F. H. RICHARDS.

MECHANISM FOR PRODUCING TYPE BARS.

APPLICATION FILED JULY 14, 1909.

947,761.

Patented Jan. 25, 1910.

3 SHEETS—SHEET 1.

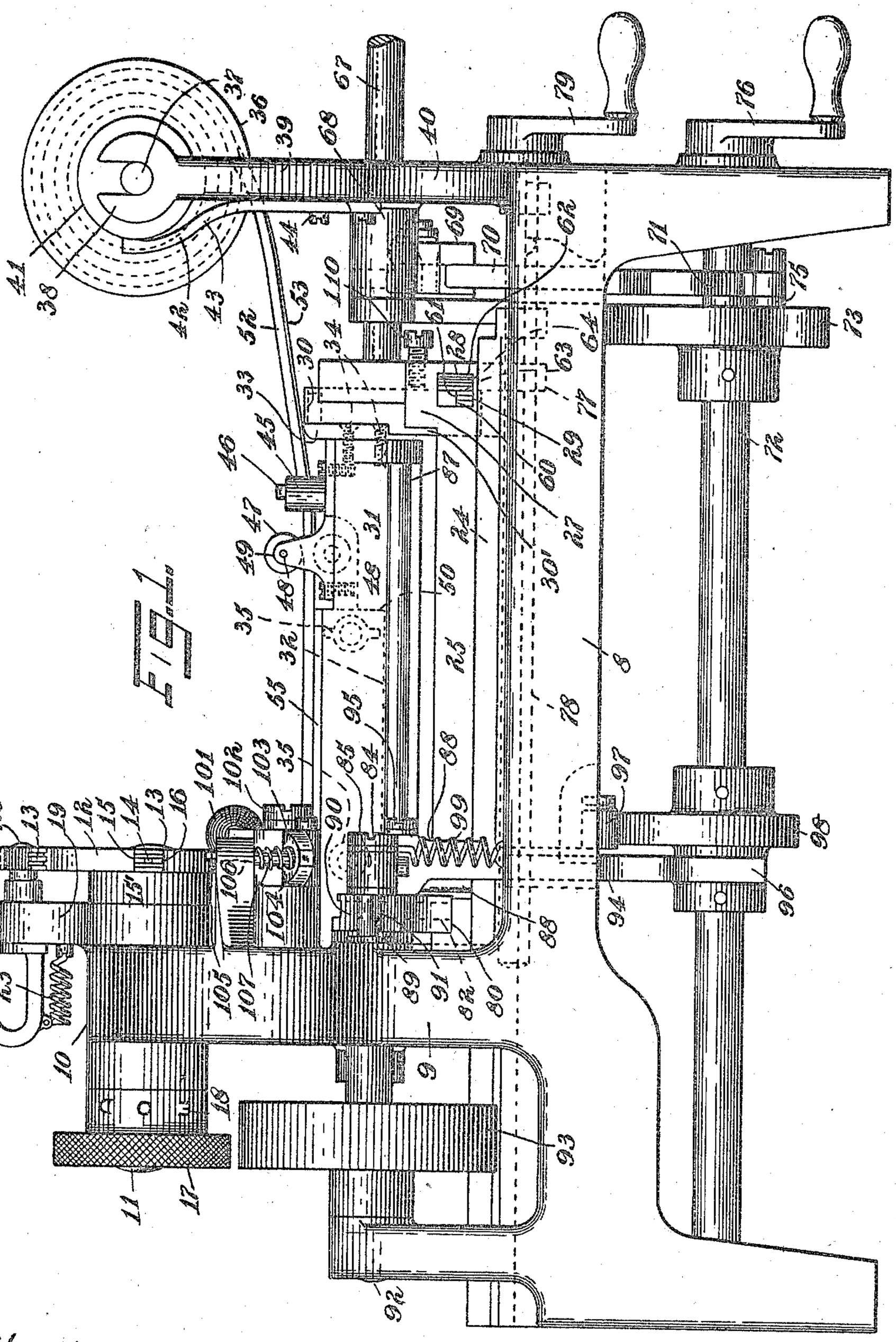

FIG. 1.

Witnesses:
C. C. Linz.
H. D. Penne,

Inventor:
Francis H. Richards,

ANDREW. B. GRAHAM CO., PHOTO-LITHOGRAPHERS WASHINGTON, D. C.

F. H. RICHARDS.

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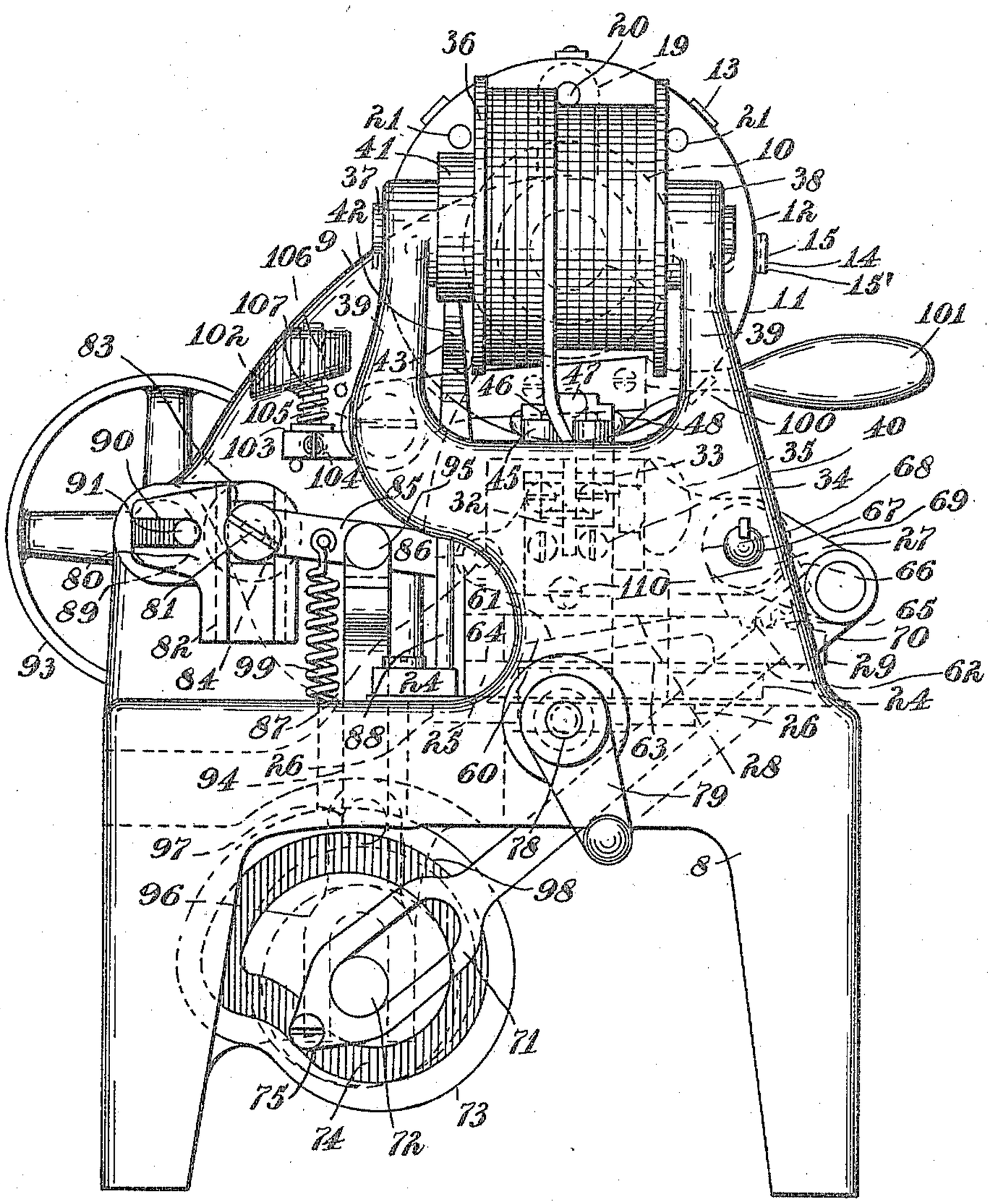
3 SHEETS—SHEET 2.

FIG. 2.



Witnesses:
Struman.
H. D. Penny

Inventor:
Francis H. Richards

F. H. RICHARDS.

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3 SHEETS—SHEET 3.

FIG. 3.

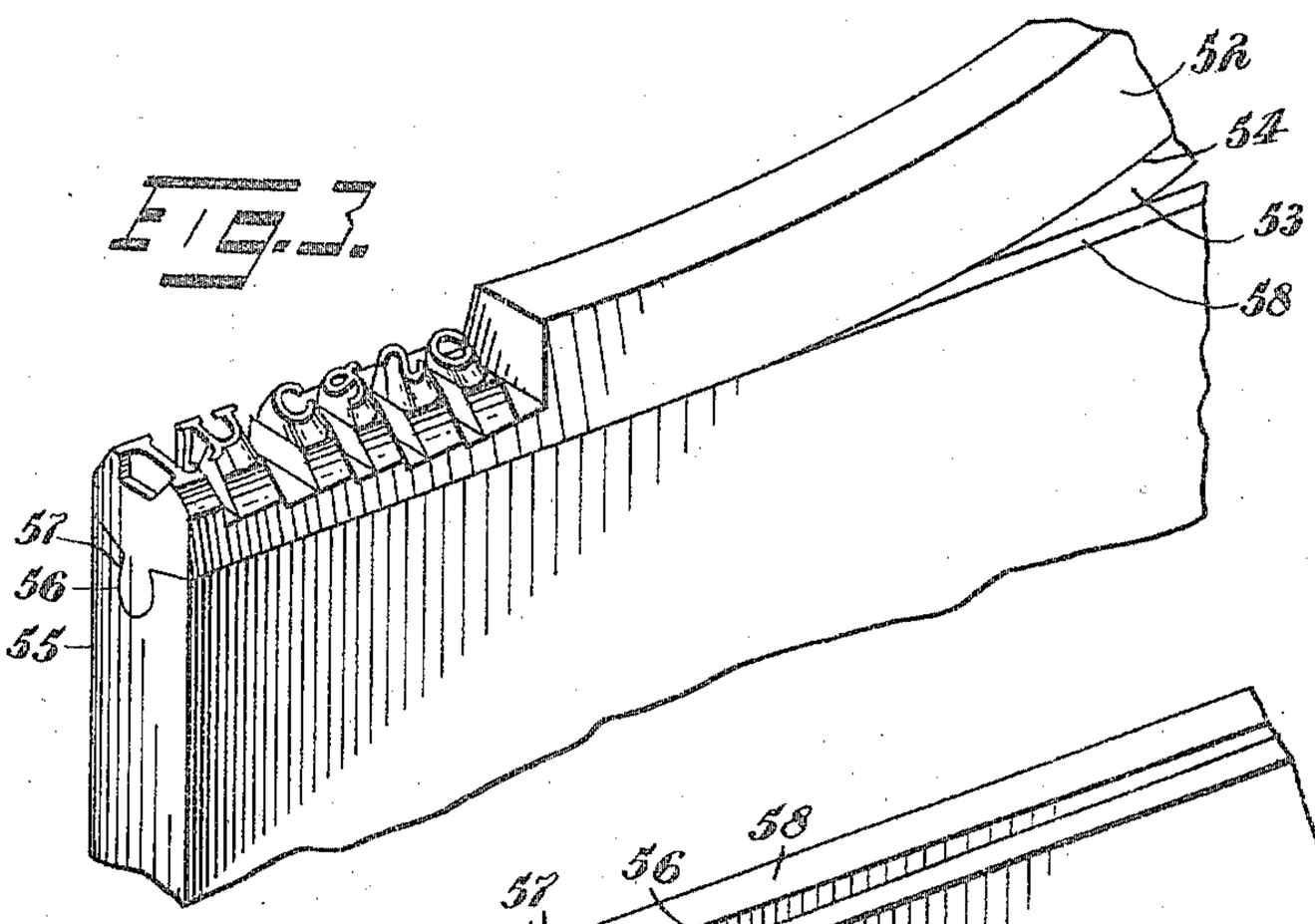


FIG. 4.

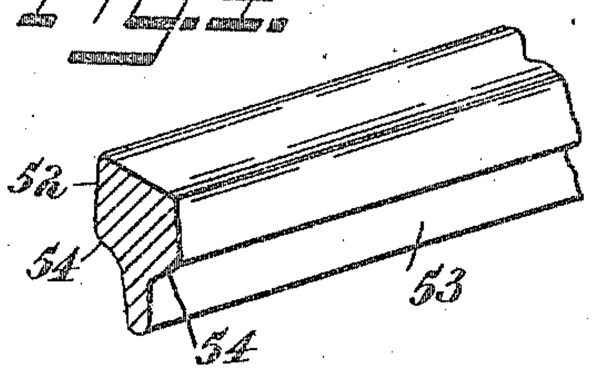


FIG. 5.

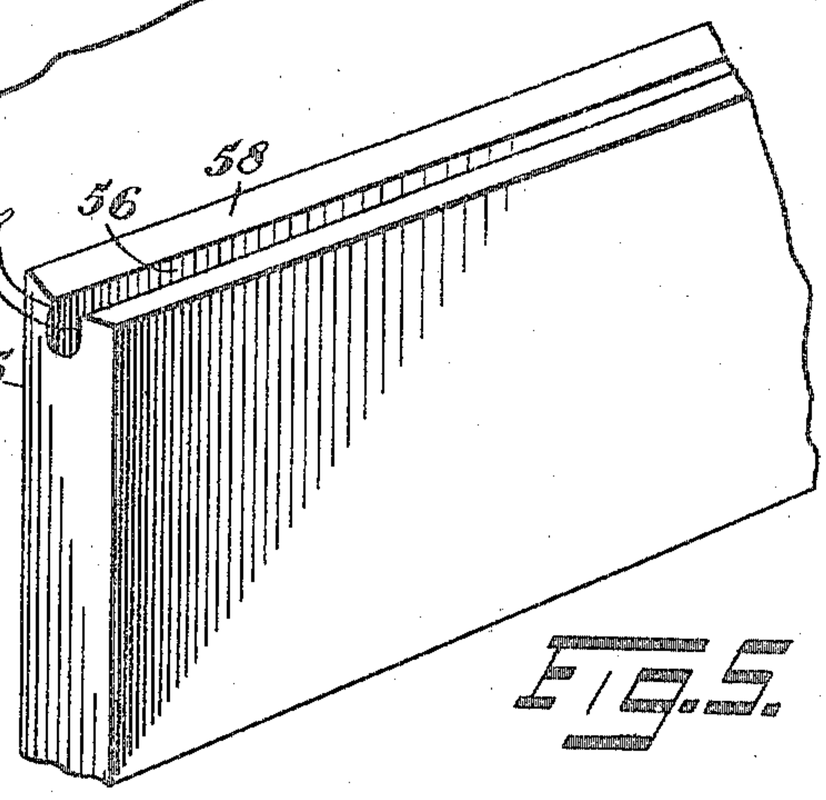


FIG. 6.

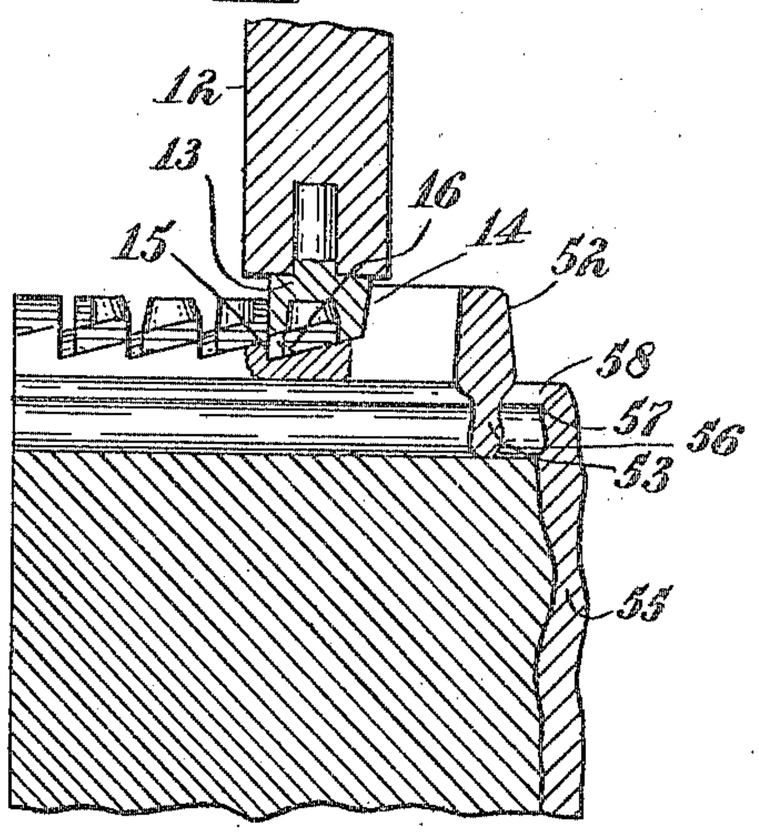
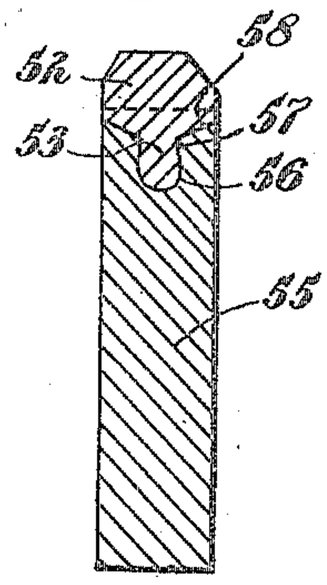


FIG. 7.



Witnesses:
S. Truman.
H. D. Penney

Inventor:
Francis H. Richards.

UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT.

MECHANISM FOR PRODUCING TYPE-BARS.

947,761. Specification of Letters Patent. Patented Jan. 25, 1910.

Application filed July 14, 1909. Serial No. 507,529.

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 Mechanism for Producing Type-Bars, of which the following is a specification.

This invention relates to the typographic art and has for an object to provide improved means for producing typebars.

In the manufacture of typebars by imposing the impress of dies upon blanks it is desirable to employ metal or other material for the stock from which the type head or type face is to be formed of such a suitable consistency that upon the inauguration of the pressure the material of the stock will be readily workable, to the end that the die or other forming tool employed may produce a well shaped character upon the bar or blank. In the use of a soft blank the type face will of course be compacted during the process of manufacture, but the compacting is in many instances local and the body of the typebar below such face, if made out of the same consistency of material or metal of which the face or head is made, would in many instances be too soft for the uses for which it may be employed. The locking up of the forms into the chase would have a tendency to distort the bars and in use some of the bars might yield more than others or some portions of a bar yield more than other portions, whereby irregularities over the face of the form would occur with disastrous results. It has for these reasons been found desirable in practice to unite into one completed bar a comparatively soft blank for the head piece and a relatively hard blank for the body piece, the consistency of the blank for the type head being such that it may be readily workable and the consistency of the body piece being sufficient to maintain it against the pressure of formation and also against pressures to which it will be subjected when in use, among which pressures are that incident to locking up in a form and also to 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 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 thin head 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 is practicable and economical, for after use the whole bar may be thrown into the pot and melted up and either heads or body pieces may be made from such metal, thus saving material and avoiding the separation which would be necessary were different metals or materials employed for the respective parts of the bar. The body piece may be provided with a channel upon its type-carrying side or face and the stock from which the type head or face is to be made may have a web or feather adapted to mate therewith. The channel may be undercut or dovetailed and the face adjacent thereto may be sloped toward it to control the flowage of the metal. In the present improvement it is contemplated to employ such blanks or blank stocks and to feed the same to the dies, which during the formation of the type will securely unite the head piece to the body piece.

The mechanism as herein illustrated is constituted for receiving the body piece in lengths suitable for having impressed thereon the matter for a line of type and the head piece or the stock therefor fed into the machine from a reel, a suitable shearing device being employed for severing the head piece upon the completion of the matter which it is desired to place upon the particular bar being operated upon. By the peculiar formation of dies and the relative movement between the blank and dies the head may be efficiently fashioned and securely attached to the body piece.

The present organization contemplates a die which will displace the metal of the head piece in the direction of the stock end and will not appreciably displace it toward the completed characters or finished end of the bar, whereby after a character has been formed and the adjacent metal of the head piece secured to the body piece there will be no dislodgment thereof but the space produced by the machine will be maintained during the further operation of the bar. The lengths of the body piece are to be in-

serted and securely fastened in the carriage and the head piece led upon the body piece and fed forward to the dies. After the die has been chosen and shifted to the working position the carriage will be advanced toward the die and the cradle upon the carriage which holds the blank will be violently oscillated. The length of the excursion of the oscillations, however, will be gradually diminished as the carriage advances toward the die during the pressure, and upon the final pressure the carriage will be maintained against oscillation; and will also be maintained against oscillation during the withdrawal of the blank or work from the die. Such contact between the die and blank will cause the web of the head piece to expand and fill the channel and will cause a flowage of the metal of the head piece against the face of the body piece and will displace portions of such metal, swaging them as it were, against the web of the head piece and thereby securely locking the two pieces together, either from disassemblage in the direction of the type face or from longitudinal movement.

In the drawings accompanying the forming part of this specification, Figure 1 is a side view of a form of my invention. Fig. 2 is an end view looking from the right-hand end of Fig. 1. Fig. 3 is an incomplete bar, partly broken away, showing the work which the machine is calculated to perform. Fig. 4 is a perspective view of a form of stock for the head piece. Fig. 5 is a perspective view of a form of stock for the body piece. Fig. 6 is a side view, partly broken away, of a portion of a bar in the process of manufacture, and Fig. 7 is a cross-section through a completed bar.

The mechanism herein illustrated is shown as mounted upon a convenient frame 8, a standard 9 whereof carries a bearing 10 in which a shaft 11 is mounted which bears a die-carrier 12 upon which a series of dies 13 is mounted, each of the dies having a die head 14 bearing some suitable character and a face 15 having a portion 15′ depending therefrom at one side and having also in such depending portion an opening or recess 16. The general face of the die or the superficial face is shown at an angle to the true face or that which will produce the printing face of the types. The shaft 11 carries a hand wheel 17 for shifting the carrier and locating the chosen die. The wheel 17 is provided with a hub 18 bearing characters corresponding to or indicating the various dies. The bearing 10 has a projection 19 forming the bearing for a latch or bolt 20 which enters openings 21 in the die-carrier to lock the same in position. A suitable handle 22 is provided upon the bolt for withdrawing the same and a spring 23 is shown for the purpose of extending the bolt and holding it in its locked position.

The typebar-blanks are to be placed in a suitable carriage, which in the present instance is illustrated as shiftable upon ways 24 of the machine frame and which carriage comprises a body portion 25 having guides 26 shiftable upon said ways 24 and is provided with standards 27 having guides 28 upon which blocks 29 are shiftable and by which blocks pivots 30 of a cradle 31 are carried. The cradle has a blank pocket or recess 32 for receiving one portion or member of a blank. The pivots are fastened to the cradle by means of plates 33 secured by screws 34 to the body of the cradle. To compensate for wear and for the purpose of lateral adjustment an adjusting screw 110 is illustrated carried by the standard 28 and engaging the slides 30′.

The form of mechanism herein illustrated contemplates that the body pieces of the typebar will be made up into lengths and each length placed into the cradle and secured in position by means of suitable set-screws 35. If the body piece is sufficiently massive it will be practically self-sustaining; otherwise it may be supported at the sides clear to the upper edge by the walls of the pocket of the cradle. The head piece will be fed from a reel 36 supported on a shaft 37 held by forks 38 of arms 39 supported by a standard 40 of the machine frame. The reel is shown as provided with a hub or face 41 upon which a brake 42 is pressed by a spring 43 secured by screws 44 to the standard 40, the brake preventing the stock for the head piece being drawn off more rapidly than the requirements of the machine demand. In order that the head piece may be properly straightened out it is received from the reel between a pair of upright rolls 45, supported by spindles 46 set into the top of the cradle, and which will straighten the sides of the head piece as it is received from the reel. It is also received between a pair of transverse rolls 47 whose journals 48 find bearing in plates 49 secured to the cradle upon each side of the body receiving slot 50, the edges of which slot may if desired project to the top face of the body piece whereby it will be sustained against lateral displacement.

Suitable forms of stocks for the head piece and body piece respectively are herein illustrated, wherein in Fig. 4 is shown a head piece having a portion 52 which will constitute when completed the type heads of the bar, from which portion is shown depending a web 53 and the lower portion as having slanting faces 54, which head piece is organized to be assembled with a body piece 55 having upon its type-bearing face

a groove 56, in the present instance shown as of less depth than the web 53 which may loosely mate therewith. The edges of the grooves 56 are undercut or overhang at 57 and the faces 58 are shown as sloping toward the groove or channel and organized to mate with the faces 54 of the top or head piece. After a length of the body piece has been placed in the cradle and securely clamped by means of the set-screw the head piece will be drawn off the reel between the straightening rollers and laid upon the body piece. It will be observed that the straightening device is carried by the cradle so that any movement imparted thereto will also be imparted in its full value to the head piece and prevent any displacement which might occur if the straightening device were upon a stationary part of the machine and no means employed in connection with the cradle for maintaining the head piece in position. This will also prevent any twisting or distortion of the bar after it has been straightened and placed in position.

The lower portions of the slide 30′ are shown as provided with wedge faces 60 mating with wedge faces 61 carried by bars 62 having flat faces 63 sliding upon flat faces 64 of the carriage, and which bars are shown as provided with racks 65 gearing with sectors 66 splined upon a rock-shaft 67 which is supported by journal bearings 68 of the machine frame and which has fast thereon an arm 69 pivoted to a link 70 having a yoke 71 embracing the driver-shaft 72 supported by suitable journal bearings in the machine frame and upon which driver shaft is fastened a driver 73 for throwing and returning such link, which driver is, in the present instance, shown as a wheel having a cam groove 74 in which runs a roller 75 secured to the end of the yoke 71. The driver-shaft 72 may be driven by any suitable power, here shown as hand-crank 76.

The carriage may be advanced past the dies by means of a nut or female screw 77 connected thereto, which mates with a screw-shaft 78 held from longitudinal movement and having some suitable means, here shown as a hand-crank 79, to rotate the same and advance the carriage and thereby feed the blank to the dies.

For the purpose of oscillating the typebar while in the process of manufacture a guide-block 80 is shown as pivoted at 81 upon a standard of the frame and having guides or ways 82 thereon, upon which ways is shiftably mounted a slide 83 having pivoted thereto at 84 a link 85 which has an eye 86 embracing a bar 87 carried by the cradle and which bar will move through the eye as the cradle is advanced with the carriage by the feed. Suitable standards 88 may be employed for supporting the link 85 upon its sides and preventing it from being bent or shifted by the travel of the carriage. The block 80 is shown as having a projecting portion 89 carrying a slot which has faces 90 embracing a crank-pin 91 upon a shaft 92, which shaft is driven in the present instance by means of a pulley 93 driven from some suitable source of power, not shown. In the position shown in Fig. 2 the pivot 84 is in concentricity with the pivot 81, whereby oscillations of the block will not be imparted to the cradle, but upon shifting the slide 93 upon the ways 82 and moving it off the center of oscillation of the block 80 oscillation 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 toward its position where oscillations will not be imparted to the cradle there is shown a link 94 pivoted at 95 to the link 85 and having a forked end 96 embracing the driving-shaft and carrying a roll 97 riding upon the driver, in the present instance an eccentric 98. 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 80, which means is herein shown as a spring 99 secured to the link 85 and to some convenient part of the machine frame.

The organization herein is such that the means for controlling the advance of the blank toward the working point will also control the oscillation of the blank. As the blank nearly finishes its movement of pressure the oscillation will cease, during the final portion of which movement and also as the bar is drawn away from the die the cradle will be locked from oscillation.

After a length of the body piece has had imposed thereon a length of type heads the stock for such type heads will be severed in some convenient manner. There is, however, here shown a form of shearing device which comprises a knife blade 100 located adjacent to the position which will be occupied by the end of the bar after the completion of the characters thereon and which blade is carried by a hand lever 101 pivoted at 102 to the machine frame and having an extension 103 to which is pivoted at 104 a pin 105, which pin enters a guide 106 and is surrounded by a spring 107 bearing upon the extension 103 and the guide 106 for the purpose of returning the knife or shearing device to its normal or inactive position.

By the use of a die formed as herein illustrated the displacement of the metal of the head piece will be from the completed portion of the bar and will be toward the stock end of the bar. The side of the die will cut

straight down past the type last formed and will not permit any appreciable flowage of the metal from the point of oscillation toward the portion of the bar which has been completed. Lateral displacement will therefore be toward the stock end. As the bar is rocked from side to side the pressure generally will crush the web 53, causing it to conform in shape to the outline of the channel 56 and the sidewise pressure incident to the oscillation and pressing combined will through the depending portion of the die displace or cause to flow portions of the metal of the head piece, forcing them against the faces 58 which will displace such portions, causing them to flow against the web whereby the head piece will not only be held by the conformation of the web to the channel, but will have depending flowages occupying self-formed recesses or cavities in the body piece and also self-formed swages upon the body piece clamping the web.

In operating upon the type head portion 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 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 combination with a die, of means to hold a two-piece blank in loose assemblage, means for feeding the same so assembled to the die, and means for operating the die and the blank holding means for making letters in succession along the edge of the blank.

2. In a typebar-machine, the combination with a series of type dies, of means for holding, in loose assemblage, a two-part typebar blank and means for successively bringing the blank so assembled and the dies into engagement and successively forming types upon the bar and simultaneously securely assembling the parts of the blanks.

3. In a typebar-machine, the combination with a carriage, of means for shifting the carriage, a cradle pivoted thereon, a portion of the cradle organized to receive and support one portion of a blank, means upon the cradle to receive and hold another portion of a blank, and means for rocking the cradle.

4. In a typebar-machine, the combination with a carriage; means for shifting the carriage; a cradle pivoted to the carriage and provided with means to receive and sustain a length of body piece for a typebar; a reel to carry a roll of stock for the head piece of the base; means upon the cradle to receive the stock for the head piece, straighten the same and during the rocking of the cradle to prevent movement of the head piece other than the movement imparted to it by the cradle.

5. The combination with a die, of means to hold in loose assemblage a two-part blank, and means to bring together in oscillating contact the blank and die to fashion the blank and assemble the parts thereof.

6. The combination with a die, of means to feed a two-part blank thereto, and means to oscillate the blank against the die to secure the parts thereof together.

7. The combination with a die, of a carriage, means upon the carriage to hold a two-part blank, means to advance the carriage toward the die, and means to oscillate the carriage during its advance.

8. The combination with a series of dies and means for bringing these one at a time to their working position, of a carriage adapted for holding a body portion and superposed head portion of a typebar blank, means for bringing the head portion of the blank and the die at the working position into engagement, and means for advancing the two-part blank past the working position.

9. The combination with a die, of a carriage adapted to hold a two-part blank, one part superposed upon the other, means to press one part and the die into engagement, and feed devices connected for advancing the carriage with the blank therein by a step by step movement past the working position of the die.

10. The combination, with a die of a carriage for holding a portion of a typebar-blank, means for holding another portion of the said blank superposed thereon, a portion of the die being constructed and adapted for causing the metal of one portion of the blank to flow against the other portion of the blank at successive steps thereon, and feed devices connected to said carriage for advancing the same with a blank therein by a step by step movement past the working position of the die.

11. In a typebar-machine, the combination with a carriage organized to receive a body portion of a blank in lengths and a head portion from a reel; a series of forming dies; means for feeding the two-part blank to the forming dies, means for severing the head piece from the stock; and means for holding the stock end of the head piece upon the carriage after the severance of the completed portion.

12. The combination with a die, of a carriage for feeding stock to the die, and a shearing device for severing the stock and located adjacent to the die, and means for advancing the carriage intermittently in correspondence with the width of a selected die.

13. The combination with an oscillatory cradle for receiving a blank, and rolls upon the cradle for straightening the blank and holding the same.

14. The combination with a carriage; means for shifting the carriage; means for oscillating the same; a pair of rolls upon the carriage for straightening the stock in one direction; and a pair of transverse rolls upon the carriage for straightening the stock in another direction.

15. The combination with a cradle; means for shifting the cradle; means for oscillating the same; means for securing a portion of a blank fixedly upon the cradle; means for supporting another portion of the blank to permit movement thereof longitudinally of the former portion of the blank.

16. A feed for a typebar-machine comprising means for holding the blank; means for advancing the same toward the working point; means for severing the blank adjacent to the working point; means for holding the severed end of the stock; means for retracting the feed and permitting the same to traverse a portion of stock to straighten the same.

17. The combination with a carriage; means for advancing the carriage; two pair of rolls arranged transversely to each other for receiving the stock; means for advancing the rolls with the carriage as the stock is fed to the working point; means for severing the stock adjacent to the working point; means for holding the severed end of the stock during the retraction of the carriage and while the rolls are traversing the stock to straighten the same.

18. In a typebar-machine, the combination with a carriage embodying a frame having slides; ways upon the frame of the machine for such slides; slide ways upon the carriage; slides shiftable thereon; a cradle pivoted to such slides; means for shifting the slides; an oscillator; a bar upon the cradle traversing the oscillator; and means to shift the carriage.

19. In a typebar-machine, the combination with a carriage embodying a frame having slides; ways upon the frame of the machine for such slides; slide ways upon the carriage; slides shiftable therein; a cradle pivoted to such slides; means for shifting the slides; an oscillator; a bar upon the cradle traversing the oscillator; means to shift the carriage; means upon the cradle for receiving a length of a portion of a typebar; means upon the cradle for receiving a continuous portion of the typebar; and means for impressing type upon one portion of the bar and uniting the portions by mutual interflowage of the materials thereof.

20. In a typebar-machine, the combination with a carriage organized to receive a body portion of a blank in lengths and a head portion from a reel; a series of forming dies; means for feeding the two part blank to the forming dies; and means for severing the head piece from the stock.

21. The combination with a die having a type-producing face and a superficial face occupying a plane at an angle to the plane of the type-producing face; means for holding a two-part blank; means for advancing the blank toward the die and displacing the metal of one portion of the blank into interlocking engagement with the other portion of the blank.

22. The combination with a die having a projection at an angle to the plane of its die face; means for holding a blank and feeding the same past the die; a recess being provided in the depending portion of the die on a line with the line of advance of the blank; and means for successively presenting the alternate sides of the blank against the depending portion of the die during the production of a single impression upon the blank.

23. The combination with a die; of a blank carriage; means upon the carriage for receiving a portion of a blank and supporting at its upper edge the sides thereof; means for holding another portion of a blank upon the upper side of the former blank; means for pressing portions of the metal of the latter blank against the former blank to displace the same in a direction not controlled by the support of the blank-holder at successive points along the blank.

24. The combination with a die having a face occupying a plane at an angle to the plane of the face of the die which will form the face of the completed impression; a blank-holder having a portion organized to receive a blank and support the entire sides of the same; means for holding a blank upon the former blank; means for advancing the latter blank against the die and oscillating the same and displacing the metal of the latter blank toward the stock end thereof and toward the center of the edge of the former blank.

25. The combination with a die-carrier, of a series of dies thereon each embracing a cavity the walls whereof are organized to fashion a blank and form a face thereon and having a surface on a plane at an angle to the plane of the face-forming portion, and a feed for the blank.

26. The combination with a die-carrier, of a series of dies thereon each having a portion organized to form a type face and a portion organized to displace the metal around the face and to localize such displacement, and means to feed a blank to the dies.

27. In a typebar-machine, the combina-

tion with means to feed a typebar-blank, of means to form a type face thereon, and means to displace the metal of the blank around the face and to control the direction of such displacement.

28. In a typebar-machine, the combination with means to hold the blank, of means to produce type faces upon the blank, and means to displace the metal of the blank and localize such displacement.

29. The combination with a series of dies, of a die-carrier to shift the dies into working position; means to feed a blank past the working position of the dies, each die consisting of an impression-forming face and a face on a plane at an angle to the plane of the impression-forming face; and a channel in the edge of such face at the base of the angle.

30. In a typebar-machine, the combination with a die, of means for holding a body piece of a typebar blank and for supporting the sides thereof, means for holding in loose assemblage a head piece of a typebar-blank upon the body piece in said holding means, and means for advancing said assembled blank against the die and for producing the resultant of a compound movement of said blank while in contact with the die.

31. The combination with a die, of means for holding a two-part blank, means for advancing said blank toward the die, and means for oscillating the same during its advance.

32. In a typebar-machine, the combination with a series of selective dies, of means for holding a hard type bar body piece and a soft typebar head piece in loose assemblage and swaging the same together.

33. In a typebar-machine, the combination with a series of selective dies, of means for holding a hard typebar blank body piece and a soft typebar blank head piece in loose assemblage, means for advancing the same successively to the dies as these are successively selected and means for swaging said body piece and head piece together.

34. Means for producing typebars from a juxtapositioned soft and hard piece of metal comprising means for forming types in succession upon the soft piece and contemporaneously swaging the portion of the soft piece which is having a type formed upon it against the hard piece.

35. The combination with a die, of means for holding a two-part blank in loose assemblage, and means for bringing the blank and die together in working contact forming an impression upon the blank and assembling the parts together by a crosswise movement.

36. In a typebar-machine, the combination with an oscillatory blank holder having means for receiving a body portion of a blank, and means for holding a head portion of the blank received from a reel, a series of forming dies, means for bringing the dies into operative relation with the blank in said holder, means for severing the head piece from the stock upon the reel at a point upon the opposite side of said head piece holding means.

37. In a typebar-machine, the combination with means for holding a body portion of a blank in lengths, and a head portion from a reel, a series of dies, means for bringing the dies and blank into operative relation, and means for severing the head piece from the stock after this has been worked upon.

38. The combination with a type die, of means for holding the parts of a two-part blank imposed one upon the other, and means for bringing the die into type forming relation with one of said parts while so held by a crosswise working movement.

39. The combination with a die, of means for holding, imposed one upon the other, the parts of a two-part blank, and means for bringing the die into type forming relation with the imposed part of the blank and embodying feed mechanism for effecting this at each of a number of type forming positions.

40. The combination with a carriage for holding the body portion of a two-piece typebar blank, of means for holding the unworked-upon portion of the head-piece of said blank upon the body piece, a series of type dies each having a portion constructed for forming a type face and a portion constructed and located for increasing the longitudinal displacement of the metal of the head piece toward the unworked-upon portion thereof, a feed device connected to said carriage for advancing the same and a blank carried therein by a step by step movement past the working position of the die, and means for successively bringing the blank so assembled and selected dies into engagement and successively forming types upon the blank and simultaneously securing and assembling the parts of the blank at the positions worked upon.

41. In a typebar-machine, the combination with means for holding in loose assemblage the unworked-upon portions of a two-part blank, of a series of type dies each having a portion constructed for forming a type face and a surface disposed upon a plane at an angle to the plane of the face forming portion and directed toward the unworked-upon portion of the blank for increasing the longitudinal displacement of the metal of the head piece toward the said unworked-upon portion thereof, and means for bringing the blank and the dies selectively into engagement at successive points along the blank.

42. In a typebar machine, the combination with means for holding in assemblage a two-

piece blank, of a series of type dies each having a portion constructed for forming a type face and a surface disposed upon a plane at an angle to the plane of the face forming portion and constructed and located for directing the flowage of the metal of the headpiece for the unworked-upon portion thereof and for augmenting and accelerating the flowage within the portion of the metal acted upon by the die.

FRANCIS H. RICHARDS.

Witnesses:

FRED. J. DOLE,

CHAS. LYON RUSSELL.