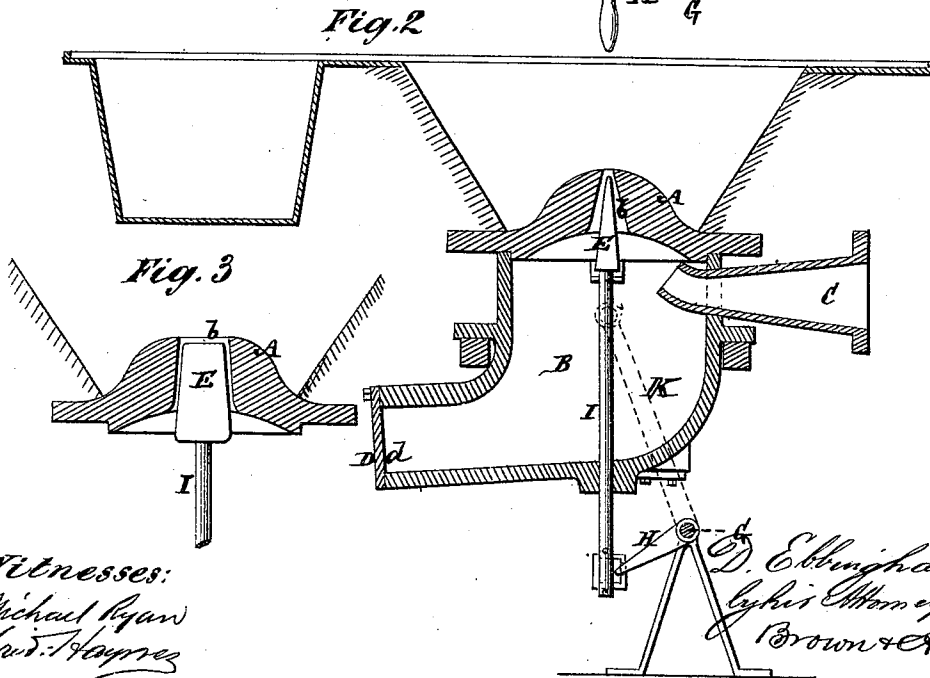
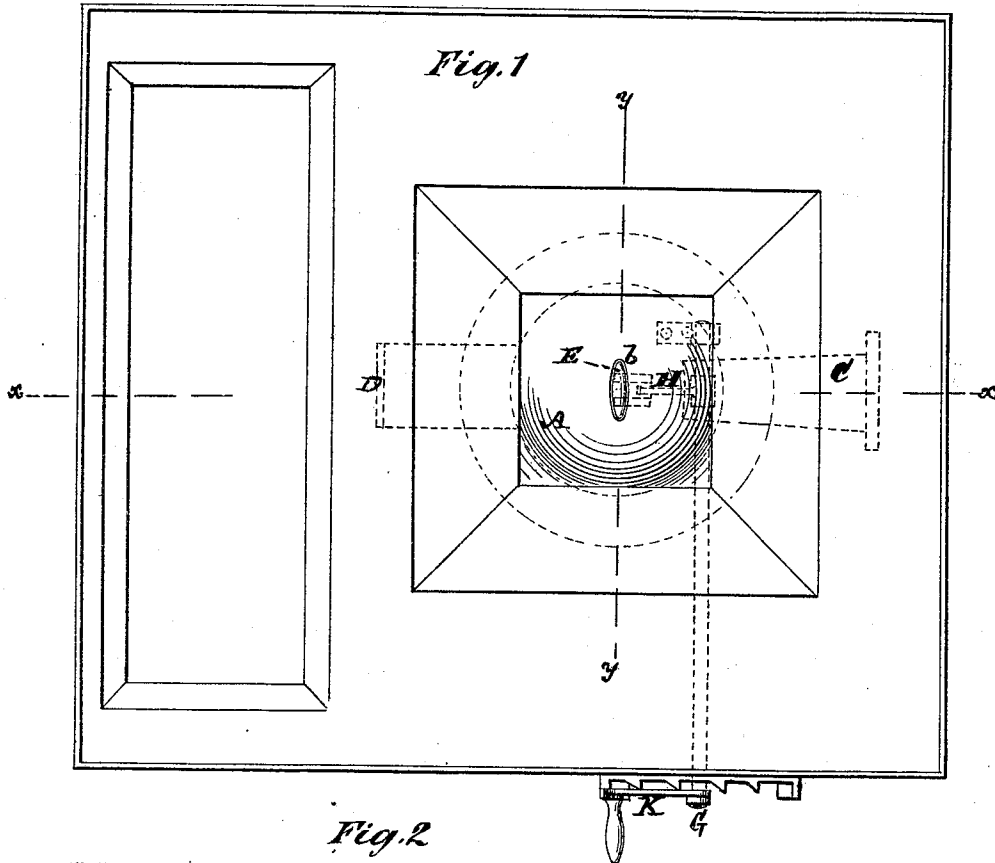


D. EBBINGHAUS.  
SMITHS' FORGES.

No. 180,330.

Patented July 25, 1876.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

DIEDERICH EBBINGHAUS, OF SUNDEWIG, PRUSSIA.

## IMPROVEMENT IN SMITHS' FORGES.

Specification forming part of Letters Patent No. **180,330**, dated July 25, 1876; application filed June 2, 1876.

*To all whom it may concern:*

Be it known that I, DIEDERICH EBBINGHAUS, of Sundewig, in Westphalia, Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Smiths' Forges or Fires; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, which forms part of this specification.

This invention more particularly relates to smiths' fires or forges in which the blast is introduced through the bottom of the hearth; and it consists in a tongue made movable up or down within and through the tuyere in the hearth-plate, in combination with a lower wind box or chamber to which the blast is admitted, whereby said tongue may be used either for breaking and loosening the fire on the hearth, and for preventing the clogging of the tuyere by cinders, or for varying the amount of air and force to the blast through the tuyere, or for both purposes. The invention also consists in a combination, with a tongue working up and down within and through or above the tuyere, of mechanism for operating said tongue from the exterior of the wind box or chamber. The invention likewise consists in a wind box or chamber, closed at top by the hearth-plate, in combination with a blast pipe entering said box, and from which the blast or current is distributed beneath or projected against the under surface of the hearth-plate, whereby the latter is kept cool, and the adhesion of the cinders to the hearth-plate or around the mouth of the tuyere is prevented. Furthermore, said wind-box is, or may be, provided with a door for the removal of any ashes entering by the tuyere within it.

Besides the advantages hereinbefore named for my invention, there are others incidental to it, some of which will be hereinafter noted.

In the accompanying drawing, Figure 1 represents a plan of a base-blast smith's forge with my invention applied; Fig. 2, a vertical section of the same on the line *x x*, and Fig. 3 a further vertical section, on the line *y y*, of the hearth-plate with a tongue, as hereinafter described, arranged to work within and through the tuyere-opening therein.

A is the hearth-plate, made with a single

air-blast aperture or tuyere, *b*, up through it. B is the wind box or chamber, which may be made of cast-iron, and is covered by the hearth-plate A, which may also be of the same material. This box B may be placed in brick-work, and be supported by wrought-iron beams, as shown in the drawing. C is the blast-pipe, which enters through one side of the wind-box, and the inner end of which within the box is curved upward, so as to lead the current of air against the lower surface of the hearth-plate, whereby the latter is cooled, and the adhesion of cinders to the hearth-plate in vicinity of the tuyere is prevented; at the same time the fresh air entering the wind-box is sufficiently warmed to avoid any reduction of the heat of the fire on the hearth. An opening, *d*, closed by a door, D, is provided in the lower part of the wind-box for the removal of any ashes which may collect in the wind-box. The tuyere *b* may be of any desired shape, either in its longitudinal or transverse sections. Fitting freely within the tuyere or blast-aperture *b*, and of corresponding configuration with it in its transverse section, is a tongue, E, which is made capable of being raised or lowered as required, whereby it not only acts as a valve to regulate the blast or amount of air passing up through the tuyere, but also—and which is highly important—serves to break up the cover or mass of cinders resting in the cavity of the hearth, and so stimulates the fire. Said tongue E also restricts the passage of cinders down through the tuyere. It may be lifted, when being raised, so as to project to any desired distance above the mouth or upper end of the tuyere. When heavy pieces of iron are being heated in the forge, said tongue should be projected sufficiently above the mouth of the tuyere to prevent the latter from being blocked up, without preventing the necessary amount of blast from entering, and whereby the fire may be kept loose instead of being dense or compacted.

This tongue E will enable the smith to use the coal or fuel to the greatest advantage, and with the greatest economy, and by it the iron or forging may be rapidly brought to the required heat. It also reduces the burning away or waste of the iron, which is of no small importance in heavy work. Furthermore, a forge

constructed and provided with a blast regulating tongue and cinder breaker or stirrer, as described, will be found to be more durable, and capable of greater resistance than smiths' forges as ordinarily constructed, the hearth-plate being kept permanently cool by the blast acting on its under surface, and the invention may be applied to free standing fires and round fires with chimney above, the wind or blast pipe being led from the main pipe in the ground-floor up to the side of the smith's forge or fire.

The tongue E may be operated or adjusted from the outside by mechanism as follows: G is a lower rock-shaft fitted with a toe or lever, H, below the wind-box B. This toe is in free but positive connection with a rod, I, which passes up through an opening in the bottom of the wind-box, and on which is mounted the tongue E. Secured to the outer end of the rock-shaft G, externally of the forge, is another lever, K, by which the operator adjusts or works the tongue E, as required. This lever may be of an elastic construction, so as to lock

within a notched plate on the exterior of the forge for the purpose of locking or holding the tongue at any precise adjustment which may be given it. By working the lever K, the smith is enabled either to raise or lower the tongue within the tuyere b to regulate the blast, or by suddenly raising the tongue to break or loosen the fire or fuel on the hearth-plate.

I claim—

The combination, with the wind box or chamber B, the convex hearth-plate A, and blast-pipe C, the former having the curved extension and door D, of the movable tongue E in the tuyere b, the rod I, levers K H, and rock-shaft G, for operating the tongue from the exterior of the wind-box, all constructed to operate substantially as shown and described.

This specification signed by me this 13th day of April, 1876.

DIEDERICH EBBINGHAUS.

Witnesses:

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