

No. 1,890.

PATENTED DEC. 10, 1840.

H. BURDEN.

ROLLING PUDDLER'S BALLS IN THE MANUFACTURE OF IRON.

Fig. 1.

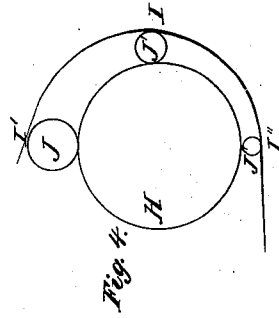
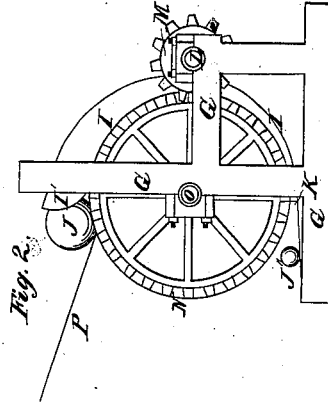
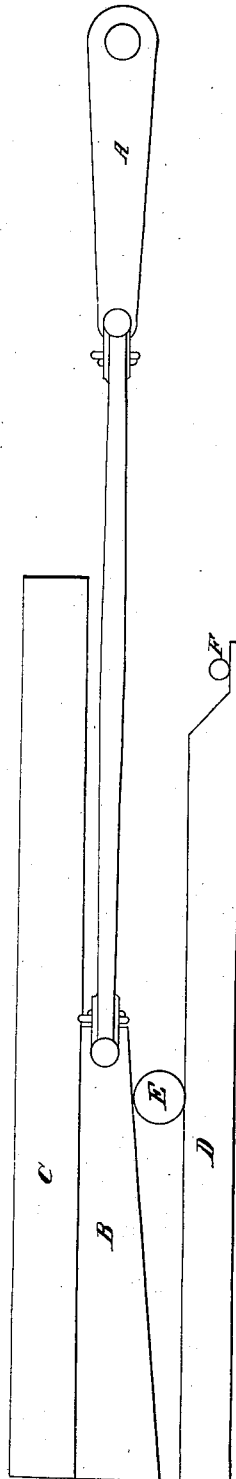


Fig. 4.

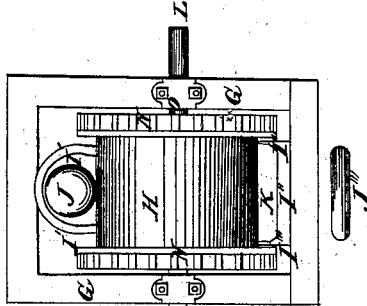


Fig. 3.

# UNITED STATES PATENT OFFICE.

HENRY BURDEN, OF TROY, NEW YORK.

## MACHINE FOR ROLLING PUDDLE-BALLS OR OTHER MASSES OF IRON IN THE MANUFACTURE OF IRON.

Specification of Letters Patent No. 1,890, dated December 10, 1840.

*To all whom it may concern:*

Be it known that I, HENRY BURDEN, of the city of Troy, in the county of Rensselaer and State of New York, have invented an improvement in the process of manufacturing iron, which improvement consists in the employment of a new and useful machine for the rolling of puddlers' balls, or balls prepared in the puddling furnace, and of other similar masses of iron, by which rolling they are more perfectly and rapidly prepared for the process of being drawn out into bars by means of the rollers ordinarily employed for that purpose or under the tilt hammer.

My rolling machine dispenses with the shingling, or other methods heretofore adopted of preparing the bloom for being drawn out into bars.

The puddler's ball is conveyed into my machine immediately from the puddling furnace, and it is therein rolled down, and elongated between two plane, or curved, surfaces, and made to assume a cylindrical form; a progressive motion being given to one, or both, of these surfaces during the time the mass of metal is between them, so as to cause the ball to roll over and over, separating from it a large portion of the cinder, and other foreign matter, reducing it in diameter, and finally delivering it in a cylindrical form.

The machine, as I now construct it, consists of a cast-iron cylinder, which may be from four to six feet in diameter, and three feet, more or less, wide; said cylinder being in part surrounded by a trough-like, stationary concave, sufficiently distant from it at one end to admit the puddler's ball, and gradually approaching nearer and nearer to it, along its whole length, until it arrives at the point at which the bloom is delivered in a state ready for the subsequent operations of the manufacture.

To exemplify the principle upon which my machine operates, I will, before describing it more particularly in the form in which I now use it, show it in that in which my first essays were made, and which I have represented in Figure 1, in the accompanying drawing. In this figure, A, represents a crank having a throw of four or five feet, and attached by a shackle bar to a wedge-formed piece of cast-iron, B, of corresponding length, and of sufficient width for the

formation of the bloom; the piece B, is supposed to be sustained, and to slide, against the stationary guide, or top piece, C; and above the bed piece D. If, in the position represented, a puddler's ball E, be placed between B, and D, it will, by the revolution of the crank, be rolled over and over; will be reduced in diameter, be brought into, and delivered in, a cylindrical form, as shown by the end view of it at F.

Figs. 2, 3, and 4, represent my machine in the form in which I now construct it, and in each of the figures the same letters of reference are used to designate like parts. Fig. 2, is a side view, Fig. 3, a front view, and Fig. 4, a diagram showing the relationship of the cylinder and concave to each other. G, G, is the frame-work of the machine, which may be made of cast-iron. H, is a cylinder of cast-iron, which is to revolve in said frame, and which may be from four to six feet, more or less, in diameter, and three feet, more or less, wide. The surface of this cylinder may be even, or it may be furnished with protuberances on its periphery, for the purpose of giving a kneading motion to the particles of the mass which is rolled, should this be preferred. I, is a curved, segmental trough of cast-iron which partially surrounds the cylinder, and which is firmly attached to the frame G, G. A ball of puddled iron J, is represented as entering the mouth of this trough at I', I'; the form given to the trough, or concave, at that part, being that of a semicircle at its upper portion, and having parallel sides near to the cylinder. The curved trough becomes wider and shallower throughout the circuit intended to be given to the ball, until, at its termination, or point of delivery, K, its back I'', is parallel with the cylinder, while its sides, or flanches, I''', I''', are so shaped as to act upon and upset the ends of the bloom, which is consequently delivered in a cylindrical form, such as is represented at J''', Fig. 1.

In the diagram, Fig. 4, the line H, represents the outline of the cylinder, the line I, I, I, that of the interior of the trough, in a section along its middle, showing how the ball J, must necessarily and progressively be reduced in its diameter as seen at the middle J', and until, at J'', it makes its escape in the form of a cylinder.

L, is the driving shaft of the machine,

which carries two pinions, one of which is shown at M, Fig. 2, meshing into the cog wheel N, on one end of the cylinder; each end of the cylinder being similarly furnished with a cog wheel, as shown in Fig. 3; the second pinion, similar to M, is hidden by the other parts of the machine. O, O, is the shaft of the cylinder H, supported upon proper bearings.

10 In my establishment, the puddling furnace is situated several feet above my machine for rolling the balls, and they are, therefore, most conveniently fed to the machine down an inclined plane represented by the line P, 15 Fig. 2. But in many, and probably in most, situations, it will be more convenient to feed them in below, and deliver them above, reversing the segmental trough for that purpose. The segment also may be made to surround nearly, or quite, three fourths of the cylinder, only allowing sufficient space for the convenient entrance and delivery of the blooms. The cylinder may, if preferred, be made to revolve horizontally, the only 20 change required in this case would be the turning the machine down on one side, and the adapting the driving parts thereto.

It will be readily perceived, also, by the skillful machinist, that the principle upon 30 which I proceed may be carried out under various modifications, of which I have given two examples, and these might be easily multiplied, but this I do not think necessary as I believe that those which have been 35 given must suffice to show, in the clearest

manner, the nature of my invention, and to point out fully what I desire to have secured to me under Letters Patent of the United States.

Having thus fully made known the nature 45 of my said improvement, and explained and exemplified the manner in which I construct the machinery for carrying the same into operation, what I claim as constituting my invention and desire to secure by Letters Patent, is—

The preparing of the puddlers' balls as they are delivered from the puddling furnace, or of other similar masses of iron, by causing them to pass between a revolving 50 cylinder and a curved, segmental trough adapted thereto, constructed and operating substantially in the manner of that herein described, and represented in Figs. 2 and 3, of the accompanying drawings: or by 55 causing the said balls to pass between vibrating, or reciprocating, tables, surfaces, or plates, of iron, in the manner exemplified in Fig. 1, in the accompanying drawings, or between vibrating, or reciprocating, curved 60 surfaces, operating upon the same principle, and producing a like result by analogous means.

In testimony whereof I hereunto set my name this eighteenth day of August, in the 65 year 1840.

H. BURDEN.

Witnesses:

THOS. P. JONES,  
GEORGE WEST.