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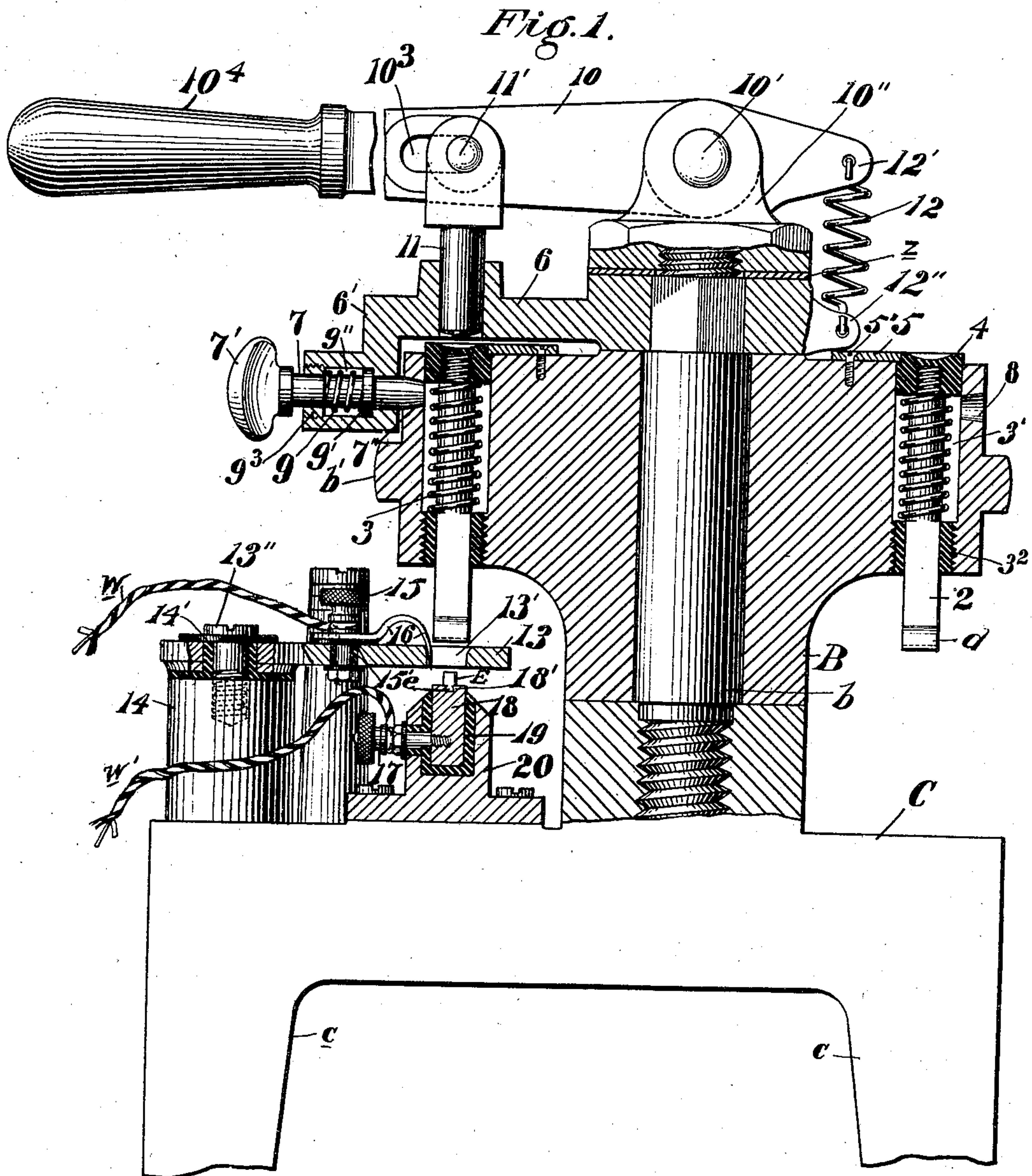
PATENTED APR. 28, 1908.

F. H. RICHARDS.

APPARATUS FOR MAKING TYPES AND LINES OF TYPE.

APPLICATION FILED JULY 16, 1902.

3 SHEETS--SHEET 1.



Witnesses:
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J. C. Davidson.

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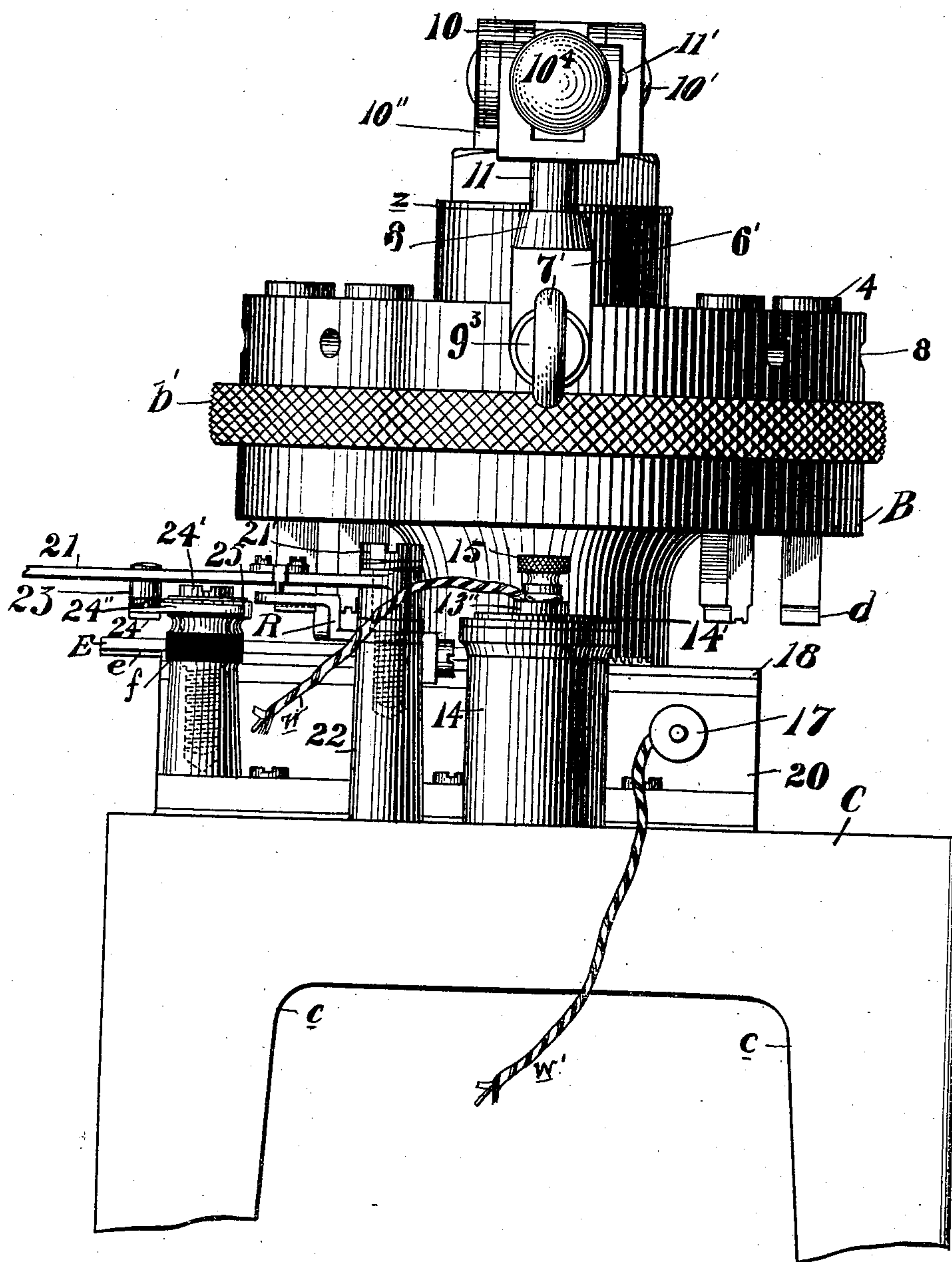
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3 SHEETS—SHEET 2.

Fig. 2.



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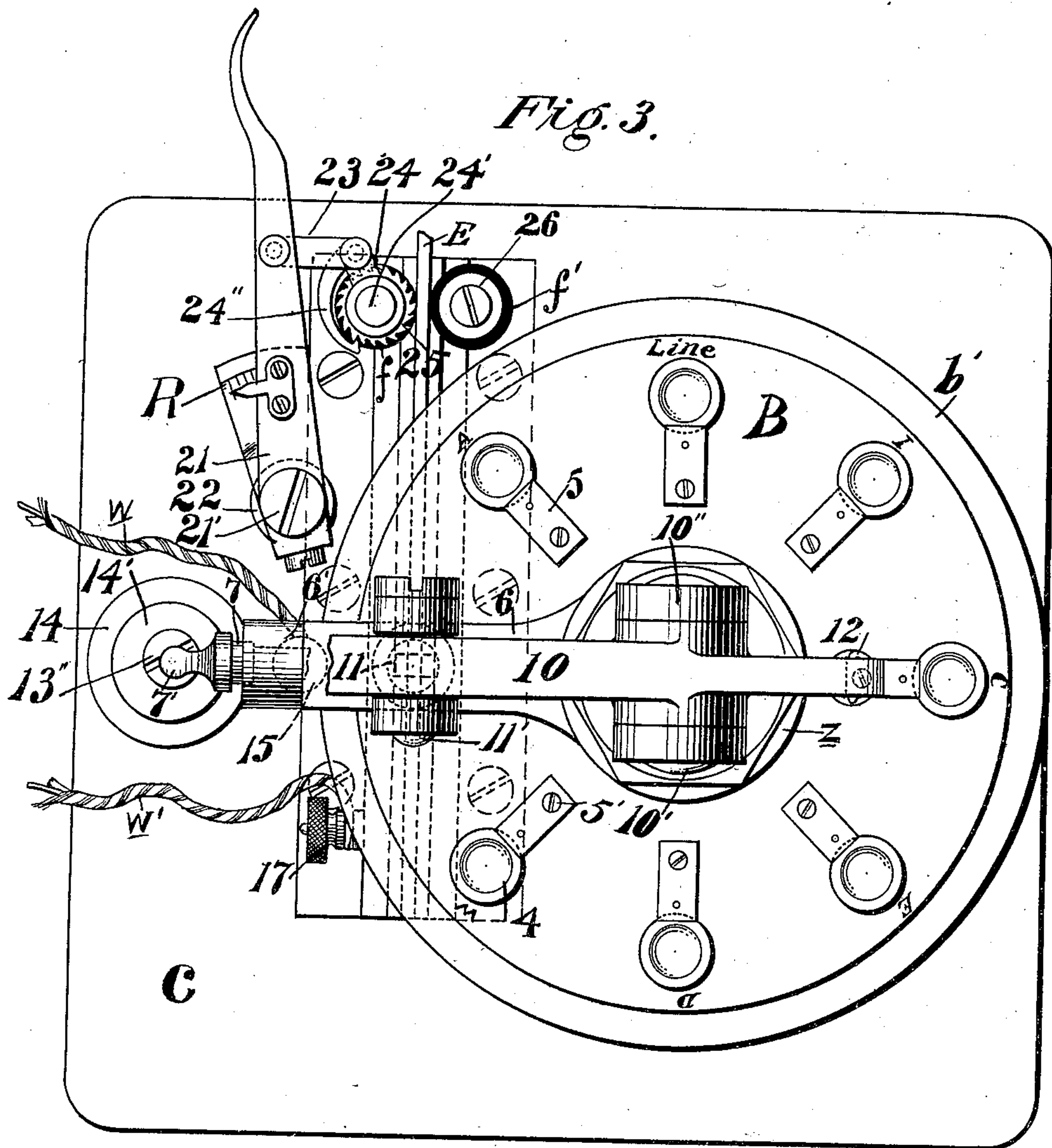
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UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT, ASSIGNOR, BY MESNE ASSIGNMENTS,
TO AMERICAN TYPOGRAPHIC CORPORATION, A CORPORATION OF NEW JERSEY.

APPARATUS FOR MAKING TYPES AND LINES OF TYPE.

No. 886,328.

Specification of Letters Patent.

Patented April 28, 1908.

Application filed July 15, 1902. Serial No. 115,622.

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Apparatus for Making Types and Lines of Type, of which the following is a specification.

This invention relates to means for making types, and a succession of the same constituting a line of type or a typebar and more especially does the invention relate to apparatus which operates to form type by the aid of heat arising from the conversion of electric energy whereby the internal or molecular resistance of the metal or stock from which each type is formed is diminished and the forming operation facilitated.

In the particular form of apparatus illustrated in the present drawings for carrying my present improvements into practice and making a line of type or a typebar, it is designed that the individual members of an assemblage of dies, matrices or other impression devices shall be capable of being brought into action in proper sequence or order and caused to operate upon a proper blank, each die, etc. when operating to impress the blank as well as the portion of the blank under the die being in a heated condition whereby the resistance offered by the blank to the forming action of the die is diminished. It is not contemplated, however, that the heat shall be sufficient to cause the material of the blank to flow too freely, but shall be adequate only to diminish the internal cohesion of such material to an amount sufficing to facilitate to some degree the production of the type. Thus, a mechanism embodying my present improvements will comprise suitable impression devices, such as dies or matrices, which in number and configuration correspond with the character and variety of the composition to be produced. These dies when an operation in sequence is desired, will be, ordinarily, so related to the blank to be operated upon that they are capable of being brought in proper sequence to the working point.

For the purpose of bringing each working die and the portion of the blank thereunder to and maintain the same in a sufficiently

heated condition, I employ, according to the present improvements, an electric heating current and ordinarily so combine an electric circuit with the mechanism that the movement of the die from its normal or inoperative position to a position in which it acts upon and impresses the blank is effective to close the circuit and thereafter by the conversion of the electric energy into heat the temperature of the working die and the material of the blank which is being shaped into a type is raised. According to the preferred mode of carrying the present improvements into practice, moreover, I mount the blank upon a suitable support insulated from loss of heat, whereby the heat arising from the passage of the current is prevented in large measure from being absorbed and dissipated and the tendency created to localize the heat within the blank and under the working die. The temperature of the blank is thus maintained if not augmented from the instant that the die begins its work until and during the last stages of its operation when the amount of energy necessary to cause the material of the blank to conform to the configuration of the die approaches a maximum. Thus during those stages of the die working when the effort of the die is relatively greatest the tendency of the heat to diminish the internal cohesion or resistance of the material is maintained.

Another species of type making apparatus utilizing heat applied in a way other than described and illustrated herein, is set forth in my pending application Serial No. 215,729, refiled July 8, 1904, original application filed May 27, 1902.

In the drawings accompanying the present specification there is set forth a simple organization of mechanism for carrying into effect my present improvements, and in these drawings Figure 1 is mainly a central longitudinal section of the mechanism, parts being shown however in elevation; Fig. 2 is an elevational view looking from the left in Fig. 1, and Fig. 3 is a plan of the mechanism.

Similar characters of reference designate corresponding parts in all figures.

For the purpose of conveniently supporting the various dies, matrices or other impression devices, and to enable them to be

conveniently adjusted for the purpose of locating any desired die etc. at the working point, I will ordinarily employ some suitable form of carrier upon which the dies may be mounted. This carrier may be supported and mounted in any appropriate or desired manner.

In the particular embodiment set forth in the drawings attached to the present specification, which it will be understood, is mainly intended for the purpose of illustrating an operative device, the same not being shown as comprising all the elements and refinements of organization of a commercially workable machine, an angularly adjustable carrier designated in a general way by B is indicated, the same being rotatably mounted upon a fixed stud *b* rigidly secured to and extending from a base C provided in the present instance with legs *c*. Adjacent to the periphery of the carrier B the dies or matrices are mounted; and while I have indicated a comparatively small number of dies, designated without preference by *d*, the number thereof may manifestly differ. In the organization shown each die *d* is located at the end of a corresponding stem 2 longitudinally reciprocable in an opening in the carrier. Each stem 2 is encircled by a spring 3 located in the enlarged bore 3' of the opening in which the stem is slidable. Each spring at one end bears against an insulating plug 3² firmly secured in the bottom of the opening in the carrier and through an opening in which plug the stem 2 of the die slides. At the opposite end the spring bears against a collar 4 of insulating material secured to the stem 2 and constituting a head slidable with the stem, the spring being under compression whereby the die and stem is urged to its upward or operative position. The purpose of making the aforesaid plug and collar of insulating material will appear later. In this instance the stem of each die is angular in cross-section and the opening in the plug 3² is of similar cross-section, thus preventing the rotation of the die during the longitudinal movement of the stem and insuring the correct position of the die when forced down upon the block, as will be adverted to later on. For limiting the upward movement of each die and its stem under the action of its elevating spring 3 there is in this instance combined with each head 4 a corresponding stop-piece 5 which projects sufficiently far toward the axis of the stem to cause the piece to engage with the head, a screw 5' serving to fixedly secure the stop-piece to the upper surface of the carrier.

In the use of the simple species of mechanism illustrated, it is intended that the carrier shall be turned upon the axis of the supporting stud *b* until a chosen die shall have been brought to the working point. For facilitating this manually effected angular adjust-

ment of the carrier, the latter may have, and it is here so shown, a roughened or knurled flange *b'* upon its periphery.

Preferably, means will be provided for locking the carrier in a position to which it may have been adjusted in bringing a selected or chosen die to the working point of the machine. In the construction set forth this means comprises an arm 6 fixedly secured to the upper end of the stud *b* and projecting radially across the carrier, a depending portion 6' of the arm overhanging the outer edge of the latter. In this overhanging portion 6' is mounted a locking pin 7 having a finger-piece 7' and also having in the form illustrated a tapering end 7'' adapting it to engage with any one of a number of radial sockets 8 provided in the carrier, the relation being such that when the locking pin is engaged with one of these sockets the corresponding die will be properly located with reference to the working point. The locking pin 7 is in this instance spring-pressed to insure its engagement with the sockets, the means for this purpose comprising a spring 9 under compression and seated in a recess 9' formed in the overhanging portion 6' in the arm and bearing at one end against a shoulder 9' formed on the locking pin while at its opposite end the spring bears against a plug 9² secured into the outer end of said opening.

Referring now to the blank from which types are formed and the means for supporting it at the working point, it will be of proper material and its form will depend of course upon the particular mode of operation carried out by the mechanism when in use, whether, for instance, the latter is to be utilized for making separate types or for making lines of type, each embodying two or more type-like characters, or whether it is to be utilized for providing the upper or type-carrying edge of a typebar blank with its complement of types to form a typebar of greater or less length. The means for supporting the blank will manifestly likewise vary with the configuration of the latter, and while I have for the purpose of illustration set forth a particular form and construction of both blank and support therefor, it will be readily understood that these features may be widely varied without departing from the spirit of the invention. The blank illustrated in this instance is represented in the form of a strip or ribbon E suitable for forming a line of type and having an under-cut or dovetailed rib *e* along its lower edge, adapting the blank or the line of type formed therefrom to be engaged with a proper typebar body-piece or support. If a blank of such a cross-sectional configuration be used, the support for maintaining it in proper position at the working point relatively to the working die will ordinarily be provided with a counterpart channel

or groove with which such under-cut rib engages. In this instance, the die operation results from the rectilinear movement of the die thereby compressing the material of the blank, and in the simple species of mechanism illustrated, this compressing movement of the die is accomplished by depressing a hand-lever 10 which is fulcrumed by a pin 10' to a support 10'', secured to the aforesaid fixed stud *b* and here shown as a nut-like member screwed onto the end of the stud, a washer *z* being interposed between the nut-like member and the opposed face of the arm 6. On one side of the pivot-pin 10' there is a second pivot-pin 11' connecting the lever with a plunger 11, which works in an opening in the arm 6, so located that when the die shall have been brought to a working position, and the locking pin 7 engaged with the proper socket in the carrier, the plunger is adapted to contact with the head 4 on the stem of the located die (the said head being preferably somewhat concave and the contact end of the plunger somewhat convex). By a forcible movement of the hand lever, the die is forced downwardly and compresses the blank at the proper point. Freedom of movement of the plunger 11 with reference to the lever 10, is assured by the location of the pivot-pin 11' of the plunger in a slot 10³ in the lever, while a handle 10⁴ is provided on the lever 10 for the ready manipulation thereof. The lever is returned to its upward position (to permit the ready and free adjustment of the carrier B) through the action of a spring 12 which connects an extension 12' on the lever with an ear 12'' extending, in this instance, rearwardly from the arm 6.

Coming now to the means for heating the dies, whereby when a die shall be applied to the surface of the blank, an amount of heat shall be developed sufficient to decrease to a more or less extent, the internal resistance or cohesion of the material thereof, I utilize for this purpose an electric circuit in which is included the blank being operated upon, and preferably so combine such circuit with the type making mechanism that the circuit is completed through the working die and that portion of the blank directly thereunder. In the present case, the circuit is broken when the die after its operation is lifted to withdraw it from the face of the blank. Thus the current flows and the electric energy is converted into heat in overcoming the resistance offered to its passage by the material under the die at such periods only as the successively located dies operate upon the blank.

It should here be stated that a guide-plate 13 is provided, which plate is in this instance secured to a post 14 located upon the base C, and is provided with an opening 13' for centering and steadying the descending die.

Since in the illustrated form of mechanism the binding post for the attachment of one of the circuit wires is mounted upon the guide-plate 13, and as the die in its descent may contact with the guide-plate, I prefer that the connection of the guide-plate with its supporting post shall be such as to insulate it therefrom, and have therefore shown suitable insulating devices 14' interposed between the post and the securing screw 13'' of the plate. The binding post 15, to which is attached one of the circuit wires *w* is mounted upon the guide-plate 13 and likewise insulated therefrom by means of suitable insulating means such as 15'. When a die descends after having been brought over the opening in the guide-plate, it comes in contact with a flexible finger or brush 16 in electrical communication with the binding post 15 and circuit wire *w*, and when the die shall have contacted with the blank the circuit is closed through the binding post 15, via the brush 16, die-stem 2 of the working die, and blank E, to the remaining binding post 17 which is screwed into a block 18 serving to support the blank in a sufficiently rigid manner to permit the satisfactory operation of the dies. Preferably the supporting block 18 is mounted in such a manner as to minimize the tendency to absorb and dissipate the heat into which the electrical energy is transformed as well as to electrically insulate it from the adjacent metallic parts. To this end the block is in direct contact with insulating means such as 19 located in a channel in a holder 20 in which the block is mounted. This holder is fixed rigidly on the base C, and the aforesaid binding post 17 is likewise insulated from the holder, being in this instance screwed directly into the aforesaid block 18. To the binding post 17 the remaining circuit wire *w'* is attached. These wires *w*, *w'* serve to convey the current from a suitable source of electric energy, not shown. The blank E is fed through a slot 18' in the block 18.

Some means will ordinarily be provided for feeding the blank to and past the working point, in order that successively located dies may operate upon consecutive portions of the blank. Any means appropriate for the purpose may be employed, but in the simple mechanism illustrated a hand feed is indicated which when properly operated causes the blank to be fed forward step by step an amount corresponding to the width of the types made upon its edge. The feeding mechanism in the form thereof indicated comprises a lever 21 fulcrumed by a stud 21' to a post 22. This lever is connected by a link 23 with a pawl-carrier 24, pivoted by a stud 24' concentrically with a notched feed wheel 25. Upon the pawl-carrier there is pivotally mounted a spring-pressed pawl

24" engaging with the teeth of the feed wheel. In juxtaposition to the aforesaid notched-wheel is rotatably mounted a presser roll 26, in such relation to the notched feed wheel 5 that the space between the peripheries of the two is somewhat less than the width of the blank fed to the machine, in order that the teeth of the notched wheel may engage with the face of the blank to a sufficient depth, to 10 cause upon the rotation of the notched wheel the feeding of the blank. Both the feed roll and the presser roll are in this instance insulated from their supports (such insulation being indicated by f, f' , respectively) in order 15 to preclude the current from passing to the machine frame and thence to ground.

The locking pin 7, after having been withdrawn from the engaged socket, permits the free angular movement of the carrier B 20 which may then be turned to bring the desired die into alinement with the aperture 13' in the guide-plate 13. Upon the release of the locking pin, it enters its proper socket 8 in the carrier, and the latter becomes 25 locked against further movement. Assuming now that the proper section or portion of the blank is located in proper relation to the opening or aperture 13', the depression of the hand-lever 10 results in the forcing down 30 of the stem of the located die and ultimately, in the engagement of the die at the end of the stem, with the blank. During this time, however, the circuit having been closed by reason of the contact of the brush or finger 16 35 with the depressed die, and the electric current in overcoming the resistance of the metal of the blank, is converted in a large measure into heat, thereby raising the temperature of the blank, although as before stated it is not 40 designed that the temperature shall be such as to cause a too free fluid condition of the portion of the blank in the die, but shall merely heat the blank to an extent sufficing to overcome in some measure the internal 45 cohesion of the material thereof in order that the formative action of the descending die may be facilitated by reason of the decreased resistance to flowage offered by the metal of the blank. After a type has thus been made 50 the lever 10 is assisted in its upward movement by the action of the spring 12, and the depressed die follows the plunger upward by reason of the action of the encircling spring 3.

Before making the next type the feed lever 55 21 is manipulated sufficiently (an index or gage R indicating the movement necessary) to bring the next section or portion of the blank into alinement with the opening 13'; upon the necessary adjustment of the die-carrier to bring the proper die to the working 60 point the type may be made as before.

In the making of lines of type, the point at which the continuous ribbon-like blank is to be severed after a proper number of types

have been formed thereon, may be indicated 65 by a separate die having a V-shaped working portion (this die being marked by "Line" in Fig. 3) operating to notch the bar at the point of division after which the bar may, by 70 suitable means, be severed at that point.

The particular advantage resulting from the use of heat applied from an extraneous source in conjunction with an insulated support for the blank, arises from the fact that such support tends to conserve within the 75 material of the blank the heat represented by the electric energy consumed, and as the working of the die nears its completion, the diminution of the internal resistance or cohesion caused by the heat is maintained at a 80 maximum, thus facilitating the production of the type at that stage in which it is highly advantageous that such internal resistance should be a minimum,—to-wit: when the 85 effort that the working die should exert is naturally the greatest.

Having described my invention, I claim—

1. The combination with a support for a blank, of a type die adapted to engage with a blank in such support and form a type thereon, and an electric circuit for heating the 90 blank, and means for closing the circuit during the working of the die and blank.

2. The combination with a support for a blank, of a plurality of selective type dies 95 adapted to form on a blank in such support a succession of types, and an electric circuit for heating the blank, and means for closing the circuit during the type formation.

3. The combination with a support for a 100 blank, of a plurality of selective type dies adapted to form on a blank in such support a succession of types, an electric circuit for heating the blank, and means for closing the same during each type forming operation. 105

4. The combination with means for supporting and insulating a blank, of a type die adapted to engage with a supported and insulated blank and form a type thereon, an electric circuit for heating the blank during 110 the type forming operation, and a circuit closer controlled by the type die in its working movement.

5. The combination with means for supporting and insulating a blank, of a plurality 115 of selective type dies adapted to form on a supported and insulated blank a succession of types; an electric circuit, and means for rendering the same effective during each type forming operation for heating the blank. 120

6. The combination with a support for a blank, of a type die adapted to engage with a blank in such support and form a type thereon, an electric circuit and means for rendering the same effective during the forming 125 operation for heating the blank, and feed mechanism operative to impart a step by step movement to the blank.

7. The combination with a support for a blank, of a plurality of independently movable selective type dies adapted to form on a blank in such support a succession of types, an electric circuit for heating the blank, a circuit closer controlled by the die in its movement, and feed mechanism operative to impart a step by step movement to the blank.

8. The combination with a support for a blank, of a plurality of selective type dies adapted to form on a blank in such support a succession of types, an electric circuit, and means for rendering the same effective during each type forming operation for heating the blank, and feed mechanism operative to impart a step by step movement to the blank.

9. The combination with means for supporting and insulating a blank, of a type die adapted to engage with a supported and insulated blank and form a type thereon, an electric circuit for heating the blank during the type forming operation, a circuit closer controlled by the type die in its working movement, and feed mechanism operative to impart a step by step movement to the blank.

10. The combination with an adjustable carrier, of a plurality of type dies mounted thereon, an electric circuit embodying a die controlled circuit closed for heating a blank when located in juxtaposition to the working point of the machine, a heat insulating holder upon which that portion of the blank is supported which is subjected to the action of the said electric circuit and the working die, and feed mechanism for feeding a blank through such support.

11. The combination with an adjustable carrier, of a plurality of type dies mounted thereon, means for effecting the working engagement of the die when located in juxtaposition to the working point of the machine, a guide for centering and steadying the die during its working, and an electric circuit for heating a blank, a circuit closer controlled by the die in the working movement, a heat insulating substance applied to that portion of the carrier subjected to the heat of said electric current, an insulated support for supporting that portion of said blank subjected to the action of the working die, and feed mechanism for imparting a step by step movement to the blank.

12. The combination with a die and a blank holder, of a guide for centering the die when brought into engagement with a blank in the holder, an electrical circuit in which is included a source of electrical energy and a blank within the holder, and means for closing the circuit simultaneously with the movement of the die to its working positions.

13. The combination with a die and a blank holder, of a guide for centering the die

when brought into engagement with a blank in the holder, a plunger for forcing the die against the blank, an electrical circuit in which is included a source of electrical energy, and means for closing the circuit simultaneously with the movement of the die to its working position.

14. The combination with a die and a blank holder, of a guide for centering the die when brought into engagement with a blank in the holder, and an electrical circuit in which is included a source of electrical energy, and a spring finger interposed in the path of the die during the movement of the latter to effect its engagement with the blank, the other terminal of said circuit being electrically connected to the blank.

15. The combination with a shiftable die carrier provided with a plurality of dies, and a blank holder, of a guide for centering the successively selected dies when successively brought into engagement with a blank in the holder, an electrical circuit in which is included a source of electrical energy, and means for closing the circuit simultaneously with the movement of the die to its working position.

16. The combination with a rotatable die carrier provided with a plurality of dies, shiftable parallel to the axis of the rotatable die carrier, and a blank holder, of a guide for centering the successively selected dies when brought into engagement with a blank in the holder and an electric switch controlled by the die in entering and leaving the working position.

17. The combination with a shiftable die carrier provided with a plurality of dies, and a blank holder, of a guide for centering the dies when successively brought into engagement with the blank in the holder, an electrical circuit in which is included a source of electrical energy, means for closing the circuit simultaneously with the movement of the die to its working position, and feed mechanism.

18. The combination with a rotatable die carrier provided with a plurality of axially reciprocable dies and a blank holder, of means for successively positioning the dies, an electric switch in position to be controlled by any die as the same is moved into operative relation with a blank in the holder, and means for feeding a blank in the holder by increments.

19. The combination with a support for a blank, of a type die adapted to engage with a blank in such support and form type thereon, and an electric circuit for heating the blank during the working of the die and closed by the die during the working thereof.

20. The combination of a support for a blank, of a plurality of selective type dies adapted to form on a blank in such form a

section of types, and an electric circuit for heating the blank and embodying a circuit closer closed by the die as it approaches its working position.

- 5 21. The combination with a support for a blank member, of a type die member, means for moving one of said members into engagement with the other to form a type on

said blank, and an electric circuit for heating one of said members and thrown into opera- 10
tion during the type formation.

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Witnesses.

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