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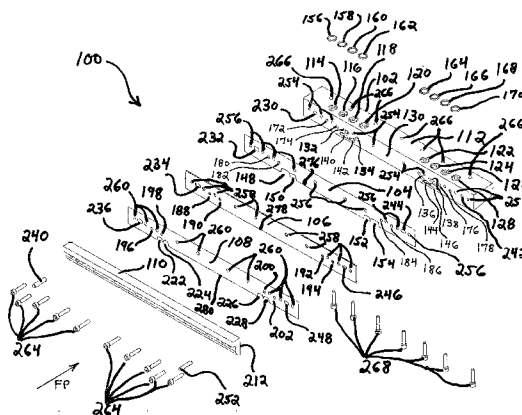
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(54) Title: DUAL PATTERN SHIM ASSEMBLY FOR USE IN CONJUNCTION WITH HOT MELT ADHESIVE DISPENSING SYSTEMS

Fig. 1



(57) Abstract: A dual pattern shim assembly (102, 104, 108), for use in conjunction with hot melt adhesive dispensing systems, permits various different overlapping or overlying deposition or application patterns, having different length dimensions, different width dimensions, different coating thicknesses, and different longitudinal positional locations or dispositions with respect to each other, to be achieved during a single pass of the underlying substrate with respect to the hot melt adhesive contact die applicator or head. In this manner, different or multiple adhesive deposition or application procedures are able to effectively be accomplished simultaneously so as to effectively simplify and shorten the overall assembly lines and production times required for the fabrication or manufacture of various different particular products.

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**DUAL PATTERN SHIM ASSEMBLY FOR USE IN CONJUNCTION  
WITH HOT MELT ADHESIVE DISPENSING SYSTEMS**

**CROSS-REFERENCE TO RELATED PATENT APPLICATION**

5                    This patent application is related to, based  
upon, and effectively a utility patent application  
conversion from United States Provisional Patent  
Application Serial Number 60/907,535, which was filed on  
April 6, 2007, the filing date benefits of which are  
10 hereby incorporated by reference.

**FIELD OF THE INVENTION**

The present invention relates generally to hot  
melt adhesive dispensing or deposition systems, and more  
15 particularly to a new and improved dual pattern shim  
assembly for use in conjunction with a hot melt adhesive  
contact die applicator or head which enables multiple  
deposition coatings or patterns to be dispensed,  
discharged, and deposited or applied onto an underlying  
20 substrate in an overlying or overlapping manner during a  
single pass of the underlying substrate with respect to  
the hot melt adhesive contact die applicator or head.  
This shim apparatus or assembly therefore permits, for  
example, hot melt adhesive materials to be deposited onto  
25 the underlying substrate in accordance with multiple  
predetermined patterns at predetermined times during the  
deposition process or procedure dependent upon, for  
example, the structural requirements of the particular  
product being fabricated or manufactured so as to  
30 effectively enhance the fabrication or manufacturing  
capabilities of the overall product assembly line. In a

similar manner, this shim apparatus or assembly effectively permits different or multiple adhesive deposition or application procedures to effectively be accomplished simultaneously so as to effectively simplify and shorten the overall assembly lines and production times required for the fabrication or manufacture of various different particular products.

### **BACKGROUND OF THE INVENTION**

10           Very often in connection with the deposition of various materials or substances, such as, for example, hot melt adhesive material, onto an underlying substrate, it is desired to deposit or apply different types of adhesive materials, compositions, or the like, or adhesive coatings or materials, comprising different thickness dimensions or patterns, in an overlying or overlapping manner onto the underlying substrate. For example, depending upon the particular structural requirements of the particular product being fabricated or manufactured, the hot melt adhesive materials are required to be deposited upon the underlying substrate in accordance with predetermined patterns and at predetermined times during the deposition procedure or process. Such deposition techniques may theoretically be accomplished, for example, by means of a system employing two different contact die applicators, however, this has not in fact proven to be practically viable in view of the fact that when the second contact die applicator deposits the second adhesive, material, or coating onto the underlying substrate, the first material, adhesive, coating, or substance tends to be wiped off the underlying substrate. Accordingly, it has been contemplated that another mode for achieving such

deposition techniques may be accomplished, for example, by means of a system wherein the first adhesive coating or substance is applied by means of a contact die applicator, however, the second adhesive coating or substance is  
5 applied by means of a spraying operation. However, this type of system is relatively complex in view of the fact that two different applicators must be utilized, both pneumatic and hydraulic systems need to be employed, and the actual handling, or relative movement of the  
10 substrate, with respect to the applicators, becomes relatively complicated.

A need therefore exists in the art for a new and improved dispensing system, in particular, for a hot melt adhesive dispensing system, wherein multiple different  
15 types of materials, substances, adhesives, coatings, or the like, or multiple different materials, adhesives, coatings or substances, comprising, for example, different thickness dimensions or patterns, can be deposited or applied in an overlying or overlapping manner onto an  
20 underlying substrate during a single pass of the underlying substrate with respect to the applicator or head. A need also exists in the art for a new and improved dispensing system, in particular, for a hot melt adhesive dispensing system, wherein the multiple different  
25 hot melt adhesive materials can be deposited upon the underlying substrate in accordance with predetermined patterns, and at predetermined times during the deposition procedure or process, depending upon the particular structural requirements of the particular product being  
30 fabricated or manufactured so as to effectively enhance the fabrication or manufacturing capabilities of the overall product assembly line. Still further, a need

exists in the art for a new and improved dispensing system, in particular, for a hot melt adhesive dispensing system, wherein multiple different adhesive deposition or application procedures are permitted to effectively be accomplished simultaneously so as to effectively simplify and shorten the overall assembly line and production times required for the fabrication or manufacture of various different particular products.

10 **SUMMARY OF THE INVENTION**

The foregoing and other objectives are achieved in accordance with the teachings and principles of the present invention through the provision of a new and improved dual pattern shim assembly, for use in connection with a hot melt adhesive contact die applicator, which comprises a pair of pattern shims, each one having multiple deposition or applicator discharge ports, which are mounted upon or between a die adaptor and a die plate, and wherein further, a separator shim is interposed between the pair of pattern shims. At least a first set of hot melt adhesive supply paths is defined within the shim assembly and comprises at least a first set of hot melt adhesive flow channels formed within the die adaptor so as to effectively supply at least a first hot melt adhesive material to the deposition pattern ports of a first one of the pair of pattern shims, while at least a second set of hot melt adhesive supply paths is defined within the shim assembly and comprises a first set of through-holes or bores formed within the die adaptor, a second set of through-holes or bores formed within non-deposition portions of the first pattern shim, a third set of through-holes or bores formed within the separator

shim, a fourth set of through-holes or bores formed within non-deposition portions of the second pattern shim, and at least a second set of flow channels formed within the die plate and fluidically connected to the deposition pattern portions of the second pattern shim.

Such a system therefore enables dual deposition coatings or patterns to be dispensed, discharged, and deposited or applied onto an underlying substrate in an overlying or overlapping manner as a result of a single pass of the underlying substrate with respect to the contact die applicator. Still further, as a result of the aforementioned structure of the shim assembly, multiple different hot melt adhesive materials can be deposited upon the underlying substrate in accordance with predetermined patterns, and at predetermined times during the deposition procedure or process, depending upon the particular structural requirements of the particular product being fabricated or manufactured so as to effectively enhance the fabrication or manufacturing capabilities of the overall product assembly line. Still further, different or multiple adhesive deposition or application procedures are permitted to effectively be accomplished simultaneously so as to effectively simplify and shorten the overall assembly line and production times required for the fabrication or manufacture of various different particular products.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

Various other features and attendant advantages of the present invention will be more fully appreciated from the following detailed description when considered in

connection with the accompanying drawings in which like reference characters designate like or corresponding parts throughout the several views, and wherein:

**FIGURE 1** is an exploded view of a new and improved dual pattern shim assembly, for use with a hot melt adhesive contact die applicator, as constructed in accordance with the principles and teachings of the present invention and showing the cooperative parts thereof;

**FIGURE 2** is a front elevational view, partially in cross-section, of the assembled dual pattern shim assembly as disclosed within **FIGURE 1**;

**FIGURE 3** is a top plan view, partially in cross-section, of the assembled dual pattern shim assembly as disclosed within **FIGURES 1** and **2**;

**FIGURE 4** is a cross-sectional view of the assembled dual pattern shim assembly as disclosed within **FIGURE 3** as taken along the lines **4-4** of **FIGURE 3**;

**FIGURE 5** is a cross-sectional view of the assembled dual pattern shim assembly as disclosed within **FIGURE 3** as taken along the lines **5-5** of **FIGURE 3**;

**FIGURE 6** is a cross-sectional view of the assembled dual pattern shim assembly as disclosed within **FIGURE 3** as taken along the lines **6-6** of **FIGURE 3**; and

**FIGURE 7** is a front elevational view of the assembled dual pattern shim assembly, similar to that disclosed within **FIGURE 2**, showing, however, the generation of different patterns as a result of the particular operation of the dual pattern shim assembly of the present invention.

**BRIEF DESCRIPTION OF THE PREFERRED EMBODIMENT**

Referring now to the drawings, and more particularly to **FIGURES 1-6** thereof, a new and improved dual pattern shim assembly, for use in conjunction with, for example, a hot melt adhesive applicator or head, as constructed in accordance with the principles and teachings of the present invention, is disclosed and is generally indicated by the reference character 100. More particularly, as can probably be best seen from **FIGURE 1**, it is seen that the new and improved dual pattern shim assembly 100, for use in conjunction with, for example, a hot melt adhesive applicator or head, and for depositing or applying multiple deposits or patterns onto an underlying substrate, comprises a die adaptor 102, a first pattern shim 104, a separation shim 106, a second pattern shim 108, and a die plate 110, wherein the underlying substrate will be movable relative to the new and improved dual pattern shim assembly 100 along a flow path FP. For ease of understanding the present invention, and the operation thereof, the new and improved dual pattern shim assembly 100 will be described as if two different types of adhesives, coatings, substances, or materials are being conducted through and discharged from the new and improved dual pattern shim assembly 100 so as to be deposited or applied onto the underlying substrate, however, it is to be appreciated that the two different types of adhesives, coatings, substances, or materials can actually comprise multiple different types of adhesives, coatings, substances, or materials, or the same adhesive, coating, substance, or material but may be differentiated from each other in that the two different adhesives, coatings,

substances, or materials may comprise or be characterized by different thickness dimensions or different patterns, all as will be explained more fully hereinafter.

With reference continuing to be made to **FIGURES**  
5 **1-6**, but in particular to **FIGURE 1** for clarity, it is seen that the die adaptor 102 has a substantially trapezoidal cross-sectional configuration, and that the upper surface portion 112 of the die adaptor 102 is provided with, for example, eight fluid inlet ports  
10 114,116,118,120,122,124,126, 128 for providing the die adaptor 102 with, for example, eight separate supplies of, for example, hot melt adhesive materials which are supplied thereto, for example, by means of a suitable number of pumps, not shown, although the fluid flows from  
15 the pumps are schematically illustrated by inlet arrows within **FIGURE 2**. In accordance with the particular exemplary arrangement of the assembly 100 of the present invention, to which this disclosure is directed, the eight fluid inlet ports 114,116,118,120,122,124,126,128 are  
20 disposed within two laterally or transversely spaced sets of fluid inlet ports with each set of fluid inlet ports comprising four fluid inlet ports, and four pumps, not shown, are utilized to respectively supply two different fluids, such as, for example, two different hot melt  
25 adhesive materials, to the eight fluid inlet ports 114,116,118,120,122,124, 126,128, although it is to be noted that, in accordance with other possible arrangements or embodiments which may be constructed in accordance with the general principles and teachings of the present  
30 invention, a larger or smaller number of pumps may in fact be provided in conjunction with the assembly 100.

For example, only two pumps, not shown, may be utilized whereby each pump will supply a particular one of two fluids or hot melt adhesive materials to four of the eight fluid inlet ports 114,116,118,120,122,124,126,128, or alternatively, eight different pumps, not shown, may be utilized whereby each pump will directly supply a respective one of eight different fluids or hot melt adhesive materials to the eight fluid inlet ports 114,116,118,120,122,124,126,128. Other combinations and permutations comprising the number of pumps, number of different fluids, materials, substances, or the like, being supplied to particular numbers of the fluid inlet ports 114,116,118,120,122,124,126,128, are also of course possible so as to achieve the deposition or application of different fluids, different patterns, different coating thicknesses, and the like, onto the underlying substrate in accordance with particular or predeterminedly desirable patterns as required for particular or different products being fabricated or manufactured.

More particularly, with reference still being made primarily to **FIGURE 1**, a first one of the aforementioned two pumps, not shown, will supply a first one of the two different hot melt adhesive materials to the fluid inlet ports 118, 120,122,124 defined within the upper surface portion 112 of the die adaptor 102, and it is seen that the forwardly facing surface portion 130 of the die adaptor 102 is provided with a plurality of flow channels 132,134,136,138 which are adapted to be respectively fluidically connected, at the upstream end portions thereof, to the fluid inlet ports 118,120,122,124. In turn, downstream end portions of the plurality of flow channels 132,134,136,138 are respectively fluidically

connected to a plurality of fluid discharge ports  
140,142,144, 146 which are also defined within the  
forwardly facing surface portion 130 of the die adaptor  
102, and still further, the plurality of fluid discharge  
5 ports 140,142,144,146 are adapted to be respectively  
fluidically connected to a plurality of first fluid  
deposition or application ports 148,150, 152,154 which are  
defined within the lower edge portion of the first pattern  
shim 104 and which will therefore deposit or apply the  
10 first fluid, or the first one of the two different hot  
melt adhesive materials, onto the underlying substrate in  
accordance with a predetermined pattern, thickness  
coating, or the like. It is also noted that a plurality  
of O-ring members 156,158,160,162,164, 166,168,170 are  
15 adapted to be respectively operatively associated with the  
plurality of fluid inlet ports  
114,116,118,120,122,124,126,128 so as to provide desired  
fluid sealing in connection therewith.

Continuing further, it is also seen that  
20 forwardly facing surface portion 130 of the die adaptor  
102 is also provided with a plurality of flow channels  
172,174,176,178 which are adapted to be respectively  
fluidically connected, at the upstream end portions  
thereof, to the fluid inlet ports 114,116,126,128, and, in  
25 turn, the downstream end portions of the plurality of flow  
channels 172,174,176,178 are adapted to be respectively  
fluidically connected to a first set of through-bores or  
holes 180,182,184,186 which are defined within the first  
pattern shim 104. It is similarly seen that the  
30 separation shim 106 is likewise provided with a second set  
of holes or through-bores 188,190,192,194 which are  
adapted to be respectively fluidically connected to the

first set of through-bores or holes 180,182,184,186 defined within the first pattern shim 104. Still further, a third set of through-bores or holes 196,198,200,202 are defined within the second pattern shim 108 and are adapted to be respectively fluidically connected to the second set of through-bores or holes 188,190,192,194 which are defined within the separation shim 106. It is lastly seen that a plurality of flow channels 204,206,208,210 are defined upon or within the rearwardly facing surface portion 212 of the die plate 110, as can best be seen from **FIGURE 2**, and that the plurality of flow channels 204,206,208,210 are adapted to be respectively fluidically connected, at the upstream end portions thereof, to the third set of through-bores or holes 196,198,200,202 which are defined within the second pattern shim 108 so as to receive the second fluid therefrom, while the downstream end portions of the flow channels 204,206,208,210 are adapted to be respectively fluidically connected to a plurality of fluid discharge ports 214,216,218,220, which are also defined within the rearwardly facing surface portion 212 of the die plate 110, so as to supply the second fluid thereto. Still further, the plurality of fluid discharge ports 214,216,218,220 are adapted to be respectively fluidically connected to a plurality of second fluid deposition or application ports 222,224, 226,228 which are defined within the lower edge portion of the second pattern shim 108 and which will therefore serve to deposit or apply the second fluid, or the second one of the two different hot melt adhesive materials, onto the underlying substrate in accordance with a predetermined pattern, coating thickness, or the like.

With reference now being specifically made to **FIGURES 3-6**, in addition to **FIGURES 1** and **2**, the assembling procedure of the new and improved dual pattern shim assembly 100, as well as the mounting of the new and improved dual pattern shim assembly onto a hot melt adhesive applicator or head, will now be described. More particularly, it is seen that in order to assemble together the various components comprising the new and improved dual pattern shim assembly 100 of the present invention, left side portions of the die adaptor 102, the first pattern shim 104, the separation shim 106, the second pattern shim 108, and the die plate 110 are respectively provided with first bores or apertures 230,232, 234,236,238 for accommodating a first dowel pin 240 which is adapted to be inserted through the aforementioned bores or apertures 230,232,234,236,238 so as to effectively align the left side portions of the die adaptor 102, the first pattern shim 104, the separation shim 106, the second pattern shim 108, and the die plate 110 together. In a similar manner, right side portions of the die adaptor 102, the first pattern shim 104, the separation shim 106, the second pattern shim 108, and the die plate 110 are respectively provided with second bores or apertures 242,244,246,248,250 for accommodating a second dowel pin 252 which is adapted to be inserted through the aforementioned bores or apertures 242,244,246,248,250 so as to effectively align the right side portions of the die adaptor 102, the first pattern shim 104, the separation shim 106, the second pattern shim 108, and the die plate 110 together.

In this manner, as a result of the disposition of the first and second dowel pins 240,252 within the

respective apertures or holes 230,232,234,236,238 and  
242,244,246,248, 250, all of the structural components  
comprising the new and improved dual pattern shim assembly  
100, that is, the die adaptor 102, the first pattern shim  
5 104, the separation shim 106, the second pattern shim 108,  
and the die plate 110, are properly aligned with respect  
to each other and ready to be fixedly assembled together.  
Accordingly, it is seen that each one of the die adaptor  
102, the first pattern shim 104, the separation shim 106,  
10 the second pattern shim 108, and the die plate 110  
components is also respectively provided with a plurality  
of apertures or bores, such as, for example, ten apertures  
of bores, 254,256,258,260,262 which are disposed within a  
horizontal array and which are adapted to respectively  
15 receive therethrough a plurality of suitable bolt  
fasteners, that is, ten bolt fasteners 264 so as to in  
fact fixedly secure the die adaptor 102, the first pattern  
shim 104, the separation shim 106, the second pattern shim  
108, and the die plate 110 together in order to form the  
20 new and improved dual pattern shim assembly 100. Lastly,  
it is seen still further that the die adaptor 102 is  
provided with a plurality of vertically oriented bores,  
such as, for example, seven bores 266, within which a  
plurality of bolt fasteners, such as, for example, seven  
25 bolt fasteners 268, are adapted to be inserted for  
threaded engagement within an undersurface portion of the  
hot melt adhesive applicator or head, not shown, in order  
to fixedly mount the new and improved dual pattern shim  
assembly 100 thereon.

30 Having described substantially all of the  
structural components comprising the new and improved dual  
pattern shim assembly 100 of the present invention, a

brief operation of the same will now be described along with some unique operative features thereof. As can best be appreciated from any one of **FIGURES 4-6**, it is noted that the bottom edge portion 270 of the forwardly facing surface portion 130 of the trapezoidal-shaped die adaptor 102 projects downwardly beneath, for example, the lower or inclined bottom surface portion 272 of the die adaptor 102 so as to form what is known as a knife edge. In addition, it is also seen that the rearwardly facing or extending bottom edge portion of the die plate 110 terminates in an arcuately shaped portion 274 which is known as an eagle beak, and that the first pattern shim 104, the separation shim 106, and the second pattern shim 108 are effectively sandwiched between the die adaptor 102 and the die plate 110 such that the respective lower edge portions 276, 278, 280 of the first pattern shim 104, the separation shim 106, and the second pattern shim 108 are effectively aligned with, or disposed at the same elevational level as, the knife edge 270 of the die adaptor 102 and the terminal edge portion of the eagle beak 274. Still further, the separation shim 106 is provided with a relatively small thickness dimension which not only permits the lower edge portions 276, 280 of the first and second pattern shims 104, 108 to be physically located relatively close to each other, but in addition, to permit both of the lower edge portions 276, 280 of the first and second pattern shims 104, 108 to also be physically located relatively close to the knife edge 270 of the die adaptor 102. In this manner, as will be explained even more fully hereinafter, such a composite assembly defines a sharply edged structure which permits the desired patterns to in fact be deposited or applied onto the underlying substrate as desirably crisp, sharp, and clean images when in fact,

for example, hot melt adhesive material is dispensed or discharged from, and deposited or applied onto the underlying substrate, by means of either one of the pattern shims 104,108.

5                   Continuing further, and as can be appreciated from a comparison of **FIGURES 2** and **7**, it is to be appreciated that as a result of the aforementioned new and improved dual pattern shim assembly 100 as constructed in accordance with the principles and teachings of the present invention, different deposition or application  
10 patterns, different deposition or application patterns having different width dimensions, and different deposition or application patterns, having overlapping or overlying sections or portions, can be achieved. For  
15 example, as can best be seen or appreciated from **FIGURES 1** and **2**, a first deposition or application pattern 282 comprising, for example, a first hot melt adhesive material, is deposited or applied onto the underlying substrate by means of the fluid deposition port 148  
20 defined within the lower edge portion 276 of the first pattern shim 104, and it is seen that such first deposition or application pattern 282 has predetermined length and width dimensions. In addition, this first deposition or application pattern 282 preferably has a  
25 first predetermined thickness dimension.

In a similar manner, a second deposition or application pattern 284 comprising, for example, the same hot melt adhesive material as that utilized in forming the first deposition or application pattern 282, is deposited  
30 or applied onto the underlying substrate by means of the fluid deposition port 150 which is also defined within the lower edge portion 276 of the first pattern shim 104, and

it is seen that such second deposition or application pattern 284 has a predetermined length dimension which is substantially the same as that of the first deposition or application pattern 284, however, it is also appreciated that the second deposition or application pattern 284 is effectively longitudinally offset with respect to the first deposition or application pattern 282 as a result of the suitably timed operation of, for example, the dispensing valving structure, not shown, disposed within the applicator or head, also not shown. In addition, it is seen that the width dimension of the second deposition or application pattern 284 is somewhat smaller or narrower than that of the first deposition or application pattern 282 as determined, for example, by the relative width dimensions of the fluid deposition ports 148,150. Furthermore, this second deposition or application pattern 284 preferably has a predetermined thickness dimension which is substantially the same as that of the first deposition or application pattern 282. Still yet further, third and fourth deposition or application patterns 286,288, respectively similar to the first and second deposition or application patterns 282,284, are formed by the corresponding fluid deposition ports 154,152 which are likewise defined within the lower edge portion 276 of the first pattern shim 104.

Continuing still further, it is similarly seen that a fifth deposition or application pattern 290 comprising, for example, a second hot melt adhesive material, is deposited or applied onto the underlying substrate by means of the fluid deposition port 222 defined within the lower edge portion 280 of the second pattern shim 108, and it is seen that such fifth

deposition or application pattern 290 also has predetermined length and width dimensions. In addition, this fifth deposition or application pattern 290 preferably has a second predetermined thickness dimension which may be greater than or less than that of, for example, any one of the deposition or application patterns 282,284,286,288. In a similar manner, a sixth deposition or application pattern 292 comprising, for example, the same second hot melt adhesive material as that utilized in forming the fifth deposition or application pattern 290, is deposited or applied onto the underlying substrate by means of the fluid deposition port 224 which is also defined within the lower edge portion 280 of the second pattern shim 108, and it is seen that such second deposition or application pattern 292 has predetermined length and width dimensions which are substantially the same as those of the fifth deposition or application pattern 290, however, it is also appreciated that the sixth deposition or application pattern 292 is effectively longitudinally offset with respect to the fifth deposition or application pattern 290 as a result of the suitably timed operation of, for example, the dispensing valving structure, not shown, disposed within the applicator or head, also not shown, whereby the particular first and second hot melt adhesive materials are dispensed at predetermined times relative to the movement of the underlying substrate along the flow path FP.

In addition, this sixth deposition or application pattern 292 preferably has a predetermined thickness dimension which is substantially the same as that of the fifth deposition or application pattern 290. Still further, seventh and eighth deposition or

application patterns 294,296, respectively similar to the fifth and sixth deposition or application patterns 290,292, are formed by the corresponding fluid deposition ports 228,226 which are likewise defined within the lower edge portion 280 of the second pattern shim 108. Still yet further, it is also seen, for example, that a trailing edge portion of the first deposition or application pattern 282 is overlapped by means of a leading edge portion of the sixth deposition or application pattern 292, and similarly with respect to the trailing edge portion of the third deposition or application pattern 286 which is overlapped by means of the leading edge portion of the eighth deposition or application pattern 296. Again, this is achieved as a result of, for example, the particular timing of the dispensing valve structure, not shown, disposed within the applicator or head, also not shown, whereby the particular first and second hot melt adhesive materials are dispensed at predetermined times relative to the movement of the underlying substrate along the flow path FP.

In addition, it is to be appreciated that the overlapped deposition or application of the two different hot melt adhesive materials atop one another is also achieved as a result of the unique contact or engagement of the entire aforementioned new and improved dual pattern shim assembly 100 of the present invention, as comprising, for example, the knife edge structure 270 of the die adaptor 102, the lower edge portion 276 of the first pattern shim 104, the lower edge portion 278 of the separation shim 106, the lower edge portion 280 of the second pattern shim 108, and the terminal edge section of the eagle beak portion 274 of the die plate 110, with the

underlying substrate. In particular, as such assembly 100 contacts or engages the underlying substrate, and assuming that, for example, the first deposition or application pattern 282 is in fact the first deposition or application pattern to in fact be deposited or applied onto the underlying substrate from the first pattern shim 104, the underlying substrate will, in effect, be slightly indented or depressed, not only as a result of the contact or engagement of the underlying substrate by means of the dual pattern shim assembly 100, but in addition, as a result of the pressure of the hot melt adhesive material being dispensed or discharged from, for example, the first pattern shim 104. Subsequently, and in a similar manner, when the sixth deposition or application pattern 292 of the hot melt adhesive material is to be deposited or applied onto the underlying substrate such that the leading edge portion of the sixth deposition or application pattern 292 is disposed atop the trailing edge portion of the first deposition or application pattern 282 in an overlying or overlapping manner, by means of the second pattern shim 108, then again, as such dual pattern shim assembly 100 contacts or engages the underlying substrate, the underlying substrate will, in effect, again be slightly indented or depressed, not only as a result of the contact or engagement of the underlying substrate by means of the dual pattern shim assembly 100, but in addition, as a result of the pressure of the hot melt adhesive material being dispensed or discharged from, for example, the second pattern shim 108. Accordingly, the hot melt adhesive, being dispensed or discharged from the second pattern shim 108, will in fact be able to be deposited or applied onto the underlying substrate within such secondary indented or depressed region by means of

the second pattern shim 108, and atop the first deposition  
or application pattern 282 in an overlying or overlapping  
manner, so as not to disturb or otherwise adversely affect  
the previously applied first deposition or application  
5 pattern 282.

As can best be appreciated from **FIGURE 7**, it is  
also seen that alternative or converse deposition or  
application patterns 282,284,286,288,290,292,294,296, with  
respect to the deposition or application patterns  
10 282,284,286,288, 290,292,294,296 as disclosed within, for  
example, **FIGURE 2**, can likewise be achieved. More  
particularly, it is seen, for example, that not only are  
the deposition or application patterns 282,284, or  
286,288, or 290,292, or 294,296 no longer longitudinally  
15 offset with respect to each other, but in accordance with  
the particular, overall deposition process or procedure  
comprising the deposition or application of the deposition  
or application patterns 282,284,286,288,290,292,294, 296  
onto the underlying substrate, it is seen that in  
20 accordance with such deposition or application patterns as  
illustrated within **FIGURE 7**, the trailing edge portion of  
the sixth deposition or application pattern 292 is now  
effectively overlapped by means of the leading edge  
portion of the first deposition or application pattern  
25 282, and similarly with respect to the trailing edge  
portion of the eighth deposition or application pattern  
296 being overlapped by means of the leading edge portion  
of the third deposition or application pattern 286. With  
the principles and teachings of the present invention,  
30 various different overlapping or overlying deposition or  
application patterns, having different length dimensions,  
width dimensions, coating thicknesses, relative

longitudinal positional locations or dispositions, and the like, can be achieved by means of the new and improved dual pattern shim assembly 100 of the present invention.

In addition, it is to be noted and emphasized  
5 that, regardless of which patterns  
282,284,286,288,290,292,294,296 are deposited or applied  
onto the underlying substrate, and regardless of the order  
in which the various patterns 282,  
284,286,288,290,292,294,296 are deposited or applied onto  
10 the underlying substrate, the successful deposition or  
application of the patterns  
282,284,286,288,290,292,294,296 onto the underlying  
substrate is achieved in accordance with, or as a result  
of, the aforementioned principles and teachings of the present  
15 invention. However, it is to be further noted that  
several other factors also come into play in connection  
with the deposition or application of the two hot melt  
adhesive materials onto the underlying substrate in order  
to in fact successfully achieve the aforementioned multiple  
20 depositions or patterns 282,284,286,288,290,292,294,296  
upon the underlying substrate. For example, the provision  
of the separation shim 106, as having its relatively thin  
or small thickness dimension, has been noted as being  
important in that the same not only permits the first and  
25 second pattern shims 104,108 to be disposed extremely  
close to each other, but in addition, permits the pattern  
shims 104,108 to be disposed extremely close to the knife  
edge 270 of the die adaptor 102.

If the thickness dimension of the separation  
30 shim 106 is in fact too large, then the deposition of the  
first hot melt adhesive material from, for example, the  
first pattern shim 104, will be distorted, and will not be

cleanly or crisply defined, because the relatively wide separation shim 106 will, in effect, tend to enhance the dwell time or deposition time of the deposition of the hot melt adhesive material being dispensed by the first  
5 pattern shim 104 whereby the pattern of such hot melt adhesive material will effectively be distorted.

Conversely, if the thickness dimension of the separation shim 106 is in fact too thin, then the deposition pattern of the hot melt adhesive material being dispensed from the  
10 second pattern shim 108 will, in effect, be distorted because sufficient time for providing the aforementioned indenting or depression, into which the second deposition or application of the hot melt adhesive material from, for example, the second pattern shim 108, will not in fact  
15 have been able to have been effectuated. Therefore, instead of the hot melt adhesive material, being dispensed from the second pattern shim 108 in a truly overlapping manner with respect to the hot melt adhesive material that was dispensed from the first pattern shim 104, the hot  
20 melt adhesive material, being dispensed from the second pattern shim 108, will, in effect, commingle with the hot melt adhesive material previously deposited onto the underlying substrate from the first pattern shim 104. Therefore, the provision of the separation shim 106,  
25 having the correct thickness dimension, along with other operational or dispensing factors, such as, for example, the particular hot melt adhesive material being dispensed, its viscosity properties, the pressure of the hot melt adhesive material being dispensed, all affect the  
30 successful deposition or application of the particular patterns onto the underlying substrate.

Thus, it may be seen that in accordance with the principles and teachings of the present invention, there has been provided a new and improved dual pattern shim assembly, for use in conjunction with hot melt adhesive dispensing systems, wherein various different overlapping or overlying deposition or application patterns, having different length dimensions, different width dimensions, different coating thicknesses, different longitudinal positional locations or dispositions with respect to each other, and the like, can be achieved by means of the new and improved dual pattern shim assembly of the present invention during a single pass of the underlying substrate with respect to the hot melt adhesive contact die applicator or head. In this manner, different or multiple adhesive deposition or application procedures are able to effectively be accomplished simultaneously so as to effectively simplify and shorten the overall assembly lines and production times required for the fabrication or manufacture of various different particular products.

Obviously, many variations and modifications of the present invention are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the present invention may be practiced otherwise than as specifically described herein.

**WHAT IS CLAIMED IS:**

1. A dual pattern shim assembly for use in conjunction with hot melt adhesive dispensing systems for depositing hot melt adhesive material onto an underlying substrate in accordance with predetermined patterns, comprising:

a die adaptor for receiving a supply of a hot melt adhesive material from a source of hot melt adhesive material;

a first pattern shim for receiving a hot melt adhesive material from said die adaptor and for depositing a first pattern of the hot melt adhesive material onto an underlying substrate;

a second pattern shim for receiving a hot melt adhesive material from said die adaptor and for depositing a second pattern of the hot melt adhesive material onto the underlying substrate; and

a separation shim interposed between said first and second pattern shims for separating said first and second pattern shims from each other and yet permitting the first and second patterns of the hot melt adhesive materials to be deposited onto the underlying substrate in accordance with an overlapping pattern wherein a portion of a first one of the first and second patterns of the hot melt adhesive materials overlaps a portion of the second one of the first and second patterns of the hot melt adhesive materials.

2. The dual pattern shim assembly as set forth in Claim 1, wherein:

said die adaptor defines a knife edge portion for effectively defining the deposition of the first and

second hot melt adhesive material patterns onto the underlying substrate as clear, crisp, and clean patterns.

3. The dual pattern shim assembly as set forth in Claim 1, wherein:

said first and second pattern shims are disposed close to said knife edge portion of said die adaptor so as to effectively deposit the first and second hot melt adhesive material patterns onto the underlying substrate as clear, crisp, and clean patterns.

4. The dual pattern shim assembly as set forth in Claim 3, wherein:

said first and second pattern shims are disposed upon the same side of said knife edge portion of said die adaptor.

5. The dual pattern shim assembly as set forth in Claim 1, wherein:

said separation shim has a thickness dimension that is sufficiently large so as to permit the first and second pattern shims to be sufficiently spaced from each whereby the second pattern of hot melt adhesive material can be deposited onto the underlying substrate without distortion, and wherein said separation shim has a thickness dimension that is sufficiently small whereby the first pattern of the hot melt adhesive material can be deposited onto the underlying substrate without distortion.

6. The dual pattern shim assembly as set forth in Claim 1, further comprising:

a die plate disposed adjacent to said second pattern shim.

7. The dual pattern shim assembly as set forth in Claim 6, wherein:

said die plate is disposed upon a first side of said second pattern shim while said separation shim is disposed upon a second opposite side of said second pattern shim.

8. The dual pattern shim assembly as set forth in Claim 6, wherein:

a first flow path of a first portion of the hot melt adhesive material to be deposited onto the underlying substrate as the first hot melt adhesive pattern by said first pattern shim is defined from said die adaptor to said first pattern shim.

9. The dual pattern shim assembly as set forth in Claim 8, wherein:

a second flow path of a second portion of the hot melt adhesive material to be deposited onto the underlying substrate as the second hot melt adhesive pattern by said second pattern shim is defined from said die adaptor, through said first pattern shim, through said separation shim, through said second pattern shim, to said die plate, and back to said second pattern shim.

10. The dual pattern shim assembly as set forth in Claim 1, wherein:

a leading edge portion of the second pattern of the hot melt adhesive material overlaps a trailing edge

portion of the first pattern of the hot melt adhesive material.

11. The dual pattern shim assembly as set forth in Claim 1, wherein:

a leading edge portion of the first pattern of the hot melt adhesive material overlaps a trailing edge portion of the second pattern of the hot melt adhesive material.

12. The dual pattern shim assembly as set forth in Claim 1, wherein:

said die adaptor receives two different types of hot melt adhesive material from two different sources of hot melt adhesive materials.

13. A hot melt adhesive dispensing system, comprising:

a dual pattern shim assembly, comprising first and second pattern shims, for depositing hot melt adhesive material onto an underlying substrate in accordance with two pre-determined overlapping patterns.

14. The hot melt adhesive dispensing system as set forth in Claim 13, wherein said dual pattern shim assembly comprises:

a die adaptor for receiving a supply of a hot melt adhesive material from a source of hot melt adhesive material;

said first pattern shim for receiving a hot melt adhesive material from said die adaptor and for depositing a first pattern of the hot melt adhesive material onto the underlying substrate;

said second pattern shim for receiving a hot melt adhesive material from said die adaptor and for depositing a second pattern of the hot melt adhesive material onto the underlying substrate; and

a separation shim interposed between said first and second pattern shims for separating said first and second pattern shims from each other and yet permitting the first and second patterns of the hot melt adhesive materials to be deposited onto the underlying substrate in accordance with an overlapping pattern wherein a portion of a first one of the first and second patterns of the hot melt adhesive materials overlaps a portion of the second one of the first and second patterns of the hot melt adhesive materials.

15. The hot melt adhesive dispensing system as set forth in Claim 14, wherein:

said die adaptor defines a knife edge portion for effectively defining the deposition of the first and second hot melt adhesive material patterns onto the underlying substrate as clear, crisp, and clean patterns.

16. The hot melt adhesive dispensing system as set forth in Claim 14, wherein:

said first and second pattern shims are disposed close to said knife edge portion of said die adaptor so as to effectively deposit the first and second hot melt adhesive material patterns onto the underlying substrate as clear, crisp, and clean patterns.

17. The hot melt adhesive dispensing system as set forth in Claim 16, wherein:

said first and second pattern shims are disposed upon the same side of said knife edge portion of said die adaptor.

18. The hot melt adhesive dispensing system as set forth in Claim 14, wherein:

said separation shim has a thickness dimension that is sufficiently large so as to permit the first and second pattern shims to be sufficiently spaced from each whereby the second pattern of hot melt adhesive material can be deposited onto the underlying substrate without distortion, and wherein said separation shim has a thickness dimension that is sufficiently small whereby the first pattern of the hot melt adhesive material can be deposited onto the underlying substrate without distortion.

19. The hot melt adhesive dispensing system as set forth in Claim 14, further comprising:

a die plate disposed adjacent to said second pattern shim.

20. The hot melt adhesive dispensing system as set forth in Claim 19, wherein:

said die plate is disposed upon a first side of said second pattern shim while said separation shim is disposed upon a second opposite side of said second pattern shim.

21. The hot melt adhesive dispensing system as set forth in Claim 19, wherein:

a first flow path of a first portion of the hot melt adhesive material to be deposited onto the underlying

substrate as the first hot melt adhesive pattern by said first pattern shim is defined from said die adaptor to said first pattern shim.

22. The hot melt adhesive dispensing system as set forth in Claim 21, wherein:

a second flow path of a second portion of the hot melt adhesive material to be deposited onto the underlying substrate as the second hot melt adhesive pattern by said second pattern shim is defined from said die adaptor, through said first pattern shim, through said separation shim, through said second pattern shim, to said die plate, and back to said second pattern shim.

23. The hot melt adhesive dispensing system as set forth in Claim 14, wherein:

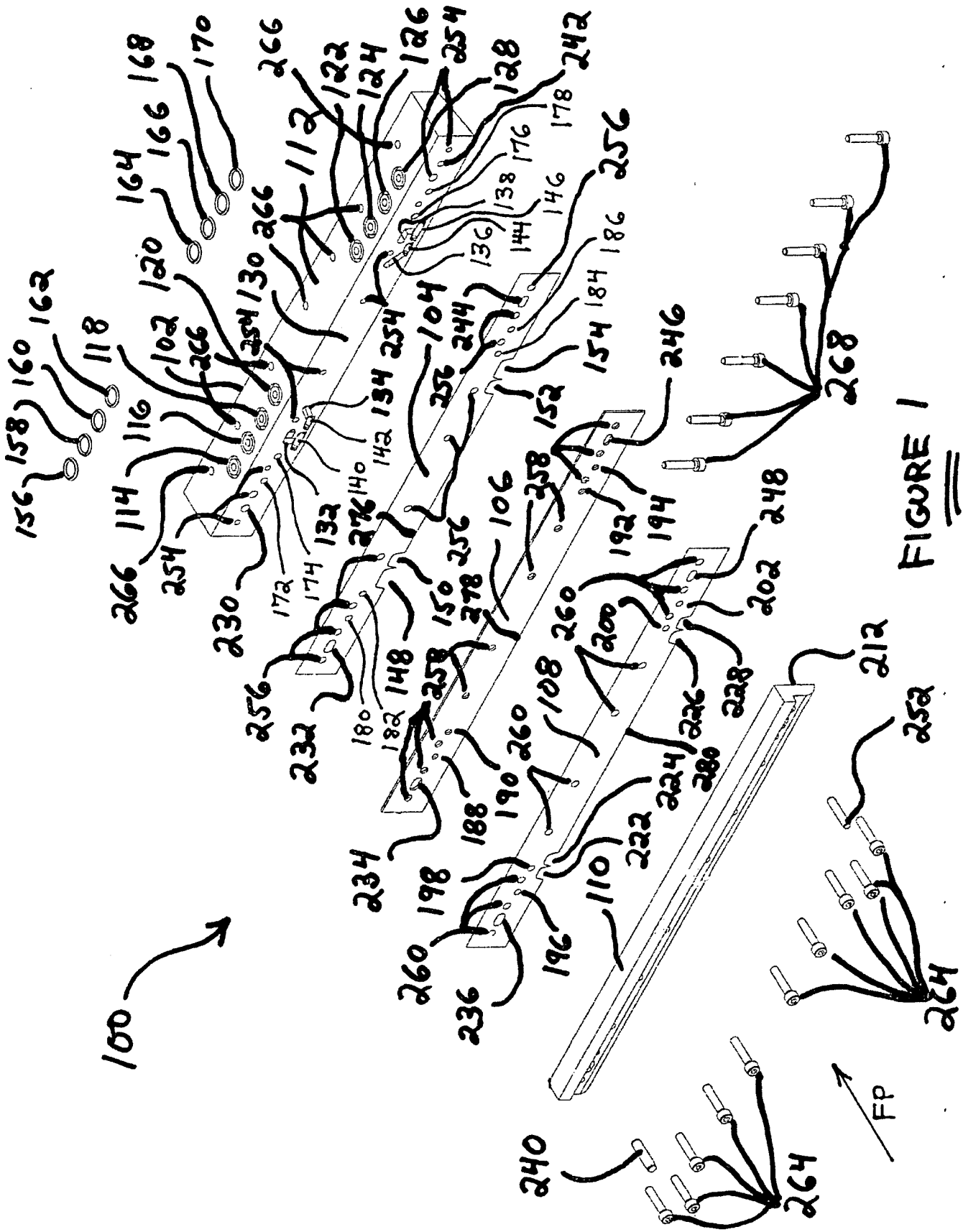
a leading edge portion of the second pattern of the hot melt adhesive material overlaps a trailing edge portion of the first pattern of the hot melt adhesive material.

24. The hot melt adhesive dispensing system as set forth in Claim 14, wherein:

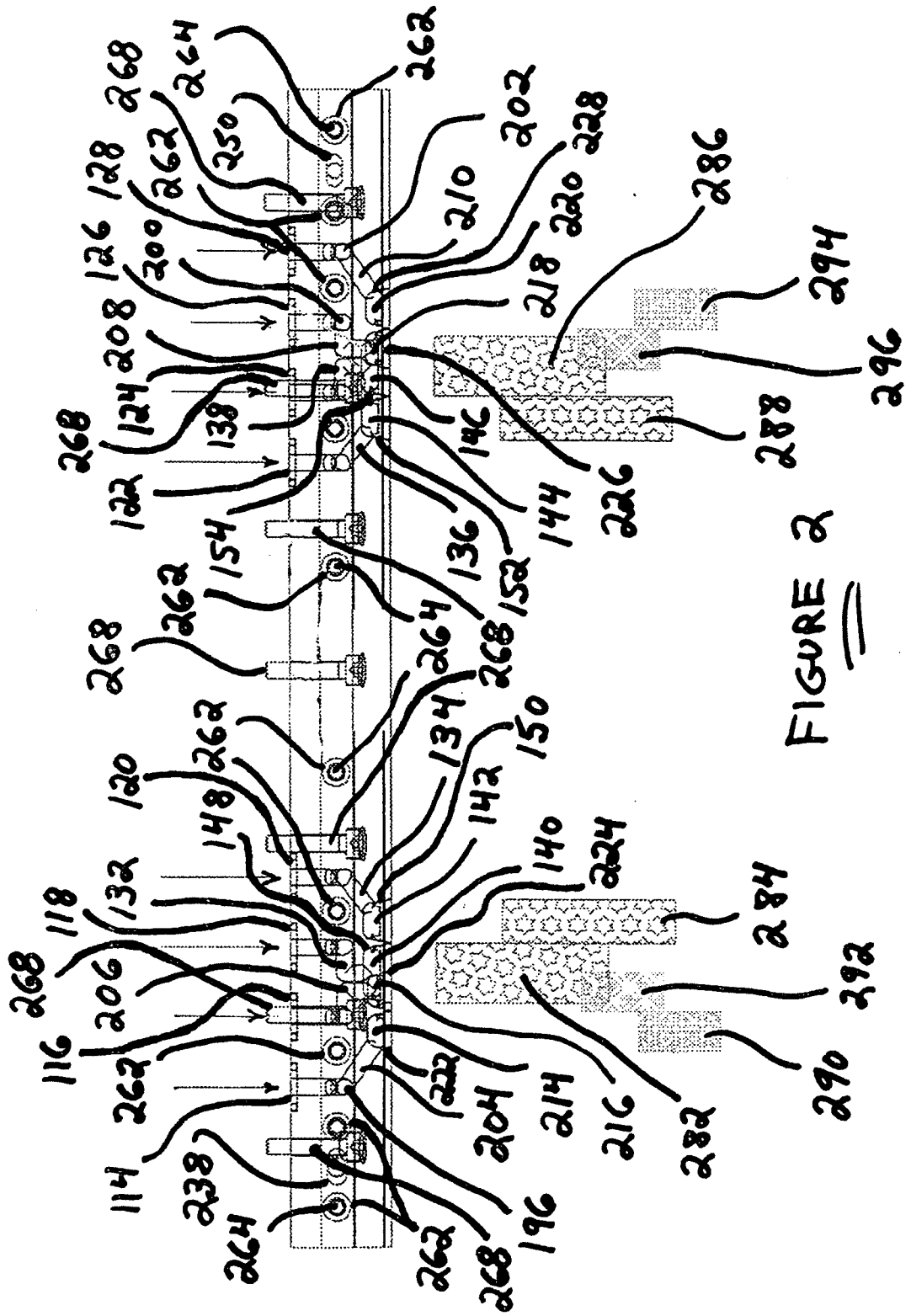
a leading edge portion of the first pattern of the hot melt adhesive material overlaps a trailing edge portion of the second pattern of the hot melt adhesive material.

25. The hot melt adhesive dispensing system as set forth in Claim 14, wherein:

said die adaptor receives two different types of hot melt adhesive material from two different sources of hot melt adhesive materials.



**FIGURE 1**



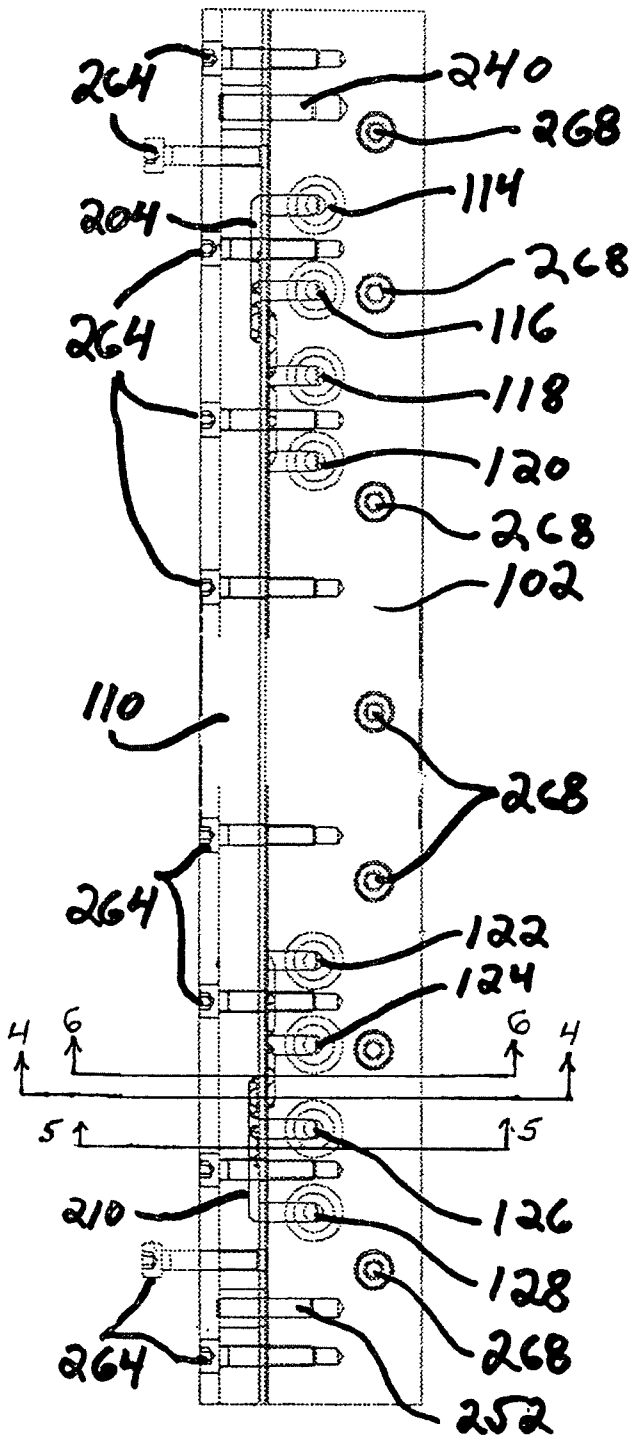


FIGURE 3

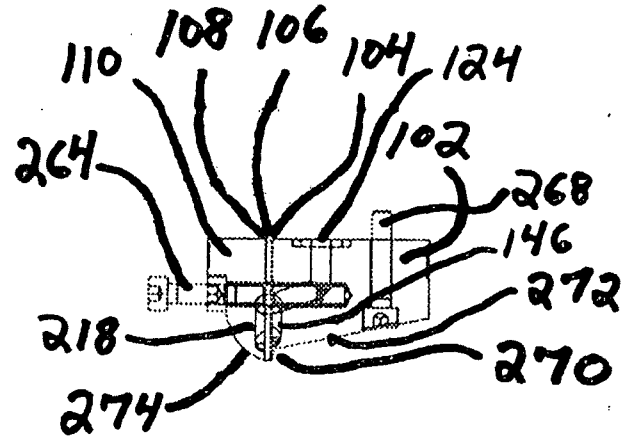


FIGURE 4

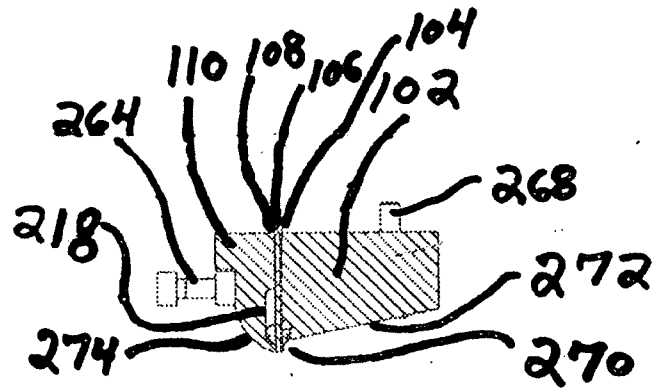


FIGURE 5

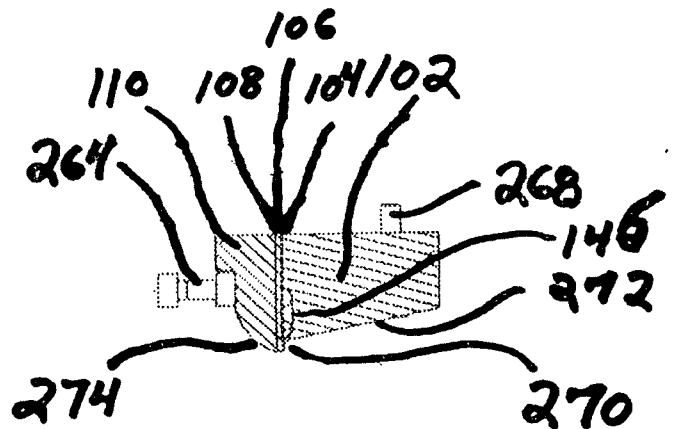


FIGURE 6

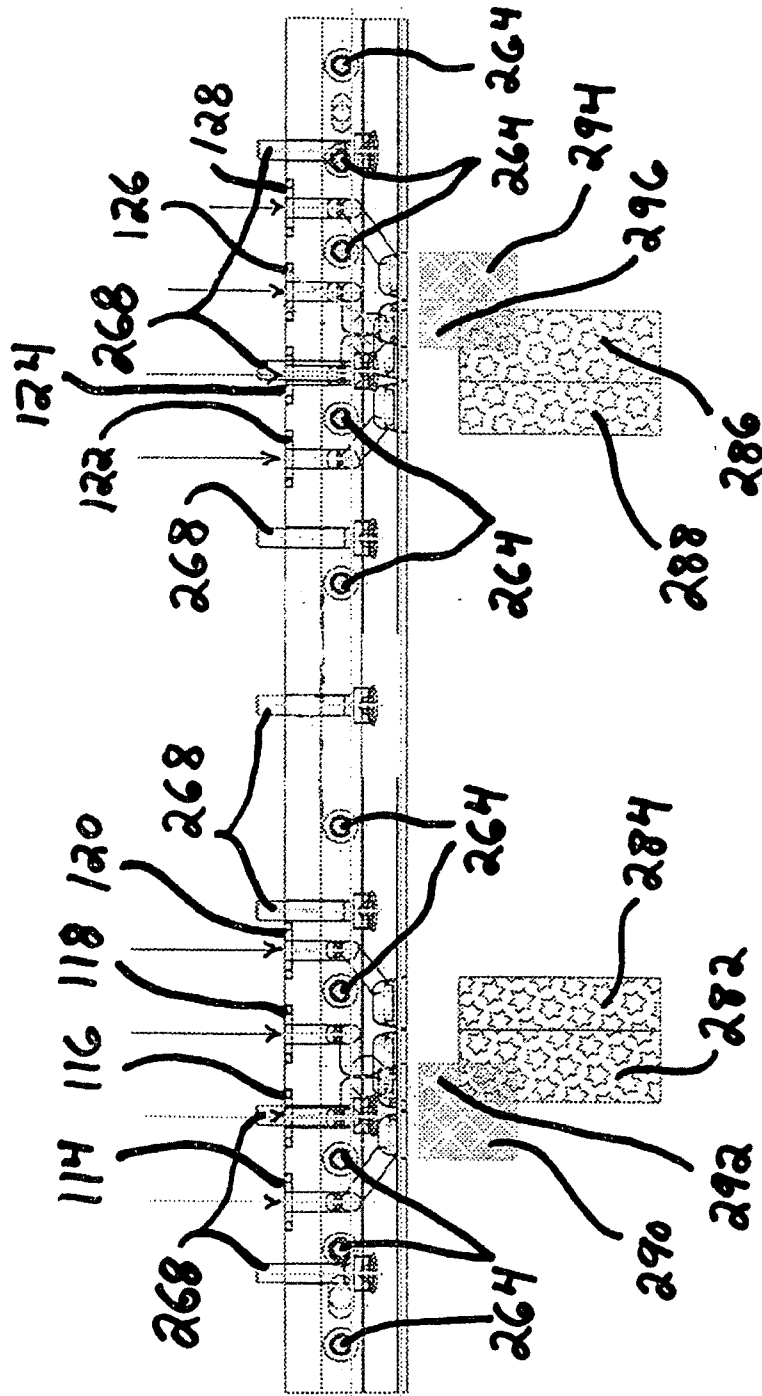


FIGURE 7

# INTERNATIONAL SEARCH REPORT

International application No

PCT/US2008/058887

**A. CLASSIFICATION OF SUBJECT MATTER**

INV. B05C5/02

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)  
B05C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched.

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 096 453 A (ACUMETER LAB [US]) 21 December 1983 (1983-12-21) page 1, lines 5-14 page 7, lines 15-20; figures	1-25
X	US 2004/256496 A1 (HARRIS MICHAEL W [US] ET AL) 23 December 2004 (2004-12-23) figures	1-25
X	JP 11 226469 A (NITTO DENKO CORP) 24 August 1999 (1999-08-24) abstract; figures	1-25
X	JP 2005 270704 A (TORAY ENG CO LTD) 6 October 2005 (2005-10-06) abstract; figures	1-25
	-/--	

Further documents are listed in the continuation of Box C.

See patent family annex.

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Date of the actual completion of the international search

30 July 2008

Date of mailing of the international search report

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# INTERNATIONAL SEARCH REPORT

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PCT/US2008/058887

**C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 774 109 A (HADZIMIHALIS THEODORE M [US] ET AL) 27 September 1988 (1988-09-27). figures	2
A	JP 2006 015235 A (NORDSON CORP) 19 January 2006 (2006-01-19) figures	2

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2008/058887
---

Patent document cited in search report	A	Publication date	Patent family member(s)	Publication date
EP 0096453	A	21-12-1983	DE 3380842 D1 JP 1662931 C JP 3023221 B JP 58214375 A US 4476165 A	21-12-1989 19-05-1992 28-03-1991 13-12-1983 09-10-1984
US 2004256496	A1	23-12-2004	NONE	
JP 11226469	A	24-08-1999	NONE	
JP 2005270704	A	06-10-2005	NONE	
US 4774109	A	27-09-1988	AU 598437 B2 AU 2259588 A CA 1291679 C DE 3850111 D1 DE 3850111 T2 EP 0368914 A1 JP 2504235 T WO 8900459 A1	21-06-1990 13-02-1989 05-11-1991 14-07-1994 19-01-1995 23-05-1990 06-12-1990 26-01-1989
JP 2006015235	A	19-01-2006	NONE	