Nov. 22, 1949 A. M. RAPOPORT 2,488,682

PERFUME ATOMIZER

Filed Sept. 22, 1947

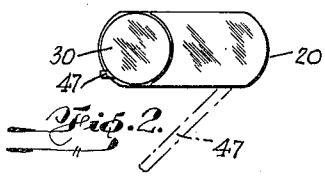

Fig. 2.

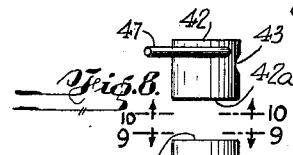

Fig. 8.

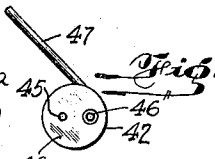

Fig. 10.

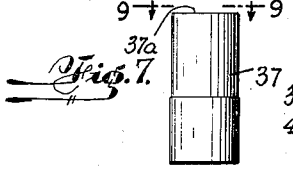

Fig. 7.

Fig. 9.

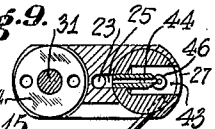

Fig. 15.

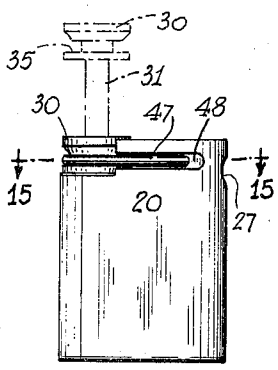

Fig. 1.

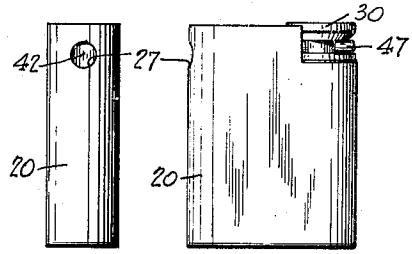

Fig. 4. Fig. 5.

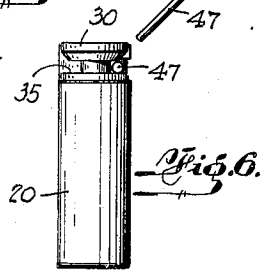

Fig. 6.

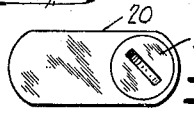

Fig. 3.

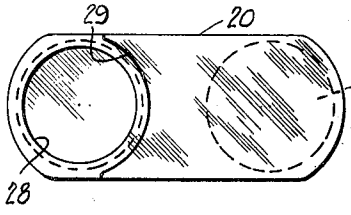

Fig. 12.

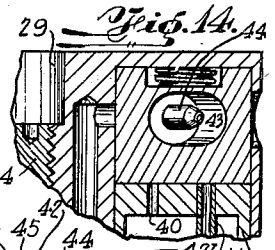

Fig. 14.

Fig. 13.

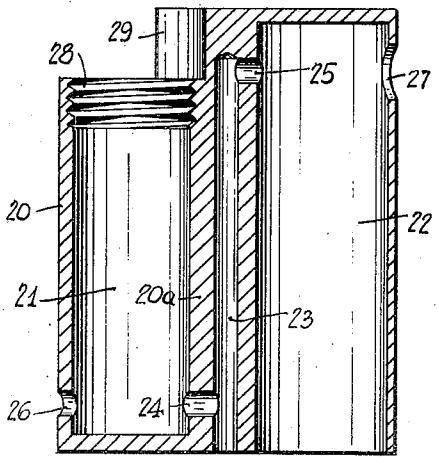

Fig. 11.

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PERFUME ATOMIZER

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Application September 22, 1947, Serial No. 775,412

1 Claim. (Cl. 299—88)

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This invention relates to new and useful improvements in perfume atomizers and has especial reference to one which can be carried around in a hand bag or the pocket.

An object of the invention is to provide a simple, compact, durable, efficient and inexpensively manufactured device.

A further object is to provide a device which is light in weight, of ornamental material, made of a few simple parts which can be separately and inexpensively manufactured and then assembled and disassembled with ease for inspection, replacement, and repair.

Still a further object is to provide a device of the kind described which can be operated while being held in one hand and with the fingers of that hand alone, thus making it extremely convenient to use at all times.

Yet another object is to provide a device in which the operating parts may be easily moved to operative and inoperative positions and in which there is no likelihood of leakage of liquid on to the garments of the user.

Further and more specific objects, features, and advantages will more clearly appear from the detailed specification hereinafter set forth especially when taken in connection with the accompanying drawings which illustrate a present preferred form which the invention may assume and which form part of the specification.

In brief and general terms the invention comprises a simple casing of solid metal such as aluminum in which are bored two chambers spaced apart and separate, one forming a pump chamber and the other a chamber for a rotatable valve block and a liquid tank. A passage connects the pump chamber with the other chamber in the vicinity of the valve block. A reciprocable piston in the pump chamber is operated against the resistance of a spring therein by means of a plunger with a head thereon having an annular groove therein. When the head is depressed it lies against the top of the casing and is held in this position by an arm on the rotatable valve block when that arm has moved the block to an inoperative position and lies in said groove. When the arm is released from the groove, the spring under the piston, forces the head up ready for operation.

The valve block has a central bore containing an air nozzle, a liquid nozzle and a vent passage with the air nozzle adapted to be associated with the air passage leading from the pump chamber when the block is moved to operative position. The block is associated with air and vent passages in the top of a liquid tank disposed immediately below it so that in one position of the block the corresponding passages will be aligned and in another position these passages will be disaligned to prevent leakage and flow of fluid. The tank is tight-fitted into the chamber and thus tends to hold the block in position but not to prevent its free rotation under the influence of the arm. Thus when the operator wishes to use the atomizer all he has to do is to flick the arm out of the groove in the head which will then spring up, the outward movement of the arm also moving the block to operative position. The movement of the arm in this direction is gauged and limited by an adjacent wall of the casing. Thus the main casing is simple, having merely two simple bored chambers and a connecting passage. The few sub-units or assemblies comprise merely the block which can be slipped into place after having been otherwise completely assembled, and the liquid tank which is fitted tight into the bore, as well as the simple spring plunger pump mechanism which can be held in place by a screw plug in its chamber or bore.

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The present preferred form which the invention may assume is illustrated in the drawings, of which

Fig. 1 is a side elevation of the device, with the pump element shown in dash-dot lines in elevated or extended position;

Fig. 2 is a plan view of the device, showing the valve-operating arm in released position in broken lines;

Fig. 3 is an inverted plan view of the device;

Fig. 4 is an end elevation of the device looking at the discharge opening;

Fig. 5 is a side elevation of the device opposite to that shown in Fig. 1;

Fig. 6 is an end elevation of the device looking at the end opposite that shown in Fig. 4;

Fig. 7 is an elevation of the fluid casing or reservoir;

Fig. 8 is an elevation of the valve block and nozzle unit;

Fig. 9 is a top view of the device shown in Fig. 7;

Fig. 10 is a bottom plan view of the device shown in Fig. 8;

Fig. 11 is an enlarged vertical longitudinal section through the main casing of the device with the inner parts removed;

Fig. 12 is a plan view of the casing shown in Fig. 11;

Fig. 13 is a section similar to Fig. 11 with the parts in place;

Fig. 14 is a partial enlarged corner section of the device, showing the valve unit in closed position; and

Fig. 15 is a horizontal section taken on the line 15—15 of Fig. 1.

Referring now to the specific construction shown in the drawings, it is seen that there is a main casing or body portion 20, preferably made of some light ornamental metal such as aluminum, and which is preferably shaped quite like a cigarette lighter and generally small enough to fit into the pocket or a handbag.

As seen in Figs. 11 and 13 this casing is bored from the top and bottom respectively to provide chambers 21 and 22 which receive the operating plunger and the liquid tank and valve unit respectively. The casing 20 also has a central bore or passage 23 drilled in from the bottom with a lower cross passage 24 communicating with the chamber 21 and an upper cross passage 25 connecting passage 23 with the upper part of the chamber 22. For convenience in boring of passage 24 a drill may be operated through wall of chamber 21 thus producing opening 26; which is later plugged, and opposite the passage 25 in the wall of chamber 22 is a large opening 27 which acts as an opening through which the liquid being atomized is emitted and which also permits the boring of passage 25.

It will be observed that the construction and manufacture of the main casing is extremely simple, requiring very few simple machining operations.

The top portion of the chamber 21 is screw threaded as at 28 and the top of the casing 20 is cut away above the chamber 21 with a curved wall 29 formed on the adjacent portion of the casing 20. This cutout provides space for housing an operating cap or head 30 of a pump plunger rod 31 on the lower end of which is disposed a piston 32 of any desired type adapted to reciprocate in the chamber 21.

Beneath the piston is disposed a compression spring 33 which resists the downward movement of the piston and moves it up when the finger pressure is removed from the head 30. The rod 31 is slidably received in plug 34 which is threaded into the top of the chamber 21. The head 30 is circular in outline plan and lies snugly in the cutaway portion of the corner of the casing when it is in its downward position as shown in Fig. 1 in full lines. The periphery of the head 30 is provided with an annular groove 35 for a purpose later to be described.

When the piston is reciprocated air is forced through passages 24, 23, and 25 with an effect to be later set forth. After the casing 20 is manufactured the opening 26 and the lower end of passage 23 are closed by suitable metal plugs 36 as seen in Fig. 13.

While not shown, it will be obvious that a communicating passage may be made between bore 23 and chamber 21 by a drill entered at an angle through the bottom of bore 23 and thus drilling through wall 20*a*, in which case the opening 26 is not necessary.

Now turning to the other chamber 22, Fig. 13 shows that its open bottom is closed by a liquid tank 37 which is tight-fitted into the chamber 22 and extends quite a bit up into the chamber, occupying the major portion thereof. The tank 37 holds liquid 38 to be atomized, and is closed at the bottom by a removable screw closure plug 39. The top wall of the tank 37 is provided with an air vent passage 40. There is tight-fitted into

said wall the upper end of a pipe 41 which extends close to the bottom of the tank 37, the upper end of the pipe 41 opening into the top surface of the tank 37. The passage 40 acts to vent air into the tank 37 as the liquid is sucked out of the tank and the pipe 41 acts to conduct liquid to a valve mechanism now to be described.

A valve unit is disposed in the top of the chamber 22 above the tank 37 and is snugly but rotatably disposed therein. This is in the form of a cylindrical block 42 the flat bottom surface 42*a* of which abuts the flat top surface 37*a* of the tank 37. This block has a horizontal chamber or bore 43 opening at one end into the face of the block and at the other end provided with a passage in which is seated an air nozzle element 44 projecting into the chamber. The bottom wall of the block is provided with an air vent passage 45 to register at times with the vent 40, and with a passage in which is seated a liquid nozzle element 46 which projects up into the chamber 43 to a point just below and in front of the air nozzle element 44.

The block 42 is rotatable in the chamber 22, and in the operative position shown in Fig. 13 the nozzle element 44 is aligned with the passage 25, and the passages 45 and the nozzle element 46 are respectively aligned with the passage 40 and the pipe 41 on the tank previously described. It is also seen that in this position, the open end of the chamber 43 in the valve block is registered with the discharge opening 27 in the casing previously mentioned. As will be seen, an air passage is provided from the pump chamber 21 to the air nozzle 44 and communication is established for flow of liquid from the tank 37 to and through the liquid nozzle element 46.

In order to turn the valve block 42 it is provided with an operating arm 47 screwed into the block 42. The side of the casing adjacent and to the rear of the block is formed with a slot 48 open at its rear end so that this arm 47 may be freely moved to rotate the block and in one position to lie along the slot and rest in the annular groove 35 of the plunger head 30 above mentioned. This will hold the arm 47 and block 42 in inoperative position of the block when the arm 47 is in inoperative position as shown in Fig. 14 and it is seen that the various passages above described for the passage of air and liquid are disalined so that no air or liquid can pass and since the block is snugly fitted into the casing 22 and is yieldingly urged against the surface 37*a* by spring 42*b* located in recess 42*c* of block 42, there is no likelihood of leakage when the block is thus disposed. The arm 47 in moving to the position shown in Fig. 15, where the block is disposed in operative position is limited against further movement in the outward direction by the end of the slot 48 as shown in Fig. 15.

In the operation of the device, let us assume the parts are in the position shown in Fig. 1, namely their inoperative position. With a flick of the finger the end of arm 47 is moved out of the groove 35 to the position shown in Fig. 15. This permits the spring 33 to force the pump plunger 31 upwardly ready to be operated, and also sets the valve block in the position shown in Fig. 13 so that the various passages previously mentioned are aligned for flow of the fluids therethrough. By depressing the head 30 the air is forced through the passages and out through nozzle 44 across the top of the nozzle 46 whereupon some liquid is sucked out and atomized and discharged as spray through the

aligned openings **43** and **27** into the atmosphere. The device is closed by depressing the head **30** and then moving the arm **47** back into position in the groove **35** whereupon the parts are locked in closed position.

This device is small so that it can be carried in the pocket or in a hand bag; is light in weight and ornamental; is economical to manufacture; and is composed of a few simple accurately machined and related units which can be assembled and disassembled with ease and dispatch for inspection replacement, and repair at will. It can be operated while being in one hand and with the fingers of that hand as easily as a cigarette lighter is also operated.

While the invention has been described in detail and with respect to a present preferred form which the invention may assume, it is not to be limited to such details and forms, since many changes and modifications may be made in the invention without departing from the spirit and scope of the invention in its broadest aspects. Hence it is desired to cover any and all forms and modifications of the invention which may come within the language or scope of the appended claim.

What I claim as my invention is:

An atomizer comprising a casing having a pump chamber with a plunger pump therein and a plunger head extending without the casing, an annular groove around said plunger head, said casing also having a vertical cylindrical chamber therein, a cylindrical valve block coaxially and oscillatably disposed in said chamber at one end thereof and having a flat base, an arm extending from said valve block to oscillate it, a liquid tank tight-fitted into said chamber below said block and having a closed flat top in surface contact with said flat base, said block and tank having corresponding passages through said base

and top respectively to be aligned when the valve block is in one rotative position and to be disaligned when said block is in another rotative position, said block being further provided with a horizontal chamber open to one side of said block, an air nozzle horizontally disposed within said chamber and extending through the wall of the opposite side of said block, said casing having a discharge opening with which the open end of said horizontal chamber may be aligned when the block is in position to align the aforesaid passages, and means to yieldingly urge the valve block base into intimate contact with said tank top, said casing having a transverse slot in its wall adjacent the top thereof, said slot being open at its rear end and receptive of said arm when the valve block is in inoperative position, with the end of said arm extending beyond said slot and resting in the annular groove of the plunger head to maintain the plunger in inoperative position, the front end of said slot being closed to serve as a limit stop for said arm when the arm swings the valve block to operative position.

ARTHUR MITCHEL RAPOPORT.

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