

Compiled by Paul Duesing

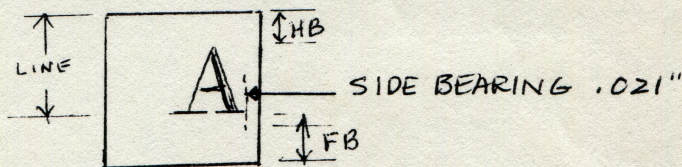
MATLAS
An Atlas of Matrices

The purpose of this talk is to examine the various kinds of type matrices a 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. 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 4-1/4 point comp and for all American Monotype comp mats); .050" all English comp and display 5-36 pt., all American Monotype display, some Thompson display; .043" all Intertype and Linotype (except APL) and the majority of old Thompson mats; .065" English Supercaster and American Giant mats 42 pt. and up; .168" Ludlow. Nuernberger-Rettig matrices are usually .065". Foundry matrices usually change for every size or two, from .0309" for small point sizes to .240" or more for large sizes.

American comp mats in theory can nearly all be run together and the types cast will all align. The exceptions to this are, of course, lining fonts such as the four sizes of 6 or 12 pt. Copperplate Gothics, Scripts, Old English, etc. As the table compiled by the late John Carroll (Table 1) shows, the alignment is not always automatic or exact.

TABLE 1



POINT	HB	FB	LINE
6	.0840"	.036"	.1490"
8	.0618"	.0305"	.1468"
10	.0400"	.0231"	.1450"
12	.0207"	.0145"	.1457"

From Baltotype

The American cellular matrix is .2"x.2" across the face, has a depth of .030" and a right hand side bearing of .021". The opposite end has a tapered cone-hole specific to an American centering pin, and side channels to receive the mat case combs. Mats belonging to a font are marked with the font number and a letter on one side, and the point size on the opposite side. The letter codes are:

A = Modern Roman Caps & lc
 B = Modern Roman small caps
 C = Modern Italic Caps & lc
 E = Old Style Roman Caps & lc
 F = Old Style Roman S. C.
 G = Old Style Italic
 H = Display (especially titlings, which are H4)
 K = Boldface Caps & lc
 M = German
 N = Ornament

J sans serif

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 2 (See Table 2 at end of text).

These mats are castable on an American Comp Caster or English Comp Caster fitted with American bridge, centering pin and .888 mold. Also on a Thompson with special holder and mold.

English small comp mats in the 4-1/4 pt. size (e.g. Times Roman 327) are .030 drive and require a special .888 mold (which is the standard for American comp). 4-1/4 pt. English cannot be run in with any other size of English type because of the difference in drive, nor can 4-1/4 pt. English Comp be run in an American mat case because English mats are held in the mat case by rods through their mid-section and they have a different taper to their centering pin.

Standard English Comp mats all 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 no grooves are cut in comp mat sides. There is not even a pretense of standard alignment and if two fonts (other than, say, a related bold or italic) do align, it is pure chance.

Interestingly when the British speak of matrix alignment, they measure from the base line of the font to the bottom of the matrix (baseline-descender line-edge of mat); but when they measure type alignment they measure the opposite direction baseline-x-line-capline-ascender line-edge of mat).

The following standards are for the sidewalls of English Comp mats:

4-1/2 to 11 pt = .035
 12 pt = .025
 Some special comp mats = .017
 Border mats = .017
 Didot Border mats = .011
 Exotic (non-Roman) fonts = .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 the designation 327/10 (=10 pt Times Roman 327). Those which do not belong to a font carry series, point and special numbers (269/10-3946). If there is no series number, a dash is placed above the point size. Borders are marked with B before the design number (B81-10 pt). Superior figures series are prefaced by "L".

Two kinds of space mats are made:

Low space--without cone hole, but with steel insert

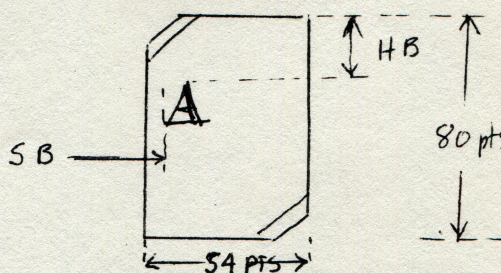
High space--with cone hole

Note that the set widths of mats are always in points of the pica system, and this includes Didot faces 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. Also a Thompson with special mat carrier and mold.

American Mono Display

7 PTS THICK



Balto & Mono			
	Head	Foot	
T-Mold	12	32	36
	14	29	37
	18	25	37
U-Mold	24	31	25
	30	25	25
	36	19	25
Thompson	42	18	20 NG use
	48	18	12 large mat

Mono. Std.

12	32	36
14	30	36
18	24	36
24	32	24
30	26	24
36	20	24

Thompson

12	18	50
14	18	48
18	18	44
24	18	38
30	18	32
36	18	26

Definition of Modified Characters:

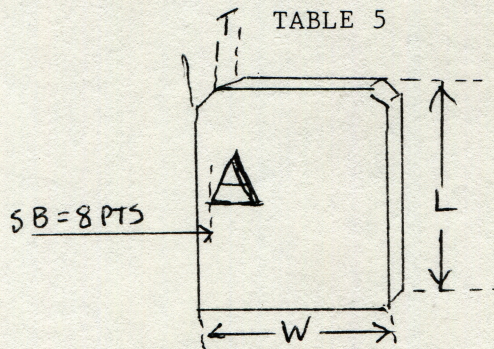
- H1-Means shortened descenders
- H2-Means condensed on a narrower body
- H3-Means extended on a wider body
- H22-Means condensed on a narrower body
- H32-Means extended on a wider body
- H4-Means full face on body pointways
- H5-Means shortened ascenders
- H6-Means central on body pointways
- H61-Means central on body and safe on a smaller body
- H7-Means low line
- H8-Means high line
- H9-Means a multitude of things including long descenders and redesigned character
- H12-Means shortened descenders and condensed
- H13-Means shortened descenders and extended

1950s most still electroed

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, Thompson, Super-caster or Giant with proper attachments.

American Thompson

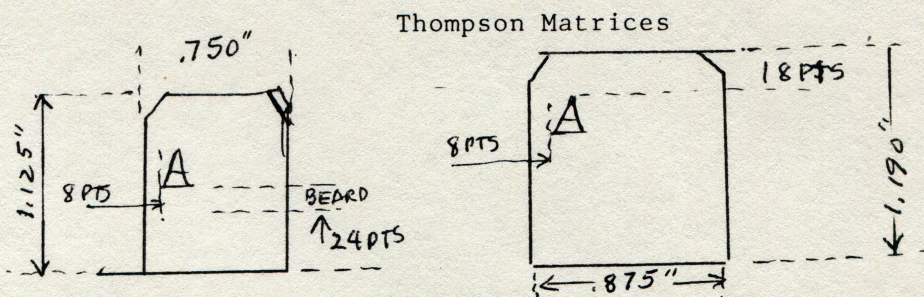
These mats were made in two sizes and may be identified by their having two chamfered corners at the head. Their dimensions are given in Tables 5 & 6.



	Length	Width	Thickness
Old Thompson	1.185	.875"	.093"
BALTO	1.181*	.815"*	.098"*
Mono Thompson	1.186	.875"	.119"
IWATA BOKEI	1.125	.875"	.125"

*VARIABLE

TABLE 6



Thickness = .094" to .099" (nominal 7 point)

Some old ones = .085" to .086" (nom. 6 pts)

Placement = Wide = 18 pts head bearing

Points	NARROW Head bearing
6 pt	51 pts
8 pt	49 pts
10 pt	47 pts
12 pt	45 pts
14 pt	43 pts
18 pt	39 pts
24 pt	33 pts
30 pt	27 pts
36 pt	21 pts
42 pt	15 pts * will not clear mold
48 pt	9 pts * will not clear mold

The depth of drive was .043" which was the standard early mold on this machine, since it was originally seen as a device to cast single types from linecasting matrices.

Linotype and Intertype

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 mat 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 must be carefully monitored to prevent fins forming between the mats.

Giant and Supercaster

These mats are .065" drive. Their dimensions vary as seen in the illustrations. Different mat holders are needed for the various kinds of mats. English mats are generally 1"x1" up to 60 pt unless very wide characters are involved. The larger characters are 1-1/4"x1-1/4". A few Giant mats were made with the characters turned 90 degrees to provide 108 pt letters (mostly condensed advertising figures).

See Table 7 at end of text

Ludlow

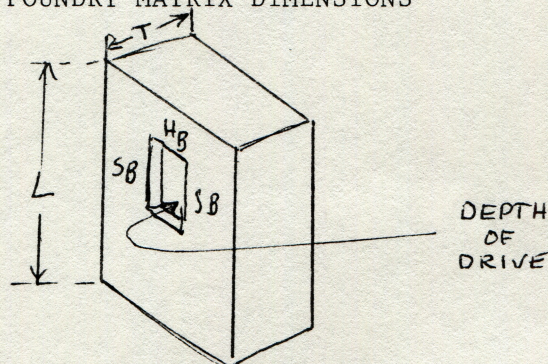
These mats are punched .168" into brass blanks. A holder for them is made for the Thompson and, of course, like Lino mats, they must have a space mat at the side to prevent squirts. Since Ludlow slugs are designed to sit atop regular slugs, and since slugs and spaces (for display sizes) are both .750,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

Recessed quads may also be cast on the Thompson using the special pyramid insert mats. Another insert allows casting low spaces on the .868" display mold.

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 8.

TABLE 8
FOUNDRY MATRIX DIMENSIONS



	POINT	T	L	SB	HB	DEPTH
GROUP I	6	.294+	1-1/2±	9 PT	18 PT	.044"
	8	.324+	1-5/8±	9 PT	18 PT	.044"
	10	.329+	1-3/4±	9 PT	18 PT	.044"
	12	.329+	1-5/8±	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"

Some depths of drive for ATF mats made to fit molds from the St. Louis and Boston subsidiaries.

TABLE 9
ATF - MATRICES - DEPTH OF DRIVE

6 pt - HA (8,10,-12?) = .0309

St. Louis II = .0535 Side Bearing 9 pt. ea.
III = .0844

Boston (?)I = .042
II = .0758
III = .0968
IV = .1240

This table (Table 10) reflects the beard and alignment standards for ATF as compared with Monotype; these standards are a reflection of the justification standards of the matrices.

TABLE 10
Alignment of Type

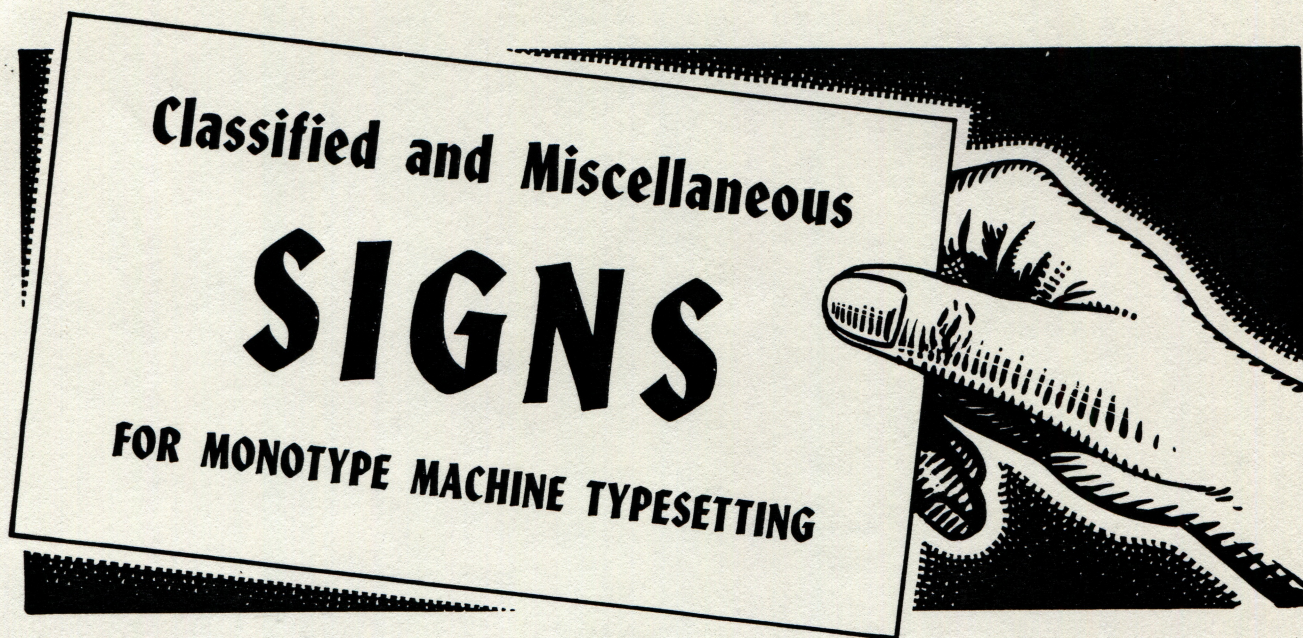
American St'd

Body	Beard	Line Points	Decimal Line	Monotype for Comparison
6	1	5	.0692	.0650
8	2	6	.0830	.0850
10	2	8	.1107	.1050
12	3	9	.1245	.1250
14	3	11	.1522	.1450
18	4	14	.1937	.1850
24	5	19	.2628	
30	6	24	.3320	
36	7	29	.4012	
42	8	34	.4703	
48	10	38	.5257	

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

In the appendix, some additional tables are included which may be of occasional help in dealing with the baffling markings and kinds of typesetting matrices.

Paul Hayden Duensing
July, 1986



MATHEMATICAL * COMMERCIAL * ASTRONOMICAL * REFERENCE
 MEDICAL * TIME TABLE and TARIFF * MUSICAL * MISCELLANEOUS

[Classified Sign Matrices in sizes 4 to 12 point are Class A; Miscellaneous Sign Matrices, 4 to 12 point, are both Class A and B (information on request). All 14, 16 and 18 point Composition Matrices are Class B.]

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 8W_a is an 8 Point, 8¼ set character; 10U_b indicates a 10 Point, 10½ set character, and 7X_c 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

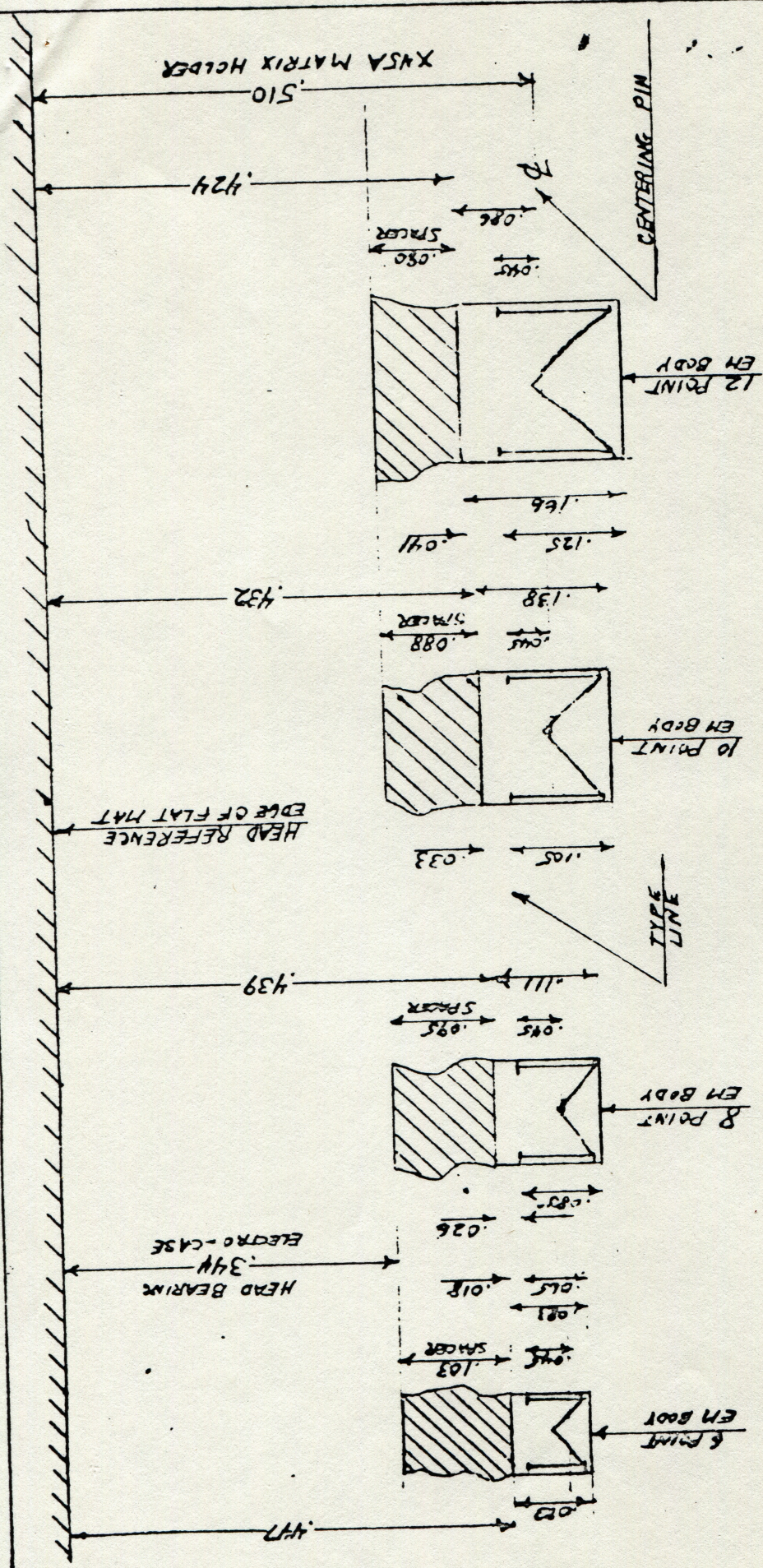
Thus, an 8 Point, 8½ Set, 18-unit Sign of the No. 10 series of signs (P is the designating letter for classified signs) would be marked thus: Point Side, 8W_b; Series Side, 10P_o.

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 832X_o.

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.

LANSTON MONOTYPE MACHINE COMPANY, PHILADELPHIA 3, PENNA.

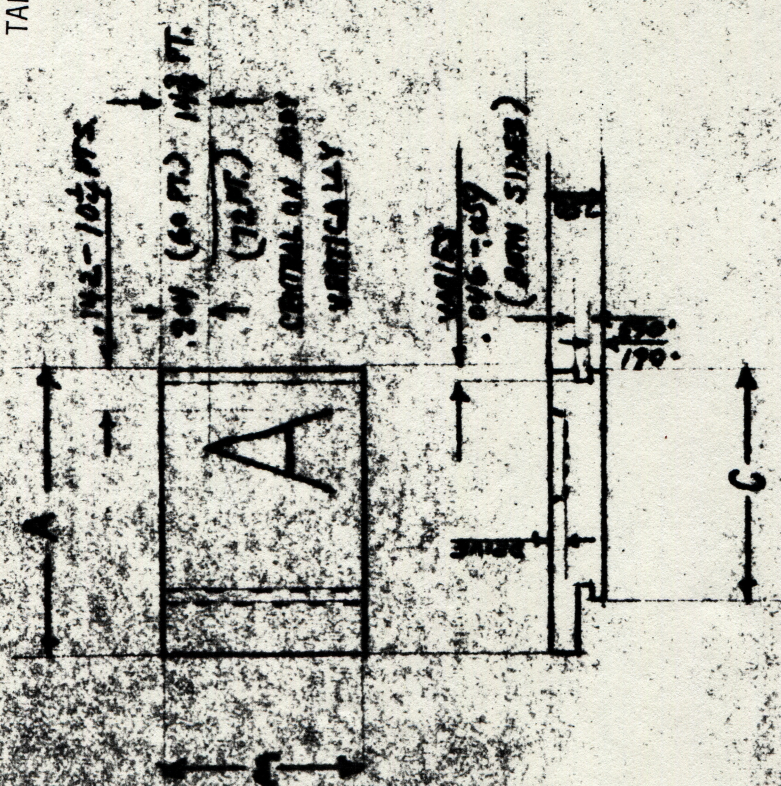


NOTE - STRIKE MUST BE
INVERTED FOR USE ON COMPO-
SITION MOLDS.

DIMENSIONAL RELATIONSHIP OF
LANSTON COMPOSITION TYPE,
THE DISPLAY MATRIX, AND
COPPER ELECTRO-MATRICES
6X SCALE

ANDREW W. DUNKER 10-1-67

TABLE 7

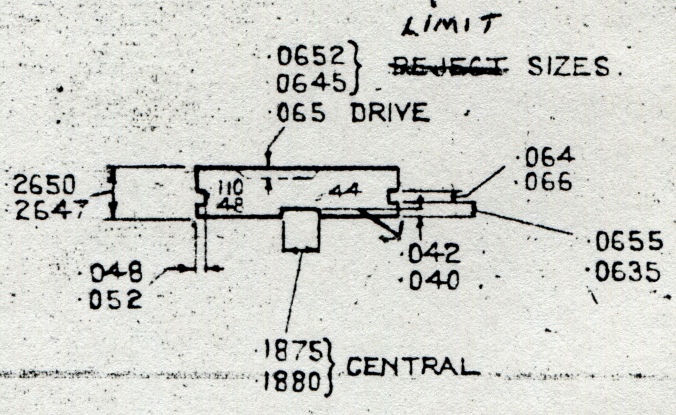
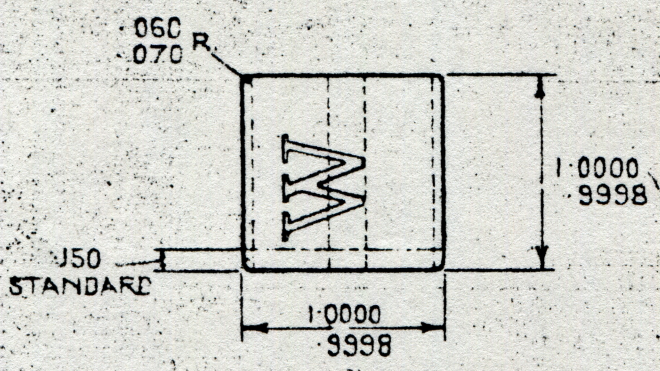


ALUMINUM WEIGHS .9924 POUNDS
PER CUBIC INCH

MAT	A	B	C	DRIVE
I	1.710	1.117	1.400	.065"
II	1.498	1.117	1.400	.065"
III	1.053	1.117	.999	.065"
IV	1.050	1.117	1.000	.032
V	.840	.840	.750	.032
VI	.800	1.117	.749	.065"

LANSTON GIANT MATRIX DIMENTIONS
DIMENSIONAL DETAILS FULL SIZE SCALE
Drawn by A. W. Dunker 10/1/69

FROM FILE of MHT
Depth of Bevel Groove .023
273
265 drive



ALL CORNERS TO BE SLIGHTLY BROKEN.

Design approved
Page 1
265 drive
1.0

MATRIX ROOM

NAME:- ENGLISH DISPLAY MATRIX (42-60 POINT)
 1" SQUARE

OTHER DRGS. D.1813, DJ814, D.3438, D.3439
 D 4603

THE MONOTYPE
 CORP LTD.

6-2-29

D. 3437

READING WEDGE POSITIONS AS SET DIMENSIONS FOR SORTS
CASTING

Wedge Positions for Casting Spaces and Quads

Width in Points	Width in Inches	Normal Wedge		Width in Inches	Width in Points	Width in Points	Width in Inches	Normal Wedge		Width in Inches	Width in Points	Width in Points	Width in Inches	Normal Wedge		Width in Inches	Width in Points
		47S	46S					47S	46S					47S	46S		
* 2½	.0311	2	2	.2663	19½	* 8	.1107	7	8	.3458	25	* 13½	.1902	13	6	.4254	30½
* 2½	.0346	2	4	.2698	19½	* 8½	.1141	8	2	.3493	25½	* 14	.1937	13	8	.4288	31
* 2½	.0380	2	6	.2732	19½	* 8½	.1176	8	4	.3528	25½	* 14½	.1971	14	2	.4323	31½
* 3	.0415	2	8	.2767	20	* 9	.1245	8	8	.3597	26	* 14½	.2006	14	4	.4358	31½
* 3½	.0450	3	2	.2801	20½	* 9½	.1280	9	2	.3631	26½	* 15	.2040	14	6	.4392	31¾
* 3½	.0484	3	4	.2836	20½	* 9½	.1314	9	4	.3666	26½	* 15½	.2075	14	8	.4427	32
* 3½	.0519	3	6	.2870	20½	* 9½	.1349	9	6	.3700	26½	* 15½	.2110	15	2	.4461	32½
* 4	.0553	3	8	.2905	21	* 9½	.1383	9	8	.3735	27	* 15½	.2144	15	4	.4496	32½
* 4½	.0588	4	2	.2940	21½	* 10	.1418	10	2	.3770	27½	* 16	.2179	15	6	.4530	32¾
* 4½	.0623	4	4	.2974	21½	* 10½	.1453	10	4	.3804	27½	* 16½	.2213	15	8	.4565	33
* 4½	.0657	4	6	.3009	21½	* 10½	.1487	10	6	.3839	27½	* 16½	.2248	16	2	.4600	33½
* 5	.0692	4	8	.3043	22	* 10½	.1522	10	8	.3873	28	* 16½	.2283	16	4	.4634	33½
* 5½	.0726	5	2	.3078	22½	* 11	.1556	11	2	.3908	28½	* 17	.2317	16	6	.4669	33¾
* 5½	.0761	5	4	.3113	22½	* 11½	.1591	11	4	.3943	28½	* 17½	.2352	16	8	.4703	34
* 5½	.0795	5	6	.3147	22½	* 11½	.1625	11	6	.3977	28½	* 17½	.2386	17	2	.4738	34½
* 6	.0830	5	8	.3182	23	* 11½	.1660	11	8	.4012	29	* 17½	.2421	17	4	.4773	34½
* 6½	.0865	6	2	.3216	23½	* 12	.1695	12	2	.4046	29½	* 18	.2455	17	6	.4807	34¾
* 6½	.0899	6	4	.3251	23½	* 12½	.1729	12	4	.4081	29½	* 18½	.2490	17	8	.4842	35
* 6½	.0934	6	6	.3285	23½	* 12½	.1764	12	6	.4115	29½	* 18½	.2525	18	2	.4876	35½
* 7	.0968	6	8	.3320	24	* 12½	.1798	12	8	.4150	30	* 18½	.2559	18	4	.4911	35½
* 7½	.1003	7	2	.3355	24½	* 13	.1833	13	2	.4185	30½	* 19	.2594	18	6	.4945	35¾
* 7½	.1038	7	4	.3389	24½	* 13½	.1868	13	4	.4219	30½	* 19	.2628	18	8	.4980	36
* 7½	.1072	7	6	.3424	24½	* 13½											

* The Abutment-screw Packing Piece 60S must be in position to obtain this size. The front Justification Wedge 10D must be as far to the left as possible when using this Table.

FIGURE 100

Table of WEDGE positions for casting space material in all widths from two and one-quarter to thirty-six points inclusive. Space material thinner than two and one-quarter points can be obtained by readjusting the MOLD-BLADE ABUTMENT SCREW.

NOTE: The left number (with preceding asterisk) = number of whole points. Right number is coded as follows:

2 = + ¼ point

4 = + ½

6 = + ¾

8 = + 1 point

Thus *15 6 = 15 ¾ points, etc.

Without the asterisk, add 17 points to the left number.

10 2 = 27 ¼ points, 18 8 = 36 points.

The Private Press and Typefoundry of Paul Hayden Duensing

TYPE AND MATRIX INVENTORY

1/8 .0017 1/4 .0034 3/8 .0051 1/2 .0069 5/8 .0086 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 .1936
	1/8 .1262	
4 .0553	1/4 .1280	
1/8 .0569	3/8 .1297	
1/4 .0588	1/2 .1314	
3/8 .0604	5/8 .1331	
1/2 .0623	3/4 .1349	
5/8 .0638	7/8 .1366	
3/4 .0657		
7/8 .0673	10 .1383	
	1/8 .1400	
5 .0692	1/4 .1418	
1/8 .0707	3/8 .1435	
1/4 .0726	1/2 .1453	
3/8 .0742	5/8 .1470	
1/2 .0761	3/4 .1487	
5/8 .0777	7/8 .1504	
3/4 .0795		
7/8 .0811	11 .1522	
	1/8 .1539	
6 .0830	1/4 .1556	
1/8 .0847	3/8 .1573	
1/4 .0865	1/2 .1591	
3/8 .0882	5/8 .1608	
1/2 .0899	3/4 .1625	
5/8 .0916	7/8 .1642	
3/4 .0934		
7/8 .0950		

"DIDOT" TYPE BODY DIMENSION

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

POINTS	DIDOT
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"