

(No Model.)

H. McDONALD.  
FURNACE DOOR AND SHIELD.

No. 258,095.

Patented May 16, 1882.

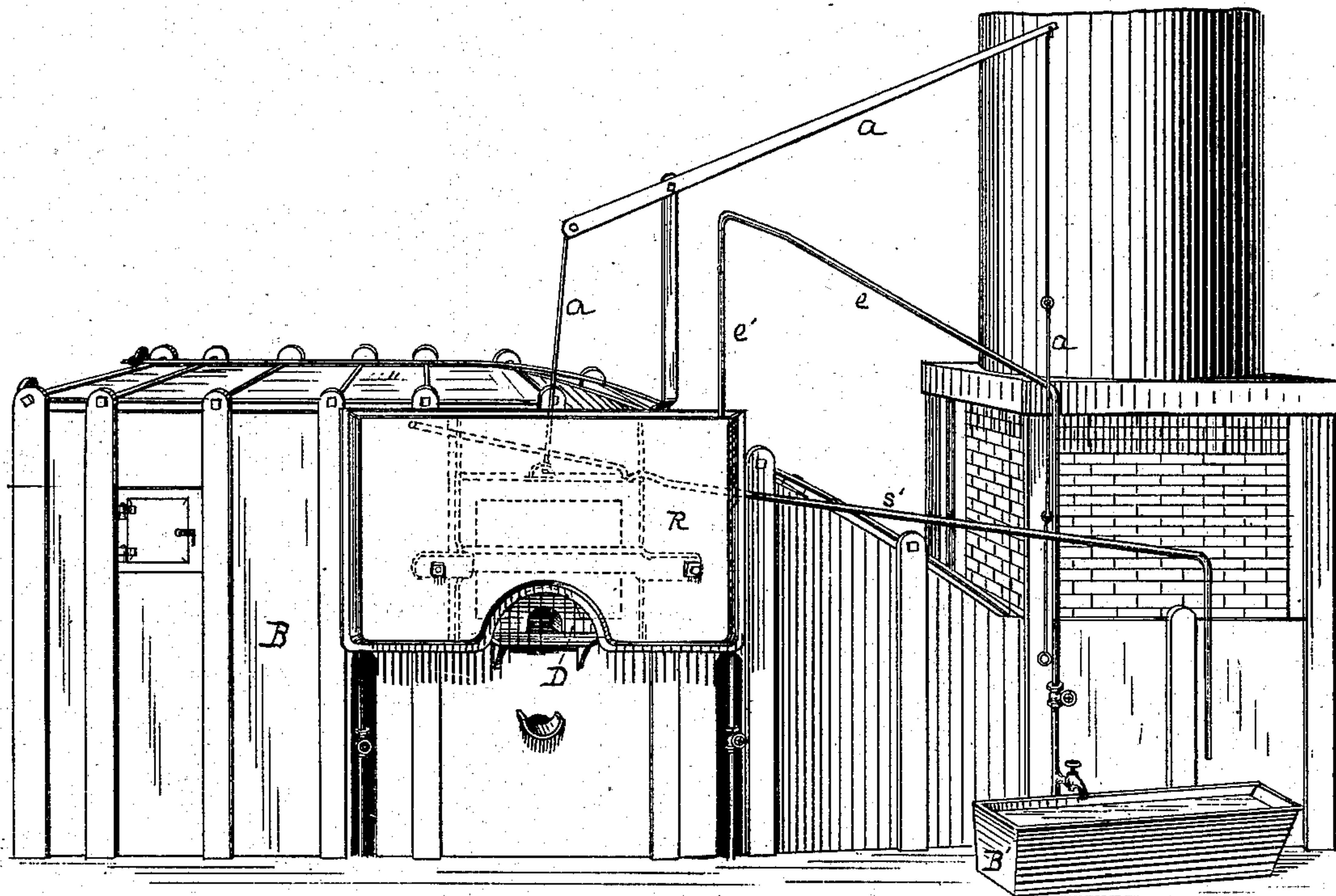


Fig. 1.

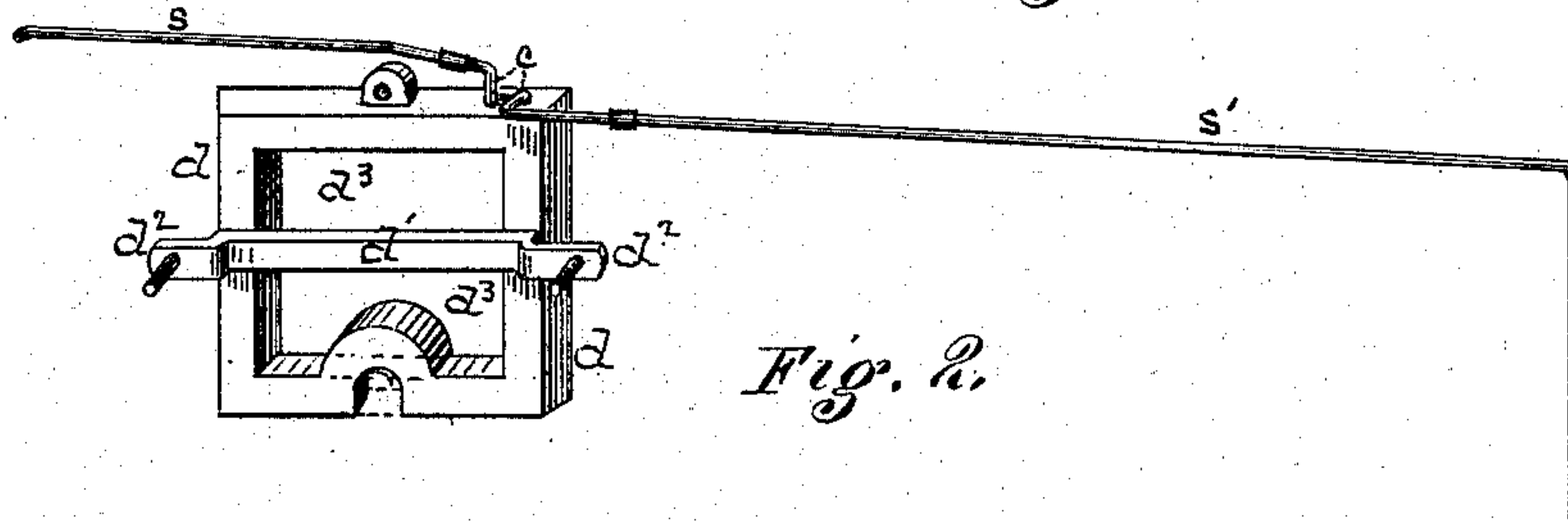


Fig. 2.

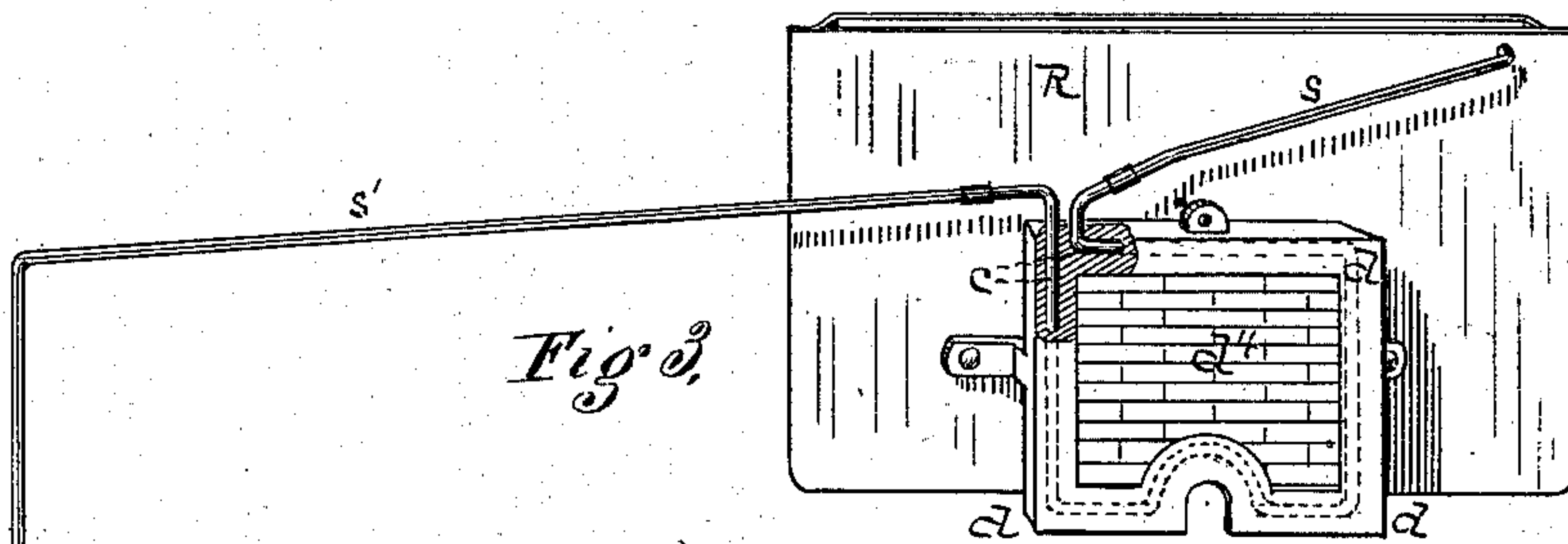


Fig. 3.

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# UNITED STATES PATENT OFFICE.

HUGH McDONALD, OF PITTSBURG, PENNSYLVANIA.

## FURNACE DOOR AND SHIELD.

SPECIFICATION forming part of Letters Patent No. 258,095, dated May 16, 1882.

Application filed September 19, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, HUGH McDONALD, of Pittsburg, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Furnace Doors and Shields; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—like letters indicating like parts—

Figure 1 is a front perspective of a puddling or boiling furnace having my present improvements applied thereto. Fig. 2 is a detached view of the metallic band employed in making a furnace-door, with its water-pipe connections and means for attaching it to a shield; and Fig. 3 is a view from the inner or rear side of the door and shield, a part of the door-band being sectioned to show the cooling pipe or chamber.

My present invention relates to an improved construction of door suitable for use on boiling, puddling, and other furnaces requiring a high heat, in combination with a water-supply and a shield for the protection of the workman as against the excessive heat of the furnace.

An ordinary puddling, boiling, or heating furnace is represented at B. The door D of the working-hole of such furnaces is usually made to slide vertically by any suitable connections, such as shown at a. These doors are necessarily subjected to an intense heat, and as they have to be made light enough to be readily movable, it has been found difficult to secure a great degree of durability as compared with the walls of the furnace.

By my present improvement I add materially to their durability, and at the same time render them easy of repair when burned out. To this end I make what I term a "door-band," *d*, substantially of a rectangular form, as illustrated in Fig. 2, and either with a recess or upward curve on the under side for a stopper-hole, as shown by full lines, or without such recess, as illustrated by dotted lines. This door-band *d* may be made solid, if desired—that is, around its four sides—the middle open part to be bricked up, as presently to be described; but I prefer to make it hol-

low all, or nearly all, the way around, either from sheets cut, bent, and riveted, as in boiler and shield making, or cast on and around a water-pipe, *c*, properly shaped and laid in the central part of the mold-cavity before casting.

In patents already granted to me I have described furnace-shields having a sliding motion along the front of the furnace. It is sometimes preferred to raise them vertically, and when such is the case it is better to raise the door and shield by the same motion; and to this end (when such construction of shield is preferred) I cast or make along with the band *d* a cross-bar, *d'*, which tends to strengthen the band *d* and support the brick-work filling; and the extreme ends *d''* of the cross-bar are bent out, so that when the shield R is secured thereto, as in Fig. 3, an air-space will be left between the door and shield, so that the currents of air passing between shall tend to keep both cool. In the cavity *d'''* of the band *d*, Fig. 2, I build in brick-work *d''''*, Fig. 3, of the desired thickness. It will then be seen that so long as a stream of water is kept flowing through the pipe *c* or other cavity of the band *d* such band will be well protected as against the destructive action of the furnace-heat, and that, while the fire-brick center filling, *d''''*, possesses the usual elements of durability, it can, when burned out, be easily and quickly renewed, and that both the original cost, as also the cost of repairs, will be small.

For the purpose here in view any known form or construction of shield may be employed; but for convenience, and because I consider it the best, I have shown a hollow water-supplied shield. Thus organized, the door and shield are bolted together, so that both can be raised and lowered by the same motion, and they are then arranged with reference to the furnace substantially as represented in Fig. 1. And while any suitable arrangement of water supply and discharge may be employed, I have shown one, which at present I prefer, wherein the water-supply pipe *e* discharges directly into the hollow of the shield; and the pipe *e* may be so bent, as shown, that its descending leg *e'* may enter the shield as the latter rises, so that the supply may go on whether the shield be up or down; but a swing-joint or flexible hose may be used instead.

From the back of the shield, at about the proper overflow-level, I take a pipe, *s*, to the pipe *c* or other cavity in the band *d* of the door, and from the other end of this pipe or cavity

5 I attach a discharge-pipe, *s'*, which empties into the bosh *B'*, or at other desired point. Thus organized, one water-supply answers for both shield and door-band.

I claim herein as my invention—

10 1. A furnace door and shield in combination with a water-supply to one and a discharge therefrom to the other, substantially as described.

2. The band *d*, having cross-bar *d'*, as a means of attachment to a shield to be moved 15 simultaneously by the same motion, substantially as described.

In testimony whereof I have hereunto set my hand.

HUGH McDONALD.

Witnesses:

R. H. WHITTLESEY,  
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