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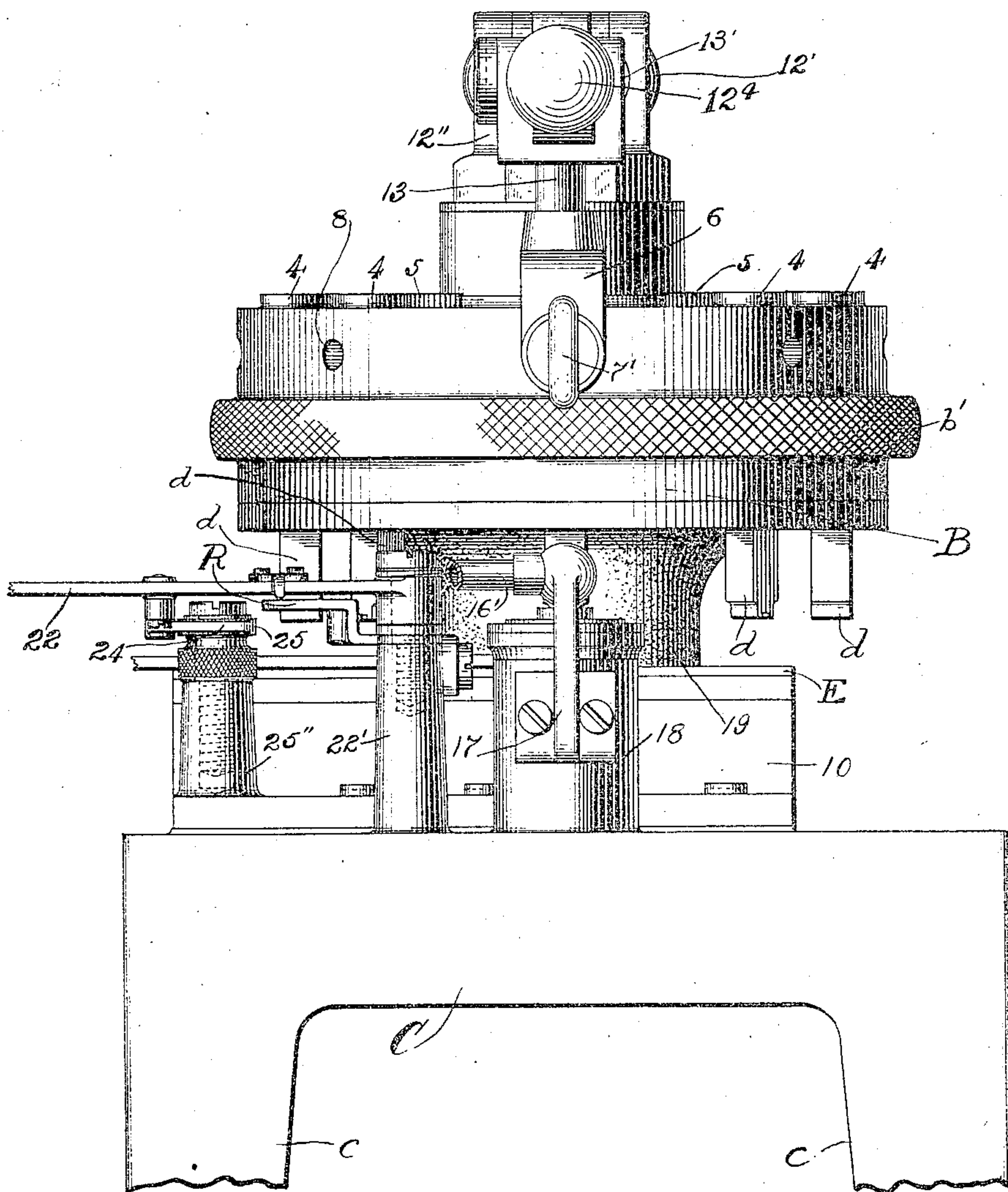
F. H. RICHARDS.

MECHANISM FOR MAKING TYPES AND LINES OF TYPE.

APPLICATION FILED MAY 27, 1902. RENEWED JULY 8, 1904.

3 SHEETS—SHEET 2.

*Fig. 2.*



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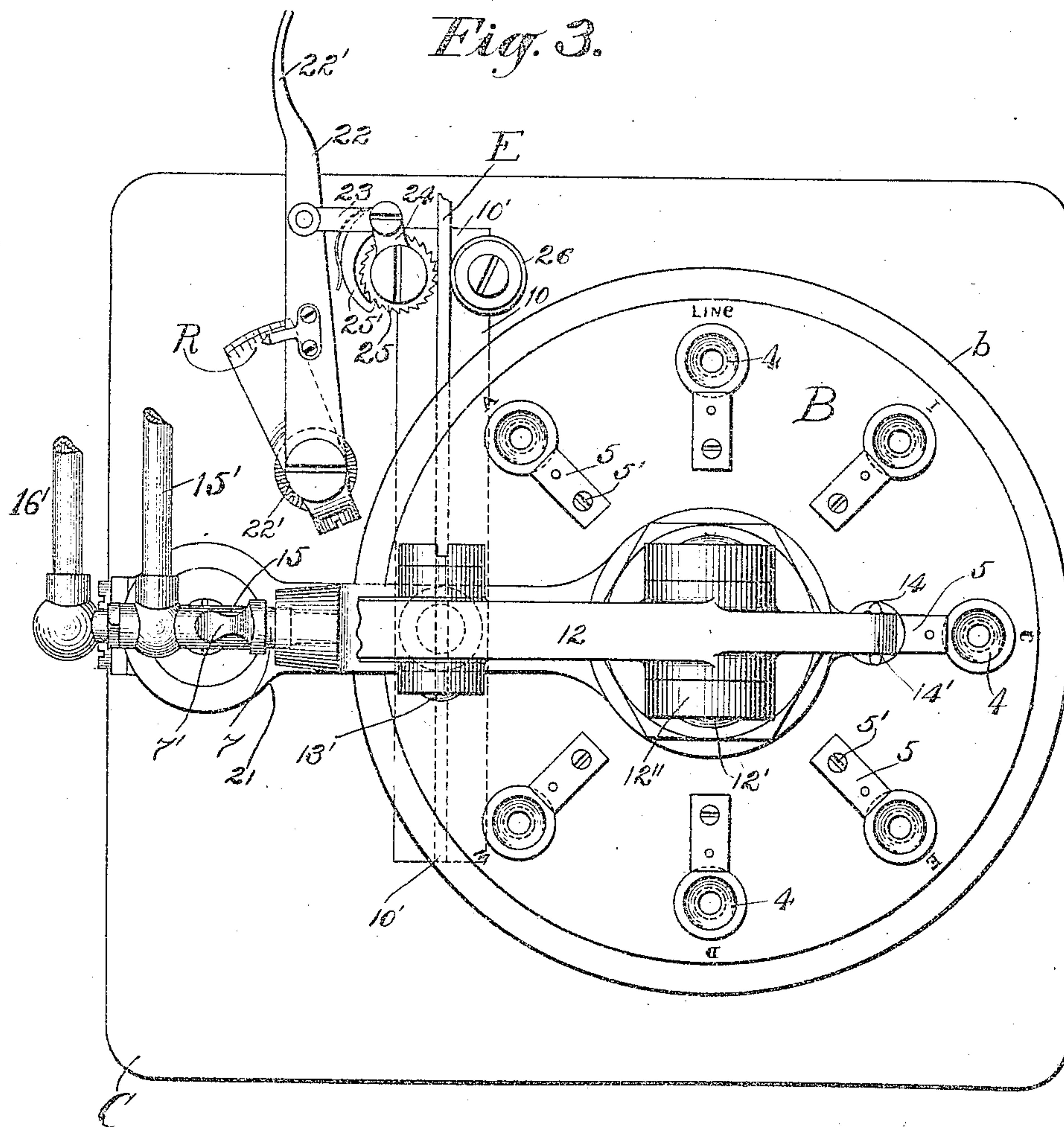
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# UNITED STATES PATENT OFFICE.

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TO AMERICAN TYPOGRAPHIC CORPORATION, A CORPORATION OF NEW JERSEY.

## MECHANISM FOR MAKING TYPES AND LINES OF TYPE.

No. 886,330.

Specification of Letters Patent.

Patented April 28, 1908.

Application filed May 27, 1902, Serial No. 109,152. Renewed July 8, 1904. Serial No. 215,729.

*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 Mechanism for Making Types and Lines of Type, of which the following is a specification.

This invention relates to means for making types, or a succession of the same to form a line of type, or a typebar, and more especially to mechanism which operates to form the type by the aid of heat applied from an extraneous source whereby the internal or molecular resistance of the metal or stock from which the type is formed is diminished and the forming operation facilitated.

In the particular form of mechanism 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 being in a heated condition whereby by reason of the heat communicated to the blank the resistance offered by the latter to the forming action of the die is diminished. It is not contemplated, however, that the heat so communicated shall be sufficient to cause the material of the blank to flow freely, but shall be adequate only to diminish the internal cohesion of such material to an extent sufficient to facilitate 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, and which dies (when an operation thereof in sequence is desired) are so related to the blank to be operated upon that they are capable of being brought in proper sequence to the working point of the machine. For the purpose of raising each die to and maintaining the same when in operation in a sufficiently heated condition, I employ, according to the present improvements, one or more streams of highly heated gaseous fluid

and as I find that the most convenient form of utilization of the same is a gas flame, suitable means will ordinarily be provided for projecting one or more gas flames against the dies, especially at such time as a die is doing its work of compressing the blank and forming thereon a type. According to the preferred mode of carrying the present improvements into practice, moreover, I mount the blank upon a suitable heat insulating support whereby the heat imparted to the blank by the heated and working die is prevented, in large measure, from being absorbed and dissipated, and resulting in the localization of 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 later stages of its working when the amount of energy expended in causing the material to conform to the figuration of the die reaches a maximum. That is to say, at that stage of the die working when the effort of the die is relatively greatest the tendency of the heat conserved in the material of the blank to diminish the internal cohesion or resistance of the metal to working is maintained.

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 through the same, parts being shown, however, in elevation; Fig. 2 is an elevational view, looking from the left in Fig. 1; Fig. 3 is a plan view 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 bringing any desired die, etc., to the working point of the machine, I will ordinarily employ some convenient form of carrier upon which the dies may be mounted. This carrier may be supported or 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 illustrat-



ing an operative device, since the same is not shown as comprising all the elements and refinements of organization of a commercially workable machine, a carrier, designated in a general way, by B, is indicated, which is rotatably mounted upon a fixed stud *b* rigidly secured to and extending from a base C, provided in this instance with legs *c*. Adjacent to the periphery of the carrier B the dies or matrices are mounted, and while I have indicated a number of dies designated without preference by *d* as being longitudinally movable in line with the axis of the stud *b*, the number thereof represented may manifestly be different. In the organization shown each die *d* is located at the end of a 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 is under compression and at one end bears against the bottom surface of the enlarged bore of the opening in which it is located and at the opposite end against a head 4 secured to the stem whereby the die and its stem is urged to its upward or inoperative position. In this instance the stem 2 of each die is angular in cross-section and the opening in the carrier through which it slides is of a 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 blank, as will be adverted to later on. For limiting the upward movement of each die and its stem under the tension of its spring 3, there is in this instance combined with each head 4 a corresponding stop-piece 5 which projects sufficiently far towards the axis of the stem to cause the piece to engage with the head 4, a screw 5' serving to fixedly secure the stop-piece to the upper surface of the carrier.

In the simple species of mechanism illustrated, it is intended that the carrier shall be turned about the axis of the supporting stud *b* until a chosen die shall have been brought to the working point of the machine. For facilitating this manually effected angular adjustment of the carrier, the latter is indicated as being provided with 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 for the purpose of 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' 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 working portion 7''

which is adapted 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 any one of these sockets, a 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 being seated in a recess 9'' formed in the overhanging portion 6' of 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 9<sup>s</sup> screwed 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 made of proper material and its form will depend of course upon the particular purposes for which the machine is designed, 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 the machine 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 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 undercut or dove-tailed rib *e* at its lower edge adapting the blank or the line of type formed therefrom to be engaged with a proper typebar body 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 dies will, ordinarily, be provided with a counterpart channel or groove with which said undercut rib may be engaged. Whatever be the nature or form of the blank, I preferably support the same in such a manner as to minimize the tendency to absorb and dissipate the heat of the heated die. To this end the blank at and adjacent to the working point is in contact with a heat insulating substance. In the construction disclosed in this instance the blank is fed through a slot 10' in a supporting guide 10 secured to the base C and at and immediately adjacent to the working point passes over a block 11 of some heating insulating substance with its undercut rib in engagement with a counterpart channel therein. This block 11 is secured within an opening in the aforesaid supporting guide 10. The nature



of the insulating substance forming such block is such as to support the blank with the proper rigidity under the pressure of the working die. In this instance the die operation results from a rectilinear movement thereof effecting a compression of the material of the blank by the die and in the simple species of mechanism illustrated this compressing movement of the die results from the depression of a hand lever 12 fulcrumed by a pin 12' to a support 12'' secured to the aforesaid fixed stud *b*, and here shown as a nut-like member secured onto the end of the stud, a washer *z* being interposed between the nut-like member and opposed face of the arm 6. On one side of the pivot pin 12' there is a pivot pin 13' connecting the lever with a plunger 13 which works in an opening in the arm 6 so located that when a die shall have been brought to the 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 die (the said head being somewhat concave and the contacting end of the plunger somewhat convex.) By a forcible movement of the lever the die is forced downward and compresses the blank at the proper point. Freedom of movement of the plunger 13 with reference to the lever 12 is assured by the location of the pivot pin 13' of the plunger in an elongated opening 12<sup>3</sup> in the lever while a handle 12<sup>4</sup> is provided on the latter for the ready manipulation of the lever. The lever is returned to its upward position permitting thus the ready and free adjustment of the carrier B, through the action of a spring 14 which connects an extension 14' on the lever with an ear 14'' extending in this instance rearward 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 communicated to the latter sufficient to decrease to a more or less extent the internal resistance or cohesion of the material of the blank, I project against the dies or rather against a part or parts connected with them and adjacent to the dies a stream of highly heated fluid. This heating means may conveniently consist of a gas flame and as the present mechanism is organized the flame is projected against the stem of the die adjacent to the latter when the die is at the working point. In this instance the gas flame is derived from an ignited stream of gas emerging from a gas tube or nozzle 15 with which nozzle there is combined an air tube or nozzle 16, both of said tubes being supported by a bracket 17 attached to a post 18 erected on the base C. Suitable supply or delivery pipes 15' and 16' respectively, supply gas and air under compression to the respective nozzles and the latter are so located with reference to the stem of a die

at the working point that the stem adjacent to the die proper shall be more or less bathed in flame.

The organization being such as set forth in the drawings, the direction of the gas flame is toward the carrier B and if means were not provided for preventing the communication of heat therefrom to the carrier the latter would become excessively heated. I have therefore provided a guard 19 upon the lower portion of the carrier having the form, in this instance, of a layer of non-conducting material which prevents the heating of the carrier to an undue extent. There is also provided in this instance a guide-plate 20 secured to the post 18 and having an aperture 20' for centering and steadying the descending die. This guide-plate is likewise provided with a layer 21 of non-conducting material for preventing the radiation of heat downward.

Some means will ordinarily be provided for feeding the blank toward and past the working point of the machine in order that consecutively located dies may operate upon consecutive portions of the blank. Any means appropriate for this purpose may be employed and in the simple mechanism illustrated a hand feed is indicated upon whose proper operation the blank is fed forward step by step an amount corresponding to the width of the types made upon its edge. The feed mechanism in the form thereof indicated comprises a lever 22 fulcrumed by a stud 22' to the base C. This lever is connected by a link 23 with a pawl carrier 24 pivoted by a stud 25'' concentrically with a notched feed wheel 25 and upon which pawl carrier there is pivotally mounted a spring-pressed pawl 25' engaging with the teeth of the feed wheel. In juxtaposition to the aforesaid notched wheel 25 is rotatably mounted a reaction feed roll 26 in such relation to the notched wheel 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 depth sufficient upon the rotation of the notched wheel to cause the feeding of the blank.

The locking pin 7, after being withdrawn permits the free rotary movement of the carrier B which may then be turned to bring a desired die above the aperture 20' in the guide-plate 20. Upon the release of the locking pin the same enters its proper socket 8 in the carrier and the latter is locked from further movement. Assuming now that the proper section or portion of the blank is located in proper relation to the opening 20', the depression of the hand lever 12 results in the forcing down 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 gas flame playing against the stem of the die has heated the same to a comparatively high temperature, although it is not intended that the temperature shall be such that when the die engages with and compresses the blank, the heat communicated to the latter by the die shall be sufficient to cause a too free fluid condition of the portion of the blank under the die. After a type has thus been made, the lever 12 upon its release is withdrawn by the action of the spring 14 and the depressed die follows the plunger 13 upward by reason of the action of the spring 3.

Before making the next type the feed lever 22 is manipulated to a sufficient extent (an index or gage R indicating the movement necessary) to bring the next section or portion of the blank into alinement with the opening 20'; upon the necessary adjustment of the die carrier to bring the proper die to the working point the type may be made as before.

In the making of lines of type, the point at which the continuous ribbon is to be severed after a proper number of types have been formed thereon may be indicated by a separate die having a V-shaped working portion (this die being marked by "Line" in Fig. 3) and operating to notch the bar at the point of division after which the bar may by suitable means be severed at that point.

The particular advantage resulting from the use of a heated die in conjunction with an insulated support for the blank arises from the fact that such supports tend to conserve within the material of the blank the heat communicated thereto by the heated die and as the working of the die nears its completion the diminution of the internal resistance or cohesion created by the heat is maintained at a maximum, thus facilitating the production of the type at that stage in which it is most advantageous that such internal resistance should be at a minimum—to wit, when the effort exerted by the working die is greatest.

Having described my invention, I claim—

1. 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; and means for projecting a stream of heated fluid toward and thereby heating the working die during the type forming operation.

2. The combination with means for supporting and insulating a blank from loss of heat, of a type die adapted to engage with a supported and insulated blank and form a type thereon; and means for projecting a stream of heated fluid toward and thereby heating the die during its type forming operation.

3. The combination with means for supporting and insulating a blank from loss of

heat, of a plurality of selective type dies adapted to form on a supported and insulated blank a succession of types; and means for projecting a stream of heated fluid toward and thereby heating the working die.

4. The combination with means for supporting and insulating a blank from loss of heat, of a plurality of selective type dies adapted to form on a supported and insulated blank a succession of types; and means for projecting a stream of heated fluid toward and thereby heating the working die during its type forming operation.

5. 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; means for projecting a stream of heated fluid toward and thereby heating the die during its type forming operation; and feed mechanism operative to impart a step by step movement to the blank.

6. 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; means for projecting a stream of heated fluid toward and thereby heating the working die during its type forming operation; and feed mechanism operative to impart a step by step movement to the blank.

7. The combination with means for supporting and insulating a blank from loss of heat, of a type die adapted to engage with a supported and insulated blank and form a type thereon; means properly positioned relative to said support and the working position of the die for projecting a stream of heated fluid toward and thereby heating the working die while at the working position and during the type forming operation thereof; and feed mechanism operative to impart a step by step movement to the blank.

8. The combination with means for supporting and insulating a blank from loss of heat, of a plurality of selective type dies adapted to form on a supported and insulated blank a succession of types; means properly positioned relative to said support and the working position of the die for projecting a stream of heated fluid toward and thereby heating the working die while at the working position and during its type forming operation; and feed mechanism operative to impart a step by step movement to the blank.

9. 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 means for projecting a gas flame toward and thereby heating the die during the type forming operation thereof.

10. 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; and means for projecting



a gas flame toward and thereby heating the working die during the type forming operation thereof.

11. The combination with means for supporting and insulating a blank from loss of heat, of a type die adapted to engage with a supported and insulated blank and form a type thereon; and means for projecting a gas flame toward and thereby heating the die during the type forming operation thereof.

12. The combination with means for supporting and insulating a blank from loss of heat, of a plurality of selective type dies adapted to form on a supported and insulated blank a succession of types; and means for projecting a gas flame toward and thereby heating the working die during the type forming operation thereof.

13. 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; means for projecting a gas flame toward and thereby heating the die during the type forming operation thereof; and feed mechanism operative to impart a step by step movement to the blank.

14. The combination with a support for a blank, of a plurality of selective type dies adapted to form on a supported and insulated blank a succession of types; means properly positioned relative to said support and the working position of the die for projecting a gas flame toward and thereby heating the working die while at the working position and during the type forming operation thereof; and feed mechanism operative to impart a step by step movement to the blank.

15. The combination with an adjustable carrier, of a plurality of type dies mounted thereon; a nozzle for projecting a gas flame toward and thereby heating a die when located in juxtaposition to the working point of the machine; a heat insulating holder upon which that portion of the blank is supported when subjected to the action of the working die; and feed mechanism for feeding a blank through such support.

16. The combination with an adjustable

carrier, of a plurality of type dies mounted thereon; means for effecting the working engagement of a die when located in juxtaposition to the working point of the machine; a guide for centering and steadying a die during its working; means for projecting a gas flame toward and thereby heating a working die; a heat insulating substance applied to that portion of a carrier subjected to the heat of said gas flame; a heat insulating holder for supporting that portion of the blank subjected to the action of the working die; and feed mechanism for imparting a step by step movement to the blank.

17. The combination with a support for a blank, of an orbitally mounted type die adapted to engage with a blank in such support and form a type thereon; and means for projecting a stream of heated fluid toward and thereby heating the die during the working of the die.

18. The combination with a support for a blank, of a series of orbitally mounted type dies, selective means for the type dies, locking means for the type dies, and means for projecting a gas flame against the working die during the type forming operation thereof.

19. The combination with a support for a blank, of a plurality of selective dies, means for bringing a selected die into working relation with a blank in said holder, and means for projecting a stream of heated fluid against the working die at the shank portion of the die.

20. The combination with a support for a type bar blank, of a revoluble type bar die for engagement therewith, and means for projecting heated fluid toward and thereby heating the die during the working thereof.

21. The combination with a support for a blank, of a die orbitally movable, and means for projecting a heated stream toward and against the shank of the die during the working thereof.

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