F. C. L. D'AIX.

LINE CASTING MACHINE.

APPLICATION FILED MAR. 28, 1906.

944,981. **Patented Dec. 28, 1909.**

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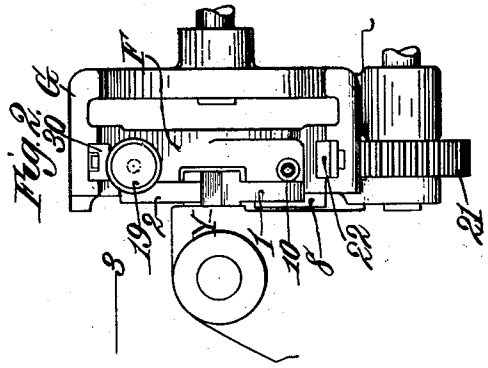

Fig. 2.

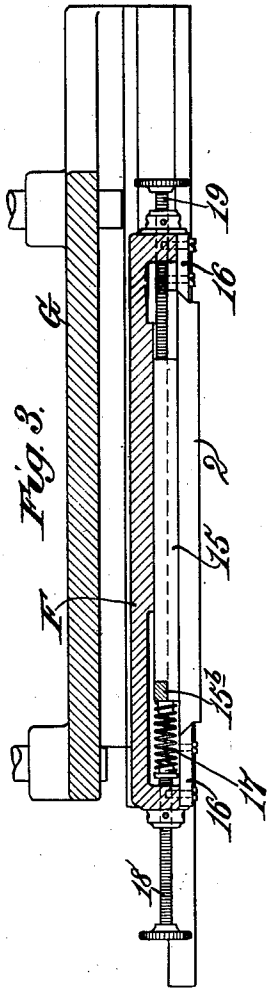

Fig. 3.

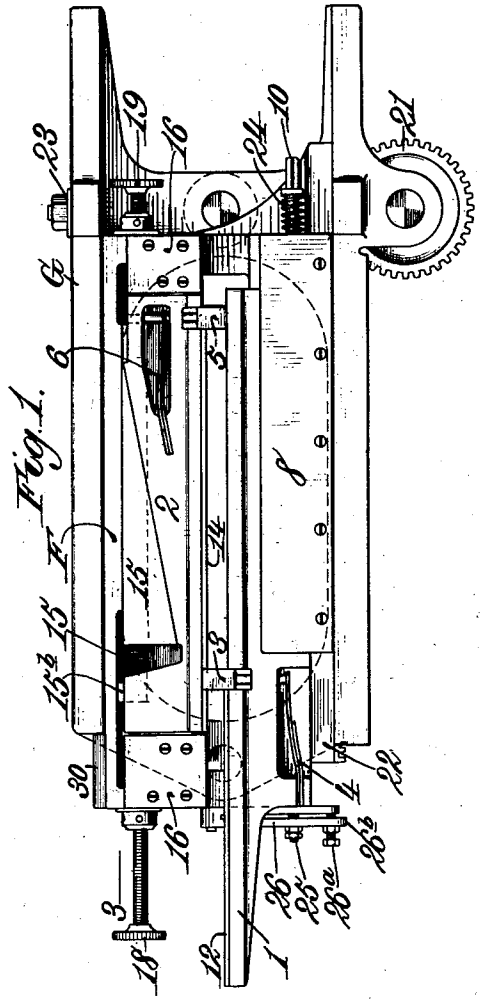

Fig. 1.

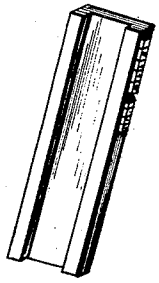

Fig. 4.

Witnesses
H. Lee Stokes
Robt Everett.

Inventor:
Fritz C. Lucke d'Aix.
By his Attorney
Marcellus Bailey

F. C. L. D'AIX.

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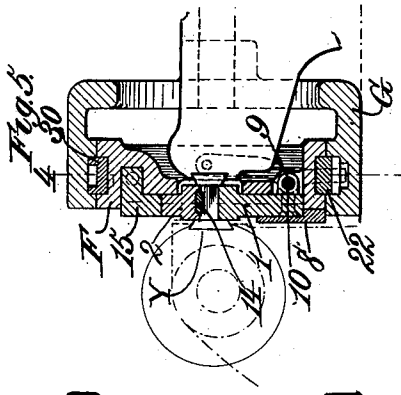

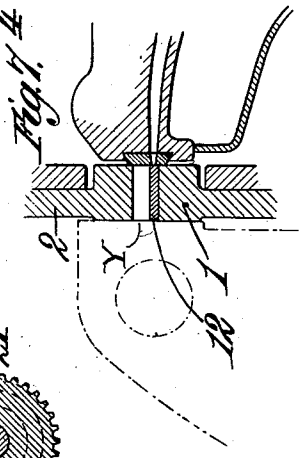

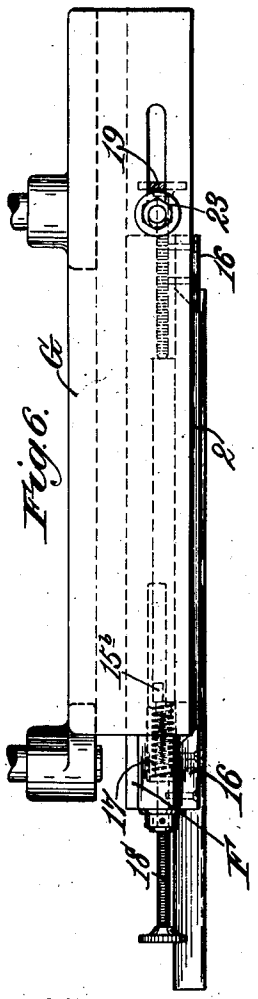

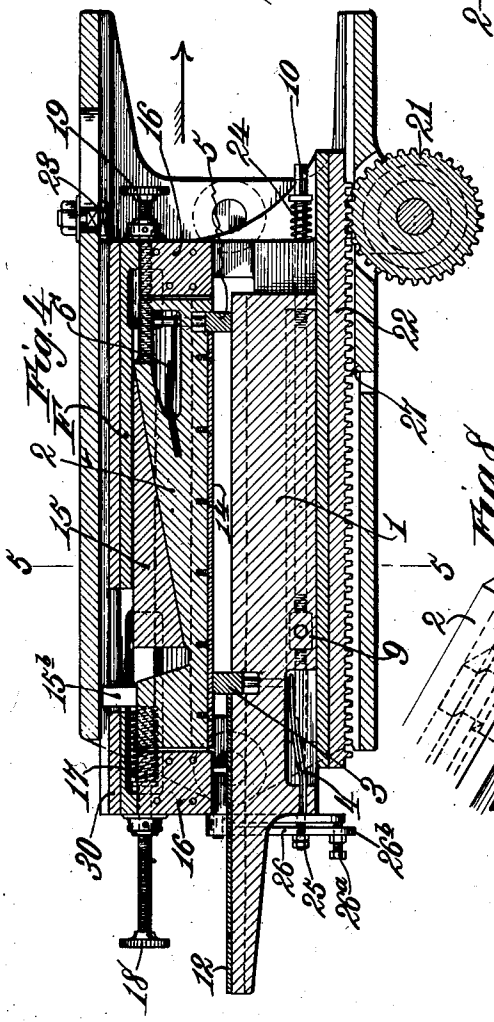

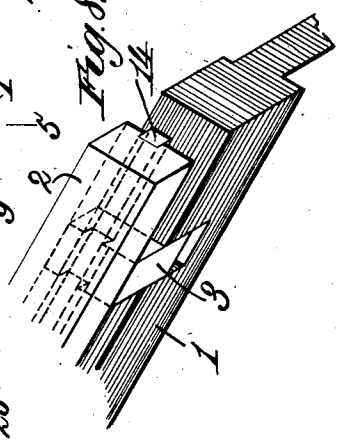

Witnesses

H. Lee Helms

Robt Everett.

Inventor

Fritz C. Lucke d'Aix.

By his Attorney

Marcellus Bailey

F. C. L. D'AIX.

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3 SHEETS—SHEET 3.

Fig. 13.

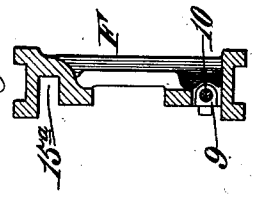


Fig. 11.

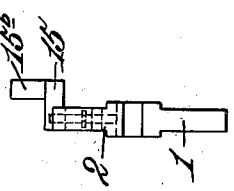


Fig. 10.

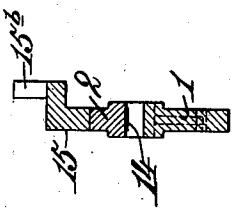


Fig. 12.

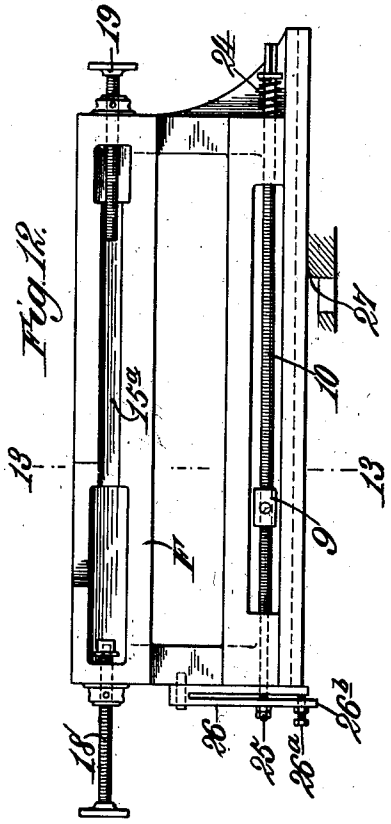
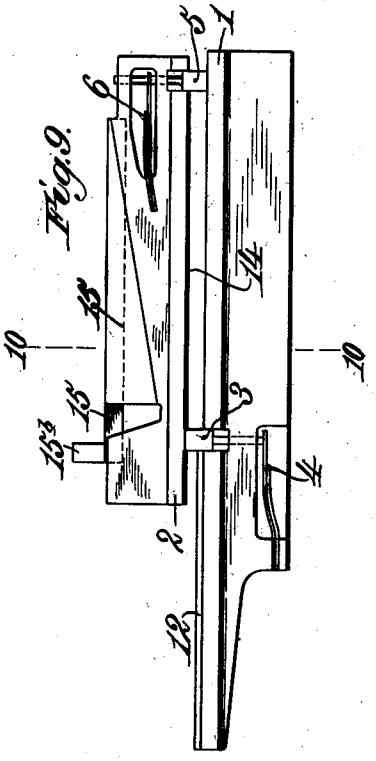


Fig. 9.



Witnesses

H. Lee Helms

Robert Brackett.

Inventor

Fritz C. Lucke d'Aix.

By his Attorney

Marcellus Bailey

UNITED STATES PATENT OFFICE.

FRITZ C. LUCKE D'AIX, OF NEW YORK, N. Y.

LINE-CASTING MACHINE.

944,981. Specification of Letters Patent. **Patented Dec. 28, 1909.**

Application filed March 28, 1906. Serial No. 308,522.

To all whom it may concern:

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

These improvements in line casting and kindred machines have to do with the mold in which the slug or line is cast, the primary object of the invention being to provide a mold adapted to cast slugs or lines of any desired length, without necessitating the addition, removal, or substitution of any of the parts of the mold.

It is also the purpose of the invention to provide a mold which possesses this same characteristic as regards the thickness of the slug or line—that is to say, a mold which, without change in its parts themselves, but merely by changes in the adjustment of those parts, is adapted to cast slugs or lines of varying thickness as desired.

It is also the purpose of the invention to combine with a mold thus variable as to length and width of its mold space, means for automatically opening the mold in both directions during its travel from casting to ejecting position to an extent sufficient to relieve the pressure upon the cast slug, and adjustable means for automatically closing the mold to one length and width or another as required during its return from ejecting to casting position. This I believe to be broadly new with me, beyond its preferred structural embodiment hereinafter set forth.

In the preferred embodiment of my invention the mold is composed in the main of top and bottom jaws and side pieces. One of the side pieces is carried by the bottom jaw and one by the top jaw; and each is spring-pressed toward the opposite jaw. One of the jaws, preferably the top or cap jaw, is movable to and from the other jaw to open and close the mold and also to adapt the mold to cast slugs of different thicknesses as desired, and the other of said jaws, preferably the bottom jaw, is movable and adjustable lengthwise in order to bring the side piece which it carries nearer to or farther from the side piece carried by the opposite jaw, according as it is desired to decrease or increase the length of the mold space and the consequent length of the slug or cast line. These and other features of my improvements will first be described in connection with the accompanying drawings forming part of this specification and will then be more particularly pointed out in the claims.

In the drawings—Figure 1 is a front elevation of a mold embodying my improvements in their preferred form. Fig. 2 is an end elevation of the same—looking at the right hand end of the mold Fig. 1. Fig. 3 is a horizontal section of the same on line 3—3 Fig. 1. Fig. 4 is a longitudinal vertical section of the same on line 4—4 Fig. 5. Fig. 5 is a transverse vertical section of the same on line 5—5 Fig. 4, showing to a large extent diagrammatically the melting pot spout and the matrix holder against the front and rear respectively of the mold space. Fig. 6 is a top plan of the mold. Fig. 7 is an enlarged vertical cross section of a portion of the top and bottom plates of the mold, showing (as in Fig. 5) the spout of the melting pot closed against the back of the mold space and the matrix holder against the front thereof. Fig. 8 is a perspective view of a portion of the top and bottom jaws. Fig. 9 is a front elevation of the two jaws, the two spring impelled side pieces carried by them, and the adjustable spring impelled presser for the top jaw. Fig. 10 is a transverse vertical section on line 10—10 Fig. 9. Fig. 11 is a right hand end elevation of the parts in Fig. 9. Fig. 12 is a front elevation of the slide in which the mold proper is mounted. Fig. 13 is a transverse vertical section of the same on line 13—13 Fig. 12. Fig. 14 is a perspective view of a cast slug or line.

In the present embodiment of my invention the mold proper is shown as mounted in a slide F (Figs. 1, 4, 5, 12, 13), which in turn is mounted in a carrier frame G (Figs. 1—7)—the slide F being capable of sliding movement in, and lengthwise of, the carrier frame to convey the mold from casting to ejecting position and return, and the carrier frame being in turn capable of movement (at right angles to that of the slide) toward and away from the position occupied by the line of matrices Y (Figs. 2, 5 and 7) at the casting point, as set forth in connection with the like lettered parts in my Patent No. 834,971 of November 6, 1906. It will be understood however that the mold in which my present invention is comprised is not nec-

essarily limited in its use, to its conjunction with these instrumentalities, but is susceptible of use in other connections.

The mold proper consists (see more particularly Figs. 1, 4, 8, 9) of the bottom and top jaws 1 and 2, and the side pieces 3 and 5 which form the side walls of the mold. These four members are permanently associated together to form at all times and under all conditions the four walls of the slot or mold space, while at the same time, as will hereinafter appear, they are so connected and arranged as to be relatively movable to change the length or the width of the slot, whereby the length and thickness or either, of the slug produced may be varied, without change or substitution in any of the members, and without removing parts from or applying parts to the mold. The top and bottom jaws of the mold are movable the one from the other to vary the distance between them and thus to correspondingly vary the thickness of the cast slug or line. In the preferred embodiment of my invention the side pieces 3 and 5, are carried each by one of the jaws, the side piece 3 by the jaw 1, and the side piece 5 by the jaw 2. The side piece 3 is mounted in a guide slot in the lower jaw in which it is vertically movable and is impelled with yielding pressure toward the upper jaw by a spring 4 attached to the lower jaw. The side piece 5 is correspondingly mounted in a guide slot (at the opposite end of the mold space) in the upper jaw 2, and is impelled with yielding pressure toward the lower jaw by a spring 6 attached to the upper jaw. Thus, if the distance between the top and bottom jaws be increased or decreased, the spring-pressed, spring-yielding, side pieces 3 and 5 will be in effect self-adjusting, that is, they will automatically adapt themselves to these variations, each maintaining firm and close contact with the jaw opposite to it. This I believe to be new with me over and beyond the particular arrangement of these pieces—one in each jaw—is concerned. I prefer, however, the arrangement just described, because, by making one of the jaws—the lower jaw 1 for example—movable and adjustable lengthwise relatively to the other jaw, the distance betwen the two side pieces 3 and 5, and consequently the length of the mold space (which governs the length of the cast slug or line) can be varied at pleasure. Manifestly, as will be understood by the mechanic skilled in the art to which this invention relates, various instrumentalities may be employed to secure either or both of these adjustments. In the accompanying drawing I have represented the instrumentalities which at present I prefer to employ for the purpose and will proceed to describe them.

The slide F is of skeleton form. It is supported and can slide lengthwise in the carrier G, the latter having at the top a longitudinal guide groove which is entered by a corresponding guide rib 30 on the top of the slide (Fig. 5), and at the bottom a longitudinal guide groove which is entered by a corresponding rib 22 on the under side of the base of the slide, which rib is formed as a rack to engage a pinion 21, which has its bearings in the carrier frame G and by which the slide is moved at proper intervals from the casting point to the ejecting point and return, as set forth in my aforesaid patent No. 834,971.

The jaw 1 rests, and takes its bearing, on the base of the slide F, as seen in Fig. 5, and is capable of lengthwise movement thereon. It is held upright between the back of the slide, and the guide plate 8 (Figs. 5, 8) affixed to the front of the slide. Its longitudinal adjustment is effected by a rotatable screw threaded spindle 10 (Fig. 12) supported in suitable bearings in the slide F, and carrying a nut 9, which is suitably secured to the jaw 1. By rotating the screw spindle, the nut, and the jaw 1 fast to said nut, will be moved lengthwise of the slide in one direction or the other, according to the direction of rotation of the spindle. The right hand end of the spindle 10 is squared (Figs. 4, 5) to receive a detachable handle or key, which may be used to rotate the spindle, as will be understood without further explanation. The jaw 1 in its movements carries with it the side piece 3, and thus this side piece can be caused to approach or recede from its fellow side piece 5 carried by the upper jaw, in this way varying the length of the mold space as desired.

The upper jaw 2, is supported and can move vertically up and down between guide plates 16 (Figs. 1, 4) fixed to the slide F, there being a tongue and groove or equivalent connection between the plates and the jaw, whereby the latter is held in proper position and relation to the lower jaw, while at the same time it can move up and down. The spring actuated side pieces 3, 5, tend to lift the upper jaw 2. Said jaw is depressed and held depressed against the lifting tendency of said side pieces, by means of a presser 15 (Figs. 1, 2, 4, 5, 6, 9 and 10) of substantially cross section, its upper and horizontal limb extending into a guide groove 15ª (Fig. 12) in which it is supported and can move longitudinally. The lower and vertical limb of the presser is wedge shape, its inclined bottom edge bearing on a correspondingly inclined edge on the top of the upper jaw. Under this arrangement it will be seen that, by advancing the presser to the right, the upper jaw will be depressed against the stress of the spring-impelled side pieces 3, 5, thus closing the mold. A movement of the presser in the opposite direc-

tion will relieve the pressure of the jaw and permit it to be correspondingly lifted by the side pieces. An adjustable stop screw 19, mounted in the slide in the path of the front end of the horizontal limb of the presser, limits and regulates the extent to which the presser can be advanced, thus determining the width of the mold space when the mold is closed, and consequently the thickness of the cast line. Various instrumentalities can be made use of to advance and retract the presser. For reasons which will hereinafter be indicated, I prefer to employ for this purpose a spring yielding actuating device, consisting of the thumb screw 18, mounted on the left hand end of the slide, and the spiral spring 17 interposed and held between the end of the screw, and the horizontal limb of presser 15, and bearing constantly against the presser, pushing it in a direction to cause the presser to advance and close the mold. The pressure of the spring 17—which can be varied and adjusted by means of the adjusting screw 18—should be strong enough to overcome the counter spring pressure of the side pieces 3 and 5, the mold thus being normally closed.

From the foregoing it will be noted that the means for adjustably closing the jaws for the purpose of varying the width for the mold space are independent of the means hereinbefore described for varying the length of the mold space, whereby the mold space may be rapidly and definitely varied in either direction independently of the other.

After the slug or line has been cast, the mold must be opened to permit the removal or ejectment of the cast line. It is for this purpose that the actuating mechanism of the presser 15 is made spring-yielding.

In Figs. 1 and 4, the mold and slide F in which it is mounted are shown in the position in the carrier frame G which they occupy during the casting operation. After this operation, the slide, together with the mold mounted therein, move in the direction of the arrow (Fig. 4) from casting position to ejecting position—that is, to a position opposite to the ejector by which the slug is expelled from the mold. It is my purpose to open the mold by the time it reaches ejecting position. To this end I provide on the rear end of the horizontal limb of presser 15, an upright finger 15^b. In the path of this upright finger, there is secured in the carrier frame G a stop 23 (Figs. 4 and 6) at a point where it will be reached by the finger 15^b slightly before the mold reaches ejecting position. This stop 23—as indicated in the figures referred to—is movable and adjustable in a longitudinal slot in the carrier frame wherein it is held in desired position by a clamp nut, the purpose of this adjustment being to permit the stop to meet the finger sooner or later in the course of the movement of the mold from casting to ejecting position, thus determining the extent to which the upper jaw is raised away from the lower jaw.

The rib 30, as seen in Figs. 4 and 5 is longitudinally channeled on top, and the stop 23, as seen in Fig. 4, is so located as to enter this channel during the movement of the mold from casting to ejecting position, and to meet therein at the proper time the finger 15^b which projects through a slot formed in the top of the slide and the bottom of the rib 30, up into the channel in the latter, as plainly shown in Fig. 4.

In operation, the finger 15^b meets the stop 23, while the slide and mold are traveling in the direction of the arrow, Fig. 4, and a little before the mold reaches the end of its travel in this direction. As the finger brings up against the stop, the presser will be held back, while the mold still moves forward, with the result that by the time the mold reaches ejecting position the downward pressure on the upper jaw will be relieved, thus permitting the spring-impelled side pieces 3, 5, to raise this jaw, thereby opening the mold. It is desirable that the slug, before ejection, should be relieved from side pressure also. To this end, the rotatable screw spindle 10, is capable of slight endwise motion in its bearings in the slide, and is held normally in the position shown in Figs. 4, 12, by a spiral spring 24, encircling a portion of it which projects from the right hand end of slide F, being confined between that end of the slide and a collar on the spindle. The left hand end of the spindle passes loosely through a spring arm 26, secured at its upper end to the slide, and has on that portion of it which projects beyond the spring arm, nuts 25 or equivalent devices, which prevent it from drawing out from the spring arm under the action of spring 24, which spring thrusts spindle 10 endwise to the right, as far as permitted by the nuts 25. The spring arm 26 has an adjusting screw 26^a which brings up against the slide; and the lower end 26^b of the spring arm projects down below the bottom of the slide (see Fig. 4) far enough to act as a stop, to meet, at the proper time in the travel of the mold from casting to ejecting position, a shoulder 27 on the carrier G, whereby the screw spindle 10 is held back while the slide F still moves forward, thus holding back the lower jaw while the slide and upper jaw are still moving forward to the right, and consequently drawing the side piece 3 slightly away from the cast line or slug. While the mold remains at ejecting position, it will be held in open position both as to sides and top. But when the mold returns from that position to casting position, the moment the movable stop members 15^b and 26^b, are re-

tracted from engagement with their respective fixed stop members on the carrier frame, the springs 17 and 24, will at once reassert themselves, and all parts of the mold will automatically resume their normal position. Thus it will be seen that the mold is combined with means whereby, during its travel from ejecting to casting position, it is automatically closed both lengthwise and widthwise; that these means are adjustable for the purpose of closing the mold to one length and width or another as required; and that the adjustable means for automatically effecting the lengthwise closure are independent of the adjustable means for automatically effecting the widthwise closure.

The upper jaw has on its under face, a longitudinal rib 14 (Figs. 4, 5, 8), the purpose of which is to form a groove in the top side of the line or slug to be cast. Fig. 12 shows a cast line provided with such a groove. The side piece 3, has in its top a corresponding groove to receive this rib 14 (Fig. 8) the latter thus acting as a guide to insure the parallelism of the piece 3 during the horizontal movement of the jaw 1.

The upper face of the lower jaw, on the outside of the mold space and to the left of side piece 3, is raised up above the level of that portion of said face of said jaw included within the mold, as seen in Figs. 1, 4, 9, this raised portion being provided in the present instance by a strip 12 of proper thickness secured upon the upper face of the jaw, and fitted close up against the side piece 3. The nose of the spout of the melting pot, has usually the same breadth laterally as the greatest breadth of mold space. But when that breadth of mold space is contracted by moving the jaw 1 and its side piece 3 to the right, the unused portion of the spout will extend laterally beyond the side piece 3. The strip or enlargement 12, in these circumstances, will come opposite this unused portion of the spout as indicated in Fig. 7, and will effectually close it.

The operation of the device has been described in the course of the foregoing specification, so far as is needed to an understanding of the improvement here claimed, and need not be repeated.

The slug must of course be trimmed and shaved after having been cast. Such devices form no part of the present invention; but suitable devices for that purpose are fully set forth in my aforesaid patent No. 834,971 of November 6, 1906.

I state in conclusion that I do not restrict myself to the mechanical details herein set forth in illustration of my improvements since manifestly the same can be considerably varied without departure from the spirit of my invention. But

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

1. In a line casting machine, a mold the top and bottom of which are formed of parallel jaws, a carrier in which said jaws are movable one to and from the other to open and close the mold, spring-impelled side pieces mounted and interposed between said jaws, forming the side walls of the mold and tending to hold the jaws in open position, and means for closing the jaws against the pressure of the side pieces, substantially as and for the purposes hereinbefore set forth.

2. In a line casting machine, a mold carrier, a lower mold jaw mounted in said carrier, an upper mold jaw also mounted therein and capable of vertical movement to and from the lower jaw, a presser mounted in, and movable lengthwise of, the carrier, and having an incline which meets a corresponding incline on the upper jaw, means for moving the presser lengthwise of the carrier, and means for holding the incline on the upper jaw up against, and in yielding contact with, the presser, substantially as set forth.

3. In a line casting machine and in combination, a mold carrier and two mold jaws mounted therein, the upper jaw vertically movable to and from the lower jaw, a presser mounted in, and movable lengthwise of, the carrier, and having an incline which meets a corresponding incline on the upper jaw, means for holding the incline on the upper jaw up against, and in yielding contact with, the incline on the presser, means for moving the presser lengthwise of the carrier, and adjustable means for limiting said movement in the direction requisite to depress the upper jaw, substantially as and for the purposes hereinbefore set forth.

4. In a line casting machine of the character described, the combination with jaws constituting the top and bottom of the mold and means for varying the distance between said jaws at will, of side pieces housed in and interposed between the said jaws and spring-impelled each toward the face of the opposed jaw to form tight fitting self-adjusting side walls for the mold space, substantially as hereinbefore set forth.

5. In a line casting machine of the character described, the combination with jaws constituting the top and bottom of the mold and means for varying the distance between said jaws at will, of side pieces housed one in the upper and the other in the lower jaw and spring-impelled toward the face of the opposed jaw to form tight fitting self-adjusting side walls for the mold, and means for adjusting one jaw lengthwise of the other at will to vary the normal distance between the side pieces, substantially as hereinbefore set forth.

6. In combination with the upper mold jaw, the lower mold jaw movable lengthwise relatively to the upper jaw, and the side

pieces carried by the upper and lower jaws respectively, the spout closing strip or enlargement 12, on the upper face of the lower jaw, outside the mold space next to the side piece carried by the lower jaw, substantially as and for the purposes hereinbefore set forth.

7. In a line casting machine, a traveling mold comprising an upper and lower jaw, one longitudinally movable relatively to the other, and side members spanning the space between the two jaws, in combination with means for automatically effecting the longitudinal movement between the two jaws to lengthen and shorten the mold space, substantially as hereinbefore set forth.

8. In a line casting mold the combination of the upper and lower jaws, one longitudinally movable relatively to the other, a supporting frame therefor, two spring actuated members spanning the space between the two jaws and tending to separate them, and a wedge for adjusting and confining the upper jaw in opposition to the spring pressure, substantially as hereinbefore set forth.

9. A line casting mold mounted to reciprocate bodily and comprising, in combination, a lower jaw, a rising and falling upper jaw, intermediate yielding members to close the ends of the mold space, a wedge for adjusting the upper jaw, and means for automatically causing a change in the relation between the wedge and the other parts, substantially as hereinbefore set forth.

10. In a line casting machine, a traveling mold having one member longitudinally movable in relation to the others for the purpose of changing the length of the mold space, in combination with adjustable means for automatically closing the mold to one length or another as required, and a stop for automatically opening the mold lengthwise, substantially as hereinbefore set forth.

11. In a line casting machine, a traveling mold variable as to the length and width of the mold space, in combination with adjustable means for automatically closing the mold to one length and width or another as required, and means for automatically opening the mold in both directions during its travel, substantially as hereinbefore set forth.

12. A traveling linotype mold having two opposed jaws relatively movable to vary the casting width of the slot and manually operated 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 for automatically returning said jaw to normal closed position after the ejecting and before the next succeeding casting operation.

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

FRITZ C. LUCKE D'AIX.

Witnesses:
OSCAR MUSSINAN,
LOUIS T. STEIN.