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(54) DIE ASSEMBLY AND LOCATING METHOD

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ENSEMBLE DE MATRICE ET PROCÉDÉ DE LOCALISATION

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(73) Proprietor: **SilDie Systems Limited
Witham Essex CM8 2FB (GB)**

(72) Inventor: **Cook, Chris
Witham, Essex CM8 2FB (GB)**

(74) Representative: **Sandersons
D2 Knowledge Gateway
Nesfield Road
Colchester, Essex CO4 3ZL (GB)**

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Description

[0001] The present invention relates to a reusable assembly adapted for use in one or more of foiling, embossing and debossing, and to methods of positioning a die using such an assembly. The present invention improves both the speed of positioning, removal and repositioning of dies upon the bed of a press, which finds application in embossing and hot foil blocking.

[0002] The process of pressing a sheet against a die in order to impress a design upon the sheet finds use in a number of different applications. One such use is embossing in which a carrier sheet is aligned between opposite facing complimentary dies, one male and the other female, whereupon the dies are brought together, this action compressing the carrier sheet between the dies. In doing so, a selected area of the carrier sheet becomes raised from the surface of the desired side of the sheet, the raised profile corresponding to the force applied and the geometry of the dies used. Debossing is largely identical save for the fact that the design is instead impressed into the desired, viewed side of the carrier sheet which creates a recessed profile. Similarly, in hot foil blocking foil or a material which resembles foil, is pressed upon specific regions of a carrier sheet by a heated die which leaves behind a residue of the foil upon the carrier sheet in the desired form.

[0003] Typically, in applications such as those above, the type of press used will comprise a pair of horizontal beds positioned opposite one another. Dies are attached to the internally facing surfaces of the beds and in most instances it is the upper bed which is pneumatically actuated. A typical series of events for such a press might go as follows: a carrier sheet is introduced between the faces of the press, one or both faces of the press are brought against one another and against the carrier sheet, the force of which impresses a design upon the carrier sheet, the faces of the bed then move apart and finally the carrier sheet is removed from between the faces ready for the process to be repeated.

[0004] Such presses must be operated at high speeds and to reduce the length of a given run, it is usual to make a number of impressions on different parts of a carrier sheet simultaneously. For example, if a raised graphic design is to be applied to a greetings card, then the blanks for several such cards may be formed on a single large sheet of the card material which is cut into individual blanks after the printing and embossing operations have been completed.

[0005] For an application such as this, it is not economical to produce just one die in order to make the multiple impressions as such a die would be not only prohibitively expensive but also the entire die would need replacement if any part of it were to be damaged. Also and importantly it would not be possible to adjust the position of each individual image in relation to the sheet to cope with sheet shrinkage. Due to this, a number of separate dies are created which are all individually mounted on the bed or

beds of the press.

[0006] To this end, the beds of the press are often formed as thick plates of steel having a regular matrix of anchoring holes. Expanding pegs, referred to in the art as dogs, grip within these holes and are used to anchor the individual dies to the bed. The dies themselves are usually made from Copper, brass, Magnesium or Zinc for foiling (as they are required to transmit heat), and the same materials are used for embossing and debossing, although sometimes plastics, resins or other materials are used as well for the latter. Foiling dies are mounted onto a steel or aluminium chase with either dogs or screws or some such clamping device. Embossing dies can be mounted in the same way, or may be mounted within a separate, larger wooden cutting and creasing die where the embossing dies are supplied screwed to a mount block which is then held in an aperture in the cut and crease die. Alternatively, the mount block may be positioned within a window board (as the window board being similar to a cut and crease die but not having the cut and crease rules) for running separate pass when embossing/debossing is too close to, or running across, a cut or crease area, or the mount block may be screwed on top of a hard material sheet for separate pass. The reason that dies are not mounted directly onto the wood is because the wood is uneven and can be crushed by the pressure used in a press. The dies are a plate onto which the desired pattern has been formed by a photographic etching process that is well known in itself and need not be described within the context of the present invention.

[0007] Individual dies are positioned on the beds and a test is run to ensure that their position is in register with the existing markings on the cardboard carrier sheets. Adjustments are made to the individual dies and the test procedure is repeated until all the dies are in their correct position. This setting up of the dies may take several hours. At the end of a production run, the dies are removed to allow the same press to be used for another job and should a fresh run later be required, the whole setting up procedure of the dies must be repeated.

[0008] Installation of the dies upon the faces of the press thus contributes to a substantial portion of the set-up time of a production run and therefore takes away from the time which can be spent profitably producing products. Furthermore, producing products which do not match the specifications of a production plan is very costly, therefore it is of paramount importance to reduce the possibility of introducing errors during set-up of the dies.

[0009] The Applicant's own earlier International Patent Publication No. WO 01/87602 describes a die assembly and locating method which seeks to address some of the problems discussed above. The present invention provides improvements of the apparatus and method previously disclosed.

[0010] The present invention aims to reduce the time taken to precisely position a given number of dies upon a face of a press whilst simultaneously improving the

ease, accuracy and therefore reproducibility of their precise positioning and allow for swift repositioning.

[0011] To achieve the above-mentioned objects, a reusable assembly according to the present invention as defined in claim 1 and a method according to the present invention as defined in claim 14 are provided.

Further preferred embodiments are defined in the dependent claims.

[0012] According to the present invention there is provided a reusable assembly adapted for use in one or more of foiling, embossing and debossing, the assembly comprising:

- a chase, the chase having a first surface with a plurality of user identifiable discrete grid positions arranged within a grid, the chase adapted for connection to an embossing, debossing or foiling press; and
- a die assembly comprising a die defining a first surface adapted for one or more of foiling, embossing and debossing and a linkage mechanically connected to the die between the first surface of the chase and the die, the linkage defining a second surface adapted for separable engagement with the first surface of the chase at various grid positions.

[0013] Preferably each discrete grid position has a reference to identify it. The grid of the chase provides the advantageous effect that a designer/user may plan/specify the positions of one or a number of dies within the grid of the chase ahead of time. During set-up for a production run, the user is able to quickly and accurately place the dies according to that plan, making use of visible grid-references on the chase. This substantially reduces the time needed to set-up and thus increases the time allowed for production. If the production plan changes according to new requirements, the positions of the dies may be easily adjusted according to the new plan, perhaps to account for more dies which must be introduced onto the chase within the same production run. This versatility can allow for fewer individual pieces of die equipment to be produced in the first place, due to the range of tasks that can be accomplished with the same equipment, and thus reduces associated costs and waste.

[0014] In addition, whilst initial fine tuning of the setup of the present invention still takes some time and may involve some testing, once that is complete the die assembly can be removed from the press and replaced precisely in the correct position by using the grid, and if present the references. This means that the die assemblies can be swapped between production runs in a small fraction of the time as compared to re-setup.

[0015] The grid of positions may be identified or formed in numerous ways, for instance it could be printed upon the chase, written on by hand, formed from illuminated lines located on the chase, formed from an image projected onto the chase, applied in an overlay or film, projected as an image onto an overlay or film, formed as a layer upon the chase whereupon a grid of a particular

shape arises in response to exposure of the layer to some form of electromagnetic radiation or chemical, or formed by physical formations such as recesses or projections. The references identifying the grid may likewise be formed in a variety of ways: they may be displayed on small displays formed in the chase, written on by hand, formed from an image projected onto the chase, applied in an overlay or film, projected as an image onto an overlay or film, formed as a layer upon the chase whereupon a specific set of references arises in response to exposure of the layer to some form of electromagnetic radiation or chemical, machined into the upper surface of the chase or formed as projections which are raised from the upper surface of the chase. If the grid and/or grid references are formed removably, such that they may be freely amended, this allows for multiple chases to be positioned aside one another upon a press, in a modular fashion, and a grid and references to be created based upon the full layout of the chases and the requirements of the particular production run.

[0016] Preferably, the plurality of user identifiable discrete grid positions to which the die assembly can be connected are identified by a set of grid references. These positions may be identifiable by way of the references assigned to the grid of the chase and due to the various means of providing visibility for the grid positions and references, as above.

[0017] The grid reference to a discrete location can use any form of identification as long as it is clear and not confusing. This could be a cross reference system of letters and numbers in columns and rows or it could be unique identifiers such as a series of numbers, letters or other symbols.

[0018] In order to aid connection of the die assembly to the chase, preferably, the reusable assembly further includes a separable engagement mechanism that facilitates the separable engagement of the second surface of the linkage with the first surface of the chase. The engagement mechanism may cause or improve engagement in a variety of ways. For example, the mechanism may be magnetic and if magnetic could be engaging due to the magnetic attraction between magnets of opposing polarity or attraction between magnets and magnetic materials. If the engagement mechanism includes magnets, these may be permanent magnets or electromagnets and may further be formed from a type of magnet whose magnetic strength is not affected by temperature change. The engagement mechanism may instead comprise a suitable form of mechanical inter-engagement. For example, interacting portions may act upon one another to arrest the removal of the die from the chase once the die is within a user-defined position. The engagement mechanism may also be based upon suction, such that a die assembly is bound to a user-defined region of the chase due to the suction force applied to the underside of the die assembly by the section or sections of the chase directly below the die. If the engagement mechanism is based upon suction, the chase and/or die assembly may

further comprise appropriate formations that ensure a gas-tight seal between the underside of the die assembly and the chase. Further and/or alternatively, the above binding mechanisms may be used in combination based upon particular requirements of the production run to be completed.

[0019] The separable engagement mechanism may facilitate the engagement of the die assembly to the first surface of the chase in one or more discrete grid position or positions within the set.

[0020] The linkage locates between the first surface of the chase and the die. The linkage may be formed as a single member, for example a plate, or may be several separate members acting together. The or each part of the linkage may connect to one or more than one discrete grid position. If there are a number of different linkage members, these may be identical or may be of varying shapes. The linkage may be formed from an appropriate incompressible material, for instance metals, ceramics, and polymers and composite materials, the choice of the material depending on the properties of that material.

[0021] The linkage is mechanically connected to the die to form the die assembly. The means of connection of the linkage to the die may be determined based upon specific requirements but could be by way of a screw (or screws) inserted through a hole (or holes) in the die and engaging with a threaded opening (or openings) formed in the or each linkage. Alternatively, the screw could be replaced by a bolt that engages with a thread in the linkage, or a nut embedded in the linkage. Whatever means of connection are employed, it is preferred that no part of this means upstands the die so as not to impress upon a carrier sheet during production. To achieve this, holes formed in the die to locate means of connection may be counterbored on the design-side of the die.

[0022] Preferably, when connected together the position of the die relative to the linkage may be altered within a limited range of movement to permit small adjustment before fixing in a use position. This may be achieved, for example, due to the means of connection between the die and the linkage being a loose fit prior to being secured in place. This effect could be provided due to the use of screws with shafts that are smaller than the holes in the die in which they locate, such that the portion of the hole bounding the shaft is sufficiently greater in diameter than the shaft, in order that a desired range of lateral movement (usually a few mm) in the plane of the press is permitted until the screws are tightened.

[0023] Ideally cooperating formations are provided on the first surface of the chase as well as upon the linkage. These cooperating formations can help the interengagement of the die and chase and control accurate alignment with the defined grid formation. The cooperating formations may comprise recesses and appropriately shaped projections that locate in the recesses. The cooperating formations upon the chase and die assembly may each comprise only recesses or projections or some combination of recesses and projections. Each recess or pro-

jection may constitute one position in the grid.

[0024] The cooperating formations may have recesses and projections with engaging surfaces formed with draft angles permitting one or both of the cooperating formations to expand or contract whilst maintaining engagement and relative position between the cooperating formations.

[0025] As mentioned above the separable engagement mechanism may include magnets to hold the die assembly to the chase. A first plurality of magnets may be located within the chase or linkage. Ideally a magnet is provided at each of the grid positions within the chase. The part of the linkage that engages the chase may be formed with a magnetic material, metal or otherwise, or may include a magnet (which may be of opposite polarity to magnets in the chase if present).

[0026] The separable engagement mechanism may include a detent mechanism located in the chase, the detent mechanism acting upon a portion of the linkage. The chase may have a moveably locking member that engages with a portion or portions of the linkage located in any of the grid locations. This could clamp the portion or portions of the linkage located in any of the grid locations. It could also engage with a notch or groove on those portions.

[0027] According to the present invention there is provided a method of reusably positioning and connecting a die to a chase in a foiling, embossing or debossing press, comprising: providing a chase with a grid of user identifiable discrete grid positions on a first surface thereof; mounting the chase within an embossing, debossing or foiling press; providing a die assembly comprising a die having a first surface adapted for one or more of foiling, embossing or debossing and linkage mechanically connected to the die to locate between the first surface of the chase and the die, the linkage having a second surface adapted for separable engagement with the first surface of the chase; locating the die assembly at a desired location using one or more of the discrete grid positions; and noting the grid position or positions of the engagement so that the die may be removed and replaced in the same position for future repeat use.

[0028] The grid may have a reference noted on the die for future use. The method may include fine adjustment of the die relative to the linkage once engaged with the one or more discrete grid positions.

[0029] The above apparatus and method may be combined with a cutting and creasing operation in order to accomplish more tasks simultaneously with fewer pieces of equipment. For instance, a cutting and creasing die made of a suitably incompressible material (if necessary) may be attached to a chase as outlined above. The cutting and creasing die may include apertures in which a die assembly, as previously described, may be mounted to the chase. Alternatively, the cutting and creasing die may be substituted for, or used in combination with, a window board, a die assembly locatable in one or more windows of the window board and the die assembly may

be mounted within a window using the techniques described above.

[0030] In order that it be better understood, but by way of example only the present invention will now be described with reference to the accompanying drawings in which:

Figure 1A is an exploded view of a first embodiment of assembly comprising a grid referenced, recessed magnetic chase plate with an embossing die atop the chase;

Figure 1B is a perspective view of the rear side of the intermediate plate of Figure 1A, which shows the shape of the protrusions that fit into the recesses of the chase of Figure 1A;

Figure 1C is a plan view of the assembly of Figure 1A in which the die portion is fitted to the chase plate;

Figure 1D is a sectional view of the assembly of figure 1C, taken along line A-A of figure 1C;

Figure 2A is an exploded view of a second embodiment of assembly comprising a grid referenced, recessed magnetic chase with a foiling die atop the chase;

Figure 2B is a plan view of the assembly of Figure 2A, in which the die portion is fitted to the chase plate;

Figure 2C is a sectional view of the assembly of Figure 2B, taken along line B-B of Figure 2B; and

Figure 3 is an exploded view of a third embodiment of assembly showing an alternative engagement mechanism.

[0031] A first embodiment is shown in Figures 1A to 1D. Figure 1A shows an exploded view of that first embodiment of embossing assembly generally indicated 102, which comprises a chase plate 104, a linkage in the form of an intermediate die plate 106, magnets 108 that locate within the intermediate die plate 106, an upper die plate 110 and securing screws 112. The chase plate 104 comprises an upper (in this view) first surface 114 having an array of grid-referenced recesses 116, magnets 108 located within the chase plate 104 underneath (as shown in Figure 1D) each of these recesses 116 and a second surface 118 on the underside of the chase plate 104. The intermediate die plate 106 is a square plate having an underside 134 (visible in 1B) and an upper face 120, the upper face 120 has four recesses 122 located approximately half way along each edge of the face 120, the recesses 122 holding the magnets 108. The intermediate die plate 106 further comprises four threaded holes 124 for the screws 112, each hole located at a separate corner of the square upper face 120. The magnets 108 fit securely in the recesses 116, flush with the upper face 120. The upper die plate 110 is also a square plate with the area and same edge lengths as the intermediate die plate 106. The upper die plate 110 has an uppermost face 126 on which is etched a recessed design 127. In each of the four corners of the uppermost face 126 of the upper die plate 110 there is a counter-bored hole 128. The securing

screws 112 have a head width 129, a body width 130 and a length 132.

[0032] In use, the second surface of the chase plate 118 is secured upon an inner-facing side of a press (not shown). Separately, the intermediate die plate 106, with magnets 108 within the recesses 122 of the intermediate die plate 106, is combined with the upper die plate 110 such that the upper face 120 lies against a lower face (not shown) of the upper die plate 110. The intermediate 106 and upper 110 plates are secured together loosely to one another by way of the four screws 112, each of which is inserted through the counter-bored holes 128 in the corners of the uppermost face 126 of the upper die plate 110, the screws 112 engaging part-way within the threaded holes 124 in the intermediate plate 106. Due to the tolerance of the dimensions 128, 130 & 132 of each screw 112 compared with the dimensions of each counter-bored hole 128, the upper die plate 110 is permitted a certain amount of movement in the plane above the upper face 120 of the intermediate plate 106, prior to the screws 112 being screwed firmly in place.

[0033] The combined assembly of intermediate 106 and upper 110 plates, magnets 108 and screws 112 is then positioned atop a desired subset of recesses within the grid-referenced recesses 116 of the chase plate 104. Due to the magnetic attraction forces between the magnets located within both the chase plate 104 and the intermediate die plate 106, the combined assembly will snap firmly into the desired position, namely a subset of four grid recesses. The position of this subset will correspond substantially to a desired location of a carrier sheet which is to be introduced between the beds of a press. Any slight misalignment between the uppermost face 126 of the upper die plate 110 and the carrier sheet is easily correctable by way of the slight movement afforded between the upper die plate 110 and the intermediate plate 106. The amount of movement afforded between the screws 112 and the counter-bored holes 128, in combination with the spacing of the recesses 116 within the grid allows for the combined die assembly to be securely located at any desired position within the grid. After making any necessary final positional adjustments, the upper die plate 110 is screwed firmly into place, ready for the beds of the press to be brought together during an embossing of the carrier sheet.

[0034] Figure 1B shows the underside 134 of the intermediate die plate 106. Raised from the underside 134 is a three-by-three grid of square projections 136, the shape of each square projection corresponding to the internal dimensions of the grid-referenced recesses 106 of the chase plate 104, ensuring a snug fit between the projections 136 and the recesses 106 in use. Also shown are the threaded holes 124 made in the corners of the intermediate die plate 106, for locating the screws 112.

[0035] Figure 1C shows the die assembly positioned atop a three-by-three grid of recesses as would be the case during use of the embossing equipment. In this, the recesses to which the die is engaged have the references

C5, C6, C7, D5, D6, D7, E5, E6 and E7.

[0036] Figure 1D shows a cross-section taken along line A-A of Figure 1C. The magnets 108 located within the chase plate 104 are located directly below the recesses 116 so that the die assembly is attracted most strongly to defined grid positions, therefore ensuring a useful snap-fit engagement. The chase plate may be formed from a suitable material such as plastics as can the parts of the die plate.

[0037] Figures 2A-2C show a second embodiment suitable for foiling. In this the foiling assembly 202, comprises a chase base plate 204, magnets 206 located within the chase base plate 204, a chase cover plate 208, metal pads 210, a foiling plate 212 and securing screws 214. The chase base plate 204 has an upper surface 218 in which there is a grid of circular recesses 220, the dimensions of each circular recess 220 ensuring a snug fit around each of the magnets 206 that locate therein. The magnets 206 may be made from a heat resistant material such as ferrite that exhibit a strong magnetic field even when operated at elevated temperatures as used in foiling. The chase cover plate 208 has matching edge dimensions to the edges of the chase base plate 204, and an upper (in this view) grid surface 224, in which is formed a set of grid-referenced recesses 226. The positions of these grid-referenced recesses 226 correspond directly to the positions of the magnets 206 located in each of the magnet recesses 220. The numeric references to the grid positions are visible within each of the recesses 226.

[0038] The metal pads 210 are shaped to correspond to the grid-referenced recesses 226 and therefore each fits snugly within a grid-referenced recess 226. Furthermore, both the pads 210 and the grid-referenced recesses 226 are tapered to have draft angles formed in the lateral walls of the pads 210 and recesses 226 (see Figure 2C) which permits the pads 210 and grid-referenced recesses 226 to expand or contract at different rates, depending upon the temperature of each portion, whilst maintaining contact between the pads 210 and grid-referenced recesses 226. Because of the draft angles formed in the pads 210, the lower surface of a pad has a smaller area than the upper surface. The pads 210 are formed from a metal which experiences magnetic attraction but does not itself exert a magnetic field. Furthermore, the strength of the magnetic force which attracts the pads 210 to the magnets 206 is unaffected by the heating of the foiling equipment, which is necessary to affect the transfer of foil or a foil-like material to a sheet. The metal pads 204 also have threaded holes 228 into which the screws 214 are securable.

[0039] The foiling plate 212 is a rectangular metal plate with an upper (in this view) profiled face 232. Raised from the profiled face 232 is a design 234 and in each of the four corners of the profiled face 232 there is a counter-bored hole 236 for locating a securing screw 214. Tolerances in the dimensions of the counter bored holes 236 compared with the securing screws 214 allow for movement of the foiling plate 212 relative to the pads 210 in a

similar manner to the first embodiment of Figure 1A above. The foiling plate 212 also comprises a notched section 238 in each of the edges of the lower surface 230 to aid removal of the foiling plate 212 from the chase cover plate 208. Other formations or mechanisms to aid removal could be provided.

[0040] In use, the chase base plate 204, magnets 206 and chase cover plate 208 are secured together prior to installation within a press. The chase is secured upon an inner facing side of a press (not shown) either way up. Separately the foiling plate 212 is attached to four metal pads 210, such that the lower surface lies against the upper surfaces of the pads 210. The foiling plate 212 is attached to the metal pads 210 by way of the securing screws 214 that are inserted through the counter-bored holes 236 (as indicated in Figure 2A) and engaging with the threads 228 in the metal pads 210. This combination of foiling plate 212, metal pads 210 and securing screws 214 are then located upon a defined subset of the grid-referenced recesses 226, the metal pads 210 snapping into position within the subset as the metal pads 210 are attracted to the magnets 206 located within the chase base plate 204. Any minor changes that must be made to the position of the foiling plate 212 about the grid referenced recesses 226 are made, in order precisely to align the foiling plate 212 with the carrier sheet (not shown) above the foiling plate 212. The securing screws 214 are then tightened to prevent movement of the foiling plate 212. Heat is supplied to the foiling assembly 202 until the foiling plate 212 is at the desired temperature, at which point the beds of the press are brought together, forcing the foil or foil-like material (not shown) against an area of the carrier sheet (not shown) corresponding to the design 234 formed upon the foiling plate 212. The pressure and heat cause the foil or foil-like material to be transferred to the carrier sheet, thus leaving a residue of the foil or foil-like material in the shape of the design 234 upon the carrier sheet. The beds of the press are then moved apart, the now-completed carrier sheet and spent foil sheet removed from between the beds of the press and fresh supplies of each reintroduced, ready for the process to be repeated. Once the production run has been completed the foiling plate 212 and pads 210 can be removed from the chase without altering the connection of the foiling plate 212 to the pads 210. The foiling plate 212 may be accurately replaced in the exact same position later simply by reengaging the pads 210 with the same four grid referenced recesses. No fine adjustment is needed again as the adjustment previously made has been preserved by the connection of the die to the linkage. By identifying on the cover plate 208 the grid reference or references of the recess or recesses to which one or more of the pads 210 should engage a clear record can be kept both for first setup and repeat use.

[0041] Figure 2B shows a foiling plate 212 positioned atop a three-by-five grid of grid-referenced recesses 226, as would be the case during use of the foiling equipment. Also shown is the tolerance between the dimension of

the heads of the securing screws 214 and the rim of the counter-bored holes 236, this tolerance permitting the aforementioned movement prior to the foiling plate 212 being secured firmly to the metal pads 210.

[0042] Figure 2C shows a section taken along line B-B of Figure 2B. It clearly shows the magnets 206 located within the circular recesses 220 of the lower chase plate 204, and that these circular recesses 220 are located directly below the grid-referenced recesses 226 of the upper chase plate 208. This ensures that the die assembly is attracted most strongly to defined grid positions, and therefore creating a useful snap-fit engagement. The draft angles formed in the exterior walls of the metal pads 210 and interior walls of the grid-referenced recesses 226 are also clearly shown.

[0043] Figure 3 shows an exploded view of a third embodiment with a mechanical locking arrangement. This assembly 302, comprises a base chase plate 304, a locking layer 306 to be located upon the base chase plate 304, an overlying chase plate 308, locking prongs 310, a foiling plate 312 and securing screws 314. The base chase plate 304 comprises a square surface 316 in which are formed several parallel channels 318 which almost span the entire length of the base chase plate 304 but do not quite reach both edges. Arranged along the length of each channel 318 are regularly spaced circular recesses 320, having a depth greater than the channels 318. The diameter of the circular recesses 320 tapers to decrease very slightly with increasing depth. The locking layer 306 is composed of a rectangular bar 322, from which extends a number of flat rectangular plates 324, extending adjacent one another and within the same plane. Each rectangular plate 324 has a number of locking holes 326 formed regularly along its length, each locking hole 326 tapers with a diameter which increases slightly as the locking hole 326 extends from the top to the bottom surface of a rectangular plate 324. The rectangular plates 324 fit closely in the channels 318 of the base chase plate 304. The overlying chase plate 308 is a square plate which has edge lengths that match those of the base chase plate 304. The overlying chase plate 308 also has overlying holes 328 made through the plate, the locations of these overlying holes 328 match the locking holes 320 formed in the locking layer 306 and the circular recesses 320 formed in the base chase plate 304. The overlying holes also taper and have a diameter which decreases slightly as the overlying hole 328 extends from the top to the bottom surface of the overlying chase plate 308.

[0044] The metal locking prongs 310 are frustoconical in shape and their height is equal to the combined thicknesses of the base chase plate 304, locking layer 306 and overlying chase plate 308. Midway along the curved surface of each frustocone is formed an annular step 330. In the foiling-plate side face of the prong 310 there is formed a threaded hole 332 for locating a securing screw 314.

[0045] The interconnection of the foiling plate 312 and

securing screws 314 is identical to that of the foiling plate 212 and securing screws 214 of Figure 2A and they operate in a similar manner to that described above.

[0046] In use, the base chase plate 304, locking layer 306 and overlying metal chase plate 308 are combined, with the rectangular plates 324 lying within the channels 318 of the base chase plate 304. The overlying chase plate 308 is positioned atop the locking layer 307 and the overlying chase plate 308 is bound to the base chase plate 304 by means not shown. Due to the fit of the rectangular plates 324 within the rectangular recesses 318, the rectangular plates 324 are able to slide freely along the lengths of the rectangular recesses 318. These three combined chase plates are bound to an inner-facing surface of a press (not shown). The foiling plate 312 is combined with the locking prongs 310 by inserting the securing screws 314 through the design-side of the foiling plate 312 such that the securing screws 314 engage with the threaded holes 332 of the locking prongs 310. The combined foiling components are then located within a subset of the holes formed by the three combined chase plates, based upon a pre-defined specification, the locking prongs 310 fitting closely within these holes. In Figure 3 the grid references are not shown but would be of a similar nature to those seen in Figures 1A, 1C, 2A and 2B. In order to secure the locking prongs 310 within the holes, the rectangular bar 322 is pulled away from the edges of the base chase plate 304 and overlying chase plate 308, against which it normally resides, and secured in that position. This action engages the interior rims of the circular locking holes 320 with the step 330 formed in the curved surfaces of the locking prongs 310 and acts to prevent removal of the locking prongs 310, and thus the foiling plate 312 which is attached to the locking prongs 310. Minor adjustments are then made to the precise position of the foiling plate 312 as detailed extensively above in relation to Figure 2A. The foiling plate 312 is then utilised in a foiling operation, again as described in relation to Figure 2A above. The foiling plate assembly comprising the plate 312 and locking prongs 310 can, when not needed be removed by moving the rectangular bar 322 to release the lock and then lifting from the recesses. It can be repositioned at any time in the same place with no need for fine adjustment as that is set by the connection of the prongs to the plate that need not be changed in removal and reconnection.

Claims

1. A reusable assembly (102) adapted for use in one or more of foiling, embossing and debossing, the assembly (102) comprising:

- a chase (104), the chase (104) having a first surface (114) with a plurality of user identifiable discrete grid positions (116) arranged within a grid, the chase (104) adapted for connection to

- an embossing, debossing or foiling press; and
 - a die assembly comprising a die (110) defining a first surface (126) adapted for one or more of foiling, embossing and debossing and a linkage (106) mechanically connected to the die (110) between the first surface (114) of the chase (104) and the die (110), the linkage defining a second surface (134) adapted for separable engagement with the first surface (114) of the chase (104) at various grid positions (114).
2. An assembly as claimed in claim 1 wherein the discrete grid positions (116) are each identified by a reference to identify where a die assembly should be connected.
 3. An assembly as claimed in claim 1 or claim 2, including a separable engagement mechanism that facilitates the separable engagement of the second surface (134) of the die assembly with the first surface (114) of the chase (104).
 4. An assembly as claimed in claim 3, wherein the separable engagement mechanism facilitates the engagement of the die (110) to the first surface (114) of the chase (104) in one or more discrete grid position or positions within the set of grid positions (116).
 5. An assembly as claimed in any of the preceding claims, wherein cooperating formations are provided on the first surface of the chase (104) as well as upon the linkage (106).
 6. An assembly as claimed in claim 5, wherein the cooperating formations comprise recesses and appropriately shaped projections to locate in the recesses.
 7. An assembly as claimed in claim 5 or claim 6, wherein the cooperating formations having engaging surfaces have draft angles permitting one or both of the cooperating formations to expand or contract whilst maintaining engagement and relative position between the cooperating formations.
 8. An assembly as claimed in any of claims 3 to 7, wherein the separable engagement mechanism includes magnets (108) to hold the die (110) to the chase (104).
 9. An assembly as claimed in claim 8 wherein a first plurality of magnets (108) is located within the chase (104) or linkage (106).
 10. An assembly as claimed in claim 9 wherein the first plurality of magnets (108) is located within the chase (104) and a magnet is provided at each of the grid positions.
 11. An assembly as claimed in claim 9 or claim 10 wherein one or more magnet of opposite polarity to the first plurality is/are located within one or both of the linkage (106) and/or the die (110).
 12. An assembly as claimed in any of claims 3 to 7, wherein the separable engagement mechanism includes a detent mechanism located in the chase (104), the detent mechanism acting upon a portion of the linkage (106).
 13. An assembly as claimed in claim 12, wherein the chase (104) has a moveably locking member (306, 310) that engages with a portion or portions of the linkage (106) located in any of the grid locations.
 14. A method of reusably positioning and connecting a die (110) to a chase (104) in a foiling, embossing or debossing press, comprising: providing a chase (104) with a set of user identifiable discrete grid positions (116) on a first surface (114) thereof; mounting the chase (104) within an embossing, debossing or foiling press; providing a die assembly comprising a die (110) defining a first surface (126) adapted for one or more of foiling, embossing or debossing and linkage (106) mechanically connected to the die (110) to locate between the first surface (114) of the chase (104) and the die (110), the linkage (106) defining a second surface (134) adapted for separable engagement with the first surface (114) of the chase (104); locating the die assembly at a desired location using one or more of the discrete grid positions; and noting the grid position or positions of the engagement so that the die assembly may be removed and replaced in the same position for future repeat use.

Patentansprüche

1. Wiederverwendbare Anordnung (102), die zur Verwendung bei einem oder mehreren von Folieren, Prägen und Entprägen geeignet ist, wobei die Anordnung (102) Folgendes umfasst:
 - ein Strehlwerkzeug (104), wobei das Strehlwerkzeug (104) eine erste Oberfläche (114) mit einer Mehrzahl von benutzeridentifizierbaren einzelnen Rasterpositionen (116), die innerhalb eines Rasters angeordnet sind, aufweist, wobei das Strehlwerkzeug (104) geeignet ist, an eine Präge-, Entpräge- oder Folierpresse angeschlossen zu werden; und
 - eine Matrizenanordnung umfassend eine Matrize (110), die eine erste Oberfläche (126) definiert, die für eines oder mehrere von Folieren, Prägen und Entprägen geeignet ist, und ein Verbindungsstück (106), das mechanisch an die Matrize (110) zwischen der ersten Oberfläche

- (114) des Strehlwerkzeugs (104) und der Matrize (110) angeschlossen ist, wobei das Verbindungsstück eine zweite Oberfläche (134) definiert, die zum trennbaren Einrasten in die erste Oberfläche (114) des Strehlwerkzeugs (104) an verschiedenen Rasterpositionen (114) geeignet ist.
2. Anordnung nach Anspruch 1, wobei die einzelnen Rasterpositionen (116) jeweils durch eine Bezugshinweiszahl identifiziert sind, um zu identifizieren, wo eine Matrizenanordnung angeschlossen werden soll.
 3. Anordnung nach Anspruch 1 oder Anspruch 2, die einen trennbaren Einrastmechanismus umfasst, der das trennbare Einrasten der zweiten Oberfläche (134) der Matrizenanordnung in die erste Oberfläche (114) des Strehlwerkzeugs (104) ermöglicht.
 4. Anordnung nach Anspruch 3, wobei der trennbare Einrastmechanismus das Einrasten der Matrize (110) in die erste Oberfläche (114) des Strehlwerkzeugs (104) an einer oder mehreren einzelnen Rasterpositionen oder Positionen innerhalb des Satzes von Rasterpositionen (116) ermöglicht.
 5. Anordnung nach einem der vorhergehenden Ansprüche, wobei zusammenwirkende Gebilde auf der ersten Oberfläche des Strehlwerkzeugs (104) sowie auf dem Verbindungsstück (106) bereitgestellt werden.
 6. Anordnung nach Anspruch 5, wobei die zusammenwirkenden Gebilde Vertiefungen und geeignet gestaltete Vorsprünge zum Positionieren in die Vertiefungen umfassen.
 7. Anordnung nach Anspruch 5 oder Anspruch 6, wobei die zusammenwirkenden Gebilde, die einrastende Oberflächen aufweisen, Entformungsschrägen aufweisen, die einem oder mehreren der zusammenwirkenden Gebilde gestatten, sich auszudehnen oder zusammenzuziehen, während das Einrasten und die relative Position zwischen den zusammenwirkenden Gebilden beibehalten werden.
 8. Anordnung nach einem der Ansprüche 3 bis 7, wobei der trennbare Einrastmechanismus Magnete (108) zum Halten der Matrize (110) an dem Strehlwerkzeug (104) umfasst.
 9. Anordnung nach Anspruch 8, wobei eine erste Mehrzahl von Magneten (108) sich innerhalb des Strehlwerkzeugs (104) oder Verbindungsstücks (106) befindet.
 10. Anordnung nach Anspruch 9, wobei die erste Mehrzahl von Magneten (108) sich innerhalb des Strehlwerkzeugs (104) befindet und in Magnet an jeder der Rasterpositionen bereitgestellt ist.
 11. Anordnung nach Anspruch 9 oder Anspruch 10, wobei ein oder mehrere Magnete entgegengesetzter Polarität zu der ersten Mehrzahl sich innerhalb eines oder beider des Verbindungsstücks (106) und/oder der Matrize (110) befindet/befinden.
 12. Anordnung nach einem der Ansprüche 3 bis 7, wobei der trennbare Einrastmechanismus einen Arretierungsmechanismus umfasst, der sich im Strehlwerkzeug (104) befindet, wobei der Arretierungsmechanismus auf einen Teil des Verbindungsstücks (106) einwirkt.
 13. Anordnung nach Anspruch 12, wobei das Strehlwerkzeug (104) ein bewegliches Verriegelungselement (306, 310) aufweist, das in einen Teil oder Teile des Verbindungsstücks (106) einrastet, das sich an einer der Rasterstellen befindet.
 14. Verfahren zum wiederverwendbaren Positionieren und Anschließen einer Matrize (110) an ein Strehlwerkzeug (104) in einer Folier-, Präge- und Entprägepresse, umfassend: Versehen eines Strehlwerkzeugs (104) mit einem Satz benutzeridentifizierbarer einzelner Rasterpositionen (116) auf einer ersten Oberfläche (114) davon; Montieren des Strehlwerkzeugs (104) innerhalb einer Präge-, Entpräge oder Folierpresse; Bereitstellen einer Matrizenanordnung umfassend eine Matrize (110), die eine erste Oberfläche (126) definiert, die für eines oder mehrere von Folieren, Prägen oder Entprägen geeignet ist, und ein Verbindungsstück (106), das mechanisch an die Matrize (110) angeschlossen ist, um sich zwischen der ersten Oberfläche (114) des Strehlwerkzeugs (104) und der Matrizen (110) zu befinden, wobei das Verbindungsstücks (106) eine zweite Oberfläche (134) definiert, die für das getrennte Einrasten in die erste Oberfläche (114) des Strehlwerkzeugs (104) geeignet ist; Positionieren der Matrizenanordnung an einer erwünschten Stelle unter Anwendung einer oder mehrerer der einzelnen Rasterpositionen; und Vermerken der Rasterposition oder -positionen des Einrastens so, dass die Matrizenanordnung entfernt und für künftige wiederholte Verwendung an der gleichen Position zurückgesetzt werden kann.

Revendications

1. Ensemble réutilisable (102) adapté pour l'utilisation dans un ou plusieurs parmi le pelliculage, l'embossage et le désembossage, l'ensemble (102) comprenant :
 - une rainure (104), la rainure (104) présentant

- une première surface (114) avec une pluralité de positions de grille discrètes identifiables par un utilisateur (116) agencées dans une grille, la rainure (104) étant adaptée pour le raccordement avec une presse d'embossage et de désembossage ou de pelliculage ; et
- un ensemble de matrice comprenant une matrice (110) définissant une première surface (126) adaptée pour un ou plusieurs parmi le pelliculage, l'embossage et le désembossage et une liaison (106) raccordée mécaniquement à la matrice (110) entre la première surface (114) de la rainure (104) et la matrice (110), la liaison définissant une seconde surface (134) adaptée pour la mise en prise séparable avec la première surface (114) de la rainure (104) dans diverses positions de grille (114).
2. Ensemble selon la revendication 1, dans lequel les positions de grille discrètes (116) sont chacune identifiées par une référence pour identifier où un ensemble de matrice devrait être raccordé.
 3. Ensemble selon la revendication 1 ou la revendication 2, incluant un mécanisme de mise en prise séparable qui facilite la mise en prise séparable de la seconde surface (134) de l'ensemble de matrice avec la première surface (114) de la rainure (104).
 4. Ensemble selon la revendication 3, dans lequel le mécanisme de mise en prise séparable facilite la mise en prise de la matrice (110) dans la première surface (114) de la rainure (104) dans une ou plusieurs positions de grille discrètes dans l'ensemble de positions de grille (116).
 5. Ensemble selon l'une quelconque des revendications précédentes, dans lequel des formations de coopération sont prévues sur la première surface de la rainure (104) ainsi que sur la liaison (106).
 6. Ensemble selon la revendication 5, dans lequel les formations de coopération comprennent des évidements et des saillies formées de manière appropriée pour se situer dans les évidements.
 7. Ensemble selon la revendication 5 ou la revendication 6, dans lequel les formations de coopération présentant des surfaces de mise en prise présentent des angles de dégagement permettant à une ou aux deux des formations de coopération de se développer ou se contracter tout en maintenant la mise en prise et la position relative entre les formations de coopération.
 8. Ensemble selon l'une quelconque des revendications 3 à 7, dans lequel le mécanisme de mise en prise séparable inclut des aimants (108) pour maintenir la matrice (110) sur la rainure (104).
 9. Ensemble selon la revendication 8, dans lequel une première pluralité d'aimants (108) est située dans la rainure (104) ou la liaison (106).
 10. Ensemble selon la revendication 9, dans lequel la première pluralité d'aimants (108) est située dans la rainure (104) et un aimant est prévu sur chacune des positions de grille.
 11. Ensemble selon la revendication 9 ou la revendication 10, dans lequel un ou plusieurs aimants de polarité opposée à la première pluralité est/sont situé(s) dans un ou les deux de la liaison (106) et/ou la matrice (110).
 12. Ensemble selon l'une quelconque des revendications 3 à 7, dans lequel le mécanisme de mise en prise séparable inclut un mécanisme de détente situé dans la rainure (104), le mécanisme de détente agissant sur une portion de la liaison (106).
 13. Ensemble selon la revendication 12, dans lequel la rainure (104) présente un élément de verrouillage mobile (306, 310) qui se met en prise avec une portion ou des portions de la liaison (106) située dans l'un quelconque des emplacements de grille.
 14. Procédé de positionnement et de raccordement réutilisable d'une matrice (110) à une rainure (104) dans une presse de pelliculage, d'embossage et de désembossage, comprenant : la dotation d'une rainure (104) d'un ensemble de positions de grille discrètes identifiables par un utilisateur (116) sur une première surface (114) de celle-ci ; le montage de la rainure (104) dans une presse d'embossage, de désembossage ou de pelliculage ; la fourniture d'un ensemble de matrice comprenant une matrice (110) définissant une première surface (126) adaptée pour un ou plusieurs parmi le pelliculage, l'embossage et le désembossage et la liaison (106) raccordée mécaniquement à la matrice (110) pour se situer entre la première surface (114) de la rainure (104) et la matrice (110), la liaison (106) définissant une seconde surface (134) adaptée pour la mise en prise séparable avec la première surface (114) de la rainure (104) ; le positionnement de l'ensemble de matrice à un emplacement souhaité en utilisant une ou plusieurs des positions de grille discrètes ; et la notation de la position ou des positions de grille de la mise en prise de sorte que l'ensemble de matrice puisse être retiré et remplacé dans la même position pour un usage répété futur.

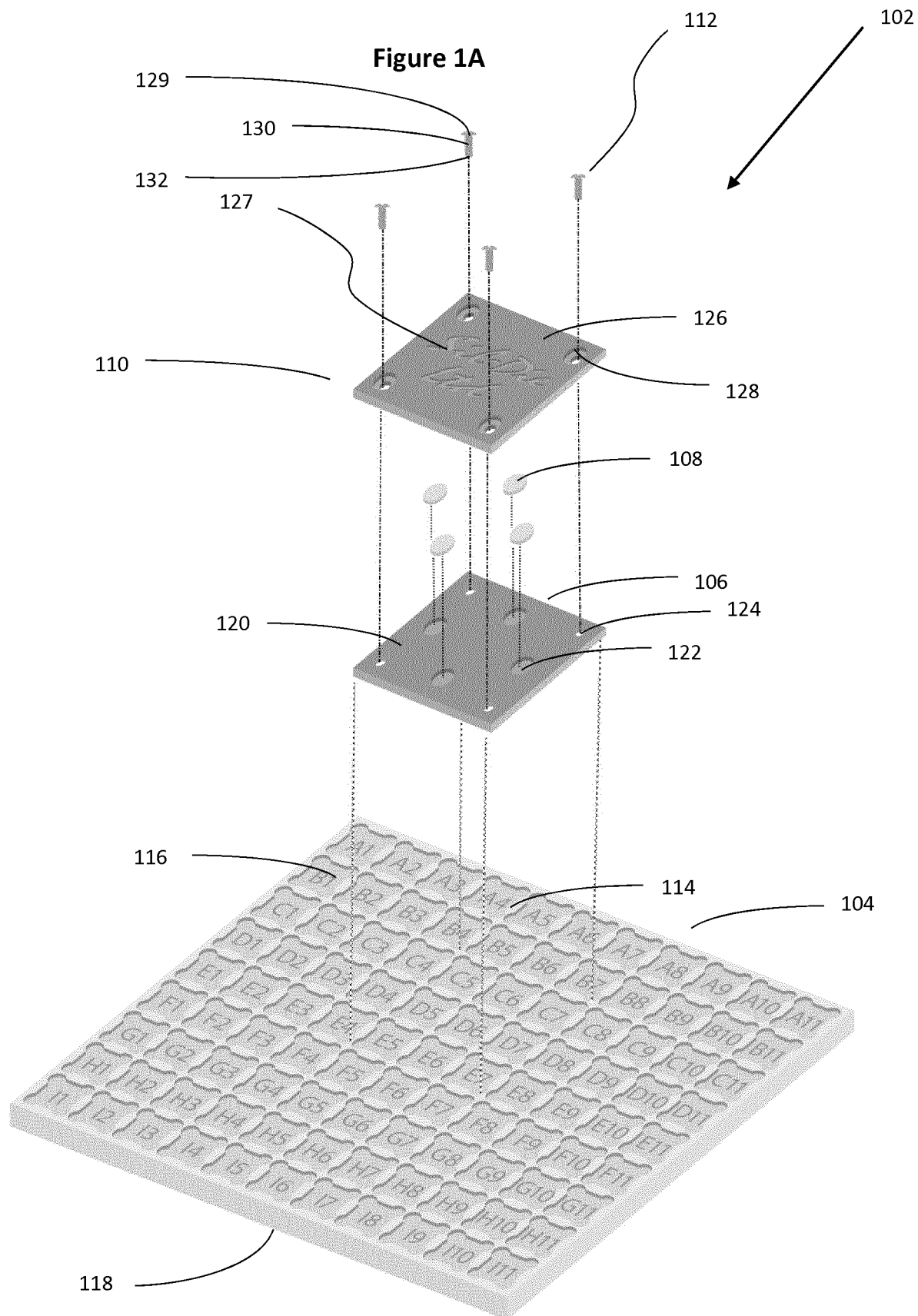


Figure 1B

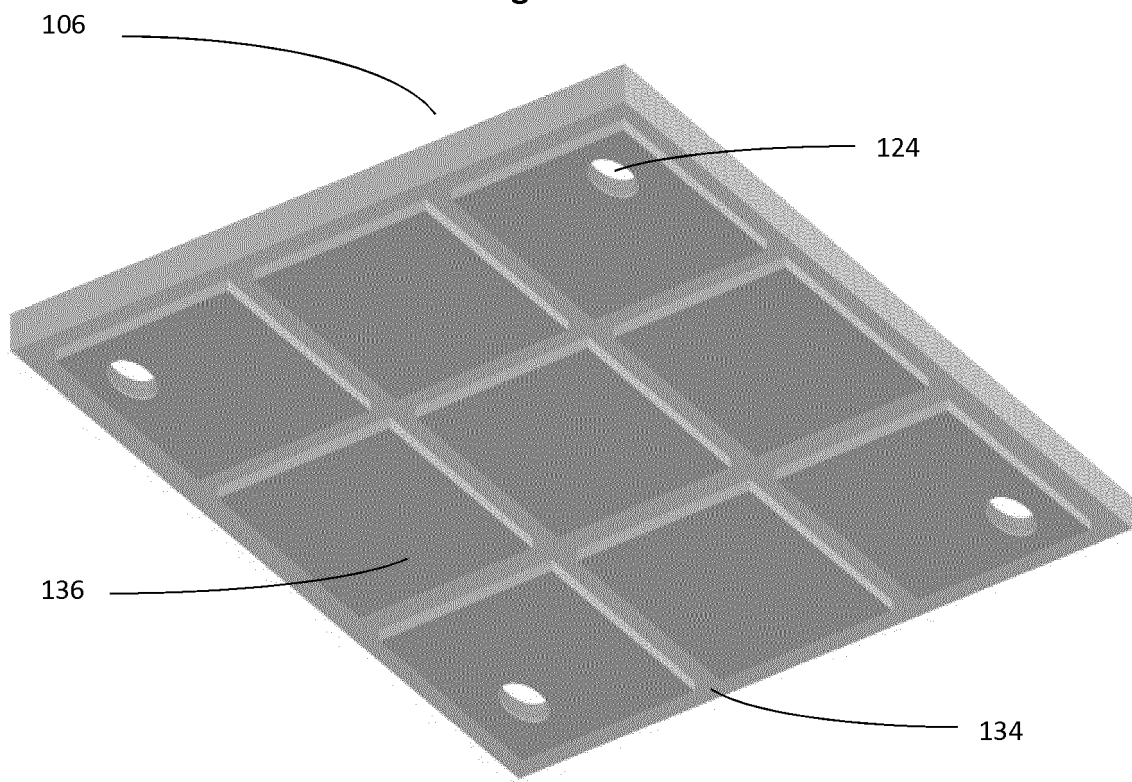


Figure 1C

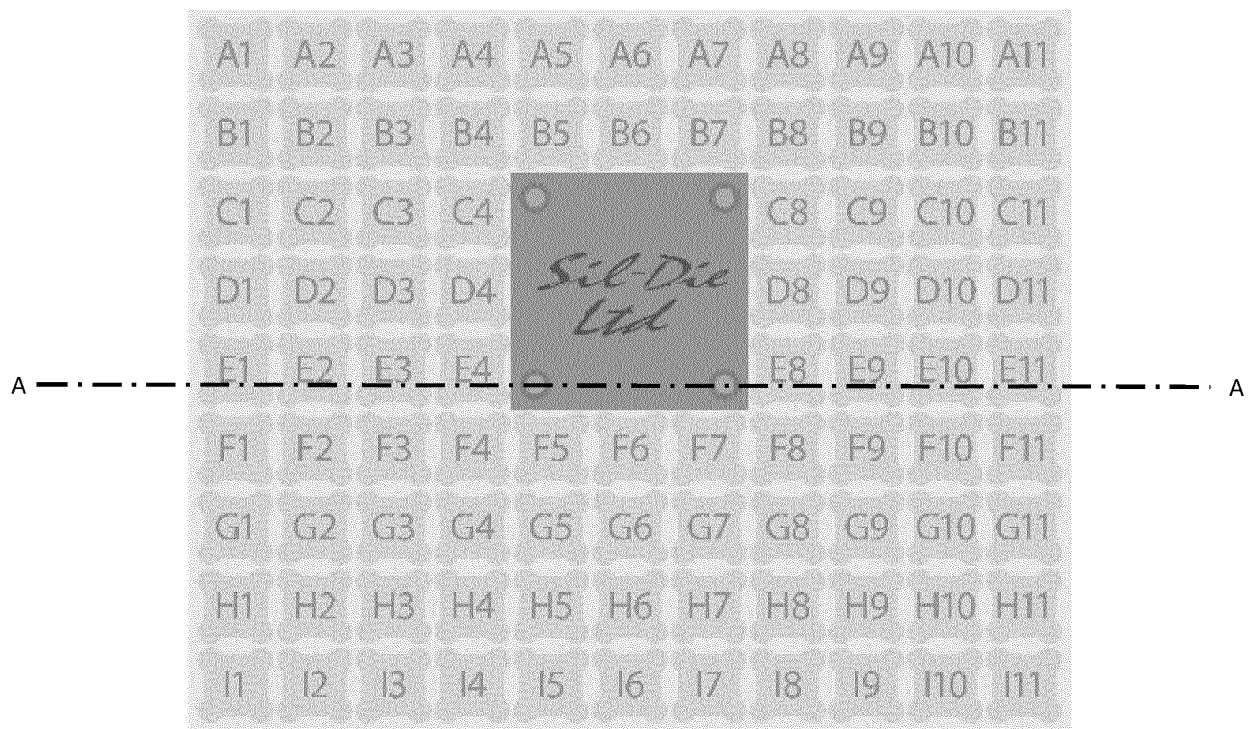


Figure 1D

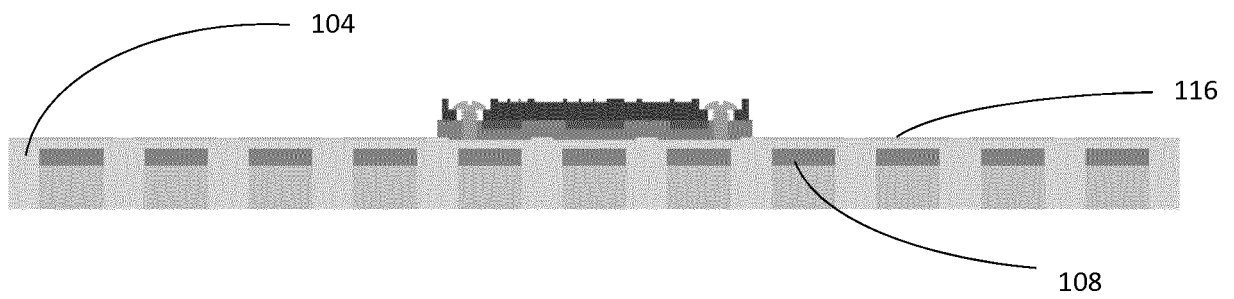


Figure 2A

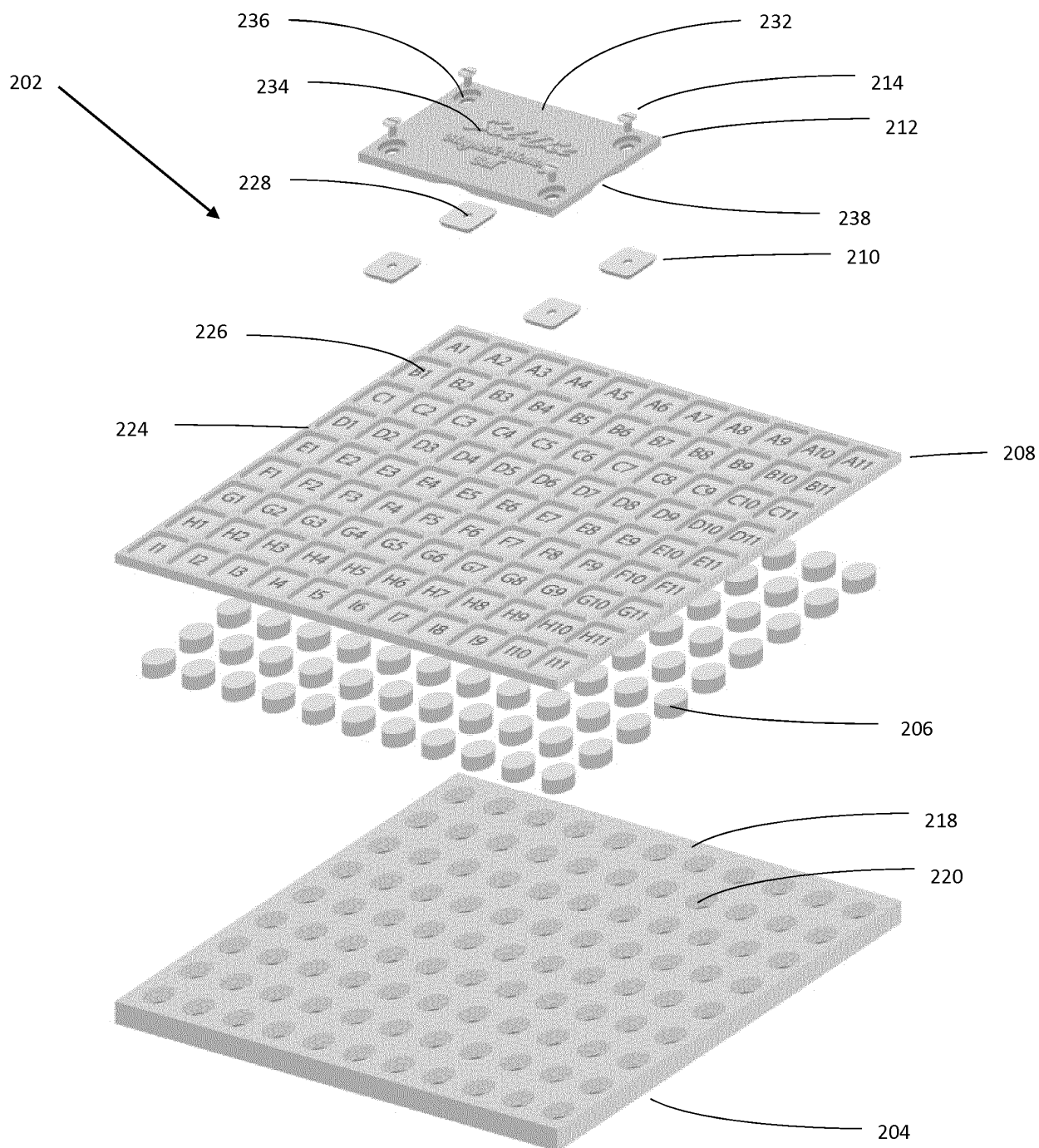


Figure 2B

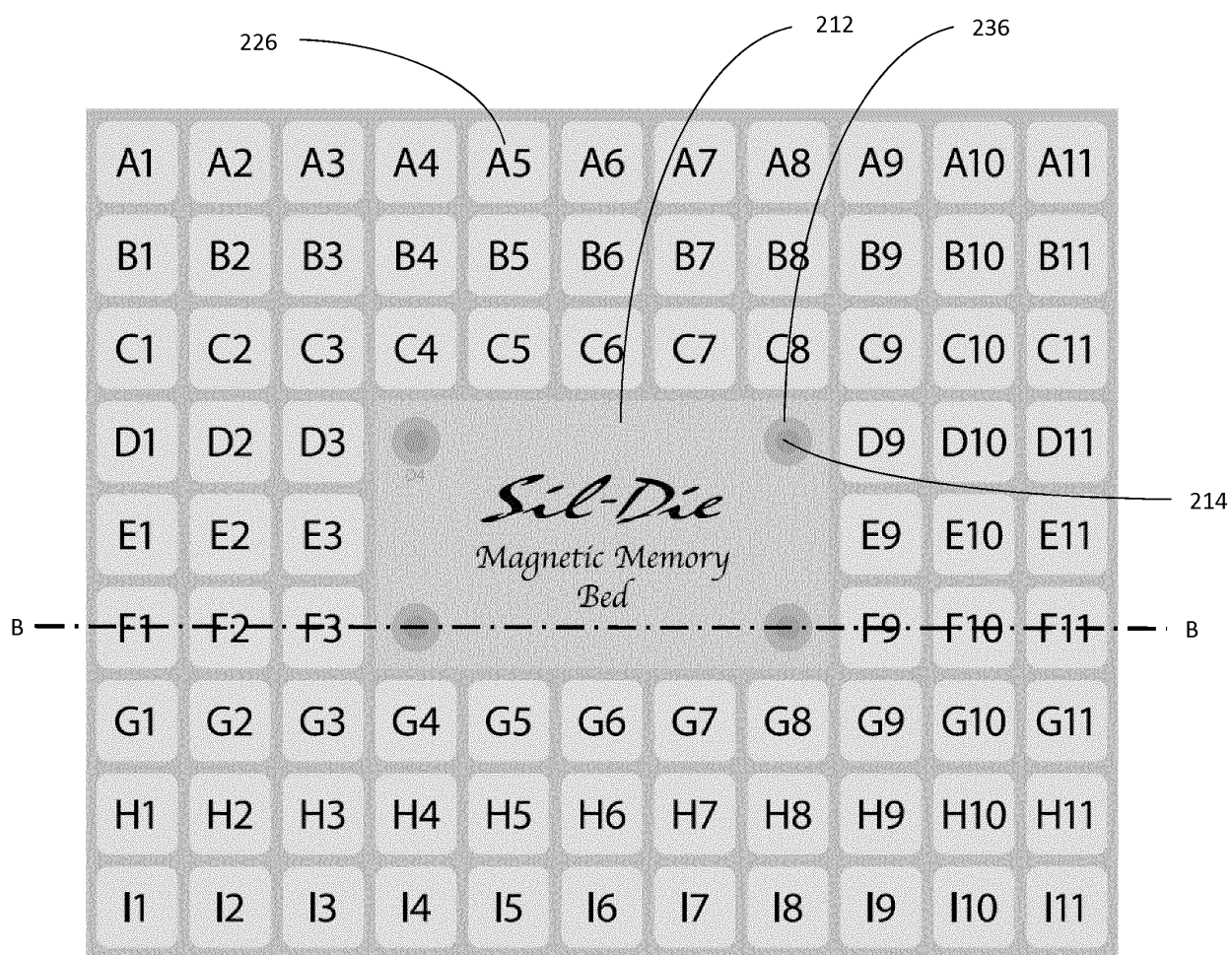
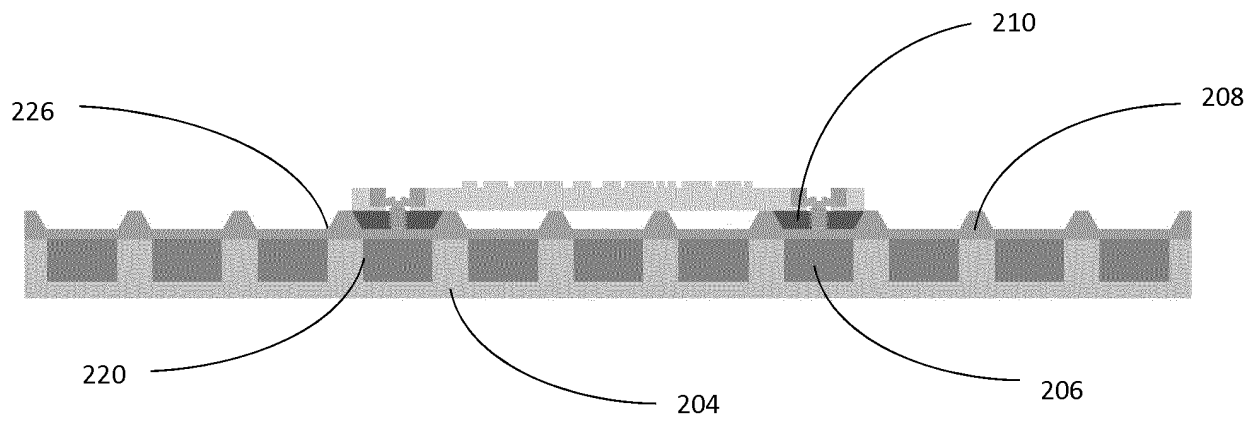
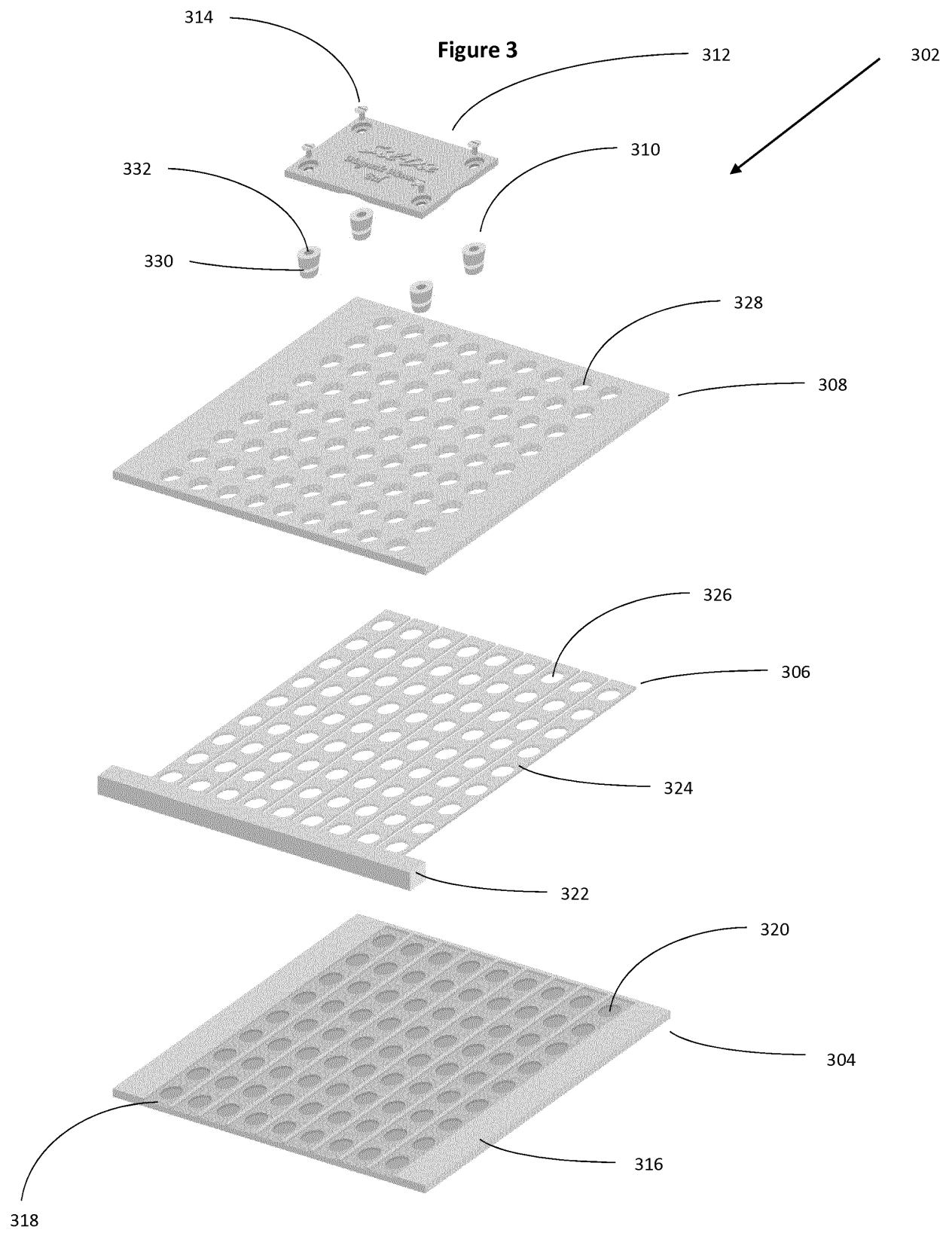


Figure 2C





REFERENCES CITED IN THE DESCRIPTION

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