

(No Model.)

2 Sheets—Sheet 1.

J. A. DUBBS.
SINKING SHAFTS.

No. 543,230.

Patented July 23, 1895.

FIG. 1.

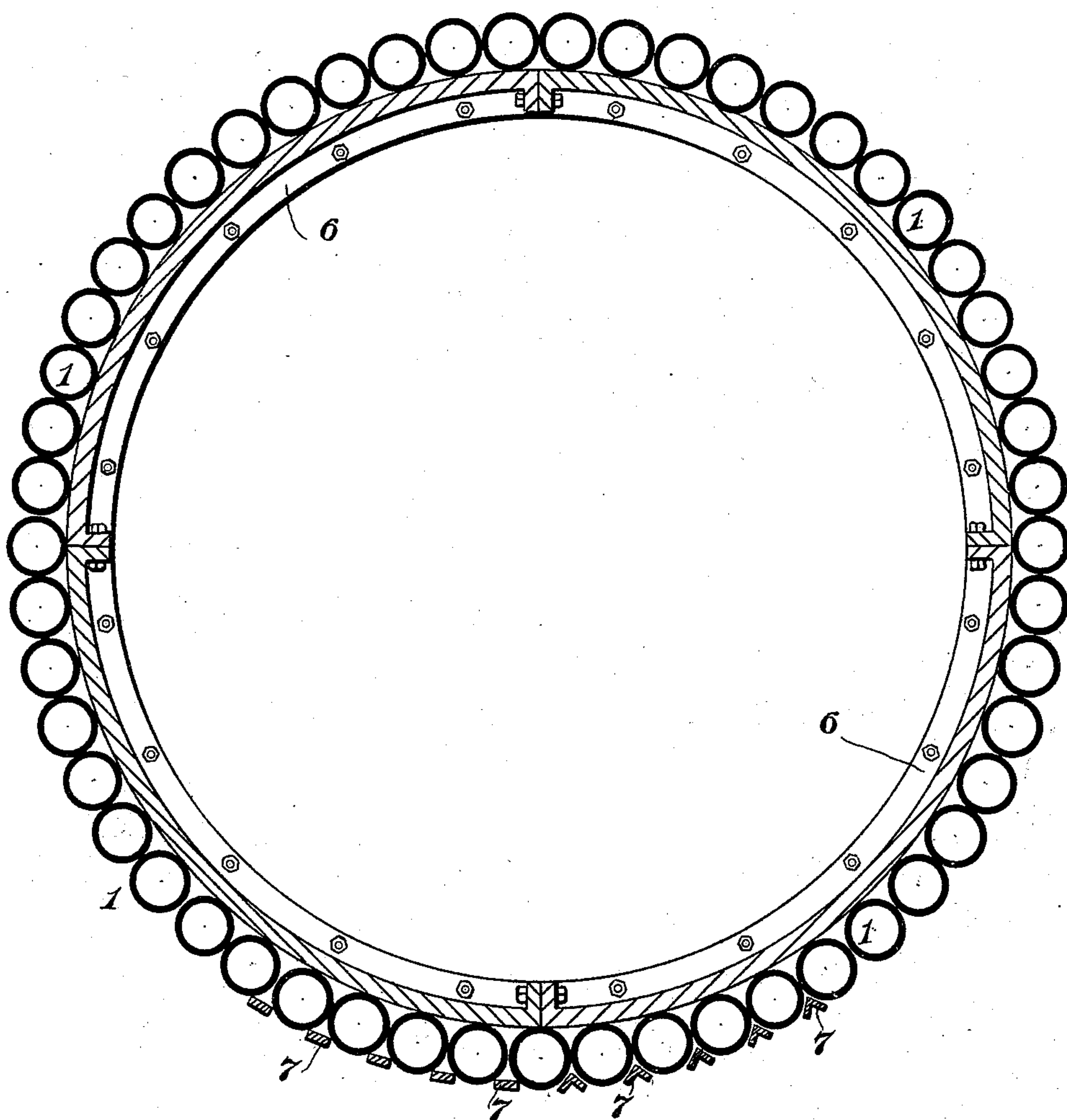
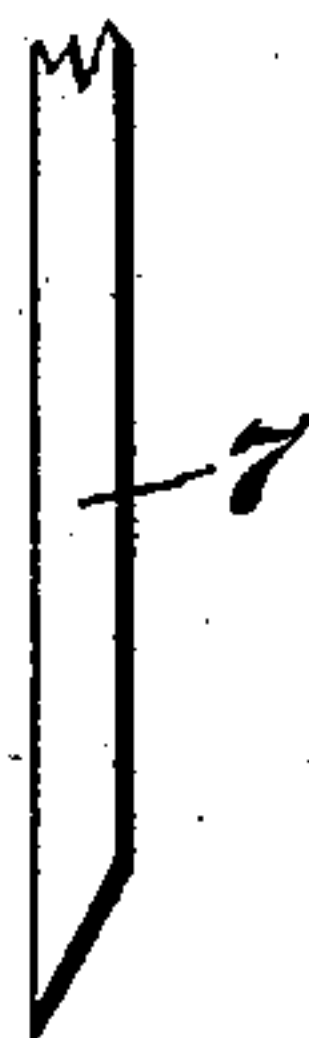


FIG. 4



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Att'y.

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2 Sheets—Sheet 2.

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FIG. 2.

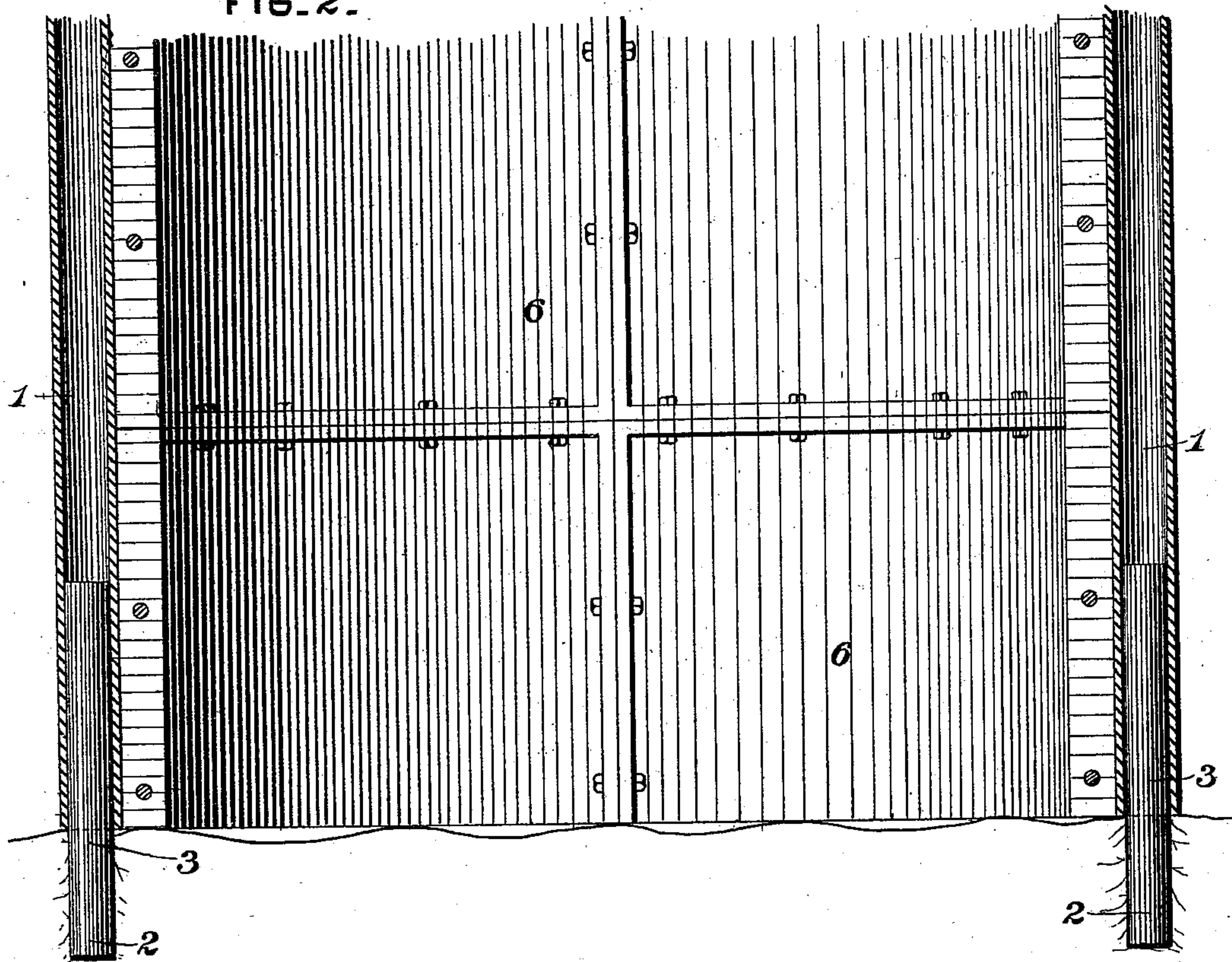
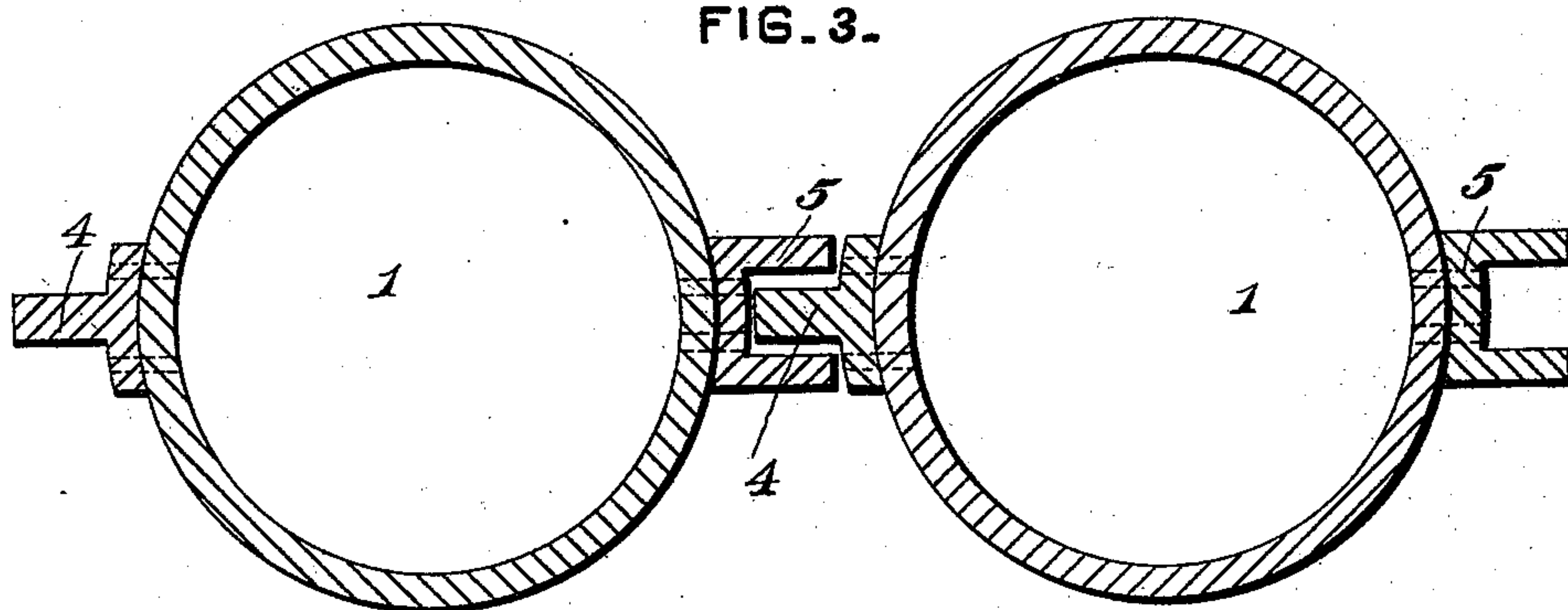


FIG. 3.



WITNESSES:

Samuel S. Wolcott
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INVENTOR,

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UNITED STATES PATENT OFFICE.

JESSE A. DUBBS, OF PITTSBURG, ASSIGNOR OF ONE-FOURTH TO CHARLES T. RUSSELL, OF ALLEGHENY, PENNSYLVANIA.

SINKING SHAFTS.

SPECIFICATION forming part of Letters Patent No. 543,230, dated July 23, 1895.

Application filed December 21, 1893. Renewed December 20, 1894. Serial No. 532,506. (No model.)

To all whom it may concern:

Be it known that I, JESSE A. DUBBS, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Sinking Shafts, of which improvements the following is a specification.

The invention described herein relates to certain improvements in sinking caissons for shafts in mining, for bridge-piers, &c.

In some parts of the country mineral deposits are found overlaid by beds of quicksand, clay, &c., the quicksand being of such character as to render it impossible to sink a caisson through the same by any of the methods hitherto known in the art—such, for example, as rendering the quicksand solid by freezing or the injection of hydraulic cement thereinto. It has also been attempted to sink the caisson by providing a circle of piles driven through the clay and quicksand to the bed-rock; but, on account of the depth of the quicksand—i. e., one hundred and fifty feet, more or less—the lower ends of the piles become deflected entirely out of line, especially the lower ends thereof when the inclosed material is removed, as such lower ends are unsupported as against lateral movement.

The object of this invention is to provide for the sinking of a series of hollow piles or casings down through the clay and quicksand to the bed-rock, and then securing the lower ends in proper position.

In general terms the invention consists in the construction and combination substantially as hereinafter described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a top plan view showing the manner of sinking a caisson according to my invention. Fig. 2 is a sectional elevation of the same, and Figs. 3 and 4 illustrate details as to the construction of the piles or casings.

In the practice of my invention a series of casings or hollow piles 1 is forced down through the superincumbent clay and quicksand to the strata of rock, and the interior of the casings are then cleaned, all earthy matter being removed. A drill—such, for example as is employed in drilling oil-wells—is

now passed down through the casings, and holes 2, about four or five feet deep, more or less, are drilled into the rock, the holes being made approximately of the same diameter as the internal diameter of the casing. The drill is now removed, and metal bars 3 of a diameter adapted to fit into the holes in the rock are lowered down into position. These bars are made of sufficient length as to project up a considerable distance into the casings, say four or five feet, while their lower ends are embedded in the rock. The casings are now filled with cement.

When the quicksand is of such a character as to flow very readily, it is preferred to drive the casings in contact with each other as nearly as possible, so as to form tight joints as against the ingress of the quicksand into the circle formed by the inclosing casings or piles. If desired the casings may be provided on opposite sides with male and female guides 4 and 5. One of such guides consists of a channel-iron, as shown, and the other guide of a T-iron, both riveted to the casing. These guides will serve to prevent any lateral displacement either in or out of the several piles, and, if desired, the guides may be so constructed as to prevent the shifting of one pile from another during the driving operation. As soon as the circle of piles has been completed the clay and quicksand inclosed thereby are removed in any suitable manner, and a shell 6 composed of a series of sections and having an external diameter approximately equal to the internal diameter inclosing casings or piles, is forced down until the rock is reached. While not necessary it is generally preferable, to remove the material from the interior of the casing or pile while it is being driven down, so as to permit examination as to the direction of movement of the pile, whether it is being shifted laterally or not, and affording opportunity of correcting any lateral deviation.

It will be readily understood by those skilled in the art that my improvement can be employed for sinking caissons for any desired purpose, whether for mine-shafts, bridge-piers, or other foundations.

Where casings or piles having the interlocking guides are employed, the internal

lining or shell need not be employed, as the guides will form tight joints as against any material inflow of the quicksand. Whatever spaces there may be between adjacent piles 5 or casings may be closed by driving piles 7 intermediate of the main piles 1, as shown in Fig. 1. These intermediate piles may be either rectangular or U-shaped in cross-section, as shown. The lower ends of the inter- 10 mediate piles are made of a chisel shape in order to cause them to hug the main piles closely while being driven in, as shown in the drawings.

I claim herein as my invention—

15 1. As an improvement in the art of sinking shafts through quicksands, &c., the method herein described, which consists in forcing down and inclosing series of casings or hollow piles to the underlying strata and securing 20 the lower ends of such casings or piles as against lateral movement, substantially as set forth.

25 2. As an improvement in the art of sinking shafts through quicksands, &c., the method hereindescribed, which consists in forcing down an inclosing series of casings or hollow

piles to the underlying strata securing the lower ends of such casings or piles as against lateral movement, and then placing a lining shell within the piles, substantially as set 30 forth.

3. As a means for sinking shafts through quicksands or other mobile material, the combination of a series of casings or hollow piles extending down through the quicksand to 35 the subjacent rock or solid material, and a like series of bars projecting from the lower ends of the casings and into the subjacent material for holding the piles as against lateral movement, substantially as set forth. 40

4. A lining for shafts having in combination a series of casings or hollow piles, provided with interlocking guides, and a bar projecting from the lower ends of the casings or piles for holding the piles as against lat- 45 eral movement, substantially as set forth.

In testimony whereof, I have hereunto set my hand.

JESSE A. DUBBS.

Witnesses:

DARWIN S. WOLCOTT,
F. E. GAITHER.