No. 721,381. PATENTED FEB. 24, 1903.

W. A. McADAMS.

CASTING MACHINE.

APPLICATION FILED JUNE 13, 1899.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.

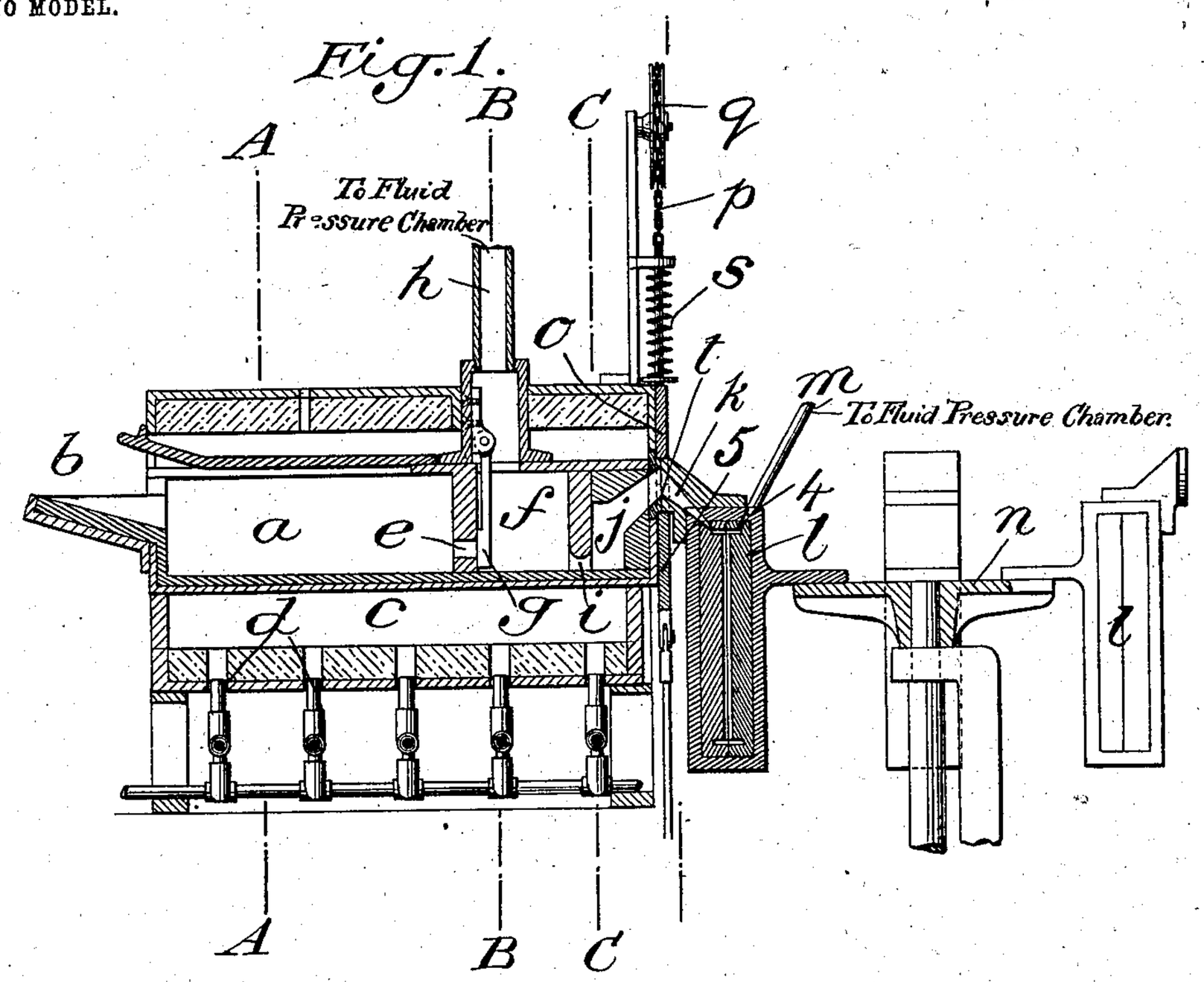
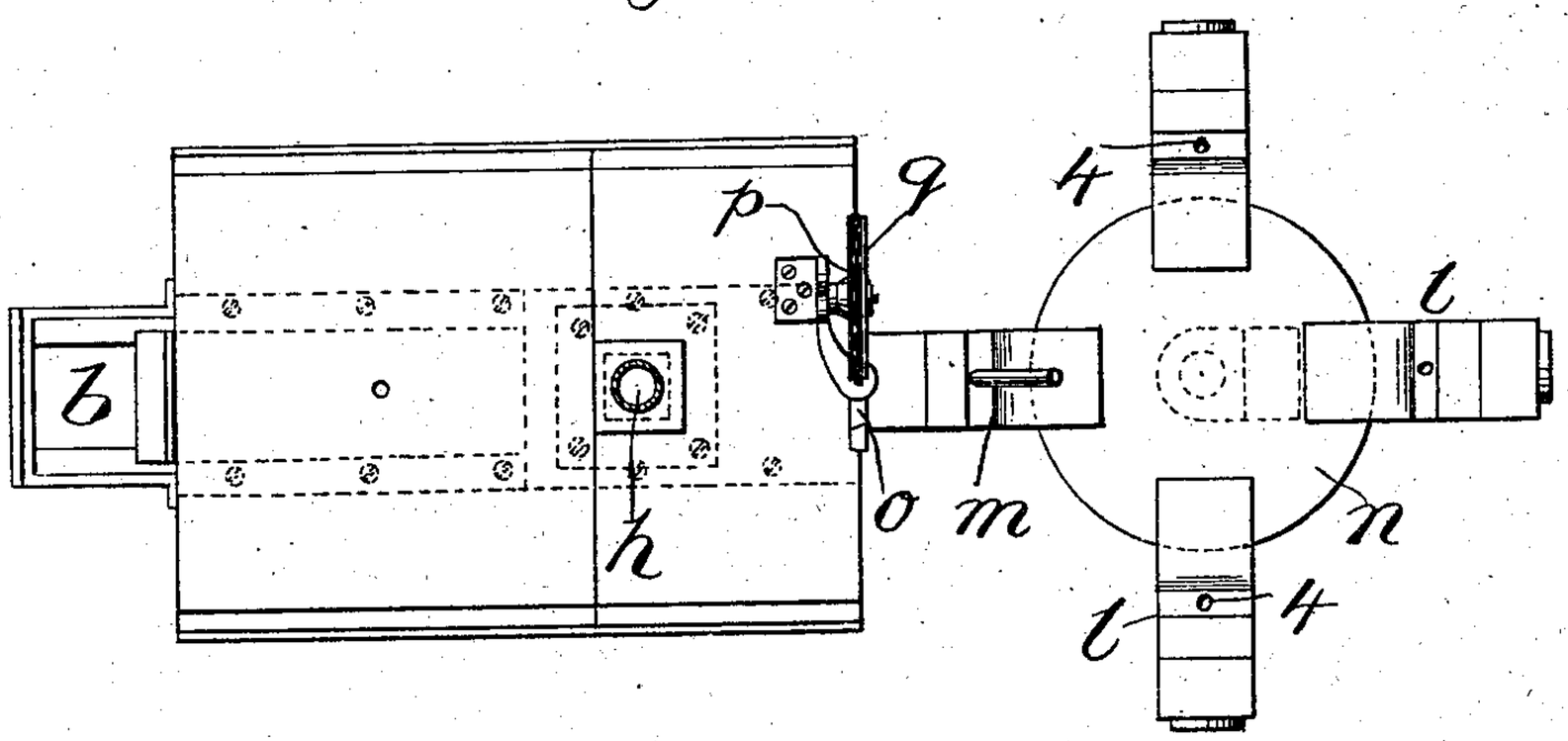


Fig. 2.



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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 3.

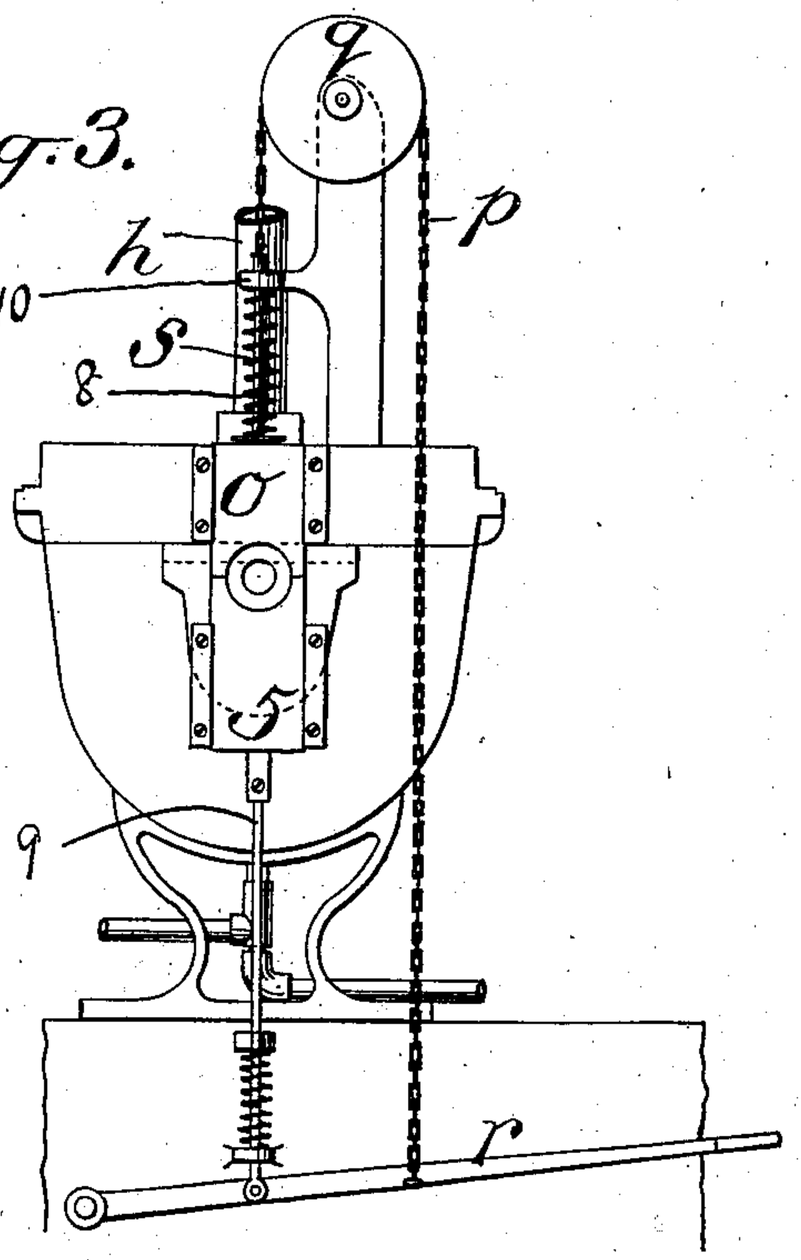


Fig. 4.

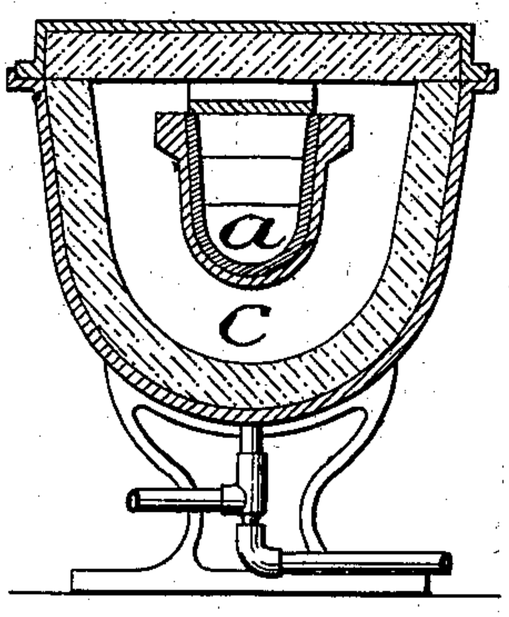


Fig. 5.

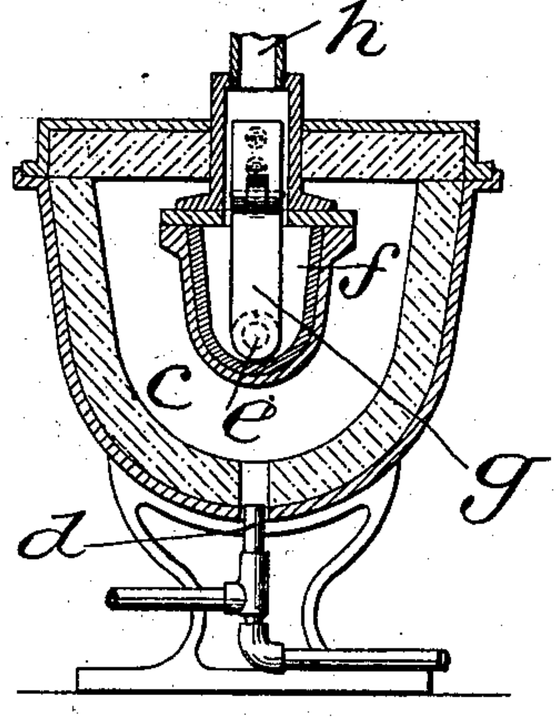
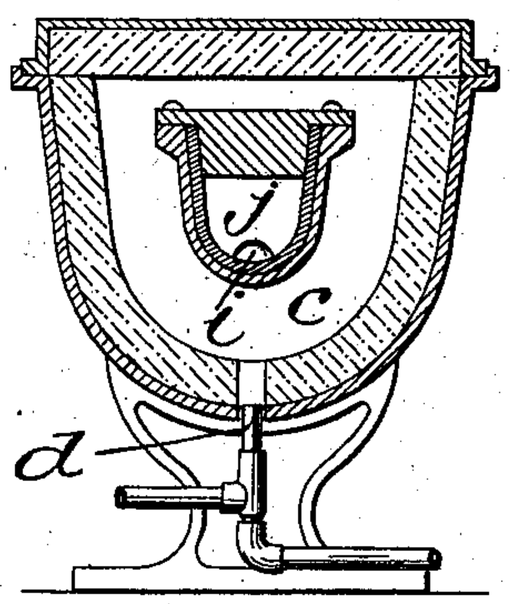


Fig. 6.



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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 7.

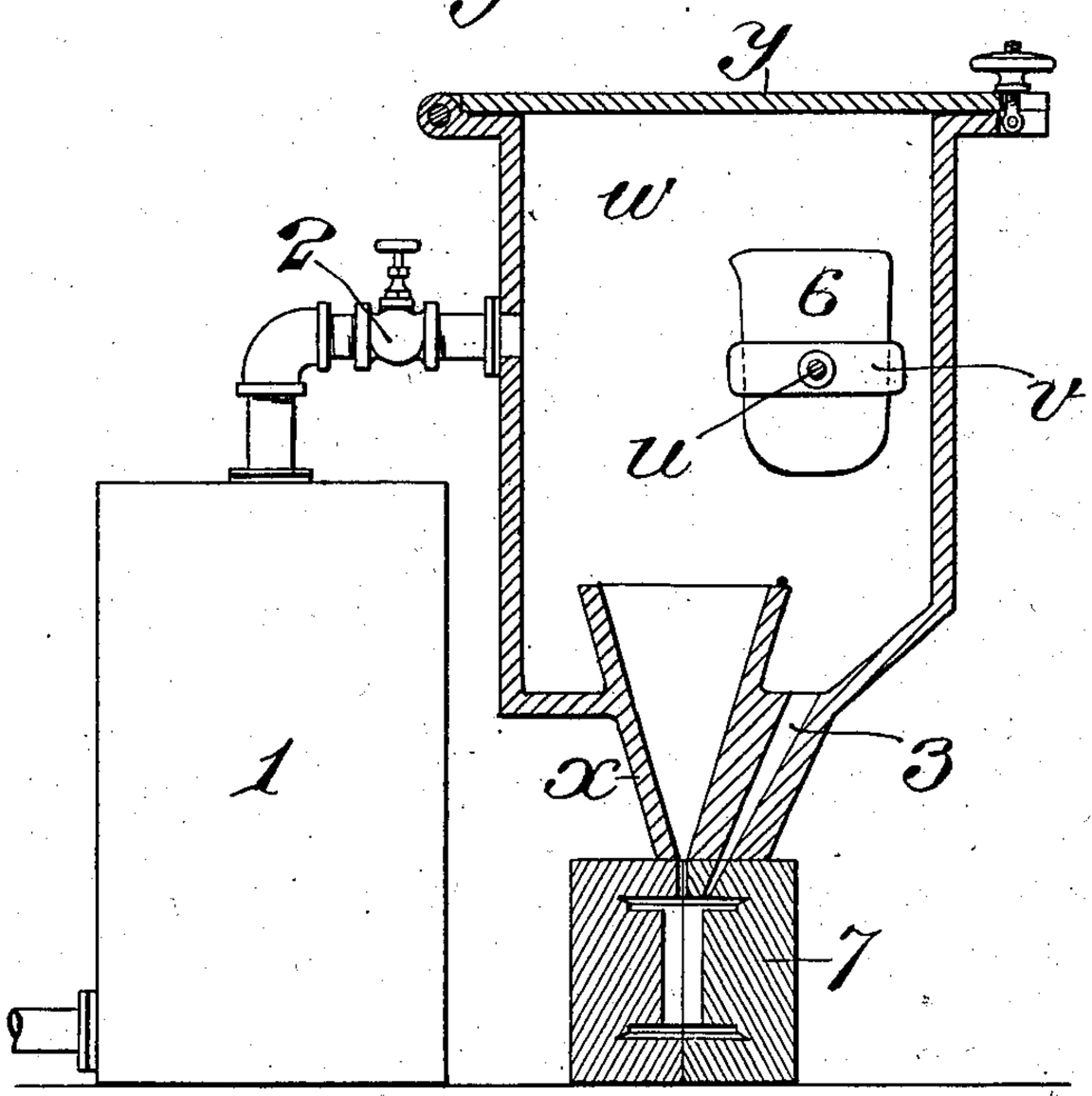
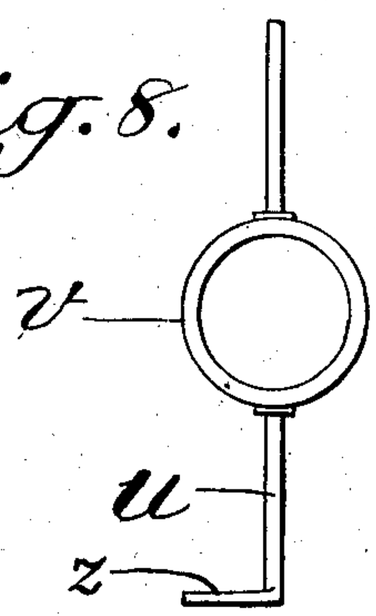


Fig. 8.



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UNITED STATES PATENT OFFICE.

WILLIAM A. McADAMS, OF BROOKLYN, NEW YORK.

CASTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 721,381, dated February 24, 1903.

Application filed June 13, 1899. Serial No. 720,363. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. McADAMS, a citizen of the United States, and a resident of the borough of Brooklyn, in the city and State of New York, have invented a new and useful Improvement in Casting-Machines, of which the following is a specification.

My invention relates to an improvement in casting-machines, with the object in view of simplifying and expediting the process of casting, particularly where the molten metal is to be forced into the mold by the action of fluid-pressure as well as by its own gravity.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 represents a view of the machine in vertical longitudinal section. Fig. 2 is a top plan view. Fig. 3 is an end view, the mold-support being removed. Figs. 4, 5, and 6 represent vertical transverse sections of the parts through which the sections are taken, the points at which the sections are taken being represented, respectively, by the lines A A, B B, and C C, Fig. 1. Fig. 7 is a vertical section of a modified form of machine, and Fig. 8 is a plan view in detail of the tilting crucible-support of said modified structure.

Referring to the structure shown in Figs. 1 to 6, inclusive, the metal to be cast is inserted into one end of a trough-shaped crucible *a* through a suitable opening *b*. The crucible *a* is preferably built into and its bottom forms the crown-sheet of a furnace *c*, in which combustion is supported by a series of gas-jets *d* in any well-known or approved manner. The crucible *a* connects, through an opening *e* at the opposite end from that in which the metal is fed into the crucible and at a slight distance above the bottom of the crucible, with a second compartment *f*, the said compartment *f* being arranged to be temporarily closed to the crucible *a* by means of a swinging valve *g*, which will close the opening *e* under pressure in the compartment *f*, but which will readily open to admit the molten metal to flow from the crucible *a* into the compartment *f* whenever the pressure upon the metal in the compartment *f* is removed. The compartment *f* communicates, through a suitable pipe *h*, with a supply of compressed fluid—compressed air, for example. (Not shown, but assumed to be any convenient body of compressed air which may be arranged for the purpose.) The compartment *f* in its turn communicates at its bottom through an opening *i* with a compartment *j*, having an inclined neck leading upwardly and rearwardly therefrom to register with the gate *k*, which in its turn leads downwardly and rearwardly to the mold *l*. The space within the mold *l* which the molten metal is intended to fill is in communication through an air-conduit 4 with a second compressed-air supply, (not shown,) which may be kept at any desired pressure in any well-known or approved manner and admitted to the air-conduit 4 through the compressed-air pipe *m*, arranged at its lower end to register with the air-conduit 4.

In the arrangement shown in Figs. 1 and 2 I have supported several molds *l* upon a rotary table *n*—in the present instance, four—so that they may be brought successively into position with their gates *k* in register with the opening in the compartment *j* of the crucible, and in order to effect a tight closure between the wall of the gate *k* and the wall of the exit-opening of the compartment *j* I provide a pair of sliding plates *o* 5, (see Fig. 3,) the adjacent ends of which are made semicylindrical, so that the two when in closed adjustment will completely surround the joint between the end of the gate and the end of the opening to the compartment *j* to prevent the escape of molten metal. I provide for operating the plates *o* 5 simultaneously by connecting their operating-rods 8 and 9 by a chain *p*, leading from the upper plate-operating rod 8 over a pulley *q* and thence to a lever *r*, to which the operating-rod 9 of the plate 5 is attached, and which at the same time may have a projection for the reception of the foot of the operator, so that when depressed the plates *o* 5 will be separated to permit a new mold *l* to be swung into position, and when the foot is released a spring *s*, surrounding the operating-rod 8 of the plate *o* and free to operate between an abutment 10 and the plate, will force the two plates into closed adjustment ready for the operation of casting.

Particular attention is called to the sharp

ridge *t*, formed at the joint between the gate and the exit-opening through the compartment *j* and at the bottom of said opening, by which the metal when left free to flow into the mold and back into the compartment *j* will be entirely separated at the joint as though cut by a knife, leaving no waste metal around the joint between the gate and the exit of the compartment *j* to interfere with the advance movement of the mold *l*.

In practice when the mold *l* is in position to receive its charge a sudden pressure is admitted into the compartment *f* through the pipe *h* to force the metal from the compartment *j* up through its exit-opening over the ridge *t* into the gate *k* and into the mold *l*. This same impulse of pressure will close the valve *g*, preventing the metal in the compartment *f* from flowing back into the crucible *a*, and hence force it rearwardly into the mold. This pressure is preferably of an intensity more than sufficient to eject the proper amount of metal to fill the particular mold being used, and after the pressure has been exerted to eject a sufficient quantity of metal to fill the mold it may be cut off and the metal again allowed to resume its level in the compartments *j* and *f*, as well as in the crucible *a*, the latter furnishing a new charge into the compartments *f* and *j* through the opening *e* as soon as the valve *g* is free to swing away from the opening. At the same time that the pressure is being exerted behind the metal to force it out of the compartment *j* into the mold pressure from a separate source may be exerted upon the metal within the mold through the air-conduit 4 and the pipe *m*, leading to a compressed-air supply of a lower intensity than that which is employed to force the metal into the mold. This will have a tendency to pack the metal as it accumulates within the mold. If the orifice in the gate be small enough, the mold will fill slower. The metal—say an alloy of aluminium containing zinc and copper—will solidify at the bottom of the mold and gradually upward as the mold is filling. The heavy pressure will pack it into every crevice and fine line of the mold, and in the case of the alloy mentioned and others will almost wholly overcome the shrinkage of them.

A simple arrangement for use where the process of melting is not carried on simultaneously with the casting is represented in Figs. 7 and 8, in which the crucible 6 is made removable from its support, the latter consisting of a shaft *u*, having a ring *v* for receiving the crucible and extending across within an air-chamber *w*, from which the metal is arranged to flow through a gate *x* into the space within the mold 7. The top *y* of the air-chamber *w* is made to open for the purpose of removing the empty crucible 6 and inserting a crucible filled with molten metal and to form an air-tight closure when shut, a gasket of asbestos of any well-known or approved form may be utilized for sealing the joint. The shaft which supports the crucible projects to the exterior of the chamber *w* through suitable air-tight stuffing-boxes and is there provided with a crank *z* for tilting it, and hence the crucible carried by it, to pour the molten metal into the gate *x*. The air-chamber *w* is connected with an air-pressure tank, (denoted by 1,) and a valve 2 serves to admit the air-pressure to the chamber *w* and cut it off from the said tank at pleasure. The space within the mold 7 is in connection with the interior of the air-chamber *w* through an air-conduit 3, separate from the gate *x*, through which the metal flows into the mold, and through which air-conduit 3 the pressure of the air within the tank *w* is exerted upon the molten metal within the space in the mold while the mold is being filled.

It is obvious that the form and arrangement of the structures herein described may be changed without departing from the spirit and scope of my invention. Hence I do not wish to limit myself strictly to the structure herein set forth; but

What I claim is—

1. In combination, a mold, a pressure-chamber, a gate through which communication is established between the pressure-chamber and mold, means for holding molten metal in position to enter the gate, and means for supplying fluid-pressure to the chamber, the said mold being provided with an air-passage independent of the gate for admitting fluid-pressure to the interior of the mold during the pouring of the metal, substantially as set forth.

2. In combination, a crucible, an air-pressure chamber in communication therewith and arranged to receive molten metal therefrom, a valve for opening and closing communication between the chamber and crucible, an upwardly-inclined exit leading from said air-pressure chamber, a mold having a downwardly-inclined gate, a mold-support arranged to bring the mouth of the downwardly-inclined gate to register with the mouth of the said upwardly-inclined exit from the pressure-chamber and means for admitting air-pressure to the said pressure-chamber to discharge the metal into the mold, substantially as set forth.

3. In combination, the air-pressure chamber arranged to receive a charge of molten metal and provided with an upwardly-inclined exit, a mold provided with a downwardly-inclined gate, a mold-support arranged to bring the gate of the mold to register with the exit in the pressure-chamber and movable packing-plates arranged to close the joint between the gate and exit-opening, substantially as set forth.

4. A casting-machine comprising a retort, U-shaped in cross-section and having its cover formed separate from the body portion, the said retort being provided with a partition intermediate of its ends separating the interior into different communicating chambers, an opening for feeding the metal to be

melted in at one end of the retort, an opening for the discharge of the molten metal at the opposite end of the retort, a mold and means for admitting a fluid under pressure into one of the said communicating chambers for discharging the molten metal, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 9th day of June, 1899.

WILLIAM A. McADAMS.

Witnesses:
FREDK. HAYNES,
C. S. SUNDGREN.