

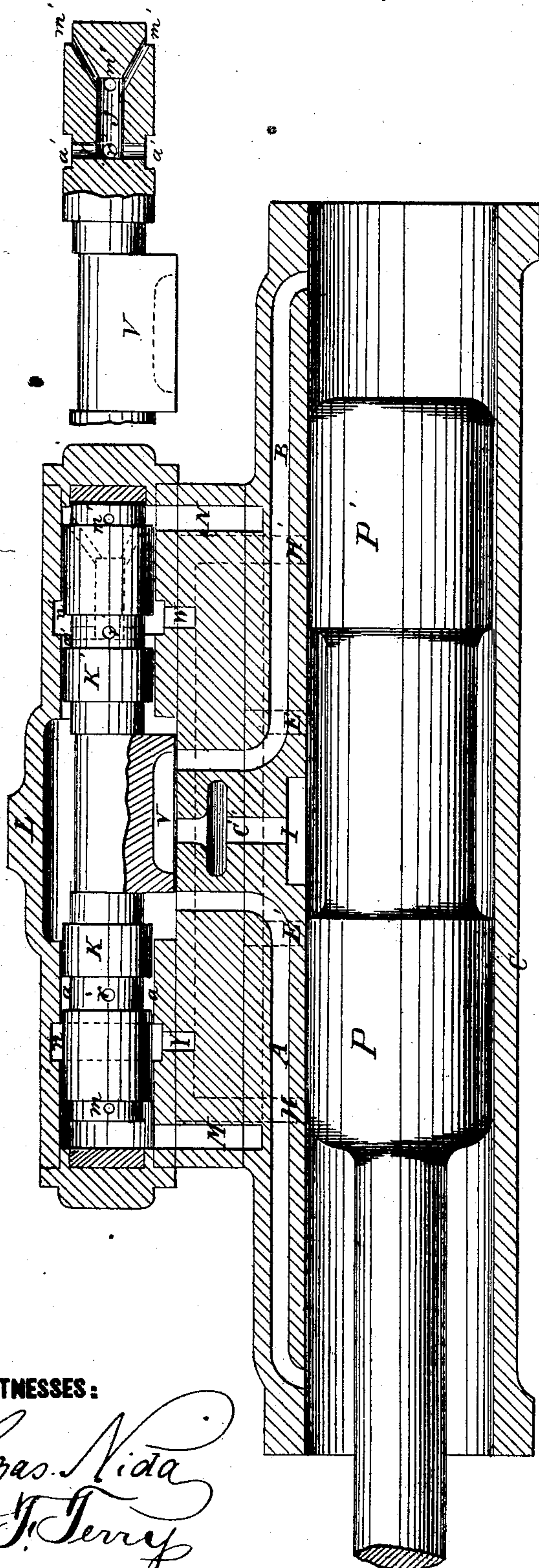
**J. BRANDON.**  
**Steam-Engine for Rock-Drills.**

No. 163,631.

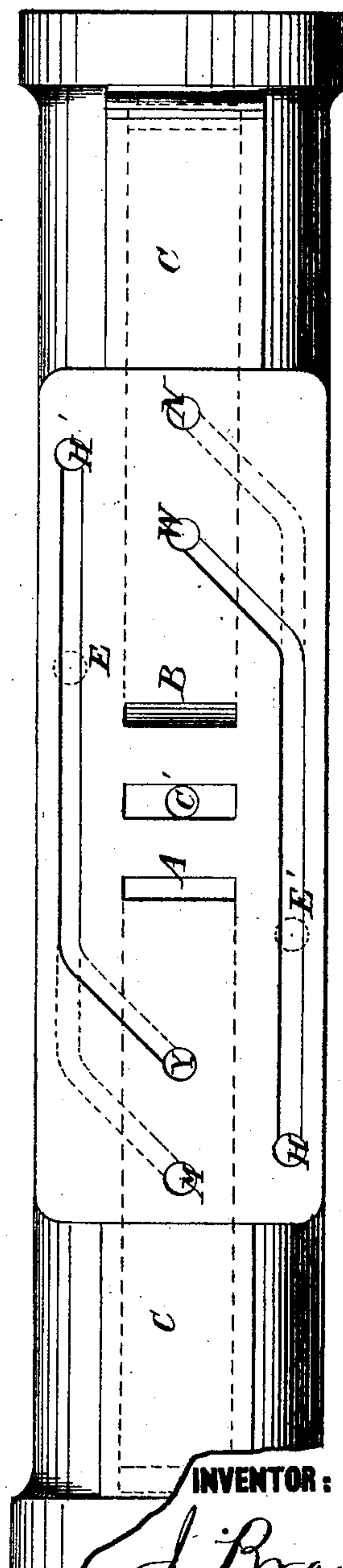
Patented May 25, 1875.

*Fig. 3.*

*Fig. 1.*



*Fig. 2.*



WITNESSES:

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*A. J. Terry*

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# UNITED STATES PATENT OFFICE.

JAMES BRANDON, OF NEW YORK, N. Y.

## IMPROVEMENT IN STEAM-ENGINES FOR ROCK-DRILLS.

Specification forming part of Letters Patent No. **163,631**, dated May 25, 1875; application filed October 31, 1874.

*To all whom it may concern:*

Be it known that I, JAMES BRANDON, of the city, county, and State of New York, have invented a new and useful Improvement in Steam-Engines for Rock-Drills, of which the following is a specification:

This invention relates to the construction of engines for driving rock-drills, more especially, but which may be applied to other purposes; and consists in the arrangement of the steam passages and ports in the steam-chest.

Figure 1 is a vertical longitudinal section of an engine constructed according to my invention. Fig. 2 is a top view of the steam-chest with the valve taken off. Fig. 3 is a detail, showing the mode of introducing steam into the chest for operating the valve.

Similar letters of reference indicate corresponding parts.

C is the steam-cylinder. A and B are steam-passages. C' is the exhaust-port. P P' represent the main piston. L is the steam-chest, having its ends accurately bored out and two plugs or pistons, K K', fitted to the same, and forming the valve V. The steam-chest L has grooves turned out of the bore, as shown at *n n'*. The pistons K K' have grooves *a a'*, having communications or passages *m r* and *m' r'*. H is a passage communicating with the interior of the main cylinder, and terminating in the steam-chest at W. E' is a steam-passage which communicates with the interior of the main cylinder, and terminating in the steam-chest at N. H' is a passage which communicates with the interior of the main cylinder, and terminates in the steam-chest at Y. E is a steam-passage which communicates with the interior of the main cylinder, and terminates in the steam-chest at M.

With this arrangement of the ports and steam-passages, we will assume that the piston P P' is passing from left to right, and that it has passed far enough to just commence to

open the passage H, the part P of the main piston being just long enough to close the passage E'. The steam will now pass through the passage H W, and, through *r' j' m'*, will move the valve-piston K K', carrying with it the slide-valve V. The exhaust from the other end of the steam-chest will pass through M E into the main cylinder, along between the parts P P' of the main piston to I, and will exhaust at C'. The grooves *n n'* in the steam-chest are so arranged in connection with the grooves *a a'* in the valve-piston that when the slide-valve V is just over the ports A and B the small piston will have passed so far that the communication between the groove *n'* in the steam-chest and the groove *a'* in the valve-piston K' will be just closed at the same time the groove *a* of the passage *n* will be just opening. Now, it will be seen that the steam passing through H W will have full pressure until the piston K' closes the passage by its own movement. The steam cannot pass out through N E', the part P of the main piston having covered E'; consequently the valve-piston K K' will still have the expansion of the steam to carry it over; nor can the steam escape until the passage E' is opened by the main piston P, as it moves back from right to left, and in a similar manner when the piston passes in the other direction.

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

The valve-piston K K', having grooves *a a'* and passages *m m' r r'*, combined with a steam-chest, L, having grooves *n n'* M N W Y and passages H H' E E', as and for the purpose specified.

JAMES BRANDON.

Witnesses:

T. B. MOSHER,  
ALEX. F. ROBERTS.