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2,134,827

STEREOTYPE PLATE CASTING MOLD

Filed July 10, 1935

2 Sheets-Sheet 1

Fig. 1.

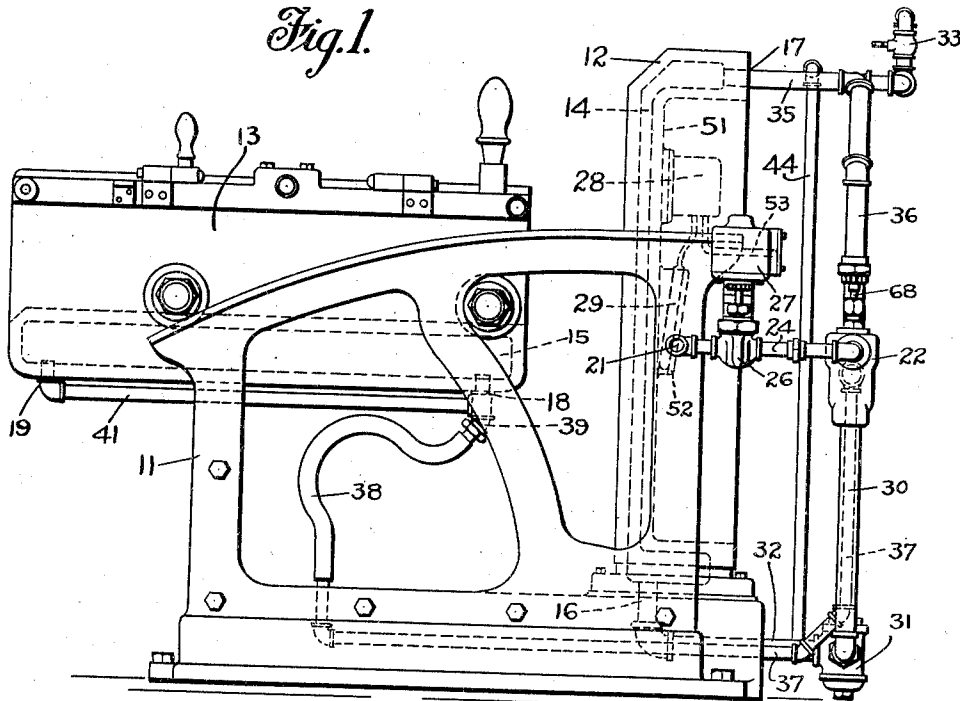
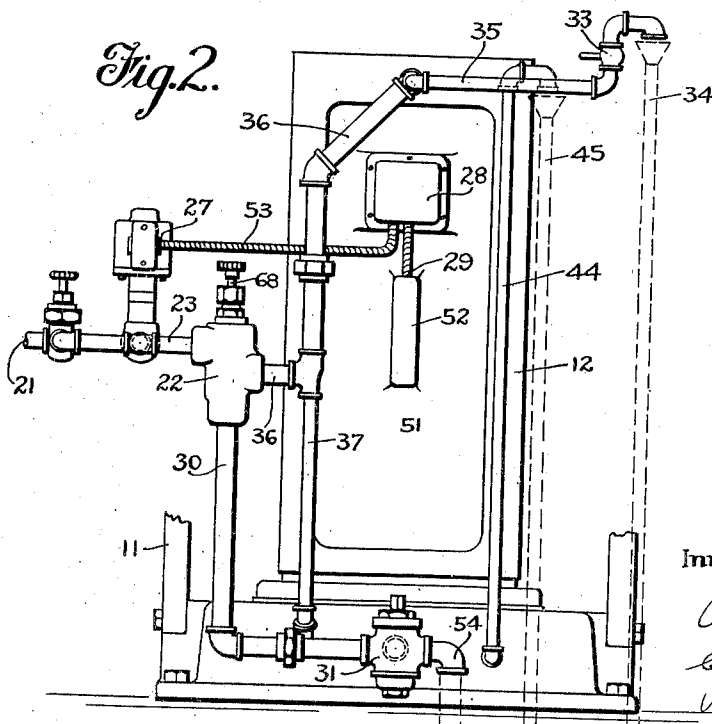


Fig. 2.



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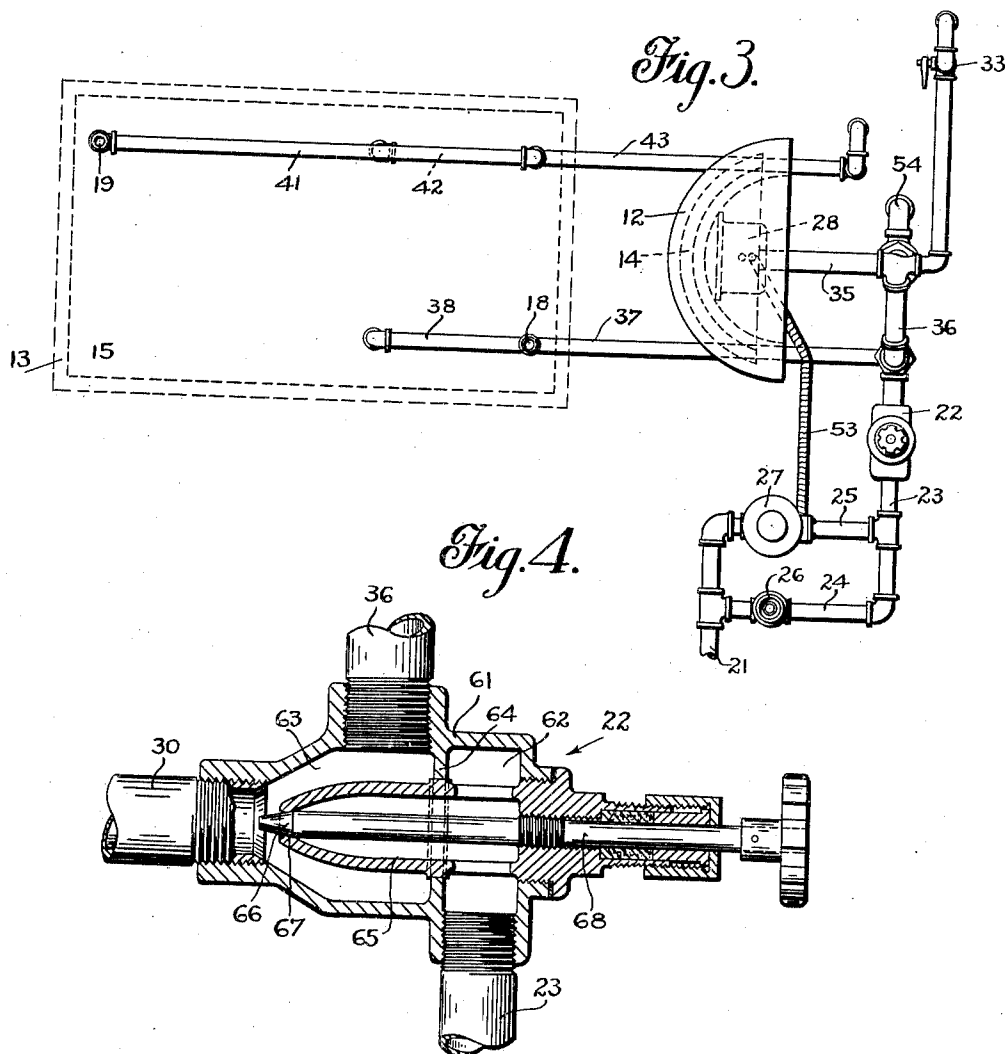
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STEREOTYPE PLATE CASTING MOLD

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11 Claims. (Cl. 22—4)

This invention relates to improvements in cooling means for casting molds and more especially to automatic cooling means for stereotype casting molds. This invention contemplates the automatic maintenance of a stereotype casting mold within a predetermined range of temperature whereby the casting of stereotype plates from matrices may be expeditiously and efficiently accomplished.

One of the principal objects of this invention is to provide cooling means for a casting mold whereby the mold will be maintained at substantially a uniform predetermined temperature.

Another object is to provide cooling means for cooling both parts of a stereotype casting mold simultaneously and to automatically maintain a substantially uniform temperature in each part.

Still another object is to provide means to control automatically operating cooling means for stereotype casting molds whereby various predetermined temperatures may be provided and maintained.

A further object is to provide means to increase or decrease the temperature difference between the parts of the mold and to automatically maintain the difference selected, substantially uniformly.

A still further object is to provide in mold cooling means an improved fluid mixing valve whereby heated and cooled fluid may be efficiently and controllably mixed to obtain the desired cooling effect of the fluid on the mold.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts, and in the details of construction hereinafter described and claimed, it being understood that various changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

The preferred embodiment of the invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a side elevation of a stereotype casting mold for casting curved plates with cooling means embodying the features of this invention operatively applied thereto, unimportant structural details of the mold being omitted for the sake of clearness;

Figure 2 is an end view of the mold cooling means shown in Figure 1, with certain associated parts of the mold being shown to illustrate the

disposition of the cooling means relatively thereto;

Figure 3 is a top view of the mold cooling means of this invention, certain mold parts being shown to illustrate the application of the cooling means thereto; and

Figure 4 is a longitudinal section through the fluid mixing valve used as part of the cooling means in the particular embodiment shown in Figure 1.

The stereotype casting mold selected to illustrate the application of the mold cooling means of this invention generally comprises a supporting frame 11 upon which is mounted a stationary core or cover 12 and a movable matrix holding part 13. The detail structure of the type of mold shown is well known and it is understood that the movable part 13 may be moved into cooperating position with the stationary part 12 whereby stereotype metal may be poured into the space therebetween to form a casting from a stereotype matrix held in part 13. In this instance both mold parts 12 and 13 are provided with cored out interiors 14 and 15 respectively to provide cooling fluid containing spaces between their respective walls. The space 14 extends across the top and bottom surface, and about the curved face of the stationary part 12 and the space 15 extends about the curved surface of part 13, so that all portions of each part will be effectively acted upon by cooling fluid disposed in and circulated through these spaces.

Each of the mold parts 12 and 13 is provided with a fluid inlet and outlet connecting with the respective cored out space in each. The inlet 16 and outlet 17 for part 12 are at the bottom and top respectively thereof and the inlet 18 and outlet 19 for part 13 are adjacent the ends thereof respectively, that, when part 13 is swung into cooperating position with part 12, become the bottom and top portion respectively of part 13.

The cooling means of this invention comprises a novel arrangement and combination of fluid conducting members, in this instance pipes, with fluid flow control and mixing means. In the combination illustrated, fluid from a source of supply enters the cooling means at 21 and may flow into a mixing valve 22 through a conductor 23, by either of two paths 24 and 25, the first being manually controlled by a by-pass valve 26 and the other being automatically controlled by a solenoid valve 27, electrically operated by a thermostatic control 28 having a thermostat element 29. After passing through valve 22 the fluid may flow through a fluid conduit 30 to a three-way

cock 31 and into the bottom of the cored out space 14 of the mold part 12 through a fluid conduit 32 and inlet 16. The fluid may then flow out of the space 14 through outlet 17 and the surplus may drain out through a shut off cock 33, into a waste conduit 34 through a conduit 35, while the balance flows from outlet 17 into mixing valve 22 through a conduit 36.

A fluid conductor 37 formed in this instance as a continuation of conduit 36 directs the flow of fluid beneath the frame 11 and to a flexible conduit 38 whereby the fluid is directed into a conduit 39 connected with the inlet 18 of part 13. After passing through the cored out space 15 of part 13 the fluid may pass out through outlet 19 into a conduit 41 and then through a flexible conduit 42 to conduit 43, also disposed beneath frame 11. A conduit 44 receives the fluid from conduit 43 and directs it to a waste drain 45.

The thermostatic control 28 is shown mounted upon the rear wall 51 of the stationary mold part 12 and its controlling thermostatic element 29 is disposed in a pocket 52 formed in wall 51. The control 28 is electrically connected to the solenoid valve 27 by a cable 53, whereby the latter may be energized, to open the valve and permit fluid to pass, by the operation of the control 28 under the influence of the element 29 which is acted upon by the heat of the mold part 12. Should it be desired to discontinue the use of this automatically controlled fluid feeding means for any reason, fluid flow may be controlled by means of the manually operable valve 25.

The three way cock 31 is provided with a waste drain connection 54 whereby the entire system may be drained of fluid and flushed out to clean the passages thereof. The fluid shut off cock 33 is provided for the purpose of permitting a flow of fluid from conduit 36 when the system is originally filled with fluid to insure proper filling thereof and the elimination of all air therefrom. It is also for use as an extra drain, when desired, and should occasion develop whereby only the stationary mold part 12 is to be cooled, as the drain for this section of the system. In the latter instance, where only the stationary mold part 12 is cooled, the fluid conduits 37, 38, 39, 41, 42, 43, 44 and waste drain 45 are omitted and cock 33 is left set in open position. When the system is arranged to cool both mold parts 12 and 13, the cock 33 is maintained in closed position.

The mixing valve 22 comprises a casing 61 having chambers 62 and 63 formed therein and separated by a dividing wall 64. Cooling fluid under pressure from the supply enters chamber 62 through conduit 23 and flows into a hollow nozzle 65 which passes through wall 64 and has an open end 66 disposed in said chamber 63. A needle valve 67 is provided on an end of a stem 68 and disposed through nozzle 65 to cooperate with the opening in end 66 to control the rate of flow and volume of cooling fluid therethrough and into chamber 63. The chamber 63 is in connection, by means of conduit 36 with outlet 17 at the upper end of mold part 12 and by means of conduit 30 with the three way cock 31, and by conduit 32 with the inlet 16 of mold part 13. The injection action of the mixing valve, by opening needle valve 67, causes cool fluid to flow from chamber 62 to chamber 63 wherein it mixes with heated fluid from the top of mold part 12, and then causes the mixture to flow into the bottom of mold part 12 at a controlled rate of flow through conduit 32 wherein it acts to cool the mold to the predetermined temperature.

Under control of the thermostatic control and the needle valve the amount of cool fluid mixed with heated fluid is regulated to automatically maintain the required temperature of the mold parts. The solenoid valve 27 is operated to open and permit flow of cool fluid into mixing valve 22 whenever the temperature in the mold part 12 reaches the maximum setting of the control 28 and to shut and stop such flow as soon as the temperature has reached the minimum permitted by the setting. When the mold is in operation, the valve 27 is substantially continuously open, as it opens as soon as the mold becomes sufficiently heated and closes only when the mold becomes too cool, thereby insuring a constant flow of the fluid mixture through the mold parts.

The temperature maintained in the mold part 12 is predetermined to suit conditions, and that in the mold part 13 is preferably somewhat higher. The difference in temperature between the mold parts 12 and 13 may be varied by opening cock 33 to permit fluid to pass out of the system before it is mixed with cool fluid or flows through conduit 37 to mold part 13.

By provision of the above described novel combination of features and the arrangement of the several parts, cooling means for stereotype casting molds is formed which insures the production of a better quality of plates, is particularly efficient in cooling action upon the mold parts, automatic in operation, readily controlled and comparatively inexpensive to construct and operate.

It will be understood that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and it is therefore desired that the present embodiment be considered in all respects as illustrative and not restrictive, reference being had to the claims rather than to the foregoing description to indicate the scope of the invention.

What I claim is:

1. In cooling means for a casting mold having a plurality of cooperating parts, each part being adapted to receive fluid therein, means to mix incoming cool fluid with a portion of heated fluid from one of the mold parts and to direct the mixture back to said part, and means to conduct the remainder of the heated fluid from said part to another of the mold parts.

2. In cooling means for a casting mold having a plurality of cooperating parts, each part being adapted to receive fluid therein, thermostatically controlled means to mix incoming cool fluid with a portion of heated fluid from one of the mold parts, means to conduct the mixture back to the mold part from which the heated fluid was received, and means to conduct the remainder of the heated fluid to another mold part, to maintain a higher temperature in one mold part than in the other.

3. In a cooling means for a casting mold having a plurality of cooperating parts, each part being adapted to receive fluid therein, means to receive and to mix incoming cool fluid with heated fluid from a first one of said mold parts and to direct the mixture back to said part, a first conduit connecting said first mold part with said mixing means, a second conduit of smaller cross-sectional area receiving heated fluid from the first mold part and to direct it into the other mold part, and thermostatic means to vary the amount of the cool fluid received by said mixing means to be mixed with the heated fluid.

4. In cooling means for a casting mold having

a plurality of cooperating parts, each part being adapted to receive fluid therein, means to mix incoming cool fluid with heated fluid from a first one of said mold parts and to direct the mixture back to said part, a first conduit connecting said first mold part with said mixing means, a second conduit of smaller cross-sectional area receiving heated fluid from the first mold part and to direct it into the other mold part, and means to vary the amount of heated fluid received by said first conduit.

5. In cooling means for a casting mold having a plurality of cooperating parts, each part being adapted to receive fluid therein, means to mix incoming cool fluid with heated fluid from a first one of said mold parts and to direct the mixture back to said part, a first conduit connecting said first mold part with said mixing means, a valved conduit leading from the first mold to a waste drain to vary the amount of heated fluid received by said first conduit, a second conduit of smaller cross-sectional area receiving heated fluid from the first mold part and to direct it into the other mold part, a conduit leading from the second mold part to a waste drain and means controlled by the temperature of one of said mold parts to vary the temperature of the fluid mixture.

6. In a cooling system for a casting mold, cooperating first and second parts each having a fluid receiving space and an inlet and outlet for said space, a fluid mixing device having separated chambers, one of said chambers having an inlet for cool fluid under pressure and the other having an inlet adapted to be connected with the first mold part outlet and an outlet adapted to be connected with said first mold part inlet, a passageway between said chambers, a valve in the passageway operable to vary the amount of cool fluid passing therethrough, means adapted to connect the inlet of the second mold part with the outlet of said first mold part to receive heated fluid therefrom, and means to connect the outlet of the second mold part with a waste drain.

7. In a cooling system for a casting mold having cooperating parts, each mold part being adapted to receive fluid from a first one of the mold parts, a fluid mixing valve connected to a supply of fluid and to the first mold part, means to direct the fluid mixture from the valve back to the first mold part, means to conduct a portion of the heated fluid from the first mold part to a second one of the mold parts, and means to connect the second one of said mold parts to a waste drain.

8. In a cooling system for a casting mold having cooperating parts, each part having a fluid receiving opening therein, a fluid mixing valve, a first fluid conduit connected to and extending from the first of the mold parts to said valve, a second fluid conduit connected to and extending from the first fluid conduit to a second of the mold parts, a third fluid conduit connected to and extending from the mixing valve to the first mold part, and a fluid conduit connected to and extending from both of the mold parts to a waste drain.

9. In a cooling system for a casting mold hav-

ing cooperating parts, each part having a fluid receiving opening therein, a fluid mixing valve, a first fluid conduit leading from one end of a first of the mold parts to an inlet port provided in said valve, a second fluid conduit leading from an outlet port provided in said valve to the other end of the first mold part, a third fluid conduit leading as an extension thereof from the first conduit to an end of a second mold part, and a fourth fluid conduit leading from one end of the second of the mold parts to a waste drain.

10. A mold for casting stereotype printing plates including a chamber for mold-cooling liquid, a mixing valve having a casing, an injector nozzle within the casing and having a discharge terminal, a supply conduit communicating with a source of cool supply liquid under pressure and the nozzle to supply cool liquid under pressure into the nozzle, an injector chamber within the casing and communicating with the discharge terminal of the nozzle, circulating conduits communicating with the said mold-cooling chamber and the injector chamber to form therewith a closed liquid circulating system whereby the discharge of cool supply liquid under pressure from the discharge terminal of the nozzle through the injector chamber creates a partial vacuum in the injector chamber to draw therein the warm liquid from the mold-cooling chamber and the force of the cool supply liquid in discharging under pressure from the discharge terminal of the injector nozzle circulates the mixed cool and warm liquids through the said entire closed circulating system to cool the mold, and means interposed between the mold and the said injector chamber for discharging surplus warm liquid from the circulating system.

11. A mold for casting stereotype printing plates including a chamber for mold-cooling liquid, a mixing valve having a casing, an injector nozzle within the casing and having a discharge terminal, a supply conduit communicating with a source of cool supply liquid under pressure and the nozzle to supply cool liquid under pressure into the nozzle, a thermostatically-controlled valve interposed in the said supply conduit for controlling the supply of liquid through the supply conduit, said valve being controlled by the temperature of the mold, an injector chamber communicating with the discharge terminal of the nozzle, circulating conduits communicating with the said mold-cooling chamber and the injector chamber to form therewith a closed liquid circulating system whereby the discharge of cool supply liquid under pressure from the discharge terminal of the nozzle through the injector chamber creates a partial vacuum in the injector chamber to draw therein warm liquid from the mold-cooling chamber and the force of the cool supply liquid in discharging under pressure from the discharge terminal of the nozzle circulates the mixed cool and warm liquids through the closed circulating system to cool the mold, and means interposed between the said mold chamber and injector chamber for discharging surplus warm liquid from the circulating system.

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