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R. T. POLLOCK

INK CARTRIDGE

Original Filed Feb. 17, 1923

Fig. 1.

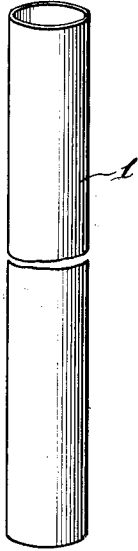


Fig. 2.

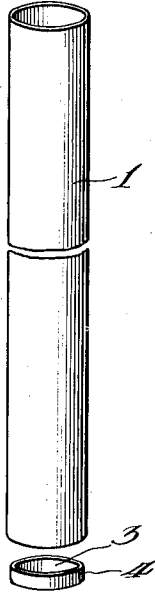


Fig. 3.

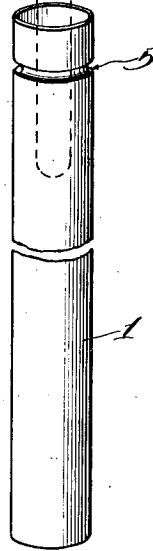


Fig. 4.

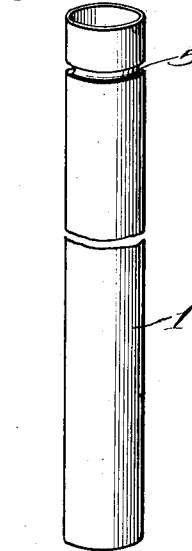


Fig. 5.

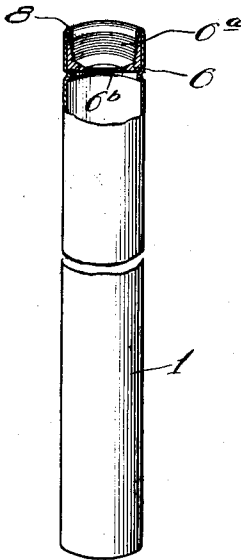


Fig. 6.

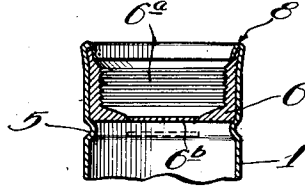
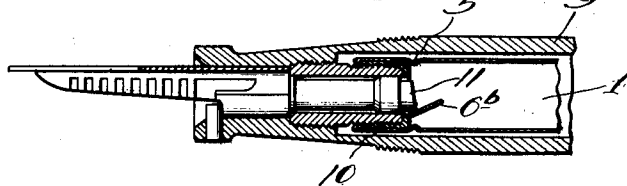


Fig. 7.



Witness:

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# UNITED STATES PATENT OFFICE.

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## INK CARTRIDGE.

Application filed February 17, 1923, Serial No. 619,625. Renewed October 10, 1927.

This invention relates to improvements in sealed ink cartridges, and refers more particularly to sealed receptacles or containers insertable in the barrel of a fountain pen for supplying ink thereto.

Among the salient objects of the invention are to provide cartridges of thin metal having sealed ends, one of the sealed ends being adapted to be attached to the feed of a fountain pen, whereby substantially simultaneously with the attachment of the container to the feed, the seal is broken and the ink fed to the pen feed; to provide a container which on insertion into the pen barrel and attachment to the pen feed is first sealed thereto prior to its being punctured whereby any leakage or fouling of the inner barrel is prevented; to provide containers which are rigid in form and practically indestructible, and receptacles which are especially adapted to be used in traveling, as the ink is sealed in the liquid-tight containers, which are not easily broken.

Fig. 1 is a view of the metal tube used for making the container. Fig. 2 shows the bottom sealing cap ready to be inserted in the tube. Fig. 3 is a view of the tube after it has been grooved near the open end to receive the seal, with a displacement peg in the tube for removing the excess ink. Fig. 4 is a view of the tube showing the seal to be placed in the upper open end of the tube or cartridge after filling. Fig. 5 is a view of the tube partly in section with the seal in place. Fig. 6 is an enlarged detail sectional view of the seal. Fig. 7 is a cross sectional view through the feed end of a pen illustrating a cartridge in position.

Referring to the drawings, at 1 is shown a drawn metal tube which is cut in desired lengths, the thickness of the metal ranging from .003 to .007 inches. Normally, the gauge will be substantially .004 of an inch for the tubes used in connection with these cartridges, although this thickness may be varied as desired.

The metal may be either copper, aluminum, brass or numerous other alloys which can be drawn to this thickness.

These tubes are first cleaned with a solution which removes any dirt or grit from the inner and outer surfaces. Into the bottom of the tubes are then inserted caps 3 which have a narrow upturned edge 4. These caps are of a similar metal to the tube, or

may be plugs of any desired character which may be easily soldered into the bottom of the cartridge.

After the soldering operation, the cartridges are grooved as shown at 5, which supplies a seat on the inner surface of the cartridge for sealing member shown at 6. These sealing members are die cast, molded or otherwise formed from a relatively soft metal such as lead, solder or other similar alloy.

After forming the groove 5 in the upper portion of the cartridge, the outer surfaces of the cartridges are dipped in a bakelite solution. After dipping, they are permitted to dry for half an hour, more or less and are subsequently baked at temperatures ranging from 275° upward. This bakelite coating may be substituted by dipping in other coating materials, the purpose being to coat the outer surface of the tube or cartridge to prevent corrosion due to the acid contained in the ink.

The cartridges after having this coating application, are internally sprayed with paraffin, wax or other hydrocarbon coating which will adhere to the inner surfaces of the cartridges, and prevent the ink from coming in contact and attacking the metallic surface. When this coating substance is dried, the tubes are filled in a desired manner, it being essential that bubbles of air are eliminated from the tubes during the filling operation. After filling, a plurality of tubes are inserted in a rack, and displacement pegs such as those shown at 7 are inserted into the open ends of the tubes to remove the excess ink, which will flow over the top of the cartridge and be collected in a receptacle (not shown) beneath the tubes.

The seals which close the upper ends of the tubes or the ends which are inserted into the pen barrel, consist of a hollow soft metallic plug such as that shown at 6. The inner portion of the seal is threaded as shown at 6<sup>a</sup>, and in the bottom of the seal is a scored circular portion 6<sup>b</sup> which is punched out of the seal when the cartridge is screwed on to the pen feed. The cartridges are adapted to a particular type of pen which has a threaded feed which engages the threads of the seal when the cartridge is screwed in place. On the circumference of the seal is shaved off a narrow groove as shown at 6<sup>a</sup>, which permits the

escape of air from the cartridge when the seal is pressed into place on the grooved seat in the upper portion of the cartridge as shown in Fig. 5.

5 After the cartridges have been filled with ink, any paraffine or wax coating which remains about the inner mouth of the cartridge is removed and the seal pressed in place against the grooves 5.

10 To assure a liquid tight container, the hollow mouth of the tube is then spun or rolled so that the upper lips of the cartridge are turned back as shown at 8 in Fig. 6. These lipped portions are pressed or punched into the upper part of the seal, and prevent any ink which may work its way between the seal and cartridge to escape and foul the cartridge. In addition to the spinning or rolling back of these lips the final stage slightly flares the upper portion of the tube as shown in Fig. 6 so that the cartridge may be more easily inserted in the pen barrel.

To use the cartridge, it is only necessary to remove the end of the barrel shown at 9 diagrammatically, in Fig. 7 and screw the cartridge on the threads of the pen feed shown at 10. As the cartridge is screwed in place on the pen feed, it will first form a liquid tight seal with the pen feed and then the puncturing point 11 will contact the scored portion or plug 6<sup>b</sup> and punch it in the form of a disc out of the seal. This disc will fall into the cartridge and permit the ink to flow readily into the feed and to the pen point.

The utility of the device is readily appreciated as a cartridge may be removed and replaced by a filled cartridge as soon as the ink has been exhausted. The ink is kept in the best possible condition as it is insulated from contact with the metal by the paraffin or wax coating on the inner surfaces of the cartridge. The screw seal further assures the pen against any ink fouling due to leakage of the ink from the cartridge into the pen barrel. The containers are particularly adapted for use in traveling as they may be packed with clothing without fear of soiling, and are not easily broken.

The cartridges have a further advantage of holding a larger quantity of ink than can be put into the self-feeding or other types of fountain pens, where the barrel of the pen is taken up by the rubber sack or where the ink is introduced directly into the barrel of the pen.

The cartridges may vary in size according to the type of pen in which they are used.

I claim as my invention:

1. Ink cartridges comprising substantially rigid metallic containers filled with a writing fluid and having sealed ends, one of the ends being closed by a sealing cap having a puncturable area adapted to be pierced and through which the ink flows, and a depressed internally threaded pen feed engaging portion.

2. Ink cartridges comprising substantially rigid metallic containers filled with a writing fluid and having sealed ends, one of the ends being closed by a sealing cap having a puncturable area adapted to be pierced and through which the ink flows, and a depressed internally threaded pen feed engaging portion, said puncturable area of the seal being entirely removable to provide a permanent hole therein.

3. An ink cartridge comprising a metallic container filled with writing fluid, one end being permanently closed by a closure cap fitted into said end, and the other end being provided with an internally threaded sealing cap depressed therein and provided with an area adapted to be punctured and entirely removable to provide a permanent hole therein.

4. An ink cartridge comprising a metallic container filled with writing fluid, one end being permanently closed by a closure cap fitted into said end, and the other end being provided with an internally threaded sealing cap depressed therein and provided with an area adapted to be punctured and entirely removable to provide a permanent hole therein, the exterior wall of said cartridge being circumferentially depressed adjacent the sealing cap to assist in retaining the sealing cap in place.

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