Aug. 20, 1935. H. FRITZ 2,012,189

AUTOMATIC CASTING MACHINE FOR METAL BARS AS USED IN COMPOSING MACHINES

Filed May 20, 1932 8 Sheets-Sheet 1

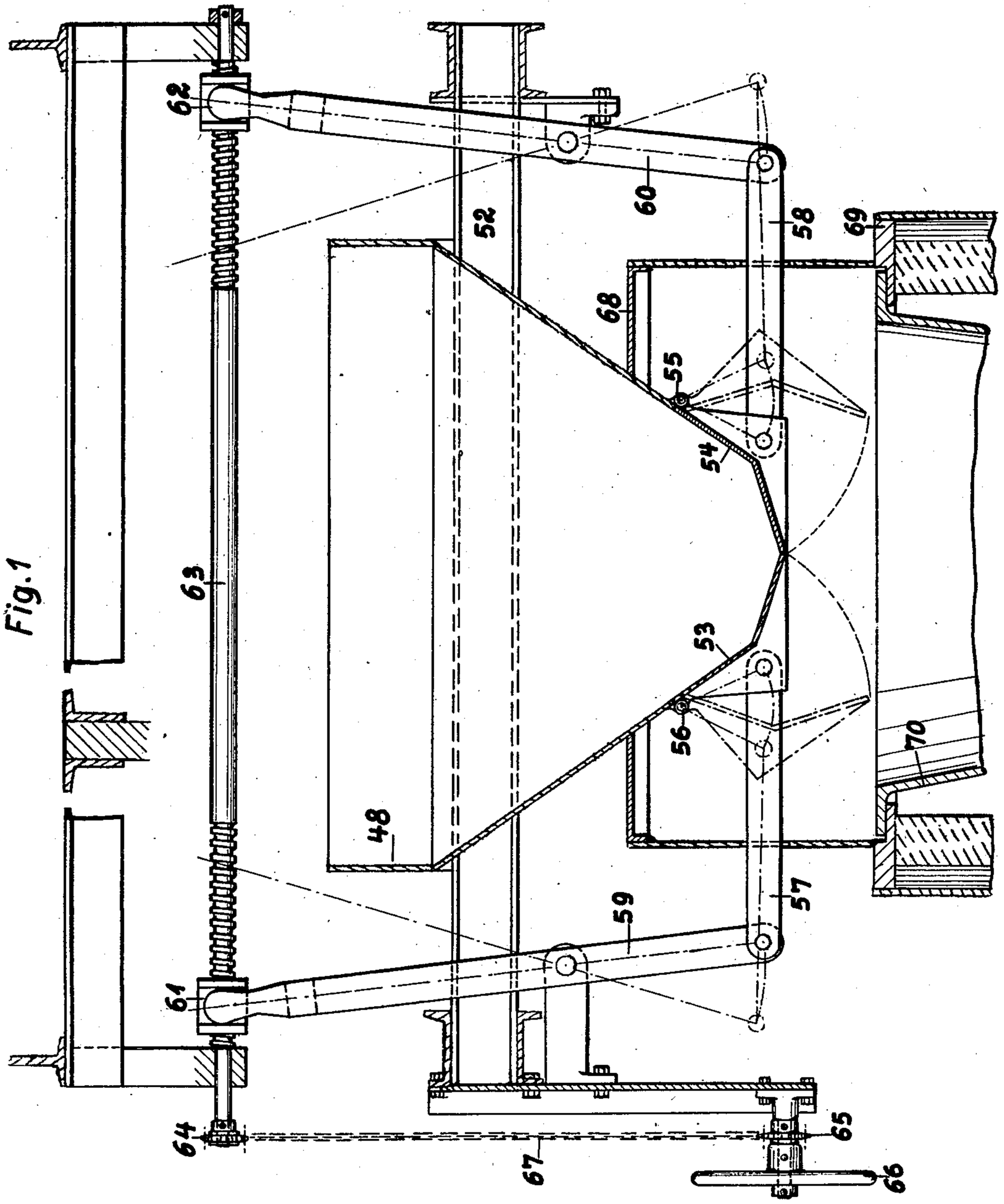

Fig. 1

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Fig. 2.

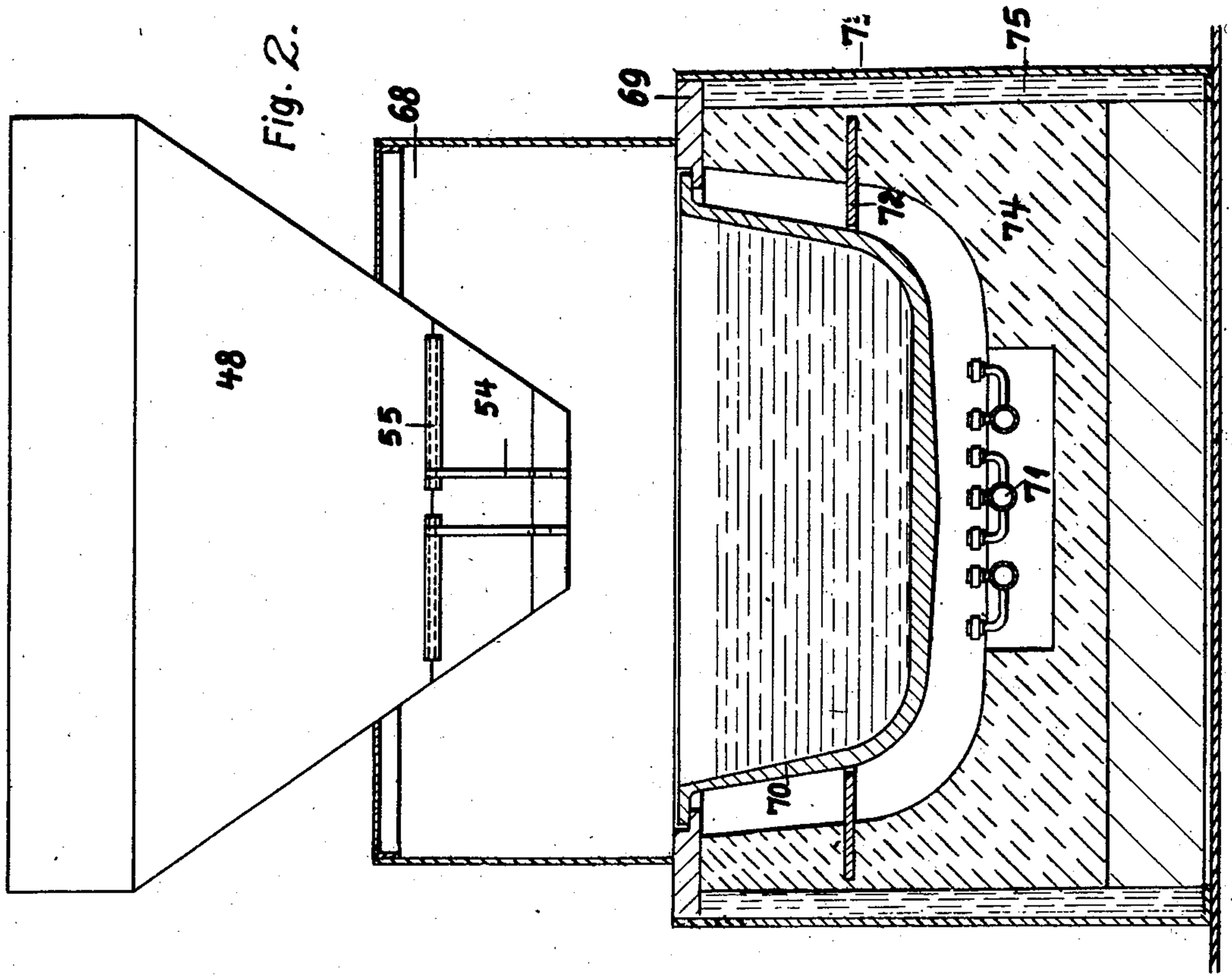

Fig. 3.

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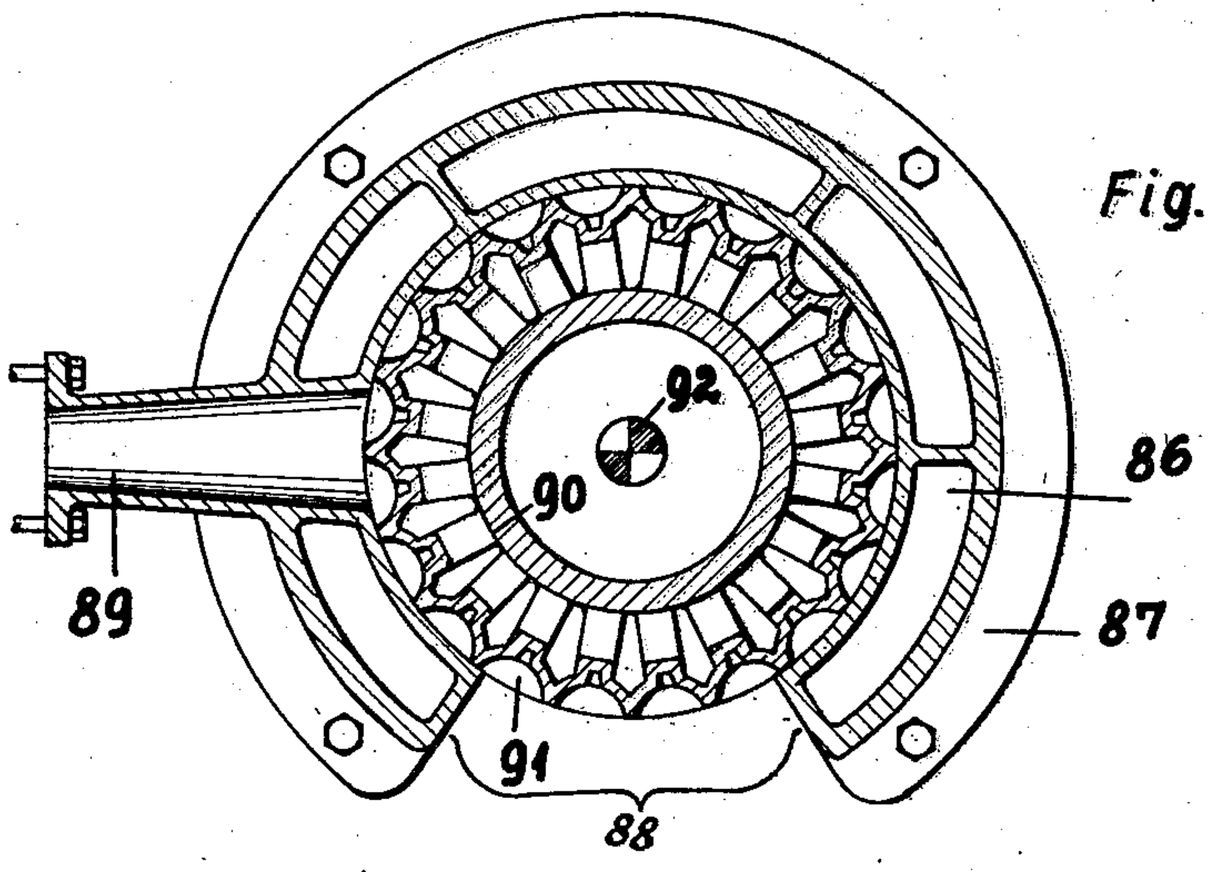

Fig. 4.

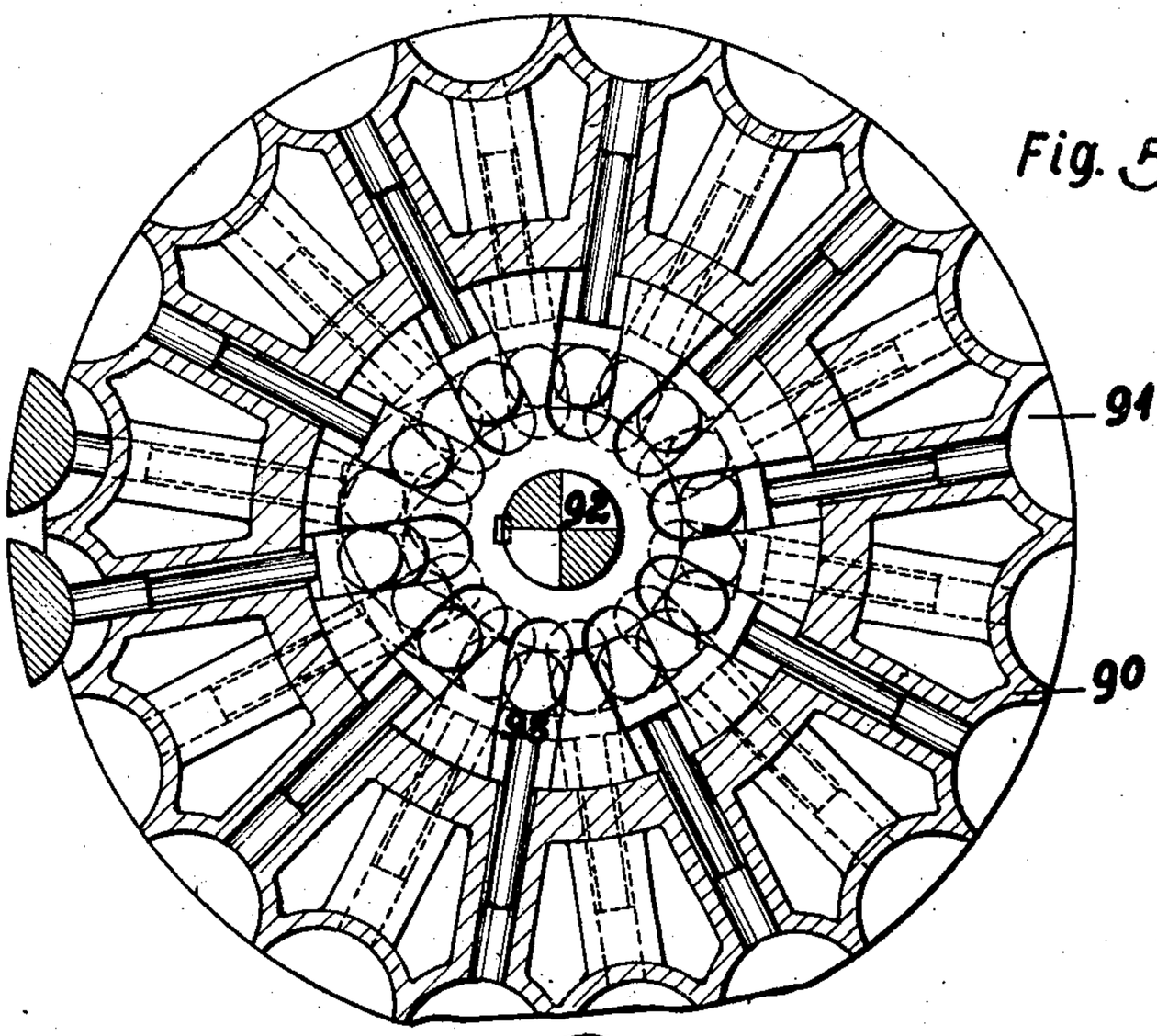

Fig. 5.

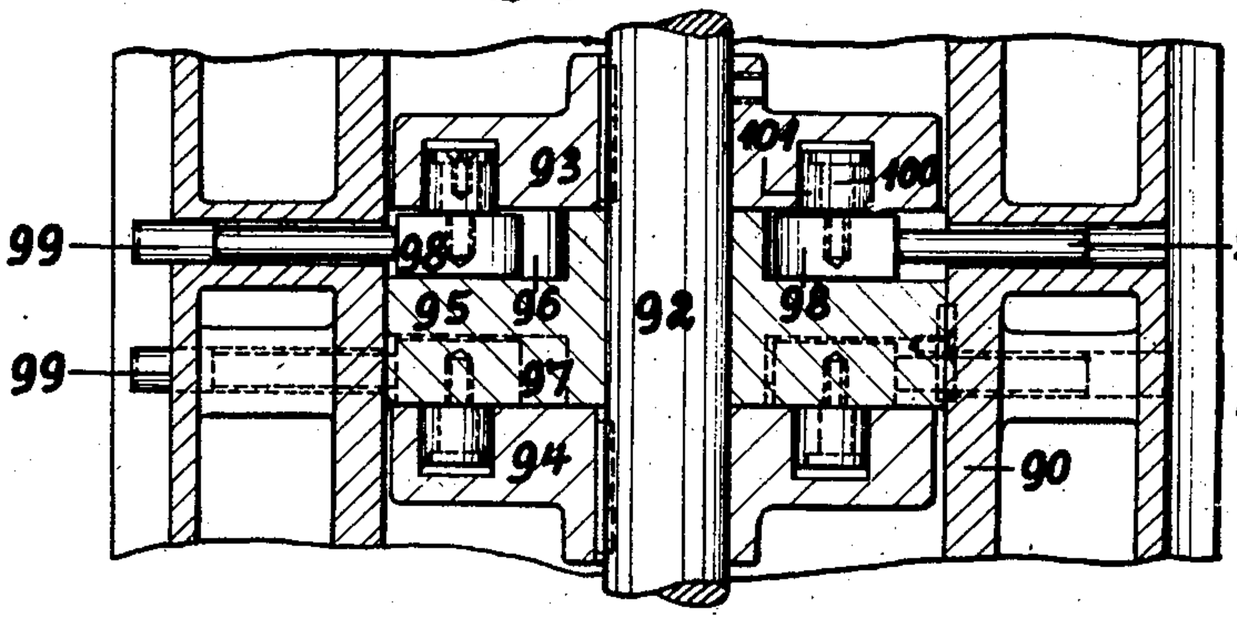

Fig. 6

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AUTOMATIC CASTING MACHINE FOR METAL BARS AS USED IN COMPOSING MACHINES

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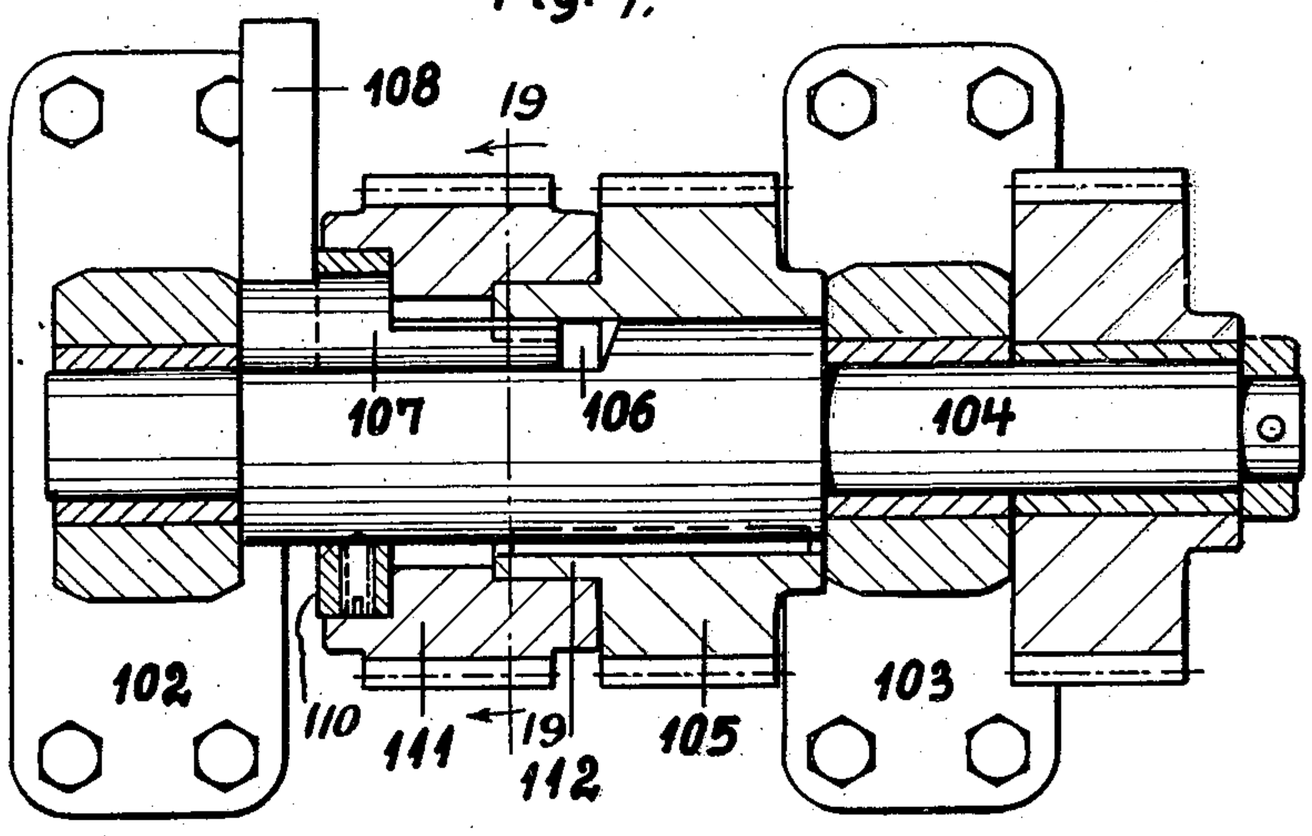
Fig. 7.



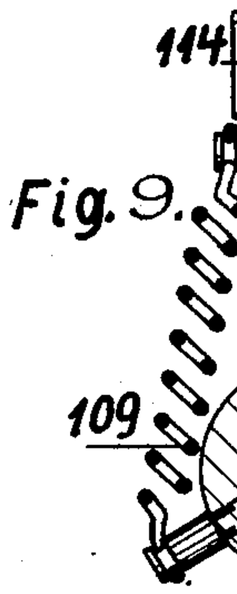


Fig. 9.

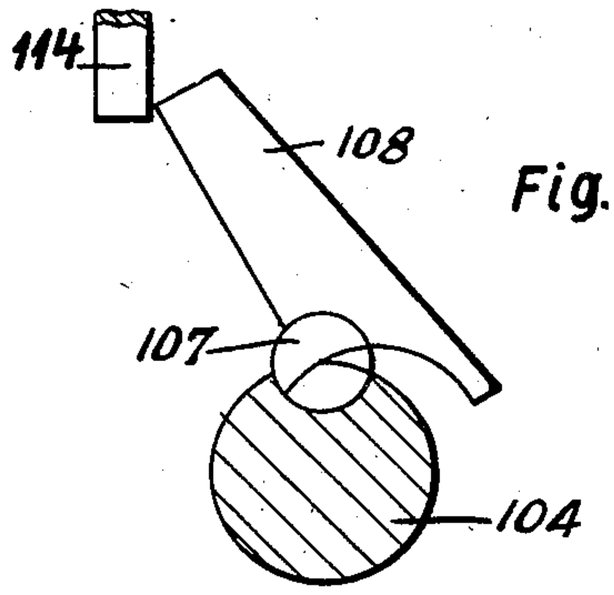


Fig. 8.

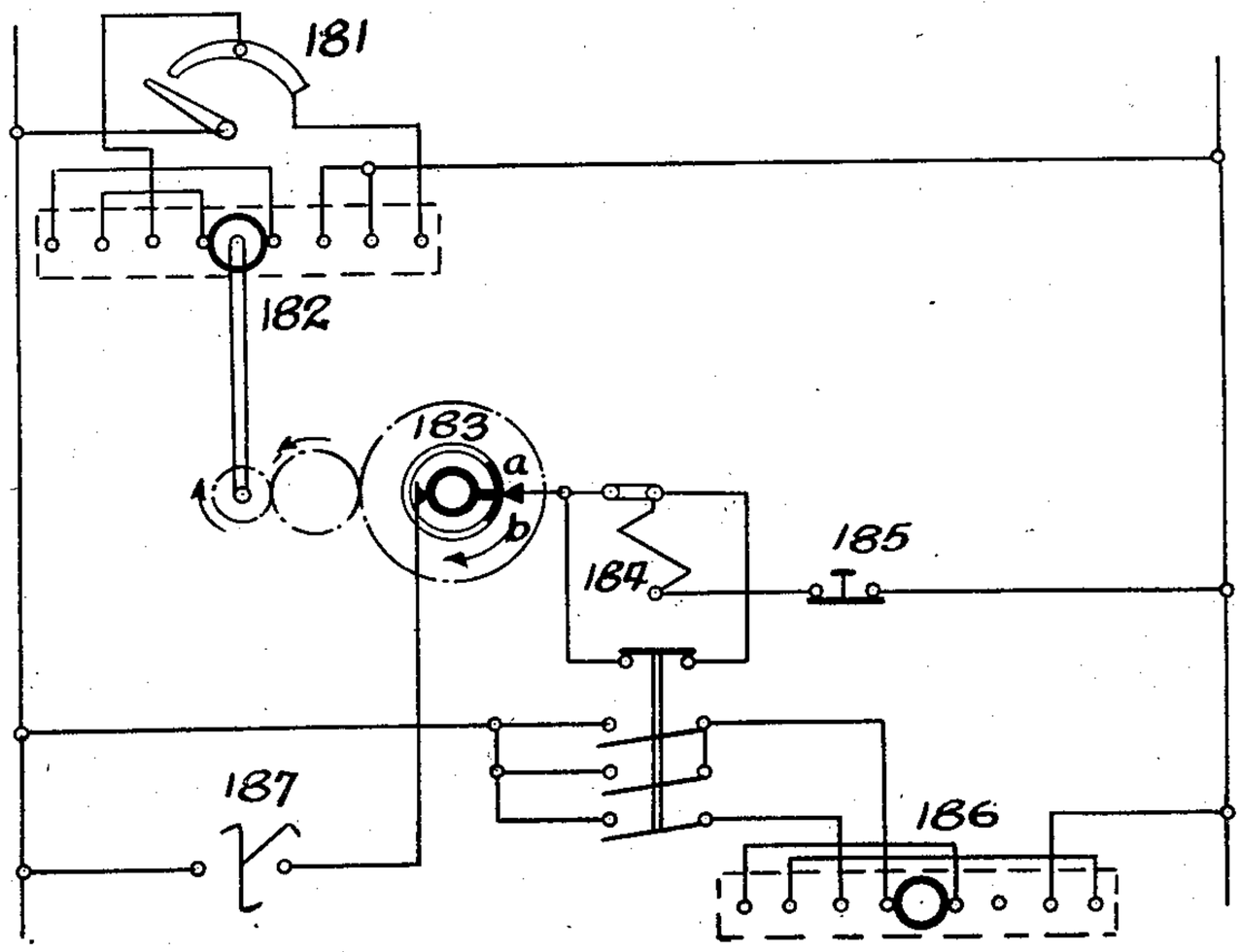


Fig. 21.

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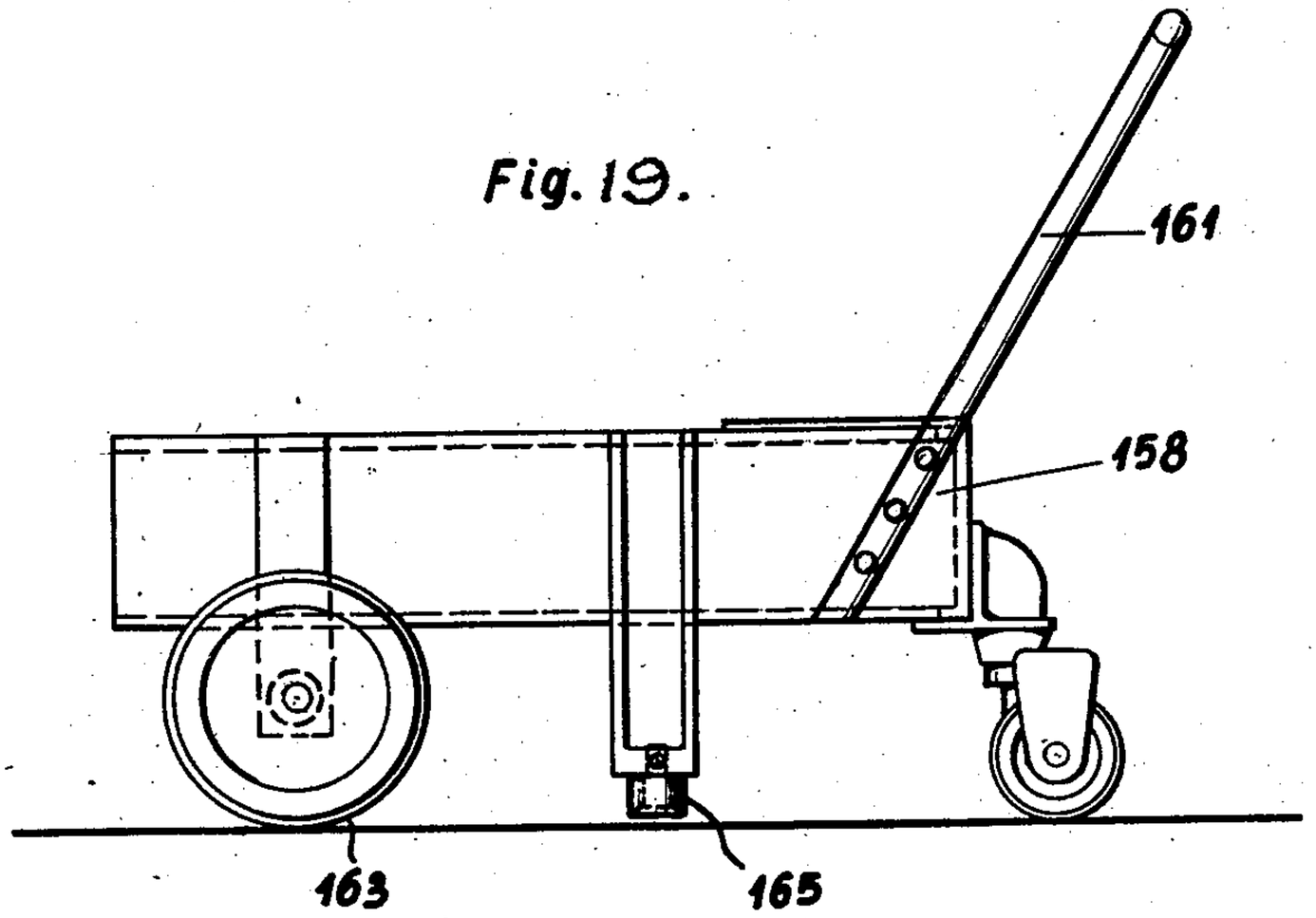
Fig. 19.



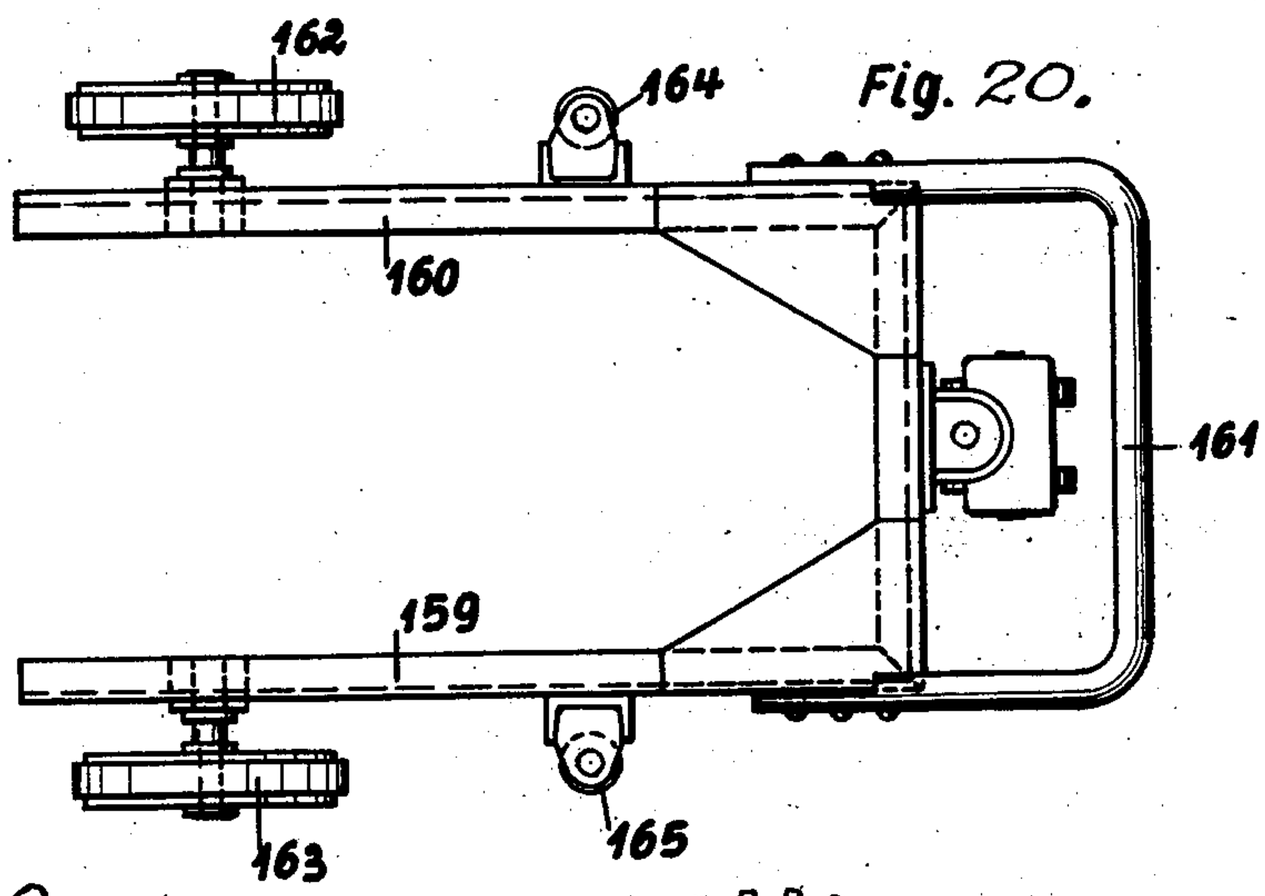
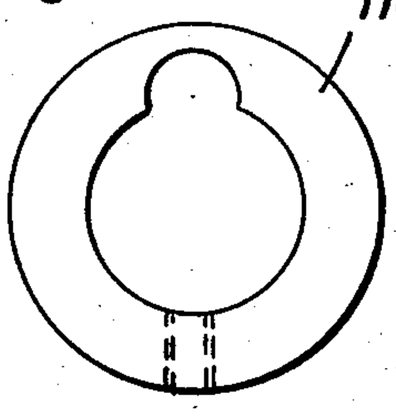


Fig. 20.

Fig. 10.



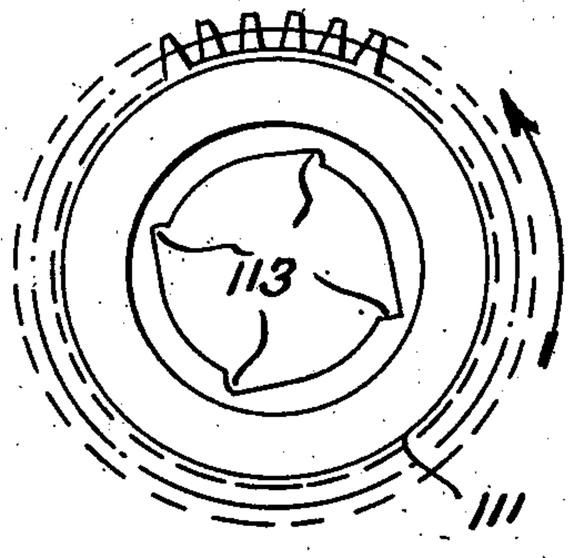


Fig. 11

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Fig. 12.

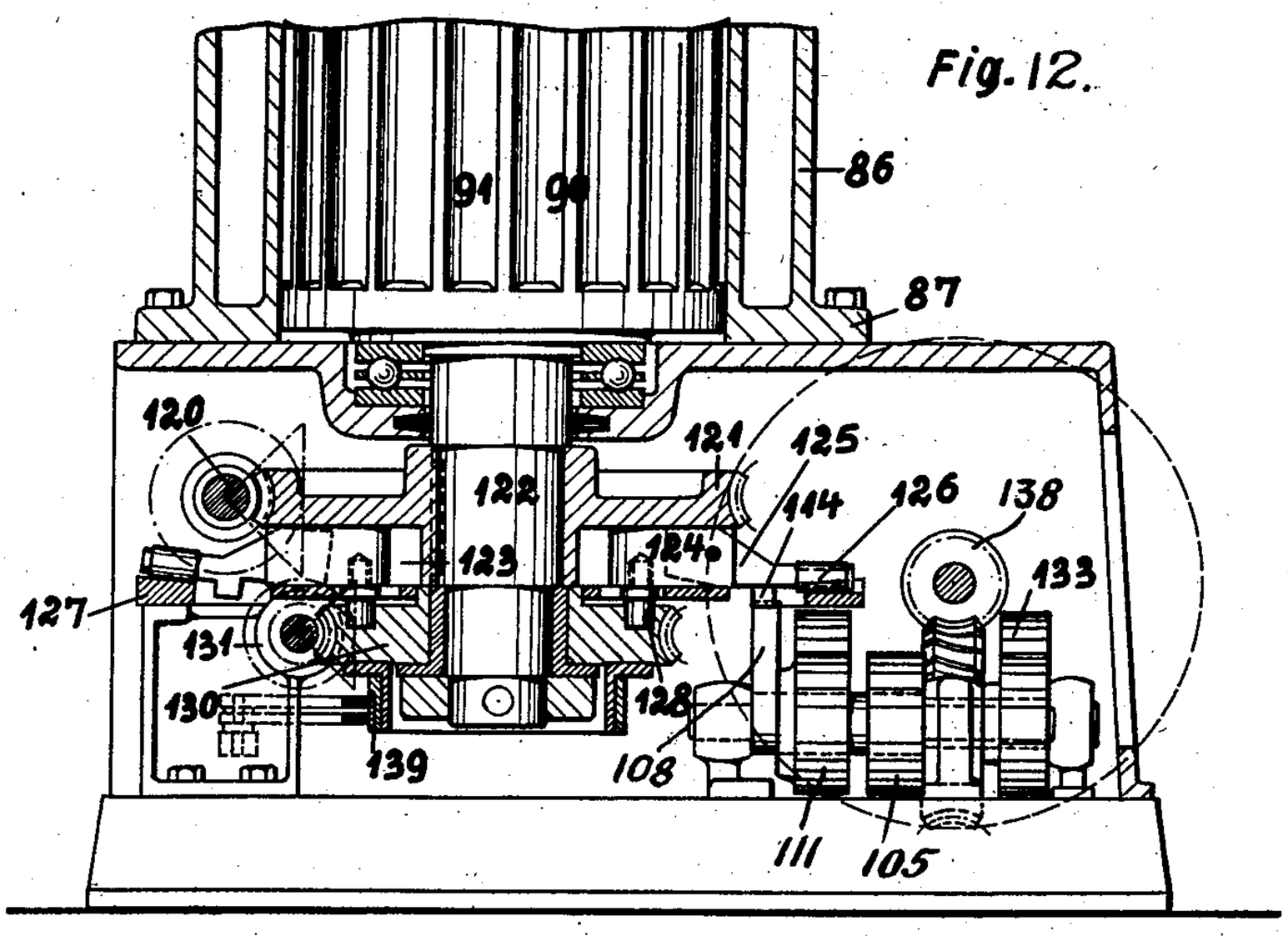
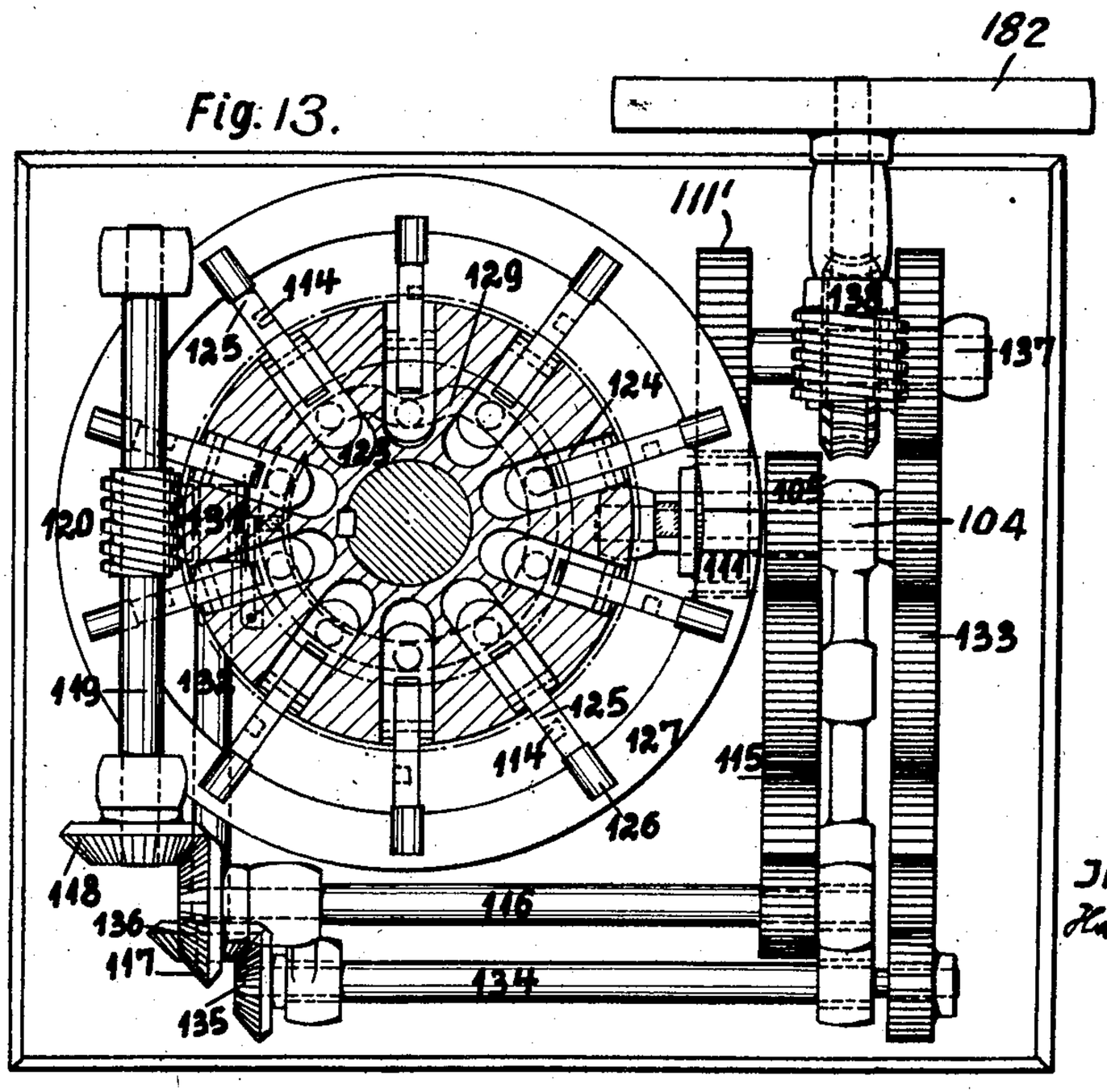


Fig. 13.



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AUTOMATIC CASTING MACHINE FOR METAL BARS AS USED IN COMPOSING MACHINES

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Fig. 14.

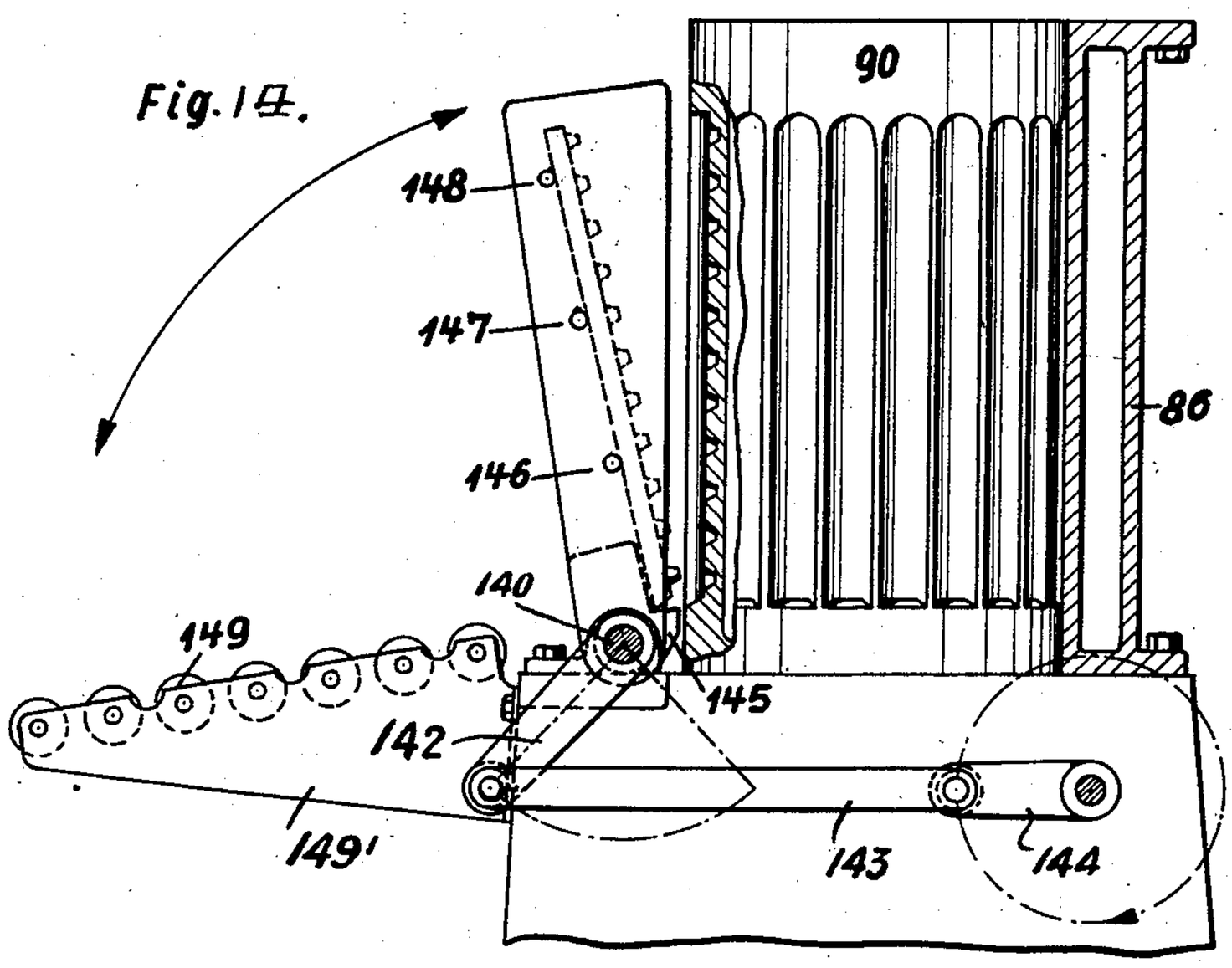
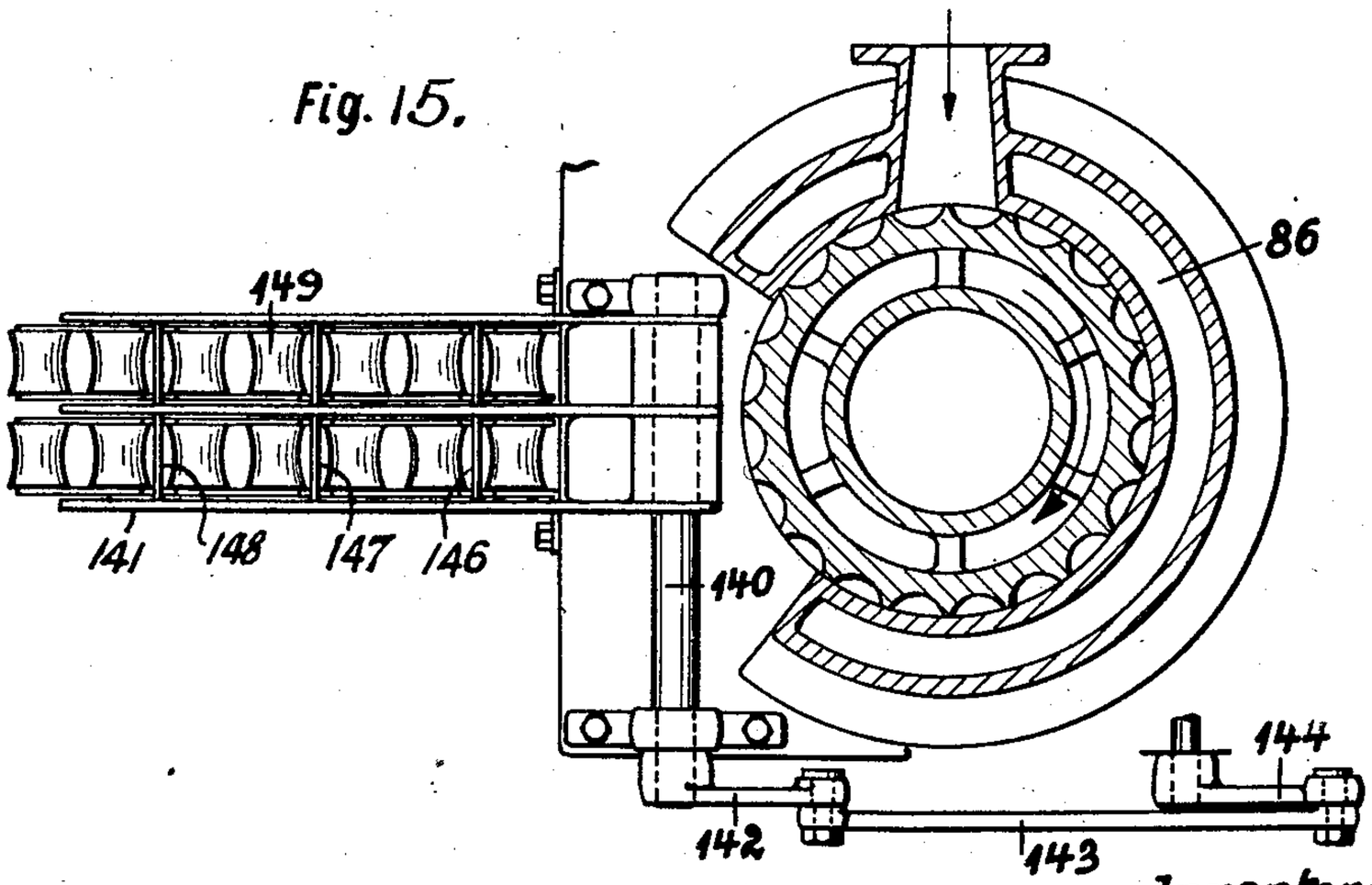


Fig. 15.



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AUTOMATIC CASTING MACHINE FOR METAL BARS AS USED IN COMPOSING MACHINES

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Fig. 16.

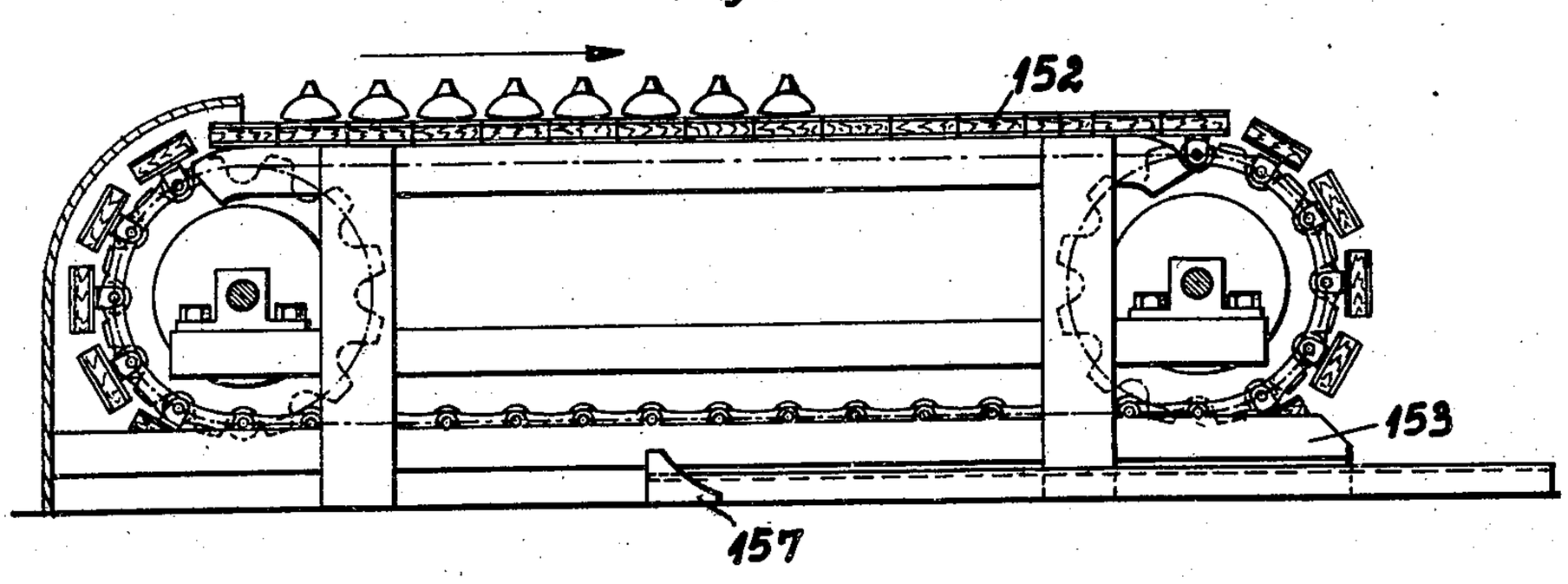
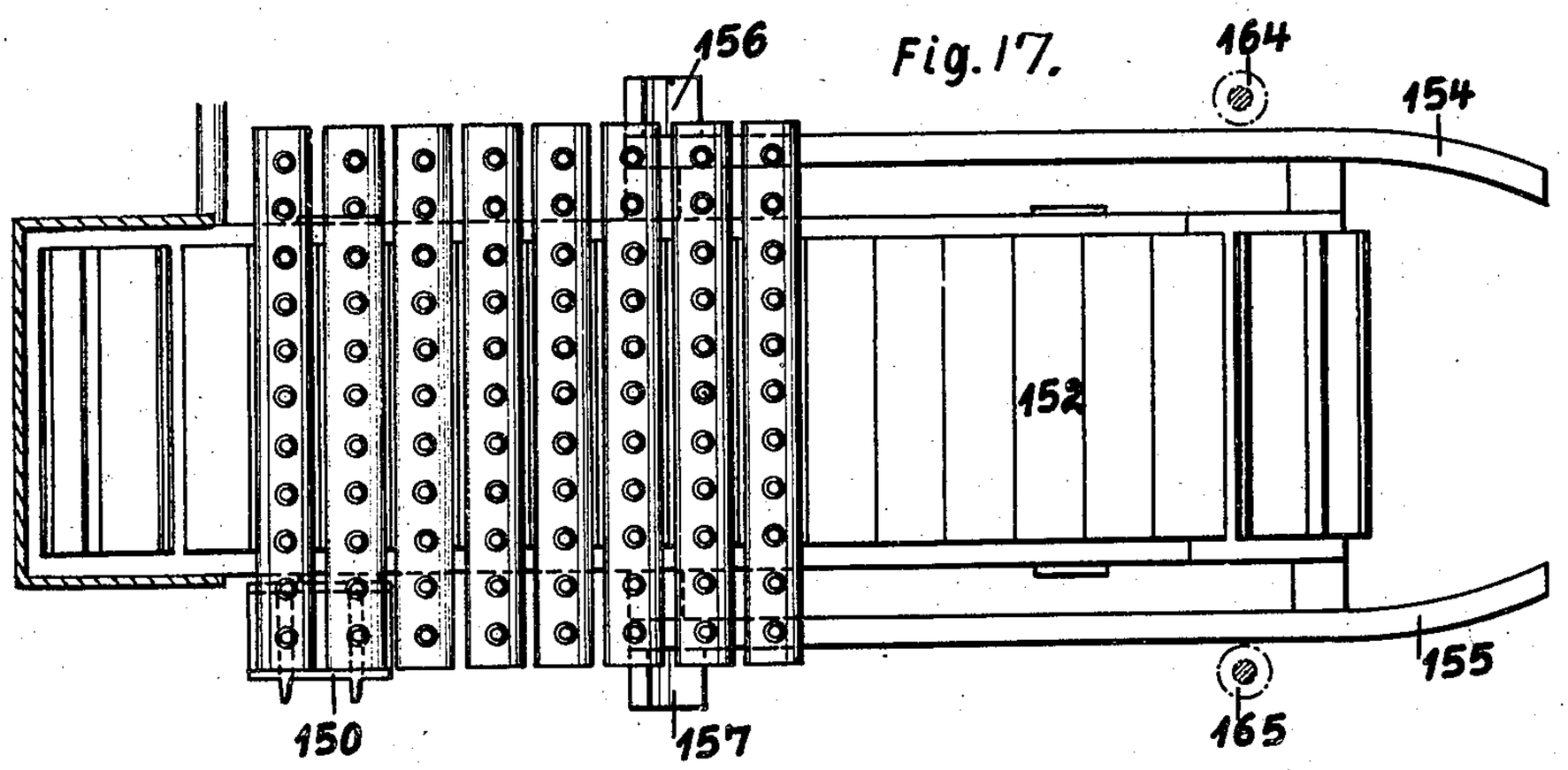


Fig. 17.



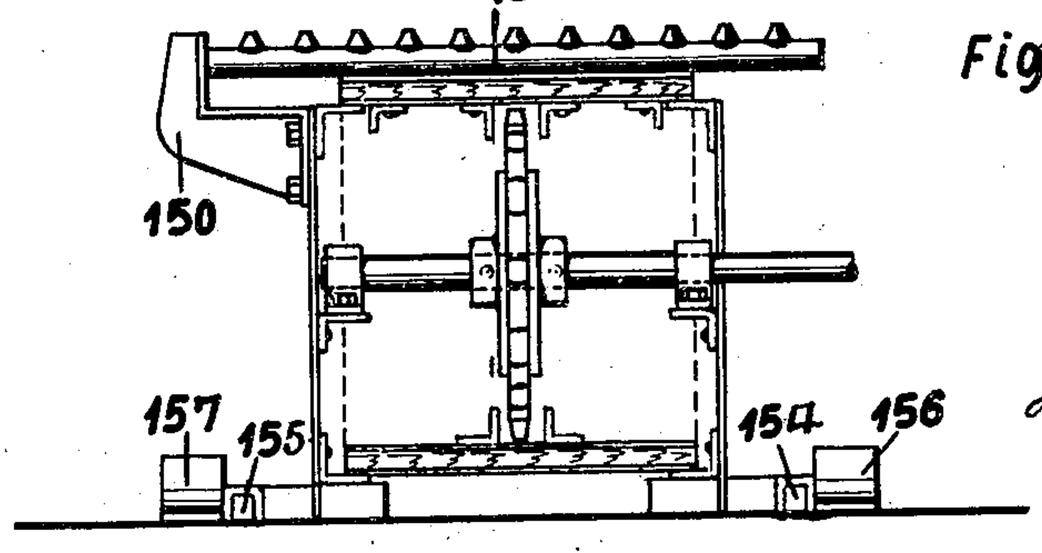


Fig. 18

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Hanns Fritz.

Patented Aug. 20, 1935 2,012,189

UNITED STATES PATENT OFFICE

2,012,189

AUTOMATIC CASTING MACHINE FOR METAL BARS AS USED IN COMPOSING MACHINES

Hanns Fritz, Wurzburg, Germany, assignor to firm "Schnellpressenfabrik Koenig & Bauer Aktiengesellschaft", Wurzburg, Germany

Application May 20, 1932, Serial No. 612,541
In Germany April 29, 1931

30 Claims. (Cl. 22—57)

The object of the invention concerns an absolutely automatically working machine, which remelts the line or letter material derived from the form after its use in the stereotyping or printing department, and casts it into bars which are then conducted to the composing machine. The daily consumption of such bars in large newspaper printing offices is very great. The most usual production of bars, viz, casting by the use of a valve or a tap and moulds turned by hand, no longer answers modern requirements. It is, on account of the open handling with lead, injurious to health and dangerous, besides requiring a large staff and much time. These disadvantages—injury to health, danger, waste of employees and time—the new machine entirely removes. The melting and casting in the new machine take place completely under cover. The cooled bars are automatically deposited on a truck so that the workman who has to wheel them away, does not come into contact with either liquid or congealed lead.

The machine consists of three parts, the elevator (not shown), the melting furnace and the casting device.

The method of working of the machine is as follows:—

The old material to be re-melted, comes out of the individual rooms in small box-shaped carriages into the melting kitchen and are raised and dumped into a preheating bunker.

The pre-warming bunker hangs on the ceiling of the melting kitchen in an iron construction. It has two movable trap doors on hinges which can be opened or closed as desired by means of a hand wheel. On opening the doors, the contents of the bunker slide into the melting tank of the furnace underneath. Between the melting tank and the bunker is a tightly closed jacket which directs the metal vapours into the chimney and allows the heat of the melted metal and of the furnace to ascend to the bunker. It is of course provided with doors to allow the metal to be cleaned and alloyed before the commencement of the casting process.

The metal-conveyor consists of a cast iron box with an inserted metal worm. This is periodically put into action as will later be explained in the description of the casting apparatus proper. The metal conveyor is arranged so that it freely swings into the boiler. It has besides the casting channel an ascending passage which, when the mold is full, serves at the same time as an overflow. The tank itself is a rotary body devoid of every bulge, a fact to be noticed especially on account of the durability of the tank.

The casting apparatus which is screwed on to the casting channel of the metal conveyor, consists principally of a mould and a core as well as a drive for the turning of the core. The casting mould is a double walled cast iron piece, which is put with its foot-flange on top of the gearing box. The interior of the mould is cylindrically ground out and has an opening which makes the depositing of the metal bars possible. It is intensively water cooled. The core has, for example, 20 milled out indentures in its circumference which serve as moulds for the bars to be cast. The casting mouth of the mould is so wide that it always supplies two moulds with metal simultaneously. When a certain time after the casting has elapsed the core is turned some way further corresponding to two moulds on the circumference of the core. As soon as the first moulds are filled with metal, i. e. the first cast metal bars, have reached the delivery, two pestles, which lie in the interior of the core and are guided by means of fixed unround grooved rolls, move automatically forward and knock the bars out of the mould. Two pairs always work simultaneously so that two bars are always knocked out at the same time. The knocked out bars come to lie on a delivery device which is driven in step with the core. The delivery device then moves downwards until the bars lie on a roller slope. As soon as the delivery device has released the bars, they slide out on the said roller slope and push against the elastic stop which is fitted on the frame of an endless conveyor. The conveyor, moving by steps, is likewise driven from the core. When the bars reach the end of the conveyor they glide off over two conductors on to a truck which embraces a part of the conveyor band, the platform of such truck being formed in the shape of an U. This truck is likewise guided by guiding rollers on rails in order to secure a perfect entrance and exit.

Fig. 1, a vertical section of a preheating bunker and coacting parts,

Fig. 2, a section of a melting tank, showing coacting parts,

Fig. 3, an elevation of a metal pump, partly in section,

Fig. 4, a horizontal section of a casting mold,

Fig. 5, a similar section showing ejecting means for the molds,

Fig. 6, a vertical section of parts shown in Fig. 5,

Fig. 7, a plan of a tangent wedge coupling,

Fig. 8, an end view of the same on section line 19—19 of Fig. 7,

Fig. 9, a view similar to Fig. 8 with parts in a different position,

Fig. 10, an elevation of a guide ring forming a part of said coupling,

Fig. 11, an elevation of a gear forming part of said coupling,

Fig. 12, a vertical section showing the core and operating means therefor,

Fig. 13, a horizontal section of the same,

Fig. 14, an elevation of a transferring means for castings,

Fig. 15, a plan of the same, partly in section,

Fig 16, an elevation of a conveyor for castings,

Fig. 17, a plan of the same,

Fig. 18, a vertical cross section of the same,

Fig. 19, an elevation of a truck for finished bars,

Fig. 20, a plan of the same, and

Fig. 21, a wiring diagram for the casting machine.

In Fig. 1 the pre-heating bunker **48** with the dumping mechanism is shown in cross section. The bunker is, according to the construction of the building, mounted on an iron construction. It is either suspended from the ceiling or also supported from the floor and has slightly conical walls, so that a conglomeration of line material cannot take place. The trap doors **53** and **54** are made fast to the bunker by means of hinges **55** and **56** running along the whole height of the doors. Two connecting rods **57** and **58** are connected to the doors **53** and **54**, such bars being connected with two double levers **59** and **60**. These are operated simultaneously by nuts **61** and **62**, which are provided with right-handed and left-handed threads respectively on a common spindle **63**. Spindle **63** has further, in the depicted example, a sprocket **64** which is geared, by means of a chain **67**, to sprocket **65** and a hand wheel **66** connected therewith. In Fig. 1 the trap doors are shown in closed position, while the open positions of the doors and the lever-mechanism are shown in dot-and-dash lines. The underneath part of the bunker **48** is surrounded by a jacket **68**. This stands on the edge of the furnace **69** in which the tank **70** is suspended. Fig. 2 shows a cross section of the furnace **69**. Here the simple bowl shape of the tank is clearly seen. The tank will preferably be heated by means of the compressed air gas burners **71**, whereby the burning gas is reversed through an inserted fire guiding plate **72**. Between the mantle **73** surrounding the tank and the fire clay work **74**, in these boilers an intermediate wall with insulation **75** is employed. The mode of operation of an insulation so placed is an advantage, because the iron walls of the furnace are, from the beginning, less highly heated than when the insulation is placed outside the walls of the furnace. The effect of an insulation so placed is considerably greater than the outer insulation usual up to the present.

The metal supplying mechanism (Fig. 3) is so placed that it projects freely into the tank. It consists of an iron casing **76**, a foot plate **77**, a worm elevator **78**, and a passage formed by an ascending pipe **84** and a downwardly extending pipe **79** which simultaneously forms an overflow in case that the worm still delivers metal and the casting room is already full of lead. The conical gears **80** and **81** visible in Fig. 3 and the shafts in bearings **82** and **83** appertaining thereto serve to drive the worm elevator **78**, shaft **83** being driven by a motor **186** (Fig. 21).

The lower part of casing **76** provides space for the worm elevator while the upper part forms the outlet channel to the bar-casting apparatus. The upward continuation **84** of the pipe to which the downwardly inclined pipe **79** is connected, allows the air of the casting room to escape and supplies during the casting process, owing to its being filled with lead, the hydrostatic pressure for the cast bars. The foot plate **77** provides a step-bearing for the elevator worm shaft **78** and also provides several metal inlets **85**. Through these inlets the liquid lead flows into the worm elevator which, as a result of the working of the worm, guides it into the bar-casting apparatus.

The bar-casting apparatus is illustrated in Fig. 4 in horizontal cross section. The bars are cast standing perpendicularly. In the drawings the moulds for the bars are shown in about half cylindrical cross section provided with small conical feeding projections. Every desirable form of bar can be manufactured in this manner. The foot **87** of the casting mould **86** is screwed on to the gearing box. It is provided with hollow walls and with water cooling. The opening **88** in the mould provides a space for the operation of means serving to knock out and deposit the bars. The cast iron socket **89** makes a tight joint with the metal channel of the elevator mechanism. The core **90**, which is turnable in its bearing in the casting mould **86**, has in the illustrated example, 20 moulds **91**. It is likewise made as a double walled body and provided with water cooling.

The device for knocking out the bars is illustrated in Fig. 5 in horizontal cross section and in Fig. 6 in vertical cross section. In the middle of the revolvable core **90** is a stationary non-rotary spindle **92**. On this spindle two grooved cams **93** and **94** are splined. Almost the entire circumference of the grooved curve is circular there being a rise only at the point where the bars are knocked out. Between the two grooved discs is a guiding piece **95**, which is revolvable on the shaft **92** and is secured to the core **90**. On the upper and lower side of the guiding piece **95** ten radial straight guiding channels **96** and **97** are milled out. In these **20** channels the same number of blocks **98** fit which bear the plungers **99** for knocking out the bars. Besides these plungers the blocks **98** have also journals **100** on which the rolls **101** can turn. The rolls **101** move in the grooved cams **93** and **94** when the core **90** turns. As can be seen in the Fig. 5, the faces of the plungers are in a straight line with the moulds **91**. Only at the point where the bars are knocked out do they project in the drawing out of the moulds **91** owing to the guiding of the cams **93** and **94**. Since two bars are always simultaneously cast, two bars are also appropriately knocked out simultaneously. In order to accomplish this the plungers **99** are arranged at different heights and two grooved curved disks **93** and **94** are employed which are offset relatively to each other to the necessary extent circumferentially of the core.

The casting machine requires, for the casting process and for the cooling time, the stoppage of the mould, then a further onward movement corresponding to two casting moulds and then again another stoppage. The drive of the core must therefore be interrupted at regular intervals. For this purpose the tangent wedge coupling illustrated in Figs. 7 to 11 is embodied in the drive at

a suitable place. A gear 105 is splined to a steel shaft 104, lying in ball bearings 102 and 103. The shaft 104 has a semicircular slot 106 extending under the gear 105 into which slot a tangent wedge 107 is fitted. This is a turnable tangent wedge which in one position releases the coupling gear and in the other position clutches the latter to the shaft. Fig. 9 shows the position of the tangent wedge in the unclutching position and Fig. 8, the clutching position. The tangent wedge 107 has a projection 108, which, when released is turned by a spring 109 into the coupling position. The tangent wedge 107, which is fully-cylindrically turned for working together with the part nearest to the projection 108, is held by means of a ring 110 made fast on the shaft 104. The gear 111 which is constantly driven by a gear 111' on a shaft 137 hereinafter described runs loosely on this ring and on the projection 112 of the gear 105. It is, in the illustrated example, provided with four indentations 113 at the inner side, into which the tangent wedge can enter. When the tangent wedge is released by the stop 114, it glides along the interior of the gear and enters the next indenture 113 of this gear, whereby the gear 111 is connected with the shaft 104. The gear 105 now follows the revolution of the gear 111 until the latter, by the presence of the stop 114, is again disconnected and thereby stopped.

The gear 105 transmits the movement as illustrated in Fig. 13 by means of a set of gears 115 to a shaft 116, this by a pair of bevel gear wheels 117 and 118 to a shaft 119 which has a worm 120. The worm 120 is geared to a worm wheel 121 which is splined to the core axle 122 which may be an enlarged continuation of shaft 92, or be fixed to shaft 92, if separate therefrom. A step-by-step movement is therefore transmitted from the wheel 111 to the core. To bring about the interruptions in this drive the action of the stop 114 for the tangent coupling must be controlled accordingly. For one revolution of the core, since the core contains 20 moulds and every two moulds should be simultaneously filled, 10 casting periods and 10 advances of the core, each advance comprising two moulds, are necessary. The core is therefore to be stopped 10 times. For this purpose the underneath side of the worm wheel is provided with ten guide indentures 123 in which ten slide blocks 124 move. These slide blocks bear flexibly suspended arms 125 which have depending stops 114 while the arms 125 carry on their extension journals the rollers 126. These rollers run on a ring 127. The ring 127 has a depression at the point where it crosses the shaft 104, i. e. where the projection of the tangent wedge 106 rotates. As soon as a roller 126 comes within range of the depression, it falls automatically into this depression and brings the stop 114 within reach of the projection 108 of the tangent coupling. The projection 108 meets at this moment the stop 114 and the drive of the mould is put out of action. When the casting and solidifying time has elapsed, this stop 114 must again release arm 108 so that the core drive may again be put into operation. For this purpose the blocks 124 have rollers 128 which run in a groove 129. The groove is milled into the worm wheel 130, the greater part of the length of the groove lying in a circle and having only one low place. As soon as this low place reaches a roller 128 the block 124 with its arm 125 is, simultaneously with the stop 114, drawn backwards. When the arm and stop are drawn backwards to release the core drive, the projection of the tangent wedge is rendered free and the spring 109 makes the coupling effective, whereby the core is turned by one tenth of its circumference. The worm wheel 130 which runs loosely on the core shaft 122 and has the said groove 129, is driven by a worm 131, which is fixed to a shaft 132 which receives its drive over a gearing 133, a shaft 134 and a pair of bevel gear wheels 135 and 136. This drive is taken from the constantly revolving shaft 137 which receives its drive over a connecting worm 138 from the motor 186. The constantly driven worm wheel 130 therefore decides the time during which the core remains stationary. The time for one revolution of the worm wheel 130 corresponds to the time for one casting and solidifying period, as well as for the advance of two casting moulds. Since however the control takes place by means of parts which are rigidly connected with the core, a displacement of the casting moulds relative to the casting mouth can never result. The bars are always knocked out at the same place. On the worm wheel 130 a slip ring 139 is made fast, which at a given moment and for a determined time supplies the current for the fluid metal pump. The control of the metal pump therefore results from the wheel 130 and the slip ring 139. The ring 139 is so adjusted that as soon as the movement of the core is ended, the motor of the metal pump is switched on. The switching will be again referred to later.

Figs. 14 and 15 show the delivery for the bars. An oscillatory double depositor 141 is fixed to a shaft 140. This depositor receives its movement over a swinging lever 142, a connecting rod 143 and a driving crank 144. This crank makes the same number of revolutions as the worm wheel 130 so that it makes one movement for every casting operation corresponding to the knocking out of two bars. The bars which are knocked out of the core 90 by means of the previously described knocking-out device, are laid on the roller conveyor 141, by means of the oscillatory depositor wherein they stand with their lower ends on a plate 145 and are further supported by three transoms 146, 147, 148. During the downward movement of the depositor the transoms enter between the slopingly arranged rolls 149 of a roll conveyor 149'. Since the rolls 149 are easily turnable and the bars do not lie any longer on the transoms 146, 147, 148 but move on these rolls, they slide down the roller slope.

The bars strike upon the conveyor band illustrated in Figs. 16, 17 and 18 the carrying belt of which is covered with polished metal plates to guarantee a good sliding of the bars. Opposite the opening of the core 90 for knocking out the bars there is a stop 150 on the frame of the conveyor band, which limits the movement of the bars and assures that the bars 151 lie in proper arrangement on the conveyor band. The drive of the conveyor band is taken from the shaft 116 (Fig. 13) so that when the core turns the conveyor also makes a corresponding forward movement. In this manner the bars have still time to cool thoroughly on their way to the truck. On the frame 153 of the conveyor band 152 two guiding rails 154 and 155 are made fast which serve for guiding the truck into proper position for receiving the bars from the conveyor band. The stops 156 and 157 are provided as termini for the wheels of the truck for transporting the bars.

The transport truck for taking away the bars is illustrated in Figs. 19 and 20. The platform

of the wagon 158 is so cut out that it can surround the conveyor band 152. The parts of the bars projecting over the conveyor band rest on the elevations 159 and 160 of the truck. If the truck while it is being loaded is slowly drawn backwards by the handle 161 the bars are piled up. When the truck is being wheeled in the wheels of the truck are outside the rails 154 and 155. In this case the rollers 164 and 165 coact with rails 154 and 155 to give the truck the necessary parallel position to the conveyor band 152.

Fig. 21 shows the wiring diagram for the drive of the casting machine. The motor 182 is set in motion by means of the starter switch 181. Hereby the core mechanism and also the slip ring system is set in rotation. If now the switch 187 is switched on, a remote switch 184, on one point of the slip ring, is, as the illustration shows, switched on for the length of the segment of the slip ring, such remote switch also setting in motion the motor 186 for the metal conveyor. The slip ring *a* runs past under the brush *b* and at this moment the remote switch 184 falls and stops the motor 186 and thereby also the metal conveyor. The push button 185 has a locking device and serves the purpose of setting the metal conveyor out of action, even when the core and thereby also the slip ring system are rotating, without operating the switch 187. In this way it is possible to set the casting machine itself in motion at the beginning of work with the machine or at the end of the working period, without lead being supplied from the boiler. Thus the core can deposit the last cast bars, or before being set in action the working of the machine can be examined.

Method of working

The method of working of the machine is as follows:—The workman wheels the old letter material which is to be re-melted and which is contained in a truck to the elevator mechanism (not shown) where it is raised and dumped into bunker 48. When the bunker 48 is filled with an amount of old material corresponding to the content of the boiler, the workman operates the hand wheel 66 (Fig. 1). Thereby the trap doors 53 and 54 of the pre-heating bunker are opened and the metal falls into the boiler 70. When the bunker has been emptied it is again closed by the hand wheel 66 and during the melting of the metal filled into the boiler the workman can again freshly fill the bunker. As soon as the material in the boiler is melted and possesses the necessary temperature the metal is cleaned, scraped and newly alloyed. The metal is therefore now ready to be used for casting. The workman presses the button 185 so that the motor 186 for the metal conveyor 78 cannot be set in motion by the switching on of the machine. After that he lets the casting machine begin to run by operating switch 181. He thereby makes sure that everything in the machine and in its mechanism is in good working order. During this time he can also easily grease all revolving parts. After unlocking the press button 185 and while the machine is continuing to run, two bars are always cast simultaneously, during the stoppage of the core, by the operated metal conveyor. After the casting process the core moves, by means of the previously described guiding mechanism and time wheel, forward step-by-step until the first cast metal bars have reached the delivery point. There, the bars, by means of two guided plungers, are knocked out on to a double depositor and gently laid on the conveyor band. This conveyor band which like the core moves forwards step-by-step, lays the bars arranged beside each other on a specially constructed truck on which they can be further conveyed to the required place—the composition room. When the casting machine itself is in operation, it works absolutely automatically. The workman has simply to attend to the changing of the truck for the bars. A soon as the boiler is emptied the worker switches off the casting machine by operating the starter switch 181, fills up the boiler 70 with old material, melts and alloys the lead and then allows the machine to run further in the manner previously described.

Although I have only described and illustrated one form of the invention, I am convinced of the fact that this invention can also be employed without the use of the described details. On that account I do not wish to be limited to the details which are shown and described.

Having thus fully described my invention, what I claim is:

1. In a casting machine for metal bars, a casting apparatus, a fixed cylindrical casting mold and a revolvable cylindrical core therein having grooves forming casting molds, a plunger for each casting mold and means for actuating the plunger to knock out the metal bar in a predetermined position of said core.

2. In a casting machine for metal bars, a casting apparatus comprising a cylindrical core, driving means for rotating the core about a vertical axis, a track concentric with the core said track having a low place, a series of pivoted arms rotating with the core and supported by said concentric track, and means operated by a pivoted arm for stopping the core when such arm reaches said low place.

3. A device as in claim 2, combined with automatic means for restarting the core drive after a predetermined time.

4. In a casting machine for metal bars, a casting apparatus comprising a cylindrical core, driving means for rotating the core about a vertical axis, including a clutch and unclutching means therefor, a track concentric with the core said track having a low place, a series of pivoted arms rotating with the core and supported by said concentric track, each of said arms acting on said unclutching means for stopping the core when any arm reaches said low place in the track.

5. In a casting machine for metal bars, a casting apparatus comprising a cylindrical core, driving means for rotating the core about a vertical axis, including a clutch and unclutching means therefor, a track concentric with the core said track having a low place, a series of pivoted arms rotating with the core and supported by said concentric track, each of said arms acting on said unclutching means for stopping the core when any arm reaches said low place in the track, and means rotating about the axis of the core for withdrawing an operative arm to thus reestablish the core drive.

6. In a casting machine for metal bars, a rotary core having a plurality of molding cavities spaced about its periphery, means for stopping the core at a plurality of points in each rotation thereof, and means for restarting the core after a predetermined period.

7. In a casting machine for metal bars, a rotary core having a plurality of molding cavities

spaced about its periphery, means for rotating the core, means for stopping the core at a plurality of points in each rotation thereof, means for restarting the core after a predetermined period, said rotating means including a clutch, said stopping means including a plurality of spaced pivoted arms rotating about the axis of the core and movable at one point in their rotation into position to uncouple said clutch, and timing means for withdrawing said arms radially from their unclutching position after a predetermined interval.

8. In a casting machine for metal bars, metal feeding means, a driving motor therefor, a time gearing, a circuit for driving the motor, a continuously driven worm wheel, a slip ring on the worm wheel, a contact for engagement by the slip ring to close said circuit, and a segment on the slip ring for breaking the circuit to stop the motor, said circuit being again closed to start the motor after said segment has passed said contact.

9. In a casting machine for metal bars, a vertical molding core, driving means therefor including a tangent wedge coupling, means for unclutching said coupling at regular intervals in the rotation of the core, and timing means for restarting the core after a predetermined interval.

10. In a casting machine, an elevated melting tank, a grooved casting core, a fixed casing coacting with the grooves of the core in casting bars, means for rotating the core step-by-step about a vertical axis, means for feeding melted metal from the tank to an operatively positioned groove of the core, means for ejecting a finished casting from another groove of the core while the first-named groove is being filled, a horizontal traveling conveyor on the floor, a gravity conveyor leading to said traveling conveyor, means for receiving a vertical casting and laying it on said gravity conveyor, means for positioning a truck at the discharge end of said traveling conveyor, and correlated automatic control means for controlling the step-by-step rotation of the core, for causing the feeding means to operate only when the core is stationary, and for operating the receiving means and the traveling conveyor in timed relation with said ejecting means.

11. In a casting machine, an elevated melting tank, a longitudinally grooved casting core, a fixed mold member coacting therewith, means for rotating said core step-by-step about a vertical axis, means for feeding molten metal to a groove in said core while the same is stationary, means for ejecting a finished casting from another groove at such time, handling means for the finished castings including a horizontal conveyor, a gravity conveyor arranged to slide such castings endwise into a position crosswise of the horizontal conveyor, and an oscillatory device to receive said castings from the core and lay them on said gravity conveyor.

12. A device as in claim 11, including correlated automatic control means for controlling the rotation of the core, for causing the feed to operate only when the core is stationary, and for operating the oscillatory device and the horizontal conveyor in timed relation with the casting operations.

13. A device as in claim 11, combined with a stop at the side of said horizontal conveyor opposite to said gravity conveyor for arresting the movement of the castings across said belt conveyor.

14. A device as in claim 11, including a correlated automatic control means for controlling the rotation of the core, for causing the feed to operate only when the core is stationary, and for operating the oscillatory device and the horizontal conveyor in timed relation with the casting operations.

15. A device as in claim 11, combined with a stop at the side of said horizontal conveyor opposite to said gravity conveyor for arresting the movement of the castings across said horizontal conveyor, and correlated automatic control means for controlling the rotation of the core, for causing the feed to operate only when the core is stationary, and for operating the oscillatory device and the horizontal conveyor in timed relation with the casting operations.

16. A device as in claim 11, including motors for driving the core, the metal feeding means, the oscillatory casting receiving device and the horizontal conveyor, and a control circuit for correlating the operations of said motors.

17. A device as in claim 11, including motors for driving the core, the metal feeding means, the oscillatory casting receiving device, and the horizontal conveyor, a control circuit for correlating the operations of said motors, and means in said control circuit for cutting out the motor of the feeding means without interrupting the operation of the casting and conveying means.

18. In combination, a melting tank, a longitudinally grooved bar casting device, automatic means for intermittently rotating said device about a vertical axis, automatic means for feeding metal to a groove in said device between movements thereof, automatic means for simultaneously ejecting finished bars, a horizontal conveyor on the floor, and automatic means for translating said bars from vertical position to horizontal position on said conveyor.

19. A device as in claim 18, including means for putting the metal feeding means out of action without interrupting the operation of the casting and ejecting means.

20. In a casting machine for metal bars having an elevated melting tank, a preheating bunker above the same and an endless conveyor belt to receive the finished bars, the combination of a stationary circular casting mold, a core therein said core having grooves symmetrically distributed on its periphery, means for rotating the core step-by-step about its vertical axis, means to supply molten metal from the tank to two adjacent grooves of the core after each step in its rotation, ejecting means for forcing the cast bars out of said grooves after the core has made nearly a complete rotation from the point where the molten metal is supplied thereto, means to engage the vertical bars ejected from the core and to move them into a horizontal position, an endless conveyor having a horizontal portion to receive said horizontal bars, a truck having a bifurcated body adapted to straddle said horizontal portion of the conveyor, and a stop on the truck positioned to be engaged by the bars so deposited and to push the truck along progressively as the bars are placed thereon by the conveyor, until the truck is covered with a layer of parallel bars.

21. In a casting apparatus for metal bars, a stationary cylindrical casing having a gateway, a casting core in the casing provided with vertical molding grooves for the bars, means for rotating the core step-by-step about a vertical

axis, means for feeding molten metal to a plurality of grooves at each step of rotation, plungers mounted in said core, and means for forcing the plungers against a plurality of finished bars opposite said gateway for ejecting them from the core.

22. In a casting machine, a longitudinally grooved casting core, a fixed mold coacting therewith, means for rotating said core step-by-step about a vertical axis, means for feeding molten metal to a groove in said core, means for ejecting a finishing casting from another groove while such feeding is taking place, means for receiving the ejected vertical bar and moving it into a substantially horizontal position, and conveying means for receiving the bar when so positioned.

23. In a casting machine for metal bars having an elevated melting tank, a preheating bunker above the same and an endless conveyor belt to receive the finished bars, the combination of a multiple-bar casting mold having a fixed casing and a core rotatable about a vertical axis, means to supply molten metal incrementally to individual bar-forming upright grooves of said mold, means for ejecting finished upright bars from said mold, and handling means for bringing said bars into horizontal position on said conveyor belt.

24. A device as in claim 23, including a belt conveyor, means for sliding said bars crosswise of said conveyor, and means for moving said conveyor step-by-step to receive said bars.

25. A device as in claim 23, including a belt conveyor, means for sliding said bars crosswise of said conveyor, means for moving said conveyor step-by-step to receive said bars, means for positioning a truck to take the bars off the conveyor, and means for moving the truck as the bars are placed thereon so as to cover the truck with a layer of cast bars.

26. A device as in claim 23, including a belt conveyor, means for sliding said bars crosswise of said conveyor, means for moving said conveyor step-by-step to receive said bars, means for rotating said core step-by-step in timed relation with the movements of said conveyor, and means for ejecting a finished bar from said core at each step in its rotation.

27. In a machine for casting metal bars, a casting core rotatable on a vertical axis said core having longitudinal molding grooves, a delivery device swingable on a horizontal axis from an upright receiving position to a substantially horizontal delivery position, and means for removing a bar from said device when in delivery position.

28. Molding mechanism comprising an axially grooved core mounted for rotation about a vertical axis, a casing for said core said casing having a gateway, ejecting means for the moldings, a downwardly inclined conveyor adjacent said gateway, and oscillatory handling means for receiving the castings in vertical position and laying them on said conveyor.

29. Molding mechanism comprising an axially grooved core mounted for rotation about a vertical axis, a casing for said core said casing having a gateway, ejecting means for the moldings, a downwardly inclined conveyor adjacent said gateway, oscillatory handling means for receiving the castings in vertical position and laying them on said conveyor, and interconnected means for rotating said core and oscillating said pivoted handling means.

30. Molding mechanism comprising an axially grooved core mounted for rotation about a vertical axis, a casing for said core said casing having a gateway, ejecting means for the moldings, a downwardly inclined conveyor adjacent said gateway, oscillatory handling means for receiving the castings in vertical position and laying them on said conveyor, and interconnected means for rotating said core, for operating said ejecting means and for oscillating said handling means.

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