Jan. 23, 1934. L. J. TISCHLER 1,944,199

DIE CASTING MACHINE

Filed Sept. 10, 1931

Fig. 1.

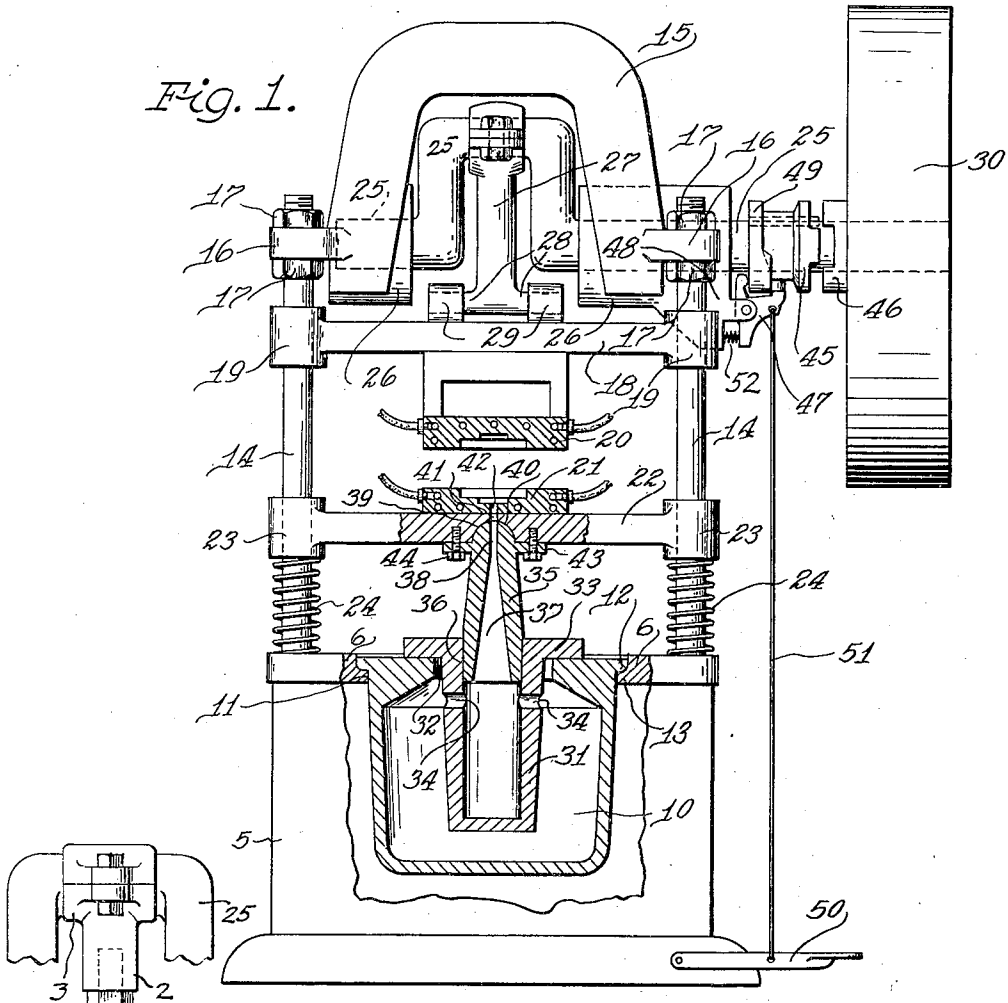

Fig. 2.

INVENTOR

Ludwig J. Tischler

BY

ATTORNEYS

Patented Jan. 23, 1934 1,944,199

UNITED STATES PATENT OFFICE

1,944,199

DIE CASTING MACHINE

Ludwig J. Tischler, Detroit, Mich.

Application September 10, 1931
Serial No. 562,085

2 Claims. (Cl. 22—68)

My invention relates to die casting machines and more particularly to a machine of this character wherein the mold and operating parts therefor are movable in a vertical plane.

Die casting machines now in general use are constructed so that the mold and operating parts therefor travel in a horizontal plane. In addition to machines of this type, necessitating a maximum amount of floor space, they require a complicated operating mechanism.

With these objections in mind, it is an object of the present invention to provide a die casting machine wherein the mold and actuating mechanism therefor travel in a vertical plane so that they will occupy but minimum floor space and at the same time simplify and reduce the number of parts employed in machines which operate as above stated.

The invention further provides means for conducting a predetermined amount of molten metal into the mold each time the machine is operated to form a casting.

Another object of the invention is to provide a die casting machine embodying a pair of cooperating mold sections arranged one above the other and a driven element operatively connected with the upper mold section for moving the same into operative and inoperative positions.

With these and other objects in view, the invention consists in the novel combination of elements, and arrangement of parts to be hereinafter more specifically referred to, claimed and illustrated in the accompanying drawing, in which—

Figure 1 is an elevation of my improved die casting machine shown partly in section; and

Fig. 2 is an elevation illustrating an adjustable connecting rod.

Referring to the invention in detail a hollow base 5 having an upper horizontal wall 6 is provided. Removably supported within the hollow base 5 is a reservoir 10 for the molten metal. This reservoir extends through a central opening 11 in the wall 6 and is formed with a lateral flange 12 at its upper edge which rests upon an annular shoulder 13 surrounding the opening 10.

Arising from the horizontal wall 6 are four vertically alined guide rods 14 which are tied together at their upper ends by an inverted U-shaped yoke 15. The legs of the yoke 15 are formed with lateral ears 16 which receive the upper terminals of the four guide rods 14. Jamb nuts 17 are engaged with these terminals and abut the opposite faces of the ears as shown.

Arranged below the yoke 15 and extending from one pair of rods to the other is a cross head 18 which is formed with vertically extending guide sleeves 19 at its corners which are slidably mounted on the guide rods 14. An upper mold section 20 is supported from the under face of the cross head 18 and is located directly above a cooperating mold section 21. The mold section 21 is carried by the upper face of a horizontal plate or bed 22 which terminates in sleeves 23 which are also slidably mounted on the guide rods 14. The plate or bed 22 and mold section 21 are normally supported in the position shown in the drawing by means of expansible coil springs 24 which encircle the lower ends of the guide rods and bear against the horizontal wall 6 and lower ends of the sleeves 23.

In order to reciprocate the cross head 18 to move the mold section 20 into operative and inoperative relation to the mold section 21, a crank shaft 25 is mounted at the upper ends of the guide rods in bearings 26. The throw of the crank shaft is connected with a connecting rod 27 which extends downwardly and is formed with laterally extending pintles 28 which are journalled in bearings 29 cast with the upper face of the cross head 18. This connecting rod may be made adjustable to vary the stroke to control the amount of metal fed into the dies or molds as shown in Figure 2, in which 1 is the connecting rod provided with right and left screwthreads adapted to engage the threaded bosses 2 on the bearing members 3, 4.

The outer end of the crank shaft is equipped with a loosely mounted flywheel or pulley 30 which is driven by any suitable power source such as an endless belt.

In order to conduct a predetermined amount of molten metal into the mold at each casting operation, a cylindrical auxiliary reservoir 31 is arranged within the reservoir 10 and extends through a central opening 32 in the latter, a suitable filler opening (not shown) being provided. The upper end of this auxiliary reservoir is formed with an annular flange 33 which rests upon the upper wall of the reservoir 10. Inlet openings 34 are provided in the auxiliary reservoir adjacent its upper end through which molten metal flows from the reservoir 10. Movable with the bed or die carrier 22 is a plunger 35 preferably having a cylindrical end portion 36 which has a sliding fit within the cylindrical auxiliary reservoir 31. The plunger is formed with a continuous bore 37 which decreases in diameter from

its lower end to its upper end and terminates in a restricted passage 38 which opens through the rounded upper terminal 39 of the plunger. The rounded terminal 39 is received in a concavity 40 in the under face of the bed plate or die nozzle and the restricted passage 38 communicates with restricted openings 41 and 42 in the bed 22 and mold section 21 respectively.

In order to secure the plunger to the bed 22 the plunger is formed with an annular flange 43 which is secured to the under face of the bar 22 by fastenings 44.

Each of the mold sections is provided with a water cooling passageway 53 which are connected to the usual circulating mechanism by flexible inlet and outlet connections 54 and 55 respectively.

In order to control the rotation of the crank shaft a clutch mmeber 45 is keyed to the crank shaft adjacent the flywheel and is adapted to engage a clutch element 46 fixed to the inner face of the flywheel. The clutch member 45 is actuated by means of a Y-shaped member 47 which is pivoted to a bracket 48. The opposed portions of the Y-shaped member engage opposite faces of a collar 49 formed on the clutch member 45. A foot treadle 50 is pivotally supported on the base 5 below the Y-shaped member and is operatively connected with the latter by means of a vertically extending operating rod 51. The clutch member 45 is returned to normal position after each depression of the lever 50 by means of an expansible spring 52 interposed between the lower terminal of the Y-shaped member and the bracket 48.

In the operation of the machine the foot pedal is depressed and immediately released so that the crank shaft will make a single revolution. As the throw of the crank shaft moves downwardly, the cross head 18 with the mold section 20 is shifted downwardly into engagement with the mold section 21. The continued downward movement of the cross head 18 moves the plate or bed 22 with the section 21 downwardly compressing the springs 24. Incident to the downward movement of the bed 22 the plunger 35 is forced downwardly into the auxiliary reservoir 31. As the plunger moves downwardly in the auxiliary reservoir the ports 34 are closed and the molten metal is displaced vertically through the bore 37 and discharged into the recesses of the mold sections. The bed 22 and cross head 18 at this time start to rise to the normal position due to the expansion of the springs 24 and the movement of the crank shaft. As the plunger 35 rises in the auxiliary reservoir a vacuum is created therein which serves to draw any surplus molten liquid from the plunger back into the auxiliary reservoir.

What I claim is:—

1. In a die casting machine, a base, a reservoir suspended therein and removable through the top thereof, an auxiliary reservoir suspended in and removable through the top of the first named reservoir, means of communication between said reservoirs, vertical guide rods on said base, a yoke uniting the upper ends of said vertical guide rods, a mold bed slidable on said guide rods, springs interposed between said base and said mold bed and normally holding said bed spaced from said base, a crank shaft rotatably mounted in said yoke, power means for rotating said shaft a single revolution at one operation, an upper mold section slidably mounted above said bed plate on said guide rods, a crank on said shaft, a rod connecting said upper mold section to said crank, and a hollow plunger carried by said mold bed and having a sliding fit with said auxiliary reservoir.

2. In a die casting machine, a base, a reservoir suspended therein and removable through the top thereof, an auxiliary reservoir suspended in and removable through the top of the first named reservoir, means of communication between said reservoirs, vertical guide rods on said base, a yoke uniting the upper ends of said vertical guide rods, a mold bed slidable on said guide rods, springs interposed between said base and said mold bed and normally holding said bed spaced from said base, a crank shaft rotatably mounted in said yoke, power means for rotating said shaft a single revolution at one operation, an upper mold section slidably mounted above said bed plate on said guide rods, a crank on said shaft, an adjustable rod connecting said upper mold section to said crank, and a hollow plunger carried by said mold bed and having a sliding fit with said auxiliary reservoir.

LUDWIG J. TISCHLER.