No. 839,254. PATENTED DEC. 25, 1906.

F. M. ASHLEY.

AUTOMATIC INKSTAND.

APPLICATION FILED APR. 9, 1898.

Fig. 2.

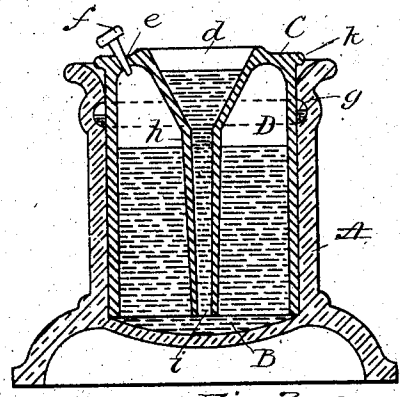


Fig. 1.

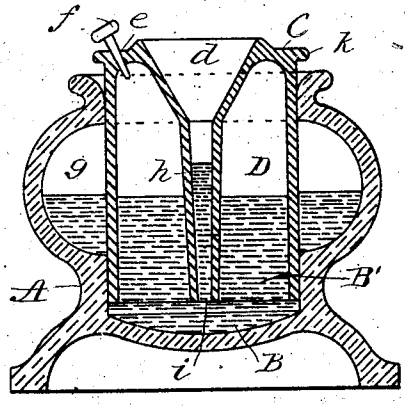


Fig. 3.

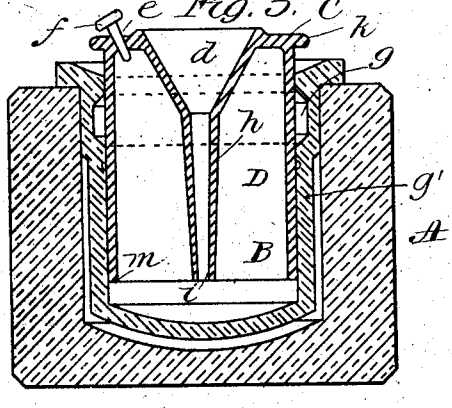


Fig. 4.

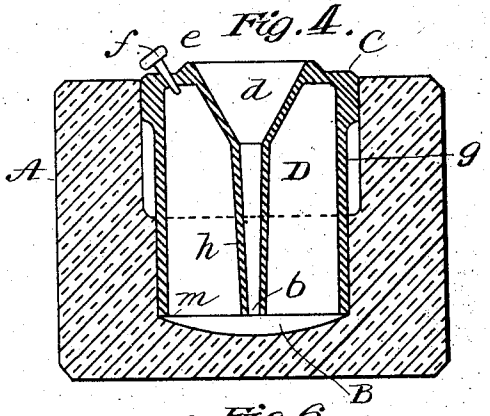


Fig. 5.

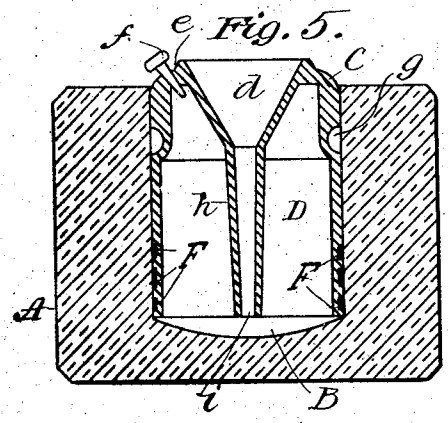
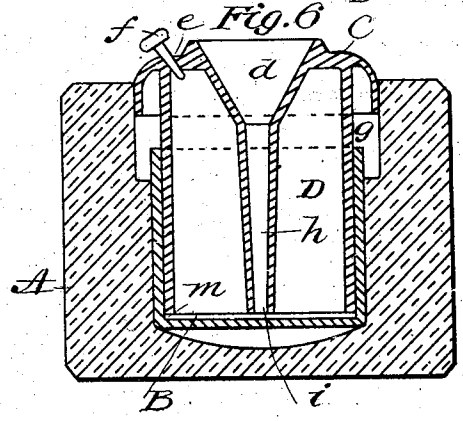


Fig. 6.



Witnesses

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AUTOMATIC INKSTAND.

No. 839,254. Specification of Letters Patent. Patented Dec. 25, 1906.

Application filed April 9, 1898. Serial No. 677,004.

To all whom it may concern:

Be it known that I, FRANK M. ASHLEY, a citizen of the United States, and a resident of New York city, New York, have invented certain new and useful Improvements in Automatic Inkstands, of which the following is a specification.

My invention relates to that class of automatic inkstands actuated by pneumatic pressure wherein a float is adapted to convey the ink to a dip-cup upon depressing the same by the pen of the user. Its object is to provide an inkstand of this character having capacity for a larger quantity of ink in proportion to its dimensions than any of those in vogue heretofore or previous to my invention of which I am aware and to provide in this connection a simple, durable, and inexpensive device free from the usual multiplicity of parts and consequent joints which are apt to leak more or less when in operation, thereby rendering the operativeness of the stand useless, and likewise to obviate the use of elastic material—such, for example, as rubber diaphragms and the like, which are subject to deterioration.

The features of my invention whereby I carry out these objects are illustrated in the drawings hereto attached, which form part of this application, and the distinct features of novelty are particularly referred to in the detailed descriptive matter of the specification where they occur and emphasized in the claims.

With reference to the drawings, Figure 1 is a central vertical sectional elevational view of my preferred form of inkstand embodying my invention. Figs. 2, 3, 4, 5, and 6 are like views illustrating various modifications thereof.

In the several figures where the parts are identical similar characters of reference are employed to designate them, wherein—

A illustrates the body portion of my improved inkstand, adapted to carry the ink-supply, which I shall occasionally refer to hereinafter as the "well" or "vessel," and has the depressed portion B or B′ as the main reservoir and the bulged portion *g* as the auxiliary reservoir, which I shall occasionally refer to as the "overflow." The portion B′ of the main reservoir I shall refer to as the "neck."

C is a floating reservoir, preferably made cylindrical in form, and is open at the bottom and closed at the top, so as to constitute a pneumatic bell or caisson inclosing air within the annular space D.

d is a dip-cup carried by the top or roof of the bell C and terminates in a conduit *h*, leading from the dip-cup *d* to the ink-supply within the floating reservoir C. These latter parts I prefer to make integral of any suitable material—such, for example, as hard rubber. The lower extremity of the pneumatic bell is fitted to the neck B′ of the main reservoir B in sliding engagement, whereby the ink-containing vessel or well A is partitioned into the two aforesaid reservoirs.

With the reservoir C introduced into the well A and the ink being previously supplied to the latter the floating reservoir C will be floating upon the surface of the liquid or ink as a pneumatic bell, and upon depressing it by the pen of the user or otherwise a quantity of air, as D, will be entrapped between the top or roof *k* of the reservoir C and the surface of the liquid, resulting in a vertical displacement of the ink upward in a small column in the conduit *h*, through the opening *i*, and into the cup *d* in establishing an equilibrium between the weight of the column in the conduit *h* and the pneumatic pressure of the atmosphere D, and upon releasing the downward thrust or pressure upon the bell C the latter will be lifted by the reaction of the pressure of the air D and will consequently be projected to a height as the original. In providing the vessel A, therefore, with a suitable supply of ink, such as that indicated by the broken shaded lines in Fig. 1, or a quantity in excess thereof, the floating reservoir C or pneumatic bell would be projecting considerably above the surface of the vessel A, occupying a considerable space, since it serves no purpose further than that of a plunger. This is a serious objection, as it limits the capacity of the ink-well and again impairs its value, due to the liability for overflow in the manner following, as the sliding engagement between the lower extremities of the walls of the floating reservoir C and the main reservoir B would be interrupted, and upon depressing the former the displacement of the ink resulting will be forced up to a height in *g* sufficient to force the ink out of

the vessel A at its neck and between the wall of the bell C, or in the construction illustrated in Fig. 2 of inkstands of this character the objection in this connection would be still greater in this respect, as the bell would be extended for a considerable height above the upper edge of the vessel A and which would render the inkstand unwieldy, for a given capacity of ink and overflow could not be prevented. By my invention I am enabled to overcome this objection and at the same time increase the capacity of the inkstand by a major portion of the volume which the bell C displaces, and a feature characteristic thereof is exemplified in the manner by which I accomplish this desideratum, and the manner by which I effect an increased capacity and obviate the overflow referred to lies in the principle whereby I permit some of the entrapped air D to escape by means of a controller, consisting of a valve, as *e* and *f*, the former in the instance illustrated being a perforation in the roof of the bell and the latter a plug adapted to fit in air-tight connection therewith. By opening the said valve by withdrawing the plug *f* the bell will sink by gravitation until its lower edge will rest upon the bottom of the main reservoir B, and the air D will be displaced by a corresponding quantity of liquid entering the bottom of the bell C as it sinks, the air in the meanwhile escaping through the valve *f* and *e*.

In order to adjust the inkstand for use whereby the bell C will have a predetermined height above the vessel A while in continued use, the bell is lifted to a height relative to the reservoir A, as illustrated in Fig. 1, whereby the same is adapted to play vertically and have freedom of movement between the bottom of the main reservoir B and its adjusted height. This action causes a rarefaction of the air D and a consequent fall of pressure beyond that of the surrounding atmosphere, which latter exerts a downward thrust upon the small column of ink in the conduit *h*, which is depressed below the lower end *i* of the said conduit, and the air following same will escape through the column of ink within the said reservoir into the air-space above the same until the said pressure within the said space equals the surrounding atmospheric pressure, whereupon equilibrium in the exterior and interior pneumatic pressures aforesaid will be established, and the bell in consequence will remain at rest at the adjusted height. Upon again depressing the bell C in the act of dipping ink from the dip *d*, and the consequent downward thrust upon the bell, as aforesaid, the volume of air D will be initially compressed and exert its pressure upon the surface of the liquid enveloped by the walls of the bell, resulting in the same being forced into a small column through the aperture *i* and into the conduit *h* and dip *d*, as aforesaid, and thus it will be observed that the operation of the pneumatic bell thus playing vertically within the limits of adjustment may be repeated until the entire quantity of ink contained in the reservoir A will have been discharged through the conduit *h* and used in the dip-cup *d*. This, however, is dependent upon the degree of seal afforded by the thin stratum of liquid between the lower extremity of the outer wall of the reservoir or bell C and the neck of the main reservoir B. It is therefore obvious that the relation between these coacting parts should be approximately sufficiently tight to cut off free communication between the reservoir or overflow *g* and the reservoir B.

In the modification illustrated in Fig. 2 it will be observed that the overflow *g* is considerably reduced, and in this respect it is disposed within the inner wall of the vessel A as an annular groove. Its capacity, however, is comparatively small, but sufficient to serve the purpose for an overflow when the ink is suddenly forced up between the outer wall of the bell C and the inner surface of the reservoir A. When it is desired to construct the vessel A of heavy glass, such as that illustrated in Fig. 3, and to obviate the well-known difficulty which is encountered in forming the interior of glass vessels of this character sufficiently exact to meet the requirements in fit between the outer surface of the float and the inner surface of the vessel A, I have adopted an expedient as small *g'*, which, as illustrated, is a cylindrical shell made to set within the glass vessel A and fit the bell C slidingly, as in the vessel A and bell C in Figs. 1 and 2. This construction obviates the necessity of grinding the inner cylindrical surface of the vessel A to accommodate the requirements in fit with the outer cylindrical surface of the bell C. In Fig. 5, however, I have illustrated this latter construction and have also shown a means of increasing the sealing action between the two vessels A and C by the grooves F, which are formed upon the outer perimeter of the vessel C. As an economic feature in manufacture I have shown another expedient in this figure for the formation of the overflow *g*, which in lieu of being formed reëntrantly in the glass vessel A, as in Figs. 1 and 2, is formed in the outer periphery of the float C, and another economic feature in effecting the construction of the overflow in heavy glass vessels, and when it is desired to carry more ink, I form the vessel A in the manner indicated in Fig. 4, internally of two diameters, the upper one any desired diameter within the limits of the stand and the lower one to fit the lower extremity of the bell in the manner already described in connection with Figs. 1 and 2. It will be observed in this construction that this larger extremity of the

bell C serves the purpose of a cover and affords the opportunity of a more compact construction.

In the modification illustrated in Fig. 6 I have illustrated a construction of the outer vessel A similar to that of Fig. 4 and have shown an expedient for effecting a fit between the bell A and the reservoir in accordance with Fig. 3.

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

1. In an ink-well of the character described, a vessel adapted to contain a supply of ink, a reservoir adapted to float on the ink-supply and inclose a quantity of ink and entrapped air, said reservoir being adapted to be immersed in the said ink-supply, a dip-cup carried by the reservoir and a communication between the dip-cup and the interior of the reservoir, whereby said ink-supply is adapted to be brought into communication with the dip, a valve coacting with the reservoir and the entrapped air for controlling the supply of the latter, and an open communication between the reservoir and the vessel; substantially as and for the purpose set forth.

2. In an inkstand of the character described, a well adapted to carry a supply of ink, a pneumatic bell adapted to float upon the ink and to be immersed therein, so as to inclose a quantity thereof, a pneumatic controller for the air-supply in the bell for regulating the degree of immersion and the consequent quantity of inclosed ink; substantially as set forth.

3. In a pneumatically-operated inkstand, a well adapted to carry a supply of ink, a pneumatic bell adapted to float upon the ink by the buoyancy of the air entrapped therein and adapted to be immersed in said ink so as to inclose a column thereof reëntrantly within the bell, said bell being provided with a dip-cup and a conduit, the latter leading to the ink-supply of the bell, and a pneumatic controller for the said entrapped air in the bell for regulating the degree of immersion and the consequent height of the said column within said bell; substantially as set forth.

4. In a pneumatically-operated inkstand, a well adapted to carry a supply of ink, a float in said well provided with means for admitting air thereto whereby the height of the float may be adjusted in the well, the construction being such that when the float is depressed, ink will be forced to the upper end thereof.

5. In a pneumatically-operated inkstand, a well adapted to carry a supply of ink, having a plurality of reservoirs, a pneumatic bell adapted to float upon the ink in the well by virtue of the buoyancy of the air entrapped therein, said bell adapted to fit slidingly within one of the said reservoirs and adapted to be immersed in said ink so as to inclose a column thereof reëntrantly within the bell, said bell being provided with a dip-cup and a conduit, the latter leading from the dip-cup to the ink-supply of the bell, a pneumatic controller for the said entrapped air in the bell for regulating the degree of immersion and the consequent height of the said column within said bell; substantially as set forth.

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