Dec. 7, 1965 R. W. SEEMAN 3,221,360

MARKING DEVICE CONSTRUCTION

Filed March 11, 1963

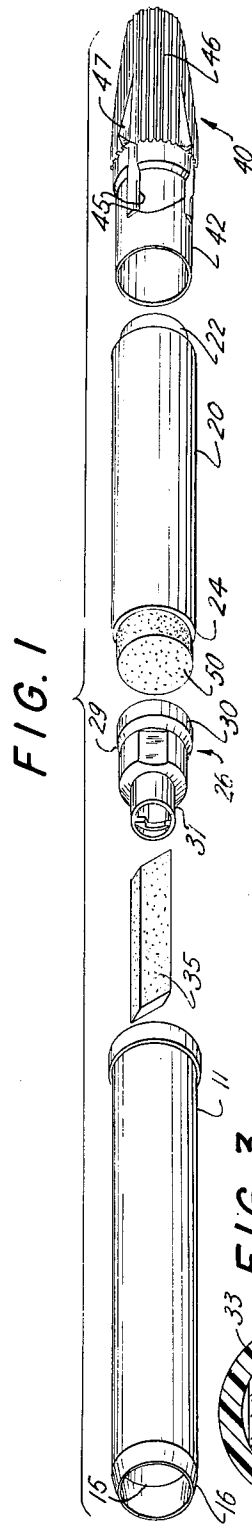

FIG. 1

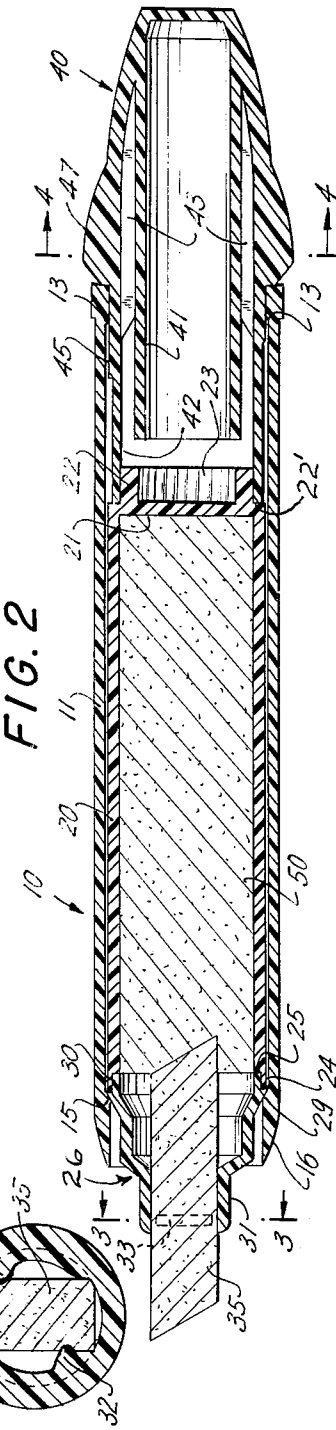

FIG. 2

FIG. 3

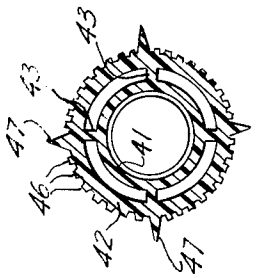

FIG. 4

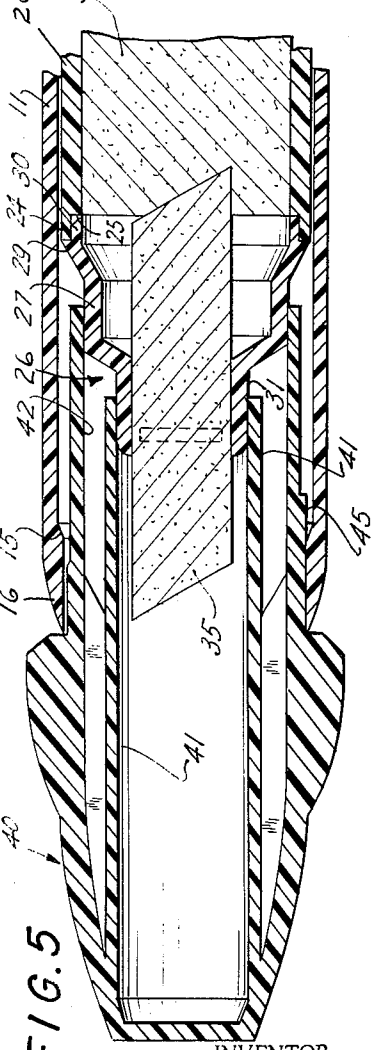

FIG. 5

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MARKING DEVICE CONSTRUCTION

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This invention relates to the art of marking devices, more particularly to an improved construction for these devices, implementing their fabrication and utilization.

A variety of marking devices have been evolved utilizing a marking tip maintained in fluid communication with a reservoir for marking ink or the like with marking ink passing by capillary action to the marking tip from the reservoir. The tip and the reservoir are supported by a barrel forming a handle element, and a cover is generally provided to enclose the marking tip when the device is not being used. As is the case with all items produced for mass distribution, it is desirable to form the marking device with a minimum of components subject to ready assembly with minimum handling, thus simplifying and reducing the cost of manufacture and maintenance. Since the marking fluids employed are generally relatively volatile, it is necessary to enclose the marking tip, and the fluid reservoir during periods of non-use so as to prevent evaporation of the fluid. It is additionally desirable to insure complete enclosure of the marking tip during periods of non-use so as to prevent inadvertent marking of either the storage area or the hands of the user, and at the same time make certain that the tip is disposed for ready utilization when desired.

It is accordingly among the primary objects of this invention to provide an improved marking device of relatively simple construction.

Another object of the invention is to provide a marking device in which the marking tip is oriented in desired position when the device is being utilized, and is covered and the marking fluid protected from evaporation during periods of non-use of the device.

A further object of the invention is to provide a marking device of a construction subject to efficient fabrication.

According to the invention, the novel marking device is formed with a barrel providing a handle element. This barrel is of cylindrical configuration permitting ready manual gripping by the user. The barrel is hollow and is provided with annular retaining shoulders on opposite ends of the interior thereof. Slidably mounted within the cylindrical barrel is a reservoir similarly formed of a cylindrical configuration, and movable between limiting positions defined by the aforementioned annular shoulders. Within the reservoir a marking fluid retainer in the form preferably of a cylinder of sponge-like porous material such as cellulose, or the like, is provide. A marking tip assembly closes off the open end of the reservoir and is secured to the reservoir by welding. The marking tip assembly and the reservoir are preferably formed of a thermoplastic material and the marking tip is desirably provided with marking tip engaging jaws serving to grip a felt marking tip and maintain same in fluid communication with the reservoir. Relatively air tight tip covering means in the form of a double walled cap assembly is provided which may be removably press fit into either end of the barrel. The cap assembly is provided with exterior walls engaging on the interior of the barrel, and a spaced interior wall adapted to surround and encapsulate the marking tip to maintain same in a relatively air tight enclosure.

An important feature of the invention resides in the provision of a double wall cap assembly serving to insure relative air tight enclosure of the marking tip and reservoir when the marking device is not being employed so as to prevent vaporization of the marking fluid.

Another feature of the invention resides in the fact that the cap assembly serves to retract the marking tip within the barrel thus reducing the size of the marking device and protecting the marking tip from inadvertent contact with surfaces.

In the accompanying drawings in which are shown one or more of various possible embodiments of the several features of the invention,

FIG. 1 is an exploded perspective view of a marking device formed in accordance with the teachings of this invention,

FIG. 2 is an enlarged longitudinal sectional view through the marking device when the marking tip is in operative extended position,

FIG. 3 is a cross-sectional view on line 3—3 of FIG. 2 showing the tip engaging jaws of the tip assembly,

FIG. 4 is a cross-sectional view on line 4—4 of FIG. 2 showing the exterior contour of the cap and the interrelationship between the interior and exterior walls of the cap assembly, and

FIG. 5 is a longitudinal sectional view with parts broken away of the marking device when the cap is in position to enclose the marking tip in an air tight storage position.

Referring now to the drawings, the marking device **10** is shown to be provided with an exterior elongate hollow barrel **11** of cylindrical configuration, and preferably dimensioned so as to permit ready manual gripping. Within the interior of the barrel adjacent opposite ends thereof are annular shoulders providing a head end annular shoulder **13** and a tip end annular shoulder **15** as best shown in FIG. 2. The tip end of the barrel **11** is preferably tapered as at **16**.

Arranged slidably within the barrel **11** is a reservoir **20** also formed of a cylindrical configuration and preferably dimensioned so as to substantially extend across the interior cross section of the barrel **11**. One end of the reservoir **20** is closed as at **21** and is provided with a base **22** having a ribbed recess **23** for the purpose hereinafter set forth. The opposite end of the reservoir **20** is formed with a relatively thin wall **24** surrounding an annular seat **25**. Provided for seating on the seat **25** is marking tip assembly **26** formed with a circumferential seating flange **29**, adapted to abut against shoulder **15** to limit the movement of the assembly **26** in the reservoir **20**. The reduced diameter skirt **30** beneath flange **29** seats on seat **25**.

At the tip end **31** of assembly **26**, which is circular in cross section, integral keys **32** and **33** are arranged to provide a space therebetween of a dimension such as to accommodate marking tip **35**, which is rectangular in cross section as best shown in FIG. 3. The marking tip **35** is formed of felt or the like porous material and is inserted into the assembly **26** by slipping same into the space between the keys **32** and **33**, and thereafter twisting the marking tip **35** through 90° so as to cause the keys **32** and **33** to grip the tip.

The cap assembly **40** is of a double walled configuration with an interior wall **41** of a cylindrical shape adapted to slide over the tip **31** of the marking tip assembly **26** as shown in FIG. 5 in a press fit relation thereto, while the outer cap wall **42** encompasses the body portion **27** of the marking tip assembly as best shown in FIG. 5. The interior wall **41** is maintained at a spaced distance with respect to the exterior wall **42** by means of webs **43**, as best shown in FIGS. 2 and 4. Ribs **45**, as best shown in FIGS. 1 and 2, on cap assembly **40** extend along a part of the outer surface of exterior wall **42** and provide for press fit engagement of the cap assembly **40** with the extremities of the barrel **11** outwardly of the shoulders **13** and **15** as shown in FIGS. 2 and 5. Fluting **46** and fins **47** facilitate digital gripping of cap assembly **40** to effect turning to

break the press fit bond between the cap assembly **40** and barrel **11**.

It will be understood that the lengths of inner cap wall **41** and outer cap wall **42** are dimensioned so as to move the assembled reservoir **20** and tip assembly **26** between its limiting position against anniulii **13** and **15** in barrel **11**, when arranged respectively in a tip enclosing position as shown in FIG. 5, and in a tip extending position as shown in FIG. 2.

Ink retainer **50** in the form of a sponge-like porous mass is arranged within reservoir **20** in fluid communication with tip **35**. In retainer **50** may be satisfactorily formed of cellulose or the like. In FIG. 1 the ink retainer **50** is illustratively shown extending outwardly from reservoir **20**, but in use it is fully contained in the reservoir as shown in FIG. 2.

To assemble the marking pen, the ink retainer **50** is first placed within reservoir **20**. The marking tip **35** is placed in operative position in assembly **26**. This is accomplished by inserting the tip **35** in the rectangular space between keys **32** and **33** to a distance such that the end of the tip will extend slightly into the ink retainer **50**, as shown in FIGS. 2 and 5. The marking tip **35** is then twisted to cause engagement of the tip **35** by the keys **32** and **33**.

Thereafter, tip assembly **26** is positioned with skirt **30** within reservoir cartridge **20**. The ribbed recess **23** of base **22** of reservoir **20** is engaged by an appropriate tool member adapted to seat within the recess **23**, while tip assembly **26** is securely engaged by an appropriate clamping element. Rotation of either the reservoir **20** or the tip assembly **26** so as to provide relative movement between the tip assembly **26** and the reservoir **20** will generate sufficient heat at thin wall **24** of reservoir **20** so as to weld the skirt **30** to the wall **24**. It is of course understood that the ink retainer **50** is appropriately charged with suitable marking fluid prior to assembly.

The combined tip assembly **26** and reservoir **20** are then positioned within barrel **11** by forcing the combined tip assembly **26** and reservoir **20** into the barrel **11** from its rear end past annular shoulder **13**. The reservoir **20** and barrel **11** are preferably made of a resilient material such as the conventionally readily available polyvinyl, styrenes or the like moldable or extrudable plastics. The resilient nature of the material permits ready assembly of the components as described.

Thereafter, when it is desired to use the marking device, cap assembly **40** is inserted at the head end of barrel **11** as shown in FIG. 2 with the free end of outer wall **42** forcing the reservoir **20** and associated tip assembly **26** to move toward the tip end of barrel **11** until the tip **35** is extended as shown in FIG. 2, the outward extension of tip **35** being limited by annular shoulder **15** against which flange **29** abuts. Further movement of the cap assembly **40** into the barrel **11** will cause the free end of outer wall **42** to engage over circular base **22** as shown in FIG. 2 to form a releasable press fit.

When it is subsequently desired to enclose the marking tip **35** during periods of non-use, the cap assembly **40** is removed from the head end of barrel **11** by twisting and pulling the cap outwardly. Withdrawal of the cap assembly **40** from the head end of barrel **11** pulls the reservoir **20** and retracts tip assembly **26** into the barrel, since the free end of outer wall **42** is engaged with circular base **22** in press fit relationship.

Subsequent insertion of the cap assembly **40** into the tip end of barrel **11**, as shown in FIG. 5, results in inner wall **41** of cap assembly **40** engaging the tip **31** of the tip assembly **26**. As the cap **40** is moved into the tip end of the barrel **11**, it will move the reservoir **20** and tip assembly inwardly until the annular shoulder **22'** defined by base **22** abuts against shoulder **13**. At this time the inner

wall **41** will move over tip **31** in press fit relationship therewith, and the outer wall **42** will engage the body portion **27** of the tip assembly **26**. Securement of the cap assembly within the barrel **11** is accomplished by ribs **45** engaging in press fit relationship with respect to the end **16** of the barrel.

It is thus seen that a simple marking device has been provided having relatively few components, simple in manufacture and maintenance and providing positive extension and retraction of the marking tip of the device, with the tip when in retracted position, enclosed in a substantially air tight cap assembly.

As many changes could be made in the above construction, and many apparently widely different embodiments of this invention could be made without departing from the scope of the claim, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

A marking device comprising an elongated hollow barrel having a head end and a tip end, an ink containing reservoir slidably mounted in said barrel, said barrel having an internal tip end annular flange and an internal head end annular flange longitudinally spaced by a distance greater than the length of said reservoir to limit the slidable movement of said reservoir in said barrel, a tip assembly secured to one end of said reservoir independently of said barrel, said tip assembly having a sleeve extending axially of said reservoir and a marking tip of compressible material positioned in said sleeve having one end protruding from said sleeve and the other end in communication with said reservoir, the sleeve of said tip assembly having keys extending laterally inward from the inner wall of said sleeve and spaced from each other to provide a substantially rectangular space therebetween, said marking tip being insertable into said rectangular space, said tip being substantially rectangular in cross section and of smaller dimension than said rectangular space, whereby upon rotation of said tip in said rectangular space said keys will wedge into said compressible tip to effect secure retention of said tip in said sleeve, a cap assembly selectively insertable into either end of said barrel and adapted to react against said reservoir to move the latter axially in said barrel, said movement being limited by the respective internal flanges, said cap assembly having an outer sleeve adapted to engage the interior surface of the wall of said barrel at either end thereof and an inner sleeve adapted to encompass the sleeve of said tip assembly completely to enclose the marking tip in substantially an airtight fashion, whereby when said cap assembly is inserted into the head end of said barrel, said outer sleeve will abut against the associated end of said reservoir to move the latter toward the tip end of said barrel to expose said marking tip from said tip end for use and when the cap assembly is inserted into the tip end of said barrel said outer sleeve will abut against the associated end of said reservoir to move the latter toward the head end of said barrel.

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