

(No Model.)

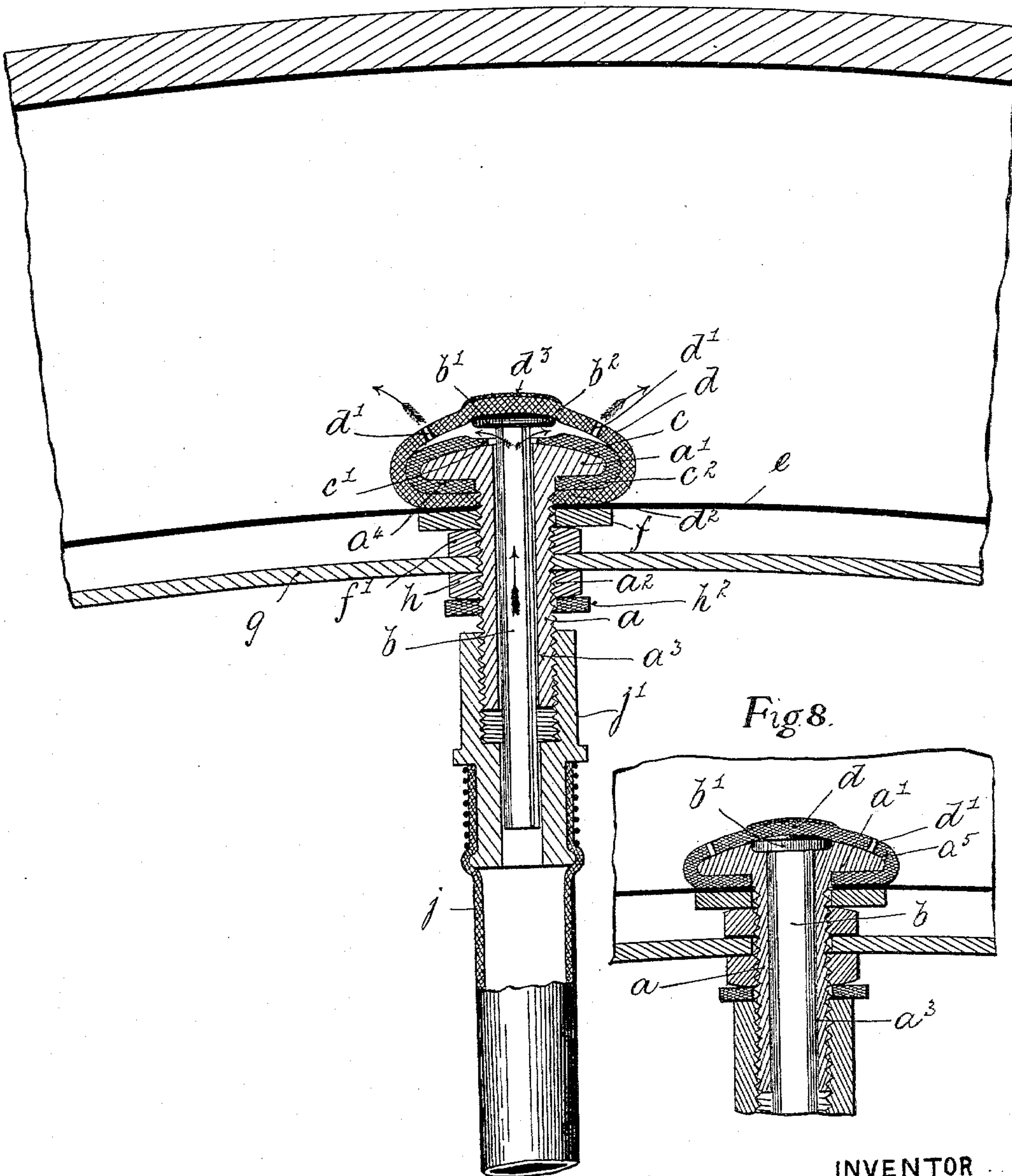
2 Sheets—Sheet 1.

A. S. CARTWRIGHT.  
TIRE VALVE.

No. 597,954.

Patented Jan. 25, 1898.

Fig. 1.



WITNESSES

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(No Model.)

2 Sheets—Sheet 2.

A. S. CARTWRIGHT.  
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Fig. 2.

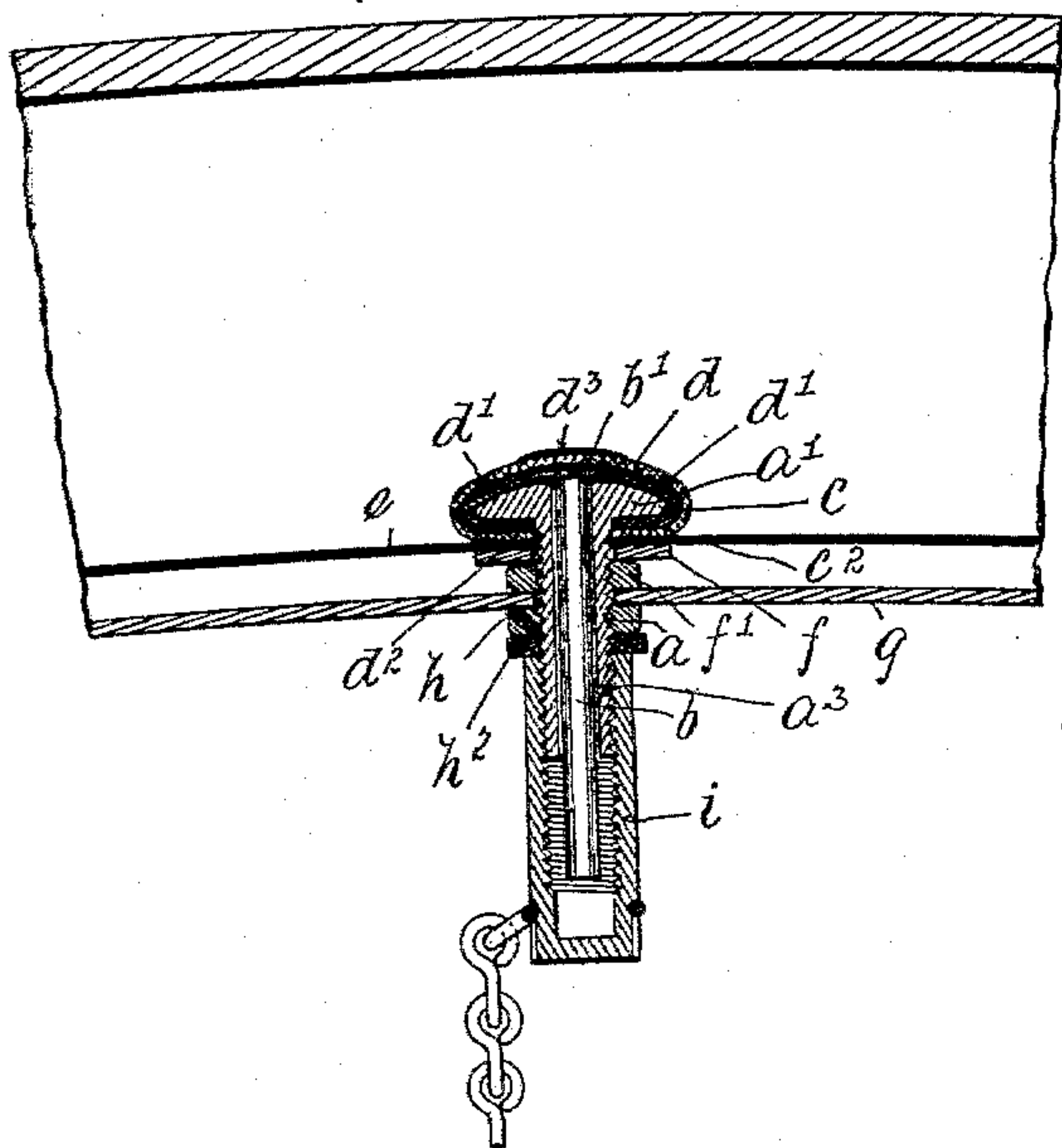


Fig. 5.

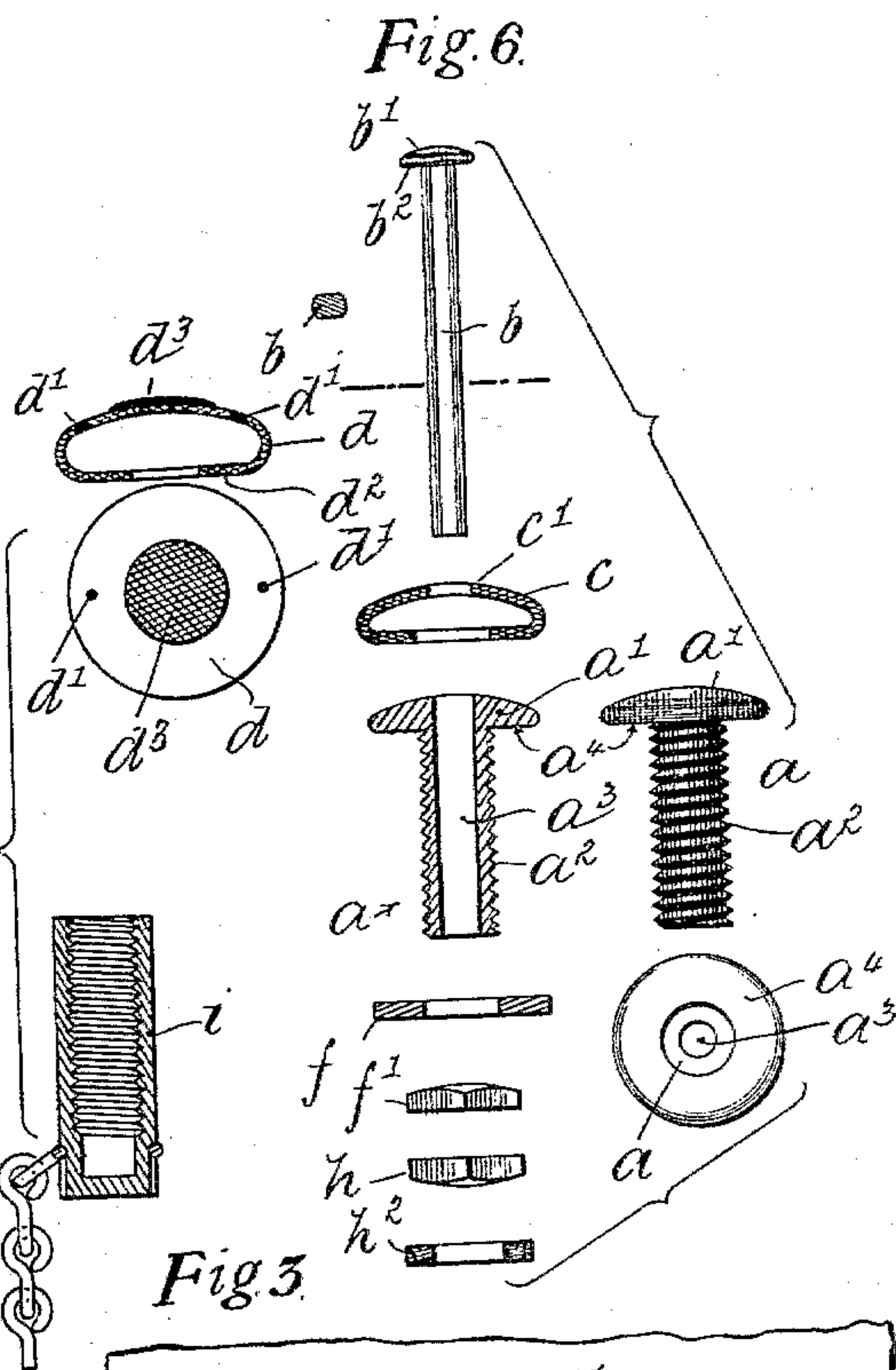
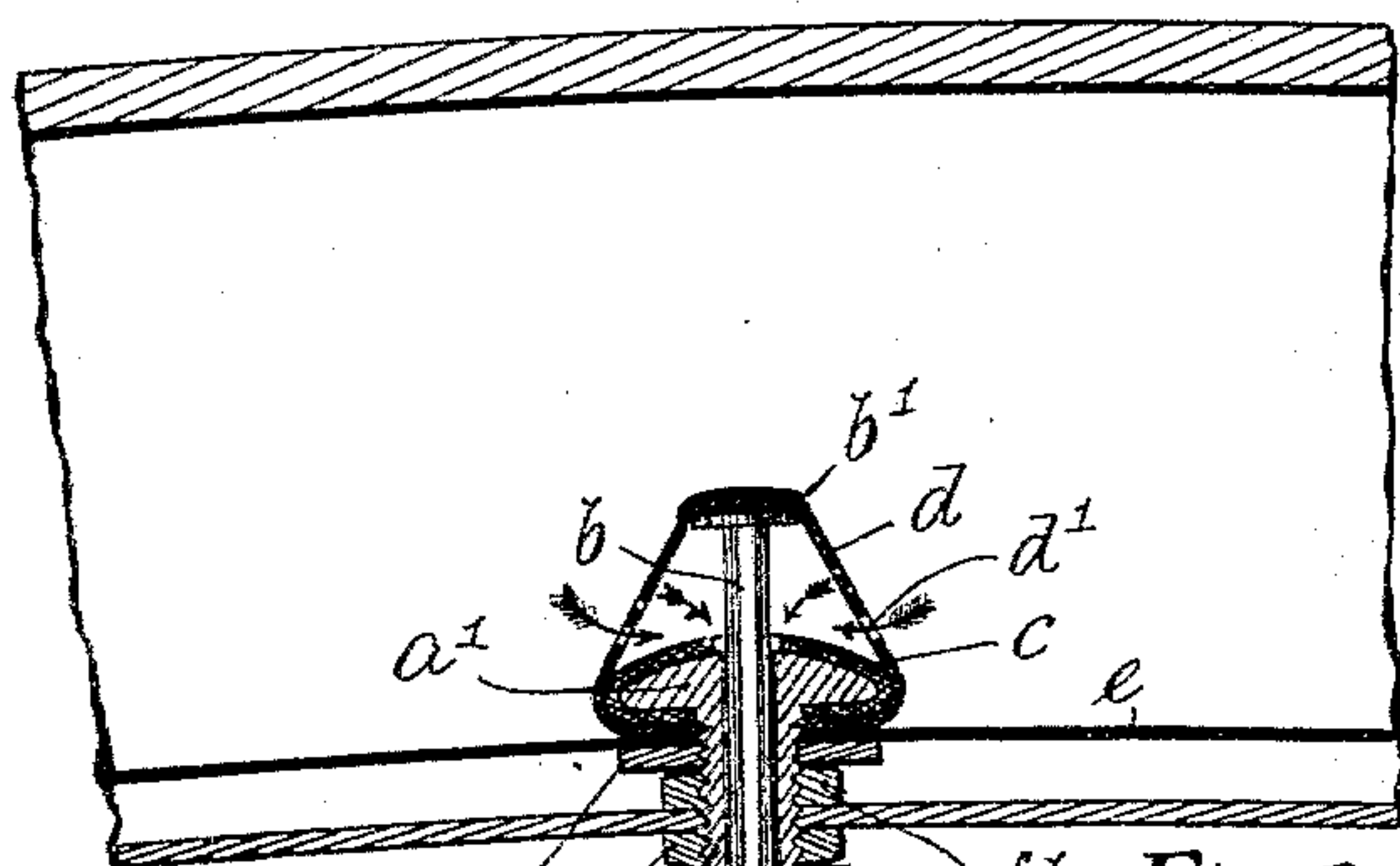


Fig. 3.

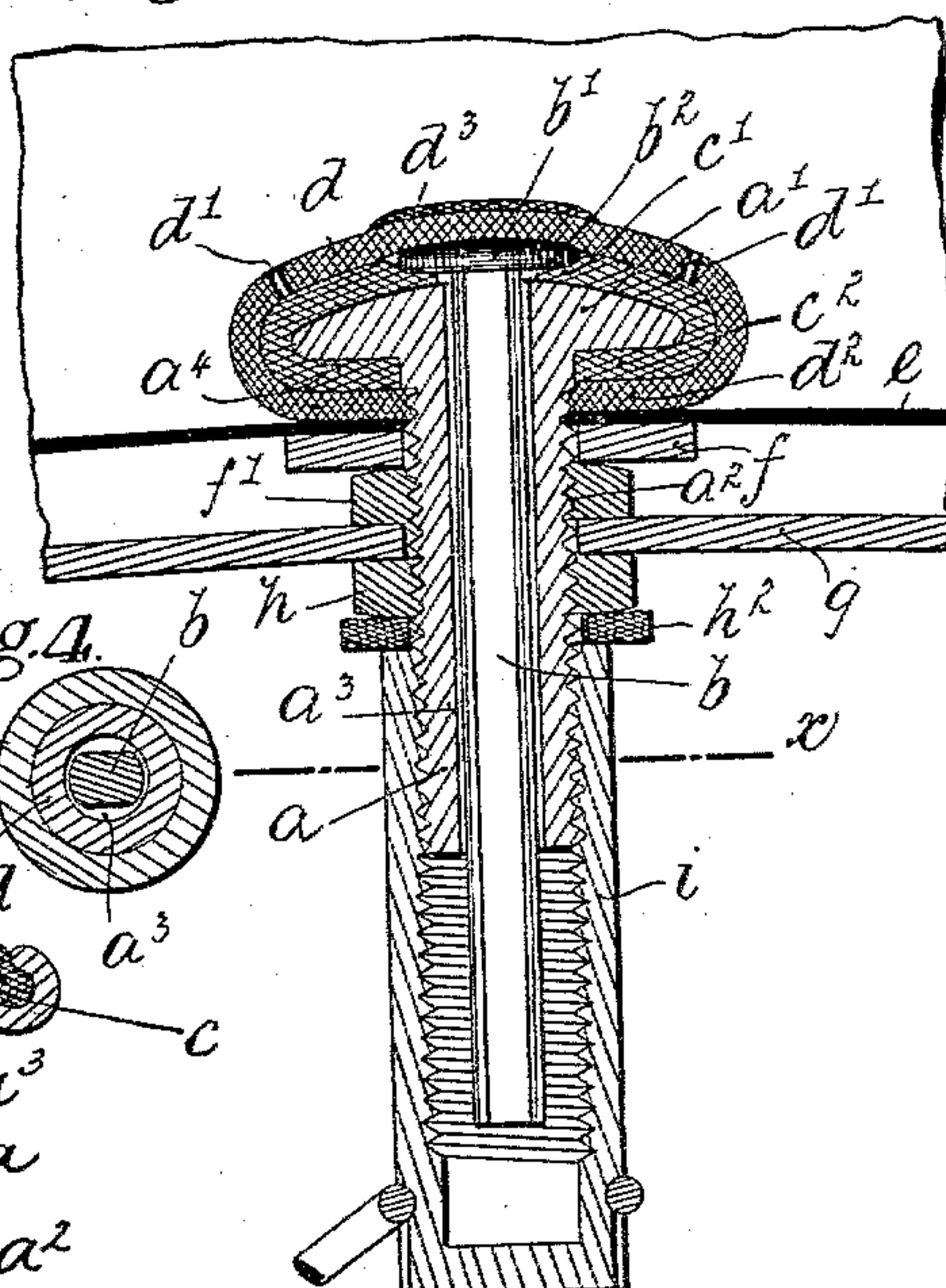
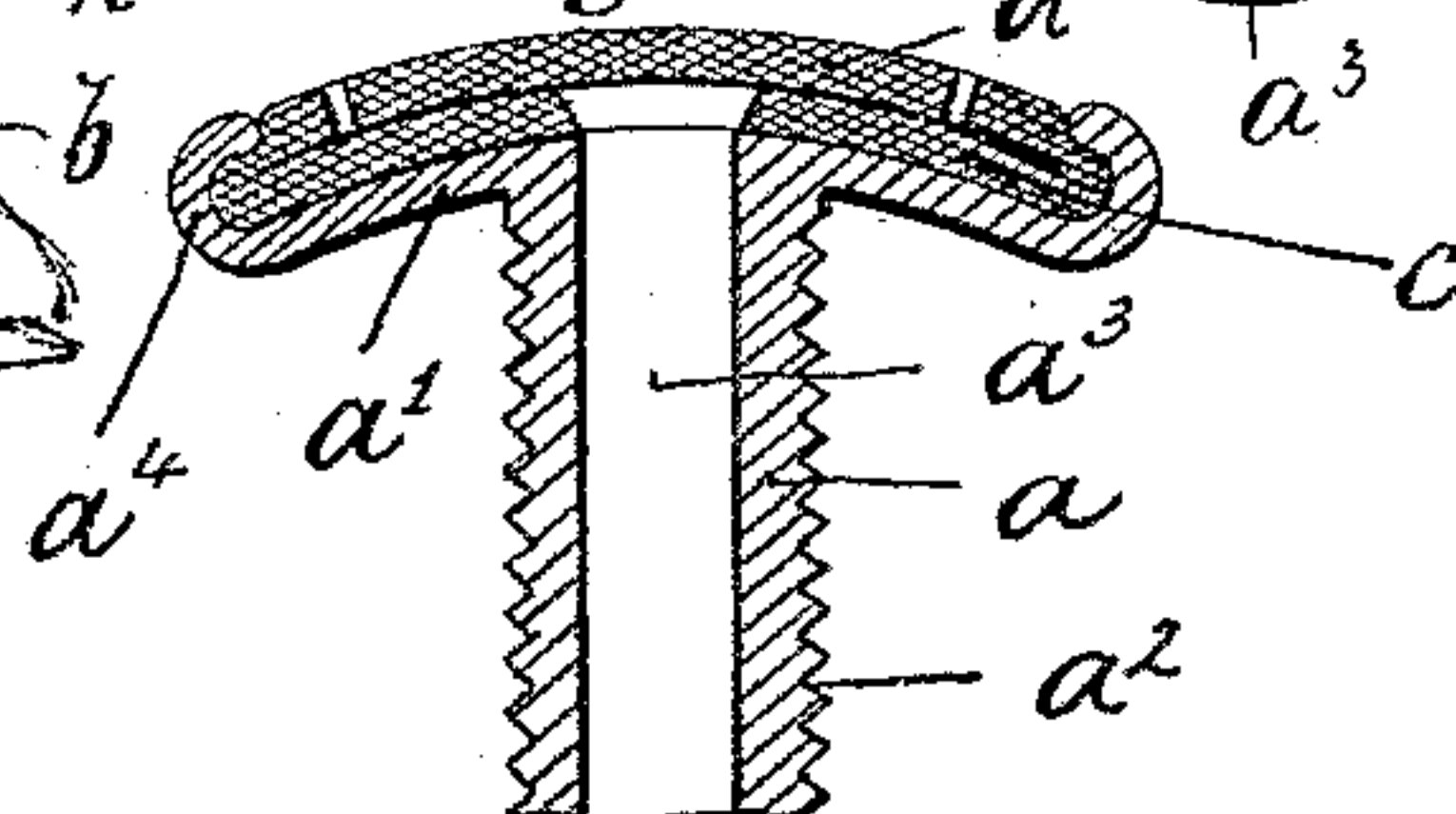


Fig. 4.

Fig. 7.



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# UNITED STATES PATENT OFFICE.

AARON SMITH CARTWRIGHT, OF BIRMINGHAM, ENGLAND.

## TIRE-VALVE.

SPECIFICATION forming part of Letters Patent No. 597,954, dated January 25, 1898.

Application filed February 13, 1897. Serial No. 623,252. (No model.) Patented in England December 28, 1896, No. 29,762.

*To all whom it may concern:*

Be it known that I, AARON SMITH CARTWRIGHT, manufacturer, a subject of the Queen of Great Britain, residing at Ford Street, Hockley, in the city of Birmingham, England, have invented certain new and useful Improvements in Tire-Valves, of which the following is a specification, and for which application for Letters Patent of Great Britain has been made, dated December 28, 1896, and numbered 29,762.

This invention relates to the valves of pneumatic tires, and has for its object the production of an efficient valve which is easily and cheaply produced and not liable to become deranged by use.

Figure 1 of the accompanying drawings represents a pneumatic tire fitted with a valve constructed and arranged according to my invention. The said valve is shown in action as when inflating and with the flexible connection of the air-pump attached. Fig. 2 represents a vertical section of the said valve upon a smaller scale, showing the same in its normal condition or when in use after inflation has been completed. Fig. 3 represents a like view as Fig. 2, but with the same drawn upon the same scale as Fig. 1. Fig. 4 is a cross-section of Fig. 3 upon the dotted line  $\alpha$ . Fig. 5 shows the said valve in the act of being deflated upon the same scale as Fig. 2, and Fig. 6 represents the disassembled component parts of the valve.

The same letters of reference indicate corresponding parts in the several figures of the drawings.

The said improved valve comprises a valve-stalk  $a$ , having a head end  $a'$ , an outside screwed stem  $a^2$ , and an axial hole  $a^3$  up its middle, wherein a pusher-stalk  $b$ , terminated by a head end  $b'$ , freely slides, the said head  $a'$  having stretched over it an india-rubber facing or bed  $c$ , which forms the primary seating to the valve, while completely inclosing the said facing  $c$  and the pusher-head  $b'$ , which head serves as a secondary valve and whose under side  $b^2$  normally seats itself upon the surrounding edges  $c'$  of the said bed  $c$ , is a distensible and collapsible chamber, sack, or diaphragm  $d$ , having piercings  $d'$  made through its walls, wherethrough air passes either into or out of the tire, according as to

whether the outer chamber is lifted from its seating by air-pressure in the act of inflation or by the pusher (forced up the valve by hand) in order to deflate the tire. The feet  $c^2$   $d^2$  of both seating and outer chamber, and also the walls of the inner tube  $e$  of the tire, are gripped between the under side  $a^4$  of the stalk-head  $a'$  and a metallic washer  $f$  and nut  $f'$ , screwing upon the outside  $a^2$  of the stalk or stem and the rim  $g$  of the wheel, the said rim coming between the said nut  $f'$  and a lock-nut  $h$ , also screwing upon the stalk or stem, and with a leather or rubber washer  $h^2$  coming between the nut  $h$  and the screwed-on dust-cap or cover  $i$ .

In Fig. 1,  $j$  is the metallic end fitting of the flexible connection  $j'$ , which couples up the valve and inflater.

The outer face of the external chamber may be reinforced with a small patch of canvas at  $d^3$  to prevent overdistention and bursting of the same.

Operation: Assuming that air under pressure is being forced into the valve from an ordinary inflater, then it passes up the space between the inside walls of the hole in the valve-stalk and the pusher-stem and exerts itself upon the under side of and lifts the pusher-head, which in turn presses upon the middle of the inner side of and raises the outer chamber or diaphragm from off its seating or bed and leaving clear the holes through its walls for the passage of air into the interior of the tire. The return stroke of the inflater relieves the external pressure, and the internal pressure of air in the tire now expends itself upon the outside walls of the outer chamber or diaphragm and presses both it and the head of the pusher forcibly down upon their seating, thus forming a trap or check against the outward escape of air. This operation is repeated until the tire is fully inflated.

In order to deflate the tire, it is only necessary to press upward the valve-stalk, when the outer sack or flexible overlay chamber is distended, as seen in Fig. 5, and the air can freely escape through the piercings or holes, which have been lifted from contact with the seating.

Fig. 7 represents the stem, head, flexible diaphragm, and the bed or seating of a modified form of valve.  $\alpha$  is the valve,  $\alpha'$  its



head,  $a^2$  the screwed stem, and  $a^3$  the axial hole up its middle.  $a^4$  is a turned-over edge of the said head for keeping or securing the combined diaphragm  $d$  and bed  $c$  in position.

5 The operation of this modification is exactly the same as the first-described and preferred form of my invention.

It is obvious that instead of the diaphragm and its bed or seating being made of one piece and alike unto a collapsed chamber it may be made of two disks of india-rubber, the upper one being pierced and the other coming underneath and forming the bed. It must also be understood that it is not absolutely essential to employ the rubber seating or bed on the head of the valve, as the outside chamber or diaphragm alone, when bedded upon the naked metal of the head by the inner pressure of the compressed air in the tire, as represented in Fig. 8, would be sufficient to form a sound check against the escape of air.

In Fig. 8,  $a'$  is the head of the valve  $a$ .  $a^3$  is the axial bore of the same.  $b$  is the pusher and  $b'$  the pusher-head, while  $d$  is the outer chamber or diaphragm, pierced with air-holes  $d'$  and bedding itself directly upon the outer face  $a^5$  of the said stem-head  $a'$ .

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

1. In a valve for pneumatic tires, the combination with a hollow stem having a head at one end located within the tire, an elastic sack or diaphragm inclosing the said head and having a contracted mouth located between the head and tire, and clamping-nuts arranged upon the stem to hold the parts in position.

2. A valve for pneumatic tires, comprising a distensible chamber or diaphragm, pierced with small air-passages and inclosing the head or end of a valve-body faced or provided with a rubber or elastic seating or bed, said diaphragm being lifted off its bed, so as to admit of the passage of air through its piercing, by external air-pressure when a tire is being inflated, and by a suitably-arranged pusher or equivalent in order to deflate the tire, substantially as set forth.

3. In a tire-valve, the combination with the valve-body  $a$ , having a head  $a'$  at one end provided with a convex outer face and an axial

bore  $a^3$ , extending through said valve body and head, of a distensible diaphragm  $d$ , pierced with air-openings, said diaphragm inclosing the head and having the air-openings arranged to seat upon the convex face thereof, substantially as described. 55

4. In a tire-valve, the combination with a valve-body  $a$ , having an axial bore  $a^3$ , and a head end  $a'$ , faced with an elastic seating or bed  $c$ , of a distensible chamber or diaphragm  $d$ , pierced with air-passages  $d'$ , and inclosing said seating  $c$ , and valve-head  $a'$ , substantially as described and set forth. 60

5. In a tire-valve, the combination with a valve-body  $a$ , and head end  $a'$ , faced with an elastic seating or bed  $c$ , and inclosed within a distensible chamber or diaphragm  $d$ , pierced with small air-passages  $d'$ , of a pusher  $b$ , whose head end  $b'$ , is inclosed within and comes against the inside of, the said diaphragm  $d$ , while the stem or shank of the same lies within and extends beyond the open end of the bore  $a^3$  of the said valve-body  $a$ , substantially as described and set forth. 70 75

6. In a tire-valve, the combination with a valve-body  $a$ , its head end  $a'$ , located within the interior of a tire inner tube  $e$ , and faced with an elastic seating or bed  $c$ , pierced diaphragm or chamber  $d$ , inclosing same, and pusher  $b$ ,  $b'$ , for distending said diaphragm when required to deflate the tire, of the nuts  $f'$ ,  $h$ , and washers  $f$ ,  $h^2$ , for securing said valve to the tire-tube  $e$ , and wheel-rim  $g$ , substantially as described and set forth. 80 85

7. A valve for pneumatic tires comprising an elastic sack or diaphragm having a throttled or contracted mouth end, which is drawn over the head or flange of an axially-bored valve-stem, and is clamped between the under side of the said head and the inside of the tube or air-chamber of a tire by a nut and washer threaded upon the said stem, substantially as described. 90

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses. 95

AARON SMITH CARTWRIGHT.

Witnesses:

HENRY SKERRETT,  
ARTHUR T. SADLER.