W. H. HAWS.

STOPPERS FOR POURING LADLES.

No. 178,003. Patented May 30, 1876.

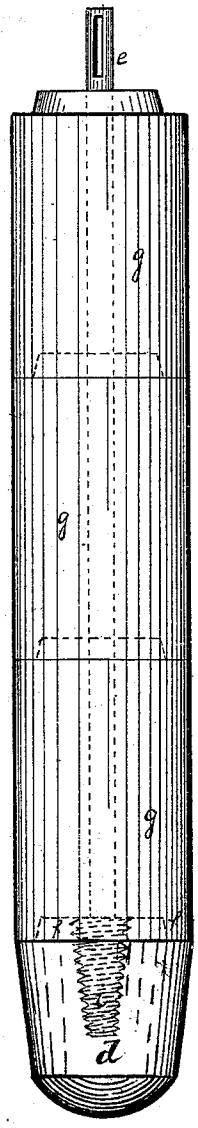

Fig. 3.

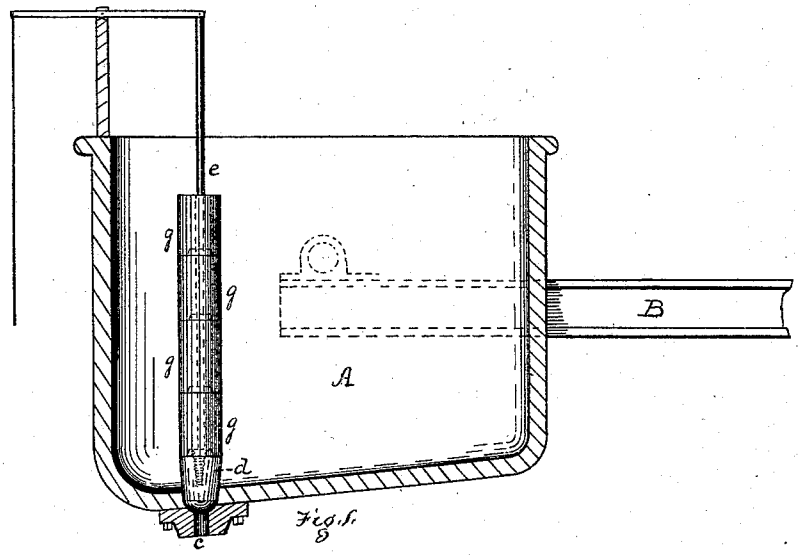

Fig. 1.

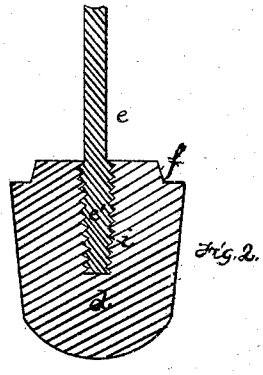

Fig. 2.

Witnesses.

James D. Kay

D. G. Kay

Inventor

William H. Haws

by Bakewell & Kerr

Attys.

UNITED STATES PATENT OFFICE.

WILLIAM H. HAWS, OF JOHNSTOWN, PENNSYLVANIA.

IMPROVEMENT IN STOPPERS FOR POURING-LADLES.

Specification forming part of Letters Patent No. **178,003**, dated May 30, 1876; application filed December 6, 1875.

To all whom it may concern:

Be it known that I, WILLIAM H. HAWS, of Johnstown, in the county of Cambria and State of Pennsylvania, have invented a new and useful Improvement in Stopper for Bessemer and similar Ladles; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1 is a sectional view of a ladle for Bessemer-steel converter. Fig. 2 is a sectional view of my improved plug for closing the tap-hole of the converter; and Fig. 3 is an elevation of plug and sleeve.

Like letters of reference indicate like parts in each.

In the Bessemer process, after the metal has been treated in the converter, it is discharged into a ladle brought underneath the converter, for that purpose, by means of a large crane. The ladle is swung over the molds arranged around the pit below, and the metal drawn off into the molds by means of a tap-hole in the bottom of the ladle, which is opened and closed by a fire-clay or plumbago plug fitting into the tap-hole. On account of the intense heat, the rod carrying the plug must be covered with some refractory material.

My invention relates to the plug for closing the tap-hole; and it consists, first, in forming a screw-thread upon the end of the rod, and a corresponding screw-thread in the plug, by means of which it is attached to the plug, whereby a direct connection between the plug and rod can be made without the use of keys, bolts, and similar devices; and, secondly, in forming a shoulder upon the top of the plug, so that the hollow clay covering of the rod shall fit on said shoulder, and, by the means of a corresponding recess, center itself thereon, whereby the sleeve that incloses the rod may be brought down to the plug, thereby avoiding the direct application of fire-clay to the rod, plug, and connecting parts.

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

In the drawing referred to, A represents the ladle, suspended on the crane B. In the bottom of the ladle is the tap-hole *c*. Fitting into the tap-hole *c* is the plug *d*, made of fire-clay, plumbago, or other refractory material. This plug *d* is suspended in position by the rod *e*, and operated thereby, by steam or in any suitable manner. Upon the end of the rod *e* I form the screw-thread *e'*, and in the plug *d* a corresponding screw-thread, *i*, so that the plug may be screwed directly upon the rod.

I prefer a tapered screw, as shown, though such a form is not essential.

The rod *e*, where it would come in contact with the molten metal, is covered by the hollow refractory covering *g*, divided into lengths, and provided with shoulders and recesses at either end, in order to fit closely and neatly together. Upon the plug *d* I form the shoulder *f*, corresponding to the recess in the lower part of the covering *g*.

Thus, by screwing the plug *d* onto the rod *e*, the shoulder *f* centering itself in the recess, I am enabled to make a close joint with the covering *g*.

It is obvious that the recess might be made in the plug, and the shoulder on the sleeve, just the reverse of what is shown in the drawing, without departing from the spirit of my invention.

The advantages of my improved attachment for the rod and plug are, that the plug can be easily removed and replaced by another, when worn or burned out, without disturbing the covering of the rod, or necessitating the filling up of the space between the covering and plug with refractory material, as has heretofore been done; and by avoiding the bolts and keys heretofore used to secure the rod and plug, there is nothing to prevent the sleeve from being brought down to the plug.

The advantage of the shoulder formed upon the plug is, that the sleeve is centered and held in position, time and labor are saved in fitting the parts, and the plug and sleeve form a continuous refractory protector for the rod necessarily employed to withdraw the plug.

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

1. A ladle-stopper provided with screw-connections for attachment to the stopper-rod, substantially as specified.

2. A ladle-stopper provided with a shoulder or recess for the reception of the rod-sleeve, substantially as specified.

In testimony whereof I, the said WILLIAM H. HAWS, have hereunto set my hand.

WILLIAM H. HAWS.

Witnesses:
JAMES I. KAY,
C. E. MILLIKEN.