

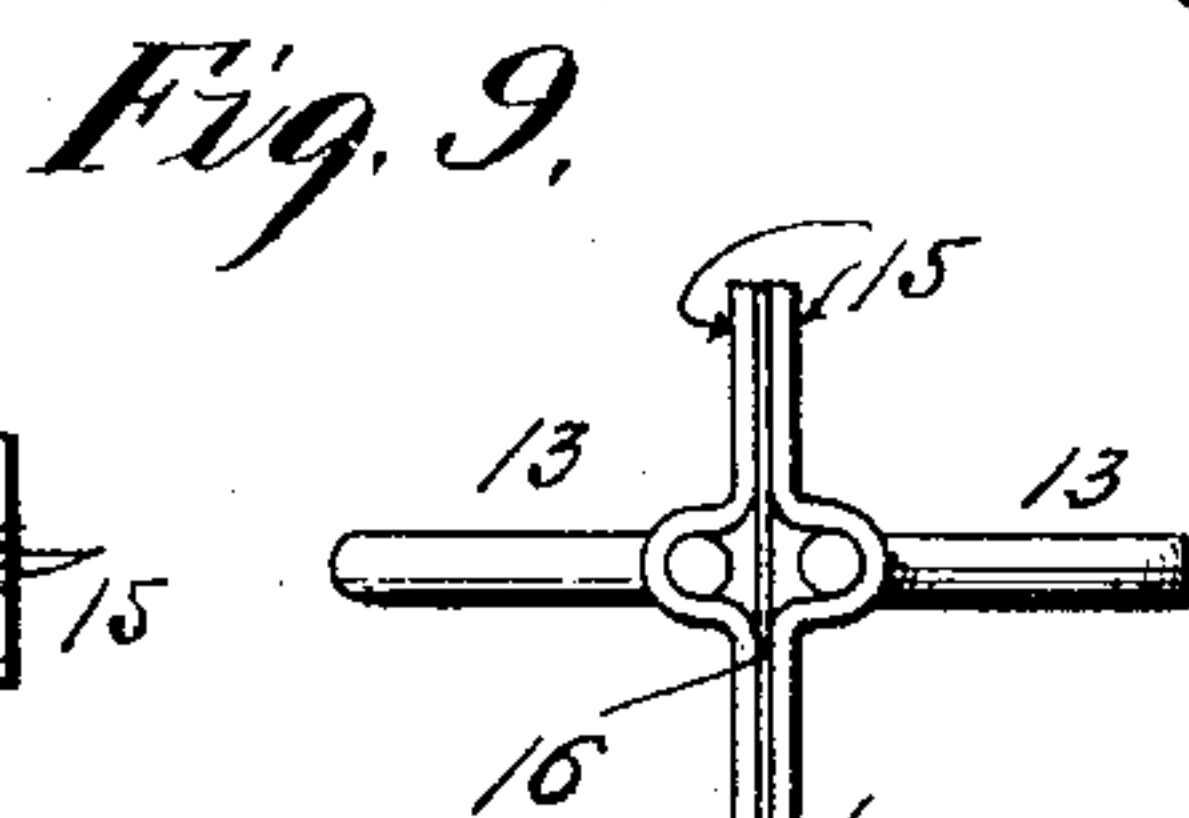
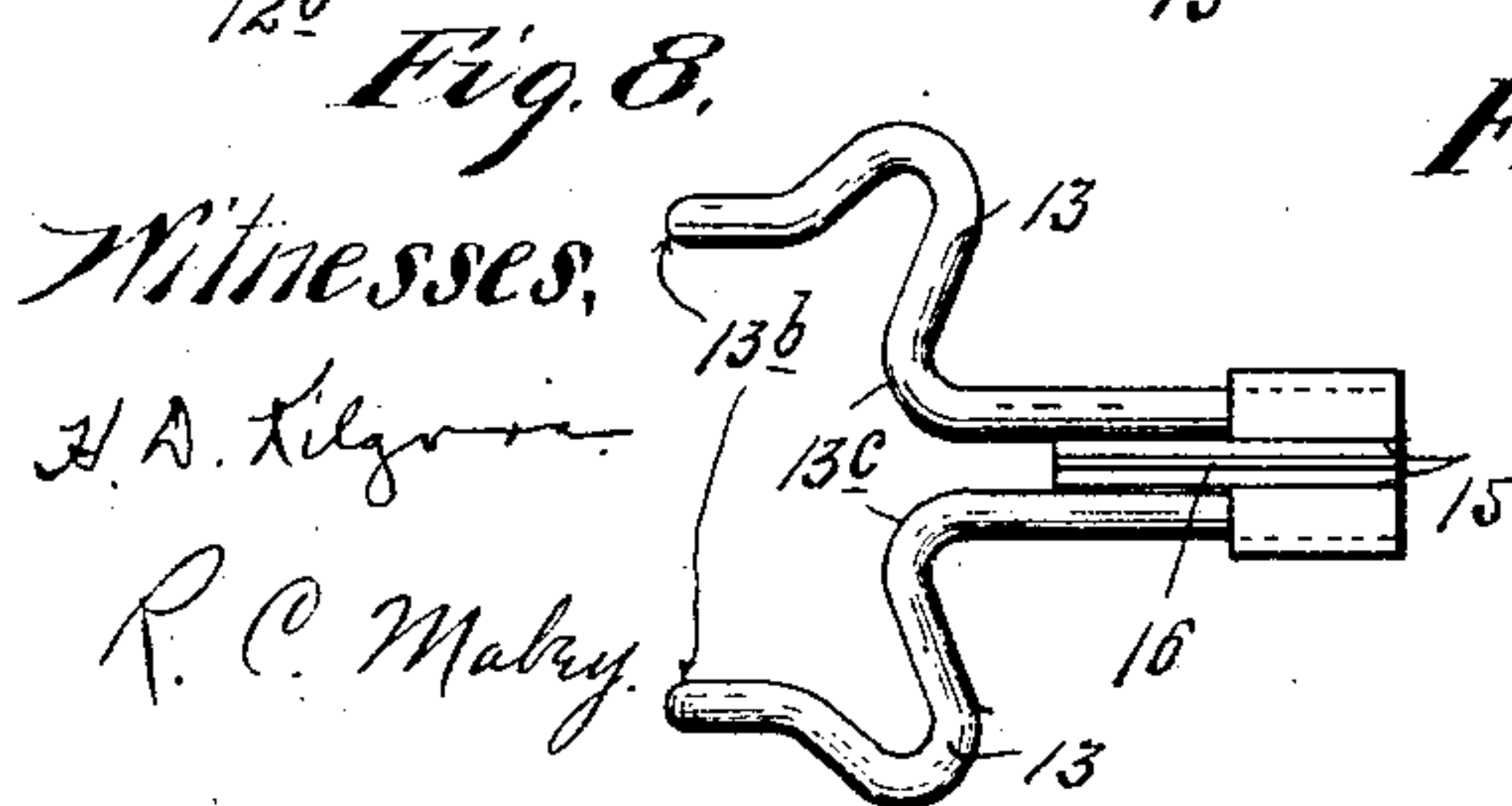
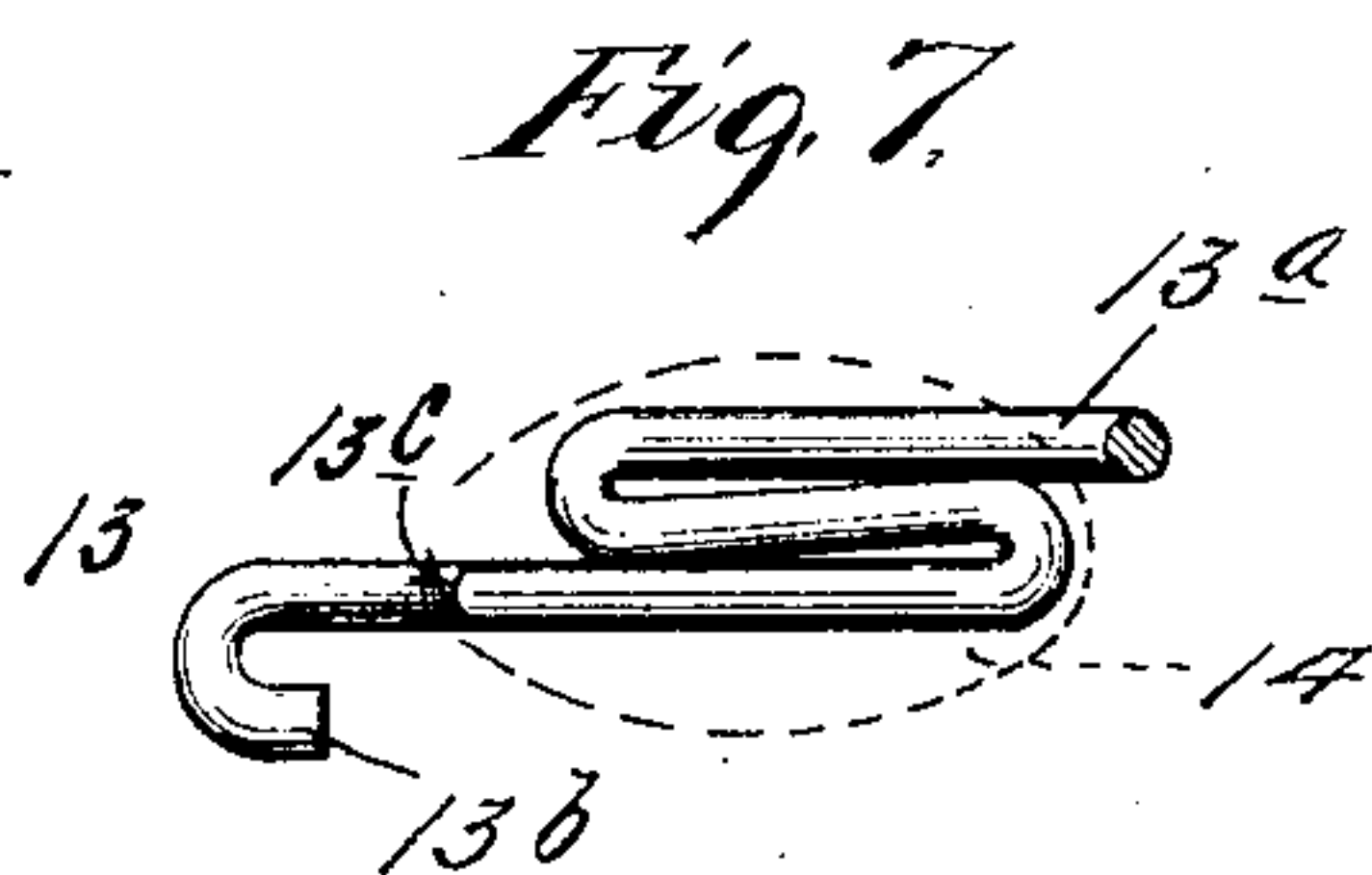
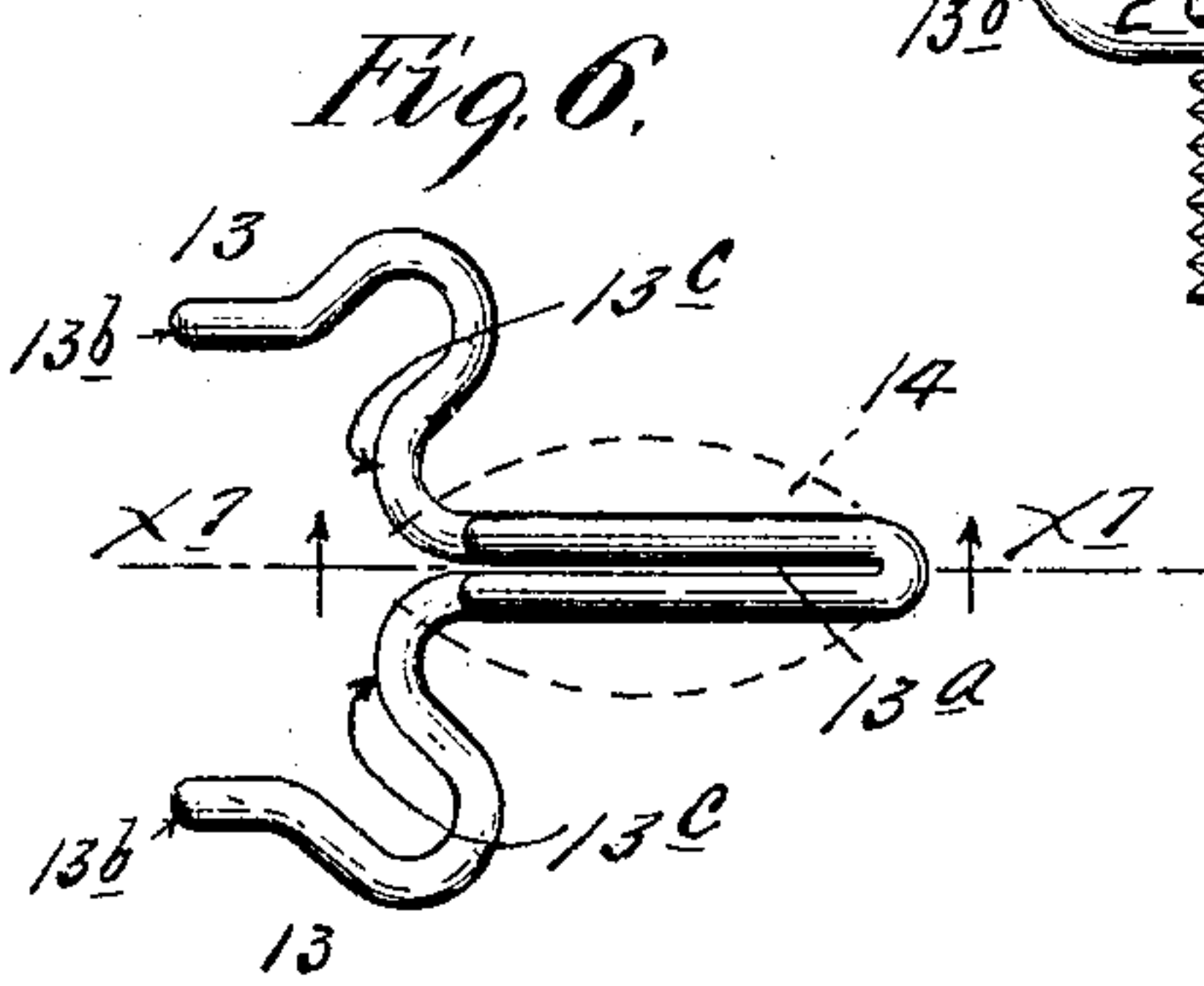
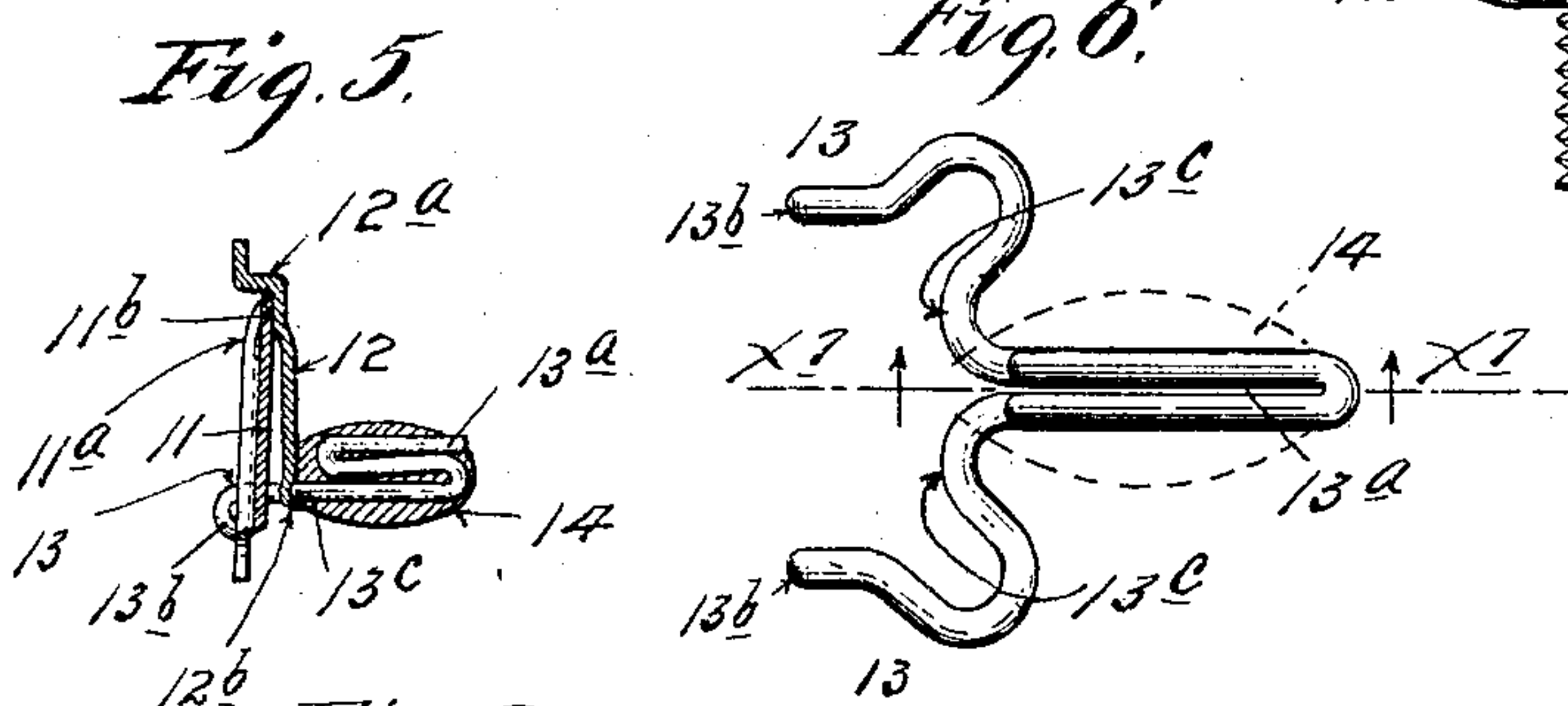
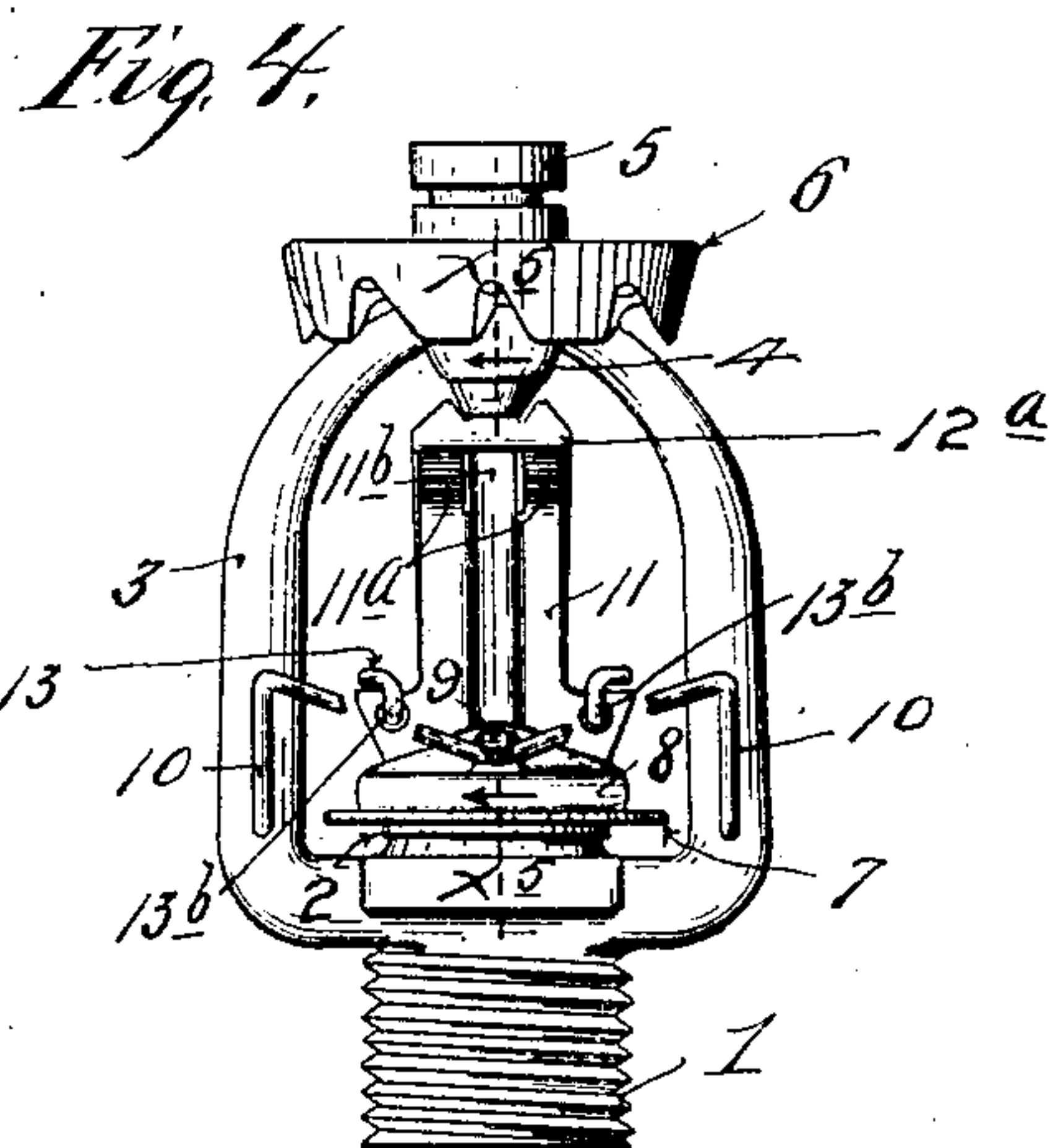
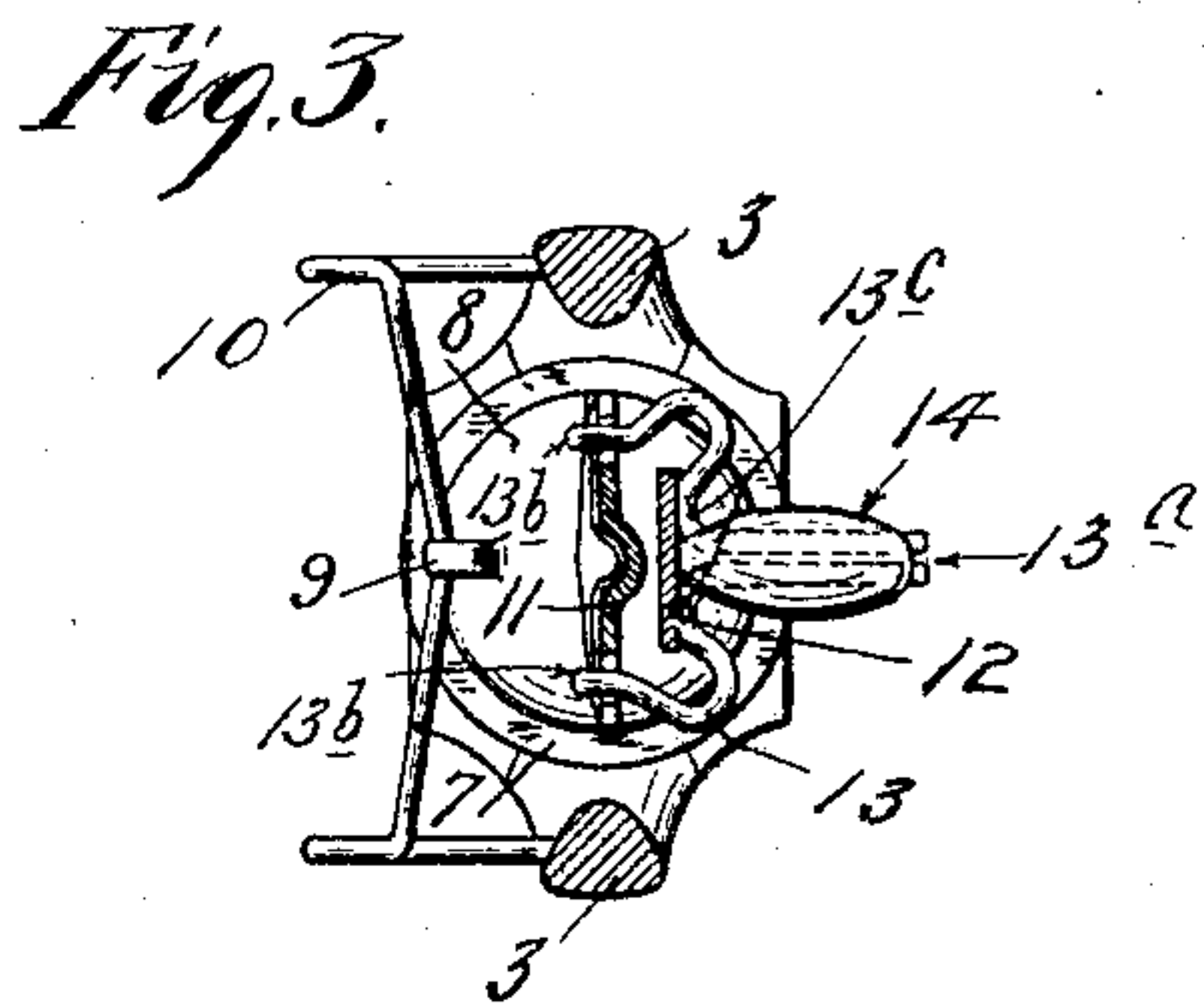
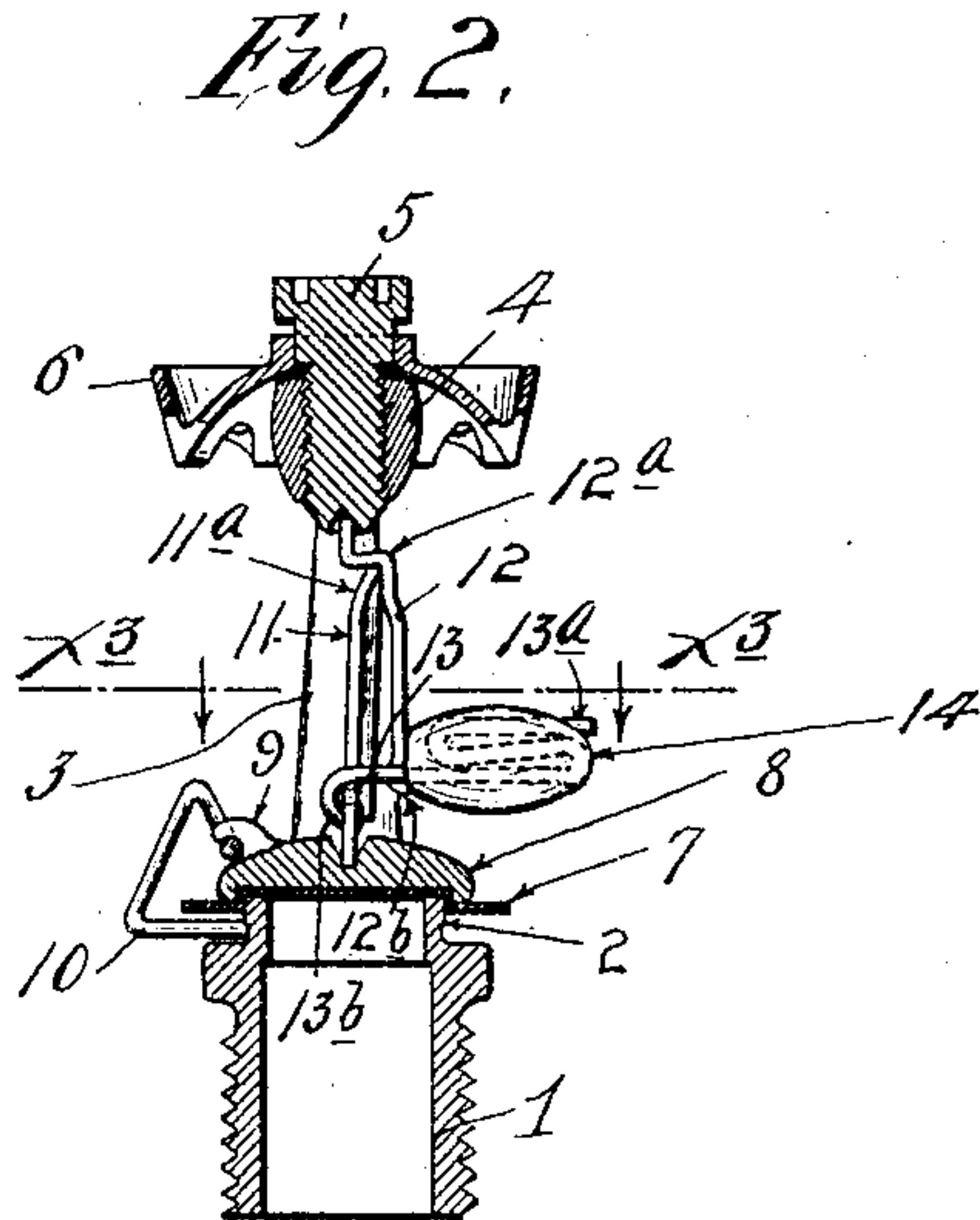
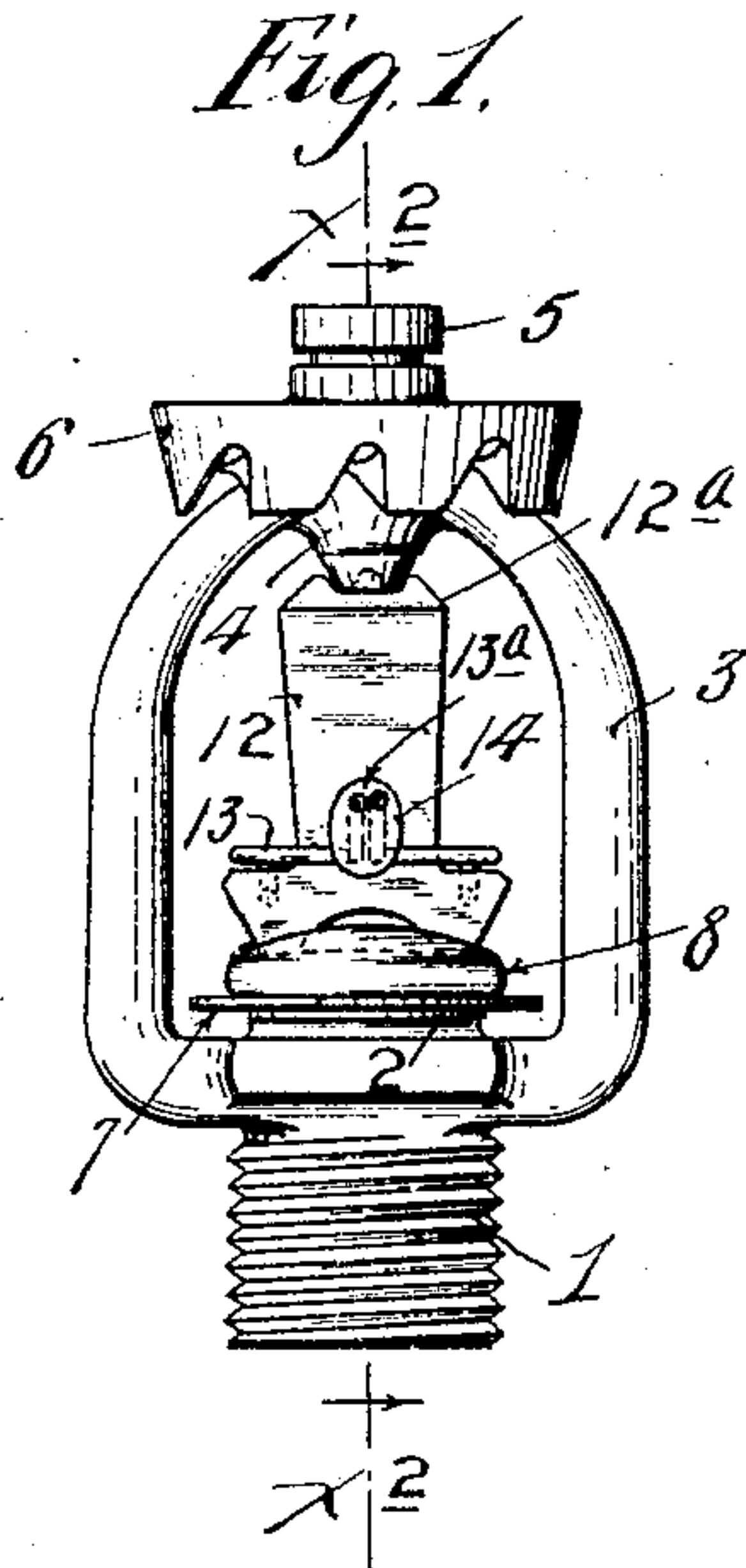
No. 777,783.

PATENTED DEC. 20, 1904.

C. B. GARRETT.  
AUTOMATIC SPRINKLER HEAD.

APPLICATION FILED SEPT. 28, 1903.

NO MODEL.



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# UNITED STATES PATENT OFFICE.

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## AUTOMATIC SPRINKLER-HEAD.

SPECIFICATION forming part of Letters Patent No. 777,783, dated December 20, 1904.

Application filed September 28, 1903. Serial No. 174,996.

*To all whom it may concern:*

Be it known that I, CHARLES B. GARRETT, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Automatic Sprinkler-Heads; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to automatic sprinkler-heads for use in connection with automatic fire-extinguishing installations, and, generally speaking, has for its object to provide a sprinkler-head of greater reliability, durability, and efficiency.

More specifically stated, the leading objects of my invention are to provide in an automatic sprinkler-head a strut construction in which the fusible element is given a maximum exposure to heat in the vicinity of the sprinkler-head; to arrange this fusible element or solder in such manner that it is not subject to crystallization, and hence not liable to be ruptured by jars not intended to set the sprinkler-head into action; to provide a strut construction which is capable of being set up and tested before the solder or fusible element is applied thereto and in which the solder may be there-after applied at any time prior to the setting of the sprinkler-head permanently in position for actual work; to provide means for effectually preventing the nozzle cap or valve from becoming attached or united to the nozzle either by corrosion or cementation, and to further provide minor but important features of improvement, as will hereinafter more fully appear.

To the above ends the invention consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

The invention is illustrated in the accompanying drawings, wherein—

Figure 1 shows the complete sprinkler-head in side elevation. Fig. 2 is a section on the line  $x^2 x^2$  of Fig. 1. Fig. 3 is a horizontal section on the line  $x^3 x^3$  of Fig. 2. Fig. 4 is a side elevation of the sprinkler-head looking

at the opposite side thereof from that shown in Fig. 1. Fig. 5 is a detail in section on the line  $x^5 x^5$  of Fig. 4. Fig. 6 is a plan view showing in detail and on an enlarged scale the so-called "strut-detent," some parts being indicated by dotted lines. Fig. 7 is a section on the line  $x^7 x^7$  of Fig. 6. Fig. 8 is a plan view showing in detail a modified form of the so-called "strut-detent," and Fig. 9 is an end elevation of the detent shown in Fig. 8.

Like characters indicate like parts throughout the several views.

In the drawings, the numeral 1 indicates a nozzle which is adapted to be secured in the usual way to the pipe-fittings of the fire-extinguishing installation. The upper end of the nozzle 1 terminates in a raised annular flange 2 and is provided with a yoke or arch 3, that supports at its upper portion a hub or nut-block 4. An abutment-screw 5, having a recessed lower end, works through the hub 4 and holds in position the usual spraying-wheel 6.

A non-corrosible washer 7 is interposed between the nozzle-flange 2 and the nozzle cap or valve 8 and projects at its peripheral portion a considerable distance radially outward of the peripheral portions of the said cap and flange. The cap 8 is a downturned peripheral flange which forces the projecting portion of the washer 7 slightly downward and around the said flange 2, thereby forming an extremely close and tight joint therewith. The said washer 7 is preferably constructed of celluloid. Celluloid will not corrode and, furthermore, is durable and will form a tighter joint under pressure than can be formed with a metallic washer or packing. This non-corrosible peripherally-projecting element, herein designated as a "washer," I believe to be a broadly new feature in the use made thereof. Experience with sprinkler-heads as hitherto designed, and especially where the same were used in leather-factories, glucose-works, dye-houses, &c., where noxious gases exist, there is great liability of the nozzle caps or valves becoming cemented or attached to the nozzles by corrosion or cementation or the combined action of both. The action of water both from within and without the nozzle greatly



tends to hasten such corrosion and cementation, and hence the above-noted action is even more liable to take place in so-called "wet systems," where any seepage will greatly hasten corrosion by the combined chemical action of water and gas.

The celluloid washer 7 is of course inflammable, and hence will burn when its exposed marginal portion is subjected to flame. This insures the release of the washer, and for this reason is important.

The peripherally-projecting non-corrosible washer effectually prevents the union of any particles of corrosion on the cap and on the nozzle, and hence of course prevents the said cap and nozzle from being connected or cemented together by such corrosion. Furthermore, the said washer prevents corrosion both of the internal and external parts of the cap and nozzle with which it comes into contact.

The cap 8 is shown as provided with a hook-like lug 9, with which engages the intermediate portion of a spring kicker-bar 10, the ends of which are seated in depressions formed in the sides of the yoke 3. The purpose of the spring 10 is to kick or force the cap 8 from its working position when the latter is released by the separation of the retaining-strut under the action of heat.

The strut for holding the cap or valve 8 in working position is made up of two toggle-acting members and a detent, which detent involves a fusible element. The toggle-acting members of the strut are designated by the numerals 11 and 12. The base member 11 is bifurcated at its lower end and is seated in depressions formed in the cap 8, while the upper end thereof is split to form spring portions 11<sup>a</sup> and an intermediate rigid portion 11<sup>b</sup>. Furthermore, said member 11 is formed with a longitudinal corrugation in line with the rigid portion 11<sup>b</sup>, which corrugation greatly stiffens the body of the said member 11.

The strut member 12 at its upper end is pointed for engagement with the recess in the lower end of the abutment-screw 5, and below said pointed end it is offset to afford a shoulder 12<sup>a</sup>, with which the spring portions 11<sup>a</sup> and rigid portion 11<sup>b</sup> of the member 11 engage at a point offset or to one side from the direct line of strain between the extremities of the structure. The depending end of the said member 12 extends downward nearly but not quite to the cap 8 and constitutes the spring portion of the structure.

The toggle members of the strut are normally locked or held in operative positions to retain the cap 8 in working position by means of a device herein designated as a "detent" and comprising in its best form a fork-like piece of stiff wire 13, having its intermediate portion closely folded together, as shown at 13<sup>a</sup>, and having its extremities bent to form hook-like fulcrum-lugs 13<sup>b</sup>. The prongs of the

member 13 are bent laterally so that they will clear the sides and base portion of both of the toggle-acting strut members, and the hooks or fulcrum-lugs 13<sup>b</sup> are seated in depressions formed in the base of the said member 11. The diverging portions 13<sup>c</sup> of the member 13 afford bearing-shoulders that press against the depending spring end of the strut member 12. The fusible element—to wit, the body of solder (designated by the character 14)—embeds within itself all but a slight portion of the closely-folded intermediate section of the member 13, and this projecting portion after the solder has been applied and before the detent is finally set for action on the spring must be cut off, so that the member 13 will then be made up of two independent sections united only by the solder or fusible material. Preferably the inner end of the bulb of solder 14 is allowed to adhere to the lower extremity of the strut member 12; but even if not thus united the detent will be held upward in working position by a depression 11<sup>c</sup> in said member 11. With the detent constructed as above described it is evident that the same may be applied in working position on the strut and tested without having the solder or fusible material applied thereto. In practice it will be advisable to apply the solder to the detent at the time, or at any rate only a short time before the time of applying the strut and its detent in working position on the sprinkler-head. This insures the solder being in good condition at the time that the sprinkler-head is set for action.

In practice it has been found that the solder or fusible material in time becomes crystallized and that this is especially so when the solder is in a small thin body, as is the case where two plates are united thereby. By the application of the solder in a mass the liability to crystallization is practically eliminated, and by the disposition thereof in the form of an exposed bulb a maximum surface thereof is exposed to the direct action of heat, such as would be caused by fire in the vicinity of the sprinkler. Furthermore, in sprinkler-heads as hitherto constructed it has been necessary to apply the solder in order to test the sprinkler-head, which is done at the factory, so that the solder frequently becomes very old and sometimes crystallized before it is set up for work in connection with the automatic fire installation. In this respect, as above pointed out, my improved arrangement of the strut and its detent is a marked improvement over such prior devices.

With the sprinkler-head set up as shown in the drawings and with the sections of the detent 13 severed and connected only by the solder the action in case of fire is probably obvious, but may be briefly stated as follows: When the sections of the detent 13 are severed by the melting of the solder, the spring end of the strut member 12 acting on the



shoulders 13<sup>c</sup> will throw the sections of said detent laterally apart with a leverage action which will release the strut members 11 and 12 and permit the said strut to buckle and then fly apart with a toggle-lever action, thus of course releasing the cap 8 and permitting the latter to be unseated under the combined action of the spring 10 and of the pressure of the water thereon from within the nozzle.

10 The strut described under normal conditions is very rigid and will hold the cap 8 very tightly seated, but when acted upon by abnormal heat becomes very sensitive to the action of such heat and when once broken down or released instantaneously flies to pieces and releases the nozzle-closing stopper or valve.

When the members of the strut are held in working position, the spring portions 11<sup>a</sup> of the member 11 are set under spring tension and the shoulder 12<sup>a</sup> of the member 12 is forced firmly against the unyielding portion 11<sup>a</sup> of said member 11; but when the strut members are released said spring portions 11<sup>a</sup> act as spring-fingers to accelerate the buckling movement of the strut.

From what has been said it will of course be understood that the device described is capable of many modifications within the scope of my invention as herein set forth and claimed.

In Figs. 8 and 9 I have illustrated a modified construction of the so-called "strut-detent" in which the wire member 13 has its prongs bent in the same manner as above described, but is made up of two sections that are united by a pair of plates or flat heads 15 and an interposed layer of solder 16. As shown in Fig. 9, the plates 15 extend at a right angle to the plane of the sections of the detent; but they might be turned at an oblique angle thereto, in which case they would be more sensitive to the action of heat. This latter described detent when the sections thereof are severed by the melting of the solder will separate and release the members of the strut in very much the same manner as will the strut before described; but for obvious reasons it is not the full equivalent of the preferred construction illustrated in the other views.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. In a sprinkler-head, a non-corrosible washer interposed between the nozzle and the nozzle-closing cap and extending outward be-

yond the adjoining washer-engaging portions of said parts, substantially as described.

2. In a sprinkler-head, the combination with a nozzle and a flanged nozzle-cap, of a non-corrosible washer pressed between the mouth of said nozzle and the flanged face of said cap, with its marginal portion projecting beyond the said parts, substantially as described.

3. In a sprinkler-head, the combination with a nozzle and a cap for closing the same, of an inflammable washer interposed between said cap and the mouth of said nozzle, with its marginal portion projecting beyond said parts, substantially as described.

4. In a sprinkler-head, a detaining mechanism having the releasing members of its detent integrally formed and embedded in a mass of solder or fusible material, with its intermediate portion projecting and adapted to be severed, to separate the sections of said detent, except as held by said solder.

5. In a sprinkler-head, the combination with a nozzle-closing cap and an abutment, of a toggle-acting spring-strut comprising the member 12, offset at 12<sup>a</sup>, the member 11, having the rigid stop portion 11<sup>b</sup> and spring portions 11<sup>a</sup>, engaging said offset 12<sup>a</sup>, and a thermally-released detent normally acting on said strut member, substantially as described.

6. In a sprinkler-head, the combination with a nozzle-closing cap and an abutment, of a toggle-acting spring-strut reacting against said abutment to press said cap onto its seat, and a detent for holding said strut set, said detent comprising a pair of fulcrum members, arranged to separate laterally and release, but normally held together by solder or fusible material, substantially as described.

7. In a sprinkler-head, the combination with a nozzle-closing cap and an abutment, of the toggle-acting strut, made up of the members 11 and 12, said member 11 having the laterally-bent rib 11<sup>b</sup> adapted to press against the intermediate portion of said member 12, and said member 12 having the shoulder 12<sup>a</sup> with which the end of said member 11 engages, and a strut involving a fusible element normally preventing buckling movements of said members 11 and 12, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES B. GARRETT.

Witnesses:

ELIZABETH H. KELIHER,  
F. D. MERCHANT.