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3,032,802

FELT PEN

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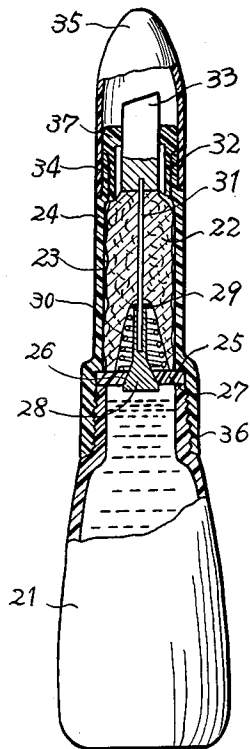


FIG. 1.

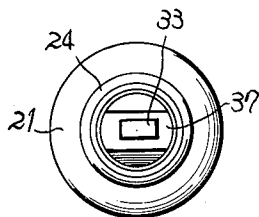


FIG. 2.

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FELT PEN

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1 Claim. (Cl. 15—563)

The present invention relates to felt pens, and particularly to an improved construction of a writing implement comprising a felt pen and two chambers divided by a valve seat. One chamber is an ink reservoir and the other is a chamber for ink-absorbing material used for immediately feeding ink to a pen tip. A valve mechanism associated with said valve seat is closed by a coil spring and opened by pressure upon the valve pen tip for feeding necessary ink from said reservoir to the pen tip through said chamber for ink-absorbing material.

Hitherto felt pens have been constructed which accommodate felt packings impregnated with ink from an ink-reservoir which is constructed so as to feed the ink contained in said felt packings to a felt pen, or to feed the ink from the ink reservoir directly to the felt pen. In the former case, the ink contained in the felt packing exists in the form of drops, and thus the contact surfaces of the ink with air are large. Therefore, loss of ink due to vaporization of liquid in the ink is extremely high. There occurs accordingly another defect in that no smooth supply of ink can be obtained because of the capillary action of the felt is disturbed. As a result of the ink being evaporated a residue of dried coagulated ink is left in the felt pen. In the latter case, because ink is directly fed from an ink reservoir to a felt pen, the felt pen tends to become dry and coagulated as a result of evaporation of the liquid content of the ink. The supply of ink to the pen tip is therefore not sufficient. As a result, smooth writing is impossible. A substantially constant feed of ink is necessary for impregnating the felt pen with ink. When an excess of ink has been fed, however, to the pen tip, the excess ink is likely to leak through the tip undesirably, leading to stained fingers of the writer. Such are the disadvantages of the usual felt pens.

In order to eliminate the above-mentioned disadvantages of conventional felt pens, the felt pen according to this invention has such a construction that the main body of the felt pen is divided by an annular valve seat into two chambers. One chamber is an ink reservoir and the other chamber is filled with a liquid-absorbing material. A conical valve member coacts with the valve seat to open and close the valve, opening the valve by moving into the ink reservoir and closing the valve by moving toward the chamber which is filled with the liquid absorbing material. A valve rod is fixed at one end to the valve member, and extends through the liquid-absorbing material to the writing end of the pen, formed as a projecting bar-shaped felt member to which the other end of the valve rod is fixed. The bar-shaped felt member is in contact with the liquid-absorbing material which moistens it. Thus, pressure exerted upon the projecting writing end of the bar-shaped felt member acts through the valve rod to open the valve. A conical coil spring surrounds the end of the valve rod nearer to the valve, upon which it acts to bias the valve member towards valve-closing position.

Thus, when writing with the felt pen of the present invention, pressure is exerted upon the bar-shaped felt member which opens the valve and admits liquid from the ink reservoir chamber to the liquid absorbing material in the chamber which contains it, and through this material to the bar-shaped felt member. When not writing with

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the pen, pressure on the bar-shaped member is released and the conical coil spring closes the valve. Such action prevents the pen from drying up and also insures an adequate ink supply without leakage, thus ensuring uniform writing by the pen.

The ink to be used for the felt pen should be a dye-stuff which is insoluble in water, but soluble in oil, or an alcohol soluble dyestuff, which is soluble in an organic solvent. Since such an ink possesses a rapid-drying property and an adhesive property in addition to the water-proofness, light-resistivity and abrasion-resistance to the writing surface, it is desirable to maintain the wet condition of the pen by constant impregnation of the felt pen with the required quantity of ink below the saturation point but at that optimum for writing.

It is the principal object of this invention to provide an excellent felt pen which is perfectly free from those disadvantages referred to above.

Other features and advantages of this invention will be described in detail in the following description with reference to the accompanying drawings, in which:

FIG. 1 is an elevation of a device according to the invention, shown partly in section to reveal the principal parts thereof; and

FIG. 2 is a plan view of the device shown in FIG. 1 as seen from above.

Referring to the accompanying drawings, a synthetic resin cylinder 24 has an internally threaded end which is screwed upon external threads formed around a mouth portion of an ink-reservoir 21 comprising an ink receptacle made of polyethylene, said cylinder 24 having a long and large ink reservoir 23 therein. The reservoir 21 and cylinder 24 together form a cylindrical housing. A liquid absorbing material 22, such as felt fills the ink reservoir 23 relatively loosely. An annular valve seat 27 comprising a polyethylene disc having a central valve opening 26 therein is placed inside a stepped portion 25 of said cylinder 24. The valve seat has a conical central valve opening therethrough of larger diameter on the side of said ink reservoir. A conical valve member 28 is inserted in said valve opening, seatable on said valve seat to close the valve, and a truncated conical coil spring 30 is compressed between a flange 29 at the smaller end of the valve member and the valve seat 27 acting to close the valve. A valve rod 31 is fixed at one end to the smaller end of the conical valve, and extends through the liquid-absorbing material 22 to the writing end of the pen, which is formed as a projecting bar-shaped felt member or writing element 33 to which the other end of the valve rod 31 is fixed. At its end opposite to that which is screwed upon the ink reservoir 21, the cylinder 24 is formed with a mouth portion 32 of reduced diameter into which an end bushing 37 extends with a tight fit. The reduced diameter of the cylinder 24 and the inner annular end of the bushing 37 maintain the liquid-absorbing material 22 in the cylinder 24, while permitting the central part of the liquid absorbing material to maintain contact with the bar-shaped felt member 33. Furthermore, the bushing 37 provides a cylindrical inner surface for guiding and laterally supporting the bar-shaped felt member during its axial movement. The reduced diameter of the cylinder 24 also provides accommodation for a synthetic cap 35 for protecting the projecting bar-shaped felt member 33, and permits the cap to have the same diameter as the cylinder, thus forming a smooth unit.

When the felt pen described above is to be used, the cap 35 is first removed, and the cylinder 24 is grasped with the felt bar writing element 33 pointed downwardly, as when a fountain pen is to be used. The felt bar 33 is then applied to the surface to be written upon, thus causing the felt bar to be retracted and simultaneously the conical valve member 28 to be pushed against the action

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of the coil spring 30 to open the valve. The ink in the ink reservoir 21 is thus admitted into the reservoir 23 in the cylinder 24 through the valve, so that the liquid absorbing material 22 in the reservoir 23 may be impregnated with the ink thus supplied. Because the rear portion of felt bar 33 comes in contact with the liquid absorbing material 22, the ink absorbed in the liquid absorbing material is fed to felt bar 33 in suitable quantity, said felt bar being thus enabled to write smoothly. Since the liquid absorbing material 22, is contained in a long and large ink reservoir 23 communicating with the ink of the ink reservoir 21 through the valve the felt bar 33 need only be pushed inwardly to open the valve. Ink is thus fed into the ink reservoir 23 through the valve seat 27 each time the conical valve member 28 is moved to open the valve. The ink of the ink reservoir 21 is uniformly absorbed by the liquid absorbing material, and the ink of said liquid absorbing material is uniformly applied to felt bar 33 in adequate quantity. A clear writing can thus be effected by the said felt bar, with the cap 35 taken off, without fear of ink leaking in drops or becoming dried up. The felt bar is always impregnated with ink contained in the liquid absorbing material in the long and wide ink reservoir 23.

Further, as the ink reservoir 23 in the synthetic resin cylinder 24 is long and wide, writing for an extended period of time is possible, provided that ink remains in the ink reservoir 21. The valve seat has inherently a ventilating property, and as the ink in the ink reservoir 21 passes through the valve opening 26 and enters in the ink-reservoir 23 of said cylinder 24, moving reversely through the body of relatively loose liquid absorbing material passes immediately through the valve seat 27 in the opposite direction and enters the reservoir 21 in place of ink.

What I claim is:

In a felt pen, the combination comprising a cylindrical housing having a closed end and an open end, valve seat means internally positioned in said cylindrical housing and dividing the same into first and second chambers, said first chamber cooperating with the closed end to define an ink reservoir, an apertured bushing fixed to said

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cylindrical housing for sealing the open end defining said second chamber, a quantity of ink-absorbing material substantially filling said second chamber, a writing element of felt material reciprocably mounted in said apertured bushing and having one end in contact with said ink absorbing material and an opposite end protruding through said apertured bushing, a valve member cooperating with said valve seat means for controlling a flow of ink between said first and second chambers, a valve stem extending through said ink absorbing material and having one end portion fixed to the said one end of said writing element and an opposite end fixed to said valve member whereby said writing element and said valve member reciprocate as a unit, spring means normally biasing said valve member to a closed position on said valve seat means, said valve member being moved to an open position in response to writing pressure on said writing element and permitting a flow of ink from said ink reservoir to said ink-absorbing material whereby said ink-absorbing material is assured of a sufficient flow of ink whenever said writing element is being operated, and said quantity of ink-absorbing material being loosely arranged in said second chamber and permitting air to flow reversely through said absorbing material whereby a flow of air will replace a flow of ink from the ink reservoir whenever said writing element is being operated.

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