(No Model.)

H. H. BALLARD.

DEVICE FOR FILLING OR EMPTYING TUBES.

No. 545,838. Patented Sept. 3, 1895.

Fig. 1.

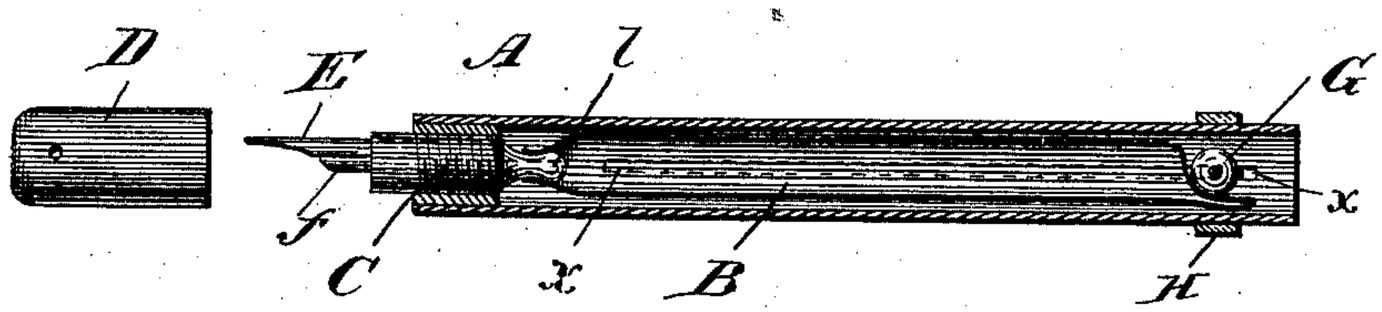
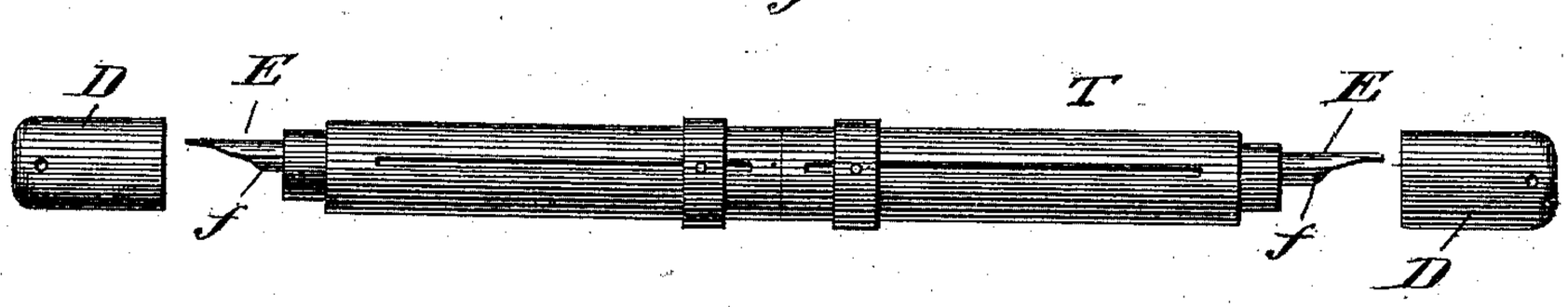


Fig. 2.



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DEVICE FOR FILLING OR EMPTYING TUBES.

SPECIFICATION forming part of Letters Patent No. 545,838, dated September 3, 1895.

Application filed January 8, 1895. Serial No. 534,277. (No model.)

To all whom it may concern:

Be it known that I, HARLAN HOGE BALLARD, a citizen of the United States, residing at Pittsfield, in the county of Berkshire and State of Massachusetts, have invented a new and useful Device for Filling and Emptying Tubes, as for fountain-pens, medicine-droppers, &c., of which the following is a specification, reference being had to the accompanying drawing.

My invention relates to improvements in instruments designed to produce a more or less complete vacuum by compressing the walls of a normally-open receptacle, as a rubber tube closed at one end, and then of releasing the pressure, thereby allowing the receptacle to regain its normal condition, thereby creating sufficient suction to draw a liquid substance into the interior thereof. I attain these objects by means of the mechanism illustrated in the accompanying drawing, in which—

A represents a tube with rigid walls, closed at one end and made of any suitable substance, as hard rubber.

B represents a tube with elastic and compressible walls, having one end closed and of a size adapted to fit easily within the tube A.

C represents a mouthpiece or nozzle adapted to be securely attached, by a screw-end or otherwise, to the open end of the rigid tube A, and also furnished with a suitable projection or shoulder *l*, adapted to enter the open end of the inner compressible tube B, forming an air-tight joint.

G represents a ball or block of such substance as may be suitable, preferably hard rubber, of a size such that when rolled or otherwise forced into the large tube, between the inner walls thereof and the outer wall of the inner tube, it shall so compress the walls of the inner tube B as to flatten the inner tube against the inner wall of the outer tube A and expel the contents of the inner tube B. In the outer tube A there are two longitudinal slits *x x*, extending for a suitable distance through the walls thereof on opposite sides.

H is a band of hard rubber or other suitable material, of a size suitable to surround the tube A and slide thereon. A pivot passes through the walls of the encircling-ring H, through the slits *x x* in the outer tube A, and through the diameter of the ball or block G. The figure represents this entire device in connection with a fountain-pen, for filling and emptying which it is primarily designed.

In the figure the ball or block G is shown in its normal position near the closed end of the tube A and resting upon and compressing the inner tube B at a point near its upper or closed end. The tube B is normally filled with air. If now the band or ring H be pushed down the barrel of the tube A, the pivot, sliding in the slits *x x* and passing through the ball or block G, will force the ball or block to roll or slide along the inner tube, compressing its walls as it goes and expelling the air in front of it. When the band has been thus slid down the tube to the limit of the slits, the air in the inner tube will have been nearly all expelled. The nozzle F is then to be immersed in ink or other suitable fluid and the band H is drawn back up the barrel to its first or normal position. As the ball or block G is thus forced back along the inner tube B, the pressure is removed, the tube opens by the elasticity of its walls, a vacuum is formed and the liquid is forced into the nozzle F and fills the tube B. By again pushing the band H down the barrel A the liquid may be expelled as slowly or rapidly as desired, or the band may be left stationary in its normal position and the ink may be allowed to flow from the nozzle under the regulation of any suitable "feed" that may be attached to the nozzle or mouthpiece.

I am aware that pens and other tubes have been filled by means of the exhaustion of air by pistons and rods; but this method is open to three serious objections.

First. The rod of the piston when extended adds nearly one-half to the unavailable length of the pen and renders the use of a pen at each end impracticable.

Second. The extended piston-rod is liable to accidental movement inward, resulting in premature and disastrous discharge of the liquid. It therefore requires to be protected by a cap, which increases both the cost of construction and the inconvenience of use.

Third. The plunger or piston-head requires to be fitted with extreme nicety to avoid leakage on the one hand and immobility on the

other. I do not, therefore, claim any piston device.

I am also aware that elastic receptacles have been used in filling-tubes, as in the ordinary medicine-dropper and in some fountain-pens; but in these cases compression has hitherto been accomplished either by the fingers, which necessitates the frequent removal of the inner tube and an awkward use of the fingers, or by means of pressure applied by a screw at a single point upon the elastic receptacle, which cannot produce a satisfactory vacuum, and which is likewise accomplished only by an expensive and bulky device. My invention obviates all these difficulties.

I claim as my invention and desire to secure by Letters Patent—

1. The combination with an outer rigid and an inner compressible tube of a traveling compressor actuated by a pin or pivot passing through it and through the outer tube, and connected with a sliding ring or band, substantially as hereinbefore described.

2. The combination with an outer rigid and an inner compressible tube of a traveling compressor actuated by a pin or pivot passing through it and through the outer tube, and connected with a sliding ring or band, and a suitable nozzle.

3. The combination with an outer rigid and an inner compressible tube of a traveling compressor actuated by a pin or pivot passing through it and through the outer tube, and connected with a sliding ring or band, a suitable nozzle, a pen and suitable ink-feeding device therefor, and a cap to cover the exposed end.

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Witnesses:
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