Dec. 2, 1941. D. M. DUNWOODIE 2,264,626

PIPE

Filed May 2, 1939

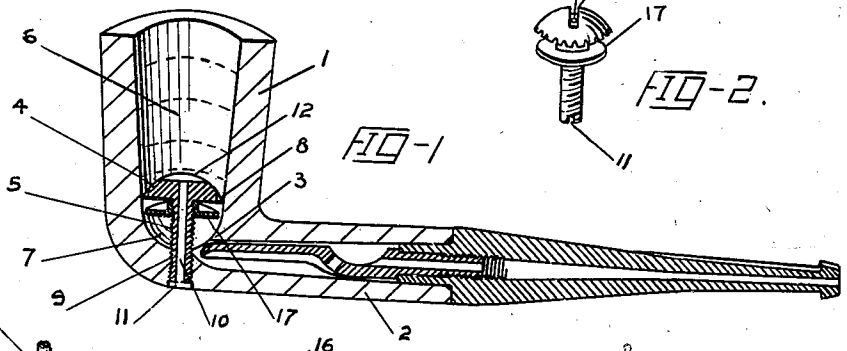


FIG-1

FIG-2.

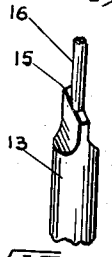


FIG-3

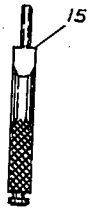


FIG-4



FIG-5

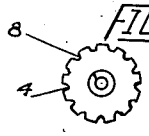


FIG-9



FIG-12

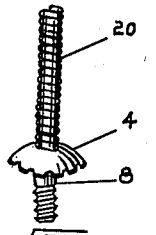


FIG-10

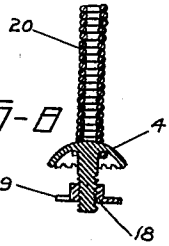


FIG-8

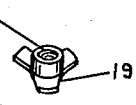


FIG-11

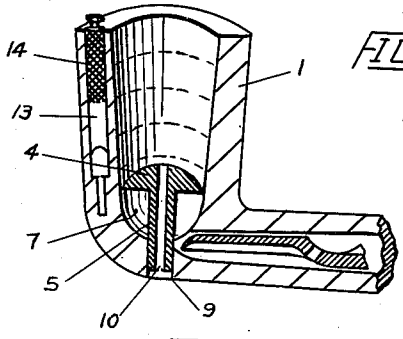


FIG-6

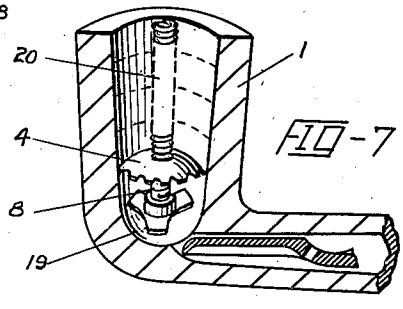


FIG-7

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PIPE

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Application May 2, 1939, Serial No. 271,312

20 Claims. (Cl. 131—198)

This invention pertains to tobacco pipes, and more particularly to means for controlling combustion and distribution of draft and for regulating the quality of the smoke.

As is well known, in the ordinary unconditioned pipe bowl the tobacco charge burns unevenly, usually developing a relatively deep central crater and leaving a greater or less quantity of partially burned tobacco or charred crust contiguous to the walls of the bowl. As result of this condition, the character and flavor of the smoke materially changes during the smoking period. The first few puffs are most enjoyable, but as the combustion progresses the flavor becomes stronger and less pleasing.

In the present instance not only is the suction draft through the tobacco charge directed close to the interior walls of the bowl, but means is provided for regulating the draft volume and for closing off the draft completely when the tobacco charge has been consumed. To insure a uniformly cool smoke, outside air is admitted in limited quantity for intermixture with the smoke before being drawn from the bowl, as well as to supply air to maintain combustion and keep the tobacco charge lighted.

The object of the invention is to improve the construction as well as the means and mode of operation of tobacco pipes whereby they may not only be economically manufactured, but will be more efficient in use, uniform in operation, and easily adjusted to the requirements of individual smokers.

A further object of the invention is to provide means for not only directing the course of the suction draft through the tobacco charge, but to enable the regulation of the volume thereof.

A further and important object of the invention is to afford a supplemental supply of fresh cool air for intermixture with the smoke and products of combustion before being withdrawn from the bowl.

A further object of the invention is to insure even, uniform combustion of the tobacco charge and its complete consumption, thereby conserving tobacco and preventing accumulation of a charred and ill smelling residue in the pipe bowl.

A further object of the invention is to prevent the drawing into the pipe stem of ash and dregs of a consumed tobacco charge by automatically closing the intercommunication between the pipe stem and bowl as the final remains of the charge are being consumed.

A further object of the invention is to enable a tightly tamped or compacted tobacco charge to be readily loosened in the pipe bowl without disturbing the ignited portion thereof.

A further object of the invention is to enable a pipe to be adjusted to the use of tobacco of different grades or of different character and to adapt it to the individual taste and preference of a particular smoker.

A further object of the invention is to insure a cool, soothing and dry smoke and to minimize the debris and crust remaining within the pipe bowl, maintaining the latter at all times clean and clear.

A further object of the invention is to provide a tobacco pipe having the advantageous structural features and inherent meritorious characteristics herein mentioned.

With the above primary and other incidental objects in view as will more fully appear in the specification, the invention intended to be protected by Letters Patent consists of the features of construction, the parts and combinations thereof, and the mode of operation, or their equivalents, as hereinafter described or illustrated in the accompanying drawing.

In the drawing, wherein is shown the preferred but obviously not necessarily the only form of embodiment of the invention, Fig. 1 is a longitudinal sectional view of a pipe of conventional shape wherein the present invention is embodied.

Fig. 2 is a perspective view of the insert removed from the pipe.

Figs. 3, 4 and 5 present different aspects of the implement for inserting, removing and adjusting the insert.

Fig. 6 is a sectional view illustrating a modification wherein the insert is devoid of screw threads and is held in adjusted position by its press fit.

Fig. 7 is a further modification illustrating an assembly applicable to any pipe without special preparation for adaptation.

Fig. 8 is a sectional view of the device of Fig. 7 in assembled relation.

Fig. 9 is a top plan view thereof.

Fig. 10 is a perspective view of the insert diaphragm and attached flue removed from its mount.

Fig. 11 is a perspective view of the mounting spider.

Fig. 12 is a perspective view of the thermo-responsive cut-off disc removed from the assembly.

Like parts are indicated by similar characters of reference throughout the several views.

Referring to the accompanying drawing, 1 is the bowl of a conventional form of tobacco pipe, of which 2 is the stem. The interior of the bowl 1 is slightly tapered or flaring, being larger at its top and smaller at the bottom where the stem 2 communicates therewith at 3. Adjustably positioned in the bottom of the bowl 1 is a mushroom shaped insert comprising a convex head 4 and an integral tubular stem 5, upon which the head is supported in an elevated position within the bowl. The head 4 of the insert is of somewhat smaller

diameter than the interior of the bowl at coincident level and is supported by its stem 5 in elevated relation within the bowl. It divides the bowl into an upper combustion chamber 6 and a lower suction chamber 7 with which the pipe stem communicates. The suction and combustion chambers communicate through an annular space 8 peripherally surrounding the head 4, intermediate the head and the wall of the bowl.

The stem 5 is projected within an opening 9 in the bottom of the bowl where it is accessible for axial adjustment of the insert relative to the pipe bowl. The stem 5 may be either screw threaded for adjustable engagement in the opening 9 in the bottom of the pipe bowl, or it may have a close press fit therein. A bore 10 extending axially entirely through the stem 5 and head 4 interconnects the bottom of the combustion chamber 6 with atmosphere and serves to admit a supplemental supply of clear cool air for intermixture with the smoke of combustion.

The only communication between the combustion chamber and the suction chamber 7 is through the annular space 8. The suction draft from the top of the bowl 1 follows closely to the sides thereof and accelerates the combustion of the outside of the tobacco charge, instead of the formation of a central crater therein. Such peripheral acceleration of combustion causes the charge to burn quite evenly through successive substantially horizontal levels as indicated by dotted lines. The acceleration of combustion closely adjacent to the walls of the bowl insures that there will be left no residue or crust of partially burned and charred tobacco. The consumption of the charge is from the outside inwardly.

The rapidity of combustion is regulated and controlled by the axial adjustment of the insert. By varying its position within the flaring or tapered interior of the bowl, the size of the intervening annular space 8 between the head 4 and bowl wall may be varied at will. This enables the pipe to draw more or less freely with a corresponding variation of the rate of combustion. Also, if it is found that the tobacco charge is packed too tightly or tamped too hard, by adjustment of the insert the charge may be lifted and thereby loosened in the flaring bowl 1, or the insert may be slightly retracted to release the pressure and afford greater air capacity through the bottom of the tamped in charge.

The axial bore 10 permits a supplemental supply of cool air to be drawn from outside the bowl into the bottom of the combustion chamber beneath the combustion zone. Such cool, clean air intermixes with the smoke and products of combustion above the head 4 and passes therewith through the variable annular communicating space 9 into the suction chamber 7 and thence to the pipe stem.

To enable adjustment of the insert to vary the capacity of the annular space 9 for suction draft, in event the stem of the insert is screw threaded, the opposite ends of the insert are provided with transverse slots 11 and 12 for engagement, in either of which, of a small implement 13, which may be carried in a suitable bore 14 in the wall of the pipe bowl. The implement 13 has formed thereon an edge 15, analogous to that of a screw driver, engageable in either of the slots, and a continuing pilot pin 16 engageable in the bore 10. The device may be engaged interiorly of the bowl with the head 4, or exteriorly thereof with the end of the stem 5 to rotate the insert in its screw threaded engagement in the bottom of the bowl. In the event that the stem is devoid of screw threads and held in adjusted relation by the tightness of its fit, the implement 13 may be applied with pressure in like manner to press the insert into or out of engagement with the bowl and axially to adjust it relative thereto.

Secured to the stem 5 immediately beneath the head 4 is a thermo-responsive concavo-convex disc 17. Normally this disc is disposed with its concave side uppermost, in which position its periphery is substantially coincident with that of the head 4 and hence does not restrict the annular air passage 8. However, as the tobacco charge is finally consumed, and the combustion zone approaches the bottom of the chamber 6, the generated heat transmitted to the thermo-responsive disc causes the disc to reverse its buckled contour, causing the periphery thereof to be projected away from the head 4 downwardly into close relation with the tapered walls of the bowl, thereby closing the annular air passage 8. This effectively prevents ash and dregs or residue of the tobacco charge being drawn into the pipe stem. Upon being allowed to cool, the thermostatic disc will again reverse itself, thus opening the air passage 8 preparatory to the next smoking period.

A modification of the air supply and regulatory means applicable to any pipe without special adaptation is shown in Fig. 7. In this embodiment the insert comprising the head 4 and threaded stem 5, instead of being mounted in an opening 9 in the bottom of the pipe bowl, is adjustably supported in a spider mount interiorly insertable in the bottom of the pipe bowl. This mount comprises an internally screw threaded hub 18 in which the stem 5 is adjustably engaged, and interconnected radial arms 19 preferably somewhat resilient, which engage with the side walls of the bowl to stationarily support the insert 4—5 axially therein. The head 4, as before described, is of somewhat less diameter than the tapered or flaring interior of the bowl 1 at a corresponding level. Therefore, by screwing the insert stem 5 to greater or less extent within the hub 18 of the mount spider the capacity of the annular air space 8 intermediate the periphery of the head and the wall of the bowl may be varied.

To afford a supply of air from the exterior for intermixture with the smoke and products of combustion generated in the chamber 6, a perforate flue 20 is attached to the head 4 of the adjustable insert and extends axially through the combustion chamber to the plane of the bowl top. This flue 20 preferably comprises a helical spring of relatively small diameter, the convolutions of which are not so tightly wound as to prevent passage of air therebetween. This fresh air flue, extending the full depth of the combustion chamber 6, is subject to the suction draft influence exerted through the pipe stem and suction chamber 7.

Fresh air drawn through the interior of the coiled spring flue escapes laterally through the interstices between the spring convolutions into the tobacco charge, particularly at the lower end of the flue, where the coils of the spring 20 are preferably, although not necessarily, less tightly wound, thereby permitting the air to more readily escape into the tobacco charge for intermixture with the smoke and products of combustion before they pass through the annular space 8 into the suction chamber.

The flue 20 being quite flexible and resilient

is easily cleaned by vibration or by snapping it back and forth while the pipe bowl is empty. This flue stem may be utilized for rotating the insert 4—5 to effect its axial screw adjustment in the mount spider to vary the admissible volume of air. It may also be conveniently used to remove and reinsert the assembly within the pipe bowl.

In either form of embodiment a supplemental supply of cool, clean outside air is afforded for intermixture with the smoke and other products of combustion and the volume of suction draft permitted may be varied to suit the requirements of tobaccos of different character and grades and the individual desire or preference of the smoker. By such draft regulation the combustion is so controlled that the tobacco charge is evenly and uniformly consumed, leaving little or no charred crust and residue adherent to the pipe walls.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific features shown, but that the means and construction herein disclosed comprise the preferred form of several modes of putting the invention into effect, and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

Having thus described my invention, I claim:

1. In a tobacco pipe having a combustion bowl and a pipe stem communicating therewith, an axially adjustable diaphragm located adjacent to the bottom of the bowl above the level of the point of communication of the pipe stem therewith, dividing the bowl into two intercommunicating compartments, and differentially positionable in operative relation therein, and a stem attached to the diaphragm and projecting through the bottom of the bowl where it is accessible for adjustment of the diaphragm into different operative positions to inversely vary the relative capacities of the compartments and regulate the intercommunication therebetween.

2. A tobacco pipe having an interiorly flaring combustion bowl, an axially adjustable diaphragm therein dividing the bowl into a combustion compartment and a smoke compartment with which the pipe stem communicates, having intercommunication with each other intermediate the flaring wall of the bowl and the periphery of the adjustable diaphragm, and adjusting means for differentially positioning the diaphragm in operative relation relative to the flaring walls of the bowl to inversely vary the relative size of the combustion and smoke compartments and proportionately regulate the intercommunication between the combustion and smoke compartments.

3. A tobacco pipe having an interiorly flaring combustion bowl, an axially adjustable diaphragm therein dividing the bowl into a combustion compartment and an air compartment with which the pipe stem communicates, having intercommunication with each other intermediate the flaring wall of the bowl and the periphery of the adjustable diaphragm, and adjusting means accessible through the bottom of the bowl for adjusting the diaphragm into different operative positions relative to the bowl to regulate the capacity of the intermediate space therebetween.

4. A tobacco pipe having an interiorly flaring combustion bowl, an axially adjustable diaphragm therein dividing the bowl into a combustion compartment and an air compartment with which the pipe stem communicates, having intercommunication with each other intermediate the flaring wall of the bowl and the periphery of the adjustable diaphragm, and a stem attached to the diaphragm and accessible exteriorly of the bowl by which the diaphragm may be adjusted into different operative positions relative to the bowl to vary the capacity of the intermediate space therebetween.

5. A tobacco pipe having an interiorly flaring combustion bowl, an axially adjustable diaphragm therein dividing the bowl into a combustion compartment and an air compartment with which the pipe stem communicates, intercommunicating with each other through a variable passage intermediate the flaring wall of the bowl and the periphery of the adjustable diaphragm, and means for axially adjusting the diaphragm into different operative positions within the flaring bowl to thereby vary the capacity of the intercommunicating passage.

6. A tobacco pipe including a bowl and a pipe stem, a diaphragm dividing the bowl into a combustion compartment and a smoke compartment with which the pipe stem communicates, a variable intercommunicating passage for passage of smoke of combustion from the combustion chamber to the smoke chamber, and adjusting means for varying the relation of the diaphragm with the walls of the flaring bowl to correspondingly vary the size of the intercommunicating passage between the combustion and smoke chambers.

7. A tobacco pipe including a flaring bowl and a pipe stem, an axially adjustable diaphragm dividing the bowl into a combustion compartment and a smoke compartment with which the pipe stem communicates, said diaphragm being differentially positionable in operative relation within the flaring bowl, there being a variable passage intermediate the diaphragm and the walls of the flaring bowl, the capacity of which is varied by adjustment of the diaphragm, means for supporting the diaphragm in any one of several positions of adjustment for passage of smoke of combustion from the combustion chamber to the air chamber, and means for introducing outside air into the combustion compartment below the level of the combustion zone for intermixture with the smoke of combustion before its passage from the combustion compartment to the air compartment.

8. A tobacco pipe including a bowl and a pipe stem, a flexible diaphragm subject to buckling action under influence of temperature change and dividing the bowl into a combustion compartment and an air compartment, and when in one position of buckled adjustment affording an intercommunicating passage between the periphery of the diaphragm and the wall of the pipe bowl, and in the alternate position of buckled adjustment closing the intercommunicating passage therebetween, the construction and arrangement being such that the diaphragm maintains open communication between the respective compartments of the pipe bowl until the tobacco charge is approximately consumed,

whereupon the increased temperature of the approaching combustion zone thereto influences the diaphragm to close the intercommunicating passage between the respective bowl compartments.

9. A tobacco pipe including a bowl divided into normally intercommunicating combustion and air compartments and a pipe stem communicating with the latter, characterized by means influenced by the combustion of a tobacco charge in said combustion compartment for automatically closing the intercommunicating passage between the respective compartments when the tobacco charge approaches exhaustion.

10. In a tobacco pipe having a flaring combustion bowl with which the pipe stem communicates, an axially adjustable diaphragm therein dividing the bowl into a combustion compartment and a smoke compartment, and a diaphragm stem for differentially positioning the diaphragm in different operative relations within the bowl, there being an annular by-pass passage intermediate the periphery of the diaphragm and the interior walls of the flaring bowl, the capacity of which is varied by the axial adjustment of the diaphragm, through which products of combustion pass from the combustion compartment to the smoke compartment.

11. In a tobacco pipe having a flaring combustion bowl with which the pipe stem communicates, an air inlet admitting outside air to the bottom of the pipe bowl, and a baffle differentially positionable within the flaring combustion bowl in operative relation with the walls thereof, there being a by-pass passage varied by the adjustment of the baffle insuring intermixture of the outside air with the smoke of combustion prior to entry thereof into the pipe stem.

12. In a tobacco pipe having a combustion bowl and a pipe stem normally communicating therewith, a thermostatic closure for automatically interrupting intercommunication between the bowl and stem when the combustible charge of tobacco in the bowl is approximately consumed.

13. A tobacco pipe having a combustion bowl and a pipe stem communicating therewith, means controlling the intercommunication of the pipe stem with the combustible charge in the bowl and subject to increase of temperature as the combustible charge is approximately consumed, the construction and arrangement being such that the withdrawal of dregs and ash from the bowl into the stem is automatically prevented.

14. A tobacco pipe including a bowl and a pipe stem, a diaphragm dividing the bowl into a combustion compartment and an air compartment, an intercommunicating passage therebetween, the pipe stem having communication with the air compartment, and means accessible exteriorly of the bowl for adjusting the capacity of the intercommunicating passage between the combustion and air compartments.

15. A tobacco pipe including a bowl and a pipe stem, a diaphragm dividing the bowl into a combustion compartment and an air compartment, an intercommunicating passage therebetween, the pipe stem having communication with the air compartment, and means for automatically closing said passage when the tobacco charge within the combustion compartment is approximately exhausted.

16. A tobacco pipe including a flaring bowl and a pipe stem, a diaphragm dividing the bowl into a combustion compartment and a smoke compartment of inversely variable sizes, an intercommunicating passage therebetween, an adjustable support for differentially positioning the diaphragm in operative relation with the flaring walls of the bowl to correspondingly vary the size of the intercommunicating passage, the pipe stem having communication with the air compartment, and means for admitting an auxiliary supply of fresh air to the combustion compartment below the level of the combustion zone for intermixture with the smoke of combustion prior to its passage to the air compartment.

17. A tobacco pipe including a bowl having an interiorly tapered bore and a pipe stem communicating therewith, characterized by a diaphragm of lesser diameter than the interior of the bowl, dividing the bowl into a combustion chamber and a draft chamber intercommunicating through a surrounding opening between the diaphragm and walls of the bowl, and means for mounting the diaphragm for axial adjustment relative to the bowl, including a spider mount located in the bottom of the bowl including a screw threaded hub, radial arms engaging the bowl walls, supporting the hub axially therein, and a screw threaded stem adjustably connecting the hub and diaphragm.

18. A tobacco pipe including a bowl having an interiorly tapered bore and a pipe stem communicating therewith, characterized by a diaphragm of lesser diameter than the interior of the bowl, dividing the bowl into a combustion chamber and a draft chamber intercommunicating through a surrounding opening between the diaphragm and walls of the bowl, and a laterally perforate flue carried by the diaphragm and projecting substantially centrally of the bowl from the diaphragm to approximately the top plane thereof, permitting the indraft of outside air therethrough and thence laterally beyond the flue walls into the lower zones of the combustion chamber.

19. A tobacco pipe including a bowl having an interiorly tapered bore and a pipe stem communicating therewith, characterized by a diaphragm of lesser diameter than the interior of the bowl, dividing the bowl into a combustion chamber and a draft chamber intercommunicating through a surrounding opening between the diaphragm and walls of the bowl, and a helical spring of relatively small diameter supported on the diaphragm and extending thence into proximate relation with the top plane of the bowl, comprising a flue for intake of outside air which is permitted to escape thence laterally into the combustion chamber.

20. A tobacco pipe including a bowl and a pipe stem, a diaphragm dividing the bowl into a combustion compartment and a smoke compartment, an intercommunicating passage therebetween, the pipe stem having communication with the smoke compartment, and a screw stem attached to the diaphragm and accessible exteriorly of the bowl for axially adjusting the diaphragm within the bowl to vary the relative operating capacities of the combustion and smoke compartments.

DAVID M. DUNWOODIE.