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N. W. PAQUETTE

2,037,177

FOUNTAIN PEN

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Fig. 1

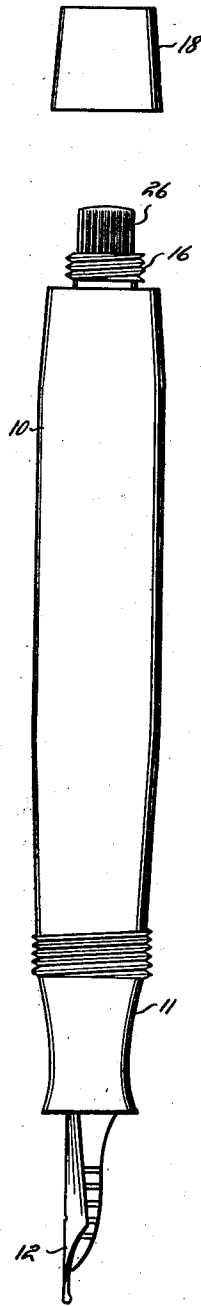


Fig. 2

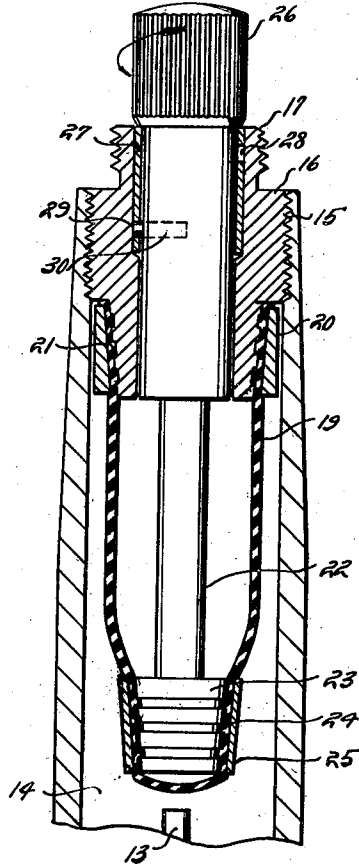


Fig. 3

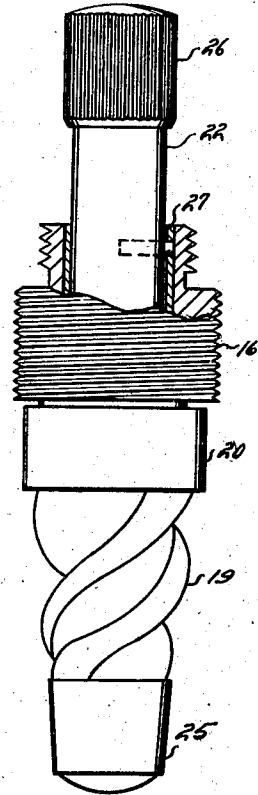
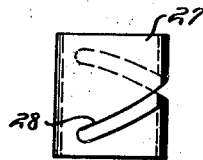


Fig. 4



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FOUNTAIN PEN

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Application March 22, 1934, Serial No. 716,782

1 Claim. (Cl. 120—46)

My invention relates to fountain pens and particularly to that class generally designated as pump fillers. More particularly it relates to the class of pump filler pens that employ a rubber diaphragm which, when actuated, tends to create a partial vacuum within the barrel to draw ink thereinto through the apertured section. An analogous device is disclosed in the patent to Arthur O. Dahlberg, Number 1,904,358, April 18, 1933. However, in the instance of the Dahlberg structure the rubber diaphragm is rolled upon itself in the filling operation, whereas in my device the diaphragm is adapted to be twisted to produce the same result.

The principal object of my invention is to provide a pump fill structure, the mechanical construction of which is such that a greater vacuum will be created within the pen barrel upon actuation of the pump than is found in other structures of the same type.

Another object is to provide a mechanism which is exceedingly simple in construction and economical to manufacture.

Another object is to provide a pump assembly that may be assembled into the rear end of the barrel as a complete unit.

In order to better understand the details of construction of my device, attention is directed to the accompanying drawing in which:

Figure 1 discloses a pen assembly minus the outer cap with the blind cap detached from the rear end of the barrel;

Fig. 2 is a longitudinal sectional view of the rear end of a pen barrel with my improved pump mechanism mounted therein;

Fig. 3 is a view partially fragmentary and partially plan of my improved pump unit;

Fig. 4 is a plan view of a sleeve which forms a part of my invention.

In the drawing the numeral 10 will be used generally to indicate the barrel of a fountain pen and the numeral 11 the section thereof. A nib and feed assembly 12 are fitted into the open end of the section, the feed being longitudinally drilled to receive a vent tube 13 through which air from within the barrel is vented upon actuation of the pump mechanism. The feed is provided with the ordinary ink channels to convey ink from the interior of the barrel to the pen point.

The barrel 10 is axially drilled to provide an ink reservoir 14 and the rear end of the said chamber so formed is internally threaded as at 15 to receive the pump unit. The pump unit consists of a threaded bushing 16 having a reduced

threaded end 17. The said threaded end is adapted to receive an internally threaded blind cap 18 which serves to cover the otherwise exposed end of the pump. The bushing 16 is also reduced at the opposite end, the reduced portion being tapered to receive a rubber diaphragm 19, which is affixed to the said tapered reduced portion of the bushing 16 through the medium of a tapered collar 20 which is forced onto the tapered end of the bushing 16 after assembly of the skirt of the diaphragm thereover.

Grooves 21 are milled in the surface of the tapered end of the bushing 16 in order to more effectually affix the diaphragm to the tapered end of the bushing as portions of the rubber skirt of the diaphragm between the collar and the bushing will be forced into the grooves, thus firmly affixing the diaphragm to the bushing 16.

The opposite end of the diaphragm is closed and is affixed to a plunger 22 in much the same manner as the skirt portion of the said diaphragm is fixed to the bushing 16. The plunger 22 has an enlarged tapered head 23 having grooves 24 milled therein. The head of the plunger is inserted through the open end of the diaphragm to the closed end thereof, and a tapered collar 25 is forced over the said closed end, thus affixing the said end of the diaphragm to the enlarged tapered end of the plunger. The upper end of the plunger is approximately twice the diameter of the plunger stem and is adapted to extend through the bushing 16 in order that the diaphragm may be actuated. That part of the said plunger extending from the bushing is enlarged and knurled as at 26 in order that the user may have a better grasp on it.

A sleeve 27 is force fitted into the top open end of the bushing until the outer end of the said sleeve is flush with the top of the said bushing. The said sleeve 27 has a spiral slot 28 stamped therein, the purpose of which will be explained hereinafter. A lug 29 is press fitted into a drill hole 30 in the plunger stem and the end of the lug is adapted to project from the wall of the plunger a sufficient distance as to engage the spiral slot 28 and the sleeve 27. In order to effect the assembly of the lug within the spiral slot, it is necessary that the sleeve 27 be sprung over the lug prior to the force fitting of the said sleeve within the bushing.

The assembled pump unit is then screwed into the upper threaded end of the barrel until the shoulder formed by reduction of the outer threaded end is flush with the top edge of the said

barrel, whereupon the mechanism is ready for use.

The pump functions as follows:

The user removes the blind cap 18 and grasps the projecting end of the plunger 26. The point end of the pen is inserted in ink and the plunger stem rotated, which action, because the opposite end of the plunger is fixed to the closed end of the diaphragm and the open end of the diaphragm is affixed to the stationery bushing 16, will cause the said diaphragm to be twisted, and due to the displacement of the diaphragm bulk will cause the air pressure to be lowered within the barrel creating a partial vacuum therein causing ink to be sucked through the section into the said barrel.

It is to be particularly noted that due to the engagement of the pin 29 in the spiral slot 28 that the plunger, when rotated, will move outwardly a predetermined distance.

The spiral slot has two functions: First, to permit outward movement of the plunger on rotation thereof and, second, to limit the twisting of the said plunger, as without a stop there would be a tendency to continue the twisting of the plunger and the resultant distortion of the diaphragm might be such as to tear it loose from the said plunger or bushing. When the dia-

phragm twists due to actuation of the plunger, it naturally tends to shorten and as the plunger recedes from the interior of the barrel simultaneously with the shortening of the diaphragm, the combined twisting and shortening of the diaphragm will cause a greater air displacement to be had within the barrel than were the plunger to be rotated in the same plane. The fact that greater displacement is effected will increase the vacuum within the pen barrel and more ink will be drawn thereinto and it will necessitate fewer actuations of the plunger to effect the complete filling of the pen.

Having described my invention, what I claim and desire to secure by Letters Patent is:

In a fountain pen, an ink reservoir barrel, having at one end passages for ink and air, combined with a twist-sac located within, supported at, and vented toward the other end of the barrel, and having an impervious wall extending into the reservoir; and a rotatable element engaging torsionally a deep part of the sac, thereby by twisting the sac to change displacement of the reservoir; and means for limiting the twisting of the sac to less than a full rotation of said rotatable element.

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