

(No Model.)

3 Sheets—Sheet 1.

S. E. HUGHES.  
Construction of Jetties.

No. 227,531.

Patented May 11, 1880.

FIG. 1.

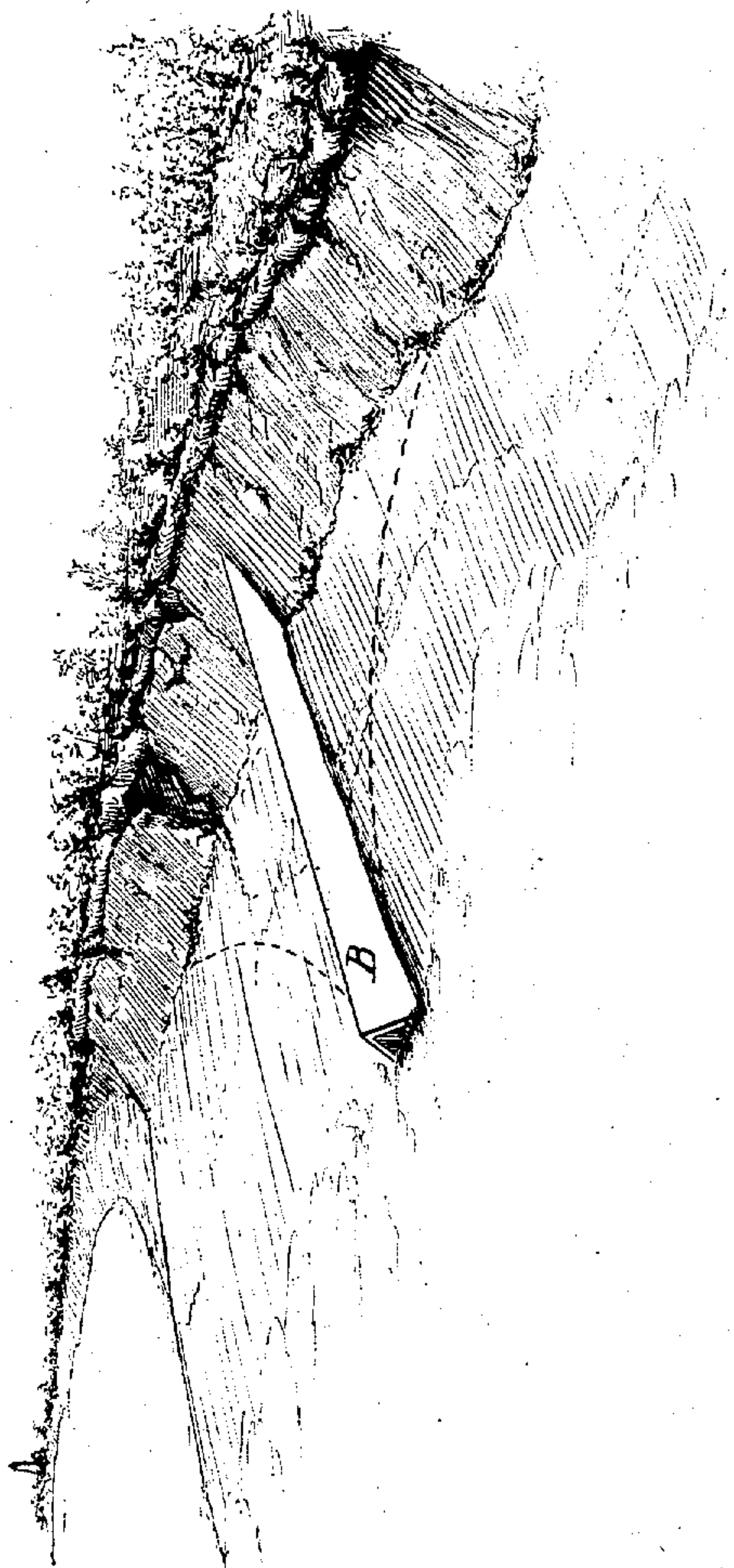
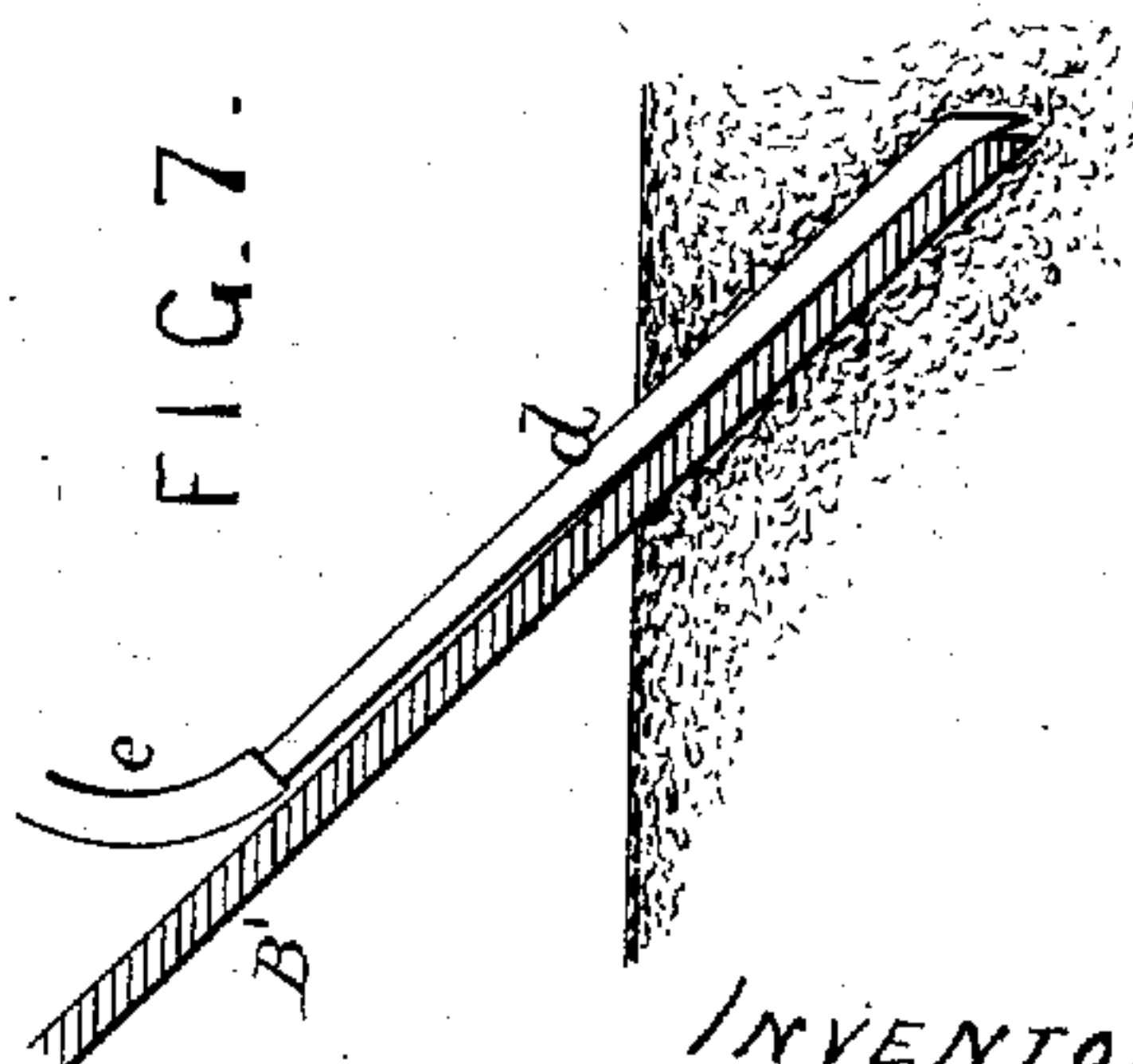


FIG. 7.



WITNESSES

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Henry Howson Jr.

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by his attorneys  
Howson and Co.

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FIG. 2.

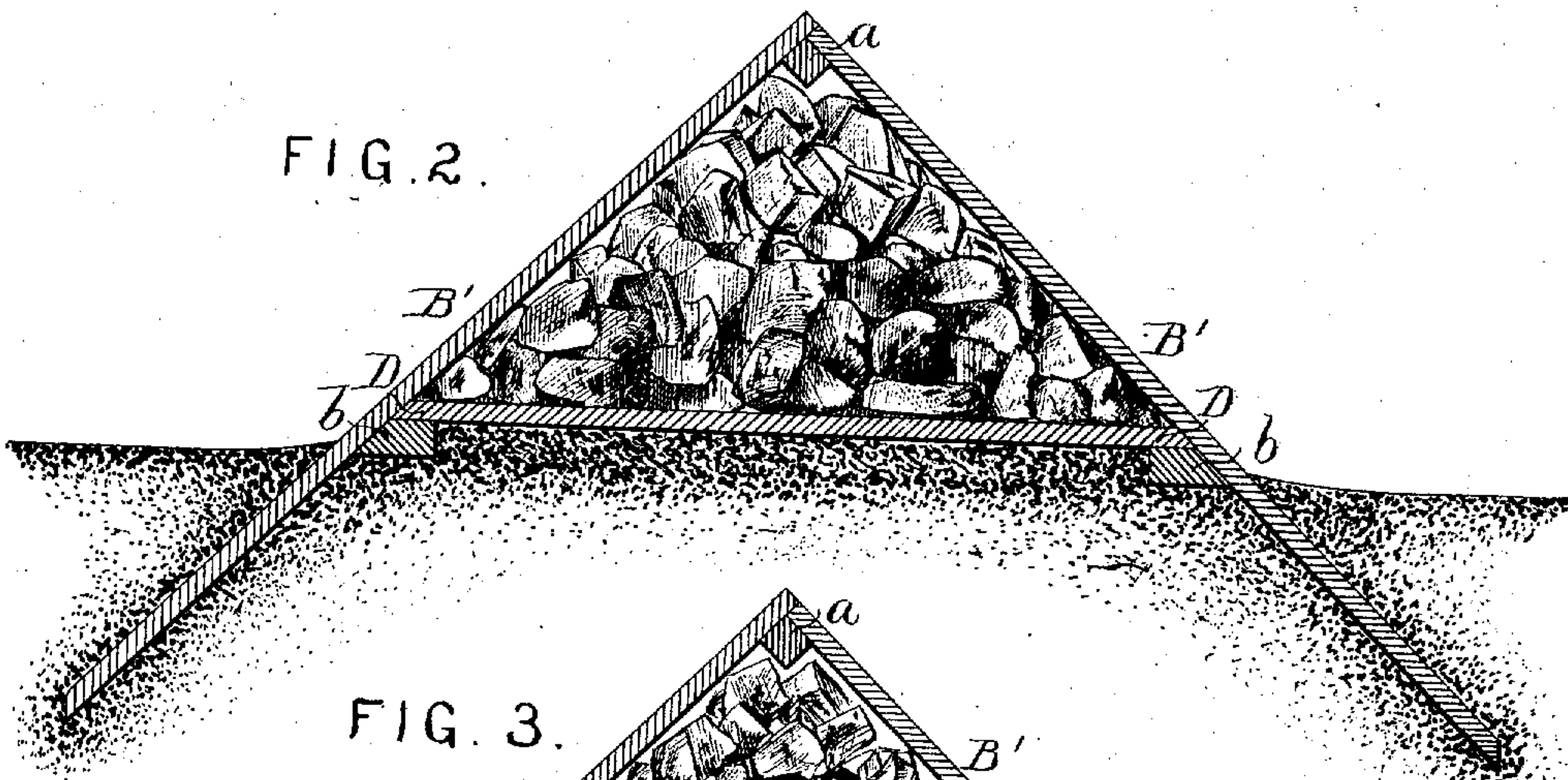


FIG. 3.

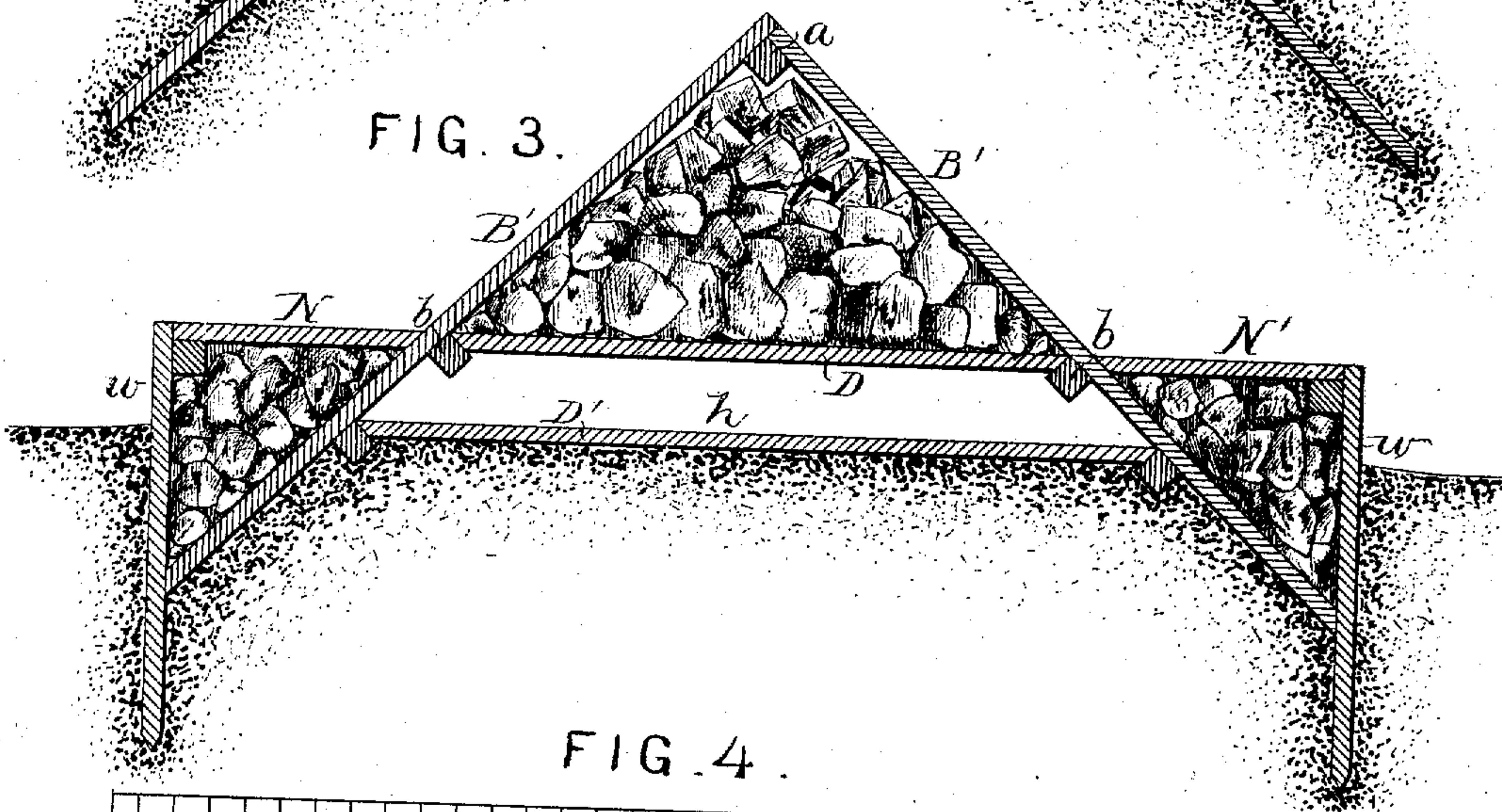
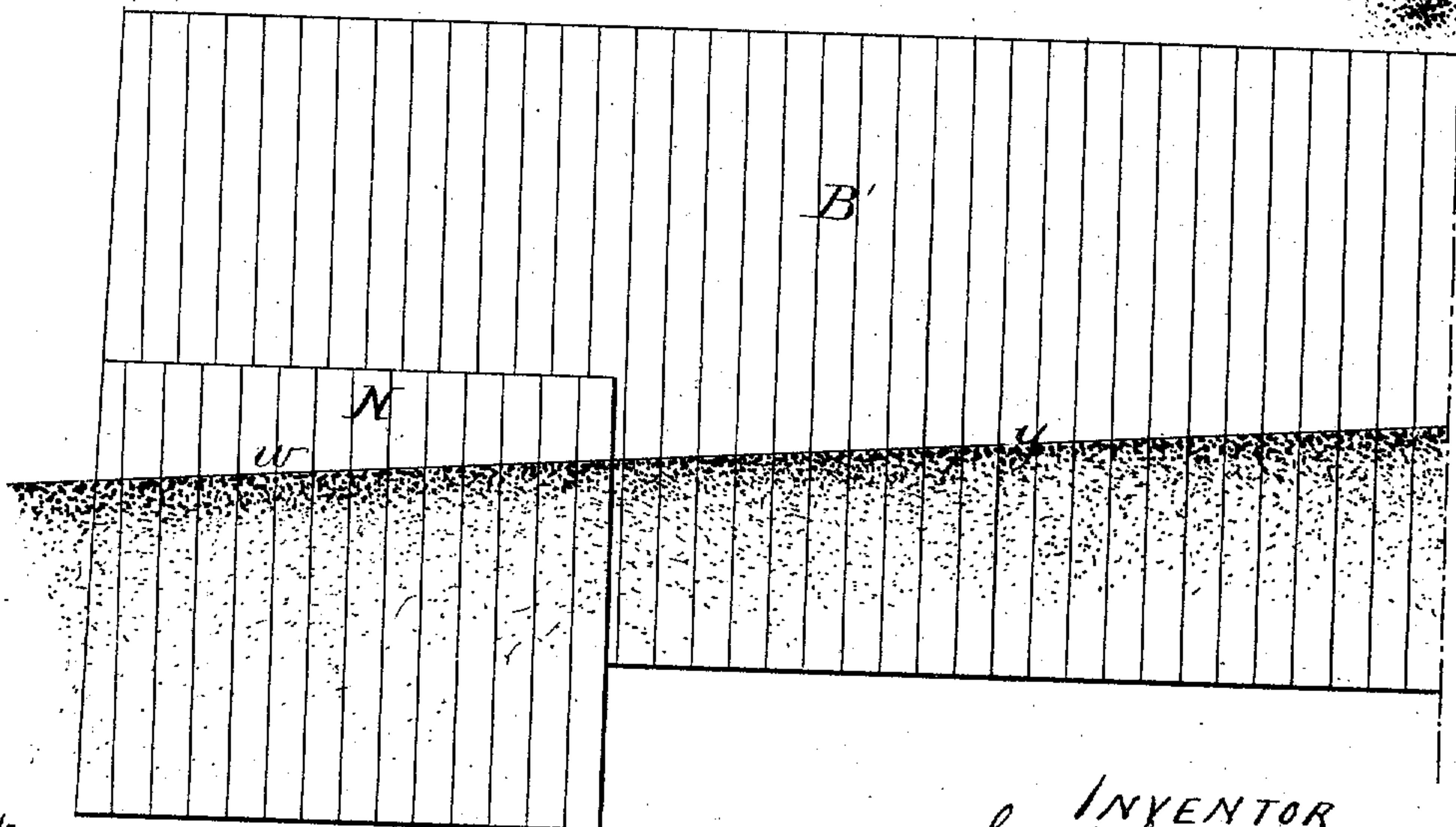


FIG. 4.



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FIG. 5

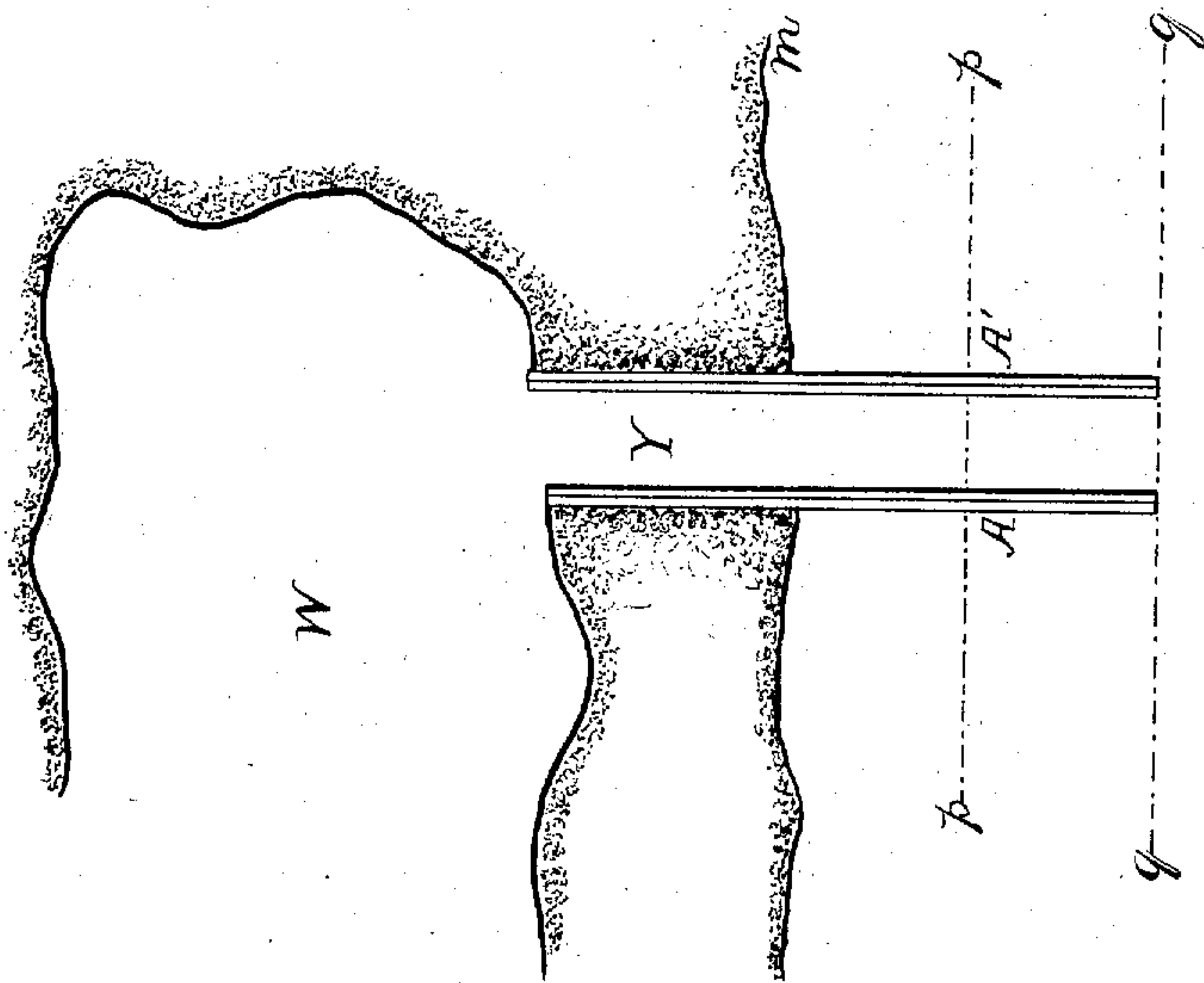
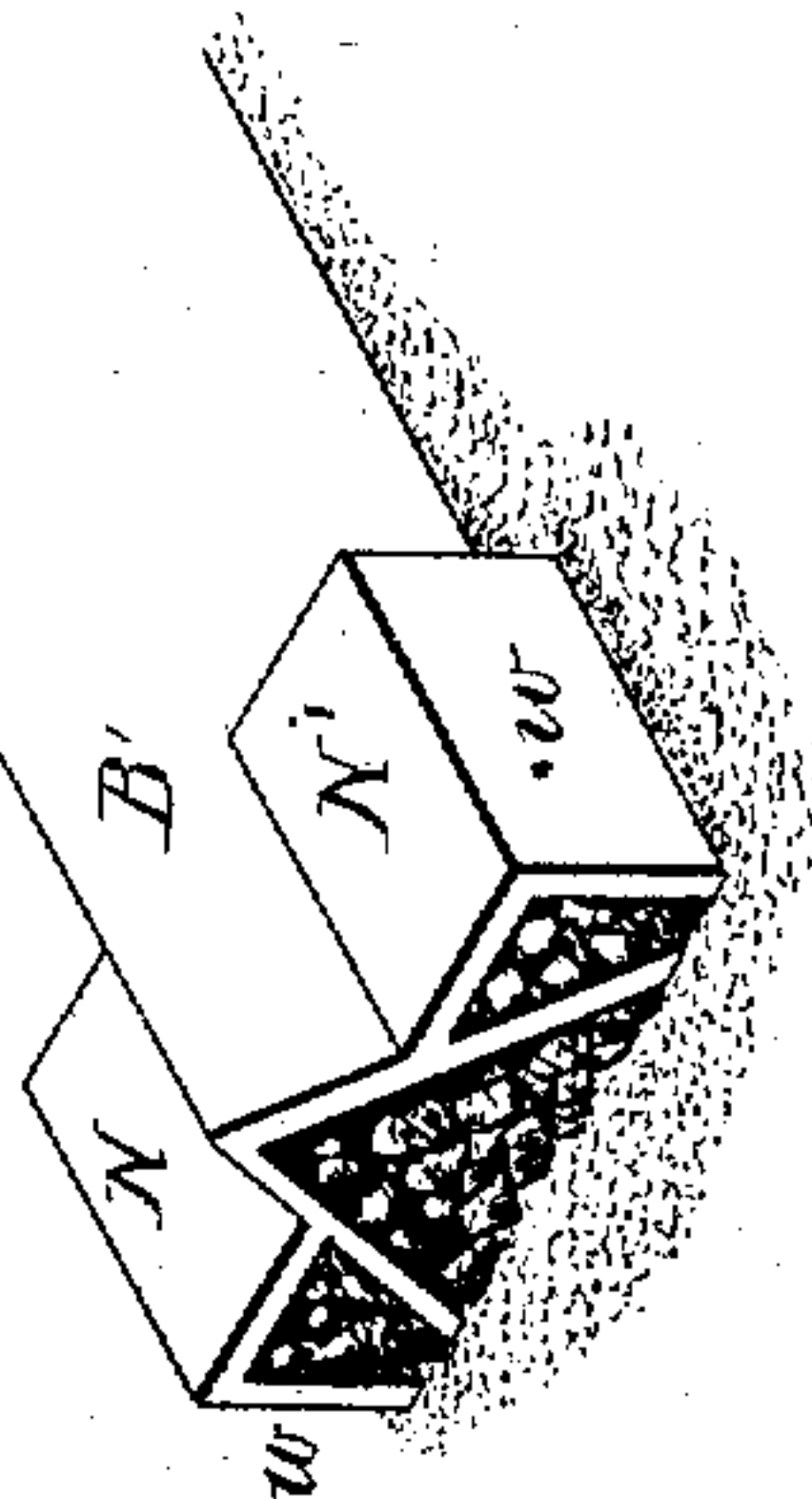


FIG. 6.

WITNESSES

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# UNITED STATES PATENT OFFICE.

SMITH E. HUGHES, OF PHILADELPHIA, PENNSYLVANIA.

## CONSTRUCTION OF JETTIES.

SPECIFICATION forming part of Letters Patent No. 227,531, dated May 11, 1880.

Application filed March 15, 1880. (No model.)

*To all whom it may concern:*

Be it known that I, SMITH E. HUGHES, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented an Improvement in Restricting the Action of the Sea on Sandy Shores, and in Jetties therefor, of which the following is a specification.

The object of my invention is to construct a jetty or jetties in the peculiar manner described hereinafter. The jetties may be erected for different purposes—for preventing the inroads of the sea on sandy banks, draining or reclaiming waste lands, preventing the choking of the outlets of creeks, and also for disposing of sewage.

My invention consists of a jetty of the peculiar construction fully described hereinafter.

In the accompanying drawings, Figure 1, Sheet 1, is a sketch of a strip of sandy shore, showing the jetty; Fig. 2, Sheet 2, a vertical section of my improved jetty; Fig. 3, a vertical section of a jetty of modified construction; Fig. 4, an elevation of Fig. 3; Fig. 5, Sheet 3, a perspective view, drawn to a reduced scale, of Figs. 3 and 4; Fig. 6, a diagram illustrating one of the uses of my improved jetty; and Fig. 7, Sheet 1, a view showing the mode of sinking into the sand the planks of which the jetties are composed.

One use of my invention may be best observed by reference to the sketch, Fig. 1, of a strip of sandy shore of a bay or inlet, and by supposing that the sea is gradually encroaching on the land by washing away the bank—a frequent occurrence, especially on the sandy shores of southern New Jersey, where the coast-line is continually changing, new inlets being formed and old inlets choked by the action of the waves.

In order to prevent the further washing away of the embankment shown in Fig. 1, I build, in the manner described hereinafter, the jetty B, extending from the high ground or bank, down the shelving shore, to a point at or below the low-water line. The outer end of the jetty should be built up to or above the high-water mark, and this height may be continued to the land end of the jetty; or the latter may, if desired, be increased in height. Against this jetty or breakwater the sand will be driven by the action of the waves, which,

during the rising of the tide, will drive the sand against one side of the jetty, and during the ebb-tide against the opposite side of the same, the accumulation of the sand depending, of course, upon the direction of the wind as the tide ebbs and flows; but the result must be the accumulation of the sand on both sides of the jetty in the direction indicated by the curved dotted lines, and the formation of a breakwater or sea-wall, which not only prevents the washing away of the bank, but adds to the same.

The jetty, a vertical section of which is shown on a larger scale by Fig. 2, Sheet 2, consists of two rows of planks sunk into the sand to about the depth indicated, the two rows being arranged at about the angle shown in respect to each other, and being secured at the ridge to the longitudinal beam *a*. To each row of planks at or near the floor-surface are secured longitudinal beams *b*, and on the latter rest the flooring-timbers *D* for supporting the ballast.

In constructing the jetties I have used, in practice, hemlock planks from eight to twelve inches wide and three inches thick, and my practice is to sink them into the sand in the manner shown in Fig. 7, Sheet 1, where *B'* represents one of the planks, and *d* a wrought-iron tube placed against the outside of the plank, and communicating at its upper end, through a flexible hose, *e*, with any appropriate force-pump. The lower end of the plank is beveled, as shown, and the lower end of the pipe bent so that a stream of water issuing from it shall displace the sand at a point directly opposite the beveled end of the plank.

While the water is being discharged from the end of the pipe the plank will readily sink into the sand in the inclined direction in which it has been first adjusted; but very shortly after the discharge of the water ceases the sand will settle about the plank, and will cling to the same in such a solid mass that the plank will be immovable. Indeed, so quickly does the sand settle after being displaced by the jet of water that the tube must be withdrawn while the flow of water therefrom continues; otherwise its withdrawal from the sand would not be accomplished without great difficulty.

Another object of my improved jetty is to



prevent the choking of inlets by driven sand and gravel, in a manner which may be best explained by reference to the diagram, Fig. 6, Sheet 3, in which  $m$  represents the line of embankment,  $p$  the high-water line,  $q$  the low-water line, and  $W$  a dock or creek for small vessels,  $Y$  being the inlet. In order to prevent the choking of this inlet with the sand driven by the waves, I build two jetties,  $A A'$ , one on each side of the mouth of the inlet, and extending from the embankment  $m$  to a point at or below the low-water line  $q$ , so that while the sand may accumulate outside both of the jetties it cannot be driven between them, a clear passage or canal being thus maintained between the bay and the inlet  $Y$  to the dock or creek  $W$ .

The jetty may also be utilized as a means of maintaining in a comparatively dry condition such land near the sea as may be flooded during very high tides. When the jetty is used for this purpose I construct it as shown in Fig. 3—that is, with a space,  $h$ , between the ballast-flooring  $D$  and a lower floor,  $D'$ , of planks, this space forming a draining-channel which may be furnished with flood-gates, or the space may be used for the reception of pipes for the conveyance of sea-water to bath-houses, &c., or for conveying the sewage of summer resorts to a point at or near low-water line; or the pipes may be conveyed through the ballast-space of the jetty when the formation of the draining-channel  $h$  is not desirable. When a jetty is thus constructed to form a channel I prefer, in order to prevent any loosening of the jetty by the washing away of the sand at and near its outer end, to strengthen it at this point by structures  $N N'$ , (shown in Fig. 3,) each of which is formed by vertical planks  $w$ , sunk into the sand and connected to the main structure by horizontal planks, so as to form triangular receptacles for ballast. This feature is also shown in the elevation,

Fig. 4, where  $y$  represents the shore-line, and is again represented in perspective and on a reduced scale in Fig. 5, Sheet 3.

It may be remarked that in building the jetty the ballast should be placed on the floor  $D$  as the work continues, so that the planking cannot be washed away during the intervals when the rising of the tide compels a cessation of operations.

When the jetty has been completed it should be closed at the outer end by suitable planking, the channel  $h$ , when the structure is made with this channel, of course remaining open.

In some cases it may be necessary to extend the structure to a point at a considerable distance beyond the low-water line. When this is required I prefer to first sink an iron frame partly into the sand, as a support for so much of the planking of the jetty as may be beyond low-water line. Indeed, much of the framework of the entire jetty might be composed of iron; but I have found in practice that a structure of wood made in the manner described serves the desired purpose.

I claim as my invention—

1. A jetty in which two inclined rows,  $B' B'$ , of planks, partly sunk into the sand, are combined with a ballast-floor,  $D$ , all substantially as set forth.

2. The jetty composed of two inclined rows,  $B' B'$ , of planks, partly sunk into the sand, ballast-floor  $D$ , and lower floor,  $D'$ , the space between the floors forming a channel,  $h$ , all substantially as described.

3. The combination of the jetty with ballasted piers or abutments  $N N'$ , as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SMITH E. HUGHES.

Witnesses:

JAMES F. TOBIN,  
HARRY SMITH.