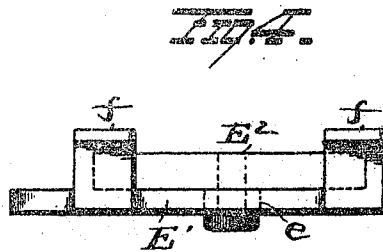
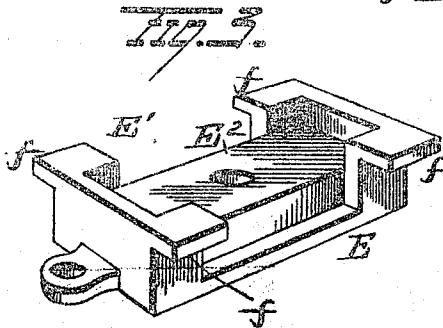
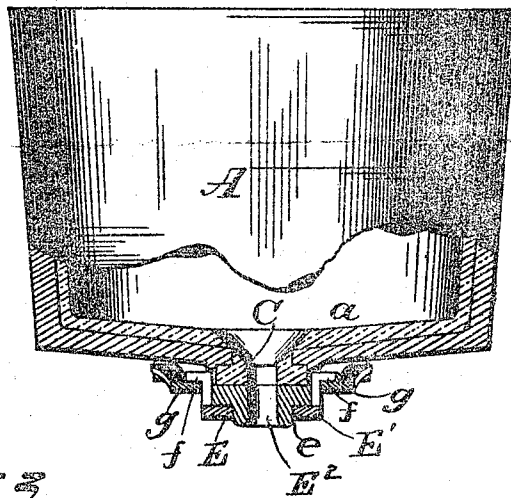
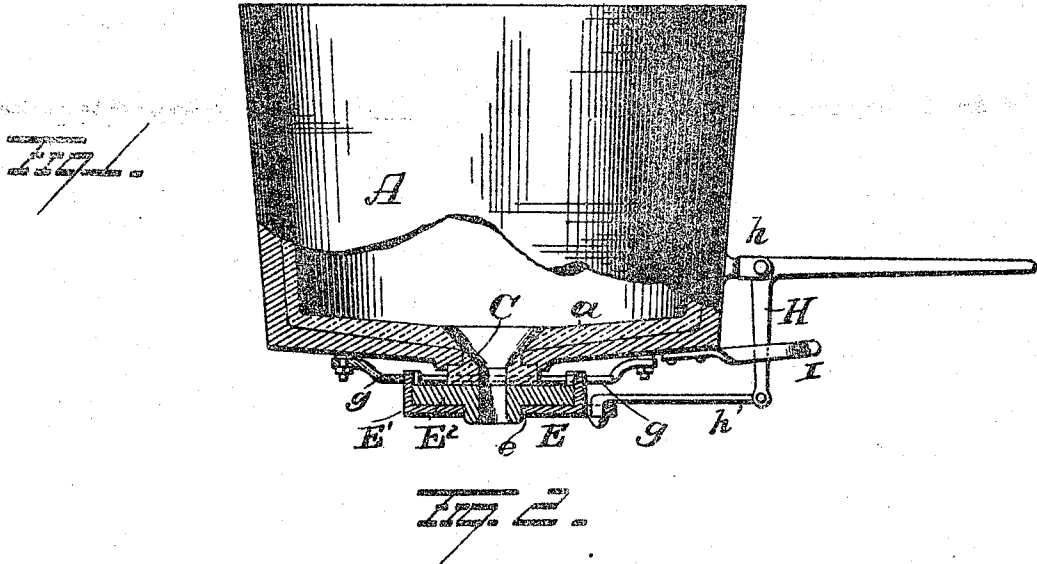


(No Model.)

F. MORRIS.
LADLE FOR HANDLING MOLTEN STEEL, &c.

No. 506,328.

Patented Oct. 10, 1893.



Witnesses
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UNITED STATES PATENT OFFICE.

FRANK MORRIS, OF ALLIANCE, OHIO.

LADLE FOR HANDLING MOLTEN STEEL, &c.

SPECIFICATION forming part of Letters Patent No. 506,328, dated October 10, 1893.

Application filed October 22, 1892. Serial No. 449,649. (No model.)

To all whom it may concern:

Be it known that I, FRANK MORRIS, of Alliance, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Ladles for Handling Molten Steel, &c.; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in ladles for handling molten steel and other metals, the object being to provide improved devices for opening and closing the discharge orifice, and it consists in the parts and combinations of parts as will be more fully described and pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation partly in section of a ladle embodying my invention. Fig. 2 is a similar view in end elevation. Fig. 3 is a view in perspective of the slide valve or stopper, and Fig. 4 is a view in side elevation of the slide-valve or stopper.

A represents a ladle provided with saucer shaped bottom *a*, the latter having a centrally located opening therein for the escape of the molten metal. The sides and bottom of this ladle are designed to be covered with fire clay or brick or other material as is ordinarily done, and the central opening therein is provided with a brick made of fire clay or any other suitable material having a central opening for the passage of the metal. This brick C is preferably cylindrical in form, concaved on its upper face and projects below the bottom of the ladle so that the under side thereof rests in close contact with the sliding-valve or stopper E. This sliding valve or stopper E consists of a metal frame E' having a recessed face and an opening *e*, and also provided with side flanges *f*, which latter rest upon the slide-ways *g* secured to the under side of the ladle. These slide-ways are preferably in a plane above the lower face of brick C so that in the event of any metal escaping between the brick C and the sliding-valve it cannot come in contact with the slide-ways. Seated within the recess in the metal frame E' is the brick E² made of fire clay or any other suitable material. This

brick is provided with an opening registering with the opening in the metal frame and also adapted to register with the opening in the brick C. The brick E² rests snugly against the lower face of the brick C, and when moved to bring the openings in line the metal within the ladle is free to flow through the same. By moving the sliding-valve or stopper longitudinally the opening in the brick E² is carried to one side of the opening in brick C, thus cutting off the flow of metal. The brick E² projects through the opening in the frame so that the metal in passing from the ladle comes in contact first with the brick C and then with brick E² and is discharged from the latter in a plane below the bottom of the frame E' and also below the slide-way carrying the sliding valve or stopper. The sliding-valve is actuated by the lever II, which is preferably of the bell-crank variety and is pivoted to the bracket *h* projecting from the side of the ladle, the short arm of said bell-crank being connected to the sliding-valve or stopper E by the pitman *h'*. The valve is limited to its movement in one direction by the closed end of the slide way and in the opposite direction by the stop I secured to the ladle and engaging the short arm of the bell-crank lever. By moving the valve until the latter engages the closed end of the slide-way the discharge openings in the brick C and E² are brought into line and by moving the valve in the opposite direction until the short arm of the bell-crank engages stop I, the opening in the brick E² is carried beyond the opening in brick C and the flow of metal cut off.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a ladle having an opening in its bottom, and slide ways secured to the bottom of the ladle, of a slide valve or stopper comprising a frame having open sides and flanged ends, and a brick carried by said frame, the brick having an opening therein and its upper face adapted to be in a horizontal plane below the plane of the flanges, substantially as set forth.

2. The combination with a ladle having an opening in its bottom, and provided with a

lining which extends through the opening and below the bottom, and sideways secured to the bottom in a plane above the plane of the lower face of the portion of the lining which
5 extends below the ladle, of a slide valve comprising a frame composed of a plate having flanged ends the flanges of which are constructed to travel on the slide ways, said
10 frame adapted to carry a brick and to that end provided with a hole in the bottom adapt-

ed to receive a depending portion of the brick, and means for sliding the valve, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscri- 15
ing witnesses.

FRANK MORRIS.

Witnesses:

H. W. HARRIS,
JOHN LANG.