3 Sheets—Sheet 1.

J. G. INGRAM,

Manufacture of Enemas, Syringes, &c., of India Rubber.

No. 212,939. Patented Mar. 4, 1879.

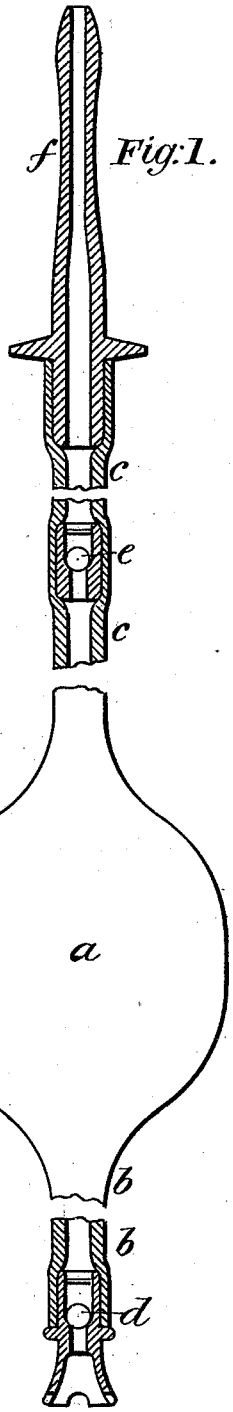

Fig: 1.

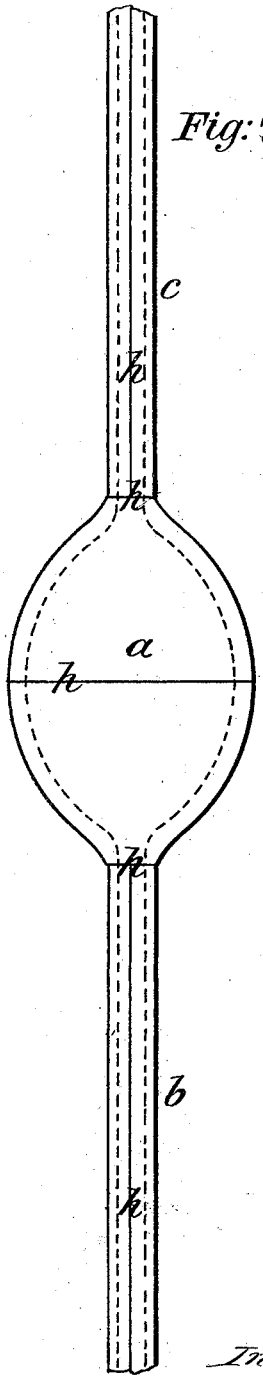

Fig: 7.

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3 Sheets—Sheet 2.

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Fig: 2.

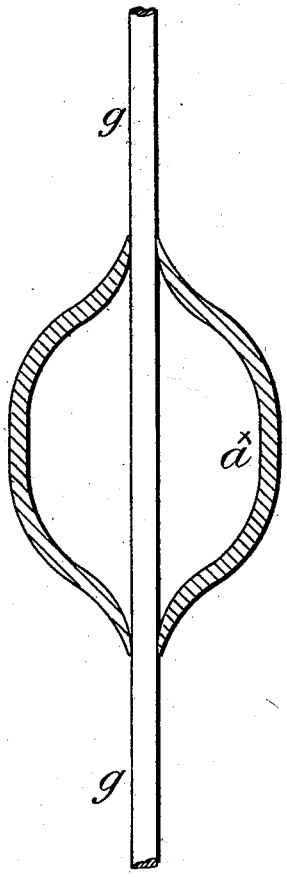

Fig: 3.

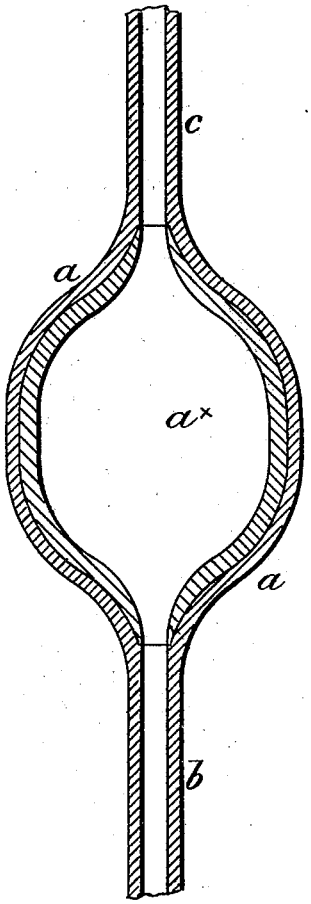

Fig: 6.

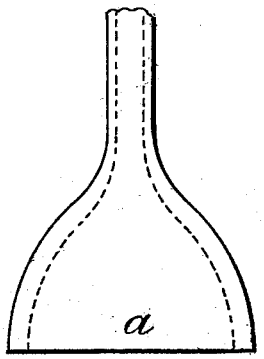

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Fig: 8.

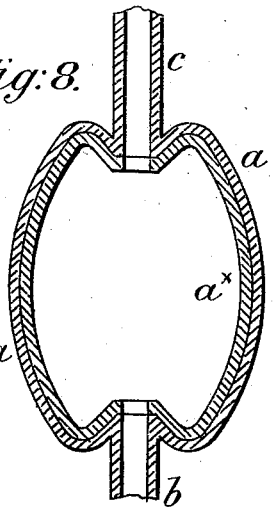


Fig: 4.

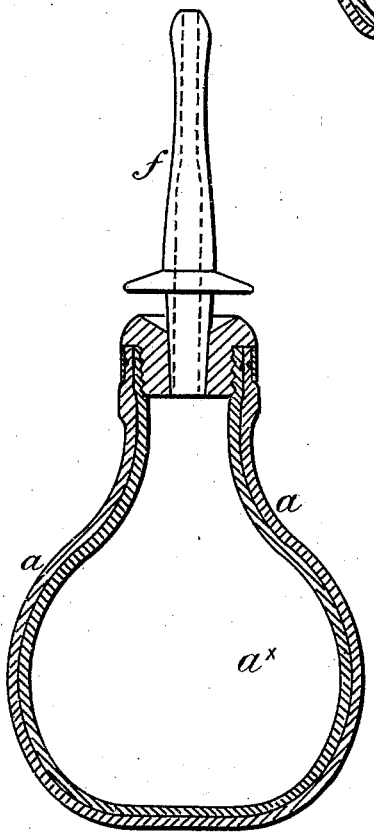
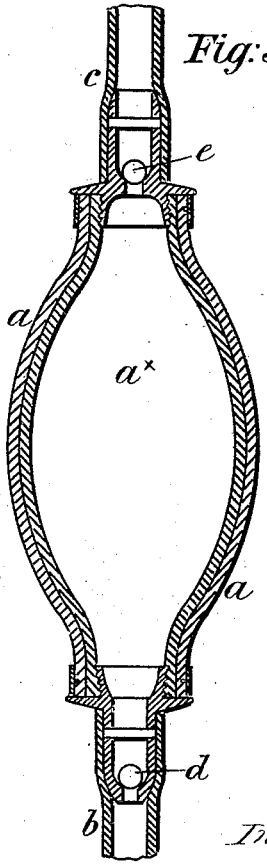


Fig: 5.



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UNITED STATES PATENT OFFICE.

JAMES G. INGRAM, OF LONDON, ENGLAND.

IMPROVEMENT IN MANUFACTURE OF ENEMAS, SYRINGES, &c., OF INDIA-RUBBER.

Specification forming part of Letters Patent No. **212,939**, dated March 4, 1879; application filed November 21, 1878; patented in England, April 12, 1878.

To all whom it may concern:

Be it known that I, JAMES GEORGE INGRAM, of the London India-Rubber Works, Hackney Wick, London, England, have invented new and useful Improvements in the Manufacture of Enemas, Syringes, and other similar articles of india-rubber, which improvements are fully set forth in the following specification.

The invention has for its object improvements in the manufacture of enemas, syringes, and other similar articles of india-rubber, whereby the same are rendered stronger, lighter, less liable to split and to injury of the tubes, and have the valves placed in more convenient position than heretofore for adjustment and repair; and in order that my said invention may be clearly understood and readily carried into effect, I will proceed, aided by the accompanying drawings, fully to describe the same.

Figure 1 is partly an exterior view and partly a section of an enema, syringe, or other similar article constructed according to my invention.

a is the ball or barrel, *b* is the suction-tube, and *c* is the delivery-tube, all of which it is preferred to form in one continuous body of india-rubber without the usual metallic or other connections. *d* is the suction-valve. *e* is the delivery-valve, and *f* is the nozzle. The valves *d e*, instead of being placed, as heretofore, at or near the junctions between the ball or barrel and the suction and delivery-tubes are, according to my invention, placed at or near the outer ends of such tubes, whereby such valves are more readily placed in position, and they are placed in a more convenient position than heretofore for adjustment and repair; and this part of my invention is applicable to enemas, syringes, and other similar articles manufactured according to my invention, or in any other convenient manner.

The improved enemas, syringes, and other similar articles above described may be manufactured in any of the modes hereinafter described.

According to one mode I first form a ball or barrel about half the thickness desired for the finished article. This I do by cutting the same out of sheet-rubber and joining the various parts thereof together at the seams by solvent, in the usual manner, and I find it advisable to partially cure this ball or barrel in a mold to cause it to assume and retain the desired shape.

This partially-formed ball or barrel $a^{\times}$, I mount, as represented at Fig. 2, upon a rod, wire, or tube, *g*, and use the entire as a form or mold upon which I obtain a coating of india-rubber to any desired thickness, as represented at Fig. 3, by dipping the same any required number of times in india-rubber solution or compound.

When the desired thickness is obtained I remove the rod, wire, or tube, leaving the first-mentioned ball or barrel $a^{\times}$ within and firmly connected with the finished article, thereby forming an increased thickness at such part as represented at Fig. 3, and I complete the enema, syringe, or other similar article by applying thereto an inlet-valve, *d*, at or near to the outer end of the suction-tube *b*, and an outlet-valve, *e*, at or near to the outer end of the delivery-tube *c*, to which I also connect the nozzle *f* in the usual way.

The above method of manufacture I also apply to the manufacture of bottle enemas, syringes, and other similar articles, as represented in section at Fig. 4, in which case I first form the bottle or reservoir about half the thickness desired for the finished article by cutting the same out of sheet india-rubber, and joining the parts thereof together at the seams by solvent in the usual manner, and then partially curing the same in a mold, as before described, after which I dip the same any required number of times in india-rubber solution or compound until the desired thickness is obtained, and, if desired, the bottle or reservoir may be provided with a tube formed thereon by the process of dipping, as described with respect to the previous figures; and instead of forming the ball or barrel and the inlet and outlet tubes all in one piece by the process described with respect to Figs. 1, 2, and 3, the ball or barrel may be formed separately by such process, as represented at Fig. 5, and the inlet and outlet tubes may be connected thereto in the usual manner; or half the ball or barrel *a* and a tube, *b* or *c*, connected thereto may be formed, as represented

at Fig. 6, by dipping a suitably-shaped mold in dissolved india-rubber or compound, and then, after removal of the two half-molds, cementing the two parts together; and I, by preference, previously bevel the adjoining surfaces, so as to afford more extended surface for the joint, and I also cement around the exterior of such joint a strip or band of india-rubber, in order that such part may be suitably strengthened. I then place the entire in a mold, and cure the same in the mode well understood for curing other hollow articles of india-rubber, after which the valves and nozzles are applied, as before described.

Another mode of manufacturing such improved enemas, syringes, and other similar articles consists in cutting the parts to form the ball, barrel, or reservoir, and the tube or tubes out of sheet-rubber, and cementing the same together, after which I place the entire in a mold of suitable shape and cure it, as before described.

The lines at *h h*, Fig. 7, represent the lines of junction of such a mold; but some of these lines of junction may be differently arranged.

If desired, in this last-described method of manufacture, the ball, barrel, or reservoir may also be made of greater thickness than the tubes by cutting the same out of thicker sheet india-rubber than that used for the tubes, and previous to curing the article in a mold strips, or rings of india-rubber may also be cemented around the lines of junction of the various parts to strengthen the same.

At Fig. 8 I have represented a section of an enema, syringe, or other similar article constructed according to my invention, of such a form as to facilitate packing. In this case I invert or turn inward the ends of the ball or barrel *a*, and connect the inlet and outlet tubes to the bottom of such inverted ends, so as to enable the tubes to be coiled around the ball or barrel for packing without injury to such tubes.

This form of enema, syringe, or other similar article may be produced by cutting the parts thereof out of sheet india-rubber, cementing them together, and then curing the article in a mold, as hereinbefore last described; or it may be manufactured in a similar manner to that described with respect to Figs. 1, 2, and 3, except that in mounting the partially-cured ball or barrel on the tube, rod, or wire for completing the same, and forming the tubes thereon by dipping, I stretch out the inverted or turned-in ends, so as to facilitate the dipping process, and then before curing the complete article I remove the rod, tube, or wire in order to allow or cause the ends of the ball or barrel to return to their turned-in position, when the tube, rod, or wire is replaced, and the article is finished in the required form by curing the same in any well-known manner.

Having thus described the nature of my said invention, and the mode in which I carry the same into effect, I would have it understood that

What I claim is—

1. Placing the inlet and outlet valves *d e* of enemas, syringes, and other similar articles at or near to the outer ends of the suction and delivery tubes *b c*, in manner and for the purpose substantially as herein shown and described.

2. Manufacturing the aforesaid improved enemas, syringes, and other similar articles by first making a ball or barrel about half the thickness required for the finished article, by cutting the parts thereof out of sheet india-rubber, cementing such parts together, and partially curing the same in a mold, and then using the same in combination with a rod, wire, or tube as a mold, upon which I obtain a coating of any desired thickness by dipping the same any required number of times in dissolved india-rubber or compound, in manner and for the purpose substantially as herein shown and described.

3. Manufacturing enemas, syringes, and other similar articles by forming half the ball, barrel, or reservoir, and a tube connected thereto by dipping a suitably-shaped mold in dissolved india-rubber or compound, and then after removal of the same from the molds cementing the two parts together and curing the same, in manner and for the purpose substantially as herein shown and described.

4. Manufacturing bottle enemas, syringes, and other similar articles, and balls or barrels for the same, by first making them about half the thickness required for the finished articles, by cutting the parts thereof out of sheet india-rubber, cementing such parts together, and partially curing the same in a mold, and then using the same as a mold, upon which I obtain a coating of any desired thickness by dipping the same any required number of times in dissolved india-rubber or compound thereof, in manner and for the purpose substantially as herein shown and described.

5. Inverting or turning in the ends of balls, barrels, or reservoirs of enemas, syringes, and other similar articles, and connecting the tubes thereto at the bottom of such inverted or turned-in ends, in manner and for the purpose substantially as herein shown and described.

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