

A. S. BEADLESTON.

Revolving Puddler.

No. 8,573.

Patented Dec. 9, 1851.

Fig. 1.

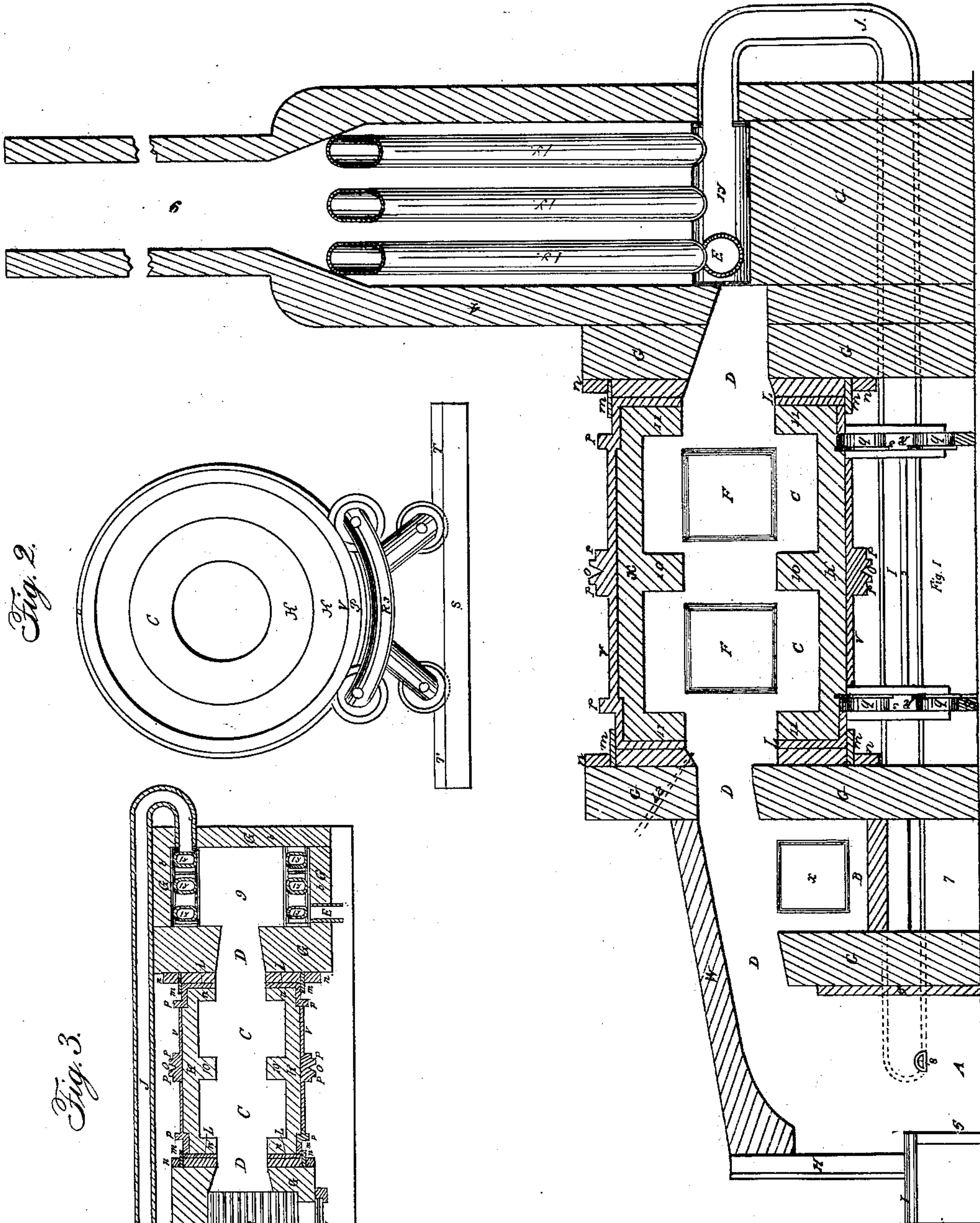


Fig. 2.

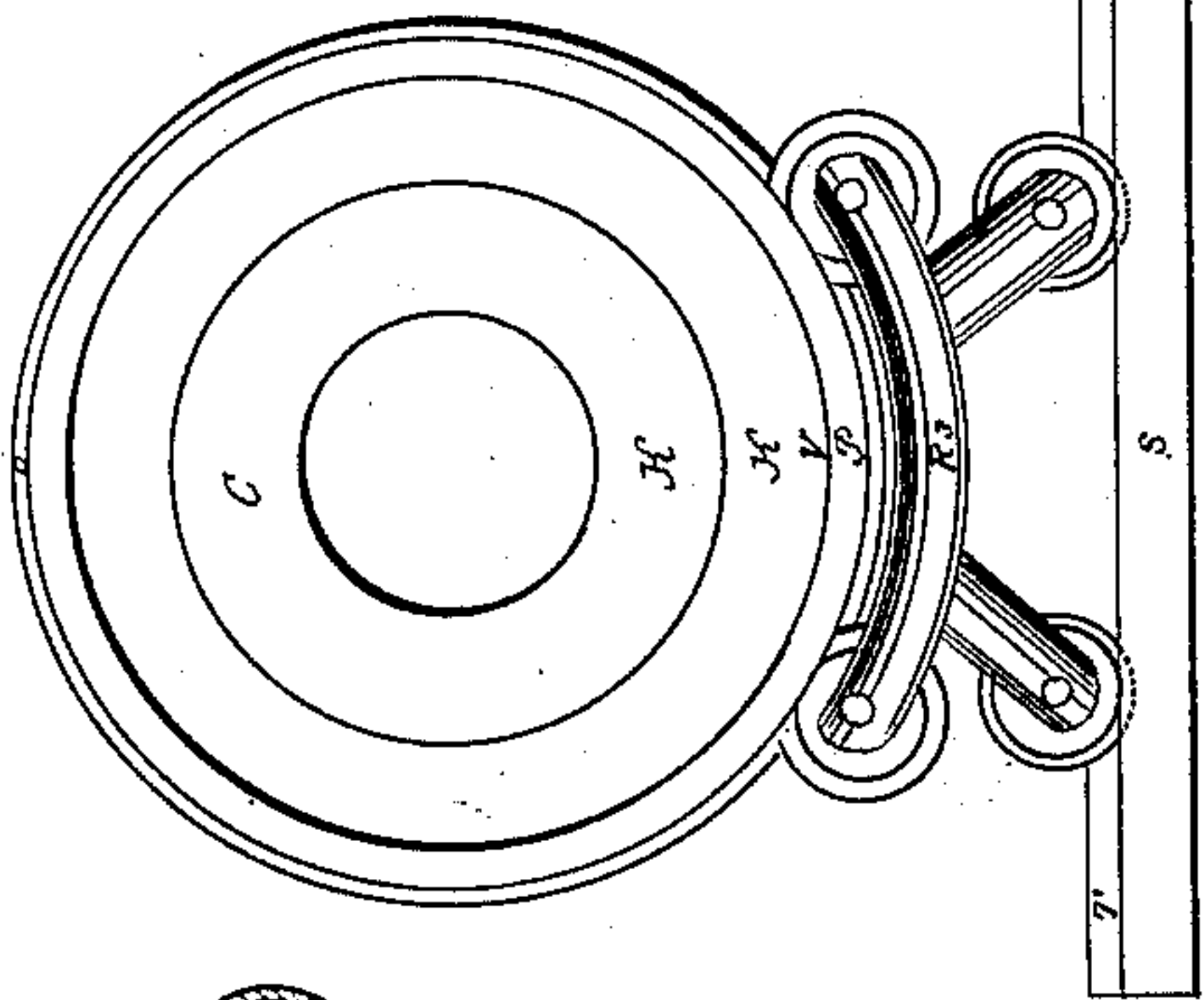
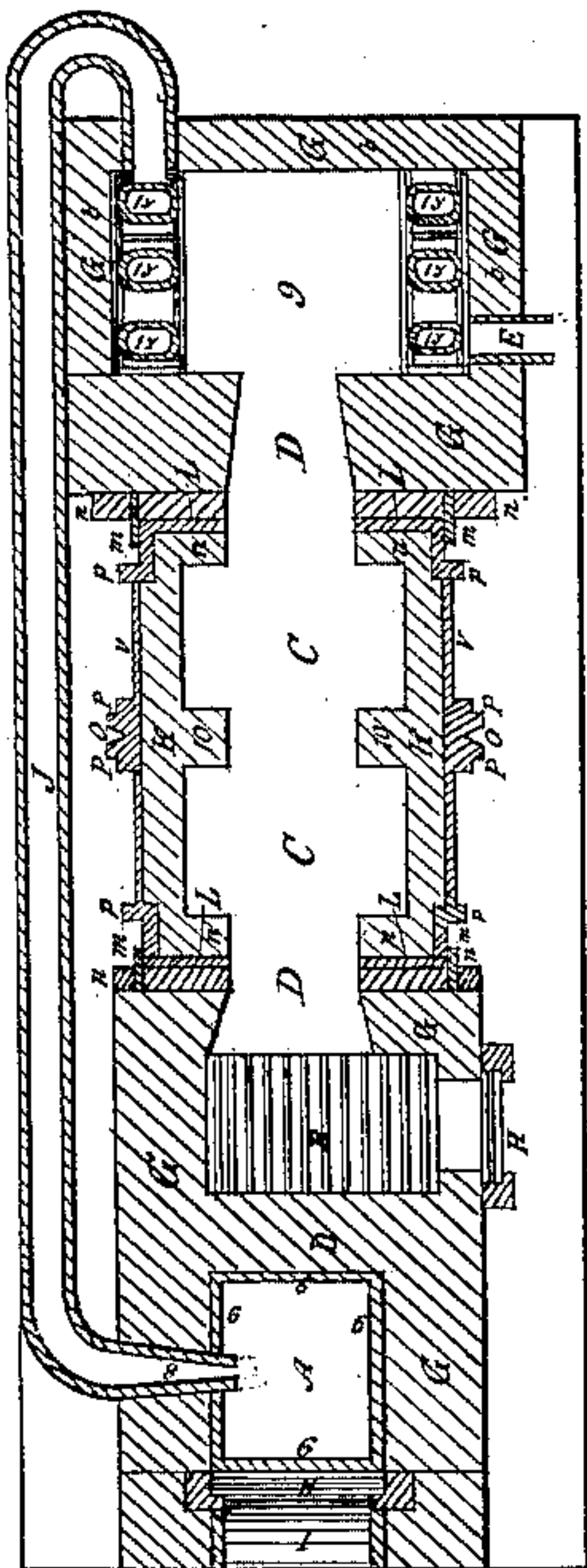


Fig. 3.



UNITED STATES PATENT OFFICE.

AMBROSE S. BEADLESTON, OF AU SABLE FORKS, NEW YORK.

IMPROVED REVOLVING REVERBERATORY FURNACE.

Specification forming part of Letters Patent No. 8,573, dated December 9, 1851.

To all whom it may concern:

Be it known that I, AMBROSE S. BEADLESTON, of Au Sable Forks, county of Essex, and State of New York, have invented a new and improved mode of reducing iron ores to wrought or malleable irons; also, the reduction of other ores—such as copper ores, lead ores, &c.; and I do hereby declare that the following is a full, clear and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a longitudinal vertical section of my furnace, taken through the center, having a grate such as is used for reverberatory and other furnaces; also, a forge-fire or Catalan fire, showing the combination and arrangement of the same when employed unitedly. Fig. 2 is a transverse vertical section taken through the center of the revolving cylinder or furnace. Fig. 3 is a horizontal section of the same, taken through the Catalan-fire grate, revolving cylinder or furnace, and chimney.

Similar letters and figures of reference indicate corresponding parts in each of the several figures.

The nature of my invention consists in the combination of a rolling or revolving cylindrical or working bottom furnace, constructed in any desirable form and size, with a grate such as is used for heating reverberatory furnaces, puddling and boiling furnaces, &c., employed in the manufacture of iron, in such a manner that the heated and inflamed gases shall pass into the interior of said rolling or revolving furnace, said apparatus being applicable to any purpose for which the ordinary reverberatory or wind furnaces are employed.

The object of the invention is to effect a saving in stock, a saving in fuel, a saving in labor, and in the time usually taken up in the manufacture of iron and other metals; also, to produce a better article than can be made by other means in present use.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A is a forge-fire or Catalan fire in general use.

B is a grate, such as is employed for heating reverberating furnaces and other furnaces.

C is a revolving cylinder or furnace revolving on frictional wheels or rollers, or their equivalent, and propelled by a chain and pulleys or gears, or otherwise.

D are flues. The ignited gases proceeding from the forge-fire A pass through the flue D to the fire-grate B, where, in addition to the ignited gases from the forge-fire A, any desirable amount of heat is generated and passes through the flue D to the revolving cylinder or furnace, and from the revolving furnace through D to the chimney inclosing the hot-air pipes I y, there heating the blast for the forge-fire A, which heated air may, if desirable, be taken from the hot-air pipe J, and introduced into the revolving furnace at the dotted line marked 12 in Fig. 1.

E are interior openings where the wind enters the hot pipes.

F are doors or openings in the revolving furnace, through which the ore or metal is introduced into the cylinder or furnace.

g is the brick-work.

H is a sliding door in front of and inclosing the forge-fire A, and is moved up and down by means of a weight and pulley or lever. This door has work-holes through it to enable the workmen to work the fire without raising the door, thereby excluding atmospheric air, when desirable.

I is the fore-plate or work-plate in front of the fire A.

J is a hot-air pipe conducting the hot-blast from the chimney or stack where it is heated to the forge-fire A.

K is the lining of the revolving furnace, either of fire-bricks or other refractory materials.

L are cast-iron plates or flanges cast or screwed to each end of the revolving furnace to secure the linings in the furnace.

m are adjusting-bands of cast or wrought iron, made to work closely in a groove or channel formed by the brick-work on the inside, and by a cast-iron ring or rim, n, on the outside, and fastened to the cylinder or furnace by set-screws or otherwise. This band excludes atmospheric air and the egress of heat from the furnace.

O is a chain-pulley, either cast to the shell of the cylinder or furnace or otherwise secured to it, in which a chain works which propels the furnace.

p are wrought-iron bands, which secure the furnace from expansive force caused by heat.

q are friction wheels or rollers placed in an iron frame, the upper ones working against the wrought-iron bands on the furnace, and

on which the furnace revolves, the lower ones working on a track or rails, S, to enable the operator to run the furnace out at any time for repairs or other purposes. The friction wheels or rollers *q* have flanges to insure the accurate working of the furnace.

R³ is a frame in which the friction-wheels are fixed.

S is the track or rails on which the car or carriage is moved.

T are blocks of wood or iron to keep the carriage in its place.

V is the shell or superficial structure of the revolving furnace. It is of iron, and either cast whole or in staves or pieces and properly secured by wrought-iron bands.

W is the roof to the forge-fire A and grate B.

4 is the brick-work inclosing hot-air pipes.

5 are bars or braces forming part of the frame in which the friction-wheels are fixed.

6 are cast-iron plates, which form the lining to the forge-fire A.

7 is the ash-pit under the grate.

8 is the tuyere to forge-fire A.

9 is the chimney or stack in which the hot-air pipes are placed.

10 shows how the interior of the revolving furnace may be divided into separate departments.

11 shows the internal form of the furnace at the ends, to prevent the escape of the ore or metal or other contents of the furnace or cylinder.

X is the door to the grate, and is moved up and down in a guide by means of a weight and pulley or lever.

The manipulation at the forge-fire or Catalan fire is not new, and therefore needs no further description.

The manipulation at the revolving furnace is as follows: The fire is built up in the grate as at reverberatory or other furnaces. Different kinds of fuel may be used for the purpose—such as hard coal, charcoal, coke, and several kinds of wood. When the furnace is sufficiently heated, the doors F are removed and the ore or pig metal constituting the charge for one heat, together with the cinder or flux, if any is to be used, is introduced into the furnace through the doors or openings F. When the furnace is charged, the doors F are replaced and made perfectly tight with fire-clay, and secured with suitable fastenings made for the purpose. The cylinder or furnace is then put in motion by means of a tightener-pulley pressing against the chain which propels the furnace. It may thus be put in motion or at rest at the pleasure of the person in charge. Other devices may be employed for the same purpose. When the furnace is charged and put in motion, the duties of the workman cease other than keeping the

grate until the mass or ball of iron is finished and ready for shingling. The furnace is then stopped, the doors removed, and the iron withdrawn and taken to the hammer or squeezer, to be shingled into a bloom or otherwise formed. The furnace is again charged with ore or metal, as before, the doors properly secured and put in motion. When the metal and other materials associated with it are fused, it is then called "coming to nature," and the small particles of refined iron are swimming about in the cinder, and the revolving motion of the furnace excites fermentation and prevents the iron from sinking and throws the particles of refined iron together. They then adhere the one to the other, forming at first small particles, but soon form one mass or ball. The ball rolling through the cinder picks up all the particles of iron in the cinder, and none is wasted or lost. The revolving furnace exposes the ore or metal and other substances uniformly and continually to the heat, and by its revolutions the highest-heated surface is continually passing under the contents of the furnace, thereby imparting to the metal a large amount of heat which it cannot obtain from other furnaces, thus facilitating fusion and saving fuel.

All the labor of the puddler so indispensable at the puddling-furnace, and all the labor of the boiler at boiling-furnaces, and all the artificial means employed to excite fermentation in those furnaces, and the labor of the fireman or bloomer at the blomary fires are performed by the revolving furnace simply by its rolling or revolving motion, thereby saving a large amount of labor.

I design by the use of my invention to produce a treble saving—namely, that of stock, a saving in fuel, and a saving in labor and in the time usually taken up in the manufacture—and at the same time produce a far superior quality of iron, simply by the use of the revolving cylinder or furnace.

What I claim as my invention, and desire to secure by Letters Patent, is—

The rolling or revolving furnace revolving on friction wheels or rollers or their equivalent, in combination with an ordinary fire such as is used in reverberatory furnaces, the two being combined in such a manner that the products of combustion, heated gases, &c., from the grate shall pass into the interior of said rolling or revolving furnace, substantially as herein described, said rolling or revolving furnace being applicable to any purpose for which ordinary reverberatory or wind furnaces are employed.

AMBROSE S. BEADLESTON.

Witnesses:

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I. R. BRIGGS.