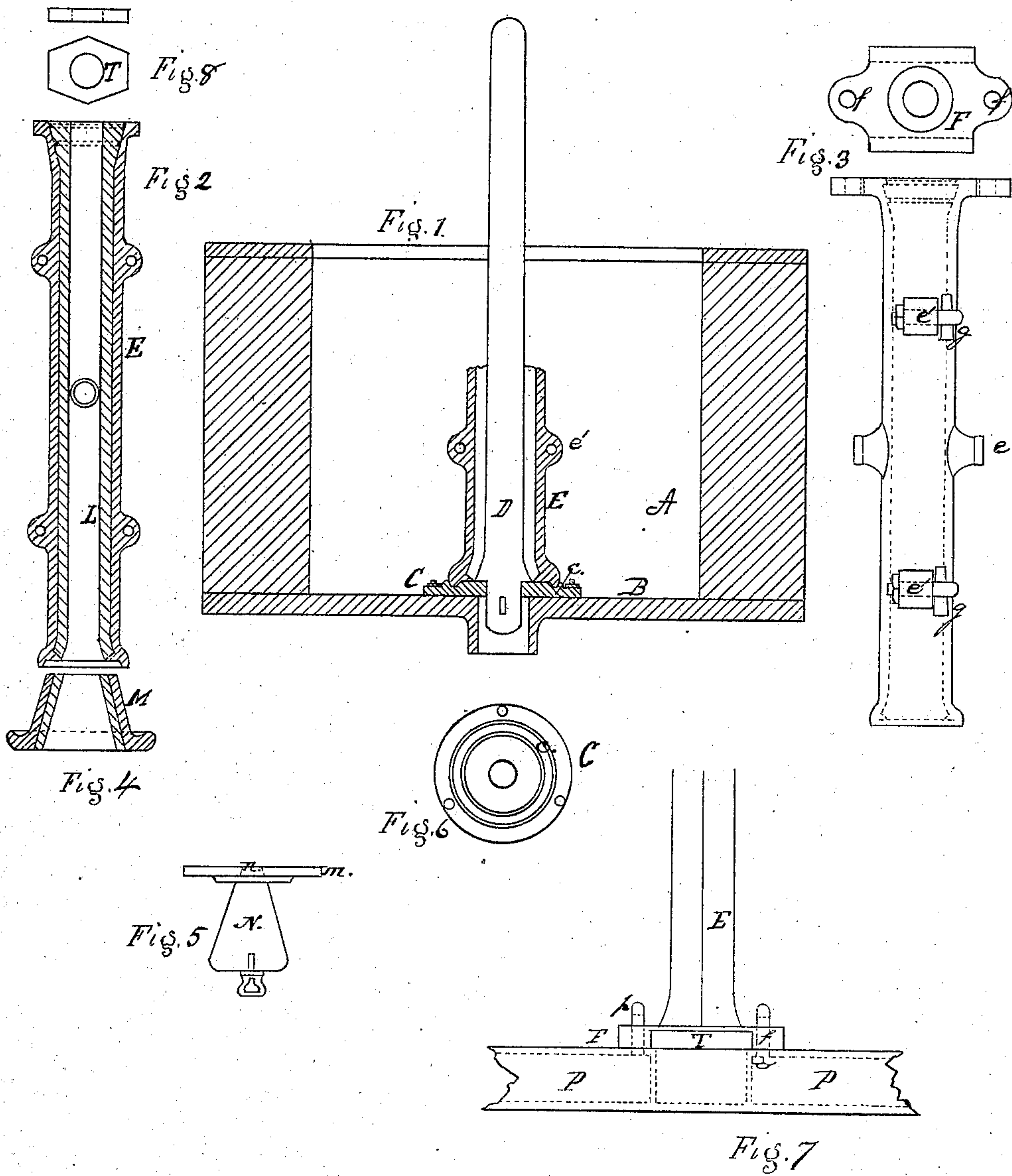


W. R. JONES.

Manufacture of Bessemer Steel.

No. 149,865.

Patented April 21, 1874.



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WILLIAM R. JONES, OF BRADDOCK'S FIELD, PENNSYLVANIA.

IMPROVEMENT IN THE MANUFACTURE OF BESSEMER STEEL.

Specification forming part of Letters Patent No. **149,865**, dated April 21, 1874; application filed April 8, 1874.

To all whom it may concern:

Be it known that I, WILLIAM R. JONES, of Braddock's Field, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Manufacture of Bessemer Steel; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, forming a part of this specification, in which—

Figure 1 is a vertical section of the pit and sprue-flask, vertical core-bar, &c. Fig. 2 is a vertical section of sprue-flask; Fig. 3, view showing mode of connecting the vertical sections; Fig. 4, section of the pouring-cup; Fig. 5, core and centering-plate for forming the pouring-cup; Fig. 6, detached view of the plate for centering the vertical core-bar and sprue-flask; Fig. 7, method of attaching flask to ingot-molds; and Fig. 8 the refractory disk for forming close joints between sprue-flask and ingot-mold.

My invention relates to the method of molding and making center-sprues in the manufacture of Bessemer steel; and consists, first, in the method of forming the outer shell or flask of the sprue in longitudinal sections, which may be separated for the removal of the sprue, and providing said flask with flanges for bolting it to the mold; second, in the construction and mode of forming the pouring-cup, and in the form of the upper end of the sprue, the cup and sprue being faced to fit; third, in the means provided for fastening the vertical core-bar and centering the sprue-flask; and, fourth, in minor details of construction hereinafter more specifically set forth.

Heretofore sprues have been built of light red brick, surrounded by an outer shell; and the disadvantages arising therefrom have been loss of time in constructing the sprue, waste of material, and the necessity of breaking the sprue-core for the removal of the sprue or quarrying out the bricks.

A designates the pit, which is in all respects of the usual construction, with this exception, that the bottom B is a plate of cast-iron, or other suitable material, having a central opening, for purposes herein specified. C is a disk, provided with an annular depression, *c*, and a central opening. The purpose of the annular

depression is for centering the sprue-flask, as will be hereinafter described. The disk C is bolted to the base B of the pit in a suitable manner. D indicates the sprue core-bar, the lower end of which is shouldered, passes through the central opening of the disk C and bottom plate B, and is firmly secured in place by a key passing through the slot in the lower end of the core-bar, or other suitable means. E indicates the sprue-flask, made in longitudinal section, and provided with trunnions *e*, or other suitable devices cast thereon, to permit of ready handling. It is also provided with projections *e'*, through which pass bolts for securing the sections together. F represents a flange or flanges, cast upon the ends of the shell E, for the purpose of bolting the vertical sprue to the ingot-mold. In forming the sprue-mold, the sections of the shell E being properly clamped together by means of the bolts and the inclined wedges or keys *g*, the shell is placed over the core-bar D, as shown in Fig. 1, and centers itself with the core-bar by the end of the shell entering the annular depression *c* in the disk C. The ends of the shell and the annular opening, and, in fact, all the joints, should be properly faced so as to obtain the result specified. The shell being in the position described, the lining L, which may be of suitable plastic material, such as ground fire-brick and fire-sand, is rammed in place. M represents the pouring-cup, which is a conical casting, and is lined in the following manner: *m* is a disk, having an annular raised portion surrounding a central opening, said annular portion having an inner diameter about equal to or a little larger than the smallest diameter of the cone-shaped pouring-cup. In this raised annular portion the cup is placed centering itself, and the central cup-core N, formed with a projection, *n*, which enters the central opening of the disk *m*, is placed in position, the intervening space between the core N and the cup M being lined with plastic material, by ramming, the same as the sprue. T represents a fire-clay disk, having a central opening, preferably made in the form shown, which I interpose between the end of the sprue and the ingot-mold for securing those joints. The sprue, having been formed as above described, is attached to the ingot-mold P by means of bolts

p passing through the openings *f* of the flange *F* of the sprue. The pouring-cup *M* being in position in the top of the sprue, the casting is duly made. In removing the sprue, the inclined wedges *g* may be simply loosened, so as to allow slight separation between the longitudinal sections of the sprue-mold, the sprue being drawn out and broken off, in lengths required, while in a heated and brittle condition. The usual vent-holes are, of course, provided.

The advantages of these devices over those in ordinary use are the readiness and rapidity with which a sprue may be formed, whereby time is saved; the small amount of material required in its construction, whereby waste of material is avoided; and the readiness with which the sprue may be removed.

Having thus described my invention, what I claim is—

1. The sprue mold or flask, made in longi-

tudinal sections, having trunnions, and provided with flanges for securing the same to the ingot-mold, substantially as described.

2. The detachable pouring-cup *M*, constructed as described, in combination with the sprue-flask *E*, substantially as specified.

3. The refractory disk *T*, as and for the purpose specified.

4. The combination of the sprue-mold *E*, the disk *C*, and core-bar *D*, as and for the purpose specified.

5. The combination of the disk *m*, provided with the raised ring and central opening, and the cup-core *N*, as and for the purpose specified.

In testimony whereof I, the said WILLIAM R. JONES, have hereunto set my hand.

Witnesses: WILLIAM R. JONES.

JAMES I. KAY,

F. W. RITTER, Jr.