

Sept. 12, 1950

C. R. SHOOK ET AL
LIQUID COOLED NONFERROUS PERMANENT
MOLD CASTING UNIT

2,521,753

Filed April 16, 1948

4 Sheets-Sheet 1

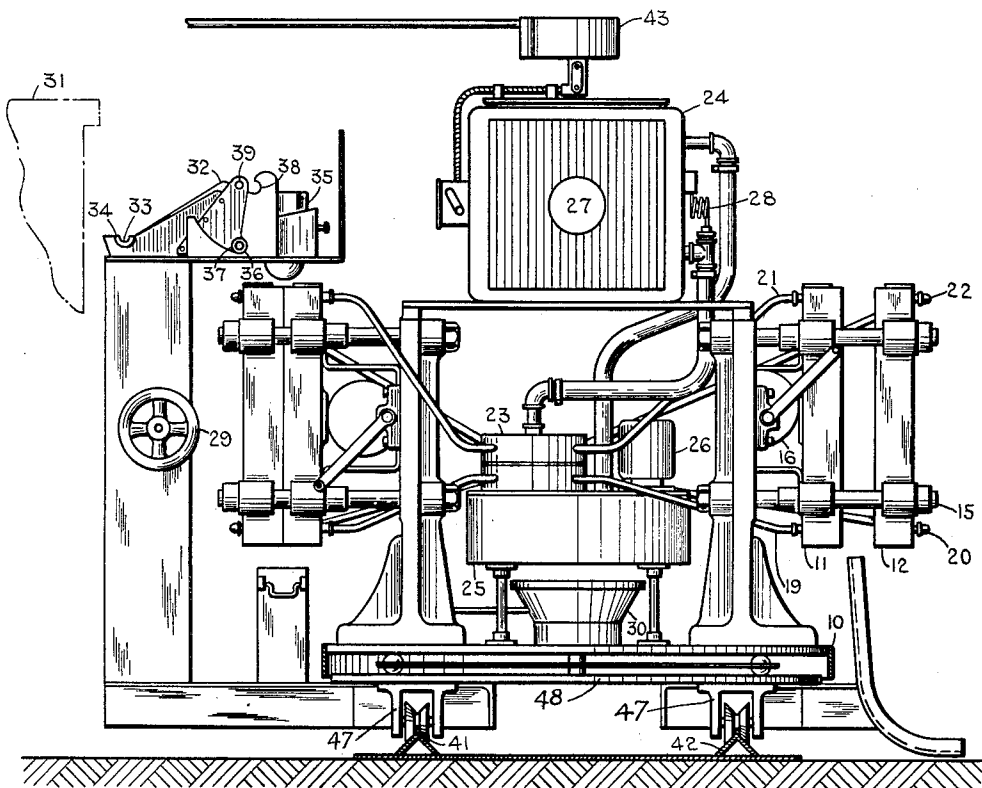


Fig. 1

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4 Sheets-Sheet 2

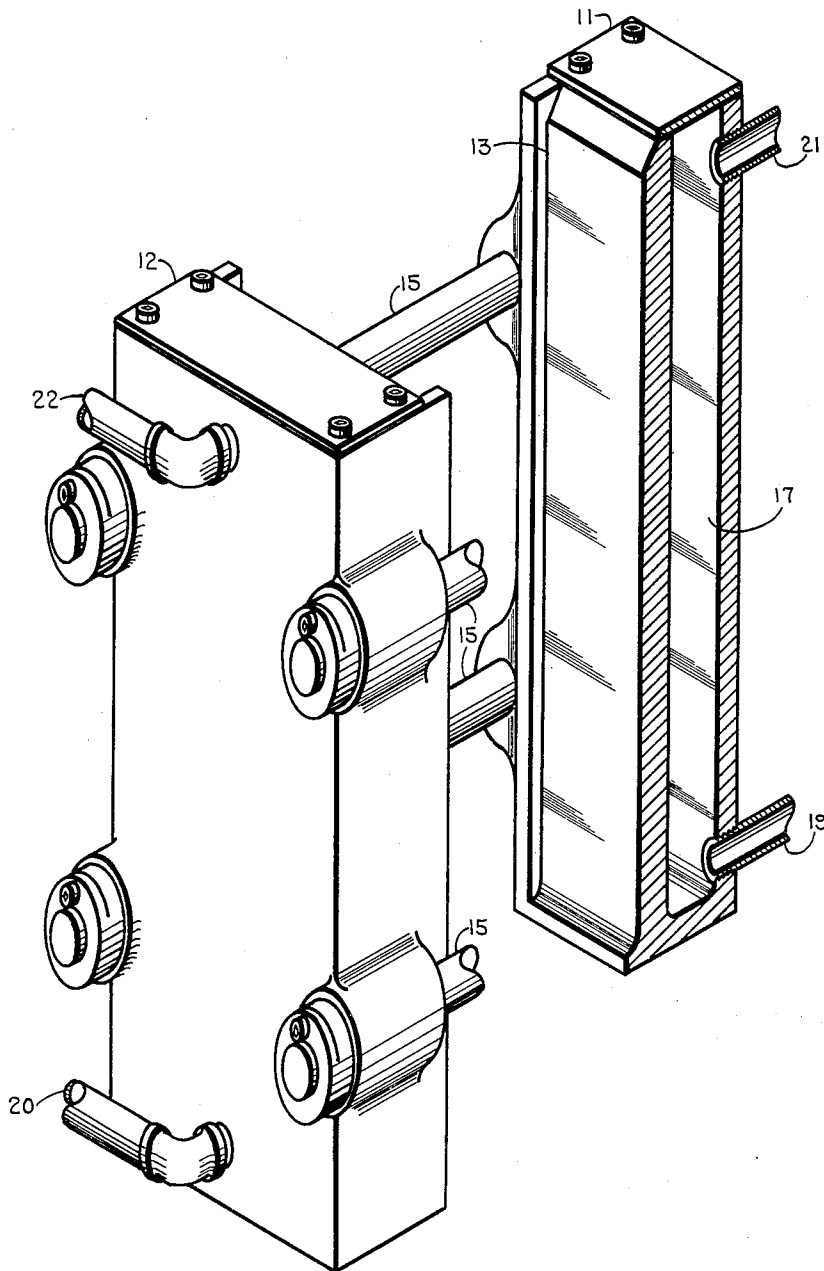


Fig. 2

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4 Sheets-Sheet 3

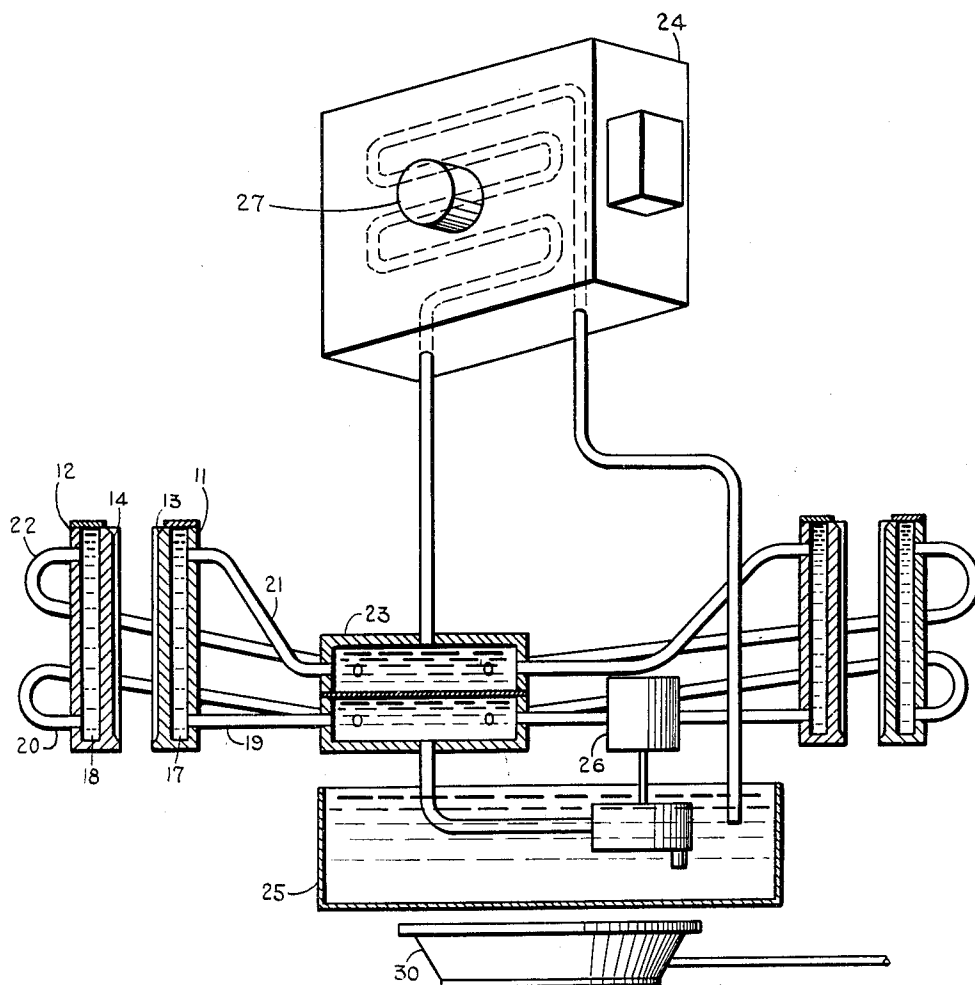


Fig. 3

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4 Sheets-Sheet 4

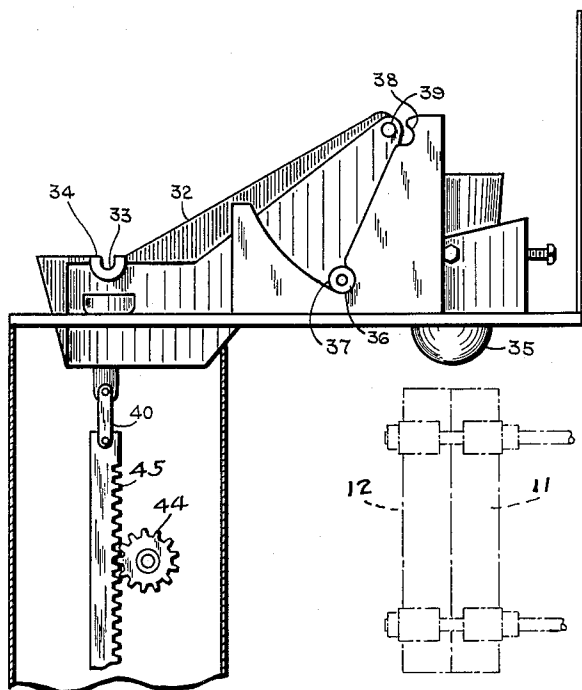


Fig. 4

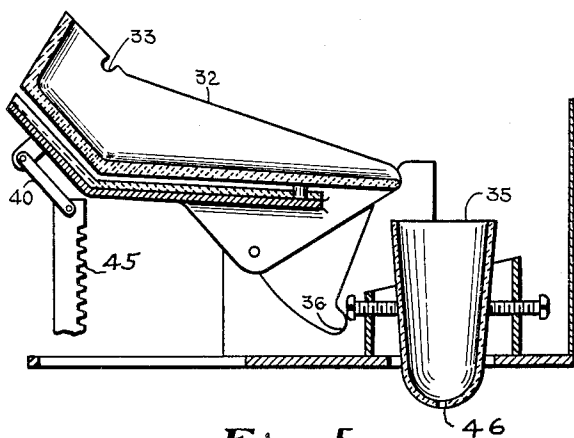


Fig. 5

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UNITED STATES PATENT OFFICE

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LIQUID COOLED NONFERROUS PERMANENT
MOLD CASTING UNITClarence R. Shook, Glenside, and Philip B.
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Application April 16, 1948, Serial No. 21,543

1 Claim. (Cl. 22-77)

(Granted under the act of March 3, 1883, as
amended April 30, 1928; 370 O. G. 757)

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The invention described herein may be manufactured and used by or for the Government of the United States for governmental purposes without the payment to us of any royalty thereon in accordance with the provisions of the act of April 30, 1928 (ch. 460, 45 Stat. L. 467).

Our invention relates to a method and apparatus for casting by means of which truly uniform cast ingots or the like may be automatically and continuously produced with controlled ductility and grain size together with avoidance of segregation, flaws and internal strains, which is particularly adapted for the continuous casting of high melting point metals and alloys.

In the accompanying drawings which are illustrative of a preferred form of our invention:

Figure 1 is an elevation of our apparatus.

Figure 2 is a perspective view of one of our two part metal molds in ingot discharging position, with the movable part shown in vertical cross section to show the construction.

Figure 3 is a diagrammatic representation of the cooling system.

Figure 4 is a side elevation of means for filling one of our molds with molten metal, a mold being indicated by dotted lines.

Figure 5 is a cross section of Figure 4, with our volume control unit in discharging position.

In these drawings:

A turntable 10 supports our apparatus which includes a plurality of identical molds each formed of a relatively reciprocable section 11 and a relatively stationary section 12; each section is provided with substantially identical casting cavities 13 and 14, and the two sections are held in exact alignment by four parallel supporting rods 15 on which the section 11 is reciprocated from closed to open position by a revolvable cam 16. The mold sections 11 and 12 are cored to provide a coolant receiving chamber 17, 18 through which flows temperature regulated coolant from inlet pipes 19 and 20; and outlet pipes 21 and 22 to a spider 23 to a cooling heat exchanger 24, thence to a storage tank 25 from which it is withdrawn by a circulating pump 26. An electrically driven fan 27 directs cooling air against the heat exchanger 24. A thermostat 28 controls the motor of the fan 27. Coolant in the tank 25 is initially brought to a predetermined operating temperature by a suitable heater 30, which may be a gas burner.

Each mold in succession is rotated with the turntable 10 to the casting position where a tilting furnace 31 (Figure 1) pours molten metal into a volume control unit 32 having substan-

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tially the same capacity as that of the mold. The capacity of the volume control unit 32 is regulated by adjusting the depth of a channel 33 in a boss 34 (Figure 4) on a side of this unit. Any excess metal is discharged through this channel into a suitable spill box provided for that purpose. The volume control unit 32 is supported on two trunnions 37 and 39 which seat consecutively into open bearings 36 and 38. As the rack 45 is raised by the pinion 44, the volume control unit 32 is tilted on trunnion 37, until trunnion 39 engages in bearing 38. This movement draws the volume control unit 32 away from the furnace 31, and thereby clears a pouring lip of the furnace 31 as the volume control unit 32 is further tilted. When the trunnion 39 engages in bearing 38, the weight of the volume control unit 32 is transferred from the trunnion 37 to trunnion 39. A floating link 40 accommodates the dual rotation and change of centers as the volume control unit 32 axis of rotation is changed. The volume control unit 32 is filled to capacity from the furnace 31 and is then tilted by suitable means, such as a hand wheel 29, which rotates a pinion 44 in mesh with a rack 45, to pour its contents into a teeming box 35 which feeds molten metal into a mold positioned immediately beneath. While the teeming box 35 is being discharged, the volume control unit 32 is returned to the initial position where it is refilled for the next casting operation. The rate of pour from the teeming box 35 depends upon the size and number of holes 46 drilled in the bottom of the teeming box 35.

The proper temperature of the molten metal in the volume control unit 32 and the teeming box 35 is maintained by suitable gas burners, this temperature varying with the alloy being worked.

41 indicates two of a set of four castors, or car wheels, mounted in brackets 47 on the under side of a supporting member 48 on which the turntable 10 is revolvably mounted. These castors travel on a suitable track 42 passing in front of a plurality of furnaces and serve to support the entire casting unit when moved from furnace to furnace. The number of furnaces this casting unit will serve is determined by the melting cycle and the casting time.

43 indicates a collector ring by means of which the necessary electric current is brought to the revolvable casting unit for operating the necessary motors.

While we have shown and described a preferred embodiment of our invention, changes may be

made in the construction and arrangement without departing from the spirit and scope of the invention as disclosed herein.

What we claim is:

In a casting machine for receiving metal from a plurality of stationary furnaces, the combination comprising a support having on its under side wheels adapted to run on a track passing in front of the furnaces, a turntable rotatably mounted on said support, a plurality of separable, water-cooled molds mounted on the circumference of said turntable, and a system for circulating water through said molds, said system being wholly supported by said turntable and including a radiator for removing from the water the heat introduced by its passage through the molds.

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