

No. 620,339.

Patented Feb. 28, 1899.

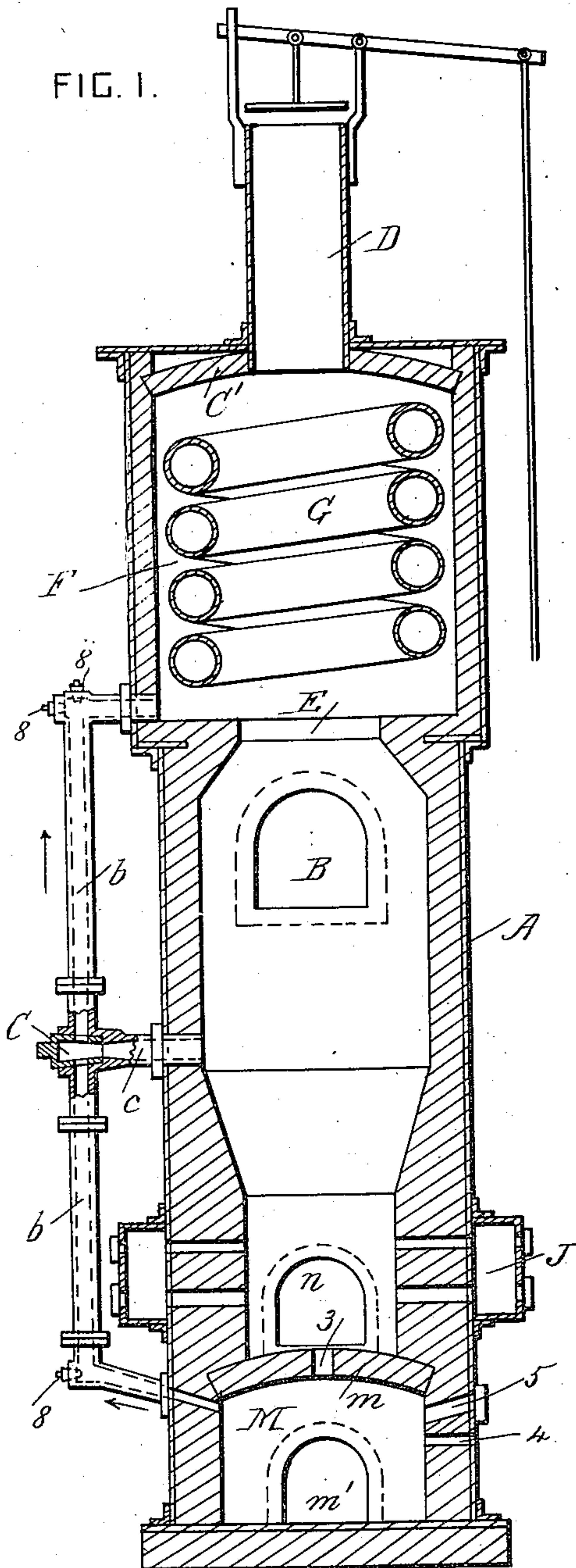
H. E. MACHELL.

CUPOLA FURNACE.

(Application filed Feb. 1, 1898.)

(No Model.)

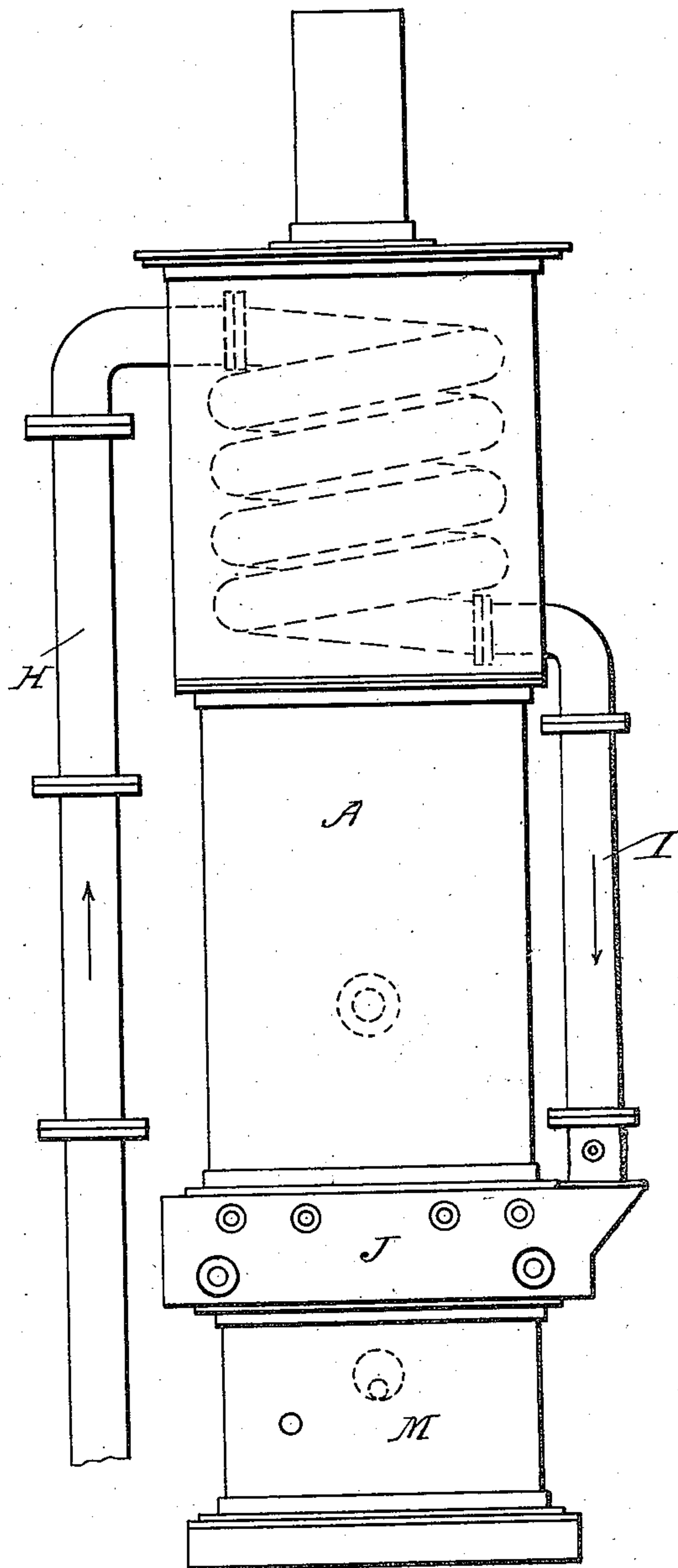
FIG. 1.



WITNESSES

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FIG. 2.



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CUPOLA-FURNACE.

SPECIFICATION forming part of Letters Patent No. 620,339, dated February 28, 1899.

Application filed February 1, 1898. Serial No. 668,734. (No model.)

To all whom it may concern:

Be it known that I, HUME EDWARD MACHELL, a subject of the Queen of Great Britain, residing at London, in the county of Middlesex, England, have invented certain new and useful Improvements in Cupolas or Furnaces for Melting Iron; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to blast-furnaces; and it consists in the novel construction and combination of the parts hereinafter fully described and claimed.

To clearly illustrate my invention, I will make reference to the accompanying sheet of drawings, wherein—

Figure 1 is a vertical section of a cupola or blast furnace for melting metal constructed according to my invention, and Fig. 2 is a front elevation of same.

In constructing a furnace according to my invention I employ an outer metal tubular casing A, provided with a door or opening B for charging the furnace with coke and metal in any ordinary and well-known manner. The top of the cupola is covered in by a dome C', provided with a chimney D, which allows for the escape of smoke and heated gases which pass into the atmosphere. At or near the top of the cupola and communicating therewith by an opening or openings E is a chamber F, containing a coiled pipe G, communicating by pipe H with a rotary "blower" and by pipe I with the blast-chamber or annular belt J, surrounding the cupola. The air generated by the blower (not shown) is forced up through pipe H into the coil G, said coil being heated by the flames and heated gases arising from the furnace, which impinge upon the coiled pipe in their passage to the outlet-chimney D, whereby the air circulating through the coiled pipes is heated to a very high temperature. This highly-heated air is then conducted from the bottom of the coiled pipe I to the blast-chamber and cupola, which adds materially to the heat of the furnace and greatly assists in melting the metal. The temperature of the furnace is maintained with a considerably less expenditure of fuel.

In order to render the working of the furnace more effective, a receiver M is formed

below the bottom *m* of the melting-chamber. The bottom *m* is preferably an arch which supports the charge of coke and metal, and the molten metal runs through a hole 3 in the bottom *m* and collects in the receiver M. A large opening *n* is formed in the side of the melting-chamber above the bottom *m* and a similar opening *m'* is formed in the side of the receiver. These openings afford access to the interior of the furnace, so that the furnaceman can plaster it with ganister or fire-clay. The receiver also has a sight-hole 5 and a hole 4 for the slag to run out. The openings *n* and *m'* are provided with suitable covers (not shown) when the furnace is in operation. A pipe *b* is provided for connecting the air-space of the receiver M above the molten metal with the chamber F, and *c* is a branch pipe which connects the pipe *b* with the middle part of the melting-chamber. The pipe *b* is provided with any approved valve mechanism for regulating the passage of air through it and through the branch *c*.

C is a plug-valve which may be used to regulate the passage of air through the pipes *b* and *c*. The heated air from the receiver M and from the middle part of the furnace assists in heating the coiled pipe G, through which the blast is passed. The pipe *b* has core-plugs 8.

What I claim is—

In a blast-furnace, the combination, with a melting-chamber open at the top and having a bottom *m* provided with a hole, a receiver M for the molten metal arranged below the said bottom, and a heating-chamber F arranged above the top of the melting-chamber and communicating directly with its upper part; of a blast-pipe which passes through the said heating-chamber and is connected with the lower part of the melting-chamber, a pipe *b* connecting the upper part of the receiver M with the lower part of the chamber F, and a branch pipe *c* connecting the pipe *b* with the middle part of the melting-chamber above the point where the blast enters it, substantially as set forth.

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

HUME EDWARD MACHELL.

Witnesses:

THOMAS WILLIAM CORBIN,
WILLIAM RICHARDS.