No. 697,011. Patented Apr. 8, 1902.

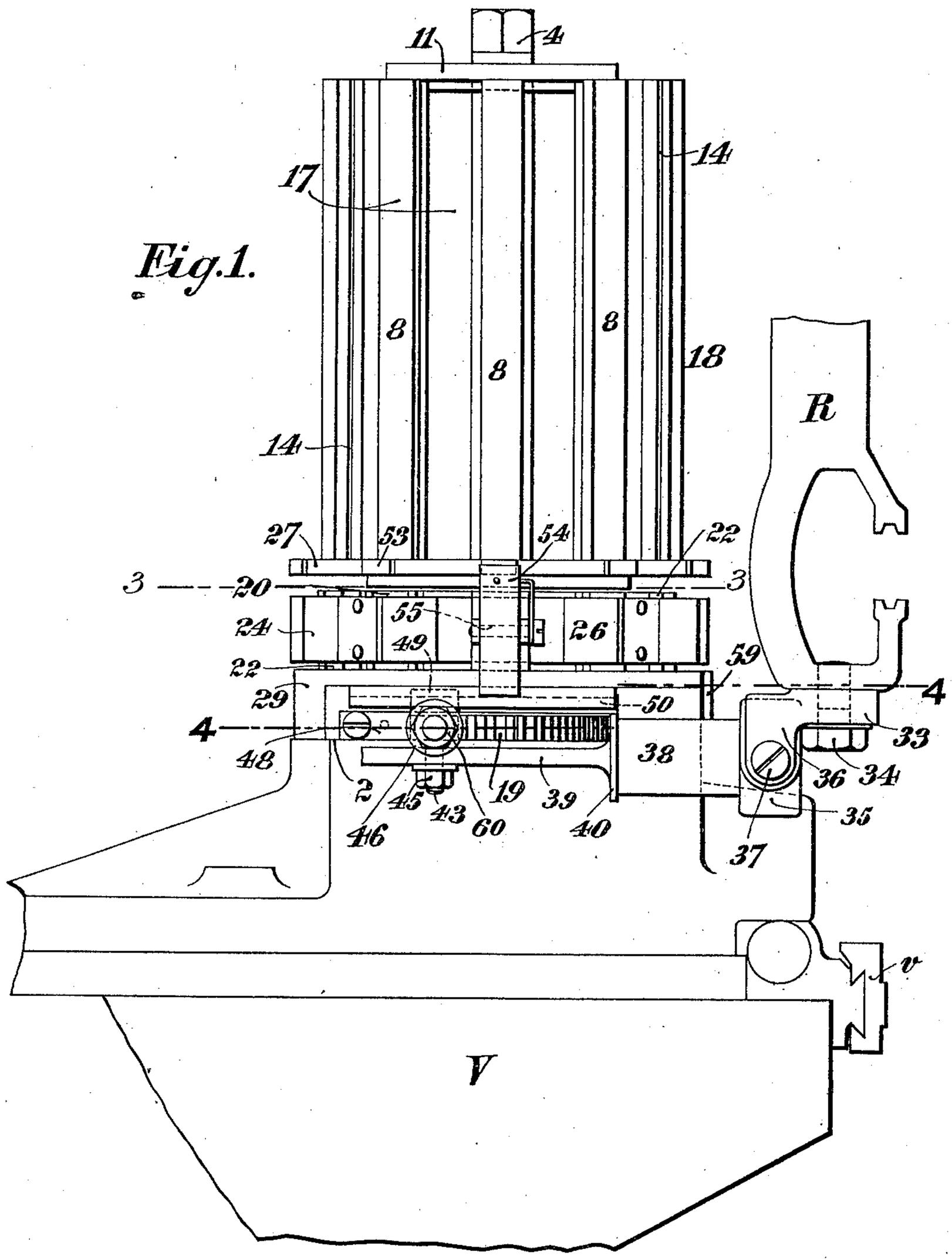
J. PLACE & W. J. LEWIS.

SELF FEEDING MECHANISM FOR METAL POTS.

(Application filed Dec. 21, 1898.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.



Witnesses.
H. R. Kennedy
F. S. Emory

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(No Model.) 4 Sheets—Sheet 2.

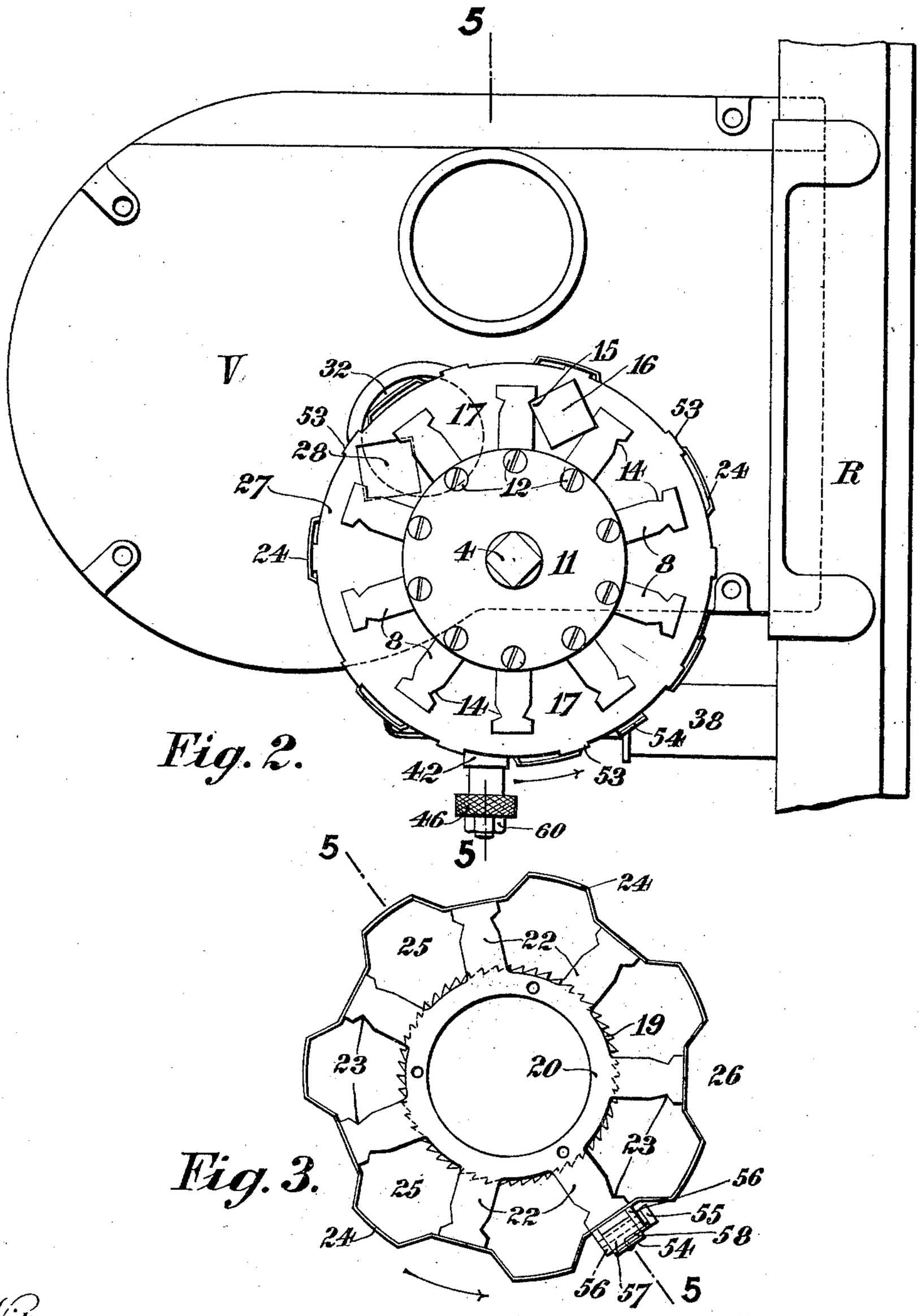

Fig. 2.

Fig. 3.

Witnesses.
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(No Model.) 4 Sheets—Sheet 3.

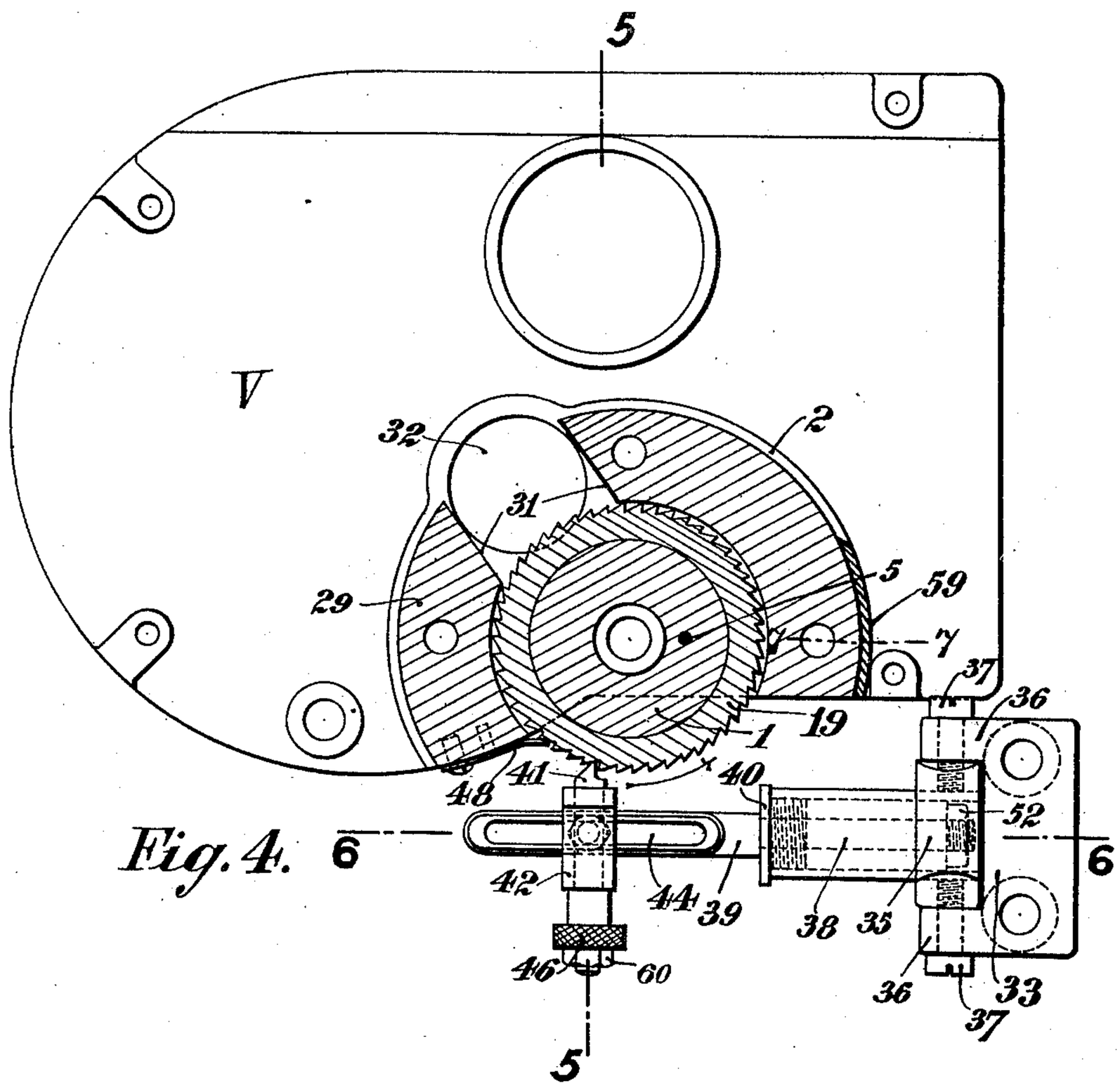

Fig. 4.

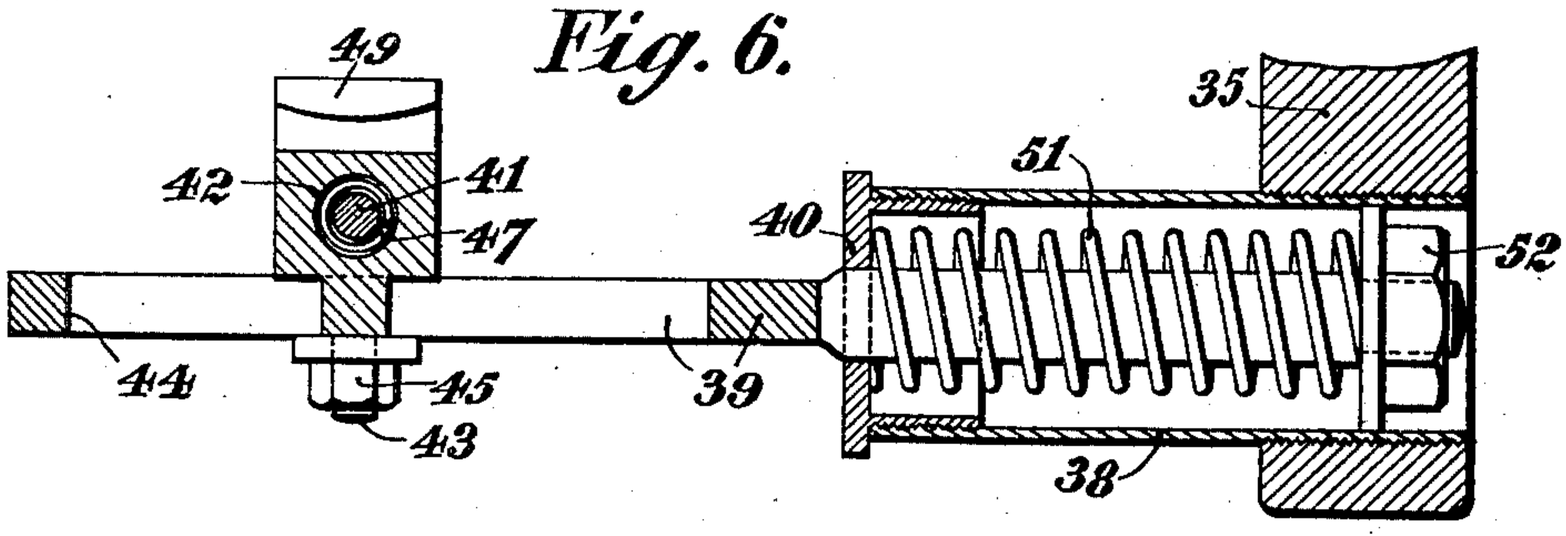

Fig. 6.

Witnesses.
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(No Model.) 4 Sheets—Sheet 4.

Fig. 5.

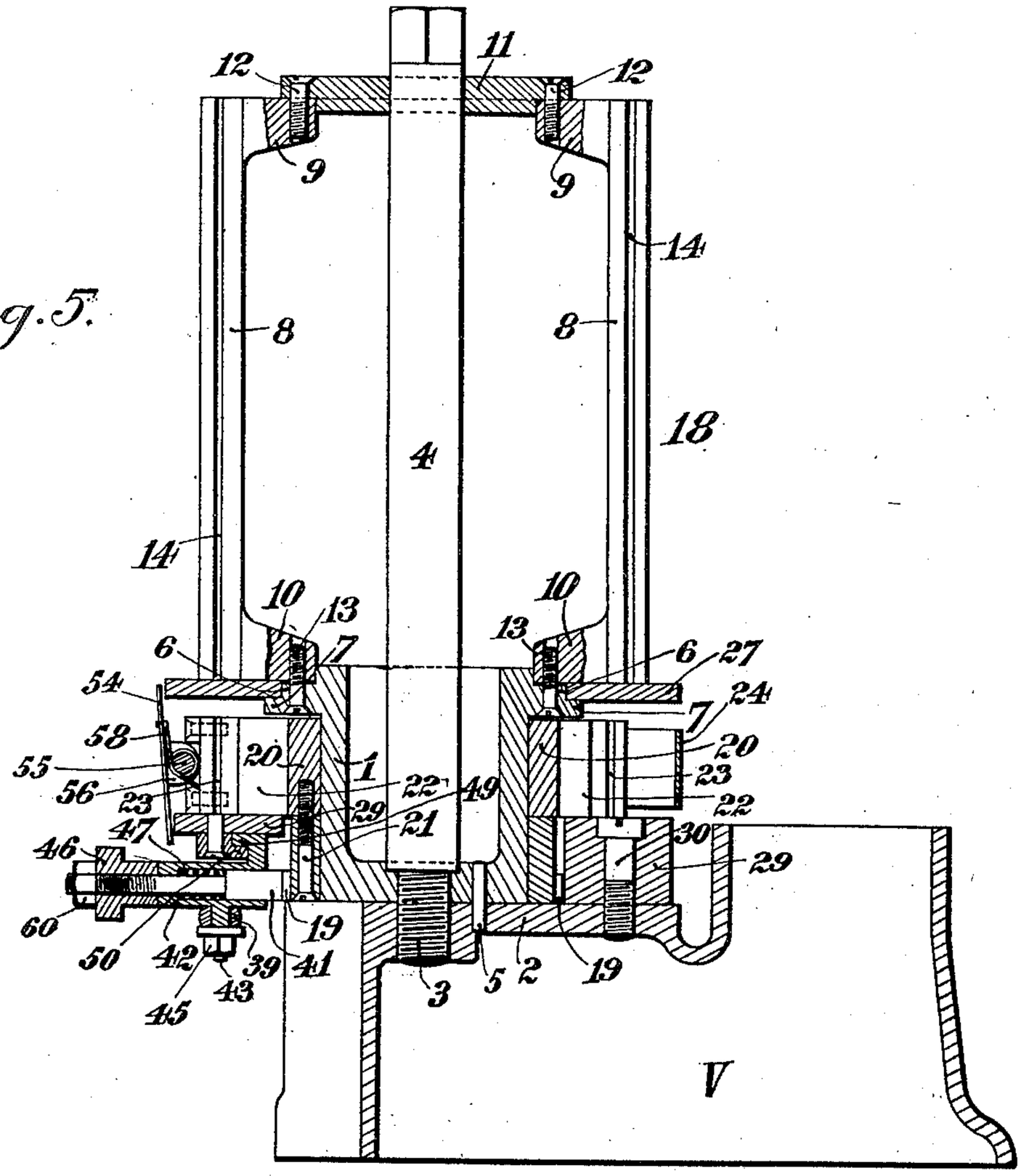
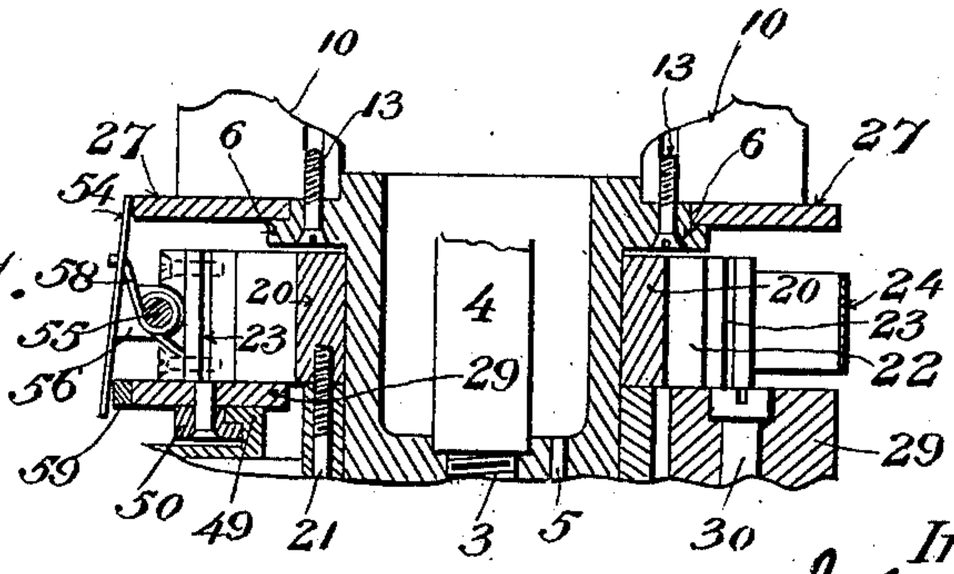


Fig. 7.



Witnesses.
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UNITED STATES PATENT OFFICE.

JOHN PLACE AND WARWICK JAMES LEWIS, OF BROADHEATH, ENGLAND, ASSIGNORS TO THE MERGENTHALER LINOTYPE COMPANY, OF NEW YORK, N. Y.

SELF-FEEDING MECHANISM FOR METAL-POTS.

SPECIFICATION forming part of Letters Patent No. 697,011, dated April 8, 1902.

Application filed December 21, 1898. Serial No. 699,927. (No model.)

To all whom it may concern:

Be it known that we, JOHN PLACE and WARWICK JAMES LEWIS, of Broadheath, in the county of Chester, England, have invented certain new and useful Improvements in the Self-Feeding Mechanism of the Metal-Pots of Linotype-Machines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to improvements in self-feeding mechanism for the metal-pots of linotype-machines; and the object of it is to provide for the quantity of metal in the metal-pot being kept normal by feeding new metal automatically into it at regular intervals, according to the rate of delivery from the pot to the mold.

In the early linotype-machines it was left to the operator to feed the pot by dropping in lumps of metal from time to time. The specification of Letters Patent No. 466,666 of 1891 describes an apparatus for keeping the quantity of metal in the pot substantially normal by feeding used linotypes from the printing-press into it at the same rate as new linotypes are being cast. The used linotypes are inferior to new metal, and the apparatus described is imperfect in that it does not include an adjustability for change in the size of the linotypes being cast.

According to the present invention only new metal is fed into the metal-pot and that is prepared in the form of blocks, each of which contains as much metal as one linotype of the largest size which the machine is capable of making. These blocks are uniform in size and shape and are stored in a magazine standing over the metal-pot cover, through which they drop into the metal-pot each time that communication with the latter is established. When linotypes of the largest size are being cast, communication is established at each cast. The device which establishes the communication is adjustable for the casting of smaller linotypes, so as to feed a smaller number of the blocks equivalent to the difference between the said smaller linotypes and the largest ones.

Referring to the accompanying figures, which are to be taken as part of this specification and read therewith, Figure 1 is a side elevation showing the invention applied to the metal-pot of a Mergenthaler linotype-machine described in the specification of Letters Patent No. 436,532, dated September 16, 1890; Fig. 2, a plan corresponding with Fig. 1; Fig. 3, a plan on the line 3 3 of Fig. 1; Fig. 4, a sectional plan on the line 4 4 of Fig. 1; Fig. 5, a vertical section on the lines 5 5 of Figs. 2, 3, and 4; and Fig. 6, a vertical section on the line 6 6 of Fig. 4. Fig. 7 is a vertical section of the devices for communicating motion from the lower magazine to the overlying plate on the line 7 7, Fig. 4.

V is the reciprocating metal-pot, and *v* the mouthpiece of it, through which the molten metal is delivered into the mold. It is moved forward to the front to make its mouthpiece *v* bear metal-tight against the rear face of the mold before the cast and backward to the rear after the cast in the same way and by the same means as heretofore. For that reason the mold is not included in the drawings.

Figs. 1, 2, 4, and 5 show the pot in its forward or casting position.

The means for sustaining the melting-pot and moving the same forward and backward have no relation whatever to the present invention; but the construction shown in Fig. 29 of United States Patent No. 436,531 is recommended.

1, Fig. 5, is a flat-bottomed circular cup. It is held down upon the flat top 2 of the metal-pot V by means of the shouldered and screw-threaded end 3 of a vertical rod 4, which is screwed down through the bottom of it into the said top, and a steady-pin 5, which is likewise passed through the said bottom of the cup 1 into the metal-pot top. The top of the cup 1 carries an external ledge or flange 6 a little below the top of it and a second one 7 a little below the ledge or flange 6 and projecting beyond it, both ledges being concentric with the cup and incorporated with it.

8 8 are a series of vertical bars standing at equal distances from each other about the vertical rod 4 as a center. 9 10 are respectively the top and bottom inwardly-bent ends

of the said bars. Each top end 9 is held to a plate 11 by a screw 12 and each bottom end 10 to the flange 6 by a screw 13. The plate 11 fits over the rod 4.

14 is a vertical groove in the opposite face of each bar 8 to receive the corners 15 of the metal blocks 16. The combination of two bars 8, each having a groove 14, constitutes a chamber 17, and the combination of chambers 17 is hereinafter referred to as the "top magazine" 18.

19, Figs. 1, 3, 4, and 5, is a ratchet-wheel turning upon the pot-top 2 and about the cup 1.

20 is a ring, likewise turning about the cup 1, between the ratchet-wheel 19 and the flange 7. It is held to the said wheel 19 by screws 21 and clears the flange 7 enough to prevent friction with 1.

22 22 are a series of arms projecting radially from the ring 20, to which they are made fast and standing at equal distances about that ring as a center.

23 is a vertical groove in the opposite face of each arm 22, like the grooves 14 in the vertical bars 8.

24 is a band led around the arms 22 and connected to each one.

The combination of two arms 22 with the respective arcs or portions of the ring 20 and band 24 constitutes a chamber 25, and the combination of chambers 25 is hereinafter referred to as the "bottom magazine" 26. The figures show ten chambers 17 and seven chambers 25 in the respective magazines; but the invention does not limit us in this respect. If there are fewer chambers in the bottom magazine 26 than in the top magazine 18, the former (chambers 25) will be larger than the chambers 17, and the entrance of the blocks into the chambers 25 will be facilitated accordingly; but the two magazines 18 and 26, as well as the chambers 17 and 25, may be of the same size respectively in plan.

The band 24 may be either circular or of any other convenient shape.

27, Figs. 1, 2, and 5, is a ring turning upon the annular ledge 7 about the cup 1 and between the same ledge 7 and the bottom of the magazine 18. 28 is a port in it large enough and properly positioned in the said ring to pass a metal block 16.

29, Figs. 1, 4, and 5, is a ring held down upon the pot-top 1, just outside the ratchet-wheel 19, by screws 30. 31 is a port through it, registering with a hole 32 in the pot-top 2. The two ports 28 31 and the hole 32 are of the same mean radial distance from the rod 4, and the top magazine 18 is fixed so that one of its bars 8 stands centrally over the port 31 and the hole 32.

33, Figs. 1 and 4, is a bracket held fast to the adjacent stationary guide-rail R by screws 34.

35 is a block held between two rearwardly-projecting lugs 36 36 by two screws 37 37, passed through the said lugs and screwed tight into the block 35.

38 is a tube screwed or otherwise made fast by one end in the block 35, from which it projects to the rear to about on a level with the front of the ratchet-wheel 19.

39 is an arm axially alined with the tube 38 and projecting to the rear through the tube-closing plug 40 to beyond the ratchet-wheel, or thereabout.

41 is a finger sliding in a tubular guide 42, held at right angles with the arm 39 by a downwardly-projecting and screw-threaded pin 43, fast to the said tube and passed downward through a longitudinal slot 44 in the arm 34 and a screw-threaded nut 45, engaging with the said pin 43 on the under side of the said arm 39. The finger 41 projects through the outer and closed end of the guide 42, where it carries a milled head 46. This milled head 46 and the respective portion of the finger 41 are screw-threaded in order that the position of the former on the latter may be adjustable, so as to provide for the tip of the said finger engaging with a longer or shorter arc of the ratchet-wheel 19 for a purpose described farther on.

60 is a locking-nut on the outer end of the finger 41 to lock the milled head 46 in its adjusted position.

47 is a spring resilient within the guide 42 between its closed end and a suitable shoulder on the said finger 41 to keep the tip of the latter in contact with the ratchet-wheel 19 and also to allow of the latter pushing the finger out of its path when the pot V moves to the front. It is to be noted that the radial faces of the teeth of the said wheel 19 engage with the tip of the finger 41 (duly projected by the spring 47) when the pot V has reached its front position and that it is the sloping sides or backs of the said teeth that push the finger 41 back into the guide 42 against the resilience of the spring 47 during the forward motion of the said pot.

48 is a spring-finger fixed to the ring 29 and engaging with the ratchet-wheel 19 to prevent friction between it and the tip of the finger 41, turning said wheel about its axis. The ring 29 is cut away on its under side, as shown best in Fig. 1, to make room for the above-described arm 39, finger 41, and their addenda.

49 is a rabbet on the top of the guide 42. It engages with and over a ledge 50, fast to and depending from the ring 29, to support the arm 39 in a horizontal position to allow of its carrying the tip of the finger 41 in the same plane as the ratchet-wheel 19. The backward motion of the metal-pot V is a quick and sudden one and might therefore break off either the tip of the finger 41 or the particular ratchet-wheel 19 tooth in engagement with it at the time. To prevent such an accident, a cushioning-spring 51 is placed within the tube 38 and about the arm 39, where it is compressi-

ble and resilient between the closed end 40 and a nut 52 on the front end of the arm 39.

53 53, Figs. 1, 3, and 5, are a series of equidistant teeth on the edge of the ring 27, respectively opposite the centers of the chambers 17.

54 is a locking bar or dog for giving an intermitting rotation to the ring 27, said bar or dog being pivoted on a pin 55, passed through two lugs 56 56, projecting radially from the outer end of one of the arms 22 of the bottom magazine 26, and a lug 57 on the inside face of the locking-bar 54. The top end of this bar is opposite the edge of the ring 27 and the bottom end of it opposite the ring 29. Normally the said top end is kept clear of the said ring 27 and the bottom end of it pressed against the ring 29 (which thus serves as a stop) by a spring 58.

59 is a fixed cam projecting radially from the edge of the ring 29. The arcual length of this cam is the same as the distance between the working faces of the two adjacent teeth 53 on the ring 27.

It will be observed that the upper magazine 18, containing the several columns of metal blocks, is fixed in position, that the lower magazine 26 is rotated to a greater or less extent by each backward movement of the pot, and that the intermediate ring 27 stands normally at rest during the rotation of the lower magazine and receives motion through the dog 54 once during each revolution of the lower magazine, this rotary motion of the ring being just sufficient to carry its port 28 from a position under one column of blocks in the upper magazine to a position under the next column of blocks.

The invention acts in the following way: If a block 16 is to be fed into the metal-pot V by each backward motion of the latter, the finger 41 is adjusted along the arm 39, so that the arc of the ratchet-wheel 19 through which the tip of the said finger would turn during such backward motion shall be equal to the arcual distance from the center of one chamber 25 to the center of the adjacent one, and so for less frequent feeding, for if the finger 41 be set to turn the ratchet-wheel 19 through half the arc above mentioned it is obvious that a block 16 will be fed into the pot V not by each backward motion of the latter, but only by each alternative backward motion. Each longitudinal adjustment of the finger 41 along the arm 39 must be accompanied by a corresponding adjustment of the milled head 46 in order that the tip of the finger 41 may be able to reach the ends of the respective arcs of the wheel 19. Assuming that each chamber 17 has a full column of blocks 16 in it—say seven—and that the ring 27 is in the relative position shown in Fig. 2, the bottom block 16 that was in the chamber 17 over the port 28 has dropped through the latter into the chamber 25 immediately underneath, where it rests upon the top of the ring 29, which thus serves as the floor of the bottom magazine 26. The next arcual movement of this magazine 26 will carry the last-mentioned block forward over the port 31 and bring the next and empty chamber 25 under the port 28, through which a block 16 will drop, as before, and from the same column in the upper magazine. As a block 16 in a chamber 25 is being moved away from under the remaining blocks 16 of the respective column the following arm 22 gets underneath the said remaining blocks before the block 16 being moved away has cleared them, and so serves to support them until the next empty chamber 25 registers with them. When a chamber 25 having a block 16 in it registers with or passes over the port 31, the said block drops through the hole 32 into the pot V. At the time the last block 16 drops from the last-mentioned chamber 17 of the upper magazine into the chamber 25 then underneath it the bottom end of the locking bar or dog 54, carried forward by the rotation of the lower magazine, comes in contact with the fixed cam 59, whereupon the latter rocks the top end of the said bar up to the edge of the ring 27, behind the adjacent tooth 53, as shown in Fig. 7, thus locking the ring or plate 27 to the rotary magazine 26. The next backward motion of the pot V by turning the magazine 26 will make the said chamber 25 drop its block 16 through the port 31 and hole 32, and the locking-dog 54, carried by the magazine 26, will at the same time move the ring 27 far enough to make it present its port 28 under the next chamber 17, the locking-bar 54 at the completion of the movement leaving the cam 59, whereupon its top end is pushed outward clear of the circle of teeth by the spring 58. The ring 27, having its port in position for the passage of metal blocks from a second column in the upper magazine, will remain at rest until the upper magazine approaches the completion of the next revolution, when the dog 54 will again engage the ring 27 and advance it until its port is in line with the third column of blocks in the upper magazine, and so on repeatedly.

The essence of our invention resides in a combination of a mechanism adapted for delivering blocks of uniform size into the melting-pot, with means for operating the same from the linotype-machine, said means being adjustable to vary the frequency with which the blocks are delivered into the pot according to the rate at which the metal is delivered from the pot to the mold—in other words, according to the size of the linotypes produced and the speed of production.

It is to be noted that our invention contemplates the use of stock metal in blocks or pieces of small and uniform size and the dropping of these pieces by gravity at uniform intervals controllable in length.

It is to be remarked that our invention does not contemplate the use of any mechanism for forcing the metal downward or for controlling the rate of its descent; nor does

it contemplate the feeding of a long ingot to be gradually fused away at the lower end.

We claim—

1. In combination with a linotype-machine, a magazine adapted to receive and loosely hold a column of uniform type-metal blocks, mechanism for removing the blocks one at a time from the bottom of the column and permitting them to fall into the pot below, and intermediate driving mechanism adjustable to vary the frequency of said delivering action in relation to the speed of the machine, whereby predetermined and uniform additions of metal may be made to the body of metal in the pot at longer or shorter intervals as demanded.

2. In combination with a linotype-machine a magazine having a plurality of upright chambers each adapted to carry a series of uniform blocks of type-metal, and mechanism substantially as described, arranged to deliver the blocks successively from one chamber, and thereafter successively from the succeeding chamber to the melting-pot.

3. The combination of the fixed vertically-channeled magazine, the single-ported plate thereunder, an intermediate rotary magazine provided with a ratchet-wheel, mechanism for alternately locking and unlocking said ring, and an actuating-pawl connected with and operated by a linotype-machine.

4. In combination with the reciprocating metal-pot of a linotype-machine, an upper fixed magazine having a series of vertical channels, an underlying rotary ring or plate having a single port, mechanism connected with a linotype for rotating said ring step by step, that its ports may register with the overlying magazine-chambers, an intermediate or secondary magazine underlying and provided with chambers corresponding in number with those in the upper magazine, a ratchet-wheel connected with the intermediate magazine, a pawl for operating the same, and adjustable connections between said pawl and the linotype for imparting to the pawl a variable movement.

5. In combination with a linotype-machine, a fixed magazine 14 with a series of channels, the underlying ring or plate 27 having a single port, the secondary or intermediate magazine 26 having a series of ports, an underlying plate 29 having a single port, and means for rotating the ring 27 and the magazine 26 intermittingly and differentially, substantially as described.

In testimony that we, JOHN PLACE and WARWICK JAMES LEWIS, claim the foregoing as our joint invention we have signed our names in presence of two subscribing witnesses.

JOHN PLACE.
WARWICK JAMES LEWIS.

Witnesses:
FRANCIS I. JACKSON,
E. N. MOLESWORTH.