E. E. NOVOTNY.

MATRIX FOR TYPE CASTING MACHINES.

APPLICATION FILED DEC. 30, 1916.

1,282,109.

Patented Oct. 22, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

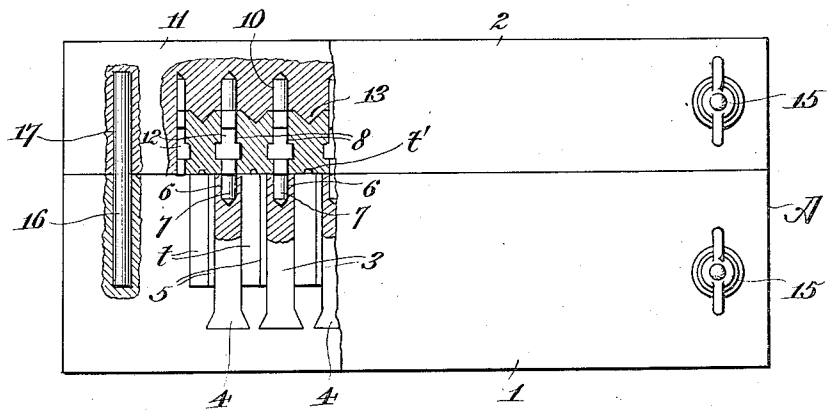


Fig. 2.

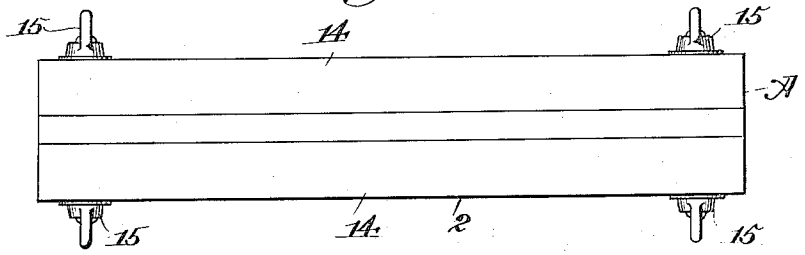


Fig. 3.

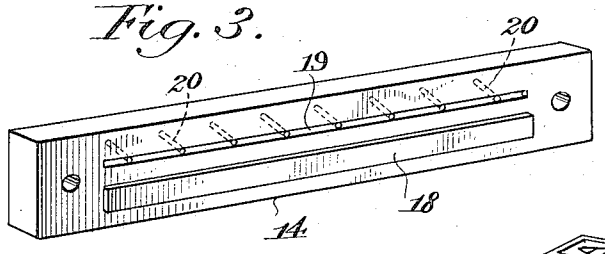


Fig. 4.

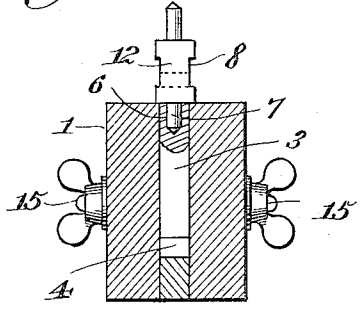
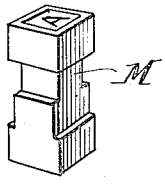


Fig. 5.



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2 SHEETS—SHEET 2.

Fig. 6.

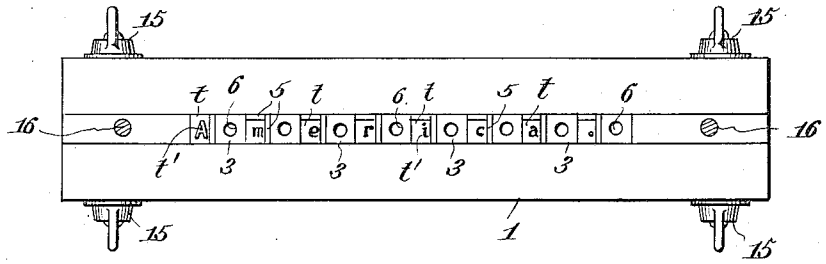


Fig. 7.

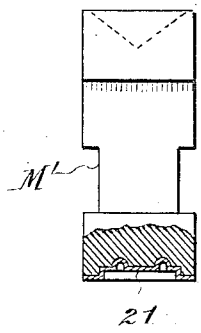


Fig. 8.

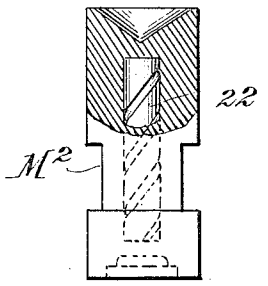
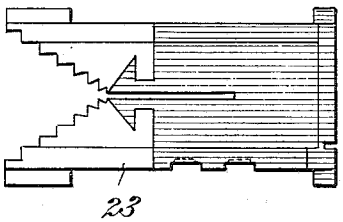


Fig. 9.



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By his Attorneys,

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UNITED STATES PATENT OFFICE.

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MATRIX FOR TYPE-CASTING MACHINES.

1,282,109. Specification of Letters Patent. Patented Oct. 22, 1918.

Application filed December 30, 1916. Serial No. 139,722.

To all whom it may concern:

Be it known that I, EMIL E. NOVOTNY, a citizen of the United States, residing at Riverside, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Matrices for Type-Casting Machines, of which the following is a specification.

This invention relates to matrices for use in connection with type casting machines and to the method of making such matrices, and has particular application to the production of matrices for linotype, monotype and other type-making mechanisms.

In the present instance I propose to provide a simple and efficient method of molding and casting the type-forming faces of the matrices as contradistinguished from punching, cutting or electrolytically producing such faces as is now the common practice. Thus I am enabled not only to attain a relatively great saving in the time, labor and expense incident to the production of the matrices but with my method a printer or compositor may prepare his own matrices, as may be required, and thus dispense with the necessity and consequent expense of purchasing these articles from manufacturers making a specialty of their production. It is well known that the manufacture of the usual type casting matrices, made as they are of relatively hard metal, such as bronze or brass, requires the exercise of great skill and the employment of experts, and consequently this work is usually confined to type founders, and composing and type casting machine manufacturers, having special tools and equipment for this purpose. Matrices made in accordance with my invention, however, do not require the employment of special equipment in the nature of punching and cutting tools or electrolytic apparatus, but may be made at the printer's establishment with the use of exceedingly simple, compact and efficient casting or molding apparatus.

Another object of the invention is the provision of molded matrices which are capable of forming type with faces of relatively greater depth than the type faces now attainable by the use of the common form of monotype or linotype matrix, and thus the type produced by my matrices will not clog or fill with ink as quickly as is ordinarily the case and consequently the necessity of frequently cleaning the type is avoided.

A further object of the invention is the provision of matrices of the character mentioned which will possess the desired features of strength and durability coupled with rigidity and accuracy of form in that such matrices will retain their shape throughout any number of type forming operations, and furthermore these matrices will possess highly polished type forming surfaces which are so essential to the production of sharp, high class type.

With the above recited objects and others of a similar nature in view my invention consists in the improved type matrix and method of making the same set forth in and falling within the scope of the appended claims.

In the accompanying drawings:

Figure 1 is a view partly in side elevation and partly in section of a casting box showing a row of matrices cast therein.

Fig. 2 is a top plan view of the complete casting box for casting a row of matrices.

Fig. 3 is a perspective view of one of the removable side walls of the casting box top.

Fig. 4 is a cross sectional view taken through a bed of the casting box, the top of the box being removed and showing the removable separators mounted in the casting box.

Fig. 5 is a perspective view of a completely cast matrix.

Fig. 6 is a top plan view of the bed of the casting box showing the type from which the matrices are made locked therein.

Fig. 7 is a sectional elevation of a modified form of my invention, wherein the body of the matrix is provided with a metallic type forming face.

Fig. 8 is a similar view of another modification of a matrix wherein the body of the matrix is reinforced.

Fig. 9 is a side view of another modified form of matrix wherein such matrix is formed partly of a molded plastic material and partly of metal.

Referring now to the accompanying drawings in detail the letter A indicates a casting box as an entirety, said box comprising a type-holding-bed section 1 and a top section 2. In the present instance this casting box is substantially rectangular in

form, and the bed section 1 is provided with a series of parallel spaced transversely extending type holding bars 3 which may be socketed in the bottom of the bed section 1 as indicated at 4 or may be made integral therewith, if desired. These bars 3 terminate at their upper ends at substantially the level of the bed section of the box, which in the present instance would be in approximately the same horizontal plane as the shoulders of the type. Within this section 1 of the box I place the type *t* which are to be reproduced in the matrices, suitable leads or spacers 5 being employed if necessary to hold the type securely in vertical position between the supporting bars 3. The type faces *t'* of course project slightly above the leads or spacers 5 and the supporting bars 3, as is clearly shown in Fig. 1. In the present instance I show and describe but one row or line of type and matrices made therefrom, but it will of course be understood that the casting box may be of any suitable and desired size to make any number of matrices, or any number of rows of matrices. Each of the type supporting bars 3 has a bore or socket 6 formed in the upper end thereof, to receive the correspondingly shaped shank 7 of a matrix body molding member 8, the upper end of this member 8 terminating in a beveled or rounded stud 9, which is intended to seat in a correspondingly shaped socket 10 formed in the top wall 11 of the top member 2 of the casting box. Of course it will be readily understood, as will be noted from the drawing, that a socket 6 in a type supporting bar 3 will aline with a socket 10 in the top member 2 of the box so that one of the members 8 will be supported in matrix-forming position, and that as many of these matrix forming members 8 as may be deemed necessary or desirable for a particular molding operation may be employed. The intermediate portion of each matrix molding member 8 is in the present instance in the nature of a rectangular enlargement, as shown at 12, each enlargement forming a corresponding depression or recess in the adjacent side of a matrix as will hereinafter appear, and as will be understood by reference to Fig. 1. Between each pair of sockets 10 the top wall 11 is provided with conical shaped or pointed spurs 13 the purpose of these spurs being to form in the adjacent ends of the matrices conical shaped sockets which serve, as is well known, to seat the centering pin which holds the matrix in proper alinement with the body casting mold of the casting machine during the type casting operation. The top of the casting box is formed with removable sides 14 in the nature of rectangular strips which are fastened to the top proper by means of wing nuts and bolts 15, while the complete top section 2 is intended to be held in proper alinement relative to the bed section 1 by means of centering and holding pins 16 socketed in the top wall of the bed section of the press and adapted to seat in alining bores 17 formed in the top section 2 when the latter is closed upon the bed. The inner face of each of the removable side walls 14 of the top section 2 is formed adjacent its lower end with a longitudinally extending rib 18, the purpose of these ribs being to mold or form the recesses or grooves 18[a] in the matrix at opposite sides of the latter just below the head, thus resulting in shouldering opposite sides of the matrix, as will be understood by reference to Fig. 5, and above this rib and extending parallel therewith is a groove 19, into which is adapted to escape the surplus material from which the matrices are molded, this material flowing up through inclined channels 20 and thus escaping through the top of the casting box. As will be seen by reference to Fig. 1 the matrix body molding members 8 at the ends of the rows of matrices are of one-half the width of the intermediate members 8, these end members having flat faces in order to lie flush against the adjacent ends of the top section 2 of the casting box.

The above is a description of the structural features of the casting box and equipment which may be used to make the form of matrix shown in Fig. 5. The matrix shown in said figure is molded from a body of plastic material, preferably in the nature of a phenolic condensation product, of which there are several varieties well known in the art, such as "bakelite" and "condensite". This material posseses the manifest advantages from the standpoints of hardness, durability and incompressibility and possesses the additional advantage that when heated or in a plastic or partially plastic state it may be readily molded and shaped, and when cooled and set will retain its set form unaffected by atmospheric conditions, temperature and the like. Some forms of this phenolic material when once set or hardened remain infusible, even under the influence of relatively great heat, and this is the form I prefer to employ in making my matrices for it will be capable of withstanding the heat of the molten metal in the type casting operation. As this phenolic condensation product unites with and binds fillers of various kinds I prefer to use this is in conjunction with mineral fillers such as asbestos or metal, as the composition will then stand a relatively high heat. The matrix shown in Fig. 5 is indicated as an entirety by the letter M and when it is desired to mold a series of these matrices, as shown in the drawing, the matrix body molding members 8 are first set in the bars 3 and the removable sides of the top section 2 of the

box are screwed tight in position. The type t having been properly set and secured in the bed of the box as shown in Fig. 1, small pieces or blocks of the phenolic condensation product are inserted between the spaces of the members 8 and the side plates and permitted to rest on the type faces t'. The top section 2 of the casting box is now lowered to or closed upon the bed section 1, while in a suitable press, and heat and pressure applied for a sufficient length of time to force the phenolic material down against the type to cause the type faces to be embedded in such material, thus forming the type depressions in the matrices, the body section or non-type forming portions of the matrices being molded by the members 8 and the removable side walls of the top section of the box, while the usual conical recesses or sockets in the bottom of the matrices are molded by the spurs 13, as will be readily understood by reference to Fig. 1. Any surplus material resulting from the molding operation will escape through the groove 19 and the channels 20 leading through the top of the box. The heat and pressure is maintained upon the matrices for a suitable length of time, say for from 5 to 10 minutes, or until such matrices have become hardened and set, at which time such heat and pressure may be removed and the matrices allowed to cool or cooled in any suitable manner. Such matrices are now infusible and insoluble in acid, and are ready to be removed from the casting box. This may be done by first loosening the wing nuts and removing the sides of the top section 2, which will expose the longitudinal sides of the row of matrices, then lifting up the top section 2 of the box and removing it from the bed section 1 thereof, and then lifting out the members 8 at the ends of the row of matrices, after which the individual matrices may be readily slipped out or stripped from between the various members 8, these members with the matrices having been bodily lifted from the bars 3. By reference to Fig. 5 it will be seen that a completely molded matrix may be made of standard form capable of being used with the ordinary type casting machine, and in such figure the matrix as above mentioned as made of a plastic material, such as a phenolic condensation product preferably having heat receiving material, such as asbestos incorporated therein as a filler.

In Fig. 7 I have shown a modified form of matrix, at M′, wherein the molded plastic body is provided with a metallic type forming face 21, the metal employed being preferably a thin sheet or film of annealed bronze or brass, and in making this form of matrix, the metal may first be inserted in the casting box so as to rest upon the type faces t' and during the molding operation the metal will be caused to adhere to the plastic material which will form a backing therefor, the type depression appearing in the metallic face. If necessary, a binder, such as a phenolic varnish may be employed to cause the adherence of the metal to the plastic material and under such conditions the strips or blocks of plastic material are previously faced with the metal and may be kept in stock in this form.

In Fig. 8 I have shown still a further modification of the matrix, indicated at M^2, in this instance the body of plastic material, constituting the matrix, being reinforced by a metallic reinforcing member or element 22 which may be incorporated therein during the molding operation, in any well known way, such as a core is usually molded in a body of plastic material.

In Fig. 9 I have shown another form of matrix, in this instance the type forming section of the matrix being composed of the plastic material, while the top of the matrix having the distributer lugs is made of brass, bronze or other suitable metal, shown at 23. This form of matrix may be desirable in some instances where it might be desired to notch or shape such distributer end to accommodate or fit in a particular distributing combination, the metal being preferable for his purpose, inasmuch as the phenolic material in its infusible state is practically unworkable in this respect due to its extreme hardness.

It will of course be understood that the casting box may be modified as to structure and form to mold matrices of the desired shape and number; and while I have herein shown and described one embodiment of the invention and manner of carrying it out, this is merely by way of illustration, as modification and variation may be made without departing from the spirit of the invention or exceeding the scope of the appended claims.

What I claim is:

1. A type matrix for type casting machines comprising a body portion of a hard phenolic condensation product provided with a type-forming face.

2. A type matrix for type casting machines comprising a body portion of a hard infusible phenolic condensation product provided with a type-forming face and having a metallic section permanently united therewith.

3. A type matrix for type casting machines comprising a body portion of a hard phenolic condensation product having a metallic type-forming face.

In testimony whereof I affix my signature.

EMIL E. NOVOTNY.