Jan. 15, 1935. C. A. STIMPSON ET AL 1,988,094

PRINTER'S MATRIX AND METHOD OF MANUFACTURE

Filed Aug. 31, 1931 2 Sheets-Sheet 1

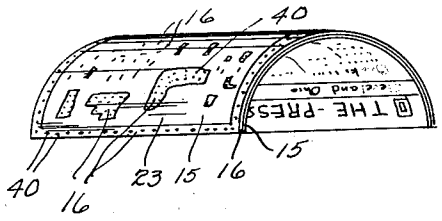
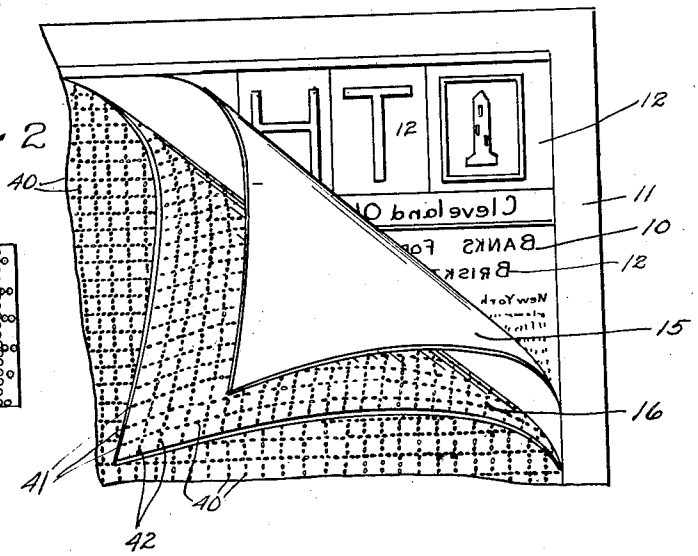


FIG.-1

FIG.-2



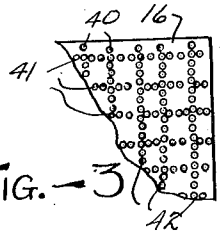
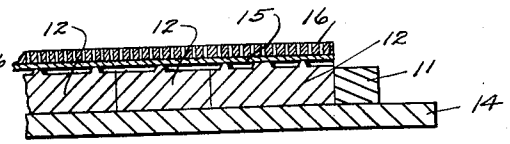


FIG.-3

FIG. 4



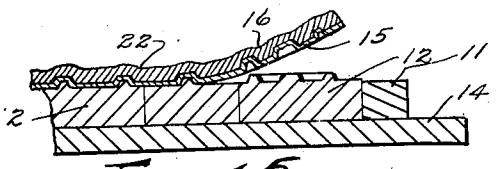


FIG.-6

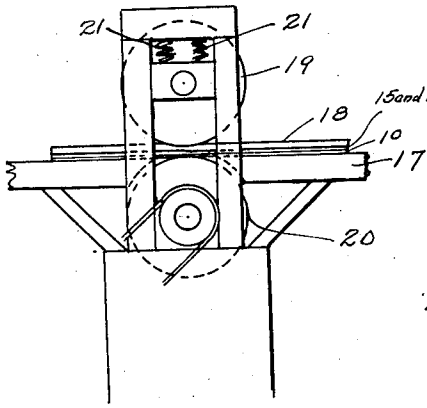


FIG.-5

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PRINTER'S MATRIX AND METHOD OF MANUFACTURE

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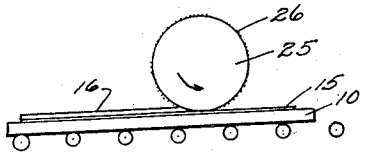


FIG. 7

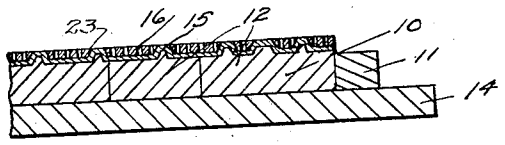


FIG. 8

FIG. 9

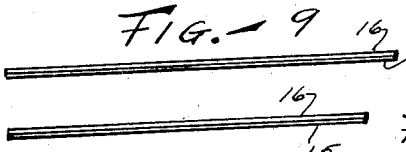


FIG. 10

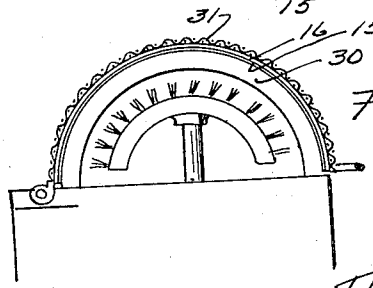


FIG. 11

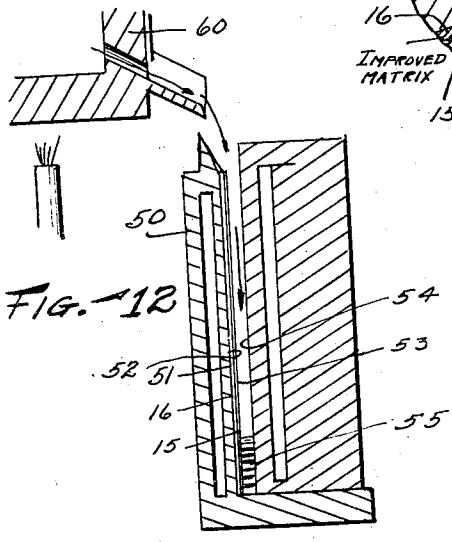


FIG. 12

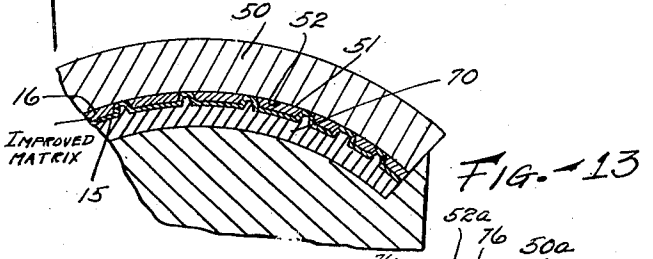


FIG. 13

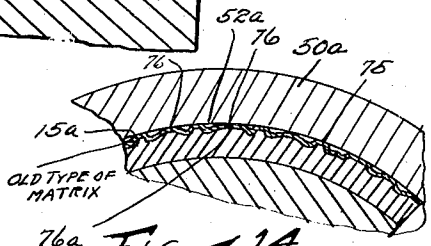


FIG. 14

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PRINTER'S MATRIX AND METHOD OF MANUFACTURE

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Application August 31, 1931, Serial No. 560,276

13 Claims. (Cl. 41—25)

This invention relates to a printer's matrix and method of manufacturing the same; this therefore is the general object of the invention.

More specifically the invention relates to the provision of an improved printer's matrix or mold from which a printing plate may be produced by the casting of suitable type metal and the method of manufacturing the same.

In the past it has been customary to first set up type, by the linotype or other similar processes and collect the type in a suitable flat chase. Moistened or steamed paper, or fibrous material was then pressed into contact with the chase molding it to the irregularities of the characters and other indicia of the type form. The paper was then stripped from the chase, cut to accurate dimensions and dried. After the paper was dry it was placed in a suitable casting mechanism and a cast made of type metal, which cast was then used in presses for printing. In case the press used stereotypes or segmental sections the paper matrix was given the proper curvature during the drying process.

This type of matrix has had many disadvantages among which were the lack of clear cut lines, and the distorting of the matrix in the casting mechanism. These were pronounced when the irregularities and distance between printing portions of the type was increased, as when the matrix and type contained what is commonly known as display advertising matter, where there are comparatively large open or non-printing portions.

The distorting or bulging was caused by the pressure of the molten metal against the depressed (non-printing) portions of the matrix, as when the type segment is cast, the matrix is backed up by a smooth surface. This bulging caused the printing surfaces of the cast to be irregular and often resulted in portions, intended to be non-printing, becoming printing surfaces, and producing blurred effects, unless some filling or packing for these low portions were applied.

In the past attempts have been made to eliminate this distortion, but only partially successful, always tending to delay the completion of the matrix after the type form reaches the molding room, and also increasing the cost of manufacture. This element of time required in preparing the matrix after the type form leaves the composing room, is very important in printing a large publication, and any elimination of manual operations shortens this time period. Heretofore, a workman manually packed the larger non-printing surfaces of the matrix with small strips of paper. This required a period of several minutes, and even then the result was more or less imperfect.

One of the objects of our invention therefore is to provide a matrix and method of manufacture of the same which will eliminate manual packing operations, and also shorten the time of producing the matrix to a few seconds, and also produce clear cut printing lines over the entire matrix area.

Another object of the present invention is to provide a method of packing a printer's matrix which method will eliminate hand packing operations.

Other objects of the invention will become more apparent from the following description referring to a preferred embodiment of matrix and a preferred method of manufacturing the same, as diagrammatically illustrated in the accompanying drawings. The essential and novel characteristics of the invention will be set forth in the claims.

Referring again to the drawings; Figure 1 is a view of our improved matrix, as prepared for a stereotype printing member;

Figure 2 is a fragmentary plan of a printing chase or form illustrating the first steps in the forming of our improved matrix;

Figure 3 is a fragmentary plan on an enlarged scale of a portion of a packing member used in our improved matrix;

Figure 4 is a section through a type chase and matrix, showing another step in our improved method;

Figure 5 is a diagrammatic illustration of another step in our improved method;

Figure 6 is a section similar to Figure 4 but illustrates the matrix after the operation illustrated in Figure 5 has been performed;

Figure 7 is a diagrammatic illustration of another step in our improved method;

Figure 8 is a section similar to Figures 4 and 6, but illustrating the matrix after the operation indicated in Figure 7 has been performed;

Figures 9 and 10 are end elevations of the matrix before and after drying, respectively;

Figure 11 is a diagram, illustrating the drying operation;

Figure 12 is a diagrammatic illustration of the casting operation;

Figure 13 is a fragmentary horizontal section through the casting mechanism illustrating the effect of our improved matrix on the type or printing segment;

Figure 14 is a section similar to Figure 13, but

illustrating the effects of matrices used in the past on the printing segment.

In general our method comprises the application of a backing or packing sheet to the matrix before the matrix material is molded to the irregularities of the type form and then after the matrix has been molded, removing the excess backing material so that the rear face of the matrix will present a flat smooth surface to the molding sheet or support.

The type chase of form 10, from which our improved matrix is made, comprises the usual rectangular chase 11, within the confines of which, the type members 12 are locked firmly in place, the entire form resting on a flat table 14.

The first step in the manufacture of our improved matrix comprises the placing of the usual laminated matrix paper 15 on the face of the form 10. This matrix paper 15 has previously been moistened or steamed, to permit it to be molded to the irregularities of the type 12 without cracking. On top of the matrix paper 15 we apply a second or packing sheet 16. This packing sheet 16 is made of a fibrous material, or paper, preferably softer and looser woven than the matrix paper 15. The form 10 together with the matrix and packing sheets 15 and 16 respectively is placed on a table 17; a sheet of soft material such as cork or sponge rubber 18 is placed over the form 10.

The form together with its superimposed sheets 15, 16 and 18 is then passed between a pair of rollers 19 and 20, which are urged toward each other by suitable compression springs 21, (Figure 5). This causes both the matrix 15 and the packing sheet 16 to be molded to the irregularities of the type form, as indicated in section in Figure 6. The sponge rubber sheet 18 is then removed and the matrix is ready for the next operation.

The molding operation leaves the exposed face 22 of the packing material irregular, conforming to some extent to the irregularities of the type form 10, as shown in Figure 6. However we next trim the packing material so that the rear face 23 of the matrix will present a smooth regular surface to the supporting surface of the casting mechanism. To accomplish this we may use, as diagrammatically shown in Figure 7, a roller 25 arranged to be rotated at a comparatively high rate of speed. The roller 25 extends the entire width of the matrix, and its periphery is covered with an abrasive material 26 such as sand paper or the like. The matrix is then passed under this roll thereby removing the excess packing material 16. We find it convenient to remove all of the packing material that can be removed without disturbing the matrix paper. This grinding operation is preferably done before the matrix is removed from the form although it can readily be done afterward.

After the excess packing material is removed the matrix is dried to remove all the moisture therefrom and prevent steam from causing undesired irregularities or pockets in the casting. To dry the matrix it is lightly pressed into engagement with a heated form 30 (Figure 11) by a wire screen 31. The form 30 as shown is semi-cylindrical hence the matrix is bent as it is applied to this form. This shapes the matrix for the usual stereotype casting. However if the casting is to be used on a flat bed press the form 30 would be flat to so shape the matrix.

As noted from Figures 9 and 10 the matrix shrinks during the drying operation. We have found that the packing material must be more loosely woven and of considerably softer texture than the matrix material. Hence it is difficult to provide a packing material which will shrink exactly the same amount as the matrix material.

The problem presented therefore was to so arrange the packing sheet 16 that the discrepancy in relative shrinking between it and the matrix sheet 15, would either be eliminated, or so controlled that it would not affect the matrix. We have found that by perforating the packing material the errors due to the shrinking would be confined to comparatively small areas and were not accumulated. This therefore eliminates, for all practical purposes, the discrepancies between the relative shrinking of the packing sheet 16 and the matrix sheet 15.

As shown in the drawings and especially Figure 3, the packing sheet 16 is provided with a plurality of comparatively small perforations 40. We find it advantageous to make these perforations in two series or rows 41 and 42, normal to each other. As shown the perforations are about one sixteenth of an inch in diameter and the rows are spaced about three sixteenths of an inch apart. These distances are not however entirely essential and vary when different kinds of packing and material are used.

After the matrix is dried it is placed in a casting form 50, the exposed face of the packing (the rear face 51 of the matrix) is placed against a complementary shaped smooth surface 52. The front face 53 of the matrix is spaced apart from the opposite wall 54 of the form 50, a distance equivalent to the desired thickness for the cast. Molten metal 55, stored in a suitable melting pot 60 is then permitted to flow into the form 50 between the face 53 of the matrix and the wall 54 of the form, thereby casting the type segment.

The value of our improved matrix is readily seen from Figures 13 and 14. Figure 13 is a horizontal section through the casting mechanism 50 illustrating our improved matrix and the cast 70 made therefrom. It will be noted that the rear face 51 of the matrix is regular, smooth and entirely complementary to the wall 52 of the casting form 50 and presents a solid section to the front face of the matrix at any point.

Figure 14 illustrates a matrix as commonly used in the past in a similar casting form 50*a*. The lack of a solid matrix structure permits the metal to bulge the matrix thereby changing the contour of the printing portions 75 of the cast. In some instances such as indicated at 76 the metal forces the matrix 15*a* back against the wall 52*a* of the casting form and that portion 76*a* of the cast is then at the printing elevation which results in smudging of the printed material.

While we have described our packing sheet 16 as an independent sheet of paper it can nevertheless be laminated as a unit, by means of a suitable adhesive to the matrix sheet 15 and thereby eliminate the handling of this extra sheet of material.

The operation of passing the form and superposed sheets through the rollers can be performed so quickly that the time therefor is also negligible. The grinding operation following immediately after the molding operation, since

both operations are performed by rollers, the grinding can begin almost continuous with the completion of the molding, and the two steps may be accomplished in from 10 to 20 seconds. No manual operation of these steps in the method need be essential.

Having set forth the principles of our invention, and described and illustrated an embodiment thereof for practical use, what we claim and desire to secure by Letters Patent, is:—

1. The method of manufacturing a printer's matrix which comprises placing a sheet of matrix material on top of a form, placing a second sheet on top of the matrix material, molding both sheets to the irregularities of the form, and then removing part of the second sheet and exposing the first sheet to thereby provide one face of the matrix with a comparatively smooth surface.

2. The method of making a printer's matrix which comprises placing a sheet of matrix material on top of a form, placing a sheet of material having a looser texture than the first sheet on top of the first sheet, molding both sheets simultaneously to the irregularities of the form, and then removing part of the second sheet until none remains on the high points of the first named sheet and thereby provide the back of the matrix with a comparatively smooth surface.

3. The method of manufacturing a printer's matrix comprising placing a sheet of matrix material on a form, perforating a sheet of material and placing it on top of the matrix sheet, molding both sheets to the irregularities of the form, removing a portion of the perforated sheet leaving the one surface of the matrix comparatively smooth.

4. The method of making a printer's matrix, comprising placing a sheet of matrix material on a form, perforating a sheet of fibrous material and placing it on top of the matrix sheet, simultaneously molding both sheets to the irregularities of the form, grinding the perforated sheet leaving that surface of the matrix comparatively smooth.

5. The method of forming a printer's matrix comprising placing a laminated sheet of dampened material on a form, molding the sheet to the form, grinding the lamination on one side of the molded sheet until the next lamination is exposed, and thereafter removing the sheet from the form and drying it.

6. The method of forming a printer's matrix comprising placing a sheet of dampened material on a form, perforating a sheet of material having a looser texture than the first sheet and placing it on top of the first sheet, simultaneously molding both sheets to the irregularities of the form, removing a portion of the perforated sheet leaving the rear surface of the matrix comparatively smooth, and thereafter removing both sheets from the form as a unit.

7. The method of forming a printer's matrix comprising placing a sheet of dampened material on a form, perforating a sheet of material having a looser texture than the first sheet and placing it on top of the first sheet, simultaneously molding both sheets to the irregularities of the form, grinding the perforated sheet until portions of the first sheet are exposed, and thereafter removing both sheets from the form as a unit.

8. The method of forming a printer's matrix comprising placing a sheet of dampened paper on a form, perforating a second sheet of paper having a looser texture than the first sheet and placing it on top of the first sheet, simultaneously molding both sheets to the irregularities of the form, grinding the perforated sheet until portions of the first sheet are exposed and thereby provide the matrix with a comparatively smooth surface, and thereafter removing both sheets from the form as a unit.

9. The method of manufacturing a printer's matrix comprising placing a sheet of paper on a form, perforating a second sheet of paper and placing it on top of the first sheet, molding both sheets to the irregularities of the form, removing a portion of the perforated sheet leaving the one surface of the matrix smooth.

10. The method of manufacturing a printer's matrix comprising placing on a form a laminated sheet of dampened material having its outermost lamination perforated, molding the sheet to the form, and grinding the perforated sheet until the next adjacent lamination is exposed and the matrix is provided with a comparatively smooth surface.

11. The method of forming a printer's matrix comprising placing a sheet of matrix material on a form, placing a second sheet of perforated material on the first named sheet, molding both sheets to the irregularities of the form, and leveling the rearmost surface of the form by removing portions of the perforated sheet until such sheet is interrupted by the surfaces of the first named sheet which were raised during the molding of the sheet.

12. A printer's matrix comprising a laminated sheet, one of said laminations being of substantially the same thickness throughout its entire area but deformed out of its original plane by contact with the form, said second lamination comprising a perforated sheet having its outermost surface in the same plane as the outermost surfaces of the raised portion of the first lamination, and wherein both of said last named surfaces combine to form a substantially non-interrupted surface all of which lies in the same plane.

13. A printer's matrix comprising a laminated sheet, one of said laminations being of substantially the same thickness throughout its entire area, but having raised portions due to contact with the form, and a perforated lamination in adherence with the first named lamination and having the raised surfaces projecting therethrough and flush with the outermost plane thereof, whereby when the matrix is dried the shrinkage of the perforated lamination will not affect the contour of the raised portions of the first lamination.

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