

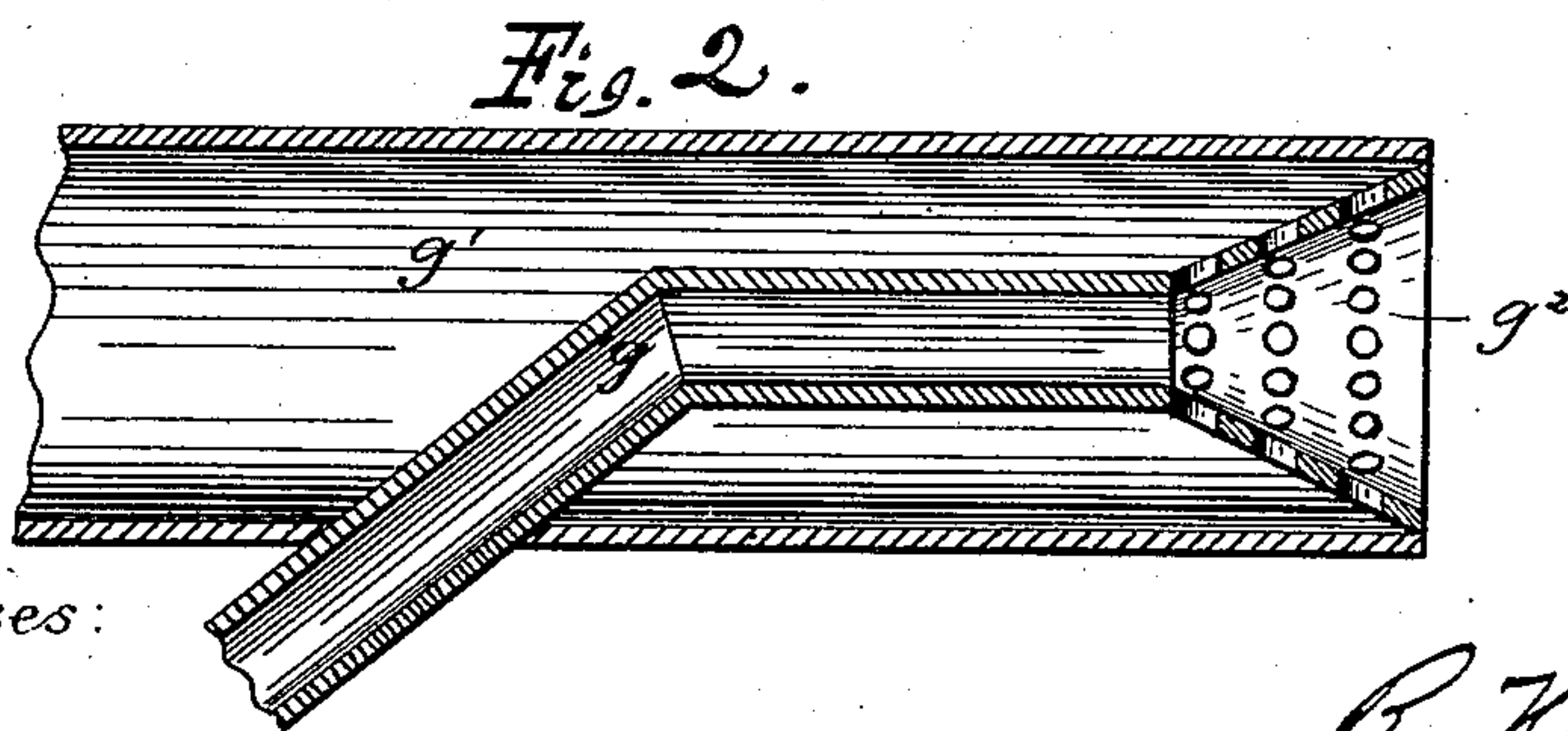
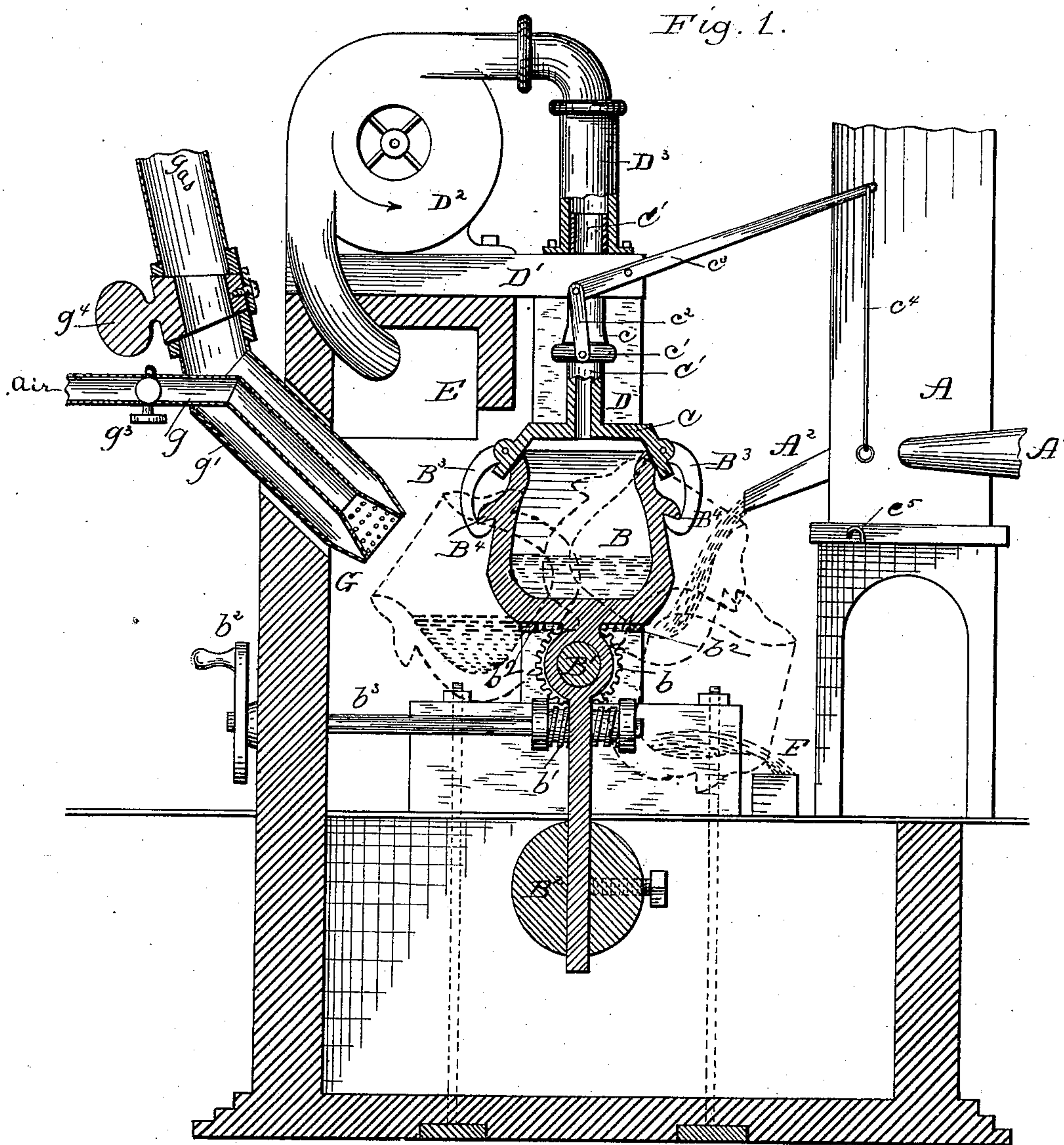
(No Model.)

R. H. GORDON.

APPARATUS FOR TREATING MOLTEN IRON.

No. 287,273.

Patented Oct. 23, 1883.



Witnesses:
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UNITED STATES PATENT OFFICE.

ROBERT H. GORDON, OF READING, PENNSYLVANIA.

APPARATUS FOR TREATING MOLTEN IRON.

SPECIFICATION forming part of Letters Patent No. 287,273, dated October 23, 1883.

Application filed December 21, 1882. (No model.)

To all whom it may concern:

Be it known that I, ROBERT H. GORDON, a citizen of the United States, residing at Reading, in the county of Berks and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Treating Molten Metal, of which the following is a specification, reference being had therein to the accompanying drawings, in which—

Figure 1 is an elevation, partly in section, of a plant or apparatus constructed and arranged in accordance with my invention; and Fig. 2 is a detail of a portion of the same.

A represents an ordinary blast furnace or cupola, provided with the usual blast-pipes, A', (one only being shown,) and discharge-spout A².

In suitable proximity to the cupola to receive charges of metal therefrom, I locate a puddling-furnace, B; or it may be a retort, pot, or crucible of any usual construction, except that its mouth or open end is adapted to be closed air-tight by a removable cover, C, provided with suitable connections to a device for producing a vacuum. In this instance the furnace or puddling-pan B is mounted on a shaft, B', and is counterbalanced by a weight, B², the said shaft being provided with a pinion, b, which, together with a worm, b', hand-wheel b², and shaft b³, serves to tilt the furnace so that it may occupy the various positions indicated by dotted lines, and to oscillate it, and by the addition of further gearing, b², in the usual manner, to rotate the furnace in order to ball its contents. The shaft or trunnions B' are supported in bearings formed in a framework, D, anchored in the masonry, as usual in furnace construction. The framework is extended upward, and supports a platform, D', upon which may be located an ordinary blower, D², as shown, or any other well-known vacuum-producing mechanism or devices, from which a connecting-pipe, D³, extends to a point above and over the center of the furnace B, when it is, as shown, in an upright position; or it may be arranged to connect with the cover-pipe C' when the furnace is inclined, so that the contents may be exposed to the action of a vacuum while the furnace is rotated, if desired.

Connected to the cover C is a pipe, C', which is fitted snugly within the pipe D³, but ca-

pable of moving longitudinally and rotating therein, and at the same time maintaining a practically air-tight joint therewith. A shoulder, c, is formed on the pipe C', and a collar, c', is located below the shoulder, and connected by a link, c², to a lever, c³, pivoted to the framework or platform above, which lever is provided with a rod or chain, c⁴, whereby the cover may be elevated and retained in such position by securing the rod c⁴ upon a hook, c⁵, located upon any fixed portion of the apparatus. This construction permits a rotation of the furnace and its cover without breaking connection with the exhaust or vacuum devices.

The contact-surfaces of the furnace and its cover are fitted snugly to each other, and preferably beveled, so that by means of the hooks B³, formed to catch under the flange B⁴, an air-tight joint may be secured between them. Other well-known fastening devices may be employed.

The outlet of the blower is directed into the stack E, as shown, in order to consume the deleterious gases eliminated. On the floor, at F, is an ordinary mold of any pattern or for an ingot.

G represents an oxyhydrogen-burner, which consists of an air-blast pipe, g, extending within and nearly to the end of a gas-pipe, g', the ends of the two pipes being connected by a perforated cone, g². (See Fig. 2.) Each pipe is provided with a controlling-valve, g³ g⁴, respectively. Gas from any suitable producer is conveyed in the pipe g', and emerges in fine jets in the perforations of the cone g², and the incoming air in pipe g, which air may be heated or not, as desired, is thoroughly intermixed with the gas, and produces in combustion an intensely-heated flame, which is directed upon the metal in the furnace when tilted to the left, as shown in dotted lines. By this construction of burner the combustion-point of the flame is exterior to the burner, and it is therefore less liable to injury by the heat of the flame.

In the arrangement of the principal elements of the apparatus as thus described, it will be seen that the furnace B may be tilted to any of the positions indicated by dotted lines after the cover is raised therefrom. It may be tilted to the right and receive from the cupola a charge

of iron in the melted state and in its first or reducing heat, and without undue exposure to the air, when, by the hand-wheel, the furnace is brought to an upright position. The cover is
 5 then lowered and secured, and the blower produces within the furnace a vacuum which causes the natural and absorbed deleterious substances now in a gaseous state and but slightly combined and contained by the iron to separate therefrom and enter the stack, where they
 10 are consumed. The vacuum treatment is continued until the products issuing from the vacuum-producing device into the stack indicate a desired effect of the treatment by appearances well known to persons skilled in the art.
 15 The cover is now removed and the furnace is tilted to the lowest position to the right, and the metal is run directly into the mold F; or, if a further heating is required, as is sometimes the case, to bring the iron to nature, the
 20 furnace is tilted to the left and the flame of the burner G is directed therein, when it may be oscillated, and, if desired, rotated to ball the metal, and then tilted to deliver the ball for
 25 subsequent squeezing or other usual manipulation.

By the arrangement of the apparatus as shown, it is apparent that pig-iron and, if desired, the usual admixtures of oxides of man-
 30 ganese and other substances may primarily be introduced into the furnace and therein reduced to the melted state by the burner G, as heretofore practiced, and to practice my method ore, alone or with other admixtures, is placed
 35 within the furnace and melted, as described, by the burner G, and then subjected to the vacuum treatment, and subsequently manipulated in the usual manner, so that the introduction

of the exhaust is utilized at the most advantageous stage in the process and without undue
 40 exposure to the air, as heretofore described.

I am aware that the oxyhydrogen flame has been heretofore similarly employed, and do not broadly claim the same as of my invention.

Having described my invention and its operation, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a tilting and rotatable puddling-furnace, an air-tight cover removably secured to the same, a vacuum-producing
 50 device, and a connecting-pipe secured to the cover and adapted to rotate with said cover and furnace, substantially as specified.

2. The combination of a tilting puddling-furnace, means for rotating the same, an air-tight
 55 cover, a connecting-pipe having a shoulder, a ring or collar located below the shoulder, and a lever connected to the ring or collar, whereby the furnace and cover may be rotated, substantially as and for the purpose set forth. 60

3. The combination of a tilting puddling-furnace, an air-tight removable cover, and a connecting-pipe constructed to reciprocate and rotate within an exhaust-pipe, substantially as
 65 specified.

4. The combination of a tilting puddling-furnace, or its described equivalent, an air-tight removable cover continuously connected to a vacuum-producing device, and a reducing-
 70 burner, substantially as shown and described.

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

ROBT. H. GORDON.

Witnesses:

E. B. STOCKING,
 L. C. HILLS.