

(No Model.)

C. L. TRAVIS.  
METHOD OF PRODUCING TYPE DIES.

No. 427,716.

Patented May 13, 1890.

Fig. 1.

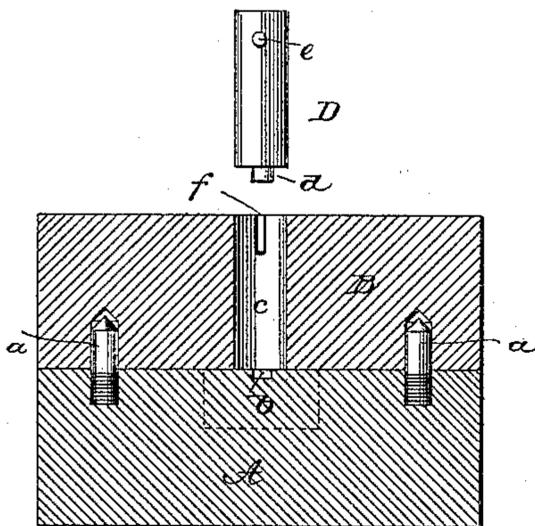


Fig. 2.

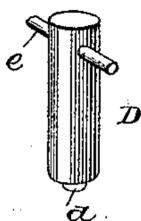


Fig. 3.

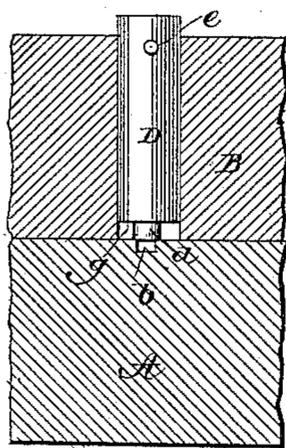


Fig. 4.

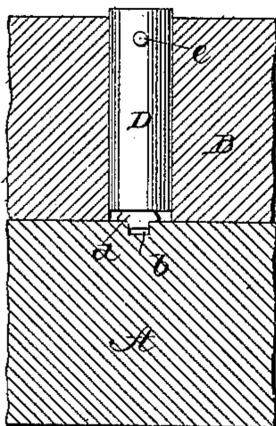
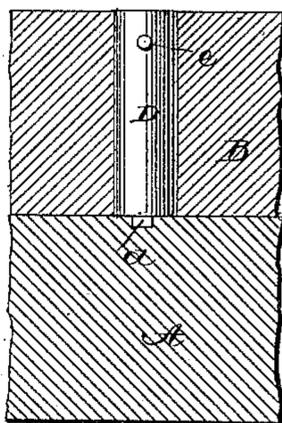


Fig. 5.



Witnesses:

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Inventor:

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# UNITED STATES PATENT OFFICE.

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## METHOD OF PRODUCING TYPE-DIES.

SPECIFICATION forming part of Letters Patent No. 427,716, dated May 13, 1890.

Application filed March 14, 1889. Serial No. 303,304. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES L. TRAVIS, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain Improvements in the Method of Producing Type-Dies, of which the following is a specification.

My invention relates more particularly to the manufacture of type or dies used in machines for producing stereotype molds or matrices. Type for this purpose must be made with great precision, sharpness, and delicacy of form. The character or type proper must occupy a predetermined position on the shank or body, so that they may be quickly and accurately adjusted in the machine, and the metal must be left in such condition that it may be hardened or tempered without cracking or warping the characters. Heretofore it has been impossible to produce steel type which will meet the above requirements in any other manner than by cutting them "from the solid."

My invention is directed to a process which secures the desired results and permits the cheap and rapid formation of the type, and this without subjecting the metal to a heating operation, which is always attended in this class of work with the formation of scale and other objectionable incidents which destroy the accuracy of the characters.

In carrying my invention into effect I produce a shank or body of soft steel or equivalent material, having one end reduced to form a neck or tenon thereon. With the exception of this tenon, the blank is preferably made in the first instance of the precise form required for the finished type. This blank I force with the tenon in advance into a hole or chamber and against a hard-metal matrix, by which the end of the hole is closed. The matrix is of hardened steel or other suitable material, and is an exact counterpart of the required type or other character. The end of the tenon is of approximately the size of the character, being either slightly larger or slightly smaller, as the case may be. I force the blank forward until the tenon is firmly embedded in the matrix and until its end is converted into the required finished character. Owing to the fact that the end which

enters the matrix is of smaller size than the body, and to the fact that this end and the matrix are surrounded by an open space or chamber during the formation of the character, I find that the surplus metal is permitted to flow or redistribute itself in a manner which secures a clean and sharp impression. To those familiar with the cold flowing of metals it is a well-known fact that extreme care must be exercised in the redistribution of the particles, as otherwise the finished object will crack or change form when subjected to the hardening or tempering operation.

I have represented in the accompanying drawings devices which I find well adapted for carrying my invention into effect; but it is to be understood that these devices are not of the essence of the present invention, and that they may be modified at will or replaced by other devices adapted to secure like results.

In the accompanying drawings, Figure 1 is a vertical section through a pair of dies adapted for forming type in accordance with my method. Fig. 2 is a perspective view of one of the type-blanks previous to its introduction to the dies. Figs. 3, 4, and 5 are vertical sections through the dies, with the blank therein at different stages of the operation.

Referring to the drawings, A and B represent two blocks or plates of steel or similar material, having their proximate faces ground or otherwise fitted closely together. The blocks are provided with dowel-pins *a*, or equivalent guides, by which they may be brought together and held in a definite relation to each other. The lower block A is provided in its upper face with a matrix or character *b*, an exact counterpart of the required type. The upper blank B is provided with a perpendicular hole *c*, extending therethrough from top to bottom, its lower end terminating above and around the matrix *b*. This opening is made of somewhat greater size than the matrix, so as to leave the upper surface of the block A exposed around the outside of the matrix.

D represents the blank of which the type is to be formed. It is made, usually, of steel, the lower end or the whole body, if preferred,

being of such softness that it may be worked cold. On its lower end the blank is reduced to form the neck or tenon. Its body portion is adapted to fit the hole *c* snugly, so that when forced endwise therethrough it will present the tenon in the predetermined relation to the matrix. The upper end of the blank is provided with a cross-pin *e* to enter the vertical slot *f*, formed in the plate B for the purpose. This pin is intended to prevent the rotation of the blank and insure its descent into the matrix without rotary motion. Any equivalent means for preventing this motion may be employed.

In carrying out the operation the blocks A and B are fitted together, as shown, after which the blank is introduced with its tenon at the lower end and forced downward until the character on its lower end is complete. The extent of the force required and the distance to which it will be necessary to carry the blank downward may be readily ascertained by experience. When the blank is first introduced, its tenon meets the upper part of the matrix, as shown in Fig. 3. An annular space or chamber *g* exists at this time within the hole *c* around the tenon of the blank. As the blank is forced downward the metal of the tenon sinks in part into the matrix, adapting itself to the form of the latter, the surplus portion of the metal being forced upward, as shown in Fig. 4, into the space *g*, where it is merged into the descending shank or body. It will be perceived that at the commencement of the operation the metal is permitted to freely overflow, but that at the conclusion of the operation the metal is confined on all sides and subjected to a continued pressure.

The advantage of providing the blank with

the tenon lies in the fact, first, that it offers a minimum resistance to the action of the matrix; second, that it permits the described operation to be conveniently carried on, and, third, that it prevents the blank from changing form primarily except at the tenon, and this for the reason that the metal of course flows in the direction of the least resistance.

Having thus described my invention, what I claim is—

1. The herein-described method of producing metal type, which consists in forming a blank provided with a tenon of less size than the body of the blank and then forcing the tenon of the blank into a hard-metal matrix, substantially as described.

2. The herein-described method of producing metal type, which consists in forming a blank provided with a tenon of less size than the body of the blank and larger than the matrix and then forcing the tenon into a hard-metal matrix.

3. The herein-described method of producing metal type, which consists in forming a blank provided with a tenon of less size than the body of the blank, and then forcing the tenon into the matrix, permitting the metal to overflow the matrix, and thereafter continuing the pressure and compressing the overflowed metal upon the main body of the blank around the tenon.

In testimony whereof I hereunto set my hand, this 11th day of February, 1889, in the presence of two attesting witnesses.

CHARLES L. TRAVIS.

Witnesses:

PARKER W. PAGE,  
ROBT. F. GAYLORD.