

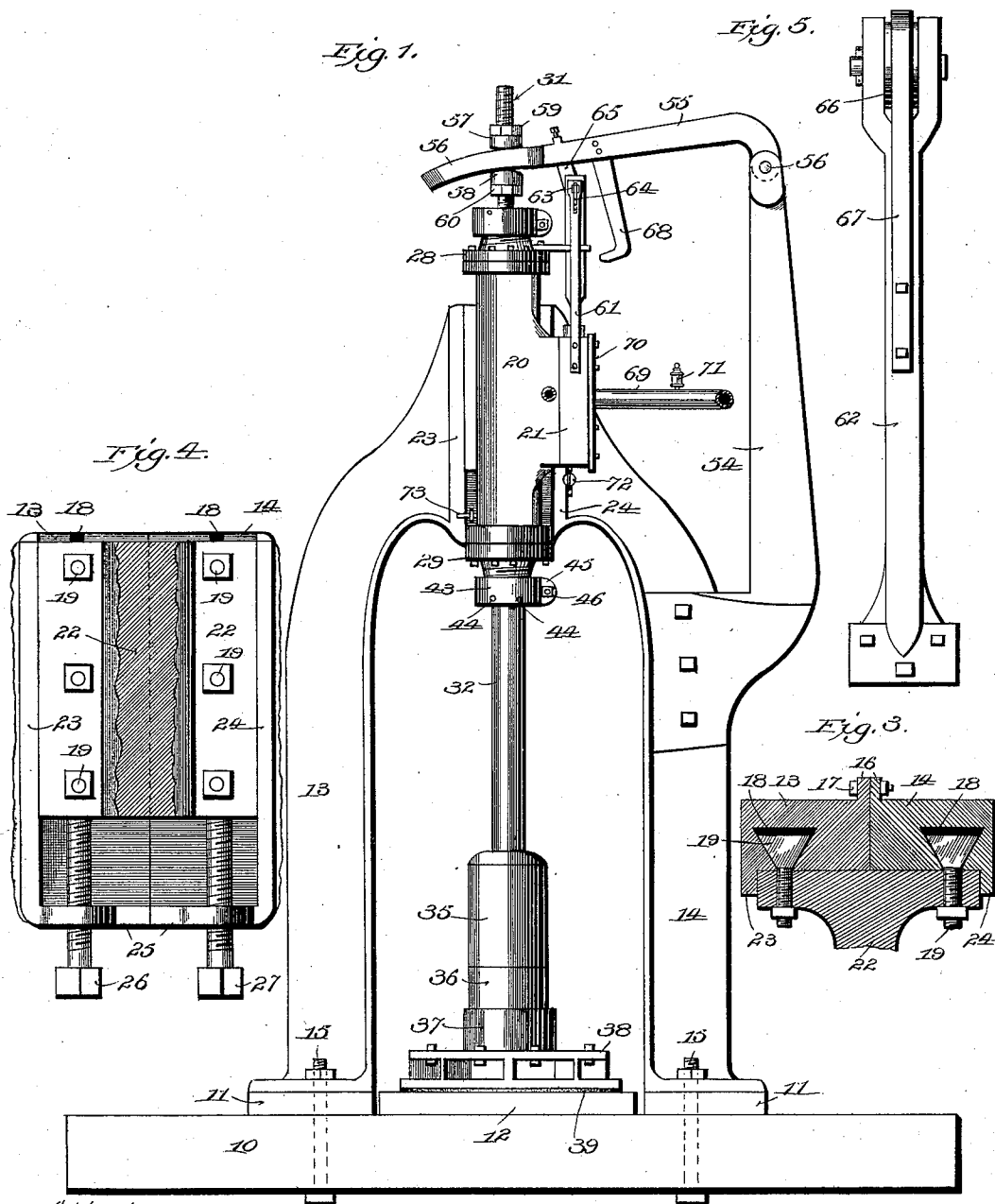
(No Model.)

3 Sheets—Sheet 1.

J. H. BROWN.
STEAM POWER STAMP.

No. 565,876.

Patented Aug. 18, 1896.



Attest:
S. C. Sweet
M. M. White

Inventor:
James H. Brown

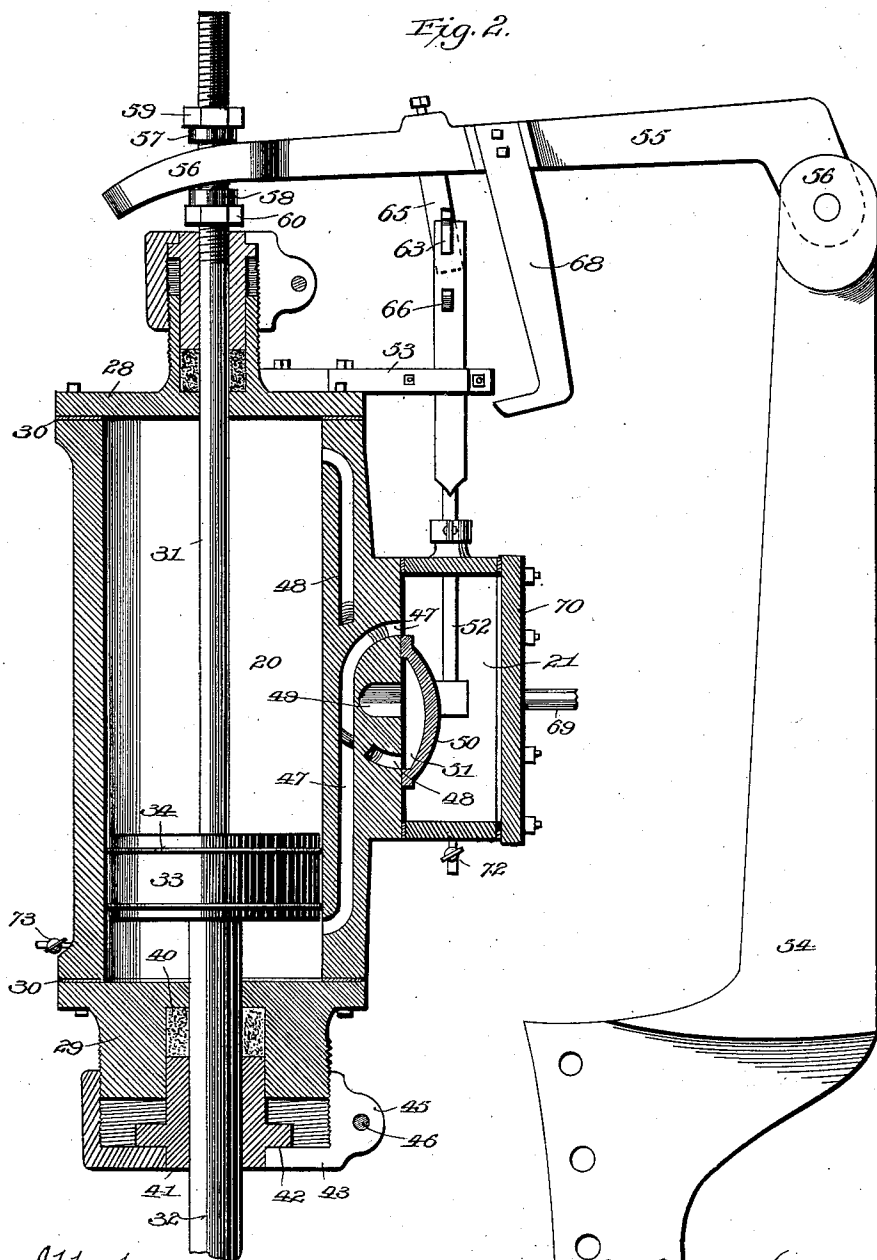
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Inventor:
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3 Sheets—Sheet 3.

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Fig. 6.

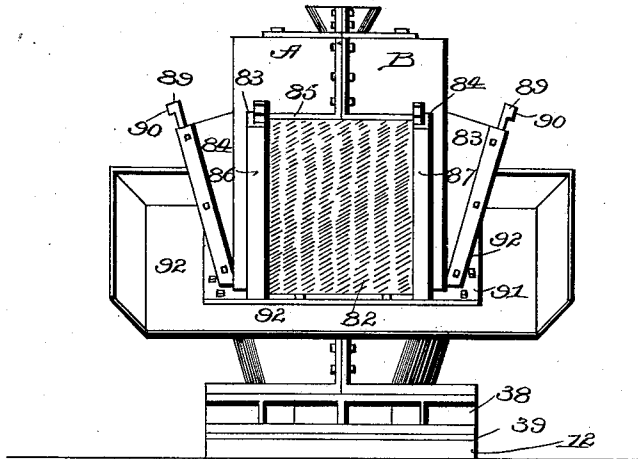
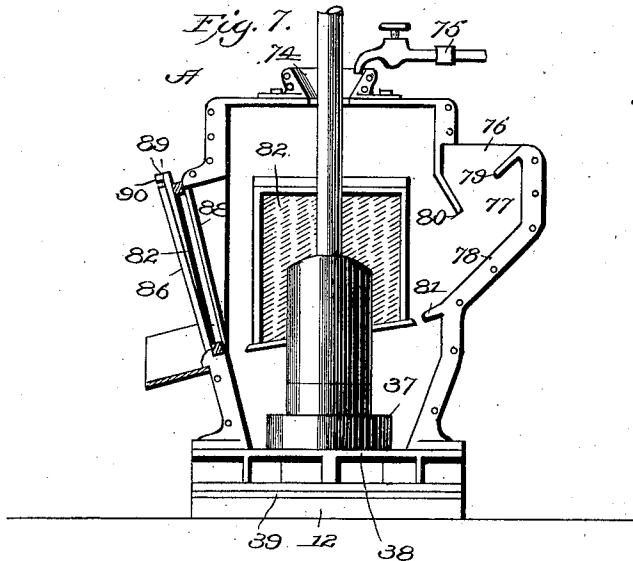


Fig. 7.



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Inventor:

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UNITED STATES PATENT OFFICE.

JAMES HOYT BROWN, OF DENVER, COLORADO.

STEAM-POWER STAMP.

SPECIFICATION forming part of Letters Patent No. 565,876, dated August 18, 1896.

Application filed August 31, 1895. Serial No. 561,136. (No model.)

To all whom it may concern:

Be it known that I, JAMES HOYT BROWN, a citizen of the United States, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Steam-Power Stamps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in mills for stamping ore, which mill is operated by steam-power and is designed to effect the following objects: means whereby the mill may be adjusted to stamp ore which has been crushed in quantities of varying-sized particles; means for adjusting the steam-cylinder relative to the machine-heads or supporting-frame to provide for the wear of the stamp-shoe; means for cutting off the supply of steam automatically at each end of the stroke, and means for adjusting the length of the stroke.

A further object of my invention is to provide a mill having a minimum weight and maximum capacity.

My invention consists in the construction, arrangement, and combination of elements hereinafter set forth, pointed out in my claims, and illustrated by the accompanying drawings, in which—

Figure 1 is a front elevation of my mill, the casing being removed. Fig. 2 is an elevation, partly in section, of the upper portion of the mill. Fig. 3 is a detail sectional plan illustrating the manner of securing the cylinder to the machine-heads. Fig. 4 is an elevation in detail, partly in section, illustrating the manner of securing the cylinder to the machine-heads. Fig. 5 is a detail elevation of an arm employed in connection with the valve mechanism. Fig. 6 is a front elevation of the casing and base of the mill. Fig. 7 is an interior view of one section of the casing mounted on the base and containing the stamp.

The cylinder and valve mechanism employed in connection with and forming a part of the ore-mill described and claimed in this application is made the subject-matter of an application filed concurrently herewith and serially numbered 561,135.

In the construction of the mill, as shown, the numeral 10 designates a base or supporting-sill, on which is mounted a wooden block 11 on each side of a central wooden block 12. Machine-heads 13 14 are vertically positioned on the blocks 11 11 and provided with flanged lower ends or feet secured to the said blocks and the base 10 by bolts 15 15. The upper ends of the machine-heads are arched to the center of the space between said heads and vertically extended in contact each with the other. Flanges 16 16 are formed on the rear faces of the upper end portions of the heads 13 14, and bolts 17 rigidly connect said flanges and the said heads. (See Fig. 3.) Dovetail slots or grooves 18 18 are formed in the inner faces of the upper end portions of the heads 13 14, and bolts 19 19, having dovetail heads, are mounted in said grooves and extend horizontally forward from the said heads.

A cylinder 20 is provided, which is positioned in a vertical plane and has a steam-chest 21 centrally located on and secured to one side thereof. A bossed portion 22, T-shaped in cross-section, is formed on the cylinder 20 and is mounted in sliding engagement with the forward faces of the upper end portions of the heads 13 14, and the bolts 19 19 traverse the said bossed portion at the edges thereof and secure the same in engagement with the heads. Flanges 23 24 are formed on the heads 13 14 on opposite sides of and parallel with the bossed portion 22, which flanges serve as clamps to limit torsional movement of the cylinder and maintain the alinement thereof, and also as guides to direct a vertical adjustment of the said cylinder. A flange 25 is formed on the lower portion of the upper ends of the machine-heads, and adjusting-screws 26 27 are seated in said flanges and have their upper ends in supporting contact with the lower end of the bossed portion 22 of the cylinder. (See Fig. 4.)

The cylinder 20 is formed with upper and lower heads 28 29, respectively, which are bolted to the ends thereof, sections of packing material 30 being interposed between said heads and the said cylinder. The heads 28 29 are vertically apertured to form slide-bearings for a piston-rod 31 and a stem 32, respectively, which piston-rod and stem are integrally formed, by drop-forging, with and

separated by a piston-head 33. Packing-rings 34 34 are mounted on the piston-head 33 and form a steam-joint between said head and the cylinder. The stem 32 extends downwardly from the piston-head and a hammer 35, Fig. 1, is integrally formed on the lower end thereof, and a shoe 36 is fixed to the lower face of the hammer 35 and engages with the block 37, mounted on a base 38. The base 38 is mounted on a rubber cushion 39, which cushion rests on the block 12, thus providing a yielding support to receive the impact of the stamp-hammer. The head 29 of the cylinder is bored out below the bearings 15 for the stem 32, and a ring of packing material 40 is mounted therein and secured by engagement at one side by one end of a thimble 41, loosely mounted on the stem 32 and provided with an annular shoulder 42, designed for engagement by a collar 43, which collar is interiorly screw-threaded and is screwed upon the exteriorly-screw-threaded head 29. Apertures 44 are formed in and radially relative to the collar 43, which apertures are designed to receive a lever or spanner, whereby the collar may be manually rotated to seat or unseat the same relative to the head. The collar 43 is split and ears 45 45 are formed on the meeting portions thereof and connected by bolts 46, whereby the said collar may be tightened relative to the head. A stuffing-box identical with the one just described in connection with the stem 32 is formed on and connected with the head 28 around the piston-rod 31.

A port 47 opens from the upper portion of the steam-chest 21 and extends downwardly parallel with the bore of the cylinder to a point of discharge into said cylinder beneath the piston-head 33. A port 48 opens from the lower portion of the steam-chest 21 and extends upwardly parallel with the bore of the cylinder to a point of discharge into said cylinder adjacent to the head 28 and above the piston-head 33. The upper end portion of the port 47 crosses the lower end portion of the port 48, and the said portions of said ports are inwardly curved to pass at the rear of an exhaust-port 49, formed in the cylinder between the adjacent ends of the other ports and leading to the outside of the cylinder. A slide-valve 50, having an exhaust-cavity 51, is mounted in sliding contact with the port-face of the cylinder. The slide-valve is of such a length as to close the entrance of steam to one port when the other port is open to receive steam, the closed port exhausting through the cavity 51 and exhaust-port 49. A valve-stem 52 is fixed to the slide-valve 50 and extends upwardly through the top of the valve-chest and a stuffing-box identical with the one described in connection with the stem 32, the upper portion of which valve-stem is angular in cross-section and has a slide bearing in a bracket 53, horizontally positioned on and extending laterally from the cylinder-head 28. A bracket 54 is fixed to and ex-

tends upwardly from the machine-head 14 parallel with the cylinder, and an arm 55 is fulcrumed at one end on a pin 56, transversely seated in the upper end portion of said bracket. The arm 55 extends across the vertical plane of the piston-rod 31 and is formed with an integral link or slotted portion 56, which is horizontally curved and is traversed by the upper end portion of said piston-rod. Wearing-collars 57 58 are mounted above and below the link 56, respectively, upon the screw-threaded upper end portion of the piston-rod 31, and jam-nuts 59 60 retain the said collars in engagement with the said link. Arms 61 62 are mounted at their lower ends on the steam-chest 21 and extend vertically parallel with the valve-stem 52 to points adjacent to the upper end of said valve-stem. The arms 61 62 are identical in construction, with the exception that the arm 61 is the shorter. A hook 63 is fulcrumed in a bifurcation formed on the upper end of the arm 61 and engages in a slot in the valve-stem. A leaf-spring 64 is mounted on the arm 61 and engages the fulcrumed end of the hook 63. An arm 65 is adjustably fixed to the arm 55, adjacent to the link thereof, and engages at times with the end of the hook 63, which projects through the slot in the valve-stem. A hook 66 is fulcrumed on the arm 62 and engages by a leaf-spring 67, which hook extends through a slot in the valve-stem below the hook 63. A hooked arm 68 is fixed to the arm 55, adjacent to the arm 65, and engages at times with the end of the hook 66, which extends through the lower slot in the valve-stem.

An ingress-pipe 69 communicates with the central portion of the cover-plate 70 of the steam-chest 21, and a lubricator 71 is mounted on said ingress-pipe.

A petcock 72 is mounted in and communicates with the lower portion of the steam-chest 21. A petcock 73 is mounted in and communicates with the lower end portion of the cylinder 20.

A casing is provided which is formed in two sections A B, of like construction, flanged at their meeting edges and connected by bolts positioned in said flanges. The casing surrounds the stamp-hammer and rests upon and is bolted to the support 38. An aperture is formed in the top of the casing and is surrounded by a hopper 74, within which aperture and hopper the stem 32 reciprocates. A water-cock 75 is located above and communicates with the hopper 74, through which cock a supply of water is provided to the stem. An ingress-opening 76 is provided in one side of the casing by the formation of outwardly-extended wings 77, connected by an integral transverse portion 78. A flange is formed on the portion 78, which flange is designated as 79, and extends inwardly and downwardly to partially close the ingress-opening 76. A transverse flange 80 is formed on and extends outwardly from the casing, the ends of said

flange integrally connecting with the inner portions of the wings 77, the said flange partially closing the ingress-opening 76. A flange 81 is formed on and extends inwardly and downwardly from the casing in the line of entrance thereto. Discharge-openings are formed in the other three sides of the casing, and screens 82, made of finely-slotted steel plates, are mounted in said openings. Flanges 83 84 are formed on the walls of the casing, at the edges of the openings in which the screens are mounted, which flanges are triangular in side elevation and are connected by integral cap-pieces 85. Transverse flanges 86 87 are formed on the outer edges of the flanges 83 84, respectively. The flanges 86 87, as shown, are formed of angle-iron bolted to the outer edges of the flanges 83 84, thus forming bearings. Ribs 88 are formed on the flanges 83 84 and extend inwardly therefrom parallel with or at angles to the flanges 86 87 and form bearings for the screen-frame. Keys 89, having lugs 90 on their upper ends, are mounted between the screen-frame and the flanges 86 87 and rigidly secure said frame and screen relative to the casing. An integral flange 91 is formed on and extends laterally from the outer faces of the casing-walls, and a receiving-pan 92 is bolted to said flange and positioned at an oblique angle relative to the horizontal, which pan is open at one side and designed to receive the stamped ore from the casing discharge-openings and convey the same to the amalgamator. (Not shown.)

In the practical operation of this device or apparatus, the parts being in the positions as illustrated, steam is admitted through the pipe 69 to the chest 21, passes through said chest and port 47 to the cylinder beneath the head 33, raises the piston-head, stem 32, and piston-rod 31, thus elevating the hammer 35 and shoe 36. The upward movement of the piston-rod elevates the link end of the arm 55 and carries the hook 68 into engagement with the hook 66 as the piston-head approaches the upward limit of its stroke. The upward movement of the hooked arm 68 causes said arm to engage the hook 66 and elevate the same and conjunctively therewith upwardly move the valve-stem 52, thus causing the valve 50 to close the port 47 to the steam-chest and open said port to the exhaust-port 49, and simultaneously open the port 48 for the reception of steam and conveyance thereof to the upper end of the cylinder. The admission of steam through the port 48 to the upper end of the cylinder depresses the piston-head 33 and connected elements, thus moving the arm 55 downwardly, releasing the hooked arm 68 from the hook 66 and bringing the arm 65 into engagement with the hook 63 as the piston-head approaches closely to the lower limit of its stroke. The engagement of the arm 65 with the hook 63 depresses the valve-stem and valve and results in the cutting off and exhausting of the port 48 and

the reestablishment of the live-steam passage through the port 47. By means of the adjustable connection between the arm 65 and the arm 55 said arm 55 may be caused to actuate the valve-stem and valve at different periods or points relative to the stroke of the piston-head, thus providing for the control of the stroke and also for the differentiation of the space between the hammer-shoe and impact-block for the purpose of receiving coarser or finer sections of ore beneath the hammer. In the provision of the adjustable connection between the cylinder and the machine heads I am enabled to raise or lower the cylinder to compensate for the wear of the hammer or impact-block without adjusting or lengthening or shortening the stroke.

The crushed ore is deposited within the casing through the opening 76 and falls by gravity to the lower portion of said casing into contact with the stamp-shoe and impact-block, where it is commingled with water supplied by the cock 75 through the hopper 74 and pulverized into a liquid mass with the water. The flanges 79, 80, and 81 obstruct the return of sections of ore or the liquid mass through the ingress-opening 76, and the agitation of the mass by the stamp-hammer forces the liquid pulverized portions against and through the screens 82 and into the pan 92, from which pan the liquid mass runs to an amalgamator, (not shown,) where the precious metal is extracted from the baser material.

What I claim is—

1. In a steam-power stamp, the combination of arched frame-heads, flanges on one side of said heads, bolts connecting said flanges, guide-flanges on the opposite side of said heads, a cylinder having a bossed portion mounted in sliding engagement with and between said guide-flanges, bolts connecting said bossed portion with said heads, and adjusting-screws whereby said cylinder may be vertically adjusted, substantially as described.

2. In a steam-power stamp, the combination of a base, arched frame-heads bolted together at their upper ends and formed with parallel dovetail slots, guide-flanges formed on said frame-heads, a cylinder having a bossed portion formed with bolt-holes arranged in said guide-flanges, bolts having dovetail heads fitted in said dovetail slots, and vertically-operated bolts arranged in said frame-heads for adjusting said cylinder, substantially as described.

3. In a steam-power stamp, the combination of a base, frame-heads having guide-flanges thereon, a cylinder arranged between said flanges, means for adjusting said cylinder vertically, a piston, a piston-rod, a stem having a stamp-hammer, a steam-chest communicating with said cylinder, a valve for said steam-chest, a pivoted arm having its free end engaging said piston-rod, and arms attached intermediate the ends of said pivoted arm

and adapted to automatically operate the valve as the piston approaches either limit of its stroke, substantially as described.

4. In a steam-power stamp, the combination of a base, frame-heads, a cylinder, a piston, a piston-rod, a stem having a stamp-hammer, a steam-chest, a valve, a slotted valve-stem, hooks pivotally supported from said steam-chest and engaging said slotted stem, a bracket supported by said frame-heads, an arm in said bracket and loosely en-

gaging the piston-rod, and hooked arms secured to said pivoted arm and adapted to engage the pivoted hooks to move or shift the valve as the piston approaches either limit of its stroke, substantially as described. 15

In testimony whereof I affix my signature in presence of two witnesses.

JAMES HOYT BROWN.

Witnesses:

W. W. WHITE,
REES DAVIS.