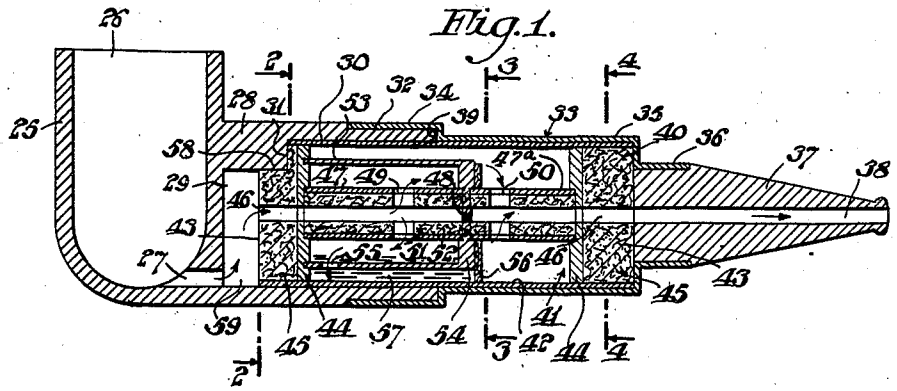
Jan. 5, 1943. F. H. CULLEN 2,307,573

SMOKE PURIFIER

Filed Dec. 28, 1937 3 Sheets-Sheet 1

Fig. 1.



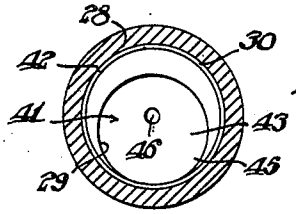


Fig. 2.

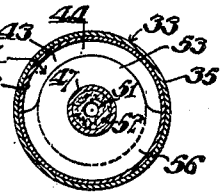


Fig. 3.

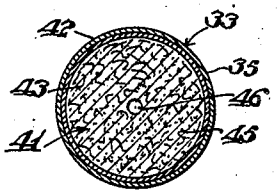


Fig. 4.

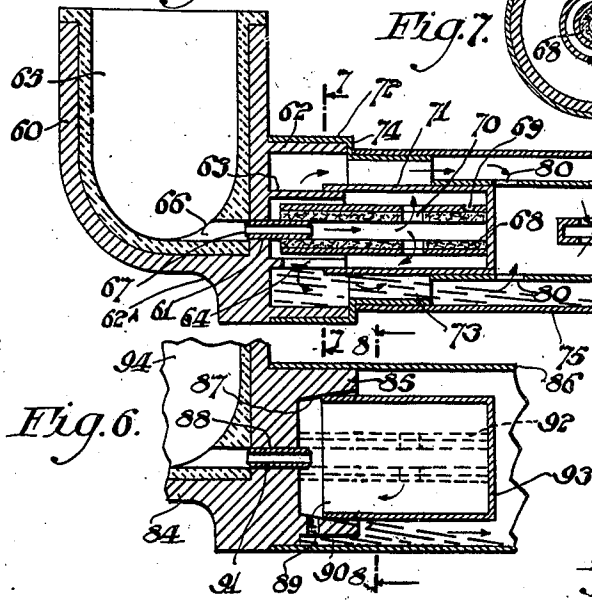


Fig. 5.

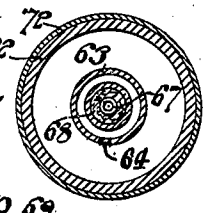


Fig. 7.

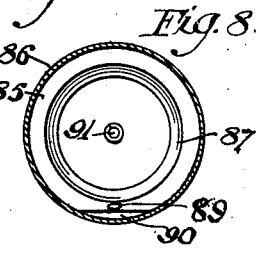


Fig. 8.

Fig. 6.

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Fig. 9.

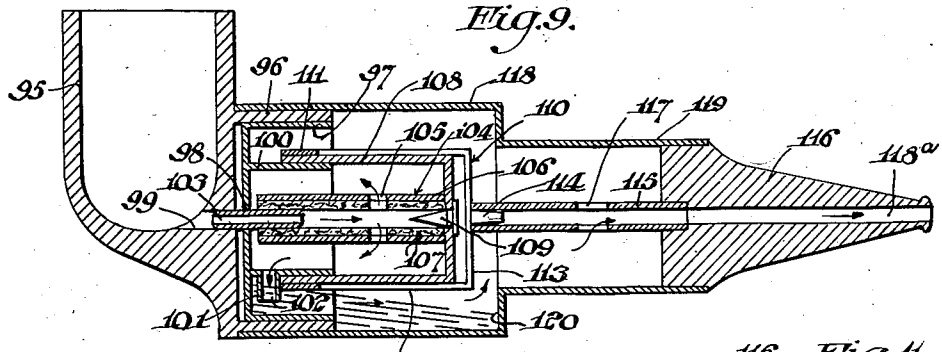


Fig. 10.

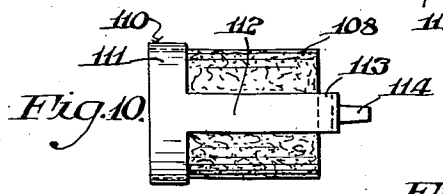


Fig. 11.

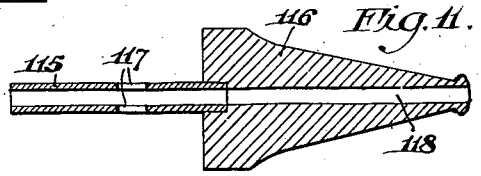


Fig. 12.

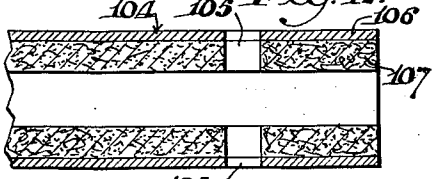


Fig. 13.

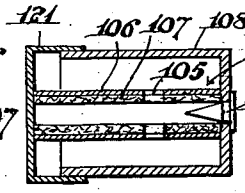
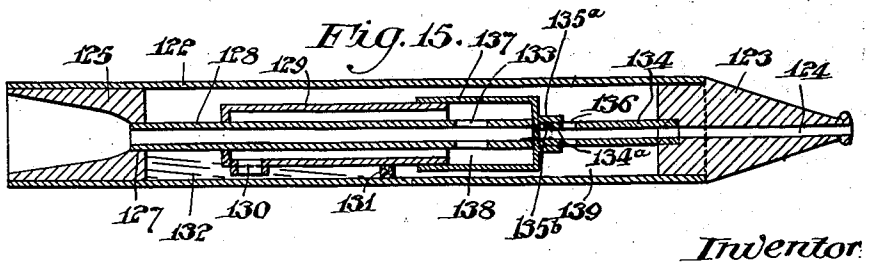




Fig. 14.

Fig. 15.



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SMOKE PURIFIER

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Fig. 16.

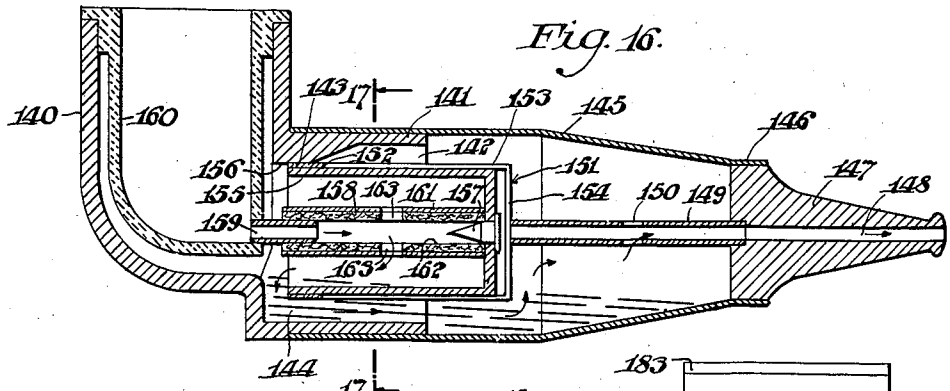
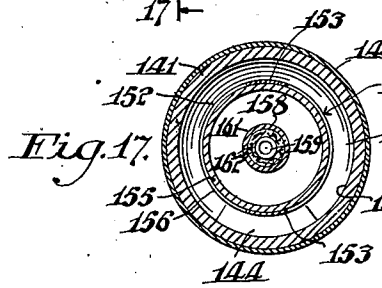


Fig. 17.



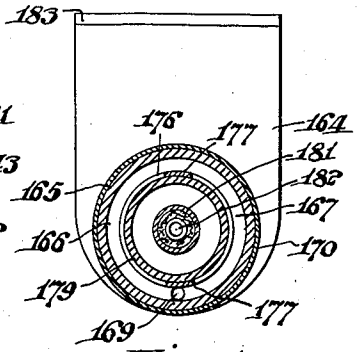


Fig. 19.

Fig. 18.

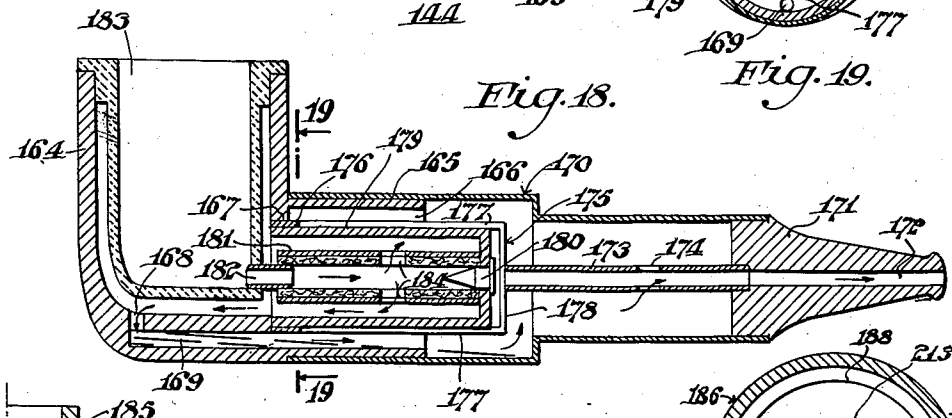


Fig. 20.

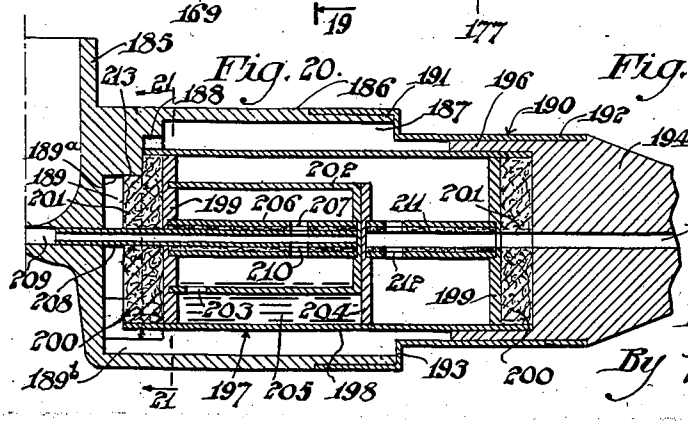
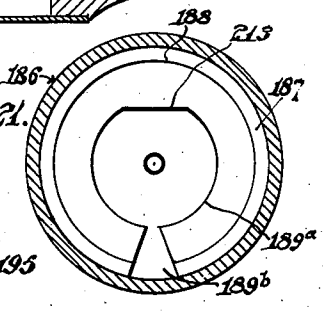


Fig. 21.



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Patented Jan. 5, 1943

2,307,573

UNITED STATES PATENT OFFICE

2,307,573

SMOKE PURIFIER

Francis H. Cullen, Philadelphia, Pa.

Application December 28, 1937, Serial No. 182,034

13 Claims. (Cl. 131—173)

My invention relates to a new and useful smoke purifier, which may be a part of a tobacco pipe or an attachment thereto, or may be used in connection with a cigar or cigarette holder. The present application is, in part, a continuation of my prior copending application, Serial Number 98,542, filed August 29, 1936, and issued February 13, 1940, as Patent Number 2,190,312 and copending application Serial Number 165,451, filed September 24, 1937, and issued March 3, 1942, as Patent Number 2,274,889. The purpose of the invention is to provide improved means for absorbing the dust, oils, juices and other objectionable substances emanating either from the tobacco or the smoker's mouth but especially the former. In addition it is an object to pass the smoke or smoke fumes through a liquid bath to condense, cool, sweeten and purify them and thereby prevent tongue burning and biting and give the smoker a pure, cool, sweet smoke.

In the past efforts have been made to provide a compact pipe adapted to hold liquid either by having a receiving tube extended into the liquid or by placing an adjustable cap over the receiving tube to cause the smoke to flow in a reverse direction and pass through the liquid. In the case where the receiving tube extends into the liquid, the tube itself will contain or hold a certain amount of liquid, and in some instances an intermediate chamber was provided between the tobacco bowl and the liquid holding chamber to prevent leakage back to the tobacco bowl. In such a case the receiving or induction tube in the liquid chamber was placed directly over or in alignment with the tube projecting from the tobacco bowl and naturally any liquid that would flow back and down the receiving tube would drop into the tube leading from the tobacco bowl and wet the tobacco. In the case of the floating, movable, adjustable, condensing cylinder or cap, no provision was made to prevent leakage when the pipe was inverted. Generally pipes are held in the mouth substantially horizontally, possibly slightly tilted forwards or backwards, or vertically, or in various other positions, which is bound to be done by the smoker when carried in either the hands or pocket, and it is important that leakage be avoided as well as to have the liquid fall to its proper place when the pipe is put into the mouth for smoking. In the case of intermediate chambers between the liquid holding chamber, the tobacco bowl and the mouthpiece, it means that the liquid entering these chambers must be returned to the liquid holding chamber to make the liquid seal function for the purpose intended. As can be realized, this would be bothersome and cumbersome because in tilting the pipe upside down to get the liquid from the lower chamber to the liquid holding chamber, the tobacco and ashes would fall out and annoy the smoker. In the case of an open end condensing cylinder, when the pipe is in a horizontal position and the liquid is below the top outer open end of the cylinder, the smoke following the line of least resistance would escape without passing through the liquid. Also in the case of an open end condensing cylinder that is floating, movable or adjustable, the condensing cylinder will have a tendency to move with the liquid and as some of the liquid is contained in the condensing cylinder, when the pipe is turned upside down, part of the liquid will rest in the cylinder or cap and when the pipe is righted this liquid will flow down the receiving or induction tube wetting the tobacco.

In my prior application, Ser. No. 165,451, dated September 24, 1937, the object of sealing the outer end of the condenser cylinder and putting the opening or spout on the bottom was to get a low liquid seal, low enough if desired, so that no liquid would be contained in the condenser cylinder. In this instance the transverse ports were used to get the smoke from the receiving tube to the condenser cylinder and the sealing of the far end of the receiving tube with the inner end of the condenser cylinder was to prevent leakage to the tobacco bowl when the pipe was inverted. Also due to the fact that there is a certain amount of moisture, oils and juices contained in most tobaccos, the flowing of the moisture, oils and juices to the liquid holding chamber, when the tobacco is being smoked continuously, that is one pipeful after another, has a tendency to increase the volume of the liquid in liquid holding chamber. To partially prevent or practically overcome this condition, an absorbent filter cartridge is used and while the use of an absorbent filter cartridge in itself is not new, it produces a novel combination in conjunction with other elements of the present purifier. The provision of a groove for easy removal of the filter cartridge and the association of said filter cartridge with the liquid holding cartridge as a part of a unitary purifier structure is beneficial and helpful to a smoker.

Further it is natural for a smoker to tilt his pipe forwards or backwards while it is being held in the mouth. When the pipe is tilted backwards, the mouthpiece stem is so bored as to form a barrier or dam and produce a well or reservoir to retain the liquid in proper position and maintain

the seal at all times while the pipe is being used for smoking purposes. This bore arrangement also provides means for coaction with the holder, that carries the liquid holding cartridge, at a point to form a sealed joint to cause the liquid to enter the cartridge prior to the latter being completely withdrawn. Another way to form the outlet orifice is to have the holder ring increased in circumference to equal the circumference of the bore of the stem and a hole provided in the bottom of the holder ring for the smoke to pass through.

It is very important that the proper amount of liquid to be put in the purifier be known so that the purifier may operate successfully. Therefore a liquid holding cartridge is provided containing the proper amount of liquid to be put in the purifier or the cartridge may be used to indicate the quantity of liquid to be put in the purifier as a refill, as successive changes of liquid are needed to purify the smoke.

It is also very important that a means for removing the discolored liquid be provided and the liquid holding cartridge is used for this purpose. After the liquid has been drained into the liquid holding cartridge, either while the cartridge is partly in the mouthpiece stem or after the cartridge has been removed, and said cartridge finally withdrawn, it may be capped with a cap from a new cartridge and thrown away. The capping of the cartridge to be discarded seals the same and prevents the escape of any unpleasant odor or the actual liquid which might destroy or damage property.

Naturally the simplest and easiest device to use to obtain a cool pleasant smoke is the purifier cartridge of a unitary structure, but some smokers prefer the blending of the juices from the tobacco that come in contact with the liquid in the purifier, while others prefer changing the liquid after each pipeful of tobacco. In the latter case, an inexpensive removable cartridge is used and if the smoker does not want to use a discardable cartridge, the cartridge may be made of more durable material and used for inserting and withdrawing the liquid.

The general object of the invention is to provide a novel construction of tobacco pipe stem and a cigar or cigarette holder stem so that in an assembled purifier a reservoir for the sealing liquid will be provided from which said liquid may be easily removed. In the case of a purifier made in a unitary structure, the construction of the stem is such that the purifier cartridge, which may contain a reservoir, may be inserted and removed with ease.

Another object of the invention is to provide a liquid holding cartridge which forms a part of the purifier, said cartridge having a closed end and an open end, the latter facing the tobacco bowl. This arrangement requires the use of only a cover and eliminates the use of extra plugs or closures to hold the liquid in the cartridge until ready for use or to hold the liquid that is to be thrown away.

Another object is the use of an attachable removable combination unit that consists of an absorbent filter cartridge and a cylinder. The cartridge being divided into two sections by a seal, the primary section making connection to the tobacco bowl and being enclosed by the cylinder and the secondary section making connection to the mouthpiece tube. The cylinder being capable of holding liquid for insertion into or removal from the smoke purifier.

Another object of the present invention is the provision of a purifier of one-piece construction having absorbent material on each end to catch or hold the juices from the tobacco at one end and to catch or hold the saliva, which flows through the mouthpiece tube from the smoker's mouth, at the other end.

Another object is the use of an intermediate space or chamber between the outer wall of a pipe bowl shank and a unitary purifier cartridge so as to cause the smoke to "drag" and deposit slugs of tobacco, dust, juices and other substances on the bottom of the shank and absorbent end wall of the cartridge before entering the passageway of the unitary purifier cartridge.

Another object is the use of a pipe bowl that has a recess on its bottom so that the pipe may rest comfortably between the thumb and forefinger of the smoker's hand when the pipe is not being smoked. The shank of this same pipe bowl may also contain a deeper and better well than could be obtained with a straight horizontal pipe bowl, stem or shank that did not have a recess in it.

Another object is the use of a cover cap for a liquid holding cartridge that may be used for placing on the end of a mouthpiece stem for draining the liquid from a liquid holding pipe or purifier.

Another object is the novel construction of a pipe bowl shank so that the inner end of the cylinder or liquid holding cartridge or the holder for the liquid holding cartridge closes the shank bore except for a channel on the bottom for the smoke to pass. This channel opening is to contain a liquid seal.

Another object is the use of an insertable bowl and placing the liquid seal or orifice opening near the outer end of the tobacco bowl so that the pipe may be smoked in a vertical position and retain the liquid seal.

Another object is the use of a combination mouthpiece stem for a tobacco pipe, cigar or cigarette holder that may be used to hold a unitary purifier cartridge or which may be used to hold removable purifier parts.

Another object is the alignment of the receiving tube with the tube from the mouthpiece with the removable cylinder carried by the mouthpiece tube so that when the cylinder which seals the receiving tube is removed and the mouthpiece is put in the pipe without the cylinder, a cleaner may be inserted to clean both the receiving tube and the mouthpiece tube.

For identification purposes, the purifier of one-piece construction is called a purifier cartridge. Where the purifier is a part of the pipe stem or cigar or cigarette holder and has removable parts, the center or receiving tube communicating with the tobacco bowl is referred to as the absorbent filter cartridge while the tube or condensing cylinder that surrounds or encloses the filter cartridge is termed the liquid holding cartridge. The combination unit consists of an absorbent filter cartridge and a condensing cylinder with the absorbent filter cartridge divided into two sections by a seal, one section making connection to the tobacco bowl and the other with the mouthpiece tube. In some instances the center tube may be of other than absorbent material and the liquid holding cartridge may be permanently attached to the mouthpiece tube instead of being removable. Where the cylinder is used merely as a condenser it may include absorbent material.

With the above and other objects in view, this invention consists of the details of construction and combination of elements hereinafter set forth and then designated by the claims.

In order that those skilled in the art to which this invention appertains may understand how to make and use the same, I will describe its construction, referring by numerals to the accompanying drawings, in which:

Fig. 1 is a longitudinal sectional view of a pipe constituting one form of my invention.

Fig. 2 is a cross section thereof on the line 2—2 of Fig. 1.

Fig. 3 is a similar section on the line 3—3 of Fig. 1.

Fig. 4 is also a cross section on the line 4—4 of Fig. 1.

Fig. 5 is a longitudinal sectional view of a pipe illustrating a modification.

Fig. 6 is a fragmentary sectional view longitudinally of a pipe showing another form which the invention may assume.

Fig. 7 is a cross section on the line 7—7 of Fig. 5.

Fig. 8 is a cross section on the line 8—8 of Fig. 6.

Fig. 9 is a longitudinal sectional view of a pipe showing another modification.

Fig. 10 is a side elevation of the holder with the cartridge therein.

Fig. 11 is a longitudinal sectional view of the mouthpiece and its tube.

Fig. 12 is an enlarged fragmentary longitudinally sectional view of the absorbent filter cartridge.

Fig. 13 is a longitudinal section of the purifier cartridge closed by a cap.

Fig. 14 is a longitudinal sectional view of a pipe stem illustrating another arrangement of my invention.

Fig. 15 is a similar view showing the same general arrangement but with slight modifications and illustrated in connection with a cigar or cigarette holder.

Fig. 16 is a longitudinal sectional view of a pipe illustrating a further modification of the invention.

Fig. 17 is a section on the line 17—17 of Fig. 16.

Fig. 18 is a longitudinal sectional view of another modification.

Fig. 19 is a section on the line 19—19 of Fig. 18.

Fig. 20 is a longitudinal sectional view of still another modification.

Fig. 21 is a section on the line 21—21 of Fig. 20.

In carrying out the invention, particular reference being first had to Figs. 1 to 4 inclusive, 25 represents a tobacco bowl having a tobacco chamber 26 with a draft opening 27 leading therefrom and communicating with the interior of the pipe shank 28. This shank has two bores 29 and 30, one eccentric to the other, thereby forming a shoulder 31 and the outer end of said shank is preferably reduced in circumference at its outer end as indicated at 32.

A pipe stem 33 is fashioned to provide a socket 34 to fit over the reduced end 32 of the shank 28, an intermediate portion 35 of smaller diameter than the socket 34 so the inner surface of said intermediate portion is flush with the inner surface of the contiguous end of the shank, and a small socket 36 to receive the mouthpiece 37 the latter having a bore 38. The formation of the sockets and intermediate portion provides a shoulder 39 to engage the end of the shank 28 and another shoulder 40 for a purpose to be later described. While the mouthpiece 37 is shown as separate from the pipe stem 33 they may be made as an integral unit. It might be well to state at this point that while the part 28 is referred to as a shank and the part 33 is mentioned as the pipe stem the two together actually form the stem of the pipe.

The purifier cartridge 41 includes an outside tube or body 42 of specially treated liquid proof paper, glass or other suitable material with absorbent or partly absorbent end walls 43 mounted in the ends of said tube or body. For purpose of illustration these end walls are shown as each including a disc 44 of liquid proof paper or equivalent material and a pad 45 of absorbent material. Each of said end walls has a hole 46 therethrough forming parts of the draft passageway.

Central filter cartridges 47 and 47a are positioned between the end walls 44 with the bores of the filter cartridges in registration with the holes 46 and said filter cartridges have a partition or obstruction 48 between their contiguous ends with sets of lateral openings 49 and 50 so located that one set is to one side of the partition and the other set is to the other side of the said partition. Each central filter cartridge consists of an outer jacket 51 of water proof paper or equivalent material and an inner layer 52 of absorbent material.

About the outer end of the central tubular member or filter cartridge 47 is a condenser cylinder 53 of paper, composition or other material which encloses only the set of openings 49 and one end of this condenser cylinder coacts with one of the end walls 44 and the other end of said cylinder has its own end wall 54 which engages the filter cartridge 47. At the bottom of the condenser cylinder 53 adjacent its outer end or that end which lies adjacent the pipe bowl is formed an outlet orifice 55 to be sealed by a liquid sealing medium contained within the purifier cartridge and particularly in the outside tube or body 42. In order that a small quantity of liquid may be used for sealing purposes and that said liquid be confined in a limited space, a dam or barrier 56 is provided which may be an integral projection on the condenser cylinder or a separate piece of material at the closed end of said condenser cylinder. Said dam or barrier engages the lower portion of the outer tube or body 42 to provide a well 57 for the sealing liquid. The purifier cartridge 41 has an end partially cut away or formed with a recess 58 to coact with the shoulder 31 whereby said purifier cartridge can be placed in the pipe stem in only one way, that is, with the orifice 55 at the bottom of the device and positions the recessed end of the purifier cartridge so that a space 59 is provided between said recessed end of the cartridge and the contiguous wall of the pipe bowl. This intermediate space or chamber 59 causes the smoke "to drag" and deposit slugs of tobacco dust, juices and other substances on the bottom of the shank 28 before entering the hole 46.

With sufficient liquid sealing medium in the well 57 to seal the orifice 55 when the smoker draws on the pipe, the smoke passes through the draft opening 27 into the chamber 59 contacting the absorbent material adjacent the pipe bowl where some of the juices from the tobacco will be taken up. From the chamber 59 the smoke will pass through the hole 46 thence through a portion of the filter cartridge 47 where additional juices may be absorbed. Next the smoke passes

through the set of openings 49 into the condenser cylinder where it is caused to reverse and flow downwards to reach the orifice 55. As the smoke departs from the condenser cylinder through the orifice it is drawn through the liquid seal and caused to flow through the set of openings 50 then through an additional portion of the filter cartridge 47 then through the hole in the other end closure and finally through the bore of the mouthpiece into the smoker's mouth. Any saliva passing down the bore of the mouthpiece will be caught by the absorbent material contiguous said mouthpiece or by the filter cartridge. It will be obvious that the pipe may be tilted or turned in various positions without the sealing liquid reaching either the pipe bowl or the mouthpiece and therefore such a pipe may be carried in the pocket or other receptacle without the danger of losing the liquid or affecting the smoking qualities of the pipe. When it is desired to discard the purifier cartridge and replace it with a new one, the pipe stem 33 is removed from the pipe shank 23 exposing one end of said purifier cartridge which may be grasped by the hand and withdrawn from the pipe stem and thrown away. A new purifier cartridge with fresh liquid is then placed in position by reversing the above operations.

In the modification illustrated in Figs. 5 and 7 the reference numeral 60 designates the pipe bowl of plastic, glass, specially treated wood or other suitable material with a draft opening 61. This bowl has a shank 62 not like Fig. 1, but one with a recess so as to form a better well in a horizontal pipe. The well is formed between the shank and shoulder 74 mentioned later in this specification. The recess 62*a* on the outside of the pipe permits the pipe to rest comfortably between the thumb and the forefinger when carried in the hand.

A smaller concentric tubular projection 63 is formed within the shank, said projection 63 having a slot 64 formed in its lower side to provide an outlet orifice as will be apparent from later description. The pipe bowl may or may not be provided with an insertable tobacco bowl 65 of clay, briar wood or other suitable material which would have a draft opening 66.

In the draft opening is a short tube 67 preferably of compressible material and this tube supports an end of the absorbent filter cartridge 68 when the latter is slipped over said tube, although said absorbent filter cartridge may be made small enough to fit into the tube. Like the other filter cartridge, the present one may include an outer jacket of waterproof paper and an inner layer of absorbent material. A groove 69 is made in the outside near one end and lateral openings 70 are formed in the sides of said filter cartridge intermediate the ends thereof. A condenser cylinder 71 which surrounds that portion of the filter cartridge 68 beyond the tubular projection 63 has a closed end to engage an end of said filter cartridge and an open end telescoping over tubular projection 63 a short distance but leaving a part of the slot 64 uncovered for the passage of the smoke. This condenser cylinder also functions as a liquid holding cartridge.

On the shank 62 is mounted a secondary shank 72 having a reduced end to form a nipple 73 and provide a shoulder 74 which is engaged by an end of the stem 75 when the latter is placed on said nipple. If desired, the shoulder 74 may also be used to form a well. The mouthpiece end of the stem 75 is reduced to form a neck or socket 76 and provide an offset or shoulder 77. The neck or socket is adapted to receive the inner end of the mouthpiece 78 and also has one end of a sleeve 79 mounted therein which sleeve is of sufficient length to pass over the closed end of the condenser cylinder and assist in holding the latter in place. The sleeve being of smaller diameter than the main body portion of the stem 75 provides a space between them for passage of smoke towards the lateral openings 80 in said sleeve adjacent the closed end of the condenser cylinder. A tube 81 is carried by the inner end of the mouthpiece and the bore of said tube communicates with the bore 82 of said mouthpiece. This tube projects into the sleeve 79 and has its outer end closed adjacent which there are lateral openings 83.

With sufficient sealing liquid in the stem and component parts to seal the orifice provided by the uncovered part of the slot 64, when the pipe is drawn upon, the smoke will flow through the draft opening or the tube 67, the filter cartridge 68, the openings 70, the condenser cylinder, the slot 64, then passing through the liquid seal and the openings 83 into the sleeve 79, afterwards flowing through the openings 83 into the tube 81 and finally passing through said tube and the bore of the mouthpiece to the smoker's mouth.

In this particular arrangement the purifier is considered a part of the pipe and has removable parts so that upon withdrawal of the stem, sleeve and condenser cylinder a portion of the filter cartridge is uncovered and may be readily removed by engaging the fingernail, a coin or other instrument in the groove 69 to pull said filter cartridge off of the tube 67. The staggered locations of the several openings prevents the sealing liquid from flowing directly from one chamber to another and the spacing of said openings from the ends of the chambers prevents the liquid from overflowing from one chamber to another so the pipe can be held and carried in any position without hesitancy and the liquid will always return to a position to seal the slot 64 when the pipe is to be used.

The condenser cylinder 71 can be used to hold a quantity of sealing liquid by placing a cap over its open end when not in the pipe and also may be used to receive the discolored liquid and when capped can be discarded without the liquid coming in contact with the person or any property. As the closed end of said condenser cylinder is partially enclosed in the sleeve 79 while the purifier is in use such enclosed portion will remain in a clean condition so as not to soil the fingers when said condenser cylinder is removed.

Figs. 6 and 8 illustrate the pipe bowl 84 as having a shank 85 on which the stem 86 is mounted and this shank has a tapered bore 87 to which leads the draft opening 88 and from which leads the outlet orifice 89 to an external recess 90. The recess provides a space between the shank and stem for passage of smoke and the reception of sealing liquid to seal the orifice. This construction is especially advantageous because a very small amount of sealing liquid is required to seal the outlet orifice which terminates very close to the bottom of the stem. A tube 91 is in the draft opening to receive and support one end of the filter cartridge 92 the same as previously described. The condenser cylinder 93, which also may be used as a liquid holding or measuring instrumentality is placed about the filter cartridge and the open end of said cylinder forced or wedged into the tapered bore 87 to retain the cylinder in position. An

insertable tobacco bowl 94 may be used if desired but is not absolutely necessary. The balance of the pipe may be constructed in accordance with any illustrated formation but particularly that shown in Fig. 16.

The modification illustrated in Figs. 9 to 13 inclusive has many features of similarity to that shown in Fig. 5 and therefore is considered as a part of the pipe and with removable parts. The structure disclosed includes a pipe bowl 95 with an integral shank 96 which may be made of briar wood or other suitable material. To prevent leakage a cup 97 of plastic or other suitable substance is placed in the shank with the end wall of said cup adjacent the pipe bowl and said end wall has a hole 98 in alignment with the draft opening 99. Formed with or carried by the cup is a tubular projection 100 having a spout 101 at the bottom to provide the outlet orifiece 102 and said spout terminates very close to the lower part of the cup flange whereby a small amount of sealing liquid is required to seal said outlet orifice.

A tube 103 is mounted in the draft opening and extends through the hole 98 to receive one end of the absorbent filler cartridge 104 of the same construction as those before referred to and having lateral openings 105. As previously described, the filter cartridge, Fig. 12, preferably comprises an outer jacket 106 of water proof paper or equivalent material and an inner layer of absorbent material 107.

A condenser cylinder and liquid holding cartridge 108 is designed to enclose the filter cartridge 104 and telescope over the tubular projection 100. In a combination unit, said cylinder has a closed end provided with a lug 109 which, for purposes of illustration, Fig. 13, is shown as a plug inserted in the closed end of the cylinder to support the opposite end of the filter cartridge. This condenser cylinder and filter cartridge may be mounted in a holder 110 including a ring 111 on the outer ends of the arms 112 of the U-shaped support 113. The holder has a lug 114 projecting from the cross bar of the U-shaped support and entered into the tube 115 carried by the mouthpiece 116. In such a construction the condenser cylinder and liquid holding cartridge 108 may be of cheap or inexpensive material, however, should the cylinder be of more substantial or more expensive material, the holder 110 may be dispensed with and said cylinder carried by the mouthpiece structure, being formed with or detachably connected to the tube 115. This tube 115 will be closed at its outer end but has lateral openings 117 leading to the bore of the tube which bore communicates with the bore 118a of the mouthpiece.

The stem 118 is mounted on the shank 96 and has a reduced inner end 119 which the holder 110 or the cylinder 108 will snugly fit and this reduced end receives the mouthpiece 116. In the formation of the reduced end of the stem a shoulder 120 is provided that establishes one end of the well for the sealing liquid. If desired, a smaller shoulder like 120 may be placed nearer the orifice opening 102.

When using the pipe, smoke passes from the pipe bowl through the tube 103 into the filter cartridge 104 and then out through the openings 105 into the cylinder 108 and back to and through the outlet orifice 102. As the smoke enters the stem 118 it passes through the sealing liquid and enters the tube 115 through the lateral openings 117 finally following through the bore of the mouthpiece to the smoker's mouth.

In removing the sealing liquid, especially after it has been discolored, the pipe is tilted so the bowl is downward and the mouthpiece is slowly withdrawn from the stem until the cylinder 108 is pulled into the reduced end of the stem a sufficient distance to bring the open end of said cylinder flush with or beyond the shoulder 120. The pipe is then inverted causing the liquid to flow into the cylinder. If the cylinder is in a holder 110, said cylinder is partially ejected, capped with a cap 121, see Fig. 13, preferably from a new cylinder, and taken from the holder and discarded. Of course, it will be obvious that, if desired, the mouthpiece and associated elements can be removed and the liquid poured from the stem into the cylinder or other receptacle or otherwise disposed of.

Further the liquid holding cartridge 108, Fig. 13, need not be a part of the pipe and may be a plain liquid container without the absorbent filter cartridge and the flange of its cap 121 made so as to fit over the small end, as 119 Fig. 9, of a pipe stem to first receive the liquid to be discharged. This cap is obtained from a new cartridge containing fresh liquid. When the liquid is in the cap the latter is removed from the stem and set aside. Next the fresh liquid is poured into the pipe stem and the disengaged parts reassembled and then the liquid is poured from the cap into the liquid holding cartridge and finally said cap is used to close the cartridge to prevent spilling of the liquid therein as the whole thing is thrown away or otherwise disposed of.

Where the cylinder is constructed to remain a part of the purifier, the said cylinder is merely cleaned and the discolored liquid replaced.

The form of the invention embodied in Figs. 14 and 15 includes a stem 122 with a mouthpiece 123 having a bore 124 mounted in one end and a connector 125 at the other end. A connector 125 may be of the plug type as shown in Fig. 14 or of the socket type as in Fig. 15. The plug type of connector is especially designed for cooperation with a pipe bowl 126 while the socket type is adapted to receive and hold a cigar or cigarette. By making the connectors detachable from the stem they may be interchanged and the purifier then used for either purpose. Each type of connector has a bore 127.

A tube 128 is mounted in the bore of the connector and is located wholly within the stem 122 along its axial center. Surrounding the intermediate portion of the tube is a cylinder 129 open at its outer end and having an inner end wall provided with an outlet orifice 130 in the bottom side. A dam or barrier 131 is located between the bottom sides of the stem and cylinder and may be formed with or attached to either of them so as to provide a well 132 in the bottom of the stem at the connector end. The tube and cylinder may be made of the same piece of material or they may be separate parts fastened together as will be obvious. Said tube 128 has lateral openings 133 located anywhere between the inner end of the tube and the closed end of the cylinder but preferably outside of said cylinder to permit ready access thereto for cleaning purposes.

A tube 134 is carried by and projects from the inner end of the mouthpiece 123 and the bore of said tube 134 communicates with the bore of said mouthpiece. The inner end of the tube 134 is closed in any suitable manner, as by a

plug 135, but has lateral openings 136 to provide communications between the interior and exterior of said tube.

A cylinder 137 may be detachably fastened to the tube 134 in any suitable manner so as to be removed, for example the outer end of the cylinder, as shown in Fig. 15, may have a lug 135a with a nib 135b attached to the lug for engaging in a bayonet slot 134a on the outer end of the tube 134. The cylinder is closed at its outer end where it joins with the tube and open at its inner end.

The cylinders 129 and 137 telescope, one over the other, and for purposes of illustration, the cylinder 137 is shown large enough to fit over the cylinder 129. When the parts are assembled the contiguous ends of the tubes 128 and 134 will be closed and the combining of the two cylinders will produce an inner chamber 138 and an outer chamber 139. A sealing liquid is placed in the well 132 so as to liquid seal the outlet orifice 130 and when the device is in use for smoking purposes the smoke from the tobacco will flow through the tube 128, through the openings 133, in a reverse direction through the chamber 138 to the outlet orifice 130, through said orifice into the chamber 139. As the smoke enters the chamber 139 it is compelled to pass through the sealing liquid before flowing through the openings 136 and the bores of the tube 134 and the mouthpiece 123 to the smoker's mouth. Sealing the inner end of the cylinder 129 and using a spout for the outlet orifice 130 and the formation of a well by the barrier or dam 131 will require only a small amount of liquid to seal the outlet orifice 130.

In the modification in Figs. 16 and 17, a pipe bowl 140 is provided with a shank 141 having a large bore 142 with a rib 143 extending around the top and down the side of the bore 142 but not along the bottom thus forming a channel 144 between the adjacent ends of the rib and forming a communicating passageway between the pipe bowl and the large bore 142. A stem 145 is mounted on the shank and has a tapered or funnel shaped portion terminating in a socket end 146 to receive the mouthpiece 147 provided with a bore 148. In lieu of the shape illustrated in Fig. 16, the stem may be made like that shown in Fig. 18.

A tube 149 having lateral openings 150 is attached to the inner end of the mouthpiece 147 with the bores thereof in communication. On the inner end of the tube 149 is mounted a holder 151 thus closing said inner end of the tube 149. Said holder is like the one previously described and includes a ring 152 on the outer ends of the arms 153 of the U-shaped support 154. A condenser cylinder and liquid holding cartridge 155 is mounted in the holder 151, and holder ring and the open end of the cylinder are inserted in the smaller bore 156 formed by the rib 143 thus providing a tight joint with the channel 144 as the only communication between the interior of the cylinder 155 and the interior of stem 145.

The cylinder may have a lug 157 on its closed end to receive one end of the absorbent filter cartridge 158 while the other end of said filter cartridge is slipped over the induction tube 159 herein shown as projecting from the draft opening of an insertable tobacco bowl 160. The filter cartridge, like those formerly described, comprises an outer jacket 161 and an inner layer of absorbent material 162 and said filter cartridge has lateral openings 163 intermediate its ends providing communications between the interior of the cartridge and the cylinder. This construction of purifier eliminates the sleeve or other tubular extensions required in the other structures and provides a relatively large chamber in the stem to allow the smoke to slow down and become cool before entering the smoker's mouth.

With sufficient liquid in the shank 141 and the outer portion of the stem 145 to fill, at least, the channel 144, when the pipe is drawn on, the smoke will travel through the tube 159 into the filter cartridge 158 and out of the openings 163 into the cylinder 155 where the smoke is caused to flow in a reverse direction and out of the open end of said cylinder. From this location the smoke must pass through the sealing liquid as it travels through the channel 144 to reach the chamber within the stem 145 from which chamber it flows through the openings 150 into the tube 149 finally passing through said tube and the bore of the mouthpiece to the smoker's mouth. A pipe fitted in this manner can be smoked in a substantially vertical position without fear of the liquid receding from the channel constituting the outlet orifice.

To withdraw the holder 151 and the parts carried thereby, the mouthpiece 147 is separated from the stem 145 and the ring 152 of the holder pulled into the socket 146 from which the mouthpiece has been removed. In this position the liquid can be flowed into the cylinder 155 and the holder dislodged from the socket after which the cylinder can be taken out of the holder and discarded. New liquid contained in another cylinder can be emptied into the stem or a liquid measure by the cylinder can be poured into said stem and said cylinder inserted in the holder and the parts replaced. As is obvious, the insertable bowl 160 may be eliminated, if desired.

In the modification illustrated in Figs. 18 and 19 a pipe bowl 164 has a shank 165 with a large bore 166, the latter communicating with the interior of the pipe bowl through a smaller bore 167. A draft orifice 168 leads from the interior of the pipe bowl adjacent the front portion of said bowl to the duct 169 opening into the larger bore of the shank. On the shank 165 is mounted the stem 170 having a large portion to fit over the shank and a small portion to receive the mouthpiece 171. The interior diameter of the small portion of said stem is the same as the diameter of the small bore 167 of the pipe.

The mouthpiece 171 has a bore 172 and carries a tube 173 at its inner end with the bore of said tube in communication with the bore of the mouthpiece. Said tube is closed at its inner end and has lateral openings 174 intermediate the ends thereof. On the inner end of the tube 173 is mounted a holder 175 including a ring 176 on the outer ends of the arms 177 forming a part of the support 178.

In the holder is removably mounted the condenser cylinder and liquid holding cartridge 179 with the open end of said cylinder flush with the outer edge of the holder ring so that when the latter is positioned at the smaller bore 167 a joint is made between the holder and the cylinder therein and the pipe walls. The closed end of the condenser cylinder 179 has a lug 180 to register with one end of the absorbent filter cartridge 181 which is the same as in Fig. 16. The other end of the filter cartridge 181 slips over the compressible tube 182 mounted in the draft opening of the tobacco bowl 183. Said filter cartridge has lateral openings 184 intermediate its ends.

Assuming there is sufficient liquid in the device to fill the duct 169 when the pipe is being smoked, the smoke will travel through the tube 182, the filter cartridge 181, the openings 184, the passageways between the filter cartridge and the cylinder and between the tobacco and pipe bowls, the outlet orifice 168, passing through the sealing liquid in the duct 169 into the stem, thence through the openings 174, the tube 173 and bore 172 of the mouthpiece to the smoker's mouth.

This construction places the point of liquid sealing well to the front of the pipe and therefore such pipe may be smoked in an almost vertical as well as other positions and still retain the liquid seal.

The modification illustrated in Figs. 20 and 21 includes a pipe bowl 185 with a shank 186 having a large bore 187, an intermediate bore 188 and a smaller bore 189 provided with a flat portion 189a. The walls forming the intermediate and smaller bores are provided with notches 189b. On the shank is mounted a stem 190 fashioned to provide a socket 191 and a reduced mouthpiece receiving end 192 with a shoulder 193 between them. In the end 192 is mounted the mouthpiece 194 having a bore 195 and provided with an integral sleeve 196 to receive one end of the purifier cartridge 197. This purifier cartridge includes an outer tube or body 198 having end walls 199 with a layer of absorbent material 200 on their outer surfaces. Each end wall, including the absorbent material, has a hole 201 therethrough. A condenser cylinder and liquid holding cartridge 202 is located within the body 198 at the end adjacent the pipe bowl and the open end of said cylinder is partially closed by the coacting end wall 199 and in the bottom wall is formed an outlet orifice 203. At the closed end of the cylinder 202 is a barrier or dam 204 providing a liquid well 205. Between the forward end wall 199 and the closed end of the cylinder so as to be situated within said cylinder is a filter cartridge 206 having lateral openings 207 intermediate its ends. When the purifier cartridge 197 is placed in the pipe, the filter cartridge 206 telescopes over a long induction tube 208 mounted in the draft opening 209 of the pipe bowl and said tube 208 has lateral openings 210 to register with the lateral openings 207. A secondary filter cartridge 211 is mounted outside of the cylinder 202 between its closed end and the rear end wall 199 of the purifier cartridge with the bore of said secondary filter cartridge in registration with the hole 201 in said rear end wall. The secondary filter cartridge has lateral openings 212 adjacent the closed end of the cylinder 202 which closed end seals the inner ends of both the primary and secondary filter cartridge.

In order to insure proper placement of the purifier cartridge 197 in the pipe, the forward end of said purifier cartridge is fashioned to provide a flat portion 213 for coaction with the flat 189a. In this position the openings 207 and 210 will be in alignment and the orifice 203 will be at the bottom of the device whereby smoke may travel in the desired directions from the bowl to the smoker's mouth.

It will be observed that upon removal of the unitary cartridge 197, the receiving tube 208 remains attached to the appliance, and a cylinder and plug, similar to the cylinder 108 and the plug 109, Fig. 13, may be mounted on the receiving tube 208 and with the mouthpiece 194 reattached to the appliance, said appliance may contain and be smoked with a removable condensing cylinder.

It is to be particularly noted that where a liquid holding cartridge is not used as a storage member having a definite quantity of liquid therein such cartridge may be of such a size that it can be used as a measuring instrument to determine the proper amount of liquid to be placed in the purifier as a liquid seal.

It will be observed that the location and arrangement of the several openings is such that the pipe, cigar or cigarette holder may be used in any proper or near proper smoking position and a liquid seal will be positively maintained and the sealing liquid can flow around and about the device, as said device is placed in various positions, without the liquid reaching either the tobacco or the smoker's mouth when the device is subsequently used.

As will be also noted, there are various ways of using a condensing cylinder to form or contain an outlet orifice.

Of course I do not wish to be limited to the exact details of construction herein shown and described as the same may be varied within the scope of the appended claims without departing from the spirit of my invention.

Having thus described my invention, what I claim as new and useful is:

1. A smoke purifier comprising a cartridge for insertion in the stem of a tobacco smoking appliance, said cartridge consisting of a body to hold a liquid and containing concentric chambers with an outlet orifice to provide a communication between the lowermost portions of said chambers which orifice is to be sealed by the liquid in the body, a receiving tube having lateral openings preceding the outlet orifice in relation to the travel of the smoke and providing a communication between the tobacco holding part of the smoking appliance and the inner chamber, and an eduction tube having lateral openings forming a communication between the outer chamber and the mouthpiece of said smoking appliance.

2. A smoking appliance comprising a pipe bowl, a stem thereon, said stem containing a discharge chamber and having a reduced inner end, a mouthpiece removably mounted on the stem, means carried by said mouthpiece and including an attachable removable condensing cylinder open at one end and a receiving tube, a portion of said condensing cylinder having an outside diameter approximately equal to the inside diameter of the reduced inner end of the stem whereby when said condensing cylinder is drawn into the reduced end of the stem the latter will be closed temporarily and when said condensing cylinder is in operative smoking position the receiving tube provides communication between the bowl and condenser cylinder and the latter communicating with the discharge chamber at its lowermost portion, and a sealing liquid normally in the bottom of said discharge chamber.

3. A smoking appliance comprising a bowl, a shank on said bowl and having a plurality of bores decreasing in size, the wall forming the smaller bore having a flat portion, a stem on the shank, a shoulder intermediate the ends of said stem, a mouthpiece in said stem and provided with a socket at its inner end, a purifier cartridge including a tubular body, a wall at each end of said body and having a hole therethrough, one end of said cartridge being fashioned to fit the bores of the shank and having a lip to fit the flat portion to position the cartridge and pre-

vent rotation thereof, the purifier cartridge containing a receiving tube and condensing and discharge chambers with an outlet orifice from the condensing chamber to the discharge chamber, a tube carried by the bowl and extending into the receiving tube and provided with lateral openings registering with similar openings in the receiving tube and a tube having lateral openings located between the closed end of the cylinder and the adjacent end wall of the purifier body, and a liquid medium to seal the outlet orifice.

4. A smoking appliance comprising a bowl, a shank on said bowl and having a plurality of bores decreasing in size, the wall forming the smaller bore having a flat portion, a mouthpiece provided with a socket at its inner end, a purifier cartridge including a tubular body having a wall at each end thereof, each of said end walls provided with a hole therethrough, one end of said cartridge being fashioned to fit the bores of the shank and having a lip to fit the flat portion to position the cartridge and prevent rotation thereof, the purifier cartridge containing a receiving tube and a condensing chamber with a closed end and a discharge chamber with an outlet orifice from the condensing chamber to the discharge chamber, an induction tube carried by the bowl and extending into the receiving tube, the said receiving tube having a closed terminal end with lateral port openings contained within the condensing chamber, and an eduction tube having lateral openings located between the closed end of the condensing chamber and the adjacent end wall of the purifier body.

5. A smoking appliance comprising a bowl, stem and mouth-piece and containing a discharge chamber, a removable condensing cylinder within said discharge chamber, said cylinder having a closed end wall, an eduction tube, a receiving tube that forms a communication between the bowl and the condensing cylinder, said condensing cylinder having an opening to the discharge chamber sealed with a liquid and an open framework holder attachable to the eduction tube, said holder being used to carry the removable condensing cylinder and a portion of the closed end wall of the cylinder being exposed through the holder.

6. A smoking appliance comprising an outer bowl, an inner bowl, a stem and mouthpiece and containing condensing and discharge chambers, said condensing chamber having an outlet situated below the inner bowl with a return passageway to the discharge chamber, a receiving tube leading from the inner bowl to the condensing chamber, an eduction tube leading to the mouthpiece and a liquid to cool the inner bowl.

7. A smoking appliance comprising an outer bowl, an inner bowl, stem and mouthpiece and containing condensing and discharge chambers, said condensing chamber being formed by a cylinder having an end wall, and an outlet from the condensing chamber formed by a passageway extended underneath the bowl with a return passageway completing the outlet to the discharge chamber, a receiving tube leading from the bowl to the condensing chamber, said receiving tube having an open inlet end, a lateral port outlet and a terminal end closed by the end wall of said cylinder, an eduction tube leading to the mouthpiece and a liquid to cool the inner bowl.

8. A smoking appliance comprising a bowl, stem and mouthpiece containing a discharge chamber with a condensing chamber within the discharge chamber, said condensing chamber having an outlet orifice to the discharge chamber sealed with liquid and said condensing chamber being formed by a removable cylinder, said cylinder having a closed end wall, an eduction tube attached to the mouthpiece and having an opening forming a communication between the discharge chamber and the mouthpiece, an open framework holder in which said cylinder is mounted, and a receiving tube having an open end in communication with the pipe bowl and a terminal end contained within the condensing chamber, said terminal end being closed by the inner end wall of the condensing chamber and said receiving tube having a lateral opening for the smoke to pass on its way to the outlet orifice.

9. A smoking appliance comprising a bowl, stem and mouthpiece containing a discharge chamber with a condensing chamber within the discharge chamber, said condensing chamber having an outlet orifice to the discharge chamber sealed with a liquid and said condensing chamber being formed by a removable cylinder, an open framework holder carrying said cylinder, said holder consisting of a U-shaped support having an outer ring, an eduction tube having an open end and a closed end, the closed end carrying said holder, said eduction tube being attached to the mouthpiece and having a lateral port forming a communication between the discharge chamber and said mouthpiece and a receiving tube having an inlet in communication with the pipe bowl and an outlet contained within the condensing chamber for the smoke to pass on its way to the outlet orifice.

10. In a device of the kind described, a smoking appliance containing liquid, an open framework holder fitted within said smoking appliance, and a condensing cylinder removably mounted in said holder, said cylinder having a closed end wall with a portion of said cylinder closed end wall exposed through the holder.

11. The structure of a smoking appliance comprising a pipe bowl and a receiving tube and a stem with a reduced inner end and a mouthpiece removably mounted on said stem, said structure containing a discharge chamber, means carried by said mouthpiece and including a condensing cylinder having an opening to said discharge chamber which opening is sealed with liquid, a portion of said means having an outside diameter approximately equal to the inside diameter of the reduced inner end of the stem whereby when said means is drawn into the reduced end of the stem the latter will be closed temporarily and when said means is in operative smoking position said receiving tube provides communication between the bowl and the condensing cylinder.

12. In a smoking appliance, a removable condensing cylinder that is used to provide an outlet orifice, said cylinder being provided with an end wall, a receiving tube having an inlet port and a lateral port outlet and a terminal end, said receiving tube being on the inside of the cylinder for connection with a pipe bowl to direct smoke from the bowl into the cylinder on its way to the outlet, means provided by the cylinder to support the cylinder to the receiving tube, and means to temporarily close the terminal end of said receiving tube.

13. A smoking appliance comprising a pipe bowl and a mouthpiece and containing a discharge chamber, a removable condensing cylinder provided with an end wall and with an outlet to the

discharge chamber, a receiving tube having an inlet port and an outlet port and a terminal end, means to temporarily close the terminal end of said receiving tube, the said receiving tube being on the inside of the cylinder for connection with the pipe bowl to direct smoke from the bowl into the cylinder on its way to the outlet orifice, and means for mounting said cylinder in the discharge chamber so that when the mouthpiece is removed, the said cylinder may be removed from the smoking appliance independently of any other part of the said smoking appliance.

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