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(54) **Device for forming brunnian links**

(57) A Brunnian link (12) is a link formed from a closed loop doubled over itself to capture another closed loop to form a chain. Elastic bands (14) can be utilized

to form such links in a desired manner. The example device (22) provides a means of creating items using Brunnian links (12) of complex configurations.

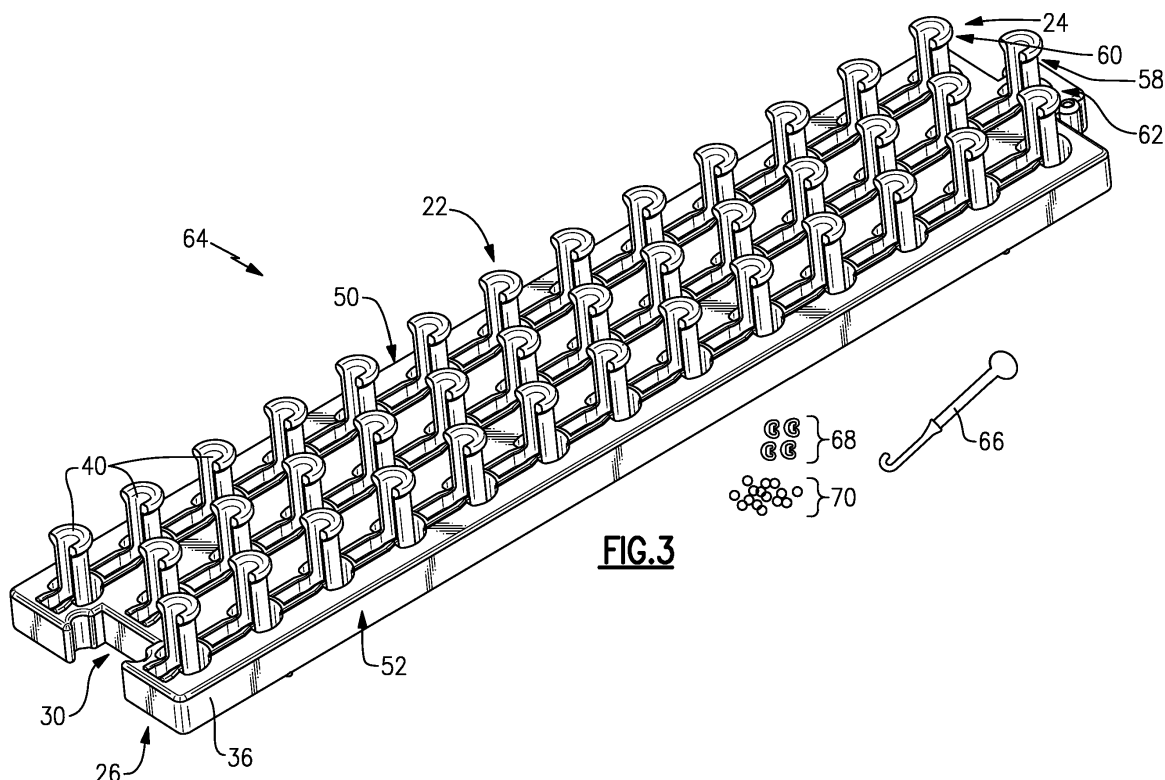


FIG.3

Description

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Application No. 61/877,480 filed September 13, 2013, and to United States Patent Application No. 14/270,635 filed May 6, 2014.

BACKGROUND

[0002] This disclosure generally relates to method and device for creating a linked item. More particularly, this disclosure relates to a method and device for creating a linked wearable item from elastic bands.

[0003] Kits that include materials for making a uniquely colored bracelet or necklace have always enjoyed some popularity. However such kits usually just include the raw materials such as different colored threads and beads and rely on the individual's skill and talent to construct a usable and desirable item. Accordingly there is a need and desire for a kit that provides not only the materials for creating a unique wearable item, but also that provides for ease of construction to make it easy for people of many skill and artistic levels to successfully create a desirable and durable wearable item.

SUMMARY

[0004] A Brunnian link is a link formed from a closed loop doubled over itself to capture another closed loop to form a chain. Elastic bands can be utilized to form such links in a desired manner. The example device provides a means of creating items using Brunnian links of complex configurations. Moreover, the example kit provides a device that allows for the successful creation of unique wearable items regardless of skill level.

[0005] According to a first aspect of the present invention, there is provided a loom according to claim 1 for creating an item consisting of a series of links.

[0006] In at least one embodiment the loom is a device comprising a base having a length and width. The loom may comprise a plurality of pins standing up from the base. Each of the plurality of pins respectively may include a flange near a top surface for holding an elastic link in a desired orientation. Each of the plurality of pins respectively may include an access groove extending through the top surface. The plurality of pins may be arranged in at least three rows spaced an equal distance apart in a direction transverse to the length.

[0007] The base may include a slot open to the access groove that extends below a first surface of the base to provide access for a tool below the first surface.

[0008] Each of the access grooves may be orientated in a common direction.

[0009] The access grooves may be orientated in a direction common with the corresponding slot.

[0010] The access grooves may be orientated in a di-

rection parallel with the length.

[0011] Pins in at least one of the at least three rows may be staggered relative to pins in another of the at least three rows.

[0012] The at least three rows may include at least one intermediate row disposed between outer rows.

[0013] The intermediate row may offset relative to the outer rows.

[0014] The outer rows may be spaced an equal distance from the at least one intermediate row.

[0015] The loom may include a first end spaced apart from a second end. The access groove for each of the plurality of pins may open toward the first end.

[0016] The flange may extend about the pin from a first side of the access groove to a second side of the access groove.

[0017] The access groove may extend through the flange and the top surface.

[0018] The base may include an opening through the first surface at least partially surrounding each of the plurality of pins.

[0019] The opening may be configured to allow for improved manufacturing of the base and/or the loom. For example, the opening may correspond to a portion of a mould, such as an injection-moulding mould, that extends through the base to define the flange, or at least an underside of the flange. Additionally or alternatively, the opening may be configured to allow the insertion of a hook to extend below the first surface to capture a bottom or lower most elastic band supported on the pin. Each respective opening of the plurality of openings may surround at least the body portion of the respective corresponding or associated pin.

[0020] The base may include at least one mating feature for connecting a first base of a first loom to a second base of a second loom.

[0021] The at least one mating feature may be disposed on at least one of a first end and a second end of the first base and the second base.

[0022] According to a further aspect of the invention, there is provided a device for creating a series of links comprising:

a base including a length and a width; and

a plurality of pins standing up from the base, each of the plurality of pins respectively including a top portion for holding a link in a desired orientation and an access groove facing in a common direction of each of the plurality of pins.

[0023] The plurality of pins may comprise rows of offset pins spaced apart and extending upward from a base.

[0024] The device may include a flange near the top portion for holding a link in place on at least one of the plurality of pins.

[0025] Each of the access grooves may face toward one end of the base.

[0026] The base may include a slot open to the access

groove that extends below a surface to provide access for a tool below the first surface.

[0027] The slot may face in a direction common with the access groove.

[0028] The base may include a connecting feature for connecting one base to a second base.

[0029] According to a further aspect of the invention, there is provided a method of creating a linked item from a plurality of elastic bands, such as defined in the claims.

[0030] In at least one example, the method of creating a linked item from a plurality of elastic bands may comprise the steps of:

stretching a first elastic band across a first pin and a second pin;
stretching a second elastic band across the second pin and a third pin over the first elastic band on the second pin;
capturing an end of the first elastic band on the second pin; and
pulling the captured end of the first elastic band through the second elastic band and onto the third pin to form a link.

[0031] Capturing an end of the first elastic band may comprise extending a hook into an access groove and capturing the end with the hook.

[0032] The method may include extending the hook into a slot open to the access groove for capturing the end of the first elastic band.

[0033] The method may include stretching subsequent elastic bands over adjacent pins and preceding elastic bands and pulling subsequent ends of different ones of the plurality of elastic bands to form a desired number of links.

[0034] The method may include the step of connecting a first base with a second base to define a spatial orientation for a plurality of pins.

[0035] The method may comprise directly connecting the first and second bases, each base comprising a plurality of pins standing up from each respective base. The method may comprise longitudinally connecting at least first and second bases, such as by connecting a plurality of bases end to end so as to form an increased total length of pins arranged on the bases.

[0036] In at least one example, the method of creating a linked item from a plurality of elastic bands may comprise the steps of:

stretching a first elastic band across a first pin and a second pin;
stretching a second elastic band across the second pin and a third pin over the first elastic band on the second pin;
capturing an end of the second elastic band on the second pin; and
pulling the captured end of the second elastic band through the first elastic band and onto the third pin

to form a link.

[0037] Capturing an end of the second elastic band may comprise extending a hook into an access groove and capturing the end with the hook.

[0038] The method may include extending the hook into a slot open to the access groove for capturing the end of the second elastic band.

[0039] The method may include stretching subsequent elastic bands over adjacent pins and preceding elastic bands and pulling subsequent ends of different ones of the plurality of elastic bands to form a desired number of links.

[0040] The method may include the step of connecting a first base with a second base to define a spatial orientation for a plurality of pins.

[0041] The method may comprise directly connecting the first and second bases, each base comprising a plurality of pins standing up from each respective base. The method may comprise longitudinally connecting at least first and second bases, such as by connecting a plurality of bases end to end so as to form an increased total length of pins arranged on the bases.

[0042] The invention includes one or more corresponding aspects, embodiments or features in isolation or in various combinations whether or not specifically stated (including claimed) in that combination or in isolation. For example, it will readily be appreciated that features recited as optional with respect to the first aspect may be additionally applicable with respect to any of the other aspects, without the need to explicitly and unnecessarily list those various combinations and permutations here. For example, features recited with respect to pins of one aspect may be applicable to the pins of another aspect, and vice-versa. Similarly the features recited in respect of any apparatus aspect may be similarly applicable to a method aspect, and vice-versa. For example, the loom and/or kit may be configured to perform any of the functions or steps of the method aspect; and/or the method aspect may comprise any/all of the functions or steps associated with the loom and/or kit aspect/s.

[0043] In addition, corresponding means for performing one or more of the discussed functions are also within the present disclosure.

[0044] It will be appreciated that one or more embodiments/aspects may be useful in forming linked items or articles. In particular it will be appreciated that one or more embodiments/aspects may be useful in forming Brunnian linked items or articles, such as with closed loops of elastic bands.

[0045] The above summary is intended to be merely exemplary and non-limiting. Although the different examples have the specific components shown in the illustrations, embodiments of this invention are not limited to those particular combinations. It is possible to use some of the components or features from one of the examples in combination with features or components from another one of the examples.

[0046] These and other features disclosed herein can be best understood from the following specification and drawings, the following of which is a brief description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0047]

Figure 1 is a schematic view of an example linked article.

Figure 2 is a schematic view of an example Brunnian link formed from elastic bands.

Figure 3 is a schematic view of an example kit for making Brunnian link articles from elastic bands.

Figure 4 is a sectional view of an example loom.

Figure 5 is a top view of an example loom.

Figure 6 is a side view of the example loom.

Figure 7 is a sectional view through a pin of the example loom.

Figure 8 is a schematic view of a connection between two looms.

Figure 9 is a schematic view of a first position for capturing an elastic band.

Figure 10 is a schematic view of a second position for capturing an elastic band.

DETAILED DESCRIPTION

[0048] Referring to Figures 1 and 2, a Brunnian link 12 is formed from a continuous looped structure 14 without forming an actual knot. Several links 12 are formed into a chain 16 to form a linked article such as a bracelet 10. The ends are then secured and a durable wearable item 10 is created. In this example three closed looped elastic bands 14 such as rubber bands are shown forming a single chain. Capturing ends 18 of one elastic band 14 with a mid portion 20 of another elastic band 14 forms each link 12. Each link 12 depends on the previous and subsequent links 14 to maintain the desired linked article.

[0049] Referring to Figure 3 and 4, an example kit 64 for creating Brunnian link items such as bracelets and other wearable or decorative items includes a loom 22, a hook 66, a plurality of clips 68 and a plurality of elastic bands 70. The loom 22 includes a base 36 and a plurality of pins 40 standing up from the base 36. The base 36 includes a first surface 38 from which the pins 40 extend. Each of the pins 40 includes a top surface 42 and a flange 44 for holding an elastic band in a desired orientation. In this example, the flange 44 extends from a first side of the access groove 48 to a second side of the access groove 48.

[0050] Referring to Figures 5 and 6 with continued reference to Figures 3 and 4. The base 36 includes a length 56 and a width 55. The base 36 includes a first end 24, a second end 26, a first side 50 and a second side 52. The pins 40 stand up from the base 36. Each of the pins 40 includes a body portion 46 including on one side an access groove 48 extending through the top surface 42

and flange 44. The body portion 46 includes a rounded shape on a side opposite the access groove 48 for supporting an elastic band. Each of the access grooves 48 is open in a common direction 76. In the disclosed example, the access grooves all point toward the second end 26. An opening 74 partially surrounds each pin 40 and extends through the first surface 38 of the base 36. Providing an opening 74 extending through the first surface 38 of the base 36 may allow for improved manufacturing of the base 36. For example, the opening 74 may correspond to a portion of a mould, such as an injection-moulding mould, that extends through the base 36 to define the flange 44, or at least an underside of the flange 44. Additionally or alternatively, providing an opening 74 extending through the first surface 38 of the base 36 may allow the insertion of a hook 66 to extend below the first surface 38 to capture a bottom or lower most elastic band supported on the pin 40. In the embodiment shown, each respective opening 74 of the plurality of openings 74 surrounds at least the body portion 46 of the respective corresponding or associated pin 40.

[0051] Referring to Figure 7, with continued reference to Figures 4, 5 and 6, the base 36 includes slots 54 that extend below the first surface 38 and that are in communication with a corresponding one of the access grooves 48. The slot 54 provides for the hook 66 to extend below the first surface 38 to capture a bottom or lower most elastic band supported on the pin 40. During fabrication of a linked article, one elastic band is captured and pulled upward within another elastic band supported on a common pin 40. The hook 66 can therefore extend through the access groove 48 into the slot 54 to capture a lower most elastic band and pull that elastic band through the slot 54 and an upper elastic band. The slot 54 extends forward from the pin 40 and access groove 48.

[0052] The plurality of pins 40 are arranged in rows that extend a longitudinal length 56 of the loom 22 between the first end 24 and the second end 28. In this disclosed example, the rows include at least one center or intermediate row 58 disposed between an outer first row 60 and an outer second row 62. The intermediate row 58 and first and second outer rows 60, 62 are spaced apart from each other in a direction transverse to the longitudinal length 56 an equal distance 75. The intermediate row 58 is staggered or offset relative to the first and second rows 60, 62 on each side. Accordingly, in this example, the intermediate row 58 includes pins 40 that are staggered or offset a distance 72 longitudinally relative to pins 40 in the first outer row 60 and the second outer row 62. The intermediate row 58 in the disclosed example includes a single pin 45 that is spaced forward of the other pins 40 at the first end 24.

[0053] Each of the slots 54 and access grooves 48 for each of the pins 40 face in a common direction 76. The common direction 76 in the disclosed loom 22 is toward the second end 26 and away from the first end 24.

[0054] Referring to Figure 8, with continued reference to Figure 5, the base includes a tab 28 on the first end

24 and a slot 30 on a second end 26 for connecting the base 36A of one loom 22A with the base 36B of another or second loom 22B. Connection of multiple looms 22 provides additional possible link combinations and lengths. In this example, the tab 28 and slot 30 are provided on respective first and second ends 24, 26; however, such connecting features are also contemplated on the first and second sides 50, 52.

[0055] Referring to Figures 9 and 10 with continued reference to Figures 3-7, the slots 54 provide for the hook 66 to pick and engage an elastic band in two positions. One position, shown in Figure 9, is with the hook 66 facing into the access groove 48. A second position, shown in Figure 10, is with the hook 66 facing outward from the access groove 48. The slot 54 within the base 36 is in direct communication with the access groove 48 so that the hook 66 can move from the access groove 48 into the slot 54 under a lower most elastic band supported on the pin 40. The lower most elastic band can then be pulled through the access groove 48 and through upper elastic bands supported on the same pin 40.

[0056] A disclosed method of creating a linked item utilizing the loom 22 includes the step of stretching a first elastic band 78 across adjacent first and second pins 82, 84. The flange 44 holds the elastic band 78 on the first and second pins 82, 84 and prevents the elastic band from slipping off. A second elastic band 80 is stretched across second pin 84 and a third pin 86. The second elastic band 80 is supported on the second pin 84 above the first elastic band 78. A link is formed by capturing and pulling an end of the first band 78 through the access groove and the second band 80 and placing the captured end onto an adjacent pin that in this example is the first pin 82. This forms the Brunnian link and holds the link in place so that additional links can be formed and joined to existing links.

[0057] The hook 66 is utilized to capture ends of an elastic band and is inserted through the access groove 48 into the slot 54 and below the lower most elastic band that in this example is the first band 78. The hook 66 is used to grasp the elastic band 78 and pull the elastic band upward through the access groove 48 and within an elastic band above the lower elastic band to form the Brunnian link. The captured end of one of the plurality of elastic bands is pulled over the other end and captured on an adjacent pin while engaged with a second one of the plurality of elastic bands. Capturing and pulling subsequent ends of different ones of the plurality of elastic bands is repeated to form the desired link pattern.

[0058] Accordingly, the example kit and method provide for the creation of many different combinations and configurations of Brunnian links for the creation of bracelets, necklaces, and other linked items. Moreover, the example kit is expandable to further create and expand the capabilities of potential Brunnian link creations. The example kit provides for the creation of such links and items in an easy manner allowing persons of varying skill levels to be successful in creating unique wearable items.

[0059] Although an example embodiment has been disclosed, a worker of ordinary skill in this art would recognize that certain modifications would come within the scope of this disclosure. For that reason, the following claims should be studied to determine the scope and content of this invention.

Claims

1. A loom for creating an item consisting of a series of links, the device comprising:
 - a base having a length and width; and
 - at plurality of pins standing up from the base, each of the plurality of pins respectively include a flange near a top surface for holding an elastic link in a desired orientation, and an access groove extending through the top surface, wherein the plurality of pins are arranged in at least three rows spaced an equal distance apart in a direction transverse to the length.
2. The loom as recited in claim 1, wherein the base includes a slot open to the access groove that extends below a first surface of the base to provide access for a tool below the first surface.
3. The loom as recited in claim 1 or 2, wherein each of the access grooves are orientated in a common direction.
4. The loom as recited in claim 2, or claim 3 when dependent on claim 2, wherein the access grooves are orientated in a direction common with the corresponding slot.
5. The loom as recited in any preceding claim, wherein the access grooves are orientated in a direction parallel with the length; and/or wherein each of the access grooves face toward one end of the base.
6. The loom as recited in any preceding claim, wherein pins in at least one of the at least three rows are staggered relative to pins in another of the at least three rows.
7. The loom as recited in claim 6, wherein that at least three rows includes at least one intermediate row disposed between outer rows; and optionally wherein the intermediate row is offset relative to the outer rows.
8. The loom as recited in claim 7, wherein the outer rows are spaced an equal distance from the at least one intermediate row.
9. The loom as recited in any preceding claim, wherein

the loom includes a first end spaced apart from a second end and the access groove for each of the plurality of pins opens toward the first end.

10. The loom as recited in any preceding claim, wherein the flange extends about the pin from a first side of the access groove to a second side of the access groove; and/or wherein the access groove extends through the flange and the top surface. 5
11. The loom as recited in any preceding claim, wherein the base includes an opening through the first surface at least partially surrounding each of the plurality of pins. 10
12. The loom as recited in any preceding claim, wherein the base includes at least one mating feature for connecting a first base of a first loom to a second base of a second loom; and optionally wherein the at least one mating feature is disposed on at least one of a first end and a second end of the first base and the second base. 15
13. A method of creating a linked item from a plurality of elastic bands comprising the steps of: 20
 - stretching a first elastic band across a first pin and a second pin;
 - stretching a second elastic band across the second pin and a third pin over the first elastic band on the second pin; 25
 - capturing an end of the first elastic band on the second pin; and
 - pulling the captured end of the first elastic band through the second elastic band and onto the first pin to form a link. 30
14. The method as recited in claim 13, wherein capturing an end of the first elastic band comprises extending a hook into an access groove and capturing the end with the hook; 35
 - and optionally includes extending the hook into a slot open to the access groove for capturing the end of the first elastic band. 40
15. The method as recited in either of claims 13 to 14, including stretching subsequent elastic bands over adjacent pins and preceding elastic bands and pulling subsequent ends of different ones of the plurality of elastic bands to form a desired number of links; 45
 - and/or including the step of connecting a first base with a second base to define a spatial orientation for a plurality of pins. 50

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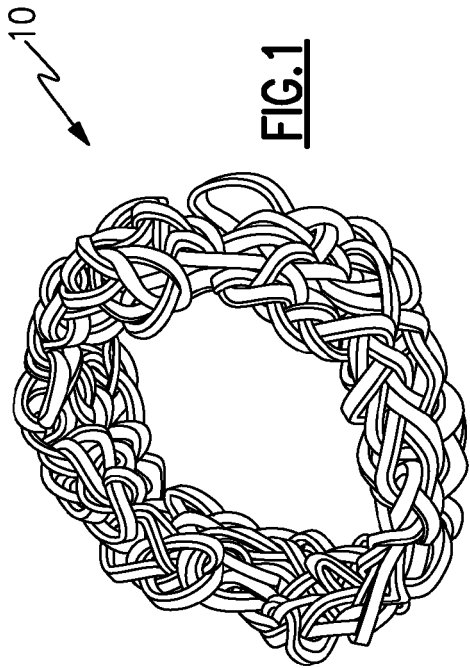


FIG. 1

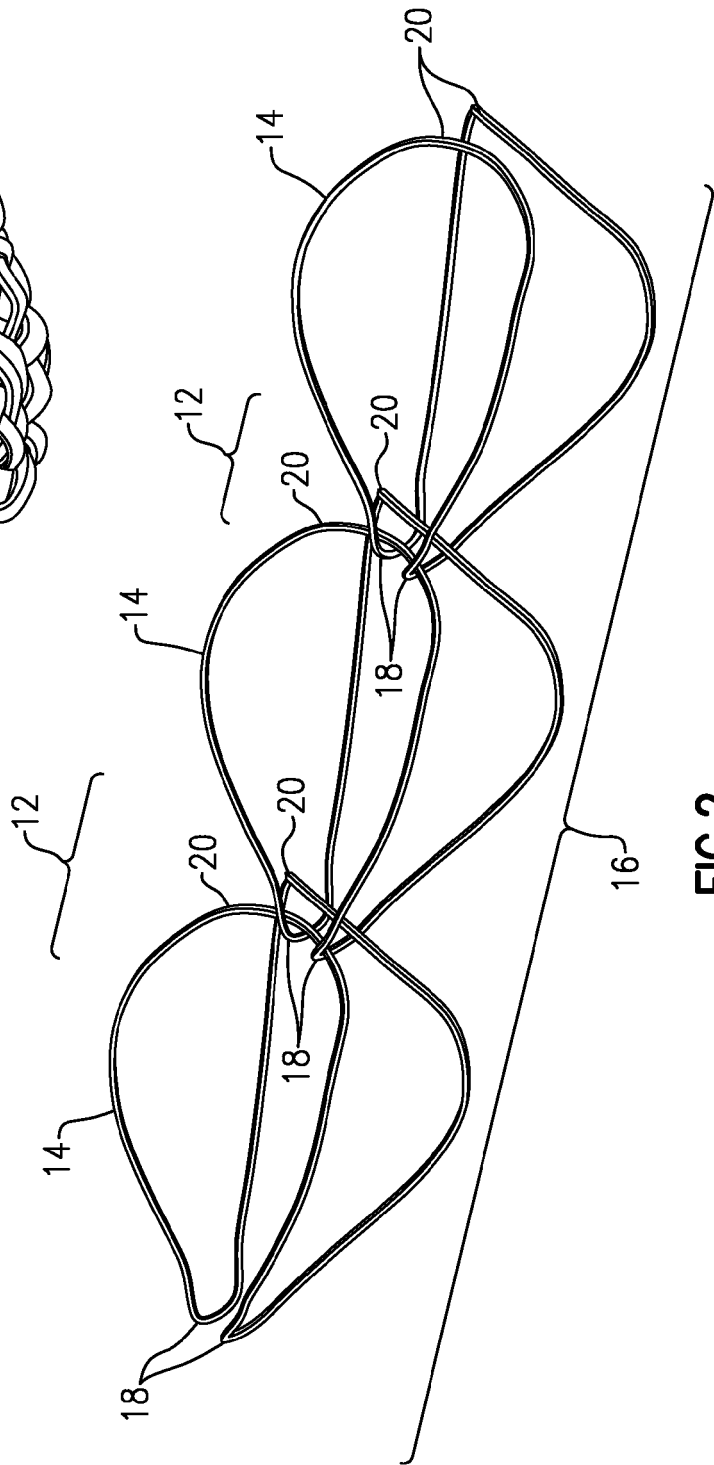
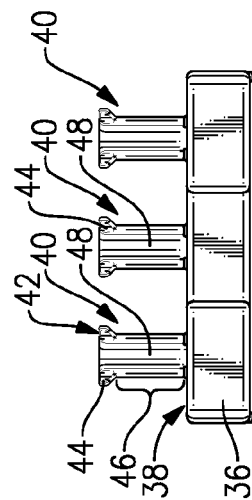
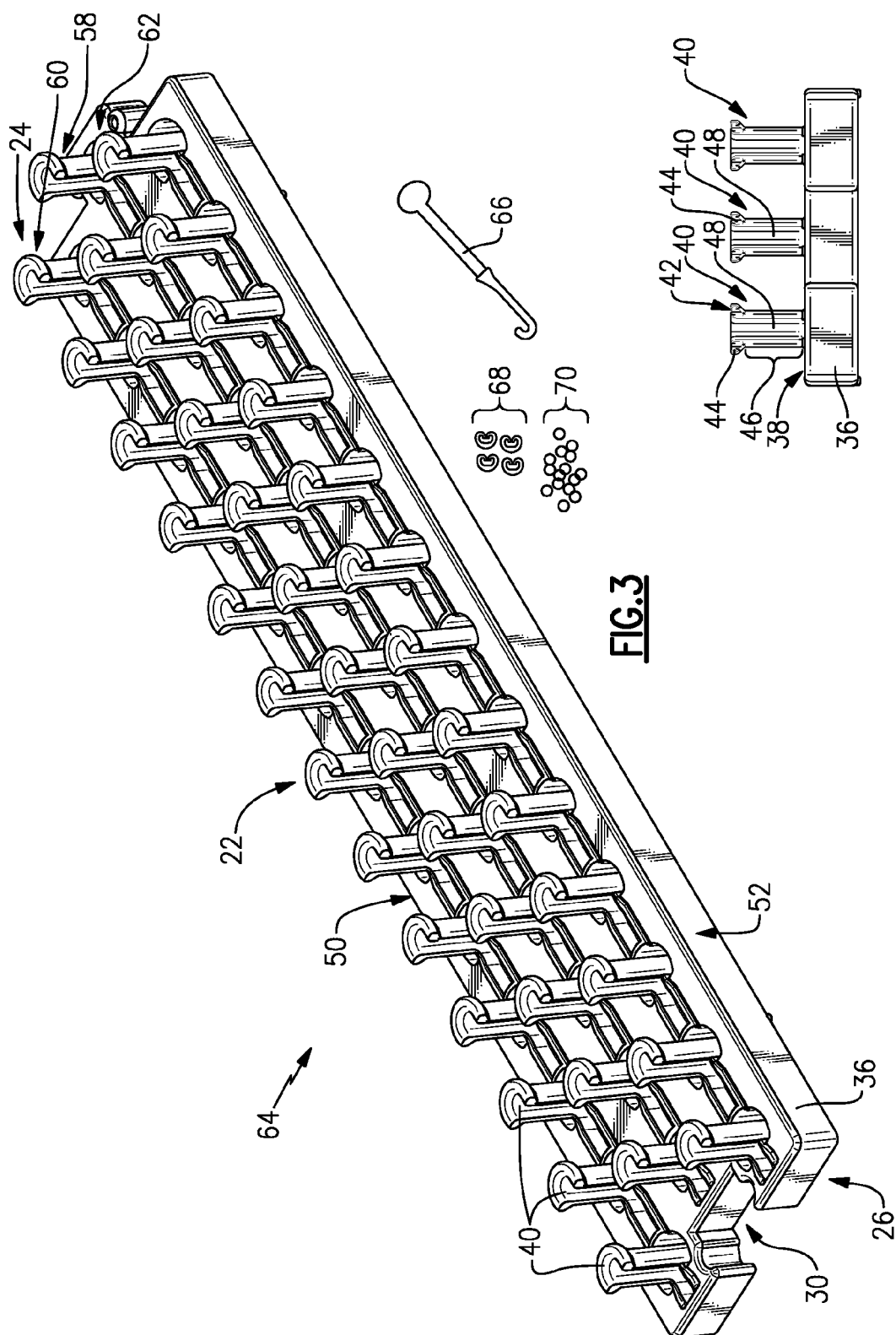
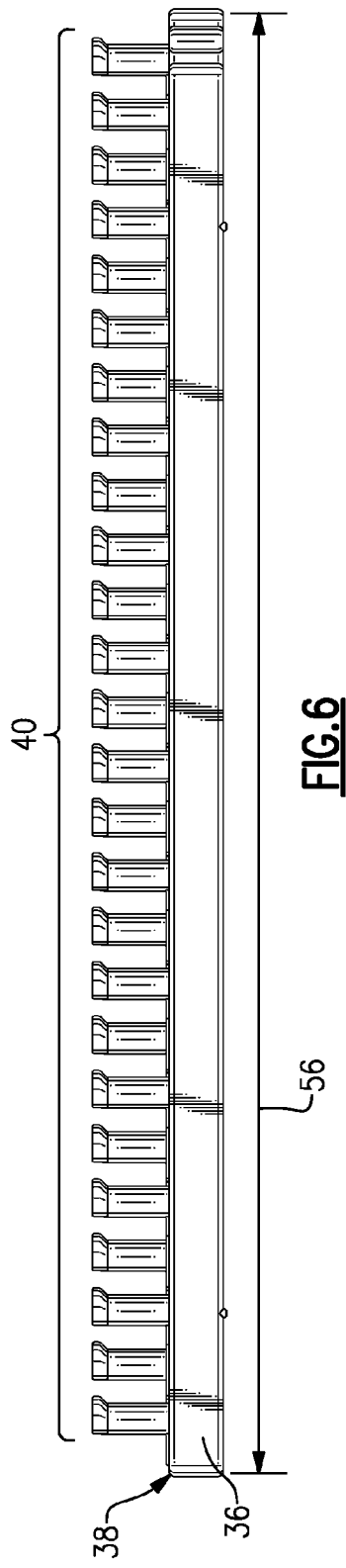
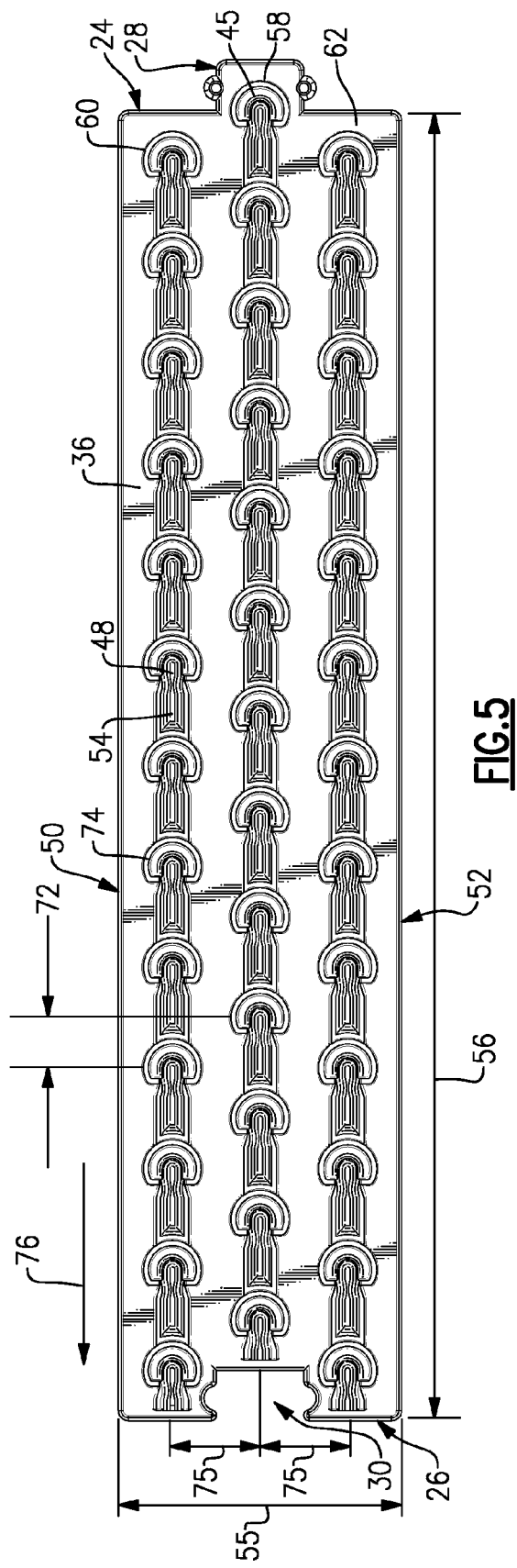


FIG. 2





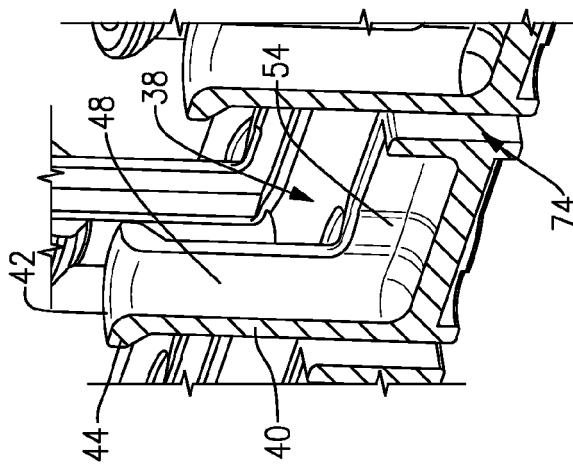


FIG. 7

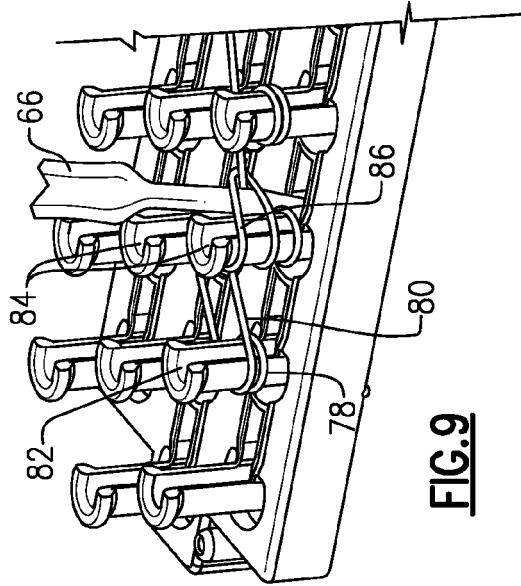


FIG. 9

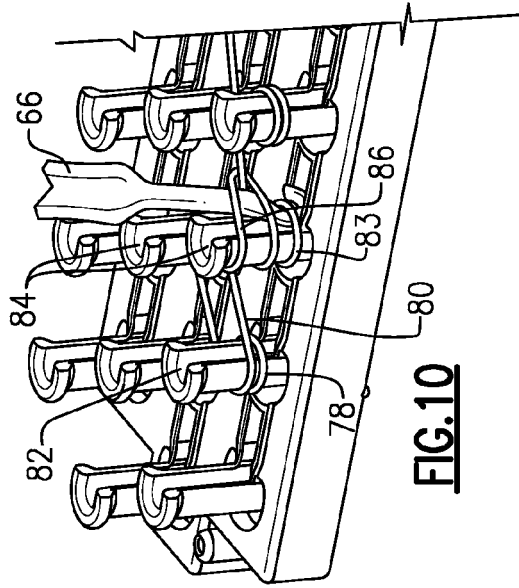


FIG. 10

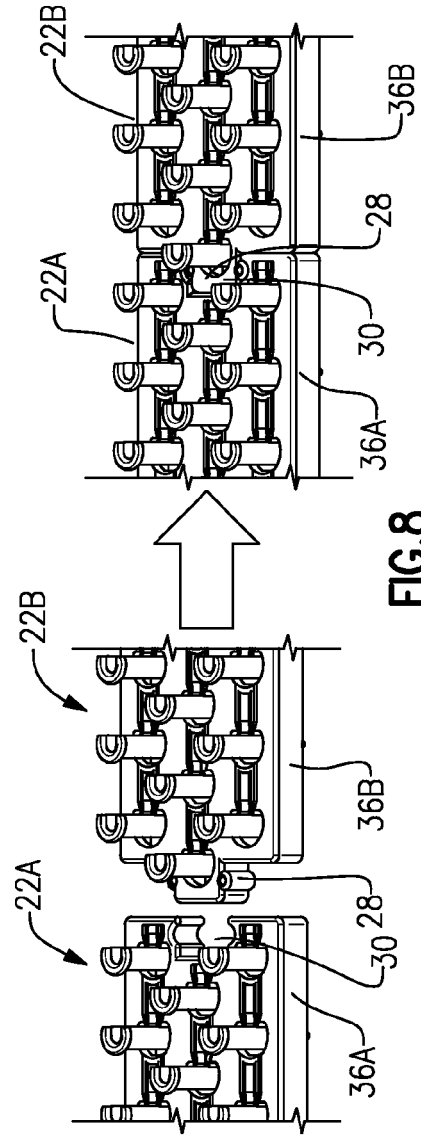


FIG. 8



EUROPEAN SEARCH REPORT

Application Number
EP 14 18 4490

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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