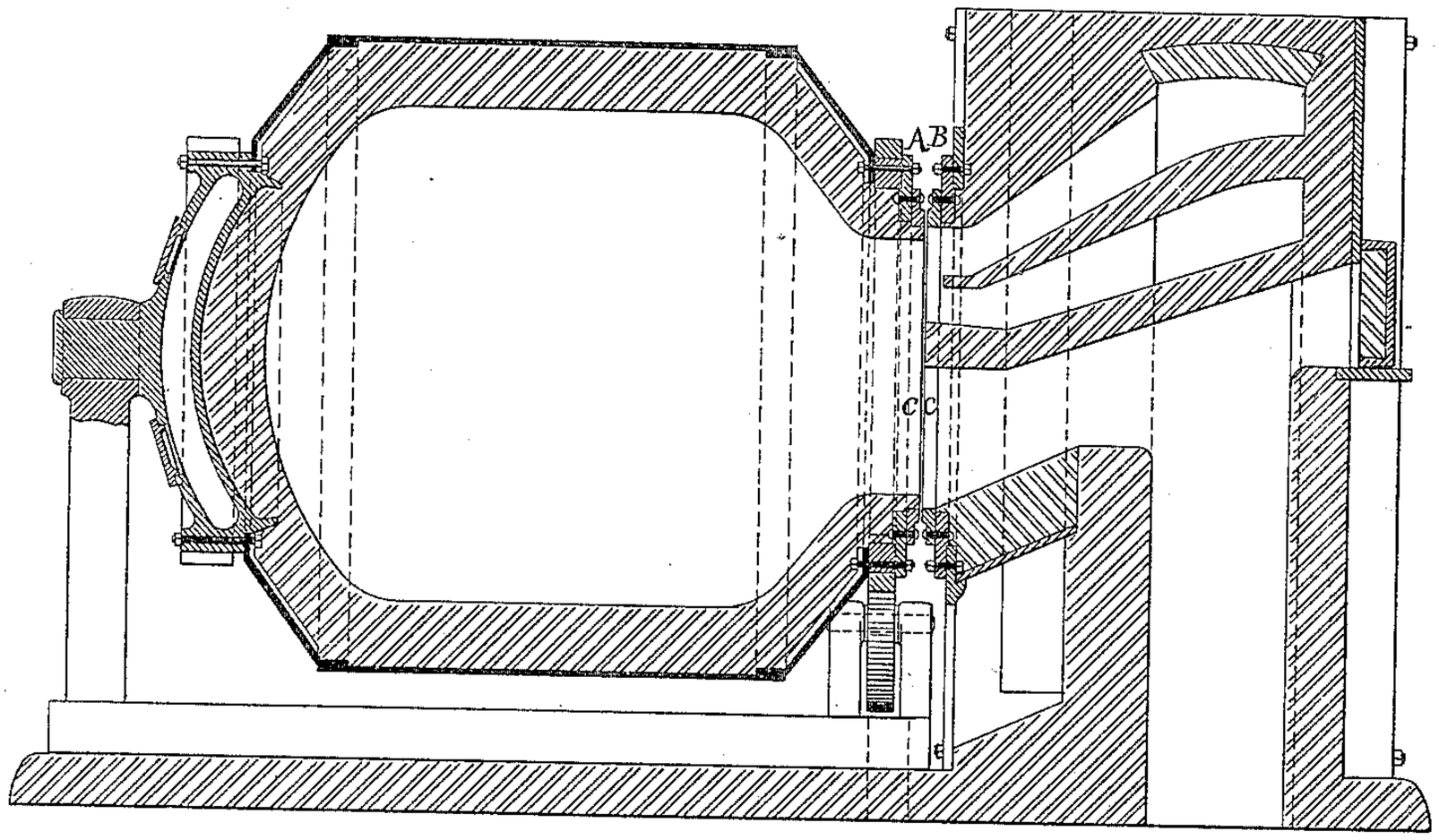
G. H. SELLERS.

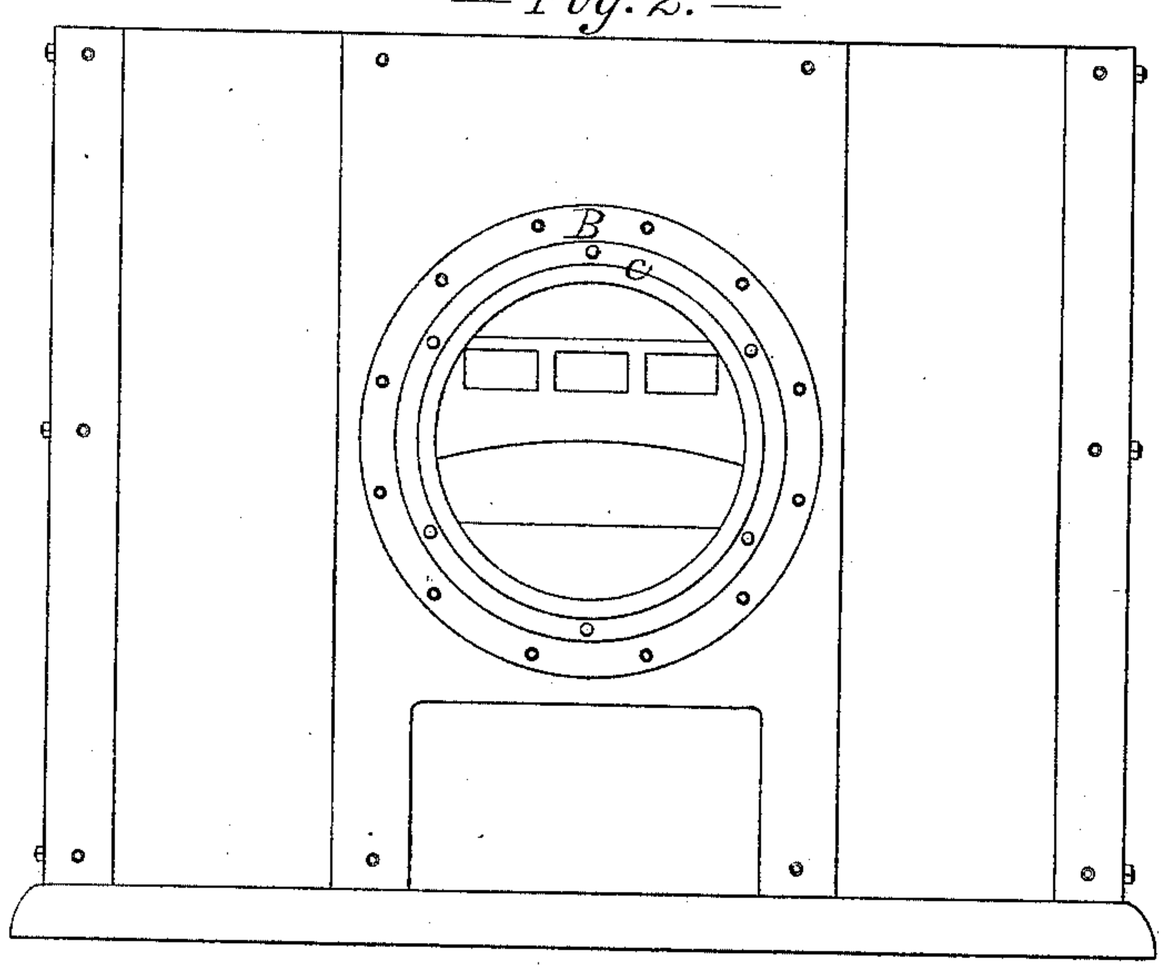
REVOLVING PUDDLERS.

No. 172,508. Patented Jan. 18, 1876.

— *Fig. 1.* —



— *Fig. 2.* —



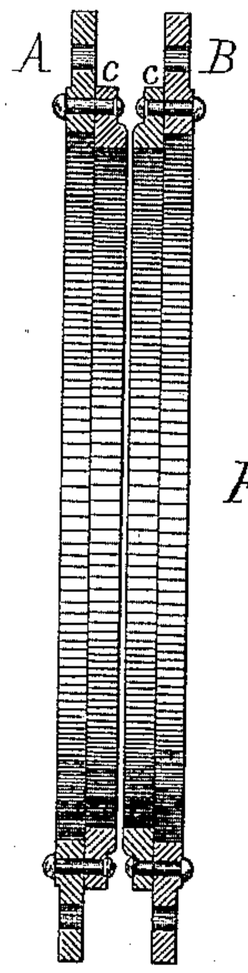


Fig. 3. —

Witnesses:
Jos. C. Fraley.
James McConaghy

Inventor
Geo. H. Sellers.
by Henry Baldwin Jr.
Atty

UNITED STATES PATENT OFFICE.

GEORGE H. SELLERS, OF WILMINGTON, DELAWARE, ASSIGNOR TO WILLIAM SELLERS AND JOHN SELLERS, JR., OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN REVOLVING PUDDLERS.

Specification forming part of Letters Patent No. **172,508**, dated January 18, 1876; application filed November 24, 1875.

To all whom it may concern:

Be it known that I, GEORGE H. SELLERS, of the city of Wilmington, New Castle county, Delaware, have invented a new and useful Improvement in the Operation of Rotating Puddling-Vessels, of which improvement the following is a specification:

My invention relates to the operation of puddling-vessels rotating about a horizontal axis, and having fixed flues for the supply of flame or fuel and the discharge of the products of combustion.

As heretofore constructed, these vessels, whether open at both ends or at one end only, have had the joints between the rotating vessel and the fixed flues formed by broad rings on the end or ends of the vessel, and on the face or faces of the flues, the breadth given to the surfaces of the joint being designed to prevent the escape of flame between these surfaces, which could not be brought into actual contact. In most cases one and generally all of these broad-surfaced rings have been provided with water circulation to lower the temperature of the joints, it having been the theory of operation in such machines that these provisions were essential to the maintenance of a practical joint. In practice, however, I have discovered that broad surfaces and lowered temperatures do not conduce to the maintenance of a proper joint, but that on the contrary they are mainly the occasion of the difficulties which have been encountered in maintaining such joints, and that this difficulty arises from the following facts: During the boiling-stage of the puddling operation the charge swells, and, overflowing the mouth of the puddling-vessel, backs up on the bottom of the flue, and across the joint between the flue and the vessel. As the iron comes to nature the charge subsides, and the liquid mass gradually retires within the vessel, the joint being close enough to retain the expanding and subsiding overflow within the flue and the vessel, yet not so close but that some portion of it will penetrate the joint, so that with the broad joint, and the lowered temperature induced thereby, whether with or without the water circulation, the cinder which penetrates the joint is chilled therein, clings to the surfaces thereof, and accumulates upon itself as the operation continues, the accretion building irregularly around the revolving surface, and almost entirely upon the lower side of the stationary surface, the whole of it attaining a degree of toughness which renders its removal extremely difficult after the operation is completed. In its conditions during the puddling operation this viscous accumulation produces great friction, and causes a gradual enlargement of the joint upon one side. To resist this tendency great pressure has been resorted to, and this pressure, while measurably retarding the enlargement, greatly increases the friction and consequent loss of power.

It is the object of my invention so to apply my aforesaid discovery as to avoid the difficulties heretofore encountered without resorting to such pressure as has heretofore been employed; and in actual practice I have accomplished this object in such a manner as to materially improve the operation of puddling, as well as the operation of the rotary vessel itself.

My invention consists in maintaining the joint-surfaces between the revolving furnace and its fixed flues at a temperature so high as will not only prevent the overflowing cinder which penetrates the joint from becoming cold and tough enough to build up on the surfaces of the joint, but, by avoiding the chilling of this cinder, to keep it in so friable a condition that it will be ground up between the surfaces of the joint, and, instead of building up irregularly upon the joint, it will be discharged therefrom in small grains or powder; and this I accomplish (without any change in the character, supply, or application of the flame or fuel) by dispensing with any cooling circulation about the joint, and by making the surfaces of the joint-rings on the open ends of the vessel, and on their corresponding flues, narrower than those heretofore employed.

In the practice of my invention the joint-surfaces should be maintained at or near a red heat, and that they may withstand such temperature without the aid of a water circulation, and resist the wear from the cinder to which they are exposed during the operation of the machine, I prefer to make the rings of wrought-iron or steel.

I have found that, in the use of a puddling-vessel such as shown in the accompanying drawings, with gaseous fuel, a joint the surfaces of which had a breadth of one and a half inch meets all the requirements of the improved operation, and accordingly I give this as a proper width for the purpose. Of course a greater or less breadth may be found compatible with the maintenance of the proper conditions of the joint and the cinder, as above set forth; but all such variations will be comprised within the knowledge of the constructor or operator.

In the accompanying drawings, which form part of this specification, Figure 1 represents a longitudinal elevation, in section, of a puddling-vessel and its flues, constructed as described in Letters Patent No. 159,849, granted to myself and Wm. Sellers, of Philadelphia, Pennsylvania, February 16, 1875, except that the joint-rings are modified in accordance with my present invention. Fig. 2 is an elevation of the joint-rings, with the base-plates to which they are attached. Fig. 3 is an enlarged section of the ring and base-plate, showing the mode of attachment.

The base-plate A encircles the mouth of the puddling-vessel, and a similar one, B, incloses the flues, through which flues the flame or fuel enters the vessel, and the products of combustion are discharged. To these base-plates I secure the joint-rings C C, preferably by rivets, in such manner that they can be conveniently removed. The rings are flanged to afford a means of securing them to the base-plates without exposing the fastenings to wear during the operation of the machine.

When the rotating puddling-vessel is open at both ends it is only necessary that all the joint-rings should be constructed and operated substantially as hereinbefore set forth, and I contemplate the application of my invention, in the manner described, to such vessels.

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

The method, substantially as described, of preventing the accumulation of cinder between the joint-surfaces of rotary puddling-vessels, which method consists in maintaining the joint-surfaces at so high a temperature as to keep the penetrating cinder in a friable condition during its passage between the said joint-surfaces, whereby this cinder is prevented from building up irregularly, and is ground between and discharged from the joint.

GEO. H. SELLERS.

Witnesses:

ALBERT W. SMITH,

J. ERNEST SMITH.