

No. 803,484.

PATENTED OCT. 31, 1905.

D. HICKOX & C. KILLEFER.
APPARATUS FOR SINKING WELLS.

APPLICATION FILED OCT. 7, 1904.

2 SHEETS—SHEET 1.

Fig. 3

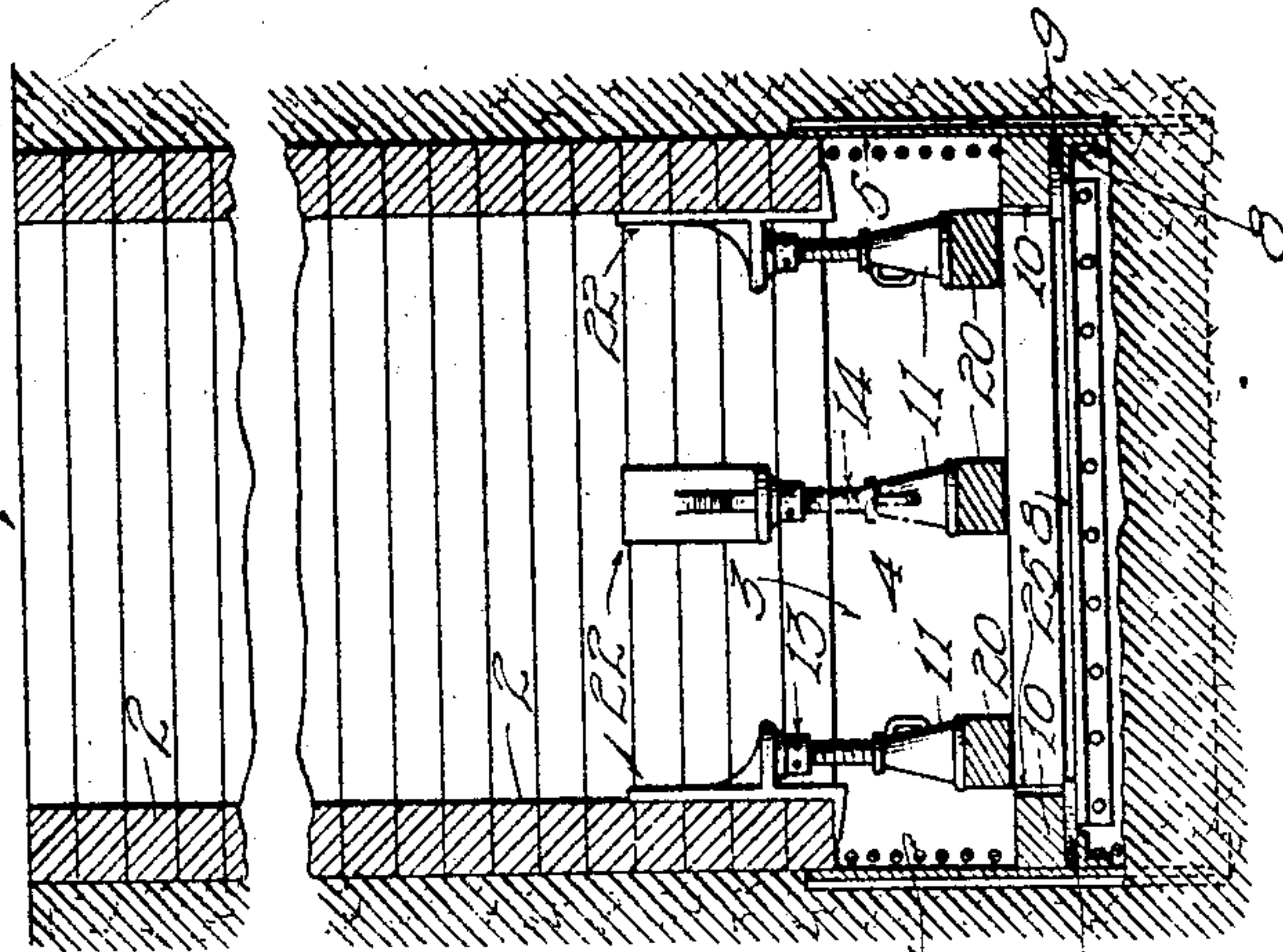


Fig. 2

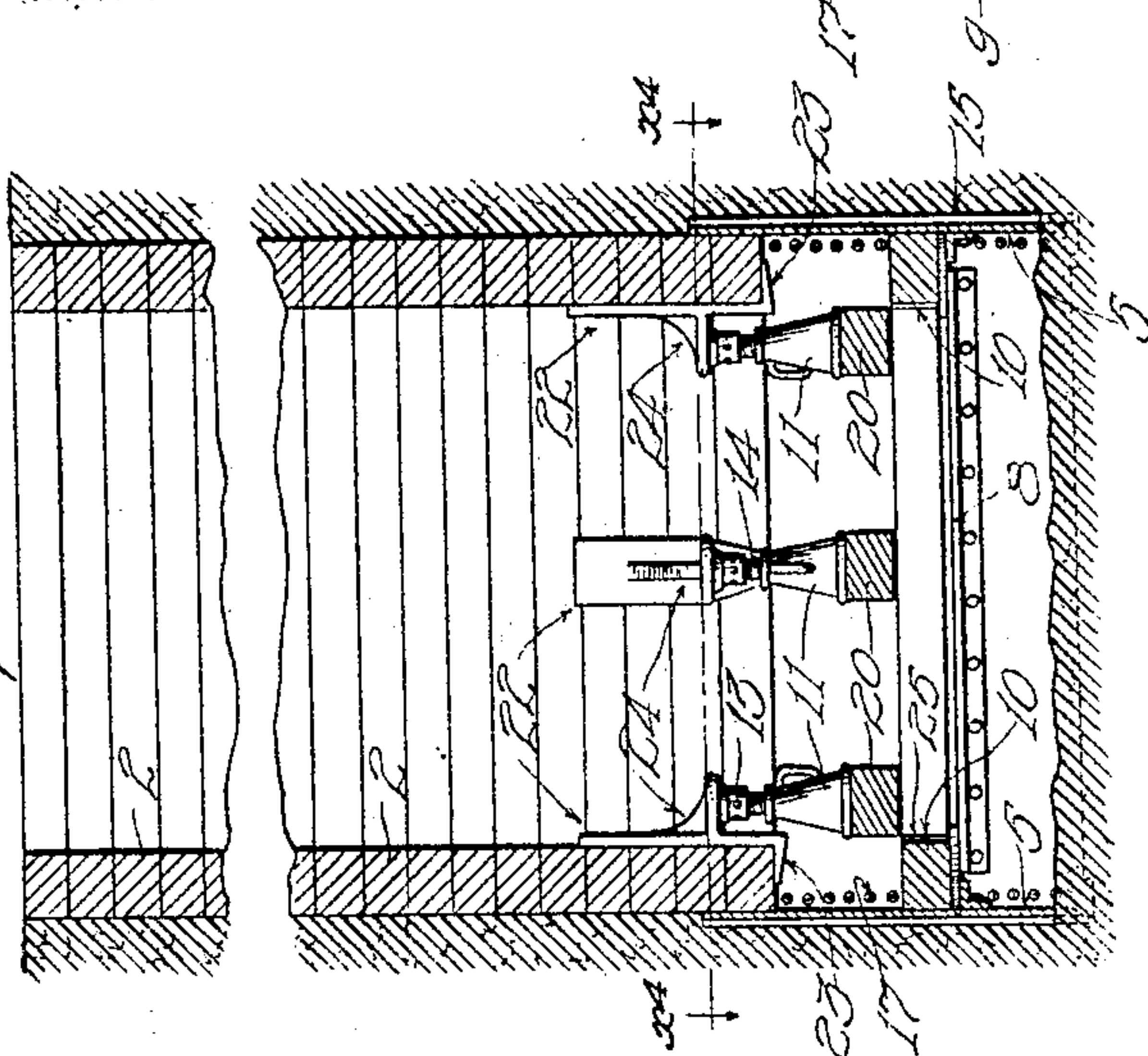
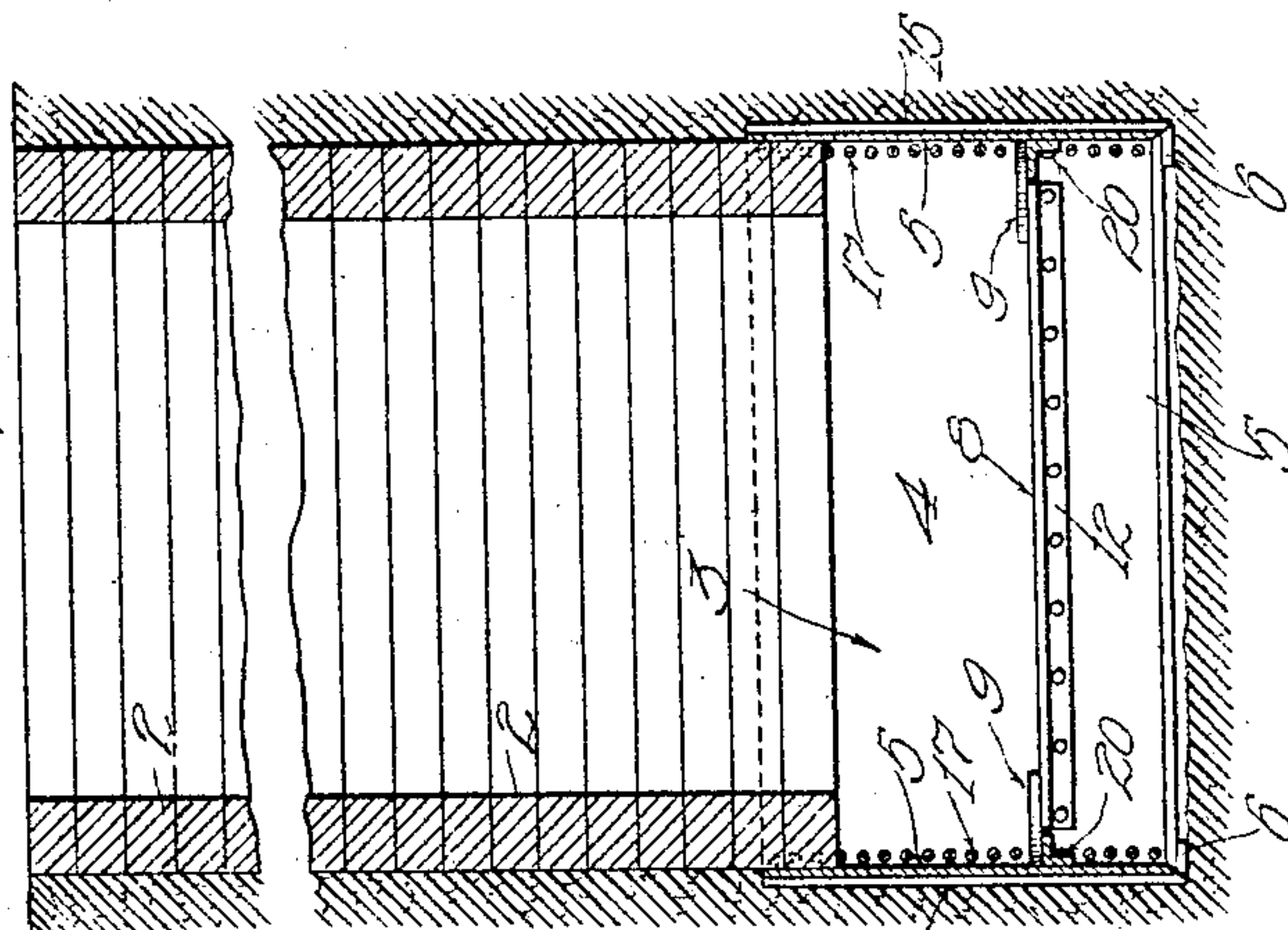


Fig. 1



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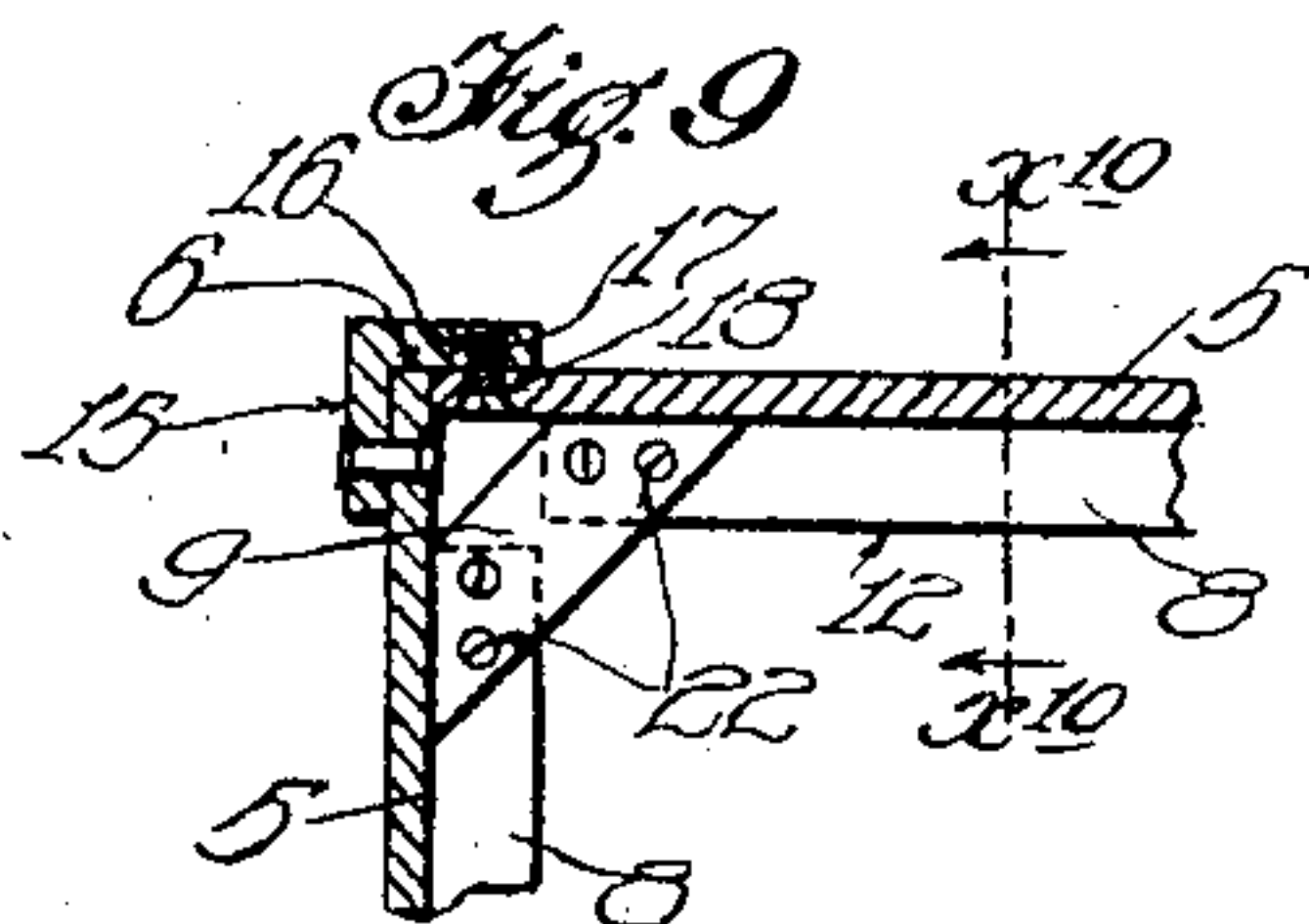
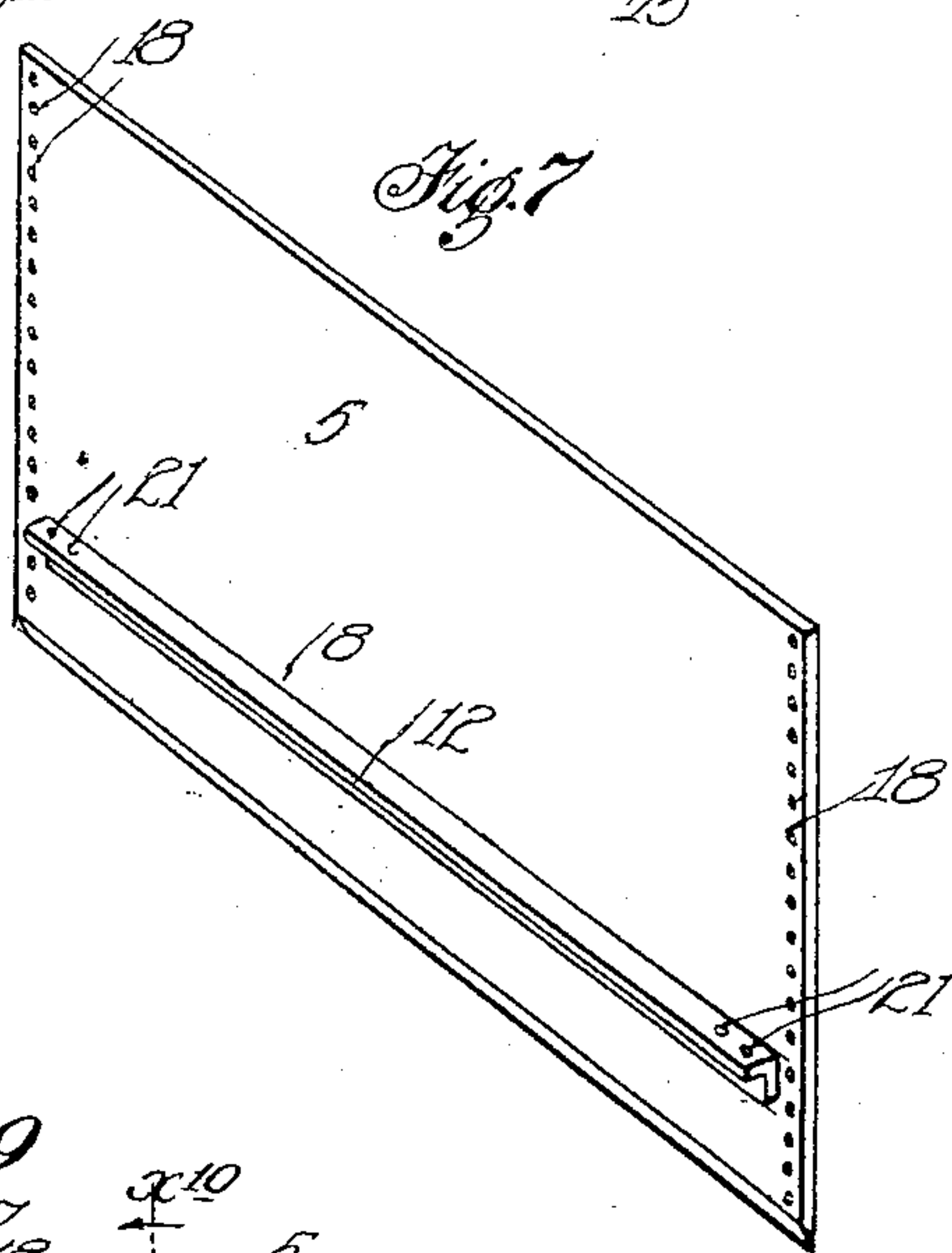
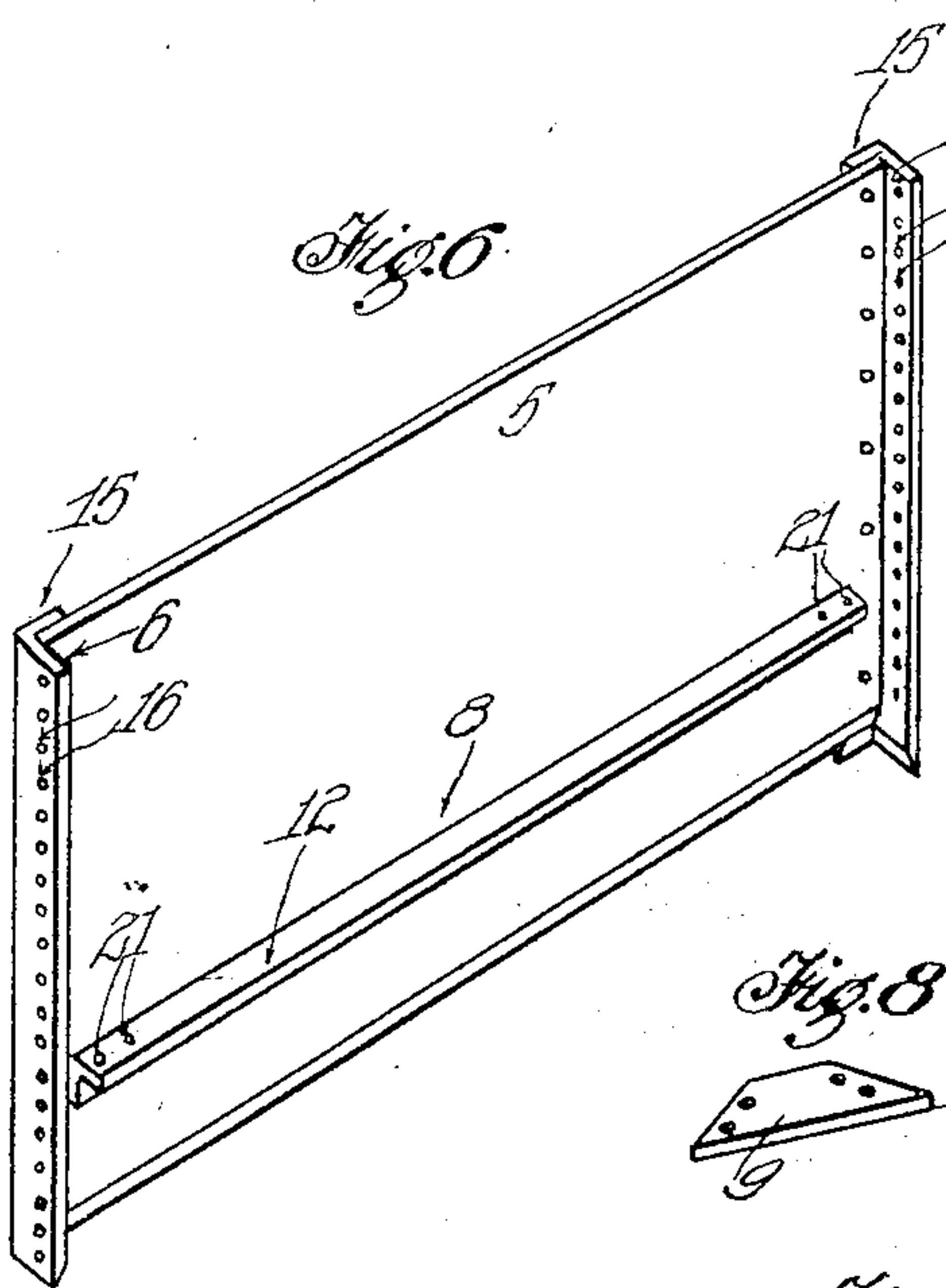
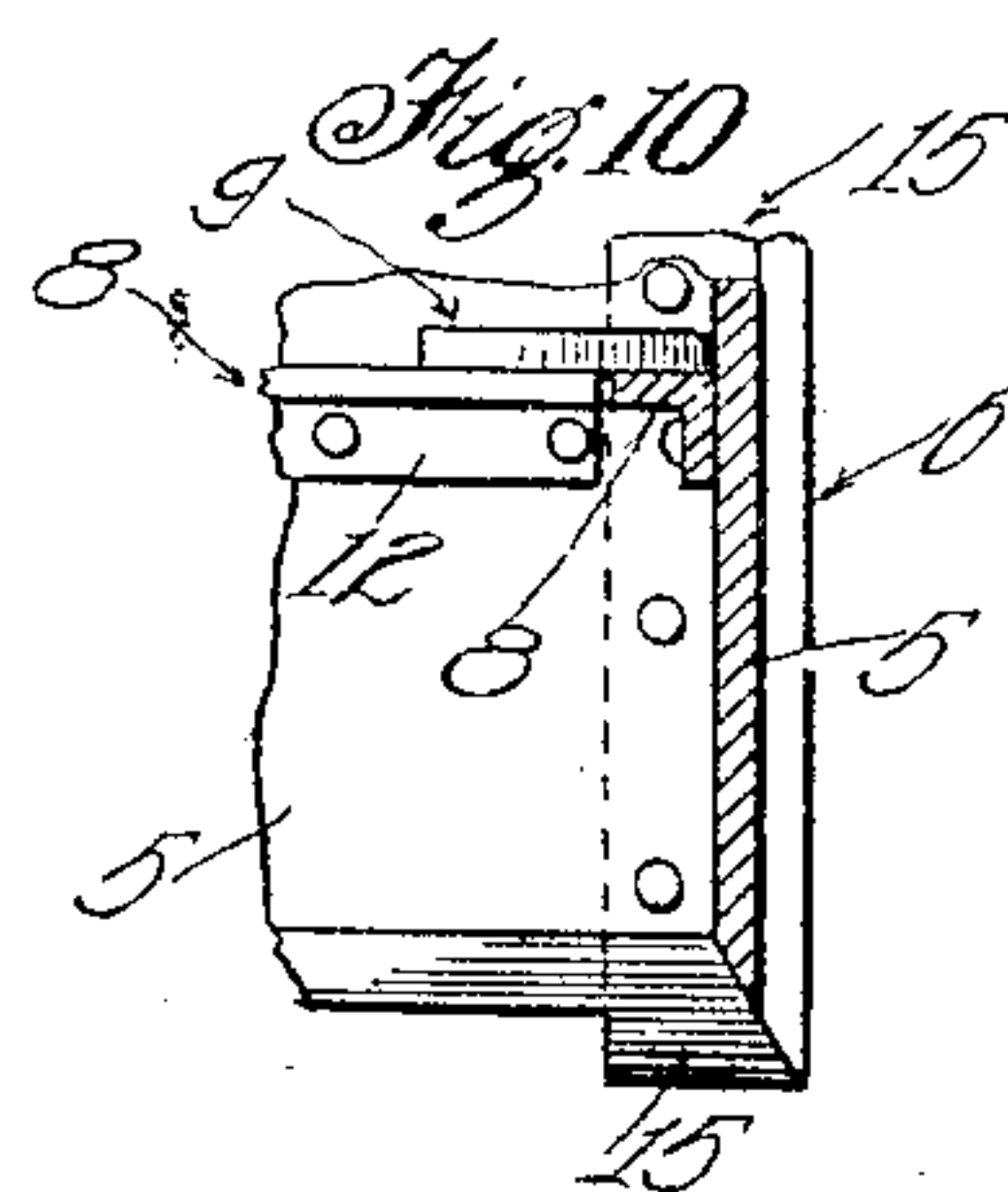
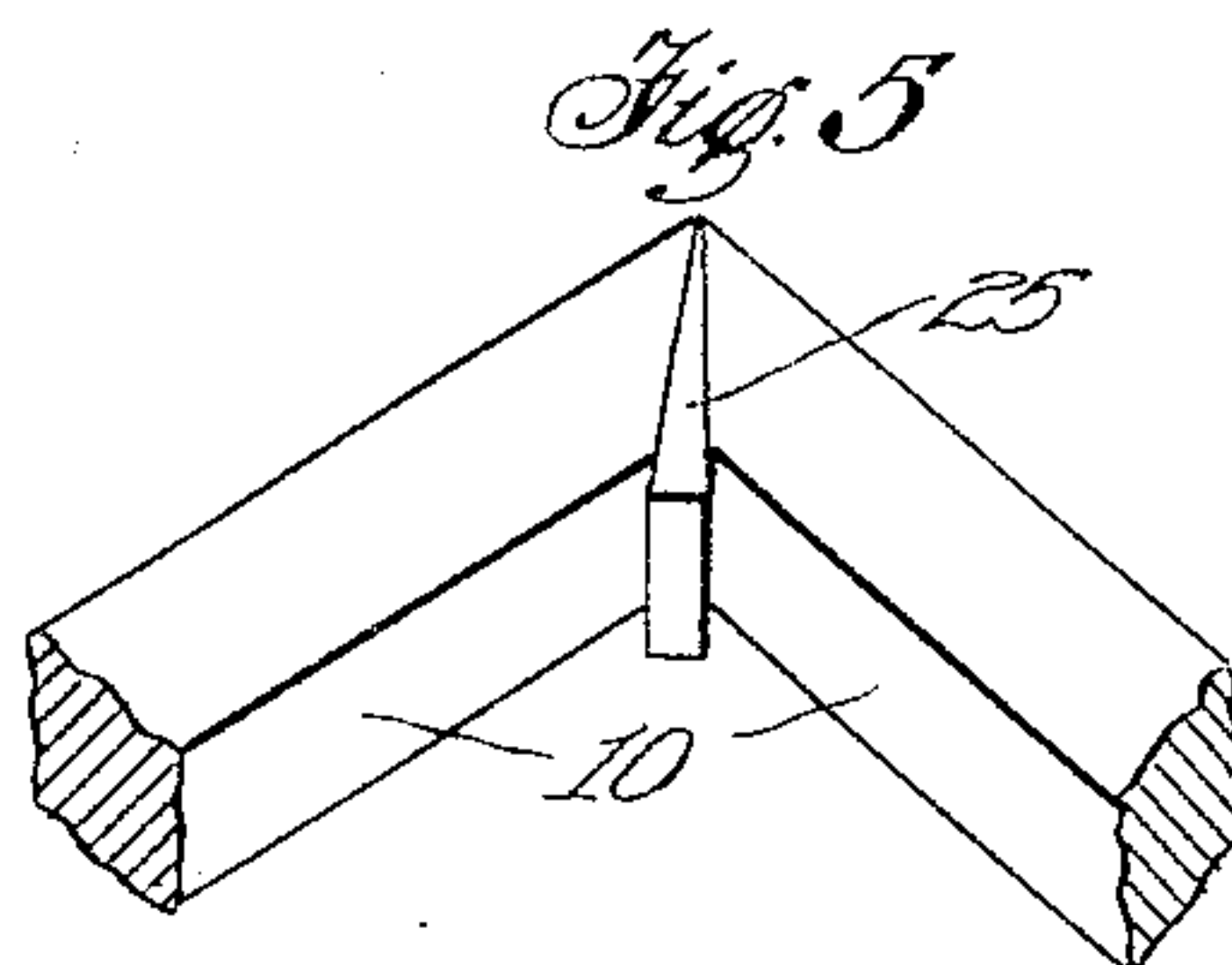
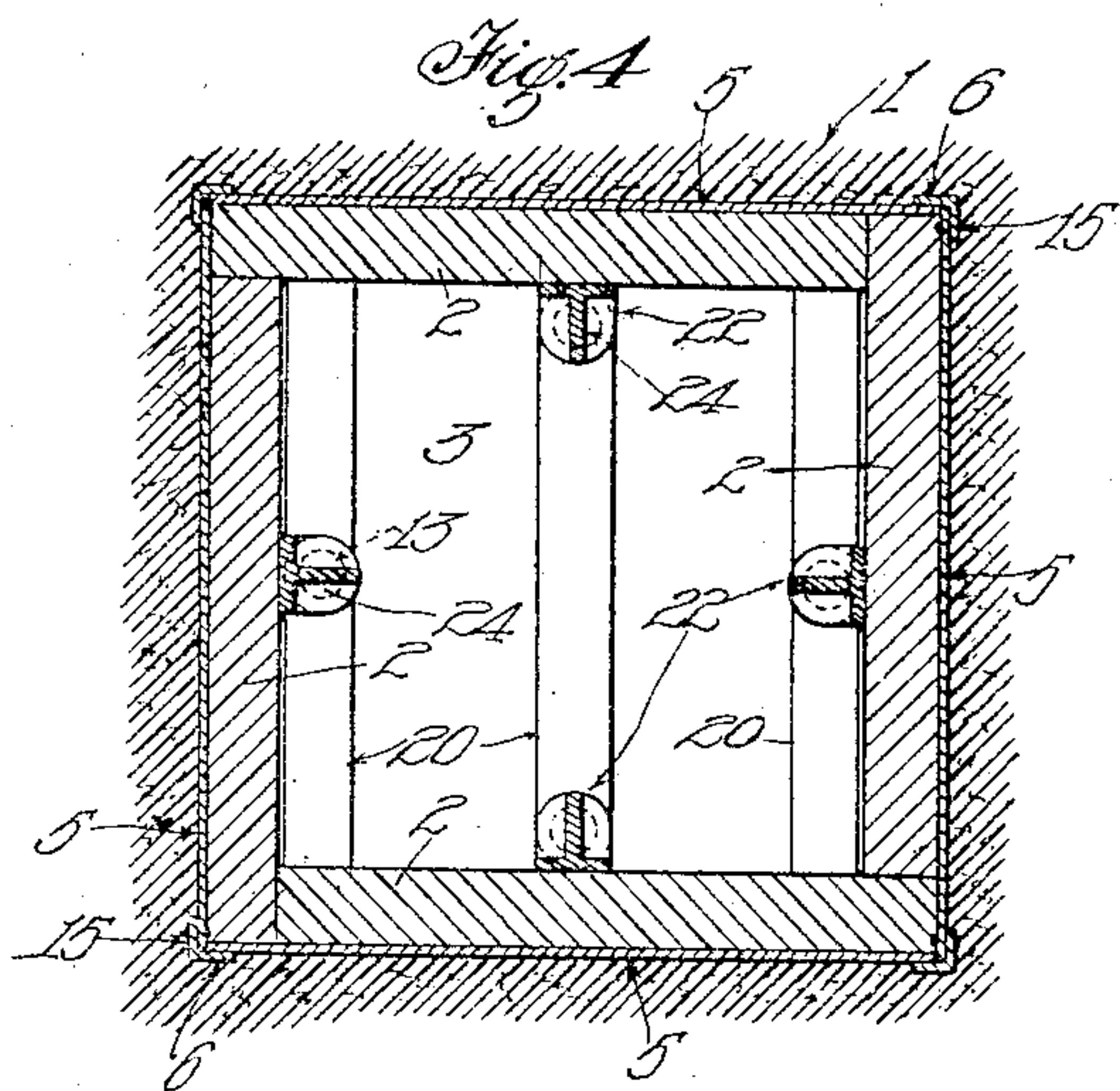
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

DORY HICKOX, OF GARDENA, AND CHARLES KILLEFER, OF LOS ANGELES, CALIFORNIA.

APPARATUS FOR SINKING WELLS.

No. 803,484.

Specification of Letters Patent.

Patented Oct. 31, 1905.

Application filed October 7, 1904. Serial No. 227,608.

To all whom it may concern:

Be it known that we, DORY HICKOX, residing at Gardena, and CHARLES KILLEFER, residing at Los Angeles, in the county of Los Angeles and State of California, citizens of the United States, have invented new and useful Improvements in Apparatus for Sinking Wells, of which the following is a specification.

This invention relates to an improved apparatus particularly adapted for sinking wells of large diameter.

The apparatus may be used for sinking wells directly from the surface of the ground; but it is especially adapted for use in sinking wells after a preliminary well structure has been formed by the usual means now used for wells of this character.

An object of the invention is to enable such wells to be sunk with great economy and rapidity.

A further object of the invention is to provide an apparatus that can be conveniently used to deepen wells of large dimensions which are already in place.

As a preliminary to the operation of this apparatus the well may be assumed to have been sunk to a certain distance by the ordinary means, the well cavity or hole being lined with the usual cribbing.

The invention comprises a shell which is adapted to be inserted or constructed in the well-cavity beneath the cribbing and to be progressively lowered, by means hereinafter described, so as to protect or shield the space to be excavated and prevent falling or squeezing of extraneous material into such space. Said shell is constructed to closely embrace the lower end of the crib, so as to prevent penetration or intrusion of material between the crib and shell and also to guide the shell in its downward movement. The shell is lowered by driving means, using the overlying crib as an abutment, and as the shell progressively descends cribbing is inserted within the same and below the original cribbing to continue the latter downwardly.

The accompanying drawings illustrate the invention.

Figure 1 is a vertical section of a well, showing the initial step in the operation of this apparatus, the shell having been inserted in place. Fig. 2 is a similar view showing the lowering-jacks in position. Fig. 3 is a

similar view showing the lowering-jacks as having been operated to lower the shell. Fig. 4 is a horizontal section on the line $x^4 x^4$ in Fig. 2. Fig. 5 is a perspective showing a corner of the timber structure to receive the pressure from the jacks. Figs. 6 and 7 are perspective views showing two adjacent sides of the knockdown shell structure. Fig. 8 is a perspective of a corner junction-piece of such sides. Fig. 9 is a horizontal section of a corner of the shell structure. Fig. 10 is a vertical section on line $x^{10} x^{10}$ in Fig. 9.

1 designates a well-cavity which is excavated in the usual manner and is provided with the usual cribbing or timber lining 2. This cavity having been excavated to certain depth and it being desired to sink the well deeper with the use of this apparatus, the ground is excavated below that depth, or the cribbing is removed, as shown at 3, for a sufficient distance to enable the putting in place of the shell or casing hereinafter described. Said shell (indicated in a general way at 4) is preferably of larger diameter than the cribwork 2, and it is therefore desirable to make it of a knockdown or detachable structure, so that it may be passed down through the well-cavity in sections, which are afterward attached together to form the shell. Each of said sections in case of a rectangular well comprises a wall or side plate 5, two of which have vertical flanges 6 formed or attached at each end thereof, said flange and the ends of the other plate being perforated for the reception of bolts and screws, so that when the four sections are placed end to end in rectangular order, each end of the flanged section contacting with and secured to the adjacent end portions of an unflanged section, they will form a box-like frame or shell.

The lower edge of each plate 5 may be sharpened to serve as a cutting-shoe, and means are provided for driving and forcing said shell downwardly, said means comprising jacks or other suitable extensible means adapted to engage the bottom of the crib 2 and means on the shell to receive the pressure from said jacks. For this purpose each shell-plate 5 may have a horizontal flange 8 on its inner face, the flange 8 of adjacent plates 5 being connected by corner-braces 9. (See Fig. 8.)

Timbers (indicated at 10) are placed across

between said corner-braces to form bearings for the jacks. (See Fig. 2.) Suitable devices may be employed to effect a bearing on the crib above the lowermost point thereof—for example, brackets or crabs, such as indicated at 22 in Fig. 2, may be provided, having claws or fins 23, adapted for insertion below the cribbing, the body of the crab or bracket extending against the inner face of the cribbing and being provided with projections 24 to serve as an abutment for the upper end of the jack. The lower end of the jack in this case may be supported on a cross-piece of timber 20, stretched across over the timbers 10 aforesaid.

The jacks (indicated at 11) may be of any suitable construction and are inserted between the timbers 20 aforesaid and the crabs or brackets 22. Said jacks are shown as having capstan-heads 13 and screws 14, whereby the operation of such heads will cause extension of the jacks between the cribwork and the timbers 10. The cribwork on account of the frictional resistance of the adjacent earth will act as a stationary abutment, with the result that the extension of the jacks will force or drive the shell downwardly into the ground. (See Fig. 3.) The earth within the shell may then be dug out to about the level of the bottom of the shell without any liability of caving in or falling in of the earth at the sides. The jacks 11 having then been removed, a layer of timbers is placed below the bottom of the crib and secured, if necessary, to the overlying crib.

The operation above described is repeated until the well reaches the desired depth, the casing or shell 4 being continually guided in its downward movement by the engagement of its upper portion with the end of the crib 2 or the lowermost layers of timbers 10, forming when the well is complete the lining therefor. When the well is completed, the shell or shoe above described may be left in place at the bottom thereof.

The preferred construction of the shell 4 is shown in detail in Figs. 4 to 9, each plate 5 having an angle-iron 15 riveted at each end thereof, the projecting angles of said angle-irons forming the vertical flanges 6 aforesaid, the said flanges being provided with tapped perforations 16 to receive and engage the screws 17, (see Fig. 9,) which pass through perforations 18 in the end portions of the adjacent plates to engage said tapped perforations.

The lower edge of each plate 5 is preferably sharpened, and the lower ends of the angle-irons 15 are similarly sharpened, the sharpened portions of the latter continuing downwardly from the sharpened portions of the plates 5, so that the four angle-irons at the corners project slightly below the shell. The main object of this is to do away with any

blunt edges that would resist downward movement of the shell, and incidentally its projections, for the advantage of piloting or guiding the shell to some extent in its downward movement.

The horizontal flange 8 is provided on the plate 5 by riveting or otherwise attaching an angle-iron 12 to said plate, the projecting angle of said angle-iron forming the flange 8 aforesaid. Perforations 21 are formed on said flanges 8, which are tapped to receive and engage screws 22, passing through the angle plates or pieces 9, the latter being perforated, as at 23, to receive said screws.

The arrangement of the timbers 10 is indicated in Figs. 4 and 5, said timbers being beveled at their ends in such manner as to leave between them a tapering space adapted for reception of a wedge block or key 25 at each corner. On inserting and driving said wedge-block home the timbers will be tightly jammed in place.

The timbers which are placed between the jacks and form a downward extension of the crib 2 may be arranged and secured in place in the same manner as the cribbing overlying the same.

What we claim is—

1. An apparatus for sinking wells comprising a shell formed of detachable side plates, each provided with a projection, means for fastening said detachable side plates together and members resting on said projections for receiving a driving thrust.

2. The combination with a well-crib, of a shell adapted to fit around the lower end of said crib, and formed of a plurality of side plates provided with projections, fastening means detachably securing said side plates together, members resting on said projections for receiving a downward thrust and driving means engaging with the thrust-receiving means and with the well-crib.

3. A combined shoe and shell for well-sinking formed of a plurality of flanged and unflanged sections, each having a projection on its inner wall, and screws attaching the unflanged plates to the flanges of the other plates.

4. A well-sinking shoe and shell comprising four plates, each having a horizontal flange, two of the plates having vertical flanges at each end and two being unflanged, screws connecting the unflanged plates to the vertical flanges of adjacent plates, and corner-braces connecting the horizontal flanges of adjacent plates.

5. A well-sinking shoe and shell comprising four plates each having a horizontal flange, two of the plates having vertical flanges at each end and two being unflanged, screws connecting the unflanged plates to the vertical flanges of adjacent plates, corner-braces connecting the horizontal flanges of adjacent

plates, timbers resting on said corner-pieces, and keys in the corners between said timbers wedging and locking said timbers in place.

5 6. A combined shoe and shell for well-sinking formed of a plurality of sections mounted with flanges for fastening said sections together, and with projections on the inner walls of the sections.

10 7. A combined shoe and shell for well-sinking formed of a plurality of flanged sections, a plurality of sections detachably secured to

the flanges of the aforesaid sections, said shoe and shell being provided with internal projections to receive downward thrust.

In testimony whereof we have hereunto set 15
our hands, at Los Angeles, California, this
26th day of September, 1904.

DORY HICKOX.

CHARLES KILLEFER.

In presence of—

FREDERICK L. LYON,

GEORGE T. HACKLEY.