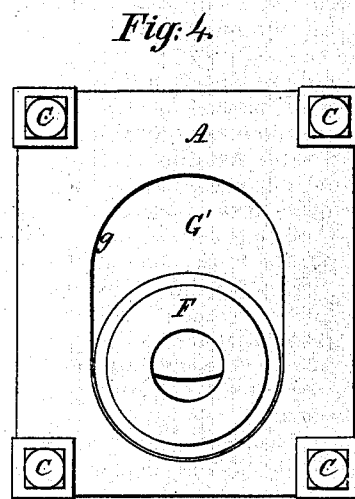
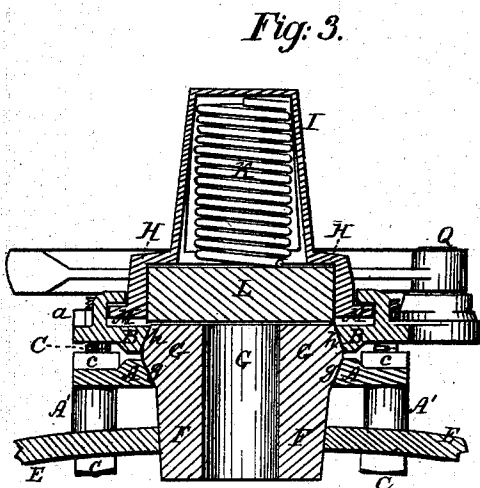
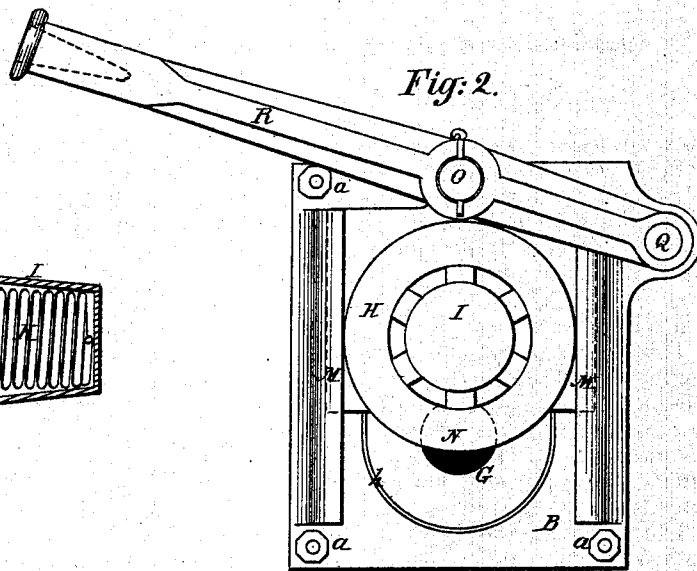
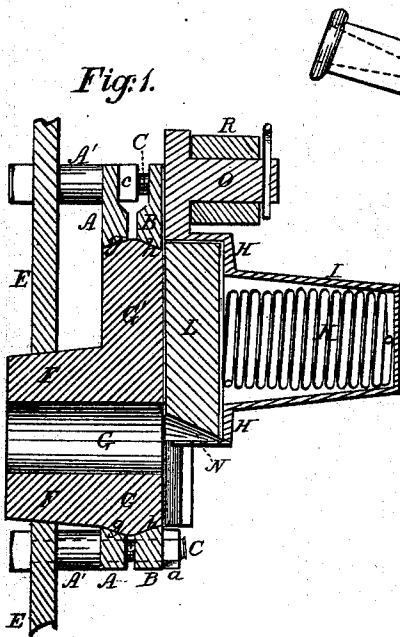


W. H. WARD.

Valves or Cut-Offs for Cupola and other Furnaces.

No. 139,693.

Patented June 10, 1873.



Witnesses:

West Wagner.

Aug. H. Girard.

Inventor:

William Henry Ward

By *Johnson, Klauke & Co.*
his Attorneys.

UNITED STATES PATENT OFFICE.

WILLIAM H. WARD, OF AUBURN, NEW YORK.

IMPROVEMENT IN VALVES OR CUT-OFFS FOR CUPOLA AND OTHER FURNACES.

Specification forming part of Letters Patent No. **139,693**, dated June 10, 1873; application filed November 7, 1872.

To all whom it may concern:

Be it known that I, WILLIAM HENRY WARD, of Auburn, in the county of Cayuga and State of New York, have invented certain new and useful improvements in Pressure-Gates or Cut-Offs for Drawing Molten Metal from Furnaces, &c., of which the following is a specification:

This invention has for its object to furnish a gate cut-off or device for drawing molten metals in a pure state from cupola or melting furnaces, or from a receiving chamber or reservoir located in a position adjacent to the same, for the purpose of collecting the metal prior to its being used for casting.

The principal feature of my invention consists in the combination, with a discharge-spout or tapping-orifice, located at the base of a cupola-furnace, or a separate receiver, of a vertically-sliding gate or cut-off, consisting essentially of a metallic cup-shaped frame, adapted for the reception of a valve or cut-off proper, formed of burned clay, fire-brick, or other material capable of withstanding heat.

The second feature of my invention consists in the combination or relative arrangement, with said metallic receiving-frame and burned fire-brick cut-off, of a spiral, coiled, or other spring, whose function is to exert a continuous pressure upon the cut-off, for holding it in contact with the bed of the discharge-orifice, to produce a tight joint for preventing the escape of molten metal caused by the pressure within the furnace; said spring serving also to adjust the cut-off horizontally for compensating for the wear of its acting surface or that of its bed.

The third feature of my invention consists in the provision of a discharge spout or tube, formed of burned fire-clay, which is secured on a metallic frame carrying the cut-off mechanism, and constituting an entirely separate device, to enable the same to be applied to furnaces now in use.

The fourth feature of my invention consists in forming a concave channel or spout in the lower side of the composite cut-off and receiving-frame, which shall serve to permit the escape of a small and regulated flow of metal without the necessity of entirely raising said cut-off.

In the accompanying drawings, Figure 1 represents a vertical section of a cut-off gate embracing my invention. Fig. 2 represents a front elevation of the same. Fig. 3 represents a transverse section, and Fig. 4 a rear-side view.

The frame receiving the entire cut-off mechanism, and serving as a medium for attaching the same to a cupola-furnace, or separate receiver for molten metal, is composed of an inner and an outer plate, A B, the former of which is provided with tubular posts or feet A' on its inner side, through which pass screw-bolts C. This frame is applied to the furnace-receiver, or other vessel used in the manipulations of molten metal, by drilling holes in the same, and then passing the bolts C from the inner side through walls of the furnace or receiver E, and then through the tubular posts A', causing the screw-threaded portion of said bolts to project for enabling the application of nuts *a a*, which serve to secure the inner plate A of the frame in position. The plate A is formed with a central opening, through which projects into the furnace or vessel, and communicating with the same, the inner or elongated tubular portion F of a composition or fire-clay bed-piece or discharge-spout, G. The outer or enlarged portion G' of said spout forms the bed for the cut-off, and is fitted in elongated openings formed in the inner and outer plates A B, and secured in position by applying said outer plate B on the bolts C when fastening-nuts *c c* are applied to the outer projecting ends of the same. The composition bed G G', forming the surface against which the cut-off acts, is provided with beveled edges *g h*, inclining in opposite directions, and fitted in the seats formed in the plates A B, having their edges correspondingly beveled. The cut-off or gate for drawing the metal from the furnace or receiver is composed of a short cylindrical tubular section or socket H, formed with or carrying on its outer side a cylindrical skeleton-frame, I, for the reception of a coiled spiral or other spring, K. A composition plug or follower, L, forming the cut-off proper is inserted into the metallic socket H, and the same, being constructed of fire-clay, ordinary burnt clay, or other material capable of withstanding a high

degree of heat. Projecting from the sides of the socket H are formed plates M, which move in side overlapping guides formed on the outer plate B, which parts serve to guide the vertical movement of the cut-off gate and to prevent the lateral displacement of the same. The upper side of the cut-off holder is formed with a horizontal post, O, for the reception of a laterally-extending manipulating-lever, R, which has its fulcrum at its end on the pin or post Q projecting from the plate B. The lower side of the receiving-socket H is cut away to a sufficient extent for forming, in connection with a concave-surfaced groove in the composition plug L, a channel, N, for the escape of small or regular quantities of metal from the discharge-spout G.

A gate or cut-off device constructed as above described is adapted to be applied to the base of a melting-furnace for drawing off the molten metal directly from the same, rendering impossible the escape of the scoria or slag and other impurities floating on the surface of the metal. In certain cases it is generally found preferable to draw the metal from the furnace into a receiver or collecting-basin, where the pure metal, acting by the laws of gravitation, settles to the bottom of the same, while the scoria or slag, being light, will float on the surface of the same. The cut-off devices being applied to the lower or bottom end of said receiving-tank, it will of course be apparent that nothing but the pure metal can pass through the same, thus rendering possible the formation of first-class castings direct from the furnace.

When it is desirable to produce a very large casting, I provide a large reservoir provided with a series of cut-off devices. The operating-lever has a socket in its end to receive an iron extension piece, which is removable to keep cool for use.

The surface of the burned-fire-clay bed must project beyond the outer face of the holding-plate B; and the acting face of the cut-off plug or valve of fire-clay must also project beyond its holding-cup to allow the acting faces of the bed and plug to be kept in constant contact by the force of the spring, which is effected by the action of the latter in pushing the cup-guides M constantly outward, and the plug-

valve L inward as it wears. When the latter is worn too thin it can be easily replaced, and when the bed is worn down even with the outer plate it can also be replaced by another.

The device is manufactured complete in itself, and applied for use with either the furnace or a separate ladle, by simply making screw-holes in the thing to receive the screw-shanks of the cut-off device; and in this respect is made a new article of manufacture and commerce in the trade or iron-melting business.

Having described my invention, I claim—

1. The combination, with the discharge-orifice of a melting furnace or separate receiver, of a sliding cut-off gate, consisting of a composition or burned fire-clay valve or plug, L, and a metallic holding and operating frame, H, therefor, as herein set forth.

2. The adjustable fire-clay plug or valve L, and receiving-frame H, combined with a spring, K, as and for the purpose set forth.

3. The independent or detachable receiving-frame A B, adapted for the reception of a composition or burned fire-clay bed-piece or discharge-tube, F G, and an adjustable fire-clay valve, L, as described.

4. The bed-piece F G G', secured within the openings in the plates A B by means of the beveled seats of the latter, constituting a clamping device, as set forth.

5. In a cut-off device for melting-furnaces, a removable fire-clay plug, valve, or stopper, having a constant pressing adjustment upon its bed at right angles to its opening and closing movement upon the latter.

6. In such a cut-off device, the combination of a removable fire-brick clay plug or valve, with a removable fire-brick clay bed, to effect the replacement of one or both when required.

7. An attachable cut-off device or gate for furnaces or furnace-ladles, as a new article of manufacture and trade.

In testimony whereof I have hereunto set my hand this 30th day of October, A. D. 1872.

W. H. WARD.

Witnesses:

GEO. V. N. BALDWIN,
PETER W. WERLE.