F. C. L. D'AIX.

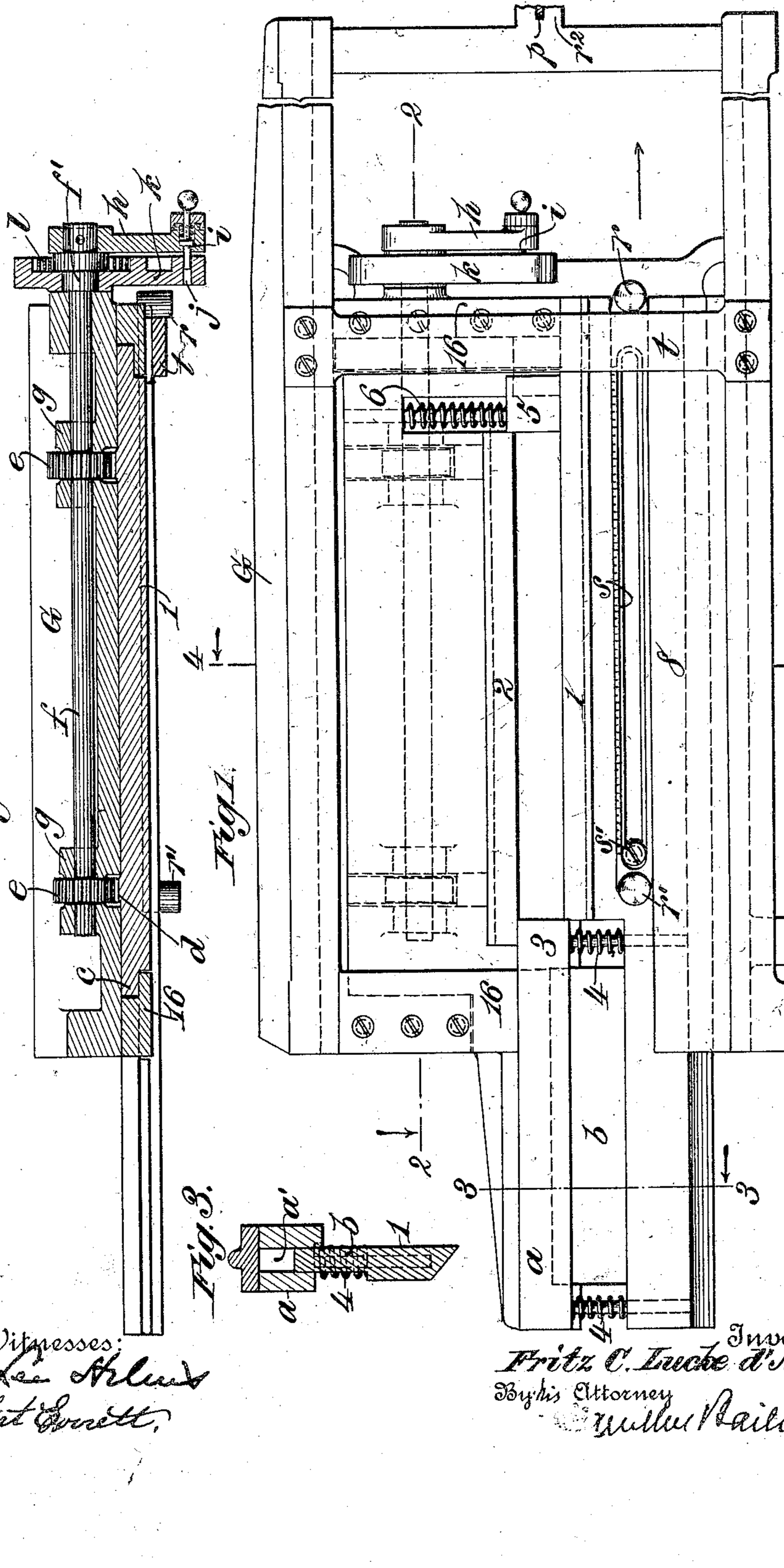
LINE CASTING MACHINE.

APPLICATION FILED AUG. 12, 1908.

944,588.

Patented Dec. 28, 1909

2 SHEETS—SHEET 1



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2 SHEETS—SHEET 2.

Fig. 3.

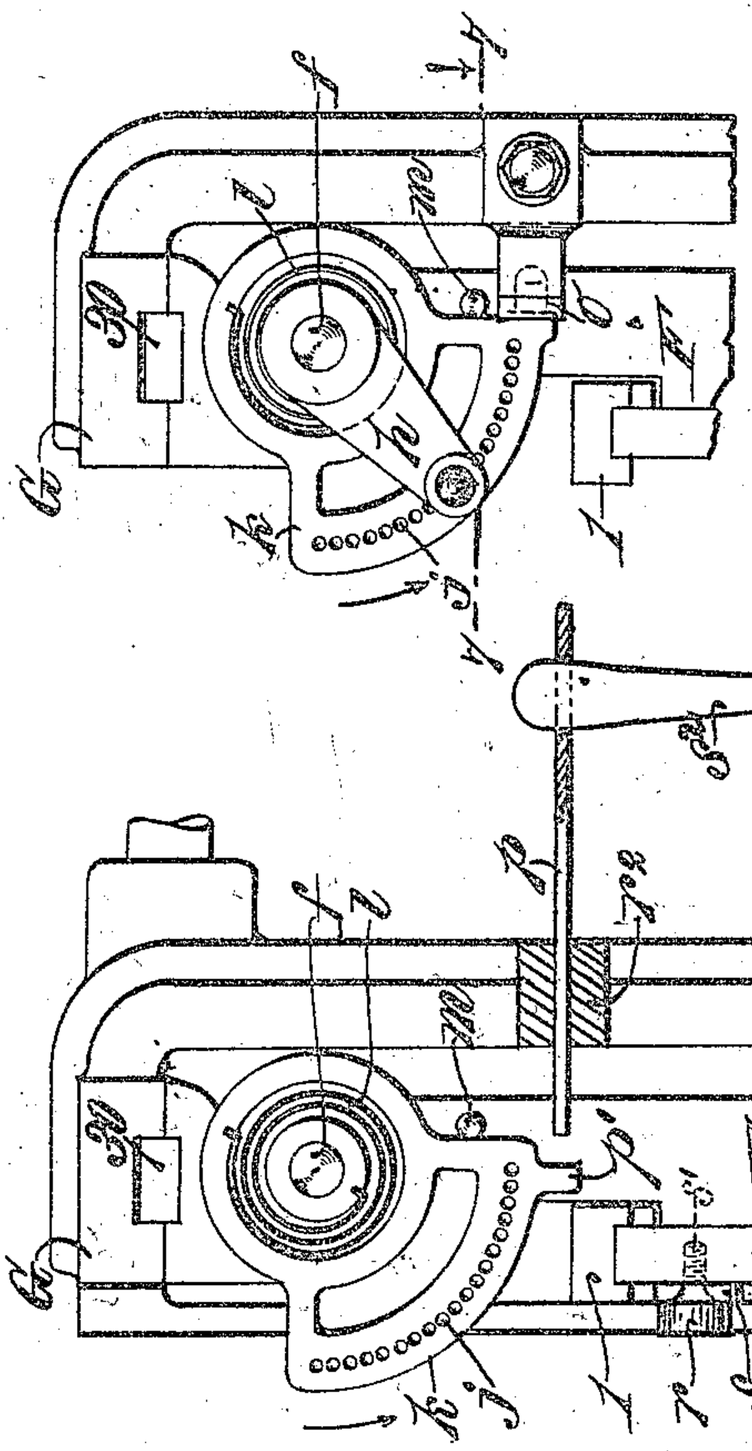


Fig. 4.

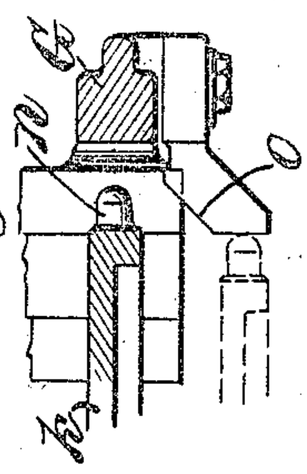
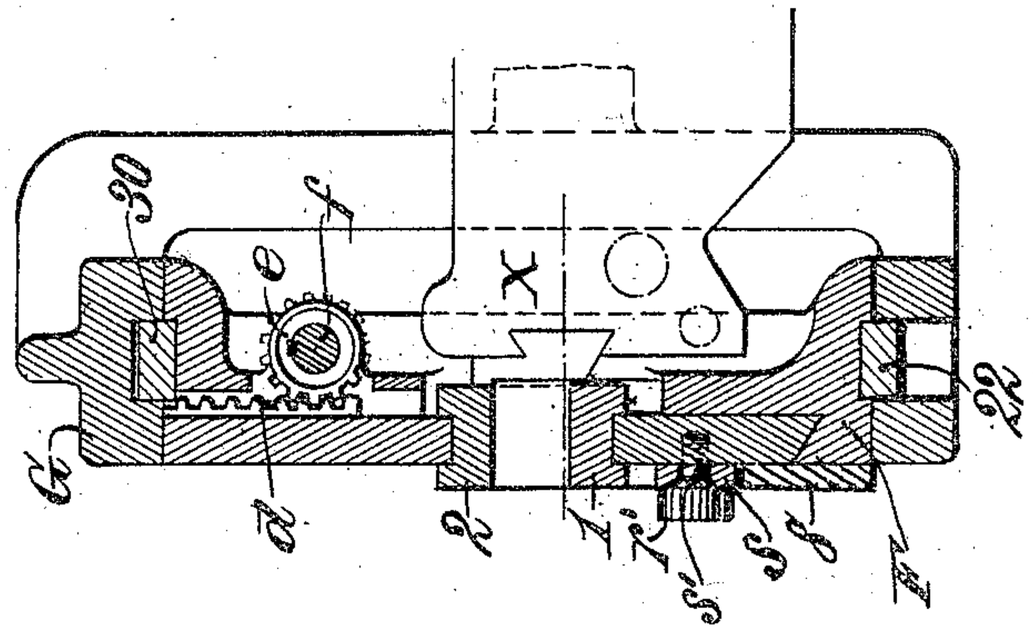


Fig. 5.

Fig. 4.



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UNITED STATES PATENT OFFICE.

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LINE-CASTING MACHINE.

944,588. Specification of Letters Patent. Patented Dec. 28, 1909.

Application filed August 12, 1908. Serial No. 448,125.

To all whom it may concern:

Be it known that I, FRITZ C. LUCKE D'AIX, of the city, county, and State of New York, have invented certain new and useful Improvements in Line-Casting Machines, of which the following is a specification.

My invention relates to the mold in which the line or slug is cast, and more particularly to a mold which is variable as to the length and width of the slot or mold space and is combined with adjustable means for automatically closing the mold to one length and width or another as required, and with means for automatically opening the mold in both directions after the casting and before the ejecting of the slug. A mold possessing these characteristics is not here broadly claimed, it being the subject of my prior application Serial No. 308,522, filed March 28, 1906.

My present invention has mainly to do with the means for varying the dimensions of the slot, and for automatically opening and closing the mold.

I shall first describe my improvements in connection with the accompanying drawings forming part of this specification and will then point out more particularly in the claims those features which I desire to secure by Letters Patent.

In the drawings—Figure 1 is a front elevation of a mold embodying my improvements with the mold in casting position. Fig. 2 is a horizontal section of the mold and slide in which it is mounted on line 2—2 Fig. 1—the carrier frame in which the slide is mounted being omitted. Fig. 3 is a cross section on line 3—3, Fig. 1. Fig. 4 is a vertical cross section of the mold, the slide in which the mold is mounted, and the carrier in which the slide is mounted, on line 4—4 Fig. 1. In this figure a portion of the nose of the melting pot is shown at X. Fig. 5 is an end elevation of these parts—the handle by which the rack and pinion adjusting mechanism for the upper mold jaw is operated being omitted. Fig. 6 is a like elevation, with the handle in place, representing a modification of the means for automatically opening the mold. Fig. 7 is a section on line 7—7, Fig. 6.

In Figs. 1 and 2 the mold is represented in casting position, with the four members of the mold in the position they occupy when the mold slot is enlarged to the full extent in both directions. G is the carrier. F is the slide mounted in the carrier and adapted to slide therein for the purpose of conveying the mold from casting to ejecting position. The mold proper consists of four members, viz: the lower jaw or body 1; the upper jaw or cap 2; and the two spring-impelled, spring-yielding, side pieces 3 and 5 housed, the one, 3, in the lower jaw, and the other, 5, in the upper jaw, and forming the side walls of the slot. They are spring pressed, by springs 4 and 6, each toward the face of the opposite jaw, forming tight fitting side walls which are self-adjusting to variations in distance between the upper and lower jaws. The upper jaw is capable of vertical movement to and from the lower jaw in order to vary the width of the slot, and is pressed upward by the side pieces 3, 5, which tend to open the mold; it moves up and down in guides 16 in the slide—there being a tongue and groove, or equivalent, connection between the slide and the jaw, whereby the latter, as it moves up and down, is held in its proper relation to the lower jaw. The lower jaw 1 is seated in a V-groove in the lower portion of slide F and is held in place between the back of the slide and the front plate 8, which form a guideway wherein the jaw can move lengthwise. This movement of the lower jaw will, according to its direction, cause the side piece 3 which it carries to approach or recede from the other side piece 5, thus varying the length of the slot as desired. The slide F is held and guided in its movements in the carrier G, by a longitudinal rib 30 on its top, which enters a corresponding groove in the carrier; and by a rib 22 on its bottom, which enters a corresponding guide slot or groove in the carrier. The slide may be moved at proper intervals, from casting to ejecting position and return, by any suitable means—typified in the drawing (Fig. 1) by the pitman rod 50 connected by link 51 to the slide, said pitman rod being actuated by any proper means. In lieu of this arrangement for actuating the slide I can use the rack and pinion arrangement illustrated in my aforesaid application Serial No. 308,522. The parts as thus far described are substantially similar in general construction and operation to the parts identified by like reference characters in my application Serial No. 308,522.

I come now to those portions of the mechanism which embody my improvements.

The side piece 3, which forms the left

hand side wall of the mold slot in Fig. 1, is prolonged in the form of a lengthwise extending strip or bar *a* solid with the piece 3; and the other end of this bar *a* is supported and upwardly pressed by a second spring 4, similar in construction, arrangement and function to the spring 4 which supports and upwardly presses the side piece 3. This bar *a* is so arranged and formed that when the length of the slot is decreased by moving the lower jaw 1, and consequently the side piece 3, to the right, it will cover and close the unused portion of the mouth in the spout of the melting pot, which otherwise would be exposed. The bar *a* is vertically slotted as at *a'*, Fig. 3, to receive a tongue *b* on the lower jaw which extends up into the slot, serving as a guide to steady and hold the spout closing bar or prolongation *a* in proper position during its up and down movements. The upper jaw also has a tail or prolongation *c* which extends through a slot or opening in the left hand guide standard 16 in the slide F, and bears upon the upper face of the bar *a* when the parts are in the position shown in Fig. 1. In this way the side piece 3 gets a broad, extended bearing upwardly against the upper jaw, which permits it (the side piece) to be moved to contract the length of the mold space or slot without any danger of the lengthwise canting of the upper jaw which otherwise might arise by reason of this shifting of the bearing point between the two.

To adjust the upper jaw for the purpose of varying the width of the slot, I make use of a rack and pinion mechanism—the former preferably on the jaw, and the latter on the slide in which the jaw is mounted. And with this mechanism I combine means by which the pinion carrying shaft, before the ejecting of the cast slug, is automatically rotated in a direction and far enough to relieve the pressure of the upper jaw upon the slug; and also means by which the shaft is automatically returned to its original position after the operation of ejecting the cast slug and before the operation of casting another slug. Devices for these purposes can be widely varied. They are represented in the drawing in the form in which I now prefer to employ them.

Upon the back of the upper jaw, are formed or attached two vertical toothed racks *d*, and meshing with these racks are two pinions *e*, fast upon a shaft *f* which is mounted to revolve in bearings *g* on the slide, and is provided at one end with any suitable operating means—for example the handle *h*—as shown more clearly in Figs. 1, 2, 6. By turning the handle to rotate the shaft in one direction or the other, it will be seen that the upper jaw can be raised or lowered so as to be placed at the desired distance from the lower jaw. The upper jaw is secured in adjusted position by any proper means—in this instance by a spring pressed detent pin *i* in the handle which will enter the selected one of a series of holes *j* in a suitable portion of the mold. To provide for the automatic opening and closing of the jaw 2, the holes *j* are formed in the arc of a circle in the outer portion of an arm *k* mounted loosely on a hub *f'* on shaft *f*, on which it can move, and connected with shaft *f* by a helical spring *l* which tends to turn the arm *k*, and consequently the shaft *f*, in the direction indicated by the arrow in Figs. 5 and 6—that is to say in a direction which will tend to cause the pinions *e* to depress the upper jaw against the stress of the opposed springs 4, 6 of the side pieces 3, 5, the spring *l* being stronger than the springs 4, 6 combined. The movement of arm *k* in the direction of the arrow (Figs. 5 and 6) is limited by a stop *m* on the slide against which it brings up and normally rests.

In Figs. 6 and 7 is shown one means of automatically effecting the slight lifting of the upper jaw prior to ejecting the cast slug. Referring to these figures, *n* is a stud or projection with rounded end, extending rearwardly from the outer end of arm *k*, and *o* is an incline secured to the ejecting end of the carrier frame G in such position that just before the slide F in its travel from casting position reaches ejecting position the stud *n* will meet the incline *o* and by the continued movement of the slide F will be caused to travel over the inclined surface of *o* with the result of forcibly turning the arm *k*, and consequently the shaft *f*, against the stress of spring *l*, in a direction to lift the upper jaw, so that by the time the slide reaches ejecting position, the mold will have been automatically opened to the desired extent.

In Fig. 7 the stud is represented in dotted lines in the position it occupies when the parts are in ejecting position—having traversed the incline, and resting against a flat surface beyond the incline where it is held so long as the mold is in ejecting position. As soon, however, as the mold on its return to casting position moves far enough to disengage the stud from the incline, the mold will automatically close and the parts will resume normal position. In lieu of this mechanism, I may use a plunger *p* (indicated diagrammatically in Figs. 1 and 5) which will reciprocate in a guide r^2 on the carrier frame, and be operated by a rocker arm s^2 (Fig. 5) for example, connected and deriving its motion from some suitable part of the machine; and will operate at the proper time against a depending finger *p'* (Fig. 5) on the arm *k*, pushing that finger and consequently the arm *k* back far enough to lift the upper jaw the requi d distance before the ejector acts. I have not deemed

it necessary to represent the ejector or its actuating mechanism here. Any suitable mechanism of the kind can be employed, as for example that shown in my Patent No. 834,971 of November 6, 1906.

It remains to describe the mechanism for moving the lower jaw lengthwise for the purpose of changing the length of the slot and for automatically opening and closing the slot in this direction during the to and fro movement of the mold. My mold in this respect, is characterized by the combination with the member which is longitudinally movable in relation to the others for the purpose of changing the length of the slot, of stops for automatically and positively opening and closing the mold to one length or another during its movement to and fro. This feature is not here broadly claimed, inasmuch as it is the subject (among others) of my application for a patent for improvement in line casting machines Serial No. 432,605, filed May 13, 1908. In said last named application one of the stops is a fixed stop which automatically opens the mold always to maximum length, and the other is an independently adjustable stop which automatically closes the mold to one length or another as desired.

In my present application, the two stops are placed at a distance apart slightly less than the length of traverse of the mold, and are so connected as to be adjustable bodily and together, the distance between them being invariable, so that the automatic opening movement of the mold will always be the same in extent whatever may be the adjusted position of the stops. In the drawing the two stops are shown at r, r'; they are attached to opposite ends of the slotted bar s from the face of which they project in the path of a vertical bar t attached at its ends to the carrier G and extending down in front of the mold. The bar s, which rests on top of front plate 8, is arranged horizontally on the front face of the lower jaw 1, passing between it and the vertical bar t, and is adjustably secured to the jaw 1 by set screw s' which passes through the slot in the bar into the lower jaw. The bar s can be adjusted back and forth to change the relation of the stops r, r' to the intermediate vertical bar t, and can then, by tightening the set screw, be held firmly in its adjusted position. A scale can be formed on the bar s, as shown, to facilitate adjustment as usual in devices of this character.

The closing stop is r; r' is the opening stop. In Fig. 1 the mold is shown in casting position with its members in position to form a slot of maximum dimensions in both directions. In moving from casting to ejecting position, stop r', just before the mold reaches ejecting position, brings up against bar t, thus holding back the lower jaw while the rest of the mold moves forward, and consequently increasing the distance between the side pieces 3, 5, or in other words the length of the slot. On the return movement of the mold the reverse action takes place; the closing stop r brings up against the bar t, and holds the lower jaw motionless, while the remainder of the mold moves back to casting position. To decrease the length of the slot, the bar s, while the mold is in ejecting position, is adjusted to the left, so as to bring the stop r' sooner into contact with the bar t during the return movement of the mold, as will be understood without further explanation.

Having described my improvements and the best way now known to me of carrying the same into practical effect, I state in conclusion that I do not limit myself strictly to the structural details hereinbefore set forth in illustration of my invention, since manifestly the same can be varied considerably without departure from the spirit of the invention; but

What I claim and desire to secure by Letters Patent is as follows:

1. In a linotype mold having one side member movable longitudinally in relation to the other for the purpose of changing the length of the mold slot, a spout closing member attached to and moving with said side member, substantially as and for the purposes herein set forth.

2. A linotype mold having two opposed jaws movable one relatively to the other to vary the length of the mold slot, a side member connected to one jaw for closing one end of the slot, a side member connected to the other jaw for closing the other end of the slot, and a spout closing member attached to and moving with one of the side members.

3. In combination with the upper mold jaw, the lower mold jaw movable lengthwise relatively to the upper jaw, the spring pressed side pieces carried by the upper and lower jaws respectively, and the spout closing member on and moving with the side piece carried by the lower jaw.

4. In a linotype mold the combination with a lengthwise movable lower jaw, a spring pressed side piece carried by the same, a spout closing member on and moving with said side piece, of an upper jaw having a tail piece or extension, which rests upon the spout closing member, and a spring pressed side piece carried by said upper jaw, substantially as and for the purposes set forth.

5. A traveling linotype mold having two opposed jaws relatively movable to vary the casting width of the slot, manually operated rack and pinion mechanism for thus positioning one of the jaws, in combination with means for automatically opening the thus positioned jaw after the casting and before

the ejecting operation, and means for automatically returning said jaw to normal closed position after the ejecting and before the next succeeding casting operation.

6. A traveling linotype mold having two opposed jaws relatively movable to change the casting width of the slot, manually operated rack and pinion mechanism to effect said change, a spring acting to hold said jaws at the width apart to which they may be set by the rack and pinion mechanism, and devices for automatically operating the rack and pinion mechanism to widen the slot after the casting and before the ejecting operation, and to then permit the spring to return the jaws to normal closed position.

7. A longitudinally reciprocating linotype mold having one member movable for the purpose of changing the width of the slot, in combination with a rack and pinion mechanism for adjusting said member, including a pinion-actuating shaft spring-pressed in a direction to hold the member in normally closed position, and means for automatically rotating the shaft against the stress of its spring to raise the member after the casting, but before the ejecting, of the slug.

8. A traveling linotype mold having a cap or upper jaw vertically movable to change the width of the slot, a slide in which said jaw is mounted; racks on the jaw; pinions engaging said racks, and mounted on an actuating shaft having its bearings in the slide; an operating handle on said shaft with a spring latch; an arm mounted axially relatively to said shaft and provided with a series of holes for engaging the spring latch on the handle; a spring connection between the shaft and said arm; a stop against which the arm is held normally by the stress of said spring, and means for automatically turning or rotating the arm against the stress of its spring after the casting, and before the ejecting, of the cast slug, substantially as hereinbefore set forth.

9. A traveling linotype mold having one member movable longitudinally in relation to the others for the purpose of changing the length of the slot, in combination with stop mechanism including two stops separated from one another by a distance less than the traverse of the mold, and connected so as to be adjustable bodily and together for automatically and positively opening and closing the mold to one length or another during its traverse to and fro.

10. A traveling linotype mold having one member movable longitudinally in relation to the others for the purpose of changing the length of the slot, and a carrier frame in which said mold is mounted and can travel to and fro, in combination with two stops at a distance apart from each other less than the length of traverse of the mold and adjustably mounted upon said member and connected so as to be adjustable bodily and together, and a stationary bar attached to the carrier frame and extending between and in the path of movement of said stops, substantially as and for the purposes hereinbefore set forth.

11. A traveling linotype mold having two opposed jaws relatively movable to change the width of the slot, positioning means which may be set to give various widths of slot, a spring acting to hold a jaw to the position set by the positioning means and means for automatically opening said jaw against the stress of said spring after the casting and before the ejecting operation.

12. A traveling linotype mold having two opposed jaws relatively movable to change the width of the slot, an index device for setting the slot for the desired thickness of slug, means for widening the slot at ejecting position by the relative movement of said jaws, and a spring for causing a return movement thereof to bring the slot again to casting width as determined by the index device.

In testimony whereof I affix my signature in presence of two witnesses.

FRITZ C. LUCKE D'AIX.

Witnesses:

EDGAR A. FELLOWS,

M. BAILEY.