

(No Model.)

H. A. JONES.

METHOD OF MAKING PUDDLERS' BALLS.

No. 457,352.

Patented Aug. 11, 1891.

Fig. 1.

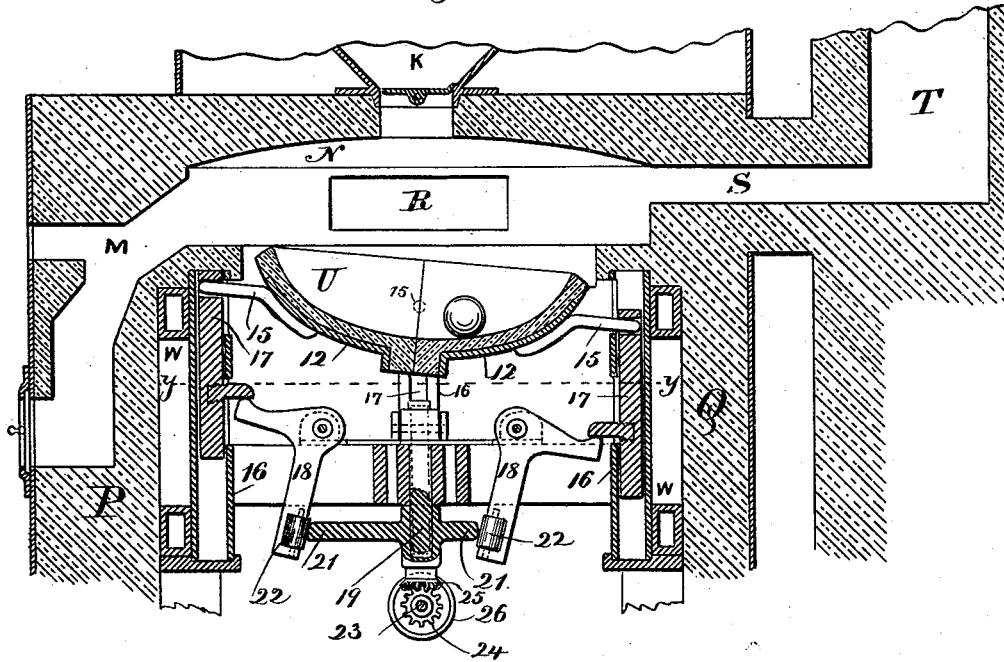
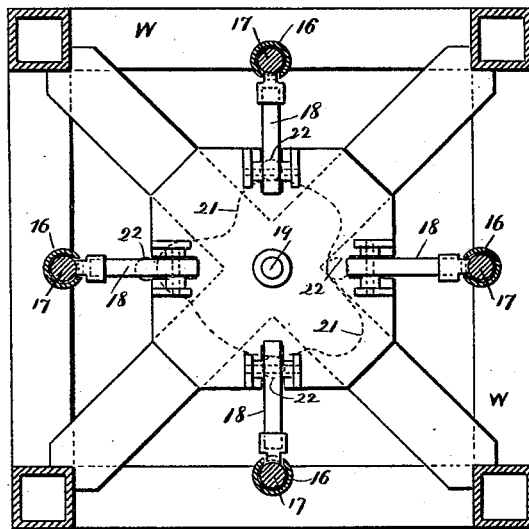


Fig. 2.



Witnesses

Chas. H. Smith
J. Stark

Inventor

Henry A. Jones
per Lemuel W. Correll
Att'y

UNITED STATES PATENT OFFICE.

HENRY ANWYL JONES, OF BROOKLYN, NEW YORK.

METHOD OF MAKING PUDDLERS' BALLS.

SPECIFICATION forming part of Letters Patent No. 457,352, dated August 11, 1891.

Application filed January 8, 1889. Renewed January 10, 1891. Serial No. 377,319. (No model.)

To all whom it may concern:

Be it known that I, HENRY ANWYL JONES, of Brooklyn, in the county of Kings and State of New York, have invented an Improved Method of Making Puddlers' Balls, of which the following is a specification.

In the puddling operation heretofore usually performed upon the hearth of a reverberatory furnace the melted iron is subjected to the action of tools in the hands of workmen to gather such iron up into a ball and to work the same until it is sufficiently hard for removal from the furnace. This operation is exceedingly laborious and can only be performed by skilled labor.

The object of the present invention is to form the puddler's ball automatically by providing an oscillating concave hearth to the reverberating furnaces, so that the iron or iron ore when supplied to such hearth from time to time shall be brought to a welding heat and such mass of iron shall be rolled around and backward and forward within the concave hearth in a nearly-circular direction by the gyrations given to such hearth until the iron is gathered into a ball, and the further rolling of the same consolidates this ball sufficiently for its removal to the trip-hammer or to the rolls, by which the same is brought into a merchantable condition, and to facilitate this operation I introduce into the reverberatory furnace and upon the hearth of the same a ball of iron corresponding in quality to that which is being melted, so that this ball may form the nucleus upon which the wrought-iron will gather by the accretion resulting from the rolling of this ball of iron around the concave of the oscillating or gyratory hearth of the furnace.

In the drawings, Figure 1 is a vertical section representing the reverberatory furnace, the hearth, and mechanism for giving to the same the required movement; and Fig. 2 is a sectional plan below the line *y y*.

There is a suitable inclosure having a flue M, through which the flame is admitted from a furnace or from pipes supplying gas and air, which is ignited to form the flame, and there is an arch N and sides P and Q to the reverberatory furnace and a flue S, passing to the chimney T, and a door at R to give access to the hearth. The hearth

U is made of suitable refractory material within the pan 12, the upper surface of the hearth being concaved to form a pan of the desired depth, and from the opposite edges of the metal pan 12 there are trunnions 15, received into hollow columns 16, such columns being slotted vertically and receiving lifters 17 and the outer ends of the bent levers 18, and these bent levers occupy radial positions, or nearly so, and there is a central shaft 19, with cams 21 upon the same, which shaft 19 is rotated by suitable power—such, for instance, as the pulley 26, horizontal shaft 23, and bevel-gears 24 and 25—and the cam 21 is shaped in such a manner as to act against the rollers 22 upon the bent levers 18 in succession and by the lifters 17 raise the trunnions 15 successively, and thereby the pan 12 and hearth U will receive an automatic oscillating or gyratory movement to cause the contents of the hearth to roll around within the concave upper surface of such hearth in nearly a circle.

The material to be melted or heated to a welding condition and treated upon this hearth may be supplied in any suitable manner. Where ore in a pulverized condition is acted upon, it may be supplied by the hopper K through the arch of the furnace and fall upon the automatic hearth, which is exposed to an intense heat, by which the particles of iron are melted or raised to a welding heat. During this operation the hearth receives an oscillating or gyratory motion, before mentioned, and the contents of the hearth move round and round the concave surface of such hearth in nearly a circular direction, due to the oscillating or gyratory movement of the hearth, and the particles of iron adhere together and form a ball that increases in size by accretion until the whole of the wrought-iron within the hearth forms a puddler's ball that is surrounded more or less with the melted slag and impurities thrown off from the iron, and this puddler's ball becomes sufficiently consolidated by the movement to which it is exposed for its removal from the furnace by suitable tongs or other tools, as usual, and I remark that should there be slag it may be removed by a ladle from time to time, or drawn off through a tap or gate provided in the hearth.

The operations before described are assisted by introducing into the mass of iron and slag a ball of iron corresponding in quality, or nearly so, to the iron that is being manufactured, and this ball of iron will sink in the mass and will roll around nearly in a circle in consequence of the gyrations of the automatic hearth, and the particles of iron will adhere to this ball, and the ball will continue to increase in size until almost all of the iron in the charge upon the hearth has attached itself to such ball, and by the weight of this ball as it rolls around upon the hearth the slag and other impurities will be largely pressed out from the iron in forming the puddler's ball automatically, as aforesaid.

I do not herein lay claim to the mechanism made use of in giving to the hearth an oscillating or gyratory movement, the same forming the subject of a separate application for Letters Patent of like date herewith.

I claim as my invention—

1. The method herein specified of forming puddlers' balls, consisting in heating the iron upon a concave movable hearth, giving to such hearth an oscillating gyratory movement to cause the materials to move around upon such

hearth in nearly a circular direction, and thereby bring the particles of iron together in the form of a ball, and continuing the movement until such ball has increased in size by accretions and becomes sufficiently consolidated for removal from the hearth, substantially as set forth.

2. The method herein specified of forming puddlers' balls, consisting in heating the iron upon a movable hearth having a concave upper surface, giving to such hearth an oscillating or gyratory movement to cause the heated material to move around the same in nearly a circular direction, introducing into the heated mass a ball of iron and causing the particles of iron in the mass to adhere to the same and form a puddler's ball by the accretion, and consolidating such ball by the continuation of the movement of the hearth until the ball is in a condition for removal from the furnace, substantially as set forth.

Signed by me this 4th day of January, 1889.

HENRY ANWYL JONES.

Witnesses:

GEO. T. PINCKNEY,
WILLIAM G. MOTT.