

(No Model.)

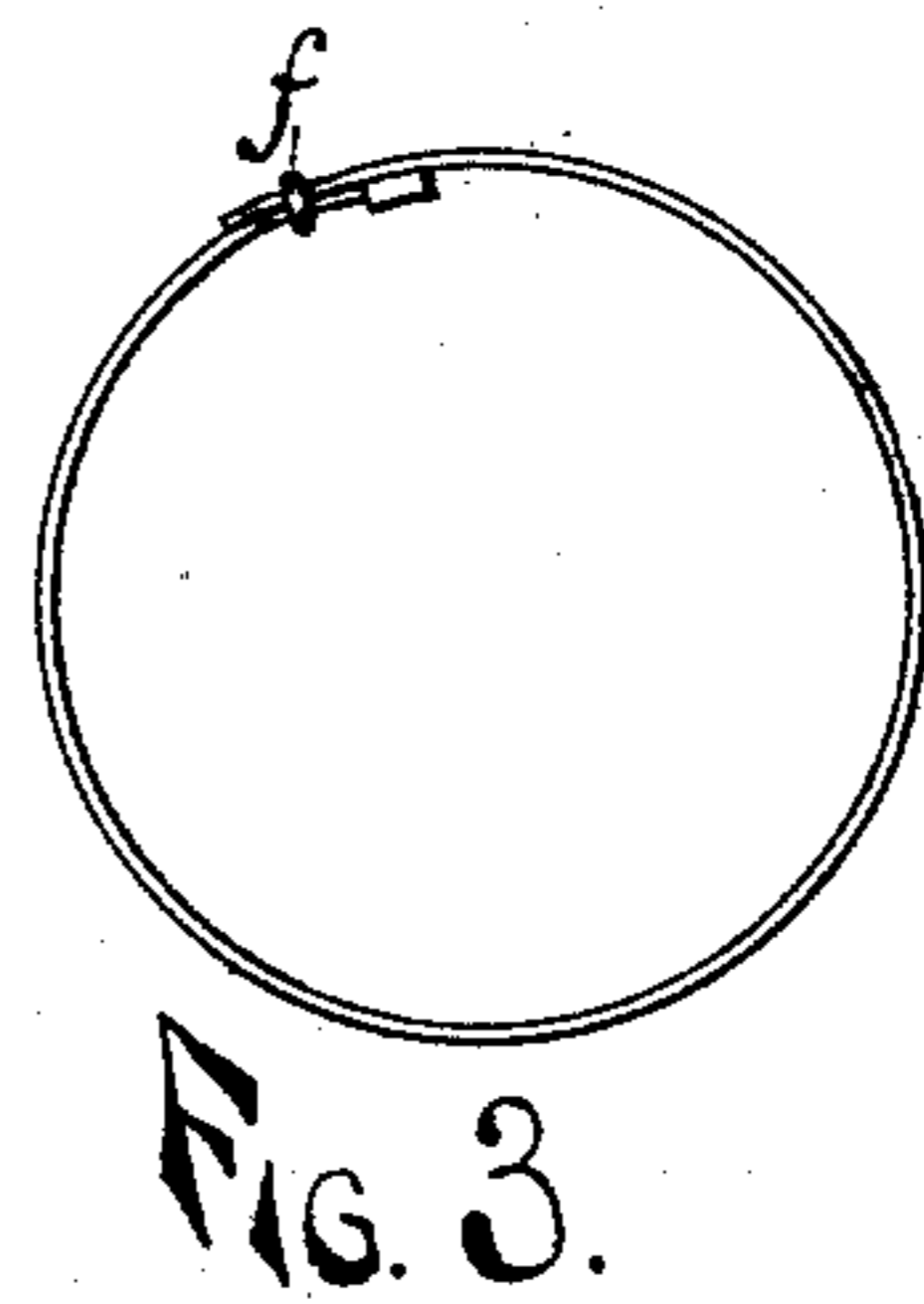
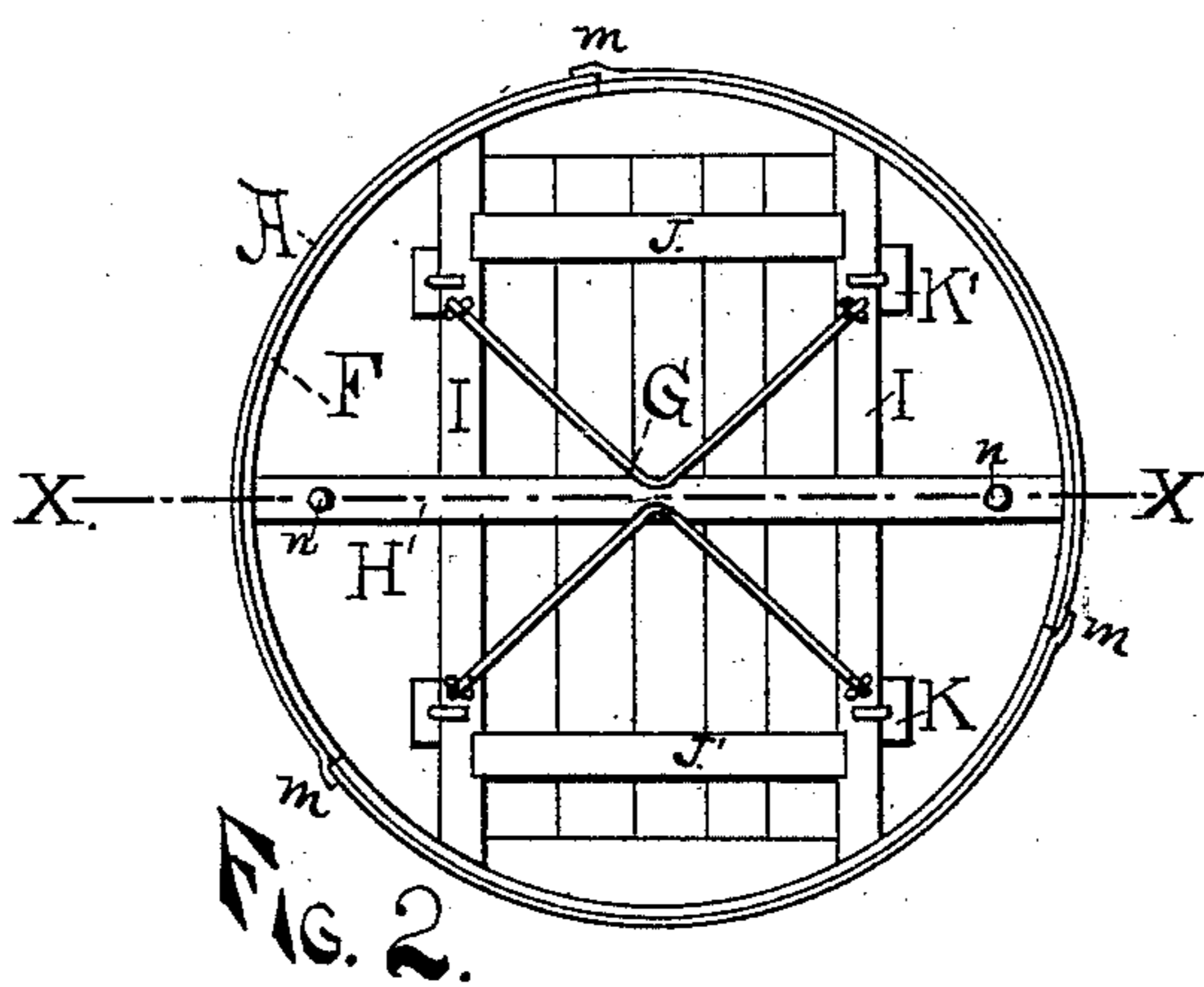
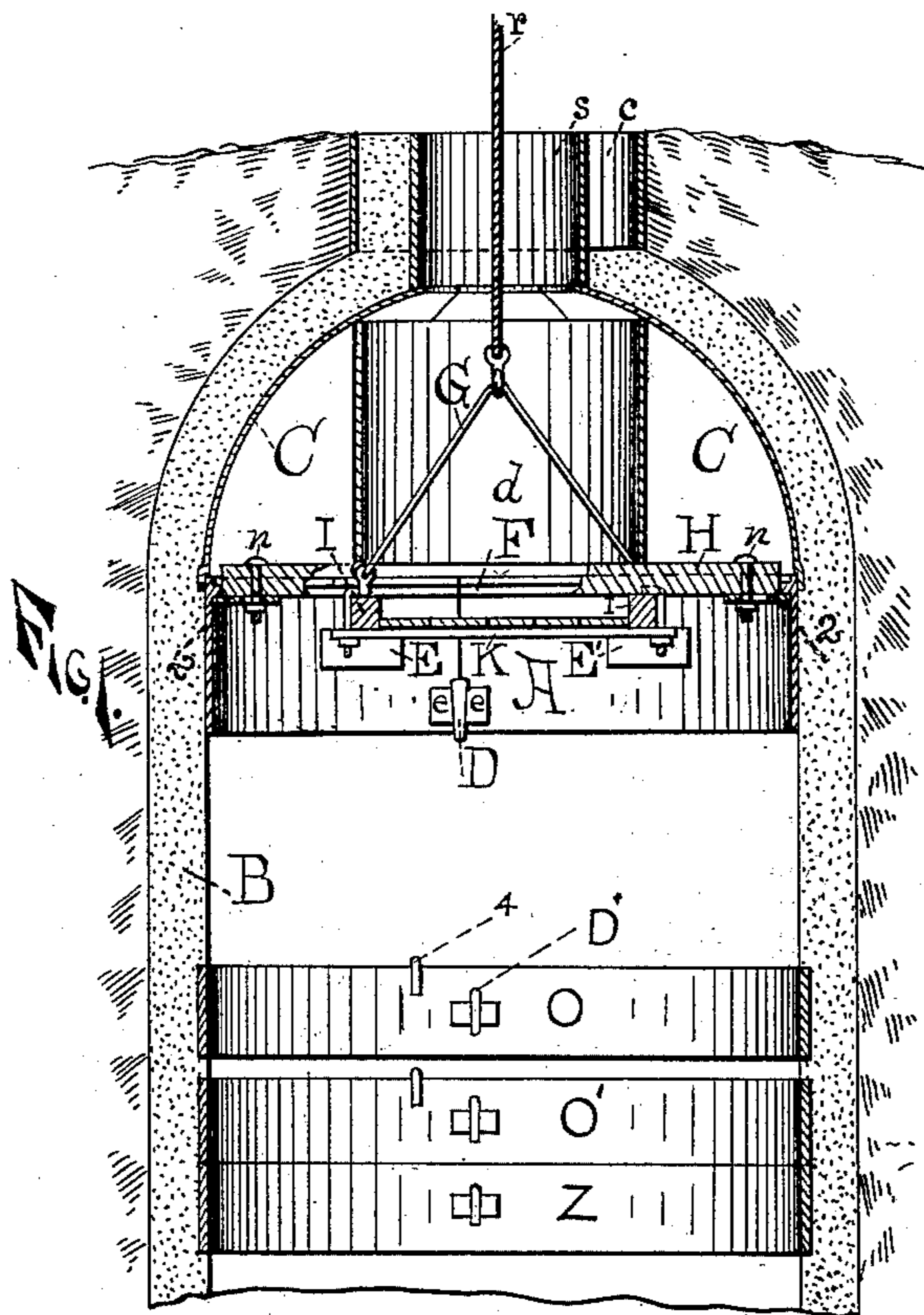
2 Sheets—Sheet 1.

W. H. H. DAVIS.

APPARATUS FOR BUILDING CISTERNS.

No. 371,039.

Patented Oct. 4, 1887.



WITNESSES:
Fred W. Stevens.
Arthur C. Senison.

INVENTOR
William H. H. Davis
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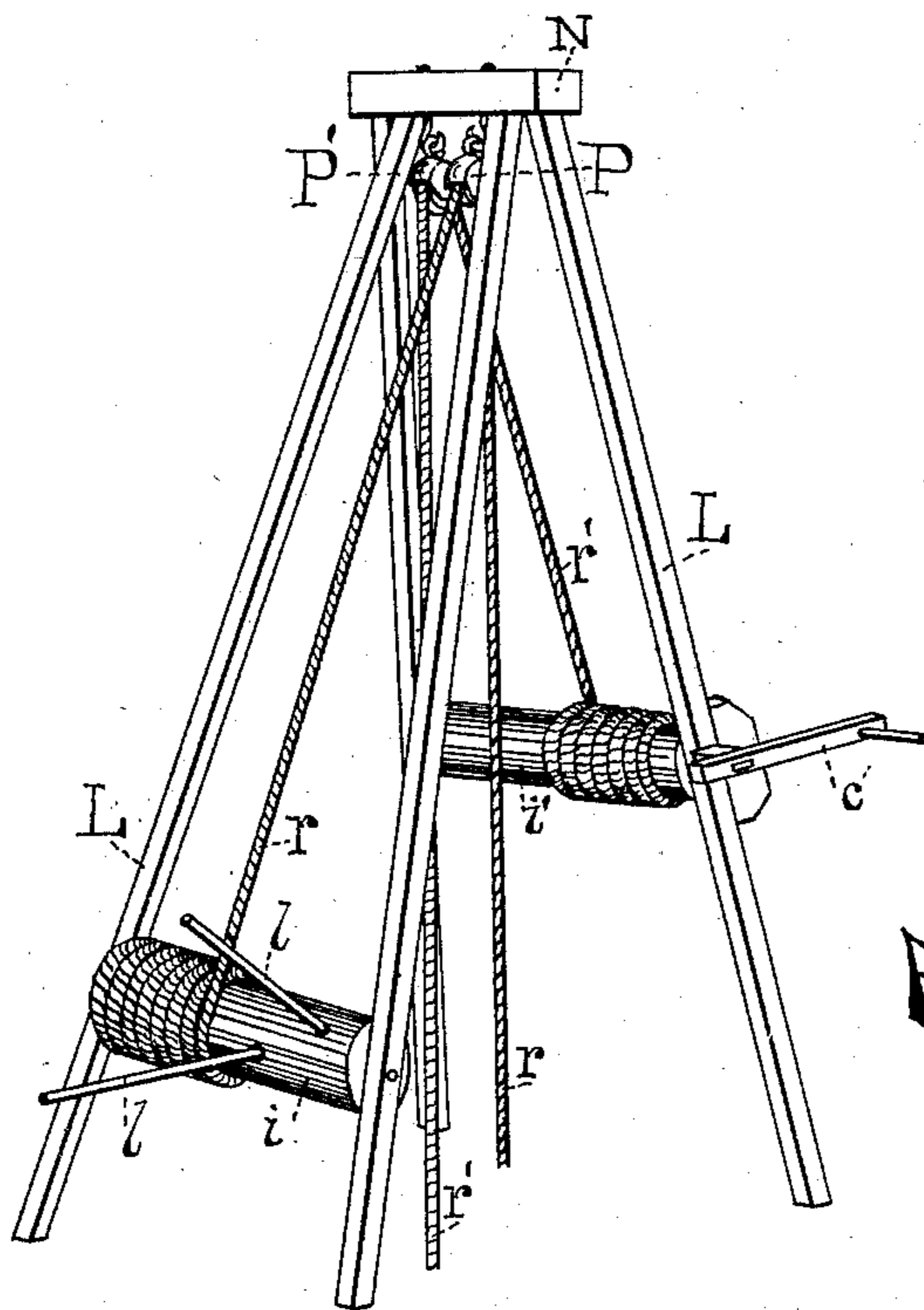


Fig. 5.

Fig. 6.



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UNITED STATES PATENT OFFICE.

WILLIAM H. H. DAVIS, OF OAKFIELD, MICHIGAN.

APPARATUS FOR BUILDING CISTERNS.

SPECIFICATION forming part of Letters Patent No. 371,039, dated October 4, 1887.

Application filed March 10, 1884. Serial No. 123,704. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. H. DAVIS, a citizen of the United States, residing at the township of Oakfield, in the county of Kent and State of Michigan, have invented an Improved Apparatus for Building Cisterns, of which the following is a specification.

In my Patent No. 248,922, November 1, 1881, I describe sections of an outer circular collapsible and expansible curbing and an inner collapsible and expansible core used in cementing a well of ordinary form, and the method there followed is to insert in the well as it is dug the sections of the curbing, to support the earth walls of the well as the digging proceeds. When of sufficient depth, bricks are set below the lowest section of the curbing within a body of closely-fitting staves. After the bricking is completed, the core or inner cylinder is lowered to the top of the brick, the lower section of outer curbing removed, and the space between the earth and the inner core filled with cement; then the inner core is raised, the next section of curbing above removed, and the cementing continued in this manner until the well is completed.

My present invention has for its object the construction of cisterns as well as wells, and although some of the instrumentalities are the same as employed in my said former patent, yet there are material differences in method, instrumentalities, and results produced.

Figure 1 is a vertical sectional view of a cistern containing my invention. Fig. 2 is a plan view of the inside supporting-cylinder and platform used by the operator in building the walls of the cistern; Fig. 3, a plan view of the man-hole cylinder detached; Fig. 4, a cylinder-clip detached; Fig. 5, a perspective view of derrick, windlasses, and supporting-ropes; and Fig. 6, a detail view illustrating the mode of binding together the cylinder ends.

Similar letters refer to similar parts throughout the several views.

The cistern may be excavated in the ordinary manner, and when the earth walls are sufficiently stable to stand without curbing, I commence at the bottom and build the cement wall B between the earth wall on the outer side and the forming-cylinder A, moving cylinder A upward until the wall reaches the

point where the arch meets the perpendicular wall.

The cylinder A A, I make in two or more sections, with joints *m m m*, so constructed that the sections can be taken apart when desired. Within the cylinder A A is the strengthening-rib F, made of five-eighths square iron or other suitable material, which extends entirely around the inner side of cylinder A.

Within the cylinder A is the frame composed of side pieces, I I, and end pieces, J J. Beneath the side pieces, I I, are two lugs, E E', attached to cylinder A A, which support I I after the bail is detached.

K K are two cross-pieces, upon which are placed boards (shown in Fig. 2) for the support of the operator in building the cistern.

To the side pieces, I I, are attached the bails G, having a rope, *r*, connected with a windlass, by means of which the platform and the cylinder A are raised or lowered.

H is a cross-piece placed within the cylinder, and has at either end an adjustable extension, 2, held to the cross-piece by a bolt, *n*, fitting into a slot, so that 2 may be pressed against the inner side of the cylinder in order to hold the cylinder in place. In case of small cylinders, the piece H is not necessary, and in all cases, before commencing to build the arch, H should be detached and removed from the cistern as well as the bails G.

Near the bottom of the cylinder A, and in the inside, are two metal projections, *e e*, so placed as to form a groove between them, into which fits the key D. The edges of the sections of the cylinder lap each other a short distance, as shown in Fig. 2, and by inserting key D into said groove it spreads the sections slightly apart, acting as a wedge, and thereby firmly holding the sections of the cylinder together. The rib F is riveted to the inside of the sections A A, and so placed that the end of the rib on one section passes beneath the end of a rib on the next section, and a bolt passes through the ends of the ribs, thereby bolting the ribs and attaching the sections.

When the perpendicular wall of the cistern is completed, the upper edge of the cylinder A is at the point where the arch begins. The supporting-cylinder *d* is now placed upon the cross-pieces I I, and the former C, which is in

sections, put in position, the lower end of the former resting on the top of cylinder A A, and the top of the former C C resting on the top of the supporting-cylinder *d*. The arch or dome is then built of stone and cement, or any other suitable material, the bottom of the dome resting on the top of the cement wall of the cistern. When the dome reaches the top of the former C, the man-hole cylinder S is placed in the position shown in Fig. 1 and the cement packed in against it, and then the outer cylinder, *c*, is placed in the position also shown in Fig. 1, and the space between S and C filled with cement, forming a short cement cylinder extending from the dome to the surface of the ground, which quickly hardens, when the cylinders S and C are removed and cylinder *d* contracted and taken out of the man-hole. Said cylinder *d* can be easily contracted by removing clip *f* and coiling the cylinder up. The arch-support C and cylinder A are also taken apart, and they, with the frame, are removed in the same way, and the cistern is completed.

Cylinders S, *d*, and C are made in the form shown by Fig. 3, so that the edges lap by each other, and they are attached by means of a clip, Fig. 4. This enables the user to expand or contract them, so as to readily remove them when the cement has hardened so as to no longer need support.

In building a cistern or well I use two windlasses in combination. One, *i*, around which rope *r* is wound, serves to raise and lower the platform and cylinder A. The rope, being attached to the bails G, passes upward and over pulley P and down, and is attached to the windlass. This is operated entirely independently of the devices for lowering cement or lifting the earth excavated. The latter device is shown by rope *r'*, pulley P', and windlass *i'*. Both devices are supported by the same derrick, L L N. By this arrangement the platform and forming-cylinder can be held in any desired position in the cistern or well and raised and lowered without in any manner interfering with the working of the other windlass and its attachments.

It not unfrequently happens that the earth is so gravelly and loose that the earth will readily cave in if the well or cistern is excavated to any considerable depth without curbing. In such cases I use curbing-cylinders O O', excavate to the depth of one cylinder into the gravel, then insert a cylinder, O, and fill the space between this cylinder and the earth wall with cement, and, leaving the cylinder O in place, I excavate a little more than the length of another cylinder, O'. I insert another cylinder so as to leave a small space between the lower end of O and the top of O', so as to allow the space between O' and the earth wall to be filled with cement, and in this way I proceed until I have passed the gravelly or loose earth. I thus make my cement wall extend downward, and save the

expense of curbing, inasmuch as the cement wall acts both as a curbing and a permanent wall for the cistern or well. As fast as the cement hardens and sets, the cylinders may be removed.

In some cases with wells and cisterns I find that water percolates through the ground and injures the cement wall. In such cases I place a hoop or cylinder, Q, outside of the forming-cylinder A and lock it by a clip similar to clip *t* in Fig. 4, and then pack the cement between Q and the earth wall, and continue adding other cylinders and filling the space between these outer cylinders and the earth wall until the water is cemented out. These outside cylinders are large enough to allow the forming-cylinder A to pass within them, and they are left in position until the cement between the earth wall and them has hardened and set, when they may be removed. It may be necessary to use but few of these supporting-cylinders; but in some cases it may be necessary to nearly fill the well with them, as the surface-water, percolating through the ground and gathering between the cement wall and the earth wall, causes great pressure, and is liable to destroy the cement wall unless the cement wall is protected until it shall have hardened and set.

The two particular processes just described are not claimed in this application, but may be made the subjects of separate applications.

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

1. The forming-cylinder A, built in sections and provided with projections *e*, placed to form a groove between them, in combination with the key D, placed in said groove, whereby said key spreads the sections slightly apart and acts as a wedge to firmly hold the sections together, substantially as described.

2. The inside movable cylinder A, constructed in two or more sections joined together at *m m m*, so as to form a continuous cylinder when in use in the building of the cement wall, and which is detachable and formed in sections for the purpose of removing the same from the cistern.

3. In combination with a cylinder having lapping edges, the clip *f* for binding the said edges together, substantially as described.

4. In combination with the forming-cylinder A and frame I, supporting-cylinder *d*, the dome-supporter C C, the cylinder S, and the upper outer forming-cylinder, *c*, substantially as and for the purpose described.

5. In combination with the forming-cylinder A and supporting-cylinder *d*, dome-supporter C C and frame I, substantially as described.

WILLIAM H. H. DAVIS.

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