J. SOSS & A. W. CHRISTIANSON.

CASTING MACHINE.

APPLICATION FILED APR. 19, 1909.

936,486.

Patented Oct. 12, 1909.

2 SHEETS—SHEET 1.

Fig. 1

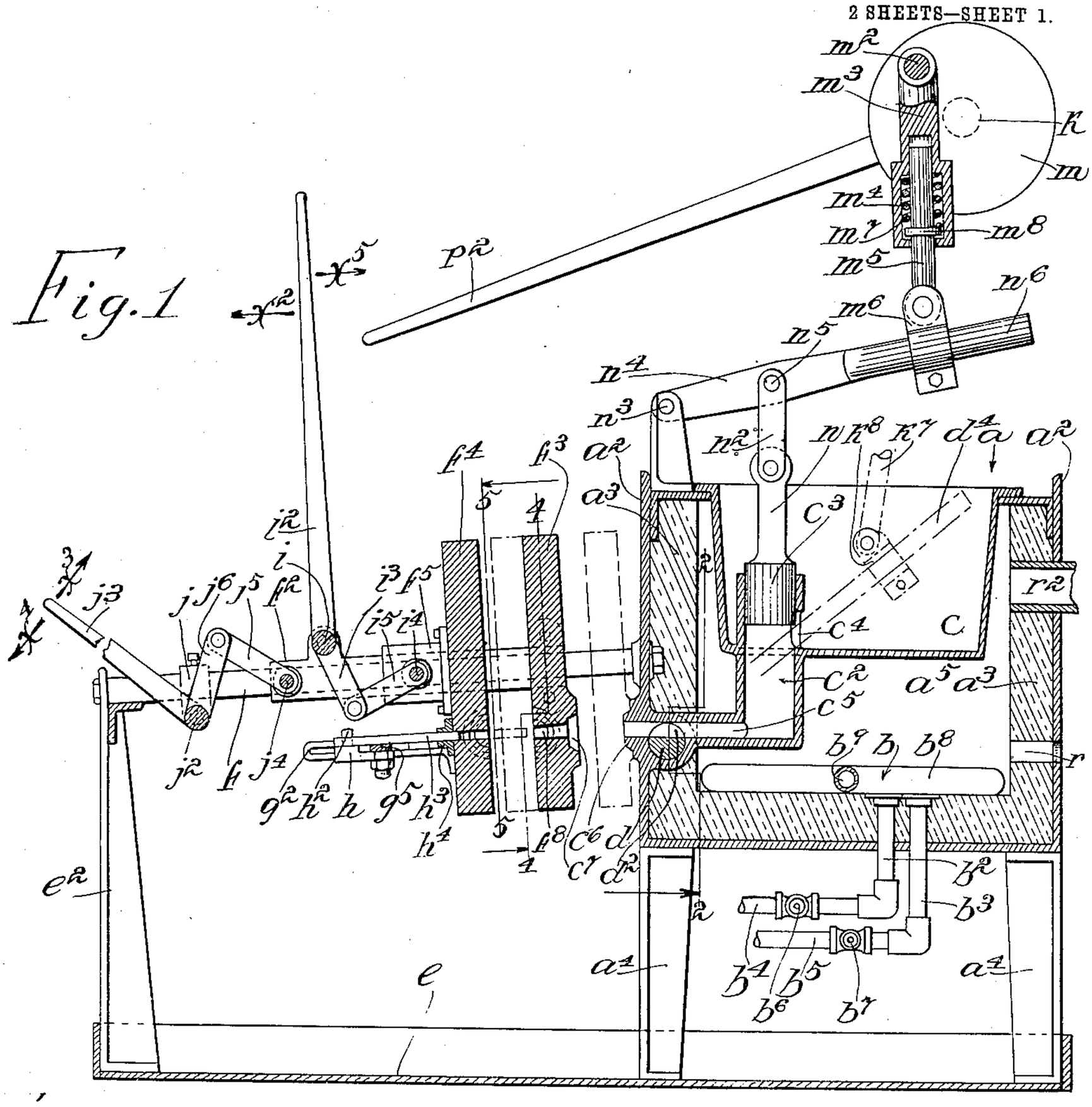

Fig. 2

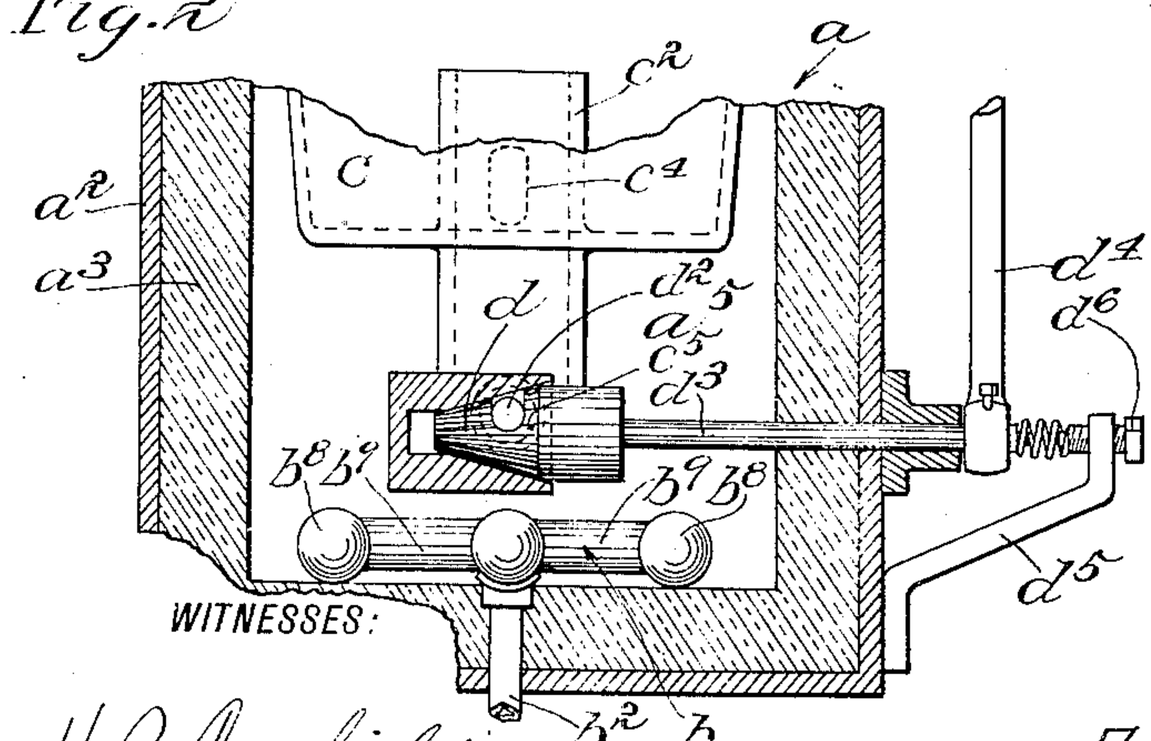

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Fig. 3

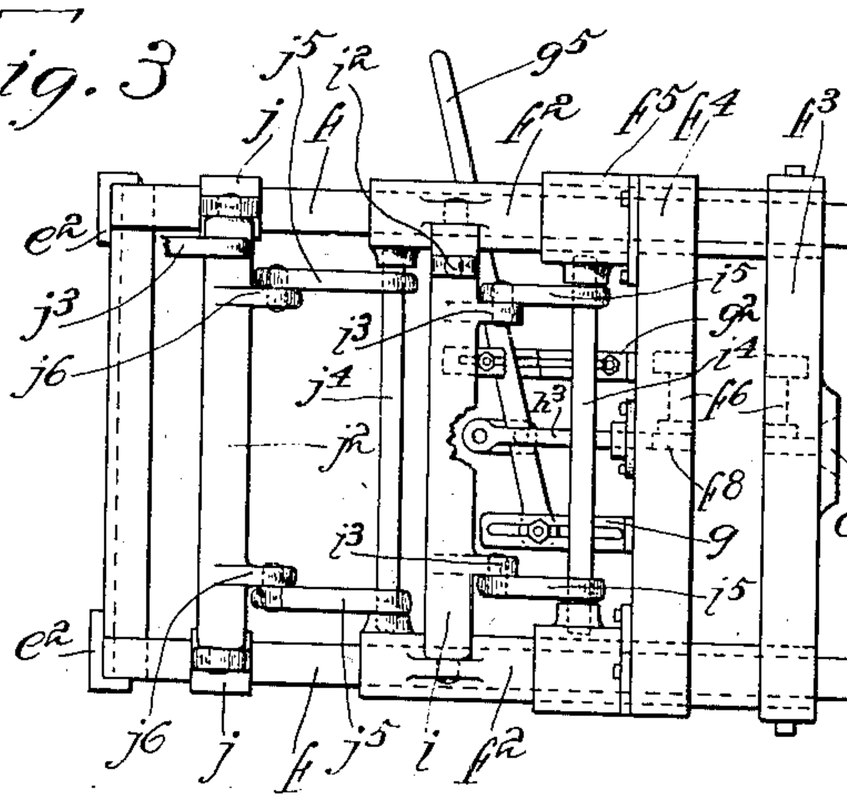


Fig. 4

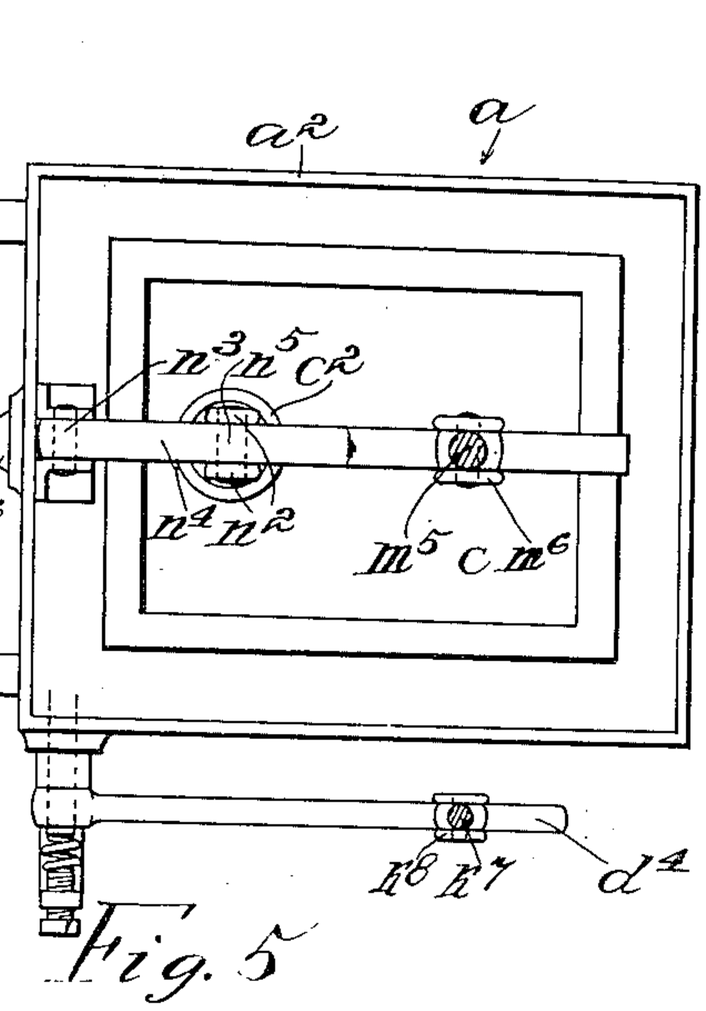
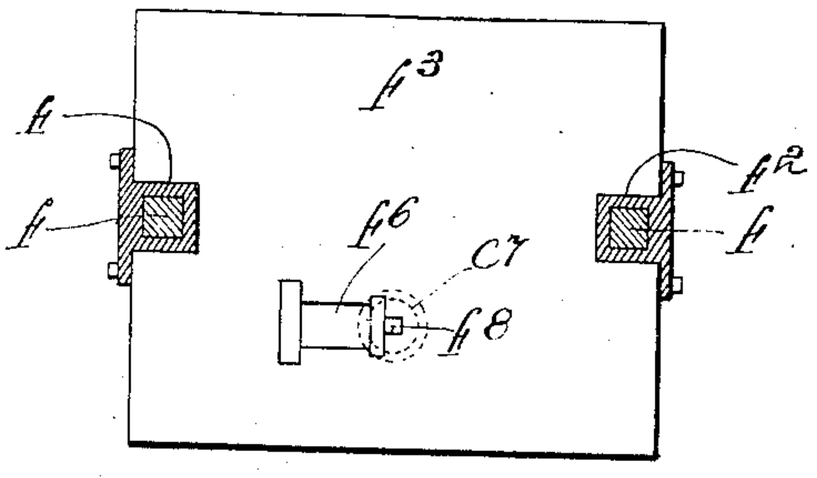


Fig. 5



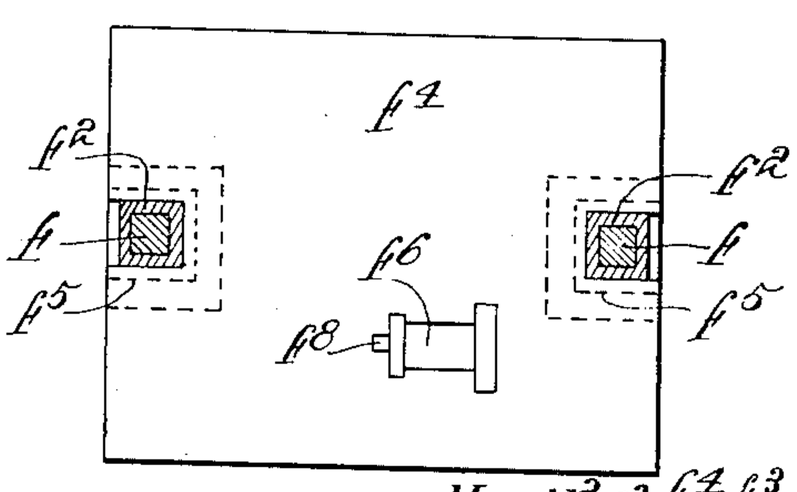


Fig. 7

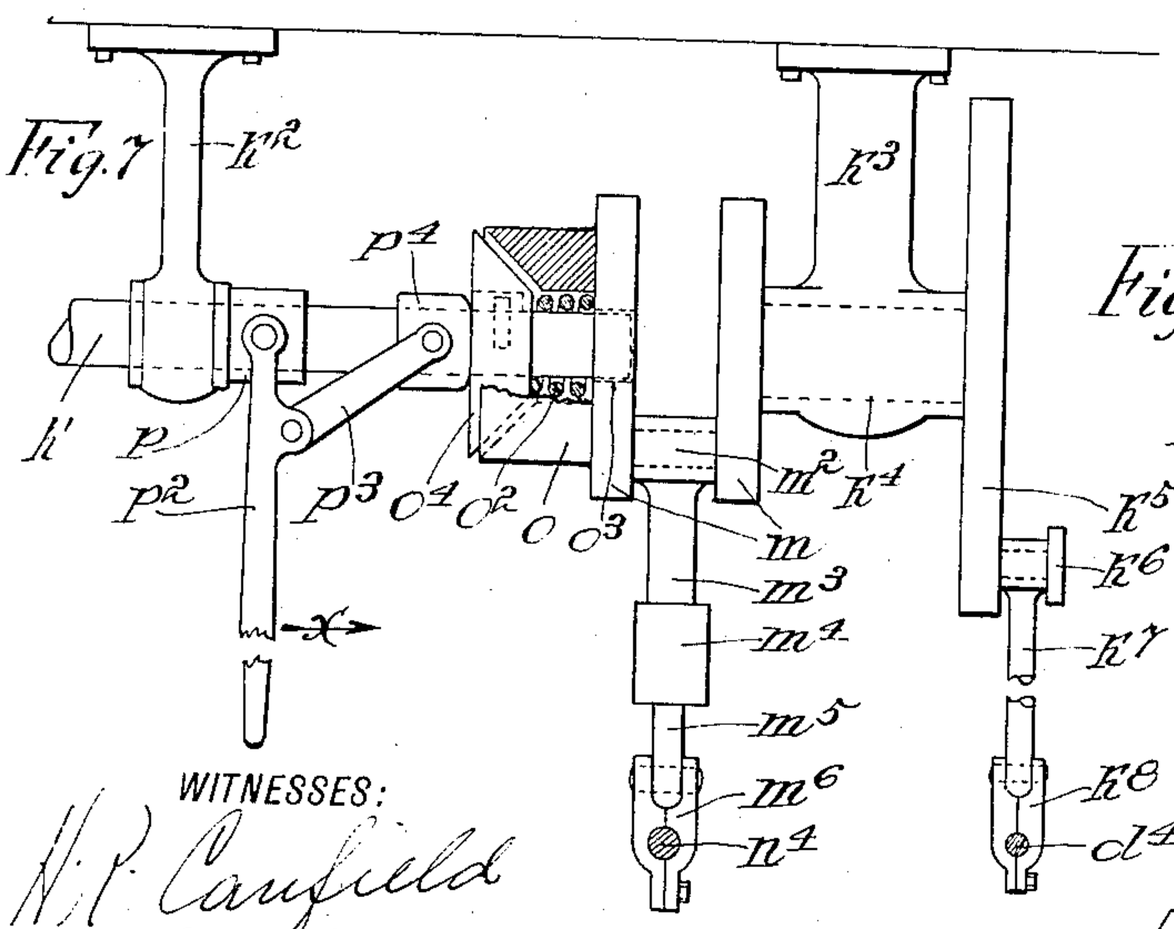
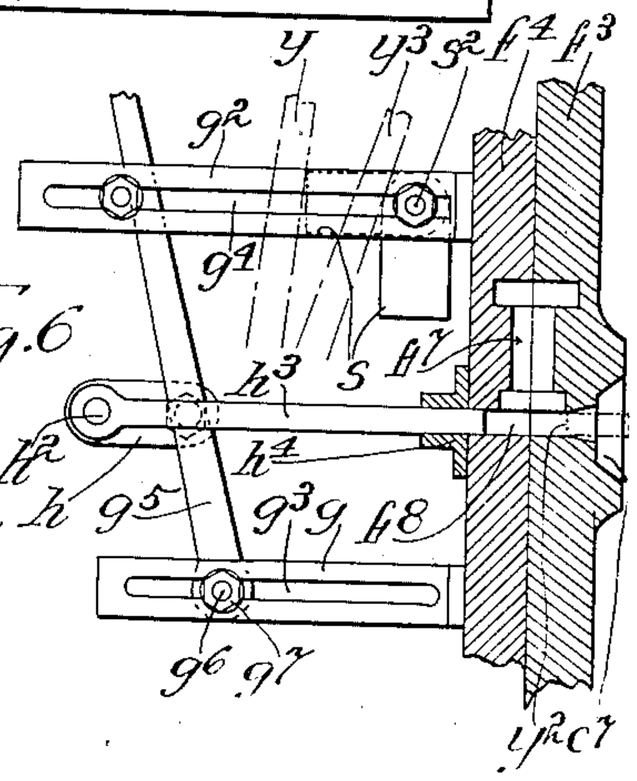


Fig. 6



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UNITED STATES PATENT OFFICE.

JOSEPH SOSS AND ADOLPH W. CHRISTIANSON, OF NEW YORK, N. Y.

CASTING-MACHINE.

936,486. Specification of Letters Patent. Patented Oct. 12, 1909.

Application filed April 19, 1909. Serial No. 490,716.

To all whom it may concern:

Be it known that we, JOSEPH SOSS and ADOLPH W. CHRISTIANSON, citizens of the United States, and residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Casting-Machines, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to machines for casting small articles of various kinds and classes of metal; and the object thereof is to provide an improved machine of this class which is simple in construction and efficient in operation, and which may be conveniently manipulated; and with this and other objects in view, the invention consists in a machine of the class specified constructed as hereinafter described and claimed.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which the separate parts of our improvement are designated by suitable reference characters in each of the views, and in which;—

Figure 1 is a sectional side view of our improved casting machine with parts of the construction omitted, Fig. 2 a section on the line 2—2 of Fig. 1, Fig. 3 a plan view with part of the construction in section and parts omitted, Fig. 4 a partial section on the line 4—4 of Fig. 1, Fig. 5 a section on the line 5—5 of Fig. 1, Fig. 6 a view similar to Fig. 3 but showing only parts of the construction and showing parts in section and in different positions, and;—Fig. 7 a sectional detail showing a part of the driving mechanism of the machine, part of which is also shown in Fig. 1.

In the practice of our invention, we provide a furnace a composed of an outer metallic wall or casing a^2 and provided with an inner lining a^3 of fire brick, and the furnace a is supported by legs a^4.

Within and resting on the bottom of the furnace chamber a^5 is a gas and air burner b of any suitable construction, and with which is connected two pipes b^2 and b^3 one of which is designed to supply gas and the other air to the burner b, and said pipes are preferably passed through the bottom of the furnace casing and are provided respectively with extensions b^4 and b^5 having valves b^6 and b^7. The burner b is preferably composed of parallel pipes b^8 connected by cross pipes b^9, but any suitable burner adapted for the consumption of gas and air may be employed.

Within the top portion of the furnace is placed a retort receptacle c, and passing upwardly through the bottom thereof is a cylinder c^2 in which is mounted a piston c^3. The cylinder c^2 is provided in one side thereof and adjacent to the bottom of the retort receptacle c with an opening c^4, and at the bottom end of said cylinder is a forwardly directed pipe c^5 which communicates therewith and extends through the front wall of the furnace, and which is controlled by a valve d which is conical in form as shown in Fig. 2 and provided in one side with a transverse port d^2, and the valve d is provided with a rod d^3 which passes out through one side of the furnace wall and with which is connected an arm d^4. A bracket arm d^5 is connected with the furnace casing or wall and passed through the end thereof is a set screw d^6, and a spring d^7 is placed between the inner end of the set screw d^6 and the outer end of the valve rod d^3, and this spring presses on the end of said valve rod and serves at all times to hold the valve d firmly seated and the tension of this spring may be regulated at any time by means of the screw d^6.

The entire machine is preferably supported in or by a suitable base pan e with the front portion of which are connected upright supports e^2, and connected with the front wall of the furnace above the pipe c^5 and with the top of the supports e^2 are rods or bars f which are angular in cross section and on which are mounted sleeves f^2 which are movable thereon and with the inner ends of which is connected a mold jaw f^3. Another mold jaw f^4 similar in form to the mold jaw f^3 is mounted on the sleeves f^2 and provided with sleeves f^5 which are movable on the sleeves f^2, and while the mold jaw f^3 is movable on the rods or bars f the mold jaw f^4 is movable on the sleeves f^2.

The mold jaws f^3 and f^4 are provided in their inner faces with mold chambers or recesses f^6 which are the counter parts of each other, and when the said mold jaws are placed together in the operation of the machine as hereinafter described, the chambers or recesses f^6 form a mold chamber f^7 which is spool-shaped in form as clearly shown in Fig. 6, and said mold jaws are provided adjacent to one end of said mold with a transverse

aperture f^8 which communicates with the mold chamber and is angular in shape in cross section in the form of construction shown.

The mold jaw f^4 is provided with two forwardly directed arms g and g^2 provided respectively with longitudinal slots g^3 and g^4, and a lever g^5 is pivoted to the arm g by means of a bolt g^6 which passes through the slot g^3 and is provided with a nut g^7 and the position of the lever g^5 may be adjusted on the arm g by means of the said bolt and nut. The arm g^2 is slotted horizontally as shown in Fig. 1, and the lever g^5 passes therethrough, and pivoted to said lever between the arms g and g^2 is a link h provided with a pin h^2 on which is mounted a horizontal bar h^3 which ranges backwardly and is adapted to enter and pass through the transverse aperture f^8 in the mold jaws f^3 and f^4, and the mold jaw f^4 is provided with a thimble h^4 into which the bar h^3 passes and which serves as a guide and support for the rear end thereof.

Mounted on the front end portion of the sleeves f^2 is a rock shaft i with which is connected a lever i^2, and said shaft is provided with downwardly and backwardly directed arms i^3, and mounted between the sleeves f^5 is a rod i^4 with which are connected links i^5 which are also connected with the arms i^3 of the shaft i.

On the front ends of the bars f are placed keepers j with which is connected a transverse rod j^2 provided with a lever j^3, and mounted between the front ends of the sleeves f^2 is a rod j^4 with which are connected links j^5, and the rod j^2 is provided with arms j^6 with which said links are also connected.

The front end of the pipe c^5 is provided with a conical or tapered nozzle c^6 and the mold jaw f^3 at the inner end of the transverse aperture f^8 is provided with a corresponding conical recess c^7, and by manipulating the levers i^2 and j^3 the mold jaws f^3 and f^4 may be thrown into the position indicated in dotted lines in Fig. 1, and in full lines in Fig. 6 in which position the aperture f^8 in the mold jaws f^3 and f^4 will register with the bore of the pipe c^5 and a communication between the cylinder c^2 and the mold chambers or recesses f^6 in the mold jaws f^3 and f^4 will be established.

Supported above the furnace a is a shaft k, said shaft being preferably supported by a hanger or hangers k^2 only one of which is shown, and adjacent thereto is another hanger or support k^3 in which is mounted a crank shaft k^4, this construction being clearly shown in Fig. 7 and partially shown in Fig. 1. The crank shaft k^4 is provided with a large crank disk k^5 having a crank pin k^6 with which is connected a crank rod k^7, and connected with the crank rod k^7 is a link device k^8. The crank rod k^4 is also provided with two other crank disks m connected by a wrist pin m^2 with which is connected a crank pin m^3 provided with a tubular head m^4 into which passes a longitudinally movable pin m^5 provided with a pivot keeper m^6.

Placed in the tubular head m^4 of the crank pin m^3 is a spiral spring m^7, this construction being clearly shown in Figs. 1 and 7, and the pin m^5 is provided with a stop m^8 on which the spring m^7 bears. The piston c^3 in the cylinder c^2 is provided with a rod n with which are connected links n^2, and pivoted over the front wall of the furnace at n^3 is a lever n^4 with which the links n^2 are connected at n^5, and the lever n^4 ranges backwardly and the end n^6 thereof passes through the keeper m^6. The arm d^4 which is connected with the valve rod d^3 passes through the link device k^8 as clearly shown in Figs. 1 and 7, and with this construction it will be seen that the operation of the crank shaft k^4 results in the operation of both the lever n^4 and the arm d^4 by which the piston c^3 and the valve d are operated.

The outer crank disk m on the crank shaft k^4 is provided with a conical clutch member o in which is placed a spiral spring o^2, and said crank disk m is provided with a recess o^3 adapted to receive the corresponding end of the shaft k as clearly shown in Fig. 7, and mounted on said shaft is a supplemental clutch member o^4 which is movable longitudinally of said shaft.

Mounted on the shaft k adjacent to the hanger k^2 is a sleeve p to which is pivoted a lever p^2, and connected with said lever is a link p^3 which is connected with a supplemental sleeve p^4 slidably mounted on the shaft k and by means of which the clutch member o^4 may be forced in the direction of and into connection with the clutch member o, and by means of this construction the motion of the shaft k may be transmitted to the crank shaft k^4 whenever desired, the lever p^2 being forced in the direction of the arrow x for this purpose, and whenever the pressure on said lever is released the spring o^2 will operate to separate the clutch members o and o^4 and the movement of the crank shaft k^4 will be discontinued.

One wall of the furnace, preferably the back wall, is provided with a side opening r through which the burner or the condition of the furnace chamber may be examined, and by means of which, or through which the burner may be ignited, and in the top portion of said wall of the furnace is an escape flue or passage r^2 through which the products of combustion may pass.

Pivoted to the inner end of the arm g^2 which is connected with the mold jaw f^4 is a rotatable stop or regulating device s, the connection of which with said arm is made by means of a bolt or screw s^2 passing through the slot g^4 and provided with a nut

whereby the stop or regulating device s may be adjusted longitudinally of said arm if desired, and this device is intended to regulate the operation of the lever g^5 as hereinafter described.

It will be understood that the mold chamber formed by the separate parts f^6 in the mold jaws f^3 and f^4 may be of any desired shape according to the article which it is desired to cast, and the operation of our improved casting machine will be readily understood from the foregoing description when taken in connection with the accompanying drawings and the following statement thereof.

This machine is particularly designed for casting various articles from what are known as soft or comparatively soft metals which will melt quicker than steel or cast iron, and in practice the metal or metals to be melted and from which the castings are to be made are placed in the retort receptacle c and the burner is ignited. The molten metal, as will be understood, passes into the cylinder c^2 through the opening or aperture c^4 and into the pipe c^5, the valve d therein being normally closed. At this stage of the procedure the lever g^5 is operated to withdraw the bar h^3 into the position shown in Figs. 1 and 6. The lever i^2 is then moved in the direction of the arrow x^2. This operation forces the mold jaw f^4 into connection with the mold jaw f^3 as indicated in dotted lines in Fig. 1 and in solid lines in Fig. 6, and the form and construction of the arm i^3 and link i^5 is such that this operation will lock the jaws f^3 and f^4 together. The lever j^3 is then moved in the direction of the arrow x^3 and this forces the jaw f^3 with the jaw f^4 locked thereto into the position shown in dotted lines in Fig. 1, in which position the conical nozzle c^6 at the end of the pipe c^5 enters the corresponding recess c^7 in the jaw f^3 and the communication between the pipe c^5 and the mold chamber in the jaws f^3 and f^4 is established, the position of the jaws f^3 and f^4 at this time with reference to each other being clearly shown in Fig. 6. The lever p^2 is then operated to throw the clutch members o and o^4 into engagement and the crank shaft k^4 is turned. At the beginning of this movement of the crank shaft, the arm d^4 which is engaged with the large crank disk k^5 is operated to open the valve d, and at the same time the piston c^3 which is operated by or from the small crank disk m begins to move. The pressure of the piston c^3 on the molten metal in the lower end of the cylinder c^2 is not exerted until the aperture c^4 is entirely closed, and at this time the valve d has been opened and the molten metal is forced under pressure into the mold chamber f^7 in the jaws f^3 and f^4. The lever p^2 is operated until the shaft k^4 has made one complete revolution, during which the valve d has been opened, the mold chamber in the jaws f^3 and f^4 filled and the valve d reclosed and the piston c^3 raised to its highest position. The lever j^3 is then operated in the direction of the arrow x^4 to withdraw the mold jaws f^3 and f^4 while still locked together from engagement with the pipe c^5, after which the lever g^5 is thrown into the position indicated at y in Fig. 6, in which position of said lever the bar h^3 is thrown backwardly until the end thereof reaches the position shown at y^2 in said figure. This cleans off the surplus metal at the end of the casting in the mold chamber f^7, and when the metal has partially cooled the lever g^5 is forced into the position shown at y^3 in Fig. 6, and this operation forces the bar h^3 entirely through the mold jaw f^3 and cleans out the recess c^7, or forces out any metal which may have lodged in said recess.

It will be understood that the stop device s is turned into the position shown in dotted lines in Fig. 6 to limit the first movement of the lever g^5 as above described, after which said stop device is turned into the position shown in full lines in order that the lever g^5 may be moved into the second position above described, or that shown at y^3. After the operation of the lever g^5 as and for the purpose above described, the lever i^2 is moved backwardly or in the direction of the arrow x^5, and this operation results in separating the mold jaws f^3 and f^4, and the casting is dropped out and falls into the base pan e of the frame or to any suitable receptacle prepared therefor.

The object of the spring attachment by means of which the pin m^5 is connected with the crank rod m^3 as shown in Fig. 1, is to cushion the piston c^3 in its downward movement and to prevent a too great or too sudden pressure or shock being applied to the molten metal within the cylinder c^2, and the consequent injury to said cylinder and its connections which might result especially when said parts are highly heated. The link or keeper devices m^6 and k^8 which are connected with the lever n^4 and the arm d^4 respectively and by means of which said lever and arm are operated are adjustable on said lever and arm, and by means of this construction the interval of time between the operation of said arm and said lever may be regulated.

It will be seen that the lower end of the cylinder c^2 and the pipe or passage way c^5 are directly over the burner or in the bottom part of the furnace chamber, and by means of this construction or location of said parts, the molten metal in the said cylinder and in the said pipe is highly heated and maintained in a liquid condition so that it flows more freely than would otherwise be possible, and this facilitates the operation of the apparatus as hereinbefore described

and also enables the apparatus to work with a less degree of heat or less consumption of fuel than would otherwise be possible.

The mold jaws f^3 and f^4 as shown in Figs. 1, 3, 4 and 5 and the means by which they are operated form no part of the invention described and claimed herein, but are made the subject of another application for Letters Patent of the United States filed by us ne 5, 1909, Serial No. 500,336.

The reason for forming the valve d with a transverse port or passage in one side thereof only, is to provide means whereby said valve will clean itself every time that it is turned back to close the tube or tubular passage which communicates with the bottom of the cylinder, this operation being accomplished by reason of the fact that the molten material between the valve and the cylinder in the reduced passage way or tube c^5 is highly heated at all times when the apparatus is in operation.

The burner b and the clutch device by which the crank shaft k^4 is operated form, in themselves, no part of this invention, and any suitable burner may be employed and any preferred means for operating the crank shaft, and various changes in and modifications of the other parts of our improved casting machine, as herein shown and described, may be made, within the scope of the appended claims without departing from the spirit of our invention or sacrificing its advantages.

Having fully described our invention, what we claim as new and desire to secure by Letters Patent, is:—

1. In a casting machine, a furnace provided with a retort receptacle, a vertically arranged cylinder communicating with said retort receptacle and terminating below the same in a contracted tube or passage way which extends through one side of the furnace, said retort receptacle and said cylinder being adapted to receive molten metal, a piston adapted to operate in said cylinder to exert pressure on the molten metal in said cylinder, a valve adapted to control said tube or passage way, a single hand operated means adapted to operate said valve and said piston, and adjustable devices whereby the time interval between the operations of said valve and said piston may be regulated.

2. In a casting machine, a furnace provided with a retort receptacle in the top portion thereof, means for heating the same, a vertically arranged cylinder passing through the bottom of the retort receptacle and provided at its lower end with a tubular extension or passage way which extends out through one side of said furnace, and a valve for controlling said tubular extension or passage way, said valve being provided with a port or passage in one side thereof only.

3. In a casting machine, a furnace provided with a retort receptacle in the top portion thereof, means for heating the same, a vertically arranged cylinder passing through the bottom of the retort receptacle and adapted to receive molten metal therefrom and provided at its lower end with a laterally directed extension which passes through one side wall of the furnace and is provided with a conical valve seat, a conical valve for controlling said extension and provided with a transverse port or passage in one side thereof, means for holding said valve normally seated, and means for operating said valve.

In testimony that we claim the foregoing as our invention we have signed our names in presence of the subscribing witnesses this 17th day of April 1909.

JOSEPH SOSS.
ADOLPH W. CHRISTIANSON.

Witnesses:
C. E. MULREANY,
H. R. CANFIELD.