

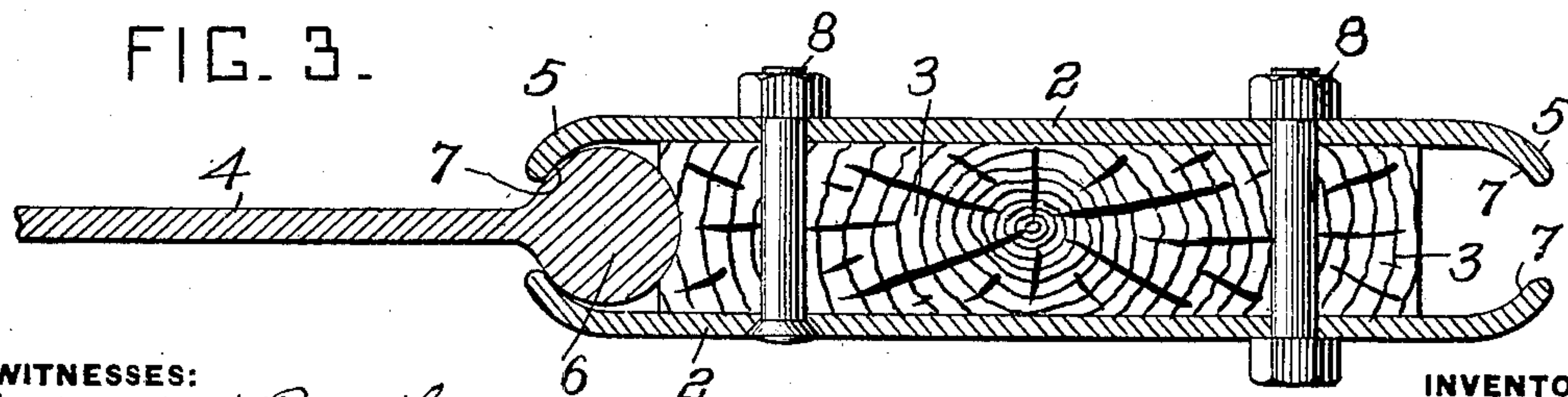
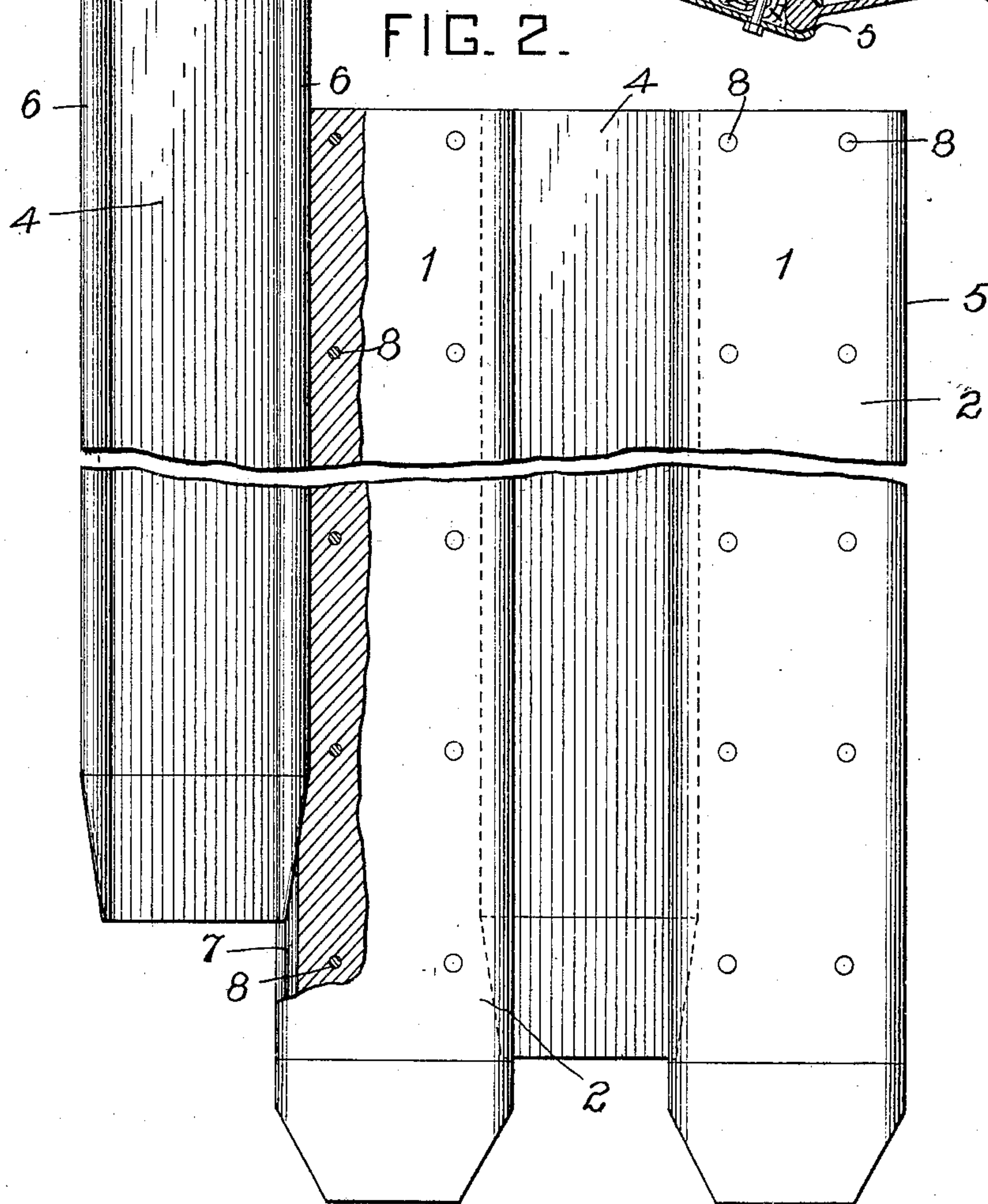
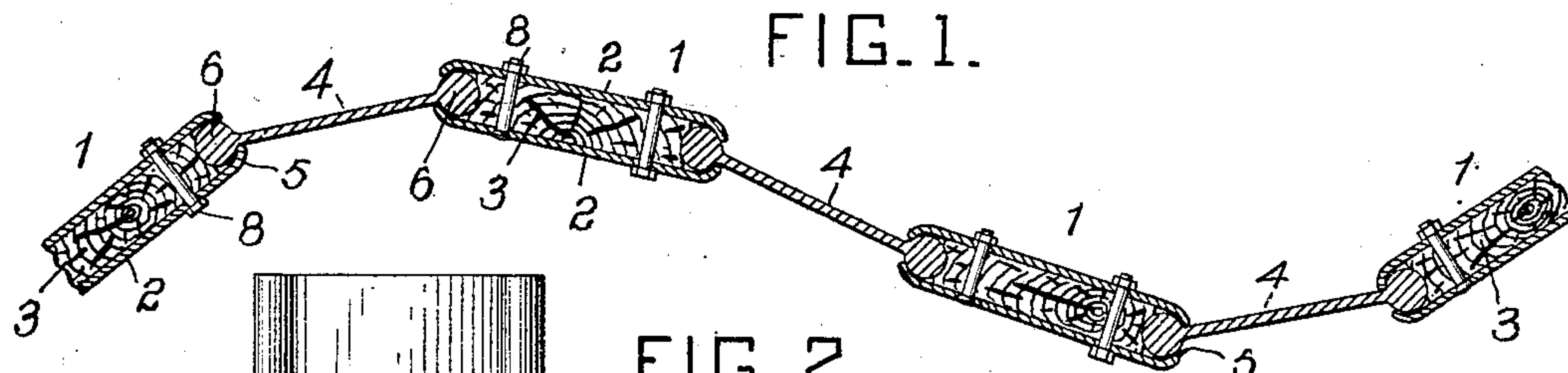
No. 863,837.

PATENTED AUG. 20, 1907.

F. R. DRAVO.
SHEET PILING.

APPLICATION FILED MAY 17, 1907.

2 SHEETS—SHEET 1.



WITNESSES:

J. Herbert Bradley.
Charles Barnard.

INVENTOR

Francis R. Dravo,
Christy & Christy, Atty's

No. 863,837.

PATENTED AUG. 20, 1907.

F. R. DRAVO.
SHEET PILING.

APPLICATION FILED MAY 17, 1907.

2 SHEETS—SHEET 2.

FIG. 4.

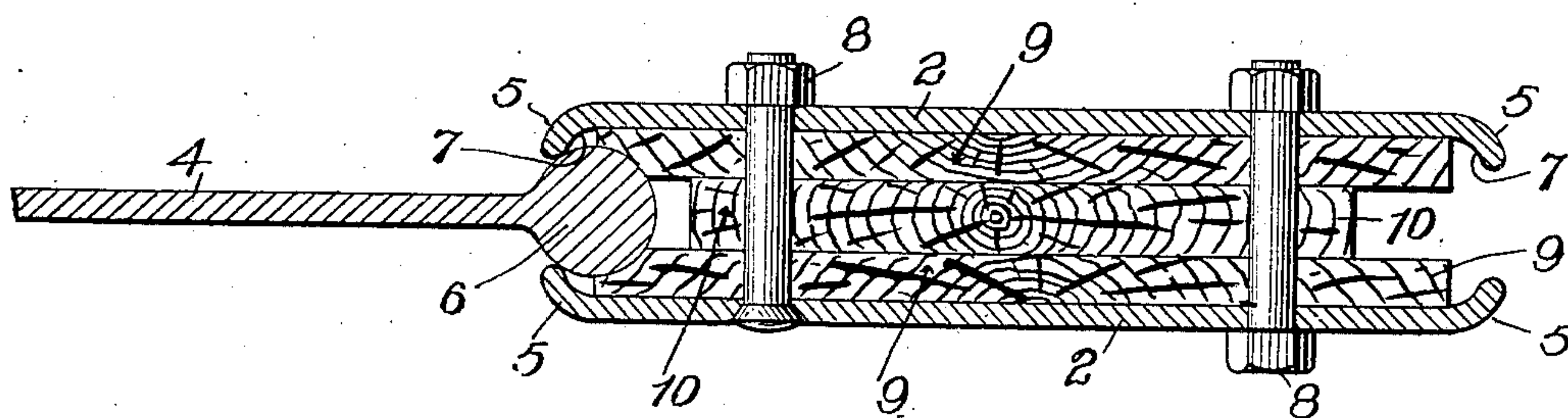
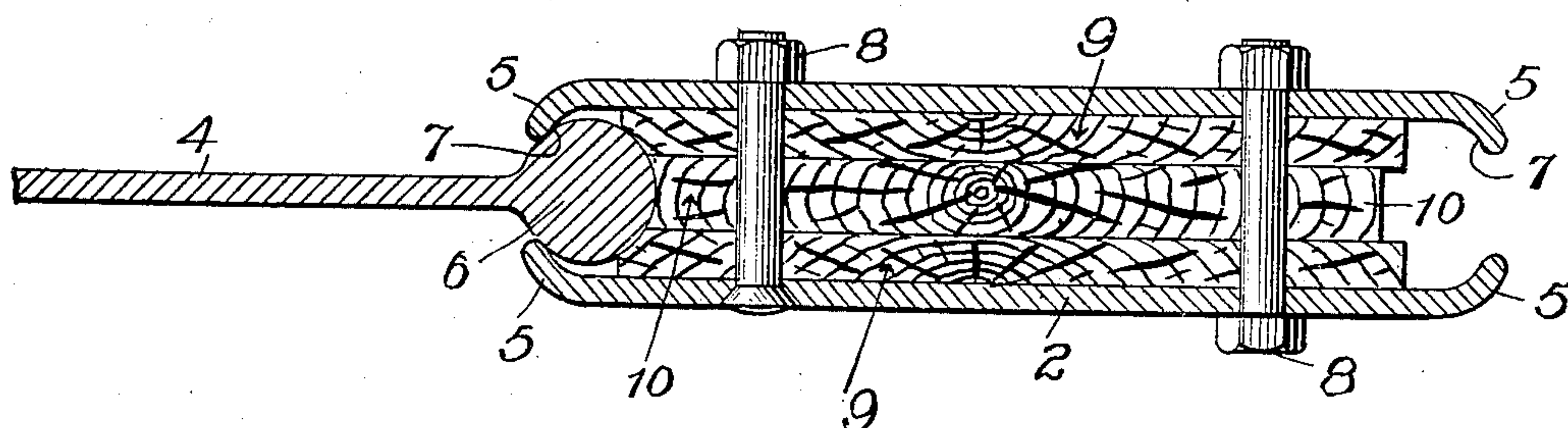


FIG. 5.



WITNESSES:

J. Herbert Bradley.
Charles Burnett.

INVENTOR

Francis R. Dravo,
by Christy & Christy, Atty's

UNITED STATES PATENT OFFICE.

FRANCIS R. DRAVO, OF SEWICKLEY, PENNSYLVANIA.

SHEET-PILING.

No. 863,837.

Specification of Letters Patent.

Patented Aug. 20, 1907.

Application filed May 17, 1907. Serial No. 374,179.

To all whom it may concern:

Be it known that I, FRANCIS R. DRAVO, residing at Sewickley, in the county of Allegheny and State of Pennsylvania, a citizen of the United States, have invented or discovered certain new and useful Improvements in Sheet-Piling, of which improvement the following is a specification.

The invention relates to sheet piling made up of interlocking sections, and resides in certain improvements in the construction of such sections, whereby the joints between the same may be made thoroughly water-tight, and shall at the same time be flexible, in order to permit of the sinking of the wall in any desired conformation, or of deflection of the same by contact with boulders, etc., without impairing its imperviousness to leakage.

In the accompanying drawings Figure 1 is a horizontal sectional view of a portion of a wall composed of interlocking sections constructed in accordance with the invention, and illustrating the flexible character of the joints between the sections; Fig. 2 is a view in elevation of a portion of a wall composed of the improved piling, in the process of driving the same; Fig. 3 is a horizontal section, on an enlarged scale, of one of the composite pile sections, and a portion of one of the metallic connecting sections in interlocking engagement therewith; Figs. 4 and 5 are views similar to Fig. 3 illustrating modifications of the invention.

The improved piling consists of composite sections 1, composed of metallic face-plates 2, having secured between them a filling 3 of fibrous material, preferably wood, and, in interlocking connection with the edges of the composite sections, the metallic sections 4 of the form shown and hereinafter described.

The metallic face-plates 2 are channel-beams, or plates having their longitudinal edges curved or bent, which are oppositely disposed as shown, and having secured between them such thickness of filling that the edges of their flanges or curved portions 5 shall be separated by such a distance as to receive between them the web portion of a metallic section 4 and allow the latter sufficient clearance therein to permit of deflection at the joint to the extent desired. The filling 3 is of less width than the face-plates 2, which are thus made to extend at the edges of the composite sections to an extent no greater, and preferably less, than is necessary to provide a space between the edges of the filling and the overhanging flanges 5 of the face-plates, for the reception of the enlarged edges 6 of the metallic sections 4. The inner faces 7 of the flanges 5 of the face-plates are preferably rounded, as shown, in order to provide bearing surfaces or seats for the interlocking enlarged portions of the sections 4.

The sections 4 are preferably of the form shown in the drawings, being sometimes known as "plow-beams", having a plain body or web-portion and enlarged edges

of spherical or bulbous form, which edges 6 are, as shown, adapted to be locked in tight pivotal engagement with the edges of the composite sections in the spaces in the latter between the edges of the filling and the overhanging flanges of the face-plates. The lower ends of the sections may be beveled or pointed, as may be desired.

As hereinbefore stated it is preferred, as is shown in Fig. 3, that the spaces between the edges of the filling 3 and the overhanging flanges of the face-plates 2 shall be of a depth somewhat less than sufficient to receive the enlarged edges 6 of sections 4. In such case the sections 4 are forcibly driven into place, and the edges 6 are caused to form for themselves bearing surfaces or seats of considerable extent in the filling, and exactly conforming to the shape of the edges, in which the said edges may turn, and which will render the joint impervious to leakage of water. Since the opposite edges of the sections 4 are preferably of bulbous form, and the inner faces 7 of the channel-beams of sections 1 are preferably rounded in conformance therewith, it will be seen that all joints between sections will be flexible and capable of considerable pivotal deflection, while at the same time remaining absolutely water-tight. The channel-beams or plates 2 and the filling 3 of the composite sections 1 may be fastened together by any suitable means, as by bolts 8.

In lieu of the construction shown in Fig. 3 I may employ two properly spaced filling pieces 9, as shown in Figs. 4 and 5, held apart by a spacing-block or piece 10, of varying width, but of thickness less than the diameter of the enlarged edges 6 of sections 4. In these constructions also the enlarged edges 6 are, by forcibly driving the sections 4 into place, caused to form seats for themselves in the fibrous filling or portions thereof.

It will be observed that the spaces into which the enlarged edges of the connecting sections are driven have greater areas than the cross-sectional areas of the enlargements, thereby providing for the portions of the filling displaced by the enlargements, and permitting of the swelling of the filling, without forming such a tight grip on the enlargements as would prevent the withdrawal of the connecting section.

I am aware that sectional piling is already known which is made up of composite sections of oppositely-disposed channel-bars inclosing a wooden filling, and alternating plain metallic sections in interlocking engagement therewith. Such metallic sections have however been of the form known as "deck-beams", having a bulbous enlargement on one edge only, and the other edge of the form of the common I-beam. In piling made up of such sections, the I-beam joints, if made firmly enough to materially exclude leakage of water, are rigid and do not permit of deflection, whereas in the improved piling above described, all

joints, while impervious to leakage, are flexible as well. In said prior piling also spaces are provided in the edges of the composite sections which are of sufficient depth to receive the bulbous and I-beam edges respectively of the metallic sections, whereas in the preferred construction of the piling hereinbefore described, the edges of the metallic sections are forcibly driven into the wood, and caused to cut seats in exact conformance thereto, and having a broad bearing surface, thus making every joint absolutely water-tight.

I claim herein as my invention:

1. In metallic piling, the combination with two composite sections, each composed of a pair of oppositely-disposed channel-beams and an interposed filling of less width than said channel-beams and secured centrally thereof, of a connecting metallic section having bulbous enlargements at its opposite edges, and having its bulbous edges secured in the adjacent edges of said composite sections between the filling and the flanges of said channel-beams, substantially as described.

2. In metallic piling, a composite section composed of a pair of oppositely-disposed channel-beams having their flanges facing inwardly, and an interposed filling of thickness greater than the combined depth of said flanges, of a metallic section provided with a flanged edge of greater depth than the space between the filling and flanges, and driven longitudinally into said space and between the

flanges, whereby a portion of said filling is cut away or displaced to provide a seat for said edge, substantially as described.

3. In a metallic piling, the combination of a metallic connecting section having an enlargement along its edge, and a composite section composed of a pair of channel beams oppositely disposed with their flanges projecting inwardly, and a compressible filling interposed between the channels, the transverse dimensions of the filling being such relative to the space inclosed by the channels as to form spaces or openings lengthwise of the composite member and adjacent to their flanges, having one transverse dimension less than the corresponding transverse dimension of the enlargement along the edges of the connecting member or section.

4. In a metallic piling, the combination of two channel-beams oppositely disposed with their flanges projecting inwardly, metallic connecting sections having enlargements along their edges adapted to pass behind the flanges of the channels, and a compressible filling interposed between the channels and having a width greater than the distance between the enlargements on the connecting sections when in position between the channels, whereby said enlargements will form tight seats for themselves when forced into operative position behind the flanges.

In testimony whereof, I have hereunto set my hand.

FRANCIS R. DRAVO.

Witnesses:

CHARLES BARNETT,
RICHARD A. HANLEY.