This invention relates to improvements in mechanized smoking pipe cleaners of a general type comprising a motor containing ash receptacle above which projects a reamer over which the pipe bowl is pressed to ream out its cake and allow the cuttings or ash to be taken into the receptacle.

As is well known, the ash reamed from smoking pipes is objectionably odorous in open exposure, and is unsightly and otherwise troublesome when deposited in the usual trays. As to the pipe itself, ordinary hand reaming of the bowl cake often is unsatisfactory because of lack of uniformity in removal of the cake, tendency to produce clogging in the stem, and inconvenience in disposal of the removed ash.

The invention has for its general object to provide a mechanical reamer of the character indicated, which affords various advantages and convenience in accomplishing fast and uniform reaming of the cake, continuous removal of the severed ash, and entrapment of the ash in a manner eliminating objectionable odor.

A major object of the invention is to provide, in conjunction with the reamer a surrounding shroud to which the pipe bowl is applied, the shroud being downwardly displaceable as the reaming progresses to entrap and direct the cuttings into the receptacle below.

A further object is to provide a downwardly displaceable reamer yieldably resisted to govern or influence the effective reaming pressure and, movable in conjunction with the shroud so that together the reamer and shroud sever and confine the cuttings throughout full reaming of the pipe bowl.

The invention also contemplates creation of air flow from the reamer to carry the cuttings as they are formed down through the duct into the receptacle, as by a fan contained in the receptacle and driven by the reamer motor.

As to the motor and fan operation, the invention provides for switch means responsive to predetermined displacement of the shroud to start the motor, and in a manner starting the reamer into operation before it is subjected to possibly stalling pressure against the cake.

The ash odor problem is solved both by initial confinement of the ash going to collection in the receptacle, and by deodorizing air emitted from the receptacle to the atmosphere. Provision is made for venting ash-free air from the receptacle and by contacting such air with deodorizing means such as one or more sacelts over or through which the air passes before release.

The invention has various additional features and objects, all of which together with those outlined above, will be understood from the following detailed description of illustrative embodiments of the invention shown by the accompanying drawings, in which:

FIG. 1 is a view showing one embodiment of the invention in vertical section;

FIG. 2 is an enlargement of the upper portion of FIG. 1 showing a smoking pipe applied to the reamer with the shroud depressed;

FIG. 3 is a view similar to FIG. 1 illustrating a variational embodiment of the invention; and

FIG. 4 is a fragmentary sectional showing of the tubular motor driven shaft.

Referring first to FIGS. 1 and 2, the device is shown to comprise a housing 10 containing a motor 11 suitably mounted as upon the circularly spaced housing lugs 12, the housing being annularly spaced at 13 about the motor to provide for downward air passage into the shroud receptacle generally indicated at 14. The latter is shown to comprise a flanged base 15 and an upper member 16 having a friction fit within the housing, the base 15 having one or more air outlet passages 17 through which air escapes from the receptacle through a suitable deodorizing means generally indicated at 18. Such means may comprise a cup 19 covered by perforated cap 20 containing a perfumed sachet 21 confined within suitable porous filtering media 22, the sachet serving as a deodorant for the air escape through apertures 23 to passages 24.

The motor shaft 24 rotatably drives a suitable reamer shown typically as having the form of a blade 25, by way of sleeve 26 carrying bearing 27 fixed to the motor shaft, the bearing being keyed to sleeve 26 by pin 28 projecting into the sleeve slot 29. Downdraft displacement of the reamer is yieldably resisted by coil spring 30 bearing against head 31 of the reamer shaft 32, the head being fixed to the sleeve 26 by pin 33. By reason of this spring loaded mounting, the reamer is downwardly displaceable relative to the motor shaft under pipe bowl applied pressure as will appear.

An axially displaceable shroud generally indicated at 34 is mounted upon the motor housing to extend concentrically about the reamer. While capable of embodiment in any of different forms permitting downward displacement of at least the upper extent of the shroud, the latter is shown to comprise an axially elastic bellows 35 having a base flange 36 received within tubular retainer 37 extending downwardly through opening 38 in the hollow cover 39, and through opening 40 in the top of the housing 10. Space 41 within the cover 39 contains a switch 42 of suitable type having a normally upward urged actuator 43 engaged against the underside of the bellows retainer flange 37a. The switch 42 connects the electrical power leads 44 with leads 45 going to the motor 11. In the FIG. 1 which shows the raised position of the actuator 43, the switch is opened to interrupt current feed to the motor.

The motor shaft 24 mounts a fan 46 in the form of a suction impeller which during operation of the motor draws air downwardly through the bellows shroud and retainer 37 into the motor chamber 13, the fan thence operating to discharge the air downwardly about the motor and through deodorizing device 18 as previously explained.

If desired, the reamer and shroud may be enclosed when the device is not in use, as by a cap 47 fitted to extension 48 of the cover 39, this extension also serving to stabilize lateral displacement of the bellows and its retainer. Odors tending to escape from the device through apertures 49 through perforated closure 12, are perfumed by a sachet 51 accommodated within porous filtering material 52.

In considering the operation of the cleaner, assume the parts to be positioned as in FIG. 1 with the cover 47 removed. Upon initial application of a pipe bowl P to the top of the bellows 35 as in FIG. 2, the reamer 25 is permitted only partial entry to a caked bowl cavity 53. Bowl-applied pressure first displaces the bellows and its retainer 37 downwardly to close the switch 42 and thus start the motor and reamer into operation. Starting of the reamer most desirably occurs before its full entry into the bowl so as not to encounter any excessively heavy bowl cake before the motor brings the reamer to full speed. By continued light pressure, upon the shroud 14, the bellows is progressively compressed and the reamer allowed to penetrate the bowl to the full depth of FIG. 1. Simultaneously the fan 46 induces air flow through
the bowl stem passage 461 to cool and dry the bowl and to sweep and entrain the cutting downwardly into the motor chamber 13 and ultimately into the receptacle, while preventing the deposition of loosened matter in the stem passage 461. Upon release of the reamed out bowl from the bellows, the latter restores to the FIG. 1 position, being elevated by the switch actuator while stopping the motor.

The variational form of the invention shown in FIGS. 3 and 4 comprises, as before, a housing 55 containing motor 56 suitably supported as at 57 within a baffle chamber 58 annularly spaced at 59 from the outer housing. Above its in-turned apertured flange 60 the housing mounts a fan and filter assembly generally indicated at 61 comprising a rotor 62 having arms 62a fixed at 63 to the motor shaft 64, the rotor carrying an annular porous filter 65 at the inside of fan blades 66. The assembly 61 includes a cover 67 having suitable porous filter lining 68 supported on an annular shell 69 having openings 70 at the outside of an annular screen 71.

The cover 67 mounts a switch 80 corresponding to switch 42 in FIG. 1, and also supports about central aperture 72 an elastic bellows 73 carrying an arm 74 engageable downwardly against the switch actuator 75.

As best illustrated in FIG. 4, the motor shaft 64 is tubular to provide a passage 76 into which air enters through filter 77 on the bottom end of the shaft. At its upper end the shaft mounts sleeve 78 carrying the reamer 79, downward displacement of the sleeve relative to the motor shaft being resisted by spring 83 and the sleeve being keyed to the shaft for rotation therewith by the shaft pins 81 projecting into the sleeve slots 82.

In a pipe cleaning operation, initial application of the bowl to the top of the bellows 73 displaces the latter downwardly, causing arm 74 to depress the actuator 75 and start the motor in operation. Cuttings from the bowl are entrained in the air stream being induced downward through the bellows to pass between arms 62a of the rotor and downwardly through space 59 for collection in the separable receptacle section 55a of the housing. A portion of the induced air escapes to atmosphere through the filter 65 and screen 71. The filter may be perfumed or otherwise treated to deodorize the escaping air. The remaining air being displaced downwardly through space 59 enters the motor shaft through filter 77 and is discharged upwardly through the motor shaft passage 76 ultimately to be jetted through the sleeve 78 into the pipe bowl, thus to aid in sweeping out and into the shroud the cuttings as they are formed.

I claim:

1. A pipe cleaner comprising,
   (A) an ash receptacle,
   (B) a motor in the receptacle,
   (C) a pipe reamer above the receptacle,
   (D) means connecting the reamer to the motor for rotation thereby,
   (E) a vertically extending tubular shroud surrounding the reamer and engageable at its upper end by a pipe to be reamed, said shroud being communicable with the interior of the receptacle and the pipe-engaged portion of the shroud being downwardly dischargeable by pipe-applied pressure as the reaming progresses.

2. A pipe cleaner according to claim 1, including means mounting the reamer to be downwardly displaceable by an applied pipe.

3. A cleaner according to claim 1, including also means for inducing air flow downwardly through the shroud into the receptacle.

4. A cleaner according to claim 1, in which said shroud is of an axially deformable bellows configuration.

5. A cleaner according to claim 2, in which said reamer mounting means comprises a coupling interconnecting the reamer and motor and including yielding means resisting downward displacement of the reamer.

6. A cleaner according to claim 2, in which said shroud is axially and elastically deformable.

7. A cleaner according to claim 1, including switch means operable in response to downward displacement of the shroud to energize and start the motor and reamer in operation.

8. A cleaner according to claim 7, including a suction fan in the receptacle and driven by the motor to induce air flow down through the shroud.

9. A cleaner according to claim 8, including means for directing air flow from the receptacle upwardly to the reamer.

10. A cleaner according to claim 9, in which said directing means includes an air passage extending within the motor shaft.

11. A cleaner according to claim 10, in which said directing means includes an air passage extending within the motor shaft.

12. A cleaner according to claim 1, in which said receptacle contains a fan operating to induce air flow downwardly through the shroud and to discharge air to atmosphere through an opening in the receptacle.

13. A cleaner according to claim 12, including also means for deodorizing the air being discharged to atmosphere.

14. A cleaner according to claim 12, in which the receptacle includes a removable ash receiver.

15. A cleaner according to claim 12, including switch means operable in response to downward displacement of the shroud to energize and start the motor and reamer in operation.

References Cited

UNITED STATES PATENTS

1,052,759 2/1913 Shepard ___________________ 131—244
1,235,410 7/1917 Shepard ___________________ 131—244
1,651,651 12/1927 Warman ___________________ 131—232
2,252,175 8/1941 Gordon ___________________ 131—232
2,306,622 12/1942 Gordon ___________________ 131—246
2,725,884 12/1955 Colby ___________________ 131—246

FOREIGN PATENTS

1,381,338 11/1964 France ___________________ 594,653 7/1934 Germany ___________________ 522,707 12/1929 Great Britain ___________________

SAMUEL KOREN, Primary Examiner.

JOSEPH S. REICH, Examiner.