Nov. 17, 1925. 1,561,780

F. ENGEL

CASTING MACHINE

Original Filed July 8, 1918 2 Sheets-Sheet 1

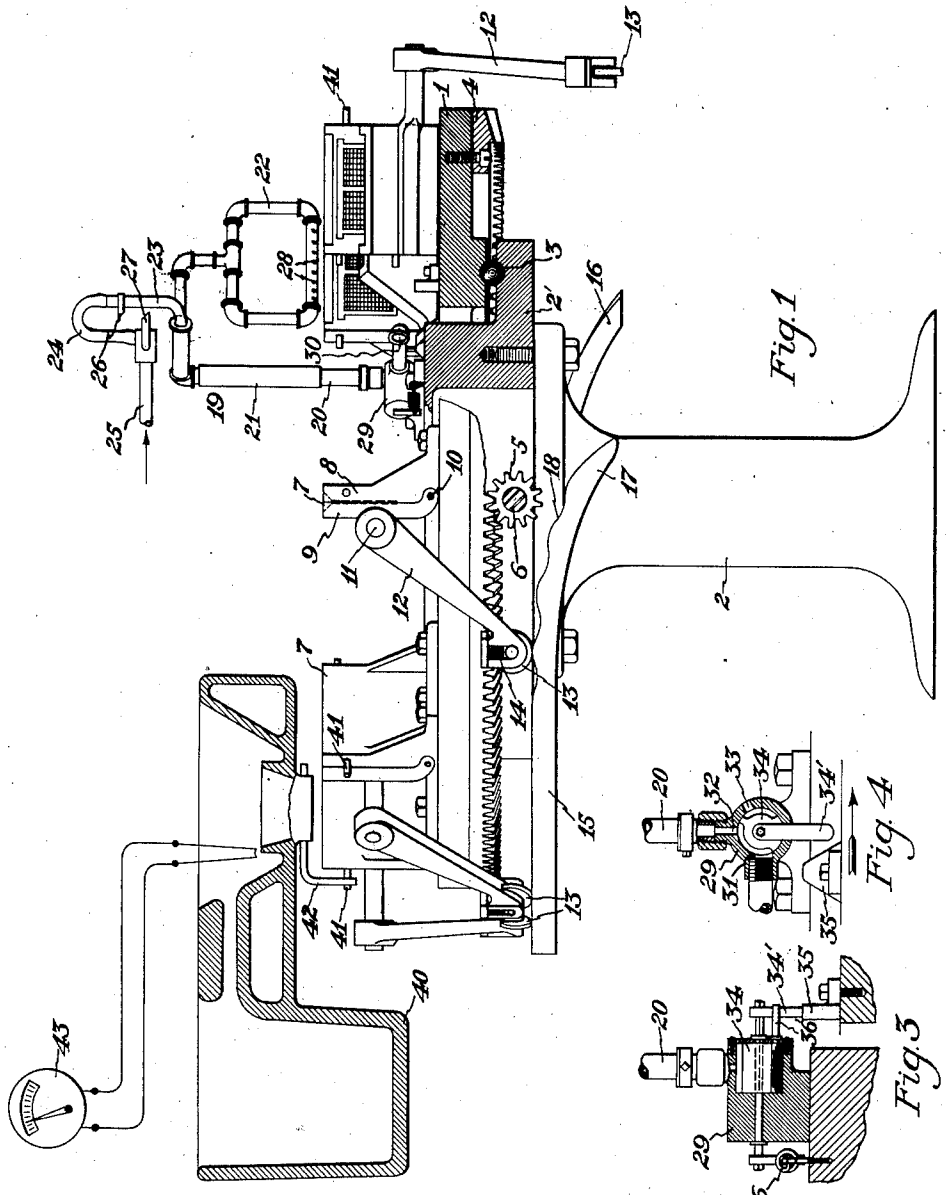


Fig. 1

Fig. 4

Fig. 3

WITNESS:

Dominic P. Cone

Ralph Munden

INVENTOR.

Frank Engel.

BY

Raymond H. Van Vest

ATTORNEY.

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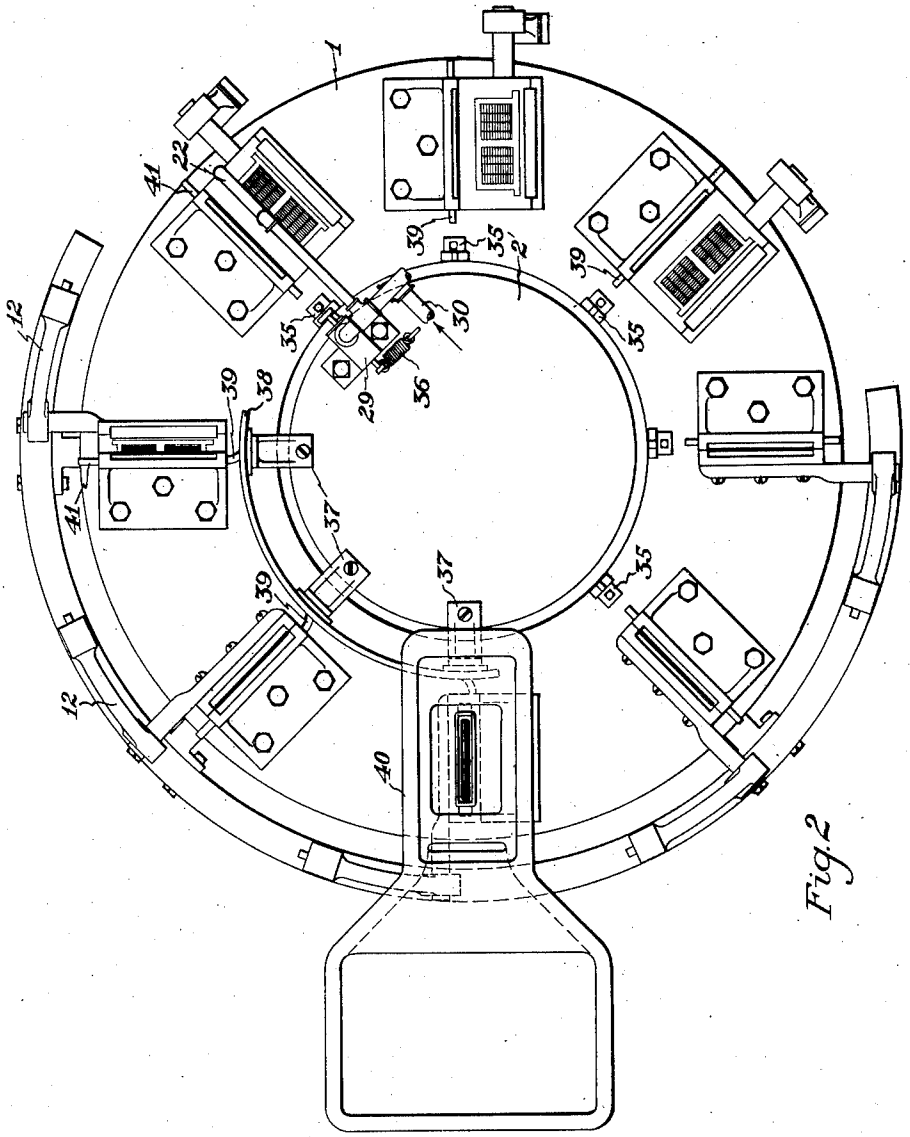


Fig. 2

WITNESS:
Dominic P. Cone
Paul Mundin

INVENTOR.
Frank Engel.
BY
Raymond H. Vanderbeek
ATTORNEY.

Patented Nov. 17, 1925. 1,561,780

UNITED STATES PATENT OFFICE.

FRANK ENGEL, OF SYRACUSE, NEW YORK, ASSIGNOR TO U. S. LIGHT & HEAT CORPORATION, OF NIAGARA FALLS, NEW YORK, A CORPORATION OF NEW YORK.

CASTING MACHINE.

Application filed July 8, 1918, Serial No. 243,759. Renewed February 2, 1925.

To all whom it may concern:

Be it known that I, FRANK ENGEL, a citizen of the United States, residing at Syracuse, in the county of Onondaga and State of New York, have invented new and useful Improvements in Casting Machines, of which the following is a specification.

The present invention relates to casting machines.

More particularly the present invention relates to casting machines which may operate continuously and with a minimum of attention from an operator for preparing the moulds for pouring, pouring the metal and for opening the moulds.

An object of the present invention is to provide a casting machine having a plurality of moulds, with means for automatically operating said moulds whereby moulding operations may be expeditiously performed.

A further object is to provide a casting machine in the form of a revoluble table, together with automatic devices which will perform the various steps necessary in moulding operations.

A further object is to provide a casting machine which is simple and sturdy in construction, which will require a minimum of attention and discretion on the part of the operator.

Further objects will appear as the description proceeds.

Referring to the drawings:—

Fig. 1 is a side view, partly in section, showing one embodiment of the present invention.

Fig. 2 is a plan view.

Figs. 3 and 4 represent details of a valve which may be utilized in the embodiment illustrated in Figs. 1 and 2.

The numeral 1 represents a table which may be circular in outline and which is supported upon a standard 2. The standard 2 has a top 2′ upon which the table 1 is mounted to revolve. Ball bearings 3 may be provided to reduce the friction to a minimum. The under side of the table 1 may be provided with an annular rack 4 which is adapted to engage with a pinion 5 mounted upon a shaft 6. The shaft 6 will in operation be given a movement of rotation. Such movement may be communicated from a shaft extending vertically within the standard 2 or may be communicated by means of a belt from overhead shafting. No means for rotating the shaft 6 have been illustrated, inasmuch as they constitute no part of the present invention and their description seems to be unnecessary for a complete understanding of the present invention. When the shaft 6 is rotating, movement will be communicated through the pinion 5 to the rack 4 to revolve the table 1.

Mounted upon the revoluble table 1 are a plurality of moulds 7, 7. Each of the moulds 7 has a part 8 which may be fixedly mounted on the revoluble table 1, and a part 9 which is movable relative to the part 8. Each of the parts 9 is pivoted to the part 8 at the point 10, whereby the part 9 may be swung away from the part 8. Mounted on each of the parts 9, as at the point 11, is a lever 12. Each lever 12 carries at its outer end a roller 13 which is spring-pressed downwardly by means of the spring 14. The rollers 13, 13 are adapted to engage with a cam-shaped member 15 which may be rigidly supported by the standard 2 to partly surround said standard 2. The levers 12 with rollers 13 co-operate with the cam-shaped member 15 to move the parts 9 of the moulds. For this purpose one end 16 of the cam-shaped member 15 is inclined and has a smooth surface. The other end 17 is also inclined but is provided with a waved surface 18. It will be understood that as the table 1 revolves in a counter-clockwise direction as viewed in Fig. 2, moving the levers 12 therewith, the rollers 13 will in succession engage with the end 16 of the cam-shaped member 15 whereby said levers will be moved to swing the parts 9 about their pivots 10 into closed position with the parts 8. The cam-shaped member 15 will be designed to hold the levers 12 in such a position as to maintain the parts 9 in closed position for a considerable arc of the rotation of the table 1. When, however, the rollers 13 in succession engage with the inclined end 17 with its waved surface, the levers will be given a vibratory movement, the net result of which will be the dropping of the levers 12 whereby to separate the parts 9 from the parts 8. The purpose of

the waved surface of the end 17 is to shake the part 9 loose from the casting, as will be referred to further hereinafter.

Located upon the top 2′ of the standard 2 is a lubricating device 19. Said lubricating device as illustrated, has means for directing a smoky flame upon the parts 8 and 9 of the mould 7. Said lubricating device 19 will be located at a point whereat the cam-shaped member 15 will not be operative to hold the movable part 9 in closed position relative to the part 8 of the mould. The lubricating device 19 is provided with an upstanding pipe 20 which is encircled by a movable sleeve 21. The sleeve 21 is adapted to move a set of piping 22 in a vertical direction. The sleeve 21 is also adapted to operate a pipe 23 which may be connected through a flexible connection 24 to a source of gas supply 25. The pipe 23 may be provided with an abutment 26 adapted to co-operate with a lever 27 to open and close communication between the source of gas supply and the piping 22. The piping 22 will be provided with a series of vents 28 whereby flames may be directed upon the parts of the moulds. The outside of the upstanding pipe 20 and the inside of the sleeve 21 should be provided with finished surfaces to provide a fairly air-tight fit while permitting relative movement between said pipe 20 and sleeve 21. The pipe 20 has communication through a valve 29 to a source of air pressure 30. The valve 29 should be provided with three ports, 31, 32 and 33, of which port 31 may communicate with the source of air pressure 30, port 32 may communicate with pipe 20 and port 33 may communicate with the outside atmosphere. A gate 34 is provided, having a trigger 34′ adapted to co-operate with abutments 35. A spring 36 may be provided to hold the trigger 34′ against a stop 36′, whereby said gate 34 is biased to the position illustrated in Fig. 4, whereby communication is had between the source 30 and the pipe 20 to hold sleeve 21 in its uppermost position whereby to hold the piping 22 out of proximity with the moulds. In this position the gas supply from the source 25 will be reduced. When the gate 34 is moved to another position through engagement of an abutment 35 with the trigger 34′, communication with the source of air pressure 30 will be cut off and communication will be had from the pipe 20 to the atmosphere through port 33. Under these conditions the sleeve 21 will be in its lowermost position, whereby the piping 22 will be in proximity to the parts of the moulds 7. In moving from the upper to the lower position, the abutment 26 will engage with the lever 27, whereby to turn on the supply of gas from the source 25. In moving back to the upper position, the abutment 26 will co-operate with the lever 27 to reduce the supply of gas, leaving only small jets of flame from the vents 28. The details of the mechanism whereby the abutment 26 operates the lever 27, form no part of the present invention. Suitable mechanism will occur to the skilled mechanic. The lever 27 may be biased, as for instance, by a spring, to the position shown in Fig. 1. When abutment 26 is in lowered position, it will hold lever 27 in unbiased position, and when said abutment 26 moves upward, said lever 27 may move back to biased position to reduce the supply of gas. Suitable stops may be provided for limiting the range of movement of abutment 27. Any desired fuel may be used for the jets of flame. Any gas which carbonizes readily when burned without free access of air may be used. For instance, acetylene gas may be used.

Also mounted upon the top 2′ of the standard 2 are a plurality of supports 37 which may support a pair of electrical contact members 38. Only one of said contact members is illustrated in the drawing. Said contact members will be side by side and occupy an arcuate position, removed from the lubricating mechanism in a counter clock-wise direction. Each of the moulds is provided with brushes 39 which engage with the members 38 to provide electrical connection. Each of the moulds will be provided with heating coils (not shown) which will be energized when the brushes 39 contact with the members 38. The members 38 will be so placed that the heating coils are energized when the cam shaped member 15 is holding the part 9 of the mould in closed position relative to the part 8, whereby to conserve the heat. Located at a point near the ends of the members 38 is the pouring mechanism 40. Each of the moulds is provided with an outstanding stud 41 adapted to engage a lever 42 on the pouring mechanism. As the moulds move in succession to a position underneath the pouring mechanism, the stud 41 will engage the lever 42 to allow the molten material to flow into the moulds. Thermo-electric apparatus 43 may be provided for indicating at a glance the temperature of the molten material. As the moulds travel in a counter clock-wise direction from underneath the pouring mechanism, the part 9 will remain closed upon the part 8 for a predetermined period in order to allow the casting to solidify. When, however, the moulds are moved in succession to a point where the rollers 13 engage with the waved surface of the inclined end 17 of the cam-shaped member 15, a vibrating movement will be communicated to the parts 9 of the moulds, the result being the opening of the moulds in succession. An operator will be stationed at a point removed from

the end 17 in a clock-wise direction. His duty will be to remove the castings from the mould.

The operation of the above described device will be obvious. Each of the moulds will be left open after it passes the end 17 of the cam-shaped member 15. After the operator has removed the casting from each of the molds as it comes to him, each of the moulds will be lubricated in succession as it passes in proximity to the lubricating mechanism 19. As described above, the lubricating mechanism 19 will operate automatically to direct a smoky flame upon the two halves of the mould from a point in proximity to said mould. As each of the moulds passes by the lubricating mechanism, the flame will be automatically extinguished by engagement of the abutment 26 with the lever 27, until the next mould comes in proximity to the lubricating mechanism. After each mould passes the lubricating mechanism, the part 9 will be closed upon the part 8 by reason of the fact that the roller 13 will contact with the cam-shaped member 15, thereby moving the lever 12 to operate the part 9 of each mould. When each mould has moved to the position whereby the brushes 39 will contact with the contacting members 38, the heating coils of said mould will be energized to heat said moulds to prepare for the pouring operation which will take place when the stud 41 engages with the lever 42 of the pouring mechanism. During further movement the casting will be allowed to solidify until the mould reaches such a position that the roller engages the inclined end 17 of the cam-shaped member 15, at which time the mould will be opened with a vibrating movement and the operator may remove the casting.

Many details of the described embodiment of the present invention may be varied without departing from the invention. It is intended in the patent to include all modifications that come within the scope of the invention as defined by the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States, is—

1. In a casting machine, in combination, conveying means, a plurality of moulds thereon having separable parts, and means associated with said moulds for automatically closing said parts upon one another and opening same with a shaking movement.

2. In a casting machine, in combination, revoluble conveying means, a plurality of moulds thereon having separable parts, and means associated with said moulds for automatically closing said parts upon one another and opening same with a shaking movement.

3. In a casting machine, in combination, a conveyor, a plurality of moulds thereon, lubricating means, heating means and pouring means for said moulds, and mechanism co-operating with said moulds for automatically operating said means when said moulds are in predetermined position.

4. In a casting machine, in combination, a revoluble means, a plurality of moulds carried thereby, said moulds having separable parts, stationary cam means, and means co-operating with said cam means for closing said parts upon one another and opening same with a shaking movement.

5. In a casting machine, in combination, a revoluble means, a plurality of moulds carried thereby, each of said moulds having a part stationary relative to said revoluble means and a second part movable relative to said stationary part, means for automatically closing said movable part upon said stationary part and for vibrating said movable part relative to said stationary part.

6. In a casting machine, in combination, a revoluble means, a plurality of moulds carried thereby, and means rendered operative by the movement of said moulds for lubricating and heating same in succession, and means rendered operative by the movement of said moulds for pouring molten material into said moulds in succession.

7. In a casting machine, in combination, a plurality of moulds, means for moving same and automatic means for lubricating said moulds, closing and heating same, pouring molten material into said moulds and opening same with a vibrating motion.

8. In a casting machine, in combination, a mould and means for lubricating said mould, said means including movable flame-directing means, and means controlled by said mould for varying the position of said flame directing means and for varying the length of flame emitted by said flame-directing means.

9. In a casting machine, in combination, a mould, conveying means for said mould, means responsive to the movement of said mould for lubricating same, completing an electrical circuit for heating same, pouring molten material into same and opening same with a vibrating movement.

10. In a casting machine, in combination, a mould, conveying means therefor, and means responsive to movement of said conveying means for lubricating said mould.

11. In a casting machine, in combination, a revoluble conveying means, moulds carried thereby, lubricating means adapted to emit a smoky flame, and means responsive to the movement of said conveying means for governing the position of said lubricating means and the flame emitted thereby.

12. In a casting machine, in combination, a mould, conveying means therefor, said mould including a separable part, means for operating said part, and cam means adja-

cent to said conveying means for controlling said operating means, said cam means and said operating means being adapted to communicate a vibratory movement to said separable part.

13. In a casting machine, in combination, a revoluble conveying means, moulds carried thereby, each of said moulds including a separable part, operating means for moving said separable part, and cam means substantially concentric with said conveying means for controlling said operating means, said cam means and said operating means being adapted to communicate a vibratory movement to said separable part.

14. In a casting machine, moulds, flame-emitting lubricating means for said moulds and means for periodically directing said lubricating means into molds about to be filled.

15. In a casting machine, conveying means, moulds carried thereby, and flame-emitting lubricating means for said moulds responsive to the movement of said conveying means.

16. In a casting machine, conveying means, moulds carried thereby, flame-emitting lubricating means, and means responsive to the movement of said conveying means for governing the position of said lubricating means and the flame emitted thereby.

17. In a casting machine, moulds, heating means for said moulds and means for automatically controlling the application of heat to said moulds.

18. In an automatic grid casting machine, moulds, means for automatically opening and closing said moulds, means for heating said moulds and means for automatically controlling the application of heat to the moulds.

19. In an automatic grid casting machine, a mould, means for opening and closing said mould, automatic means for filling said mould heating means for said mould and means for automatically controlling the application of heat to said mould.

In witness whereof, I have hereunto subscribed my name.

FRANK ENGEL.