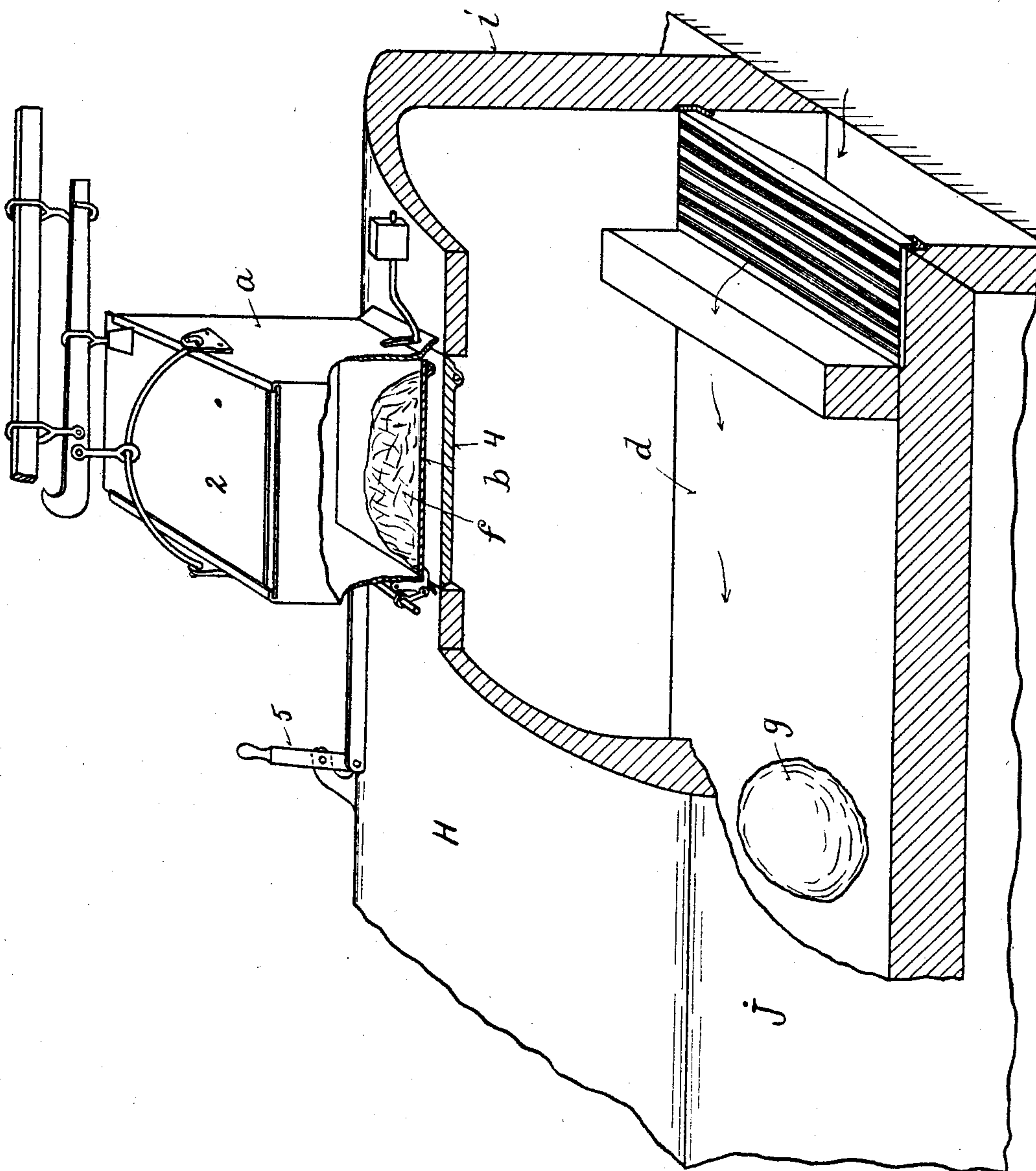


No. 765,158.

PATENTED JULY 19, 1904.

J. W. ARNOLD.
PROCESS OF TREATING IRON.
APPLICATION FILED JAN. 15, 1903.

NO MODEL.



WITNESSES:

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JAMES WALTER ARNOLD, OF COVINGTON, KENTUCKY.

PROCESS OF TREATING IRON.

SPECIFICATION forming part of Letters Patent No. 765,158, dated July 19, 1904.

Application filed January 15, 1903. Serial No. 139,241. (No model.)

To all whom it may concern:

Be it known that I, JAMES WALTER ARNOLD, a citizen of the United States, residing at Covington, in the county of Kenton and State of Kentucky, have invented a new and useful Process of Treating Iron, of which the following is a specification.

My invention relates to improved process of treating iron and steel preparatory to rolling it into bars, &c. Its object is to provide an improved process whereby the use of dampers is dispensed with and the heating of one charge serves to temper the preceding charge, thereby increasing the capacity of the furnace and reducing the consumption of labor and fuel.

In the accompanying drawing, forming part of this specification, is represented, partly in section, a furnace and apparatus for carrying out my improved process.

The process is primarily adapted for the treatment of various kinds of scrap iron and steel and as heretofore conducted consisted in charging into the furnace through the working door in the side of the furnace a quantity of scrap, which after the door was closed was highly heated, so as to become semifluid and welded or run into a mass, which was then worked into a ball. Then the dampers of the furnace were closed to allow the ball to cool to a temperature suitable for rolling or passing through the rolls. This process entailed the introduction of a current of cold air through the door while the charge was being introduced, which chilled the furnace.

By my improved process I provide a charging-box *a*, located above the crown of the furnace *H* and preferably supported on a scale, so that uniform charges may be introduced into the furnace. This box has a lid 2 at the top and a door *b* at the bottom, which may be tripped to discharge the contents of the charging-box through an opening in the crown of the furnace, which opening is also provided with a door 4, adapted to be worked by a hand-lever 5.

d represents the hearth, *j* the front wall, and *i* the rear wall, of the furnace.

f represents a charge of scrap in the charging-box, and *g* a ball formed from a previous charge.

The operation is as follows: After the ball has been sufficiently heated to secure a sufficient degree of fluidity to insure the uniting of the component parts into a homogeneous ball this ball is rolled or worked toward the flue end of the hearth, so as to be out of the way of the fresh charge, which is then introduced into the furnace by opening the door in the crown of the furnace and tripping the door in the bottom of the charging-box. The lid of the box prevents any draft of cold air entering with the charge or flame passing up through the charging-box. The introduction of the fresh cool charge between the previously-formed ball and the fire serves by the close proximity of the two charges to cool or temper the ball. Thus the fresh charge is rapidly heated, while the ball, which was too highly heated for treatment in the rolls, is by the same operation sufficiently reduced in temperature or tempered to the proper degree to fit it for the rolls and at the same interval of time that the fresh charge is being heated, and the damper is not required to be closed and other parts of the furnace thereby chilled. I am thus enabled to increase the output of the furnace in a given length of time and at the same time reduce the labor and fuel consumption.

Having described my invention, what I claim is—

1. The process of treating iron, which consists in introducing the fresh cool charge into the furnace at a point between the fire and the preceding charge, and in such proximity to the preceding charge that the latter acts to heat the fresh charge, and the fresh charge acts to cool the preceding charge by direct absorption of heat.

2. The process of treating iron which consists in introducing the successive cool fresh charges into the furnace before removing the preceding charge, and in close proximity thereto in such manner that while the fresh charge is being heated, the preceding charge is being directly cooled from absorption by the fresh charge.

3. The process of treating iron, which consists in rolling a highly-heated charge into a ball and placing the same out of the path of

the fresh charge, introducing a fresh charge
close to and between the fire and the preced-
ing charge, in such manner that the fresh
charge will be heated and the preceding charge
5 cooled by direct radiation between the charges.

4. The process of treating iron, which con-
sists in rolling a highly-heated charge into a
ball and placing the same out of the path of
the fresh charge, introducing a fresh charge,
10 without the introduction of a current of air
therewith, close to and between the fire and
the preceding charge, in such manner that

while the fresh charge is being heated, the
preceding charge is being reduced in tempera-
ture by the action and close proximity of the 15
fresh charge.

In testimony whereof I have signed my name
to this specification in the presence of two sub-
scribing witnesses.

JAMES WALTER ARNOLD.

Witnesses:

ED. C. KELLEY,
ED. BRADY.