

April 17, 1934.

H. A. BURT

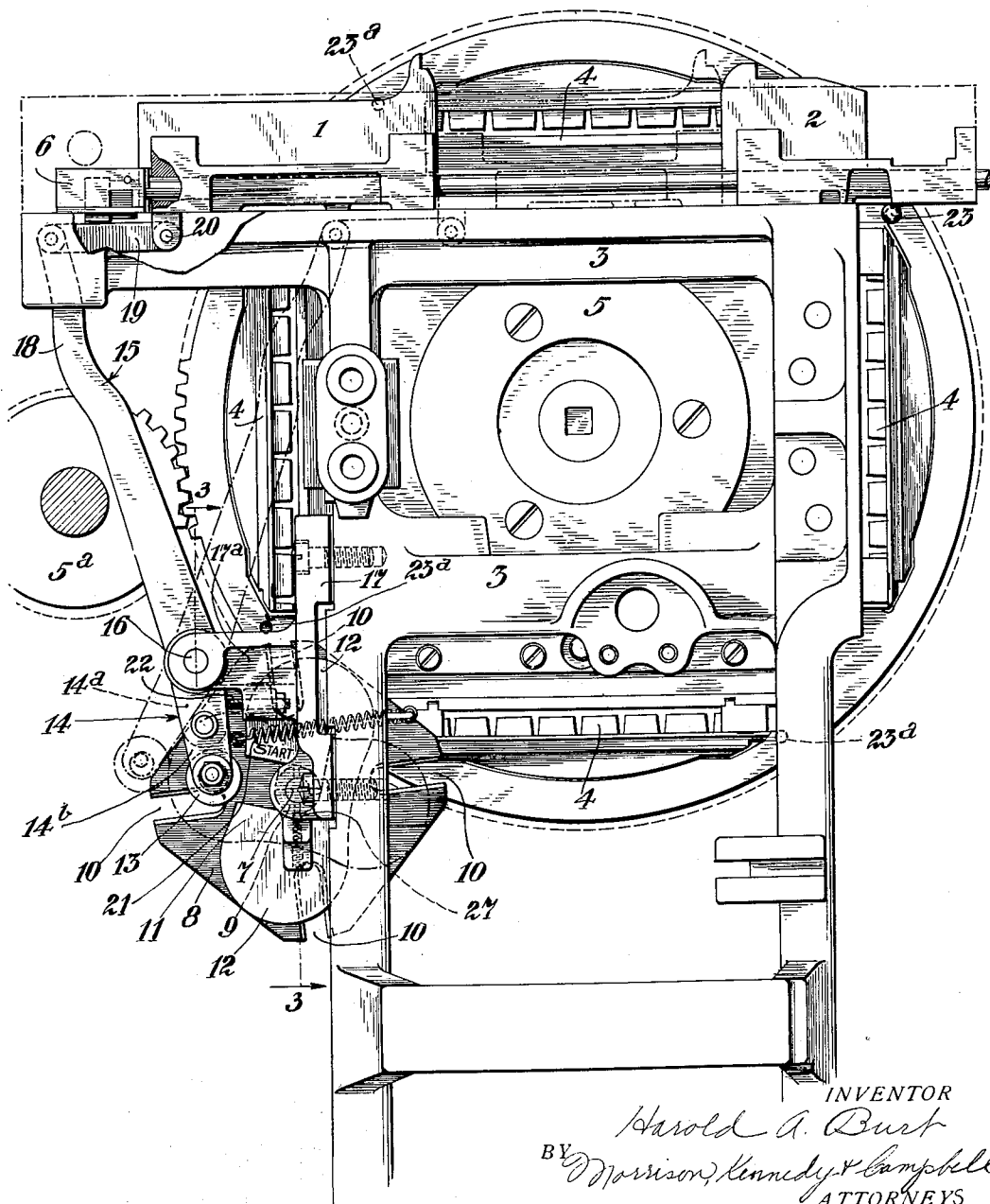
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SLUG CASTING MACHINE

Filed Sept. 15, 1932

3 Sheets-Sheet 1

Fig. 1



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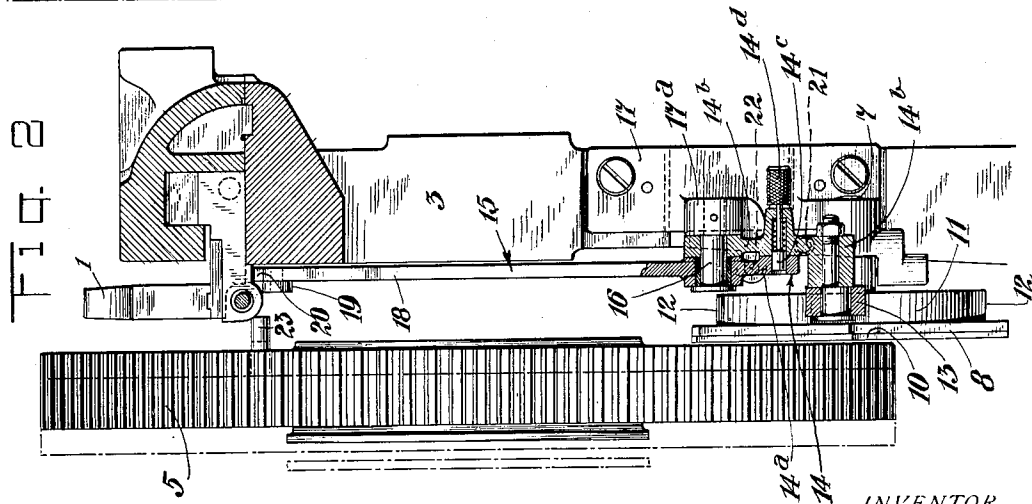
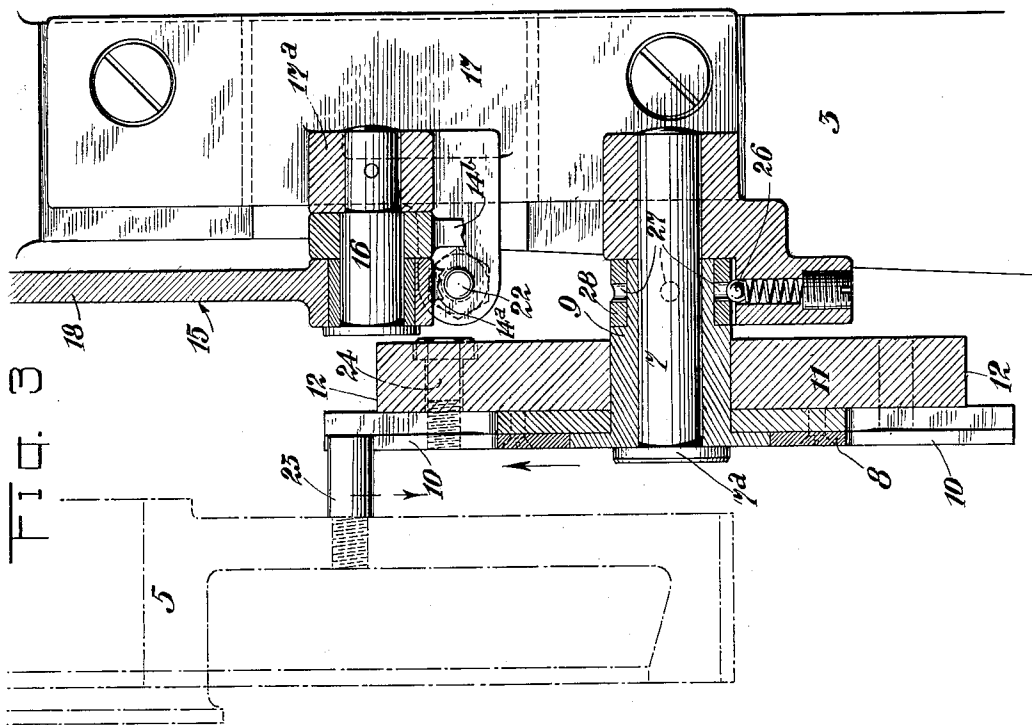
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3 Sheets-Sheet 2



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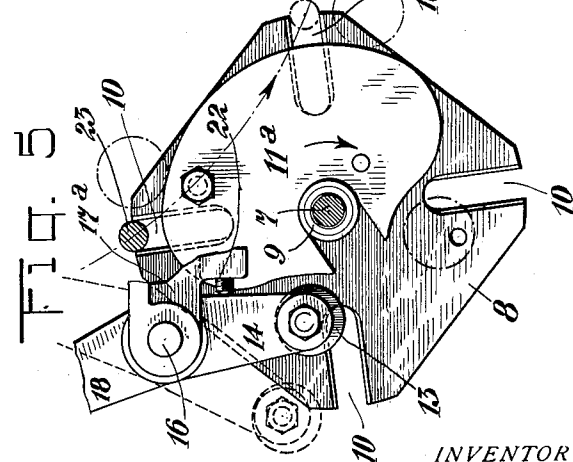
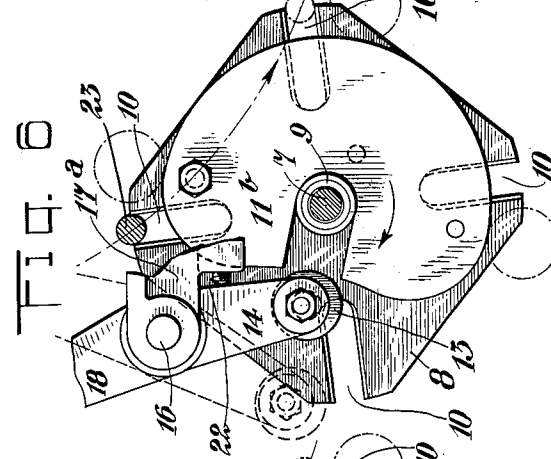
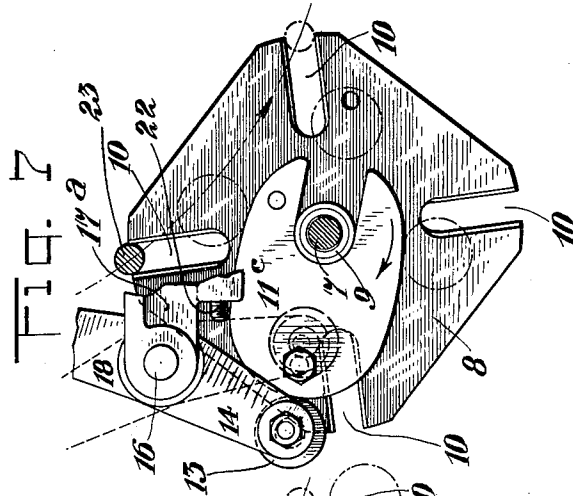
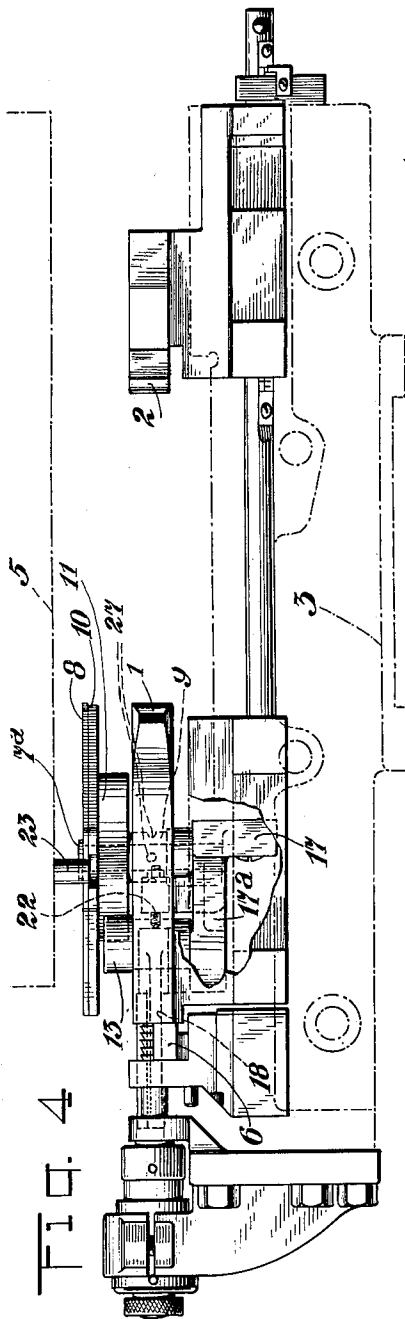
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SLUG CASTING MACHINE

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3 Sheets-Sheet 3



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## UNITED STATES PATENT OFFICE

1,955,621

## SLUG CASTING MACHINE

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of New York

Application September 15, 1932, Serial No. 633,253

20 Claims. (Cl. 199—50)

This invention relates to slug casting machines, such as linotype machines of the general organization represented in United States Letters Patent No. 436,532 to O. Mergenthaler, wherein circulating matrices are released from a magazine in the order in which their characters are to appear in print, and then composed in line, the composed line transferred to the face of a mold, the mold filled with molten metal to form a slug or linotype against the matrices which produce the type characters thereon, and the matrices thereafter returned through distributing mechanism to the magazine from which they started.

More particularly, the invention is directed to certain improvements which adapt these machines, when so desired, to cast blank slugs or leads in conjunction with printing slugs, such improvements being herein presented in the nature of an attachment which can be applied substantially to all commercial machines, with practically little or no alteration.

As is well known, in these machines, when a composed line of matrices is presented to the mold, it is positioned between a pair of clamping jaws, one of which is fixed (except for a limited movement to operate the customary pump stop), and the other of which (usually the left-hand jaw) is adjustable to different positions to accord with the length of the mold slot or the length of the composed line in its justified condition, the position of such adjustable jaw being determined by an adjustable banking stop, which however does not interfere with the free movement of the jaw up against the relatively fixed jaw in the absence of a matrix line between them.

In carrying out the present invention in its preferred embodiment (although the invention is not limited to such embodiment as will later appear), this capability of moving the left-hand jaw into contact with the right hand jaw is utilized to completely close the mold at one side, so that a blank slug may be cast in the mold against the smooth side face of the left-hand jaw, and suitable means are provided for automatically actuating the left-hand jaw to close the mold at certain predetermined cycles of operation of the machine.

Among other uses, the invention is of special utility in the production of blank slugs for use in supporting the overhanging printing faces of L-shaped or T-shaped printing slugs such as are frequently employed in advertising and telephone book work, it being customary in the assembling of such type slugs (especially in the case of "low" slugs) to insert a blank slug or filler alongside the

body of the printing slug and beneath its overhanging printing face to support the latter. In producing blank slugs for this purpose, the mechanism for automatically closing the mold may be set so as to operate alternately with the printing-slug casting operations or in such other sequence as may be required by the nature of the work.

The invention will be described in detail in the specification to follow, and the novel features thereof will be set forth in the appended claims.

In the accompanying drawings:

Fig. 1 is a front elevation of the mold disc, vise frame, and line clamping jaws of a linotype machine, showing applied thereto the attachment for the casting of blank slugs in accordance with the present invention;

Fig. 2 is a side elevation of the same as viewed from the left in Fig. 1, with certain parts shown in section;

Fig. 3 is a vertical sectional elevation, on an enlarged scale, of the actuating mechanism for the mold closing means taken on the line 3—3 of Fig. 1, as viewed in the direction of the arrows;

Fig. 4 is a top plan view of the parts shown in Fig. 1;

Fig. 5 is a face view, on an enlarged scale, of the Geneva stop motion device and its associated cam, for operating the left-hand jaw to close the mold in accordance with the invention, said cam being of a different contour from that shown in Fig. 1 in order to vary the sequence of the casting of blank slugs in relation to the casting of printing slugs;

Fig. 6 is a similar view, showing another form of cam to bring about another variation in the sequence of the casting of blank slugs; and

Fig. 7 is a similar view of still another modified form of cam to bring about still another variation in the sequence of the operations.

Referring to the drawings:

In the operation of the linotype machine in the customary manner for the production of printing slugs, the matrices, as they are released from their storage magazine, are delivered to and composed in line in an assembler, which is then manually elevated to raise the composed line to a delivery slide, which thereupon transfers the line to the line transporter or first elevator. Upon receiving the line, the first elevator descends to position the line between the left-hand clamping paw 1 and the right-hand clamping jaw 2 (both mounted on and carried by the vise frame 3) in front of the then horizontally positioned slotted mold 4 on the rotatable mold wheel 5 (the latter having previously

been given a one-quarter rotation to carry the mold in use from ejecting to casting position), and the mold wheel then advances from the rear to press the mold into contact with the matrix line and the two clamping jaws for the slug casting operation. After the slug has been cast, the mold wheel is given a three-quarter rotation to carry the mold from its horizontal casting position back to its vertical ejecting position (the latter being the normal position of rest of the mold), the first elevator in the meantime being raised to deliver the composed line to the matrix distributing devices, and finally coming to rest in its original or line receiving position.

Of the various parts just referred to, there are only shown those sufficient for an understanding of the present invention, viz., the molds (four in number), the mold disc, the vise frame, and the clamping jaws, the invention, as before stated, contemplating an attachment to enable the mold in use to be closed at one side, so that at predetermined cycles of operation of the machine, the casting mechanism may be caused to cast blank or filler slugs or leads.

In carrying out the invention in its preferred form, the left-hand clamping jaw 1 (which as usual banks against a manually adjustable stop 6 on the vise frame, and thus determines the length of the justified matrix line, and is movable from said adjusted position up against the right-hand jaw 2 when no matrix line is present) is utilized as the means for closing the mold by thus moving the jaw, and such movement of the jaw is, in the embodiment illustrated, effected by mechanism actuated automatically by the movement of the mold wheel 5 and in such manner that the jaw will be moved to close the mold at predetermined cycles of operation of the machine.

It may be stated here, however, that the invention is not limited to this particular form or embodiment, but may be carried out in connection with a mold supported in other ways, and by the use of mold closing means other than the clamping jaw, the essence of the invention residing broadly in the provision of means actuated automatically at predetermined cycles of operation of the machine for closing the mold to cast blank slugs.

Referring now to Figs. 1 to 4, there is rotatably mounted on the vise frame 3, by means of a horizontal stud 7 carried by a bracket 17 screwed or otherwise secured to the vise frame (see Fig. 1), a Geneva stop motion device consisting of a Geneva disc or plate 8 formed with a hub or bushing 9 journaled on the stud 7 and confined thereon by a head 7<sup>a</sup> on the rear end of the stud. The disc 8 is formed at four equidistant points in its peripheral edge with radial slots 10; and fixed to the forward face of this disc is a cam plate 11, which is formed with two diametrically opposed risers 12. This cam in the rotation of the disc, in the manner presently to be described, is adapted to engage a roller 13 mounted (eccentrically for purposes of adjustment, see Fig. 2) on the lower arm 14 of a vertically arranged jaw actuating lever 15 pivoted between its ends by a pin 16 to a horizontal arm 17<sup>a</sup> projecting from the bracket 17, the upper arm 18 of the lever being pivoted to a horizontal link 19, which is in turn pivoted as at 20 to the left-hand end of the left-hand clamping jaw 1.

A spring 21, anchored at one end to the vise frame 3 and connected at its opposite end to the

lower arm 14 of the jaw actuating lever 15, acts to retract or move the jaw to the left (in Fig. 1) on the disengagement of the cam risers from the roller 13, such movement of the jaw in its extreme retracted position being limited by a stop screw 22 on the vise frame in position to be engaged by the lower arm of the jaw actuating lever. When not fully retracted, the jaw 1 will be limited in its movement by the spring by the adjustable banking nut 6, before alluded to.

The Geneva disc 8 is rotated by means of a pin 23 removably fastened to the mold wheel 5 and projecting forwardly from the same near its peripheral edge, said pin in the successive rotations of the mold wheel entering and leaving the slots 10 in the Geneva disc in succession, and thereby imparting a quarter rotation to said Geneva disc at each complete rotation of the mold wheel. In such rotary movements of the Geneva disc, the risers 12 of the cam 11, by engaging the roller 13 on the lower arm of the jaw actuating lever 15, will shift the jaw 1 to the right (in Fig. 1) until it contacts with the right-hand jaw 2 and thus closes the mold, so that molten metal injected into the mold slot by the usual metal pump, will form a blank slug therein. Actually, the range of action of the cam 11 is sufficient to cause the left-hand jaw 1 to move the right-hand jaw 2 slightly to the right so as to operate the customary pump stop and permit the casting operation to take place.

The form of the cam shown in Fig. 1, with its two diametrically opposed risers 12, will, in the successive rotations of the mold wheel, close and open the mold alternately in succeeding cycles of operation of the machine, the jaw 1 between each movement to the right being retracted by the spring 21 on the disengagement of a cam riser 12 from the roller 13, thus uncovering the mold. As a result, the machine will operate to cast blank slugs alternately with the casting of printing slugs. Thus, starting with the parts in their position of rest as shown in Fig. 1, the first cycle of operation of the machine will result in the casting of a printing slug, the cam 11 being inactive before casting. However, as the mold after casting is carried from its horizontal casting position to its vertical ejecting position, the pin 23 (located at the leading end of the mold) will operate the Geneva disc 8 and impart a quarter turn to the cam 11, causing it then to act upon the lever 15 and move the left-hand jaw 1 up against the right-hand jaw to close the mold for the next casting operation (the composed line which was positioned between the two jaws for the first casting operation being of course lifted out of the jaws before the left-hand jaw is moved over). The left-hand jaw remains in its mold closing position during the second casting operation, so that a blank slug results; but, as the mold during this second machine cycle is carried by the mold wheel around to its vertical slug ejecting position, the pin 23 again operates the Geneva disc 8, imparting a second quarter turn to the cam 11 and allowing the spring 21 to return the jaw to its original retracted position. At the next operation of the machine (its third cycle), a composed matrix line will be presented to the mold for the casting of a second printing slug, the action of the parts being the same as when casting the first slug. In the fourth machine cycle, a blank slug will be cast, the action of the parts being the same as when casting the second slug or the first blank slug. In this way, the machine will continue indefinitely and entirely automatically

to cast first a printing slug and then a blank slug until the lever 15 is disconnected from the cam 11 by hand in the manner presently to be described. It will be noted that while the casting of a blank slug takes place in one cycle of operation of the machine, the left-hand jaw is automatically adjusted to its mold closing position in the machine cycle immediately preceding, although subsequent to the slug casting operation which takes place in such preceding cycle. This allows ample time for the movements of the left-hand jaw to and from its mold closing position without interfering with the composed matrix lines as they are delivered to and later taken from casting position.

The cam plate 11 is fastened detachably to the side of the Geneva disc 8 by a bolt 24, (being held from rotary displacement thereon by one or more dowel pins), whereby the cam can be readily removed from the disc and replaced by other cams of different contours, such as shown at 11<sup>a</sup>, 11<sup>b</sup> and 11<sup>c</sup> in Figs. 5, 6 and 7, to bring about variations in the sequence of the casting of the blank slugs relative to the casting of printing slugs.

In Fig. 5 for instance, the cam plate 11<sup>a</sup> is of such contour that the mold closing jaw will be caused to close the mold at two successive cycles of operation of the machine, and then retracted (to open the mold, so to speak) during the next two cycles of operation. Thus, starting with the cam in the position shown in Fig. 5, the machine will cast two printing slugs in succession, then two blank slugs, and so on, repeating this sequence.

With the form of the cam plate shown in Fig. 6, the machine will cast (starting with the parts in the position there shown) one printing slug, then three blank slugs, and so on, repeating this sequence; and in Fig. 7, the form of the cam plate is such that the machine will cast (starting with the parts in the position shown in said figure) one blank slug, then three printing slugs, and so on, repeating this particular sequence.

It is seen therefore that by substituting for the cam plate 11 in Fig. 1, cam plates of different contours, such as shown in Figs. 5, 6, and 7 just described, the sequence of the operations of casting blank slugs relative to the casting of printing slugs may be greatly varied.

The Geneva disc in its intermittent rotation is held against overthrow by means of a spring-actuated ball detent 26 adapted to seat in sockets 27 formed in a collar 28 fixed to the bushing 9 of the Geneva disc, and located at points corresponding to the positions of the radial slots 10 in said disc.

The pin 23 carried by the mold wheel 5 for operating the Geneva stop motion device is, as before stated, removable and is adapted to be seated in any one of the four sockets 23<sup>a</sup> formed in the mold wheel at the leading ends of the four molds carried thereby, the purpose of this arrangement being to permit the pin to be shifted from one to another of said sockets according to the particular mold which is to be used in the casting operation. As well known, any one of the four molds may be selected for use by the manual adjustment of the mold wheel 5 with the aid of the turning pinion 5<sup>a</sup>.

In order that when desired the left-hand jaw 1 may be freed from the influence of the actuating arm 11, the lower arm 14 of the jaw actuating lever 15 is formed in two sections, an upper section 14<sup>a</sup> forming a continuation of the upper arm 18 of the lever, and a lower section 14<sup>b</sup>

pivoted co-axially of the lever on the pin 16 and carrying the aforementioned roller 13. These two sections 14<sup>a</sup> and 14<sup>b</sup> are coupled together by means of a retractable spring pressed plunger 14<sup>c</sup> carried by the lower section 14<sup>b</sup> and engaging in a socket in the upper section 14<sup>a</sup>. Normally, when the jaw is to be subjected to the action of the cam 11, the plunger 14<sup>c</sup> is seated in the socket, as shown in Fig. 2, but when the jaw is to be freed from the influence of the cam, the plunger is withdrawn from the socket by means of a handle 14<sup>d</sup>. When the lever 15 is thus disconnected from the cam 11, the lower roller-carrying section 14<sup>b</sup> of the lever will be free to vibrate idly about the axis 16 without imparting motion to the lever itself.

It will be understood by those skilled in the art that the equipment of a slug casting machine with the improved attachment for the casting of blank slugs, will in no manner interfere with the normal operation of the machine when it is to be used alone for casting printing slugs, since the lever 15 can be disconnected whenever desired from its actuating cam as just described, and in such circumstances the left-hand jaw is free to perform its usual functions in clamping a composed line at each casting operation. And likewise when the machine is to be used for the alternate casting of printing and blank slugs as above described, there is nothing to interfere with the usual operation of the left-hand jaw in clamping a composed line during these cycles devoted to the casting of printing slugs, since at those times the cam 11 is not under the influence of the lever 15, which therefore can move freely with the jaw.

It may be noted that the Geneva stop motion device and associated parts, including the cam 11 and lever 15, are all mounted on and supported by the bracket 17. As will be apparent, this bracket may be readily attached almost to any commercial machine, involving only the tapping of two screw holes. The mounting of the pin 23 on the mold wheel likewise involves merely the drilling or tapping of the sockets 23<sup>a</sup>. These are all very simple operations and make it possible to apply the present invention to existing machines with little or no alteration.

While in the foregoing description and accompanying drawings the invention has been set forth in the particular detailed embodiment which it is desired to adopt, it will be understood that these details may be variously changed and modified without departing from the limits of the invention; and further, it will be understood that the invention is not limited to any particular form or construction of the parts, except insofar as such limitations are specified in the appended claims.

Having thus described my invention, what I claim is:

1. In a slug casting machine, the combination of a mold, and means settable manually and actuated automatically at predetermined cycles of operation of the machine for closing the mold to cast blank slugs, said cycles being determined by the manual setting of said means.

2. In a slug casting machine, the combination of a mold, line clamping means operable to close the mold for the casting of a blank slug, and means settable manually and actuated automatically at predetermined cycles of operation of the machine for operating said line clamping means to close the mold, said cycles being determined by the manual setting of said means.

3. In a slug casting machine, the combination of a mold, a pair of clamping jaws for holding a composed line of matrices in casting position relative to the mold, one of said jaws being  
5 movable to a position to close the mold at one side for the casting of a blank slug, and means independent of the composed line and actuated automatically at predetermined cycles of operation of the machine for effecting such mold  
10 closing movement of the jaw.
4. In a slug casting machine, the combination of a mold, a pair of clamping jaws for holding a composed line of matrices in casting position relative to the mold, one of said jaws  
15 being adjustably sustained and movable from different adjusted positions to close the mold for the casting of a blank slug, and means independent of the composed line and actuated automatically at predetermined cycles of operation  
20 of the machine for effecting such mold closing movement of the jaw.
5. A combination as set forth in claim 3, characterized by the fact that the movable clamping jaw therein recited for closing the mold, is the  
25 left hand jaw.
6. In a slug casting machine, the combination of a movable mold carrier having a mold in which printing slugs are cast, and means actuated by the movement of the mold carrier during  
30 the normal operation of the machine and at predetermined cycles of operation of the machine, for closing the mold to cast blank slugs.
7. A combination as set forth in claim 6, characterized by the fact that there are a plurality  
35 of molds on the mold carrier, and that means are provided for selectively determining the particular mold which is to be closed.
8. A combination as set forth in claim 6, characterized by the fact that there are a plurality  
40 of molds on the mold carrier, and that means are provided on said carrier for selectively determining the particular mold which is to be closed.
9. In a slug casting machine, the combination of a movable mold carrier having a mold in which  
45 printing slugs are cast, a pair of clamping jaws for holding a composed line of matrices in casting position relative to the mold, one of said jaws being movable to a position to close the mold at one side for the casting of a blank slug,  
50 and means actuated by the movement of the mold carrier at predetermined cycles of operation of the machine for effecting the mold closing movement of the jaw.
10. In a slug casting machine, the combination  
55 of a rotatable mold wheel, a line clamping jaw operable to close one side of the mold for the casting of a blank slug, a Geneva stop motion device operated periodically by the rotation of the mold wheel, a cam movable by said Geneva  
60 device, and a movable member operated by the cam and operatively connected with the line clamping jaw.
11. In a slug casting machine, the combination  
65 of a rotary mold wheel provided with a plurality of molds, a vise frame, a pair of line clamping jaws mounted in said vise frame and operable to hold a composed line of matrices in casting position relative to a mold, one of said jaws being  
70 movable, in the absence of a composed line, to a position to close the mold at one side for the casting of a blank slug, a lever pivoted between its ends on the vise frame and having its upper end  
75 operatively connected with said movable clamping jaw, a Geneva stop motion device also mounted on the vise frame, a pin on the mold wheel adapted in the rotation of the same to operate the Geneva device, and a cam associated with said Geneva device and engaging the lower end of the jaw actuating lever.
12. A combination as set forth in claim 11,  
80 characterized by the fact that the pin therein recited for operating the Geneva stop motion device is adjustable to different positions on the mold wheel, whereby to selectively determine the  
85 particular mold which is to be closed.
13. In a slug casting machine, the combination of a mold adapted for the casting of printing  
90 slugs, means actuated automatically during the normal operation of the machine and at predetermined cycles of operation of the machine for closing the mold to cast blank slugs, and selectively controlled means whereby the sequence of  
95 operations of the mold closing means may be varied in their relation to the casting of printing slugs.
14. A combination as set forth in claim 13,  
100 characterized by the fact that interchangeable cams are employed for varying the sequence of operations of the mold closing means.
15. A combination as set forth in claim 2, characterized by the fact that the means therein  
105 recited for operating the line clamping means to close the mold, may be adjusted at will into operative relation to said line clamping means, to permit the latter to act at each operation  
110 of the machine.
16. In a slug casting machine, the combination of a mold adapted for the casting of printing slugs, a pair of clamping jaws for holding a composed  
115 line of matrices in casting relation to said mold, one of said jaws being movable to a position to close the mold at one side for the casting of a blank slug, a lever pivoted between its ends and operatively connected at one end to the movable  
120 clamping jaw, and actuating means acting on the opposite end of the lever at predetermined cycles of operation of the machine to operate the lever to close the mold, said opposite end of the lever being in the form of two sections detachably  
125 coupled together, whereby when said sections are uncoupled, the clamping jaw will be freed from the influence of the actuating means, and will be permitted to act at each operation of the machine.
17. In a slug casting machine, the combination  
130 of a carrier having a mold in which printing slugs are cast and movable through a definite range at each cycle of operation of the machine, means for closing said mold for the casting of blank slugs, a rotary cam operated periodically  
135 by successive movements of the mold carrier, and operative connections between said cam and the mold closing means.
18. In a slug casting machine, the combination  
140 of a mold, means operable to close the same for the casting of blank slugs, a member actuated automatically at each cycle of operation of the machine, and connections between said member and the mold closing means, whereby the latter  
145 will be actuated automatically at predetermined cycles of operation of the machine.
19. In a slug casting machine, the combination of a mold, means operable to close the same for  
150 the casting of blank slugs, a rotary member, means whereby said member is given automatically a partial rotation at each cycle of operation of the machine, and operative connections between said rotating member and the mold closing means, whereby said mold closing means is

operated at predetermined cycles of operation of the machine.

20. In a slug casting machine, the combination of a mold, a rotatable wheel carrying said mold and adapted to make a complete rotation at each operation of the machine, a pair of line clamping jaws, one movable into contact with the other to

close the mold at one side for the casting of a blank slug, and means actuated during the normal operation of the machine and at predetermined rotations of the mold wheel for effecting the mold closing movement of the jaw.

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