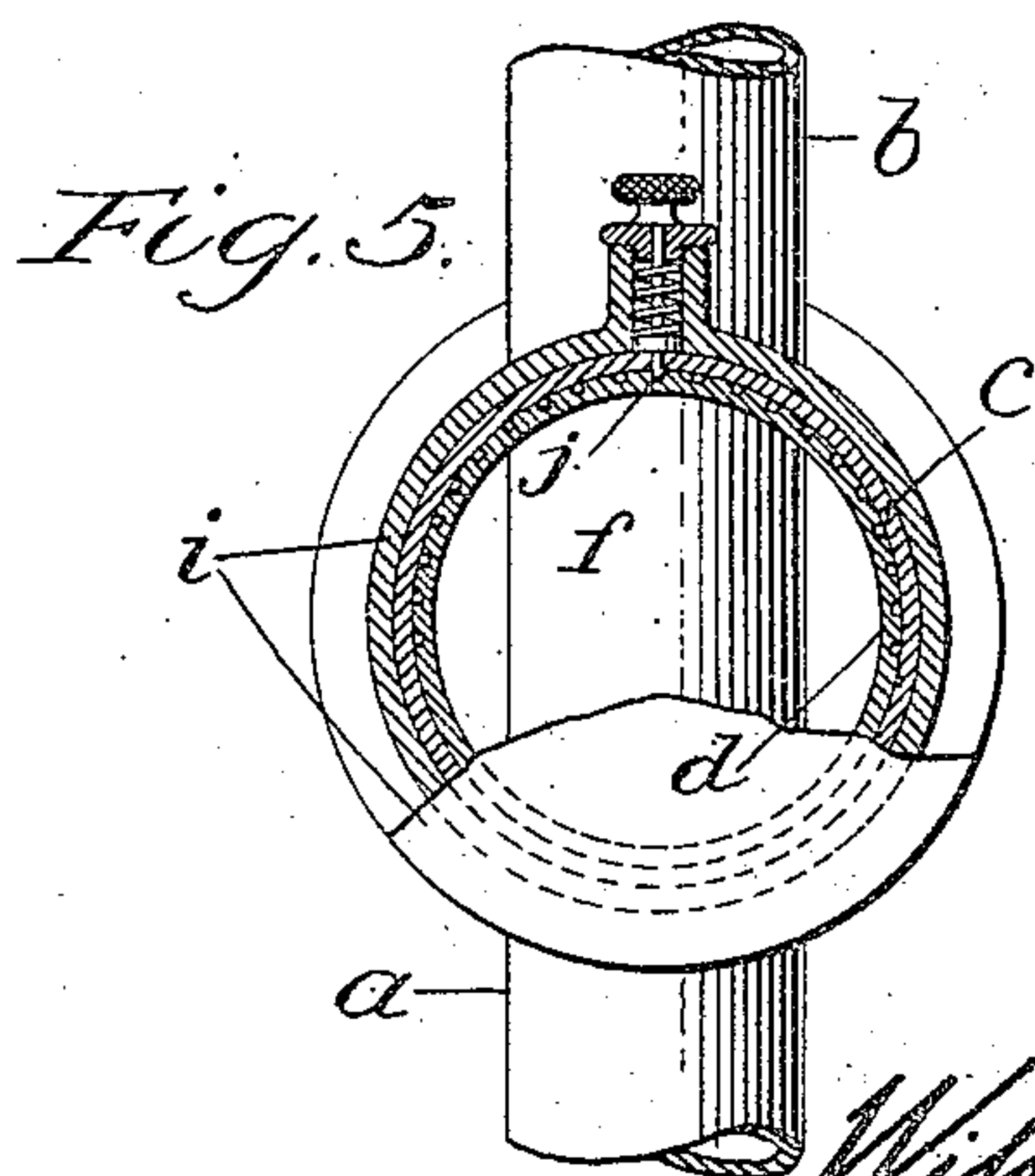
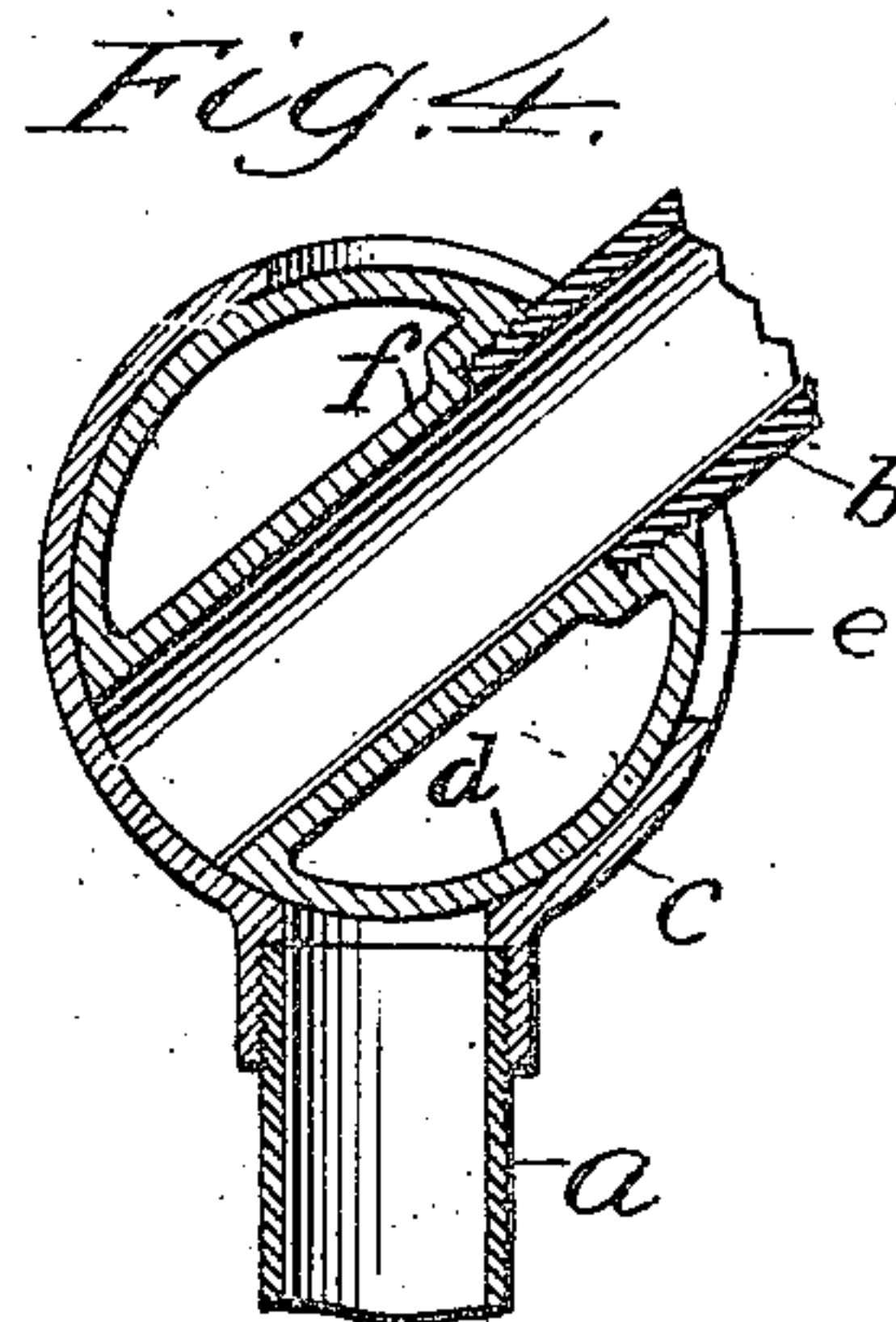
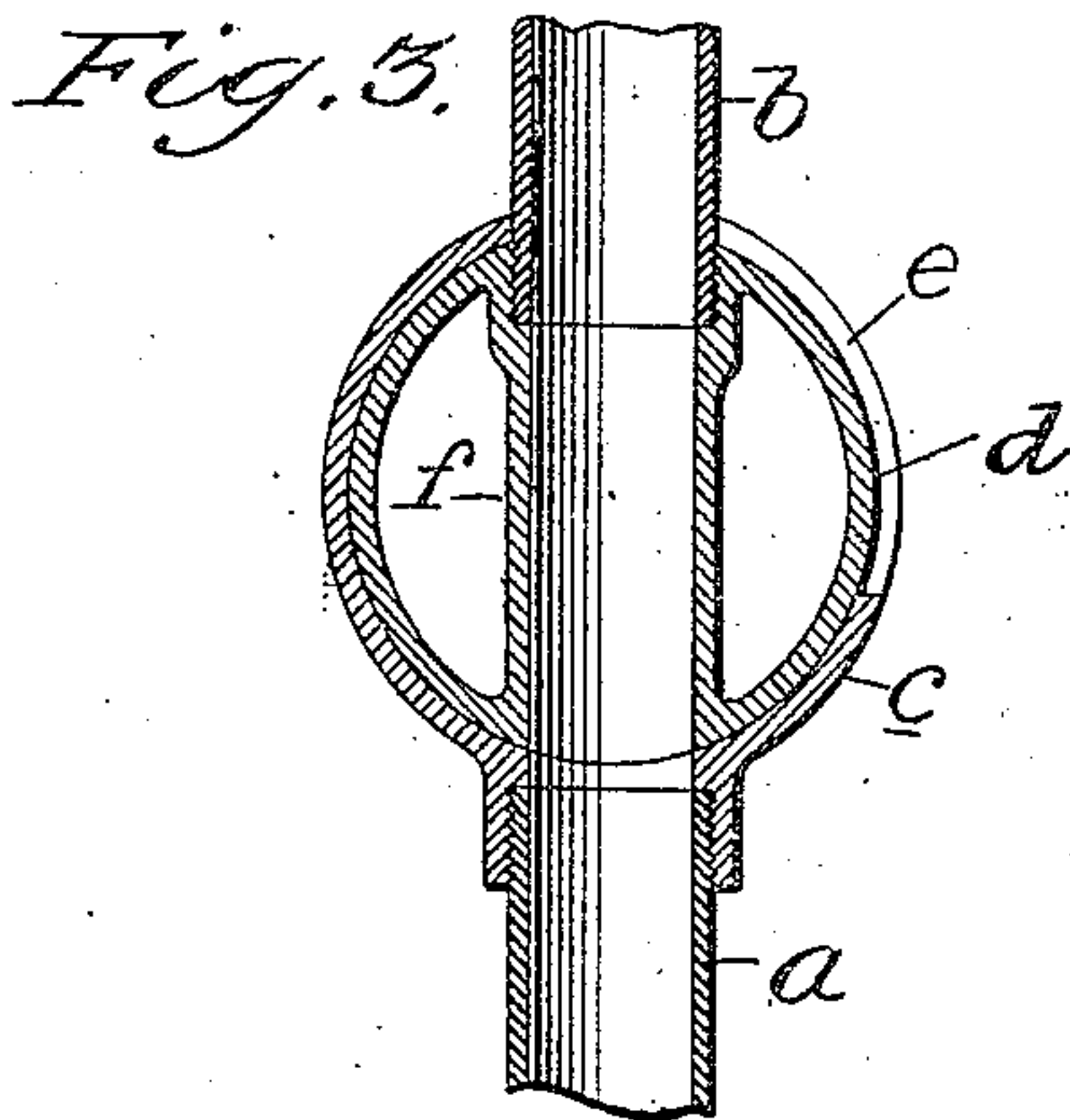
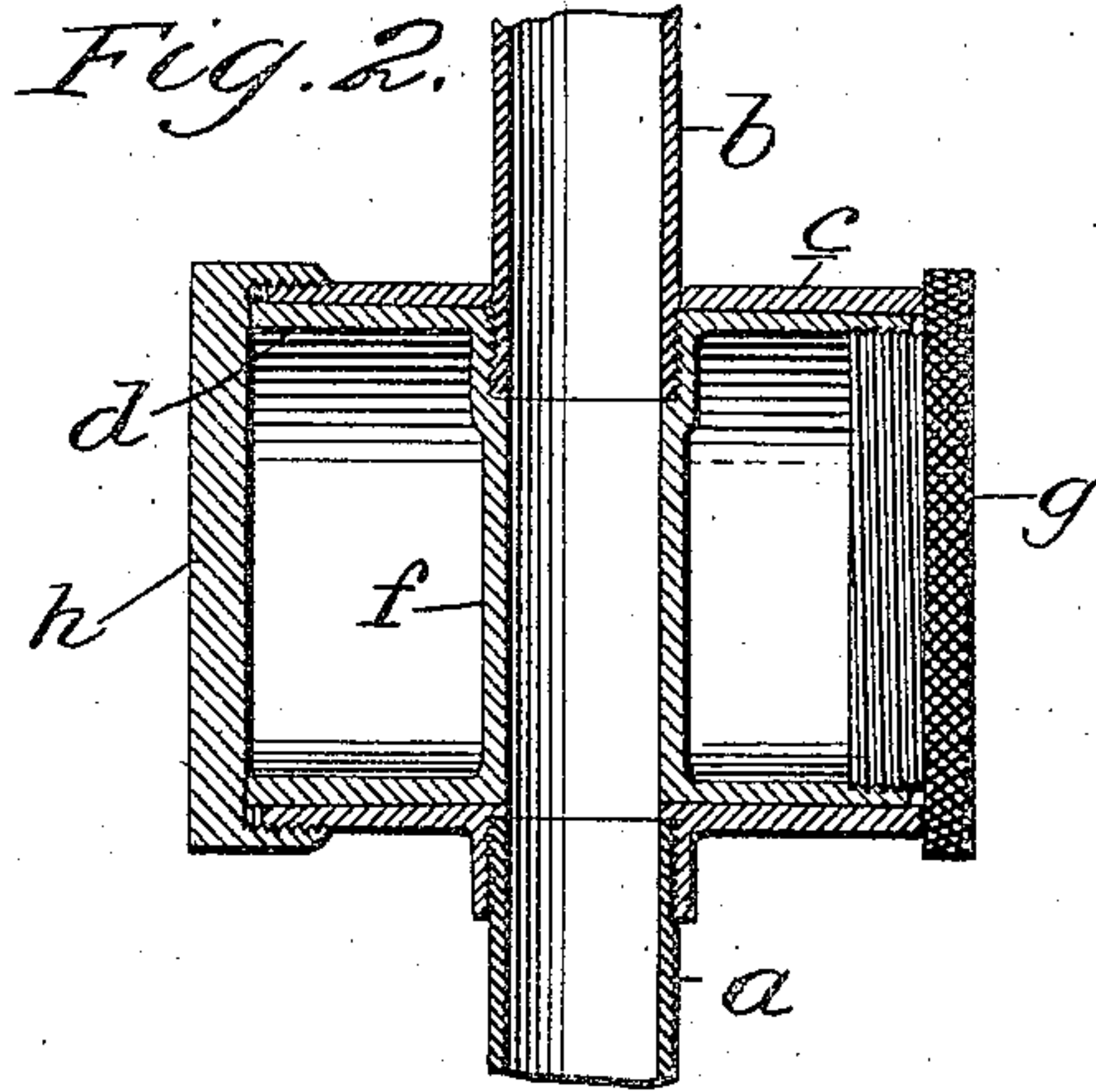
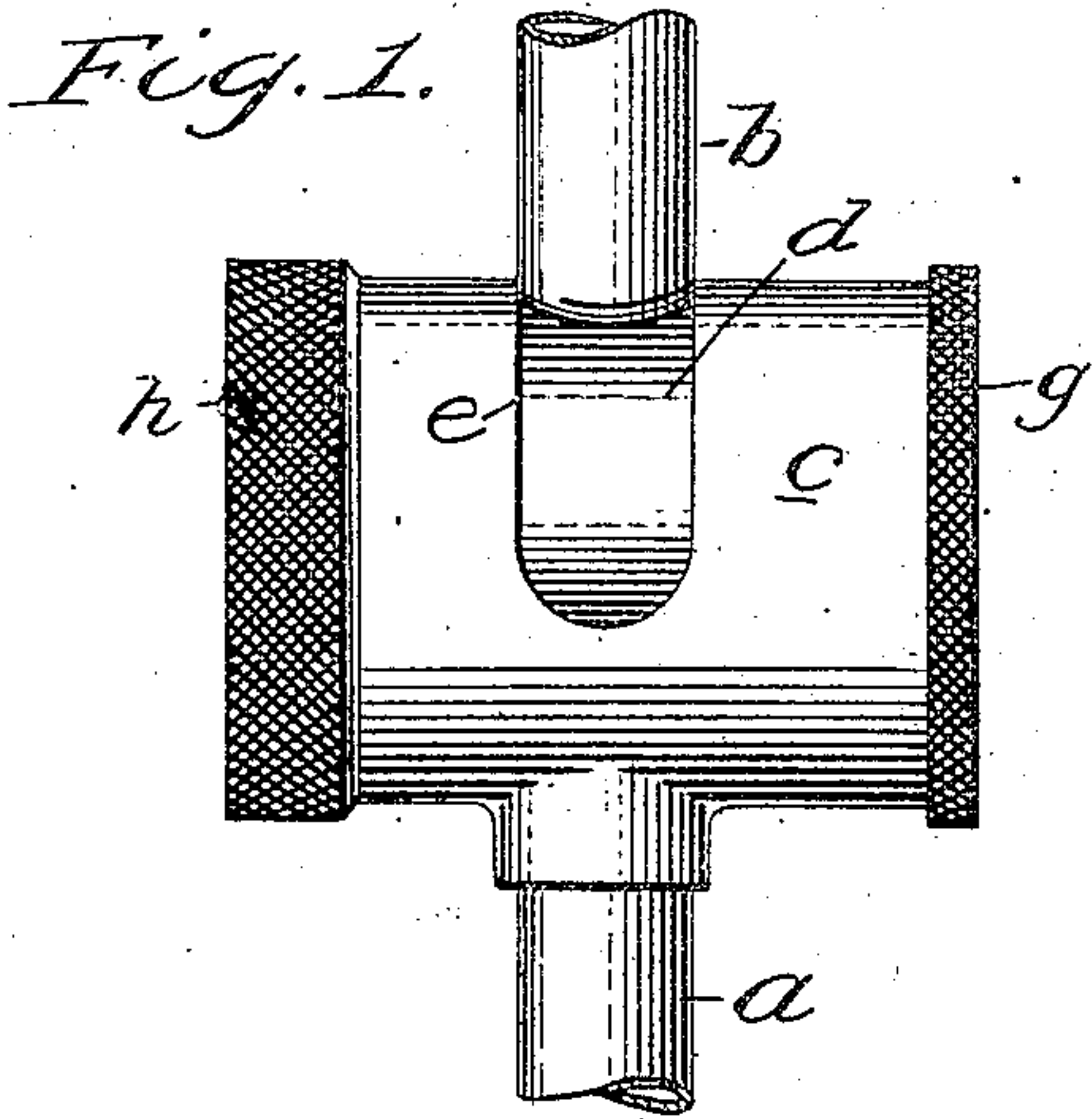


No. 848,223.

PATENTED MAR. 26, 1907.

W. B. CAMPBELL.
ELBOW PIPE JOINT.
APPLICATION FILED MAR. 29, 1906.



Witnesses
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UNITED STATES PATENT OFFICE.

WILLARD B. CAMPBELL, OF JACKSON, MICHIGAN.

ELBOW PIPE-JOINT.

No. 848,223.

Specification of Letters Patent.

Patented March 26, 1907.

Application filed March 29, 1906. Serial No. 308,812.

To all whom it may concern:

Be it known that I, WILLARD B. CAMPBELL, a citizen of the United States, residing at Jackson, in the county of Jackson and State of Michigan, have invented certain new and useful Improvements in Elbow Pipe-Joints; 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.

This invention relates to knuckle or elbow pipe-joints used in certain classes of apparatus requiring adjustable piping or tubing, more especially in apparatus for hospital, surgical, or dental service where such piping is employed for conducting off the expectorations and other discharges or emissions of a patient to some suitable receptacle or to a pipe connection with a sewer.

My invention provides a simple and efficient pipe-joint of this character, the same being water-tight, cleanly, and sanitary, allowing a continuous passage or close juncture between the contiguous ends of the pipe-sections and operating as a stiff hinge to permit angular adjustment between the pipe-sections and the holding of the conduit or piping in rigid position; also, operating as a trap or cut-off to confine and prevent the rising or passage of noxious gases, vapors, or odors back through the conduit. These results are attained by means substantially as hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, which form a part of this specification, Figure 1 is a front elevation of a knuckle pipe-joint embodying my invention, the united pipe-sections being represented vertically disposed, as in the case of an angularly-adjustable pipe-standard for supporting a receptacle and conducting off discharges therefrom through the conduit in such standard. Fig. 2 is a central longitudinal section of the same. Fig. 3 is a vertical cross-section showing the pipe-sections in alinement. Fig. 4 is a vertical cross-section showing the pipe-sections at an angle and cut off from communication. Fig. 5 is an end elevation, partly in section, of a pipe-joint embodying a modification.

The contiguous ends of the pipe-sections *a* and *b* are provided with or affixed to short cylinders *c* and *d*, respectively. These cylinders are arranged crosswise to the pipes and

they are tightly but rotatably fitted one within another, providing a stiff hinge-joint. The outer cylinder *c* is medially affixed to the extremity of the one pipe-section *a*, which is shown screwed or tapped into a lateral boss on said cylinder. A cross-slot *e* is also provided in said outer cylinder to accommodate the other pipe-section *b* and allow tilting thereof or a relatively angular adjustment between the two pipe-sections within the limits of said slot. The inner cylinder *d* is trans- fixed by the pipe-section *b*, or rather by a short pipe or tube *f*, secured to or rigid with said pipe-section, the extremity of which is shown tapped or screwed into said tube *f*. This tube *f*, which is integral or rigid with the inner cylinder and has its opposite ends flush with the cylindrical outer surface thereof, may therefore be regarded as a part or extension of said pipe-section *b*, since *b* and *f* together constitute one rigid pipe, the construction described affording a practicable means for assembling the parts. By this construction the contiguous extremities of the two pipe-sections, or rather of the pipe-section *a* and the tube *f*, to which the adjacent pipe-section is secured, are flush with the interior walls of the outer casing and are in contact or meet in a close juncture when the pipes are in alinement. Hence when the pipes are straight or in alinement their contiguous ends exactly register and provide a continuous conduit through the joint; but by turning the pipe-section *b* at an angle of about thirty degrees to the pipe-section *a*, as shown in Fig. 4, the inner extremity of the tube *f* will ride close against and confront the inner solid wall of the outer cylinder *c*, thus shutting off communication between the two pipe-sections. By a lesser angular adjustment between the pipe-sections the passage between *b* and *f* can be more or less opened or restricted, as desired, without entirely cutting off such passage. In service the pipe-sections are held either in alinement to maintain a full passage or at a slight angle to maintain a more or less restricted passage, as desired, and after the passage of any noxious fluid through the joint the pipe-sections may be adjusted to a greater angle, as shown in Fig. 4, to cut off communication, thereby serving as a trap to prevent and confine the ascent or back passage of any noxious odors, gases, or vapors from the reservoir or sewer to which the conduit leads.

To insure a fluid-tight fit between the cylinders *c* and *d*, their inner and outer surfaces are preferably made to taper slightly in opposite directions, as shown in Fig. 2, where the inside surface of the outer cylinder tapers outwardly or gradually enlarges toward the left, while the outside surface of the inner cylinder tapers inwardly or gradually decreases toward the right, so that by drawing or forcing the cylinders in opposite endwise directions they may be effectively tightened. At one end of the joint (the thicker end of the outside cylinder and the thinner end of the inside cylinder) is a milled cap or cover *g* having a reduced threaded boss which screws into the end of the inside cylinder. As said boss is screwed in tight the cap abuts the end of the outside cylinder, which projects slightly beyond the end of the inside cylinder. This tends to force or draw the cylinders in opposite directions, making them not only fluid-tight, but also making a very stiff hinge-joint, so that the pipe-sections will naturally maintain any desired position to which they may be adjusted. At the opposite end of the joint is a hollow cap *h*, which is interiorly threaded and screws over the end of the outside cylinder, and the inner face of this cap is preferably roughened or milled and abuts the end of the inside cylinder, which is also roughened or milled and which projects slightly beyond the outside cylinder, so that when said cap *h* is screwed on tight it will serve as a lock to hold the pipe-sections rigidly in the desired relation. By unscrewing this cap the pipe-sections can be adjusted. The caps *g* and *h* also enhance the ornamental appearance of the joint and they stop any leakage which might occur through prolonged usage of the joint, or by the gradual working of fluid between the cylinders, although the tight fitting of the cylinders is itself sufficient to virtually prevent leakage. One or both of the cylinders may have closed ends, though the construction described is preferred, the cylinders being desirably open-ended and provided with the said caps, not only for the purposes already described, but also to allow detachment of the parts for cleaning from time to time.

In the modified construction shown in Fig. 5 instead of a cap *h*, screwed onto the outer cylinder, a cap *i* is simply fitted onto or over the end of said outer cylinder and serves as a support for a spring-pressed stud or catch *j*, which enters through a hole in the end of the outer cylinder and engages one of a series of apertures or recesses in the outer surface of the inner cylinder, whereby the tubes may also be locked in any desired relation.

It will be understood that other changes may be made in the details, the invention being susceptible of embodiment in various forms.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A knuckle pipe-joint comprising adjacent pipe-terminals, a cylinder transversely affixed to the extremity of one pipe-terminal, a similarly-disposed cylinder closely but rotatably fitted therein, the other pipe-terminal being inserted crosswise through said inner cylinder and having its inner end substantially flush with the interior walls of the outer cylinder, said outer cylinder having a segmental slot to accommodate the last-named pipe-terminal and allow adjustment of the angular relations between the pipe-terminals, the contiguous ends of the pipe-terminals being in registration in one position of the pipes and out of registration in another position.

2. An angularly-adjustable pipe comprising hinged pipe-sections having a water-tight joint which affords a conduit there-through when the pipe-sections are in alignment but cuts off communication when said pipe-sections are arranged at a certain angle, said joint comprising an outer cylindrical casing fixed on the end of one pipe-section, and an inner cylinder completely transfixed by the contiguous end of the other pipe-section, the inner cylinder being rotatably fitted in said casing.

3. A knuckle pipe-joint comprising adjacent pipe-sections, and interfitting cylinders transversely affixed to the contiguous ends thereof, the outer cylinder being fixed on the extremity of the one pipe-section and having a segmental slot to accommodate the other pipe-section, and the inner cylinder having a short tube transfixing it and extending from side to side thereof, the end of said other pipe-section being detachably connected to said tube.

4. A knuckle pipe-joint comprising adjacent pipe-terminals, and interfitting cylinders transversely affixed on the contiguous ends thereof, there being a passage through said cylinders, the outer surface of the inner cylinder being slightly tapered and the inner surface of the outer cylinder being correspondingly tapered to fit therewith, and means whereby the fit of the cylinders can be tightened.

5. A knuckle pipe-joint comprising adjacent pipe-terminals, and interfitting cylinders transversely affixed on the contiguous ends thereof, there being a passage through said cylinders, the outer surface of the inner cylinder being slightly tapered and the inner surface of the outer cylinder being correspondingly tapered to fit therewith, one cylinder having an end projecting slightly beyond the end of the other, and a cap engaging the said ends of both cylinders in such manner as to force or draw the cylinders oppositely in such direction as to tighten them.

6. A knuckle pipe-joint comprising adjacent pipe-terminals, and interfitted cylinders transversely affixed on the contiguous ends thereof, there being a passage through
 5 said cylinders, the outer surface of the inner cylinder being slightly tapered and the inner surface of the outer cylinder being correspondingly tapered to fit therewith, the thicker end of the outer cylinder projecting slightly be-
 10 yond the corresponding and thinner end of the inner cylinder, and a cap abutting said end of the outer cylinder and having a reduced threaded boss screwing into said end of the inner cylinder.

15 7. A knuckle pipe-joint comprising adjacent pipe-terminals, and interfitted cylinders transversely affixed on the contiguous ends thereof, there being a passage through said cylinders, the outer surface of the inner
 20 cylinder being slightly tapered and the inner surface of the outer cylinder being correspondingly tapered to fit therewith, the thicker end of the outer cylinder projecting slightly beyond the corresponding and thin-
 25 ner end of the inner cylinder, and a cap abutting said end of the outer cylinder and having a reduced threaded boss screwing into said end of the inner cylinder, the opposite end of the inner cylinder projecting slightly
 30 beyond the corresponding end of the outer cylinder, and a cap screwed on said end of the outer cylinder and abutting said end of the inner cylinder, said end of the inner cylinder and the abutting inner face of the cap
 35 being roughened to provide a frictional lock.

8. A knuckle pipe-joint comprising adjacent pipe-terminals and interfitted cylinders affixed on the contiguous ends thereof, there being a passage through said cylinders, the
 40 outer surface of the inner cylinder being slightly tapered and the inner surface of the outer cylinder being correspondingly tapered to fit therewith, one cylinder having an end projecting slightly beyond the end of the
 45 other, and a cap screwed to one cylinder and

abutting the corresponding end of the other cylinder.

9. A knuckle pipe-joint comprising adjacent pipe-terminals, and interfitted cylinders transversely affixed on the contiguous ends
 50 thereof, there being a passage through said cylinders, and caps attached to and covering the opposite ends of the joint, one of said caps having means for locking the cylinders together.

10. A knuckle pipe-joint comprising adjacent pipe-terminals, and interfitted cylinders transversely affixed on the contiguous ends thereof, there being a passage through
 60 said cylinders, and frictional means for locking the cylinders rigidly together.

11. A knuckle pipe-joint comprising adjacent pipe-terminals, and interfitted cylinders transversely affixed on the contiguous ends thereof, there being a passage through
 65 said cylinders, the outer surface of the inner cylinder being slightly tapered and the inner surface of the outer cylinder being correspondingly tapered to fit therewith, caps attached to and covering opposite ends of the
 70 cylinders, one cap engaging both cylinders in such manner as to draw them tightly together, the other cap having means for locking the cylinders rigidly together.

12. A knuckle pipe-joint comprising adjacent pipe-terminals, interfitted cylinders transversely affixed on the contiguous ends
 75 of said pipe-terminals, the outer cylinder having a segmental slot to accommodate the pipe-terminal carrying the inner cylinder, 80
 said pipe-terminal having a passage through said inner cylinder to the other pipe-terminal, the contacting surfaces of said cylinders being tapered.

In testimony whereof I affix my signature 85
 in presence of two witnesses.

WILLARD B. CAMPBELL.

Witnesses:

G. CARL WISSMANN,
 JOHN HELMER.