J. M. HARTMAN.

Gas-Washer.

No. 214,293. Patented April 15, 1879.

FIG. 1

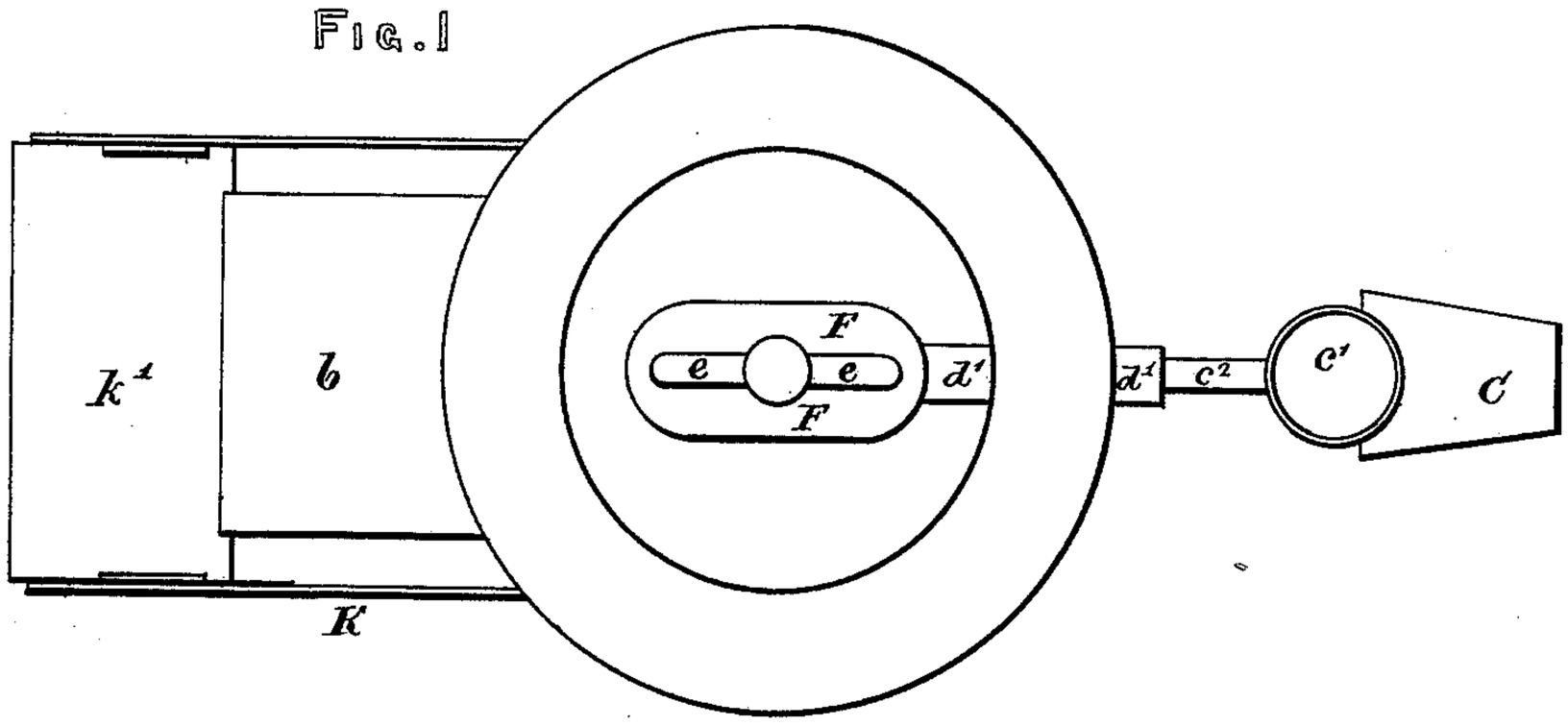
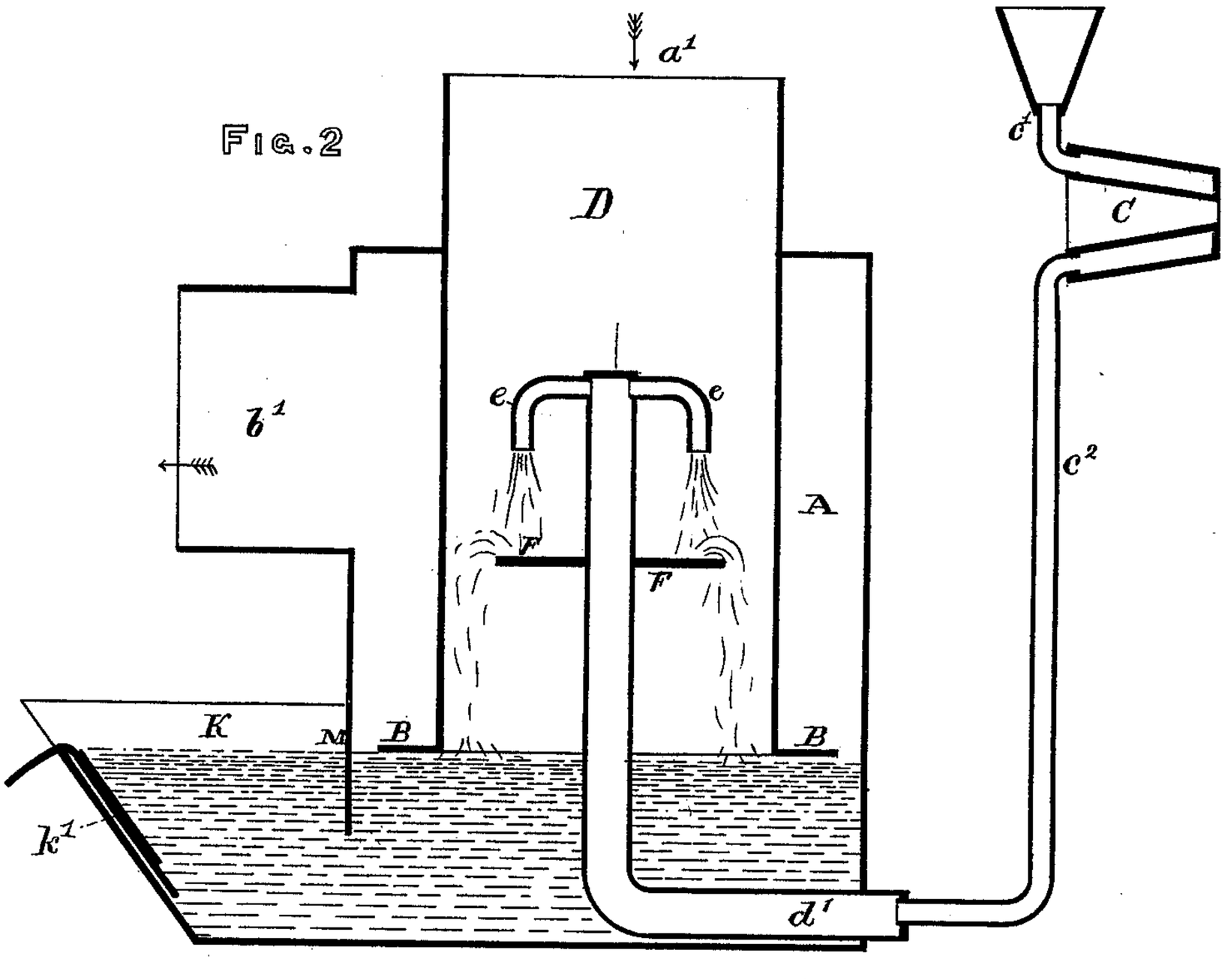


FIG. 2



Witnesses.

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JOHN M. HARTMAN, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN GAS-WASHERS.

Specification forming part of Letters Patent No. **214,293**, dated April 15, 1879; application filed November 19, 1878.

To all whom it may concern:

Be it known that I, JOHN M. HARTMAN, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Gas-Washers, which improvement is fully set forth in the following specification and accompanying drawings.

This invention relates, first, to the combination, with a water-cooled portion of a blast-furnace, preferably the tuyere thereof, of a gas-washing apparatus the supply-pipe of which leads from the said water-cooled portion of the furnace and has its delivery ends below the plane of said portion, whereby the waste water from the blast-furnace is utilized for the purpose of washing the gases.

Secondly, the invention consists in the construction of the gas-washer, as hereinafter specified.

Figure 1 is a plan of the washer and tuyere. Fig. 2 is a sectional elevation of the same.

The large volume of gas escaping from the top of a blast-furnace carries with it a great amount of dust, which covers the hot-blast pipes and boiler, making it difficult to keep up steam and the temperature of the hot-blast. The different water-cooling connections around the bottom of the furnace—such as tuyeres, water-breast, dams, water-jackets—give off a large volume of water, but these connections being so close to the ground the water has no elevation sufficient to form a spray or jet. By washing the gas the dust is removed; but to wash it well and prevent the water becoming hot enough to form vapor a large volume of water is required. When vapor is formed it destroys the heating power of the gas and causes explosions.

The pumping of a large volume of water to an elevation especially for this gas-washing purpose involves much expense. To obviate this, I place the gas-washer down below the level of the tuyeres, and utilize the waste water therefrom, which heretofore has run off without doing further duty than cooling the tuyeres. The gas passes from the furnace-top through the down-coming pipe, and enters the condenser D at a', and, passing beneath the flange B, which is placed at or above the surface of the water, so as to avoid a back-pressure at the tunnel-head, escapes to the hot-blast and boilers through outlet b'.

C is the tuyere, into which the cooling-water enters by pipe C^1 and leaves it by pipe C^2; thence it enters the gas-washer by pipe d'. This pipe turns up vertically into the condensing-tube D, and terminates in downward bends e. Through these bends the waste water from the tuyere escapes, and, falling in streams, splashes into spray upon the splash-plates F, which are secured at some distance below, and, falling through the gas to the bottom of the condenser, it collects until it reaches the level of the flange B. The furnace-gas receives an additional cleaning by passing beneath this flange B in contact with the surface of the water. It then rises into the receiver A, and passes therefrom to the hot-blast pipes.

In the operation of the furnace changes take place, which are foretold by the color, smell, and appearance of the wash-water when it overflows. As this change has not heretofore been detected until the furnace began to work badly this knowledge beforehand gives the founder time to regulate the hot-blast and prevent the furnace getting out of order. To collect this overflow for examination, I use a broad spout or overflow-pipe, K, on the outside of the washer. A plate, M, extends below the surface of the water, between the washer and overflow, to prevent the gas from escaping. As the gas at times is wanted in large volumes a large amount must pass between the flange B and the water.

If a small water-discharge is used, just sufficient only to carry off the water, the gas must press away the water from the flange B to pass rapidly. A back-pressure is thus made upon the gas, which causes a loss of gas at the top of the furnace, gives less gas to the boilers and hot-blast, and the furnace works irregularly. To overcome this, I make the overflow K very wide, so that a small pressure will cause a large overflow and relieve the top of the furnace from back-pressure.

To regulate the height of water, I use a wide apron, k', sliding vertically, by which the level of the water in relation to the flange B is adjusted to great exactness.

I claim—

1. The combination, with a water-cooled portion of a blast-furnace, of a gas-washing apparatus having a supply-pipe leading from said water-cooled portion whose delivery ends are below the level of the source of supply thereat, whereby the gas-washer is supplied by waste-water from the furnace by action of gravity, as specified.

2. The gas-washer having the outer shell, A, condenser D, provided with the flange B, pipe *d'*, splash-plate F, and delivery pipes or outlets *e*, turned downward toward said splash-plate, combined with the pipe c^2 and a water-supply connected with said pipe and situated above the outlets *e*, substantially as and for the purposes specified.

3. The combination, in a gas-washing apparatus, of the condenser D, the shell A, the projecting flange B, dividing-plate M, conductor K, and sliding apron K'.

JOHN M. HARTMAN.

Witnesses:
EDWD. BROWN,
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