

R. P. LINK & A. G. HYDE.
TYPE CASTING MACHINE.
APPLICATION FILED MAR. 17, 1910.

981,438.

Patented Jan. 10, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

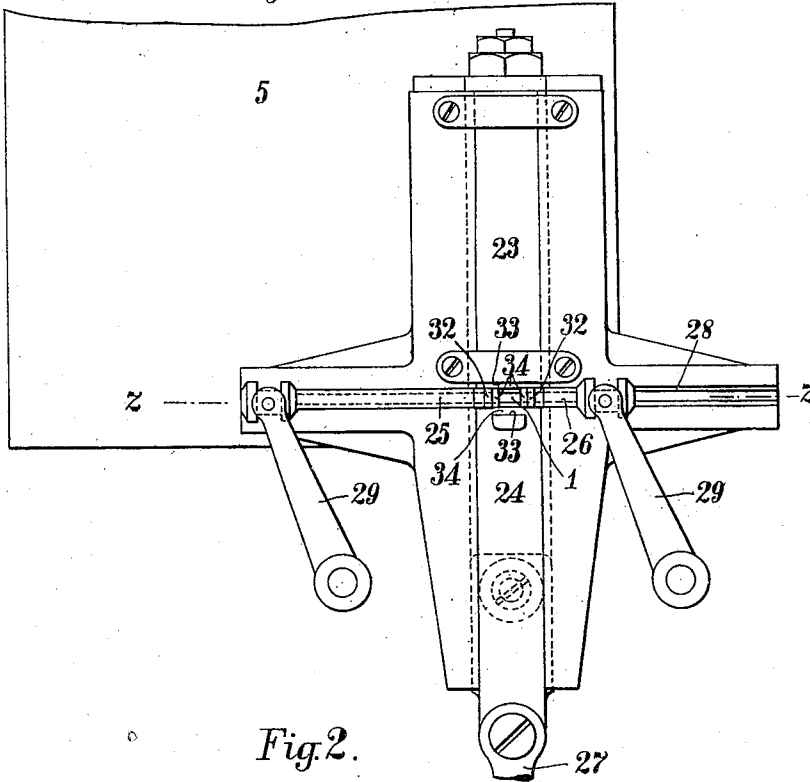
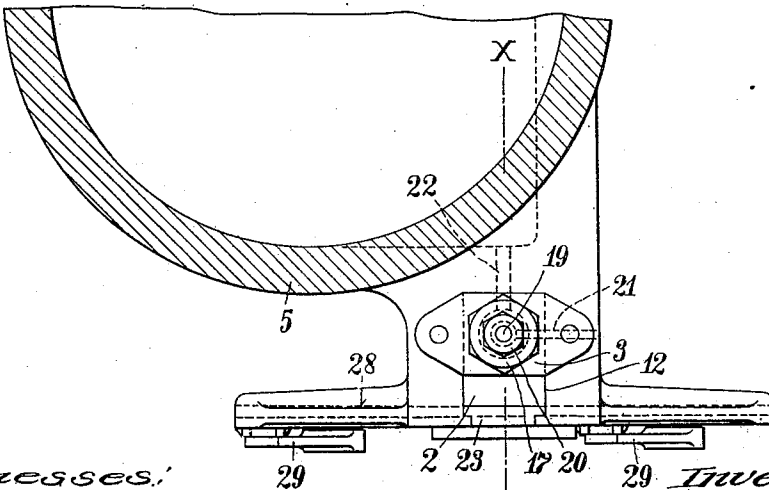


Fig. 2.



Witnesses:

[Signature]
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Inventors

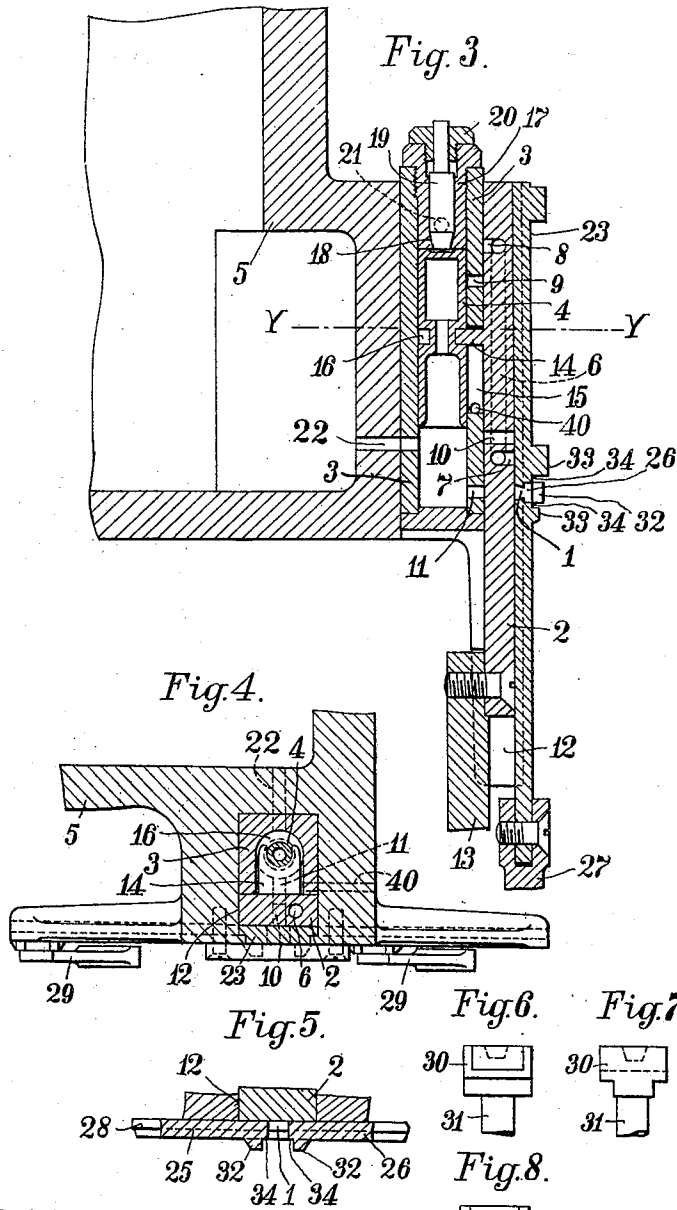
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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TYPE-CASTING MACHINE.

981,438.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, ROLLS PERCIVAL LINK and ALBERT GILLETTE HYDE, subjects of the King of Great Britain, residing at London, England, have invented new and useful Improvements in Type-Casting Machines, of which the following is a specification.

This invention relates to type casting machines for casting individual or separate types and comprises an improved mold, an improved pump for forcing the molten metal into the mold, and a valve slide arranged between the pump and the mold. The said valve slide has two main functions to perform one of which is to establish communication between the mold and a suitable air pump or aspirator prior to the casting of the type. In a convenient constructional arrangement only a single cylinder is provided in which works a single plunger which acts at one end as an air pump plunger while the other end is employed to force metal into the mold. The said pump plunger is preferably connected to and actuated by the valve slide which is mounted in a suitable guideway arranged between the pump chamber and the mold, and which may be formed with hollow spaces to retard the conduction of heat from the pump chamber to the mold. The second main function of the valve slide is to establish communication between the mold and the molten metal in the pump cylinder to allow of the metal being forced into the mold under the action of the moving plunger. The said slide also operates to cut off or separate the metal in the mold from that in the pump cylinder and then returns to its initial position. The mold comprises slides actuated by driving mechanism which imparts thereto movements which are synchronized with those of the valve slide and which are moreover limited, as the mold closes, in accordance with the size of a matrix presented between the slides, and acting as a distance piece in the known manner; whereby, in the normal operation of the machine, the mold is automatically adjusted for casting type of different sizes, without requiring any manual readjustment of the mold parts. The slides are preferably formed with integral lugs provided to grip the matrix between them while the mold is closed and the inner ends or faces of the slides forming the walls of the mold are

shaped to give the desired form and size to the body of the cast type. Said slides may be made hollow to minimize the conduction of heat through them, and their outer faces may be cooled by jets of air blown against them or otherwise to assist the rapid solidification of the metal in the mold. Four movable slides may be provided but in a preferred construction the upper slide is replaced by a fixed block.

In the accompanying drawings which show how the said invention may be conveniently and advantageously carried into practice, Figure 1 is a view in elevation of the improved mold, pump and valve slide, mounted on the side of a melting pot. Fig. 2 is a plan thereof. Fig. 3 shows a section taken on the line X—X, Fig. 2. Fig. 4 shows a section taken on the line Y—Y, Fig. 3. Fig. 5 is a detail view of the mold in section on the line Z—Z, Fig. 1. Fig. 6 is a plan. Fig. 7 is a side view, and Fig. 8 is a face view, of a matrix hereinafter referred to, drawn to a larger scale.

As shown in these drawings, 1 is a mold or space in which metal is cast, 2 is a valve slide, and 3 is a pump cylinder in which a pump plunger 4 works. These parts are mounted on the side of the melting pot 5.

In the slide 2 a longitudinal channel 6 is formed having ports 7, 8 at opposite ends thereof. In one position of the slide the port 7 is in alinement with the mold 1 and, at the same time, the port 8 is in alinement with a port 9 which opens into the upper end of the cylinder 3. In another position of the slide, a port 10 formed therein provides a passage through which metal can flow to the mold 1 through a port 11 in the wall of the cylinder 3. The slide 2 is mounted in a guideway 12, and, in accordance with requirements, is moved parallel to the axis of the cylinder by a rod 13 connecting the slide to suitable driving mechanism. A forked member 14 extending laterally from the slide 2 passes through an aperture 15 in the cylinder wall. This aperture may be vented through a hole 40. The free end of the member 14 engages a recess 16 formed in the body of the pump plunger 4 so that the reciprocatory movement of the slide is imparted to the said plunger.

The upper end of the cylinder 3 is closed by a plug 17 in which a conical valve seat 18

is provided on which a valve 19 rests. A bush 20 is arranged to retain this valve in the plug 17. During upward movement of the pump plunger 4 the air in the upper part of the cylinder 3 is compressed. This raises the valve 19 so that the upper end of the cylinder is put in communication with the atmosphere through a vent hole 21. The lower end of the cylinder is in open communication with the metal pot through a port 22.

The operation of these parts is as follows:—Referring to Fig. 3, the slide 2 is here shown at the upper end of its reciprocatory path. As the said slide moves downwardly carrying with it the pump plunger 4, a partial vacuum is formed in the upper end of the cylinder, the valve 19 being closed. This movement of the slide brings the ports 7, 8 and channel 6 into position to establish communication between the mold and the cylinder through the port 9, whereby the air in the mold, if the latter is closed as hereinafter described, is exhausted or rarefied. The continued movement of the slide then carries the port 7 out of alinement, and brings the port 10 into alinement, with the mold so that molten metal in compression beneath the plunger 4 is forced through the ports 11, 10 into the mold. The slide continues to move a farther distance cutting off the metal in the mold from that in the pump cylinder, thus permitting the casting to solidify. The slide and plunger then return to their original starting positions.

As shown in Fig. 3, the plunger is made hollow to contain a body of air and is open at its lower end to allow the air to act in the known manner as a yielding or elastic buffer or cushion between the molten metal in the cylinder and the pump plunger after the latter, in its descending movement, has closed the port 22. In practice this arrangement has been found to give better results than are obtainable by the use of a solid plunger acting directly on the molten metal.

It will be seen that the slide 2 performs two important functions. First it establishes communication between the mold and a vacuous space whereby air is exhausted from the mold so that the metal in compression beneath the plunger can flow into the mold more easily than if the latter contained a body of air, and a clean type is cast free from blow-holes. In the second place the slide acts as a distributing valve admitting molten metal at the desired time to the mold and then cutting off the body of metal in the cylinder from the metal in the mold which immediately solidifies. The arrangement of the slide so that it forms one wall of the mold permits type to be cast free from fins, so that it is not necessary

to use a trimming knife after the casting operation.

The sides of the mold 1 in the arrangement shown are formed by a fixed block 23 and three slides 24, 25 and 26 arranged at right angles to each other. The slide 24 opposite to the fixed block 23 is reciprocated by a rod 27, and the alined slides 25, 26 are independently reciprocated along guideways 28 by arms 29. The rod 27 and arms 29 are moved at suitable times by driving mechanism not comprised in the present invention. The slides 24, 25 and 26 together with the block 23 form the four sides of the mold which is closed at one end by the slide 2, and is closed at the other end by a matrix as hereinafter described. Each matrix comprises a stem 31, and a rectangular head 30 (Figs. 6, 7 and 8), the said head having a suitable intaglio design formed in the face thereof in accordance with the type to be cast, as will be well understood. Several matrices are provided and each matrix is mounted for use in a convenient form of carrier (not shown in the drawings) arranged to hold the matrix by its stem.

As shown in Fig. 5, the slides 25 and 26 are furnished with lugs 32 adapted to engage the sides of the matrix head. Similar lugs 33, adapted to engage the top and bottom of the matrix head, are provided on the block 23 and slide 24, respectively. At the commencement of a casting operation, the slide 24 is lowered and the slides 25 and 26 are moved apart. While the slides are in these positions, the head 30 of the matrix is brought by the carrier to a position beneath the lug 33 on the block 23 and between the lugs 32 on the slides 25 and 26. These slides are then moved toward each other by the arms 29 until the matrix head is clamped between the said lugs 32 thereon. The horizontal dimension of the matrix face varies for different matrices according to the width of the character to be cast by the use of the particular matrix. The slides 25, 26 are therefore moved different distances toward each other in accordance with the size of the matrix placed between them, until the latter is gripped between the lugs. The movement of the slides being thus limited, the width of the mold is determined in accordance with the width of the matrix face. The connection between the arms 29 and the driving mechanism hereinabove referred to forms no part of the present invention but may comprise, for example, any suitable spring or like yielding member permitting the arms to remain at rest gripping the matrix while the driving member completes its stroke or revolution. The slide 24 is next raised to the position shown in Figs. 1 and 3. The vertical dimension of the face of each matrix (shown in Figs. 7 and 8), is usually constant

for all the matrices and, if this is so, the block 23 and slide 24 always occupy the same positions when the mold is closed.

Surfaces 34 all arranged in the same plane, are provided on the block 23 and on each slide 24, 25 and 26, respectively. In the closed position of the mold, these surfaces are continuous (Fig. 5), the slides 25, 26 then fitting exactly between the said block 23 and slide 24 although being at the same time adjustable for different widths of type to be cast, as above mentioned.

To form a closed mold from which the molten metal cannot escape and in which a type can be cast without fins the matrix face is now pressed against the surfaces 34 provided on the block and the slides respectively. It is immaterial to the present invention how the matrix is thus pressed against these surfaces. The movements of the matrix carrier, the mold slides 24, 25, 26, and the valve slide 2 are timed so that after the matrix is thus pressed against the said surfaces, the port 7 and port 10 successively come into line with the mold to exhaust air from and admit molten metal to the same, as hereinbefore described.

The faces of the slides to the left of the surfaces 34 as seen in Fig. 3, or above these surfaces as seen in Fig. 5, are suitably formed to produce a type body of the shape required.

The types thus cast are removed by means of any convenient mechanism.

What we claim is:—

1. In a casting machine, a mold, an aspirator, a valve slide, and an air exhausting conduit in the said slide through which the mold and aspirator are, at times, put into communication.

2. In a casting machine, a mold, an aspirator, a molten metal force pump, and means for putting the said mold into communication, in turn, with the said aspirator and the said pump.

3. In a casting machine, a mold, an aspirator, a molten metal force pump, a valve slide, and air exhausting and metal supply conduits in the said valve slide, through which the said mold is put into communication, in turn, with the said aspirator and the said pump.

4. In a casting machine, a mold, a cylinder, a plunger working therein, the said cylinder and plunger acting at one end as an aspirator and at the other end as a molten metal force pump, and means for putting

the said mold into communication in turn, with the opposite ends of the said cylinder.

5. In a casting machine, a mold, a cylinder, a plunger working therein, a non-return air-discharging valve at one end of said cylinder, a port conducting molten metal to the other end of said cylinder, and means for putting the said mold into communication, in turn, with the opposite ends of the said cylinder.

6. In a casting machine, a mold, a cylinder, a plunger working therein, a valve slide having ports therein through which the said mold is put into communication, in turn, with opposite ends of the said cylinder, and an operative connection between the said plunger and the said slide.

7. In a casting machine, a mold, a cylinder, a plunger working therein, a valve slide having ports therein through which the said mold is put into communication, in turn, with opposite ends of the cylinder, a member operatively connecting the said slide to the said plunger and passing through an aperture in the cylinder wall, and a conduit through which the said aperture is vented.

8. In a casting machine, a mold, a cylinder, a port supplying molten metal thereto, an open-ended hollow plunger working in the said cylinder for closing the said port and forcing the molten metal into the mold, a valve slide arranged between the cylinder and the mold and having a port there-through for making communication between the cylinder and the mold, and also having ports therein through which said mold is put in communication, in turn, with opposite ends of the said cylinder, and an operative connection between the said hollow plunger and the said valve slide.

9. In a casting machine, a metal melting pot, a pump mounted on the side of the said pot, a valve slide movable in guideways formed on the said pot, and guideways on the said pot in which the slides forming a mold are movably mounted.

10. In a casting machine, a plurality of movable slides arranged in pairs at right angles to form a mold, an aspirator, a force pump, and a valve slide for putting the said mold into communication, in turn, with the said aspirator and the said pump.

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