

No. 646,448.

Patented Apr. 3, 1900.

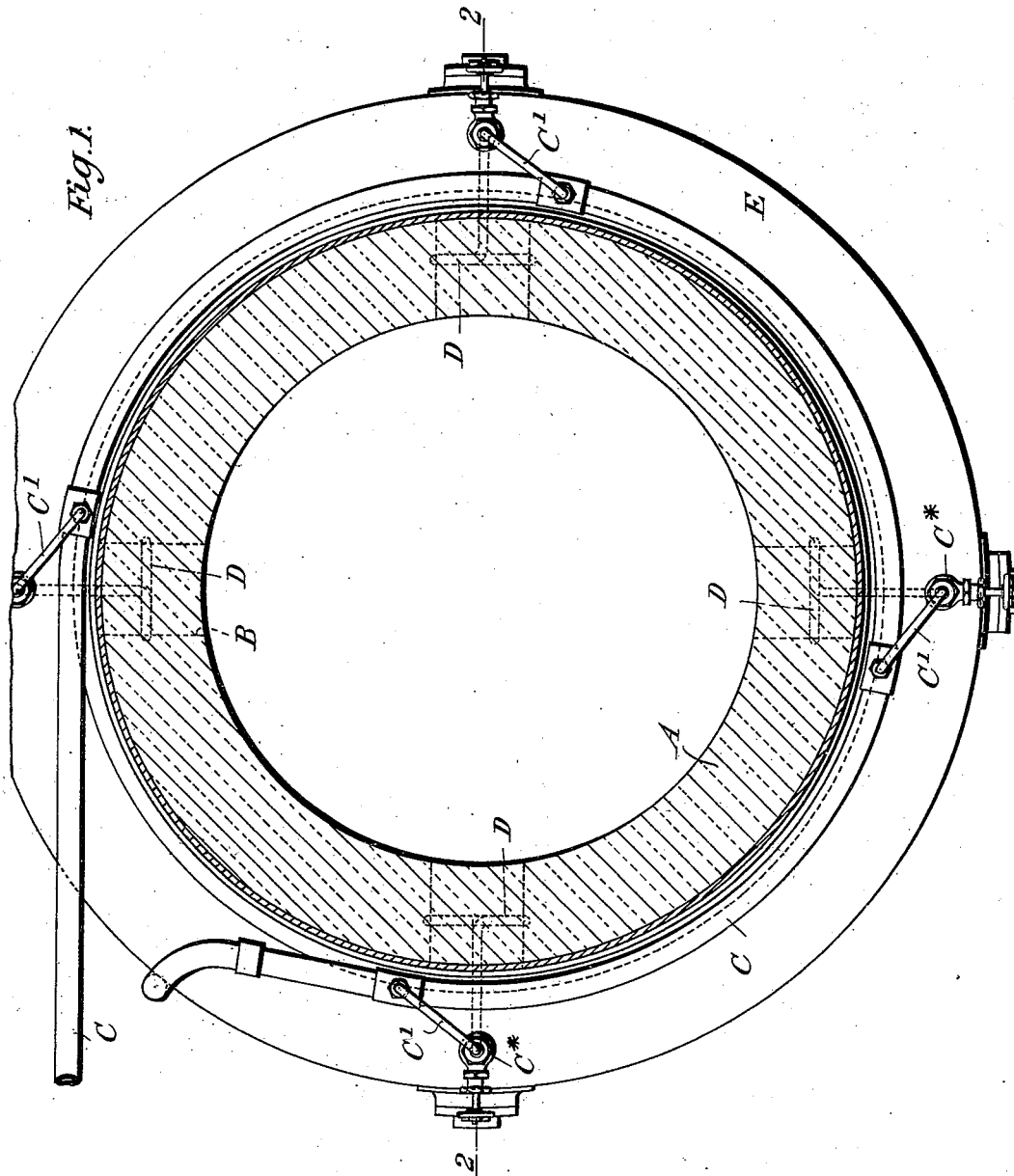
G. L. MORTON.

APPARATUS FOR INJECTING STEAM INTO CUPOLAS.

(Application filed June 23, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:—

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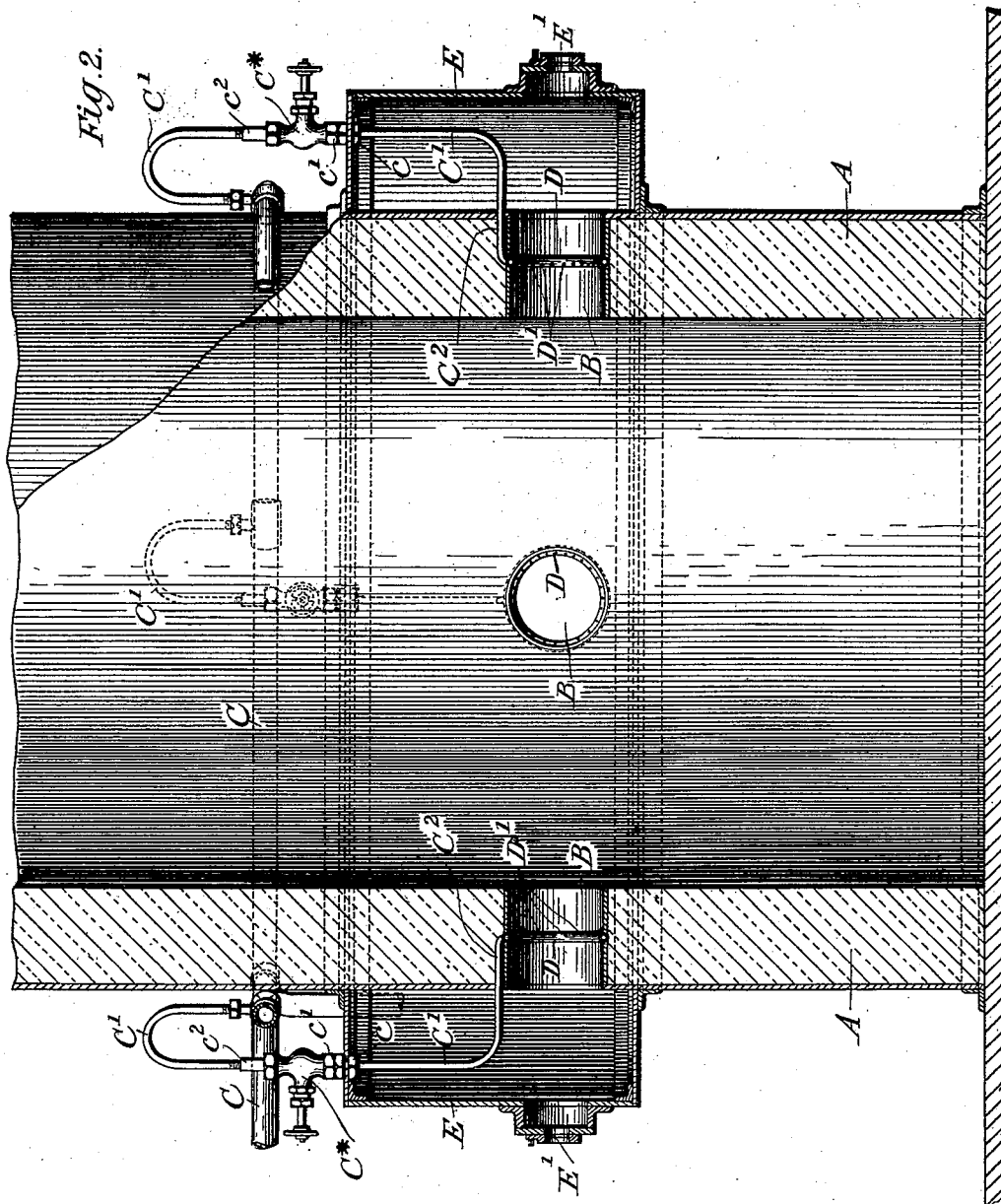
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APPARATUS FOR INJECTING STEAM INTO CUPOLAS.

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(No Model.)

2 Sheets—Sheet 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

GEORGE LOUIS MORTON, OF LONDON, ENGLAND, ASSIGNOR TO THE
DOHERTY IRON CASTINGS PROCESS, LIMITED, OF SAME PLACE.

APPARATUS FOR INJECTING STEAM INTO CUPOLAS.

SPECIFICATION forming part of Letters Patent No. 646,448, dated April 3, 1900.

Application filed June 23, 1899. Serial No. 721,635. (No model.)

To all whom it may concern:

Be it known that I, GEORGE LOUIS MORTON, managing engineer to The Doherty Iron Castings Process, Limited, a subject of the Queen of Great Britain, residing at 16 St. Helen's Place, London, England, have invented certain new and useful Improvements in Apparatus for Injecting Steam into Cupolas in the Process of Melting Iron, (for which I have made application for Letters Patent in Great Britain, No. 2,933, dated February 9, 1899,) of which the following is a specification.

In United States Letters Patent No. 575,518, dated January 19, 1897, the means shown for introducing steam through the twyers into a cupola consist of a single steam-pipe in the twyer producing a single steam-jet centrally, or thereabout, in each twyer.

Now the present invention consists of a novel means for introducing steam through the twyers into the cupola, which will be hereinafter described, and finally pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is a sectional plan of a cupola having four twyers therein, each fitted with a ring-nozzle according to the present invention. Fig. 2 is a vertical section on line 2 2, Fig. 1—*i. e.*, taken right through the twyers.

A is the wall of the cupola, and B the twyers formed therein.

C is a steam-pipe from boiler, (and super-heater, where the latter is employed,) leading to each of the four ring-nozzles D, for instance, by branch pipes C', as shown, these branch pipes C' each being provided with a cock or valve C^x, respectively, to enable a supply of steam through each such branch pipe C' individually to be regulated independently of the others and each such branch pipe leading through the air-blast passage E in any suitable manner and secured to and passing through the wall of said chamber E in any suitable manner—for instance, by means of the nuts c c' and a running coupling c²—to permit said connection to be made in a steam-tight manner.

The ring D is provided with a series of holes or openings D' all around same (advantageously drilled on the inside of said ring) in a direction either radially inward, so that

the steam-jets issuing therefrom converge and meet one another at the center or within the plane of said ring, or said holes may be drilled or formed in other suitable direction—for instance, at such an angle that the jets of steam issuing therefrom will converge in a conical form at a short distance beyond the ring toward the opening of the twyer B into the cupola.

The ring D is shown embedded or partly embedded in the wall or lining of the twyer, and also the part C² of the steam-pipe C', leading thereto, may likewise be embedded or partly embedded in the twyer lining or wall of the cupola, as shown in Fig. 2, this arrangement having the advantage that neither this part of the steam-pipe nor the ring-nozzle will be liable to be damaged by the poker or other device passed through the twyer into the cupola; but it will be obvious that I do not confine myself to thus embedding or partly embedding the ring-nozzle D in the wall or lining of the twyer, as same may be mounted in any suitable manner in the twyer, so that a clear opening is thus always left through the twyer for the poker or other device to be passed therethrough when desired.

The air-blast is introduced through the twyer in the usual or any suitable manner—for instance, through the air-blast chamber E, which is provided with doors E' to obtain access thereto opposite the twyers and forming observation-holes in the usual manner—and such air-blast carries in with it the steam issuing in a series of jets, (in the form of a ring or rings,) as aforesaid, owing to said converging ring or rings of steam-jets being interposed in the path of said air-blast on its way through the twyers to the interior of the cupola.

The steam pipe or nozzle D at the point where the series of jets issue therefrom, as aforesaid, may be other than in the exact form of a circle, as shown in the drawings. For instance, if the form of the twyer be oval, triangular, square, or rectangular the perforated steam-pipe D would or could be made to follow the shape of said twyer. Furthermore, the ring or series of steam-jets may not be continuous all around the opening through

the twyers—for instance, the series of steam-jets may issue on two opposite sides only or for a part (or parts) of the way around instead of all around the twyer.

5 By this invention important advantages are obtained in carrying out the Doherty process for melting iron according to the above-named patent, the steam being introduced in a finely-divided state and diffused
10 over a larger area of the incandescent mass than with a single jet of steam in each twyer and enabling a larger amount of steam to be decomposed.

15 Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

20 1. In a device of the character described, the combination with a cupola, and twyers in said cupola; of annular steam-pipes fitted around the interior of said twyers; said pipes having perforations therein, substantially as described.

25 2. In a device of the character described, the combination with a cupola, and twyers in said cupola; of annular steam-passages located around the interior of said twyers; said

passages having perforations communicating therewith so located that jets of steam from said passages will converge to the centers of the twyers, substantially as described. 30

3. In a device of the character described, the combination with a cupola, and twyers in the said cupola, of steam-pipes fitted around the interior of the said twyers, and partly embedded in the wall or lining of the twyers, the
35 said steam-pipes having perforations for the escape of steam; substantially as described.

4. In a device of the character described, the combination with a cupola, and twyers in the said cupola, of steam-pipes fitted around
40 the interior of the said twyers, and partly embedded in the wall or lining of the twyers, the said steam-pipes having perforations for the escape of steam, the said perforations being
45 arranged to produce a series of jets of steam which will converge in the path of the air-blast; substantially as described.

GEORGE LOUIS MORTON.

Witnesses:

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