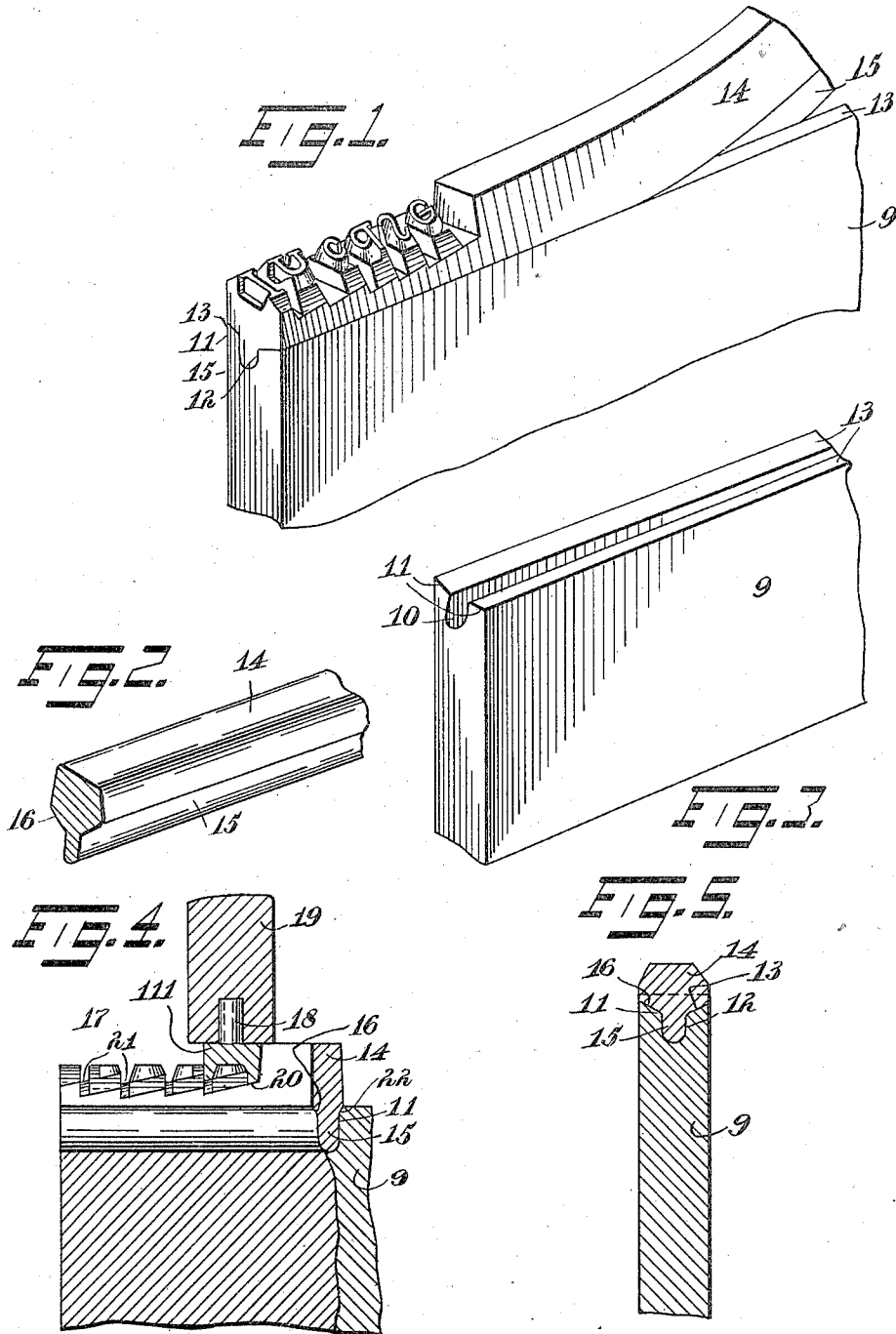


F. H. RICHARDS.
ART OF MANUFACTURING TYPE BARS.
APPLICATION FILED JULY 14, 1909.

947,760.

Patented Jan. 25, 1910.

4 SHEETS—SHEET 1.



Witnesses:
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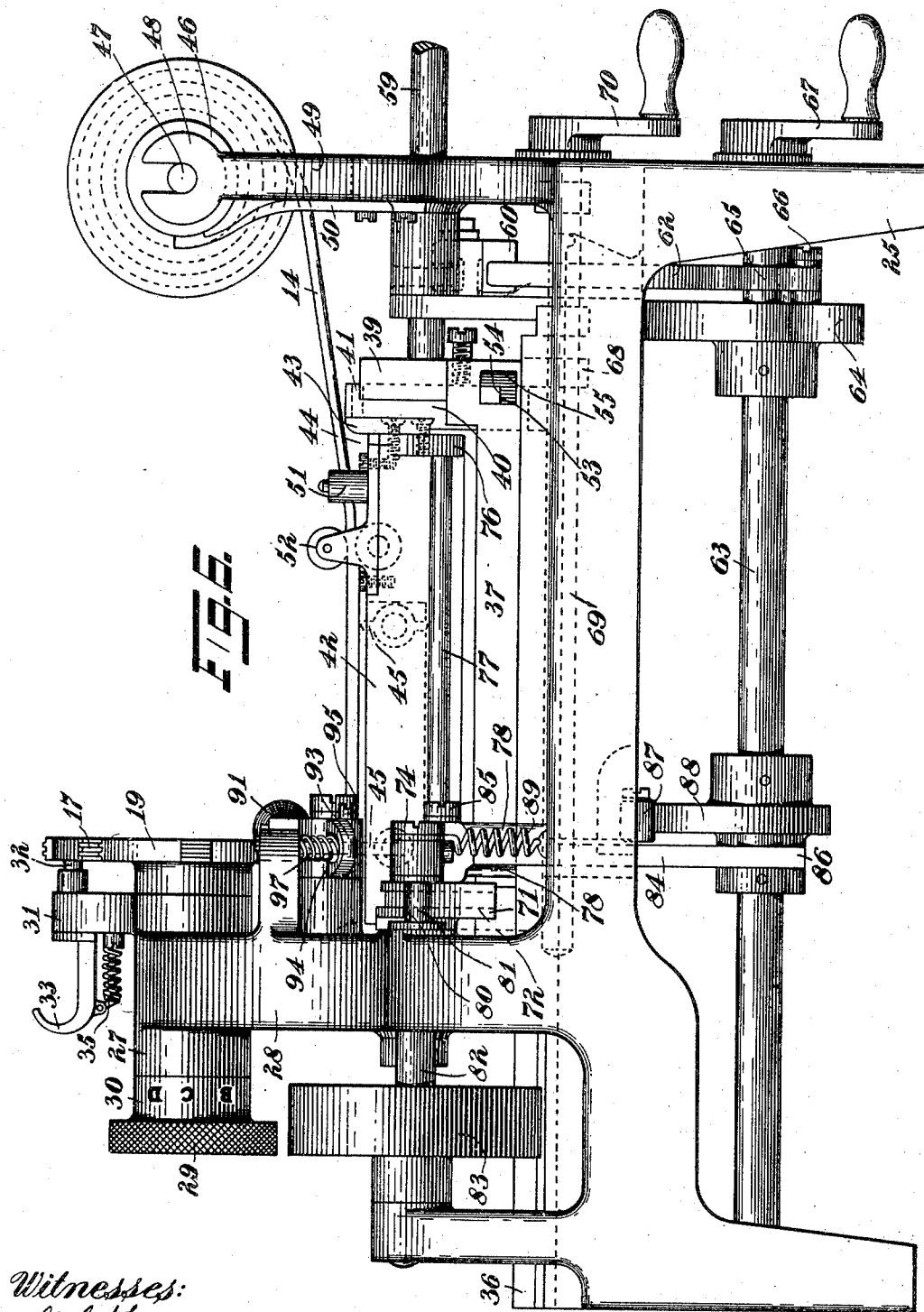
Inventor:
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4 SHEETS—SHEET 2.



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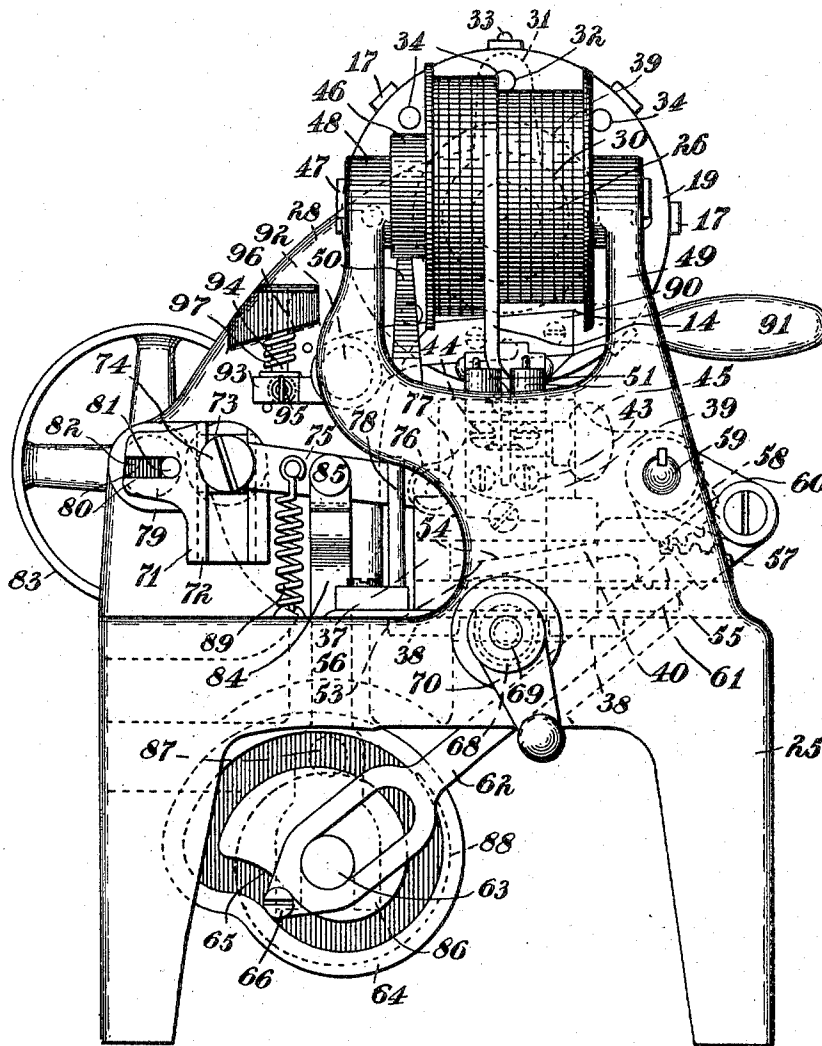
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4 SHEETS—SHEET 3.

FIG. 7.



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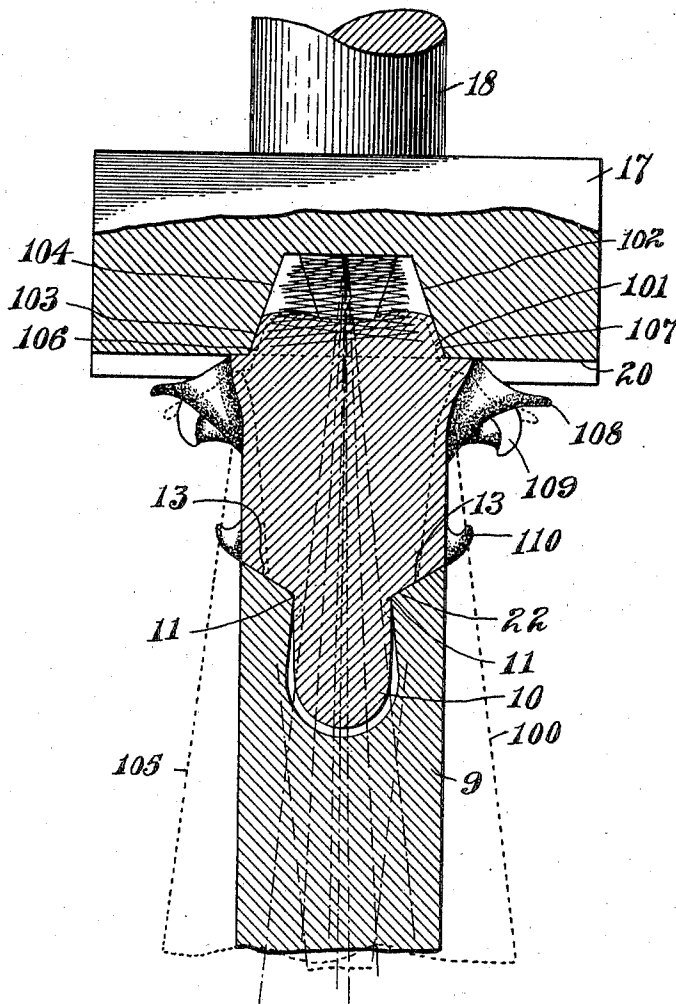
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4 SHEETS—SHEET 4.

FIG. 8.



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UNITED STATES PATENT OFFICE.

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ART OF MANUFACTURING TYPE-BARS.

947,760.

Specification of Letters Patent. Patented Jan. 25, 1910.

Application filed July 14, 1909. Serial No. 507,528.

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing in Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in the Art of Manufacturing Type-Bars, of which the following is a specification.

This invention relates to typebars and has for an object improvements in the art of manufacturing the same.

In shaping type heads by pressure it is desirable to use metal or other material from which the type head is to be formed of such suitable consistency that upon the inauguration of pressing the material will be readily workable, to the end that the die or other tool employed may produce a well formed character upon the bar. During the process of manufacture the type face will of course be compacted, but the compacting is in many instances local and the body of the typebar, if made out of the same consistency of metal of which the face or head is made, would be rather soft for the uses for which it may be employed; consequently it has been found desirable to superimpose a type head of readily workable material upon a body having a consistency which will be sufficient to maintain it against the pressure of formation and against the pressures to which it would be subjected when in use, among which pressures are that incident to locking up in a form and printing or impressing which the type will be called upon to perform when in use.

For economical purposes it is found desirable when the typebars are to be made of type-metal to employ for the type head a comparatively thin strip of type-metal sufficiently soft to permit the dies to readily work the same and fashion the types or characters thereon and to impose such strip upon a body piece made out of the same metal as the head, but harder or more compact than such head. The use of the same kind of metal for both portions makes it practical and economical, for after use the whole bar may be thrown into the pot and both parts melted up together and either heads or body pieces may be made from the metal therein, thus saving the material and avoiding the necessity of separation which would be necessary were bases of material different from the material of the heads employed. The body piece may be provided

with a channel upon its type-carrying side and the type head or face, or the stock from which it is made, may have a feather or web adapted to mate therewith. The channel may be undercut or dovetailed so that upon pressure being applied to the face portion the flowage of the metal will cause expansion of the feather or web, whereupon it will assume a form corresponding to the shape of the channel and will hold the two portions together.

In practice it may be found desirable to cut or form the body pieces into the length of the lines or bars which it is purposed to make and to feed them to the carrier of the machine, assuming that in practice a machine will generally be employed, but it may be found desirable to employ and to feed the stock for the face or head from a roller or reel. The top face of type-carrying face of the body piece may be troughed toward the channel whereby in the process of manufacture the flowage of the face piece is controlled and the dies which are employed will have a tendency to swage such edges inward. The flowage from the head portion caused by the dies will form cavities on such face and the flowage from such cavities will encroach upon the channel and embed themselves into the feather or web, whereby endwise movement of one of the portions of the bar relatively to the other will be avoided. One edge of the die or side of the die may be extended so that it will create a displacement of metal greater than could normally be produced by a plane face to accentuate the feature of displacement and locking, also to form a dam between the completed type and the point of operation, thus preventing any dislodgement of the completed type by the displacement of metal incident to the formation of the next or any succeeding type.

For the proper forming of the face of the type it may be found desirable to produce oscillations between the die and blank, which oscillations may, and in the present instance are, shown as imparted to the bar in such a manner that during its advance the length of excursion of oscillation is gradually reduced and at the final period of pressure the blank is held from oscillation, as it is also so held upon withdrawal from the die whereby the type face is left by the die square and true.

In the drawings accompanying and form-

ing part of this specification, Figure 1 is a perspective view of a bar showing a mode of carrying out my invention; such bar is shown in the process of formation and partly broken away. Fig. 2 is a perspective view of a form of strip which may be employed for a face or type head. Fig. 3 is a perspective view of a form of bar which may be employed for a body piece. Fig. 4 shows a partly formed bar with a die in the position of finishing a type; the body piece is shown split in half. Fig. 5 is a cross section through a formed bar. Fig. 6 is a side view of a form of machine which may be employed in the practice of this invention. Fig. 7 is a view from the right-hand end of Fig. 6; and Fig. 8 is an enlarged detail showing in diagram the relative advance of the die and bar during the formation thereof.

The body piece or portion 9 of the type-bar will be made of some suitable metal or material, which may if desired be type-metal. The body piece will be provided upon its type-carrying face with a channel 10. The edges 11 may slightly overhang the channel, and the faces 13 adjacent to the channel 10 are shown as sloping toward the channel, making substantially a trough. The stock from which the type-bearing face or the type head piece is to be formed is shown as comprising a body portion 14 having a web or wing 15 depending therefrom of such a shape that it will enter the channel 10, mating therewith for loose assemblage, and the underside 16 of the bar is shown formed to mate with the faces 13 of the body piece, the sides 12 of which, however, are shown as substantially parallel.

In Fig. 4 a die, which may be one of a series or set of dies designated in a general way by 17, is shown as mounted by means of a pin 18 in a die-carrier 19 and the die having a face 20, (see Fig. 8,) on an angle to the face of the type which it is contemplated to form, which formation of die will produce a considerable displacement of the metal of the head piece or face portion. Upon application of pressure the type will be formed and the flowage of the head portion will expand the wing or web, making it closely conform to the contour of the channel 10 and the edges of the projecting portion of the die will depress the metal of the head as shown at 21. The flowage of metal from such depression will force depressions 22, by flowage, in the faces 13 and will also have a tendency to swage over the portions 11 of the walls of the channel whereby a grip is had upon the wing or web of the head piece. Thus not only is the bar as to its constituent parts interlocked to prevent disassemblage, but also locked to prevent the head from sliding out of the groove of the body endwise thereof.

The form of apparatus herein illustrated

may be found convenient for use in carrying out the method hereof, which apparatus is shown as mounted upon a convenient frame 25. The type-dies 17 carried by the carrier 19 which is in the present instance illustrated as rotary and mounted upon a shaft 26 carried by a bearing 27 supported by a standard 28 of the machine frame, upon which shaft 26 is mounted a knurled head or hand-wheel 29 whereby the carrier may be shifted, which head has upon its hub 30 characters corresponding to or indicating the various dies upon the carrier. The standard 28 also bears a projecting portion 31 through which is shiftable a latch or bolt 32 having a handle 33, which bolt is organized to enter recesses 34 in the carrier to lock the same in the position to which it has been shifted. Suitable means, here shown as a spring 35, may be employed for holding the latch in its locked position.

The typebar-blanks are to be placed in a suitable carriage, which in the present instance is shiftable upon ways 36 of the machine frame and which carriage comprises a body portion 37 having guides 38 shiftable upon such ways and is provided with standards 39 in which blocks 40 are shiftable, and by which blocks pivots 41 of a cradle 42 are carried. The pivots are fastened to the cradle by means of plates 43 secured by screws 44 to the body of the cradle. This form of machine contemplates the body pieces of the typebar being made up into lengths and each length placed into the cradle and secured in position by means of suitable set-screws 45 and to have the head piece 14 fed from a reel 46, the shaft 47 of which is borne by forked arms 48 of a standard 49 projecting from the machine frame, a suitable brake 50 being employed to prevent the stock unwinding faster than it is called for. In order that the stock of the head piece may be properly straightened out it is received from the reel between a pair of upright rolls 51 which will straighten the sides thereof. It is also received between a pair of rolls 52 which will straighten it further and lead it onto the body piece. The sides of the cradle may extend as high as the top face of the body piece and afford lateral support thereto and also control the flowage thereof, inducing it to encroach upon the web of the head piece.

The lower portions of the slides 40 are provided with wedge faces 53 mating with wedge faces 54 carried by bars 55 sliding upon flat faces 56 of the carriage and which bars are shown as provided with racks 57 mating with sectors 58 splined upon a rock-shaft 59 which has fast thereon an arm 60 to which is pivoted a link 61 having a yoke 62 embracing a driver-shaft 63 carried by suitable bearings of the machine frame, and upon which driver-shaft is fast a driver 64

for throwing such link and return the same, which in the present instance is shown as a cam-wheel having a groove 65 in which a roller 66 carried by a yoke 62 travels, the cam-groove 65 having walls for throwing the roll in both directions. The driver-shaft 63 may be driven by any suitable source of power, here shown as a hand-crank 67.

The carriage may be advanced past the dies by means of nuts or female screws 68 connected thereto which mate with a screw-shaft 69 held from longitudinal movement and having some suitable means, here shown as a hand-crank 70, to rotate the same and feed the blank.

For the purpose of oscillating the type-bar while in the process of manufacture a guide-box 71 is shown as pivoted to the standard of the machine and having guides or ways 72 thereon upon which is shiftably mounted a slide 73 having pivoted thereto at 74 a link 75 which has an eye 76 embracing a bar 77 carried by the cradle and which bar will move through the eye as the cradle is advanced with its carriage by the feed. Suitable standards 78 may be employed for supporting the link 75 upon each side and preventing it from traveling with the carriage. The block 71 is shown as having a projecting portion 79 which has a slot in it having faces 80 which embrace a crank-pin 81 upon a shaft 82, which shaft is driven in the present instance by means of a pulley 83 rotated from some suitable source of power, not shown. In the position shown in Fig. 7 the pivot 74 is in concentricity with the pivot of the block 71, whereby the oscillations of such block will not be imparted to the cradle, but upon shifting the slide 73 upon the ways 72 and moving it off the center of the oscillations of the block 71 oscillations will be imparted to the cradle. The shift in this direction owing to the present organization of the machine is, so far as work is concerned, idle, because the drivers, owing to their timing, will have removed the work from contact with the die. For shifting such block there is shown a link 84 pivoted at 85 to the link 75 and having a forked end 86 embracing the driver-shaft with a roll 87 riding up on a driver, in the present instance an eccentric 88. Suitable means may be employed for returning the block to its normal or initial position, in the present instance the extreme eccentricity to the center of the block 71, which is herein shown as a spring 89. The organization is such that the means for controlling the advance of the blank toward the working point will also control the oscillation of the blank, and as the blank nearly finishes its movement of pressure the oscillation will cease, during which movement and also as the bar is drawn away from the die the cradle will be locked from oscil-

lation. After a length of the body piece has had imposed thereon a length of type heads the stock for such type heads may be severed in some convenient manner. There is shown herein a shearing device 70 which comprises a knife blade 90 adjacent to the position which will be occupied by the end of the bar after the completion of the characters thereon, which blade is carried by a hand-lever 91 pivoted at 92 to the machine frame and having an extension end 93 bearing a pin 94 pivoted thereto at 95, which pin enters a guide 96 and has surrounding it a spring 97 for the purpose of returning the blade to its normal or inactive position.

By reference to Fig. 8 it will be seen how the types are formed upon the bar and the various steps, as it were, which the material will pass through during the formation of a type. The line 100 shows the extreme outer movement of the side of the bar, during which movement the side of the type head indicated by the line 101 will be moved away from the walls 102 of the cavity of the die and the opposite side 103 of the bar or head will be squeezed against the walls 104 of the cavity of the die and pressed into shape. The bar will then be caused to assume the position shown by the line 105, whereupon the side 103 of the bar will move away from the cavity wall 104 of the die, assuming the position indicated by the dotted lines 106 and the side 107 of the head will be squeezed against the walls 102 of the die cavity, which opening and closing will follow each other alternately until the completion or approximate completion of the type. Certain portions of the metal will be pressed away, as shown at 108 and 109, by the action of the die, which may be trimmed off in some convenient manner, and at the point of contact between the stock for the head and stock for the body there will be a certain flowage, as at 110, which may also be removed.

By the use of a die formed as herein shown the displacement of the metal of the head piece is in a direction away from the completed part of the bar. The side 111 of the die, (see Fig. 4,) cuts straight down past the type last formed and does not permit any appreciable flowage of metal from the point of operation toward the portion of the bar which has been completed. All lateral displacement will be toward the stock, whereby after having once been positioned and formed the further operation will not tend to disturb the position of the type which has been formed. Any movement of the metal other than the movements of interlocking will be thrown toward the stock, where such movements will not be attended with injurious consequences.

In operating upon the type head portion 130

in the manner above described not only is the flowage directed longitudinally of the bar and toward the unworked upon or stop end thereof but there is a certain amount of augmentation or acceleration of the flowage or activity created within the portion of the material which is acted upon at that time by the die.

Having thus described my invention, I claim:

1. The art of producing typebars which consists in juxtapositioning a soft and a hard piece of metal, forming types in succession upon the soft piece, and contemporaneously swaging the portion of the soft piece which is having a type forced upon it against the bar piece.

2. The art of producing typebars which consists of juxtapositioning a piece of soft metal and a piece of hard metal, forming types upon the soft metal, at the same time distorting the soft metal against the hard metal and thereby swaging the hard metal against the soft metal at successive points corresponding to the types produced upon the bar.

3. The art of producing typebars which consists of juxtapositioning a comparatively soft piece of metal and a relatively hard piece having a recess to receive a portion of the soft piece; forming types upon the soft piece, and swaging the sides of the recess of the hard piece against the soft piece at successive points along the length of the bar.

4. The art of producing typebars which consists of placing a comparatively soft head piece upon a relatively hard body piece having a recess to receive a portion of the head piece; forming types upon the head piece; and swaging the same against the body piece at successive points and thereby swaging the sides of the recess of the body piece against the head piece at such points.

5. The art of producing typebars which consists in placing a head piece having a web upon a body piece having a groove forming, by means of dies, type upon the head upon a body piece having a groove, forming, by the means of dies, type upon the head piece, causing the metal of the head piece to flow against the body piece displace the metal thereof and upon such displacement to occupy the cavity theretofore occupied by the displaced metal.

6. The art of producing typebars which consists in placing a head piece upon a body piece, applying a die to the face of the head piece and oscillating one relatively to the other, fashioning the type head, and causing the metal of the head piece to flow against and displace portions of metal of the face of the body piece from the edges toward the center line thereof.

7. The art of producing typebars which consists of loosely assembling a head piece

having a web upon a body piece having a groove mating with the web, forming type upon the head piece and causing the metal of the head piece to flow against the body piece and swage the wall of the groove into locking engagement with the sides of the web.

8. The art of producing typebars which consists of loosely assembling a head piece having a web upon a body piece having a groove mating with the web, forming type upon the head piece, and swaging the wall of the groove against the web.

9. The art of producing typebars which consists of loosely assembling a head piece upon a body piece, forming type upon the head piece, and interlocking the pieces by reciprocal flowages.

10. The art of producing typebars which consists of loosely assembling a head piece upon a body piece, forming type with dies upon the head piece, and locking the pieces together by mutual interflowage.

11. The art of producing typebars which consists of loosely assembling a head piece having a web upon a body piece having a groove mating therewith, forming type upon the head piece, thereby causing the web to expand, and swaging the wall of the groove into locking engagement with the sides of the web.

12. The art of producing typebars which consists of assembling a non-fitting head-piece upon a body-piece having a groove therein, forming types in succession on the head-piece beginning at one end of the body-piece and proceeding along the same to the other end of said body-piece, the types being formed by subjecting the metal to flowage at the successive type locations and thereby simultaneously forming the type and locking the head-piece into permanent engagement with the body-piece.

13. The art of producing typebars which consists in loosely assembling a soft head piece upon a hard body piece, forming types upon the head piece at successive intervals and during the formation of each type preventing the displacement of metal of the head piece toward the completed types, but displacing such metal toward the unworked end of said head piece, such unworked end being free to move longitudinally of the body piece.

14. The art of producing typebars which consists in loosely assembling a soft head piece upon a hard body piece, then working the head piece for forming types thereon at successive intervals and during each such working preventing the displacement of metal from the head piece toward the completed types.

15. The art of producing typebars which consists in loosely assembling a soft head piece upon a hard body piece, then work-

ing the head piece for forming types thereon at successive intervals and during each such working preventing the displacement of metal from the head piece toward the completed types, but directing the displaced metal toward the unworked end of said head piece and maintaining such unworked end free to move longitudinally of the body piece.

16. The art of producing typebars which consists in juxtapositioning a soft and a hard piece of metal, forming a series of types each in succession upon the soft piece and swaging the soft piece against the hard piece at each of the several type forming positions.

17. The art of producing typebars which consists of loosely assembling a head piece having a web upon a body piece having a groove provided with overhanging edges and parallel sides, forming type upon the head piece and causing the metal of the head piece to flow against the body piece and swaging the wall of the groove into locking engagement with the sides of the web.

18. The art of producing typebars which consists in bringing together a soft and a hard piece of metal and contemporaneously forming types upon said soft piece, interlocking said soft and hard pieces and directing the flowage incident to such formation in a direction away from the finished types and toward the unworked upon portion of said soft piece.

19. The art of producing typebars which consists in bringing together a strip of soft metal and a strip of hard metal, forming types in succession at successive locations longitudinally of said strip, and contemporaneously with the formation of the type upon each of said locations swaging the same against the hard piece.

20. The art of producing typebars which consists in bringing together a strip of soft metal and a strip of hard metal, forming types in succession upon the strip of soft metal, a portion thereof being connected to the worked upon portion and to the unworked upon portion thereof, said unworked upon portion being otherwise free from the hard metal strip.

21. The art of producing typebars which

consists in bringing together a strip of soft metal and a strip of hard metal, forming types in succession upon the strip of soft metal, a portion thereof being connected to the worked upon portion and to the unworked upon portion thereof, said unworked upon portion being otherwise free from the said hard metal strip, and displacing the metal thereof by flowage toward the unworked upon portion.

22. The art of producing typebars which consists in bringing together a strip of soft metal and a strip of hard metal, forming types in succession upon the strip of soft metal, a portion thereof being connected to the worked upon portion and to the unworked upon portion thereof, and said unworked upon portion being otherwise free from the other said strip, and displacing the metal thereof by flowage toward the unworked upon portion.

23. The art of producing typebars which consists in bringing together in proper relation a soft and a hard piece of metal, forming types upon the soft piece, and swaging one piece against the other piece severally at each of the type forming points.

24. The art of producing typebars which consists in bringing together in proper relation members of a two-piece blank, forming types upon one of said pieces and concurrently swaging one piece against the other at each of the type forming points and concurrently augmenting the activity of the metal in the portion worked upon by the die and directing the displaced or flowage of metal longitudinally of the bar and toward the unworked upon portion thereof.

25. The art of producing typebars which consists in bringing together in proper relation members of a two-piece blank, forming types upon one of said pieces and concurrently swaging each piece against the other severally at each of the type forming points and causing the surplus metal to flow longitudinally of the bar and toward the unworked upon portion thereof.

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