MATLAS

An Atlas of Matrices

The purpose of this essay is to examine the various kinds of type matrices a contemporary typefounder is likely to encounter today and to describe their differences and similarities with a view to how they may be cast as single types for hand composition.

Basic to this consideration are five factors which govern the success of casting from a given matrix. They are: depth of drive, mold height, metal quality, temperature and speed of casting. Foremost is the depth of drive of the matrix being coupled with a mold which will yield the desired height. There are five depths of drive most commonly encountered in the U.S., Canada and England, and they are: .030" (English 4½ point composition and all U.S. Lanston composition matrices); .050" (all English composition; U.S. and English display; some Thompson display); .043" (all Linotype and Intertype except APL, and the majority of older Thompson matrices); .065" (English Supercaster and U.S. Giant matrices from 42 point upwards); .168" (all Ludlow). Nuernberger-Rettig matrices are usually .065". Foundry matrices usually change depth every size or two, from .0309" for small point sizes to .240" or more for large sizes.

American composition matrices can, in theory, all be run together and the types will align. The exceptions to this are lining fonts such as the four sizes of 6 or 12 point Copperplate Gothic, some Old English and other exotics.

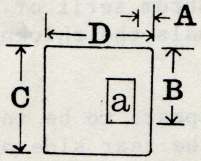


TABLE 1

Composition Matrix

A Side bearing 0.021"
B Matrix alignment 0.164"
C Length
D Width

The American cellular matrix is .2" x .2" across the face, has a depth of drive of .030" and a right-hand side-bearing of .021". The matrix alignment is .145" or 10¼ points. The opposite end has a tapered cone-hole specific to an American centering pin, and side channels to receive the matrix case combs. (Table 11.) Matrices belonging to a given font are marked with the font number and a letter on one side, and the point size on another.

The letter codes are:

A = Modern Roman Caps & lc
B = Modern Roman small caps
C = Modern Italic caps & lc
E = Oldstyle Roman caps & lc
F = Oldstyle Roman small caps
G = Oldstyle Italic
H = Display (especially titlings which are H4)
J = Sanserif
K = Boldface caps & lc
M = German
N = Ornaments
X = Specials, variants; often uncataloged customized mats

Alignment standards for U.S. Lanston matrices are:

Point Size	Head-bearing	Type line	Foot-bearing
6	.080	.0650	.0370
8	.060	.0850	.0293
10	.040	.1050	.0217
12	.020	.1250	.0140

In the case of ornament and special character mats which do not belong to a mat-case arrangement, and which therefore do not have an assigned set width in a unit row, there is a separate coding system which is shown in Table 3 at the end of this text.

Concerning alignment standards, The Monotype System says: "The thickness of the line standard equals the point size of the mold expressed as a decimal, plus .005". (For a ten-point mold, the standard is .105" [.100" + .005"]). Then the type is compared with the line standard, the distance from the base line (bottom serif of the cap H) to the side opposite the nick on the type equals the thickness of the line standard."

The English Composition Caster Manuel appears to be incorrect in its statement "Line is the distance from the rear side of the matrix body to the serif line." (It should read: "from the rear side of the type body to the serif line.")

These mats are castable on an American Composition Caster, or English Composition Caster fitted with American bridge, centering pin and .888" mold; also on a Thompson with special matrix carrier and mold.

English small comp mats in the 4¼ point size (e.g. Times Roman 327) are .030" drive and require an .888" mold (which is standard for U.S. comp). 4¼ point English cannot be run with any other size of English mats because of the difference in drive, nor can 4¼ point English be run in an American mat case because English mats are held in the mat case by rods through their mid-section and there is a different taper to the English centering pin.

Standard English comp mats are drilled with a horizontal hole for the retaining rod. Early mats had no side grooves for a comb. Then, for a while, grooves were cut on two sides to accommodate a comb or rail. Still later someone decided this was not really necessary, and currently grooves are sometimes cut in comp mat sides, sometimes not. There is not even a pretense of standard alignment among English comp mats and if two fonts (other than, say, a related bold or italic) do align, it is pure chance.

In type alignment, one measures from the base line of the font to the back of the type (baseline-x line-ascenter-edge of type). In matrix alignment, one measures from the base line of the character to the farther edge of the matrix (baseline-x line-ascender line-matrix edge).

The following standards are for the fixed-side sidewalls (that is the right side when the character reads right-side-up) of English composition matrices:

4¼ to 11 pt	= .035
12 pt	= .025
Some special mats	= .017
Border mats	= .017
Didot Border mats	= .011
Exotics, non-Romans &c	= .050, .060, .070 according to design
5-10 pt Didot fonts	= .035
11 pt Didot fonts	= .025
12 pt Didot fonts	= .015

Didot Fraktur sidewalls same as English.

Matrices which are part of a font carry a designation such as 327/10 (= 10 point Times New Roman 327). Those which do not belong in the regular font carry series, point and special numbers (269/10-3496). If there is no series number, a dash is placed above the point size. Borders and ornaments are marked with a B before the design number (B81-10pt). Superior figures series are prefaced by L.

Two kinds of space mats are made:

Low space--without conehole, but with steel insert
High space--with regular conehole

Note that the set width of mats are always in point of the Pica system, and this includes faces cut on the Didot system as well.

These mats are castable on an English Comp Caster or an American Comp Caster fitted with an English bridge, centering pin and .868" mold; a Thompson with special mat carrier and mold (with the nick wire on the bottom, instead of the top).

U.S. Lanston Monotype Display

All mats are driven .050". Earlier mats were all electrotyped: a brass blank with a copper insert. Later mats were punched into aluminum blanks. They may be cast on an American Type & Rule Caster (also called an "Orphan Annie"), Thompson, Supercaster or Giant with proper attachments and molds.

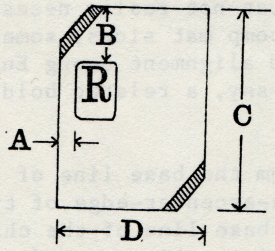


TABLE 4

American Display Matrix

A Side bearing
B Headbearing
C Length
D Width

All American Monotype Display Mats have uniform side-bearings of 8 points or .1107", length of 80 points or 1.125", width of 54¼ points or .747", thickness of 7 points or .096" and 30° chamferred corners of the upper left and lower right.

MONOTYPE STANDARD

	Point	Head Bearing	Foot Bearing
T-Mold	12	32	36
	14	30	36
	18	26	36
U-Mold	24	32	24
	30	26	24
	36	20	24

THOMPSON STANDARD

Point	Head Bearing	Foot Bearing
12	18	50 pts
14	18	48
18	18	44
24	18	38
30	18	32
36	18	26

CODES FOR MODIFIED CHARACTERS

H1 = Shortened characters
H2 = Condensed on a narrower body
H3 = Extended on a wider body
H22 = Condensed on a narrower body
H32 = Extended on a wider body
H4 = Full face on body pointways
H5 = Shortened ascenders
H6 = Central on body pointways
H61 = Central on body and safe on a smaller body
H7 = Low alignment
H8 = High line
H9 = Means a multitude of things including long descenders and re-designed characters
H12 = Shortened descenders and condensed
H13 = Shortened descenders and extended

American Thompson

The mats were made in two sizes and may be identified by their having two chamferred corners at the head. Their dimensions are given in Table 5.

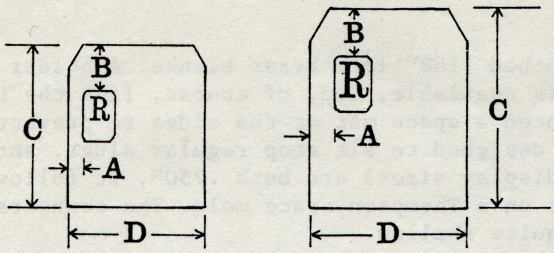


TABLE 5

Thompson Matrices

A Side bearing - 8 points
B Headbearing
C Length
D Width

	Head Bearing	Foot Bearing	Length	Width	Thickness
Old Thompson Small	-	24 pts	1.125	.750	.094-.099
Old Thompson Large	18	-	1.190	.875	.085-.086
Baltotype	18	-	1.181	.815*	.098*
Monotype Thompson	18	-	1.181	.875	.119
Iwata Bokei	18	-	1.125	.875	.125

*varies

The depth of drive of the standard early mats was .043" since the Thompson was originally seen as a device to cast single types from linecasting matrices.

Linotype and Intertype Matrices

The familiar linecasting matrix is punched .043" deep. To cast these mats, a special holder is used on the Thompson (fitted with an .875" mold). An eight point space must be used at the sides to form the sidewalls. In sizes 30 and 36 point, the bottom lug must be filed away to fit the mold projection. Several mats may be cast together to form logotypes, but they must be carefully monitored to prevent fins or hairlines forming between the letters.

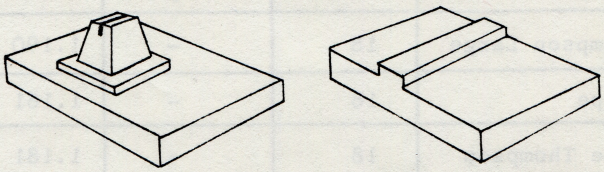
Giant and Supercaster Matrices

These mats are .065" drive. Their dimensions vary as seen in the illustrations. Different mat holders are needed for the various kinds and sizes of mats. English mats are generally 1" x 1" through 48 point unless very wide characters are involved. The larger characters are 1¼" x 1¼". A few Giant mats were made with the characters turned 90 degrees to provide 108 point characters (mostly condensed advertising figures). See tables at end of text.

Ludlow

These mats are punched .168" into brass blanks. A holder for them for the Thompson is available, and, of course, like the Linotype mats, the Ludlow mats need a space mat at the sides to prevent squirts. Since Ludlow slugs are designed to sit atop regular slugs, and since slugs and spaces (for display sizes) are both .750", it follows that Ludlow mats may be cast on a Thompson space mold. The counters of Ludlow mats are often quite shallow.

Recessed or quotation tuads may also be cast on the Thompson, using the special pyramid insert mats. Another insert placed alongside the Set-Adjusting-Liner-Banking-Plate M-935 in the mold allows casting low spaces on the .868" display mold with a .750" bodypiece.



Foundry Matrices

These are extremely varied in dimensions, drive and alignment, although the form is nearly always a rectangular solid. They may be engraved, punched or deposited, and often are nickel-plated to increase longevity. Some typical dimensions are given in Table 9.

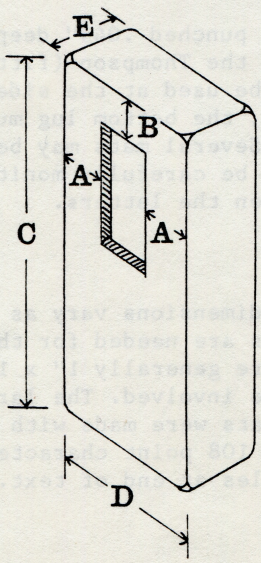


TABLE 8

Foundry Matrices

A Sidebearing
B Headbearing
C Length
D Width
E Thickness

TABLE 9

SOME DEPTHS OF DRIVE FOR ATF MATS MADE TO FIT MOLDS FROM THE ST. LOUIS AND BOSTON SUBSIDIARIES

	Point	E THICKNESS	C LENGTH	A SIDE BEARING	B HEAD BEARING	DEPTH OF DRIVE
GROUP I	6	.284+	1.50+	9 pt	18 pt	.044
	8	.324+	1.62+	9 pt	18 pt	.044
	10	.329+	1.75+	9 pt	18 pt	.044
	12	.329+	1.62+	9 pt	18 pt	.044
GROUP II	18	.366+	1.93+	12 pt	24 pt	.065
	24	.377+	1.93+	12 pt	24 pt	.065
	30	.362+	1.95+	12 pt	24 pt	.065
	42	.384+	1.95+	12 pt	24 pt	.065
	48	.366+	2.12+	12 pt	24 pt	.065

The width may depend on the casting machine in use. In some systems, the width of the character plus a fixed number of points on each side determines matrix width. In other cases, overall matrix width is constant and the character may be either centered on that width, or there may be a fixed side bearing on one side, and a variable bearing on the other.

TABLE 10
Alignment of Type

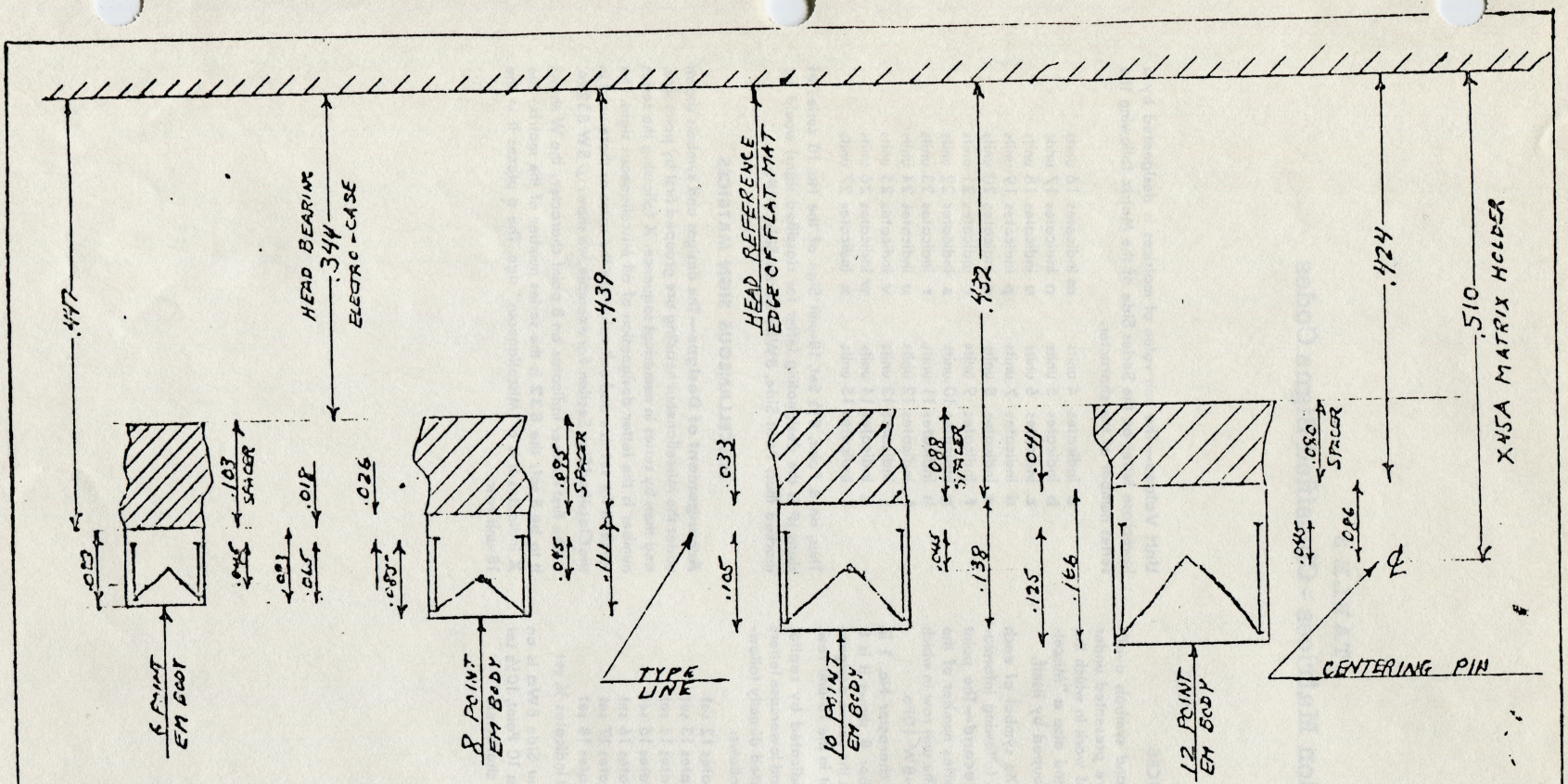
This table reflects the beard and alignment standards for ATF as compared with Monotype; the standards are a reflection of the justification standards of the matrices.

ATF Standards					
Body	Beard	Line in Points	Line as Decimal	U. S. Monotype	English Monotype
6	1	5	.0692	.0650	*
8	2	6	.0830	.0850	
10	2	8	.1107	.1050	Varies
12	3	9	.1245	.1250	According
14	3	11	.1522	.1450	to Font
18	4	14	.1937	.1850	Design
24	5	19	.2628		
30	6	24	.3320		
36	7	29	.4012		

In this short survey, I have attempted to cover some aspects of greatest probable use to members of the American Typecasting Fellowship on the subject of matrices.

In the pages which follow are some data which may be of occasional help in dealing with the various markings and kinds of typecasting matrices likely to be encountered.

Paul Hayden Duensing
Vicksburg, Michigan
July, 1988



NOTE — STRIKE MUST BE INVERTED FOR USE ON COMPOSITION MOLDS.

TABLE 2

Dimensional Relationships of Various Matrices

TABLE 3
Composition Matrices - Classified Signs Codes

CLASSIFIED SIGN MATRICES

Arrangement of Designs—The signs and symbols available for Monotype Machine Typesetting are presented under classification headings indicating the kind of work in which the design is primarily intended to be used, and also a "Miscellaneous" classification. Each point size is grouped by itself.

Method of Symboling Matrices—The symbol of each classified matrix is intended to convey the following information: **First**—The number of the design. **Second**—The point size. **Third**—The set size. **Fourth**—The series number of the group in which the matrix belongs. **Fifth**—The unit row in which the matrix is to be run. For example: + 1—8W 10Po.

This symbol means that the plus sign is character No. **1** in the "Mathematical" classification; the number **8** shows it is 8 point; **W** indicates the matrix is 8 set; **10P** is the series designation; **o** shows that the character is to be put in the 18-unit row.

Symbols for Set Size—Set size is indicated by capital letters **Z** to **M** representing whole numbers, and lowercase letters **a, b** and **c** representing fractional sets, located directly following the number showing the point size, as follows:

Z	indicates 5 set	**S**	indicates 12 set
Y	indicates 6 set	**R**	indicates 13 set
X	indicates 7 set	**Q**	indicates 14 set
W	indicates 8 set	**P**	indicates 15 set
V	indicates 9 set	**O**	indicates 16 set
U	indicates 10 set	**N**	indicates 17 set
T	indicates 11 set	**M**	indicates 18 set

a indicates ¼ set **b** indicates ½ set **c** indicates ¾ set

For example: a Matrix marked on the Point Side 8**Wa** is an 8 Point, 8¼ set character; 10**Ub** indicates a 10 Point, 10½ set character, and 7**Xc** means 7 Point, 7¾ set character.

Unit Values—The unit value of matrices is designated by a lowercase letter on the Series Side of the Matrix following the series number of the character.

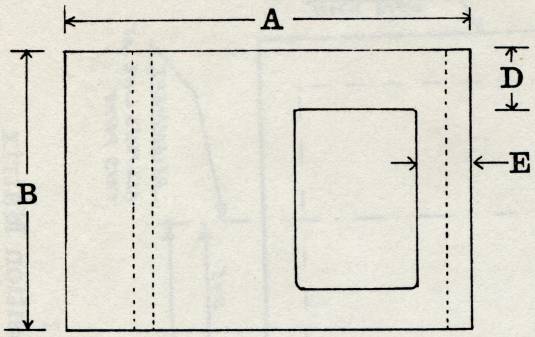
a	indicates 4 units	**m**	indicates 16 units
b	indicates 5 units	**n**	indicates 17 units
c	indicates 6 units	**o**	indicates 18 units
d	indicates 7 units	**p**	indicates 19 units
e	indicates 8 units	**q**	indicates 20 units
f	indicates 9 units	**r**	indicates 21 units
g	indicates 10 units	**s**	indicates 22 units
h	indicates 11 units	**t**	indicates 23 units
i	indicates 12 units	**u**	indicates 24 units
j	indicates 13 units	**v**	indicates 25 units
k	indicates 14 units	**w**	indicates 26 units
l	indicates 15 units	**x**	indicates 27 units

Thus, an 8 Point, 8½ Set, 18-unit Sign of the No. 10 series of signs (**P** is the designating letter for classified signs) would be marked thus: Point Side, 8**Wb;** Series Side, 10**Po.**

MISCELLANEOUS SIGN MATRICES

Arrangement of Designs—The designs and symbols shown under the Miscellaneous heading are grouped first by point size, and then by series in numerical sequence. **X** following the series number is the letter designation of all Miscellaneous signs. The symbols for set size and unit value are the same as those used in the Classified Sign Section. For example, we show: ∪ 8W 832Xo.

The first number indicates an 8 point character; the **W** shows it to be 8 set; the **832** is the series number of the matrix; the **X** indicates it is a "Miscellaneous" sign. The **o** places it in the 18-unit row.



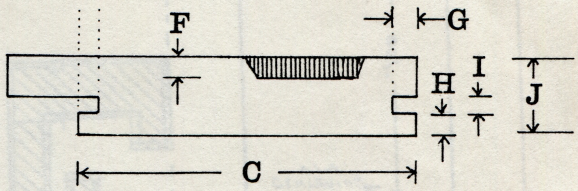


TABLE 6

American Giant Matrices

A Width of face
B Length
C Width of base side
D Headbearing
E Side bearing - .142" 10¼ pts
F Depth of drive
G Depth of side grooves - .046-.059
H Bottom flange thickness - .061"
I Width of side grooves - .063"
J Matrix thickness - .250"

Measurements and original plan by Andrew W. Dunker

MAT	A	B	C	F
I	1.710	1.117	1.400	.065
II	1.498	1.117	1.400	.065
III	1.053	1.117	1.000	.065
IV	1.050	1.117	1.000	.032
V	.840	.840	.750	.032
VI	.800	1.117	.750	.065

60 point headbearing is .204" or 14 3/4 pts
72 point headbearing ia .060. The 72point body is centered vertically on the matrix.

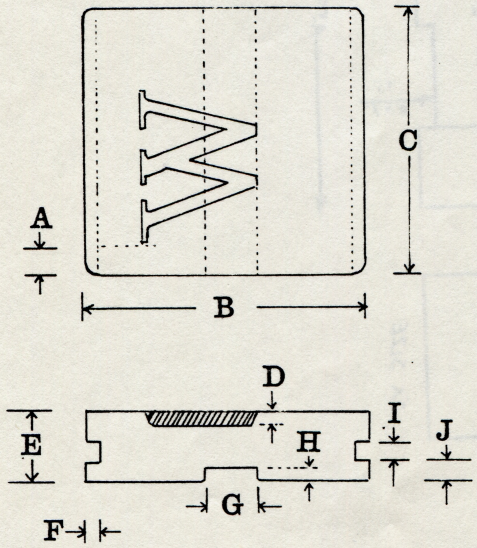


TABLE 7

English Display Matrices

A Side bearing - .150"
B Length - 1.000"
C Width - 1.000"
D Depth of drive - .065"
E Thickness - .2650"
F Depth of side grooves - .050"
G Bottom groove width - .1875"
H Bottom groove depth - .042"
I Width of side groove - .065
J Bottom flange thickness - .065"

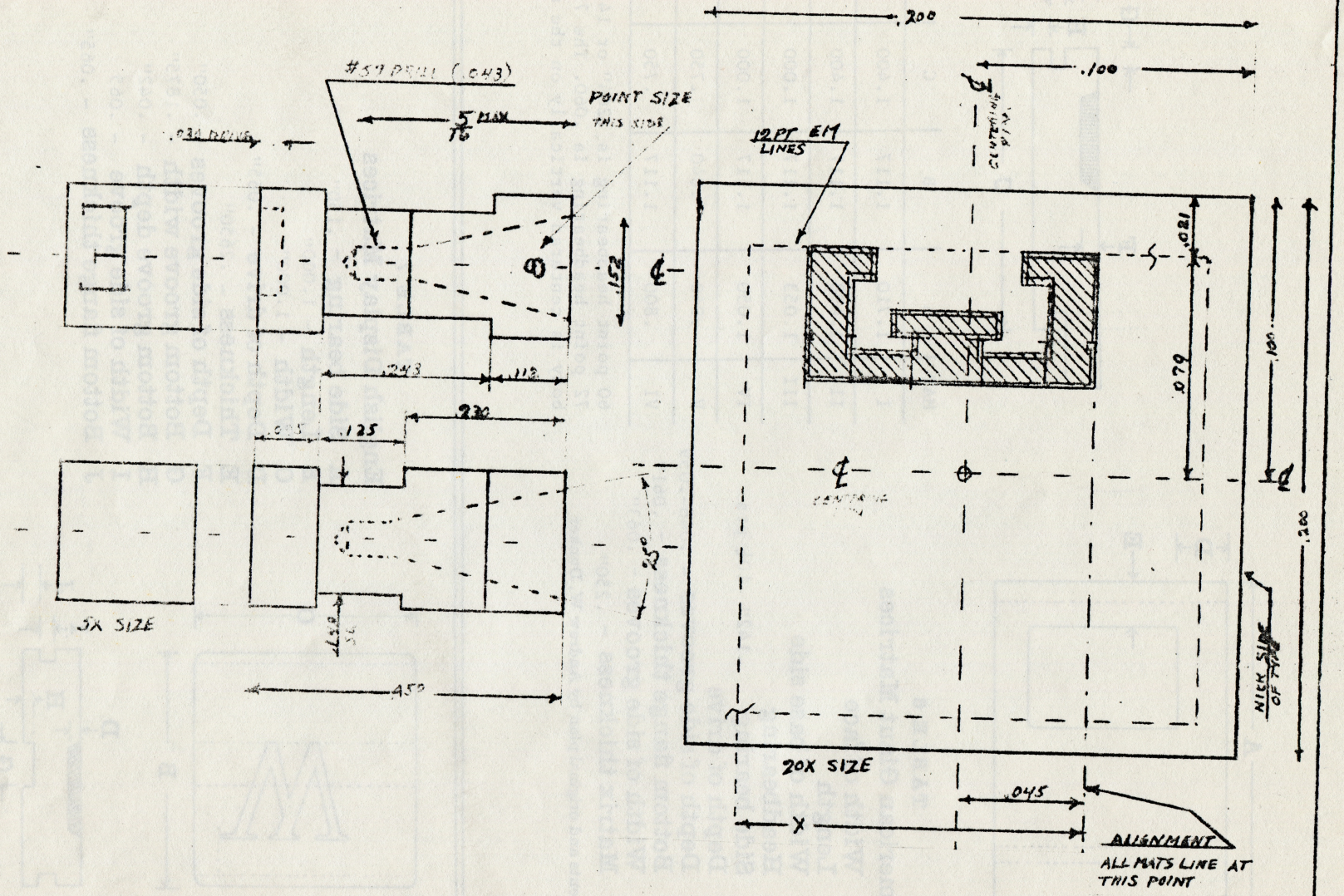
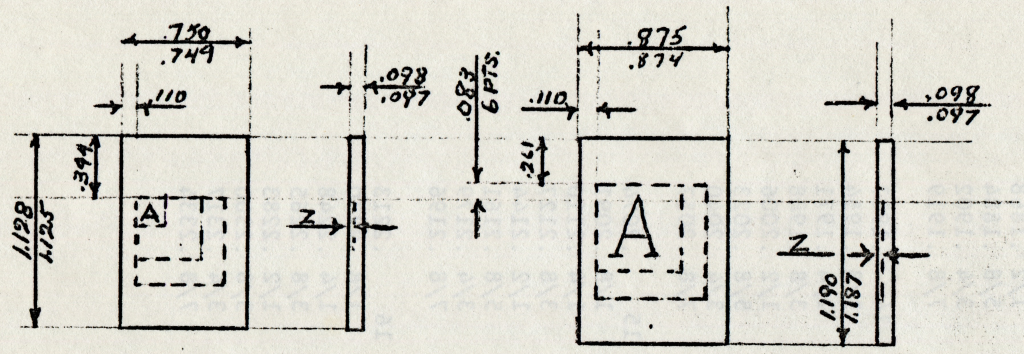


TABLE 11

U.S. Lanston Composition Matrix



STANDARD SIZE MAT
4 TO 36 POINT
Z = DRIVE WHICH MAY BE .030 TO .050, MORE THAN .050, NOT RECOMMENDED.

LARGE SIZE MAT
4 TO 48 POINT, BUT USUALLY ANYTHING OVER 36 POINT.
AN .083 PLATE IS AVAILABLE TO BRING ALIGNMENT TO .344

HAVE BEEN MADE TO .125 THICK ON SPECIAL ORDER

TABLE 12
Electrodeposited Thompson Matrices
as made by A. W. Dunker

TABLE 13
Pica System Dimensions in Inches

1/8 .0017	1/4 .0034	3/8 .0051	1/2 .0069	3/4 .0103	7/8 .0121

1	.01383	7	.0968	12	.1660
		1/8	.0985	1/8	.1677
2	.0276	1/4	.1003	1/4	.1695
1/8	.0294	3/8	.1020	3/8	.1712
1/4	.0311	1/2	.1038	1/2	.1729
3/8	.0328	5/8	.1054	5/8	.1746
1/2	.0346	3/4	.1072	3/4	.1764
5/8	.0353	7/8	.1089	7/8	.1781
3/4	.0380				
7/8	.0397	8	.1107	13	.1798
		1/8	.1124	1/8	.1815
3	.0415	1/4	.1141	1/4	.1833
1/8	.0432	3/8	.1158	3/8	.1850
1/4	.0450	1/2	.1176	1/2	.1868
3/8	.0466	5/8	.1193	5/8	.1884
1/2	.0484	3/4	.1210	3/4	.1902
5/8	.0501	7/8	.1228	7/8	.1919
3/4	.0519				
7/8	.0535	9	.1245	14	.1937
		1/8	.1262	1/8	.1954
4	.0553	1/4	.1280	1/4	.1971
1/8	.0569	3/8	.1297	3/8	.1988
1/4	.0588	1/2	.1314	1/2	.2006
3/8	.0604	5/8	.1331	5/8	.2023
1/2	.0623	3/4	.1349	3/4	.2040
5/8	.0638	7/8	.1366	7/8	.2057
3/4	.0657				
7/8	.0673	10	.1383	15	.2074
		1/8	.1400	1/8	.2091
5	.0692	1/4	.1418	1/4	.2110
1/8	.0707	3/8	.1435	3/8	.2127
1/4	.0726	1/2	.1453	1/2	.2144
3/8	.0742	5/8	.1470	5/8	.2161
1/2	.0761	3/4	.1487	3/4	.2179
5/8	.0777	7/8	.1504	7/8	.2196
3/4	.0795				
7/8	.0811	11	.1522	16	.2213
		1/8	.1539	1/8	.2230
6	.0830	1/4	.1556	1/4	.2248
1/8	.0847	3/8	.1573	3/8	.2265
1/4	.0865	1/2	.1591	1/2	.2283
3/8	.0882	5/8	.1608	5/8	.2300
1/2	.0899	3/4	.1625	3/4	.2317
5/8	.0916	7/8	.1642	7/8	.2334
3/4	.0934				
7/8	.0950				

TABLE 14
Didot System Dimensions in Inches

The following table gives the equivalent of Didot points in thousandths of an inch:

DIDOT	INCHES
1	0.0148
2	0.0286
2-1/2	0.0370
3	0.0444
3-1/2	0.0518
4	0.0592
4-1/2	0.0666
5	0.0740
5-1/2	0.0814
6	0.0888
6-1/2	0.0962
7	0.1036
8	0.1184
9	0.1332
10	0.1480
11	0.1628
12	0.1776
14	0.2072
16	0.2369
18	0.2665
20	0.2961
22	0.3257
24	0.3553
28	0.4145
30	0.4441
32	0.4737
36	0.5329
40	0.5922
42	0.6218
44	0.6514
48	0.7106

Didot height of type is .928" The only close match between a Didot and Pica-type size is 28 pt Didot (0.4145) and 30 pt Pica (0.4254).

READING WEDGE POSITIONS AS SET DIMENSIONS FOR SORTS CASTING

Width in Points	Width in Inches	Normal Wedge 47S	Special Just. Wedge 46S	Width in Inches	Width in Points	Width in Points	Width in Inches	Normal Wedge 47S	Special Just. Wedge 46S	Width in Inches	Width in Points	Width in Points	Width in Inches	Normal Wedge 47S	Special Just. Wedge 46S	Width in Inches	Width in Points
* 2¼	.0311	2	2	.2663	19¼	* 8	.1107	7	8	.3458	25	*13¾	.1902	13	6	.4254	30¾
* 2½	.0346	2	4	.2698	19½	* 8¼	.1141	8	2	.3493	25¼	*14	.1937	13	8	.4288	31
* 2¾	.0380	2	6	.2732	19¾	* 8½	.1176	8	4	.3528	25½	*14¼	.1971	14	2	.4323	31¼
* 3	.0415	2	8	.2767	20	* 8¾	.1210	8	6	.3562	25¾	*14½	.2006	14	4	.4358	31½
* 3¼	.0450	3	2	.2801	20¼	* 9	.1245	8	8	.3597	26	*14¾	.2040	14	6	.4392	31¾
* 3½	.0484	3	4	.2836	20½	* 9¼	.1280	9	2	.3631	26¼	*15	.2075	14	8	.4427	32
* 3¾	.0519	3	6	.2870	20¾	* 9½	.1314	9	4	.3666	26½	*15¼	.2110	15	2	.4461	32¼
* 4	.0553	3	8	.2905	21	* 9¾	.1349	9	6	.3700	26¾	*15½	.2144	15	4	.4496	32½
* 4¼	.0588	4	2	.2940	21¼	*10	.1383	9	8	.3735	27	*15¾	.2179	15	6	.4530	32¾
* 4½	.0623	4	4	.2974	21½	*10¼	.1418	10	2	.3770	27¼	*16	.2213	15	8	.4565	33
* 4¾	.0657	4	6	.3009	21¾	*10½	.1453	10	4	.3804	27½	*16¼	.2248	16	2	.4600	33¼
* 5	.0692	4	8	.3043	22	*10¾	.1487	10	6	.3839	27¾	*16½	.2283	16	4	.4634	33½
* 5¼	.0726	5	2	.3078	22¼	*11	.1522	10	8	.3873	28	*16¾	.2317	16	6	.4669	33¾
* 5½	.0761	5	4	.3113	22½	*11¼	.1556	11	2	.3908	28¼	*17	.2352	16	8	.4703	34
* 5¾	.0795	5	6	.3147	22¾	*11½	.1591	11	4	.3943	28½	*17¼	.2386	17	2	.4738	34¼
* 6	.0830	5	8	.3182	23	*11¾	.1625	11	6	.3977	28¾	*17½	.2421	17	4	.4773	34½
* 6¼	.0865	6	2	.3216	23¼	*12	.1660	11	8	.4012	29	*17¾	.2455	17	6	.4807	34¾
* 6½	.0899	6	4	.3251	23½	*12¼	.1695	12	2	.4046	29¼	*18	.2490	17	8	.4842	35
* 6¾	.0934	6	6	.3285	23¾	*12½	.1729	12	4	.4081	29½	*18¼	.2525	18	2	.4876	35¼
* 7	.0968	6	8	.3320	24	*12¾	.1764	12	6	.4115	29¾	*18½	.2559	18	4	.4911	35½
* 7¼	.1003	7	2	.3355	24¼	*13	.1798	12	8	.4150	30	*18¾	.2594	18	6	.4945	35¾
* 7½	.1038	7	4	.3389	24½	*13¼	.1833	13	2	.4185	30¼	*19	.2628	18	8	.4980	36
* 7¾	.1072	7	6	.3424	24¾	*13½	.1868	13	4	.4219	30½						

American Display Mats carry the point size in the upper left corner, and the series number in the upper right. Set widths are at the bottom; the left-hand number (with preceding asterisk) equals the number of whole points. The number on the right-hand side indicates:

2 = + ¼ thus: *15 2 = 15¼

4 = + ½ *15 4 = 15½

6 = + ¾ *15 6 = 15¾

8 = + 1 *15 8 = 16

When the asterisk is absent, add 17 points to the left-hand number:

10 2 = 27¼ 18 8 = 36