J. SOSS & A. W. CHRISTIANSON.

CASTING MACHINE.

APPLICATION FILED JUNE 5, 1909.

936,378.

Patented Oct. 12, 1909.

2 SHEETS—SHEET 1.

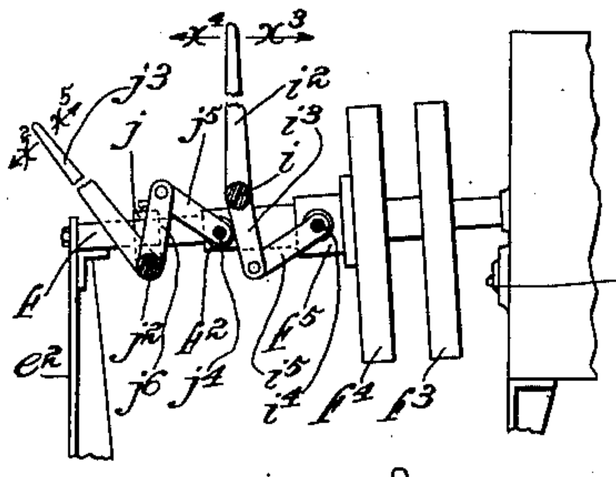
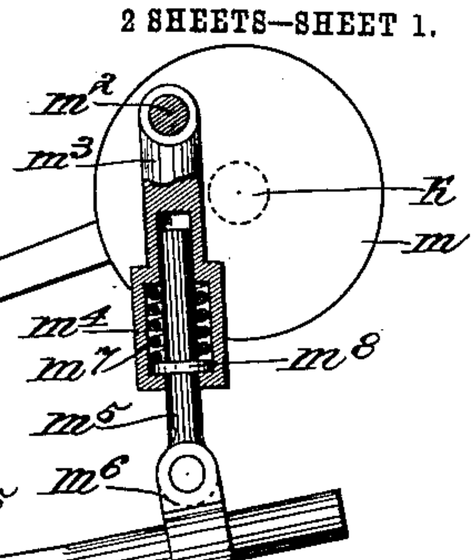


Fig. 8



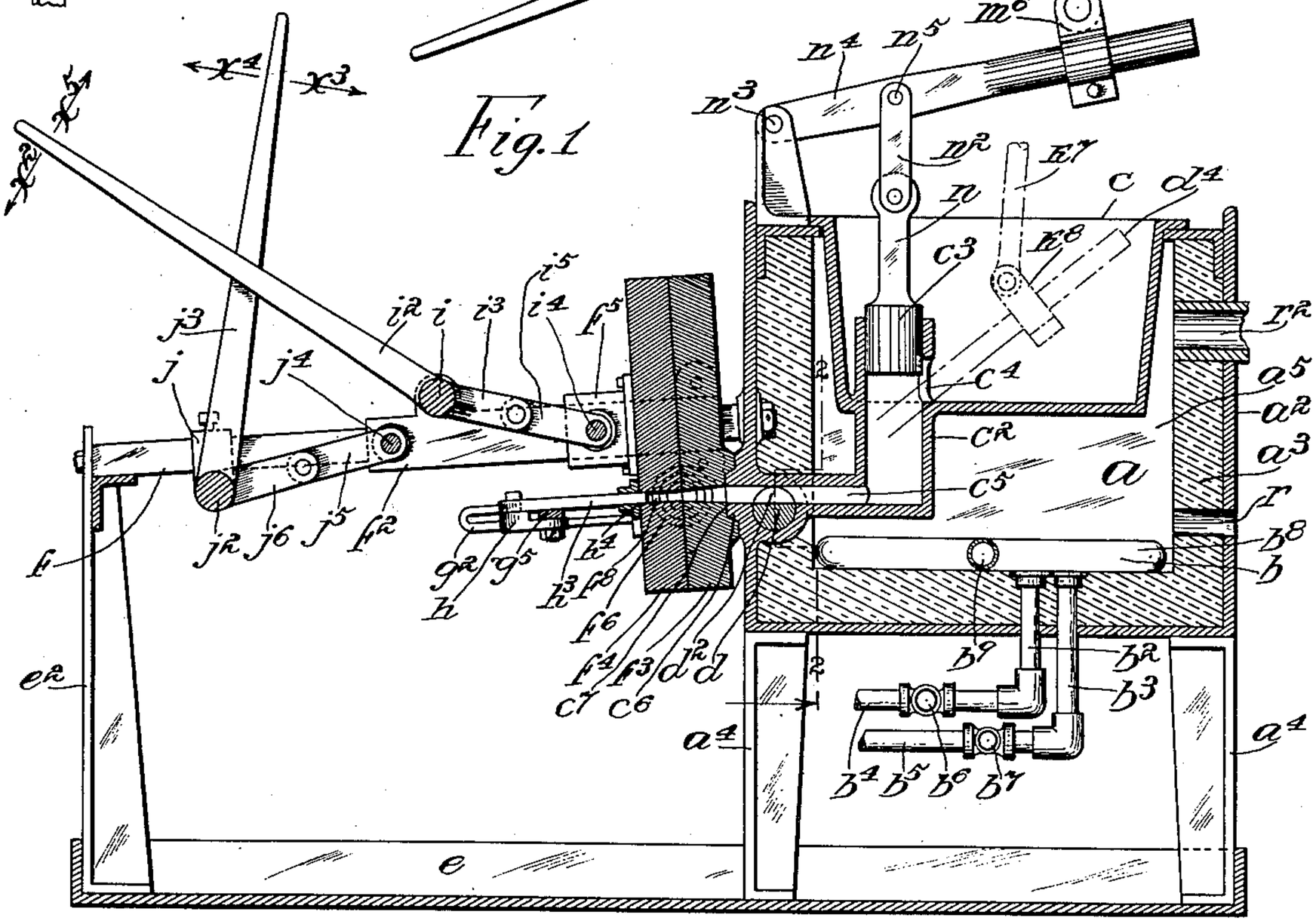


Fig. 1

Fig. 2

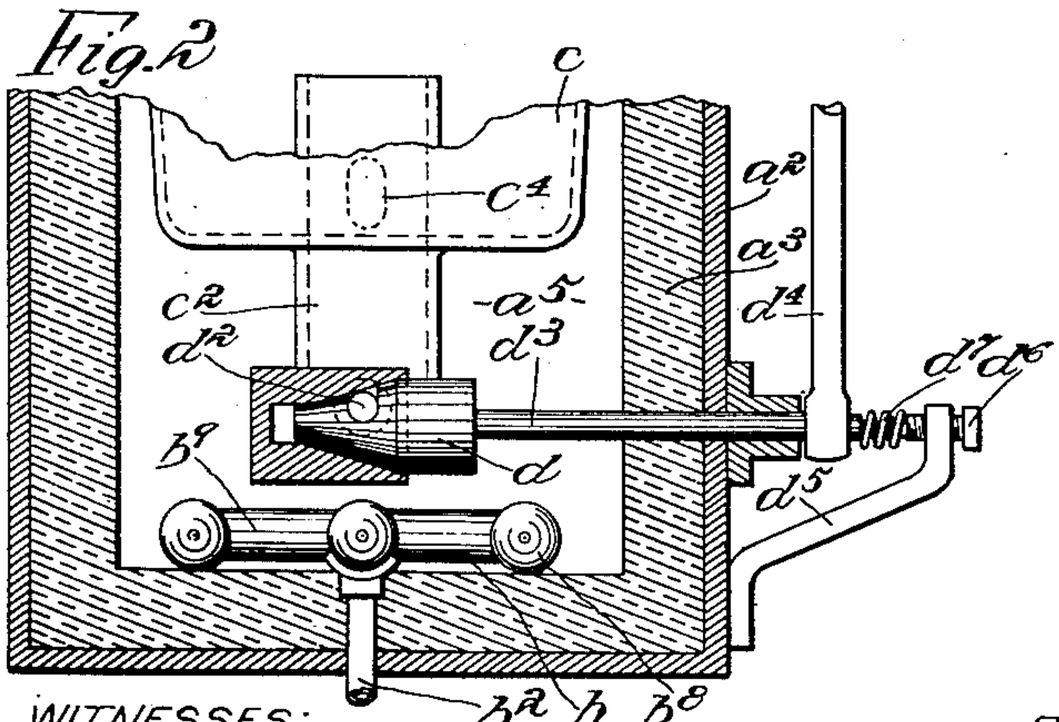
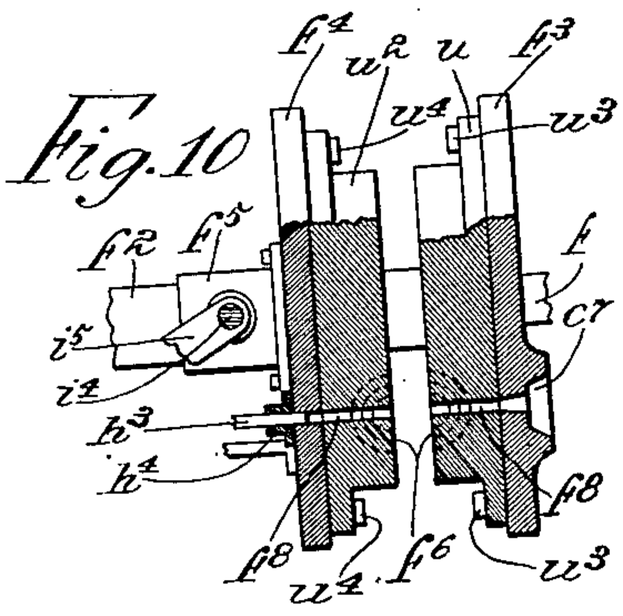


Fig. 10



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2 SHEETS—SHEET 2.

Fig. 3

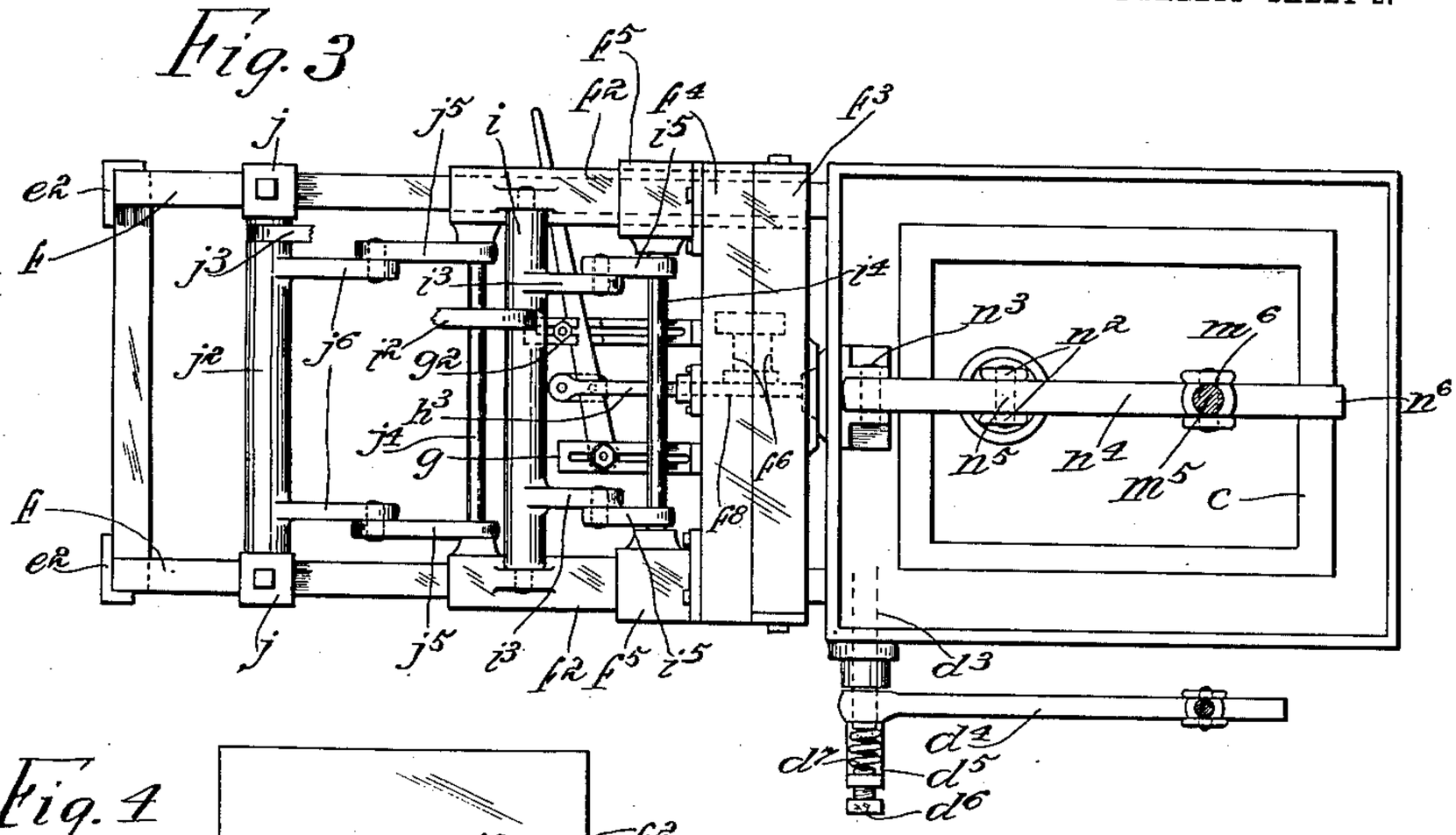


Fig. 4

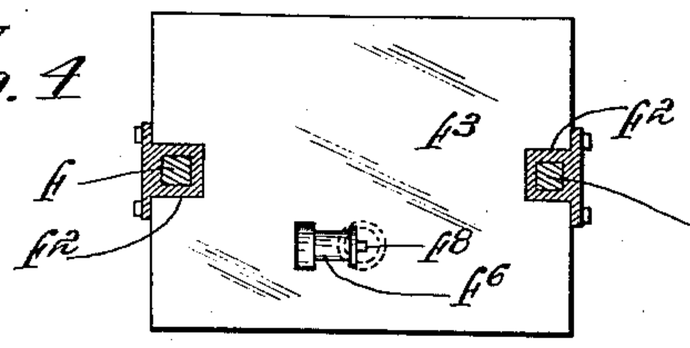


Fig. 9

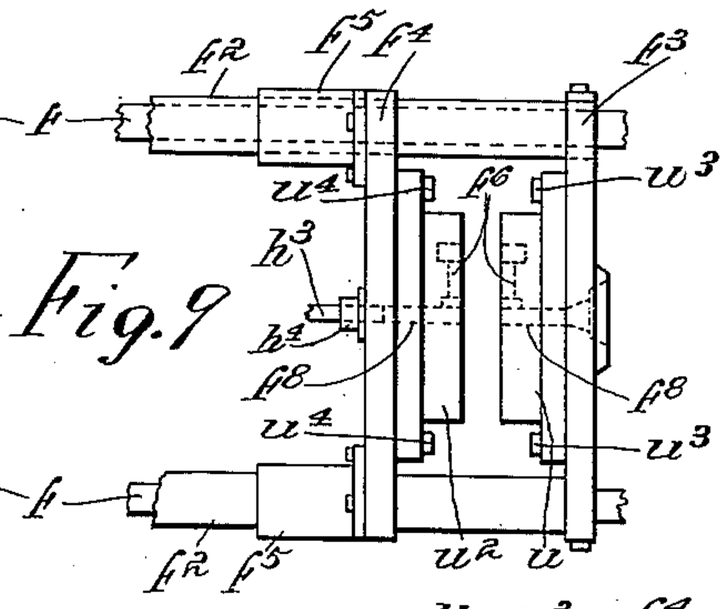


Fig. 5

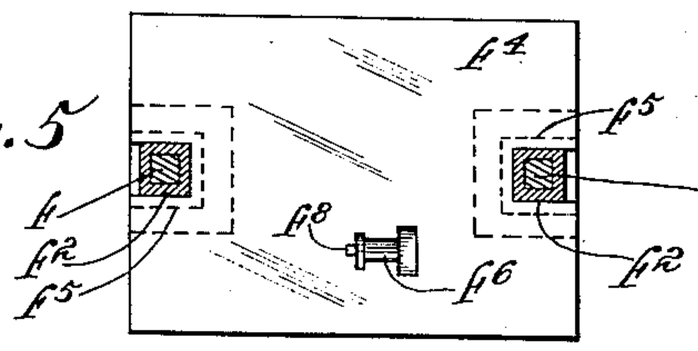


Fig. 7

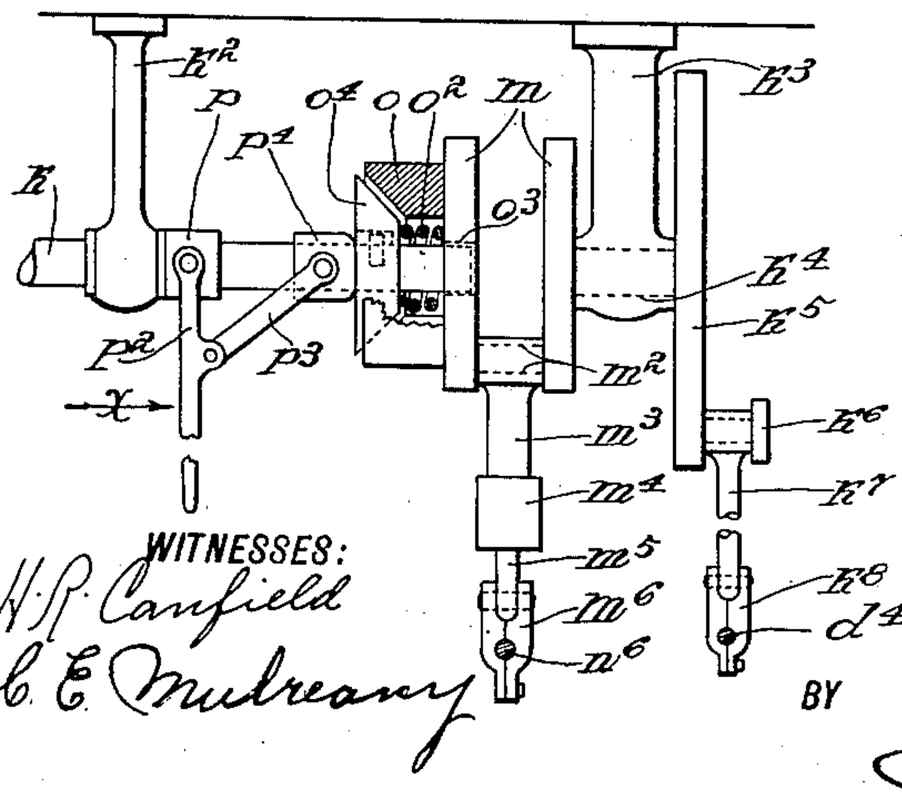
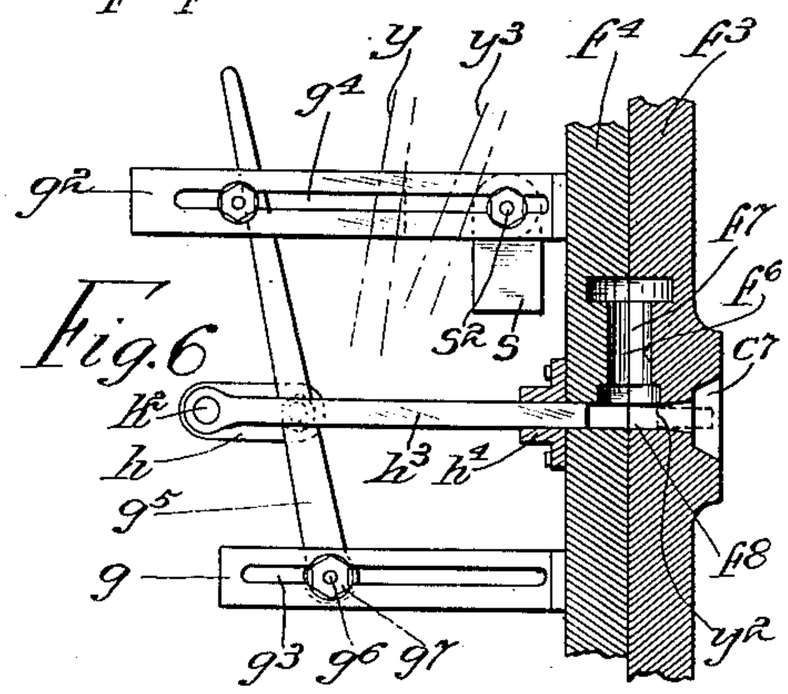


Fig. 6



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UNITED STATES PATENT OFFICE.

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

CASTING-MACHINE.

936,378. Specification of Letters Patent. Patented Oct. 12, 1909.

Application filed June 5, 1909. Serial No. 500,336.

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, Fig. 7 a sectional detail showing a part of the driving mechanism of the machine, part of which is also shown in Fig. 1, Fig. 8 a side view of a part of the construction shown in Fig. 1 and showing the parts in a different position, Fig. 9 a plan view of a part of the construction as shown in Fig. 3 and showing the parts in a different position and also showing a modification, and,—Fig. 10 a sectional side view of the construction shown in Fig. 9.

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 portions 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 i^3 the mold jaws f^3 and f^4 may be thrown into the position shown in Figs. 1 and 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 pivoted 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 shown in Figs. 1 and 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 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 Figs. 1 and 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 into 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.

In Figs. 9 and 10 we have shown a modification in which the jaw members f^3 and f^4 of the mold device are provided respectively with supplemental jaw members u and u^2, which are detachably connected therewith by means of screws, bolts or other devices u^3 and u^4, and when these supplemental jaw members are employed the mold recesses f^6 composing the mold chamber f^7 are formed therein, and the transverse passage ways f^8 extend therethrough, and the bar h^5 is movable therethrough and the reason for providing the supplemental jaw members u and u^2 is to provide means whereby different forms and sizes of molds may be employed whenever desired by simply substituting one set of the supplemental jaws u and u^2 for another. The operation with this form of construction will be exactly the same as with that shown in Figs. 1 to 8 inclusive. 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 way c^5, this operation being accomplished by reason of the fact that the molten material between the valve and the cylinder c^2 in the reduced passage way or tube c^5 is highly heated at all times when the apparatus is in operation.

The furnace, or the details of the construction thereof, and the means for operating the piston c^3 and the valve d and the burner b form no part of the invention described and claimed herein, but are made the subject of a prior application filed by us April 19, 1909, Ser. No. 490,716.

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, a retort receptacle mounted therein and provided with a discharge through one side of the furnace, parallel supports mounted outside of the furnace and on the opposite sides of said discharge, a sleeve mounted on said supports, a mold jaw connected with said sleeves, supplemental sleeves mounted on the first named sleeves, a mold connected with said supplemental sleeves, and means for moving said sleeves together or separately toward and from the discharge of the furnace.

2. In a casting machine, a furnace, a retort receptacle mounted therein and provided with a discharge through one side of the furnace, parallel supports mounted outside of the furnace and on the opposite sides of said discharge, a sleeve mounted on said supports, a mold jaw connected with said sleeves, supplemental sleeves mounted on the first named sleeves, a mold connected with said supplemental sleeves, and means for moving said sleeves together or separately toward and from the discharge of the furnace, said mold jaws being provided with supplemental detachable mold jaws.

3. In a casting machine, a furnace, a retort receptacle mounted therein and provided with a discharge through one side of the furnace, paralle supports mounted outside of the furnace and on the opposite sides of said discharge, a sleeve mounted on said supports, a mold jaw connected with said sleeves, supplemental sleeves mounted on the first named sleeves, a mold connected with said supplemental sleeves, and means for moving said sleeves together or separately toward and from the discharge of the furnace, said mold jaws being provided with supplemental detachable mold jaws, in which a mold chamber is formed, and said mold jaws and supplemental jaws being provided with a transverse passage adapted to communicate with the mold chamber and with said discharge, and a bar movable through said passage in the direction of said discharge.

4. In a casting machine, a furnace provided with a retort receptacle having a discharge through one side of the furnace, parallel supports mounted outside of the furnace and on the opposite sides of said discharge, mold jaws mounted on said supports and movable toward and from the furnace and toward and from each other, one of said jaws being connected with a main set of sleeves mounted on said supports, and the other with supplemental sleeves mounted on the main sleeves, a lever connected with said supports and in operative connection with the main set of sleeves, another lever connected with the main set of sleeves and in operative connection with the supplemental set of sleeves said jaws being provided with a mold chamber adapted to communicate with said discharge and with a transverse passage way adapted to communicate with said mold chamber and with said discharge, and a bar movable through said passage way in the direction of said discharge.

5. In a casting machine, a furnace provided with a retort receptacle having a lateral discharge through one side of the furnace, supports mounted outside of the furnace, mold jaws mounted on said supports and movable toward and from the discharge of the furnace, said mold jaws being provided with mold chambers, and supplemental

mold jaws detachably connected with the first named mold jaws and provided with mold chambers, and means for connecting the main mold jaws and for moving the same toward and from the discharge of the furnace.

In testimony that we claim the foregoing as our invention we have signed our names in presence of the subscribing witnesses this 4th day of June 1909.

JOSEPH SOSS.
ADOLPH W. CHRISTIANSON.

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