Nov. 2, 1937. R. ARCHER 2,097,712

SLUG CASTING MACHINE

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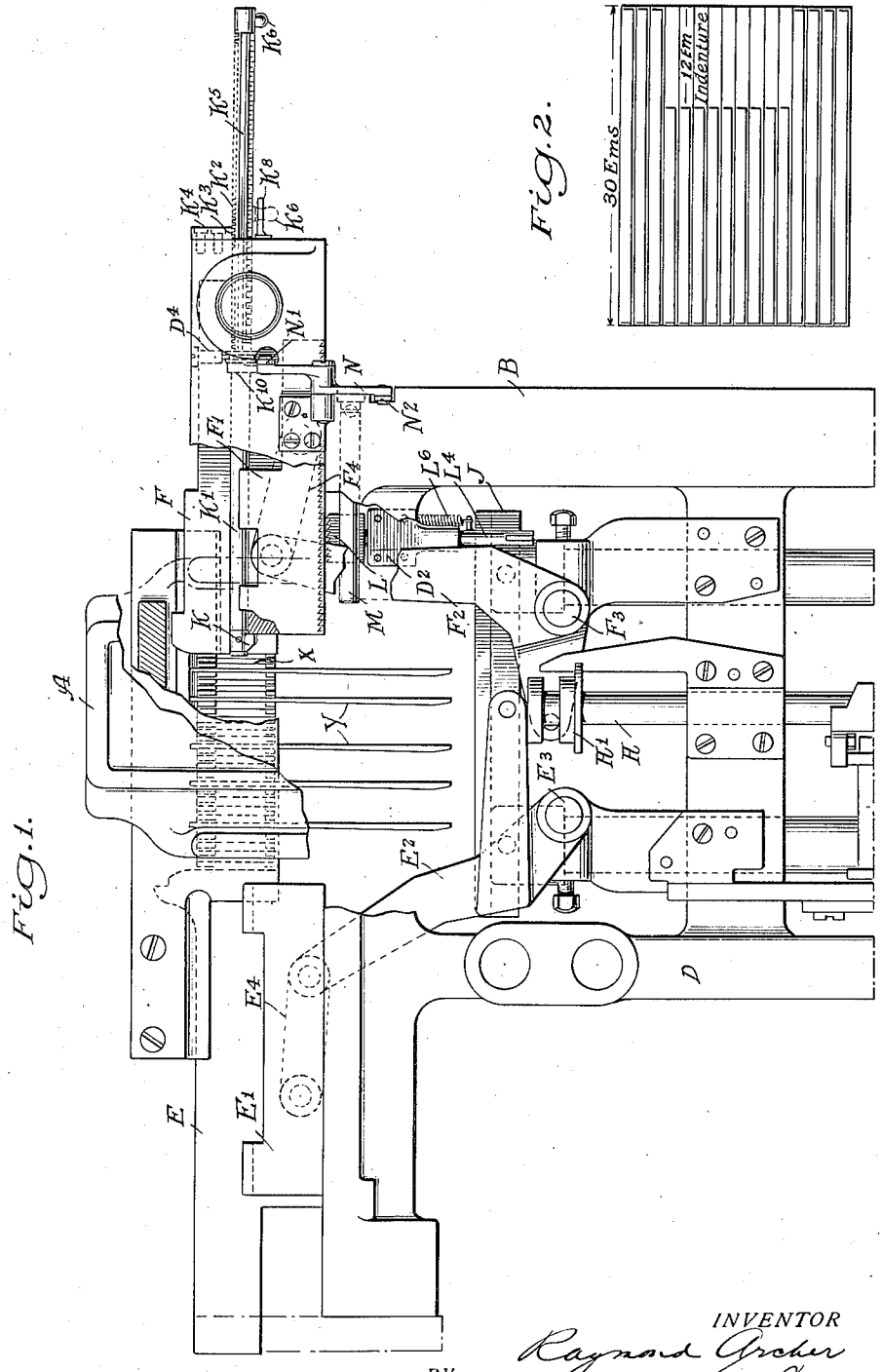


Fig. 1.

Fig. 2.

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Fig. 4.

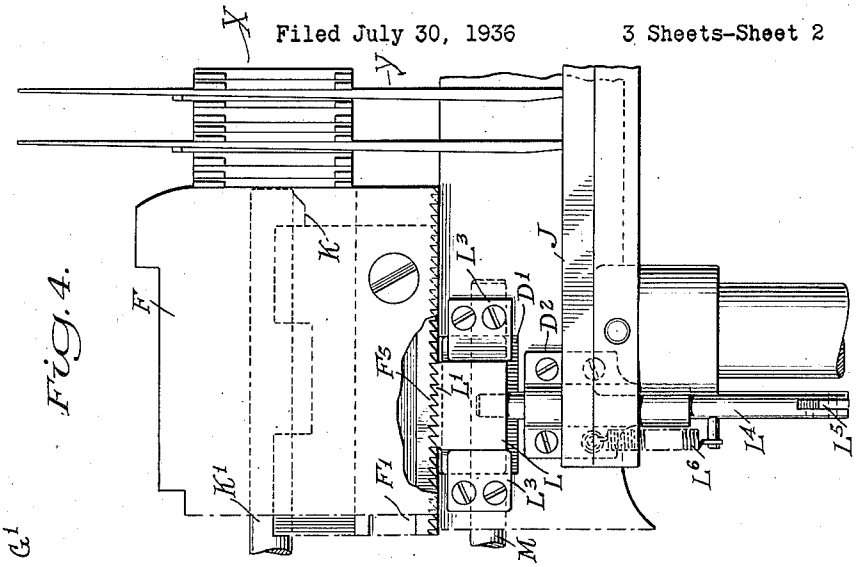
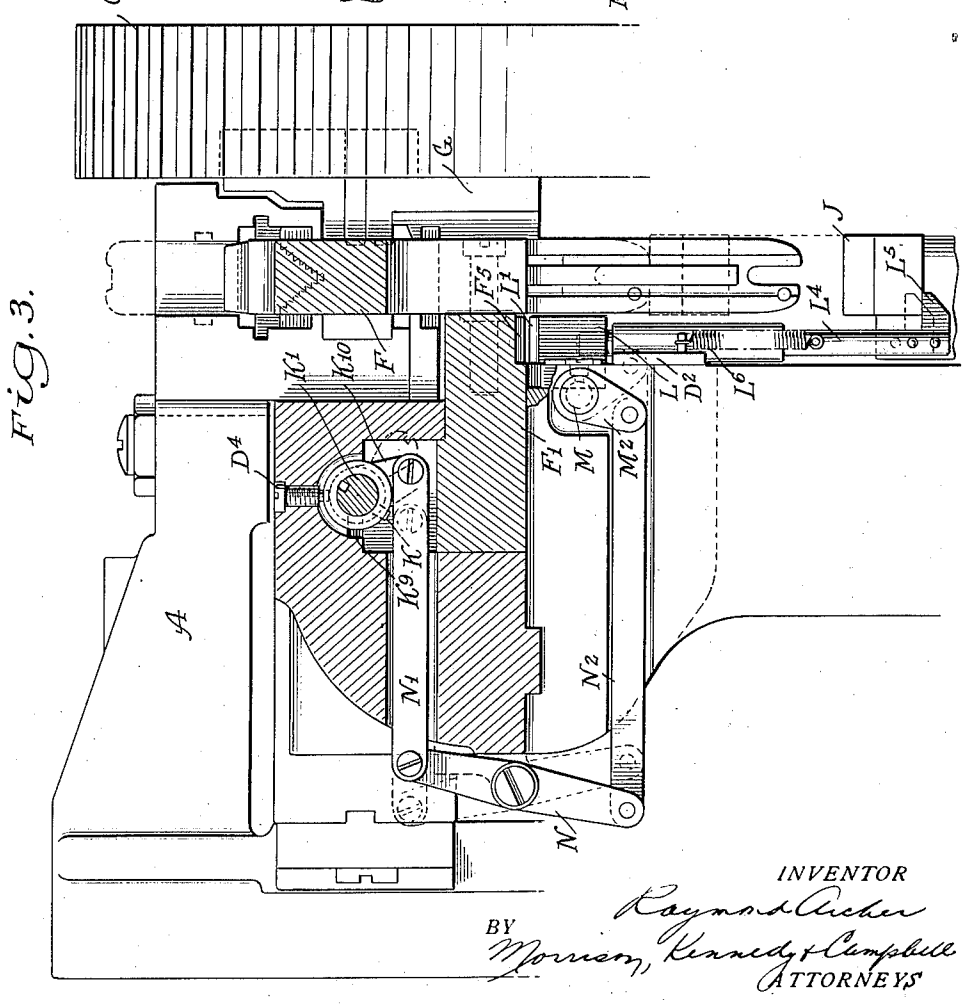


Fig. 3.



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Fig. 6.

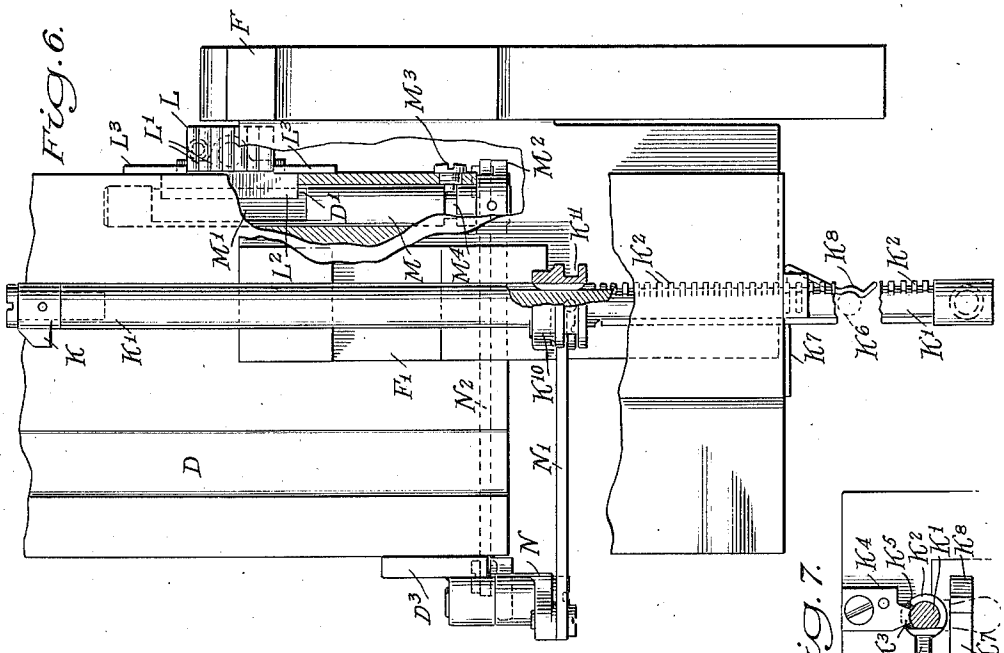
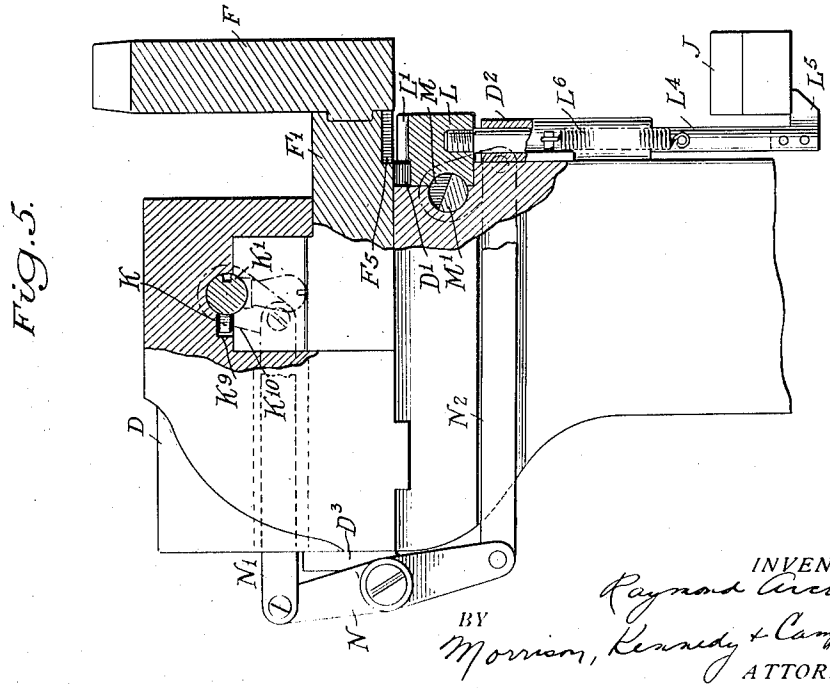


Fig. 7.

Fig. 5.



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Patented Nov. 2, 1937

2,097,712

UNITED STATES PATENT OFFICE

2,097,712

SLUG CASTING MACHINE

Raymond Archer, Seattle, Wash., assignor to Mergenthaler Linotype Company, a corporation of New York

Application July 30, 1936, Serial No. 93,357

20 Claims. (Cl. 199—50)

This invention relates to slug casting machines of the general organization represented in United States Letters Patent to O. Mergenthaler No. 436,532, wherein circulating matrices and expansible spacebands are composed in line and then transferred to a vertically movable line transporter or first elevator which descends to present the composed line between a pair of line clamping jaws and to the face of a slotted mold, the line justified by a so-called justification bar which drives the spacebands up through the line to fill out the space between the line clamping jaws, and a slug or "Linotype" thereafter cast against the line of matrices which closes the slotted mold at the front.

The present improvements deal with a machine of this class equipped for quadding and centering, and particularly to devices for arresting a line clamping jaw during its quadding movement in a predetermined position, so as to secure an even indenture at one end of the line, as contrasted with arresting the jaw during its quadding movement by contact with the end of the composed line itself. Specifically, the line clamping jaw (which is herein illustrated as the right hand jaw, although it is obvious that it could be applied to either jaw or both jaws, as desired) is arrested during its quadding movement by the banking of its jaw support against a stop mounted on a rod slidably arranged in the vise cap, and which can be adjusted to any desired position by a longitudinal movement of the rod which, for this purpose, is equipped with a scale arranged to cooperate with an indicator on the vise cap.

After the jaw has been arrested in its quadding movement, it is held securely in position against the thrust of the wedge-shaped spacebands by a block equipped with ratchet teeth adapted to engage in corresponding teeth with which the line clamping jaw support is formed on its bottom edge. Normally, the block is locked out of engagement with the jaw support, but when the before mentioned arresting stop is set, the block is automatically released and conditioned, so that, upon the upward movement of the justification bar (but prior to the justification of the line and the expansion of the spacebands), the block is moved upwardly to effect the engagement of its teeth with the teeth on the jaw support and thus holds the jaws in a fixed position during the expansion of the line. In this way, an even indenture at the end of the line is insured.

Referring to the drawings:

Fig. 1 is a front view of a portion of a "Linotype" machine equipped with the present improvements;

Fig. 2 is a diagrammatic view of a series of stacked slugs, a number of which have been indented at the right end;

Fig. 3 is a vertical sectional view through the vise cap, illustrating the stop in its active position and just prior to the raising of the justification bar which allows the toothed block to move into active engagement with the teeth associated with the right hand jaw;

Fig. 4 is an elevational view of the right hand jaw and a portion of the composed line looking at the parts from the rear, and showing the toothed block in engagement with the teeth associated with the jaw and after the justification of the line has taken place;

Fig. 5 is a partial sectional view through the right hand jaw and the vise cap, somewhat similar to Fig. 3, but showing the stop in its inactive position and the toothed block located in its normal inactive position;

Fig. 6 is a top view of a portion of the vise frame with the vise cap partially removed to show the details of the stop for the jaw support and the mechanism for releasing the toothed banking block; and

Fig. 7 is a small detail view of the devices for holding the stop adjusting rod in its different positions of adjustment.

The matrices X and the expansible spacebands Y, after being composed in line in the assembler in the usual way, are transferred to a vertically movable transporter or first elevator A slidably mounted in the fixed vise frame D. Upon receiving the line, the first elevator immediately descends to position it between the left hand jaw E and the right hand jaw F (see Figs. 1 and 3) and in front of a slotted mold G carried by the mold disc G^1, which latter is arranged to advance from the rear to bring the mold into contact with the line and the two clamping jaws for the slug casting operation, the line, prior to casting, being alined and justified by the upward movement of a horizontal justification bar J which engages the spacebands at their lower ends and forces them upwardly through the line.

The two jaws E and F are mounted for movement in the vise frame D in the customary manner, being carried by supporting blocks E^1 and F^1 slidable in suitable guideways in the vise frame and are movable toward and from each other by a periodically operated part in the form of a vertically movable rod H, which may be connected at its upper end to the respective jaws through the medium of two similar but oppositely disposed bell crank levers E^2 and F^2 pivoted as at E^3 and F^3 to the vise frame, the longer arms of said levers being connected by short links E^4 and F^4 with the jaw supports E^1 and F^1 respectively, and the shorter arms of said levers being arranged for connection to the rod H.

According to this arrangement, when the rod H is moved downwardly from its uppermost position (which is its normal position of rest), it will move the two jaws equi-distantly toward each other (assuming both to be connected to the rod) until they contact with the opposite ends of a composed line which has previously been positioned between them, and when the rod is moved upwardly for restoration to its position of rest, it will in like manner move the jaws equi-distantly away from each other and return them to their original positions of maximum separation.

Suitable provision, in the nature of a segmental grooved member H^1, is made at the upper end of the vertically movable rod H for connecting the jaws thereto, this grooved member being adjustable so as selectively to connect either or both jaws to the rod as desired for quadding at either end of the line or for centering. For further details of the quadding mechanism, as for instance, the manner in which the grooved member H^1 is adjusted and the manner in which the rod H is operated, reference may be had to the Frolander Patent No. 1,971,400.

For ordinary quadding or centering operations, the length of the line itself determines the setting of the jaws, but when an even indenture is desired, such as illustrated in Fig. 2, for the accommodation of a zinc cut or electroplate, the jaw must be set independently of the line in order that the indenture for a series of slugs will be the same throughout.

According to the present improvements, means are provided for securing an indenture at the end of the line (the right end of the line in the embodiment illustrated), these means being in the nature of a settable stop K which is rotatable into the path of the jaw support F^1 and against which the jaw support banks during its quadding movment, it being understood that, when it is desired to indent with the right hand jaw, such jaw will be connected to the vertically movable rod H in the same manner as for quadding. The stop K is fixed to the left end of a rod K^1 slidably arranged in the vice cap and which is adjustable both rotatably and longitudinally. The rotatable adjustment is for the purpose of moving the stop K from its inactive position shown in Fig. 5 (see also Fig. 7), wherein it stands clear of the jaw support so as not to interfere with the regular quadding movement of the jaw, to its active position shown in Fig. 3 (see also Fig. 1), wherein the stop stands in the path of the jaw support and arrests it in its quadding movement, thus to secure the indenture referred to. The longitudinal adjustment allows the positioning of the stop K in accordance with the amount of indenture required at the end of the line.

When the stop K has been properly adjusted longitudinally, a forty-five degree turn of the rod K^1 in a counter clockwise direction (looking at the machine from the right) will effect the engagement of several of a plurality of teeth K^2, with which the rod is equipped, with corresponding teeth K^3 in an element K^4 fixed to the vice cap at the end (see Figs. 1 and 7). When the rod K^1 is thus adjusted, the stop K will arrest the jaw in its quadding movement and thus determine the amount of indenture of the line.

When the stop K is in its normal inactive position, that is, when it clears the jaw support, a longitudinal groove K^5 in the rod K^1 will register with the toothed element K^4, as shown in Fig. 7, so that the rod may be adjusted longitudinally without interference from said member. Co-extensive with the series of teeth K^2, the rod K^1 is provided with a scale, graduated in half ems, and which in cooperation with the element K^4, will indicate the proper setting of the stop K for a given indenture.

The rod K^1 is formed at its right end with a suitable handle K^6 to facilitate its adjustment both rotatably and longitudinally and, when the rod is not in use, it may be pushed all the way into the vice cap, where it is held by a spring Clip K^7 fastened to the vice cap and which has an outwardly extending portion K^8 arranged to press against the handle K^6 and hold it in its out-of-the-way position. Incidentally, it may be stated at this point, that the vise cap just above the jaw support is recessed longitudinally as at K^9 (Fig. 5) to provide clearance for the stop K as it is adjusted longitudinally from one position to another.

When the jaw F has been arrested in its inward movement by the banking of its jaw support F^1 against the stop K, it is held in its arrested position by a block L underlying the jaw support and formed in its upper edge with a series of ratchet teeth L^1 adapted to engage corresponding ratchet teeth F^5 formed in the bottom of the jaw support. The block L is arranged for limited vertical movement, and to this end is formed (see Figs. 5 and 6) with a plain forward portion L^2 which fits into a straight sided recess D^1 formed in the vice frame at the rear, the block being held in the recess by a pair of retaining plates L^3 secured to the vise frame. In the bottom face of the block L, there is threaded a vertical guide rod L^4 arranged to slide in a bracket D^2 screwed to the vise frame and which is equipped at its lower end with a finger L^5 projecting beneath the horizontal justification bar J. A tension spring L^6, anchored at one end to the vise frame and at the other end to a pin projecting from the vertical rod L^4, tends to pull the rod, and consequently the block L, in an upward direction.

Normally, the block L is held out of engagement with the jaw support by a rotatable shaft M journalled in the vise frame and which has a half round section M^1 in the vicinity of said block (Figs. 5 and 6). However, when the stop K has been adjusted longitudinally to a position to secure the proper indenture and the rod K^1 rotated, as previously described, to bring the teeth K^2 on the rod into engagement with the teeth on the element K^4, the latter movement of the rod K^1, through a linkage which includes a lever N pivotally mounted in a bracket D^3 secured to the vise frame, a link N^1 connecting the upper end of the lever with an arm K^{10} fast to the rod K^1, and a link N^2 connecting the lower end of the lever N with an arm M^2 fast to the rock shaft M^1, will turn the shaft M to bring the half round portion thereof opposite the block L. In this position of the shaft M^1, the block L is released and brought directly under the control of the horizontal justification bar J. The normal position of the justification bar is such that the block L, through the finger L^5 which engages beneath said bar, is held out of engagement with the jaw support, but when the justification bar moves upwardly to expand the line (see Fig. 4), the block L is released, whereupon it will move upwardly under the influence of the spring L^6 and cause its teeth L^1 to engage the corresponding teeth on the jaw support. In this connection, it will be noted that the block L moves upwardly into engagement with the jaw support during the first stage of upward move-

ment of the justification bar and before justification of the line takes place. Consequently, the jaw F will be held rigidly against movement during the expansion of the spacebands and an accurate indenture of the line thus secured. It may also be stated here, that the ratchet teeth on the jaw F and the block L have a pitch of one-half em, which will provide sufficiently small increments of adjustment of the jaw for all practical purposes.

In machines of this character, justification takes place in two stages, between which the justification bar drops somewhat away from the lower ends of the spacebands, but the justification bar during this intermediate phase will not descend sufficiently far to withdraw the toothed block L out of engagement with the jaw support. After the casting operation has been completed, however, and just prior to the separating movement of the jaws, the justification bar does descend to its lowermost position and, in doing so, will engage the finger L^5 to return the toothed block to its normal retracted position.

When it is desired to return to regular machine operation or normal quadding or centering operations, the rod K^1 is rotated back through 45° to disengage the teeth K^2 thereon from the teeth on the element K^4 and, in doing so, the half round rod M, through the linkage previously mentioned, is turned to the position shown in Fig. 5, wherein the block L is again locked out of operation. In this position, the rod K^1 may be slid into the vise cap out of the way, it being noted that the arm K^{10} is splined to the rod K^1, in order that the latter may be moved longitudinally with reference thereto. The arm K^{10} is held against lateral movement by a screw D^4 (see Fig. 1) threaded into the vise cap at the top and which has a reduced end portion engaging in a groove K^{11} formed in that portion of the arm which encircles the rod K^1. The half round shaft M is also held against longitudinal movement by a similar screw M^3 threaded into the vise frame at the rear and which likewise has a reduced end portion engaging in an annular groove M^4 formed in said rod (see Figs. 3 and 6).

In the accompanying drawings, the invention has been shown merely by way of example and in preferred form, and obviously, many variations and modifications may be made therein which will still be comprised within its spirit. It is to be understood, therefore, that the invention is not limited to any specific form or embodiment, except insofar as such limitations are specified in the appended claims.

Having thus described my invention, what I claim is:

1. A slug casting machine including, in combination, a pair of line clamping jaws, one movable toward the other in quadding, means for effecting such quadding movement of the jaw, means acting independently of the line for arresting the jaw in a predetermined quadding position, and devices distinct from the jaw moving means for locking the jaw against outward movement in said predetermined quadding position during justification of the line.

2. A slug casting machine including, in combination, a pair of line clamping jaws, one movable toward the other in quadding, means for effecting such quadding movement of the jaw, means acting independently of the line for arresting the jaw in a predetermined quadding position, and devices including a toothed block adapted to cooperate with corresponding teeth associated with the movable jaw for locking the jaw against outward movement in said predetermined quadding position during justification of the line.

3. A slug casting machine including, in combination, a pair of line clamping jaws, one movable toward the other in quadding, means for effecting such quadding movement of the jaw, line justifying mechanism, means acting independently of the line for arresting the jaw in a predetermined quadding position, and devices controlled from the line justifying mechanism for locking the jaw against outward movement in said predetermined quadding position during justification of the line.

4. A slug casting machine including, in combination, a pair of line clamping jaws, one movable toward the other in quadding, means for effecting such quadding movement of the jaw, line justifying mechanism, means acting independently of the line for arresting the jaw in a predetermined position, and devices controlled from the line justifying mechanism and including a toothed block adapted to cooperate with corresponding teeth associated with the movable jaw for locking the jaw against movement in said predetermined position during justification of the line.

5. A slug casting machine including, in combination, a pair of line clamping jaws, one movable toward the other in quadding, means for effecting such quadding movement of the jaw, line justifying mechanism including a justification bar movable upwardly to justify the line, means acting independently of the line for arresting the jaw in a predetermined position, and a block arranged for limited vertical movement and equipped with teeth adapted to cooperate with complementary teeth associated with the line clamping jaw, said block being equipped with means including a finger engaging beneath the justification bar, and said justification bar acting during its upward movement to permit the engagement of the toothed block with the jaw, and acting after casting to move the toothed block out of engagement with the jaw.

6. A slug casting machine including, in combination, a pair of line clamping jaws, one movable toward the other in quadding, means for effecting such quadding movement of the jaw, means including a settable stop for arresting the jaw in a predetermined position, and devices acting directly on the jaw to lock the same against movement in said predetermined position during justification of the line.

7. A combination according to claim 6, wherein the means including the settable stop also includes a rod on which the stop is mounted and which is adjustable longitudinally to any desired predetermined position.

8. A combination according to claim 6, wherein the means including the settable stop also includes a rod on which the stop is mounted, which rod is adjustably arranged in the vise cap and positionable therein out of the way when the stop is inactive.

9. A combination according to claim 6, wherein the stop is mounted on a rod adjustable longitudinally to different predetermined positions, and rotatably to lock the rod in its different adjusted positions.

10. A combination according to claim 6, wherein the stop is mounted on a rod adjustable longitudinally to different predetermined positions and wherein the vise frame is equipped with a toothed element adapted to cooperate with teeth

on the rod to lock the rod in its different adjusted positions.

11. A slug casting machine including, in combination, a pair of line clamping jaws, one movable toward the other in quadding, means for effecting such quadding movement of the jaw, adjustable means for arresting the jaw in a predetermined position, normally inactive means for locking the jaw in its arrested position, and means for automatically conditioning the jaw locking means for operation when the jaw arresting means is adjusted to active position.

12. A slug casting machine including, in combination, a pair of line clamping jaws, one movable toward the other in quadding, means for effecting such quadding movement of the jaw, line justifying mechanism, adjustable means for arresting the jaw in a predetermined position, normally inactive means adapted to be controlled by the line justifying mechanism for locking the jaw in its arrested position, and means for automatically bringing the jaw locking means under the control of the line justifying mechanism when the jaw arresting means is adjusted to active position.

13. A slug casting machine including, in combination, a pair of line clamping jaws, one movable toward the other in quadding, means for effecting such quadding movement of the jaw, means adjustable longitudinally for arresting the jaw in different predetermined positions and rotatably into active jaw arresting position, normally inactive means for locking the jaw in its arrested position, and means for automatically conditioning the jaw locking means for operation when the jaw arresting means is rotatably adjusted to active position.

14. A slug casting machine including, in combination, a pair of line clamping jaws, one movable toward the other in quadding, means for effecting such quadding movement of the jaw, a jaw stop, a rod carrying the stop mounted in the vise frame and adjustable longitudinally to locate the stop in different jaw arresting positions, normally inactive means for locking the jaw in its different arrested positions, and means controlled by the rod for conditioning the jaw locking means for operation.

15. A slug casting machine including, in combination, a pair of line clamping jaws, one movable toward the other in quadding, means for effecting such quadding movement of the jaw, a jaw stop, a rod carrying the stop mounted in the vise frame and adjustable longitudinally to locate the stop in different jaw arresting positions, normally inactive means located below the jaw for locking the jaw in its different arrested positions, and means controlled from the top of the vise frame for conditioning the jaw locking means for operation.

16. A combination according to claim 15, wherein the means for conditioning the jaw locking means for operation is controlled from the stop carrying rod through intermediate linkage.

17. A slug casting machine including, in combination, a pair of line clamping jaws, one movable toward the other in quadding, means for effecting such quadding movement of the jaw, a jaw stop, a rod carrying the stop mounted in the vise frame and adjustable longitudinally to locate the stop in different jaw arresting positions, a block equipped with teeth adapted to cooperate with similar teeth associated with the jaw for locking the jaw in its different arrested positions, a half round member adapted in one position to hold the block against operation and in another position to condition the block for operation, and means controlled from the rod for locating the half round member in its different positions.

18. A slug casting machine including, in combination, a pair of line clamping jaws, one movable toward the other in quadding, means for effecting such quadding movement of the jaw, a jaw stop, a rod carrying the stop mounted in the vise frame, said rod being adjustable longitudinally to locate the stop in different jaw arresting positions and rotatably to lock the rod in its adjusted positions, a block equipped with teeth adapted to cooperate with similar teeth associated with the jaw for locking the jaw in its different arrested positions, a half round member adapted in one position to hold the block against operation, and in another position to condition the block for operation, and connections between the rod and the half round member for moving the latter to release the block as the rod is locked in its adjusted position and for locking the block against operation when the rod is unlocked from its adjusted position.

19. A slug casting machine including, in combination, a pair of line clamping jaws, one movable toward the other in quadding, means for effecting such quadding movement of the jaw, line justifying mechanism, a jaw stop, a rod carrying the stop mounted in the vise frame, said rod being adjustable longitudinally to locate the stop in different jaw arresting positions, and rotatably to lock the rod in its adjusted positions, a block equipped with teeth adapted to cooperate with similar teeth associated with the jaw for locking the jaw in its different arrested positions, said block operating under the control of the line justifying mechanism, a half round member adapted in one position to hold the block against operation and in another position to release the block and place it under the control of the line justifying mechanism, and connections between the rod and the half round member for moving the latter to release the block as the rod is locked in its adjusted position and for locking the block against operation as the rod is unlocked from its adjusted position.

20. A slug casting machine including, in combination, a pair of line clamping jaws, one movable toward the other in quadding, means for effecting such quadding movement of the jaw, line justifying mechanism including a vertically movable justifying bar, a jaw stop, a rod carrying the stop mounted in the vise frame, said rod being adjustable longitudinally to locate the stop in different jaw arresting positions and rotatably to lock the rod in its adjusted positions, a block arranged beneath the vise jaw and equipped with teeth adapted to cooperate with similar teeth associated with the jaw for locking the jaw in its different arrested positions, means associated with the block including a finger engaging beneath the justification bar, and a lock controlled from the rod and adapted when the rod is in its unlocked position to lock the block against movement and when the rod is locked in an adjusted position to place the block under the control of the justification bar, said justification bar acting during its upward justification movement to release the block to permit its engagement with the jaw, and acting after casting to move the block out of engagement with the jaw and into normal position.

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