Method of making a hand stamp, a hand stamp apparatus and a storage device for storing imprinting elements

A method of making a hand stamp (14) including the steps of constructing a printing element (20) having an image and urging the printing element engagement surface (20a) to the surface (16b) of a body portion (16) of the hand stamp (14), a hand stamp apparatus (14) having substantially transparent mounting block (16), and a storage device (154) for storing imprinting elements (20) which includes a binder (156) and a plurality of sheets (152) connected to the binder having a surface (152a) engageable the surface (20a) of the imprinting elements.
(BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
  — with international search report
  — before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.
METHOD OF MAKING A HAND STAMP, A HAND STAMP APPARATUS AND A STORAGE DEVICE FOR STORING IMPRINTING ELEMENTS

SPECIFICATION

Background of the Invention

This is a Continuation-In-Part Application of copending U.S. Serial No. 09/556,926 filed April 21, 2000 which is a Continuation-In-Part application of U.S. Serial No. 09/353,115 filed July 14, 1999 now U. S. Patent No. 6,095,046.

Field of the Invention

The present invention relates generally to hand stamping devices and the method of making same. More particularly, the invention concerns a novel hand stamping apparatus having a substantially transparent, hand-held mounting block to which a substantially transparent printing element or die can be removably affixed without the use of adhesives. In using the device the printing element can be clearly viewed through the transparent mounting block and the surface to be imprinted can be viewed through the printing element so that the indicia formed on the printing element can be precisely positioned relative to the surface to be imprinted.
Discussion of the Invention

Hand stamp devices of many different configurations have been suggested in the past. The classic hand stamp comprises a rubber stamp die that is fixedly mounted on a wooden block to which a bulb shaped wooden handle is attached. Such hand stamps are traditionally used with an ink pad which applies ink to the indicia formed on the die prior to each stamping operation. The printing element or pattern bearing surface is typically made of rubber.

In recent years a number of different types of hand stamps having elaborate pattern-bearing, ink-receiving surfaces have been suggested. These types of hand stamps may be used to print a wide variety of decorative images on envelopes, stationery and the like. However, because the pattern-bearing surface cannot be seen through the stamp supporting block or handle it is virtually impossible to precisely position the pattern on the surface to be imprinted. Similarly, prior art hand stamp devices having indicia in the form of legends such as words and numbers are difficult to use because the user cannot see the indicia and therefore cannot accurately position it on the surface to be imprinted.

The prior art ink stamp device disclosed in Patent No. 5,642,667 issued to Sastre partially solves the stamp positioning problem discussed in the preceding paragraphs by providing a translucent handle and base through which the imprinting element is visible. However, because the imprinting element itself is not trans-
parent, precise positioning of the indicia on the imprinting element remains difficult.

U.S. Patent No. 3,973,495 issued to Rowe also discloses a hand stamp comprising a transparent base through which a proof of the impression is visible to the user. However, like the Sastre device, the printing element itself is not transparent.

The thrust of the present invention is to provide an improved hand-held ink stamp in which both the mounting block and the imprinting element that is removably affixed thereto without the use of adhesives are substantially transparent so that the indicia formed on the imprinting element can be seen clearly and precisely positioned on the surface to be imprinted.

Additionally, in one form of the present invention, the mounting block is uniquely formed so as to magnify the indicia formed on the imprinting element when viewed through the convex upper surface of the mounting block.

Summary of the Invention

It is an object of the present invention to provide a novel hand stamp and method of making the same which is of an elegantly simple construction that includes a substantially transparent acrylic mounting block to which a substantially transparent printing element is removably affixed without the use of adhesives. With this construction, when the device is used, the indicia formed on the printing
element can be clearly viewed through the mounting block, and the printing surface can be clearly viewed through the printing element.

Another object of the invention is to provide a hand stamp of the aforementioned character in which the sides of the mounting block are provided with finger gripping means so that the stamp can be conveniently gripped by the user.

Another object of the invention is to provide a hand stamp of the character described in the preceding paragraphs in which the mounting block includes a convex upper surface which magnifies the indicia formed on the printing element when the printing element is affixed to the lower planar surface of the mounting block.

Another object of the invention is to provide a hand stamp of the type described in the preceding paragraphs in which the substantially transparent printing element is formed from a photopolymer and is resiliently deformable so that it can be selectively removably affixed to either the convex surface or the planar surface of the mounting block.

Another object of the invention is to provide a hand stamp of the class described in which a plurality of substantially transparent individual printing elements can be removably affixed to either of the surfaces of the mounting block.

Another object of the invention is to provide a hand stamp of the character described in the preceding paragraphs in which the stamping element is bounded
by an upstanding edge portion to which ink can be applied from an ink pad or the like.

Another object of the invention is to provide a method for making hand stamps of the character described in which the die or stamping element is constructed in a novel manner from a substantially transparent photo polymer.

Another object of the invention is to provide a method as described in the preceding paragraph in which the die or stamping element is uniquely formed to exhibit a novel adhering surface that will permit the die to be removably affixed to a smooth surface without the need for conventional adhesives.

**Brief Description of the Drawings**

Figure 1 is a generally perspective, exploded top view of one form of the hand stamp device of the invention.

Figure 2 is an end view of the device illustrated figure 1 and shown in engagement with the surface to be imprinted.

Figure 3 is a side view of the device shown in figure 1.

Figure 4 is a generally perspective, exploded bottom view of the device of the invention showing the printing element removably affixed to the convex surface of the mounting block.
Figure 5 is an end view of the device shown in figure 4 illustrating the manner of its use to imprint indicia onto a printing surface by means of a rocking motion.

Figure 6 is a side view of the device illustrated in figures 4 and 5.

Figure 7 is an enlarged bottom plan view of the form of the device shown in figure 1.

Figure 8 is a cross-sectional view taken along lines 8-8 of figure 7.

Figure 9 is a greatly enlarged cross-sectional view of the area designated in figure 8 by the numeral 9.

Figure 10 is a generally diagrammatic view illustrating the magnifying capability of the device.

Figure 11 is a plan view of an alternate form of the stamping device showing a plurality of dies affixed to the mounting block.

Figure 12 is a generally perspective view of one form of the exposure and photopolymer disposition unit used in the practice of the method of the present invention.

Figure 13 is a generally perspective view illustrating various component parts used in the accomplishment of one form of the method of the invention.
Figure 14 and 14A when considered together comprise a side-elevational view partly in cross section of the components shown in figure 13 stacked within the exposure unit shown in figure 12.

Figure 15 is a fragmentary, cross-sectional view similar to 14A illustrating the deposition step wherein the photopolymer is deposited onto the stacked array shown in figures 14 and 14A.

Figure 16 is a plan view, partly broken away to better show the relationship among the components shown in figure 13 of the drawings.

Figure 17 is a greatly enlarged, fragmentary, cross-sectional view illustrating the exposure of the photopolymer with ultraviolet rays from the plurality of ultraviolet lamps of the exposure unit.

Figure 18 is a fragmentary, generally perspective, diagrammatic view illustrating the separation of certain of the components used in the accomplishment of the method of the invention following radiation of the photopolymer in the manner shown in figure 17.

Figure 19 is a generally perspective, diagrammatic view illustrating the washing step wherein the precursor printing elements are washed to remove unexposed photopolymer.

Figure 20 is a generally perspective, fragmentary view of a portion of the printing element array following the washing step.
Figure 21 is a side-elevational view of an alternate form of stamping device of the invention showing the method of removably affixing the stamp die of the invention to the smooth, mirror-like lower surface of the stamping device.

Figure 22, 22A, 22B and 22C when considered together illustrate an alternate form of hand stamp apparatus of the invention for producing a multicolored image on a surface using a plurality of cooperating stamping elements.

Figure 23 is an enlarged, bottom plan view illustrating the printing element shown in Figure 22 affixed to the mounting block for use in producing a first image on the printing surface.

Figure 24 is an enlarged, cross-sectional view taken along lines 24-24 of figure 23.

Figure 25 is a plan view of the image produced on the printing surface by the apparatus shown in figures 23 and 24.

Figure 26 is a bottom plan view showing the printing element of figure 22A affixed to the mounting block for producing an indexed image of another color on the printing surface.

Figure 27 is an enlarged, cross-sectional view taken along lines 27-27 of figure 26.
Figure 28 is a bottom plan view showing the stamping element of figure 22B affixed to the mounting block for use in producing an indexed image of still another color.

Figure 29 is an enlarged, cross-sectional view taken along lines 29-29 of figure 28.

Figure 30 is a bottom plan view showing the stamping element of figure 22C affixed to the mounting block for producing an indexed image of yet another color.

Figure 31 is an enlarged, cross-sectional view taken along lines 31-31 of figure 30.

Figure 32 is a bottom plan view of yet another form of the printing apparatus of the invention wherein the stamp element includes a body portion and first and second segments adjustably connected to the body portion.

Figures 33, 34 and 35, when considered together, show a plurality of stamping elements for producing various composite images on a printing surface.

Figure 36 is a bottom plan view illustrating a selected one of the stamping element of figures 33, 34, and 35 removably connected to a mounting block.

Figure 37 is a bottom plan view illustrating a selected three of the stamping elements of figures 33, 34, and 35 removably interconnected to a mounting block.
Figure 38 is a generally perspective exploded view of a form of the invention which is somewhat similar to that shown in figure 1 and earlier described herein.

Figure 39 is a plan view of one form of the storage device of the invention for storing and transporting the viscoelastic printing elements.

Figure 40 is a generally perspective view of the storage device shown in figure 39.

Figure 41 is a cross-sectional view taken along lines 41-41 of figure 39.

Figure 42 is a generally perspective view illustrating various component parts used in the accomplishment of an alternate form of the method of the invention.

Figures 43 and 43A when considered together comprise a side-elevational view partly in cross section of the components shown in figure 42 stacked within the exposure unit of the invention.

Figure 44 is a fragmentary, cross-sectional view similar to 43A illustrating the deposition step wherein the photopolymer is deposited onto the stacked array shown in figures 43 and 43A.

**Description of the Invention**

Referring to the drawings and particularly figures 1 through 3, one form of the stamping device of the invention is there illustrated and generally designated
by the numeral 14. The device here comprises a substantially transparent, rigid, plastic mounting block 16 having a mirror polished, convex top surface 16a, a generally planar, mirror polished bottom surface 16b, and spaced-apart sides 16c. As best seen in figures 1 and 2 each of the spaced-apart sides 16c is provided with gripping means shown here as finger gripping portions 18. Mounting block 16 can be formed of various plastics but a clear acrylic has proven satisfactory.

In the form of the invention shown in figures 1, 2, and 3, a substantially transparent imprinting element or die 20 is removably affixed to bottom surface 16b in the manner indicated in figures 2 and 3. Imprinting element 20 is preferably formed of a photopolymer such as a liquid polyester that will polymerize when exposed to ultraviolet light. Element 20 is resiliently deformable and includes a generally planar, adhesive coated first side 20a and a spaced-apart second surface 20b (figure 1). As best seen by referring to figures 8 and 9, second surface 20b is provided with upstanding ink receiving portions 24, which portions define the details of the stamped impression. As best seen by referring to figure 7, portions of the upstanding ink receiving portions, or ribs 24, circumscribe the periphery of the printing element and define the outer limits of the indicia that will be imprinted on the surface “S” which receives the inked impression (figure 9). Portions 24 can be inked using conventional ink pads containing conventional inks or water soluble
inks. When water soluble inks are used, the ink will readily evaporate returning the printing element to its transparent condition.

As depicted in figure 10, when an imprinting element, such as element 26, is affixed to the bottom surface 16b of the mounting block 16, the convex upper surface 16a of the mounting block 16 functions to magnify the image 26a which is imprinted on the imprinted surface “S”. More particularly, as shown in figure 10, when the imprinted indicia, generally designated in figure 10 by the numeral 26, is viewed through the mounting block 16 as indicated in the left-hand portion of figure 10, the image to be imprinted will be somewhat magnified, that is larger in size than indicia 26a, to enable better viewing of the details of the stamped indicia. When the stamping element includes highly detailed decorative features, this aspect of the invention is very useful.

Turning next to figures 4, 5 and 6, another highly novel feature of the present invention is there illustrated. More particularly, as illustrated in these figure drawings, the transparent imprinting element 20 can also be affixed to the convex upper surface 16a of the block so that the image can be imprinted onto the surface “S” by a rolling or rocking motion imparted to the mounting block in the manner illustrated in figure 5. Because of the resilient nature of the imprinting element 20, the element will smoothly conform to the convex surface 16a so as to produce a clear image such as image 26a on the printed surface “S”.
Referring next to figure 11, it is to be observed that a plurality of highly detailed imprinting elements, such as elements 28 and 30, can be removably affixed to either surface 16a or 16b of mounting block 16. As previously discussed, when the imprinting elements are removably affixed to generally planar surface 16b, the indicia provided on the imprinting elements will be magnified when viewed through the mounting block in the direction of the arrows of figure 7. Because the mounting block is substantially transparent as are each of the imprinting elements 20, 28, and 30, it is at once apparent that the images to be formed on the imprinted surface “S” can be clearly viewed and precisely located and arranged on the surface “S” with great ease. When the imprinting elements comprise legends such as numbers and letters, the ability to view the precise location of the legends on each of the stamps is extremely important and, for example, enables the legends to be precisely positioned over a line or between lines provided on the surface “S”. Additionally, when intricate designs are formed on the imprinting element, such as those illustrated in figure 11, the precise location of the details of each image can be precisely positioned on the surface “S”.

While the imprinting elements 20, 28 and 30 can be constructed of various materials, the aforementioned photopolymer material is preferred. Such material is readily commercially available from several sources such as The Louis Melind Company, Inc. of Skokie, Illinois and the printing elements themselves can be
formed by ultraviolet curing in a manner well understood by those skilled in the art. Additionally, a suitable adhesive "A" (figure 1) can be applied to surface 20a in a manner well understood by those skilled in the art. Alternatively, the printing element can be constructed from a suitable polymer that exhibits viscoelastic characteristics that enables the printing element to be removably affixed to either the convex or planar surfaces of the mounting block without the use of an adhesive "A". These viscoelastic polymers in effect exhibit a multiplicity of very small suction-cup like protuberances which releasably grip the smooth surfaces of the mounting block.

Referring now to figure 12, one form of the apparatus for carrying out the method of the invention is there shown and generally designated by the numeral 50. Apparatus 50, which is readily commercially available from various sources including the MacDermid Company of Wilmington, DE, comprises a housing 52 which includes an internal chamber 54 (figure 14). The top opening and of chamber 54 is closed by a glass panel 56. Disposed within chamber 54 and located directly below glass panel 56 is a first bay of lamps 58 comprising a plurality of ultraviolet lamps 58a, the purpose of which will presently be described. Hingedly connected to housing 52 is a cover assembly 60 which includes an internal chamber 62 that is, covered by a glass panel 64 (figure 14). Disposed within chamber 62 is a second bay of lamps 66 comprising plurality of ultraviolet lamps 66a.
When cover assembly 60 is moved in from the position shown by the phantom lines in figure 14 to the position shown by the solid lines in figure 14, a glass panel 64 is moved into close proximity with glass panel 56. For reasons presently to be described, cover assembly 60 further includes an opaque screen 61 (figure 14) that can be moved from a retracted position to an expanded position wherein it covers glass panel 64 and prevents radiation from ultraviolet lamps 66a from passing there through. Also forming a part have apparatus 50 is a deposition means for controllably depositing onto a grid element the liquid photopolymer "P" used to form of the die or printing element of the hand stamp of the invention. The construction and operation of this deposition means will be described in the paragraphs that follow.

Turning next to figures 13, the various components used in the accomplishment of one form of the method of the invention are there illustrated. These components include a first negative 70 having formed thereon of the various art work images 72 which are to be produced by the hand stamp on an ink receiving surface and an image border 72a circumscribing the images. More particularly, on first negative 70, the various art work images 72 are clear while the area 72a surrounding the images is opaque (figure 16). Another component used in the accomplishment one form of the method of the invention comprises a thin, substantially transparent protective film 76. Superimposed over protective film 76 and negative 70 is
a uniquely configured grid 78 having a multiplicity of openings 80 formed therein. In a manner presently to be described, openings 80 cooperate with thin film 76 to form a plurality of top open chambers 82 (figure 15). After chambers 82 are filled with the liquid photopolymer, in a manner presently to be described, a second substantially transparent thin film 84 is overlayed over the filled chambers. Overlaying second thin film 80 is a second negative 86, which is used to trim each of the printing elements. More particularly, second negative 86, which is also created using the original art work, has clear areas 86a corresponding in size and shape to the backs of the printing elements and opaque areas 86b surrounding the clear areas (figure 16).

One form of the method of the invention for making the hand stamp of the invention comprises two steps, namely the step of constructing the printing element that has the image to be imprinted on the smooth surface and the step of interconnecting the printing element with the smooth surface of the body portion 87a of the hand stamp 87 (figure 21). Considering first the method of constructing the printing element, which has the image to be imprinted on the ink-receiving surface. This important method comprises the steps of first locating negative 70 on glass panel 56 of apparatus 50. For this purpose first negative 70 is provided with locating apertures 90 at each corner of the negative (figure 13). Apertures 90 closely receive upstanding locating pins 92 that are affixed to glass panel 56 in the manner
shown in figures 14 and 14A. Pins 92 extend upwardly from glass panel 56 so as to enable the precise positioning of grid 78 and second negative 86 in index with first negative 70 in the manner presently to be described and as shown in figures 14 and 14A. For this purpose, grid 78 is provided is corner apertures 94 while second negative 86 is provided with corner apertures 96, which apertures closely receive locating or index pins 92.

With first negative 70 indexedly located on glass panel 56, a slight vacuum is produced beneath the negative to urge it into secure engagement with the glass panel. Next, the earlier-mentioned protective transparent film 76 is then superimposed over negative 70. This done, grid 78 is superimposed over protective film 76 in the manner shown in figures 14 and 14A so that it is in precise index with first negative 70. With grid 78 positioned over protective film, a plurality of top-open chambers 82 are defined, which chambers are adapted to receive the specially formulated photopolymer used in the accomplishment of the method of the invention. This specially formulated liquid photopolymer is commercially available from M & R Marking Systems, Inc. of Piscathway, New Jersey and is sold under the product/chemical name Ideal i40 and Ideal i50. This material is a clear viscous liquid that will solidify or cure upon controlled exposure to ultraviolet light. While chambers 82 of grid 78 can be filled with the liquid photopolymer by any suitable means, in the method of the present invention, they are filled by a reciprocating
reservoir 95 which contains the photopolymer "P" and forms a part of the processing apparatus 50 (figure 15). As indicated in figure 15, the photopolymer "P" can be controllably dispensed from reservoir 95 through an outlet 95a as the reservoir is rolled over the upper surface of housing 52 along spaced-apart tracks 97 (figure 12).

After chambers 82 have been filled with the liquid photopolymer "P" to form a plurality of precursor printing elements, transparent film 84 is superimposed over the filled grid 78 so as to cover each of the filled chambers 82. While film 84 can be positioned over filled grid 78 in any suitable manner, apparatus 50 provides a mechanism 99 for emplacing the thin film over the filled grid in the manner illustrated in figures 14A and 15.

With film 84, which is preferably a polyester film, positioned over filled grid 78, second negative 86 is superimposed over film 84 in the manner shown in figures 14 and 14A and is precisely indexed with grid 78 and with first negative 70 by means of the indexing pins 92. More specifically, with second film 86 properly positioned over the assemblage comprising first negative 70, protective film 76, grid 78, and thin film 84, the clear areas 86a of negative 86 are in precise index with chambers 82 and the opaque areas 86b of the negative are in precise index with the image borders that circumscribe stamp element images 72.
With the components stacked in the manner described in the previous paragraph and in the manner illustrated in figures 14 and 14A, cover 60 is moved from the position shown in the phantom lines in figure 14 to the position shown in the solid lines in figures 14 and 14A. It is important to note that as cover assemblage 60 moves into position a uniform pressure is exerted on negative 86 and, in turn, on polyester film 84 causing a uniform controlled pressure to be applied to the liquid polymer contained within chambers 82. This pressure functions not only to regulate the thickness of the liquid photopolymer, but also to move polyester film 84 into positive pressural engagement with the liquid photopolymer to thereby produce a very smooth, highly unique, substantially planar shaped precursor engagement surface.

With the cover in position over the component assemblage in the manner shown in figures 13 and 17, the ultraviolet bulbs 66a housed within cover assemblage 60 are energized so as to pass ultraviolet rays “R-1” through second negative 86 to expose, through clear areas 86, the precursor printing elements designated in figure 17 by the numeral 99. As ultraviolet rays “R-1” pass through clear areas 86a of negative 86, the liquid photopolymer contained within chambers 82, or precursor elements 99, will be activated and will solidify to a predetermined thickness which is dependent upon the exposure time of the photopolymer to the ultraviolet rays. As will be discussed in greater detail hereinafter, this first exposure of the
photopolymer by ultraviolet lamps 66a forms the printing element engagement surface, or backing surface 100 of the printing element 102 that will later be removably interconnected with the smooth surface 104 of the body portion of the hand stamp 106 in the manner shown in figure 21.

Following exposure of the photopolymer by ultraviolet lamps 66a for the prescribed period of time, the previously mentioned opaque screen 61 of the exposure unit is moved from a retracted position to an extended position where it covers second negative 86 and obstructs any further ultraviolet exposure of the photopolymer from ultraviolet lamps 66a.

With the opaque screen suitably drawn, the next step in the method of the invention is to energize ultraviolet lamps 58a so as to pass ultraviolet rays “R-2” through the clear areas 72 of first negative 70 in a manner to expose the unexposed liquid photopolymer designated in figure 17 as “P-2”. More particularly, as illustrated in figure 17, as the ultraviolet rays “R-2” emanating from ultraviolet lamps 58a pass through the clear portions 72 of first negative 70, the liquid polymer “P-2” will be activated and will solidify to form the upraised portions 203a of the printing element (see also figure 18). It is apparent that this second curing step using lamps 58a will create a stamp element of the character shown in figures 18 and 20 that comprises the backing surface 100 and the upraised indicia portions 102a, which in this instance comprise the images or letters to be imprinted on the
printing surface. However, during the second exposure step, it is apparent that the portions of the photopolymer that surround the upraised indicia portions will not be exposed to rays "R-2" and, therefore, will not be activated. These unexposed portions of polymer can be washed away by the washing step of the method next to be described.

As illustrated in figure 18, following the photopolymer exposure steps, grid 78, along with the exposed photopolymer and films 76 and 84, are removed from the exposure unit. Films 76 and 84 are then stripped away from grid 78 in the manner shown in figure 18. As film 84 is separated from grid 78, the exposed photopolymer, which now comprises the precursor printing element, will adhere to film 84 and will cleanly separate from grid 78. The assemblage comprising film 84 and the precursor stamped elements is then submerged in a washing tank "WT" which is filled with a washing solution such as water and various chemical solutions. As the assemblage made up of film 84 and precursor stamps 102 is submerged in to tank "WT", the unexposed liquid photopolymer will wash away leaving the cleanly formed upstanding indicia 102a and forming the final printing element 102 having the printing element engagement surface 100 and the upstanding indicia 102a.

Following the washing step each of the plurality of printing elements 102 can be readily peeled away from thin film 84 in the manner illustrated in figure 20.
As earlier mentioned, the novel step of pressurally engaging the unexposed liquid photopolymer with the very smooth surface of film 84 produces a highly novel gripping surface comprising a multiplicity of extremely small, microscopic suction cup like elements which enable the printing elements formed by the novel method of the invention to be removably affixed to any smooth surface such as the surface of film 84 and the smooth, microscopic surface 104 of the hand stamp device of the invention (figure 21). This unique aspect of the method and apparatus of the present invention, permits the formation of printing elements of the character shown in figure 20 wherein the backing portion of the stamp is precisely trimmed to coincide with the edges of the upright indicia 102a. Unlike the prior art stamping elements, which require a base flange that extends beyond the perimeter of the upstanding indicia elements to enable successful adhesive bonding of the stamping element to the hand stamp body, such extending flange is neither necessary, nor desired in the hand stamp of the present invention. This elimination of the adhesive carrying flange not only saves expensive photopolymer material, but also, due to the unique nature of the backing surface 100 of the stamp elements, no messy and expensive adhesive need be used to affix the stamp element 102 to the finger-gripping portion of the hand stamp 87. Further and of equal importance, this novel aspect of the invention permits the printing elements to be readily removed from, or adjusted relative to, any smooth surface such as smooth surface 104 of the hand
stamp 87. This unique removability and adjustability feature of the present invention is nowhere found in the prior art which requires a backing flange that is affixed to the surface of the hand stamp to enable application of a bonding adhesive.

Referring next to figures 22, 22A, 22B and 22C, one form of a hand stamp apparatus of the present invention for producing a composite image on a printing surface is there shown. This form of the apparatus comprises a transparent, acrylic mounting block 110 having a smooth surface 110a and a first, substantially transparent, base imprint stamp element 112 removably affixed to smooth surface 110a. As will presently be described, first stamp element 112 produces a first, or base imprint image on a selected portion of the printing surface which image comprises an outline 114 of the character shown in figure 25. As indicated in figure 25, outline 114 circumscribes a plurality of openings 116, 118 and 120 which are of different shapes and to which color is imparted by the remaining stamp elements depicted in figures 22A, 22B and 22C. These stamp elements, which are designated respectively by the numerals 122, 124 and 126, are substantially transparent and, in a manner presently to be described, can be sequentially moved into index with the first image defined by the outline 114 (figure 25).

Referring particularly to figures 23 and 24, stamp element 112 can be seen to comprise a first or upper surface 112a that is provided with a multiplicity of very small, almost microscopic, suction-like elements or protuberances which releas-
ably grip smooth surface 110a of mounting block 110 in a manner shown in figure 24. As indicated in figure 24, stamp element 112 includes a second or lower surface 112b that comprises a plurality of upstanding surface engaging, rib-like protuberances 112c. In use, when surfaces 112b of protuberances 112c are inked through the use of a conventional ink pad, and are placed in contact with the surface to be printed, a pressure exerted on mounting block 110 will cause the outline 114 to be imprinted on the printing surface in the manner shown in figure 25 with the ink from the stamping element being deposited onto the surface along the outlines designated in figure 25 by the numeral 114.

Once the first image is imprinted onto the printing surface in the manner shown in figure 25, the openings 116, 118, and 120 are next imprinted with various colors in sequential fashion using printing elements 122, 124 and 126. More particularly, after the first image is formed on the surface to be imprinted, printing element 112 is removed from surface 110a and printing element 122 is affixed to surface 110a in its place through the use of the multiplicity of small, suction-like elements or protuberances formed on upper surface 112a of stamp element 122.

Turning next to figures 26 and 27, it is to be noted that stamp element 122 has a second or lower surface 122b that is defined by downwardly extending, rib-like protuberances 122c. As indicated in figure 26, protuberances 122c have the general shape of openings 116 (figure 25). With this construction, when stamping
element 122 is affixed to mounting block 110 in the manner shown in figure 26 and 27, surfaces 122b of protuberances 122c can be inked with of a first color ink by pressurally engaging surfaces 122b against a stamp pad having the first color, ink, as for example the color yellow. Once surfaces 122b have been inked, stamp element 122 can be precisely aligned with openings 116 of the first image formed on the printing surface by viewing the first imprint shown in figure 25 through the clear acrylic mounting block 110. When surfaces 122b have been precisely indexed with the openings 116 formed on the printing surface, a downward pressure exerted on the mounting block 110 will cause the colored ink to be transferred to surfaces 116 thereby precisely coloring these surfaces with the first color, such as the color yellow.

Following the coloring opening 116, stamp element 122 can be removed from surface 110a from the mounting block and third stamping element 124 can be affixed in its place to surface 110a of the mounting block in the manner shown in figures 28 and 29. Stamping element 124, like stamping element 112 and 122, has a first upper surface 124a that includes a multiplicity of microscopic suction-cup-like elements or protuberances which releasably grip surface 110a of mounting block 110. Stamping element 124 also has a second or lower surface 124b that is defined by downwardly extending protuberances 124c which, as shown in figure 28, have the general configurations of openings 118 of the first image as shown in
figure 25. With this construction, lower surface 124b of stamp element 124 can be inked using an ink pad having a third color such as, for example, the color blue. Then by indexably aligning protuberances 124c with opening 118 of the first image, the second color, or the color blue, can be imprinted onto the areas of openings 118 to form a composite wherein areas 116 are of a first color, such as the color yellow, and areas 118 are of a second color, such as the color blue. Once again, because of the unique transparent character of mounting block 110 and the substantial transparency of printing element 124, surfaces 124b of protuberances 124c can be precisely aligned with openings 118 to accurately color these areas with the second color.

Once this second coloring step has been completed, stamp element 124 can be removed from mounting block 110 and a fourth stamp element can be affixed in it place in a manner illustrated in figures 30 and 31. As shown in figure 31, printing element 126 also includes a first surface 126a which is provided with a multiplicity of microscopic, suction-cup-like protuberances which securely engage smooth surface 110a of mounting block 110 in the manner shown in figure 31. Stamping element 126 also includes a second lower surface 126b which is defined by downwardly extending protuberances 126c. As indicated in figure 30, protuberances 126c are of the general configuration of openings 120 of the first image that was imprinted on the printing surface. As before, using an appropriate ink
pad, surfaces 126b are covered with ink of a third color, such as the color red. Once surface 126 is covered with the red ink, printing element 126 can be precisely, indexably aligned with the first image imprinted on the printing surface so that protuberances 126c are precisely aligned with openings 120 of the first image shown in figure 25. Once again this precise indexing of printing element 126 is made possible because of the substantial transparency of both the mounting block 110 and the printing element 126. Once the areas 120 have been imprinted with a third color such as the color red, stamp element 126 can be readily removed from the surface 110a of mounting block 110. Preferably, the inks used in the imprinting process are of a character that will wash away from the inking surfaces of printing elements 112, 122, 124 and 126 after the passage of a short time interval. This enables reuse of the apparatus to print composite images of the same or a different color.

Turning next to figures 32, an alternate form of the hand stamp apparatus of the invention is there shown and generally designated by the numeral 130. Stamping apparatus 130 includes a substantially transparent mounting block 132 having a smooth surface 132a and a stamp element 134 can be removably affixed to smooth surface 132a for producing an image on a surface to be imprinted. In this latest form of the invention, stamp element 134 uniquely includes a body portion 134a and a plurality of arm and leg-like segments 134b that are movably interconnected.
with body portion 134a for selective movement from the first position shown in the solid lines of figure 32 to a second position shown by the phantom lines in figure 32. More particularly, because stamping element 134 is uniquely provided with a first surface having a multiplicity of very small suction-cup-like protuberances, body portion 134a as well as segments 134b can readily be releasably affixed to smooth surface 132a of mounting block 132. However, in this latest form of the invention, once the printing element 134 has been affixed to the mounting block in the manner shown in figure 32, one or more of the segments 134a and 134b can be lifted from surface 132a and adjusted relative to body portion 134a so as to create a second image different from the first image produced by the stamp element in its first position. In this way, a number of images can be sequentially produced with each image having the arm and leg-like portions 134b in a different orientation with respect to body portion 134a of the hand stamp. This is not possible with conventional prior art constructions which embody a semi-rigid backing that is not bendable from side to side.

Turning next to figures 33 through 37, still another form of hand stamp apparatus of the present invention is there illustrated. This apparatus, like the earlier described apparatus, includes a substantially transparent acrylic mounting block 138 having a smooth surface 138a (figure 37). This latest form of the invention is specifically designed for producing a composite image on a surface to be imprinted
and comprises a first substantially transparent stamp element 140 that can be removably affixed to the mounting block, a second substantially transparent stamp element 142 that can be removably affixed to mounting block 138, and a third stamping element 144 that can be removably affixed to mounting block 138. As illustrated in figure 36, the apparatus of this latest form of the invention can be used to print a single image, such as that shown in figure 36 and designated by the numeral 148, or alternatively, the apparatus can be used to produce a composite image of the character shown in figure 37 wherein images corresponding to stamping elements 140, 142, and 144 can be imprinted on a printing surface in the composite arrangement illustrated in figure 37.

As illustrated in figure 33, during the production of other composite images, stamping element 140 can be replaced by either of the stamping elements 140a and 140b which are here shown as fanciful head portions of the composite shown in figure 37. Similarly, alternate forms of stamping element 142 of the character shown in figure 34 can be provided. These elements are designated in figure 34 as 142a and 142b. During the printing step, any one of the elements 142, 142a and 142b can be used to form a composite stamping element of the general character shown in figure 37. In similar fashion, counterpart stamping elements to elements 144 can be provided in the form of the stamping elements designated in figure 35 by the numeral 144a and 144b. A selected one of the elements 144, 144a and 144b
can be affixed to the mounting block 138 along with a selected one of stamping elements 140, 140a, 140b, 142, 142a, and 142b to provide alternate composite images of the general character shown in figure 37. Because of the transparent mounting block 138 and the substantially transparent, readily removable printing elements, each part of the composite image of figure 37 can be precisely positioned on the printing surface relative to the other parts of the image.

Referring next to figures 38 through 41, another form of apparatus of the invention is there shown. This form of the invention comprises a novel storage device for storing printing elements of the character produced in accordance with the method of the invention. Printing element 150, shown in figure 38, is removably affixed to bottom surface 16b of mounting block 16 which is of identical construction to that previously described and illustrated in figures 1 and 2. Printing element 150 is resiliently deformable and includes a first side 150a and a second side 150b that is provided with upstanding ink receiving portions which define the details of the stamped impression. Side 150a is of a character produced in accordance with the method of the invention from a viscoelastic photo polymer and is provided with a multiplicity of small suction cup-like protuberances which function to removably connect the printing element to the smooth surfaces of block 16. As previously described, side 150a can be removably affixed to either of the smooth surfaces 16a or 16b of mounting block 16. Uniquely, stamping element
150 can also be removably affixed to thin film mounting sheets 152 which form a part of the storage device of the invention which is generally designated in figure 40 by the numeral 154. As shown in figure 40, storage device 154 comprises a conventional type of loose-leaf binder 156 having a back 156a, a cover 156b and a back 156c to which a plurality of spaced-apart split connector rings 158 are connected. Each of the mounting sheets, such as sheet 152, is apertured so that it can be slipped over rings 158 when the rings are moved into their open position. When the rings are in the closed position shown in figure 40, the display sheets are secured within the binder notebook 156 and can be pivoted about rings 158 in the conventional manner of a loose leaf notebook.

Importantly, each of the mounting sheets includes a smooth mounting surface such as surface 152a of sheet 152. Smooth surface 152a is of a character similar to smooth surfaces 16a and 16b of mounting block 16 so that the viscoelastic printing elements of the invention can be removably affixed to the mounting sheets by pressing the gripping surfaces, such as surface 150a, of the stamping elements into engagement with the smooth surface 152a in the manner illustrated in figures 39 and 41. As indicated in figure 39, several stamping elements, such as elements 159a, 159b, 159c and 159d can be removably affixed to sheet 152.

As shown in figure 40, mounting sheet 152 includes an index element 152b which extends outwardly from the outboard edge of the sheet so as to function as
an identifying tab to identify the stamping elements that are carried by mounting sheet 152. By way of example, as shown in figure 41, stamping element 159a is affixed to the smooth surface 152a of mounting sheet 152 with the gripping surface thereof in gripping contact with surface 152a of mounting sheet 152. In similar fashion, a second printing element designated in figure 41 by the numeral 161 can be mounted on a second mounting sheet 164 that is carried within notebook 156 in the manner shown in figures 40 and 41. As was the case with sheet 152, mounting sheet 164 is provided with an index tab 164a that can be used to identify the printing elements carried on mounting sheet 164. In similar fashion a plurality of mounting sheets such as those illustrated in figure 40 can be carried in notebook 156 and can be provided with indexing tabs identified in figure 40 by the numerals 3, 4, 5, and 6. In use, these mounting sheets, like sheets 152 and 164 can carry one or more of the imprinting elements produced in accordance with the method of the invention.

The thin film mounting sheets, which are releasably carried within notebook 156, can be constructed from cast coated paper or cardboard. However, the sheets are preferably transparent and are constructed from of a variety of plastic materials such as polypropylene film, mylar film and similar materials. If desired, spacer sheets, such as paper sheets, 170 can be disposed intermediate the mounting sheets.
Turning now to figure 42, the various components used in the accomplishment of an alternate form of the method of the invention are there illustrated. This alternate method is similar in many respects to that earlier described and like numerals are used in figures 42, 43, 43A and 44 to identify like components. The primary difference between this latest method and that earlier described is the elimination of the grid component 78.

As illustrated in figure 42, the components used in accomplishing this alternate method of the invention include a first negative 70 that is identical to that previously described. Negative 70 has formed thereon of the various art work images 72 which are to be produced by the hand stamp on an ink receiving surface and an image border 72a circumscribing the images. As before, on first negative 70, the various art work images 72 are clear while the area 72a surrounding the images is opaque. It is to be understood that in some instances the circumscribing border 72a can be eliminated. Another component used in the accomplishment of this alternate form of the method of the invention comprises a thin, substantially transparent protective film 76 of the character previously described. However, as earlier mentioned, in this alternate form of the method of the invention, the grid having the multiplicity of openings has been eliminated. Accordingly, in carrying out this latest method, the liquid photopolymer is controllably deposited directly on protective film 76. The method of accomplishing this photopolymer deposition
step will presently be described. Overlaying the liquid polymer is a second, thin, substantially transparent, protective film 84. Overlaying film 84 is a second negative 86, that is identical to the previously described second negative. Second negative 86 is created using the original art work in the manner earlier described. Like negative 70, second negative 86 has clear areas 86a corresponding in size and shape of the backs of the printing elements and opaque areas 86b surrounding the clear areas (figure 42).

As in the earlier described form of the method of the invention for making the hand stamp of the invention, this alternate method comprises two steps, namely the step of constructing the printing element that has the image to be imprinted on the smooth surface and the step of interconnecting the printing element with the smooth surface of the body portion of the hand stamp. Considering first the alternate method of constructing the printing element, which has the image to be imprinted on the ink-receiving surface. This alternate method, like the earlier described method, comprises the steps of first locating negative 70 on glass panel 56 of apparatus 50, which is identical in construction and operation to that previously described. For this purpose first negative 70 is provided with locating apertures 90 at each corner of the negative (figure 42). Apertures 90 closely receive upstanding locating pins 92 that are affixed to glass panel 56 in the manner shown in figures 43 and 43A. Pins 92 extend upwardly from glass panel 56 so as to enable the pre-
cise positioning on the glass panel of the first negative 70. Pins 92 also function to precisely position second negative 86 in index with first negative 70. For this purpose, second negative 86 is provided with corner apertures 96, which apertures closely receive locating or index pins 92.

With first negative 70 indexedly located on glass panel 56 in the manner shown in figure 44, a slight vacuum is produced beneath the negative to urge it into secure engagement with the glass panel. Next, the protective transparent film 76 is then superimposed over negative 70. This done, the specially formulated photopolymer used in the accomplishment of the method of the invention is controllably deposited onto film 76. As before, this specially formulated liquid photopolymer is commercially available from M & R Marking Systems, Inc. of Piscathway, New Jersey and is sold under the product/chemical name Ideal i40 and Ideal i50. This material is a clear viscous liquid that will solidify or cure upon controlled exposure to ultraviolet light.

In this latest form of the invention, the liquid photopolymer is deposited on film 76 by a reciprocating reservoir 95, which contains the photopolymer “P” and forms a part of the processing apparatus 50 (see figure 44). As indicated in figure 44, the photopolymer “P” can be controllably dispensed from reservoir 95 through an outlet 95a as the reservoir is rolled over the upper surface of housing 52 along spaced-apart tracks 97 (see also figure 12). After the liquid photopolymer “P" has
been deposited on film 76, transparent protective film 84 is superimposed over the photopolymer by the earlier described mechanism 99 (figure 43) which is of the character previously described.

With film 84 positioned over the photopolymer "P", second negative 86 is superimposed over film 84 in the manner shown in figures 43 and 43A and is precisely indexed with first negative 70 by means of the indexing pins 92. More specifically, with second film 86 properly positioned over the assemblage comprising first negative 70, protective film 76, and photopolymer "P", the clear areas 86a of negative 86 are in precise index with the stamp element images 72 and the opaque areas 86b of the negative positioned to define the image borders that circumscribe stamp element images.

With the components stacked in the manner described in the previous paragraph and in the manner illustrated in figures 43 and 43A, cover 60 of apparatus 50 is moved from its upper position shown in the phantom lines in figure 43 to the lowered position shown in the solid lines in figures 43 and 43A. As cover assemblage moves into its lowered position a uniform pressure is exerted on negative 86 and, in turn, on polyester film 84 causing a uniform controlled pressure to be applied to the liquid polymer "P" that overlays protective film 76. This pressure functions not only to regulate the thickness of the liquid photopolymer, but also functions to move polyester film 84 into positive pressural engagement with the
liquid photopolymer to thereby produce a very smooth, highly unique, substantially planar shaped precursor engagement surface.

With the cover in position over the component assemblage, the photopolymer is exposed to ultraviolet rays in the same manner as previously described. More particularly, during the exposure step, the ultraviolet bulbs 66a housed within cover assemblage 60 of the apparatus 50 are energized so as to pass ultraviolet rays through second negative 86 to expose, through clear areas 86, the precursor printing elements. As the ultraviolet rays pass through clear areas 86a of negative 86, the liquid photopolymer, will be activated and will solidify to a predetermined thickness which is dependent upon the exposure time of the photopolymer to the ultraviolet rays. As was earlier discussed herein, this first exposure of the photopolymer by ultraviolet lamps 66a forms the printing element engagement surface, or backing surface of the printing element that will later be removably interconnected with the smooth surface of the body portion of the hand stamp.

Following exposure of the photopolymer by ultraviolet lamps 66a for the prescribed period of time, the previously mentioned opaque screen 61 of the exposure unit is moved from a retracted position to an extended position where it covers second negative 86 and obstructs any further ultraviolet exposure of the photopolymer from ultraviolet lamps 66a.
With the opaque screen suitably drawn, the next step in the irradiation method of the invention is to energize ultraviolet lamps 58a so as to pass ultraviolet rays through the clear areas 72 of first negative 70 in a manner to expose the unexposed liquid photopolymer. As the ultraviolet rays emanating from ultraviolet lamps 58a pass through the clear portions 72 of first negative 70, the liquid polymer will be activated and will solidify to form the upraised portions of the printing element. As was the case in the earlier described method of the invention, this second curing step using lamps 58a will create a stamp element that comprises the backing surface and the upraised indicia portions which, as before, comprise the images or letters to be imprinted on the printing surface. As in the first method of the invention, during the second exposure step, the portions of the photopolymer that surround the upraised indicia portions will not be exposed to and, therefore, will not be activated. These unexposed portions of polymer can be washed away by the washing step of the method which is identical to the washing step previously described herein.

Following the washing step each of the plurality of printing elements 102 can be readily peeled away from thin film 84 in the manner earlier described. The novel step of pressurally engaging the unexposed liquid photopolymer with the very smooth surface of film 84 produces a highly novel gripping surface comprising a multiplicity of extremely small, microscopic suction cup like elements which
enable the printing elements formed by this latest method of the invention to be removably affixed to any smooth surface such as the surface of film 84 and the smooth, microscopic surface of the hand stamp device of the invention (see for example figure 21). This unique aspect of the method and apparatus of the invention, permits the formation of printing elements of the character shown in figure 20 wherein the backing portion of the stamp is precisely trimmed to coincide with the edges of the upright indicia 102a.

Having now described the invention in detail in accordance with the requirements of the patent statutes, those skilled in this art will have no difficulty in making changes and modifications in the individual parts or their relative assembly in order to meet specific requirements or conditions. Such changes and modifications may be made without departing from the scope and spirit of the invention, as set forth in the following claims.
WE CLAIM:

1. A method of making a hand stamp having a body portion having a smooth surface comprising the steps of:

   (a) constructing a printing element having an image thereon comprising the steps of:

   (i) superimposing a grid over a first negative having formed thereon the negative of the image to be produced and an image border circumscribing the image said grid having walls defining at least one opening, and cooperating with said first negative to form a first chamber;

   (ii) filling said first chamber with a photopolymer to form a precursor printing element having a first and second surface;

   (iii) overlaying a transparent film over said filled grid to form a precursor engagement surface on said photopolymer;

   (iv) superimposing over said transparent film a second negative having at least one clear area in index with said image of said first negative and an opaque area surrounding said clear opening;

   (v) passing rays of light through said second negative to expose said precursor engagement surface of said photopolymer to light to form a printing element engagement surface;
(vi) passing rays of light through said first negative to expose said first surface of said precursor printing element to light to form a printing element having an image; and

(vii) removing said printing element from said grid; and

(b) urging said printing element engagement surface into pressural engagement with the smooth surface of said body portion of the hand stamp.

2. The method as defined in claim 1 including the further step of urging said transparent film into pressural engagement with said precursor engagement surface.

3. The method as defined in claim 1 in which said first negative has a plurality of images formed thereon and an image border circumscribing each said image.

4. The method as defined in claim 3 in which said grid comprises walls defining a plurality of openings and cooperates with said first negative to form a plurality of chambers.

5. The method as defined in claim 4 in which said second negative has a plurality of clear openings circumscribed by opaque areas.

6. A method of making a hand stamp having a body portion having a smooth surface comprising the steps of:
(a) constructing a printing element having an image thereon comprising the steps of:

   (i) superimposing a transparent, protective film over a first negative having formed thereon the image to be produced and an image border circumscribing the image;

   (ii) superimposing over said protective film a grid having walls defining at least one opening, and cooperating with said protective film to form a first chamber;

   (iii) filling said first chamber with a photopolymer to form a precursor printing element having first and second surfaces;

   (iv) overlaying a transparent film over said filled grid;

   (v) superimposing over said transparent film a second negative having at least one clear area in index with said image of said first negative and an opaque area surrounding said clear opening;

   (vi) exerting a pressure upon said second negative and said second transparent film to exert a pressure on said second surface of said precursor printing element to form a substantially planar precursor engagement surface;
(vii) passing ultraviolet rays of light through said second negative to expose said precursor engagement surface to said ultraviolet rays of light to form an engagement surface;

(viii) passing rays of ultraviolet light through said first negative and said first transparent film to expose said first surface of said precursor printing element to said rays of ultraviolet light to form a precursor printing element; and

(ix) removing said precursor printing element from said grid; and

(x) removing from said precursor printing element unexposed polymers to form a printing element having a printing element engagement surface; and

(b) urging said printing element engagement surface of said printing element into pressural engagement with the smooth surface of said body portion of the hand stamp.

7. The method as defined in claim 6 including the further step of washing said precursor printing element with water prior to its removal from said grid.

8. A hand stamp apparatus for producing an image on a surface comprising:
(a) a mounting blocking having a smooth surface;

(b) a first stamp element removably affixed to said smooth surface for producing a first image on a selected portion of the surface, said stamp element being formed of a viscoelastic photopolymer; and having a multiplicity of small gripping protuberances for releasably gripping said smooth surface; and

(c) a second substantially transparent stamp element removably affixed to said mounting block for alignment with said first image for producing a second image proximate said first image on a selected portion of the surface, said second stamp element being formed of a viscoelastic photopolymer.

9. The hand stamp apparatus as defined in claim 8 further comprising a third substantially transparent stamp element removably affixed to said mounting block for alignment with said second image for producing a third image proximate said second image on a selected portion of the surface, said third stamp element being formed of a viscoelastic photopolymer.

10. A hand stamp apparatus for producing a multicolored image on a surface comprising:

(a) a substantially transparent mounting block having a smooth surface;
(b) a first stamp element removably affixed to said smooth surface for producing a first image on the surface;

(c) a second stamp element removably affixed to said mounting block for indexable alignment with said first image for producing a first color on a selected portion of the surface;

(d) a third stamp element removably affixed to said mounting block for indexable alignment with said first image for producing a second color on a selected portion of the surface; and

(e) a fourth stamp element removably affixed to said mounting block for indexable alignment with said first image for producing a third color on a selected portion of the surface.

11. The hand stamp apparatus as defined in claim 10 in which each of said first, second, third and fourth stamp elements are substantially transparent.

12. The hand stamp apparatus as defined in claim 10 in which each of said first, second, third and fourth stamp elements are formed of a viscoelastic photopolymer and each includes a surface having a multiplicity of small gripping protuberances for gripping said smooth surface.

13. The hand stamp apparatus as defined in claim 10 in which said first image comprises an outline circumscribing a plurality of openings.
14. The hand stamp apparatus as defined in claim 13 in which said second stamp element produces a first color within a selected group of said plurality of openings.

15. The hand stamp apparatus as defined in claim 14 in which said third stamp element produces a second color within a selected group of said plurality of openings.

16. The hand stamp apparatus as defined in claim 15 in which said fourth stamp element produces a third color within a selected group of said plurality of openings.

17. A hand stamp apparatus for producing an image on a surface comprising:

   (a) a substantially transparent mounting block having a smooth surface; and

   (b) a stamp element removably affixed to said smooth surface for producing a first image on the surface, said stamp element comprising a body portion and a segment adjustably connected to said body portion, said segment being movable from a first position to a second position relative to both said body portion and said smooth surface of said mounting block.

18. The apparatus as defined in claim 17 in which said stamp element is substantially transparent.
19. The apparatus as defined in claim 18 in which said stamp element is formed of a viscoelastic photopolymer.

20. A storage device for storing imprinting elements formed of a viscoelastic photopolymer having a connector surface comprising a multiplicity of small gripping protuberances for a smooth surface, said storage device comprising a binder and a plurality of sheets connected to said binder, each said sheet of said plurality of sheets having a smooth surface engagable by the connector surface of the imprinting elements.

21. The storage device as defined in claim 20 in which said sheets are removably connected to said binder.

22. The storage device as defined in claim 20 in which each of said sheets is substantially transparent.
INTLATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) : B41F 5/00; B41K 1/56; B42F 15/00
US CL : 101/199, 968; 409/78
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
U.S. : 101/199, 968, 468,405, 406, 975, 927, 928, 935, 126.1; 409/78, 70

Documention searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
NONE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<td>Y</td>
<td>US 4,625,640 A (BUNGER) 02 December 1986 (02.12.1986), Figs. 1-3B; col. 3 line 43-58.</td>
<td>8-20</td>
</tr>
<tr>
<td>X</td>
<td>US 3,973,495 A (ROWE) 10 August 1976 (10.08.1976), col. 3, lines 6-41.</td>
<td>8-20</td>
</tr>
<tr>
<td>X</td>
<td>US 5,191,837 A (BOLTON) 09 March 1993 (09.03.1993), Fig. 4; col. 2, lines 7-13.</td>
<td>8-20</td>
</tr>
<tr>
<td>X</td>
<td>US 5,642,667 A (SASTRE) 01 July 1997 (01.07.1997), Figs. 1-4.</td>
<td>8-20</td>
</tr>
<tr>
<td>X,P</td>
<td>US 6,305,714 B1 (ROSSETTO et al) 23 October 2001 (23.10.2001), see entire document.</td>
<td>20, 21</td>
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Further documents are listed in the continuation of Box C. See patent family annex.

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<td>&quot;P&quot;</td>
<td>document published prior to the international filing date but later than the priority date claimed</td>
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Date of the actual completion of the international search | Date of mailing of the international search report
07 JUNE 2002 | 26 AUG 2002

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Form PCT/ISA/210 (second sheet) (July 1998)
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<th>Relevant to claim No.</th>
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<td>X,E</td>
<td>US 6,367,842 B1 (WIEN et al) 09 April 2002 (09.04.2002), see entire document.</td>
<td>20, 21</td>
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<tr>
<td></td>
<td>Y,E</td>
<td>22</td>
</tr>
<tr>
<td>X</td>
<td>US 2,970,539 A (GRIFFIN) 07 February 1961 (07.02.1961), Figs. 1-4.</td>
<td>8-20</td>
</tr>
<tr>
<td>A</td>
<td>US 5,909,709 A (AN et al) 08 June 1999 (08.06.1999), see entire document.</td>
<td>1-7</td>
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