Oct. 11, 1927. 1,645,167

G. A. THEOBALD ET AL

DIE CASTING MACHINE

Original Filed April 2, 1923 5 Sheets-Sheet 1

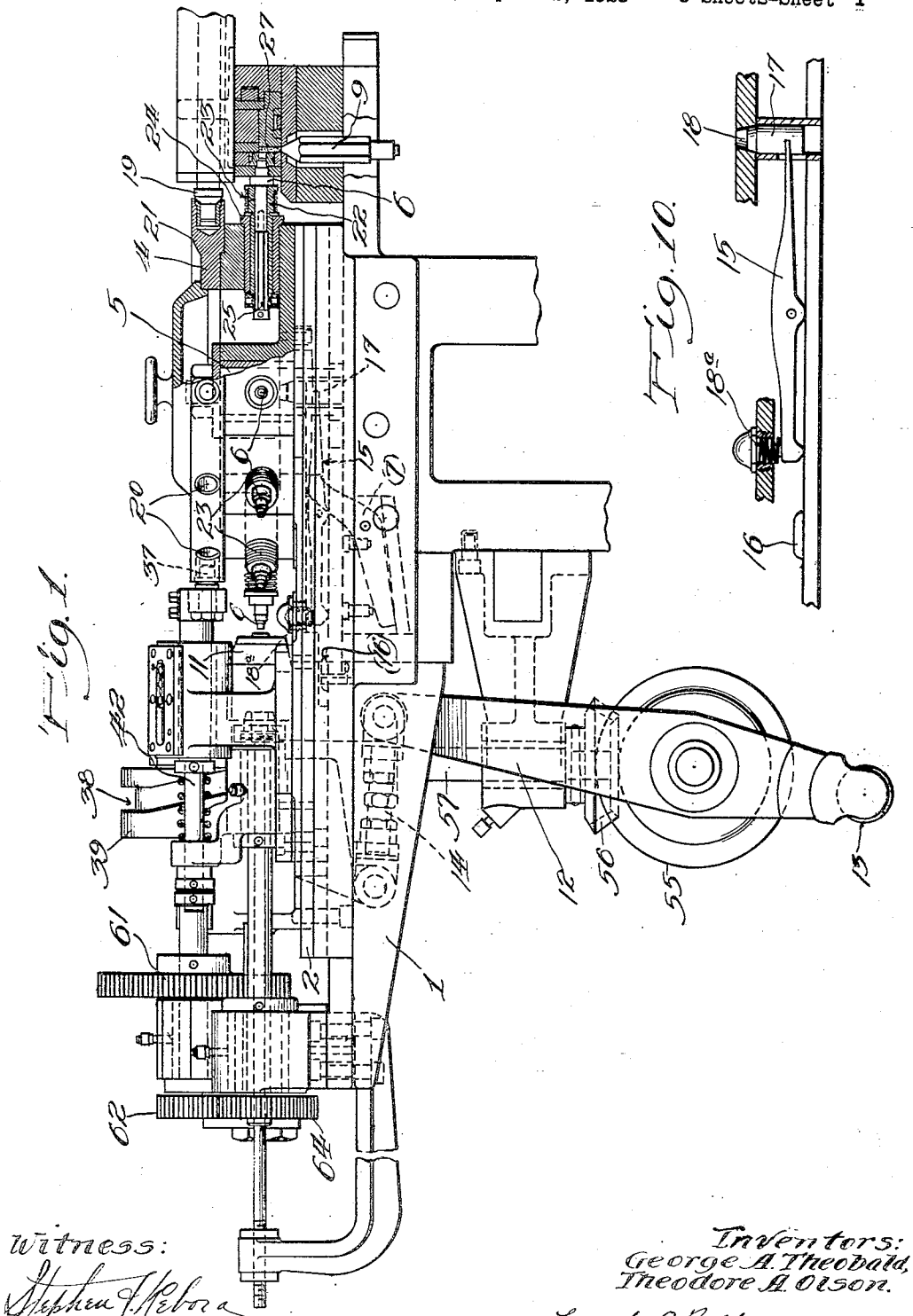

Fig. 1.

Fig. 10.

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Original Filed April 2, 1923 5 Sheets-Sheet 2

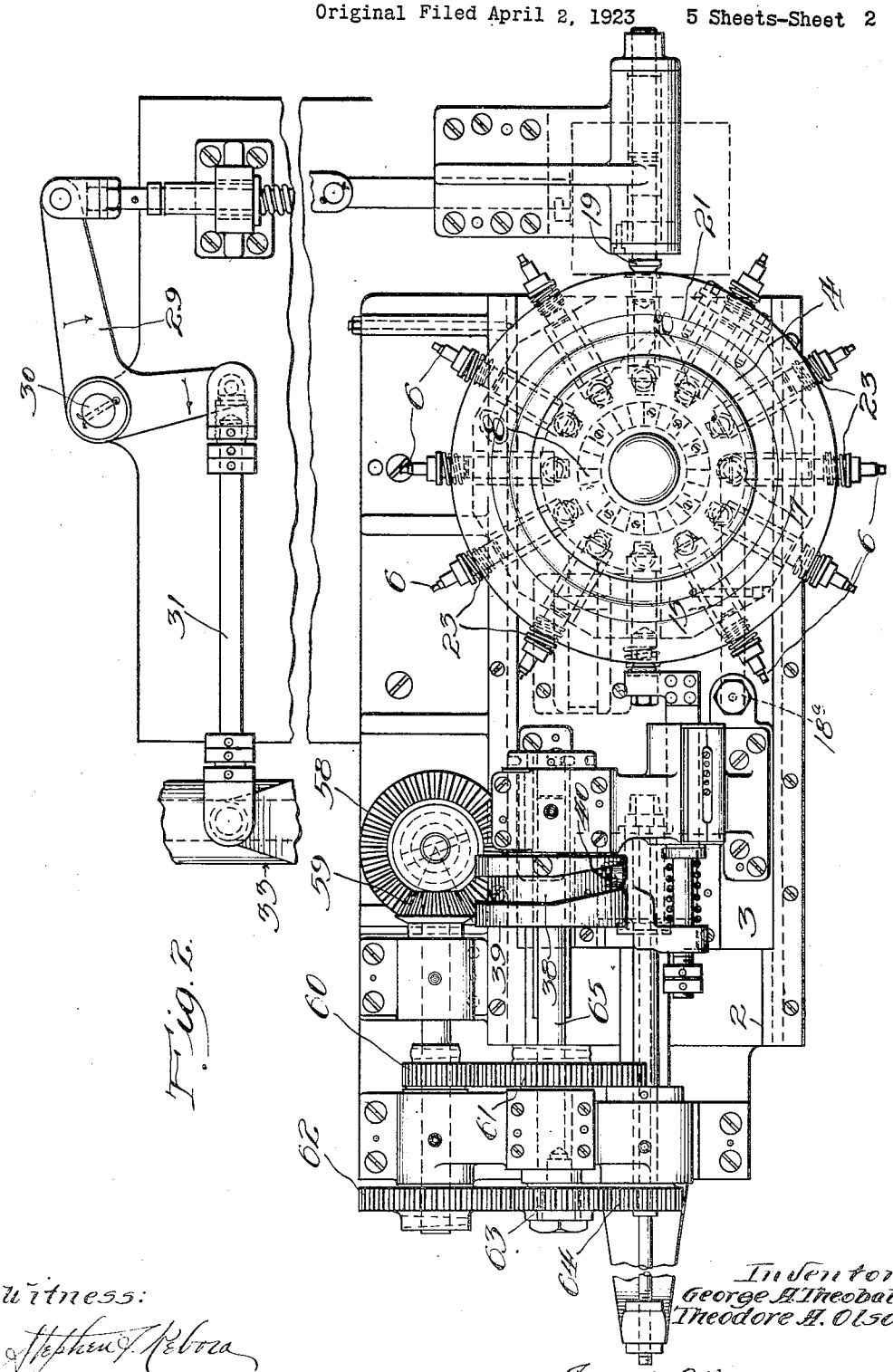

Fig. 2.

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DIE CASTING MACHINE

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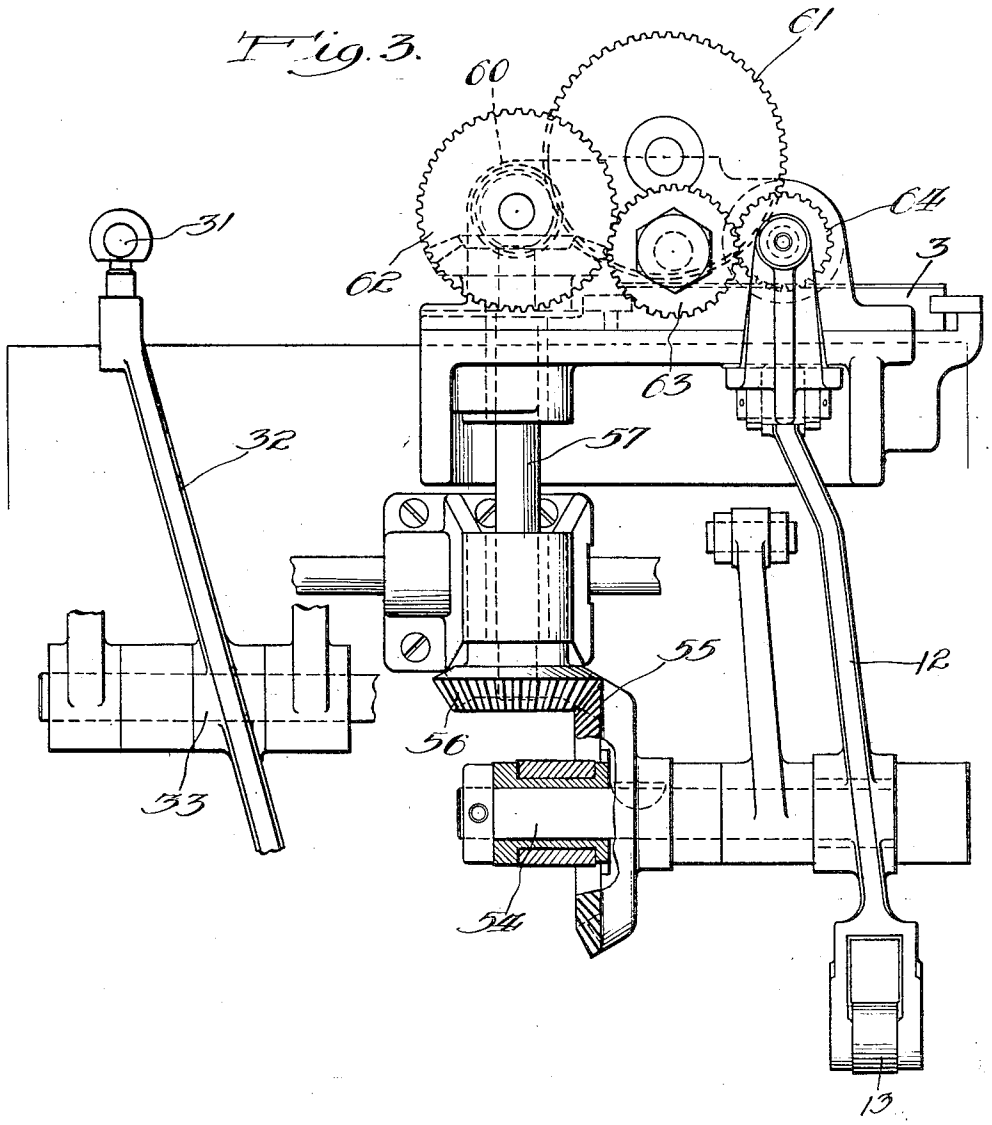
Fig. 3.



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DIE CASTING MACHINE

Original Filed April 2, 1923 5 Sheets-Sheet 4

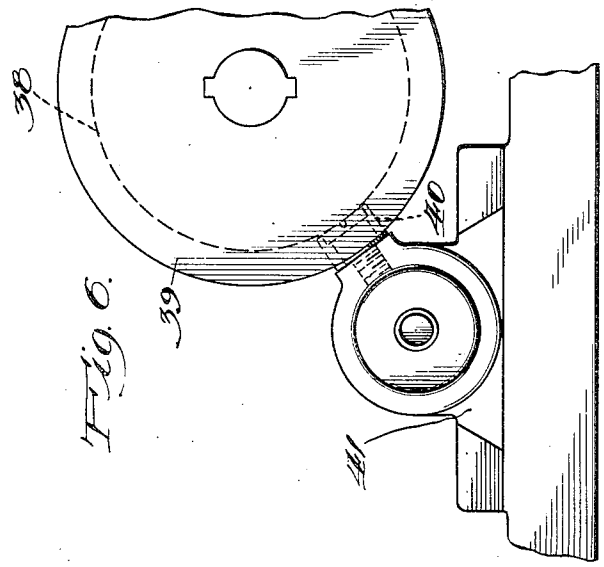

Fig. 6.

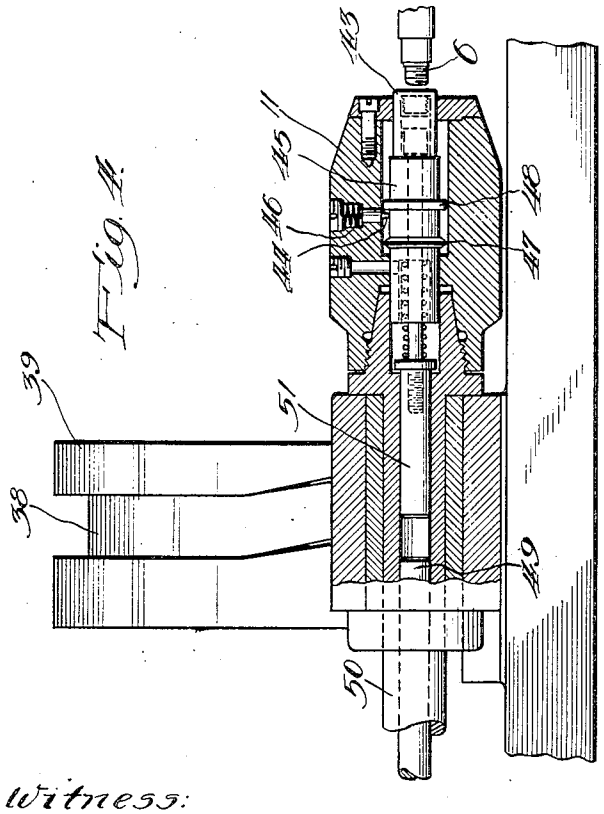

Fig. 4.

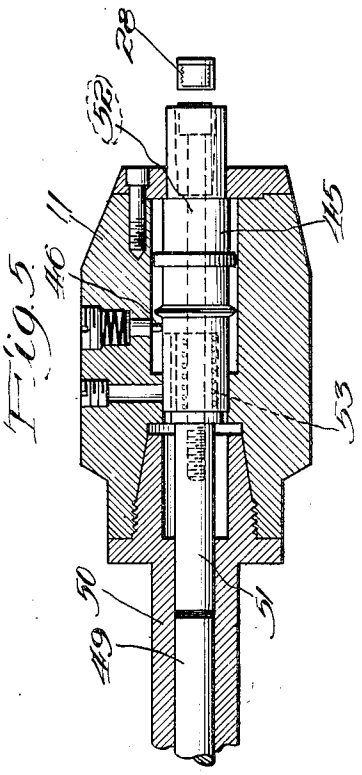

Fig. 5.

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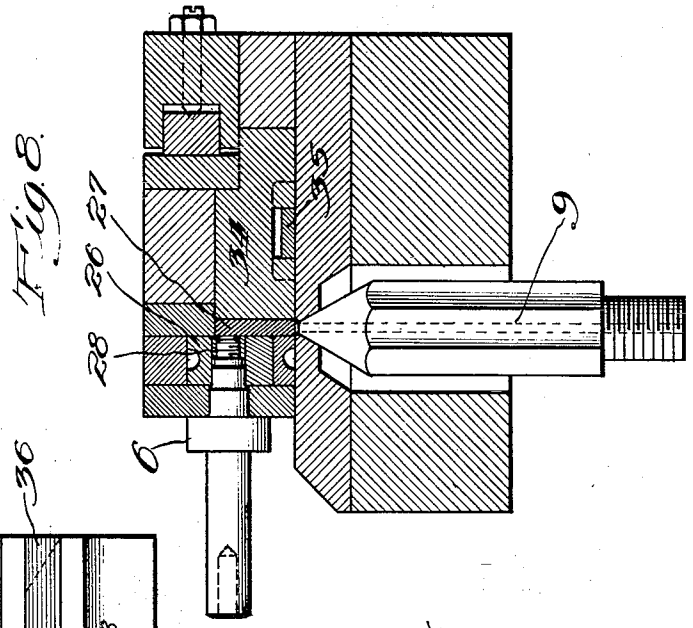
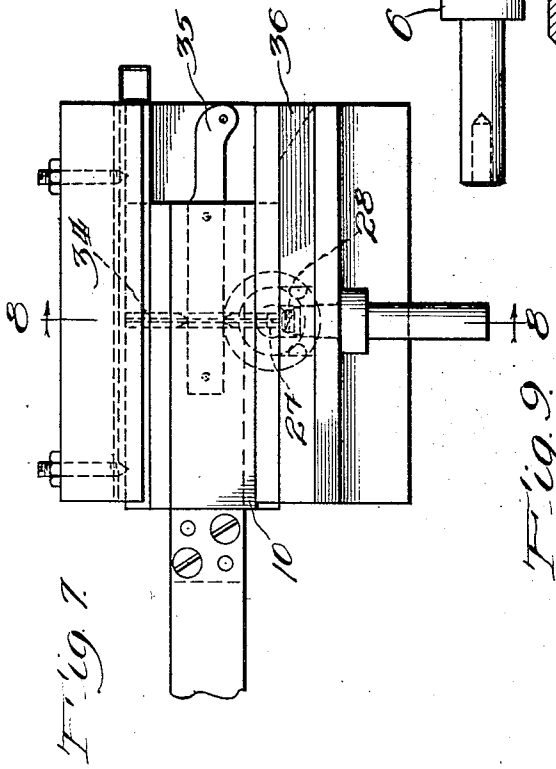
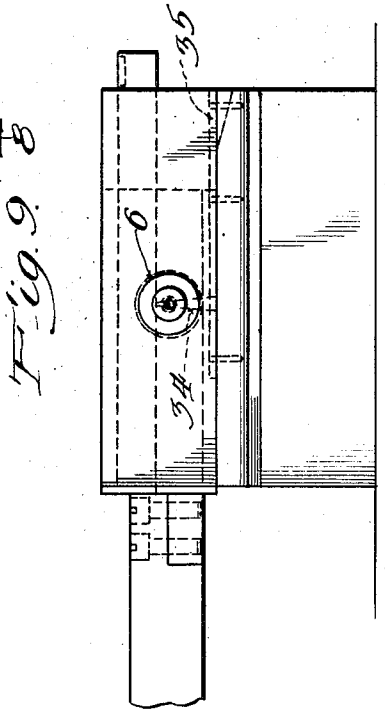
DIE CASTING MACHINE

Original Filed April 2, 1923 5 Sheets-Sheet 5







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UNITED STATES PATENT OFFICE.

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DIE-CASTING MACHINE.

Application filed April 2, 1923, Serial No. 629,522. Renewed March 3, 1927.

This invention relates to improvements in die casting machines, and refers more particularly to a machine for die casting threaded slugs adapted to be used in connection with the sealing of cartridges for cartridge fountain pens.

The mechanism may, however, be utilized for numerous other purposes and castings automatically produced in a manner hereinafter disclosed.

Among the salient objects of the invention are to provide a machine in which seals or slugs are automatically and successively cast with an internal thread upon a male core; to provide a mechanism in which these cores are rotated automatically and the slugs automatically unscrewed from the core members; to provide a mechanism which is rapid and accurate in operation, and in general to provide a mechanism of the character referred to.

Fig. 1 is a side view of the mechanism with parts of the drive omitted.

Fig. 2 is a plan view of the mechanism shown in Fig. 1. Fig. 3 is an end view showing the drive with parts omitted. Fig. 4 is an enlarged detail of the unscrewing clutch and the cam disc. Fig. 5 is a fragmentary enlarged detail of the unscrewing clutch. Fig. 6 is a detail of the cam operating means. Fig. 7 is a plan view of the shearing gate mechanism. Fig. 8 is a view taken along the line 8—8 in Fig. 7. Fig. 9 is a side view of the mechanism shown in Fig. 7. Fig. 10 is a detail view of the locking latch mechanism.

The functioning of the mechanism is briefly as follows: On the standard or base of the machine shown at 1 are ways 2 upon which is slidably mounted a slide 3 which has a reciprocatory movement. On this slide is a turret 4 rotatably mounted upon the stud 5. Radially positioned in the turret are the male cores shown at 6, which are rotated with the turret by means of a pivoted dog 7 which contacts a toothed indexing plate 8, the dog coming in contact with the teeth of the indexing plate with the reciprocation of the turret, thus indexing the turret successvely to an amount to position each succeeding core in alignment with the die.

As the turret is rotated and aligned with the die, the reciprocation of the slide causes the core to enter the die and simultaneously with this action of the mechanism, a shot of metal is introduced through the metal spout 9 shown in Fig. 8, and a slug cast. The slide is again reciprocated to the next die member, the slug which is cast remaining on the end of the die member, and withdrawn from the die with the reciprocation of the turret. In a like manner each succeeding core is inserted into the die and a slug cast. Just subsequent to the casting of the slug, the shearing mechanism or die slide 10 shown in Figs. 7 and 8 is reciprocated shearing off the gate through which the metal is introduced from the spout to the slug and clearing the passage for the next succeeding shot of metal.

Simultaneously with this action at the opposite side of the turret, the slugs are being unscrewed from the cores by means of an unscrewing clutch 11 which is moved forward into engagement with the slugs and unscrewing them from the dies after which the slugs are released from the clutch and are ready to be used.

Describing now in more detail the movement of the slide relative the molding operation, the slide 3 upon which the turret is mounted, is reciprocated by a pivoted arm 12 upon the lower end of which is mounted a cam roller 13 acted upon by a cam, not shown.

The arm 12 is connected to the slide by an adjustable connection shown at 14 by means of which the travel of the slide and turret may be accurately regulated. As the slide is reciprocated away from the molding die, one of the teeth of the indexing plate contacts with the front face of the pivoted dog 7, and due to the reciprocation of the slide indexes or rotates the turret to a position where the next succeeding core will be in alignment with the molding die.

With this rearward reciprocation of the slide there is also a pivoted locking latch 15 which is acted upon by cam plate 16 shown in Fig. 10, tilting the latch and withdrawing a plunger 17 from the hole 18 in the lower portion of the turret with which it engages to hold the turret rigidly from rotation. This withdrawal of the locking plunger 17 takes place just prior to the contacting of the indexing plate with the pivoted dog.

With the return movement of the slide and turret, the plunger 17 engages the next succeeding hole or aperture due to the action of a spring 18ª acting upon the opposite end of the latch from that engaged by the plunger 17.

With the return movement of the slide and turret, the indexing plate will pass over the top of the dog due to its pivoted mounting.

The molding operation consists first in the lining up of the turret with the die by means of a lining plunger 19 which enters the aperture 20 in the top lining plate 21 mounted on the turret above the core members. This lining plunger is positioned somewhat ahead of the die so as to line the turret with the die prior to the casting operation. The cores 6 which are mounted in bushings 22 cushioned by means of spring 23, and held in place in the sleeves 24 mounted in the turret are held in place by means of bolts 25 running longitudinally of the bushings and sleeves. Thus with the advancing of the core and die member the action is cushioned due to the springs 23.

When the core is inserted into the die, the latter being shown at 26, a shot of metal forced by pressure from any suitable reservoir, not shown, is forced from the nozzle 9 through the gate 27 and into the space between the core and die shown at 28. After the casting of the slug, the slide is again reciprocated in the turret and indexed to the next core which is inserted with the return reciprocation of the turret. Thus each core is rotated into alignment with the die and a slug cast thereon.

After the die casting operation, the die slide 10 is reciprocated due to the action of the bell crank 29 which is rotated on its pivot 30 in the direction shown by the arrows in Fig. 2. This movement is transmitted to the bell crank through connection 31 which is attached to a vertical bar 32 pivoted on the shaft 33, the opposite end of the bar 32 having mounted thereon a cam roller not shown, which is acted upon by a cam mounted upon a shaft, both of which are omitted from the drawing. With the reciprocation of the die slide, a bridged wedge shown at 34 in Figs. 7 and 8 is acted upon by the stationary cam 35 which shifts the wedge transversely, shearing the metal formed in the gate 27 from the back of the cast slug and ejects it at the side of the die slide at the bevel portion shown at 36, the metal falling back into the metal pot to be remelted and the die slide being reciprocated back to casting position. Thus, with each successive molding operation the die slide is reciprocated and cool metal formed in the gate between the metal nozzle and the slug is sheared and ejected, leaving the gate clear for the next casting operation.

Adjustments and cushioning springs are shown in Fig. 2 in the connections between the bell crank and the die slide to effect proper adjustments.

Substantially simultaneously with the die casting operation, a slug is unscrewed from one of the cores diametrically opposite the core which is being used in molding a slug. This mechanism is most clearly shown in Figs. 1, 2, 4, 5 and 6. The turret is similarly aligned for the removal of the slugs by means of a lining plunger 37 entering one of the apertures 20 in the lining plate similar to the action of the lining plunger shown at 19 during the molding operation. This lining plunger is advanced due to the action of the cam way 38 in the cam disc 39, which acts upon a cam roller 40 slidably mounted upon the gibs 41 which carry the unscrewing clutch 11 and the shaft upon which the lining plunger 37 and the shaft 42 upon which the lining plunger 37 is mounted. After being lined with the lining plunger, the unscrewing clutch 11 is then advanced to engage the slug 28 due to the tapering character of the mouth of the plunger shown at 43. The clutch is constantly rotating and unscrews the slug from the core 6. To assure the gripping of the seal, the inner tapered mouth of the clutch is corrugated.

When the clutch has moved forward and the seal has been unscrewed from the core as shown in Fig. 4, a detent pin 44 held against the rotating sleeve 45 by means of a spring 46 is held between the ridge 47 and the collar 48 on the sleeve. When the clutch is retarded, due to the action of the cam disc 39, a rod 49 within the hollow shaft 50 contacts against the end of the plunger 51 into which is screwed the ejecting plunger 52. This serves to eject the slug as shown in Fig. 5, the ejecting plunger working against the tension of the cushion spring 53 positioned between the ejecting rod 51 and the sleeve 45 which has the tapered mouth and carries the slug. With this ejection of the slug from the mouth of the sleeve by the plunger 52, the detent pin is caused to ride over the top of the ridge 47 and holds the sleeve in position until the clutch is again returned, or advanced by the cam disc to unscrew the next oncoming slug from its core.

Power to drive is transmitted from the shaft 54 shown in Fig. 3 through bevel gears 55 and 56 to a vertical shaft 57, thence through the bevel gears 58 and 59 shown in Fig. 2 to the two separate trains of gears shown at 60, 61, 62 and 63 and 64, the gears 60 and 61 driving the shaft 65 upon which the cam disc is mounted, while the gears 62, 63 and 64 drive the unscrewing clutch mounted upon the shaft 50. The gear 64 mounted upon the shaft 50 is slidably keyed to permit the advancing and retarding of the unscrewing mechanism.

The mechanism is entirely automatic, the casting of the slugs being successively performed on each of the cores mounted upon the rotating turret and the slugs unscrewed from the cores when they are rotated in position and aligned so that the unscrewing clutch engages, unscrews and ejects the slugs therefrom.

The slugs produced are perfect in form and may be more rapidly manufactured than when made on a screw machine.

Also, there is no loss of metal as the metal cools in the gate and is sheared from the back of the slug, and remelted for reuse.

Claims:

1. A die casting machine of the character described, consisting in a frame having a reciprocating means mounted thereon, a die and a metal supply means communicating therewith, a rotatable element carried by the reciprocating means having die closure members thereon adapted to co-operate with the die during molding periods to form slugs, and means for automatically removing the slugs from the die closure members.

2. A die casting machine of the character described consisting in a frame having reciprocating means mounted thereon, a die and metal supply means communicating therewith, an element carried by the reciprocating means and automatically rotated thereby having die closure means mounted thereon, said closures adapted to successively register with the die during the molding operations to form slugs, and means for automatically removing the slugs.

3. A die casting machine of the character described, consisting in a frame having a reciprocating means mounted thereon, a die and a metal supply means communicating therewith, a rotatable element having core members thereon adapted to co-operate with the die during the molding operation to form slugs, means for automatically removing the slugs from the cores.

4. A die casting machine of the character described, consisting in a frame having a reciprocating means mounted thereon, a die and a metal supply means communicating therewith, an element carried by the reciprocating means and automatically rotated thereby adapted to co-operate with the die during the molding operation to form slugs, and means for automatically removing the slugs from the cores.

5. A die casting machine of the character described, consisting in a frame having a reciprocating means mounted thereon, a die and a metal supply means communicating therewith, a rotatable element having core members thereon adapted to co-operate with the die during the molding periods to form slugs, means for automatically separating the slugs from the metal supply means, and means for automatically removing the slugs from the cores.

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