(No Model.) 2 Sheets—Sheet 1.

J. STEVENSON, Jr.

APPARATUS FOR MAKING HOLLOW BILLETS OR INGOTS.

No. 591,433. Patented Oct. 12, 1897.

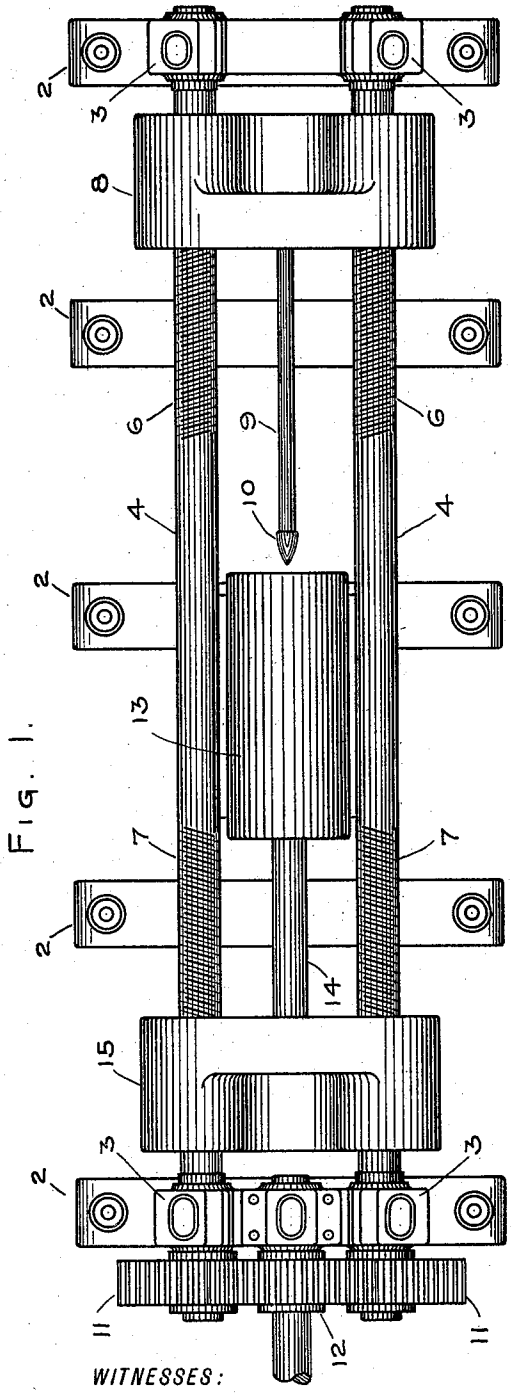


FIG. 1.

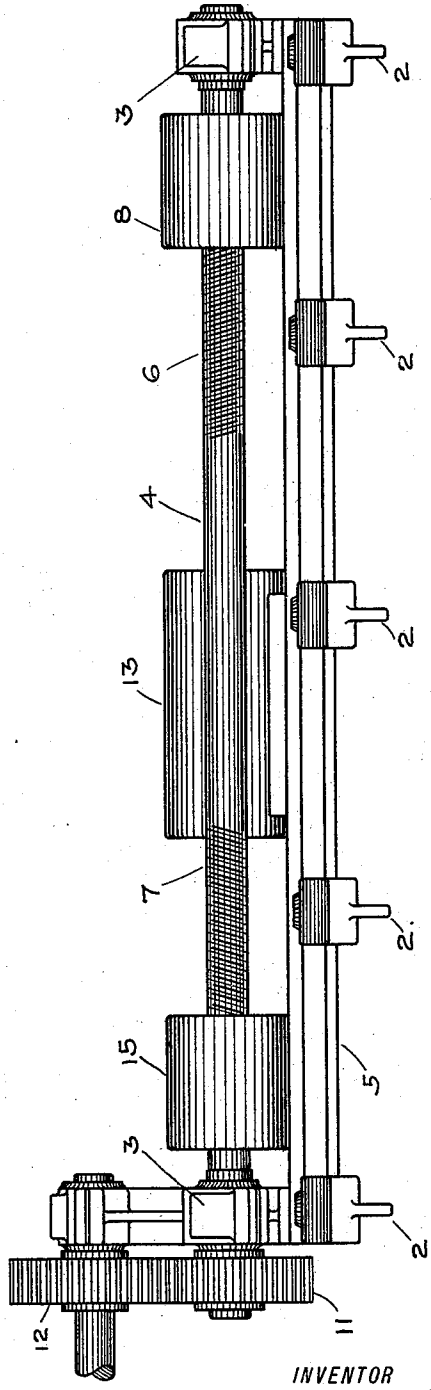


FIG. 2.

WITNESSES:

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P. T. Courtney.

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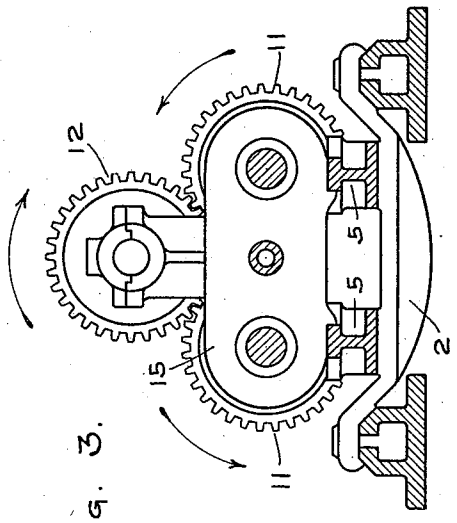


FIG. 3.

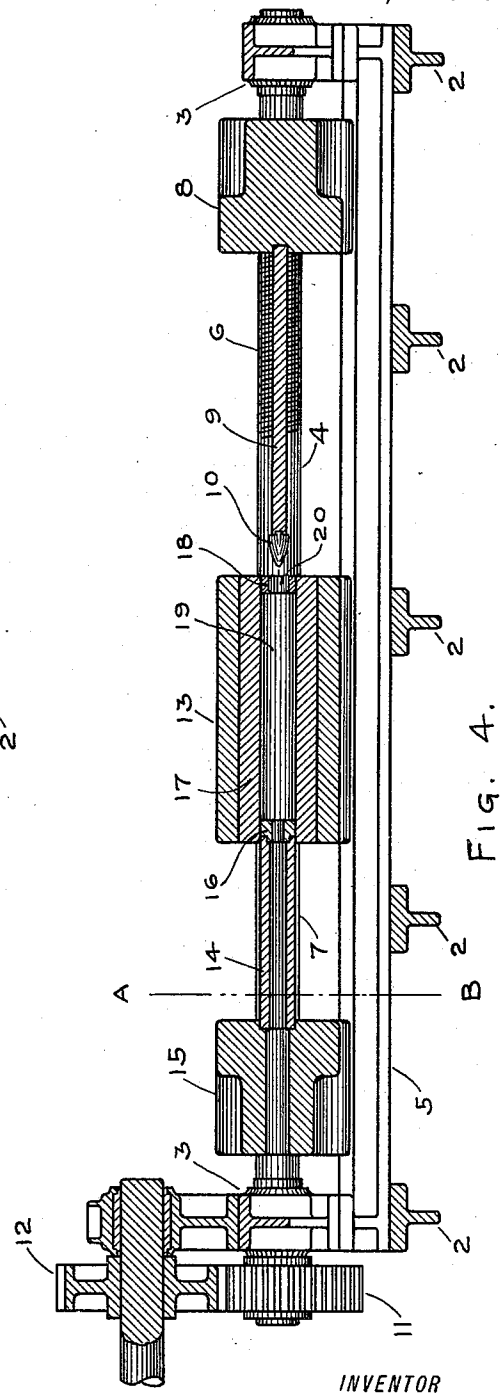


FIG. 4.

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UNITED STATES PATENT OFFICE.

JOHN STEVENSON, JR., OF NEW CASTLE, PENNSYLVANIA.

APPARATUS FOR MAKING HOLLOW BILLETS OR INGOTS.

SPECIFICATION forming part of Letters Patent No. 591,433, dated October 12, 1897.

Application filed November 16, 1896. Serial No. 612,222. (No model.)

To all whom it may concern:

Be it known that I, JOHN STEVENSON, Jr., of New Castle, in the county of Lawrence and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Making Hollow Billets or Ingots, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a top plan view of my improved apparatus for making hollow ingots or billets. Fig. 2 is a side elevation of the same. Fig. 3 is a transverse vertical section on the line A B of Fig. 4, and Fig. 4 is a longitudinal vertical section showing the interior of the receptacle for the ingot or billet.

My invention relates to apparatus for the making of hollow ingots or billets set forth in my copending application, Serial No. 608,867, filed October 14, 1896, and it is designed to provide an improvement upon such apparatus. In the above-recited application the receptacle for the metal is moved forwardly, so as to force the metal to flow forwardly over the mandrel-head, whereas in the present case the receptacle is stationary and the metal is forced forwardly over the mandrel by a plunger which moves through the opposite end of the hollow receptacle.

In the drawings, 2 2 are a series of transverse stretchers or hangers to which are secured the longitudinal rails 5 5, the rails and hangers together forming the bed-plate for the apparatus. At each end of the bed-plate are provided bearings 3 3 for two parallel longitudinal shafts 4 4, each of which near each end is provided with screw-threaded portions 6 and 7, one portion being formed with a right-hand and the other with a left-hand screw-thread. The screw-threaded portions 6 of these shafts engage with the inner screw-threads of a casting 8, to which is secured a projecting mandrel 9, having an enlarged bulb-shaped head 10, which is preferably removable. The shafts 4 4 are provided at their protruding ends with gear-wheels 11, which are engaged by an intermediate gear-wheel 12, by which the shafts are rotated.

13 is a hollow receptacle placed at about the center of the machine and secured to the bed-plate in any suitable way, the longitudinal hole in this receptacle being in line with the mandrel and also in line with a hollow plunger 14, which may be forced inwardly through the other end of the receptacle by a head or casting 15, having innerly screw-threaded holes engaged by the portions 7 7 of the shafts. The head 15 is provided with a central hole in alinement with the hollow plunger, which is preferably provided with a removable hollow head 16, which may be replaced when worn. The plunger 14 is preferably removable from the head or casting 15.

In order to provide for operating upon billets of different sizes, I preferably make the cavity of the receptacle 13 larger than the size of the metal to be acted upon and employ an inner sleeve or collar 17, the hole 19 of which is of the size for the particular billet to be acted upon. This sleeve or collar fits within the receptacle and I provide a series of such sleeves with holes of different sizes corresponding to the sizes of different billets.

18 is a guiding collar or ring which fits within the hole in the sleeve, the mandrel passing through a hole 20 in this ring, which guides and centers the same.

In operating the machine the heated billet is slipped within the cavity in the collar 17 and the ring 18 is pushed in over the end of the billet. The shafts then being rotated by power applied through the toothed wheel 12, the mandrel is driven forward and slowly forced through the metal within the receptacle, while at the same time the billet is forced forwardly over the mandrel-head by means of the plunger 14, thus causing the metal to flow forwardly and avoid the compressing and jamming of the metal in the receptacle. The head upon the mandrel, being loose thereon, is left within the plunger 14, and the mandrel being withdrawn the hollow billet is removed and the operation repeated, the mandrel-heads forcing each other through the hole in the casting 15.

The apparatus which I have described may be used not only for piercing solid billets or ingots, but also for enlarging the diameter of holes already formed therein.

The advantages of my invention will be apparent to those skilled in the art, since by the forcing of the billet or ingot forwardly

over the mandrel by means of the plunger while the mandrel is being pushed into the metal in the stationary receptacle the metal is caused to flow smoothly and easily in the proper direction, the walls of the hole in the collar holding it firmly in position and keeping the parts in alinement.

It is evident that hydraulic or other cylinders may be employed for actuating the moving parts, and many other variations may be made by the skilled mechanic without departing from my invention, since

What I claim is—

1. In apparatus for forming hollow ingots or billets, the combination with a hollow receptacle, of a mandrel, means for forcing the mandrel through the metal in the receptacle, a plunger arranged to enter the opposite end of the receptacle, and means for forcing said plunger inwardly so as to drive the metal over the mandrel.

2. In apparatus for forming hollow ingots or billets, the combination with a stationary hollow receptacle arranged to receive the metal, of a mandrel having means for forcing the same into the metal in the receptacle, a hollow plunger arranged to enter the other end of the receptacle, and means for forcing said hollow plunger inwardly as the mandrel is driven in.

In testimony whereof I have hereunto set my hand.

JOHN STEVENSON, JR.

Witnesses:

R. W. KASHNER,

P. T. COURTNEY.