraneous matter therein may be observed. The matter accumulating in this tube is of an unsightly dark brown appearance and I therefore prefer to make the tube generally opaque with a portion of the wall 4, which forms the sight opening, transparent for observation purposes.

In carrying out this invention in its preferred form, there is positioned within the cigarette holding portion 1 about midway of the length of the latter, so as to lie directly adjacent the inner ends of the cigarette, a succession of foraminous partitions, each provided with relatively small orifices, such as may be produced by laminating a succession of fine wire mesh screens, so that the products of combustion and water in hot vapor form passing through these fine orifices are very finely divided. I have used to advantage wire mesh screen of the order of from 200 to 800 mesh per inch, i. e., a screen opening or particle diameter of between .0029 and .0008 inch. The individual openings through such screen are manifestly extremely fine, so that all vapors passing therethrough are very appreciably attenuated and all parts of each stream of vapor thus brought into the most intimate contact with one another, thereby permitting maximum absorption of the vapors of the products of combustion as well as the fine ash dust by the aqueous vapor with these foreign materials appear to have considerable affinity when thus finely divided. Two or more of such of these screen partitions are preferably employed and between these laminations there may be interposed perforated sheet metal partitions with very fine perforations therein. Where I have used such sheet metal partitions, perforations of the order of .008" to .018" in diameter have given very satisfactory results.

In the showing of the drawings, three partitions 5, 6 and 7 are shown. The partitions 5 and 7 are flat wire mesh disks with the wires of the respective disks positioned in angular relation to one another as shown in Figures 2 and 4. The partition 6 which lies intermediate the partitions 5 and 7 is of sheet metal having perforations 8. The partitions 5, 6 and 7 are arranged in face abutting relation to one another, while the innermost partition 7 is in engagement with a dished metal partition 9 fitted into the holder portion 1 with sufficient tightness about its periphery to preclude leakage of liquids through the joint thus made. This innermost partition 9 is preferably dished in the direction of the bit 3 of the holder to provide a relatively small compartment 10 between it and the adjacent screen lamination 7. In the central portion of the dished partition 9 are provided a relatively few very small perforations 11. I have used five or six such perforations, all of which have diameters of the order of .008" to .018".

The aggregate cross sectional area of these perforations 11 is manifestly less than the aggregate cross sectional area of the openings in each of the screen partitions 5 and 7 or of the perforated sheet metal partition 6 which may be used in lieu of one or more of such mesh partitions. Consequently the smoke with entrained air and vapor passes relatively slowly through the mesh and sheet metal partitions 5, 6 and 7 into the compartment 10 between them and the dished partition, so as to permit of the most intimate intermingling of the constituents thereof. As it passes through the relatively small holes

11 of the dished partition, it does so at greatly increased velocity with concurrent crowding together of all of these vaporous products, immediately followed by rapid expansion of these products as they leave the perforations 11 and enter the condensation chamber 2a. This rapid expansion has a pronounced cooling action which tends to bring about the condensation of the water vapor products of combustion which are entrained therein.

As a result of the cooling action of expansion of the products and the cooler temperature of the condensation chamber, the water vapor is condensed out of the smoke and the condensate carries with it entrained tars and resins and other deleterious waste products of combustion including ash dust in appreciable quantities. The condensate with these impurities collects within the condensation chamber and may be removed from time to time by disconnecting the tube 2 from the holder portion 1 or 3 or both of them, so that the interior of the tube may be thoroughly cleaned.

It is found in practice that the condensate accumulates rather rapidly and appropriate means is therefore provided to preclude this condensate from flowing through the smoke passage of the bit into the mouth of the smoker.

In the showing in the drawings, the bit is shown as having at the end which enters the mouth of the smoker a smoke passage 12 of substantially conventional diameter, but for the remainder of the length of the bit, the smoke passage is made larger as indicated at 13 and into the forward end of this enlarged portion 13 is screwed a projecting inlet nozzle 14. The nozzle 14 projects for an appreciable distance into the condensation chamber and has a smoke passage 15 axially passing therethrough. By employing a projecting nozzle as shown accumulations of condensate which flow in the direction of the bit may accumulate about the base of the nozzle without entering the smoke passage 15 of the latter and thus passing to the mouth of the smoker. Should any relatively small quantity of this condensate enter the smoke passage 15 it will ordinarily lodge within the enlarged portion 13 of the bit and will not enter the mouth of the smoker.

In Figure 6 of the drawings I have illustrated the present invention as incorporated in a smoking pipe. Here the bowl of the pipe is indicated by the reference character 16. The cavity 17 of the bowl has a smoke passage 18 leading to a chamber 19 in the base of the bowl. Within this chamber 19 is introduced flat foraminous partitions 5, 6 and 7 and a dished partition 9 in the same manner as they are introduced into the holder portion of the cigarette holder of Figure 1. The lower end of the chamber 19 is closed by a removable plug 20 and between the plug and the dished disk 9, the smoke passage 21 leads to the bit 22 of the pipe. A tubular screen section 23 acts as a liner about the circular wall of the chamber 19 and is held in place between the partition 9 and the plug 23, the space between which parts constitutes the condensation chamber corresponding to the chamber 2a.

The invention operates in a pipe in the same manner as in a cigarette or cigar holder to remove the deleterious products of combustion which become deposited in the condensation chamber and can be removed by removing the plug 20.

Experience with this invention has demon-

strated that the foraminous partitions do not tend to clog. However, upon the occurrence of clogging of the foraminous partitions of the cigarette holder, they may be easily and expeditiously freed from obstruction by simply projecting the lighted end of a cigarette against the outermost screen partition 5 of the holder while air is sucked through the holder. Any dust which may have caused any such slight clogging will immediately be consumed. It has thus been found unnecessary to remove the foraminous partitions from the holder in order to clean them, although should this be desired, they may be readily pushed out of the end of the holder portion and, when thus separated, cleaned in any desired and suitable manner. The corresponding partitions may likewise be easily removed from a pipe by simply removing the plug 20 and pressing out the partitions and the screen 23 with a match or any other suitable instrument capable of projecting through the opening 18. To clean the bit of either the pipe or the cigarette holder, conventional cotton pipe cleaners may be employed in the usual manner.

The foregoing detailed description sets forth the invention in its preferred practical form, but the invention is to be understood as fully commensurate with the appended claims.

Having thus fully described the invention, what I claim as new and desire to secure by Letters Patent is:

1. A smoker's article comprising: a holder for tobacco, a hollow condenser back of said holder, and a bit back of said condenser, there being positioned between the condenser and the tobacco space in the holder a succession of foraminous partitions including fine wire mesh of the order of 200 to 800 mesh per inch with adjacent partitions in intimate facial contact with one another and between said partitions and the condenser an additional partition in the form of a plate having minute perforations grouped centrally of the partition and substantially spaced from the peripheral edge thereof and of the order of .008" to .018" in diameter and the aggregate area of which is less than the aggregate area of the foramina of any of the other of said partitions.

2. A conduit for the passage of tobacco smoke comprising: a tubular passage having intermediate the ends thereof a group of successive partitions with adjacent partitions of said group in intimate facial contact with one another and including partitions of fine wire mesh of the order of 200 to 800 mesh per inch, there also being included in said passage an additional partition having minute perforations grouped centrally of the latter partition and substantially spaced from the peripheral edge thereof and of the order of .008" to .018" in diameter and the aggregate area of which is less than the aggregate area of the foramina of any of the other of said partitions.

3. A conduit according to claim 2, wherein said additional partition is of frusto conical shape and dished at the smaller end of the frustum with the minute perforations only in the dished part.

4. A conduit according to claim 2, wherein said additional partition of frusto conical shape is dished at the smaller end of the frustum with

perforations only in the dished part, the smaller end of the frustum being in substantially line contact with the adjacent partition of said group and the larger end of the frustum forming a substantially tight seal with the inner surface of the tubular passage.

5. The method of removing from tobacco smoke undesirable constituents and separating them from the constituents to be received into the mouth of the smoker which comprises: drawing hot smoking gases from burning tobacco through a passage, dividing the flow of such gases into a plurality of streams of fine diametrical cross section, obstructing and deflecting laterally a substantial distance a portion of such streams while permitting the remainder of such streams to commingle, passing such commingling streams through a zone to subdivide said commingling streams into smaller streams, creating a turbulence of the latter streams, and emitting said latter streams in a plurality of jet forms of a lesser number than the last mentioned streams.

6. A conduit for tobacco smoke comprising: a tubular passage having intermediate the ends thereof a group of successive foraminous partitions arranged in intimate facial contact with one another with each foramen of each of said partitions being not less than .0008" and not exceeding .018" in diameter and at least one partition of said group being a perforated metal plate, said foraminous partitions serving to finely divide and attenuate atmospheric moisture vapor and the products of combustion passing therethrough to permit maximum absorption by the vapors of products of combustion of the tobacco, there being provided further along said tubular passage a compartment forming partition having therein foramina of .008" to .018" in diameter and the number of which latter foramina is less than the number of foramina in any one partition of said group, whereby the vapor and the products of combustion passing through the foramina of said group of partitions thereafter pass through the foramina of the compartment forming partition and are emitted therefrom as fine jets.

7. A conduit according to claim 6, wherein at least two partitions are wire mesh and said perforated metal plate in sandwiched between said wire mesh partitions.

EDWIN S. BROTHERS.

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