

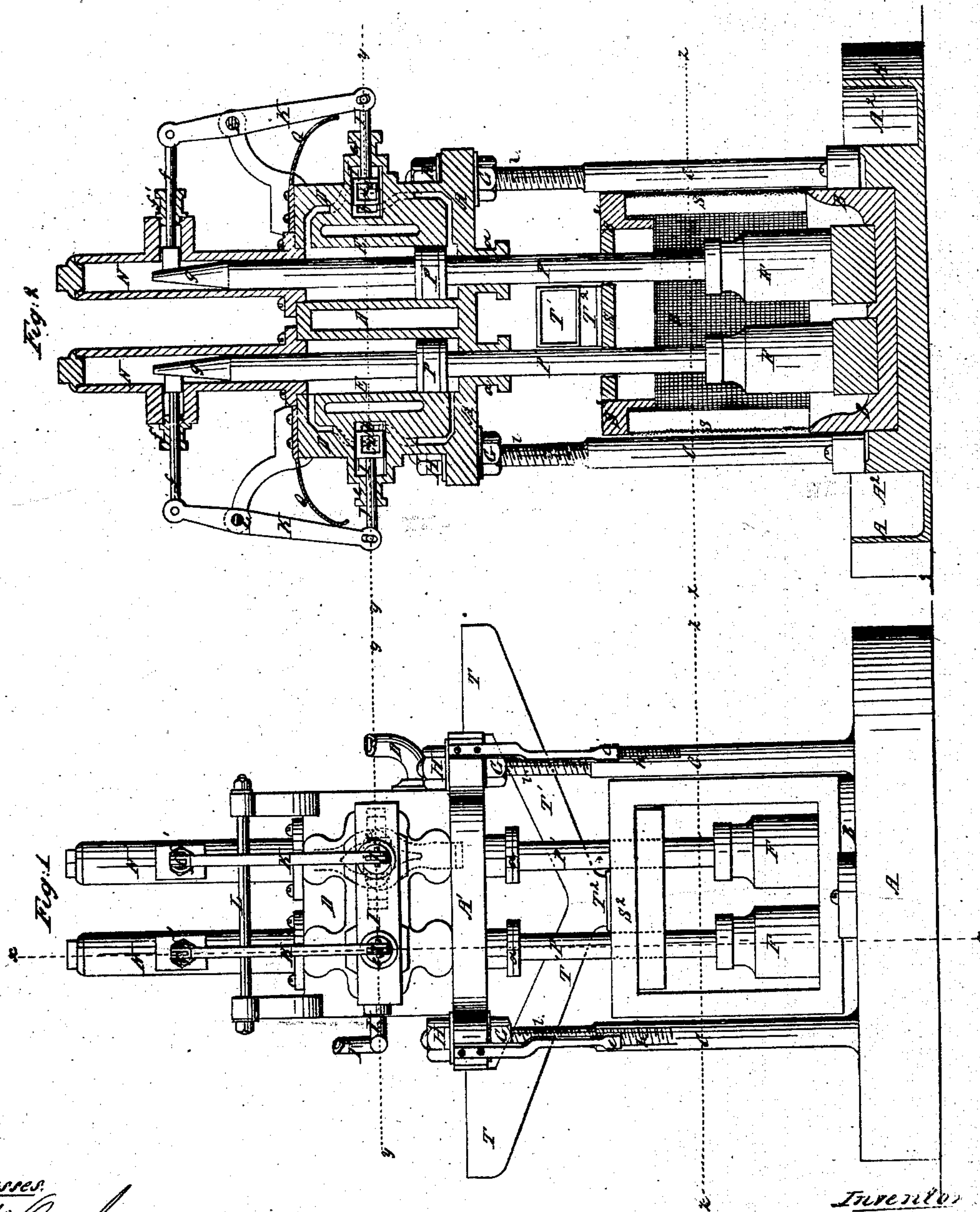
Sheet 1, 3 Sheets.

W. Wright.

Ore Stamp.

N^o 60,110.

Patented Nov. 27, 1866.



Witnesses

J. W. Coombs
L. W. Reed

Inventor

W. Wright

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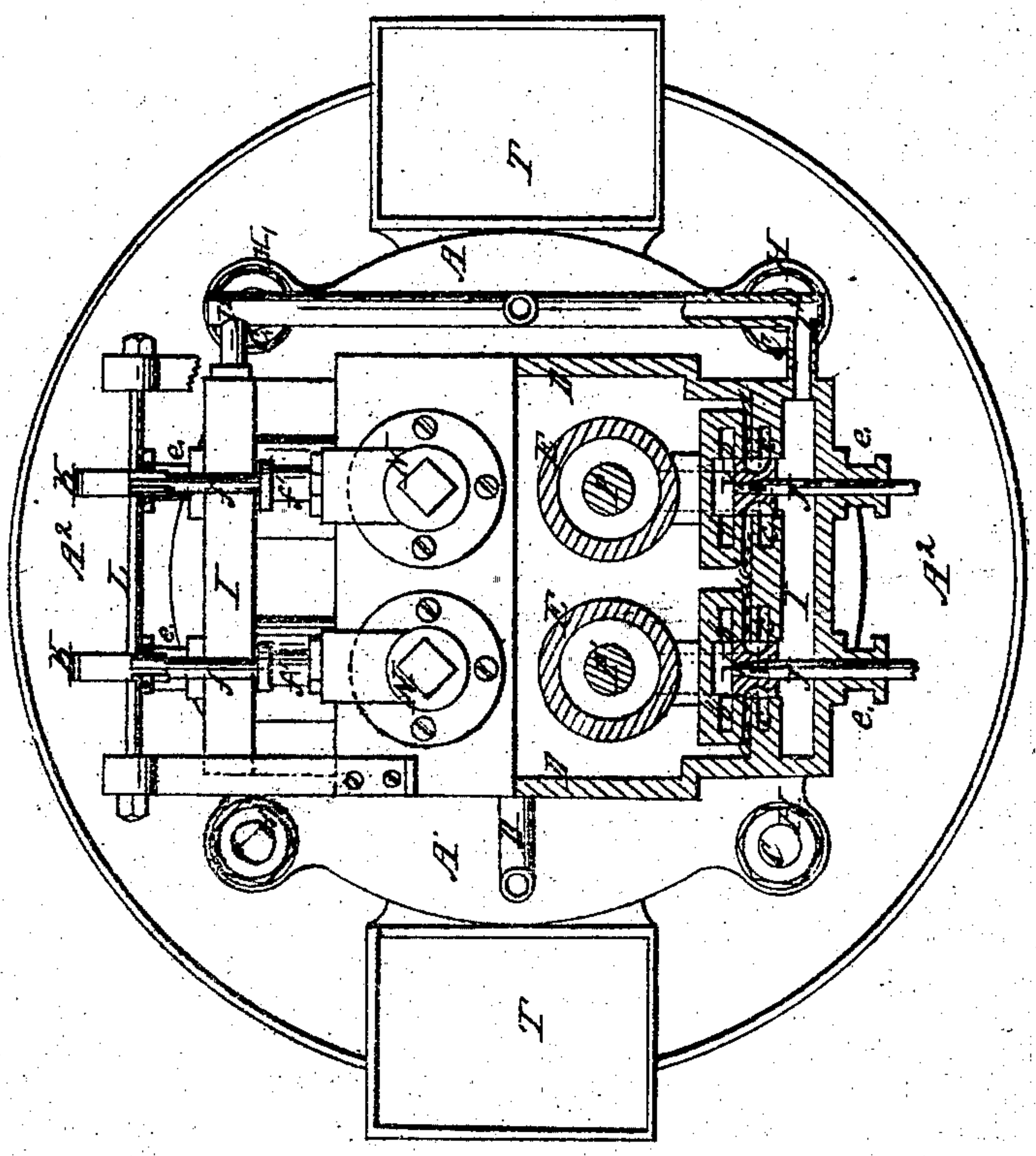
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Fig. 3



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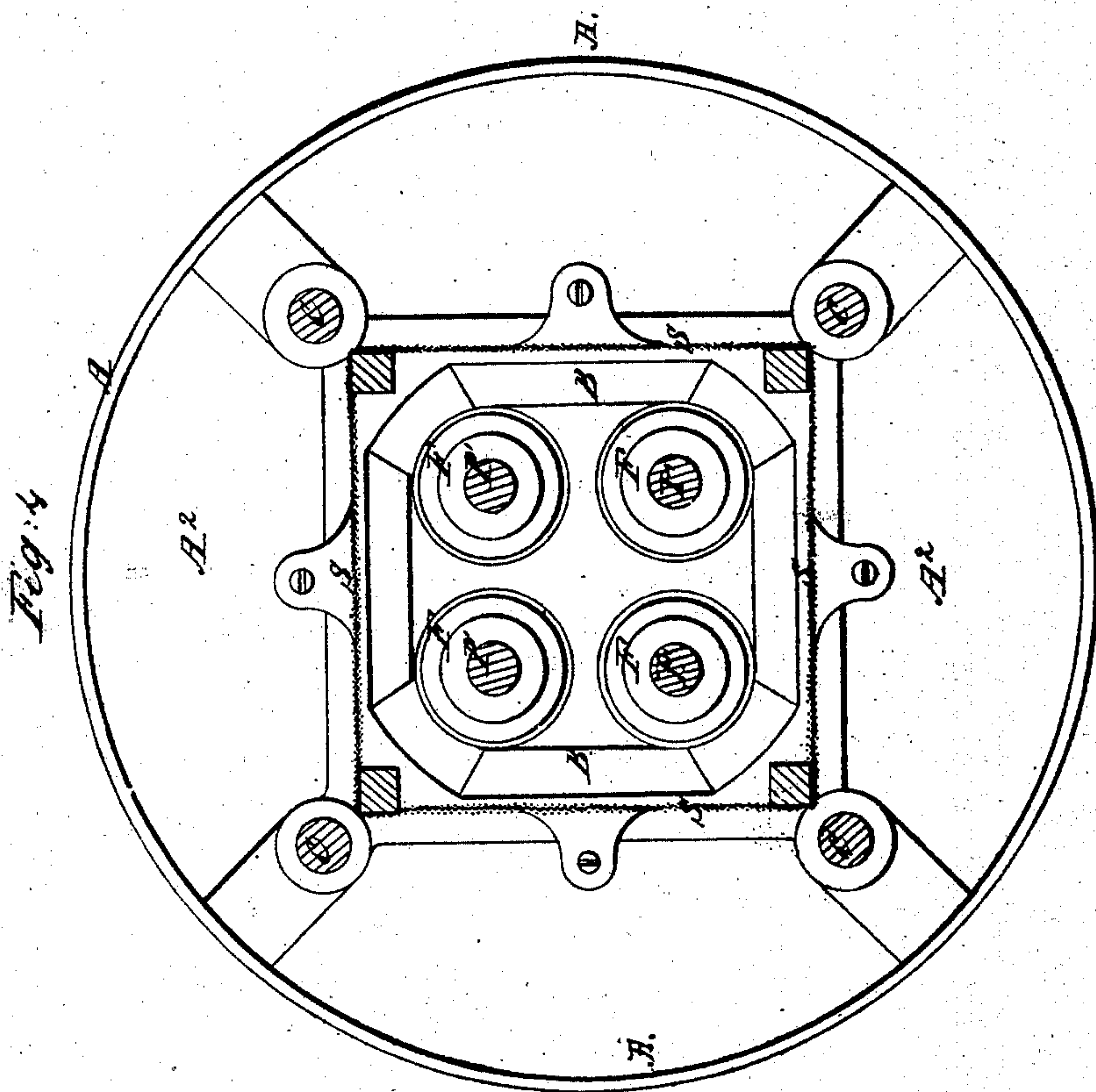
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IMPROVEMENT IN STAMP QUARTZ MILLS.

WILLIAM WRIGHT, OF NEW YORK, N. Y., ASSIGNOR TO JOHN H. CHEEVER,
OF SAME PLACE.

Letters Patent No. 60,110, dated November 27, 1866.

SPECIFICATION.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, WILLIAM WRIGHT, of the city, county, and State of New York, have invented certain new and useful improvements in Stamping Mills for Crushing and Pulverizing Ores and other substances, applicable in part also to hammers; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is an elevation of a stamping mill constructed according to my invention.

Figure 2 is a vertical section at right angles to fig. 1, in the plane indicated by the line $x x$ of that figure.

Figure 3 is a plan partly in section in the plane indicated in the line $y y$ of fig. 1.

Figure 4 is a horizontal section of the same in the plane indicated in the line $z z$ in fig. 1.

Similar letters of reference indicate corresponding parts in the several figures.

The main object of this invention is to provide for the operation of the stamps in stamping mills by the direct action of steam above and below pistons of direct-action engines attached directly to the stamp rods; but the invention is in part applicable to stamping mills in which the stamps are operated in other ways. To facilitate the direct application of steam power to the stamps, as above mentioned, and to obtain an equal delivery of the ground material all around the mill, the stamps, when more than two are used, instead of being arranged in a row, are arranged in a group, and they and the battery entirely surrounded by a screen which is again surrounded by a trough for the reception of the ground material, and the ore is fed into the mill in the centre of the group of stamps. The induction and eduction of steam to and from the steam cylinders in which the pistons are contained, are effected by valves and valve gear operated by the piston and stamp rods, in such manner as to permit the turning of the stamps as much as necessary; and the steam cylinders, with the valves and valve gearing, are also applied as to be capable of being lowered by degrees as the stamps wear away with use, and to thereby maintain a uniform or nearly uniform stroke and clearance of the pistons within the steam cylinders. The same adjustment of the cylinders is applicable to steam hammers.

To enable others to make and use my invention, I will proceed to describe it with reference to the drawings.

A represents a circular cast-iron bed-plate, in which is formed or placed the battery, B, and which forms the base of the apparatus. On this bed-plate there are erected, at equal distances apart, four pillars, C, for the support of the horizontal sole-plate, A^1 , of vertical steam cylinders E E, and their surrounding steam jacket, D, there being one steam cylinder for each of the stamps, F, each containing a piston, P, secured upon the lifting rod, P' , of one of the stamps. There may be any number of stamps, pistons, and steam cylinders, but I prefer, as a matter of convenience, that there shall be, and have represented, four arranged in the form of a square or at equal distances from a vertical line drawn through the centre of the battery, such arrangement providing for the feeding of the ore to the centre of the battery and group of stamps, and for its equal distribution to all the stamps, and for an equal delivery of the crushed ore on all sides of the mill through the screen, S, which surrounds the battery and stamps, and into the trough, A^2 , which is provided in the bed-plate, A, around the screen. To simplify construction, the cylinders and their sole-plate and surrounding jacket are all cast together. On the upper parts of the pillars, C C, which pass through holes in the sole-plate A^1 , there are screw-threads, $l l$, fitted with nuts, G G and H H, below and above the sole-plate, the lower nuts, G G, supporting the sole-plate and cylinders, and the upper ones, H H, holding them down. By screwing down the nuts G G the sole-plate and the steam cylinders, and all their attached parts, which will be hereinafter described, may be lowered bodily and so adjusted to the battery daily, or as often as is necessary to compensate for the wear of the stamps, and so maintain a uniform or nearly uniform clearance between the pistons and the tops and bottoms of the cylinders. In order that the sole-plate, A^1 , may easily be kept horizontal in its adjustment, and all the cylinders may be lowered equally, there are gauges, consisting of scales, h , of equal parts, in each pillar, C, and indices, i , attached to the sole-plate opposite each pillar. The stamp and piston rods, P' , pass through stuffing-boxes, a , in the bottoms of the cylinders or the sole-plate, A^1 , and their upper parts enter into hollow columns, N N, which form portions of or are firmly secured to the steam-cylinder covers, the said columns being concentric with the cylinders and bored out to form guides to the upper parts of the rods, and being closed at the top. The steam cylinders are furnished with valve chests, I I, of which there may be a separate one for each steam cylinder, but of which, to simplify construction, I provide only two, each being common to two of the cylinders, as shown in fig. 1, and both supplied with steam through branches, $I^2 I^3$, of one steam pipe, I' .

which brings the steam from the boiler. Each cylinder is furnished with a horizontally working slide-valve, V, by the movement of which the induction of the steam to the cylinder from its respective chest, I, and the eduction of the steam from the cylinder into the jacket, D, which surrounds all the cylinders, are effected.

The valves may be of any suitable construction; but in order that they may work with little friction, I prefer to make them of the piston kind, or as represented in fig. 1, that is, to say, double, so that each may work between two seats, and be thereby balanced to the pressure of the steam, except that the said pressure will act upon a portion of its inner end of equal area with the stem J, the outer end of which is exposed to the atmosphere. The opposite faces of the valves resemble in form the ordinary short three-port slide-valve, and work over three ports *b c d*, of which the innermost one, *b*, communicates, as shown in fig. 2, with the lower end of its respective cylinder, the outermost one, *c*, with the upper end of the said cylinder, and the middle one, *d*, with the exhaust-jacket D, to which the eduction pipe D is attached. The valve stems J work through stuffing-boxes *e* in the valve chest, and their outer ends are connected with the lower ends of levers K, which work on fixed horizontal fulcrum shafts L, suitably attached to the steam cylinders. The upper ends of these levers are connected with horizontal rods *f*, which work through stuffing-boxes *f'* in the sides of the hollow columns N, hereinbefore described. The upper terminal portions of the piston and stamp rods P' are made conical, as shown at *g* in fig. 2, for the purpose of acting like wedges upon the inner ends of the rods M, and thereby effecting through the levers K the movement of the valves in an inward direction as the pistons rise, and so admitting steam through the ports *c* to the upper ends of the cylinders, to produce the downward movement of the pistons and stamps. The outward movement of the valves, to produce the admission of steam through the ports *b* to the lower ends of the cylinders, for lifting the pistons and stamps, is effected by the pressure of steam upon the inner ends of the valves as the conical upper portions of the rods P descend and permit the rods M to move inward. Springs Q are applied to press outward against the lower parts of the levers, for the purpose of keeping the rods M in contact with the piston and stamp rods when no steam is in the valve chests, and thereby keeping the valves in position to commence operation as soon as a sufficient pressure of steam is admitted to the valve chests. The same movement of each valve which admits steam to one end of its respective cylinder permits the eduction of steam from the opposite end, in the same manner as is the case with the ordinary short slide-valve employed in steam engines. The inner ends of the rods *f* are exposed to the pressure of steam which enters the hollow columns N, and this in some degree counteracts the outward pressure upon the valves; but the lower arms of the levers K are so much longer than the upper ones that the said rods are always kept properly in contact with the conical parts *g* of the piston and stamp rods, to insure the operation of the valves. The valve gear of each cylinder being entirely independent of that of the others, each stamp will be worked separately by its own engine, and each may be thrown out of operation without interfering with the others; and the upper ends of the piston and stamp rods being of conical form, will always cause or permit the proper operation of the valves, notwithstanding that the stamps and pistons are free to turn in their operation. The valves may be operated by hand, if desirable at any time, by means of a suitable hand gear attached to the levers K.

To provide for an equal distribution of the ore or other material to be crushed to all of the stamps, hoppers T are arranged on opposite sides of the group of stamps, and from these hoppers inclined spouts T¹ lead to a central spout T², which is connected with a central opening in the cover S¹ of the screen S, and the material is thereby fed into the battery in the centre of the group of stamps and distributed equally to all. The ground material is delivered through the screen into the surrounding trough A², whence it may be shovelled out or make a continuous exit through suitably arranged discharge spouts. The cover S¹ is fitted into the mouth S² of the screen in such manner that it may rise and fall therein, still keeping the mouth closed. The hoppers T are secured firmly to the sole-plate A¹ of the steam cylinders, and the cover S¹ of the screen is secured to the spout T¹, and hence the hoppers, spouts, and cover are all adjusted up or down along with the steam cylinders. The same arrangement of valve and valve gear, and the same adjustment of steam cylinder, are applicable when a single cylinder and stamp are used, or when any number greater or less than the number represented. I do not, however, consider the valve gear represented as a part of this invention, but have merely represented it for the purpose of illustrating a mode of carrying out the direct application of steam to the working of stamps, and shall probably make it the subject of a separate and distinct application for a patent.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The arrangement of the stamps in the form of a group, in combination with a central feed opening and surrounding screen and delivery receptacle, substantially as and for the purpose herein specified.
2. In the direct application of steam power to stamping mills or hammers, I claim providing for the adjustment of the steam cylinders and their valves toward and from the battery substantially as herein described, whereby the wear of the stamps and the battery may be compensated for, and a uniform, or nearly uniform, clearance between the pistons and the tops and bottoms of the steam cylinders may be maintained.
3. In combination with the above specified provision for the adjustment of the steam cylinders, I claim the attachment of the feeding hopper or hoppers to the said cylinders, substantially as and for the purpose herein set forth.

W. WRIGHT.

Witnesses:

A. LE CLERC,
J. W. COOMBS.