

No. 768,174.

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J. F. FITZSIMMONS.

INKSTAND.

APPLICATION FILED OCT. 28, 1903.

NO MODEL.

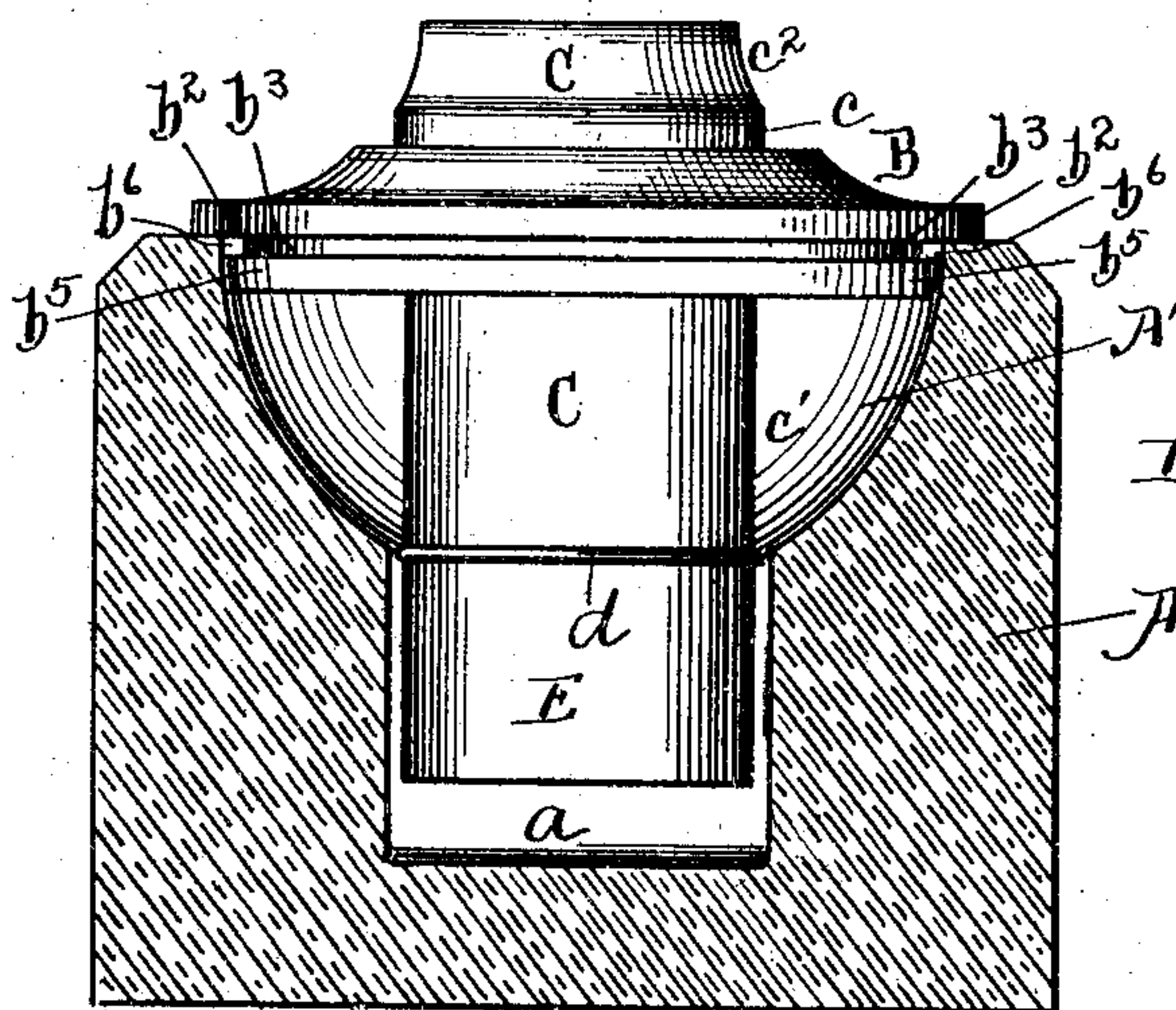


Fig. 1.

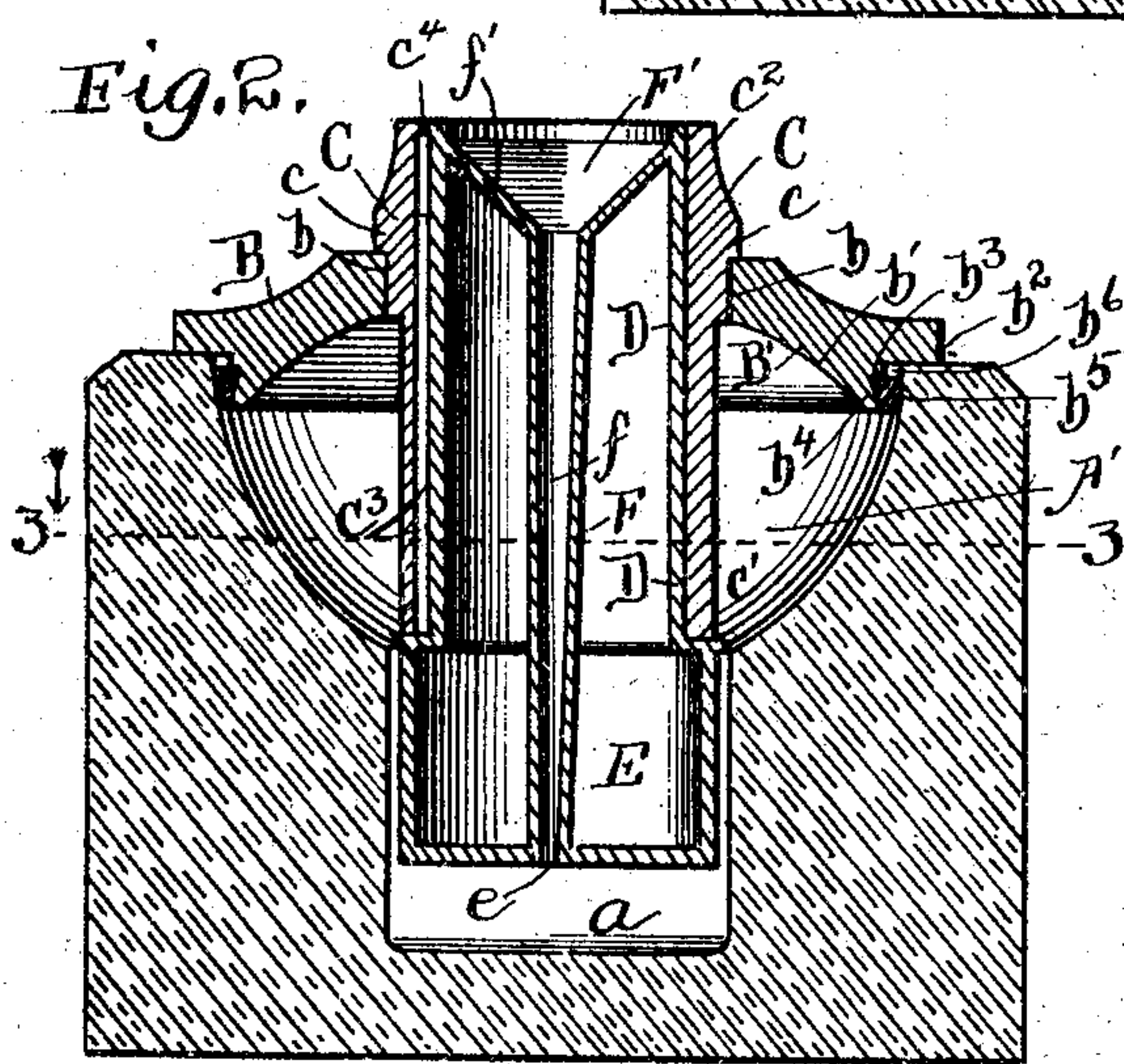


Fig. 2.

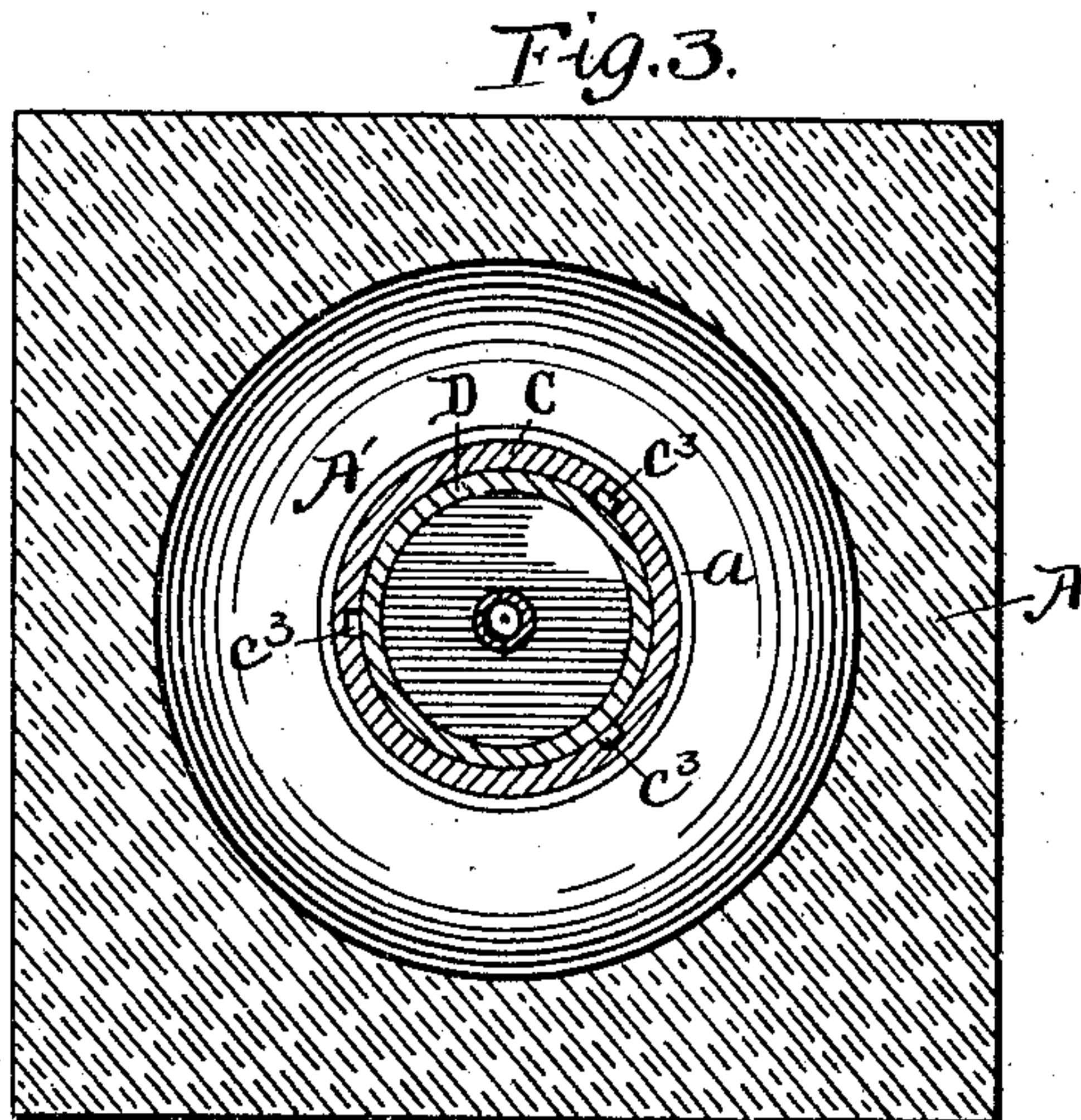


Fig. 3.

Fig. 4.

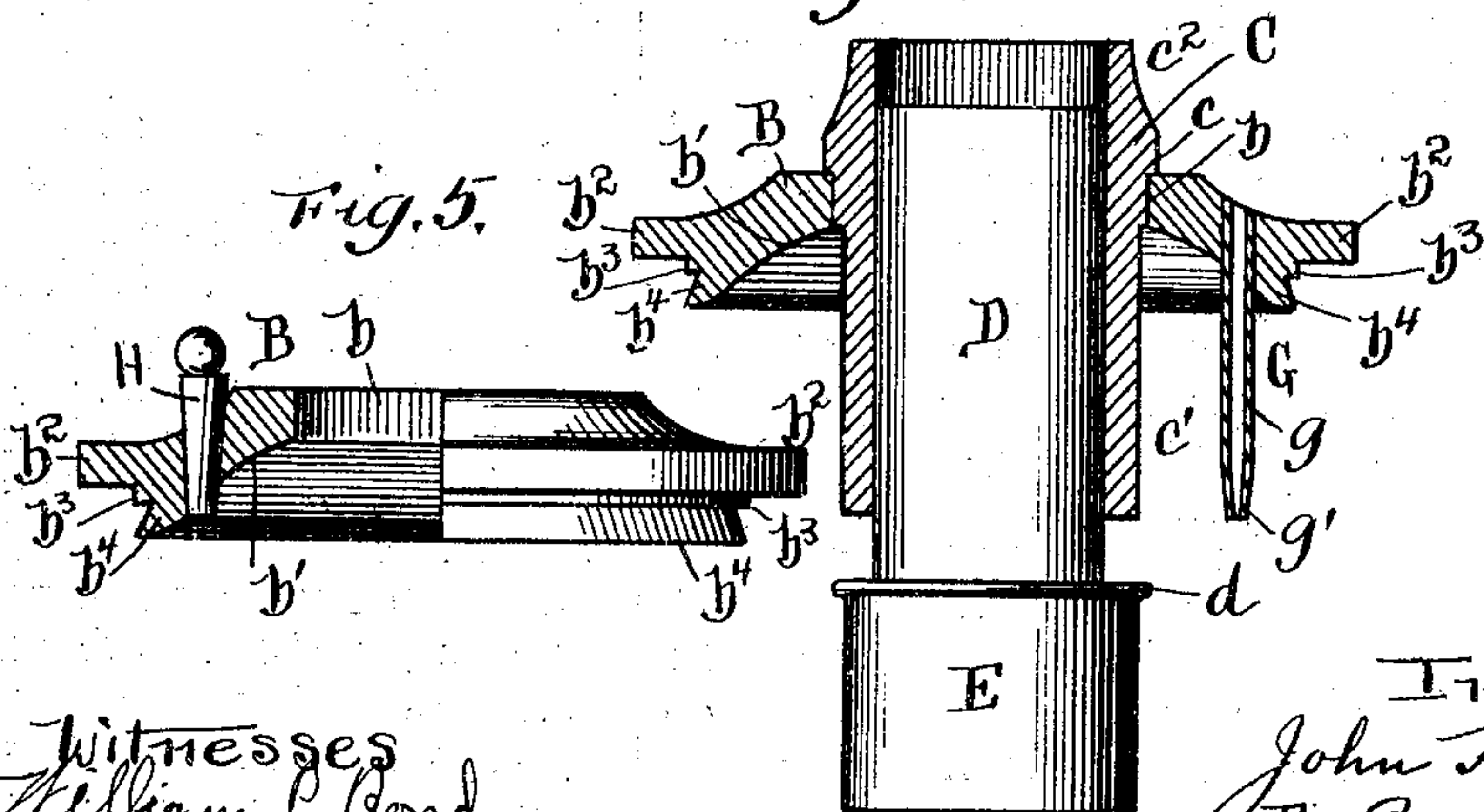


Fig. 5.

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UNITED STATES PATENT OFFICE.

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INKSTAND.

SPECIFICATION forming part of Letters Patent No. 768,174, dated August 23, 1904.

Application filed October 28, 1903. Serial No. 178,900. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. FITZSIMMONS, a citizen of the United States, residing at Hillsdale, in the county of Hillsdale and State of Michigan, have invented certain new and useful Improvements in Inkstands, of which the following is a specification.

This invention relates to inkstands of that class in which a minimum of evaporation is provided for and in which the supply of ink for the pen is automatically raised for the pen to be dipped thereinto.

The objects of the invention are to improve the construction and operation of the means for automatically raising the ink from the well for the dipping of the pen thereinto, to maintain a constant supply of air within the chamber above the ink and have such maintenance automatic with the raising of the ink from the well into the pen-duct, to insure the requisite supply of air for the operation of lifting the ink corresponding to the amount of ink displaced, to prevent ingress of the air-supply to the ink-chamber through the pen-duct for the ink, to insure a tight seal of the chamber for the ink when the cover is in place, to force the air-supply into the ink-chamber for compensating for displacement of the ink on the return movement of the means for raising the ink into position for the pen to dip thereinto, and to improve generally the construction and operation of the several parts entering into the inkstand as a whole.

The invention consists in the features of construction and combinations of parts hereinafter described and claimed.

In the drawings, Figure 1 is a sectional elevation of the inkstand of the invention with the operative parts for raising the ink in position in the ink-containing chamber and well, such parts being shown in full elevation; Fig. 2, a sectional elevation of the inkstand-body and its ink-containing chamber and well, with the operative parts for raising the ink also in sectional elevation and in position for use; Fig. 3, a cross-section on line 3 3 of Fig. 2 looking in the direction of the arrow; Fig. 4, a sectional elevation of the cover of the inkstand and the supporting-tube for the piston that raises the ink, the piston being shown in full elevation

and showing a modification in the air-supply duct or passage; and Fig. 5, a detail showing the cover partly in elevation and partly in section with a filling and feeding plug in the cover.

The inkstand has a body A, which may be made of glass, porcelain, or other suitable material and may be of the form shown or other desired form. The upper portion of the body of the inkstand has formed therein a chamber or cup A' for receiving the ink, and leading downward from the bottom of this ink-receiving chamber or cup is a well α , which preferably is of a cylindrical shape in cross-section, but could be of other shape in cross-section. This construction of chamber and well for the ink increases the capacity of the stand as to the amount of ink that can be held in the inkstand and at the same time allows only that portion of the ink contained in the well to be displaced in raising the ink to be in position for use, the ink flowing from the chamber into the well as it is used, with the result that practically all of the ink can be consumed before the inkstand has to be re-filled, thus giving a longer period of use for the stand than would be the case if the supply of ink was furnished from the well only without the auxiliary supply-chamber above the well.

The top of the ink-chamber A' is to be closed air-tight when the ink is in the chamber and well by a suitable cover. The cover B shown is a plate or disk of vulcanized rubber or other suitable material having an annular hole b at its center and having its under face b' of a concave shape, so as to furnish between the top of the ink in the chamber A' and the under face of the cover an air-chamber B', into which air is admitted to supply the requisite amount of air as the ink is withdrawn for use. The cover B has a circumferential flange b^2 , which when the cover is in place rests on the top of the inkstand around the ink-receiving chamber, and the under face of the cover B has a shoulder b^3 and a wall b^4 , the wall having an inclined outer face, as shown in Figs. 2, 4, and 5. The wall b^4 receives a packing-ring b^5 , which abuts at its upper edge against the under side of the

shoulder b^3 , leaving the space b^6 between the shoulder and the face of the chamber as a clearance for the rubber or other packing-ring in closing the chamber with the cover, thus insuring an air-tight joint between the cover and the ink-receiving chamber, which is necessary in order to insure perfect operation in raising the ink into position for the dip of the pen thereinto.

10 A tube C, of vulcanized india-rubber or other suitable material, is entered through the hole b of the cover, and the exterior of this tube has a shoulder c , which abuts against the face of the cover around the hole b , making a tight joint. The tube extends above and below the cover, and its lower portion c' terminates at its end in a plane approximately in line with the bottom of the ink-chamber, and its upper portion c^2 furnishes a guard for the pen to enter the receptacle for the ink at the top of the ink-duct. The inner wall of the tube C in the construction shown in Figs. 1, 2, and 3 has therein grooves or passages c^3 extending from the lower end of the tube upwardly and terminating adjacent to the upper end of the tube with a wall or flange c^4 , which furnishes a stoppage against the squirting of ink through the duct or passage in the operation of the ink-lifting piston, though the grooves or passages c^3 could extend from end to end of the tube C, if so desired, and in either form of arrangement these grooves or passages serve as air-ducts for carrying air from the exterior of the inkstand into the ink-receiving chamber A' for the air to pass into the air-chamber B' above the ink as the ink is lowered in the chamber and well in use. A hollow stem D is located within the tube C and is free to slide endwise in the tube C, and this stem D has at its lower end an outwardly horizontal projecting flange d , which serves as an abutment to strike against the end of the tube C and limit the upward movement of the stem D within the tube C, and this flange also forms the body of a hollow piston or plunger E depending from the flange, and for which the stem D forms a guide in the reciprocating or rising-and-falling movement.

The piston E in cross-section is of a less diameter than the interior diameter of the well, and when the parts are normal the flange d is approximately in the horizontal plane of the upper end of the well with the piston or plunger wholly, as to its body, within the well a of the ink-chamber, so that in its rising-and-falling movement the piston or plunger E moves only within the space of the well up and down, its upward movement being limited by the engagement of the flange or abutment d with the lower end of the tube C, and its downward movement being limited by the contact of its end wall or head with the bottom of the ink-well a of the ink-chamber. A feed-tube F for the ink extends upwardly from the bottom or head of the piston or plunger E, and

this tube F has therein its entire length a duct or passage f , into which the ink rises to enter the receiving-cup f' of the dip-funnel F' to be accessible to the pen. The ink duct or passage f is tapered from its upper end to its lower end, and its lower end communicates through a port e in the bottom of the piston or plunger with the ink-well a , so that with the depression of the piston or plunger a quantity of ink in the well a will be displaced and be forced through the port e into the passage or duct f to enter the pen-receptacle or cup f' , and in such lifting of the ink the tapered duct or passage f facilitates the operation as it increases in diameter from the admission-port e until the dip funnel or cup F' is reached. The tapered form of the ink duct or passage f also serves as a means for retaining ink in the duct or passage, so that the retained ink will furnish a seal against the indrawing of air through the duct or passage f , thus forcing all of the air which is carried into the air-chamber to pass through the air ducts or passages c^3 with the movement of the piston or plunger in the construction shown in Figs. 1, 2, and 3.

In use the ink-receiving chamber A' and the well a are filled with ink approximately to the height in the receiving-chamber A' of the end face of the wall b^4 , so as to leave an air-chamber between the upper surface of the ink and the under face of the cover, into which space a certain amount of air remains. The ink in the well a surrounds the piston or plunger E and is below the bottom of the piston or plunger. The depression of the piston or plunger by inserting the pen into the dip-funnel F' and bearing down on the funnel causes the ink in the well to be forced up through the port e and duct or passage f into the dip-chamber f' of the dip-funnel to a sufficient height for the pen to receive the ink thereon. This descent of the piston or plunger in forcing the ink upward through the duct or passage f draws out a certain amount of ink, lowering the ink in the ink-chamber, and, as this chamber is air-tight, if means were not provided to supply additional air the air in the chamber at first would expand so as to not furnish the requisite abutment to act in conjunction with the piston and lift the ink, and the requisite amount of air within the chamber is maintained by fresh air drawn in through the air ducts or passages c^3 in the tube C, such indrawing of the air occurring with the upward movement of the piston or plunger, forcing the air to escape at the lower end of the ducts or passages and rise up through the body of ink in the chamber A' and enter the air-chamber above the ink. This operation of drawing in air as required will occur with each descent and ascent of the piston or plunger, and in so drawing in of the air no air can pass through the central ink duct or passage f , as that duct or passage is sealed against

the admission of air by the ink therein. It will thus be seen that the piston or plunger E not only serves as a means for forcing ink into the dip-funnel, but also as the means for indrawing air for the air to maintain a constant normal pressure in the ink-chamber above the ink, thus causing the piston or plunger to operate in a uniform and regular manner in displacing and raising a quantity of ink and supplying fresh air to the air-chamber as the ink lowers in such chamber.

The air ducts or passages, as shown in Figs. 1, 2, and 3, terminate at a point below the tip of the inclosed tube, which prevents upward spurting of the ink in the descent of the piston or plunger, as the ink will strike the under face of the flange c^4 and be deflected into the upper end of the stem D to pass into the dip-funnel, and with the ascent of the piston the ink which entered the air ducts or passages in the descent of the piston will be forced therefrom, and at the same time the fresh supply of air will be drawn into the ducts or passages c^3 to enter the air-chamber and compensate for the loss of ink incident to its use with the pen.

The air-supply to compensate for the withdrawal of the ink in use can be attained otherwise than through the ducts and passages c^3 . As shown in Fig. 4, a tube G is entered through the cover B, and this tube has a passage g , the lower end g' of which is contracted somewhat. The lower end of the tube G terminates approximately at the line of termination of the tube C, and the air to supply the deficiency from the withdrawal of the ink is drawn through the passage g by the upward movement of the piston or plunger E in the same manner as the air is drawn through the ducts or passages c^3 in supplying air to the chamber B' above the ink in such chamber. The contracted end g' of the passage g prevents ink from being forced rapidly into the passage with the descent of the piston and plunger, and thus prevents spurting of the ink through the tube G in the operation of raising the ink into the dip-funnel, and what little ink enters the tube G with the descent of the piston or plunger is withdrawn therefrom on the ascent of the piston or plunger, allowing air to pass downward through the tube G and enter the body of the ink to rise into the air-chamber.

The operation of the construction shown in Fig. 4, so far as relates to the indrawing of air for maintaining normal position as to air in the ink-chamber, is in all material respects the same as described for indrawing air through the ducts or passages c^3 through the action of the piston or plunger.

The cover, if so desired, may have a filling-opening therein closed by a plug H, as shown in Fig. 5, this opening closed by the plug serving as a vent for filling purposes, but having no effect in the operation of the

piston-plunger, except that if the plug is not inserted the piston or plunger will be inoperative, making it necessary, therefore, to have the plug tightly inserted for the piston or plunger to operate.

It will be seen that with the inkstand of this invention a supply of ink is provided that will enable the stand to be used for a long period of time without refilling, that the inkstand as a whole is simple in construction, easily operated, and effective and reliable in use, that the movements of the piston or plunger in its ascent and descent withdraws ink as required for use in the dip-funnel and also maintains a constant supply of air under normal conditions in the ink-receiving chamber, and this regardless of the amount of ink therein or the quantity of ink withdrawn, and that the air is effectually sealed against entering the ink-containing chamber except through the proper air ducts or passages and cannot enter through the induct or passage for the dip-funnel.

While it is preferred to use an ink-receiving chamber with a well leading therefrom, it is to be understood that the piston or plunger, with the air-supplying ducts or passages, could be used with a well alone and perform the operation of forcing the ink to the dip-funnel and drawing in air to maintain a normal supply of air above the ink.

What I regard as new, and desire to secure by Letters Patent, is—

1. In an inkstand having an ink well or reservoir with an air-tight cover thereover, an air duct or passage opening into the well or reservoir, a piston within the well or reservoir adapted to be depressed and of its own volition return to normal position and by its depression raising the ink to the pen and with its return movement automatically supplying air to the well or reservoir through the air duct or passage as the ink is consumed in use, substantially as described.

2. In an inkstand having an ink-reservoir and a well with an air-tight cover thereover, an air passage or duct opening into the reservoir, and a piston within the well, the piston operating by its rise in the well to automatically draw air into the reservoir through the air passage or duct and supply ink to the well as the ink is withdrawn in use, substantially as described.

3. In an inkstand having an ink-well, a piston operating within the well, and an air-duct opening into the well for the rise of the piston to automatically supply air to the well through the air duct or passage as the ink is withdrawn in use, substantially as described.

4. In an inkstand in which the ink for use is raised by displacement, an air duct or passage, and a piston having a rising-and-falling movement and in rising automatically supplying air through the air duct or passage to maintain the pressure on the ink as the ink

is withdrawn in use, substantially as described.

5. In an inkstand having an ink-receiving chamber and an ink-well below and in communication with the chamber, the combination of a cover over the ink-chamber, a tube carried by and extending above and below the cover and terminating at its lower end approximately in line with the bottom of the ink-receiving chamber, a piston operating wholly below the lower end of the covered tube and having an upwardly-extending passage terminating in a dip-funnel, and an air-supplying duct or passage through which air is drawn with the upward movement of the piston to fill the vacuum created by the withdrawal of the ink from the chamber and well, substantially as described.

6. In an inkstand having an ink-receiving chamber and an ink-well below and in communication with the chamber, the combination of a cover over the ink-chamber, a tube carried by and extending above and below the cover and terminating at its lower end approximately at the bottom of the ink-chamber and having in its interior face air ducts or passages, and a piston movable wholly within the well and having an interior ink-passage sealed against the admission of air therethrough, substantially as described.

7. In an inkstand having an ink-receiving chamber and an ink-well below and in communication with the chamber, the combination of a cover over the ink-chamber, a tube carried by and extending above and below the cover and terminating at its lower end approximately at the bottom of the ink-chamber and having in its interior face air ducts or passages, closed at their upper ends, and a piston movable wholly within the well and having an interior ink-passage sealed against the admission of air therethrough, substantially as described.

8. In an inkstand having an ink-receiving chamber and an ink-well below and in communication with the chamber, the combination of a cover, a tube carried by and extending above and below the cover with its lower end terminating approximately at the line of the bottom of the ink-receiving chamber and having in its inner face longitudinal grooves forming air ducts or passages and starting at a point below the upper end of the tube and opening at the bottom through the end of the tube,

and a piston adapted to move up and down wholly within the well and having an interior ink-passage sealed against the admission of air therethrough, substantially as described.

9. In an inkstand, the combination of an ink-receiving chamber, a well below the chamber of contracted diameter, an air-tight cover for the chamber, an inclosing tube extending downwardly from the cover into the ink-receiving chamber and provided with grooves on its inner face forming air ducts or passages, a piston adapted to rise and fall below the lower end of the tube and located within the ink-well and provided with a circumferential flange at its upper end forming a shoulder to abut against the lower end of the inclosing tube, and an ink-tube upwardly extending from the bottom of the piston and having communication with the ink-well and sealed against the admission of air therethrough, substantially as described.

10. In an inkstand, the combination of an ink-receiving chamber having a semispherical shape and terminating in an ink-well, an air-tight cover over the ink-receiving chamber, a piston operating wholly within the well, an ink-passage upwardly extending from the bottom of the piston, and an air-supply passage through which air is automatically supplied to the ink-receiving chamber, thereby maintaining the piston and the passage upwardly leading therefrom at normal height without regard to the quantity of ink within the chamber or well, substantially as described.

11. In an inkstand, the combination of an ink-receiving chamber terminating in a well, a cover tightly closing the ink-receiving chamber, a piston operating wholly within the well, an upwardly-extending tube from the bottom of the piston furnishing an ink-passage and sealed against the admission of air therethrough to the ink-receiving chamber, and means for automatically supplying air to the ink-receiving chamber through the movements of the piston for maintaining the piston and its upwardly-extending tube at normal height irrespective of the quantity of ink in the ink-receiving chamber and well, substantially as described.

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Witnesses:

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