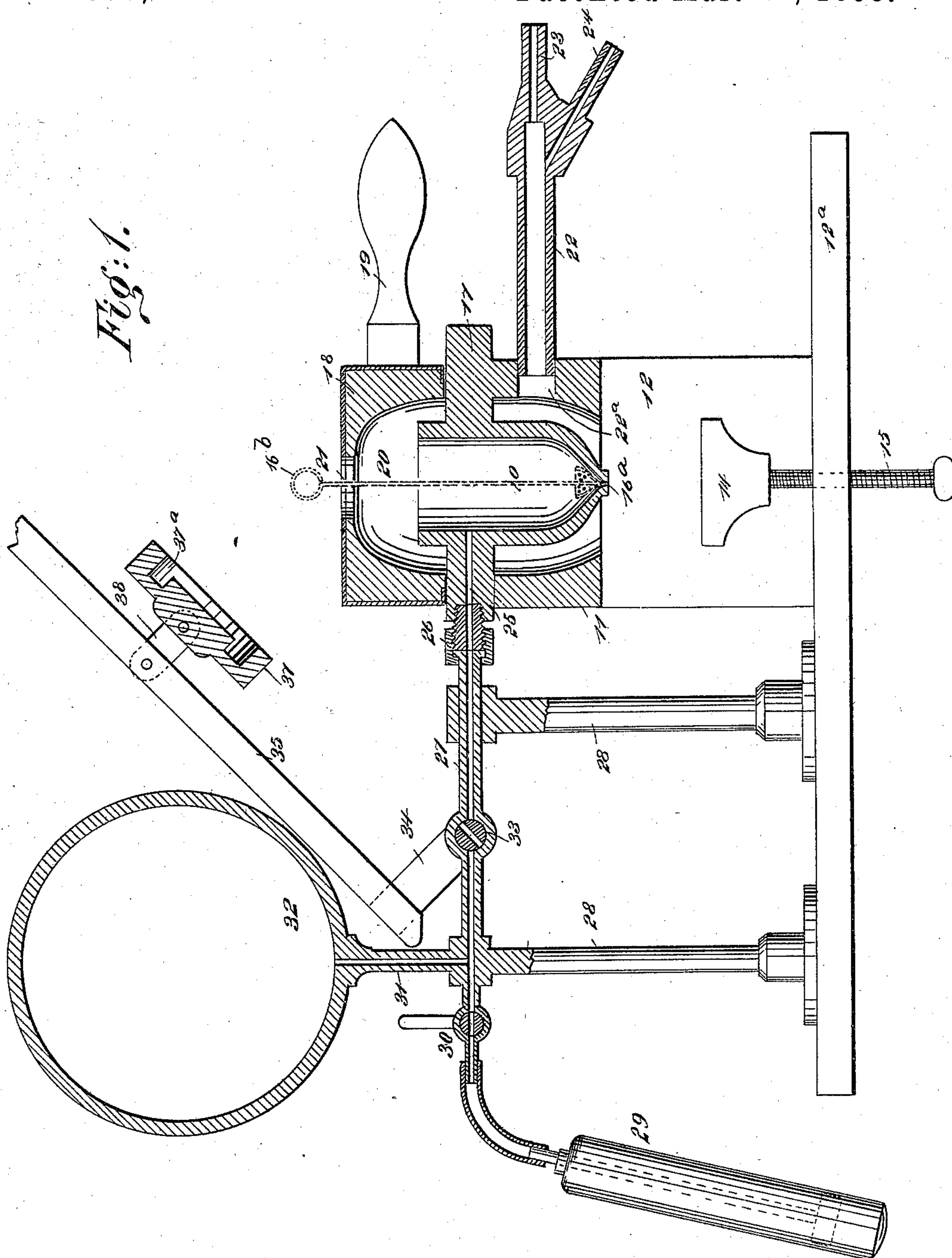


2 Sheets—Sheet 1.

No. 535,671.

Patented Mar. 12, 1895.



WITNESSES:

WITNESSES:
Chas. Viola.
A. B. Hutchinson

INVENTOR

INVENTOR
E. H. Casgrain
BY Munn & Co
ATTORNEYS.

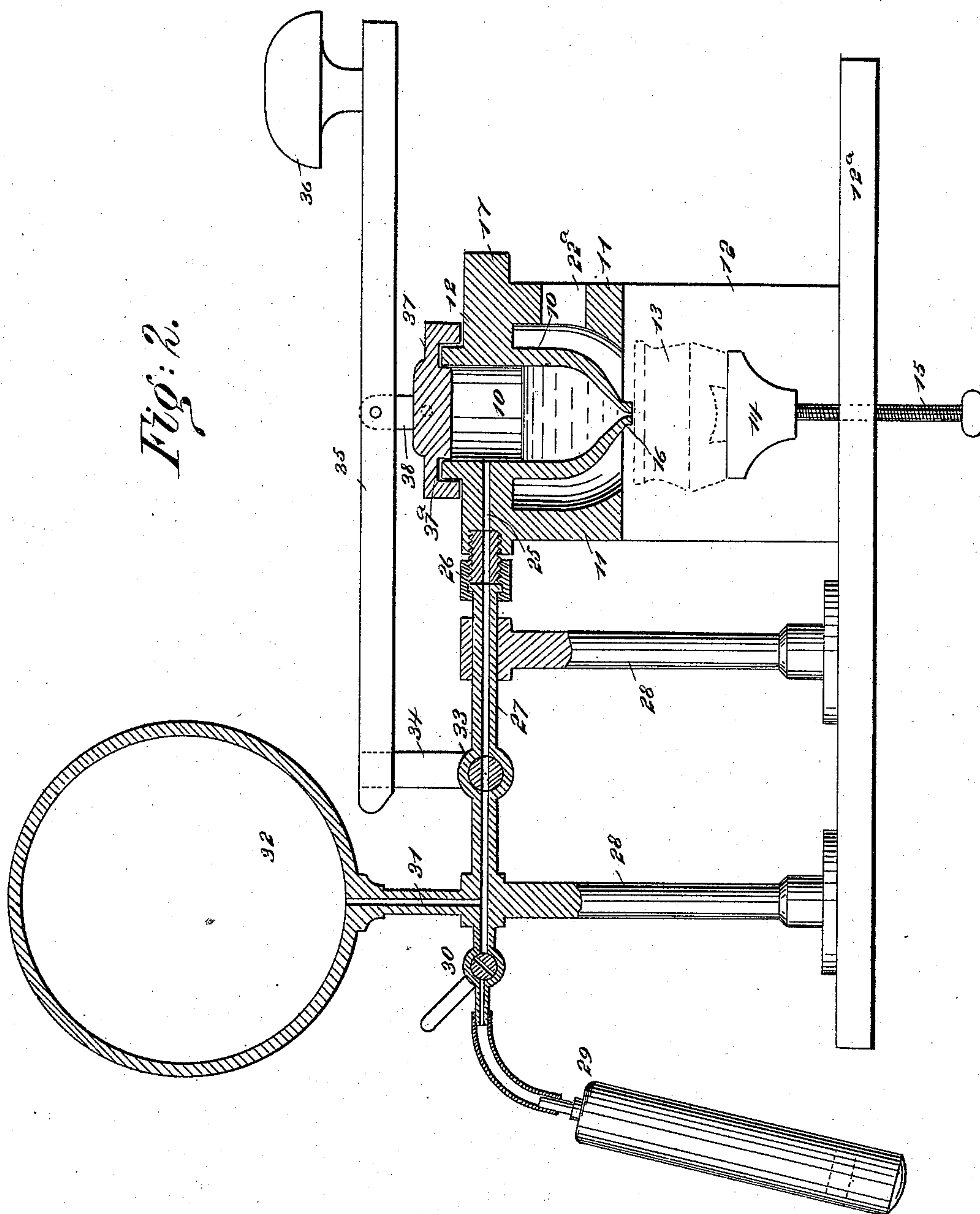
(No Model.)

2 Sheets—Sheet 2.

E. H. CASGRAIN.
APPARATUS FOR CASTING METALS.

No. 535,671.

Patented Mar. 12, 1895.



WITNESSES:

Chas. Nicola
H. O. Hutchinson

INVENTOR

E. H. Casgrain

BY

Munn & Co
ATTORNEYS.

UNITED STATES PATENT OFFICE.

EDMOND H. CASGRAIN, OF QUEBEC, CANADA.

APPARATUS FOR CASTING METALS.

SPECIFICATION forming part of Letters Patent No. 535,671, dated March 12, 1895.

Application filed November 15, 1894. Serial No. 528,879. (No model.)

To all whom it may concern:

Be it known that I, EDMOND H. CASGRAIN, of Quebec, in the Province of Quebec and Dominion of Canada, have invented certain new and useful Improvements in Casting Metals, of which the following is a full, clear, and exact description.

My invention relates to an improved apparatus for casting metals and more especially for casting aluminum. This metal, being very light, does not run from the crucible freely when melted, and being light it does not form as perfect a casting as is desirable. To obviate this difficulty, I provide an improved apparatus for injecting air under pressure to the crucible above the molten aluminum, and also for maintaining the air pressure in the flask while the metal is cooling and until it is cooled, thus forcing the metal to run freely from the crucible and to pack firmly in the flask so as to make a perfect casting without wasting any metal.

A further object of my invention is to produce an extremely cheap and simple apparatus, which is applicable to casting metals of all kinds and enables perfect castings to be made.

To these ends my invention consists in an apparatus for casting metals, which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts, in both the views.

Figure 1 is a longitudinal section of the apparatus with the first cover in place, this cover being used to cover the crucible when the metal is melted; and Fig. 2 is a similar section, but with the first cover removed, the second cover in position, and the valves arranged to turn on the air supply to the crucible.

The apparatus is provided with a crucible 10 which may be of any suitable size and of any proper material, this crucible being open at the top and supported in a furnace 11, which is of fire brick or analogous material, and the furnace is mounted on a suitable support 12 which is in turn arranged upon a base 12^a of any suitable character.

The furnace support 12 is open beneath the crucible so as to provide space for the flask 13 which may be made to contain any usual

mold, and this is mounted on a block 14 which is carried by a screw 15 journaled in the base 12^a, and by adjusting the screw the flask 13 may be raised so as to bring the mouth of the flask in direct contact with the outlet nipple 16 at the bottom of the crucible, or the flask may be lowered to enable it to be conveniently removed.

The outlet nipple 16 is not provided with a plug when aluminum is being melted, as the vent is small and the aluminum being light, does not run from the vent, owing to exterior air pressure and the natural but slight incrustation in the vent. If, however, heavier metal is being cast, the nipple 16 may be provided with the ordinary frangible plug, or a plug, as shown by dotted lines in Fig. 1, may be used, which has a perforated diaphragm 16^a to close the hole and a handle 16^b by which it may be removed when the metal is to be allowed to flow out. The perforated diaphragm is employed to remove the oxides from the metal in fusion, before the crucible is closed.

The crucible 10 depends from the top 17 of the furnace and the upper end of the crucible projects slightly above the top, as shown clearly, and when metal is being melted, the crucible is covered by a cover 18 which is also of fire brick or analogous material, and the cover has a suitable handle 19 and is concaved in the center, as shown at 20 and is provided with a top opening 21.

In the front wall of the furnace 11 is an opening 22^a to receive the end of a blow pipe 22, which may be of any usual kind, having one inlet 23 for gas and another 24 for air, and this blow pipe is removable and is used to heat the furnace, being when used inserted in the hole 22^a and lighted at its inner end.

The crucible has at its upper end an inlet 25 which is adapted to connect by means of a coupling 26 with an air pipe 27, this being mounted on suitable supports 28, and it is connected with an air pump 29 which, as shown, is an ordinary hand pump, as the apparatus illustrated is small and suitable for dental work, but the pump may be of any desired kind and if the apparatus is large and adapted for casting on a large scale, a powerful machine pump may be used. The supply from the pump is controlled by a valve 30. The pump is not used for pumping di-

rectly into the crucible, but delivers through a branch pipe 31 into a reservoir 32. The object of the reservoir is to enable the air to be held under pressure so that the pump may
5 be temporarily cut off and the air permitted to flow evenly from the reservoir to the crucible.

The air pipe 27 is provided, at a point between the pipe 31 and the crucible, with a
10 valve 33, the stem 34 of which is secured to a lever 35 which extends forward in front of the furnace 11 and is provided at its free end with a handle 36. The lever 35 carries a
15 cover 37 which is provided with an annular groove 37^a to fit over the top edge of the crucible, as shown clearly in Fig. 2, and the cover connects with the lever by a link 38 which permits the necessary movement of the lever
20 and cover in relation to each other in order that the cover may be nicely adjusted. It will be seen that by means of the lever the cover 37 may be held down snugly upon the crucible so as to resist the air pressure within
25 and cause the said pressure to be exerted efficiently upon the molten metal to drive it from the crucible, and it will also be observed that when the lever is depressed to bring the cover 37 into the position shown in Fig. 2, it also acts on the stem 34 and valve 33 so as to
30 open the valve and permit the air to flow from the reservoir 32 into the crucible.

In using the apparatus the metal to be melted is placed in the crucible 10, the lever 35 raised, as shown, in Fig. 1, in which position it may be held in any convenient manner, and the valve 33 is thus closed. While the valve 33 is closed the opportunity may be embraced to open the valve 30 and fill the reservoir 32 by means of the pump 29, and
40 when the reservoir is filled the valve 30 is closed. The cover 18 is placed over the crucible, the blow pipe lighted so as to heat the crucible and melt the metal, after which the flask 13 is adjusted beneath the crucible,
45 the cover 18 removed and the lever 35 brought down so as to place the cover 37 over the crucible and open the valve 33. The cover may be held firmly down by the lever 35, and as the valve 33 is opened, the air from the reservoir 32 rushes into the crucible and forces
50 the metal out through the outlet 16 and into the mold 13, and the pressure of air on the metal as it fills the mold, causes it to pack snugly and make a firm, smooth casting free
55 from blow holes.

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

1. An apparatus of the kind described, comprising a crucible having a suitable outlet, a

valve-controlled pipe leading from a source of air supply to the crucible, and a cover for said crucible operatively connected with the valve, as and for the purpose set forth.

2. An apparatus of the kind described, comprising a crucible having a bottom outlet, an air reservoir, a valve-controlled pipe leading from the reservoir to the crucible, a lever to operate the valve, and a cover for the crucible, carried by the lever, substantially as described. 65 70

3. An apparatus of the kind described, comprising a furnace, a crucible depending from the top of the furnace and having a bottom outlet, the upper end of said crucible projecting above the top of the furnace, a cover provided with an annular groove to fit over the top edge of the crucible, an air reservoir, an inlet at the side of said crucible near its upper end, and a valve controlled pipe leading
80 from the reservoir and connected with the said inlet, substantially as described.

4. An apparatus of the kind described, comprising a furnace, a blow pipe detachably connected therewith, a crucible in the furnace
85 having a bottom outlet, a cover for the crucible, a valve controlled air pipe connected with a source of air supply and with the upper part of the crucible, and a lever carrying the said cover and arranged to operate the valve, substantially as described. 90

5. An apparatus of the kind described, comprising a furnace, a crucible supported therein, an air pipe connected with a source of air supply and with the crucible, a valve in said
95 air pipe a temporary cover for the crucible, a second cover for the crucible carried by a lever, and a connection between the said lever and the valve controlling the air supply to the crucible, substantially as described. 100

6. An apparatus of the kind described, comprising a crucible having a bottom outlet, a furnace encircling and supporting the crucible, a cover for the crucible, an air pipe provided with a valve and connecting the crucible with an air supply, means connected with the cover for operating the valve, and a vertically adjustable flask supported beneath the crucible, substantially as described. 105

7. The combination, with the crucible having a bottom outlet, the air supply pipe connected with the crucible, and the valve controlling the air pipe, of the lever secured to the valve stem, and the cover pivoted on the lever and adapted to close over the crucible, substantially as described. 110 115

EDMOND H. CASGRAIN.

Witnesses:

H. G. CARROLL,
WM. DOYLE.