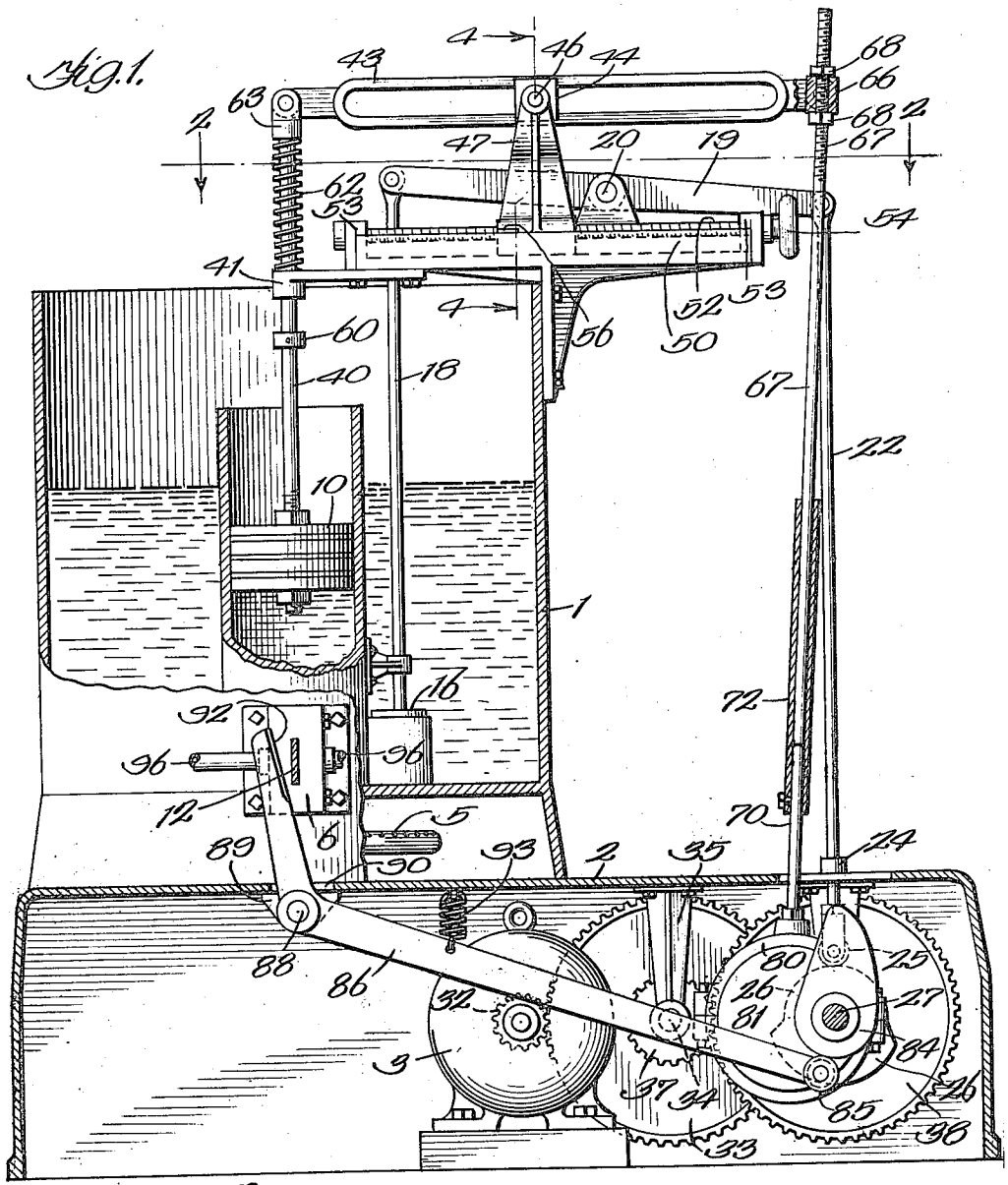
Mar. 13, 1923. 1,448,359.

E. C. DITTMAN.

SLUG CASTING MACHINE.

FILED DEC. 15, 1921. 2 SHEETS—SHEET 1.

Fig. 1.



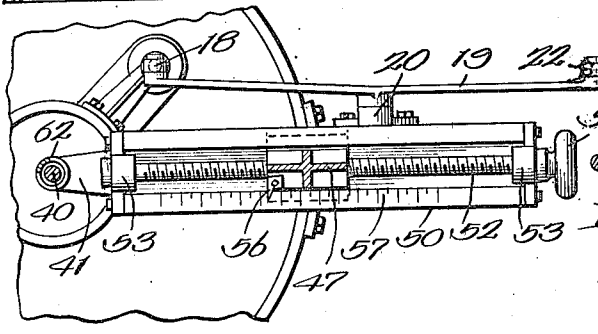


Fig. 2.

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Fig. 3.

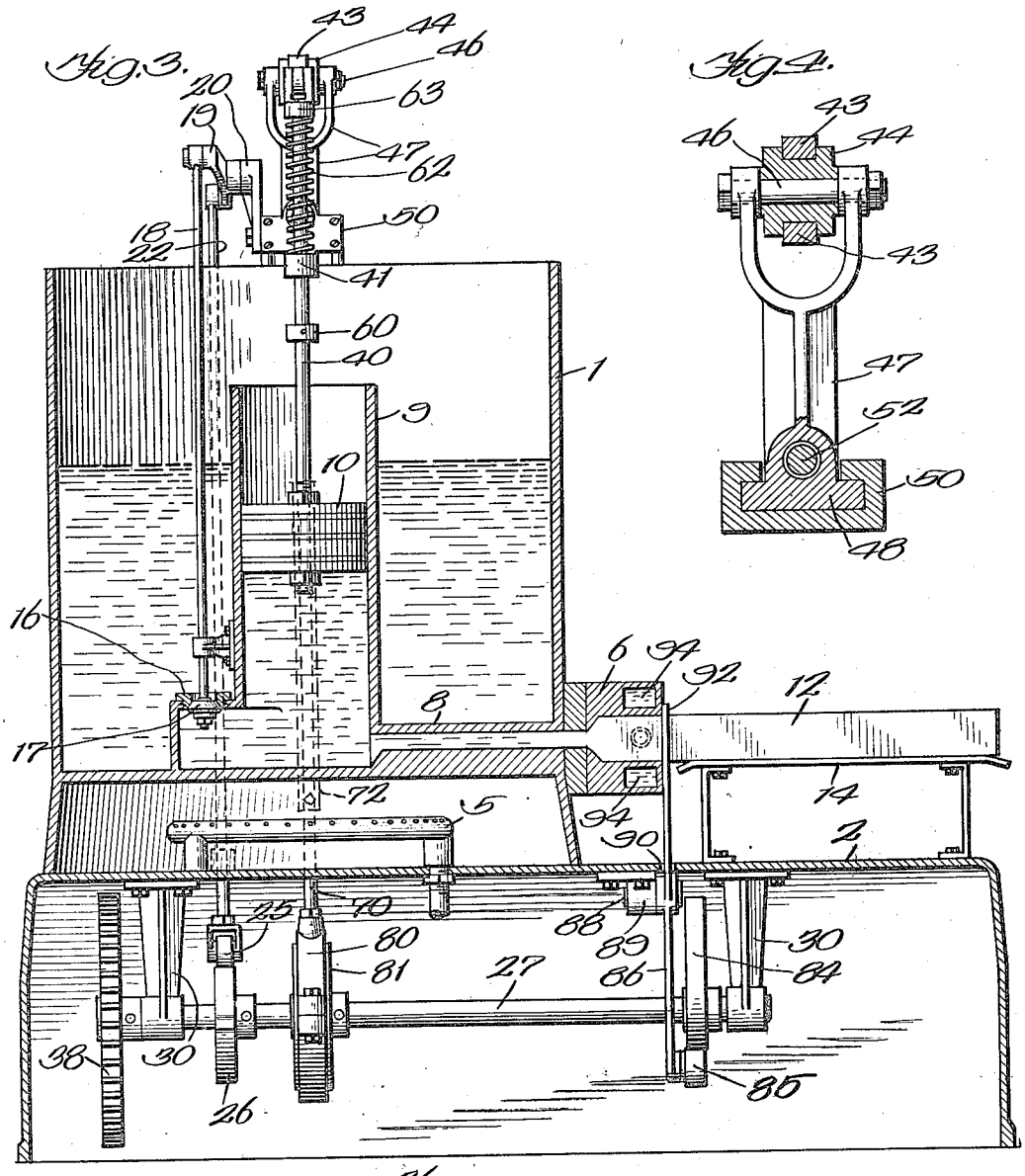
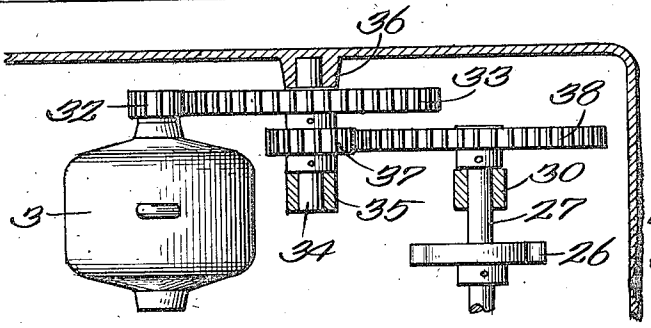


Fig. 4.

Fig. 5.



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Patented Mar. 13, 1923. 1,448,359

UNITED STATES PATENT OFFICE.

ERNST C. DITTMAN, OF CHICAGO, ILLINOIS.

SLUG-CASTING MACHINE.

Application filed December 15, 1921. Serial No. 522,457.

To all whom it may concern:

Be it known that I, ERNST C. DITTMAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Slug-Casting Machines, of which the following is a specification.

My invention relates to casting machines, especially for casting slugs for printers' use. The general object of the invention is to provide a simple and at the same time a positive acting machine which will cast the slugs or strips in a single piece and will automatically cut them off to proper length. Another object is to provide in a machine of this character means for accurately regulating the length of the strip produced. In carrying out my invention I provide a piston chamber adapted to contain the molten metal, and a plunger in the chamber for forcing the metal out thru a die. One of my objects is to provide a lost motion device and associated mechanism for determining the point at which the plunger will commence its acting stroke. Other and contributory objects will appear in the following detailed description.

I accomplish my objects by the mechanism illustrated in the accompanying drawings in which —

Figure 1 is an assembly view in elevation chiefly in section.

Figure 2 is a plan section on the line 2—2, Figure 1.

Figure 3 is an assembly view chiefly in section, the plane of section being at right angles to the plane of section of Figure 2.

Figure 4 is a vertical sectional detail on the line 4—4, Figure 1.

Figure 5 is a detail showing the driving motor and some of the associated parts by which motion is transmitted to the operating parts.

Like numerals denote like parts throughout several views.

Referring to the drawings, a melting pot 1 is mounted on a base frame 2 which is hollow and encloses the motor 3 and much of the transmitting mechanism which will be hereinafter refered to. The melting pot is heated by a burner 5 or other suitable heater. A die 6 is located at the side of the melting pot and communicates through a duct 8 with the inside of the piston chamber 9. This chamber has a plunger 10 reciprocating vertically within it. As the plunger descends, the metal is forced out of the duct 8 and out of the die opening in the form of a strip 12 which is ejected onto a receiving table 14.

Metal is admitted from the melting pot to the cylinder 9 through a ported valve seat 16 which is controlled by an admission valve 17 shown near the left end of Figure 3. This valve cooperates with the bottom of the valve seat and is operated by a valve rod 18 pivoted to the end of a walking beam or rocking lever 19 fulcrumed on a stationary pin 20. Said lever is actuated by a rod 22 which extends downward through a stationary guide 24 to a point inside of the base frame where it is provided with an antifriction roller 25 adapted to cooperate with the working edge of a rotary cam 26 rigidly fastened to the main power shaft 27. Said shaft is journaled in suitable hangers 30 and is driven from the motor 3 previously mentioned. Any appropriate reduction gearing may be introduced between the motor and the shaft, one type being illustrated in the drawings, particularly Figure 5. In this form the motor pinion 32 meshes with a gear 33 fastened to a jack shaft 34 journaled in hanger 35 and a stationary boss 36 (see Figure 1). A pinion 37 is rigidly fastened to shaft 34 and meshes with a gear 38 fastened to shaft 27.

The piston or plunger 10 previously mentioned is operated by a piston rod 40 which passes up through a stationary guide bracket 41 and is pivotally fastened at its upper end to a walking beam 43. This beam is longitudinally slotted and is slidingly mounted upon a block 44 fulcrumed upon a pin 46 mounted at the upper end of a bifurcated standard 47. Said standard has a foot 48 which is slidable in a horizontally stationary guide 50, as shown in Figures 2 and 4. The position of this foot longitudinally in the guide is determined by an adjusting screw 52 which is threaded into the standard and is journaled in stationary bearings 53, 53. The screw is provided with a hand wheel 54, and the construction is such that by rotating the wheel the standard 47 may be shifted to any position desired. It is desirable to provide the standard with a pointer 56 which cooperates with a scale 57 marked on the adjacent portion of the guide. It will be apparent that if the end of the beam opposite to rod 40 be given a definite vertical movement, the throw of the piston

rod may be varied by shifting the standard 47 lengthwise of the guide 50.

The upward movement of rod 40 is limited by a collar 60 which is adjustably fastened to the rod and is adapted to be arrested by the stationary bracket 41. A helical compression spring 62 encircles rod 40, resting upon the top of bracket 41 and at the upper end engaging a collar 63 which is fastened to the rod. The function of this spring is to constantly urge the adjacent end of the walking beam 43 upward.

The power end of the walking beam 43 has a threaded boss 66 into which screws the upper threaded end of the upper section 67 of a connecting rod. The position of the rod in the boss may be regulated by rotating the rod after which the lock nuts 68 are tightened and fix the parts rigidly together. The lower section 70 of the connecting rod has rigidly fastened to it a sleeve or socket 72 which slidingly contains the lower end of section 67. The parts are so constructed that when the lower section 70 rises it will engage the lower end of the upper section 67 and will force it upward against the force of spring 62, but the lower section 70 may descend after the descent of the upper section 67 has been arrested by the engagement of collar 60 with the bottom of bracket 41. Thus lost motion is provided for. Section 70 is fastened to an eccentric strap 80 which encircles an eccentric 81 fastened to the power shaft 27. The eccentric has a continuous rotary motion and section 70 has a constant throw, but on account of the lost motion device just mentioned the plunger 10 does not necessarily always rise to the same elevation. It will depend upon the position of the collar 60 on rod 40. Nor does the plunger always descend to the same point. This may be controlled either by shifting the block 44 in walking beam 43, or by changing the adjustment of the rod section 67 in the walking beam.

Now referring to the mechanism for cutting off the strip 12 as it issues from the mouth of the die 6: Fastened to shaft 27 is a wiper cam 84 adapted to engage an anti-friction roller 85 fastened to one end of a lever 86 fulcrumed upon a stationary pin 88 mounted in a bracket 89 fastened to the inside of the top of base frame 2. The lever extends up through a slot 90 in the base frame and at its upper end has a knife 92 which slides across the front face of the die 6 for cutting off the metal strip. A spring 93 tends to keep the knife in retracted position and the roller 85 in contact with the cam which actuates it. It will be noted that in this construction the action of the knife is positive and occurs always at a definite point in the cycle of operation of the machine.

In practice, the metal is introduced into the receptacle 1 where it is kept hot by the burner 5. After the metal has reached molten state the motor is started and this causes the rods 22 and 67 to reciprocate in timed relation to oscillate the lever 19 and beam 43. These parts actuate respectively the valve stem 18 and piston rod 40. The stem 18 controls the admission valve 16 while the piston rod controls the plunger 10. The length of stroke of the plunger may be increased by shifting the fulcrum block 46 toward the right, Figure 1, and may be decreased by shifting it in the opposite direction. It will be evident that the amount of metal forced out through the die 6 will depend upon the travel of the plunger at each downward stroke. The uppermost position of the plunger (that is, its stopping point) may be regulated by regulating the position of the collar 60 upon the rod 40. The higher the collar is adjusted upon the rod, the smaller will be the stroke of the plunger for any given position of the fulcrum block 44. The arresting of the plunger on its upward stroke will not interfere with the action of the eccentric 81 for after the collar has engaged the guide track 41 and brought the walking beam to a halt, the lower section 70 of the eccentric rod may descend independently of the upper section 67. During each cycle of operation of the machine the cam 84 will move the knife 92 across the face of the die opening and sever the strip 12 from the rest of the metal. The die is preferably water-cooled so as to chill the metal immediately before its emergence from the die. The water is contained in passages 94 surrounding the die and is circulated thru pipes 96. These features, however, are shown in a copending application filed by me on the 3rd day of November, 1921, Serial No. 512,619.

It will be evident that the machine is not only simple in its operation, but that it is positive in its action and thus is able to accurately control the length of the strip produced.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A casting machine having a chamber adapted to contain molten metal, an apertured die communicating with said chamber, a plunger working in said chamber, a constantly rotating member, and a transmission connecting said constantly rotating member to the plunger, said transmission including a lever and fulcrum which are relatively shiftable for varying the throw of the lever and consequently varying the quantity of metal ejected during a single cycle.

2. A casting machine having a chamber for the molten metal, said chamber having a die opening, a plunger working in the chamber, a walking beam connected at one

end to said plunger, a power device, means for reciprocating the other end of said walking beam, a fulcrum for supporting said walking beam between its ends, the fulcrum being slidable relatively to said beam, a stationary support, and means for controlling the position of the fulcrum on said support lengthwise of the walking beam for varying the throw of the plunger.

3. A casting machine having a chamber adapted to contain molten metal, an apertured die communicating with said chamber, a plunger working in said chamber and having a suction stroke and a forward stroke for ejecting the metal through the die, a stop for predetermining the length of the suction stroke, a power device having a constant throw and lost motion connections between said power device and the plunger having one way engagement for permitting the plunger to be arrested by the stop without interfering with action of the power device.

4. A casting machine having a piston chamber adapted to contain molten metal, an apertured die communicating with said chamber, a plunger working in said chamber, an eccentric, an eccentric rod connected to the plunger for actuating it, and means for arresting the plunger prior to the completion of its natural stroke, the eccentric rod being formed in two independent parts and having a sleeve fastened to one part and forming a socket for slidingly receiving the end of the other part.

5. A casting machine having a piston chamber adapted to contain molten metal, an apertured die communicating with said chamber, a plunger working in said chamber, a power shaft, transmission mechanism for transmitting motion from said shaft to the plunger for reciprocating it, a knife adapted to move across the face of the die, and a lever for actuating the knife, said lever being actuated by said power shaft whereby the plunger and the knife are mechanically and positively correlated and caused to operate in a definite, timed relation.

6. A casting machine having a piston chamber adapted to contain molten metal, an apertured die communicating with said chamber, a plunger working in said chamber, a melting pot, a ported valve seat thru which the melting pot communicates with the piston chamber, a valve cooperating with said valve seat, a power shaft common to the plunger and valve, and connections between the shaft and the plunger and valve for actuating them in definite timed relation.

7. A casting machine having a piston chamber adapted to contain molten metal, an apertured die communicating with said chamber, a plunger working in said chamber, a plunger stem, a stationary stop adjacent to said stem, a collar adjustably secured to said stem and adapted to engage the stop for arresting the plunger, a power device, lost motion connections between the power device and the plunger stem for actuating it, and a spring connected to the plunger stem and having a stationary abutment for taking up the slack in the lost motion connections.

In witness whereof, I have hereunto subscribed my name.

ERNST C. DITTMAN.