July 5, 1955 R. H. TURNER 2,712,380

TYPOGRAPHICAL CASTING MACHINE

Filed June 2, 1951 3 Sheets-Sheet 1

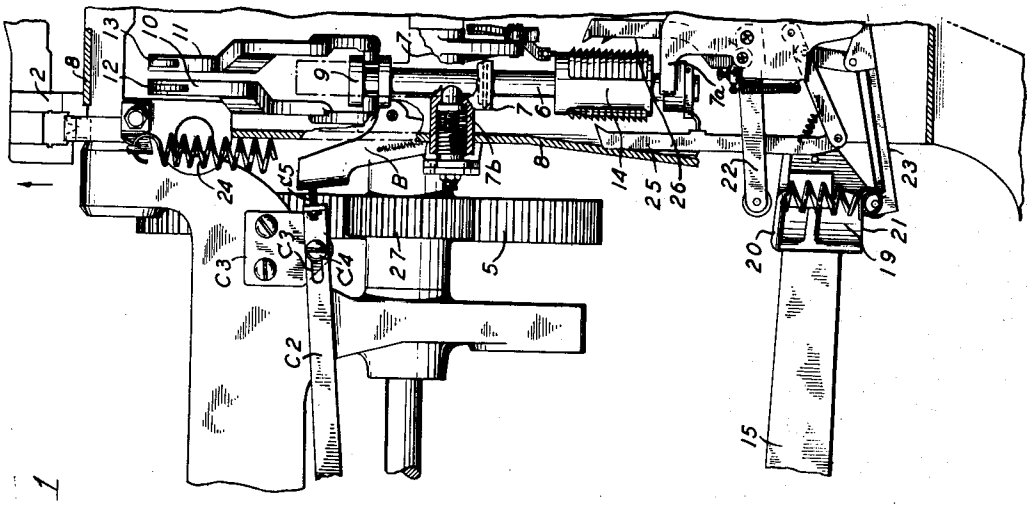
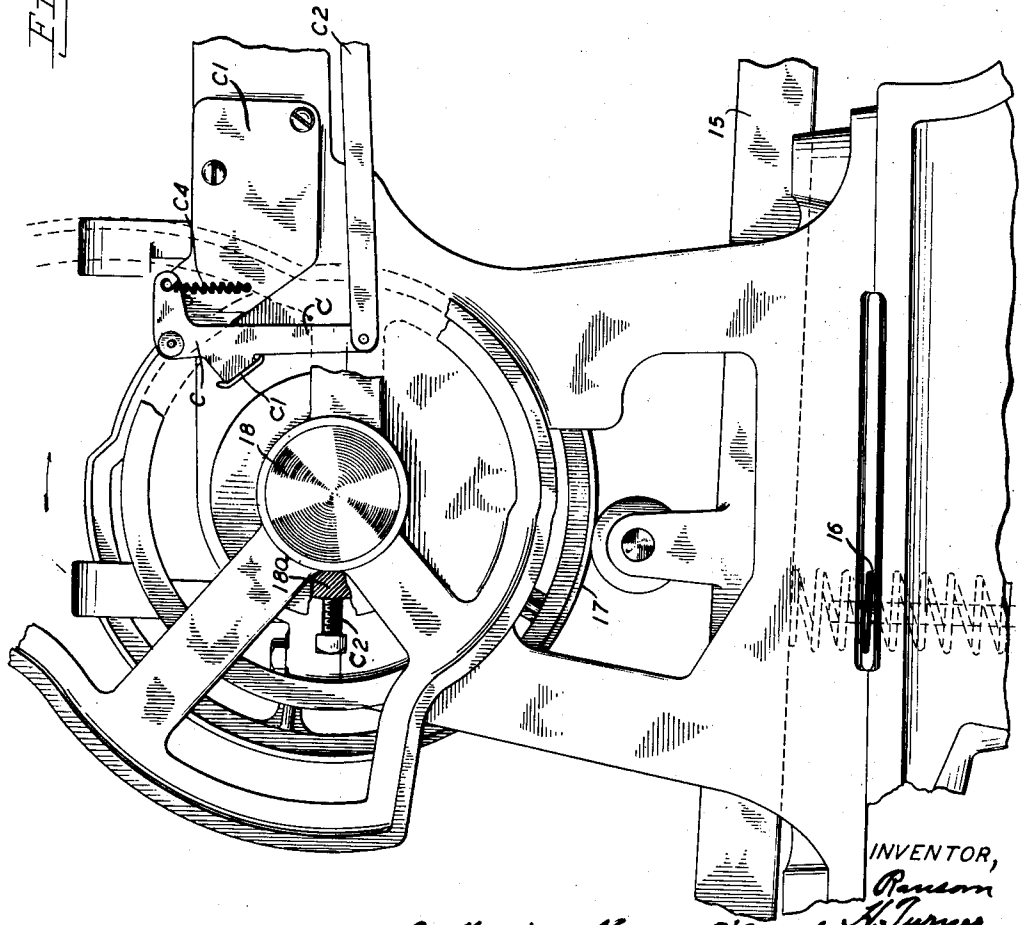


Fig. 1



INVENTOR,
Ransom H. Turner,
By Morrison Kennedy & Campbell, ATTORNEYS

July 5, 1955 R. H. TURNER 2,712,380

TYPOGRAPHICAL CASTING MACHINE

Filed June 2, 1951 3 Sheets-Sheet 2

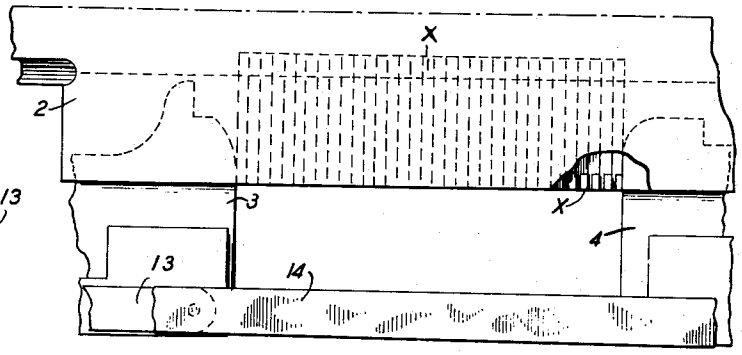


Fig. 3

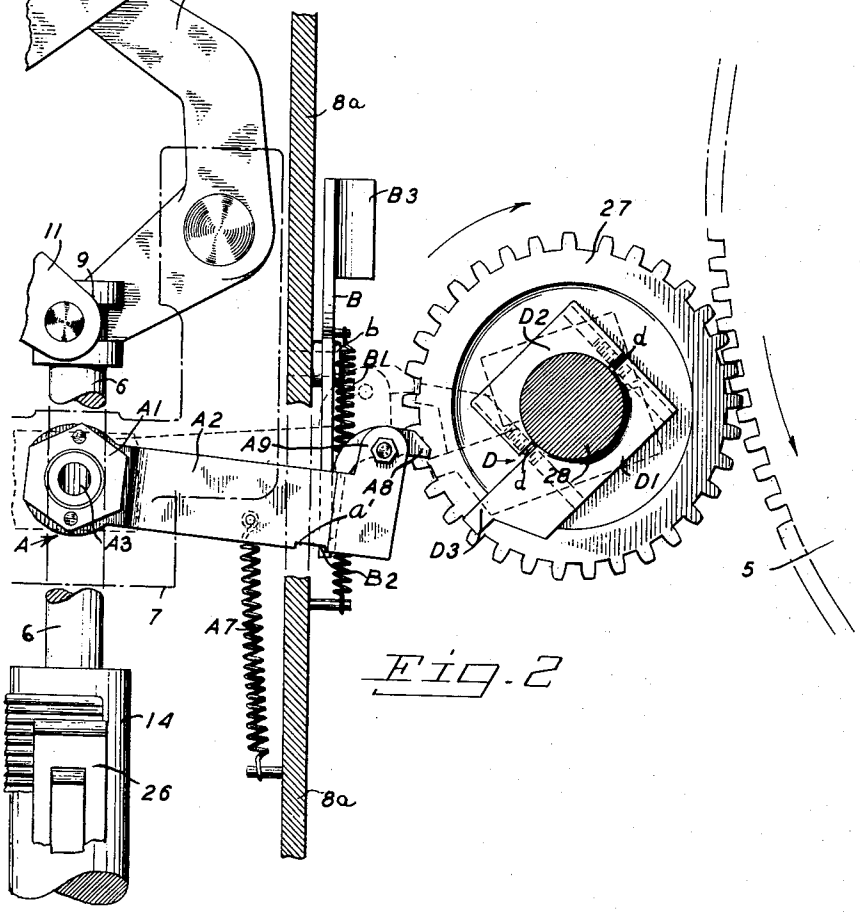


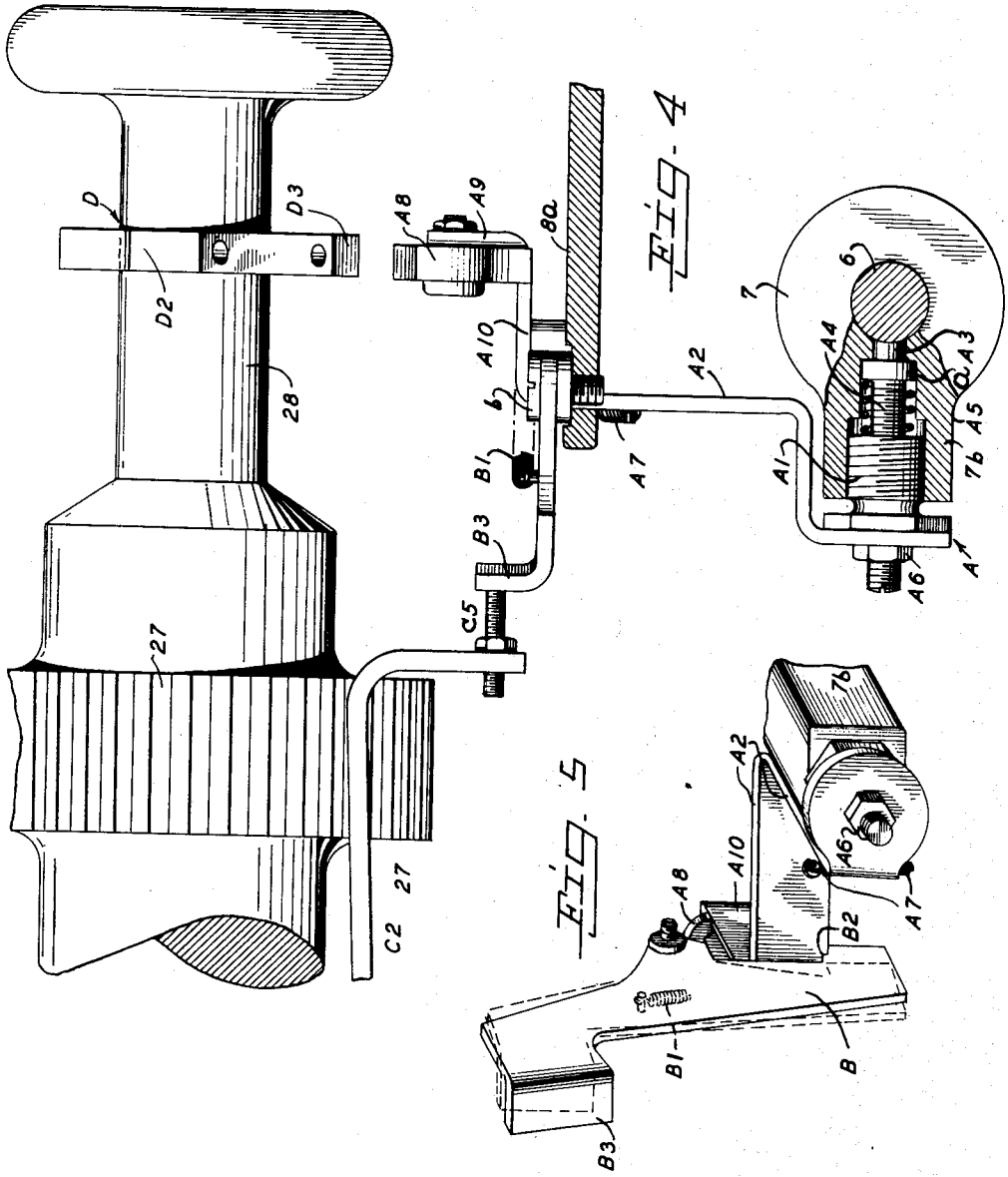
Fig. 2

INVENTOR,
Ransom H. Turner,
By Morrison, Kennedy
& Campbell, ATTORNEYS

July 5, 1955 R. H. TURNER 2,712,380

TYPOGRAPHICAL CASTING MACHINE

Filed June 2, 1951 3 Sheets-Sheet 3



INVENTOR,
Ramsom H. Turner,
By Morrison, Kennedy
& Campbell, ATTORNEYS

United States Patent Office 2,712,380
Patented July 5, 1955

2,712,380

TYPOGRAPHICAL CASTING MACHINE

Ransom H. Turner, Great Neck, N. Y., assignor to Mergenthaler Linotype Company, a corporation of New York

Application June 2, 1951, Serial No. 229,594
10 Claims. (Cl. 199—50)

This invention is directed to certain improvements in quadding and centering devices for typographical casting machines, wherein a matrix line, composed in the usual way, is lifted between the depending fingers of a line delivery slide and transferred thereby into a vertically movable transporter or first elevator slidably mounted in the so-called vise frame. Upon receiving the composed line, the elevator immediately descends to position it between the vise jaws and directly in front of a slotted mold which then advances from the rear into contact with the line and the clamping jaws for the slug casting operation, the line prior to this latter operation being aligned with the mold and properly justified when the machine is operating under normal conditions. After the slug has been cast, the mold is carried from its horizontal casting position to its vertical slug ejecting position by a three-quarter turn of the mold disk, and the first elevator meanwhile is raised to lift the composed line from between the jaws and transport it to the upper transfer channel where the line is shifted therefrom for distribution. The first elevator then is lowered and finally comes to rest in its original or line receiving position just before the machine cycle is completed.

The vise or line clamping jaws are mounted for endwise movement toward and from each other in the cap portion of the vise frame and are operable, when quadding or centering by a vertically movable rod which may be connected at its upper end through the medium of two similar, oppositely disposed, bell crank levers to either the right or the left hand jaw, or to both of said jaws when desired. The bell crank levers and the vertical operating rod therefor are mounted in suitable castings, and the latter together with most of the operative parts of the quadding and centering device (see the pending application of L. Rossetto, Serial No. 183,033, filed September 2, 1950), are built into a housing detachably secured to the left hand side of the vise frame. The vertical movements of the operating rod for the bell crank levers are controlled by a conveniently located member of the justification mechanism, which extends forwardly as usual from a horizontal hinge pin at the rear of the machine and is actuated from below by a powerful compression spring under the control of an edge cam on the main cam shaft. Twice during a machine cycle, this justification member is adapted to swing upwardly and downwardly in performing its function and serves in a manner later to be described when quadding or centering, first to permit the vertical rod to be raised in its bearings by a comparatively light spring so as to move either or both clamping jaws inwardly against a composed line supported in the casting position, and then to impart the additional line squeeze pressure thereto prior to the casting operation. Thereafter, and as the endwise pressure thereon is released, the line is lifted for distribution and the jaws are restored to their normal or outward position.

The matrices are formed as usual in their casting edges with routing notches of a given depth and the matrix characters are punched in the bottom walls of said notches. Consequently, the slugs cast from a composed line of matrices present on their printing edges corresponding character bearing pedestals, and the clamping faces of the vise jaws through their engagement with the two end matrices of the line prevent the escape of molten type metal from their routing notches during the slug casting operation. In regular casting (as distinguished from

quadding and centering) and due to the expanding pressure of the spacebands, which is maintained against the jaws after the casting operation and the retreat of the mold, the jaws consistently are subjected to a wiping action by the two end matrices as the composed lines are lifted from their position between them. However, when extensive quadding and centering operations are demanded, the molten type metal will adhere to and gradually form small hard protuberances on the clamping faces of the vise jaws within the areas defined by the walls of the routing notches in the end matrices. Unless removed, such protuberances frequently cause the production of imperfect slugs, damage the side walls of matrix characters and give rise to other attendant difficulties well understood by those familiar with the art.

The present invention is intended to overcome the above and other difficulties by providing means, particularly adapted to a quadding and centering attachment of the class referred to, for clamping the vertical jaw actuating rod temporarily against movement just before the final line squeezing pressure applied thereto is released and thereby hold the jaws in contact with the opposite ends of a matrix line until the latter has been lifted sufficiently far to clear them. In this way, a wiping action similar to that applied to the clamping faces of the jaws in regular casting is obtained and the adherence of type metal thereto prevented. The precise manner in which the desired results are accomplished will best be understood from the detailed description to follow.

In the accompanying drawings, the invention has been shown merely in preferred form and obviously many changes and variations may be made therein and in its mode of application without departure from its spirit. Therefore, it should be understood that the invention is not limited to any specific form or embodiment except insofar as such limitations are specified in the appended claims.

Referring to the drawings:

Fig. 1 is a side elevation, partly in section, showing front and rear end portions of a Linotype machine equipped with the present improvements;

Fig. 2 is a front elevation, on an enlarged scale and partly broken away and partly in section, showing the clamping device in its active position, and the controlling means therefor;

Fig. 3 is a detail front elevation showing the clamping jaws in contact with the opposite ends of a matrix line supported in the first elevator soon after the latter starts its upward movement from the casting position;

Fig. 4 is a top plan view, partly in section, of the clamping device and parts immediately associated therewith; and

Fig. 5 is a perspective view showing the clamping device and the latch pawl for sustaining it against spring tension in its inactive position.

As previously stated, after a line of matrices x has been completely composed, it is delivered to a vertically movable transporter or first elevator **2** which thereupon descends with the line to position it between a left hand jaw **3** and a right hand jaw **4**, where it is aligned with a slotted mold and properly justified preparatory to the slug casting operation. Thereafter, the mold is carried from its horizontal casting position to its vertical slug ejecting position by a three-quarter turn of the mold disk **5** while the first elevator is raised to the upper transfer level where the composed line is shifted therefrom for distribution.

The two line clamping jaws **3** and **4** are movable toward and from each other and are operable by a vertically movable rod **6** (Fig. 1) which is slidably mounted in upper and lower castings **7** and **7a** of a housing **8**, and at its upper end is provided with an annularly grooved

collar 9 adapted to accommodate diametrically opposed studs projecting inwardly from the shorter arms of two similar but oppositely disposed bell crank levers 10 and 11, whose longer arms are connected respectively by horizontal links 12 and 13 to the two clamping jaws 3 and 4. The rod 6 also is capable of rotation in opposite directions in order to set the collar 9 in different angular positions and in this way establish an operative connection between the rod and either jaw for quadding, or between the rod and both jaws for centering. The inward movement of the jaws during a quadding or centering operation is effected by the upward movement of the rod, whereas the outward or return movement of the jaws is effected by the downward movement of the rod. Near its lower end just above the casting 8, the rod 6 is provided with a cylindrical rack 14 formed with a plurality of circular teeth or serrations, whereby the rod may be raised different distances determined by the length of the matrix lines supported between the clamping jaws.

The downward movement of the rod 6 is limited by the banking of the collar 9 upon the upper casting 7, and the upward movement of the rod is effected by means controlled from a long fore-and-aft lever 15 of the well known justification mechanism. As best shown in Fig. 1, the lever 15 is actuated by a powerful spring 16 arranged beneath it and is controlled by an edge cam 17 on the main cam shaft 18 of the machine. During each cycle, the lever 15 is swung upwardly and downwardly twice in performing its regular function, and at the front it is equipped with an extension bracket 19 presenting upper and lower cam surfaces 20 and 21, respectively. The upper cam surface 20 is located in engaging relation to an anti-friction roller at the free end of a U-shaped lever 22 pivotally mounted in the lower casting 8, and the lower cam surface 21 is constantly engaged with an anti-friction roller at the free end of a second lever 23 so as to sustain it out of action against the tension of a long but not too powerful pull spring 24 connected to the lever 23 and anchored near the top of the vise frame. The levers 22 and 23 are operatively connected through suitable linkage to separate pawls 25 and 26 disposed on opposite sides of the rack 14 and arranged in engaging relation thereto. Consequently, in the first operation of the justification lever 15, the lower lever 23 will be allowed to rise under the influence of the pull spring 24 and, through its pawl connection with the rack 14, raise the vertical rod 6 to close the clamping jaws on a line supported in the casting position; and, in the second operation of the justification lever, the upper lever 24 will be operated directly by the upper cam surface 20 of the bracket 19 and through its pawl connection with the rack 14, supply the additional or line squeeze pressure required during the slug casting period. After casting, the rod 6 is moved downwardly by the upward movement of the first elevator to restore the jaws to their original or fully separated position.

So far as described, the parts, their construction and mode of operation are clearly set forth in the pending application of L. Rossetto, Serial No. 183,033, hereinbefore referred to, and constitute no part of the present invention, the latter being directed to improved means which is particularly designed for quadding and centering devices applied as attachments to typographical casting machines and which is operative during a machine cycle to retain at least part of the line squeeze pressure until shortly after the first elevator 2 starts its upward movement from the casting position so as to cause the two end matrices in the line to make wiping contact with the clamping faces of the vise jaws 3 and 4.

Such improved means includes a clamping device A, operable just before the line squeeze pressure is released, to grip the jaw operating rod 6 and hold it firmly in its raised position while the justification lever 15 is being depressed against the tension of its actuating spring by the control cam 17. As best shown in Fig. 4, the clamping device A consists mainly of a clamping screw member A^1 having a left hand thread and disposed at right angles to the vertical axis of the rod 6, an angularly shaped crank arm A^2 secured to the head portion of the member A^1 for turning the latter in opposite directions, a solid stud element A^3 to engage the outer cylindrical surface of the rod 6, and a fore-and-aft screw rod A^4 mounted for endwise adjustment in the member A^1 and directly opposed to the stud element A^3.

The screw member A^1 (Figs. 1 and 4) is mounted in a rearward projection 7^b of the upper casting 7, and the latter is drilled concentrically with said member so as to accommodate the stud element A^3 as well as a relatively light compression spring A^5 which surrounds the rod A^4 and is arranged between the member A^1 and a collar a formed on the stud element. In advance of the collar a, the stud element A^3 preferably is reamed out so as to conform with the cylindrical surface of the rod 6, and it is constantly held under the tension of the compression spring A^5 against said rod. A lock nut A^6, mounted on the rear end of the screw rod A^4 and seated against that portion of the crank arm A^2 which is secured to the screw member A^1, holds the screw rod in its proper position so that its front end will just clear the contiguous face of the stud element A^3 while the clamping device A is inactive.

The crank arm A^2 is actuated by a strong pull spring A^7 and is sustained in its normal horizontal position against the tension of said spring by a vertically disposed latch pawl B, the latter being arranged alongside one of the fixed side walls 8^a of the housing 8 and pivotally mounted on a screw stud b projecting laterally from said wall. As shown best in Figs. 2 and 4, the crank arm A^2 extends somewhat beyond the side wall 8^a and at its free end is equipped with a pivoted dog A^8 attached to an ear A^9 rising from a forwardly offset portion A^{10} of the crank arm. The latch pawl B is provided with a pull spring B^1 also anchored to the side wall 8^a; and, at a proper distance below the pivot stud b, the pawl is formed with a ledge or shoulder B^2 which normally is held under the tension of said spring engaged with a retaining notch a^1 milled transversely in the lower edge of the crank arm A^2. At its upper end, the latch pawl B presents an offset portion B^3 whereby it may be rocked about the stud b so as to disengage the shoulder B^2 from the notch a^1 and thus release the crank arm. When such disengagement takes place, the crank arm A^2 will be jerked downwardly by its actuating spring A^7 and rotate the screw member A^1 in the proper direction to advance the screw rod A^4 the few thousandths of an inch necessary to cause the stud element A^3 to firmly grip the jaw operating rod 6 and hold it against downward movement. Thereafter, the crank arm A^2 through the medium of the dog A^8 is raised sufficiently far to permit the shoulder B^2 of the latch pawl (which meanwhile retains a sliding contact with the opposing face of the crank arm) to snap back to its original position beneath the lower edge of the crank arm.

The means employed for actuating the latch pawl B in the manner just stated includes a bell crank lever C (Fig. 1) located in the vicinity of the main cam shaft 18 and pivotally attached to a bracket C^1 secured to the machine frame. The longer arm c of the lever C is operatively connected to the rear end of a long fore-and-aft link C^2 and is formed with a cam surface c^1 disposed in the path of a screw stud c^2 projecting radially from a collar 18^a keyed to the cam shaft 18. Near the front, the link C^2 is formed with a comparatively short longitudinal slot c^3 adapted to accommodate a supporting pin c^4 mounted in another fixed bracket C^3; and at its front extremity, said link is provided with an adjustable screw element c^5 located in engaging relation to the offset portion B^3 of the latch pawl B. A pull spring C^4 attached to the shorter arm of the lever C and anchored to the bracket C^1, holds the lever in its normal position (Fig. 1) with the front

end wall of the slot c^3 in the link C, banking against the supporting pin c^4.

The angular position of the screw stud c^2 in relation to the cam surface c^1 of the bell crank lever C is such that, just before the line squeeze pressure imparted to the clamping jaws **3** and **4** during a machine cycle is released by the second downward movement of the justification member **15**, the screw stud c^2 will engage the cam surface c^1 of the bell crank lever C and, through the link C^2, actuate the latch pawl B in opposition to its spring B^1 and thus release the crank arm A^2 for operation by the spring A^7. Consequently, and as the stud element A^3 performs its function in the manner already described, the line clamping jaws will be held against the line under sufficient pressure to permit the two end matrices of the line to clear away any deposit of type metal that might adhere to the clamping faces of the vise jaws, as the line is lifted from its position between them by the upward movement of the first elevator **2**. At this time during the machine cycle, the mold disk **5** is given a three-quarter turn by rotation of its driving pinion **27**, so as to carry the mold (not shown) from the casting to the slug ejecting position, and as said pinion starts its rotation in effecting this operation, it is proposed, according to the present invention, to restore the crank arm A^2 and parts controlled thereby, to their normal position in order to release the vise jaw actuating rod **6** for return to its lower and normal position of rest.

To this end, the shank **28** of the regular handle, used to rotate the pinion **27** manually for reasons well known, is equipped with an attachment D (Figs. 2 and 4) comprising two opposed members D^1 and D^2 which are recessed so as to fit the shank **28** and are held securely in place thereon by a pair of clamping screws *d* disposed on opposite sides of the shank **31**. The member D^1 (Fig. 2) is formed with an extension D^3 of predetermined length, and the angular position of the attachment D is such that, as the pinion is rotated at the time and for the purpose above stated, the extension D^3 will engage the dog A^8 on the crank arm A^2 and raise the latter against the tension of its actuating spring A^7 sufficiently far to gain support by the latch pawl B. Then, and as indicated by the dotted lines in Fig. 2, the extension D^3 is carried out of its engagement with the dog A^8 so that it may clear it while the pinion **27** continues to rotate until the mold disk **5** completes its three-quarter turn and the selected mold arrives in the slug ejecting position.

In conclusion, it may be mentioned that the main reason for employing the pivoted dog A^8 for the purpose it serves is its capability of yielding or being displaced by the extension D^3 whenever the mold turning pinion **27** is rotated counterclockwise (Fig. 2) instead of in the normal opposite direction, as may occur in "backing up" the machine or in changing molds while the crank arm A^2 occupies its unlatched position.

What is claimed is:

1. In a typographical casting machine equipped with a vertically movable first elevator to carry the composed line to and from casting position, the combination of a pair of line clamping jaws to receive the line in casting position and movable one toward the other in quadding, a vertically movable rod connectable to a jaw for effecting its quadding movement, automatic means for applying a line squeeze pressure to the rod in the quadding position of the jaw, said means being released after the casting operation and before the start of the upward movement of the first elevator, and an automatic clamping device inactive before casting and active momentarily after casting to hold the rod against movement, said clamping device being engageable with the rod and operated before the release of the pressure applying means to maintain said rod holding engagement after the release of said means and until after the first elevator has started its upward movement.

2. A combination according to claim 1, including means actuated from the main cam shaft of the machine for controlling the engagement of the clamping device with the rod.

3. A combination according to claim 1, including a so-called mold disk turning pinion, and means actuated from said pinion for disengaging the clamping device from the rod and restoring it to its normal non-clamping position.

4. In a typographical casting machine equipped with a vertically movable first elevator to carry the composed line to and from casting position, the combination of a pair of line clamping jaws to receive the line in casting position and movable one toward the other in quadding, a vertically movable rod connectable to a jaw for effecting its quadding movement, a power operated member operated twice during each machine cycle, means controlled by said member in its first operation to effect the jaw closing movement of the rod and in the second operation of said member to apply a line squeeze pressure to the rod in the quadding position of the jaw, said means being released after the casting operation and before the start of the upward movement of the first elevator, and automatic supplementary means inactive before casting and active momentarily after casting to maintain such pressure on the rod after the release of the pressure applying means and until after the first elevator has started its upward movement, said supplementary means including a clamping device controlled from the main cam shaft of the machine and actuated before the release of the pressure applying means to engage the jaw operating rod and to maintain such rod holding engagement after the release of said means and until after the first elevator has started its upward movement.

5. A combination according to claim 4, wherein said clamping device includes a screw rod disposed at right angles to the vertical jaw operating rod and rotatable momentarily to apply clamping pressure to the rod.

6. A combination according to claim 4, wherein said clamping device includes a screw rod disposed at right angles to the vertical jaw operating rod, and a clamping element shaped to fit snugly against the rod and directly opposed to the screw rod.

7. A combinaiton according to claim 4, wherein said clamping device includes a screw rod and a spring actuated automatically controlled crank arm attached to said screw rod for turning it to and from its clamping position.

8. A combination according to claim 4, wherein said clamping device includes a screw rod and a spring actuated crank arm attached to the screw rod for turning it to and from its clamping position, and wherein the control means includes a latch for sustaining the crank arm against the tension of its spring in non-clamping position of the screw rod, connections between the latch and the main cam shaft of the machine for actuating the latch to release the crank arm, and automatic means functioning in timed relation to the release of the crank arm for restoring it to its original position.

9. A combination according to claim 8, wherein the connections between the latch and the main cam shaft include a bell crank lever arranged adjacent said shaft, a fore-and-aft link connected at its rear end to the lever and terminating at the front in operative relation to the latch, and a cam element carried by a collar on the main shaft for actuating the bell crank lever.

10. A combination according to claim 8, including the so-called mold turning pinion, and wherein the means for restoring the spring actuated crank arm to its normal position includes a lifter element adjustably mounted on the hub of said pinion and arranged to engage a projection on the crank arm.

UNITED STATES PATENTS

References Cited in the file of this patent

1,949,302	Frolander	Feb. 27, 1934
1,971,400	Frolander	Aug. 28, 1934
2,051,804	Albrecht	Aug. 25, 1936