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VALVING CONSTRUCTION FOR FELT NIB MARKING DEVICES

Filed June 13, 1968

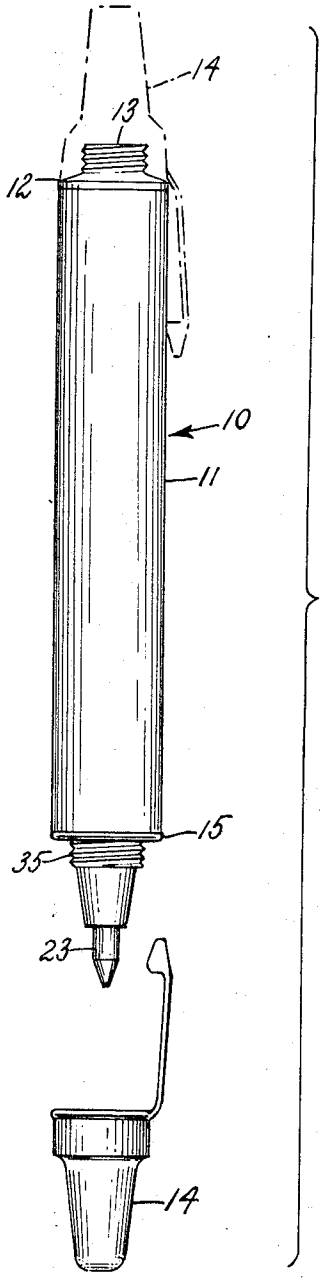


Fig.1

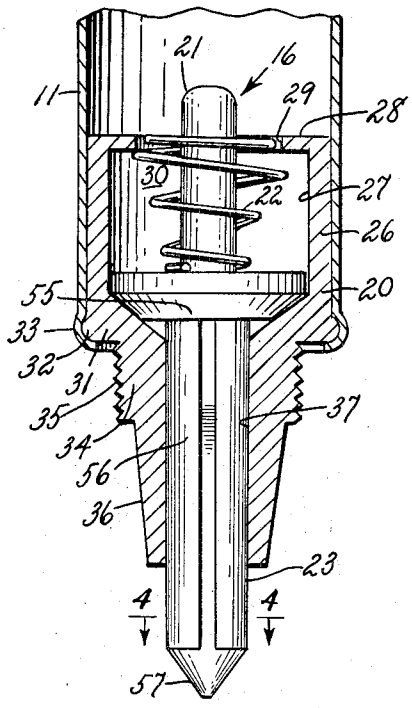


Fig.2

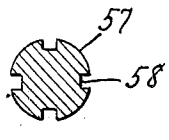


Fig.4

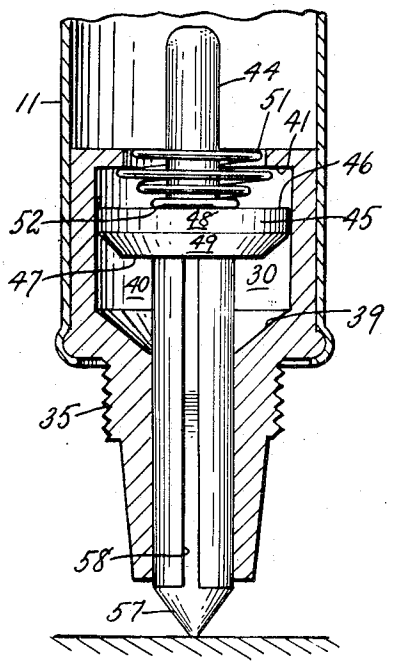


Fig.3

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VALVING CONSTRUCTION FOR FELT NIB MARKING DEVICES

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U.S. Cl. 401—206 1 Claim

ABSTRACT OF THE DISCLOSURE

An improved valving construction for felt nib marking devices including a body member forming a chamber at an upper end thereof in direct contact with a supply of inking material, a reciprocating resiliently urged valve disposed within said chamber, a bore communicating directly with the lower end of said chamber, a grooved elongated felt nib disposed within said bore to project outwardly thereof at the lower end of said bore, pressure applied to the lower end of said nib forcing the same to project the upper end thereof directly into the chamber, against the action of resilient means operating upon the valve, whereby upon the release of pressure, said valve may exert a pumping action forcing inking material into direct communication with the grooves in the nib to be conducted rapidly to the exposed lower end of the nib.

This invention relates generally to the field of felt nib marking devices, of a type widely used for industrial marking, in commerical art work, and similar applications, and more particularly to an improved valving construction to be used in connection with such devices.

It is known in the art to provide marking devices of the above described class which include a hollow elongated barrel containing a supply of fluid ink, and a valving means at the lower end of said barrel communicating with a felt nib which is mounted for slidable movement within a bore to operate a valving means. The valving means usually includes a stem in contact with the upper end of the nib, the stem projecting through a counter bore to open the valve to permit ink to flow through the counter bore to the upper surface of the nib. Ink flows through the nib by capillary action to the tip for dispensing upon contact with a surface to be marked.

Once the ink flow to the tip of the nib is established, re-inking of the nib is accomplished by pressing downwardly on the point to open the valve as required. The principal difficulty with constructions of this type has been the amount of time necessary to first ink the nib, where the marking device has previously been unused. The felt nib, in order to provide requisite stiffness has a normally been treated with a resin, and capillary flow is accordingly reduced, as compared with conventional untreated felt. Thus, the valve must be held in an open condition by continuous pressure for a considerable period of time until the first charge of ink reaches the exposed tip of the nib member.

It is therefore among the principal objects of the present invention to provide an improved valving construction in which the time necessary to initially saturate the nib member has been reduced to a small fraction of that previously required.

Another object of the invention lies in the provision of an improved valving construction employing fewer moving parts than has heretofore been necessary in prior art constructions.

Yet another object of the invention lies in the provision of an improved valving construction in which the upper end of the felt nib is employed to directly contact

the lower surface of the valve, and simultaneously extend directly into the ink chamber, so that upon release of pressure upon the exposed outer tip of the nib member, the valve may exert a pumping action tending to bring fluid ink into direct contact with the cylindrical side surfaces of the nib member, and expedite the saturation thereof through capillary action.

Yet another object of the invention lies in the provision of improved valving construction of the class described in which the nib member is provided with axially disposed grooves which project directly into the inking chamber, to receive a charge of ink upon actuation of the valve member, and conduct the ink along the grooves to the lower end of the nib member, whereby initial time required for complete nib member saturation is reduced.

A feature of the disclosed embodiment lies in the fact that the upper end surface of the nib directly contacts the head of the valving means, the valve stem serving only to facilitate assembly of the device and guide the valve spring.

These objects and feature will become more clearly apparent during the progress of the following disclosure, and be pointed out in the appended claims.

In the drawing, to which reference will be made in the specification, similar reference characters have been employed to designate corresponding parts throughout the several views.

FIG. 1 is an exploded view in elevation of an embodiment of the invention.

FIG. 2 is an enlarged fragmentary central longitudinal sectional view of the embodiment.

FIG. 3 is a fragmentary enlarged longitudinal sectional view thereof, corresponding to that seen in FIG. 2, but showing certain of the component parts in altered relative position.

FIG. 4 is a transverse sectional view as seen from the plane 4—4 in FIG. 2.

In accordance with the invention, the device, generally indicated by reference character **10**, comprises an elongated tubular barrel **11**, a first end **12** of which may include threaded cap retaining means **13**, selectively engaging a cap **14** when the device is in use. A second end **15** encloses a valve element **16**, through which marking fluid (not shown) passes outwardly of the device.

The valve element **16** is best understood from a consideration of FIGS. 2 and 3, and includes a main body member **20**, a poppet valve member **21**, a valve spring member **22** and a felt nib member **23**.

The main body member **20** is preferably formed as a synthetic resinous molding, and includes an upper hollow cylindrical portion **26** having an outer wall **27**, and upper wall **28**. The wall **28** includes a centrally disposed opening **29** leading to a cylindrical chamber **30**. At the lower end of the wall **27** is a flanged portion **31** the outer periphery **32** of which engages a headed over portion **33** of the barrel **11** to be retained thereby.

Disposed downwardly from the flanged portion **31** is an outwardly extending portion **34** which may include a threaded cap retaining surface **35** and a tapered portion **36** forming a tip. A through bore **37** extends through the portion **34** to communicate with the lower end of the chamber **30**.

Referring to FIG. 3, the chamber **30** includes a frustoconical valve seating surface **39** leading to a cylindrical wall **40**, in turn communicating with an upper inner surface **41** which serves as a back stop for the valve spring member **22**. During assembly of the valve element, the upper wall **28** is formed by heading over a portion of the outer wall **27** in well known manner.

The poppet valve member **21** is preferably formed as a molding of synthetic resinous rubber, such as neoprene

or the like, so as to be impervious to the marking fluid employed. It includes a valve stem portion **44** and a head portion **45** defining first and second planar surfaces **46** and **47**, respectively, a peripheral surface **48** forming a limited clearance with respect to the surface **40**, and a frusto-conical surface **49** selectively sealing with the surface **39**.

The valve spring **22** is of upwardly and downwardly tapering configuration, including an upper end **51** of diameter slightly smaller than that of the opening **29**, and a lower end **52** corresponding in diameter to that of the upper end **51**, whereby the valve stem portion **44** is accurately aligned with respect to the valve seating surface.

The felt nib member **23** is of cylindrical configuration, and is bounded by an upper end surface **55**, a cylindrical surface **56** corresponding in diameter to that of the bore **37**, and a tapered lower end **57**. Extending into the surface **56** are a plurality of parallel generally axially disposed grooves **58** (see FIG. 4) along which marking fluid may flow.

Operation of the device will be understood from a comparison of FIGS. 2 and 3. Pressure on the lower end of the nib member **23** is transmitted directly to the surface **47** of the valve member **21**, causing the same to move from the position shown in FIG. 2 to that shown in FIG. 3. Owing to clearances existing between the valve member and the side of the hollow cylindrical portion **26**, a quantity of ink will slip past the peripheral surface **48** and flow beneath the valve member. It will be understood that the entire volume above the surface **46** is occupied by ink or marking material. The ink will flow downwardly, being guided by the frusto-conical valve seating surface **39** to the planar surface **38** where it contacts the surface **56** of the nib member **23**. In the position shown in FIG. 3, ink may also enter the grooves **58** and flow directly downwardly under capillary action and gravity to speed the saturation of the nib member. It will be observed that a substantial area of the surface **56** is at this point disposed within the portion **26**, so that, as contrasted with prior art devices, the entry of the marking fluid is not confined to the upper end surface **55**. As a result, within a relatively short period of time, the entire nib is fully saturated.

It will be observed that as the spring **22** is compressed as shown in FIG. 3, the convolutions at the upper portion thereof tend to overlap and close, so that ink within the chamber **30** is forced past the surface **48** to lie beneath the valve surface **49**, and contact the nib. This pumping action tends to force the ink directly against the nib, whereby quick saturation is achieved.

We wish it to be understood that we do not consider

the invention limited to the precise details of structure shown and set forth in this specification, for obvious modifications will occur to those skilled in the art to which the invention pertains.

We claim:

1. Improve valving construction for felt nib marking devices comprising: a body member having therein an upper cylindrical configured chamber capable of retaining a supply of marking fluid and having a surface at a lower end of said chamber forming a valve seat, there being an open ended cylindrical bore in said body extending downwardly from said chamber, a cylindrically-shaped nib member of length greater than said bore, said nib member being of substantially the same outside diameter as the inside diameter of the bore and slidably disposed within said bore to project outwardly at a lower end thereof, and selectively projectable into said chamber, said nib member having axially aligned grooves on an outer cylindrical surface thereof extending upwardly a distance sufficient to project into said chamber; a valve member slidable disposed within said chamber and having a lower planer surface directly contacting an upper end planer surface of said nib member to be actuated by movement thereof whereby said nib is removable from said bore while maintaining a sealed relation between said valve and said valve seat to isolate marking fluid within the chamber from the area outside the chamber, resilient means cooperating on said valve member to urge the same to contact said valve seat, and limiting the effective length of the path of movement of said valve member; said nib member being formed of a saturable felt; whereby, upon the exertion of pressure upon the lower end of said nib member, said nib member may project directly into said chamber to expose said grooves therein to direct contact with marking fluid in said chamber, and release of said valve may serve to force said fluid thereagainst.

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