

No. 859,627.

PATENTED JULY 9, 1907.

J. STOCKFLETH.
BREAST BOARD FOR UNDERGROUND MINING.
APPLICATION FILED FEB. 2, 1907.

2 SHEETS—SHEET 1.

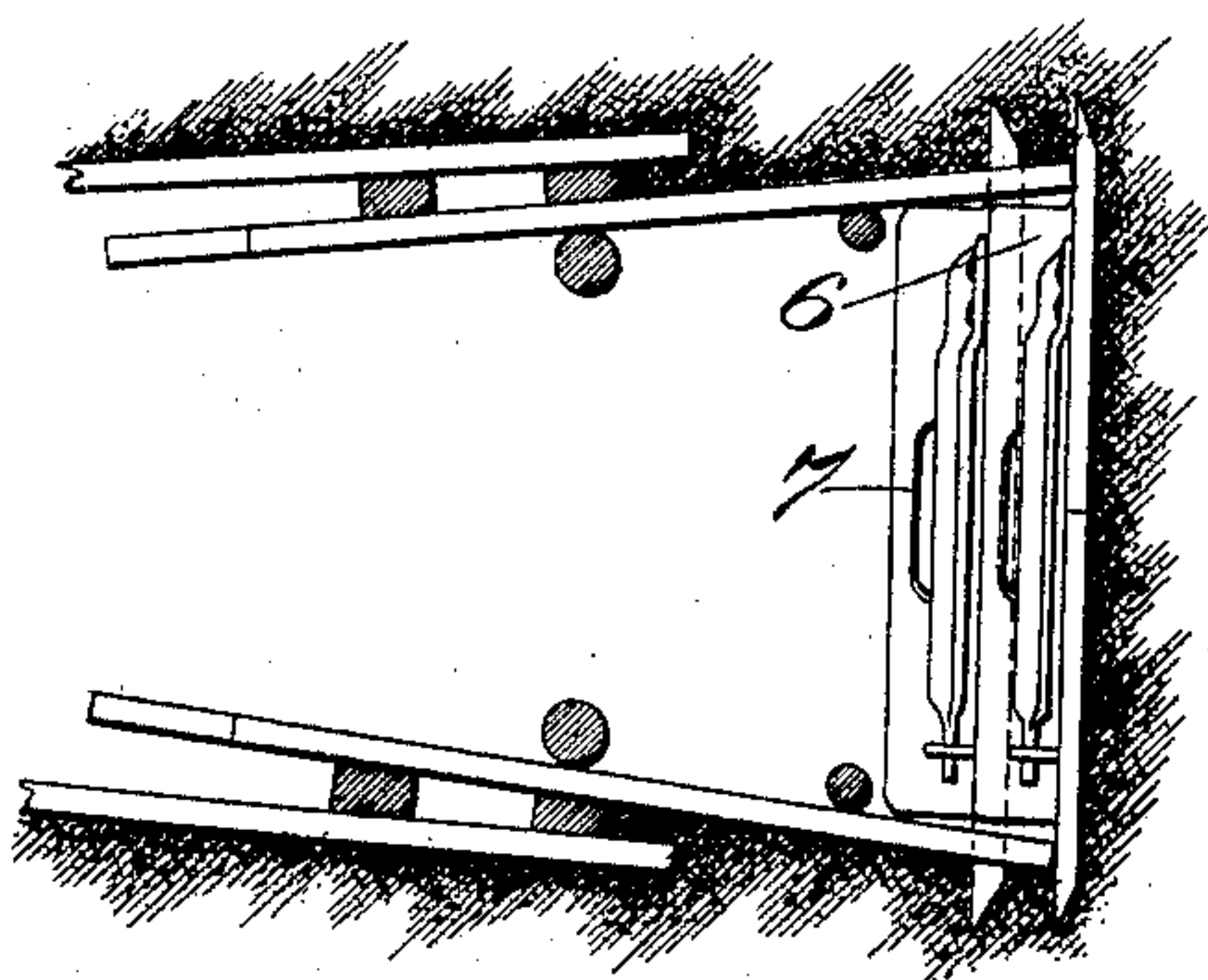
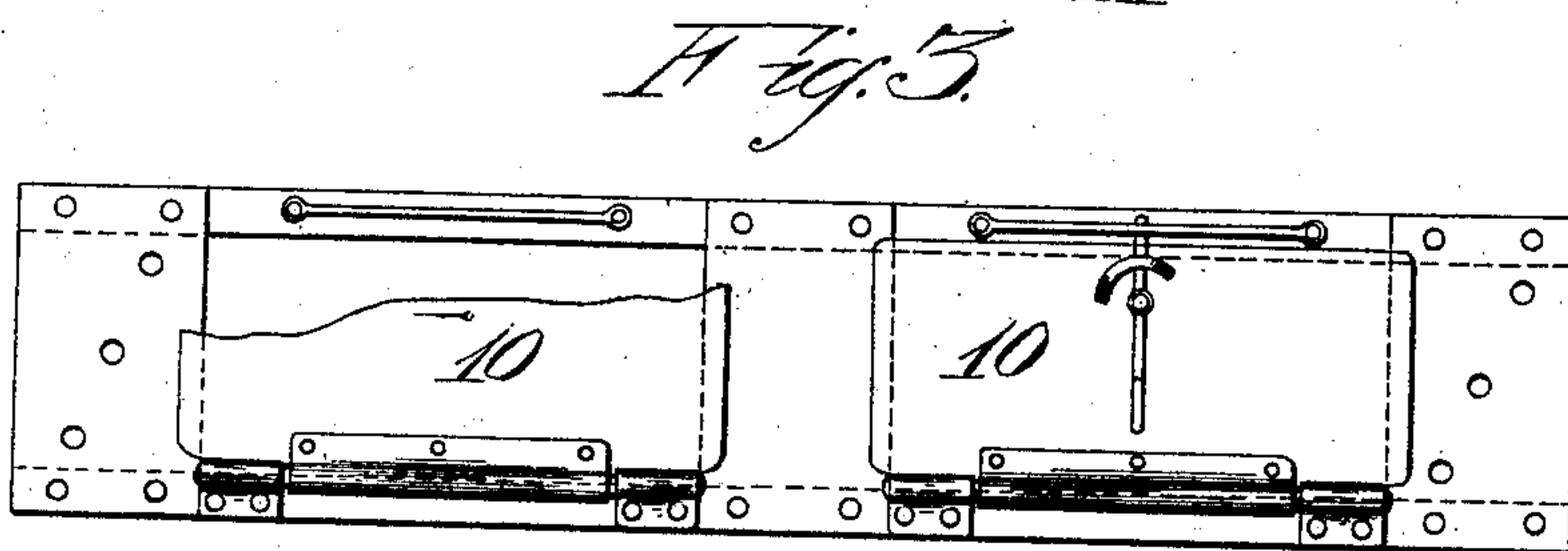
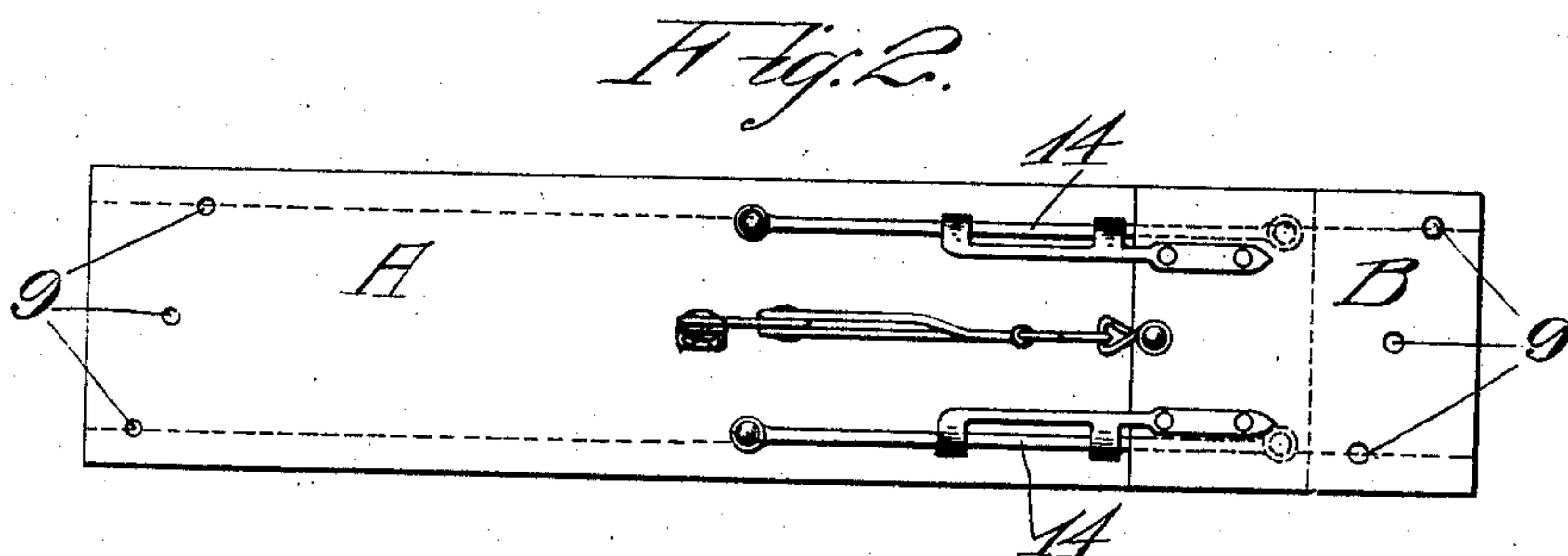
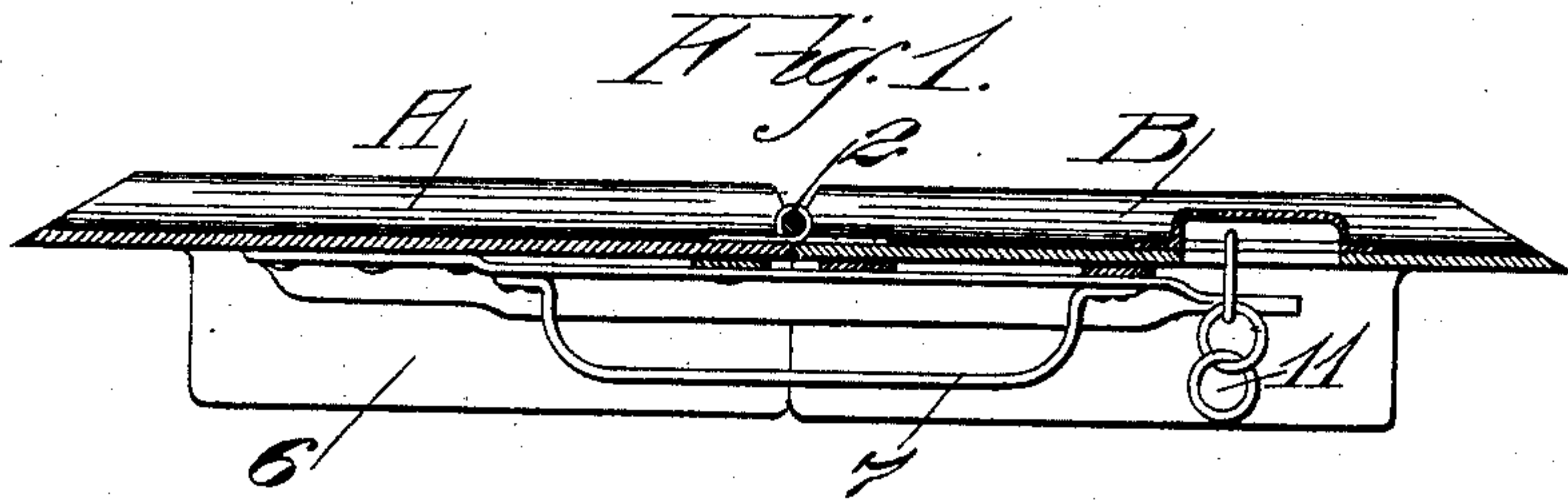


Fig. 4.

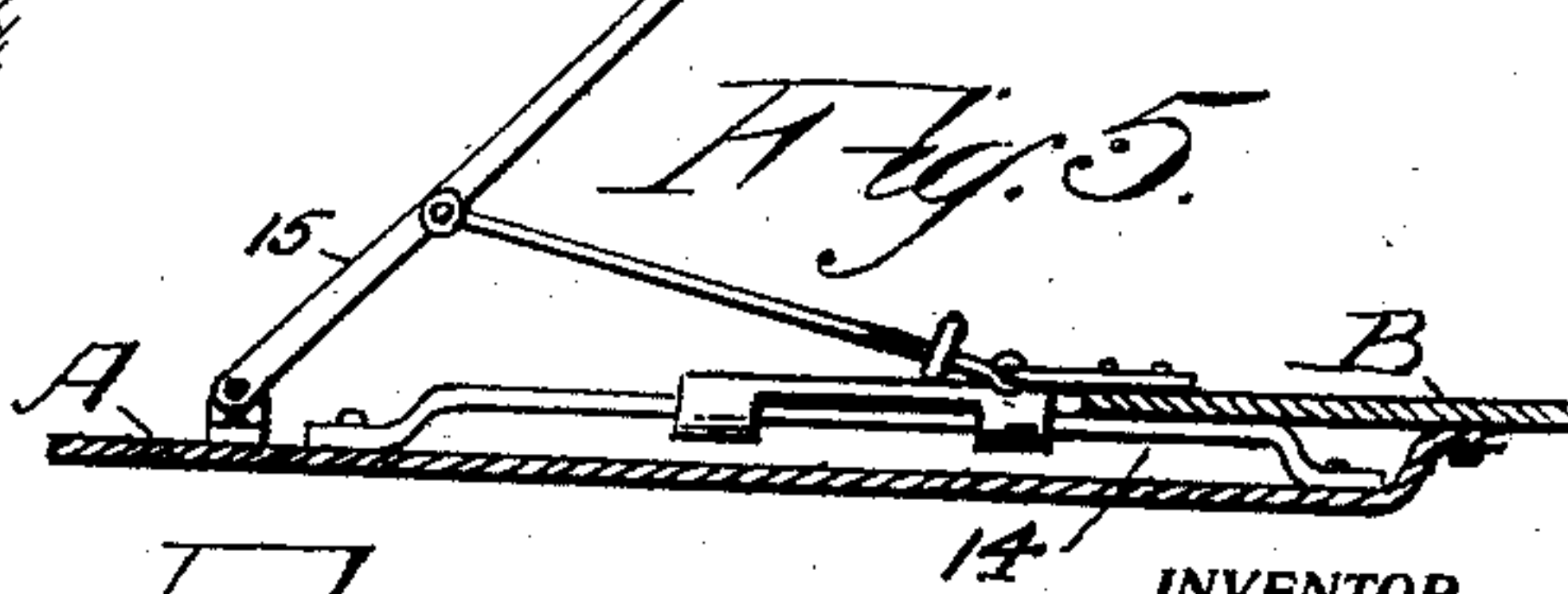
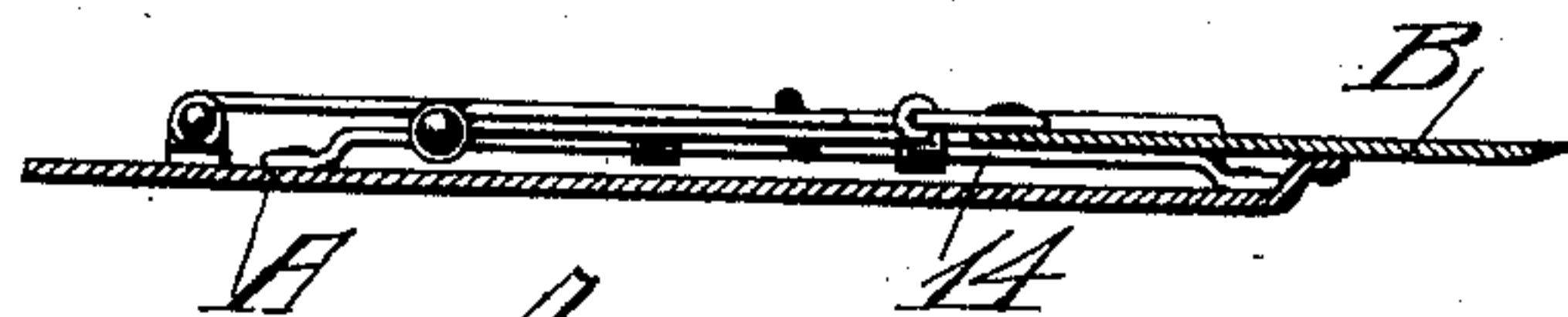


Fig. 8.

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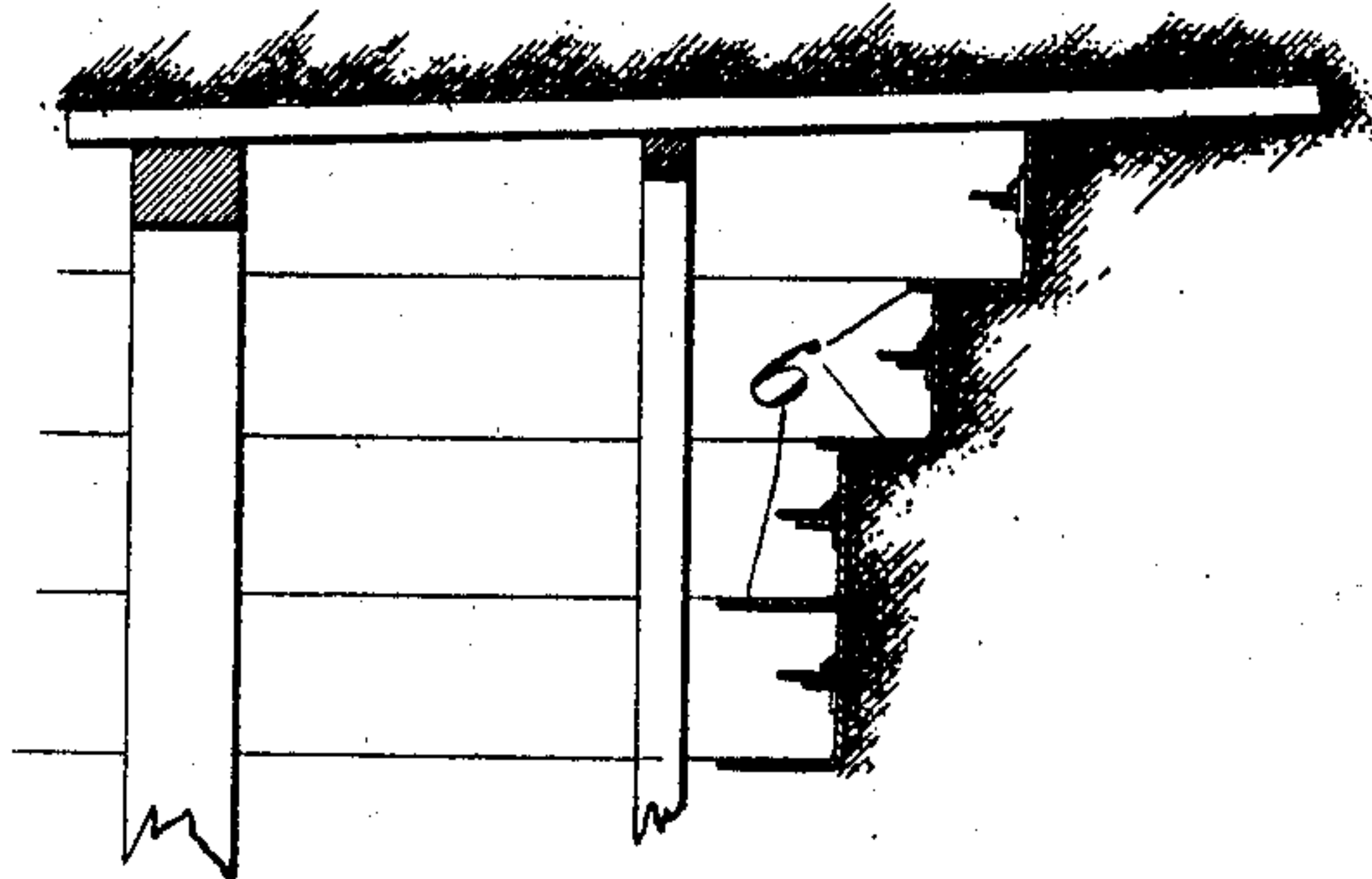


Fig. 6.

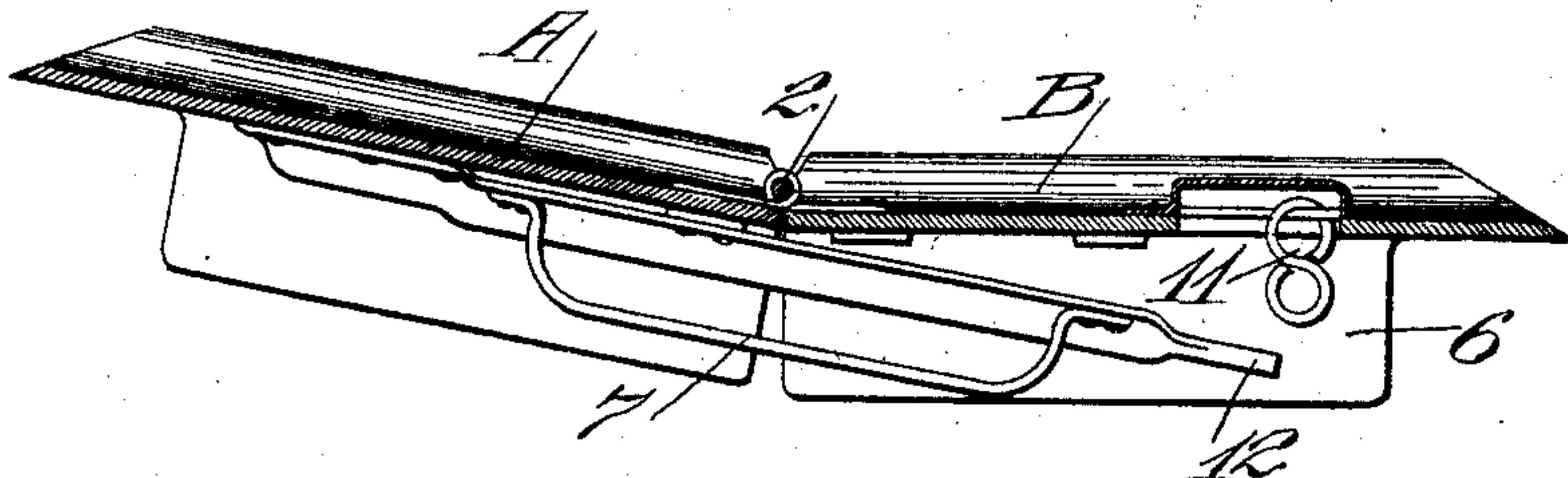


Fig. 7.

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BREAST-BOARD FOR UNDERGROUND MINING.

No. 859,627.

Specification of Letters Patent.

Patented July 9, 1907.

Application filed February 2, 1907. Serial No. 355,880.

To all whom it may concern:

Be it known that I, JOHN STOCKFLETH, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented new and useful Improvements in Breast-Boards for Underground Mining, of which the following is a specification.

My invention relates to what are termed breast-boards or apparatus to retain soft ground, and prevent its flowing or falling into excavations or tunnels, such as are made in mining operations, or where railways or conduits are to be laid through hills or mountains.

It consists in the combination of parts and in details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a horizontal section of one board. Fig. 2 is a front view of one board and a form of joint lock. Fig. 3 is a front view of board and its gates. Fig. 4 is a general plan of the device. Fig. 5 is a horizontal section of Fig. 2. Fig. 6 is a general side elevation. Fig. 7 is an edge section of Fig. 1, with the joint bent out of line. Fig. 8 is a view similar to Fig. 5 showing the guides and slides and actuating lever in their open position.

In the working of such ground, and especially where the ground is soft or inclined to slide or cave, the excavations are timbered up as fast as completed; the timbering consisting of vertical posts with caps and mud sills and bridge blocks to make room for lagging, which consists of heavy planks driven in behind the timbers, and which are guided by the bridge pieces, and by what are called "false sets", which are timbers temporarily put in place to guide the lagging as it is driven. The top and sides are thus protected as fast as the excavation proceeds, and in order to protect the front or breast of the excavation, and prevent the earth from caving, or being forced into the excavation, these breast-boards are employed.

My present invention relates to improvements in these breast-boards, and are described as follows:

The breast-board consists of sections A and B which may be made of any suitable material, heavy plate or sheet metal is very serviceable for this purpose, and the plates of which the boards are formed may be jointed as shown at 2 so that they may be folded or bent sufficiently to allow the ends of the sections to extend beyond the ends of the lagging, which has been advanced to a point in front of the timbering.

These breast-boards may be made of any suitable or desired width and length, dependent upon the size of the tunnel or excavation which is being made; but they will have a sufficient length to extend beyond the ends of the lagging, and superposed in sufficient number for the required height.

By bending or folding the sections with relation to each other, the ends can be passed in front of the ends

of the lagging, and by again bringing the boards into direct alinement, they will rest against the ends of the lagging, and being locked in position, will be firmly retained, and resist any tendency of the soft material to flow backward into the tunnel or excavation.

Any number of these boards may be placed one above the other until the full height of the face which is being worked is covered and protected.

It will be understood that the joints about which the boards are foldable, may be located at any desired point in the length of the boards, and if the sections are very long, it may be that a plurality of such joints will be found advisable.

In my present invention I have shown holes located near the ends of the sections. These holes are arranged in line with the length of the sections, and in such relation to the timbering at each side that the whole length of the breast-board may be adjusted either one way or the other so as to insure the ends interlocking properly with the ends of the lagging.

In some cases the boards may be so placed that one end extends a distance beyond the lagging, while the other barely engages upon the other side. For this purpose these holes are made, and by the use of a pinch bar or other connection the board sections may be moved into proper engagement, with the lagging, or released therefrom. These breast-board sections are provided with gates hinged at some point and adapted to open so that where ground is very soft and it would be dangerous to move a whole section of the breast-board, these gates can be opened and the earth removed in small portions until a sufficient amount has been removed to allow the advance of the lagging and the breast-board section, after which the next one may be in like manner advanced until the whole is complete.

It is often difficult to close these boards or gates entirely, and I have therefore shown links which may be in the form of chain, or otherwise connected loose rings or sections 11, and these are adapted to slip over the ends of the gates or bars 12 and hold them when the gates cannot be entirely closed; but they will be held by these links sufficiently to be safe against the pressure of the dirt behind the breast-board.

In some cases the ground is so soft that when a breast-board has been advanced beyond the contiguous sections above or below, the dirt will often force itself through the space left between the edges of the sections on account of the advance of one of them. To overcome this I have shown the boards with a flange turned horizontally at the bottom, as shown at 6. This flange may extend toward the operators, or into the finished part of the tunnel, so that when the section is being advanced, the flange will cover the space between the bottom of the section, and the top of the next contiguous section. By making these flanges of considerable

width the tunnel may be advanced much faster because the breast-board sections can be advanced a greater distance at each forward movement without danger of the earth being pressed through the opening which is temporarily made by such advancement.

7 is a handle so constructed as to form a brace or truss which greatly increases the resistance of the board sections against being bent out of shape by pressure.

It will be understood that under certain conditions it may be found desirable to make the sections continuous and without joint; the hinged doors serving to form a passage for the removal of the dirt, and the boards may be advanced bodily without removing it from its position in front of the lagging.

It will also be understood that any means may be employed for shortening the board if it is desired to remove it. Thus, in Figs. 2 and 5, the board is made in overlapping sections guided and slidable upon each other to lengthen or shorten them as a whole. The guides and slides are shown at 14, and a lever 15 is fulcrumed and connected with the two parts of the board, so that by turning the lever out from the face, the total length will be shortened, and by turning it down to stand substantially parallel with the face of the boards, the two parts will be extended.

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

1. In a mining and like appliance, the combination with sets of timbers, suitable guide means and lagging inserted behind the timbers, of breast-boards having a length sufficient to extend across the lagging at each side of the excavation, and means whereby said boards may be shifted in the direction of their length.

2. In a mining and like appliance, the combination with sets of timbers and suitable guide means, and lagging inserted behind the timbers, of breast-boards having a

length sufficient to extend across the lagging at each side of the excavation, holes or attachments carried by the breast-board so as to be engaged by an implement whereby the board may be advanced lengthwise to cause it to engage with the lagging upon opposite sides.

3. Breast-board for mining and like excavations having a length sufficient to extend across the excavation, supporting lagging across which the ends of the boards are extended, openings made through the boards, and gates closable thereon, and links and latches whereby the gates are held in closed position.

4. Breast-boards for mining and like excavations having a length sufficient to extend across the excavation, supporting lagging across which the ends of the board are extended, openings for the removal of earth from behind the breast-board, gates closable over said openings, a plurality of link attachments, and latches whereby the gates may be partially or wholly closed.

5. Breast-boards for mining and like excavations having a length sufficient to extend across the excavation, supporting lagging across which the ends of the board are extended, said boards being made in parallel series, and each having the lower edge turned outwardly to overlap and extend beyond the upper edge of the previous board.

6. Breast-boards for mining and like excavations, lagging across which the ends of the boards are extended and supported, said boards being movable or capable of shortening to allow the ends to be retracted or extended so that the boards may be disengaged from or engaged with the lagging ends.

7. Breast-boards for mining and like excavations having a length sufficient to extend across the excavation, supporting lagging across which the ends of the board are extended, said boards being made in sections so connected as to be shortened or lengthened to disengage from or engage with the lagging ends, and handles and truss braces to maintain the boards in position.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN STOCKFLETH.

Witnesses:

Mrs. J. STOCKFLETH,
FREDERICK E. MAYNARD.