Jan. 16, 1945. R. C. CASHON 2,367,198

LINE OF TYPE UNIVERSAL SURFACING MACHINE

Filed April 15, 1941 2 Sheets-Sheet 1

FIG. 1

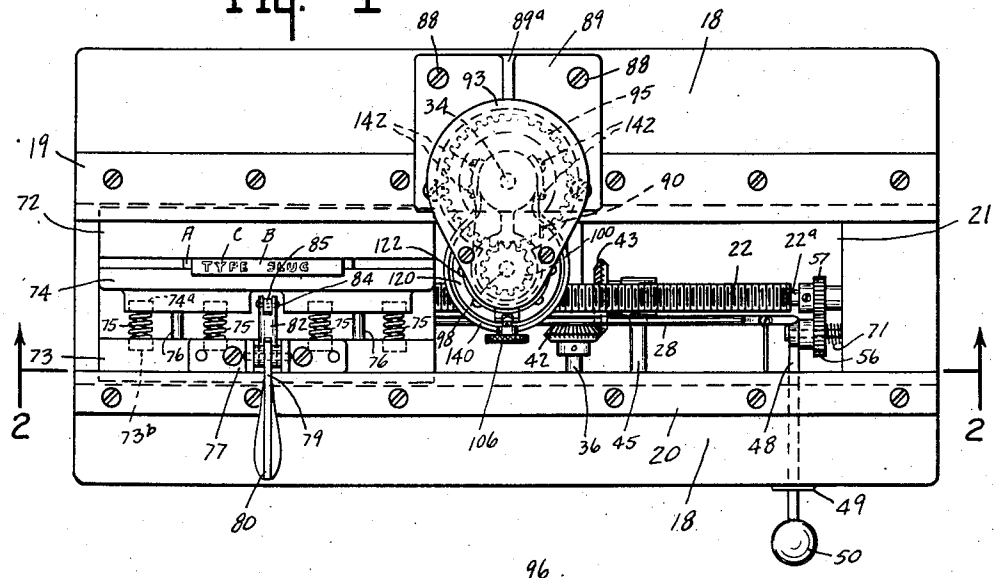
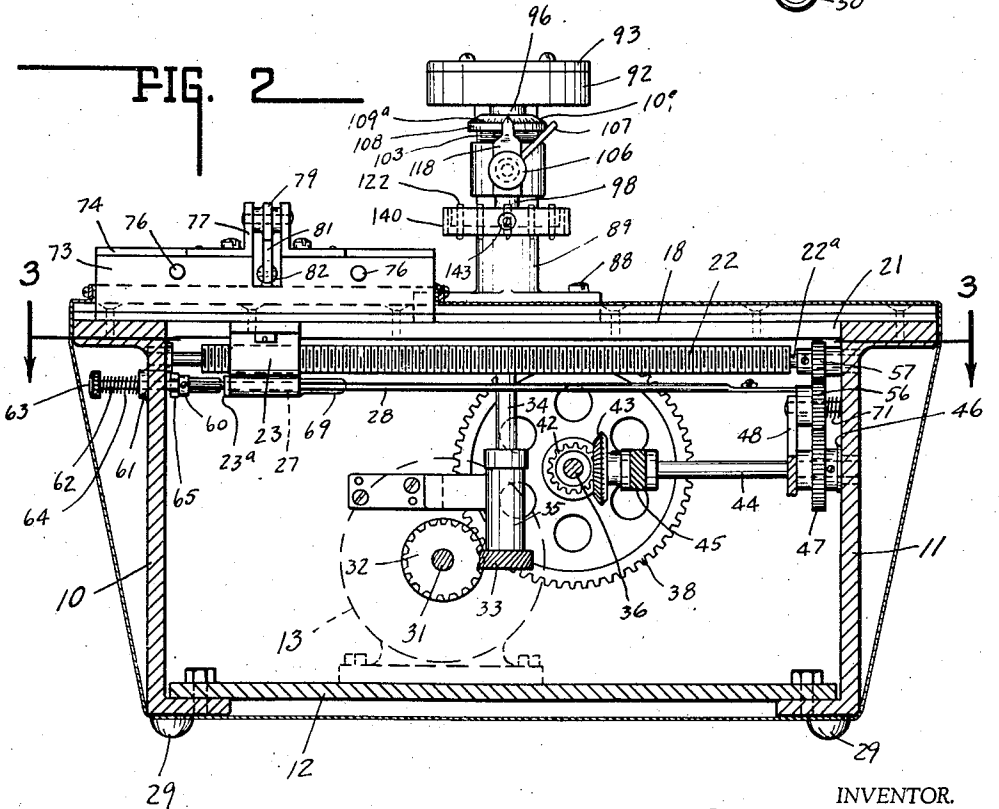


FIG. 2



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FIG. 3

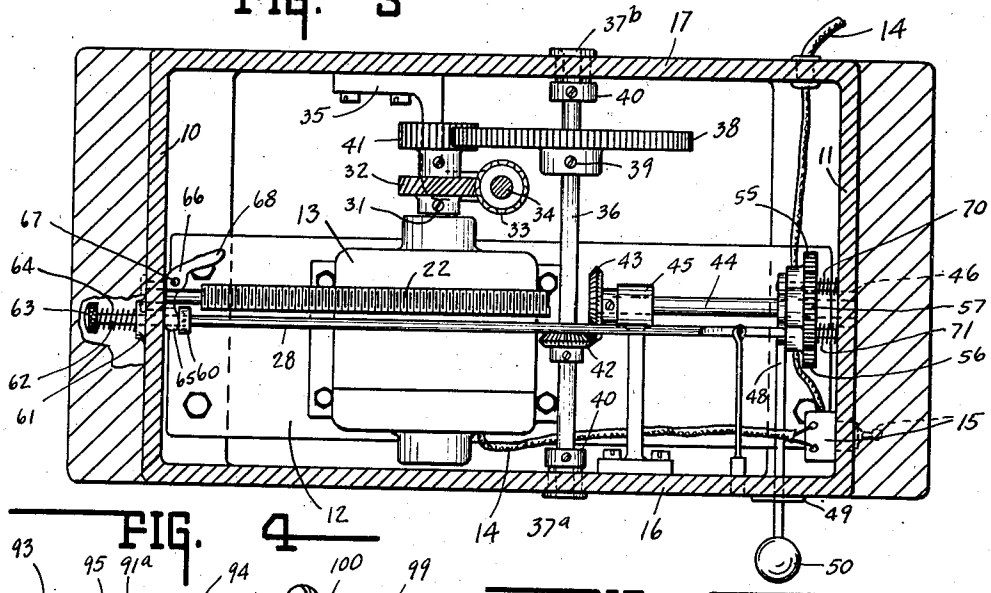


FIG. 4

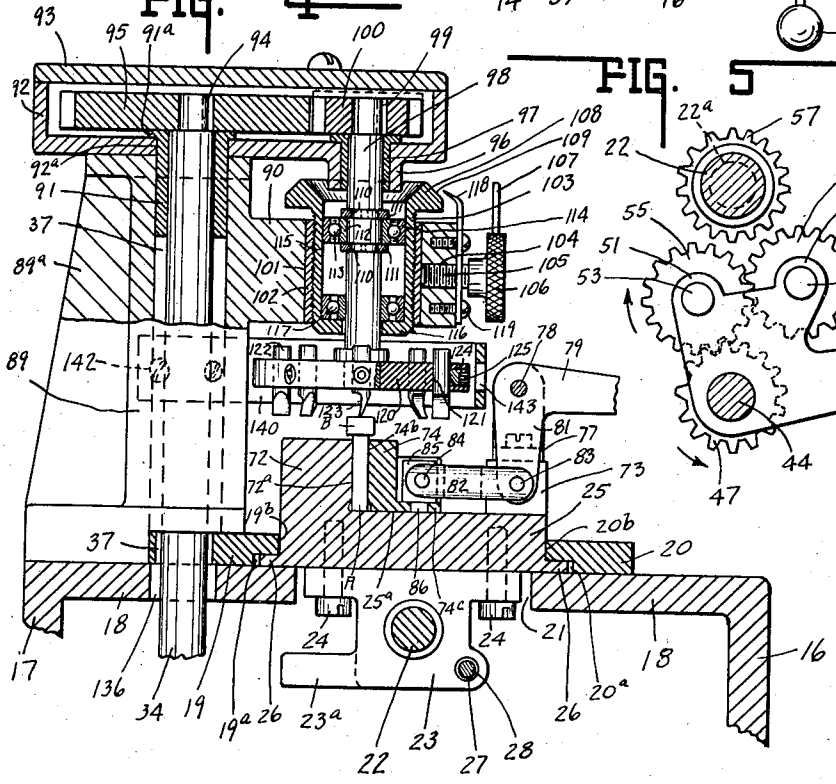
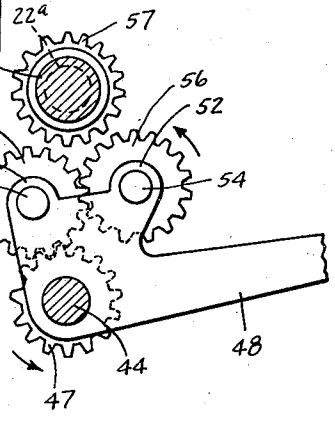


FIG. 5



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2,367,198

LINE OF TYPE UNIVERSAL SURFACING MACHINE

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Application April 15, 1941, Serial No. 388,653

6 Claims. (Cl. 90—16)

This invention relates to apparatus for surfacing type usually cast in a line or the like.

The chief object of this invention is to provide a machine for surfacing the printing face of type cast in line form so that the printing face of the type with respect to the base may have any predetermined height and will on its printing face provide a sharpness of printing impression, in other words, a fine, sharp outline, as well as a mirror finish so that such type, usually of line form and of any desired length can be finished so that it is of any desired height and can print satisfactorily on any highly smooth paper, such as a highly calendered paper with the same facility and clarity of impression as is obtained on rougher papers.

Another object of the invention is to provide a machine for finishing type of the aforesaid character so that recasting of the type is not necessary. Furthermore, type so finished avoids a considerable portion of the make-ready operations.

The chief feature of the present invention is to provide a machine which can accommodate any reasonable length of line of type and cut the same to any desired height within the range of the machine capacity and which line of type may be of any desired width and which, in operation, will sharpen the outline of the printing face of the type and provide a mirror finish on such printing portions of said face. The proper finish is obtained by proper correlation between the speed of travel of a carriage mounting the line of type and the speed of rotation of a rotatable cutter facing that type.

The device illustrated herein is capable of handling type produced by the following machines, all of which in general may be classified as line casting machines and all of which cast a different line slug. These machines are commonly called the Linotype, the Intertype, the Ludlow Typograph and the Linograph. The length of the lines of these machines varies 1½". The smallest line is from 4 ems up. The longest is 7 inches, or 42 ems. The height of type that is usually utilized is somewhere about .918 but it may vary from .915 to .922. The present machine has a height capacity of adjustment from .915 to .925. It will be obvious, of course, that this range can be increased. The width of the line of type, as stated, may vary from a very small width up to 2" in width and the present machine is capable of accommodating various widths, various lengths, and cutting to various heights within the range of adjustments.

Other objects and features of the invention will be set forth more fully hereinafter.

The full nature of the invention will be understood from the accompanying drawings, the following description and claims:

Fig. 1 is a top plan view of the invention, the carriage being shown thereon and to the left thereof.

Fig. 2 is a vertical sectional view taken on line 2—2 of Fig. 1 and in the direction of the arrows.

Fig. 3 is a top plan view taken on line 3—3 of Fig. 2 and in the direction of the arrows and is illustrative of the power portions of the machine, the carriage, cutter, type clamp and bed portions of the machine being omitted.

Fig. 4 is an enlarged vertical sectional view through the cutting head, the carriage, the clamp and the bed of the machine.

Fig. 5 is an enlarged side elevational view of the selective control for carriage drive, etc.

In the drawings 10 indicates one side portion of the bed of the machine, 11 the opposite one and these two side portions may be suitably connected together near their bottoms by the cross member shown more clearly in Fig. 3 and indicated by the numeral 12. This suitably and detachably supports an electric motor 13. This motor is supplied by current from line 14 controlled by switch 15 mounted in the side 11 of the bed of the machine.

The ends 10 and 11 are connected by the front portion 16 and the back portion 17, thus forming a rectangular framework. The upper ends of the aforesaid are laterally enlarged outwardly, as shown in Fig. 2, and are also directed inwardly forming the top portion 18 of the bed structure.

A pair of angle shaped rail members 19 and 20 are suitably secured, as illustrated in Figs. 1 and 2, to this bed structure and form the trackway. The two angle members 19 and 20 and their grooved portions confront each other. This forms a channel that extends from one end of the machine to the other. The top portion of the bed 18 is provided with an elongated aperture 21 through which depends a portion of the carriage structure and adjacent which is mounted the feed screw. The feed screw, see Fig. 4, is indicated by the numeral 22. A nut 23 is secured as at 24 to the base of the carriage structure 25 having the oppositely directed wings 26 seatable in the grooves 19a and 20a of the confronting trackway arrangements.

The nut structure 23 is apertured as at 27 and slides upon a rod 28 that extends parallel to the feed screw 22.

The machine may, if desired, be provided with rubber feet or the like, as indicated at 29.

The motor 13 includes the shaft 31 upon which is secured the gear 32 meshing with the pinion 33 carried by a vertical shaft 34, the latter being rotatably supported in the bracket 35 carried by the bed of the machine, said shaft 34 extending upwardly through an aperture 136 in the top 18 of the machine bed and through a similar aperture 37 registering therewith and in the track member 19, see Fig. 4.

A transverse shaft 36 mounted in bearings 37*a* and 37*b* in the front 16 and back 17 of the bed has suitably secured to it a gear 38 as at 39. Stop collars 40 properly position said shaft. The gear 38 meshes with the pinion 41 carried by the motor shaft 31. Thus the shaft 36 is rotated at a materially less speed than shaft 31.

The shaft 36 has secured to it a beveled pinion 42 meshing with a bevel gear 43 carried by a shaft 44 mounted in bearing 45 spaced from the side wall 11. The shaft 44 extends toward said wall and is rotatably supported therein by a bearing indicated by the numeral 46.

Rigid with said shaft 44 is a gear 47. Rotatably supported by said shaft 44 is a feed change lever arrangement, see Fig. 5, indicated by the numeral 48. This lever is pivoted on said shaft 44 and extends outwardly through an elongated slot defined by a boss 49 on the front 16 of the machine and mounts on its exposed end a knob 50 or the like for manual engagement. The other end of said lever 48 provides spaced bearings 51 and 52, mounting shafts 53 and 54 respectively carrying meshing idler gears 55 and 56 respectively, each being adapted for selective engagement to transmit power from gear 47 to gear 57, the former being on the power shaft 44 that always rotates in one direction and the other being mounted on the feed screw shaft portion 22*a* as shown in Fig. 1.

When the manual lever 48 is depressed in its slot to its lowermost position, the gear 55 is elevated and operatively connects gears 47 and 57 so that while shaft 44 rotates counter-clockwise gear 55 will rotate clockwise and gear 57 will rotate counter-clockwise. However, when the parts are shown in Fig. 5, neither gear 55 nor 56 is in mesh with the gear 57 and, consequently, the back gear arrangement and feed screw 22 will not be rotated even though the motor then be turning shaft 44. When, however, the lever 48 is elevated to its highest point in the slot, the gear 47 drives the gear 55 in turn driving the gear 56, in the counter-clockwise direction, so that when gear 56 is in mesh with the gear 57, the gear 57 is rotated in a clockwise direction. Thus the rotation of the gear 57, when so connected to the gear 47, is in the same direction as gear 47. With this construction the said screw can be reversely rotated. Consequently, since this feed screw is operatively associated with the nut 23 carried by the carriage 25, the carriage 25 will be moved either to the right or to the left or will remain stationary, depending upon the selective positioning of the parts shown more particularly in Fig. 5.

Reference will now be had to the automatic stopping device and the manual stopping device. As shown clearly in Figs. 1 to 4, rod 28 extends parallel to the feed screw 22. It mounts a collar 60, see Figs. 2 and 3, adjacent the end 10 of the bed. The rod is slidably supported in the end 10 as indicated at 61 and projects beyond the same as indicated at 62, terminating in a head portion 63. A spring 64 is concentric with the rod and bears at one end on the bearing 61 and on the opposite end on head 63 and normally constrains rod 28 to the left.

Interposed between the end 10 and the collar 60 is the bifurcated portion 65 of a lever 66 pivoted at 67 and having the tail portion 68. The portion 23*a* of the nut 23 is extended so that in the movement of the carriage to the left, see Figs. 2 and 3, this portion 23*a* engages the free end of the tail portion 68 of the bifurcated lever 66 to tilt the lever and cause the rod 28 to move to the right. This occurs before the nut attains the position where the body portion of the nut would engage stop collar 60.

When it is desired to stop the machine manually, all that is required is sufficient pressure upon the knob 63 in opposition to the spring 64. The rod 28 then will be moved to the right and no movement of the bifurcated lever 66 occurs.

Movement of the rod 28 by reason of the projection 23*a* and tilting the bifurcated lever 66 is in opposition to spring 64. Extending parallel to the rod 28 and carried by the nut 23 is an extension 69, see Fig. 2. When the carriage is at or near the extreme right-hand end of its travel, this particular portion is effective for securing cessation of carriage movement.

As shown clearly in Figs. 1 to 3 and Fig. 5, each of the gears 55 and 56 is slidably supported on its stub shaft and is normally constrained toward face contact with the supporting end of the lever 48 by mean of a spring.

Herein, spring 70 normally constrains gear 55 to the left in Fig. 3 and spring 71 normally constrains gear 56 to the left in Fig. 1. It will be observed, see Fig. 2, that gears 57 and 47 are in coplanar alignment and the gears 55 and 56 have similar alignment when released to the constraint of these springs. When, however, the rod 28 or the projection 69 engages the gear in question of the intermediate gears 55 and 56, these are projected to the right and consequently power is not supplied by gear 47 to gear 57. Hence, carriage travel ceases. Thus, carriage movement in either extreme direction near the end of that direction automatically causes cessation of further carriage movement in that direction. This in effect is a combination clutch and reversing drive arrangement.

Furthermore, since rod 28 is the one that is associated with gear 55, it is quite apparent that, even though gear 56 be the gear then in operative engagement with the gear 57, axial movement of gear 55 will break the chain of power gear transmission. Thus, travel of the carriage to the right can be stopped at will through pressure applied to the head 63. Normally, rod 28 is operatively associated with gear 55 for causing cessation automatically of carriage movement toward the left. Projection 69 is associated with gear 56 for causing cessation of movement of the carriage to the right.

The carriage 25 includes an upwardly directed flange portion 72. This flange is coextensive with the base portion 25. Adjacent thereto and spaced therefrom is the flange 73. The face 72*a* of flange 72 is perpendicular to the face 25*a* of the carriage base 25 which is parallel to the machined face of the top 18 to which the tracks 19 and 20 are secured. The parallel faces of the grooves

19a and 20a of the trackways 19 and 20 are also parallel to this machine face of the top 18. The two confronting faces 20b and 19b of these track members are truly parallel and are perpendicular to the aforesaid surfaces which are substantially horizontal when the machine is level.

Slidably supported on the face 25a is a clamping bar 74 suitably recessed as at 74a to receive and seat ends of springs 75. In alignment therewith and in the confronting face 73a are the sockets 73b receiving the other ends of the springs 75. A pin and slot connection 76 is also provided between the clamping member 74 and the flange 73. This insures movement of the clamping head 74 so that its face 74b always moves parallel to the face 72a. Two pins are shown.

In Figs. 1 to 4, A indicates the body of a slug of type and B the head portion thereof having the printing impression C thereon.

Suitably secured to the flange 73 is a bifurcated structure 77 providing a pivot 78 on which is mounted a bell crank 79 having a handle portion suitably weighted or the like and indicated by the numeral 80. The other end 81 of this lever crank extends into the bifurcated end of the link 82 and is pivoted in such bifurcated end as at 83. The other end of the link is similarly bifurcated and the pivot member 84 pivotally connects the same to the tongue portion 85 mounted as at 86 to the forwardly directed flange 74c of the clamping plate 74.

It will be apparent, therefore, that when the lever 79 is tilted counterclockwise the clamping plate 74 is retracted to the front of the machine in opposition to the springs 75. This permits removal or insertion of the line of type between the clamping bar 72 and the clamping head 74. When the handle 80 is moved downwardly and clockwise, the clamping head 74 moves rearwardly and rigidly clamps the line or slug of type against flange 72 on the carriage. The back of the type and the side faces of the body of the type are usually of proper formation so that when the slug or line of type is properly seated, it is properly clamped and can be finished so that the top face of the printing impression portion C can be made to lie in a plane that is exactly parallel to the base of the line of type and at the proper distance therefrom.

Reference will now be had to the type surfacing portion of the machine. It will be recalled that shaft 34 extends upwardly and by reason of the gear connection 32—33, the shaft 34 rotates at a speed greater than the motor speed. Suitably secured as at 88 to the top 18 of the bed of the machine is a base structure 89 having the reenforcing rib 89a, see Fig. 1. This base structure includes an overhead projecting arm portion 90. The base structure is apertured, as previously set forth, as at 37. In the upper end is mounted a bushing 91. This is the upper bearing for the shaft 34. A housing 92 is provided at the upper end of portion 89 and the upper face thereof is closed by the cover cap 93. Mounted in the housing and suitably secured as at 94 to the shaft 34 is the gear 95. The bushing 91 is a flanged bushing and is also seated in the housing 92, the latter being apertured as at 92a for such reception and the gear 95 rides on the flange portion 91a of the flanged bushing. The housing includes a spaced tubular bearing portion 96 and mounted therein is a flanged bushing 97 which rotatably supports a shaft 98, secured to the upper end of which, as at 99, is the pinion 100 meshing with the gear 95 so that the pinion 100 rotates at a speed greater than the shaft 34 which, as stated, rotates at a speed greater than the motor speed.

The pinion 100 may bear on the flange portion 97a of the flange bushing 97. The arm 90 is provided with a bore 101 in which is pressed fitted a bronze member 102 having an internal thread formation. A sleeve 103 has a similar but opposite thread formation and has threaded engagement with said bronze member. The outer end of the arm 90 is apertured as at 104 and the same is threaded to receive the threaded end 105 of the clamping structure including member 106 and arm 107. Member 105 is threaded inwardly a sufficient amount and bears on the bronze member 102 and causes the latter to tightly grip the member 103, thus fixing the two members 102 and 103 rigidly together.

The upper end of member 103 includes an annular portion 108 and the inclined outer face 109 thereof is provided with degree markings or scale indications 109a which may be in such divisions that it will register the elevation of the structure with reference to the face 25a when parts are properly adjusted. The dotted position, shown in Fig. 4, of the gear 100 indicates the highest elevation and, therefore, the largest height of type. The position that the gear 100 is shown in Fig. 4 by the full lines represents the lowest height of type. The range, as stated, is between .915" and .928". It will be apparent, therefore, that this range may be increased or decreased if desired. The means for effecting such change of height is as follows:

The shaft 98 is reduced as at 110. Mounted therein are the retaining rings 111. Between the two rings 111 is the interior collar portion 112 of a ball race structure including balls 113 and the outer race element 114, the latter being press fitted and fixedly positioned in the tubular portion 115 of the sleeve arrangement 103 previously described. The lower end of this sleeve arrangement is closed as at 116. Seated therein is a ball race structure indicated generally by the numeral 117. Thus, the shaft 98 is rotatably supported in vertical relation relative to the horizontal plane 25a regardless of its axially adjusted position. An indicator 118 may be secured as at 119 to the arm 90 adjacent the clamp structure, and terminate adjacent scale 109a.

When the portion 108 is rotated clockwise when the clamp 105 is retracted, the shaft 98 is lowered together with the gear 100. If desired, the connection 109 between the gear and shaft may be a sliding fit. When the member 108 is rotated counterclockwise, the shaft 98 will be elevated. The amount of such raising and lowering may be visually observed by readings on the scale 109a through the assistance of the indicator 118.

The lower end of the shaft 98 has rigidly secured to it the cutting head or plate 120. At proper intervals therein, there are provided the bores 121 and secured in each bore is a cutting tooth 122 having the relieved formation 123 at its cutting portion. The head 120 is apertured radially as at 124 and receives a headless set screw 125. Thus, each cutting tooth may be properly adjusted in its bore 121 and locked therein by means of the headless set screw 125. Herein, 8 of said cutting teeth are provided, see Fig. 1. If desired, a guard 140 may be provided. It is suitably secured as at 142 to the tubular portion of the head supporting arrangement. It is provided with an opening 143 as shown in Figs. 2 and 4. This opening 143 permits each headless

set screw to be loosened and tightened without removing the guard.

After the parts have been suitably adjusted, it will be quite apparent that the indicator 118 will indicate the exact height of the type that the teeth 123 will cut and finish. With the carriage positioned to the left as shown in Fig. 1 the clamp lever 80 is operated to open the clamp structure and the previously cast type is properly affixed thereto. The clamp is then released and locked to rigidly hold the type in the clamp on the carriage. Handle 48 is dropped and gear 55 engages gear 47 to rotate it counter-clockwise. The switch 15 is then closed. The carriage moves to the right because screw 22 is a right-hand thread screw and the nut 23 moves to the right, see Figs. 1 and 2. Previously, through the indexing arrangement, the height of the cutter construction has been adjusted for the proper height of type. When the carriage passes beneath this cutting head sructure, the teeth 123 finish the face of the printing impression, provide a sharp outline on those formations and insure that the coplanar face of such impressions is parallel to the base of the type slug and at the proper distance from said base so that make-ready operations are materially reduced when the finished slug is later applied to the form.

If one cutting operation is sufficient, when the carriage has moved to the right a sufficient amount the slug may be released. This operation occurs, of course, after carriage movement has ceased. Carriage movement will automatically cease when the carriage has travelled to the extreme right. If the type has not been properly finished, for example, it requires a plurality of cuts to reduce the type height to the proper height at the end of the travel of the carriage to the right, the control 50 is actuated to reverse the carriage travel and cutting is resumed in the reverse direction, it being understood that between these two directions of carriage travel the cutting teeth have been properly adjusted.

It is to be understood that not too much material can be handled at each cutting operation so that care must be exerted not to "crowd" the cutting if a large amount, relatively speaking, is to be removed.

When the carriage has returned to the left its movement is automatically stopped, the finish observed, the type removed and a new line of type applied.

As is well understood in the type casting art, slug type is not uniform. The present invention provides perfect type if the original slug is reasonably perfect. The resulting finish on the type is such that it can be used for printing upon highly calendered paper and wood papers that heretofore have required extreme care in the production of type and considerable make-ready operation. This machine, therefore, eliminates the requirement that several slugs of the same type be successively cast in order to obtain a "perfect" one.

This machine also has the advantage that it can accommodate any length of line of type up to and including 7½" long, this being slightly larger than the largest line now being utilized. It can also accommodate type from .915 to .925 in height. It also can accommodate any width of type up to and including 2". With this invention, type casting with any of the type casting machines initially mentioned can be finished and such finish is of mirror-like quality, as well as to face and height providing proper adjustment is observed.

It will also be readily apparent that the cutting head is not necessarily restricted to the utilization of 8 cutting teeth. When a lesser number of teeth are to be employed intermediate teeth may be removed. Certain types of work require a larger number of teeth than others. This is to insure that the amount of metal removed automatically clears itself, that is, does not accumulate and crowd the work so as to interfere with subsequent tooth cutting. The carriage is equipped with extensible guards, as shown in the Figure 2, so that as the carriage moves from right to left, the chips from the cutting operation do not fall through the opening 21 and fall upon or clog the mechanism within the bed structure.

While the invention has been illustrated and described in great detail in the foregoing description, the same is to be considered as illustrative and not restrictive in character.

The several modifications described herein, as well as others which will readily suggest themselves to persons skilled in this art, are all considered to be within the broad scope of the invention, reference being had to the appended claims.

The invention claimed is:

1. In a machine of the character described the combination of two parallel shafts, a gear on each shaft, said gears having coplanar alignment, a support tiltable upon the axis of one of the shafts, a pair of meshing gears rotatably supported by said support on axes parallel to the support supporting shaft and slidable longitudinally of the axes and normally constrained to coplanar alignment with the other gears, one of the pair of meshing gears, when so constrained meshing with one of the first mentioned gears, said one of the pair of gears and the other of said pair of meshing gears when so constrained having selective engagement with the other of said first mentioned gears or no engagement therewith depending upon the position of the tiltable support.

2. In a machine of the character described, the combination of two parallel shafts, a gear on each shaft, said gears having coplanar alignment, a support tiltable upon the axis of one of the shafts, a pair of meshing gears rotatably supported by said support on axes parallel to the shaft and normally constrained to coplanar alignment with the other gears, one of the pair of meshing gears, when so constrained meshing with one of the first mentioned gears, said one of the pair of meshing gears and the other of said pair of meshing gears when so constrained having selective engagement with the other of said first mentioned gears or no engagement therewith, depending upon the position of the tiltable support, and means for shifting one of the constrained gears, in opposition to the constraint, from the coplanar alignment for the purpose described.

3. In a cast type surfacing machine having a bed with a way formation thereon, and a carriage movable thereon, the combination of a type clamping structure carried by the carriage and movable therewith, said structure including an elongated abutment on the carriage having a face parallel to the direction of carriage movement, a clamping head having a similar directed confronting face, yielding means interposed between the head and carriage normally constraining the head toward face engagement, guide means interposed between the head and car-

riage insuring movement of the head transverse to its face, and manually operable means movable in one direction for retracting the head in opposition to said constraining means, and movable oppositely overcenter to assist said constraining means and gravity constrained for holding the clamping head in type locking position.

4. In a cast type surfacing machine, a bed having a way formation, a carriage movable thereon, cutting means thereabove, and flexible chip guard means connected at opposite ends to opposite ends of the carriage for covering all carriage exposed portions of the way formation, the guard means passing across the machine beneath the way formation thereof.

5. In a machine for surfacing a line of cast type having a supporting bed and a work supporting structure supported thereby, the combination of a head structure supported by the bed, one of said structures being movable on the bed relative to the other structure, said head structure including a shaft directed toward the work structure, a cutting arrangement on the shaft end nearest the work structure, an arm on the head structure supporting the shaft intermediate its ends, means engaging the opposite end of the shaft for shaft rotation, means interposed between the shaft and arm for adjusting the cutting arrangement toward and away from the work structure, guard means substantially surrounding the cutting arrangement, said guard means including an access portion therein, the cutting arrangement including a supporting member, and a plurality of cutting teeth detachably secured thereto, the guard means access portion being arranged to expose the detachable connection between a tooth and the tooth supporting member.

6. In a machine for surfacing a line of cast type having a supporting bed and a work supporting structure supported thereby, the combination of a head structure supported by the bed, one of said structures being movable on the bed relative to the other structure, said head structure including a shaft directed toward the work structure, a cutting arrangement on the shaft end nearest the work structure, an arm on the head structure supporting the shaft intermediate its ends, means engaging the opposite end of the shaft for shaft rotation, means interposed between the shaft and arm for adjusting the cutting arrangement toward and away from the work structure, guard means substantially surrounding the cutting arrangement, said guard means including an access portion therein, the cutting arrangement including a supporting member, a plurality of cutting teeth detachably secured thereto, the guard means access portion being arranged to expose the detachable connection between a tooth and the tooth supporting member, means for locking the arm and shaft interposed means in adjusted position, and a scale and indicator arrangement for visual indication of the adjusted position of the cutting arrangement.

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