

No. 701,559.

Patented June 3, 1902.

A. GOERKE.
SINKING FOUNDATIONS.

(Application filed Apr. 13, 1901.)

(No Model.)

2 Sheets—Sheet 1.

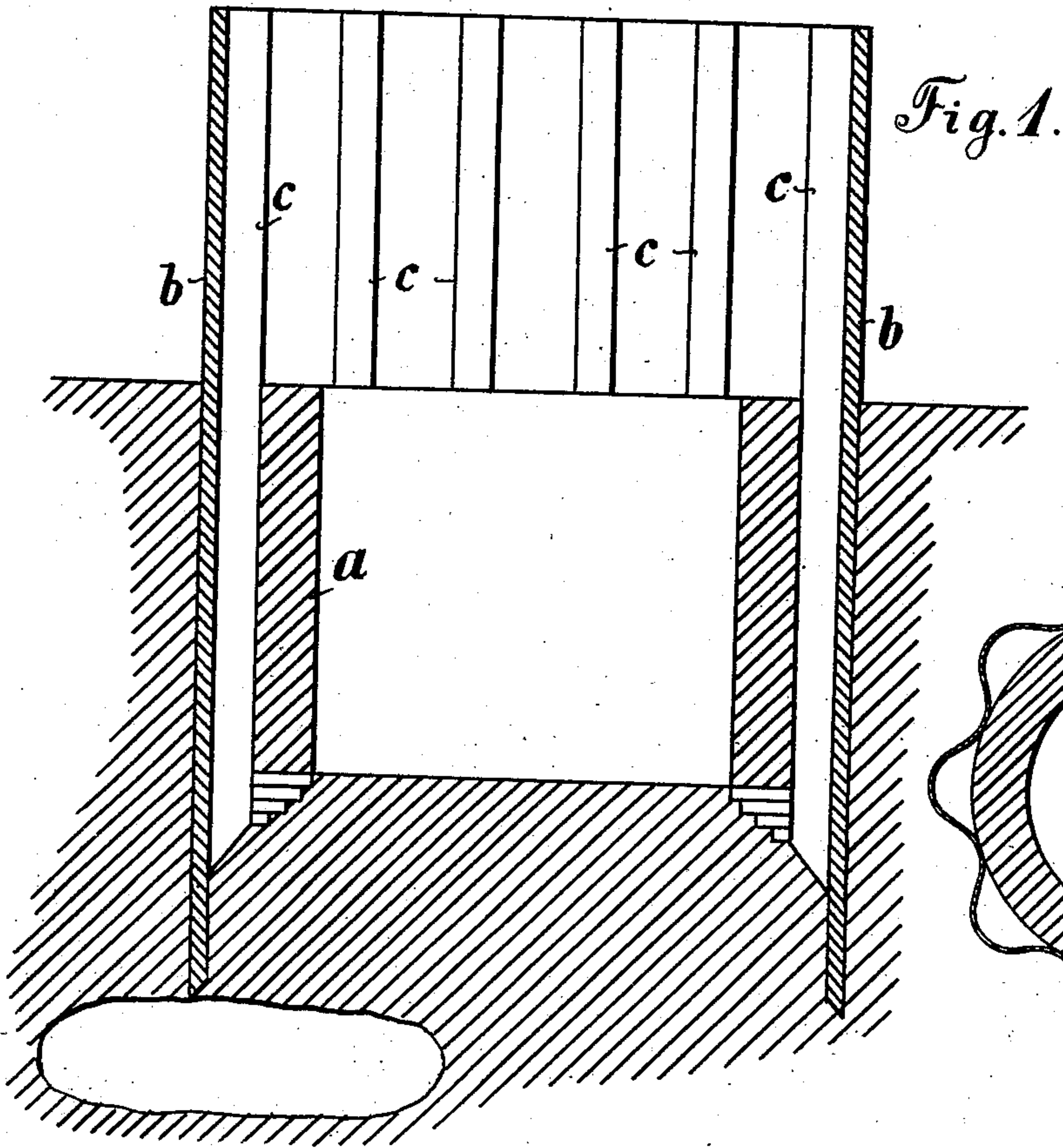


Fig. 1.

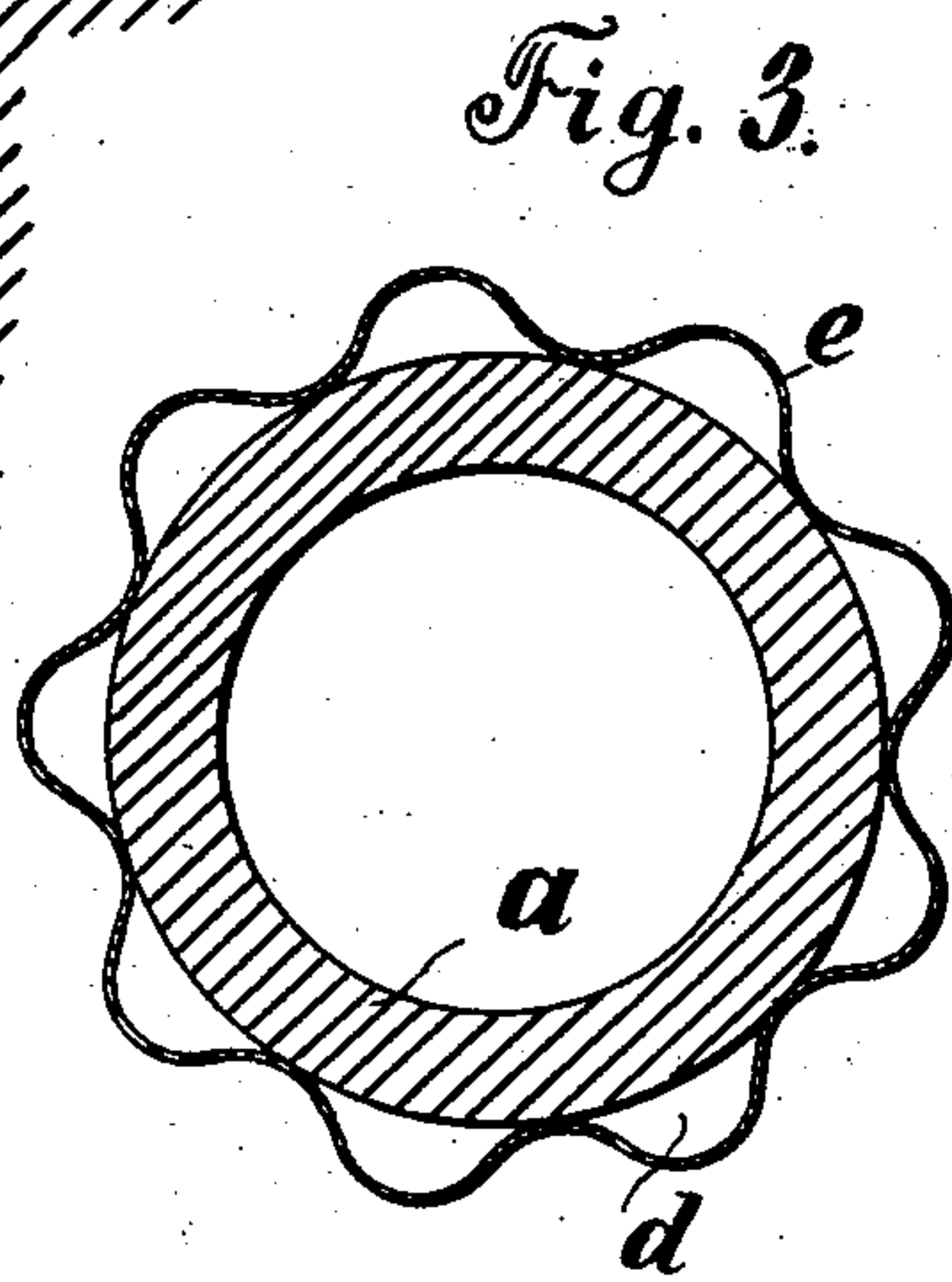


Fig. 3.

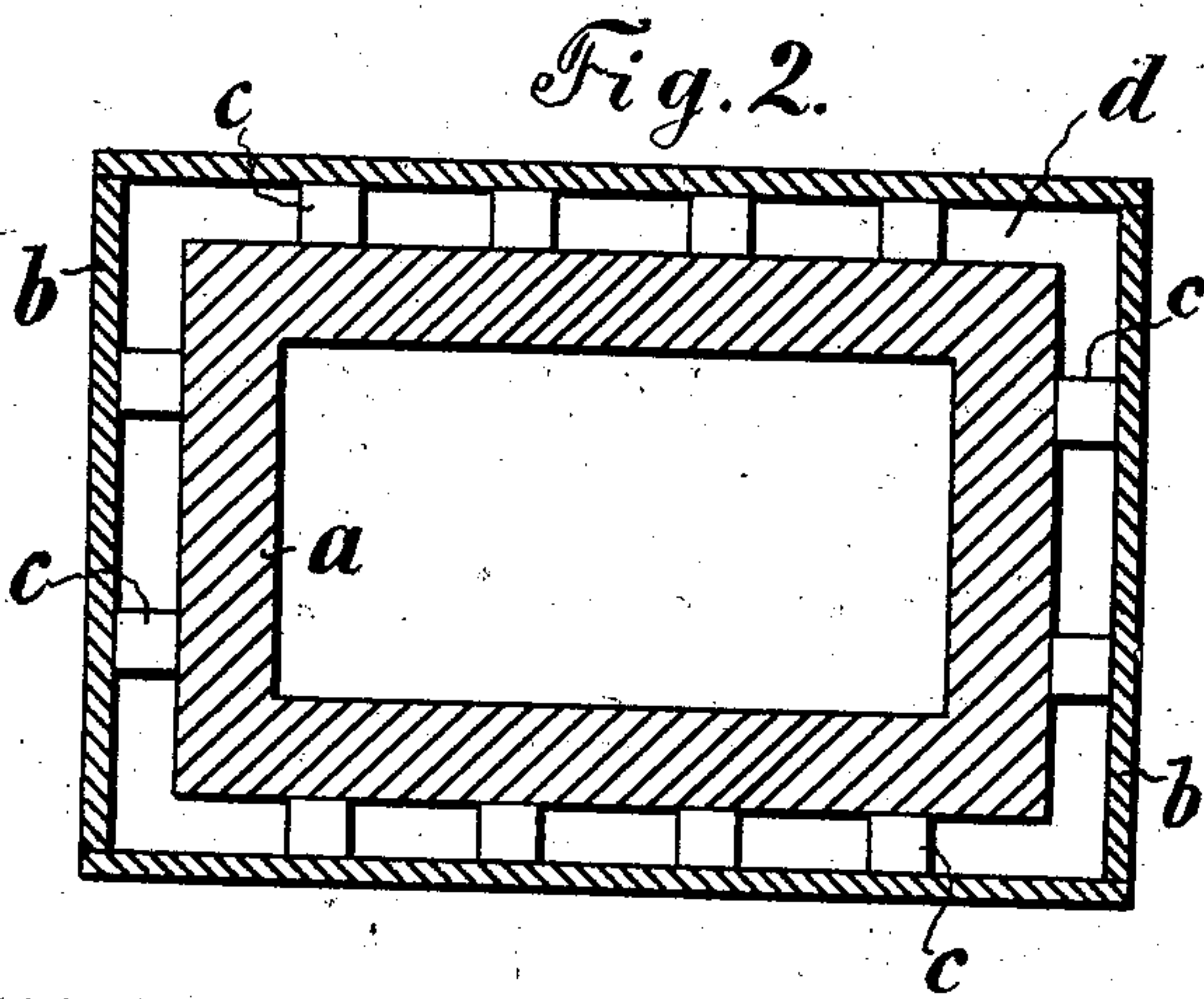


Fig. 2.

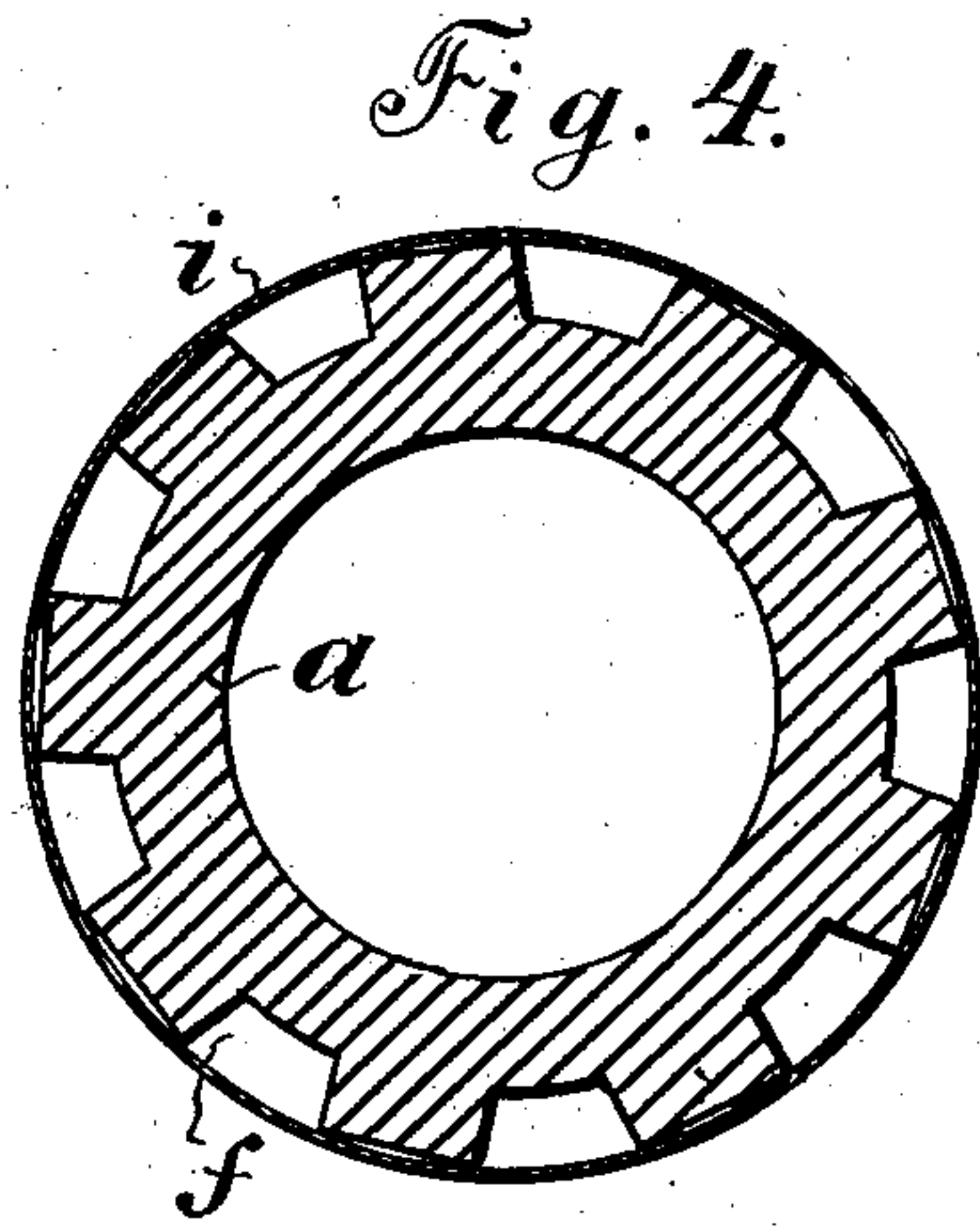


Fig. 4.

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2 Sheets—Sheet 2.

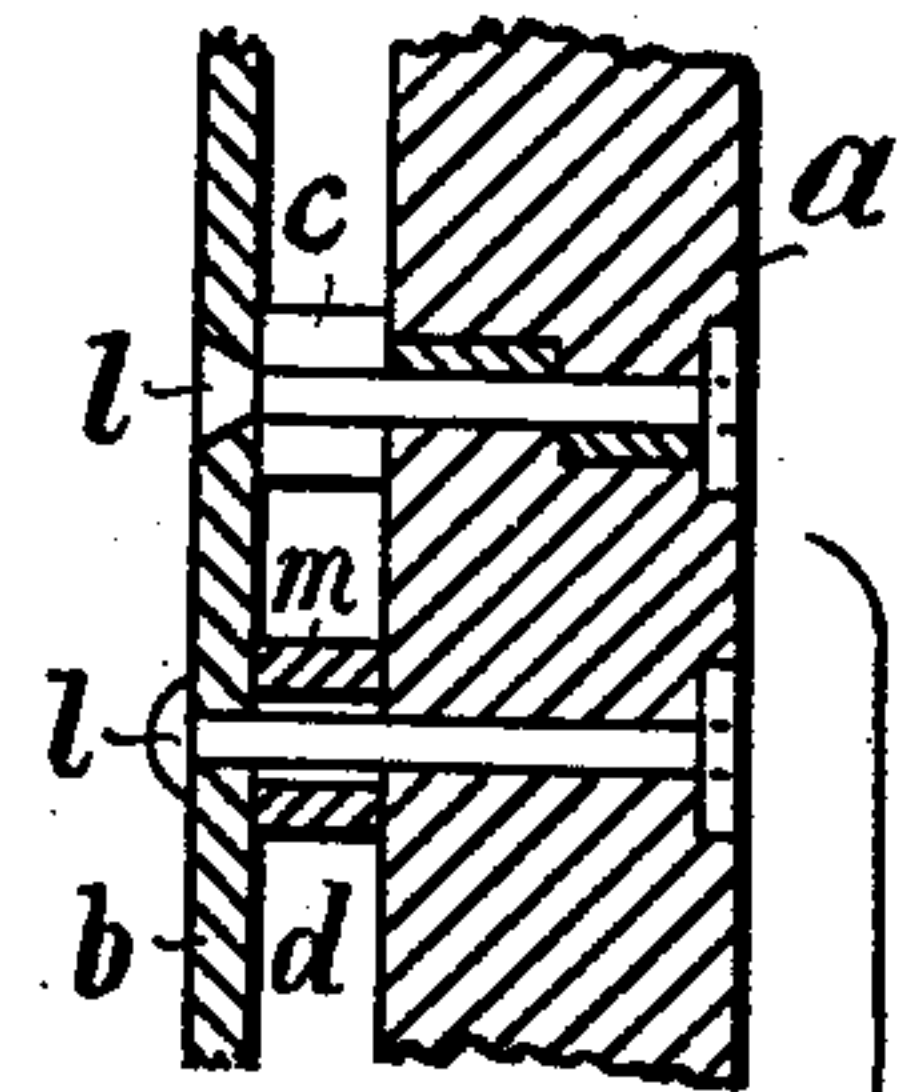


Fig. 1a.

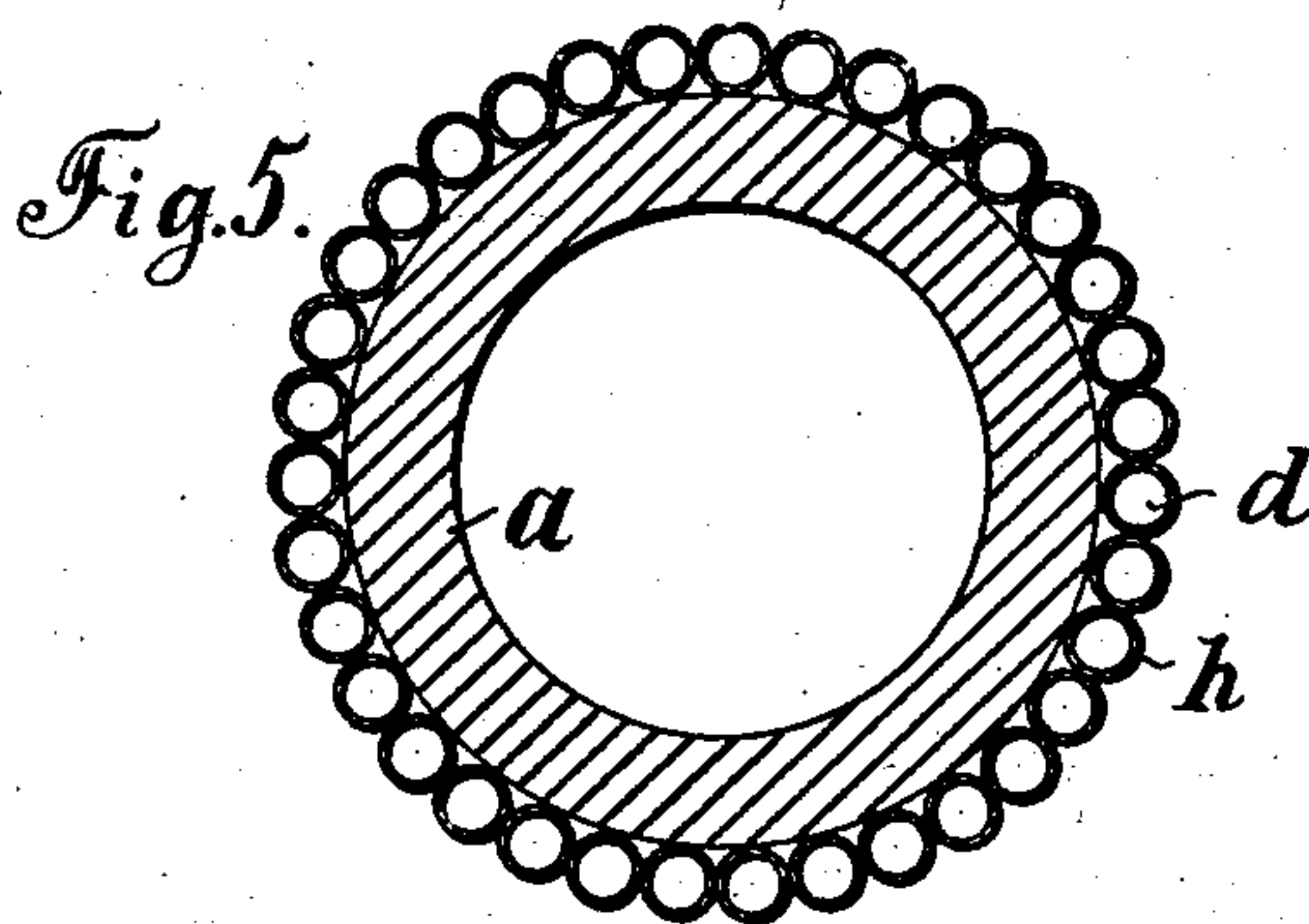
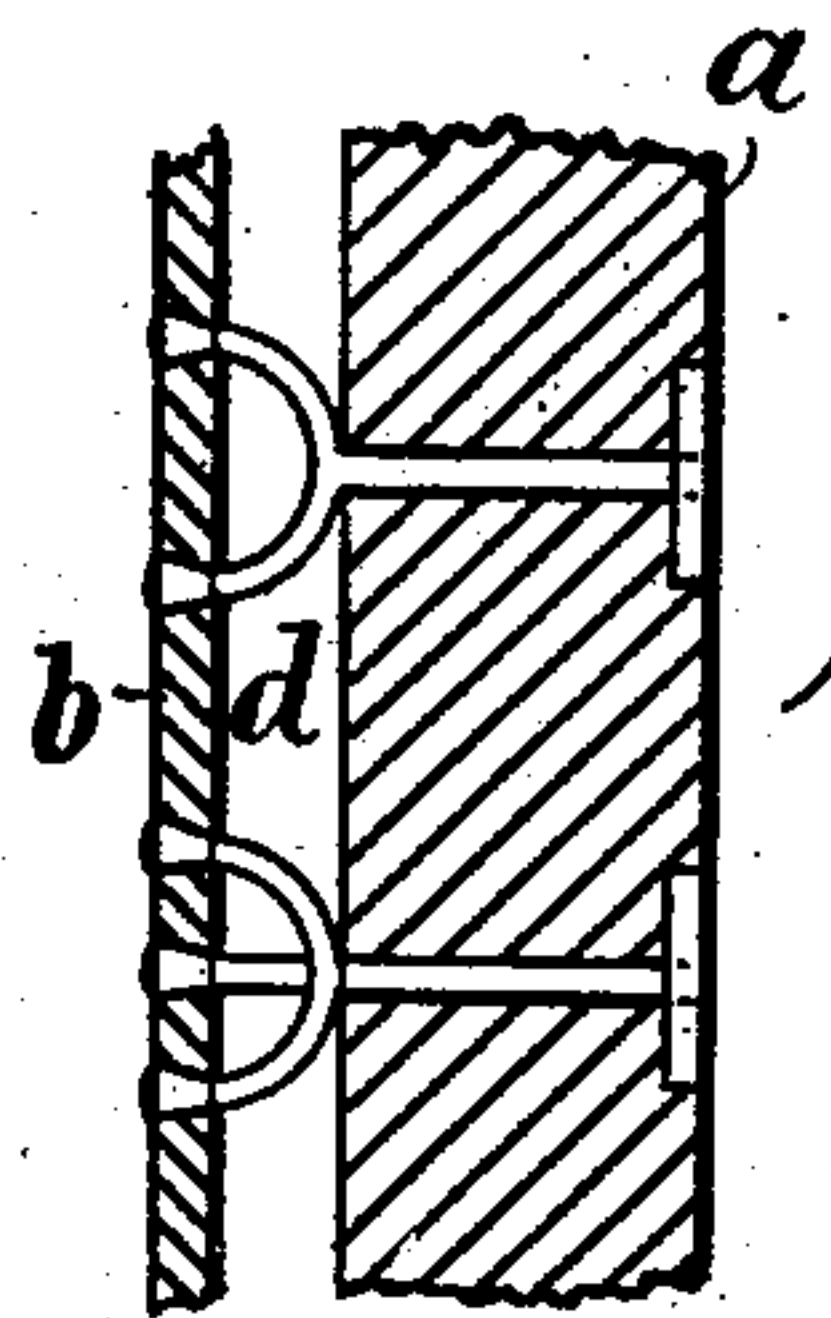
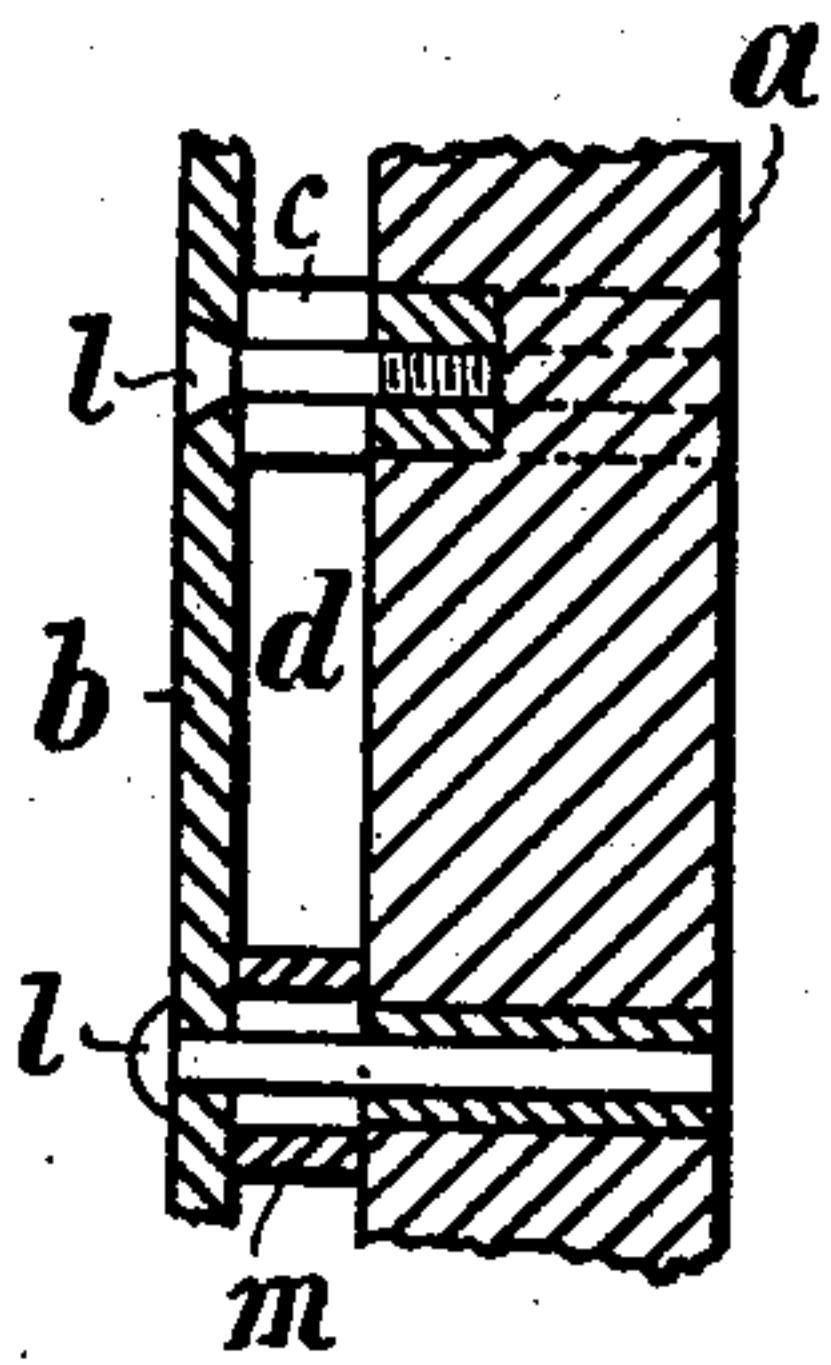


Fig. 5.

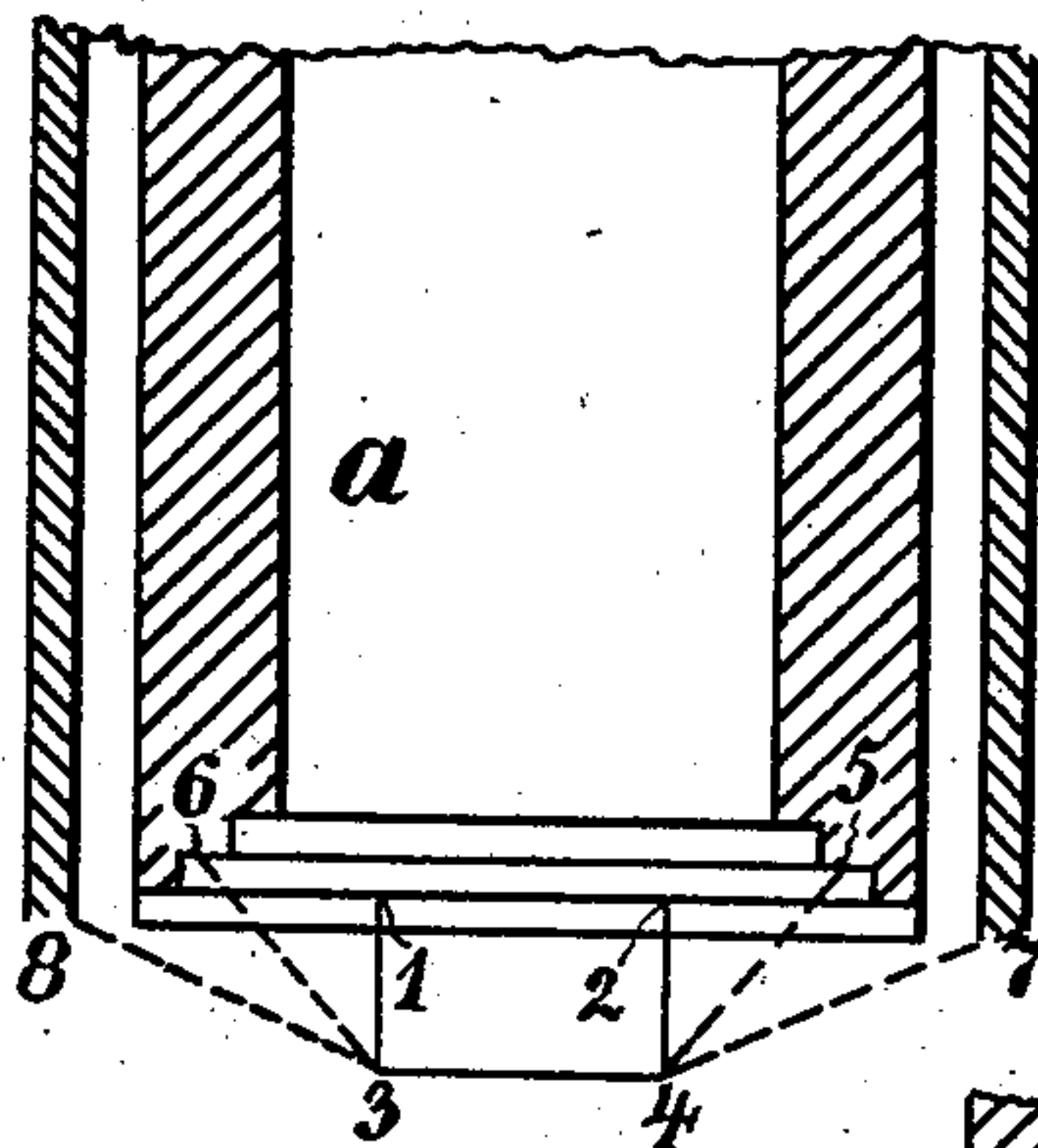


Fig. 8.

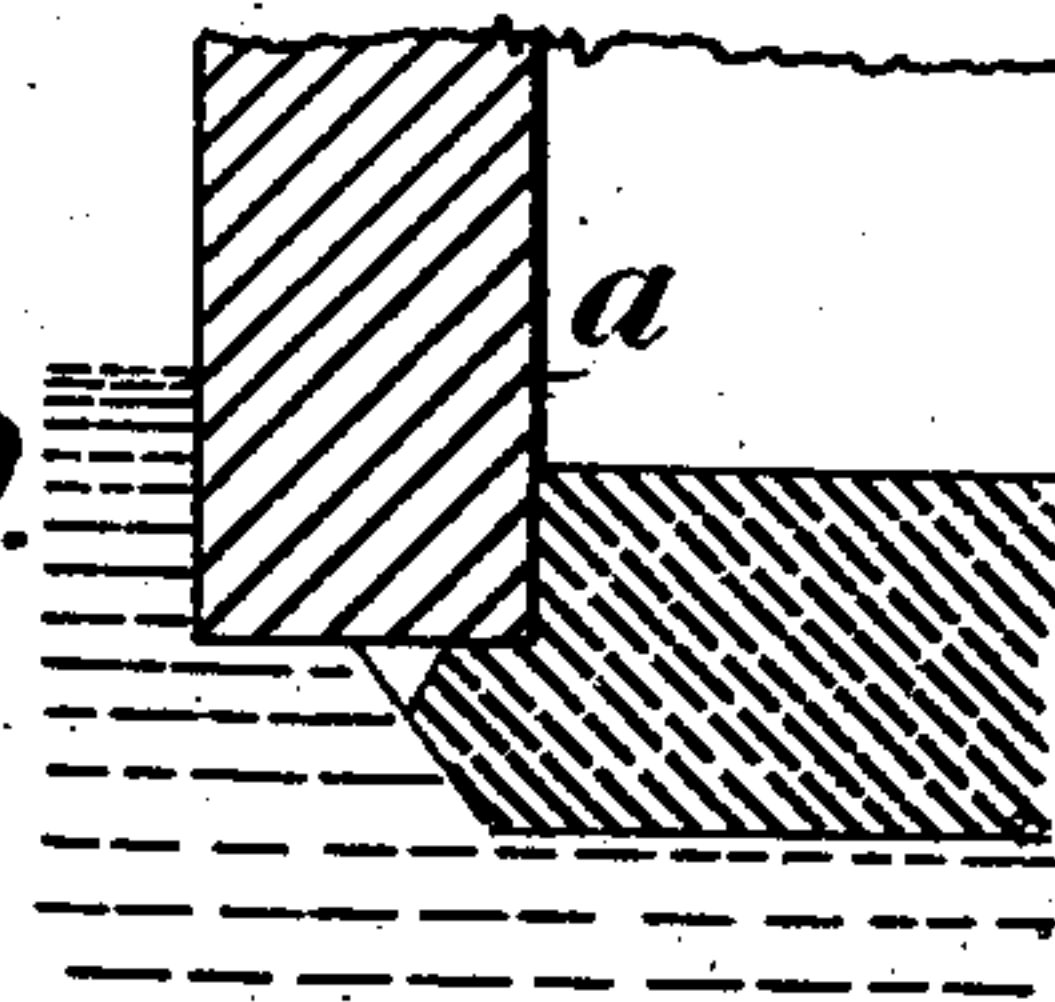


Fig. 9.

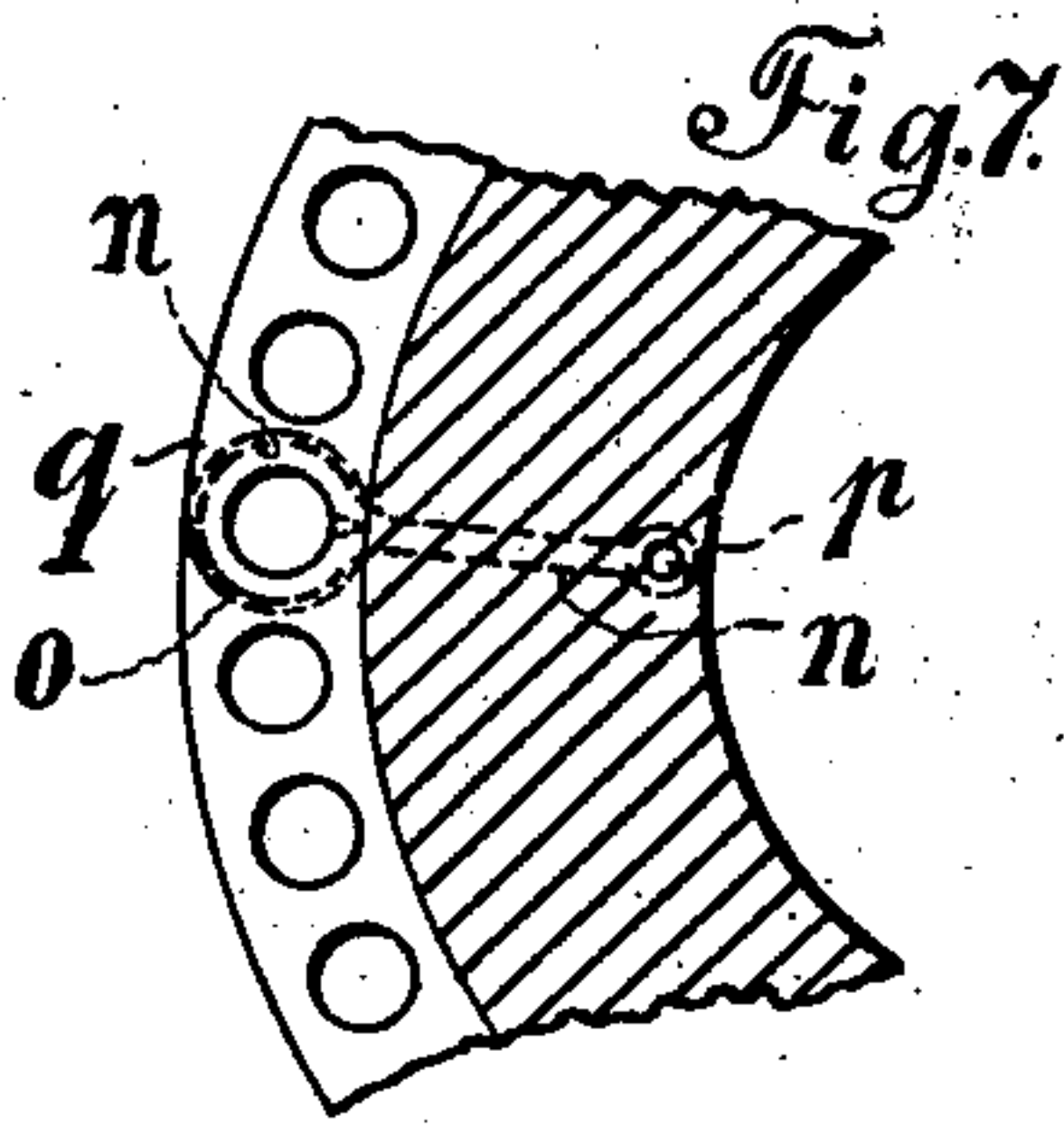


Fig. 7.

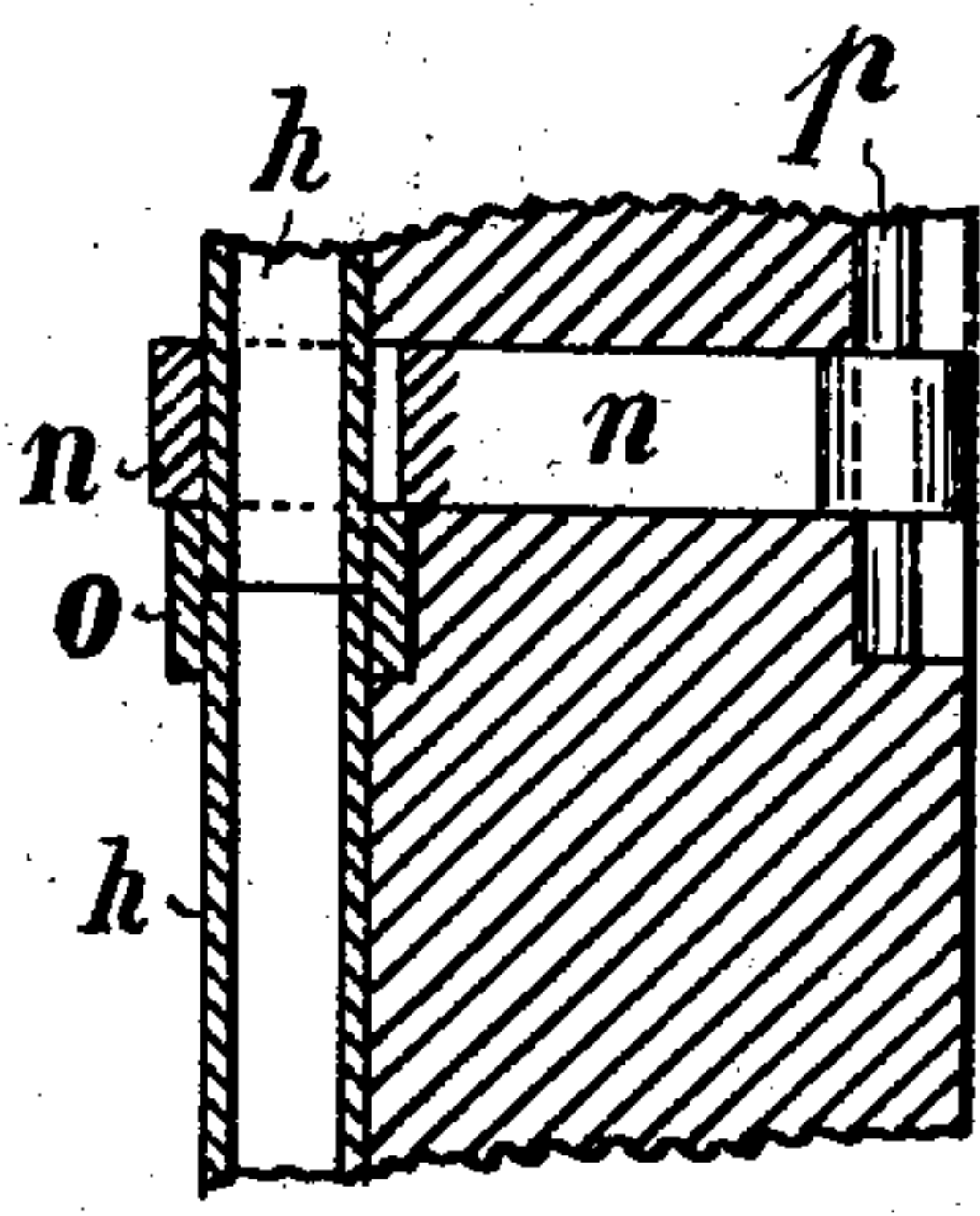


Fig. 6.

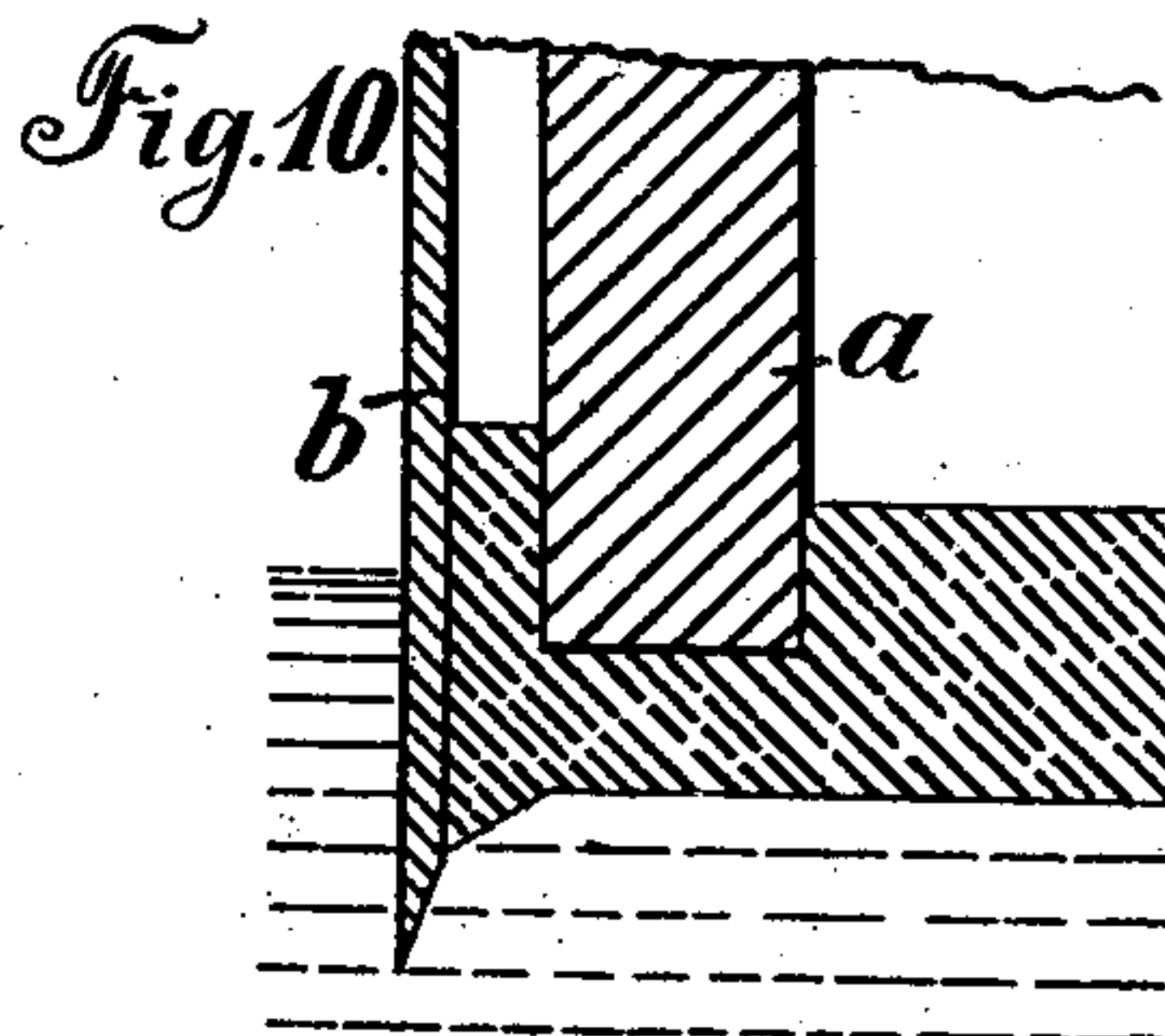


Fig. 10.

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UNITED STATES PATENT OFFICE.

ADOLF GOERKE, OF BERLIN, GERMANY.

SINKING FOUNDATIONS.

SPECIFICATION forming part of Letters Patent No. 701,559, dated June 3, 1902.

Application filed April 13, 1901. Serial No. 55,681. (No model.)

To all whom it may concern:

Be it known that I, ADOLF GOERKE, a subject of the King of Prussia, Emperor of Germany, residing in Berlin, Prussia, German Empire, have invented Improvements in Sinking Foundations, of which the following is a specification.

In sinking for the foundations of structures in difficult ground it often happens that an obstacle—such as an isolated boulder, the trunk of a tree, and the like—is encountered, which must be got rid of in order that the shaft-casing may be uniformly sunk to the required depth. The removal of such like obstacles is attended with considerable difficulties when the usual methods of sinking are adopted since it is no easy task to locate the obstacle, it being only accessible from the interior of the shaft-casing. The above-mentioned difficulty is completely obviated by spaces or chambers being provided at the outer circumference of the shaft-casing, which serve in the first instance the purpose of ascertaining the presence of the obstacles and determining their position and dimensions. By the methods hitherto usual the ascertainment of the presence of the obstacle was only possible when it protruded into the area of the shaft; but even then it was not possible to exactly ascertain the position and size of the obstacle. With the improved arrangement it is rendered possible by means of the said spaces or chambers to exactly ascertain the position and size of the obstacle, so far as the same could interfere with the sinking, and to reach it from above, so that the workman is enabled to handle it at the most effective places, to crush it with suitable tools, to saw it, or blow it up after making a suitable boring. The ground into which the shaft-casing is to be sunk may be detached through the said chambers and conveyed to the top, by which proceeding the sinking operation is greatly facilitated. Those chambers, which may be of any suitable number, shape, and arrangement, are formed in different ways.

On the accompanying drawings several modifications or specimens of the improved means of well-sinking for foundations are illustrated.

Figure 1 is a vertical section of an embodiment of my invention in operation. Fig. 2 is

a horizontal section of the same. Fig. 3 is a horizontal section of a modification. Fig. 4 is a horizontal section of another modification. Fig. 5 is a horizontal section of a third modification. Figs. 6 and 7 illustrate certain connections hereinafter described. Figs. 8, 9, and 10 are diagrammatic figures illustrating advantages of the invention. Fig. 1^a is a series of details showing various connections hereinafter referred to.

In the example shown in Fig. 1 in vertical section and in Fig. 2 in horizontal section the casing *a* is surrounded by another larger caisson *b*, which may be made of timber or planks and kept at a certain distance from the casing *a* by means of distance-pieces *c*—as, for instance, by laths. For connecting the caisson *b* with the casing *a* various different means may be employed. Such a means is, for instance, represented in Fig. 1^a. It consists of bolts 1, passing through the caisson *b* and through the casing *a*. The required distance between the caisson *b* and the casing *a* is obtained by means of timbers or laths *c* (shown in Figs. 1 and 2) or by distance-tubes *m* (see Fig. 1^a) or otherwise. The bolts 1 may be of various shapes and connected with the casing and the caisson in any suitable way.

Fig. 3 represents a cylindrical foundation in which the exterior caisson is made of corrugated metal *e*, the undulations of which form the spaces or chambers.

In lieu of a caisson of corrugated metal a plain metal caisson *i* may be used, as shown in Fig. 4, and the spaces may be provided by arranging grooves or recesses *f* in the circumference of the casing *a*. The chambers *d* (shown in Figs. 1 to 3) may also be formed by surrounding the casing *a* with a series of vertical pipes *h*, as in Fig. 5.

The metal caissons (shown in Figs. 3 and 4) may be connected to the casing like the caisson of timber by bolts, while the pipes *h* may be connected to the casing by eyebolts *n*, the eyes of which receive the tubes and bear on joint-sockets *o*, connecting the pipes *h*, as represented in Fig. 6, the bolts *n* being either fixed as before described or by means of cotters *p*. The tubes may be connected by a ring *q*, as in Fig. 7, provided with holes and which rests upon the joint-sockets *o*. The bolts which are set into the brickwork

casing may be attached to the said ring. The caisson which incloses or forms the outer spaces extends seventy to eighty centimeters deeper than the bottom edge of the casing.

5 Besides the advantages already mentioned the application of the caisson and the outer chambers leads to the following important advantages: If the brickwork of a well *a*, Fig. 8, is to be sunk by dredging out the ground 10 of the shaft, the dredging-bucket can usually, as is well known, only be worked within the space 1 2 3 4 of Fig. 8, since a comparatively great clearance must be left between the inner walls of the shaft and the bucket, which 15 moves up and down therein. Even if slopes 5 4 and 6 3 are formed the ground remaining beneath the wall will by its natural resistance prevent the latter sinking, or, at least, the passive earth-pressure will considerably 20 impede this sinking. By providing external spaces or chambers, however, it is possible to detach the ground beneath the brickwork of the shaft by clearing it out with suitable tools or by washing it out with pipes, as indicated by the lines 7 4 and 8 3 in Fig. 8, thus 25 enabling the sinking of the brickwork to be effected. With such an arrangement only the friction on the side walls has to be overcome, while the resistance of the ground (or 30 passive earth-pressure) is avoided. Another advantage consists in the fact that in making a foundation of concrete or the like the same is not only introduced as hitherto usual from inside beneath the wall, whereby a very narrow footing is formed, as in Fig. 9, but by 35 means of the exterior chambers it is possible to so introduce the concrete as to completely fill up the space underneath the wall, as in Fig. 10. In this way a broader footing is obtained and the foundation can be made homogeneous. The shaft may therefore be 40 made of smaller diameter, and by reason of the smaller frictional surface the sinking is

greatly facilitated. The sinking is also effected much easier, as the outer caisson projects about seventy-five to eighty centimeters deeper than the brickwork and acts as a cutting edge in the ground. The outer caisson also acts as a sheet-piling. 45

Having now particularly described my invention, what I claim, and desire to secure by Letters Patent, is— 50

1. Means for sinking shafts for foundations comprising a casing and a structure surrounding said casing, attached thereto, and forming one or more chambers or spaces reaching 55 down to the bottom edge of the casing, so as to facilitate the location and removal from above of obstacles such as boulders, tree-trunks, &c., which may obstruct the sinking of said casing, substantially as set forth. 60

2. Means for sinking shafts for foundations comprising a casing *a*, a caisson, and means for keeping a space between said casing and caisson, reaching down to the bottom edge of 65 the casing, so as to facilitate the location and removal from above of obstacles such as boulders, tree-trunks, &c., which may obstruct the sinking of said casing, substantially as set forth. 70

3. Means for sinking shafts for foundations comprising a casing *a*, a caisson *b*, and distance-pieces *c* for keeping a space between said casing and said caisson *b*, reaching down 75 to the bottom edge of the casing, so as to facilitate the location and removal from above of obstacles such as boulders, tree-trunks, &c., which may obstruct the sinking of said casing, substantially as set forth.

In witness whereof I have hereunto signed 80 my name in the presence of two subscribing witnesses.

ADOLF GOERKE.

Witnesses:

ISAAC BENJAMING,
HERMANN BARTSCH.