(No Model.) 2 Sheets—Sheet 1

W. BEARDMORE.

APPARATUS TO BE USED IN MANUFACTURING ARMOR PLATES.

No. 567,876. Patented Sept. 15, 1896.

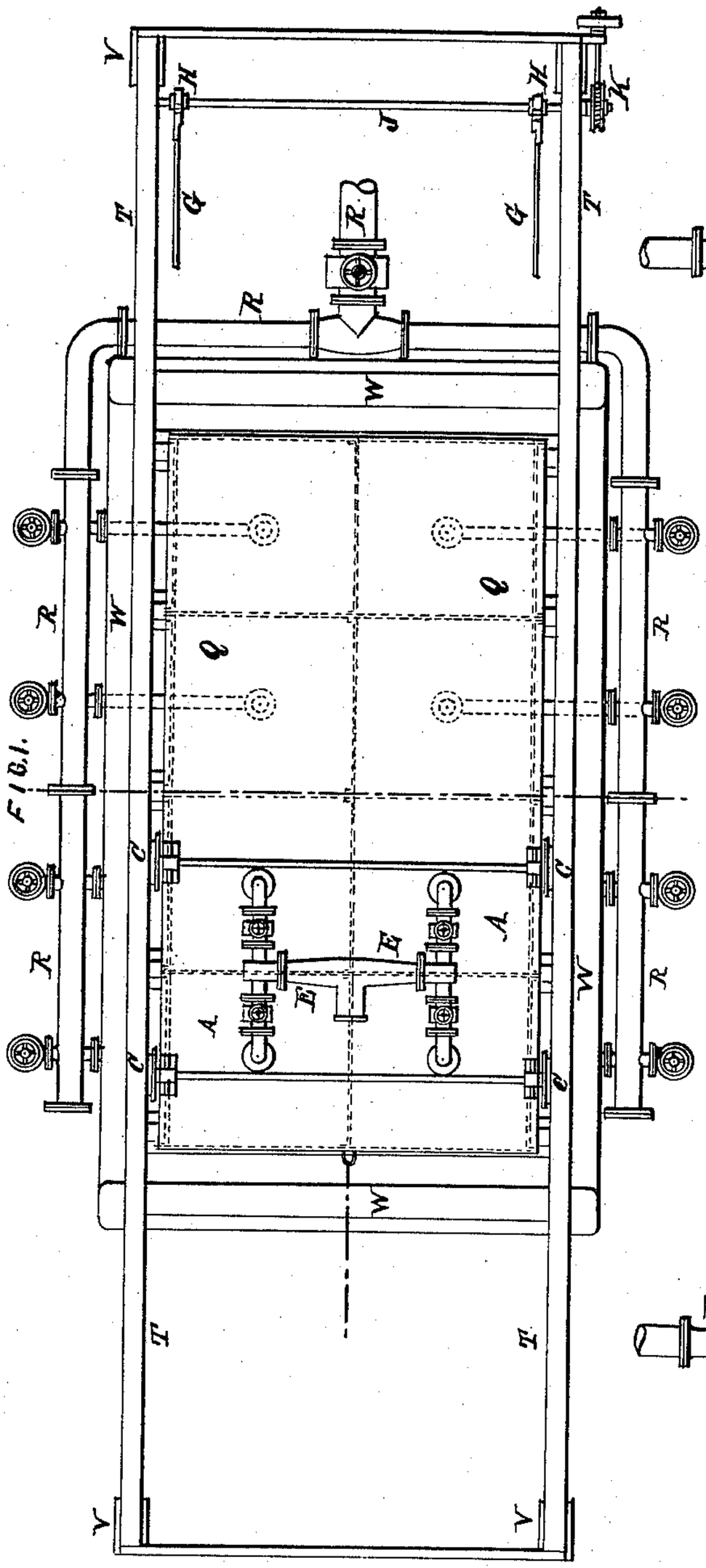

FIG. 1.

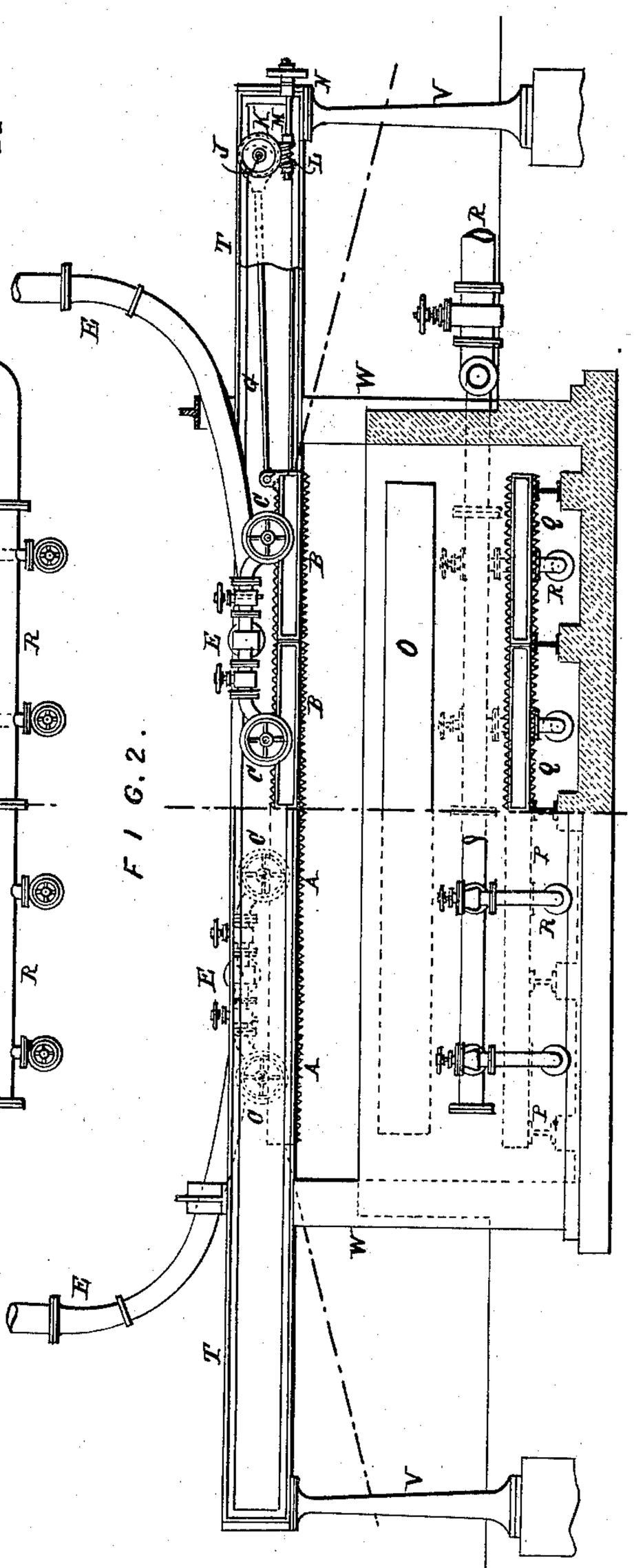

FIG. 2.

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Inventor:
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Howson and Howson

(No Model.) 2 Sheets—Sheet 2.

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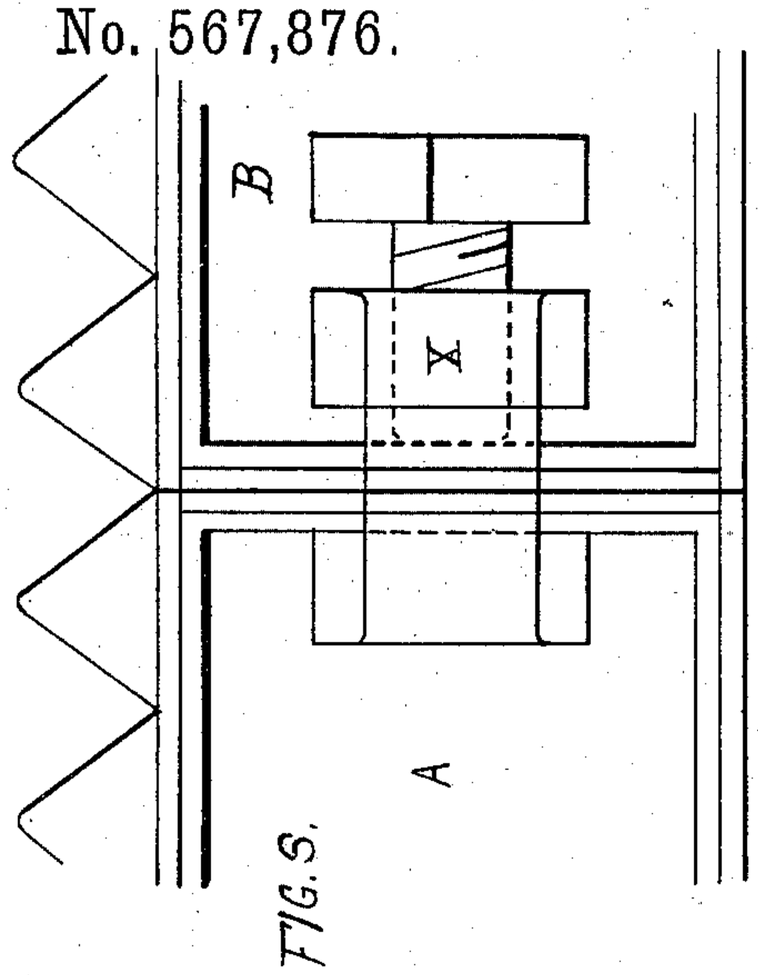


FIG. 5.

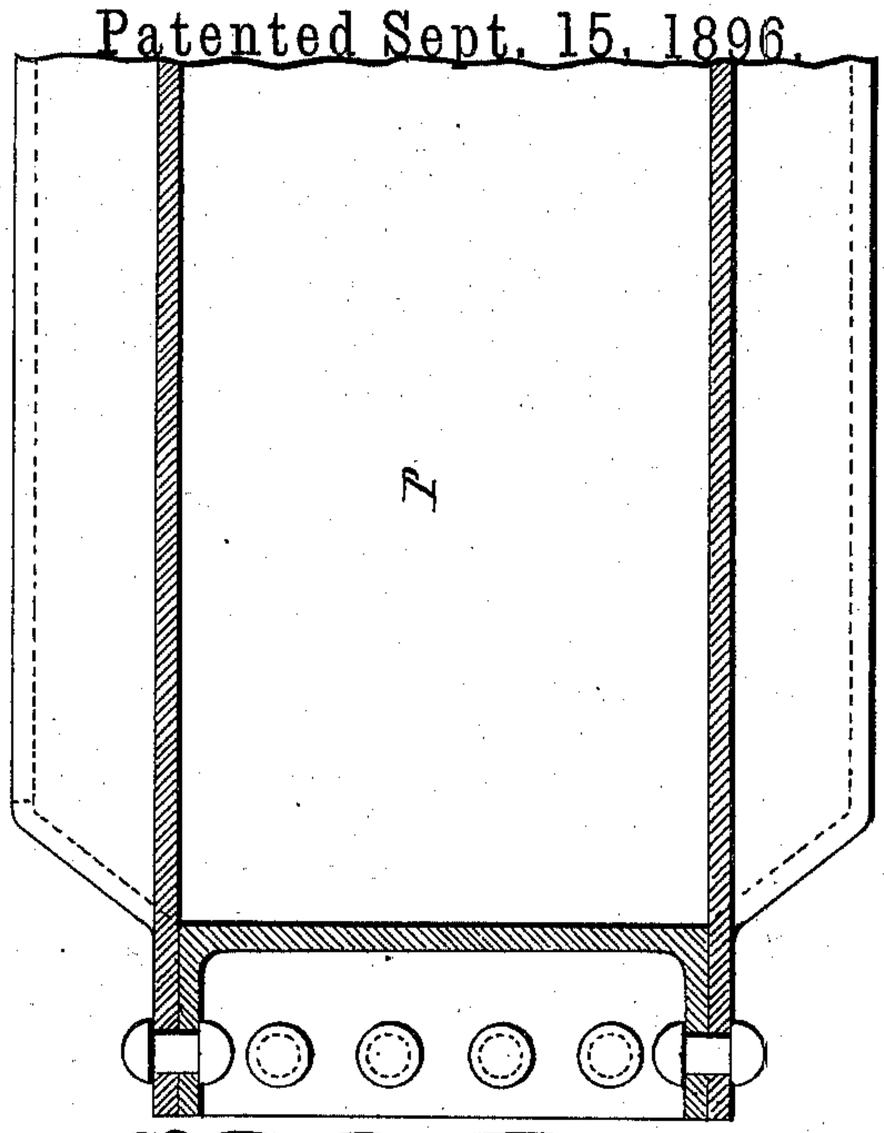


FIG. 4.

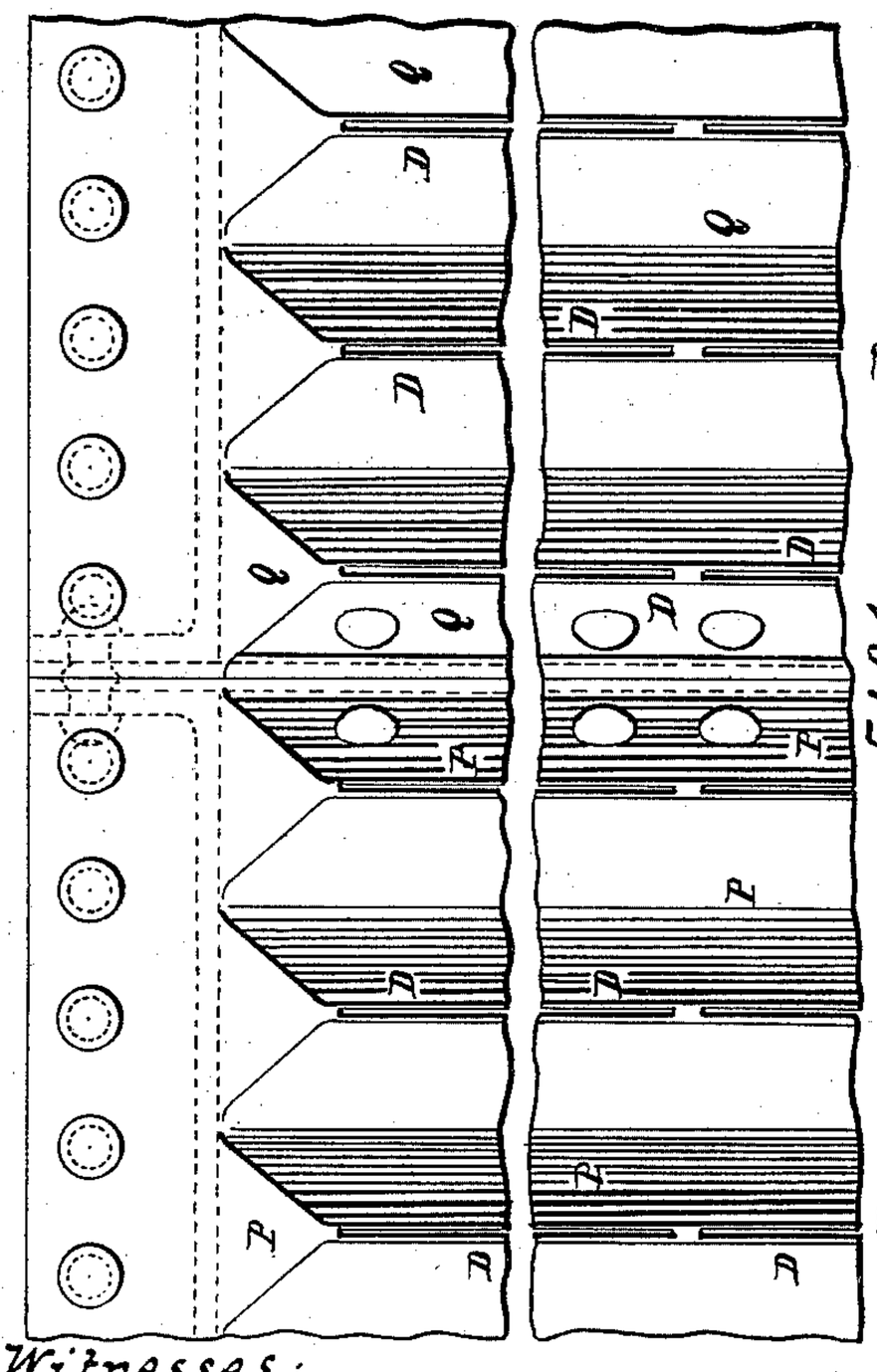
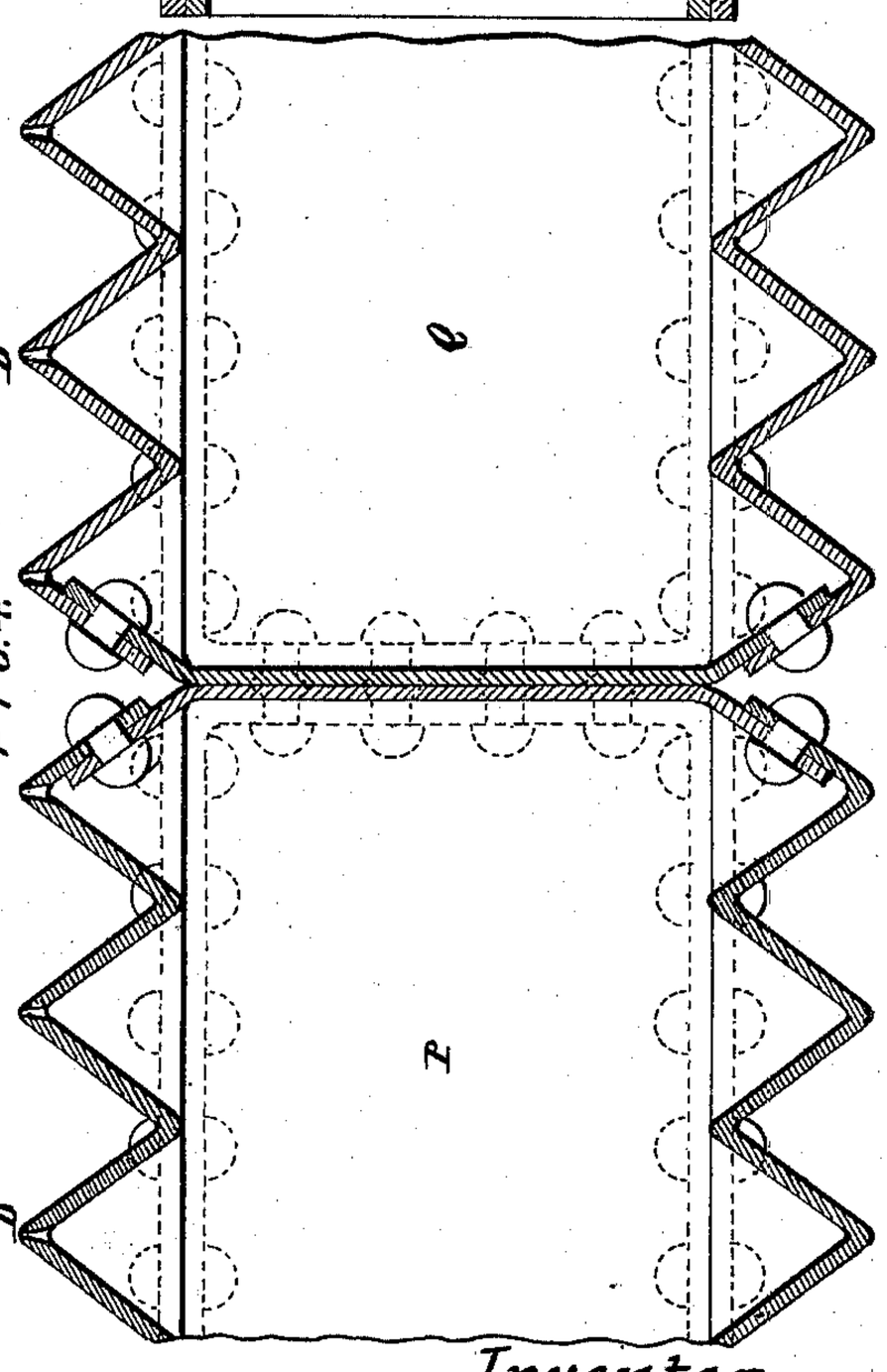


FIG. 3.



Witnesses:
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UNITED STATES PATENT OFFICE.

WILLIAM BEARDMORE, OF GLASGOW, SCOTLAND.

APPARATUS TO BE USED IN MANUFACTURING ARMOR-PLATES.

SPECIFICATION forming part of Letters Patent No. 567,876, dated September 15, 1896.

Application filed August 24, 1895. Serial No. 560,393. (No model.) Patented in France July 9, 1895, No. 248,766; in Belgium July 10, 1895, No. 116,641; in Germany July 10, 1895, No. 84,771; in Sweden August 5, 1895, No. 6,562; in Austria September 13, 1895, No. 45/3,268; in Italy September 30, 1895, LXXVII, 404, and in Spain November 14, 1895, No. 17,900.

To all whom it may concern:

Be it known that I, WILLIAM BEARDMORE, a subject of the Queen of Great Britain and Ireland, and a resident of Glasgow, Scotland, have invented certain Improvements in Apparatus to be Used in the Manufacture of Armor-Plates, (for which I have obtained Letter Patent in France, No. 248,766, dated July 9, 1895; in Belgium, No. 116,641, dated July 10, 1895; in Germany, No. 84,771, dated July 10, 1895; in Sweden, No. 6,562, dated August 5, 1895; in Austria, No. 45/3,268, dated September 13, 1895; in Italy, LXXVII, 404, dated September 30, 1895, and in Spain, No. 17,900, dated November 14, 1895,) of which the following is a specification.

My said invention has for its object to obtain increased uniformity in the surface-hardening of armor-plates when the hardening is effected by applying water or other liquid to one or both surfaces of a plate in a suitably-heated condition. My improved apparatus is also arranged so that the hardening operation can be effected conveniently and expeditiously.

In carrying out my invention I cause the water to be projected upon the armor-plate in films or sheets instead of in detached jets, and I have a to-and-fro movement imparted at right angles to the sheets or films, so that every part of the surface of the armor-plate will in turn be subjected to the direct impact of the water.

In a convenient modification of apparatus for projecting films or sheets of water on the upper surface of an armor-plate there are two water-boxes mounted on wheels to run on lateral overhead rails, these boxes being brought together over an armor-plate as soon as it has been placed in position for being hardened. Each water-box, which is constructed preferably of steel or wrought-iron, is made with two or more internal compartments, in order to equalize the distribution of the water; and the bottom and top are formed of angularly-corrugated plates, the corrugations or ridges running transversely. Slits are formed along the projecting ridges of the bottom of the box, and water, supplied to the box under suitable pressure through flexible or jointed pipe connections, issues from the slits in films or sheets. When the two boxes have been brought together and connected for an operation, they are made to reciprocate longitudinally to about the extent of the distance between two corrugations by means of connecting-rods moved by cranks or eccentrics on a rotating shaft driven at a suitable speed. If it is desired to chill the under side of an armor-plate in a similar manner, similar boxes are arranged in suitable positions.

In order that my said invention and the manner of performing the same may be properly understood, I hereunto append two sheets of explanatory drawings, to be hereinafter referred to, and showing my improved apparatus.

Figure 1 on Sheet 1 of the drawings is a plan of the apparatus with one upper-surface water-box removed. Fig. 2 is a sectional side elevation of the apparatus. Fig. 3, on Sheet 2, is a plan, and Figs. 4 and 5 are vertical sections, as at right angles to each other, of a part of an under-surface water-box, drawn to a larger scale. Fig. 6 is a view, also drawn to a large scale, to show a means for connecting two water-boxes together.

In the drawings the same reference-letters are used to mark the same or like parts wherever they are repeated.

For projecting films or sheets of water on the upper surface of an armor-plate there are two water-boxes A and B, mounted on wheels C, to run on lateral overhead rails, which are carried by girders T, supported on vertical columns V, these boxes being brought together over an armor-plate, as at O, Fig. 2, as soon as it has been placed in position in a chamber W for being hardened. Each water-box A B, which is constructed preferably of steel or wrought-iron, is made with four internal compartments, in order to equalize the distribution of the water; and the bottom and top are formed of angularly-corrugated plates, the corrugations or ridges running transversely. Slits D are formed along the projecting ridges of the bottom of the box, and water, supplied to the box under suitable pressure through flexible or jointed pipe con-

nections E, issues from the slits in films or sheets. When the two boxes A and B have been brought together and connected for an operation, (which may be done in any convenient way, as by means of clamps X, Fig. 6,) they are made to reciprocate longitudinally to about the extent of the distance between two corrugations by means such as eccentric-rods G, connected to eccentrics H on a rotating shaft J, driven at a suitable speed. On the end of the shaft J, for driving it, there is a worm-wheel K, into which there gears a worm L on a shaft M, driven by means of a pulley N on it.

The figures also show apparatus for chilling the under side of an armor-plate in a similar manner, similar but (in this instance) stationary water-boxes P and Q being arranged in suitable positions. Slits D are formed in the projecting ridges of the tops of the boxes, so as to direct the films or sheets of water (supplied by pipe connections R to the boxes) upward against the under side of an armor-plate.

I claim as my invention—

For chilling heated plates, apparatus consisting of a box having a supply-pipe and a series of transverse corrugations, and slits along the projecting ridges of such corrugations for the issue of the chilling liquid in sheets or films, substantially as described.

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

WILLIAM BEARDMORE.

Witnesses:

EDMUND HUNT,

DAVID FERGUSON.