

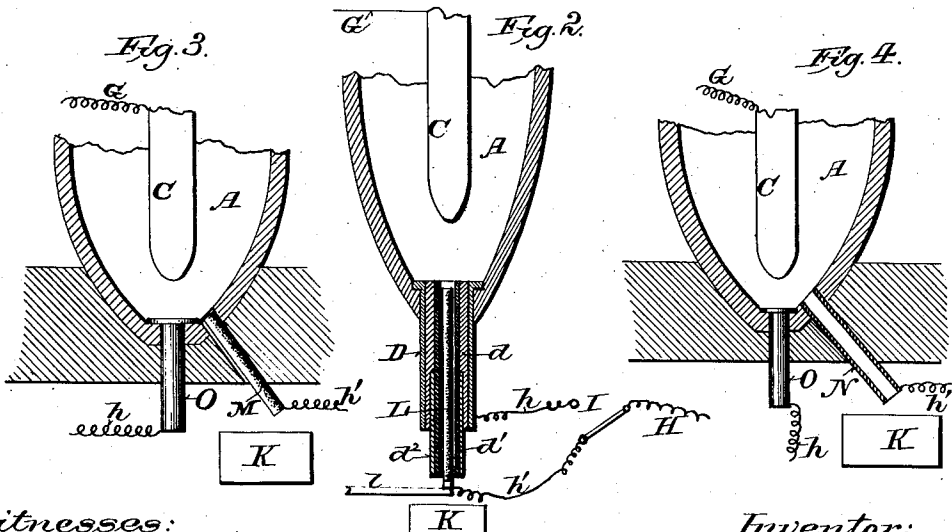
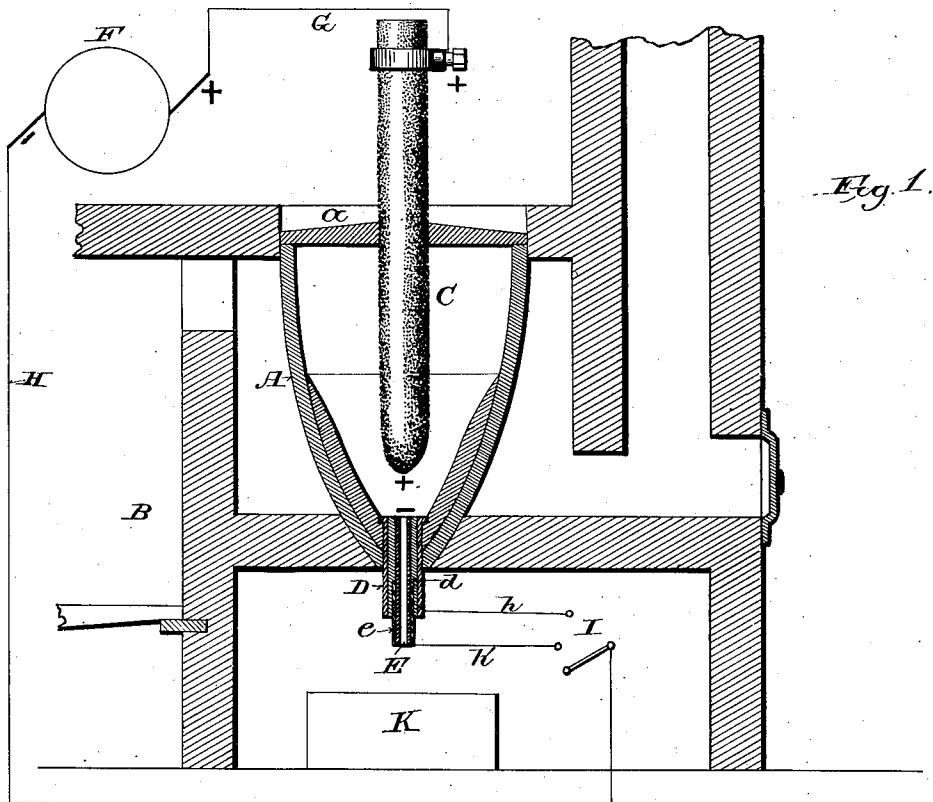
(No Model.)

A. J. ROGERS.

PROCESS OF AND APPARATUS FOR CONTROLLING THE DISCHARGE OF
MOLTEN CONTENTS OF CRUCIBLES OR OTHER VESSELS.

No. 469,454.

Patented Feb. 23, 1892.



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UNITED STATES PATENT OFFICE.

AUGUSTUS J. ROGERS, OF MILWAUKEE, WISCONSIN.

PROCESS OF AND APPARATUS FOR CONTROLLING THE DISCHARGE OF MOLTEN CONTENTS OF CRUCIBLES OR OTHER VESSELS.

SPECIFICATION forming part of Letters Patent No. 469,454, dated February 23, 1892.

Application filed March 22, 1890. Serial No. 344,880. (No model.)

To all whom it may concern:

Be it known that I, AUGUSTUS J. ROGERS, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Processes of and Apparatus for Controlling the Discharge of the Molten Contents of Crucibles and other Vessels; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The main object of my invention is to facilitate drawing off the liquid contents of a crucible and controlling the flow therefrom.

It consists, essentially, of fusing the material in the discharge aperture or passage of the crucible by heating a conductor inserted therein to start the flow and of permitting the material to cool and solidify in said aperture or passage by allowing or causing said conductor to cool to stop the flow.

In the accompanying drawings, illustrating the apparatus by which my improved method or process is carried out, like letters designate the same or similar parts in the several figures.

Figure 1 is a vertical section of a crucible and furnace provided with my apparatus, and Figs. 2, 3, and 4 are like views of crucibles with modifications of the apparatus.

Referring to Fig. 1, A represents a crucible; B, the furnace in which it is set, which is preferably formed underneath the crucible with a chamber or recess to facilitate drawing off the contents of the crucible.

C represents the positive electrode or anode, which may be composed of carbon or other suitable material and projects through the cover *a* of the crucible.

D represents the negative electrode or cathode, which may be conveniently formed of a metallic tube secured in and projecting downwardly from an aperture in the bottom of the crucible.

E is a tube of carbon or other suitable material which affords sufficient resistance to the electric current to produce heat and which

is not readily acted upon by the contents of the crucible, placed within the tube D and insulated therefrom by suitable non-conducting material *d*.

F represents a dynamo or electric generator, the positive terminal of which is connected with the anode by a wire or suitable conductor G and the negative terminal of which is connected by a wire or suitable conductor H with a switch I, by which the current may be directed either through a conductor *h*, attached to the cathode, or a conductor *h'*, connected with the protruding end of the tube E.

K represents a basin or suitable receptacle for receiving the contents of the crucible as they are drawn off.

The apparatus described is particularly designed for electrolytic work in obtaining metals and their alloys from certain compounds containing such metals.

To draw off the molten contents of the crucible, the current is switched through the tube E, and the heat generated by its passage through said tube fuses the metal or substance in contact therewith, causing it to flow from the crucible so long as the electric current traverses and heats said tube. As soon as the current is cut out from the tube E it cools and the metal or substance, which readily flows through it in the molten state, quickly cools and solidifies in contact with the tube and thereby arrests the further flow. To accelerate the cooling of the tube for the purpose of stopping the flow, I may inclose the lower protruding end of the tube E with a metallic tube or jacket *e*, to which cooling agents may be easily applied; but under ordinary circumstances the exposure of the protruding end of the discharging-tube is sufficient of itself to immediately check the flow from the crucible when the current is cut out from said tube.

In place of a tube, as shown in Fig. 1, I may employ a rod L, of similar material, through which the current is made to pass and which is preferably formed with a handle *l* for inserting and holding it in place within the discharging-tube. In connection with such a rod I employ a tube *d'* of some material which will not be readily acted upon by the contents

of the crucible, and in this tube the rod L is loosely fitted, so as to afford a passage for the molten contents of the crucible between it and said tube. To facilitate and accelerate the cooling of this tube for the purpose of arresting the flow, I may inclose the protruding end of the tube, as previously described, with a metallic tube or jacket d^2 , to which cooling agents can be readily applied.

In lieu of the forms of apparatus hereinbefore described for drawing off the contents of the crucible I may employ a rod M in an aperture or passage leading obliquely or laterally out of the lower portion of the crucible, as shown in Fig. 3, or a tube N, inserted in a similar aperture or passage tapping the lower part of the crucible, as shown in Fig. 4. With the last two arrangements of the device I may employ for the cathode in electrolytic work a solid metallic bar or rod O.

It is obvious that in its details the apparatus may be variously modified without affecting its mode of operation or departing from the spirit of my invention.

I claim—

1. The process of controlling the discharge of the molten contents of a crucible or other vessel, consisting in permitting a portion of the material to cool and solidify in the discharge-aperture for stopping the flow while the contents of the crucible proper are in a fluid condition and in heating a conductor inserted in said aperture, so as to fuse the material therein for starting the flow of the previously-melted contents of the crucible, substantially as and for the purposes set forth.

2. The process of controlling the discharge

of the molten contents of a crucible or other vessel, which consists in permitting a portion of the material to cool and solidify in the discharge-aperture for stopping the flow while the contents of the crucible proper are in a fluid condition and in fusing the material in said aperture by passing an electric current through a conductor inserted therein for starting the flow of the previously-melted contents of the crucible, substantially as and for the purposes set forth.

3. In apparatus for controlling the discharge of the molten contents of a crucible or other vessel, the combination, with a crucible or vessel having a suitable discharge aperture or passage and means of fusing the contents of said crucible or vessel, of a conductor inserted in said aperture or passage and having suitable connections with a source of electricity, and a circuit-controlling device whereby the current may be passed through said conductor or cut out therefrom independently of the means of melting the contents of the crucible or vessel proper, so as to fuse the material in said aperture or permit the same to cool and solidify for starting or stopping the flow from said crucible or vessel of its previously-melted contents, substantially as and for the purposes set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

AUGUSTUS J. ROGERS.

Witnesses:

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