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C. MUEHLEISEN.

APPARATUS FOR LOCALLY HARDENING PIECES OF METAL.

(Application filed Mar. 1, 1898.)

(No Model.)

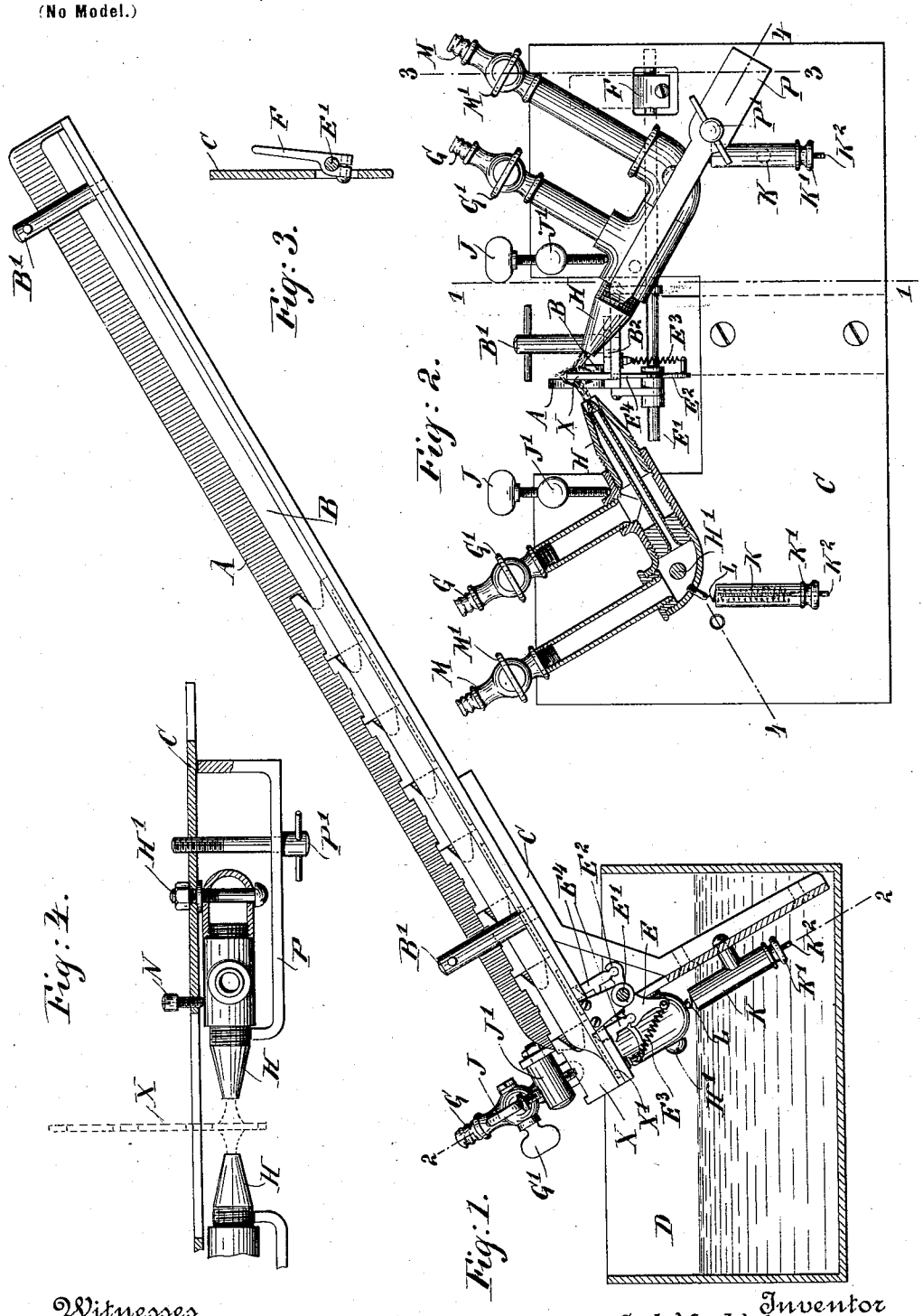


Fig. 1.

Fig. 4.

Fig. 3.

Fig. 2.

Witnesses
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UNITED STATES PATENT OFFICE.

CARL MUEHLEISEN, OF BALTIMORE, MARYLAND, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE OTT. MERGENTHALER COMPANY, OF SAME PLACE.

APPARATUS FOR LOCALLY HARDENING PIECES OF METAL.

SPECIFICATION forming part of Letters Patent No. 637,009, dated November 14, 1899.

Application filed March 1, 1898. Serial No. 672,172. (No model.)

To all whom it may concern:

Be it known that I, CARL MUEHLEISEN, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Apparatus for Locally Hardening Pieces of Metal, of which the following is a specification.

My invention relates to apparatus for locally hardening pieces of metal; and it is designed to effect the rapid heating of a portion or portions of the metal with such speed as to prevent the heating of the entire piece.

The invention comprises suitable mechanism for storing the metal pieces or blanks in such manner that they may be fed successively to the heating device, a heating device to apply heat locally to the part to be hardened, devices for holding each blank stationary and in proper relation to the heating device until the metal at the point to be hardened has reached the proper temperature, and means for releasing each blank at the proper time, the blank being plunged into the hardening-bath and another blank or piece taking its place in relation to the heating device. It will be obvious that this mode of local hardening may be applied to any metal blank or piece where such treatment is desired; but I have shown it as applied more particularly in connection with the manufacture of matrices employed in linotype-machines—for instance, such as are shown and described in Letters Patent of the United States, granted to Ottmar Mergenthaler, Nos. 436,531 and 436,532, dated September 16, 1890—and the apparatus herein described is particularly intended to be employed to locally harden matrices at and about the point where the character is formed.

In ordinary practice it has been found that the employment of molten type-metal in connection with an assembled line of matrices constantly acting in the same locality on the matrix may have the effect of disintegrating the material of which the matrix is composed, and in some extreme cases, when the temperature of the metal has been too high, this difficulty has arisen to such an extent that the matrix is practically "burned out." In other instances it has had the effect of roughening the edges of the matrices to such an extent that, even although the character itself may not be injured, the roughnesses at the edge of the matrix prevent the proper closing of the face of the mold, thereby causing in the slug or linotype cast therein irregularities or "burs," which deface the appearance of the matter printed from the linotypes. Matrices having a portion about the character hardened largely avoid the objections noted, and by the employment of a locally-hardened matrix composed of steel, for example, I am enabled to employ a softer grade of metal than would be necessary were the entire matrix composed of material which would sufficiently resist the repeated contact of the molten type-metal, and by the mode of manufacture thus indicated the difficulties of manufacture which would result from the employment of the harder metal throughout are largely decreased.

In order to procure a proper and quick heating of the metal at the desired point, I preferably employ heating devices which act upon the blank or matrix at opposite sides thereof, and I have found in practice that this mode of application of the heat enables me to quickly secure the requisite amount of heat at the desired point without materially increasing the temperature of the remaining portion of the blank or matrix. I prefer to employ in connection with the heating apparatus thus indicated a magazine for holding the blanks and an escapement mechanism arranged to hold the blank or matrix to be heated in proper position with relation to the heating device and arranged to drop the heated blank or matrix into a suitable bath and permit the next blank or matrix of the series to take its place. This arrangement of mechanism enables me to treat a large number of matrices in a comparatively short space of time and insures the uniform heating and hardening of the matrices. These advantages of speed and equal heating and hardening are of great importance in the manufacture of matrices for the reason that a large number of them must be so treated, which could be accomplished by hand only by a considerable expenditure of labor and

time and without the certainty of equality of product secured through the employment of my improved apparatus.

Referring to the drawings, Figure 1 is a longitudinal sectional view of my improved apparatus, taken substantially on the line 1 1 of Fig. 2, one of the burners being omitted, showing the tank and bath in section in its preferred relation to the magazine and escapement mechanism. Fig. 2 is a sectional view taken substantially on the line 2 2 in Fig. 1. Fig. 3 is a sectional detail view showing the finger-key for actuating the escapement, taken substantially on the line 3 3 of Fig. 2. Fig. 4 is a sectional detail showing the means of adjusting the flame-jets laterally, taken substantially on the line 4 4 in Fig. 2.

I prefer to employ a magazine A, preferably held in inclined or vertical position on the frame C in such manner that the blanks or matrices may be stored therein and that the action of gravity will tend to advance them toward the escapement. The apparatus, as shown, is provided with a partition-flange B, attached to the magazine A by turn-screws B′, said screws B′ passing through slots B^2 (see Fig. 2) in the partition-flange B and into the base of the magazine A in such manner that the partition-flange B is adjustably secured thereto, so as to adapt the magazine for different widths of blanks or matrices. The mouth of the magazine A is provided with the rocking escapement-lever E, rigidly secured to the rock-shaft E′, and at each end of the lever E is pivoted an escapement-pin E^4, which projects into the magazine and engages and holds the blanks or matrices until released therefrom. Attached to the escapement-lever E is the spring E^3, attached also to the bottom of the magazine in such manner that in its normal position the lower pin E^4 will be projected into the magazine and the upper pin E^4 retracted therefrom. Fast upon the other end of the rock-shaft E′ is the finger-key F. When the finger-key F is operated, the rock-shaft E′ and escapement-lever E will be turned against the resistance of the spring E^3, and when released the force of the spring E^3 will return the parts to their normal position. When the escapement-lever E is rocked in the manner indicated, the lower pin E^4 will be retracted from its engagement with the recess X′ of the blank or matrix X, permitting it to drop, and the upper pin E^4 will be projected into the magazine in such manner as to engage the recess X′ of the second blank or matrix in the series and hold the same from further downward movement. When the finger-key F is released, the force of the spring E^3 will restore the escapement-lever E and pins E^4 E^4 to their original positions, thereby releasing the line of matrices or blanks, which are forced down by gravity until the lowermost one in the series is engaged and stopped by the lower pin E^4, which has been again projected into the magazine. It will thus be seen that the operation of the finger-key F will effect the quick escape of the lower blank or matrix X and permit it to drop into the tank D, which contains the hardening or tempering bath, and that this operation may be repeated immediately so soon as the proper amount of heat has been imparted to the next blank or matrix. The tank D may be of any suitable construction and the bath which it contains of such character as may be desired for hardening the blank or matrix.

In order to secure the proper heating of the blank or matrix at the desired point and with sufficient rapidity to prevent the similar heating of the remainder of the blank or matrix, I prefer to employ two heating-flames, as clearly shown in Fig. 2. These flames may be of any desired character or intensity and may be supplied from any suitable apparatus. In the form preferred by me, however, I employ jets H, pivoted at H′ and supplied with suitable burning fluid or gases through the entrances G, controlled by the stop-cocks G′. The entrances M, controlled by the stop-cocks M′, admit a supply of air or oxygen, as may be desired, to intensify the heat of the flame. These details, however, may be varied at will and are not essential to my invention. I prefer to make the jets H adjustable, so that they may be directed at the proper portion of the blank or matrix, and to permit them to be accommodated to blanks or matrices of different widths. As shown in the drawings, I provide the jets H with springs L, which tend to move them upwardly about the pivots H′. These springs L pass through sleeves K and are attached at their outer ends to screws K^2, controlled by nuts K′, impinging on the sleeves K in such manner that the tension of the springs L may be regulated by turning the nuts K′. The upward movement of the jets H is controlled and checked by adjusting-screws J, which pass through studs J′, located upon the frame C. It will be seen that by turning the adjusting-screws J the location and adjustment of the jets H and the position of the heating-flames may be accurately determined and adjusted. In order to secure a similar lateral adjustment of the jets H, I make use of the adjusting-screws N, (see Fig. 4,) which impinge against the jets H and permit of their lateral adjustment. The frames P, provided with the turn-screws P′, set into the frame C, firmly hold the jets H in their adjusted positions and prevent their lateral displacement.

The operation of my improved apparatus will be readily understood. The matrices or blanks are stored in quantity in the magazine A. The jets H are adjusted so that their flames will be properly directed upon the portion of the blanks or matrices to be hardened. When the proper degree of heat has been imparted to the blank or matrix, the operation of the finger-key F actuates the escapement

and releases the lowermost blank or matrix X, which drops into the hardening-bath, the next blank or matrix taking its place.

In practice I have found it desirable to employ my improved apparatus in a dark room, so that the operator may be readily able to determine from the color of the metal the exact time when it has been given the proper amount of heat and to release it immediately into the bath below before the remainder of the blank or matrix has become unduly heated. I have also found that by the use of my improved apparatus I am enabled to operate upon a very large number of blanks or matrices within a comparatively short time and that the local heating of the blank or matrix is readily secured, as well as the proper local hardening. I have also found, as another advantage of my improved apparatus, that a uniformity and evenness of product is obtained which I have been unable to attain by hand.

A further advantage in the employment of my improved apparatus is that the quick heating secured therein largely obviates the liability to longitudinal expansion along one edge of the matrix, which has sometimes been present when the matrix or blank was hardened by hand. It will be understood, of course, that in order further to counteract the distortion of the blank or matrix due to a longitudinal expansion at one edge the other edge of the blank or matrix may be similarly treated at a point opposite the character.

While I have shown and described my invention as preferably embodied in a particular form, it will be understood that many changes may be made therein, both in construction and detail, without departing from the spirit of the invention. Thus, for example, I may employ only a single heating device instead of two, or I may vary the form of the magazine or of the escapement or of the heat-imparting devices, the particular construction of any of these elements not being essential.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. In apparatus for locally hardening pieces of metal, the combination with a heating apparatus and a hardening-bath, of a magazine for storing the untreated pieces, means for feeding the pieces one at a time from the magazine to the heating apparatus, means for holding the pieces stationary in the heating apparatus, and means for discharging the pieces at will from the heating apparatus into the bath, substantially as described.

2. In apparatus for locally hardening pieces of metal, the combination with a hardening-bath and a burner, of a magazine for holding the untreated pieces, means for feeding the pieces from the magazine to the burner, and means for holding each piece stationary and in fixed relation to the burner, and means for discharging the pieces at will from the burner into the bath, substantially as described.

3. In apparatus for locally hardening pieces of metal, the combination with a hardening-bath, and a heating apparatus comprising a pair of adjustable burners, of a magazine for holding the untreated pieces, means for feeding the pieces from the magazine to a predetermined position between the burners, and means for holding each piece in such position and for discharging the pieces from said position to the bath at will, whereby the pieces may be subjected to heat for any desired period of time, substantially as described.

4. In apparatus for hardening pieces of metal, the combination with a bath and a heating device comprising a pair of burners, of a magazine for holding the untreated pieces, means for adapting the magazine to blanks of different widths, means for feeding the pieces from the magazine to the heating device, and means for holding the pieces stationary in the heating device and discharging them at will into the bath, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CARL MUEHLEISEN.

Witnesses:
THOS. KELL BRADFORD,
LEE PURCELL.