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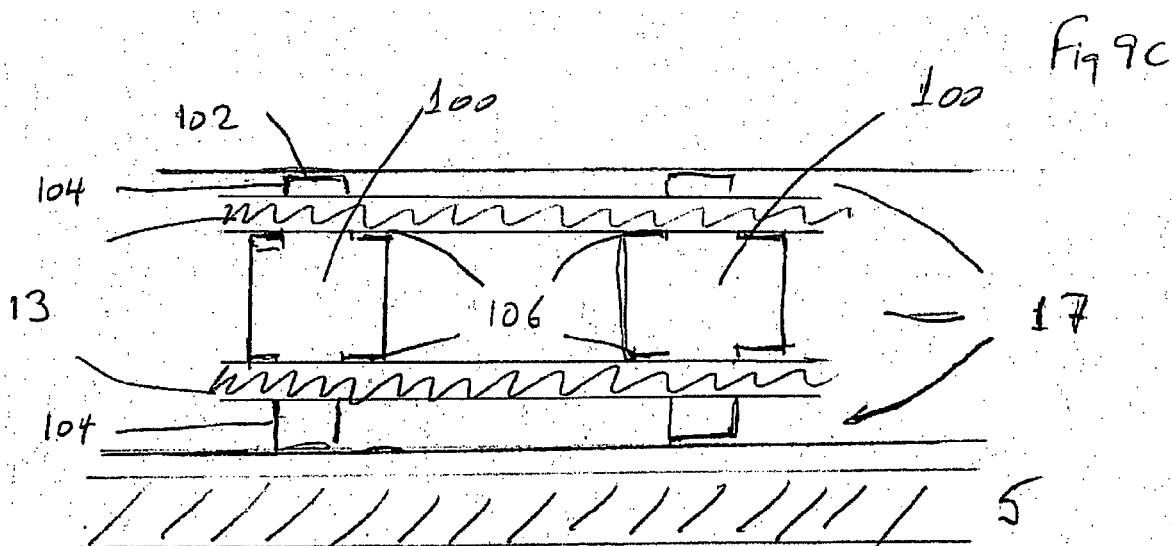
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(54) **A FLOOR SCREED REINFORCEMENT A METHOD OF USING SUCH REINFORCEMENT TO PRODUCE A SCREEDED FLOOR**

(57) A floor screed reinforcement means for use in a non-structural floor, the reinforcement means comprising at least two reinforcing meshes each having a grid like pattern, at least one spacing means engaging with the reinforcing meshes for spacing apart the reinforcing meshes, the spacing means further extending from the

reinforcing meshes to space, In use, a lower reinforcing mesh above a base on which the floor screed material will be laid, and further extending above an upper reinforcing mesh and providing indicator means which is at least covered by the floor screed material.



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Description

[0001] This invention relates to a floor screed reinforcement a method of using such reinforcement to produce a screened floor.

[0002] Screeding is one of a number of floor finishes used at the present time for finishing floors, particularly of new buildings. All buildings generally have a structural floor, for example, reinforced concrete, covered by some form of thermal and/or acoustic insulation. These are then covered by a floor finish. Such finishes include 18 or 22 mm chipboard, 12 to 30 mm calcium sulphate board or various screeds. Possible screeds are at least 65 mm thick sand/cement and at least 35 mm thick anhydrite.

[0003] Current screeding methods have many problems: Considerable amounts of screeding materials are required to provide the necessary strength. The materials need to be transported to site and sometimes need to be pumped or lifted up many storeys. The weight imposed by a thick heavy screed on the structural floor means the supporting structure needs to be designed to withstand the high loads imposed. Large quantities of water are required to make the screed which will often take many weeks to evaporate, slowing down the build process.

[0004] The present invention seeks to overcome the disadvantages of existing screeds by providing reinforcement to the screed so that the thickness of the screed can be reduced without reducing the screed strength. The reduced floor depths and imposed loads allows the structural elements to be engineered accordingly. In addition, the reduction of amount of screeding materials required provides transport savings and reduces the amount of water needed, speeding up the drying process and overall build time.

[0005] It is known to provide a floor screed reinforcement comprising a reinforcing mesh intended for location below the surface of the screed and spacing means on one side of the reinforcing mesh and adapted to space the reinforcing mesh from a floor surface to which the screed is to be applied.

[0006] The reinforcement also comprises a base sheet on which the screed can sit, the spacing means being located between the base sheet and the reinforcing mesh to maintain the reinforcing mesh spaced from the base sheet.

[0007] According to a first aspect of the present invention, there is provided a floor screed reinforcement means for use in a non-structural floor, the reinforcement means comprising at least two reinforcing meshes each having a grid like pattern, at least one spacing means engaging with the reinforcing meshes for spacing apart the reinforcing meshes, the spacing means further extending from the reinforcing meshes to space, in use, a lower reinforcing mesh above a base on which the floor screed material will be laid, and further extending above an upper reinforcing mesh and providing indicator means which is at least covered by the floor screed material.

[0008] Preferably, the spacing means may comprise a

body having a longitudinal axis and a length L, the body having end faces at its ends.

[0009] Preferably, the spacing means has a collar at or near each of its end faces for engaging with the grid pattern of the reinforcement meshes.

[0010] In an alternative embodiment a three dimensional spacer mesh filling the area between the floor surface or the base sheet and the reinforcing mesh. Alternatively, the spacing means may comprise a corrugated mesh with a "U" or "V"-shaped profile filling the area between the floor surface or the base sheet and the reinforcing mesh.

[0011] The spacing means may instead comprise a loop stitch supporting arrangement located in the area between the floor surface or the base sheet and the reinforcing mesh. The base sheet may comprise a base reinforcing mesh.

[0012] Alternatively the base sheet may be substantially impermeable to moisture and may comprise a plastics material. In this case, the spacing means may comprise spacer support modules attached to the base sheet and extending upwards therefrom to the reinforcing mesh.

[0013] The spacer support modules may be molded onto the base sheet and the reinforcing mesh may be attached to the upper surface of the spacer support modules.

[0014] The various parts of the floor screen reinforcement may be secured together to form a floor screed reinforcement sheet.

[0015] Preferably, the spacing means has a collar at or near each of its end faces for engaging with the grid pattern of the reinforcement meshes.

[0016] Preferably, the collar is in a plane substantially perpendicular to the longitudinal axis of the spacing means.

[0017] Preferably, the body of the spacing means has at or near its end faces a shoulder portion, a neck portion extending along the longitudinal axis and away from the shoulder towards an end face, the neck portion engaging with holes in the grid pattern of the reinforcement meshes.

[0018] Preferably, the spacing means has a raised portion on at least one of its end faces, which in use, is covered by screed material.

[0019] Preferably, at least a part of the body portion of the spacing means extending along the longitudinal axis has a concave section.

[0020] Preferably, the spacing means has a longitudinal axis with a length of between 10 and 40 mm.

[0021] Preferably, the spacing means spaces the reinforcing mesh between 0.5 and 5 mm from the base on which the floor will be laid.

[0022] Preferably, in use, the spacing means has an upper end surface between 1 and 20 mm above an upper reinforcing mesh.

[0023] According to another aspect of the present invention, there is provided a method of making a rein-

forced floor screed using a reinforcement means comprising at least two reinforcement mesh layers held in spaced apart relationship by a spacing means, the spacing means further extending from the reinforcing meshes to space, in use, a lower reinforcing mesh above a base on which the floor screed material will be laid, and further extending above an upper reinforcing mesh and providing indicator means which is at least covered by the floor screed material, the method including the steps of placing a reinforcement means on a base to be covered by floor screed material, pouring a free flowing screed material over the floor in sufficient quantity to flow under the lower reinforcing mesh and also to cover an upper mesh and cover the indicator means above the upper mesh.

[0024] Preferably, the screed comprises an anhydrite screed.

[0025] Preferably the method includes a screed having a thickness of between 10 and 40 mm and the reinforcing mesh is between 1 and 20 mm beneath the surfaces of the screed material.

[0026] The invention will now be described in greater detail, by way of example, with reference to the drawings, In which:-

Figure 1 is a schematic sectional view of a layered floor with a screeding method using the present invention;

Figure 2A is a sectional view of a floor finish in accordance with a first embodiment of the invention in which the spacing means is a three dimensional spacer mesh;

Figure 2B is a sectional view similar to figure 2A but additionally having a base sheet of mesh form;

Figure 2C is a sectional view similar to figure 2B wherein the base mesh sheet is replaced by a substantially moisture impermeable sheet;

Figure 3 is a plan view of the reinforcing mesh;

Figure 4A is a sectional view similar to figure 2A, wherein the three dimensional spacer mesh is replaced by a corrugated mesh with a "U" profile;

Figure 4B is a sectional view similar to figure 2B, wherein the three dimensional spacer mesh is replaced by a corrugated mesh with a "U" profile;

Figure 4C is a sectional view similar to figure 2C, wherein the three dimensional spacer mesh is replaced by a corrugated mesh with a "U" profile;

Figure 5A is a sectional view similar to figure 2A, wherein the three dimensional spacer mesh is replaced by a corrugated mesh with a "V" profile;

Figure 5B is a sectional view similar to figure 2B, wherein the three dimensional spacer mesh is replaced by a corrugated mesh with a "V" profile;

Figure 5C is a sectional view similar to figure 2C wherein the three dimensional spacer mesh is replaced by a corrugated mesh with a "V" profile;

Figure 6A is a sectional views similar to figure 2A, wherein the three dimensional spacer mesh is replaced by a loop stitch;

Figure 6B is a sectional view similar to figure 2B, wherein the three dimensional spacer mesh is replaced by a loop stitch;

Figure 6C is a sectional view similar to figure 2C, wherein the three dimensional spacer mesh is replaced by a loop stitch;

Figure 7 is a sectional view similar to figure 2C, wherein the three dimensional spacer mesh is replaced by upstanding modules moulded on the base sheet;

Figure 8 is a plan view showing the layout of the modules on the base sheet;

Figures 9A, 9B and 9C show sectional views of alternative forms of spacing means engaged with the reinforcement meshes; and

Figures 10A to 10D show sections of examples of spacing means that can be employed in the present invention.

[0027] Referring now to Figure 1 of the drawings, there is shown in section the layer construction of a floor In which the present invention can be used. Thus, to this end, the floor structure 1 comprises the basic structural floor3 which provides the support for the floor finishes and is a standard part of any building structure. Overlaid over this there will usually be some form of insulating layer 5 such as thermal and/or acoustic Insulation and on top of this can be laid a screed 7. In accordance with this invention the screed is formed from a free flowing screed material which is applied over a reinforcement mesh as will be described hereafter. Preferably an anhydrite screed is used but the invention can also be used with other screeds such as sand/cement.

[0028] In general terms, the Invention provides a reinforcement of the screed which will provide sufficient additional strength to enable a much thinner layer of screed to be used while maintaining the necessary strength. Figure 2A shows one aspect of the invention and is a sectional view of the floor starting with the insulating layer 5 on which the screed layer 7 is supported.

[0029] Thus, as can be seen, the floor screed reinforce-

ment 11 comprises a reinforcing mesh 13 which in use, as shown, is located below the surface 15 of the screed 17 and spacing means 19 is located on one side of the reinforcing mesh 13 and is arranged to space the reinforcing mesh 13 from the surface 21 of the insulating layer 5 to which the screed 17 is to be applied. The spacing means 19 in figure 2A comprises a layer of three dimensional mesh which fills in the volume between the reinforcement mesh 13 and the surface 21 of the insulating layer 5 and thus spaces the reinforcement mesh from the surface 21. As can also be seen, the three dimensional mesh is composed of relatively thin strands leaving significant spaces for the free flowing screed to occupy once it has been poured as indicated by the arrows 23.

[0030] With this arrangement, a screed 17 of between 10 and 30 mm in thickness can be used with the reinforcing mesh 13 maintained of the order of 5 mm beneath the screed surface as measured in the middle of the screeded area. Thus the thickness of the three dimensional spacing mesh will be of the order of 5 to 25 mm. This mesh can be made from a suitable plastics material, a suitable metal or glass fibre.

[0031] Suitable reinforcement mesh can be seen from figure 3. Here a plastics moulded mesh 31 is provided having square apertures 33 through which the screed can pass. Suitable plastics material includes Polyester (PET) Polypropylene (PP), and Polytetrafluoroethylene (PTFE). Other materials which can be used include metals such as stainless or galvanised steel and glass fibre. The thickness of the mesh sheet would be of the order of 1 to 2 mm. While the design of reinforcing mesh shown is considered the most suitable, other designs of mesh could be used using differently shaped apertures such as rectangular, circular, diamond shape etc. The reinforcement mesh 13 can be stuck to the top of the three dimensional spacing mesh 19 so that the whole provides a reinforcing sheet.

[0032] Figure 2B is a view similar to figure 2A but is varied by the inclusion of a second or base reinforcing mesh 35, suitably of the same design as the upper reinforcing mesh 13. This mesh forms a base for the screed 17 and as with the first reinforcing mesh 13, can be stuck to the underside of the three dimensional spacing mesh 19 so that the whole comprises a reinforcing sheet.

[0033] Figure 2C is a view similar to figure 2A or 2B but is varied by the replacement of the second reinforcing mesh 35 with a moulded plastics sheet 37. This sheet is suitably generally impervious to moisture and will act as a moisture barrier and provides a secondary reinforcement facing with tensile strength.

[0034] Figure 4A is a view similar to figure 2A but is varied by the replacement of the three dimensional spacing mesh with a corrugated mesh 39 with a "U"-shaped profile. This mesh may be the same as in the reinforcing mesh but suitably formed into corrugations. The reinforcing mesh 13 sits on and is stuck to the upper part of the corrugations while the lower part of the corrugations sit

on the surface 21 of the insulating layer 5.

[0035] Figure 4B is a view similar to figure 4A but is varied by the inclusion of a second or base reinforcing mesh 35, suitably of the same design as the upper reinforcing mesh 13. This mesh forms a base for the screed 17 and as with the first reinforcing mesh 13, can be stuck to the underside of the corrugated spacing mesh 39 so that the whole comprises a reinforcing sheet.

[0036] Figure 4C is a view similar to figure 4A or 4B but is varied by the replacement of the second reinforcing mesh 35 with a moulded plastics sheet 37. This sheet is suitably generally impervious to moisture and will act as a moisture barrier and provides a secondary reinforcement facing with tensile strength.

[0037] Figure 5A is a view similar to figure 4A but is varied by the replacement of the corrugated mesh 39 with a "U"-shaped profile with a corrugated mesh with a "V"-shaped profile 41. This mesh may be the same as in the reinforcing mesh but suitably formed into corrugations. The reinforcing mesh 13 sits on and is stuck to the upper part of the corrugations while the lower part of the corrugations sit on the surface 21 of the insulating layer 5.

[0038] Figure 5B is a view similar to figure 5A but is varied by the inclusion of a second or base reinforcing mesh 35, suitably of the same design as the upper reinforcing mesh 13. This mesh forms a base for the screed 17 and as with the first reinforcing mesh 13, can be stuck to the underside of the corrugated spacing mesh 41 so that the whole comprises a reinforcing sheet.

[0039] Figure 5C is a view similar to figure 5A or 5B but is varied by the replacement of the second reinforcing mesh 35 with a moulded plastics sheet 37. This sheet is suitably generally impervious to moisture and will act as a moisture barrier and provides a secondary reinforcement facing with tensile strength.

[0040] Figure 6A is a view similar to figure 5A but is varied by the replacement of the corrugated mesh with a "V"-shaped profile 41 with a loop stitch supporting arrangement 43. Loop stitch is a method in which the layer 13 is woven so as to provide spacing loops so as to space the layer 13, located 10 to 20 mm from the surface 21 of the insulating layer 5.

[0041] Figure 6B is a view similar to figure 6A but is varied by the inclusion of a second or base reinforcing mesh 35, suitably of the same design as the upper reinforcing mesh 13. This mesh forms a base for the screed 17. The two meshes 13 and 35 are woven together, leaving a 10 to 20 mm gap between each mesh so that the whole comprises a reinforcing sheet.

[0042] Figure 6C is a view similar to figure 6A or 6B but is varied by the replacement of the second reinforcing mesh 35 with a moulded plastics sheet 37. This sheet is attached to the spacing loops of the woven mesh 13. The sheet 37 is suitably generally impervious to moisture and will act as a moisture barrier and provides a secondary reinforcement facing with tensile strength.

[0043] Figure 7 is a view similar to figure 2C but in this embodiment, the spacing means comprises a plurality of

modules 47 which are hollow and are moulded on the base sheet 37 (alternatively modules could be solid and be either bonded to or be part of a moulded base sheet). The reinforcing mesh 13 is attached to the upper surfaces 49 of the modules 37. A plan view of the arrangement of the modules 47 is shown in Figure 8. Suitably the modules 47 are hexagonal (other module shapes could be used, such as round, star or square shaped) having a width in the range of 3 to 25 mm, preferably 5 to 10 mm. In one particular example, the modules had a width of 8 mm.

[0044] Figure 8 is a plan view showing the layout of the modules on the base sheet. As can be seen, the modules are spaced apart in a regular array. In this instance, the section of the spacing modules is hexagonal, chosen to enable the modules to engage easily with the reinforcement mesh.

[0045] Figure 9a shows another alternative embodiment. In this figure, only for simplicity of illustration, the insulating layer 5 is not covered by a waterproof film, although the skilled reader would normally expect it to be present. The reinforcing meshes 13 are held in spaced apart relationship by the spacing means 90. In this construction, the spacing means has a body with waisted section, or alternatively described as inwardly curved section like an hourglass. As can be seen, the screed material 17 once poured has flowed all around the reinforcing meshes and the spacing means to completely cover them.

[0046] In an alternative arrangement of Figure 9b, the insulating layer 5 is covered by a waterproof layer 91. This could be a thin film or substantial waterproof sheet, typically made of plastics materials. The spacing means 92 is shown holding the reinforcement meshes 13 spaced from each other and also from top and bottom surfaces of the screed material 17. This arrangement has the advantage that there are two reinforcement meshes, held close to the top and bottom parts respectively of the screed to provide reinforcement near the surfaces and so enable a thinner layer of screed to be applied over the upper surface of the mesh in order to cover it. Clearly, thinner screed layers are advantageous because they require less screed material, less water, will dry more quickly and so enable the construction process to be completed more quickly and cheaply. The spacing modules can be conveniently and advantageously a cylindrical shape. They can be provided with annular collars to enable them to engage with the reinforcing mesh. In Figure 9a, the spacing means 92 is a cylindrical body made from a plastics material. It is provided with two annular collars arranged to be substantially perpendicular to the longitudinal axis of the spacing means which engage with the reinforcing mesh.

[0047] Figure 9c shows a further alternative embodiment. In this example, the spacing body has a cross sectional dimension (or diameter) which is constant for much of the body length, but with a reduced section near the ends of the spacing means. This reduced section pro-

vides a shoulder portion and a neck portion extending along the longitudinal axis of the spacing means. The neck portion is sized such that it can pass through spaces or holes in the grid pattern of the reinforcing mesh and so engage and hold the two reinforcing mesh elements in spaced apart relationship. The spacing means may then be welded, glued or otherwise secured to the reinforcing meshes.

[0048] Figures 10A, 10B, 10C and 10D show alternative designs for the spacing body 90. In Figure 10A it is provided with a waisted section 93. The spacing body is provided with top and bottom surfaces 94 and 96 respectively. Preferably the bottom surface 96 is flat and provides a stable base which can be placed on a floor base to support the reinforcing meshes. The top surface 94 is shown as a flat surface in this embodiment but can also be of any other convenient shape. The body 90 is also provided with angular collars 98 which engage with the reinforcing meshes to locate the components and hold them in a predetermined spatial relationship. The spacing means shown in figure 10A is substantially symmetrical. A particular advantage of a symmetrically shaped spacing means is that the orientation is not important in the assembly of the sheets of reinforcing mesh material and additionally, the reinforcing sheets do not need to have top or bottom surfaces, which is more convenient when on the construction site. The top surface 94 is used as a convenient guide to indicate how much screed material is needed to cover the upper reinforcing mesh so that it is completely covered.

[0049] Alternatively, as shown in figure 10B, the spacer 90 has a cylindrical body. The top surface could have a raised portion 94a in the form of a conical shape or rounded nipple like shape with the tip of the raised portion or nipple indicating the level of the screed material required to cover the reinforcing mesh and hold it within the screed at the desired distance beneath the surface.

[0050] In Figure 10C, there is an alternative cylindrical section spacing body, with the annular collars 98. Alternative shapes for the body can easily be envisaged and could include barrel shapes, or bodies having square or rectangular shapes, or other convenient polygons, such as hexagons.

[0051] In another alternative embodiment, shown in Figure 10D, the spacing body corresponds to the arrangement shown in Figure 9C. In this example, the body 90 is only provided with two sets of shoulders 106, from which extends a neck portion 104. In such an arrangement, the neck portion extends through the holes in the reinforcement mesh and may be glued, welded or otherwise secured in place. The length of the neck is designed so that the neck extends beyond the mesh to provide the desired spacing of the mesh from either the floor base or the top surface of the screed.

[0052] The spacing bodies 90 can be distributed across the reinforcement meshes and be placed in the range of 25 to 300 mm apart, preferably 100 to 200 mm apart. In one particular example, the spacing bodies are

spaced about 50 mm apart.

[0053] Preferably the spacing bodies are clipped or fitted into the meshes by elastic distortion of the grid. Alternatively, they could be glued or welded in place.

[0054] In practice, the various parts of the floor screen reinforcement are secured together to form a floor screed reinforcement sheet which can then be laid as a single sheet.

[0055] It will also be appreciated that the invention also includes a method of making a floor screed using one of the above described floor screen reinforcement sheet. The method comprises taking a floor screed reinforcement sheet, laying the floor screed reinforcement sheet on the surface to be screeded and pouring a free flowing screed thereover of an amount sufficient to locate the reinforcing mesh below the surface thereof. As will be appreciated, cross sections of the finished screed can be seen in the sectional views of figures 2, 4, 5, 6 and 7.

[0056] It will also be understood that additions to or modifications of the above described embodiments may be made without departing from the scope of the invention. For example, the spacing means described could be replaced with other spacers such as an expanded open cell plastics material or plastic spacing clips.

Claims

1. A floor screed reinforcement means for use in a non-structural floor, the reinforcement means comprising at least two reinforcing meshes each having a grid like pattern, at least one spacing means engaging with the reinforcing meshes for spacing apart the reinforcing meshes, the spacing means further extending from the reinforcing meshes to space, in use, a lower reinforcing mesh above a base on which the floor screed material will be laid, and further extending above an upper reinforcing mesh and providing indicator means which is at least covered by the floor screed material.
2. A floor screed reinforcement means according to claim 1 in which the reinforcing mesh has a regular grid pattern.
3. A floor screed reinforcement means according to either of claims 1 or 2 in which the reinforcing mesh is made from one or more of a glass fibre, plastics fibre or metal wire material.
4. A floor screed reinforcement means according to any preceding claim in which the fibres or wires comprising the reinforcement mesh are coated in a plastics material.
5. A floor screed reinforcement means according to any preceding claim in which the spacing means is a body having a longitudinal axis and a length L, the

body having end faces at its ends.

6. A floor screed reinforcement means according to any preceding claim in which the spacing means has a collar at or near each of its end faces for engaging with the grid pattern of the reinforcement meshes.
7. A floor screed reinforcement means according to claim 1, 5, 6 or 7 in which the collar is in a plane substantially perpendicular to the longitudinal axis of the spacing means.
8. A floor screed reinforcement means according to any of claims 1 to 5 in which the body of the spacing means has at or near its end faces one shoulder, a neck portion extending along the longitudinal axis and away from the shoulder towards the end face, the neck portion engaging with holes in the grid pattern of the reinforcement meshes.
9. A floor screed reinforcement means according to any preceding claim in which the spacing means has a raised portion on at least one of its end faces, which in use, is covered by screed material.
10. A floor screed reinforcement means according to any preceding claim in which at least a part of the body portion of the spacing means extending along the longitudinal axis has a concave section.
11. A floor screed reinforcement means according to any preceding claim in which the spacing means has a longitudinal axis with a length of between 10 mm and 40 mm.
12. A floor screed reinforcement means according to any preceding claim in which the spacing means spaces the reinforcing mesh between 0.5 mm and 5 mm from the base on which the floor will be laid.
13. A floor screed reinforcement means according to any preceding claim in which, in use, the spacing means has an upper end surface between 1 mm and 20 mm above the upper reinforcing mesh.
14. A method of making a reinforced floor screed using a reinforcement means comprising at least two reinforcement mesh layers held in spaced apart relationship by a spacing means, the spacing means further extending from the reinforcing meshes to space, in use, a lower reinforcing mesh above a base on which the floor screed material will be laid, and further extending above an upper reinforcing mesh and providing indicator means which is at least covered by the floor screed material; the method including the steps of placing a reinforcement means on a base to be covered by floor screed material, pouring a free flowing screed material over the floor in sufficient

quantity to flow under the lower reinforcing mesh and also to cover an upper mesh and cover the indicator means above the upper mesh.

15. A method of making a reinforced screed floor according to claim 9 or 10 wherein the screed comprises an anhydride screed. 5
16. A method according to any of claims 13 or 14 in which the screed has a thickness of between 10 mm and 40 mm and the reinforcing mesh is between 1 mm and 20 mm beneath the surfaces of the screed material. 10

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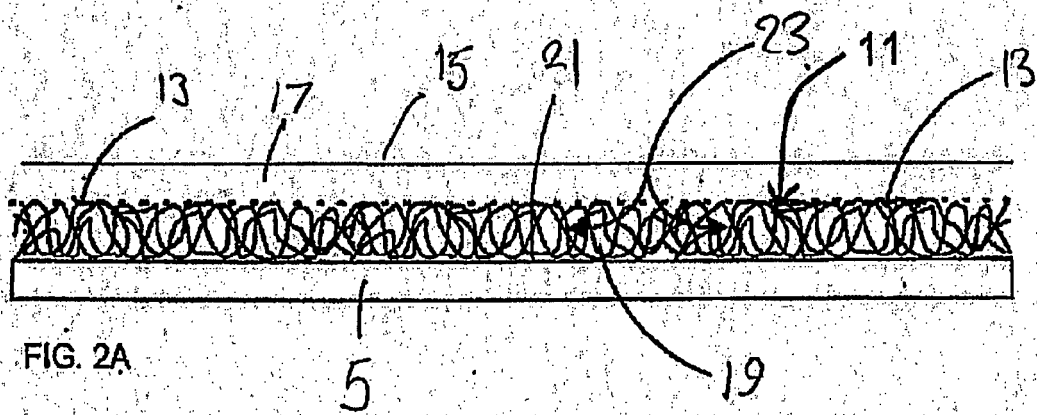
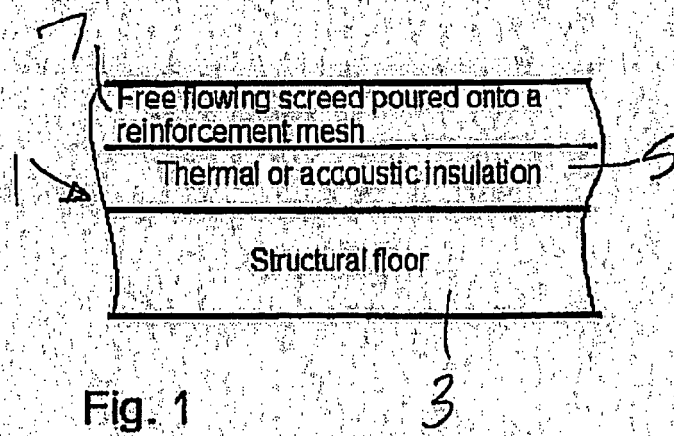


FIG. 2A

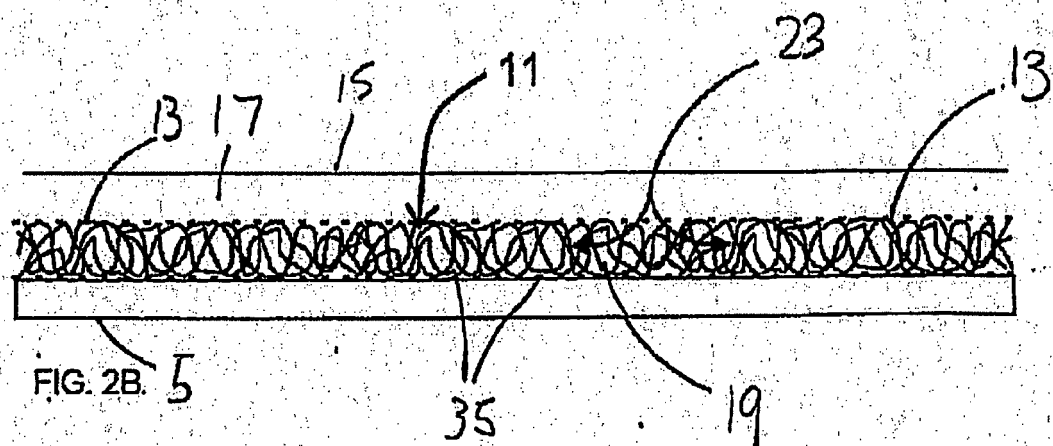


FIG. 2B

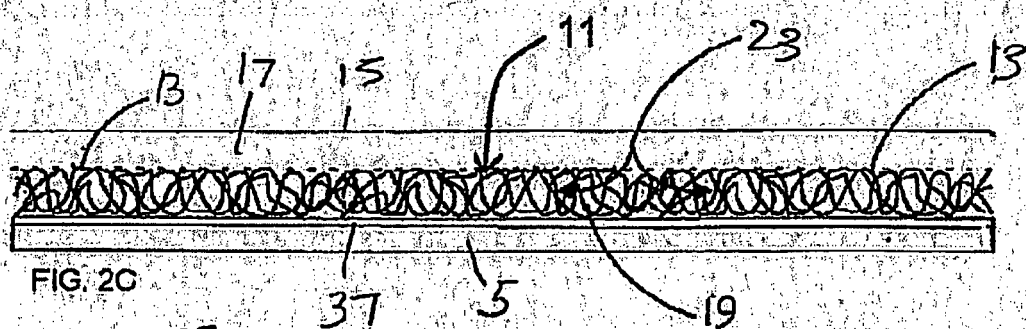


FIG. 2C

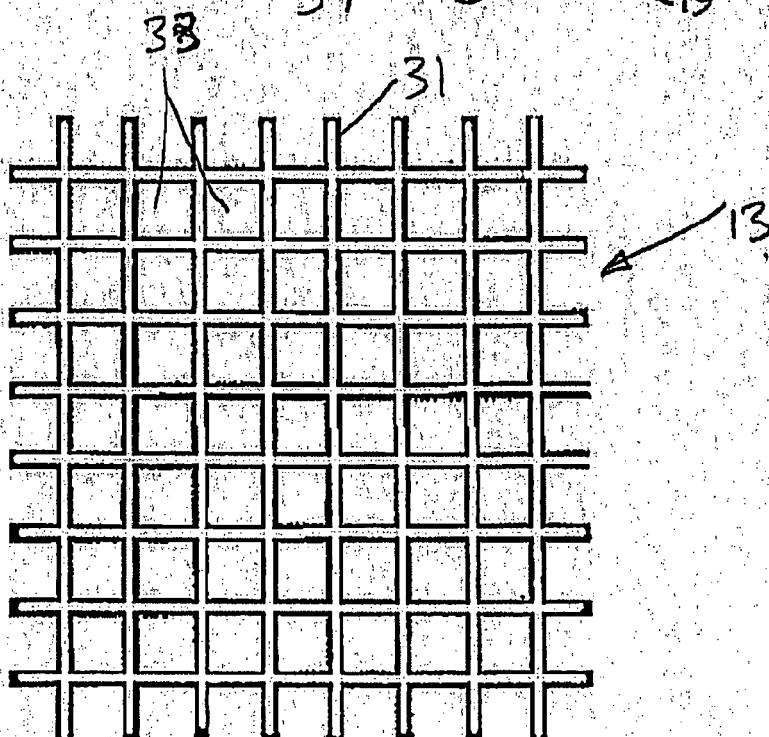


FIG. 3.

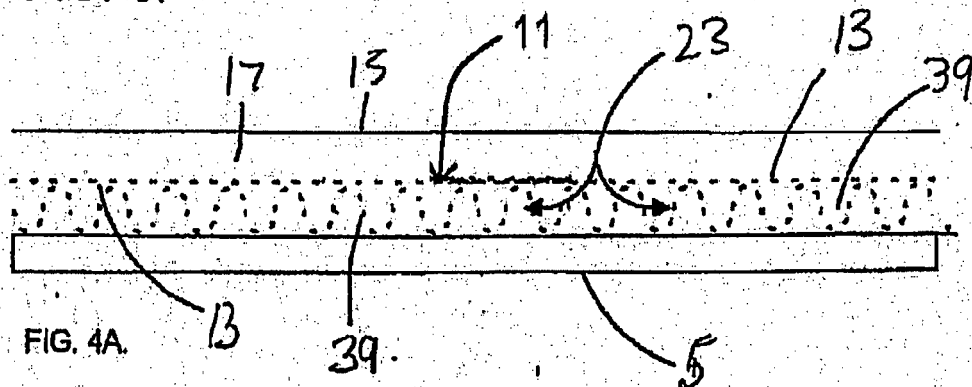
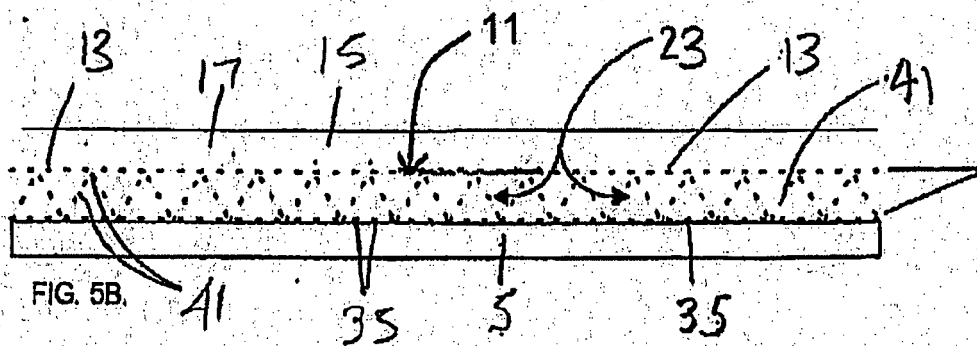
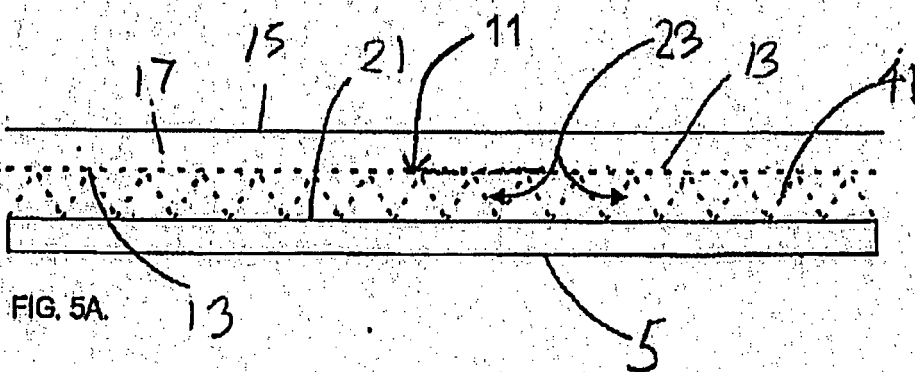
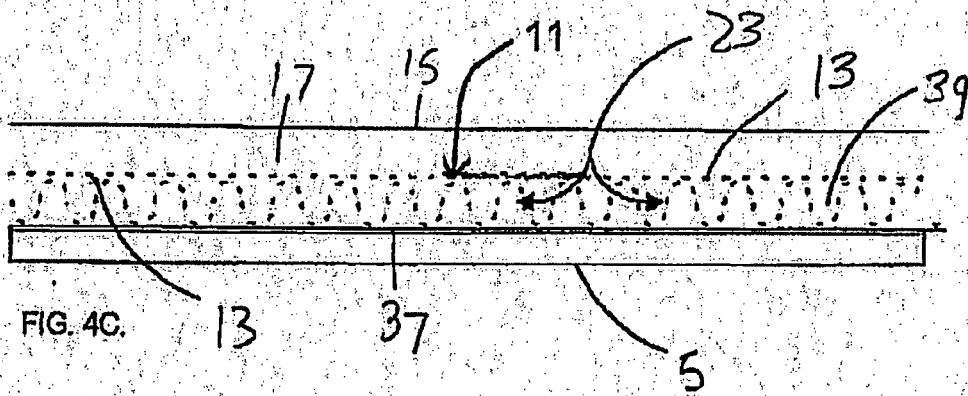
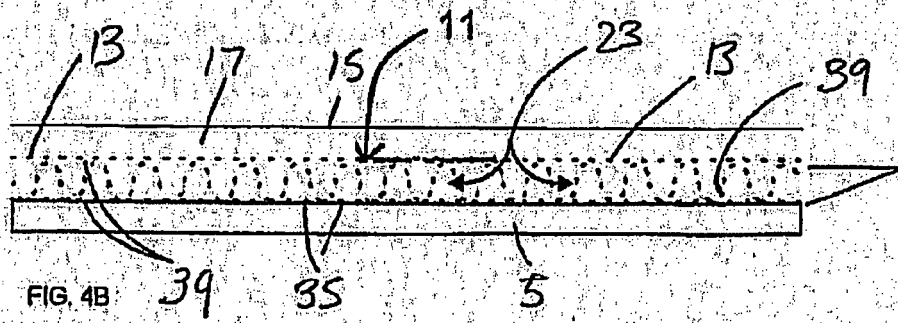
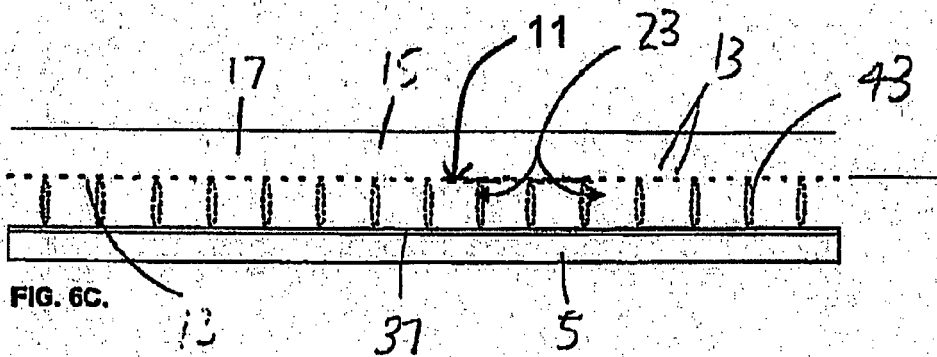
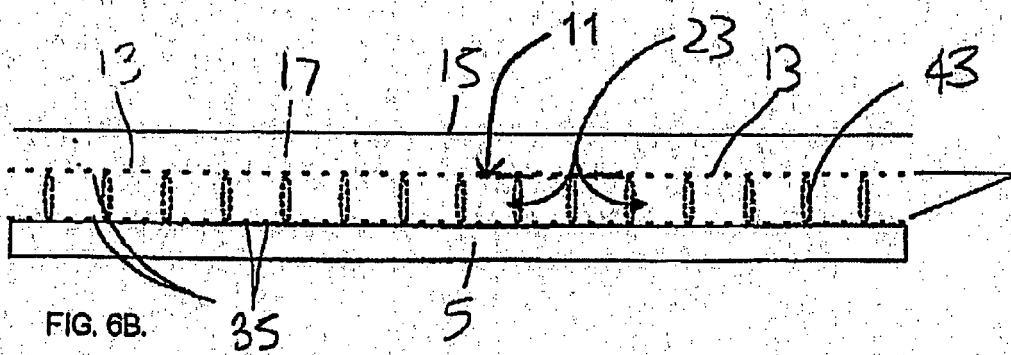
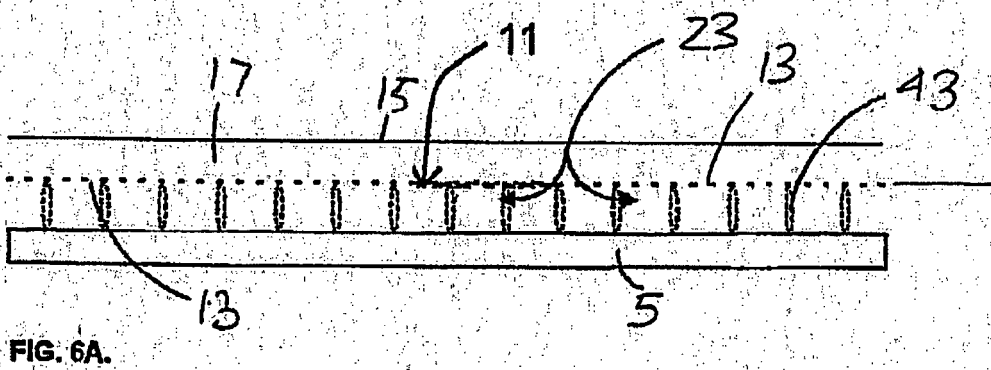
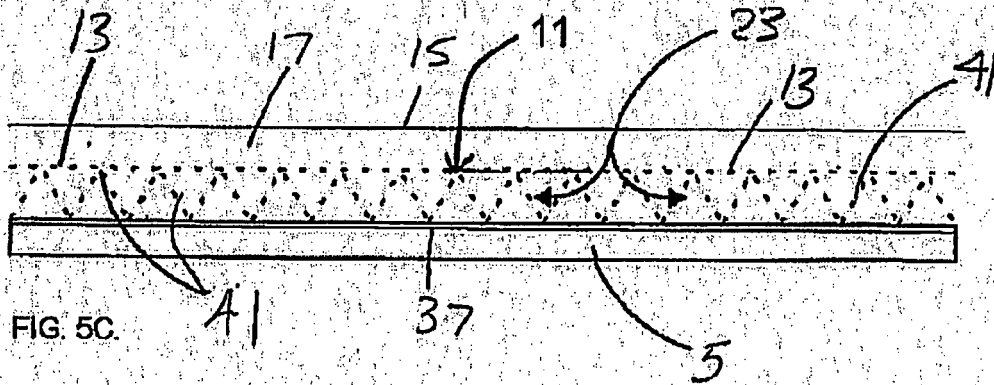
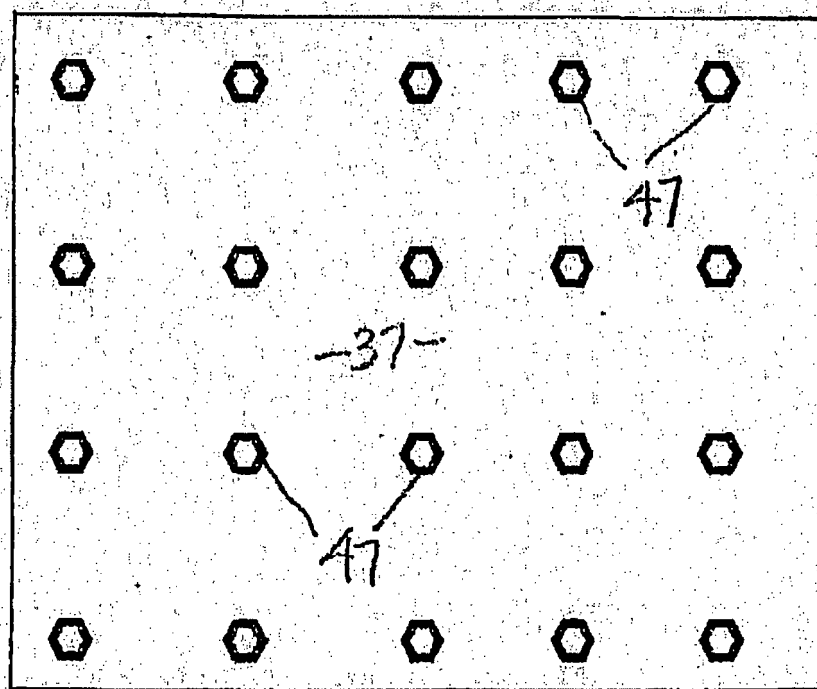
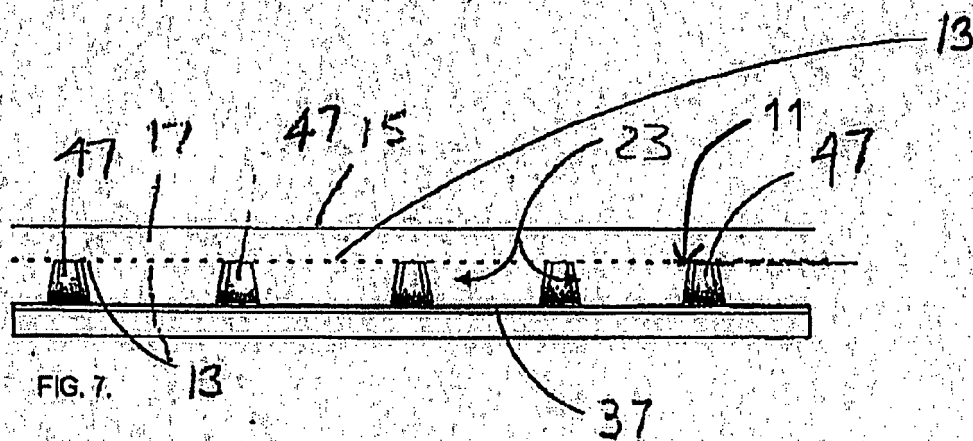


FIG. 4A.







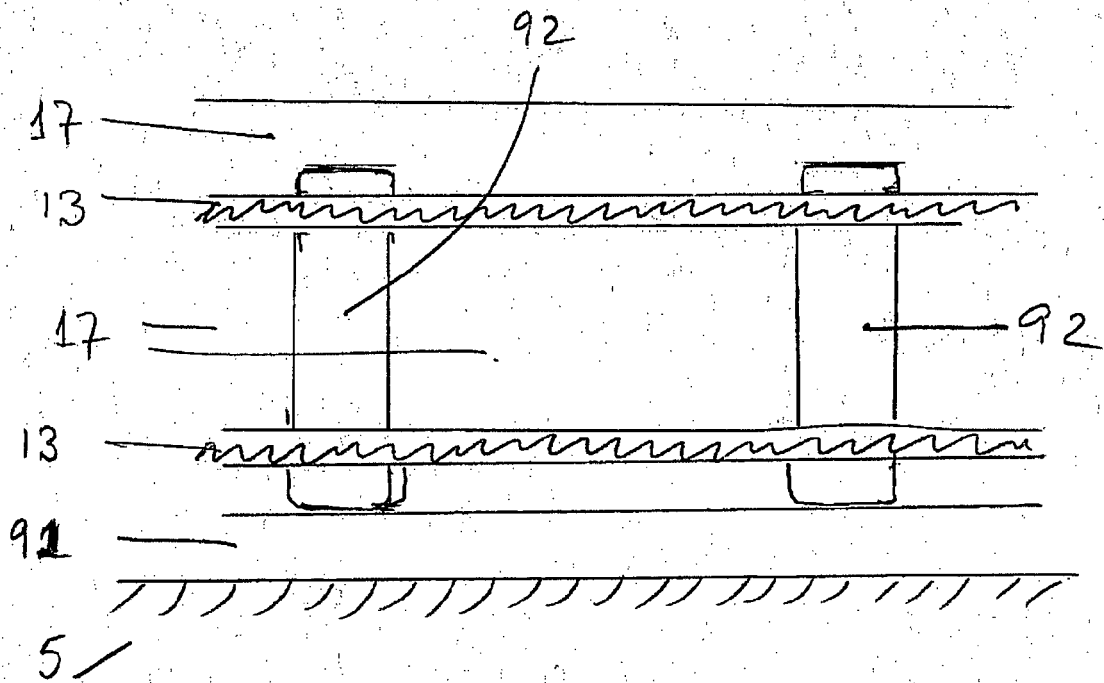
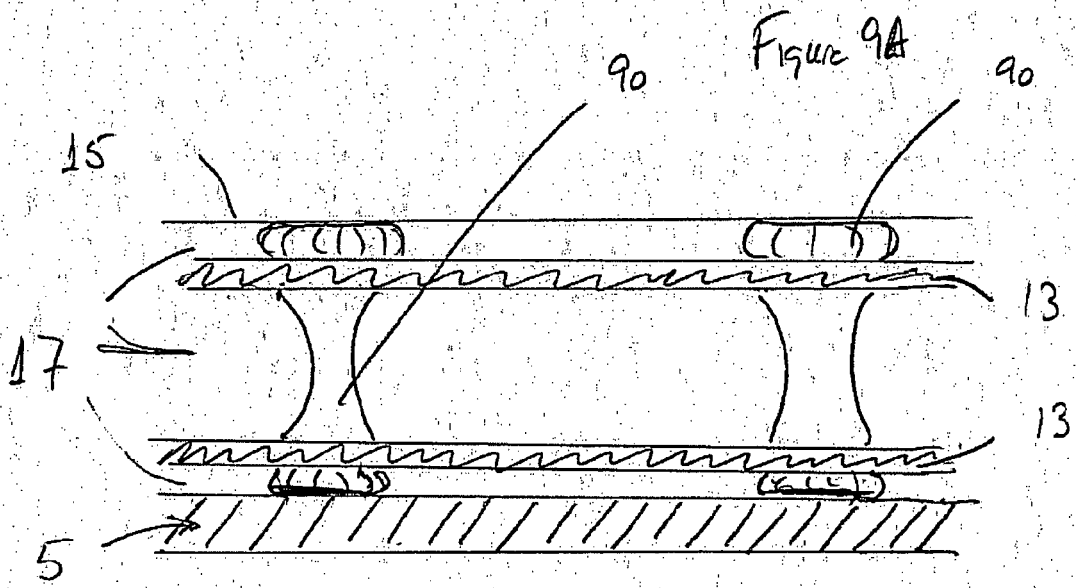


Figure 9B

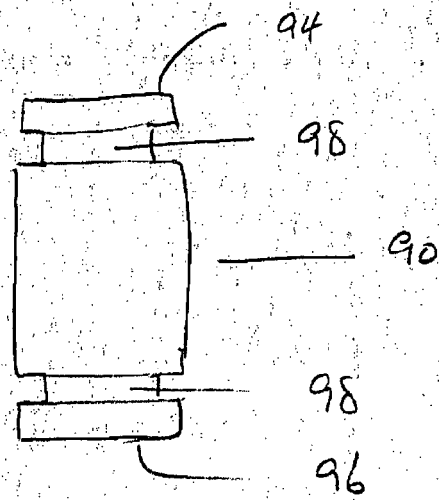


Fig 10c

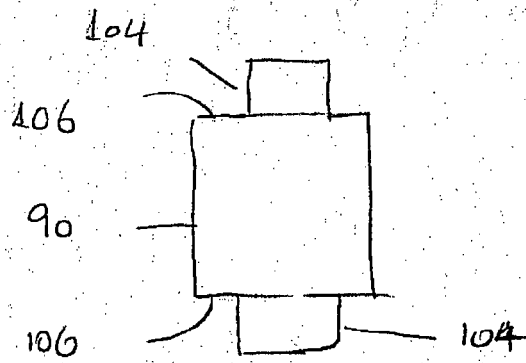


Fig 10d

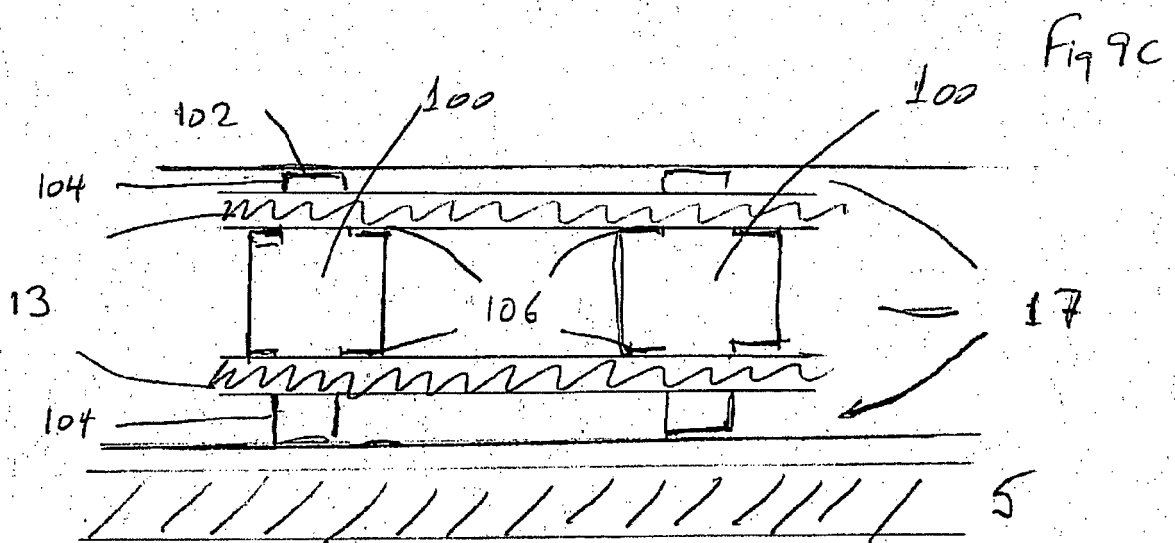


Fig 9c

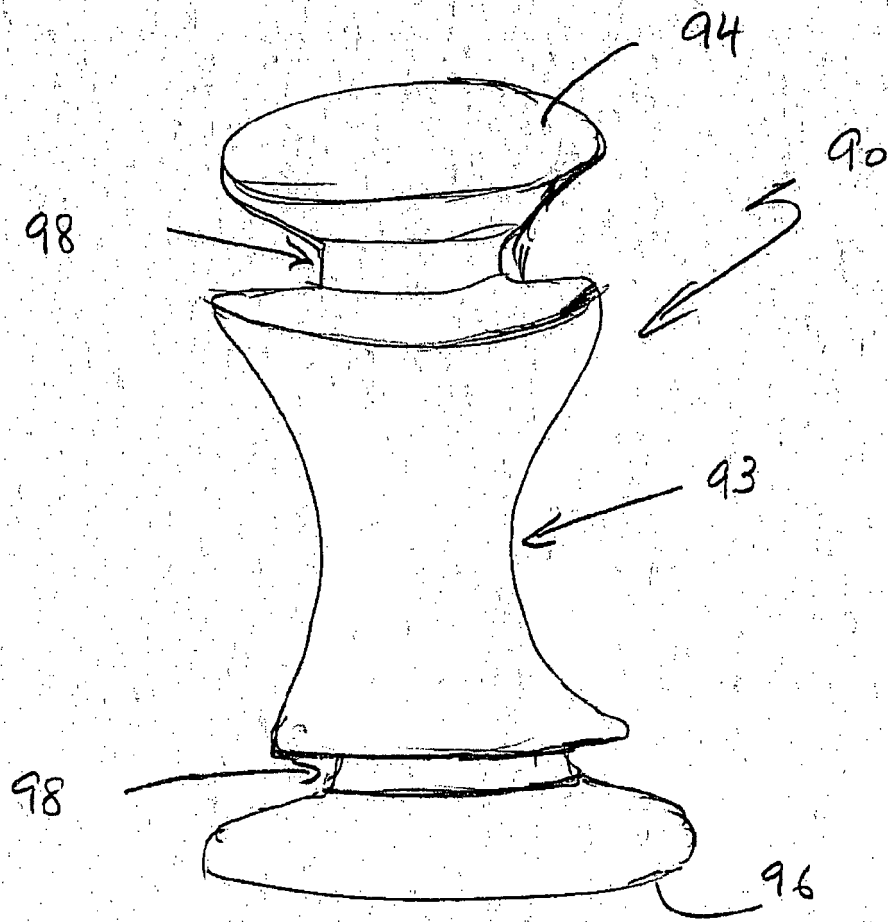


Fig 10A

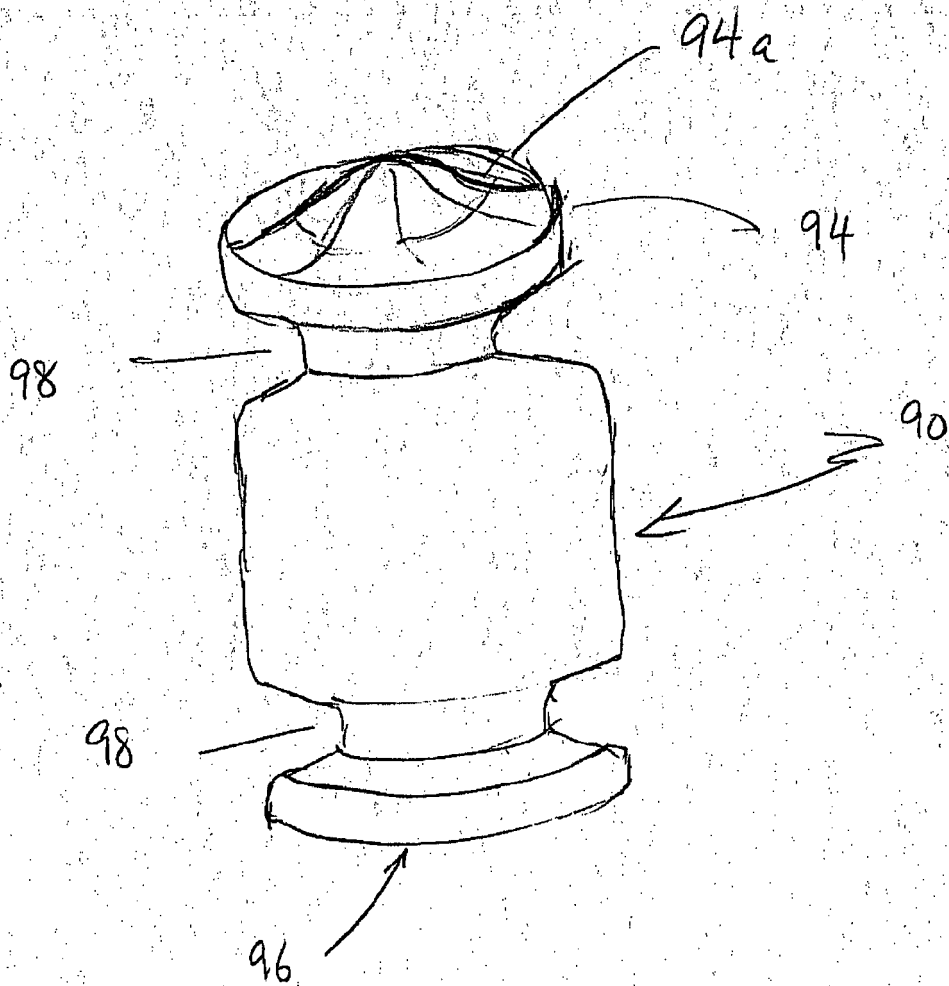


Fig 10B



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