

(No Model.)

H. H. LLOYD.
CASTING APPARATUS.

No. 438,553.

Patented Oct. 14, 1890.

Fig. 1.

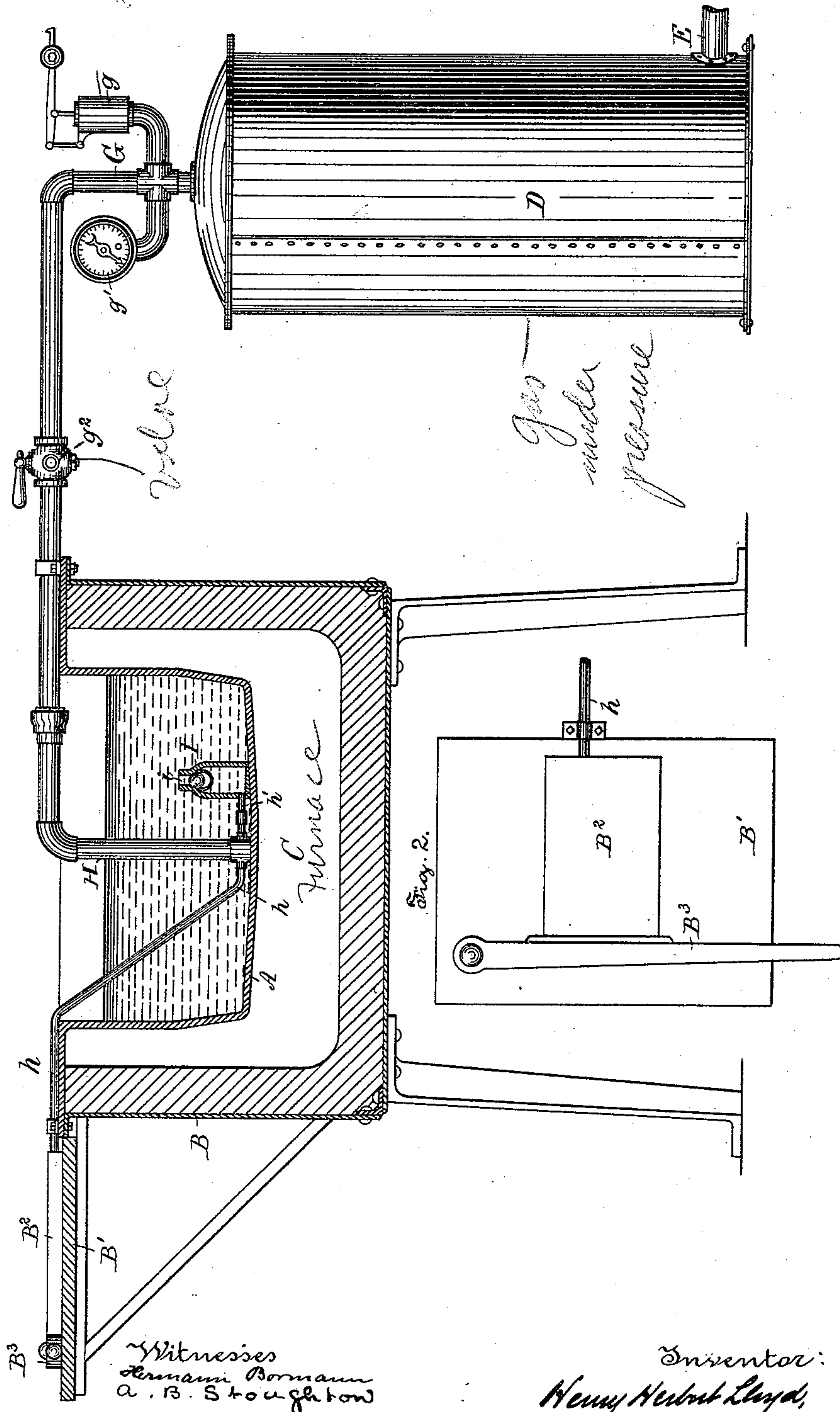
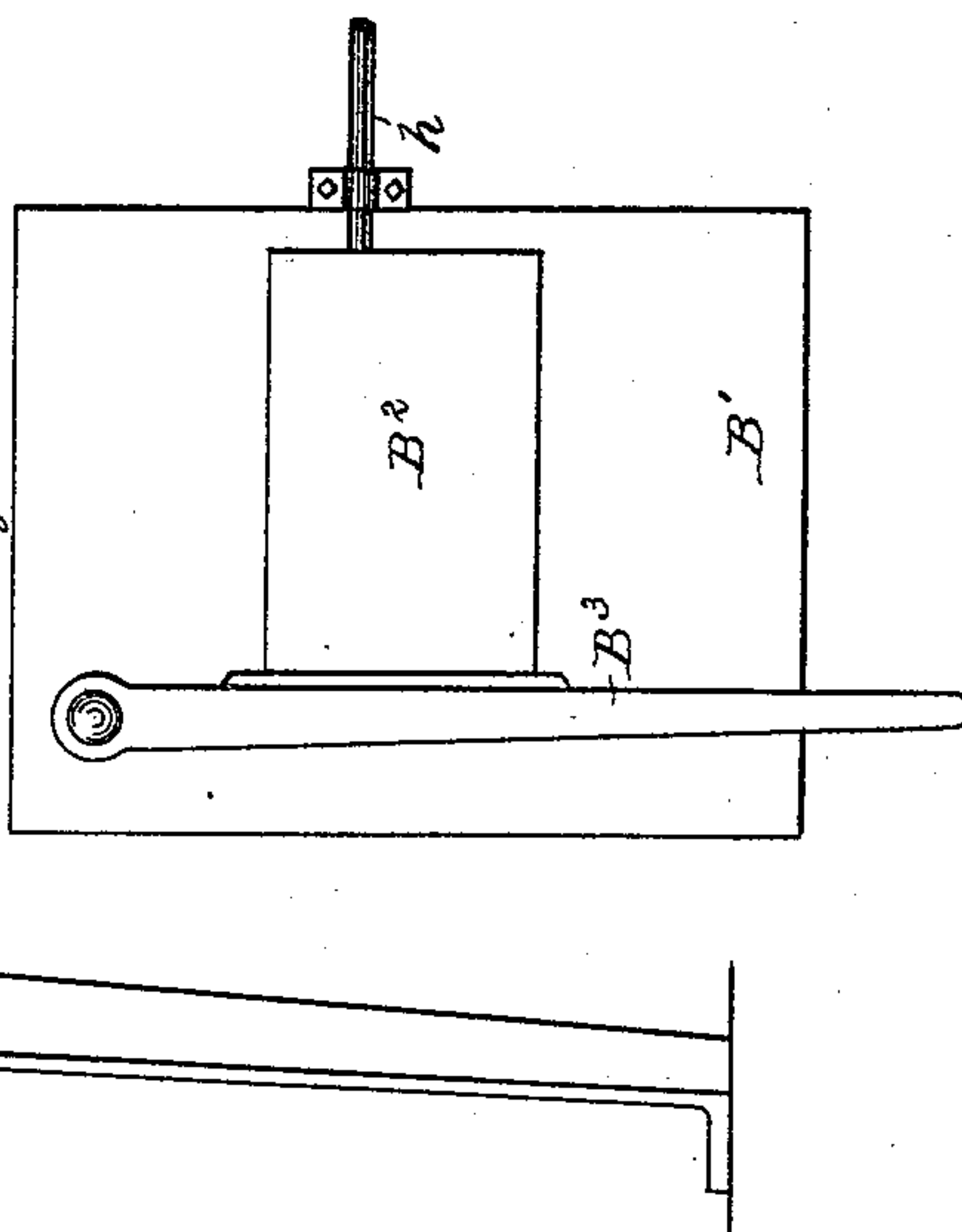


Fig. 2.



Witnesses
Hermann Bornmann
A. B. Stoughton

Inventor:
Henry Herbert Lloyd,
by J. Walter Douglass.
Att'n.

UNITED STATES PATENT OFFICE.

HENRY HERBERT LLOYD, OF CAMDEN, ASSIGNOR TO THE ELECTRIC STORAGE BATTERY COMPANY, OF GLOUCESTER CITY, NEW JERSEY.

CASTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 438,553, dated October 14, 1890.

Application filed April 9, 1890. Serial No. 347,192. (No model.)

To all whom it may concern:

Be it known that I, HENRY HERBERT LLOYD, a subject of the Queen of Great Britain, but now residing at Camden, in the county of Camden and State of New Jersey, have invented certain new and useful Improvements in Apparatus for Casting Frames or Supports to or Around Battery Plates or Elements, of which the following is a specification.

My invention relates to apparatus for forcing molten metallic substances or materials to form frames or supports for battery plates or elements by means of compressed air or other gases into suitable appliances to become cast to or around the plates or elements. The apparatus is not confined particularly to the employment of atmospheric air, as in some cases other gases—such as hydrogen or a mixture of hydrogen and carbonic oxide, commonly known as “water-gas”—may be employed, owing to the reducing properties of such gas or gases.

It is well understood by those skilled in the art of manufacturing battery plates or elements that lead and certain alloys thereof are peculiarly adapted for the frames or supports of battery plates or elements, and therefore these materials have been largely, if not exclusively, employed for such purposes, and in the practical employment of battery plates or elements it has been discovered that the presence of oxides, dross, or other impurities in the frames or supports has a deleterious effect upon them—that is, causes them to become rapidly peroxidized and honey-combed.

Heretofore in the manufacture of frames or supports for battery plates or elements it has been customary to melt lead or an alloy thereof—for example, a mixture of lead and antimony—and pour the molten metal by means of a ladle into a mold containing active material or material to become active. This method in practice possessed, among others, the following serious disadvantages: If lead was the metal employed, the surface of the stream of molten metal running into the mold became oxidized by contact with the atmosphere, and this oxide or dross, becoming diffused throughout the frame or sup-

port, materially lessened the life or durability thereof. If an alloy of lead—for example, a mixture of lead and antimony—was the metallic materials employed, the stream of molten metal became chilled and hardened before it had time to flow from the cylinder and fill the mold, thus not only rendering the finished casting defective, but also entailing a waste of both time and material. In both cases the dross or other impurities collect upon the surface of the molten metal and are apt to be dipped up in the ladle and poured into the mold, and heretofore in the art of casting type, &c., a machine consisting, essentially, of a piston and cylinder has been employed to force the metal from the cylinder into the mold; but in the employment of such type of machine it is necessary to employ oil or other lubricants. However, this machine cannot be practically employed for making frames or supports around battery plates or elements, because in order to properly fill the molds it is necessary to heat the metal to such a temperature as will burn or otherwise destroy the oil or other lubricants, and thus cause the machine to become inoperative.

The principal objects of my present invention are, first, to obviate the above-mentioned defects and disadvantages and to provide a simple, durable, and efficient apparatus for casting frames or supports to or around battery plates or elements, and, second, to avoid the introduction of dross, oxides, and other impurities into the molds containing the active material or material to become active to form the plates or elements of a battery.

To carry the invention into effect the molten metal is forced by means of compressed gas into the mold or other appliance containing the active material or material to become active without permitting the molten metallic substance or material to come in contact with the air.

The nature and characteristic features of the invention will be more fully understood by reference to the accompanying drawings, forming part hereof, and in which—

Figure 1 is a sectional elevation of an ap-

paratus embodying the features of my invention, and Fig. 2 is a top or plan view of a device for supporting the mold.

In the accompanying drawings, A is a crucible supported in a suitable frame-work B. This frame-work B also supports a table B', upon which the mold or flask B² rests.

B³ is a hand-lever for forcing and retaining the sprue of the mold in close contact with the pipe h.

C is a furnace for heating up the crucible A.

D is a gas-holder provided with a pipe E, communicating with a pump or other device for compressing gas.

G is a pipe or other conductor provided with a safety-valve g, a pressure-gage g', and a three-way cock g², communicating with the air. This pipe G communicates with the gas-holder D and with a cylinder H. The cylinder H rests upon the bottom of the crucible A and is provided near the bottom thereof with a pipe h, leading to the mold B², and with a pipe h', leading to a pressure-valve I, having an inlet-opening i, located beneath the surface of the molten metal.

It may be remarked that good results have been obtained in practice by making the contents of the cylinder H equal the contents of the mold B², and therefore preference is given to such a construction.

The mode of operation of the above-described apparatus is as follows: The three-way cock g² being turned so that the cylinder H is in communication with the atmosphere, lead or an alloy thereof is melted in the crucible A by means of a fire in the furnace C, and flowing through the pressure-valve I fills the cylinder H, while at the same time gas under pressure is introduced into the vessel D through the inlet-pipe E. A mold or flask B² is placed upon the table B' and the sprue of the mold is forced into air-tight connection with the pipe h by means of the hand-lever B³. The three-way cock g² is then turned so that the gas from the vessel D, passing through the pipe G into the cylinder H, forces the molten metal through the pipe h into the mold. When the mold is filled, the three-way cock g² is turned so that the gas is confined in the vessel D, and the gas remaining in the cylinder H is permitted to escape through the cock g² into the atmosphere or into a suitable holder for use again, in order that a fresh charge of molten lead may flow from the crucible A past the pressure-valve I into the vertical cylinder H. The mold B² may then be replaced by another mold and the above-described process or operation repeated.

By drawing the metal from the bottom of the crucible A all danger of forcing dross or other impurities into the mold is obviated, because such impurities collect and float on the surface of the metal in the crucible A. In most cases atmospheric air is the gas employed in the conduct of the above-described method of casting the frames or supports to

or around the battery plates or elements; but if lead were used to cast the supports the use of atmospheric air would be deleterious, because it would oxidize the surface of the lead within the cylinder H, with which it came in contact. Therefore preference is given to the employment of other suitable gases, such as hydrogen or a mixture of hydrogen and carbonic oxide, commonly known as "water-gas," for the reason that such gas or gases tend to reduce any oxide that may be present in the molten metal. By providing an air-tight connection between the pipe h and the sprue of the mold the molten metal or metallic materials is or are forced into the mold without coming in contact with atmospheric air, and this result is very beneficial, inasmuch as it tends to prevent the formation of oxides or dross.

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a crucible, means for heating the same, a cylinder located in said crucible, a pressure-valve in communication with said cylinder, a holder, pipe-connections provided with a three-way cock and extending from said holder to said cylinder, and a delivery-pipe from said cylinder, substantially as and for the purposes set forth.

2. The combination of a crucible and furnace having a cylinder mounted in and supported by said crucible, a ball-valve mounted in said cylinder and in communication therewith, a gas-holder located adjacent to said crucible, pipe-connections from said holder to said cylinder, and a delivery-pipe from said cylinder, substantially as and for the purposes set forth.

3. The combination of a cylinder for containing a fluid or molten metal, a mold, a gas-holder, pipe-connections from said cylinder to said mold and to said gas-holder, and a three-way cock interposed between said cylinder and gas-holder, substantially as and for the purposes set forth.

4. The combination of a cylinder, a pressure-valve in communication therewith for admitting fluid metal thereto, a gas-holder, a pipe provided with a cock and extending from said gas-holder to said cylinder, and a delivery-pipe from said cylinder, substantially as and for the purposes set forth.

5. The combination of a frame-work for supporting a crucible and furnace, a table attached to said frame-work and provided with a hand-lever, a mold, a gas-holder, a cylinder provided with a pressure-valve in communication with said crucible, a pipe provided with a three-way cock and connecting said gas-holder and cylinder, and a delivery-pipe from said cylinder to said mold, said mold held to place upon said table by said hand-lever, substantially as and for the purposes set forth.

6. The combination of a cylinder, a pressure-valve in communication therewith for ad-

mitting fluid metal thereto, a holder, a pipe provided with a cock, a safety-valve, and a pressure-gage, said pipe extending from said holder to said cylinder, and a delivery-pipe
5 from said cylinder, substantially as and for the purposes set forth.

In witness whereof I have hereunto set my

signature in the presence of two subscribing witnesses.

HENRY HERBERT LLOYD.

Witnesses:

THOMAS M. SMITH,
HERMANN BORMANN.