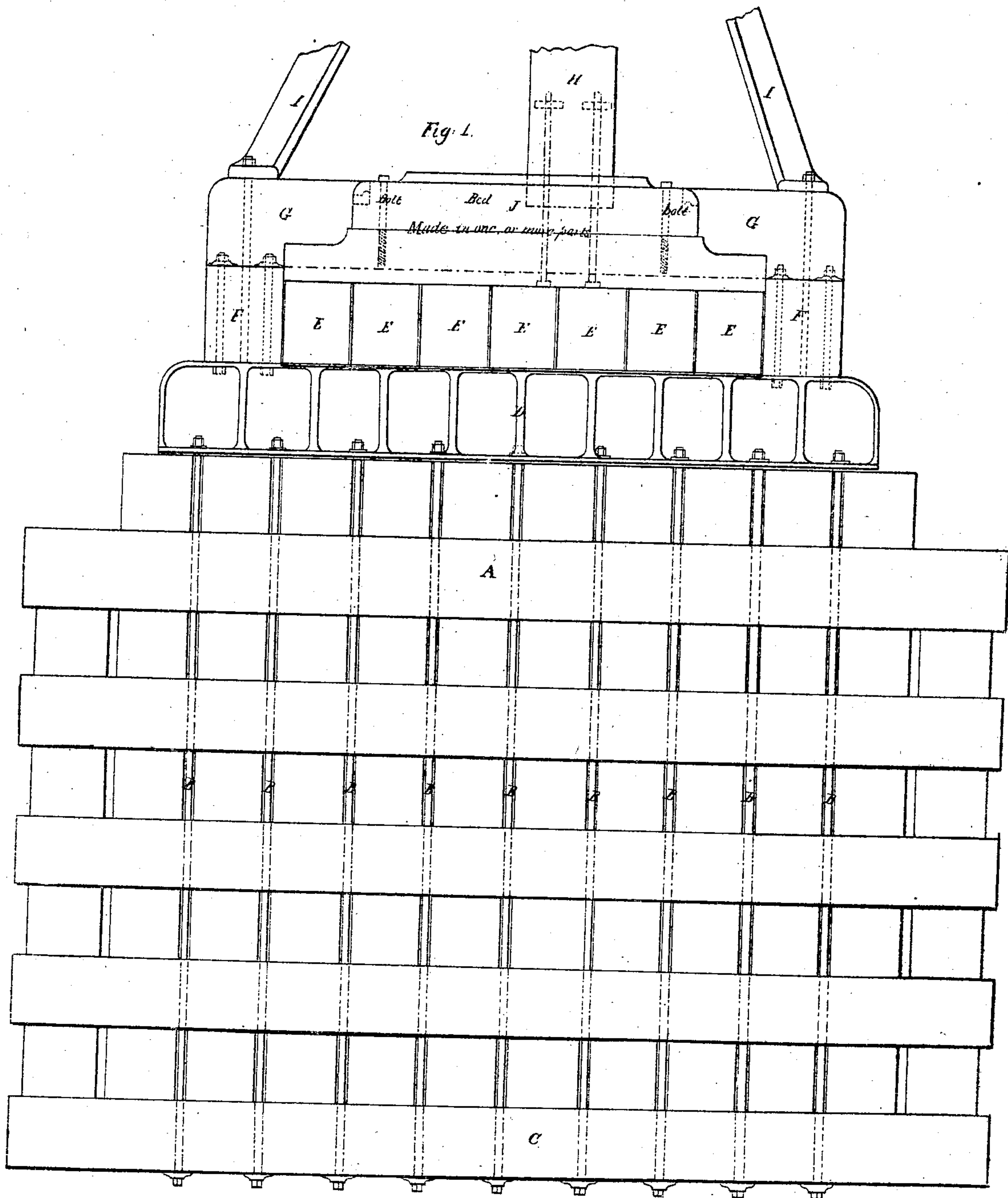


W. Ball.

Stamping Ores.

N^o 72715

Patented Dec. 31, 1867.



Witnesses:

A. C. Wilder
Jeremy W. Bliss

Inventor:

W. Ball

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Fig. 2.

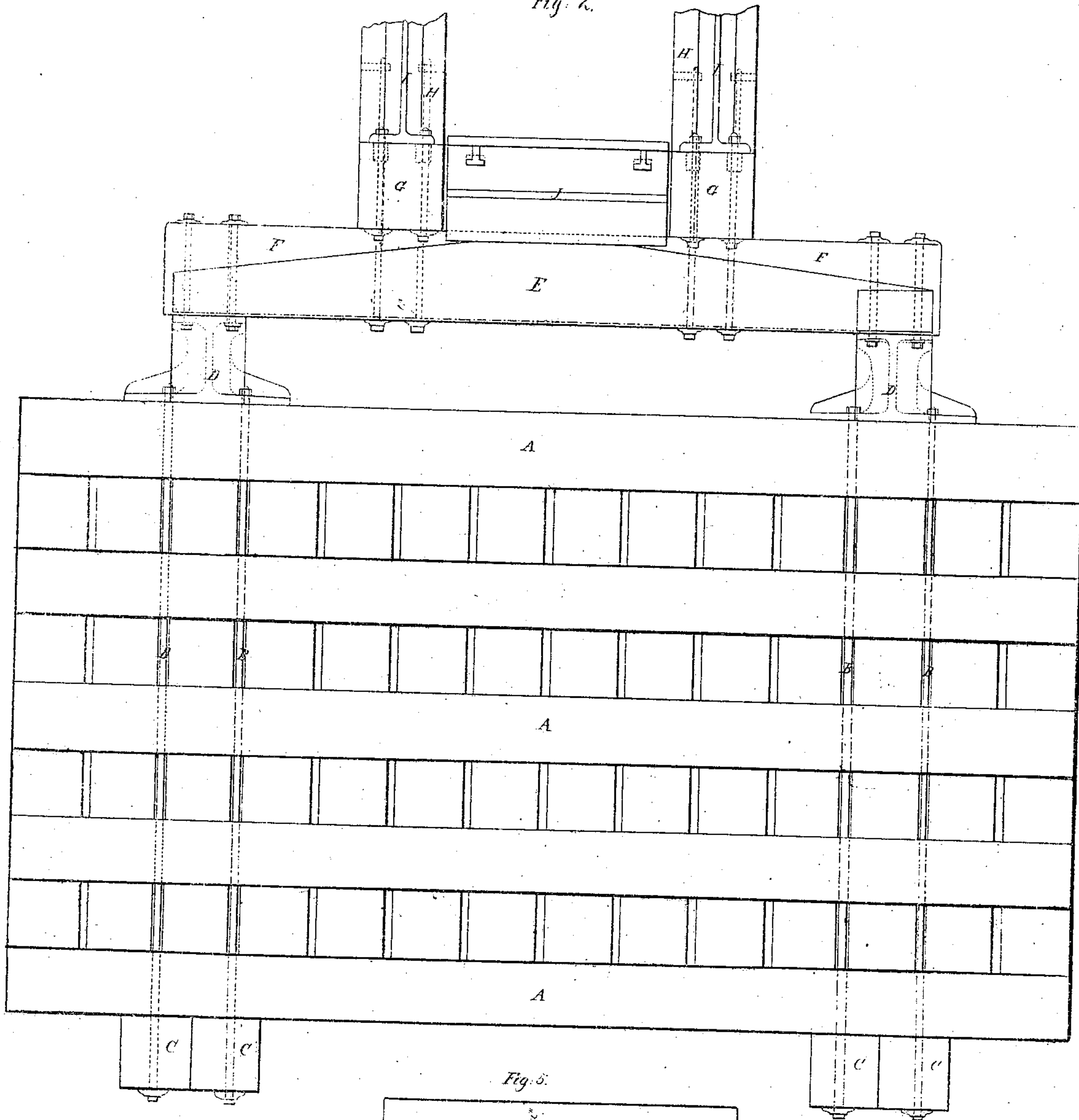
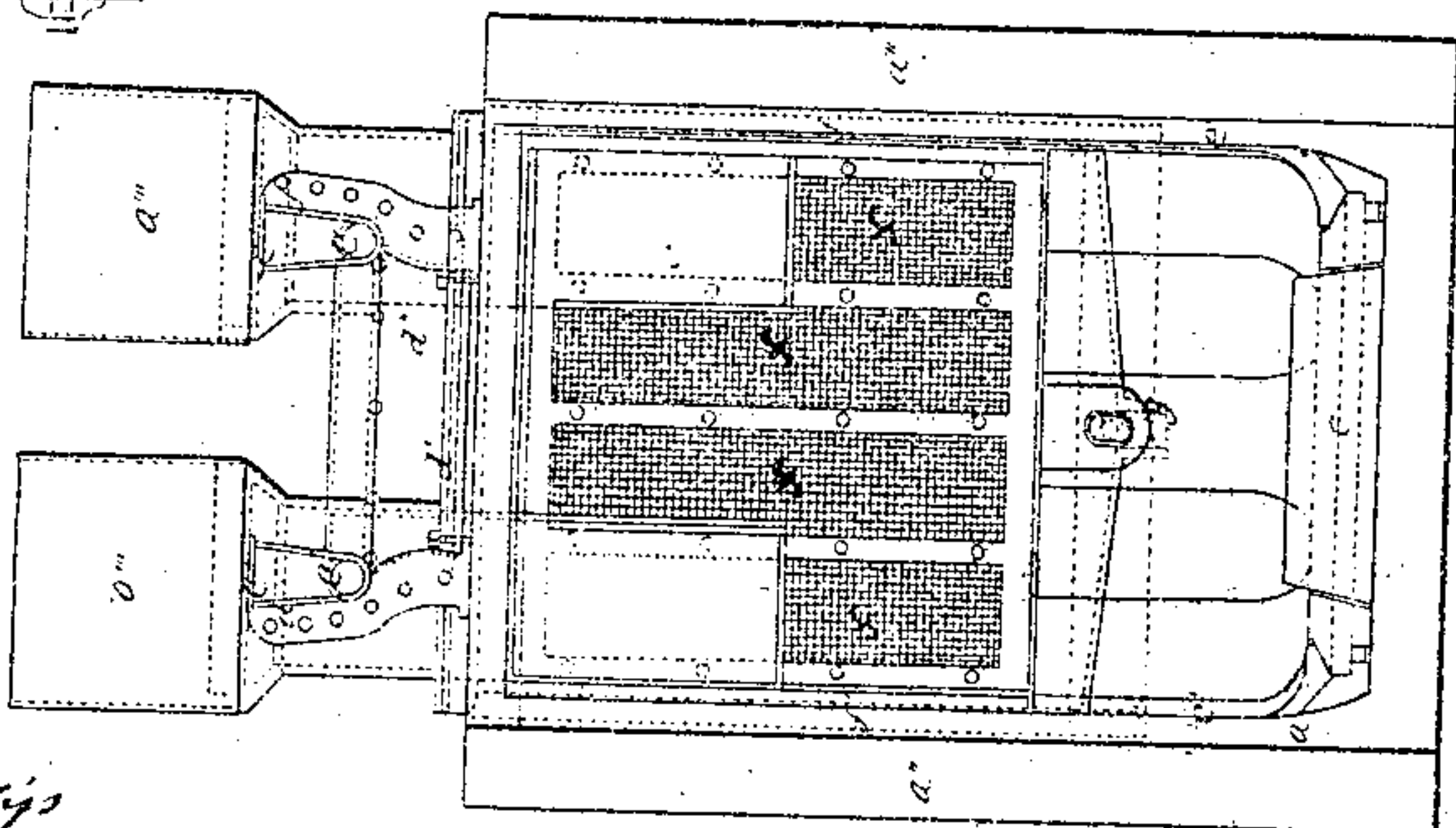


Fig. 5.



Witnesses.

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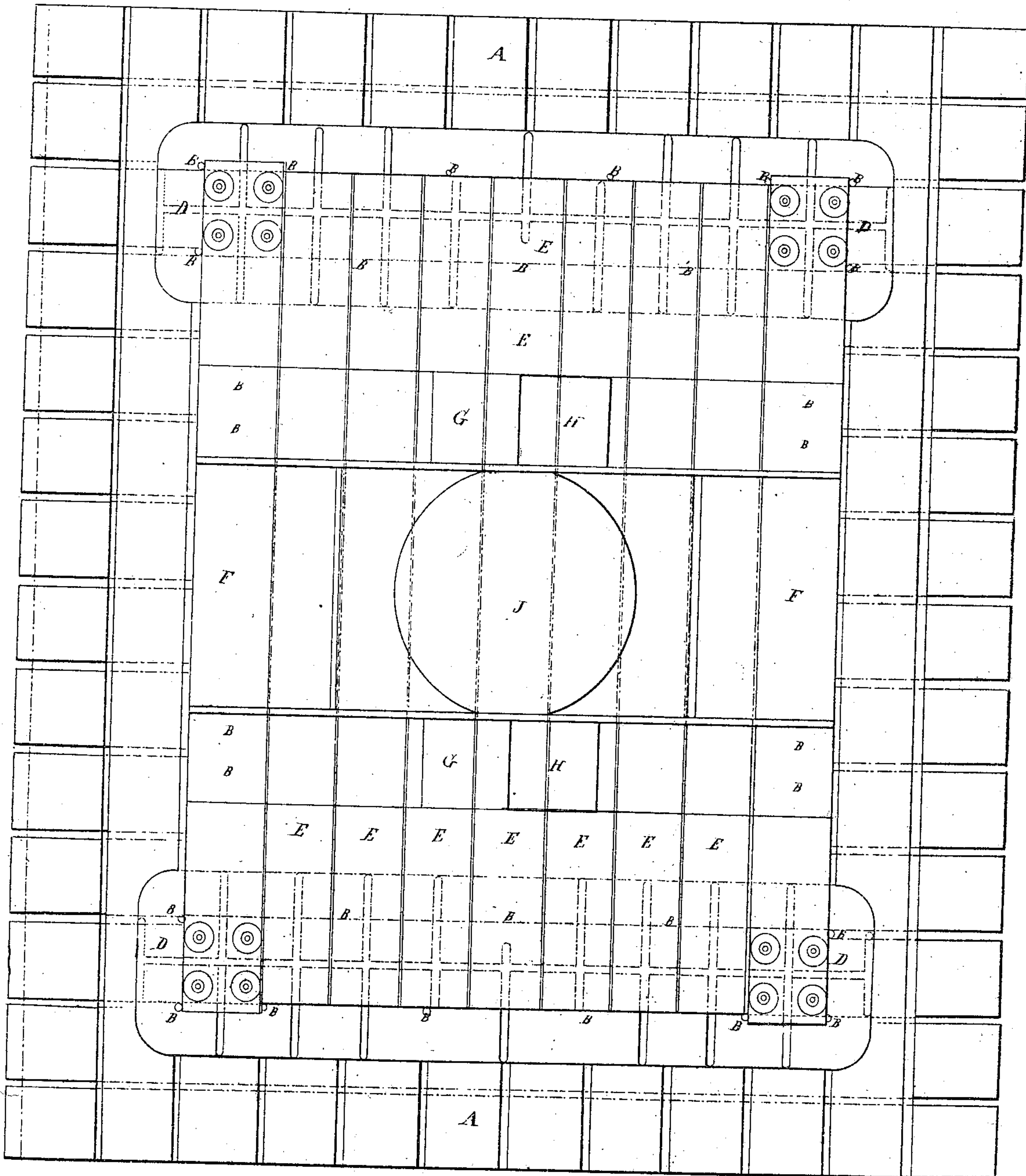
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Fig. 3.



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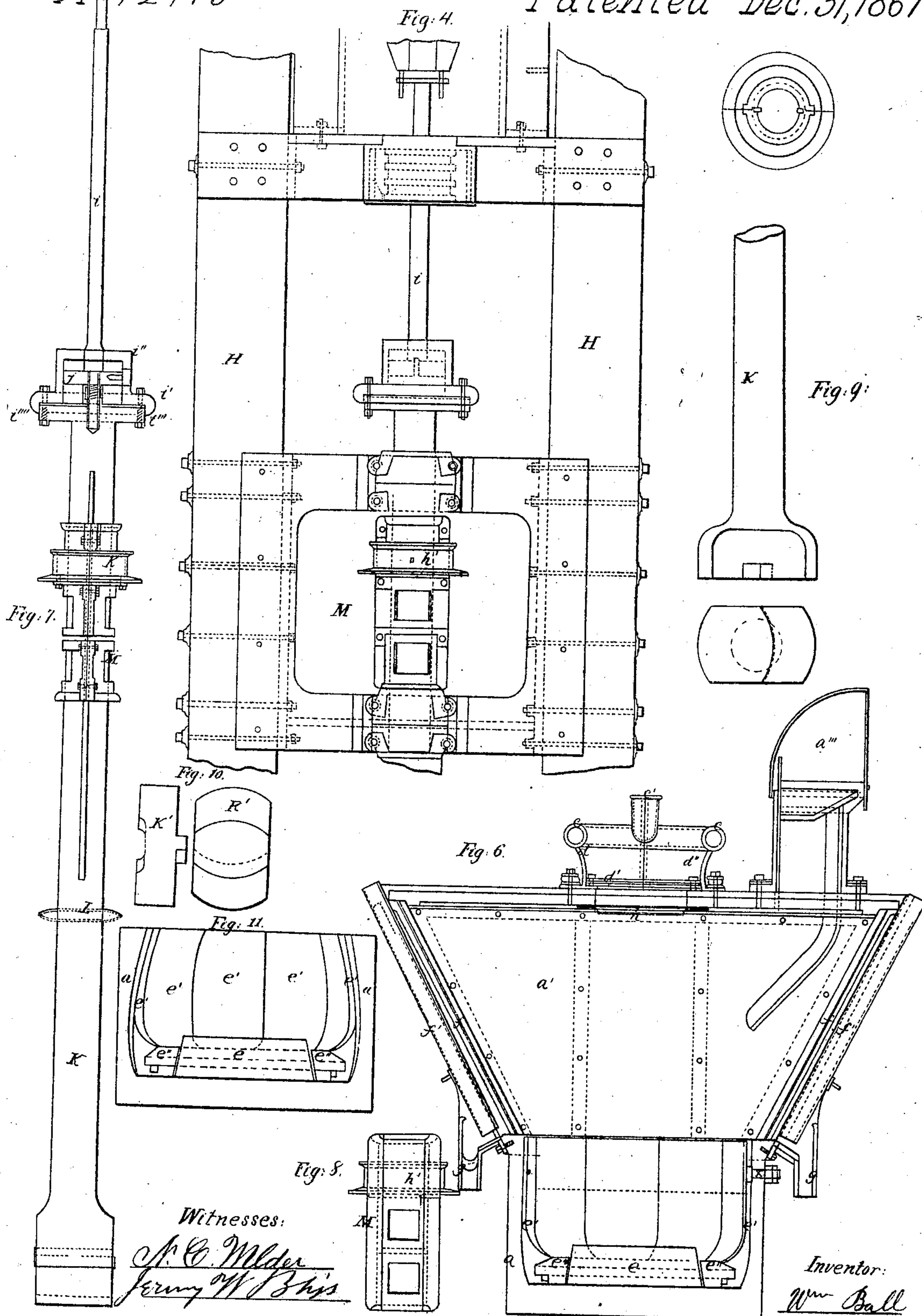
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United States Patent Office.

WILLIAM BALL, OF CHICOPEE, MASSACHUSETTS.

Letters Patent No. 72,715, dated December 31, 1867.

IMPROVED MACHINE FOR STAMPING ORES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, WILLIAM BALL, of Chicopee, county of Hampden, and State of Massachusetts, have invented certain new and useful Improvements in Machines for Stamping Ores or Mineral Rock, &c.; and to enable others skilled in the art to make and use the same, I will proceed to describe, by referring to the drawings, in which the same letters indicate like parts in each of the figures.

The nature of this invention will be understood from the specification and drawings, in which—

Figures 1, 2, 3, show the plan and construction of the foundation, with a portion of the framework.

Figure 4 shows a view of a double and single beam, which connect the perpendicular posts, and through or in which the steam-piston rod and the stamp-shaft are secured and work.

Figures 5 and 6 show a front and side view, in section, of the mortar-box and mortar.

Figure 7 is an elevation of the stamp-shaft, partly in section.

Figures 8, 9, and 10, are views of detached portions of said stamp-shaft and hammer-head.

In figs. 1, 2, 3, A is a timber foundation, bedded in the ground, each successive tier of which is placed crosswise, one tier upon the other, and a little distance apart, so that apertures will be produced in their angles from top to bottom through the several tiers, through which apertures, bolts B are allowed to pass, the lower end through the girders C, and the upper ends through the lower flange of the cast-iron sill D. By means of these bolts the whole structure or foundation of timbers is bound firmly together, and the interstices (when bedded in the ground) are filled with grout, thus rendering the foundation solid.

This sill D is made of metal, in order to produce a broader base and greater solidity thereto, than can be conveniently obtained in one piece of timber, for the purpose of taking or affording a broader surface-bearing upon and across the ends of the sills A, the base-bearing surface of which (sill D) is about three feet wide. Ordinarily, good sound timber cannot be obtained, which will square up over eighteen inches, which, of course, will cover only eighteen inches bearing-surface, and the severe usage to which they are subjected will very soon batter the timbers, much to their injury or entire destruction. For these reasons I have adopted iron sills D, thus producing a broad bearing-surface in one piece to rest upon the sills A, and a firm, unyielding support for the stamp-frame sills and the spring-timbers E. The metal weight of these sills D is about three tons each. These sills D support the whole machine, with its framework, the metal weight of which is about thirty-two tons each.

F are cross-timbers, about seventeen by twenty inches square, each end of which is secured to the outer ends of the metal sills D. G are cross-timbers, about sixteen by eighteen inches square, the ends of which are secured firmly to the timbers F, about four feet equidistant from the centre thereof. In the centre of these timbers are secured perpendicular posts, H, about eighteen inches square, which serve as supports for the stamp and its mechanism. These timbers or posts H are supported by braces I. The foot of each brace is firmly secured to the outer ends of the timber F. The upper ends of these braces are firmly secured to the posts H. The spring-timbers (seven in number, and about thirteen by eighteen inches square) E are skived off on the upper side, from a point about eighteen inches each way from the centre, down to a thickness of about nine inches at their ends. These timbers are arranged side by side between the sills F. J is a metallic bed-plate, of about ten tons weight, which, for convenience of transportation, may be made in two parts. Its shape will be understood from the drawings. It is of such size as to nearly fill the space between the timbers G F, and has its bearing directly upon the spring-timbers E. The stamp-mortar (about ten tons weight) has its foundation upon the centre of the bed-plate J. The whole depth of the foundation timbers will be about twelve feet.

Heretofore only three spring-timbers, E, have been used to support the cast-iron bed upon which the mortar is secured, which timbers have proved insufficient for the work that is put upon them; consequently, in from six to nine months they break, and cause great damage in various ways. To avoid this difficulty, I substitute a greater number of timbers, and place the bed crosswise, instead of lengthwise, (as heretofore,) which allows of four additional timbers, thus producing a broader and steadier foundation to support the mortar and the framework of the machine, and at the same time producing a greater spring surface to sustain the blow of the hammer.

The metal sill D is provided (instead of the timber sills) because they can be made of any desirable size.

width, or shape, so as to secure a broader bearing-surface in one piece upon the foundation-timbers A, and also to more perfectly secure said sills D firmly upon the foundation-timbers A by means of bolts B.

In figs. 5 and 6, *a* is a stamp-mortar; *a'* is a mortar-box, two sides of which are perpendicular and parallel with each other. Flanges *a''* are formed on each of these parallel sides of this mortar or box, perpendicular, and near the centre thereof, for the purpose of securing said mortar in an erect and firm position to the posts H, while the mortar itself rests upon the bed-plate J. This mortar-box, sides, top, and flanges are all made in one piece of cast metal, several of which are now in use. The inner sides and the under side of the top are lined with about half-inch metal plate. The top plate of the box is provided with apertures to receive the hoppers *a'''*, through which the material is introduced into the machine, and has also a central aperture, in which is secured a flange bell-shape necking, *d*, through which the shaft with its stamp-head may be introduced, before putting the packing-ring in place and while setting up the machine. The hoppers *a'''* are made of metal, and lined with metal, so that the parts most liable to wear away may be easily and quickly re-lined, when necessary. The shape and proportion of these hoppers will be understood from the drawings.

The aperture through which the shaft works is provided with a flanged bell-shape necking, *d*, made in two parts, and secured together by flanges, and having a tubular-ring rim, *e*, and funnels *e'*. Said tubular rim, *e*, is provided with perforations or jets, at regular intervals, on the inside, and near the bottom thereof. The object of these, the funnels *e'* and jets, is to introduce a supply of water into said tubular rim, and thence, through the orifices, in a direction downward and towards the stamp-shaft, the object of which is to keep down the splash and supply the stamp with water.

d' are water-packing rings, fitted upon the inside flange of the necking *d*, and secured to the top plate of the box *a'*. Between these rings is secured a leather ring, *d''*, which projects inward nearly to the stamp-shaft, or so as to leave about an equal space around and between its edge and the side of said shaft, so as to allow a body or equal sheet of water to flow all around said shaft into the box, for the purpose of counteracting the splash or rising of material produced from the action of the stamp-hammer. The opening of this leather ring is of about the same size of the shaft at its highest point of altitude; that is, the inside diameter of the ring is nine inches and the diameter of the shaft is eight inches, which allows half an inch play around the shaft, but the shaft, when elevated to its highest point, is nine inches in diameter in the ring, and nearly or quite fills the opening in the leather ring, and consequently the flow of water for the moment is checked, until the shaft again drops, causing the splash to rise, when the accumulated supply of water, with the regular flow thereof, falls through the space, between the leather ring and shaft, and counteracts the rising splash or material.

In addition to this packing I also secure a clamp-flange, L, to the shaft K, just above the necking, the object of which is to prevent or counteract any splash or gritty water that rises upward between the leather ring and shaft, which will sometimes occur when the leather ring becomes worn.

I also provide a metal ring, *h*, made in two parts, having an opening about twelve inches in diameter, and having its edge curved downward, more or less, which ring is secured around the stamp-shaft opening on the under side of the top plate of the box *a'*, between said plate and the lining, the object of which is to break the greater portion of the splash from coming in contact with the leather ring and the stamp-shaft. The inside diameter of the mortar *a* is made larger at or near the bottom than it is at the top. The staves *e'*, ten in number, (more or less,) are made of corresponding shape, so that, when they are all inserted to their place, closely side by side around the ring of the hammer, block, or anvil *e*, and the last stave (made wedging or dove-tail shape) is inserted and drawn back to its place or position with the others, against the wall of the pot, by means of a bolt, *x*, it will bind the others closely in their respective places. The mortar-die or bed (the shape of which will be clearly seen in fig. 6) is slightly conical shape, and nearly the same diameter of the inside diameter of the ring. The staves are also made thicker at their lower ends than at their upper ends, and the outside diameter of the staves, when placed compactly together in the pot, are larger at their base than at their upper ends, the object of which is to prevent them from jumping upward out of place from the jar or working of the stamp-hammer.

f are sieves or gratings, through or against which the water or choice metal splashes and escapes from the machine through the spout *g*. These perforated plates are secured in each side of the box-opening, (front and rear,) so as to be easily taken out and replaced, and held by plates and screws at their upper ends.

f' is a metal framework, secured upon the outside of the mortar-box, (front and rear,) and having grooves to receive the edges of the metal splash-plate. It is also provided with a trough and-spout at its lower side, which conducts the wash from the machine into a receptacle arranged therefor. Without these plates the water with the mingling material would be thrown, at each drop of the hammer, through the grating in a perfect shower-bath into the open space where the machine is located. This mortar and box are secured loosely to the upright posts by means of bolts, which pass through said caps and posts, between which the flanges, formed on the sides of said mortar, play or work.

In fig. 7, *k* is a metal stamp-shaft, the head of which is about twenty-two inches in diameter, tapering, the first two feet from or above the head, from nine inches in diameter to eight inches in diameter; the whole length above two feet from the head, is eight inches in diameter. This head is flattened on two sides equally, sufficient to reduce it to fourteen inches in thickness, from side to side.

k' is the stamp-hammer. Its shape is about the same as that of the head to which it is secured; its depth is about eight inches and a half. The outer edge of the hammer wears away faster than the centre, and for this reason I form a depression in the centre, (of its face,) to produce even wear of the face of the hammer, but I sometimes use them without said depressions. This hammer is secured to the stamp-shaft head by a dove-tail joint, one side of which is straight across from side to side of the head; the opposite side is curved, and both

sides are cut under dove-tailing. Said dove-tail formed on the hammer is smaller than the opening formed in the head for its reception, to admit a key to enter, and thereby firmly secure the hammer to the head.

M is a framework-pulley, made in two parts, and secured together by bolts or screws, and fitted to the stamp-shaft, and having splines which work in grooves formed in the shaft. The office of this pulley is to give a rotary motion to the stamp-shaft, by means of a belt, which runs upon said pulley, *h'*. The upper end of this stamp-shaft is secured to the outer end of the steam-cylinder piston-rod *i*, by means of a flange, *i'*, and the bonnet *i''* and fastening-bolts *i'''*.

j is a collar, secured firmly on to the piston-rod by set-nuts. Between this collar *j* and the bonnet *i''* is an elastic washer or spring, two inches thick. Between the under side of this collar *j* and the flange *i'* is an elastic packing or spring, four and one-fourth inches thick. The end of the piston-rod is fitted loosely into a steel bushing, secured into the upper end of the shaft K.

The manner of setting up this machine and putting it into operation will be clearly understood from the foregoing description.

I believe I have thus shown the nature, construction, and advantage of this invention, so as to enable others skilled in the art to make and use the same therefrom.

Having described my invention, I will proceed to state what I claim.

1. I claim, in connection with a quartz-crushing machine, the sills D, when constructed of metal in place of wood, as and for the purpose described.
2. I claim arranging the bed-plate J crosswise of a series of spring-timbers E, having their bearing upon metallic sills D, substantially as and for the purpose described.
3. I claim the construction of the staves *e'*, tapering in form from the bottom toward the top, as specified, to suit the bell-form of the mortar, substantially as and for the purpose set forth.
4. I claim the hammer-die *e*, in combination with the surrounding stave-holding ring *e'*, substantially as and for the purpose described.
5. I claim the two-part ring *h*, secured beneath the top plate, and between it and the lining around the stamp-shaft opening, substantially as and for the purpose described.
6. I claim a tubular urn-shape ring-necking, *d*, made in two parts, and secured upon the top plate around the stamp-shaft opening, substantially as and for the purpose described.
7. I claim the connection of the stamp-shaft K with the steam-piston *i*, by means of the bonnet *i''*, flange *i'*, and collar *j*, with the interposed elastic washers, as described, all arranged and combined together in the manner and for the purpose set forth.

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Witnesses:

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JEREMY W. BLISS.