

(No Model.)

A. J. CLARK.
CASING FOR ARTESIAN WELLS.

No. 411,886.

Patented Oct. 1, 1889.

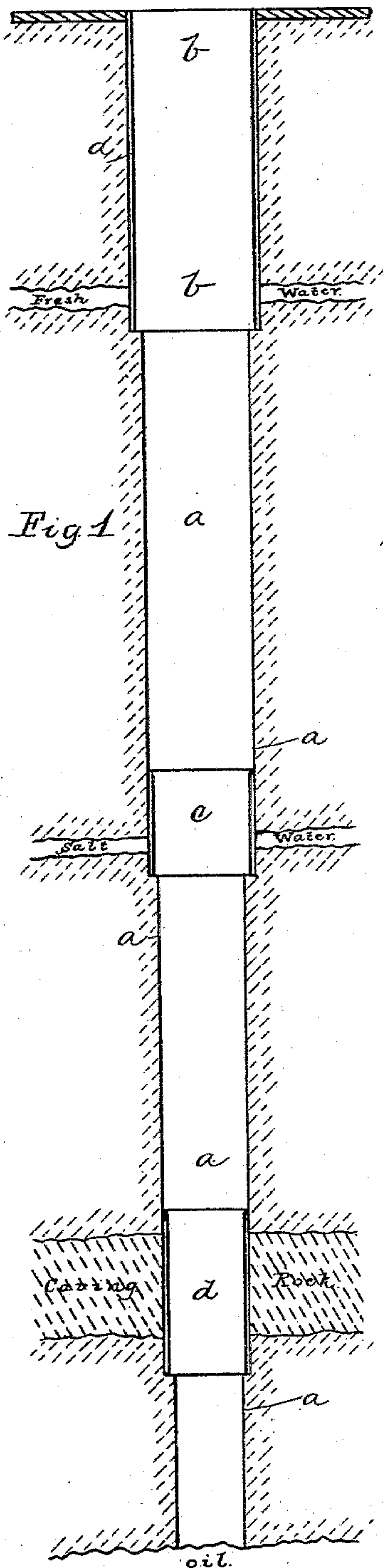


Fig. 1

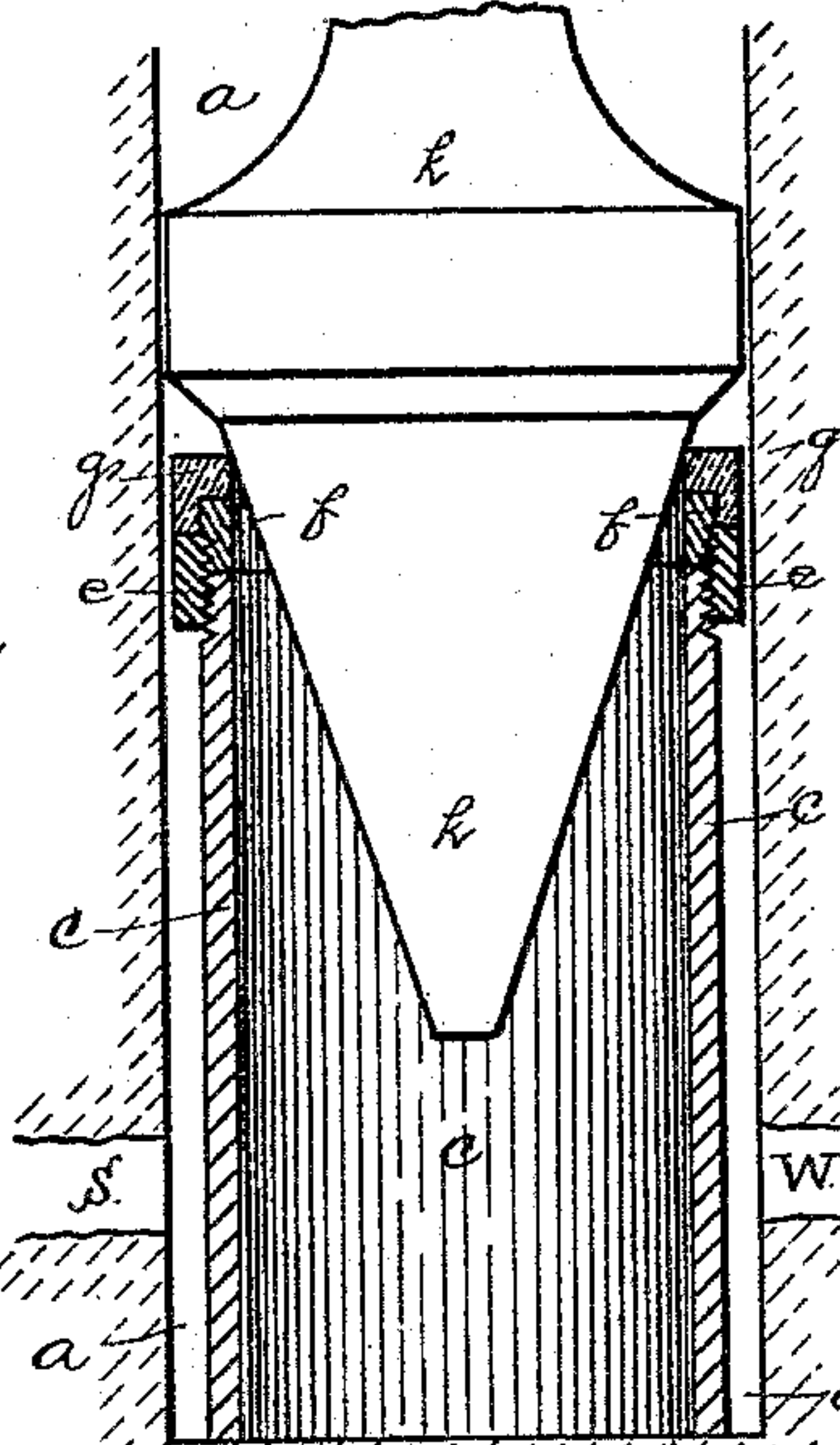


Fig. 2

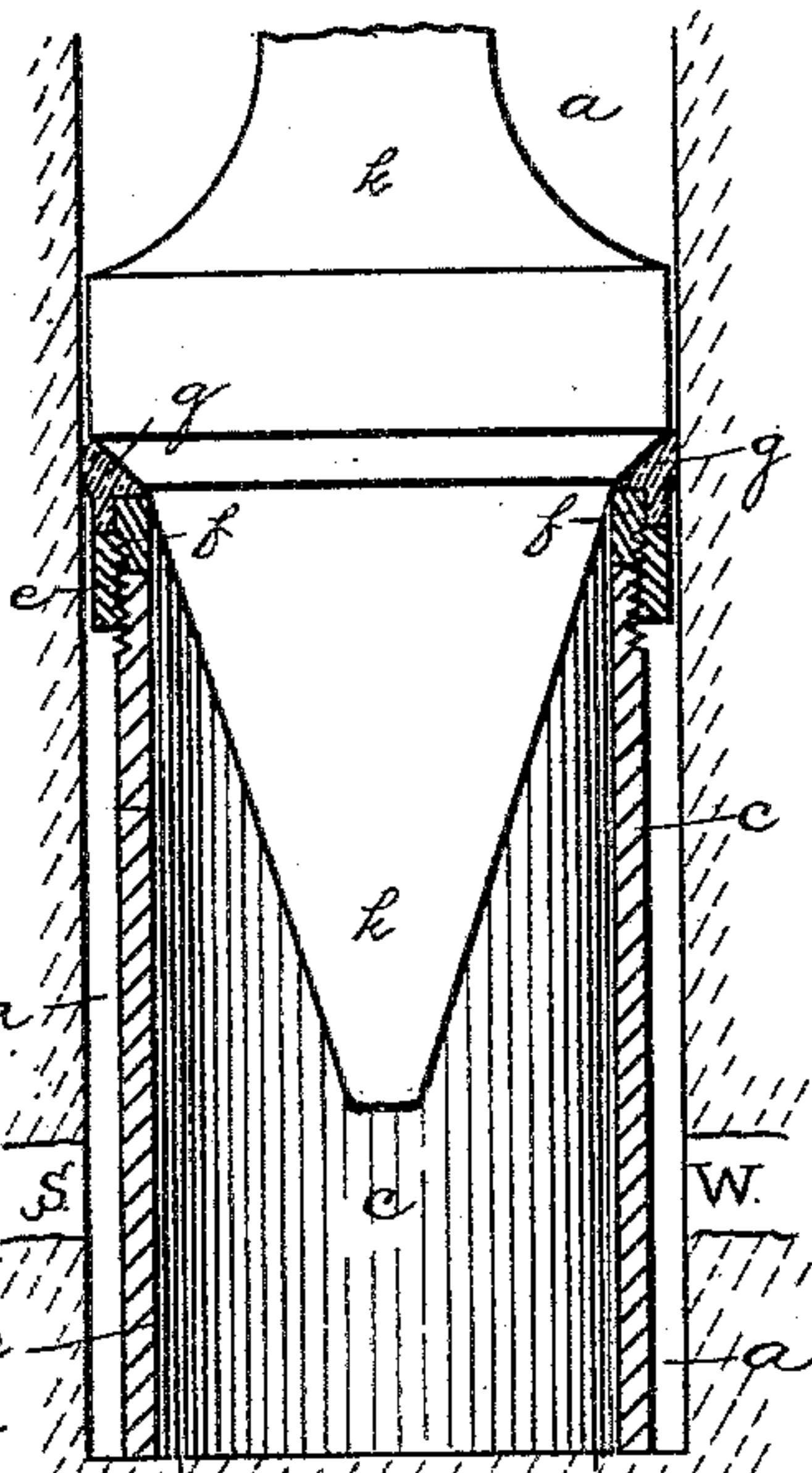


Fig. 3

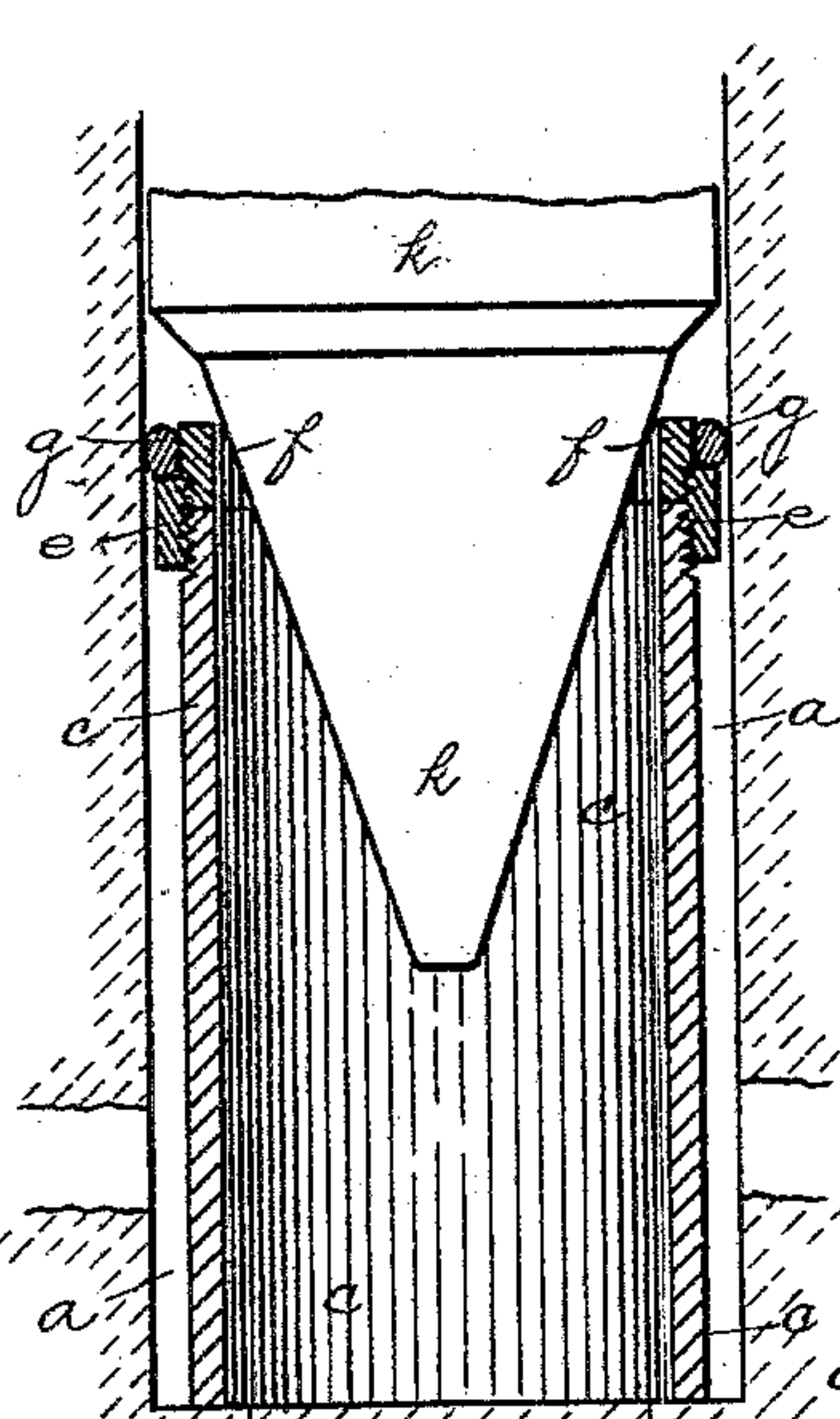


Fig. 4

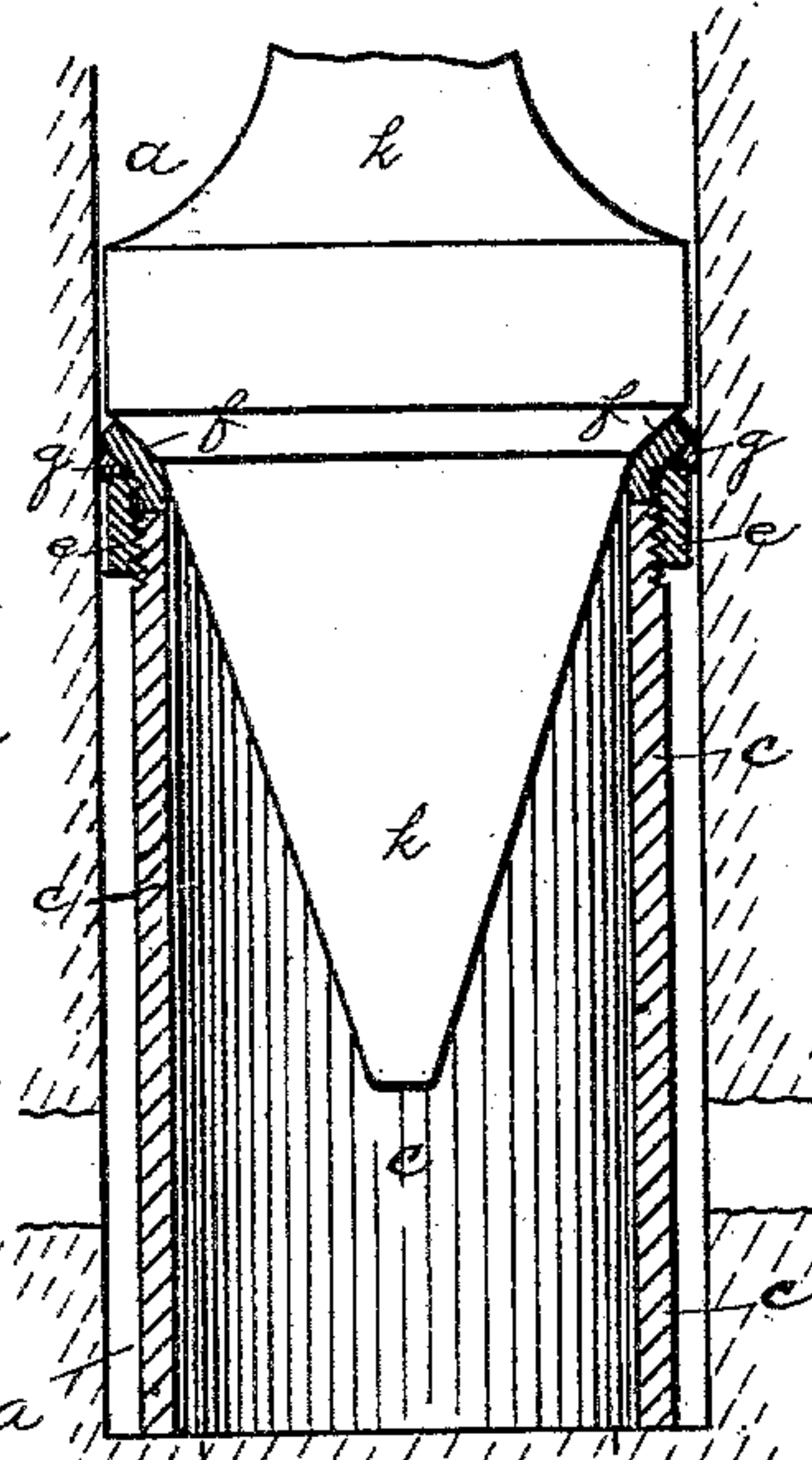


Fig. 5

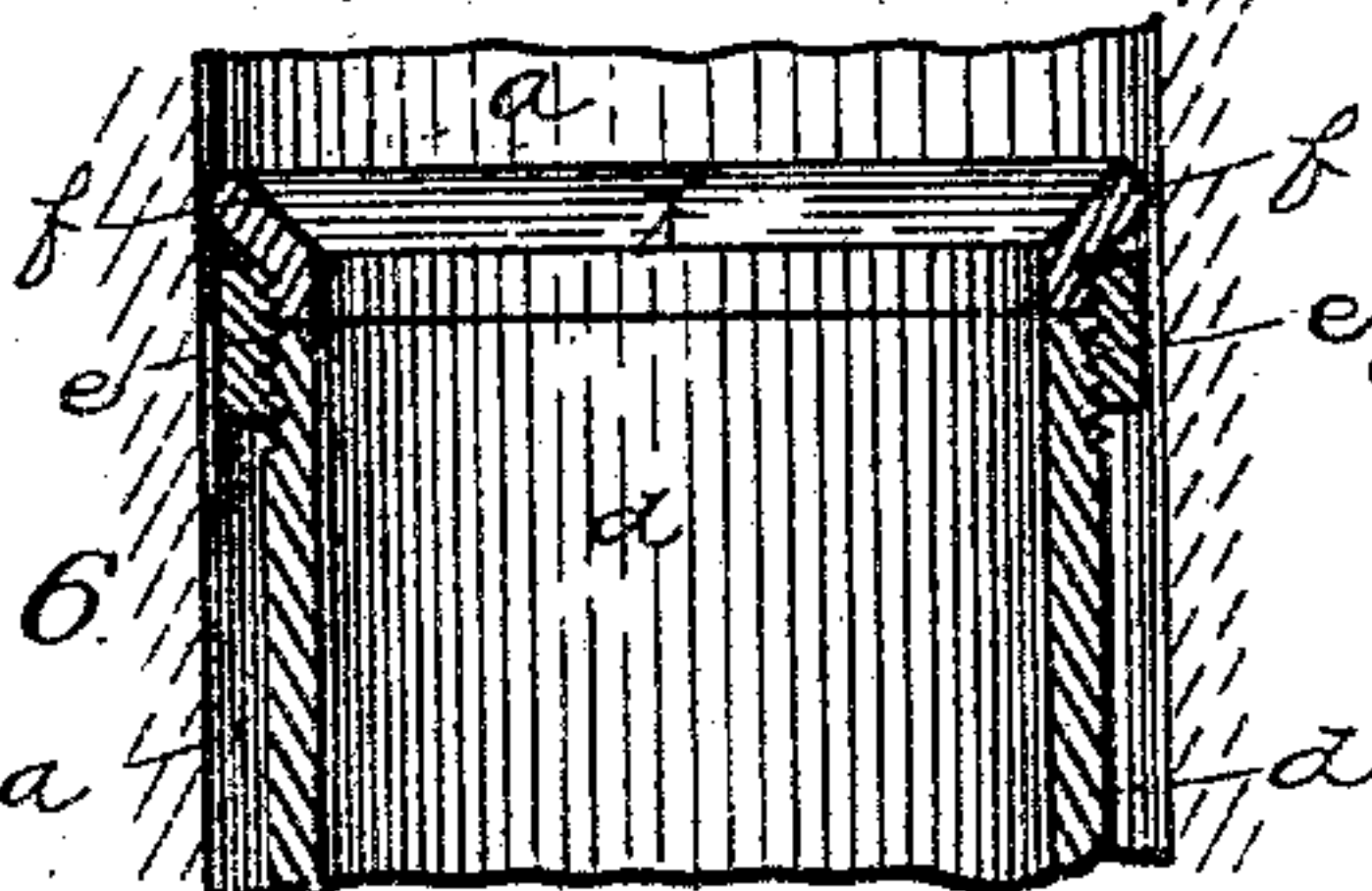


Fig. 6

Witnesses:
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UNITED STATES PATENT OFFICE.

ALEXANDER J. CLARK, OF OLEAN, NEW YORK.

CASING FOR ARTESIAN WELLS.

SPECIFICATION forming part of Letters Patent No. 411,886, dated October 1, 1889.

Application filed December 14, 1888. Serial No. 293,550. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER J. CLARK, a resident of Olean, in the county of Cattaraugus and State of New York, have invented
5 a new and useful Improvement in Casings for Artesian Wells; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to the drilling of oil
10 and other Artesian wells, and has reference particularly to a means of preventing the water encountered at different depths during the drilling from entering the well, and also to prevent the falling in of the caving rock and
15 the consequent filling of the well therewith.

It is well known that in the drilling of oil or other Artesian wells water is encountered at different depths which flows from the crevices of the rock, and unless some means are
20 employed for shutting off this water it will enter the well and prevent the further drilling of the same until the water has been removed. Again, there are certain formations of rock encountered in drilling, which, when
25 the water comes in contact therewith, will disintegrate and fall within the well. To prevent this filling in of the water and rock, it has been customary to line the well with a tubular casing, said casing being inserted at
30 different intervals during the drilling operation, so that when a vein of water is struck, and to prevent its entering the well, a line of this casing is inserted before the further drilling of the well. The same operation is per-
35 formed when other water-veins or strata of caving rock formation are reached.

In the employment of the above means of casing the well it has been customary to introduce within the well one or more lines of
40 casing of suitable material, said casing extending from below the water-veins or the strata of caving rock to the surface of the ground, and as the ordinary Artesian well is of great depth it generally contains from two
45 to four lines of this casing, which varies in length from five hundred to two thousand feet, so that the expense of drilling these wells is largely increased on account of this shutting off of the water and inclosing of the caving rock.

The object of my invention is to provide a

means of shutting off the veins of water encountered and inclosing the caving rock without the necessity of employing these long lines of casing, and thereby greatly reducing
55 the cost of the drilling operation.

It consists, generally stated, in a short casing reaching from below the portion of the well to be shut off—such as from below the water-vein or below the caving rock—a suffi-
60 cient distance above the same to properly inclose it, and having at the upper end thereof a packing material, which can be forced against the walls of the well and will prevent the entrance of the water or the caving in of
65 the rock, leaving the well in a condition for drilling.

It also consists in the construction of the packing employed at the upper end of the casing and the means employed for forcing it
70 against the walls of the well.

To enable others skilled in the art to understand and practice my invention, I will describe the same more fully, referring to the accompanying drawings, in which—
75

Figure 1 is a sectional view of an Artesian well, showing the application of my invention at different points therein. Figs. 2 and 3 show the application of one form of packing to the well. Figs. 4 and 5 show the application of
80 another form of packing thereto, and Fig. 6 shows the spreading of the nipple against the wall where a water-tight joint is not required.

Like letters of reference indicate like parts
85 in each.

In said drawings, the well *a* is shown as having several different casings therein, and it illustrates the different points at which my invention can be applied, which well has the
90 ordinary casing *b*, to cut off the fresh water, the casing *c*, to cut off the salt-water, and the casing *d*, to cut off the caving rock. In drilling such a well the well is drilled of different diameters—for example, the upper end
95 of the well being drilled about fourteen and one-half inches in diameter, and the casing *b*, which shuts off the fresh water, generally extending down about one hundred feet, this casing being about twelve inches in diameter.
100 After the insertion of this casing the well is drilled, say, of the diameter of about ten and

one-half inches, the drilling being continued until a vein of salt-water is reached or a vein of coal, which usually contains such water, and it is necessary to shut off this water. To accomplish this I employ a casing embodying my invention, such as shown in the drawings. The well being drilled a proper distance below the water-vein to prevent the escape of the water into the well, a casing of proper length—such as twenty feet in length—is then prepared for cutting off this water-vein, the casing being seated at the base of the hole drilled and extending up above the vein, any suitable number of lengths or sections of pipe being employed for the purpose. At the upper end of the casing *c* is screwed a collar *e*, and entering said collar is a nipple *f*, which extends above the collar and forms a support for the packing device. This packing device may be of different forms, that shown in Figs. 2 and 3 consisting of an annular block of copper, lead, or other suitable material, which may either be formed as part of the nipple *f* or separate therefrom, this packing material *g* extending above said nipple, as shown in said figure, and being of such diameter as to fit neatly as practicable within the bore of the well. This casing is then lowered into the well, and a suitable swaging device *k*—such as shown in the drawings—is secured to the set of ordinary drilling-tools and lowered into the well until it comes in contact with the nipple *f* or packing *g* of the casing inserted, this swaging device being generally a tool which fits neatly within the well and tapers to a point at its lower end. It is then alternately drawn up and dropped upon the packing *g* until it swages out the packing against the walls of the well and causes the packing material to conform to said walls, so forming a tight joint therewith and confining the water entering through the water-veins so inclosed by the casing and packing.

Where the packing such as shown in Figs. 4 and 5 is employed instead of the soft-metal packing, I employ a packing-ring of hemp, marlin, rubber, or like material, and I extend the nipple *f* above the sockets *e*, the nipple being formed of a quality of metal which can be swaged or enlarged by the swaging-tool *k*. After the casing with this form of packing is inserted within the well by dropping the swaging-tool *k*, as above described, the nipple *f* is spread and enlarged in such manner that it forces the packing of hemp, marlin, rubber, or like material against the walls of the well and into the inequalities of the rock in such manner as to form a tight joint, and so prevent the escape of the water.

It is evident that several different forms of packing devices can be employed for producing the desired result—namely, the packing or

securing of the casing at the upper end thereof and the forming of a tight joint between the upper end of the casing and the walls of the well.

After the casing has been secured in place, as above described, I can then drill through the casing, forming a hole of slightly smaller diameter than the inner one, until the caving rock above referred to is encountered, as at *d*. After drilling through this rock I insert a casing in the manner above described, this caving rock being from ten to three hundred feet in depth, and a casing of sufficient length to inclose the same being employed. In some cases, also—such as in shutting off the caving rock—it is not absolutely necessary to form a water-tight joint at the upper end of the casing, and in that case the nipple *f* may be swaged out without any other packing material, as illustrated in Fig. 6, though in this case the metal is forced by the swaging operation into such close contact as to pack the joint as tight as required for all practical purposes. I am thus enabled to inclose any water-veins encountered in the drilling of the well or any caving rock by means of short casings, which are of no greater length than necessary to inclose such parts of the well, and in the drilling of the ordinary well I am enabled to save from five hundred to three thousand feet of casing, so reducing the cost of drilling and finishing the well from five hundred to two thousand dollars.

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

1. As a means for packing Artesian wells, a short casing adapted to extend a short distance above the vein or rock to be shut off and having a packing at the upper end thereof, substantially as and for the purposes set forth.

2. The combination of a short casing for Artesian wells, a collar and nipple at the upper end thereof, and a packing-ring supported by said collar and nipple, substantially as and for the purposes set forth.

3. The combination of a short casing for Artesian wells, a nipple at the upper end, and a rubber, hemp, or like packing-ring surrounding said nipple and adapted to be forced against the walls of the well by the spreading of the nipple, substantially as and for the purposes set forth.

4. The combination, with a short casing for Artesian wells, of a nipple at the upper end adapted to be spread or expanded, substantially as and for the purposes set forth.

In testimony whereof I, the said ALEXANDER J. CLARK, have hereunto set my hand.

ALEXANDER J. CLARK.

Witnesses:

ERNEST F. KRUSE,
WALTER T. BLISS.