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HAND STICK FOR USE IN PRODUCING
TYPE MATTER PHOTOGRAPHICALLY
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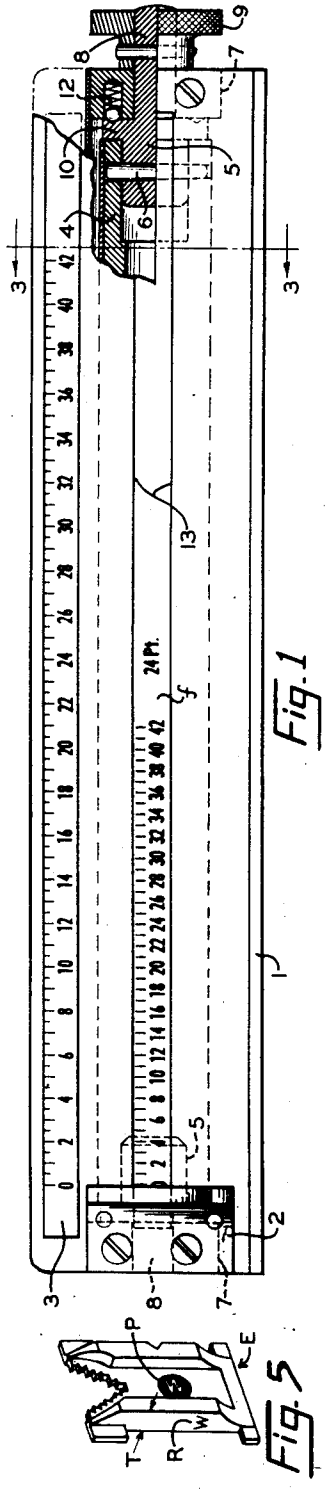


Fig. 1

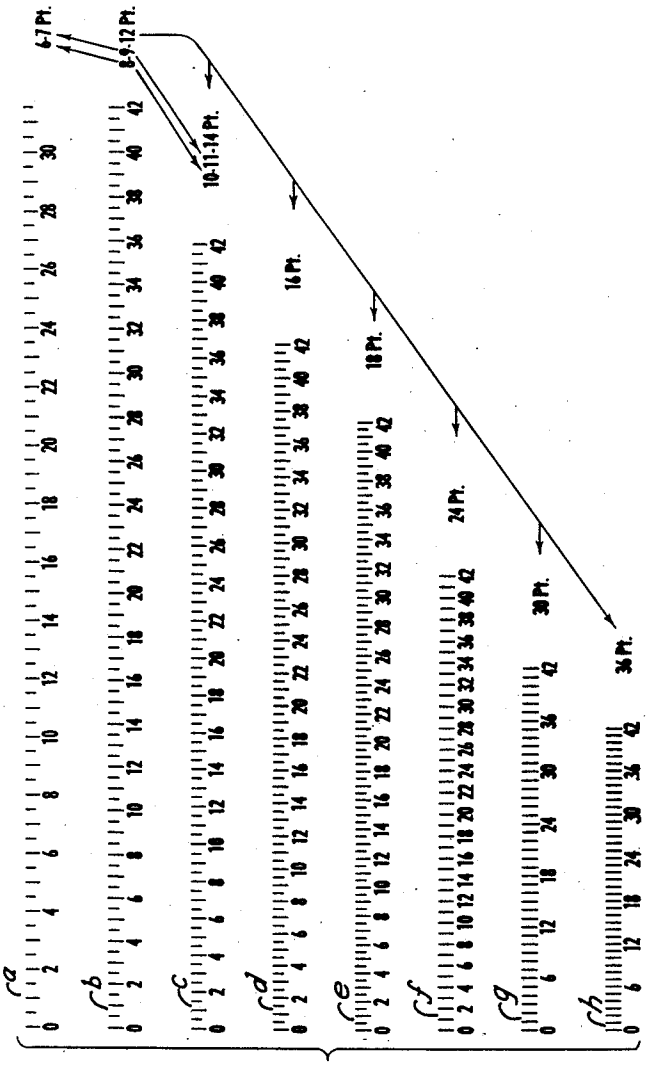


Fig. 2

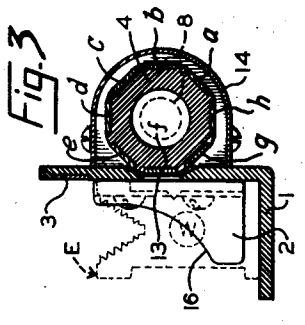


Fig. 3

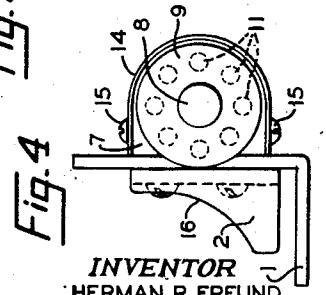


Fig. 4

Fig. 5

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HAND STICK FOR USE IN PRODUCING TYPE MATTER PHOTOGRAPHICALLY

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4 Claims. (Cl. 95—4.5)

1

This invention relates to the composition by hand of character-bearing elements or matrices designed for use in the production of lines of type matter photographically in different type sizes from a font of elements bearing characters of a given point-size.

More particularly, the invention is directed to a hand-stick of novel construction and useful in conjunction with typographical machines adapted to photographically reproduce the characters of composed lines of character-bearing elements in a variety of different type sizes, the object being to provide a hand-stick adapted to furnish the compositor with a direct-reading indication of the length to which a line of elements of a given point-size should be composed in order to photographically reproduce therefrom a line of images of a desired length in a desired enlarged or reduced type size.

According to the embodiment of the invention herein shown by way of example, there is provided a hand-stick having shelf or platform means for supporting a composed line of photographable character-bearing elements; a fixed em-scale serving as a visual guide for composing lines of elements of proper length for obtaining reproductions in a one-to-one ratio, and a plurality of additional em-scales mounted on a rotatable drum and graduated each in proportion to photographic reproductions in a different ratio, there being provided in the supporting shelf an elongated window through which any selected scale on the drum is rendered visible upon rotation of the drum, by means of a knob, to appropriate positions fixed by a locating detent.

From the ensuing description it will be apparent to those skilled in the art that the hand-stick of the invention may be used to advantage in connection with the composition by hand of photographable character-bearing elements or matrices of variant forms and in conjunction with different types of photographic reproducing machines.

The invention will be clearly understood from the description to follow and by reference to the accompanying drawings wherein:

Figure 1 is a plan view of the hand-stick of the invention with one of the proportionately graduated scales visible through the window in the base or element supporting platform of the stick.

Figure 2 shows a series of eight proportionately graduated scales such as may be provided for selective use on the hand-stick of Figure 1.

Figure 3 is a section taken on the line 3—3 of Figure 1.

2

Figure 4 is an end elevation viewed from the right hand end of Figure 1.

Figure 5 is a perspective view of a photographable character-bearing element such as may be used in connection with the hand-stick of the invention.

For illustrative purposes the invention is herein described in connection with the composition by hand of character-bearing elements of the kind disclosed in my Patent No. 2,231,899, such elements being employed in the photocomposing machines of my pending applications Serial No. 587,062 filed April 7, 1945, now abandoned, and Serial No. 94,766 filed May 23, 1949, now Patent No. 2,552,832, issued May 15, 1951. It may be pointed out here that while the foregoing machines provide for the composition of lines of elements through manipulation of a keyboard, there are occasions when lines containing special or odd characters not available on the keyboard are required. The hand-stick of the present invention is intended to meet such needs as well as to serve as the principal medium for composing lines of elements in conjunction with photographic reproducing machines devoid of keyboard composing facilities.

Fig. 5 illustrates an element E which bears the photographable character "W" on a negative film plaque P suitably embedded in the broad side of the element body, the over-all edgewise thickness T of the body representing the setwise width of such character. The "reference" letter, designated R, on the front edge of the element corresponds to the character on the film plaque P, and by means of similar appropriate letters on each element the compositor is enabled readily to identify and check the words in a composed line of elements.

The element E of Fig. 5 represents one element of a complete type font which comprises several elements bearing duplicates of each of the alphabetical characters, numerals and punctuation marks ordinarily required for printing, and as well understood the edgewise thickness T of the body of the elements differs according to the variant setwise widths of their respective characters. Further, the characters of any given font are of a basic point-size of type and may be reproduced in different desired point-sizes by projecting enlarged or reduced images thereof onto a sensitized medium provided in the photographic reproducing machine. In the machines of the pending applications hereinabove mentioned, the sensitized medium such as photographic film or paper is carried in a light-tight holder which is arranged to move step-by-step under control of

the body thickness of the elements as they are individually removed from the leading end of the composed line thereof and presented in succession for letter-by-letter exposure at a photographing position. By means of a variable ratio transmission the step-by-step movements of the film holder may be relatively proportioned to the element thicknesses in accordance with the degree of photographic enlargement or reduction of the images projected by an adjustable optical system. In other forms of photographic reproducing machine, for example such as disclosed in U. S. Patents No. 2,042,041 to Friedman et al. and No. 1,543,527 to Smothers, the sensitized medium and the optical system are adjusted to suit the desired degree of enlargement or reduction and in a single exposure of the entire composed line of elements the reproduced line of images is obtained.

Naturally, if it be desired to obtain a photographically reproduced line of images in the same type size as that of the characters borne by the elements of a given font (reproductions in a one-to-one ratio) one would compose a line of elements to the length desired for the reproduced line, using either blank word-space elements of suitable thickness or a known form of justifying spacer elements.

However, when a line of some predetermined length is desired in a photographically enlarged or reduced point-size of type, there arises the problem of composing the line of elements to a length so proportioned to the degree of optical enlargement or reduction as still to result in a reproduced line of the desired length. As will later appear, the hand-stick of the present invention provides a solution of this problem by furnishing the compositor with direct-reading line-measure scales for a number of different point-sizes, thus eliminating the necessity for such time-consuming calculations as would be required if only a single em-scale were provided.

As illustrated, the hand-stick comprises the elongated L-shaped supporting shelf or platform 1 upon which the character-bearing elements are assembled or composed on their edges and in orderly fashion by hand, the elements being taken individually out of suitable storage compartments or trays. As well understood, the compositor holds the hand-stick in one hand with the platform 1 directed somewhat downwardly and its left end (as viewed in Fig. 1) pointed toward him, there being provided a right angle abutment 2 secured to the left end of the platform 1 to provide an upright transverse end wall for supporting the composed elements upright on their edges.

A standard printer's em-scale 3 (6 picas to the inch) as ordinarily provided on hand-sticks is secured at a convenient location on one of the legs of the platform 1, such scale serving to guide the compositor in sighting the length of the line of elements being composed. As apparent, the length of the composed line of elements is equal to the sum-total of the thicknesses T of the elements accumulated edgewise from the abutment 2. Therefore the reading on the scale 3 is a direct indication of such sum-total measurement and is realistic in the sense that a line of type matter reproduced in a one-to-one ratio from the characters of the assembled elements will be of such indicated length.

To provide the compositor with a direct-reading guide for composing lines of the proper length for obtaining therefrom reproduced lines of a desired length in type sizes differing from that of a basic font of elements, the hand-stick of the invention is provided with a plurality of em-scales (*a, b, c, d, e, f, g, h*) as shown diagrammatically in Fig. 2, each scale being graduated in proportion to photographic reproductions in a different ratio.

In the present embodiment and by way of example, the aforesaid scales are arranged lengthwise and at uniformly spaced intervals around the periphery of a drum 4 extending longitudinally beneath the wider leg of the L-shaped platform 1. The drum 4 is bored out at opposite ends to receive similar hubs 5 to which it is pinned (see pin 6 in Fig. 1), the hubs 5 and accordingly the drum 4 being rotatable in suitable end bearings 7 through which a reduced outwardly extending portion 8 of the respective hubs pass, the bearings 7 being secured to the underside of the wide legs of the platform 1.

The drum 4 may be rotated by turning the knob 9 which is pinned to the hub extension 8 at the right end of the hand-stick as viewed in Fig. 1. The annularly enlarged portion 10 of the right hand hub 5 is provided in its outer face with depressions 11, Fig. 4, cooperative with a spring-ball detent 12, Fig. 1, by which the drum 4, upon turning the knob 9, is definitely located to position one or another scale in register with the elongated open window or slot 13 in the wider leg of the platform 1. The symmetrical arrangement of the depressions 11 relative to the respective em-scales on the drum 4 will be evident by reference to Figs. 3 and 4.

The em-scales *a* to *h* inclusive may be held in place on the drum 4 in any suitable manner, for example as by cementing or otherwise securing them individually in shallow longitudinal grooves formed in the surface of the drum, as clearly indicated in Fig. 3. Obviously any number of scales graduated in any desired proportions may be provided, and instead of using individual strips for each scale, the group of scales may be printed or otherwise impressed upon a continuous sheet of suitable material which itself may be wrapped around the drum, the scales being relatively spaced in correspondence with the respective drum locating depressions 11. The composite showing of the eight scales in Fig. 2 may be construed as significant of such arrangement of the scales impressed upon a single sheet.

It will also be noted in Figure 2 that the scales are arranged in orderly numerical sequence with respect to the point-size designations thereon so that clockwise rotation of the hand knob 9 (Figure 1) exposes the scale of next larger ratio and counter-clockwise rotation the scale of next smaller ratio.

To enable the hand-stick to be comfortably and conveniently gripped in the user's left hand without contacting the scale drum, there is provided a shield or cover 14 suitably secured as by screws 15 to the opposite end bearings 7.

The cut-back formation 16 of the upright leg of the abutment 2 leaves exposed a sufficient portion of the end element of a composed line of elements for easily gripping and lifting the line of elements bodily off the platform 1 to place it in a photographic reproducing machine.

Referring to the differently graduated scales illustrated in Fig. 2, attention is first directed to the scale designated "*b*" which corresponds exactly to the standard pica scale 3 secured to the wider leg of the hand-stick. The scale "*b*" is positioned at the window 13 (by turning the knob

9) when reproductions in a one-to-one ratio are desired from any one of the three basic type size fonts of elements marked at the right end of this scale, that is an 8, 9 or 12-point font.

At this juncture it may be explained that it is purely a matter of choice as to the actual type size and number of basic fonts of elements that may be available for composing lines from which to obtain reproductions in a one-to-one ratio and in other desired ratios by optical enlargement or reduction. For example, a 12-point font alone may be adopted as the basic size from which reproductions ranging from say 6-point to 36-point and even larger may be obtained, it being necessary only that there be provided in the photographic reproducing machine an optical system capable of effecting such degrees of enlargement or reduction as are appropriate to these or any other type sizes that may be desired.

For technical and practical reasons having no direct bearing upon the present invention it may be considered that the aforesaid three basic fonts of elements which respectively carry 8, 9 and 12-point photographable characters are available for use in composing lines from which to reproduce type matter in the commonly used sizes ranging from 6-point to 36-point. As indicated by the arrows in Fig. 2, the basic 8-point font is used to obtain 6, 8 and 10-point reproductions; the basic 9-point font to obtain 7, 9 and 11-point reproductions, and the basic 12-point font to obtain reproductions in 12, 14, 16, 18, 24, 30 and 36-point sizes.

The scales *a* to *h* inclusive are graduated in direct proportion to the type sizes to which they respectively apply, that is, in accordance with the ratio between the reproduced point-size indicated at the right hand end of each scale and the point-size of the basic font from which such reproduction is obtained.

Considering first the scales *c* to *h* which apply to the abovementioned enlarged reproductions obtained from the basic 12-point font, it will be seen that the 12 em line-length mark on the standard scale *b* (the one-to-one ratio scale) corresponds to or aligns vertically with the 14, 16, 18, 24, 30 and 36 em line-length marks on the respective scales *c*, *d*, *e*, *f*, *g* and *h*. Assuming purely as an arbitrary example that a line 12 ems in length is desired in each of the enlarged type sizes mentioned, these scales are graduated as follows:

Scale *c* in a ratio of 14:12 or 7:6; whereby a line of elements from the 12 pt. font when composed to the 12 em mark on scale *c* will be foreshortened by 2 ems, thus compensating for the one-sixth enlargement which reproduces a 12 em line in 14 pt. type.

Scale *d* in a ratio of 16:12 or 4:3; whereby the line of elements composed to the 12 em mark on this scale will be foreshortened by 4 ems, thus compensating for the one-third enlargement which reproduces a 12 em line in 16 pt. type.

Scale *e* in a ratio of 18:12 or 3:2 whereby the line of elements composed to the 12 em mark on this scale will be foreshortened by 6 ems, thus compensating for the one and one-half times enlargement which reproduces a 12 em line in 18 pt. type.

Scale *f* in a ratio of 24:12 or 2:1; whereby the line of elements composed to the 12 em mark on this scale will be foreshortened by 12 ems, thus compensating for the double enlargement which reproduces a 12 em line in 24 pt. type.

Scale *g* in a ratio of 30:12 or 2.5:1; whereby the line of elements composed to the 12 em mark on this scale will be foreshortened by 18 ems, thus compensating for the two and one-half times enlargement which reproduces a 12 em line in 30 pt. type.

Scale *h* in a ratio of 36:12 or 3:1; whereby the line of elements composed to the 12 em mark on this scale will be foreshortened by 24 ems, thus compensating for the triple enlargement which reproduces a 12 em line in 36 pt. type.

Attention is now directed to obtaining reproductions in 10 and 11 pt. type respectively from the basic 8 and 9-point fonts, using the scale *c*, and to obtaining 6 and 7 pt. reproductions from such fonts, using the scale *a*.

Obviously, since the scale *c* is graduated in the ratio of 7:6 (the exact proportion for obtaining 14 pt. type from the basic 12-point font, using either a 7/6× lens or focal adjustments to suit) it is slightly out of conformity with the 10:8 and 11:9 ratios necessary to obtain exactly 10 and 11 pt. type sizes. Thus, to obtain exactly 10 pt. from the 8-point font a scale graduated in the 10:8 ratio (its 15 em graduation aligned with the 12 em mark on the standard scale *b*), and either a 5/4× lens or an optical system adjusted for equivalent enlargement would be required. To obtain exactly 11 pt. from the 9-point font a scale graduated in the 11:9 ratio (its 14.6 em graduation aligned with the 12 em mark on scale *b*) and either a 11/9× lens or an optical system adjusted for equivalent enlargement would be required.

A similar situation arises with respect to the scale *a* which is graduated in the ratio of 3:4 (the exact proportion for obtaining 6 pt. type from the basic 8-point font, using either a 3/4× lens or focal adjustments to suit) and is thus slightly out of conformity with the 7:9 ratio necessary to obtain exactly 7 pt. type from the basic 9-point font, wherein a scale graduated in the 7:9 ratio (its 9.3 em graduation aligned with the 12 em mark on the standard scale *b*) and a 7/9× lens or an optical system adjusted for equivalent reduction would be required.

As stated, the foregoing non-conformities are only slight, in fact so slight that to provide an excessive number of specially graduated scales and either appropriate fixed focus lenses or equivalent optical adjustments to suit would be unwarranted.

Assuming, therefore, that the 7:6 ratio scale *c* and a 7/6× lens, appropriate directly to obtaining 14 pt. type from the basic 12-point font, is used also to obtain the indicated 10 and 11 pt. type respectively from the basic 8 and 9-point fonts, again using a 12 em length of line as an arbitrary example:

Elements from the basic 8-point font when composed to the 12 em mark on scale *c* will be enlarged one-sixth by the lens and thus produce a 12 em line (as measured on scale *b*) in type measuring 9.3 pts. instead of the full indicated 10 pts. (7/6×8 pt.=9.3 pts.).

Elements from the basic 9-point font when composed to the 12 em mark on scale *c* will be enlarged one-sixth by the lens and thus produce a 12 em line (as measured on scale *b*) in type measuring 10.5 pts. instead of the full indicated 11 pts. (7/6×9 pt.=10.5 pts.).

Similarly, assuming that the 3:4 ratio scale *a* and a 3/4× lens, appropriate directly to obtaining 6 pt. type form the basic 8-point font, is

used also to obtain the indicated 7 pt. type from the basic 9-point font:

Elements from the basic 9-point font when composed to the 12 em mark on scale *a* will be reduced one-quarter by the lens and thus produce a 12 em line (as measured on scale *b*) in type measuring 6.75 pts. instead of the full indicated 7 pts. (3/4×9 pt.=6.75 pts.).

The foregoing off-size reproductions, namely 9.3 pts. for 10 pt.; 10.5 pts. for 11 pt. and 6.75 pts. for 7 pt. will be recognized by those skilled in the design and use of type to be in full accord with the known and accepted principle that the "point-size" by which printing type is designated is unrealistic from a purely mathematical standpoint.

To explain, the term "point-size" is used to designate the "over-all" vertical space within which the top of ascending letters and bottom of descending letters must be confined in order to be classified under a particular size designation. However, taking a 10 pt. type size designation as an example, the ascending and descending letters of a given type face design need not, and seldom do, occupy the full heightwise space of 10 points. The fact is that the artist who designs a type face simply works and manipulates within the alloted 10 pt. maximum limit, forming and proportioning the different letters according to some concept or predetermined effect he wishes to attain. As a result, the over-all heightwise space actually occupied by one or another type face designated as 10 pt. varies among the many different type face designs used in printing and may or may not conform to an exact mathematical measurement, and this principle holds true for any designated point-size of type including those indicated on the scales *d* to *h*.

As a further consideration it may be explained that it is common practice among type designers to improve the readability of type, especially in the smaller sizes, by making the "*x*" or "*o*" letters (letters devoid of ascending or descending stems) somewhat oversize, thus reducing the differential or proportionate relationship between their height and the height of the associated ascender and descender letters. The object of this is to make the printed letters clearer and thus easier to read by virtue of providing maximum size "bowls" or openings in such letters as "*a, e, g, s*" for example.

Applying this technic to the basic 8 and 9-point fonts herein, the "*x*" or "*o*" letters may be made four-tenths oversize, that is 8.4 pts. and 9.4 pts. for the respective fonts, while the over-all height of the type face remains a true 8 or 9-point. In such case it will be apparent that the reproductions obtained from the oversize letters of these basic fonts will be correspondingly altered in a direction favorable to bringing them substantially to the point-sizes designated on the scales *c* and *a* respectively. Thus, the oversize 8.4 pt. letters will provide reproductions in connection with the scale *c* and 7/6× lens which measure 9.8 pts. and reproductions in connection with the scale *a* and 3/4× lens which measure 6.3 pts. The oversize 9.4 pt. letters will provide reproductions in connection with the scale *c* and 7/6× lens which measure 10.96 pts. and reproductions in connection with the scale *a* and 3/4× lens which measure 7.05 pts.

Accordingly, by using the scales *c* and *a* as common scales for several type sizes, the "over-all" size of the reproductions will deviate from the actual indicated point sizes only to the negligible extent indicated in the fourth paragraph back and which is wholly within expectations according to standard and accepted practice in the art. Moreover, the "*x*" or "*o*" letters, made somewhat oversize as just explained, will deviate still less from such indicated point sizes.

From the foregoing it will be seen that the invention provides a hand-stick of novel construction having wide utility and affording great convenience and saving of time in the composition of character-bearing elements from which to produce lines of type matter photographically in different lengths and sizes of type, it being necessary only for the user to rotate into active position an em-scale marked with the point-size of type it is desired to produce, then compose the elements to the desired line-measure mark or graduation on the selected scale.

What is claimed is:

1. A hand-stick for typographical composition comprising an elongated member of generally L-shaped cross-section for supporting in face-to-face abutting relation a composed line of typographical elements bearing photographically reproducible type characters of a given basic point-size and having thicknesses proportional to the setwise widths of the characters respectively borne thereby, a transversely extending stop at one end of said supporting member for engaging the element at one end of said line of elements, an elongated window in one side of said supporting member, a drum rotatably mounted on said supporting member and bearing a plurality of differently calibrated scales each graduated in inverse proportion to the ratio between the point size of the reproduction and said basic point size, said scales being positioned on said drum for selective visual registration with said window so that said stop is in alignment with a predetermined reference point on the scale, whereby when a line of elements is assembled on said supporting member with the element at one end of the line in abutment with said stop, the position of the element at the opposite end of the line relative to the scale thus in registration will indicate the length of a line of characters reproducible therefrom at a size ratio corresponding to that of the scale.

2. A hand-stick according to claim 1, wherein the scale supporting drum is rotatable in bearings secured to the opposite ends of the underside of the element supporting member, and said drum is shielded by a cover secured to said bearings.

3. A hand-stick according to claim 1, wherein said stop is recessed to provide finger clearance for gripping a line of elements to remove it bodily from said platform.

4. A hand stick for typographical composition comprising an elongated member of generally L-shaped cross-section for supporting in face-to-face abutting relation a composed line of typographic elements bearing photographically reproducible type characters of a given basic point-size and having thicknesses proportional to the setwise widths of the characters respectively borne thereby, a transversely extending stop fixed to one end of said supporting member within said L for engaging the element at one end of said line of elements, an elongated window in one side of said supporting member confronting the interior of said L and extending under said stop, a pair of spaced bearings secured to the exterior of said supporting member near the ends of said window, a rotatable drum of

polygonal cross-section mounted for rotation in said bearings and having on its polygonal surfaces a plurality of scales positioned for selective registration with said window when said drum is rotated and having reference points aligned with said stop, each of said scales having a different nominal point-size indication thereon and being graduated in inverse proportion to the ratio between the nominal point-size thereon and said basic point size, whereby when a line of elements is assembled on said supporting member with the element at one end of said line abutting said stop, the position of the element at the opposite end of the line will indicate on the scale in registration with said window the length of line of characters reproducible from the assembled elements at a size corresponding

to that of the nominal point-size borne by that scale, and a detachable housing surrounding said drum and secured to said supporting member.

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