Feb. 15, 1938. G. A. BETTS 2,108,039

PRINTING PLATE UNIT

Filed March 11, 1937 3 Sheets-Sheet 1

Fig. 1.

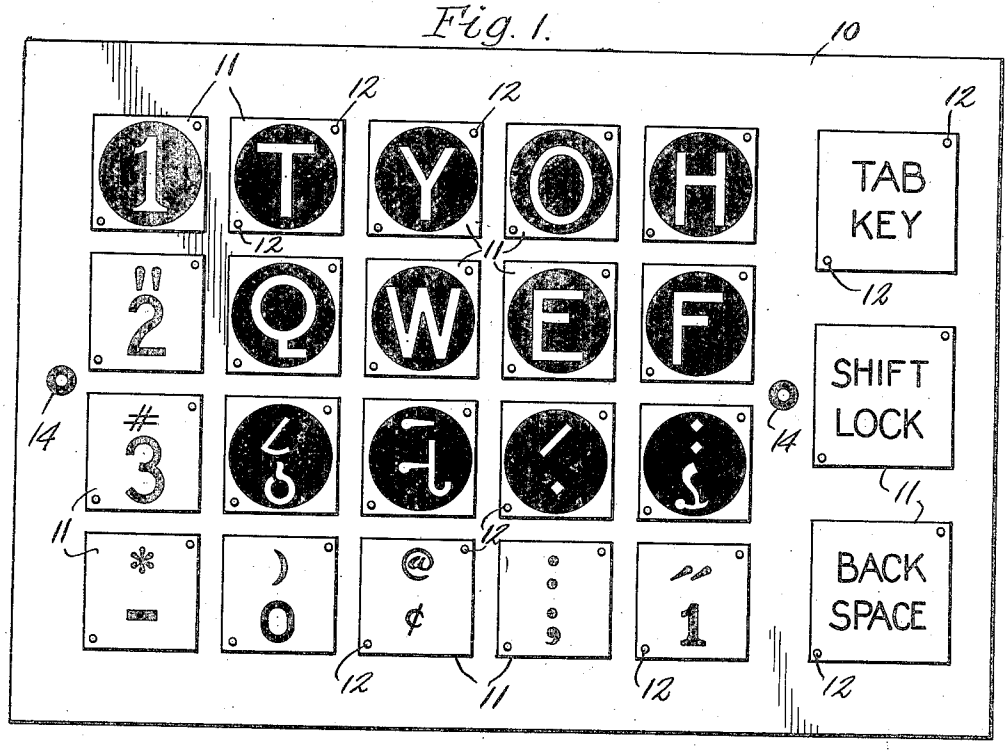


Fig. 2.

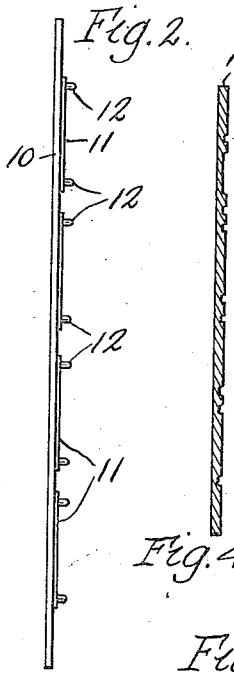


Fig. 3.

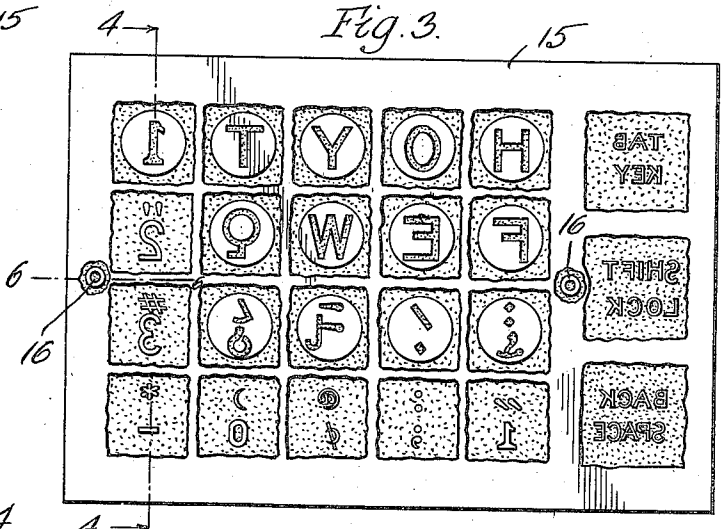
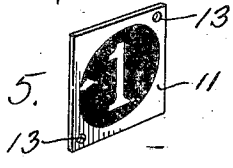


Fig. 4.

Fig. 5.



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PRINTING PLATE UNIT

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Fig. 8.

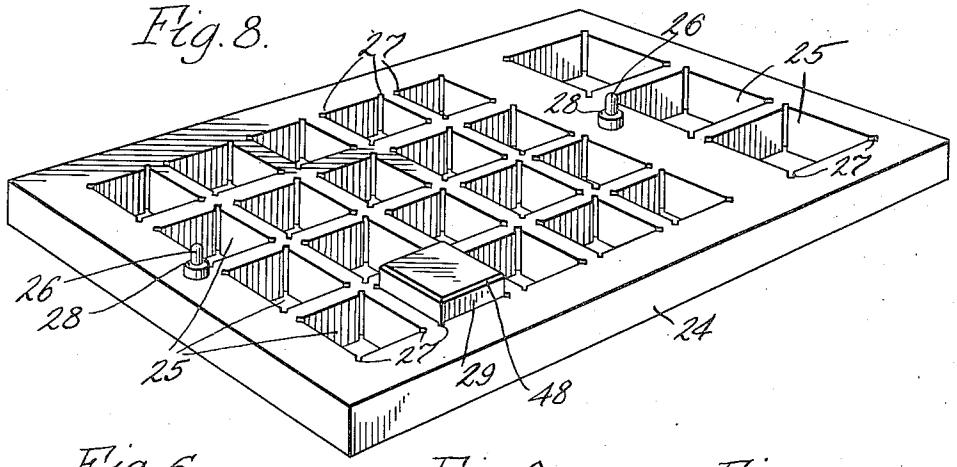


Fig. 6.

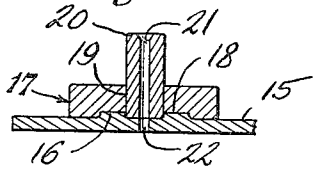


Fig. 9.

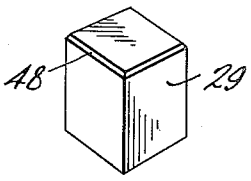


Fig. 10.

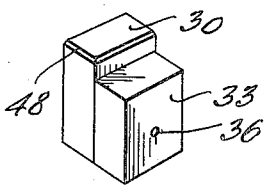
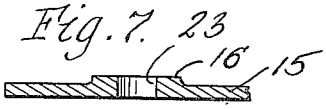


Fig. 7.



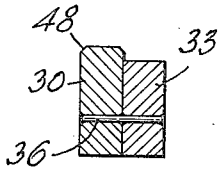


Fig. 13.

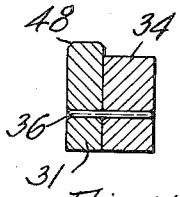


Fig. 14.

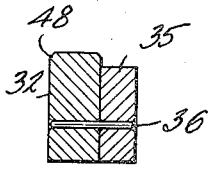


Fig. 15.

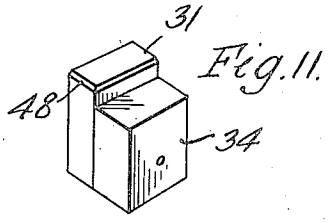


Fig. 11.

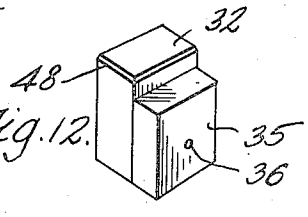


Fig. 12.

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PRINTING PLATE UNIT

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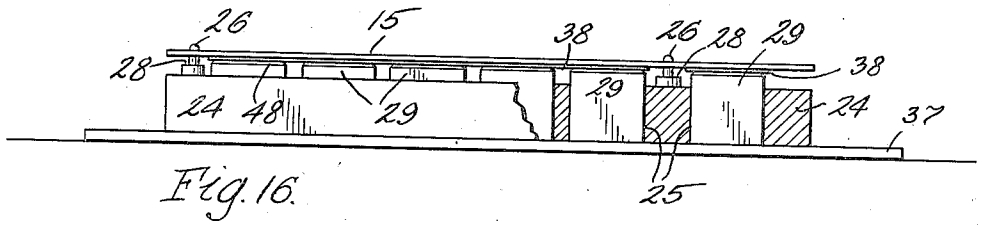


Fig. 16.

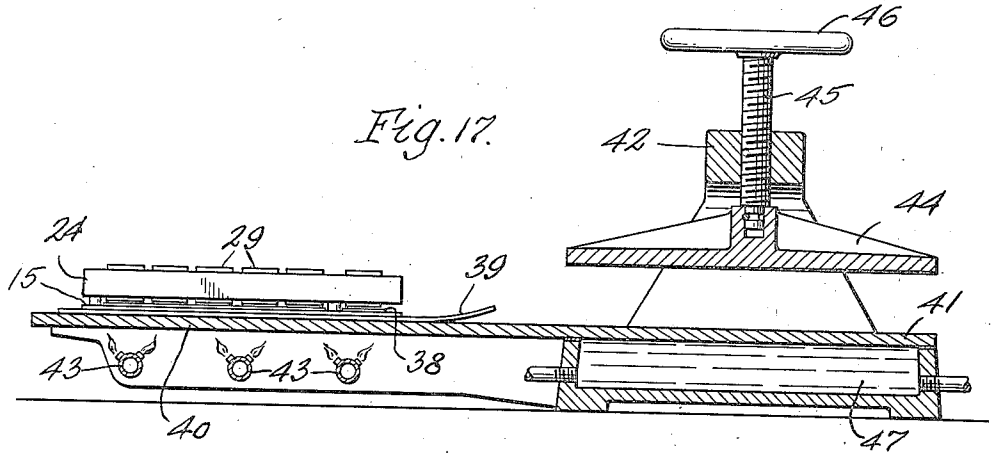


Fig. 17.

Fig. 18.

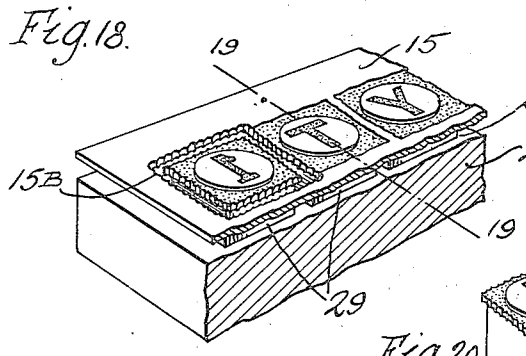
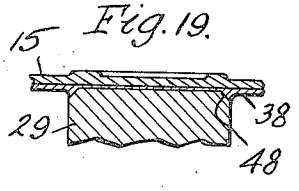


Fig. 19.



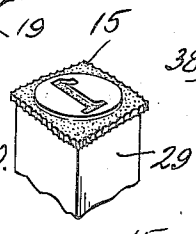


Fig. 20.

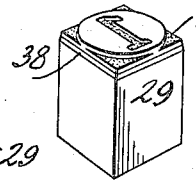


Fig. 22.

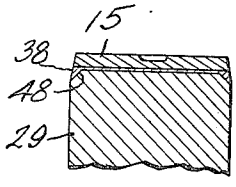


Fig. 21.

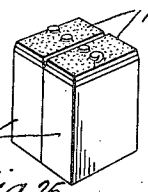


Fig. 25.

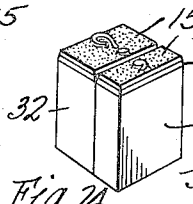


Fig. 24.

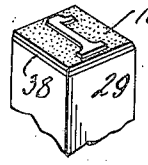


Fig. 23.

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Patented Feb. 15, 1938 2,108,039

UNITED STATES PATENT OFFICE

2,108,039

PRINTING PLATE UNIT

Gilbert A. Betts, Buffalo, N. Y., assignor to The Universal Engraving & Colorplate Company, Incorporated, Buffalo, N. Y.

Application March 11, 1937, Serial No. 130,281

11 Claims. (Cl. 101—401.2)

This invention relates to printing plates and particularly to printing plate units, each of which has one or more printing characters accurately located thereon, whereby the units may be assembled in any desired grouping without spacing or with standard spacing, and the characters of the group will then register to exact predetermined positions in printing.

One object of the invention is to provide an improved means and method for accurately locating the printing characters on the bases of individual printing units, and which will not materially increase the cost of manufacture.

Another object of the invention is to provide an improved means and method of making printing plate units, with which the printing characters will be accurately located on the bases of the units and thus enable the units to be assembled in any desired grouping for gang printing and the printed characters stamped from the printed sheet with gang presses, and with which the printing characters will always be properly aligned and positioned on the bases for such gang printing and stamping regardless of the grouping or arrangement of the units of the same size.

Another object of the invention is to provide an improved method of making printing plate units with which the printing characters will be located on the units in an accurately predetermined relation thereto, and which will be relatively simple, practical and inexpensive.

Another object of the invention is to provide an improved method and means for forming printing plate units, with which greater accuracy in locating the printing characters on the units in accordance with a predetermined plan is possible without material increase in the cost of manufacture, and without the use of expensive equipment.

Various other objects and advantages will appear from the following description of an embodiment and practical application of the invention, and the novel features will be particularly pointed out hereinafter in connection with the appended claims.

In the accompanying drawings:

Fig. 1 is a front or face elevation of a copy plate mounting the characters for which printing plate units are desired, and representing the first step in the improved method;

Fig. 2 is a side or edge elevation of the same;

Fig. 3 is a front elevation of a printing plate, such as a photo-engraving, made from the copy plate of Fig. 1 and representing an intermediate step in the improved process;

Fig. 4 is a sectional elevation of the same, the section being taken approximately along the line 4—4 of Fig. 3;

Fig. 5 is a perspective of one of the copy cards mounted on the copy plate of Fig. 1;

Fig. 6 is a sectional elevation through a portion of the printing plate of Fig. 3, the section being taken approximately along the line 6—6 in Fig. 3, but having applied to the printing plate means used in a preliminary step in drilling the register holes in the printing plate;

Fig. 7 is a sectional elevation of the same portion of the printing plate after the register hole has been drilled and which illustrates the next succeeding step after that shown in Fig. 6;

Fig. 8 is a perspective of the mounting block or form which is used in performing other intermediate steps in the process;

Fig. 9 is a perspective of a unit base which is used in the improved process;

Fig. 10 is a perspective of a fractional unit base and having a spacer attached thereto for locating the fractional base accurately in an aperture of the mounting block which is larger than this particular fractional base unit;

Fig. 11 is a perspective similar to Fig. 10 but illustrating a fractional base and spacer as of a different size;

Fig. 12 is a perspective similar to Figs. 10 and 11 but illustrating a spacer and fractional unit base of still different dimensions;

Fig. 13 is a transverse sectional elevation through the fractional unit and spacer of Fig. 10;

Fig. 14 is a transverse sectional elevation through the fractional unit base and spacer of Fig. 11;

Fig. 15 is a transverse sectional elevation through the fractional unit base and spacer of Fig. 12;

Fig. 16 is a side elevation, partly in section, of an assembly used in performing still another step in the improved process;

Fig. 17 is a sectional elevation of means for soldering the printing plate to the individual unit or fractional bases and illustrating still other steps in the improved process;

Fig. 18 is a perspective of a printing plate with attached bases, illustrating the manner of cutting it into individual printing units;

Fig. 19 is a sectional elevation through a portion of the element shown in Fig. 18, the section being taken approximately along the line 19—19 of Fig. 18;

Fig. 20 is a perspective of a printing unit after

the printing plate with attached bases has been cut into individual units or fractional units;

Fig. 21 is a sectional elevation through the unit shown in Fig. 20, but after the printing plate section secured on the end thereof has been cut to proper size;

Fig. 22 is a perspective of one finished printing plate unit made in accordance with this invention and illustrating one character thereon;

Fig. 23 is a perspective similar to Fig. 22 but illustrating a different type of printing character on the unit;

Fig. 24 is a perspective of two fractional units assembled side by side to make a composite unit, such as may be made from the bases shown in Figs. 11 and 12; and

Fig. 25 is a perspective similar to Fig. 24 but illustrating a printing unit made from fractional bases or units of the size shown in Fig. 10.

In the illustrated embodiment of the invention, the invention is applied, by way of example, to the manufacture of printing plate units for the printing of key cards for typewriters, that is, for printing upon key cards the characters corresponding to those of the type attached to the same key. It will be understood, however, that the invention in its broader aspects is of general application and is useful for the printing of other characters in quantities and in different desired groupings. By way of further example, the invention can be used for the printing of bottle tops or milk bottle caps and for various other similar purposes.

In the preparation of the printing units, the characters from which the printing units are to be made are provided, preferably on an enlarged scale, on a copy plate 10, Fig. 1, and for convenience the individual characters are provided on individual copy cards 11 which are detachably connected to the copy plate 10 in any suitable manner. While the copy plate 10 may be of any suitable material, and card board has been used as such a copy plate, I have found that a metal plate, such as an aluminum plate, is preferable because it undergoes fewer changes with atmospheric changes than the card board, and it does not warp like card board with changes in humidity.

The copy plate 10 may be provided, for example, with pins 12 arranged in pairs, and each of the copy cards 11 is provided with apertures at diagonally opposite corners which may be fitted over the pins 12. Thus if the copy of the character from which any printing unit is to be made is located accurately on the card 11 with respect to the apertures 13 thereof, when the cards may be mounted on any of the pairs of pins 12 on the copy plate 10 and the character on each card will have an accurate and uniform location with respect to the pins 12 on the copy plate. The pins 12 of different pairs may not all have the same spacing with respect to one another in the same pair, because cards of different sizes for mounting copy of printing characters of different sizes may be desired, and different spacing of the pins 12 of each pair for those cards could then be different. In Fig. 1 two different sizes of copy cards are illustrated but it will be understood that other sizes may also be provided if desired. Preferably the copy cards of the same size are grouped together.

The copy plate 10 is also provided with register marks 14 at a plurality of spaced points thereon, and which remain on the plate 10 notwithstanding interchange and regrouping of copy cards on the copy plate. While any suitable type of register marks 14 may be employed, I found that annular rings applied directly to the face of the copy plate are very suitable for this purpose. Such rings may be applied directly to the face of the copy plate with India ink and will remain undisturbed even though different copy cards may be mounted on the plate 10.

Assuming that a group of cards bearing copy for which printing units are desired has been mounted on the pins 12 of the copy plate 10, as shown in Fig. 1, the next step is to prepare a printing plate from that copy plate. While any suitable means may be employed for making the printing plate, it is essential that the printing plate be made accurately to scale, preferably at a reduced scale, and of metal, and the photographic process is preferred for this purpose. I have found that photo-engravings and photolithographs, or various etchings are very practical for this purpose, and in Fig. 3 I have illustrated a photo-engraving 15 made at a reduced scale from the copy plate 10 bearing the copy cards shown in Fig. 1.

This photo-engraving is preferably made with a prism camera which produces a photographic negative which is the same as the copy from which it is made, except as to scale. When that negative is transferred to metal it provides a reverse copy from that on the copy plate 10, as shown in Fig. 3. The characters may appear as etched cavities on an unetched background or as unetched characters on an etched background, examples of both of which are shown in Figs. 3 and 4, and 22 and 23. The processes of forming photo-engravings and other printing plates from copy is well known in the industry and therefore a detailed explanation is believed unnecessary. It will be understood, however, that any of the known means of making printing plates from copy may be employed, and that the reference to use of photo-engravings is made merely by way of example and as one of the preferred embodiments of the invention.

In making the photo-engraving or printing plate 15, the register marks 14 of the copy plate will appear as register marks 16 on the photo-engraving or printing plate. Thus the register marks 16 may be annular rings with etched border and center. The next step is to drill holes through the register marks 16 in accurate registry therewith, that is, to drill out the etched centers of the register rings 16. This procedure is illustrated in Figs. 6 and 7. Any suitable means may be employed for drilling holes through the register marks or rings but the method should be accurate and a simple yet accurate method is illustrated in Figs. 6 and 7. For this purpose a block 17 is provided on one face with a circular depression 18 which snugly fits the outer periphery of each register ring 16 and this block is provided with an accurately centered aperture 19. A sleeve 20 is slidingly fitted in the aperture 19 so as to slide through the block 17 from face to face.

The lower end of the sleeve 20 is accurately of the same size as the center of the register ring 16 and enters the etched center cavity within the register ring 16, as shown in Fig. 6. By having the sleeve 20 and the block 17 separate, and slidable endwise with respect to one another, it is easier to obtain an accurate fitting of the same over the elevated register ring 16. The sleeve 20 has a small hole 21 drilled accurately therethrough from end to end, and accurately at its center. With the sleeve 20 and block 17 fitted

over the register ring 16, as shown in Fig. 6. A drill having the size of the hole 21 is guided through the sleeve 20 into contact with the printing plate 15, and a hole 22 is drilled in the printing plate 15. The block 17 and sleeve 20 are then removed, and with the hole 22 of Fig. 6 as the centering guide for a larger drill, a larger hole 23 is drilled in the plate 15 within the register ring 16. The hole 23 is usually of approximately the same size as the inner diameter of the register ring 16.

A mounting block or assembling form 24 is provided with a plurality of apertures 25 which extend from face to face thereof, and which are of standard, accurate sizes and accurately spaced from one another in a definite, predetermined relation and scale with respect to the arrangement of copy on the copy plate 10. For example, some of the apertures 25 may have one standard size, such as approximately that of the characters of the larger group on the printing plate 15 and also having a group of larger apertures which correspond in scale to the larger characters at the right of the copy plate 10 in Fig. 1. This mounting block or assembling form 24 is also provided with pins 26 projecting from a face thereof and which at their free ends have a diameter closely conforming to the diameter of the drilled holes 23. The pins 26 are spaced from one another accurately according to the holes 23 in the printing plate 15. These pins 26 are located on the form or block 24 in exactly the same relation to the apertures 25 that the characters on the printing plate 15 occupy with respect to the register rings 16. Thus the printing plate 15 may be superposed over the mounting block 24, and the pins 26 will pass upwardly through the drilled holes 23, as shown in Fig. 16, and when the printing plate is so mounted or superposed over the mounting block 24, the various printing characters on the printing plate 15 will be accurately aligned or positioned over the apertures 25 in the block 24.

The apertures 25 are preferably square, transversely to their axes, but the corners may be notched slightly as at 27 in order to avoid filets at the corners. The notches 27 are merely a manufacturing expedient. The pins 26 preferably have shoulders 28 intermediate of their ends for a purpose which will appear presently. A plurality of metal bases 29, Fig. 9, may be provided for insertion into the apertures 25. These bases 29 may be made of any suitable material, preferably metals such as brass or copper, and are square in transverse section so that they may be inserted into the apertures 25 of the block 24, and when so inserted will snugly, yet slidingly fit those apertures. The blocks 29 are made of standard sizes so as to fit the apertures 25 of different but standard sizes in the block 24. In some instances, more than one character is provided on a copy card, examples of the same being shown in the two lower rows at the left hand side of the copy plate in Fig. 1.

In some instances, such as in typewriter key cards, various combinations of characters on a single card may be desired, such, for example, the various combinations shown in the lower row of the copy cards in Fig. 1. Accordingly, it is desirable to mount some of these characters, particularly the smaller characters, on fractional bases, so that after the fractional units are formed they may be assembled in different combinations of characters printed from such combination units. For this purpose, I provide a series of fractional bases 30, 31 and 32, shown in Figs. 10 to 15. Ordinarily, each of these small printing characters is mounted on an individual fractional base, as will now be explained, but it will be understood that a desired group of such characters may be mounted on a single full size, unitary base unit, the same as any other printing character if desired.

The fractional bases 30, 31 and 32 are of different thicknesses and in order that they may be accurately located in the apertures 25 of the mounting block 24, I provide spacers or furniture pieces 33, 34 and 35, Figs. 10 to 15, which are shorter than the bases and fractional bases, but which have different thicknesses and other dimensions such that with the fractional bases they provide an assembly or element which will have the same lateral dimensions as the bases 29. For example, in Figs. 10 and 13, the fractional base 30 and the furniture or spacer 33 both have the same thickness, so that when assembled face to face, they provide an element which has the same lateral cross sectional area as a base 29 of a standard size.

It is desirable that the furniture or spacer 33 be spaced away from the upper end of the fractional base, and in order to insure this result and enable the parts 30 and 33 to be handled as a unit, the fractional bases and spacers or furniture are drilled with aligned holes, when properly assembled, and connected releasably by a pin 36 which passes through the aligned holes. The fractional base 31 has a thickness less than half of that of the base 29, and consequently the furniture or spacer 34 which is associated therewith is of a thickness such that added to that of base 31, it equals the thickness of a unit base 29, but they are connected in the same manner by the pin 36. Similarly, the fractional base 32 is of greater thickness than one half the base 29, and accordingly the furniture or spacer 35 which is associated therewith has a thickness of less than half of the base 29, and the fractional base 32 and the furniture or spacer 35 are connected temporarily by the pin 36 in the same manner.

The bases 29 and various fractional bases 30, 31 or 32 are assembled in the apertures 25 in correspondence to the arrangement of the printing characters on the printing plate 15, Fig. 3. For example, standard bases 29 of a size corresponding to those of the printing characters, such as in the three upper rows of characters in Fig. 3, are assembled in the corresponding three upper rows of the block 24, and bases 29 of a somewhat larger yet standard size are assembled in the vertical row of three apertures 25 at the right portion of the block 24, Fig. 3. Assuming that the upper group of characters in the lower row in the printing plate 15, Fig. 3, are to be placed on printing units, fractional bases 30, 31 or 32 with attached furniture or spacers are placed in the lower row of apertures 25 in the block 24, with the fractional bases abutting along the upper sides of the apertures. When the printing character to be placed on a printing unit is relatively small, such as the star at the left hand figure of the lower row of Fig. 3, for example, the smallest fractional base, such as 31, may be placed in the lower left hand aperture 25 of the block 24 in Fig. 8, but with the element 31 abutting the upper side of the aperture 25. The element 31, of course, has the furniture or spacer 34 attached thereto to complete the filling of that aperture. For other characters

which are slightly larger, larger fractional bases may be employed, such as for the other characters shown.

With the bases assembled in the block 24 in this manner and with the blocks 24 and the bases resting upon a plate 37, Fig. 16, the upper ends of the bases 29 and fractional bases 30, 31 or 32 and the rear face of the printing plate 15 are treated with a soldering flux. Strips of sheet solder 38 are disposed on the flux treated upper ends of the bases 29 or fractional bases 30, 31 or 32. The printing plate 15 is then superposed over the mounting block or assembly form 24, with the rear face of the printing plate downward, and the printing plate is then lowered over the pins 26, as shown in Fig. 16. The pins 26 pass upwardly through the drilled holes 23 of the printing plate 15 and definitely and accurately locate the various printing characters of the printing plate over the bases 29 or fractional bases 30, 31 or 32. It will be noted, by reference to Fig. 16, that with this assembly of the various parts, the shoulders 28 of the pins 26 are slightly below the printing plate 15.

This assembly of printing plate 15, block 24, bases 29, 30, 31 and 32, and the plate 37 is then inverted and disposed in inverted position on a sheet 39, Fig. 17, of asbestos paper or the like after which the plate 37 may be removed. This assembly then appears as shown in Fig. 17, and the shoulders 28 being engaged with the rear face of the printing plate 15 will prevent the descent of the mounting block 24 into full contact with the rear of the printing plate. Such full descent would be objectionable because then the plate 15 might be soldered directly to the block 24. While the ends of the pins 26 would tend to prevent this descent, nevertheless the asbestos paper 39 is somewhat yielding, and the pins 26 will tend to sink into the sheet 39 under the pressure which is later to be applied, and for that reason the shoulders 28 are advantageous.

With this assembly in this inverted position, as shown in Fig. 17, it is placed on a metal plate 40 which forms a lateral extension of the pressing surface 41 of a press 42. The plate 40 is heated in any suitable manner such as by flames from gas pipes 43, and the heat will be transmitted through the asbestos sheet 39 to the printing plate 15 and through it and the solder to the bases 29, 30, 31 or 32 which are then in the mounting block 24. The heating of this assembled unit is continued until the solder begins to flow or has reached the fusing point, after which the assembly is moved such as by sliding the asbestos paper 39 on the plate 40, over upon the pressing plate 41 beneath a movable platen 44. The platen 44 is then forced downwardly such as by a screw 45 which is manipulated by a hand wheel 46. The platen 44 engages the upper projecting ends of the bases 29, 30, 31 or 32 and forces them tightly against the rear face of the printing plate 15, so as to make a firm contact between the bases and the printing plate. The plate 41 of the press is then cooled in any suitable manner such as by circulating a cooling medium such as water through a chamber 47 in the base of the press, and this effectively cools the printing plate and the solder while the bases are pressed firmly against the printing plate.

After the solder has been cooled sufficiently to harden it, the platen 44 is elevated and the assembly removed. The printing plate 15 is then subdivided, such as by a routing tool, between the various characters on the plate, so as to form individual units, each of which has a base 29, 30, 31 or 32 soldered or secured to its rear face. In Fig. 18 one manner of subdividing the plate with attached bases is illustrated, this subdivision being accomplished by cutting or routing a groove 15B through the plate 15 around each character in turn, after which the individual units, such as shown in Fig. 20, may be removed from the frame 24. The individual printing units thus produced will have portions of the printing plate 15 overhanging the same laterally and therefore the section of the printing plate which is attached to each individual base 29 or 30, 31 or 32 is next trimmed or cut until its lateral dimensions are within the lateral dimensions of the base to which it is attached, and examples of such trimmed units are shown in Figs. 21 to 25, inclusive. Preferably, the section of the printing plate 15 on each base is cut or trimmed until it is slightly smaller than the end of the base 29, 30, 31 or 32 to which it is attached, as shown in Fig. 21, and it will be noted that the section of the printing plate on that unit is attached by the film of solder firmly to the base 29.

Since the film of solder between the section of the printing plate 15 and the end of the base to which it is attached may be squeezed rather thin by the pressure during the soldering operation, I preferably chamfer off the upper ends of the bases 29, 30, 31 or 32, as at 48, and thus a substantial ring of solder 38 will fill the groove formed by this chamfer peripherally around the upper end of each base or fractional base, as shown clearly in Fig. 31, and serve to unite the printing plate section to each base. In Figs. 24 and 25 I have illustrated how the different fractional units may be assembled in a few different combinations, in order to make different combinations for printing. In Fig. 22, the character to be printed is the numeral 1 represented by a cavity, and the surrounding unetched portion or circle will represent the printing surface. In Fig. 23 the numeral 1 is the high part or the printing surface, and the surface surrounding it is the cavity or etched portion which is non-printing. In both types of printing, the printing is from the high point or high parts of the printing units.

It will be observed from the foregoing that by this method I may produce individual printing units or blocks which the user can set together in any desired order or grouping for printing, either without spacing or with standard spacing, and they will always register to exact positions in printing, so that the different characters or groups of characters printed by each unit in gang printing may be stamped from the printed sheet by gang stamping tools, and all of the stamped, printed sheets or cards will have the characters accurately located thereon in accordance with a predetermined, desired location or arrangement. This makes it possible to vary the number of printings and stampings of any one or more of these characters. For example, in the printing of key cards there are very many characters which are available as optional selections on typewriters, and it is seldom that equal quantities of all of the characters will be used. Hence one may select the printing units for different characters as needed, and assemble them in a gang for printing a supply of characters or key cards of any particular type as often as may be necessary to supply the demand. By making it possible to easily and quickly group them in any desired order, and print and stamp them in gangs, and always have the characters accurately located on the stampings,

the cost of production is very materially decreased without sacrifice of the accurate location of the characters on the stampings regardless of the grouping of the characters in each particular job.

In the foregoing description I have referred to the use of the fractional bases as arranged in alignment with the upper group of characters in the lower row of characters on the printing plate, and in such case the lower group of characters of that lower row may be discarded, but when another plate is made, one may dispose the fractional bases beneath the lower group of characters in the lower row of the printing plate, and thus obtain fractional printing units of those characters in the same manner as explained above for the other characters.

It will be understood that while the metal printing plate has been described as soldered to the bases, other materials for the bases or printing plate may be employed, and other means than soldering used for connecting the printing plate sections to the bases regardless of their materials. At the present time, the soldering appears to be the most satisfactory manner of connecting them.

It will be understood that various other changes in the various details and materials, which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art within the principle and scope of the invention, as expressed in the appended claims.

I claim as my invention:

1. The method of forming a printing plate unit with a printing character accurately located thereon, with which said units may be assembled in any desired order without spacing or with standard spacing and the characters thereon will register to exact predetermined positions in printing, which comprises mounting a plurality of characters of which printing plate units are desired on a copy plate in a predetermined, accurately spaced arrangement, providing a plurality of register marks on said copy plate having a predetermined and accurate location with respect to the characters mounted on said plate, preparing a photo-engraving on metal of said copy plate accurately to scale, providing a plurality of apertures of standard predetermined sizes in a mounting block, and in the same relative location with respect to one another as the characters on said photo-engraving providing projecting pins on a face of said block in accurate correspondence to said register marks on said photo-engraving, drilling holes in said photo-engraving at said register marks to snugly receive said pins, inserting in said apertures, metal bases of standard, accurate sizes and of greater length than the thickness of said block, treating the rear face of said photo-engraving and the corresponding ends of said bases with soldering flux, placing sheet solder on the treated ends of said bases, placing said photo-engraving over said block and said treated ends of said bases with said pins received in said drilled holes, inverting this assembly and resting it with the photo-engraving face downwardly on a suitable surface, heating said photo-engraving and bases until the sheet solder between the bases and the photo-engraving becomes fluid, then simultaneously cooling the same and pressing said bases and said engraving together so as to solder said bases to said engraving, removing said photo-engraving with attached bases from said block, cutting said engraving between said bases to form individual printing units, decreasing the lateral dimensions of the engraving section on each unit until that section is at least as small as, and within the lateral limits of, the base to which it is attached.

2. The method of forming a printing plate unit with a printing character accurately located thereon in accordance with a predetermined plan, with which units having different characters may be assembled for printing in any desired order without intervening spacing, or with uniform spacing, and the characters so assembled will register to exact, predetermined positions in printing, which comprises mounting a plurality of characters of which printing plate units are desired on a copy plate in a predetermined, accurately spaced arrangement with respect to one another and to a plurality of register marks on said copy plate, preparing a printing plate of said copy plate accurately to scale, providing a mounting block with a plurality of apertures of accurately predetermined size and in the same relative location with respect to one another as the characters on said printing plate, providing said mounting block with pins projecting from a face thereof in accurate correspondence to said register marks on said printing plate, drilling holes in said printing plate at said register marks of a size to snugly receive said pins, inserting metal bases of standard, accurate sizes and of equal lengths greater than the thickness of said block, in said apertures, assembling said printing plate on said pins, soldering said printing plate to the corresponding ends of said bases, removing said printing plate with attached bases from said block, cutting said printing plate between said bases to form individual printing units, and decreasing the lateral dimensions of the printing plate section on each unit until that section is at least as small as the lateral dimensions of the base to which it is attached.

3. The method of forming a printing plate unit with a printing character accurately aligned thereon in accordance with a predetermined plan, with which units having different characters may be assembled for printing in any desired order without intervening spacing or with uniform spacing, and the characters so assembled will register to exact predetermined positions in printing, which comprises mounting a plurality of characters for which printing units are desired on a copy plate in a predetermined, accurately spaced arrangement with respect to one another and to a plurality of register marks on said copy plate, preparing a metal printing plate from said copy plate accurately to scale, assembling a plurality of metal bases, of standard, accurate sizes and of equal lengths, in spaced relation to one another and in the same accurate relation to one another as the characters on said printing plate, disposing the back face of said printing plate against the corresponding ends of the assembled bases, securing said printing plate to the abutting bases, then cutting the printing plate between said spaced bases to form individual printing units, and decreasing the lateral dimensions of the printing plate section on each unit until that section is at least as small as, and within the lateral limits of, the base to which it is attached.

4. The method of forming printing plate units with printing characters accurately aligned thereon in accordance with a predetermined plan, with which units having different characters may be assembled for printing in any desired group without intervening spacing or with uniform

spacing, and the characters so assembled will register to exact predetermined positions in printing, which comprises mounting a plurality of characters for which printing units are desired on a copy plate in a predetermined, accurately spaced arrangement with respect to one another and to a plurality of register marks on said copy plate, preparing a metal printing plate from said copy plate including said register marks accurately to scale, assembling a plurality of metal bases, of standard, accurate sizes and of equal lengths in spaced relation to one another and in accurate predetermined relation to said register marks on said printing plate and abutting against the back face of said printing plate, soldering said printing plate to said bases, and then cutting the printing plate between said spaced bases to form individual printing units.

5. The method of forming printing plate units with printing characters accurately aligned thereon in accordance with a predetermined plan, with which units having different characters may be assembled for printing in any desired grouping, and the characters so assembled will register to exact predetermined positions in printing, which comprises mounting a plurality of characters for which printing units are desired on a copy plate in a predetermined accurately spaced arrangement with respect to one another, preparing, through photographic reduction, a metal printing plate from said copy plate accurately to a predetermined reduced scale, assembling a plurality of metal bases of standard, accurate sizes and of equal lengths in spaced relation to one another against the rear face of said printing plate and in accurate alignment with the characters on said printing plate, securing the bases to the rear face of the printing plate as so assembled, and then cutting the printing plate between said bases to form individual printing units.

6. The method of forming printing plate units with printing characters accurately aligned thereon in accordance with a predetermined plan, which comprises mounting a plurality of characters, for which printing units are desired, on a copy plate in a predetermined, accurately spaced arrangement with respect to one another, placing on said copy plate a plurality of annular ring characters having an accurate and predetermined location with respect to the other characters on the copy plate, preparing a metal printing plate from said copy plate including said annular ring characters, drilling out the centers of said annular rings of the printing plate as reproduced from the copy plate, providing a plurality of apertures of accurate, standard, predetermined sizes in a mounting block and in the same relative location with respect to one another as the characters on said printing plate, providing projecting pins on a face of said block in accurate correspondence to said annular rings on said printing plate, disposing said printing plate over said block, with the pins of the block passing through the drilled-out centers of said annular rings, and with the back face of said printing plate towards said block, inserting in said apertures of the block, metal bases of standard accurate sizes and of greater length than the thickness of said block, soldering the bases to the rear face of the metal printing plate as so assembled, and then cutting said printing plate between said bases to form individual printing units.

7. The method of forming printing plate units with printing characters accurately aligned thereon in accordance with a predetermined plan, which comprises mounting a plurality of characters for which printing units are desired on a copy plate in a predetermined, accurately spaced arrangement with respect to one another, and with respect to a plurality of register marks on said copy plate, preparing a metal printing plate from said copy plate and bearing said characters and register marks, drilling holes of predetermined diameters at said register marks in said printing plate, providing a plurality of apertures of accurate, standard predetermined sizes in a mounting block and in the same relative and spaced location with respect to one another as the characters on said printing plate, providing projecting pins on a face of said block in accurate correspondence to said drilled holes in the printing plate in relation to said apertures, superposing said printing plate and said block, with the pins of the block passing through said drilled holes of said printing plate and with the back face of said printing plate toward said block, inserting in said apertures of the block individual bases of standard, accurate sizes and of greater length than the thickness of said block, securing the bases individually to the rear face of the printing plate as so assembled, and then cutting said printing plate between said bases to form individual printing units.

8. The method of forming printing plate units with printing characters accurately aligned thereon in accordance with a predetermined plan, which comprises mounting a plurality of characters for which printing units are desired on a copy plate in a predetermined, accurately spaced arrangement with respect to one another, and with respect to a plurality of register marks on said copy plate, preparing a metal printing plate from said copy plate and bearing said characters and register marks, drilling holes of predetermined diameters at said register marks in said printing plate, providing a plurality of apertures of accurate, standard predetermined sizes in a mounting block and in the same relative and spaced location with respect to one another as the characters on said printing plate, providing projecting pins on a face of said block in accurate correspondence to said drilled holes in the printing plate in relation to said apertures, superposing said printing plate and block with the pins of the block passing through the drilled holes of the printing plate, and with the back face of the printing plate toward said block, inserting in said apertures of the block bases of standard, accurate sizes and of greater length than the thickness of said block and each having face dimensions corresponding to that desired for the printing unit of the aligned character on the printing plate, attaching to the bases that have lateral dimensions less than the apertures in which they are placed, spacers which are of shorter length than the bases and which, when attached, are spaced from the superposed printing plate and, with the base to which they are attached, accurately locate the base in the aperture in which it is placed, securing the bases individually to the rear face of the printing plate as so assembled, then cutting said printing plate between said bases to form individual printing units, and removing any attached spacers from said bases.

9. The method of forming printing plate units with printing characters accurately aligned thereon in accordance with a predetermined plan, with which units having different characters may be assembled for printing in any de-

sired group without intervening spacing or with uniform spacing, and the characters so assembled will register to exact predetermined positions in printing, which comprises mounting a plurality of characters for which printing units are desired on a copy plate in a predetermined, accurately spaced arrangement with respect to one another and to a plurality of register marks on said copy plate, preparing a printing plate from said copy plate including said register marks accurately to scale, assembling a plurality of bases of standard sizes and of equal lengths in spaced relation to one another and in accurate predetermined relation to said register marks on said printing plate, and abutting the back face of said printing plate, securing said bases individually to said printing plate, and then cutting the printing plate between said bases to form individual printing units.

10. The method of forming printing plate units with printing characters accurately aligned thereon in accordance with a predetermined plan, with which units having different characters may be assembled for printing in any desired group without intervening spacing or with uniform spacing, and the characters so assembled will register to exact predetermined positions in printing, which comprises mounting a plurality of characters for which printing units are desired on a copy plate in a predetermined, accurately spaced arrangement with respect to one another and to a plurality of register marks on said copy plate, preparing a printing plate from said copy plate including said register marks accurately to scale, drilling holes at said register marks, assembling in a form a plurality of bases of standard, accurate sizes in spaced relation to one another and in accurate predetermined relation to one another, locating said printing plate over said form by pins on said form entering said drilled holes of the printing plate, and with the face of the printing plate abutting said bases, securing said bases individually to said printing plate, and then cutting the printing plate between said spaced bases to form individual printing units.

11. The method of forming printing plate units with printing characters accurately aligned thereon in accordance with a predetermined plan, with which units having different characters may be assembled for printing in any desired group without intervening spacing or with uniform spacing, and the characters so assembled will register to exact predetermined positions in printing, which comprises mounting a plurality of characters for which printing units are desired on a copy plate in a predetermined, accurately spaced arrangement with respect to one another, preparing a printing plate from said copy plate accurately to scale, securing bases of standard sizes individually to the rear face of said printing plate in accurate predetermined alignment with the printing characters on said printing plate, and then cutting said printing plate between said bases to form individual printing units.

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