A magnetic covering tile comprised of laminar materials covering surfaces such as floors, walls, ceilings, columns and furniture having a surface provided with a plate made of magnetic material for receiving the magnetic covering tile, wherein the magnetic tile comprises a top layer exposed to the users and a bottom magnetic layer affixed to the top layer, with an intermediate layer to provide structural stability to the tile.
LAMINAR MAGNETIC COVERING TILES

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention
[0002] The present invention relates to the field of the construction, architecture and decoration activities by use of devices, apparatuses and assemblies for covering, coating, lining, dressing and the like, any kind of surfaces such as ceilings, floors, walls, columns, counters, furniture, including swimming pools and, more particularly the invention refers to a covering system in the form of plates, rolls, tiles, either of regular or irregular shapes, which are capable of being adhered by magnetic force to the desired surface wherein the installation and removal thereof is an easy and quick task and wherein the coatings or coverings of the invention may be flexible or not and made of materials like leather, wood, plastics, ceramics, which are applied onto several surfaces and under conditions in outer or visible surfaces including under water surfaces.

[0003] 2. Description of the Prior Art
[0004] It is well known in the art the use of tiles for covering or coating or lining floors in houses, offices, apartments, or in any other places where individuals have to walk and stay with safety and comfort. Generally such tiles are manufactured from rigid materials like cement, ceramics, glass and even wood and generally has a square or rectangular shape in a manner to cover an entire surface in a continuous basis.

[0005] It is also known that these tiles are applied and affixed onto the desired surface by means of construction materials such as wet cements and adhesives for which purpose the surface must be clean and even to guarantee that, once the cement or adhesive is set, the tiles remain permanently affixed. Care must be taken to install the tiles correctly, particularly when a decorative pattern is pursued because if an error is detected later the already affixed tiles can not be removed except by destroying the same.

[0006] Similar situations are faced when covering or coating such “wet” rooms, such as bathrooms, toilets, laundry rooms and kitchens. These rooms are generally covered by ceramic tiles in the floor, walls and, including ceilings, some times with tiles of different colors or textures in order to form decorative patterns. This installation is even more difficult because the wet adhesives that are employed must set properly and quickly in order to prevent the weight of the several tiles causes the coating of a wall, for example, to fall down while the adhesive is not set yet. The use of coatings in walls also requires the use of wood strips, papers and fabric in rolls with repetitive patterns including resembling textures of other materials.

[0007] In all the above cases the coatings are based in installations by using adhesives guaranteeing a permanent fixation of the tiles in the floor, walls and the like. Any decorative pattern can not be modified except by removing the coating through destruction thereof.

[0008] Other “warm”, soft and flexible materials are more and more employed in coverings, particularly in in-door applications, even for improving acoustical and thermal insulations, and comfort. However, since these materials are not rigid the same are applied in a manner like the wall papers and carpets, however, this kind of installation does not allow to form decorative patterns like the tiles and to change easily the pattern of the decorative arrangement.

[0009] One attempt to install such kind of coverings in walls and floors is disclosed in US 2005/0276982 to Manchee, which discloses a covering comprised of a leather layer affixed, by an adhesive, to a flexible lamina with magnetic properties. These tiles require of a magnetic substrate, such as a metal plate placed onto the floor or affixed to the walls or ceiling to be coated, in order that the magnetic flexible lamina of the tile keeps the tile removably affixed to the plate and hence the surface under covering. However the tiles like the one of Manchee, made of flexible materials like leather, fails to comply with the needs of a coating as it will be explained below.

[0010] The leather lamina is adhered to the magnetic layer by an adhesive fixing both lamina and layer together. If the leather has not been treated to be impervious the adhesive migrates through the leather outside the tile resulting in spoiled visual surfaces of the tiles. Even when the leather is treated fluids coming from humidity in the surface under covering may pass through cracks and fissures in the adhesive layer and through the leather, affecting the adherence between the leather and the magnetic layer.

[0011] Direct union between the leather and the magnetic layer is subject to high shear forces from the individuals transit and movements of furniture and other elements over the covering. These forces even peal or remove the adhesive from the magnetic layer because both materials, namely the magnetic layer and the leather, have different and flat surfaces wherein the adhesive can fail in retaining both surfaces together. This peeling may be produced also under some conditions of high temperatures and humidity, etc.

[0012] As it is disclosed in Manchee the covering and/or tile has a finishing at the edges thereof wherein the leather, the magnetic layer and the adhesive terminates together in an open edge thus offering a side exposed to whether conditions, dust and the like. Once installed and after some time when the properties of the adhesive have decay, what is accelerated by the environment conditions, the edges of the upper layer or leather peels up and detaches from the magnetic layer. The appearance of the covering is markedly affected. The humidity increases and accelerates this peeling and detaching by expanding and or decreasing the volume of the leather. This effect is increased when recycled materials are employed. Thus, the contraction of the leather is capable of bending the magnetic layer and even detaching the tile from the ferromagnetic plate arranged onto the floor, wall or any corresponding surface.

[0013] These magnetic coverings are convenient as long as they are easily removable and re-installable however the people are somewhat reluctant to use these systems because the above mentioned drawbacks. The damage and impairment of the leather edges and adherence thereof onto the magnetic layer, particularly when the leather layer is directly adhered by adhesive to the magnetic layer, get worse and the tiles must be replaced. One of the several reasons is the break down and fissures in the adhesive layer due to the mentioned decay under natural conditions and aging of the product. While Manchee makes particular reference to the leather, these effects may appear in any material employed for the upper layer, such as any laminar flexible covering material.

[0014] Other attempts like the one disclosed in the U.S. Pat. No. 5,271,200 comprise a floor covering system having a part of the floor covered by stationary ad permanently affixed tiles and a central sector covered by removable magnetic tiles for advertising purposes, wherein the magnetic tiles have their edges cut and open in direct contact with the environment and therefore exposed to humidity, dust, etc. with the results that
the edges of the upper layer, particularly leather, are affected in a short time by detaching of the layers from the tile assembly.

U.S. Pat. No. 3,341,996 to William H. Jones et al. discloses vinylic floor structures comprising a plurality of tiles with a lower magnetic surface to form floor structures, however there is not disclosure of any flexible laminar material, like leather, that could be affixed as an outer or upper layer in an effective manner, by having protected edges, for example, in order to prevent the assembly from being detached, stripped or peeled.

U.S. Pat. No. 3,609,304 discloses the installation of panels, fabrics or papers for covering walls, which are placed and maintained in their position by magnetic and ferrous stripes. U.S. Pat. No. 4,397,900 discloses a carpet that is adhered to a metal surface by magnetic tapes included into a substrate of components serving to support the fibers comprised in the outer surface of the carpet.

According to the above it is well known in the art the provision of several types of coverings, linings and decorations that may be removably affixed to a surface by means of ferromagnetic means but all of them are affected, as indicated, by detachment, stripping, peeling, crumpling, creasing, etc. due to the natural use of the floor, walls, humidity, dust, heat, cold, etc. which coverings are not capable of being installed in several more aggressive environments such us under water, particularly when soft, delicate materials, like leather, are employed.

In view of the foregoing, it would be very convenient to have a new covering, lining, decorative coating, and the like, for installation onto floors, walls, ceilings, furniture for decoration and any other surfaces, capable of resisting a heavy transit of persons, including for use under water in covering swimming pools, and which are prevented from being altered, detached, peeled, stripped, crumpled, etc., with no failures in the edges or periphery, with a highest resistance to shear forces in the adhesive layer, between the upper layer and the magnetic bottom layer, thus preventing the appearing of bubbles, peeling, crumplings, etc.

SUMMARY OF THE INVENTION

It is therefore an object of the invention to provide a flexible and/or rigid covering for affixing to a surface, preferably a plain and flat surface, or any other surface including irregular surfaces, curved surfaces, columns of small diameters, floors, walls, ceilings, furniture, furniture ornaments, the covering including an outer or upper laminar material such plastics, wood sheets, leather, glass, ceramics and other well known laminings and materials.

It is still another object of the present invention to provide a rigid and/or flexible coating or covering that may be affixed to a floor, wall or ceiling or other surfaces by a magnetic force, wherein the covering includes a flexible layer with magnetic properties capable of being magnetically and removably adhered to the floor, wall or ceiling wherein a ferromagnetic substrate is previously arranged.

It is a further object of the present invention to provide a flexible and/or rigid covering, coating or lining having the periphery or edges thereof protected to prevent damages therein particularly when it is installed.

It is a further object of the present invention to provide a flexible and/or rigid covering, coating or lining having an excellent structural stability when subject to mechanical stresses and shear forces between the upper or top layer, preferably made of leather, and the bottom magnetic layer, this stability and resistance being provided by a construction having at least one intermediate stabilizing laminar material such as a textile layer or lamina.

It is a further object of the present invention to provide a flexible and/or rigid covering, coating or lining having at least one intermediate stabilizing layer or lamina, preferably a textile lamina, which actuates preferably as an hydrophilic material and also forms a support to enhance the uniform, entire and correct distribution or spreading of an adhesive material between the top layer and the magnetic bottom layer.

It is even a further object of the present invention to provide a flexible and/or rigid covering, coating or lining, preferably in the form of a tile having a flexible top layer which is to remain exposed to the view of the users, for decorative purposes, made of several materials such as natural leather, synthetic leather, furs, plastics, resins, natural and synthetic lining, glass, ceramics, building materials, cementitious materials and metals.

It is still a further object of the present invention to provide a magnetic tile for covering surfaces, the tile being of the type for fixing onto a ferromagnetic substrate which is arranged in the surfaces to be covered, wherein the tile comprises a top layer, a bottom magnetic flexible layer, and at least one intermediate textile lamina with adhesive means to affix to both the top layer and the bottom magnetic flexible layer, wherein the top layer has peripheral edges extending downwardly around corresponding edges of the bottom magnetic flexible layer.

The above and other objects, features and advantages of this invention will be better understood when taken in connection with the accompanying drawings and description.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a perspective and exploded view of a tile according to a preferred embodiment of the invention, showing the three layer of the tile and the magnetic substrate to be installed in a surface where the tile is to be installed;

FIG. 2 shows a perspective view and partially cross section of the tile of FIG. 1;

FIG. 3 shows a cross section view of two tiles installed one adjacent the other onto the magnetic substrate with the edges of the tiles being in intimate contact to prevent the edges from being exposed to the environmental conditions, and also preventing the edges form moving up to peel or strip from the assembly, and

FIG. 4 shows a cross section view similar to that of FIG. 3 but of another embodiment of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Now referring in detail to the invention, the same refers to a new lining, coating or covering comprising decorative or lining materials such as leather, fabric and the like. The use of leather and fabric, as well as other synthetic flexible materials for covering several surfaces such as walls, floors and ceilings is associated to many difficulties coming from the laminar and flexible nature of these materials, particularly the leather which is a natural material. The present invention facilitates the use of these materials by providing a
new cover system, preferably comprised of tiles having a natural, flexible and soft surface appearance and finishing such as the properties of the leather, also permitting the easy installation and removal of the cover system in walls, floors, ceilings, furniture, columns and other surfaces by means of a magnetic force. The coverings of the invention even may be used in applications under wet conditions and water such as in swimming pools, shower spaces, bathrooms, kitchens.

[0033] The covering of the invention, preferably in the form of a tile, comprises a multi-layer construction having and enhanced resistance and stability as compared to the prior art, particularly because of the stability provided by the new adhesive and construction properties of the multi-layer system and because of the way the periphery and edges of the tile are preserved against the surrounding aggressive conditions. Thus, the invention permits to conform coverings in floors, for example, wherein a high transit of individuals must be expected. The multi-layer covering is also apt for installation in walls, ceilings, furniture and many surfaces, therefore, while the description is oriented to the covering of floors and the tile is described with leather, the invention must not be construed as restricted to these applications.

[0034] Now making reference to FIG. 1, an exploded perspective view of a covering of the invention is shown, more particularly a multi-layer tile indicated by general reference 1, comprising at least one intermediate textile lamina 2 interposed between a bottom magnetic flexible layer 3 and a flexible top layer 4 made of any decorative, lining material, such as leather, with the intermediate textile lamina 2 having adhesive to affix to both top layer 4 and bottom magnetic flexible layer 3. Top layer 4 has peripheral edges extending downwardly around corresponding edges 6 of the bottom magnetic flexible layer. The leather flexible layer 4 has a lip 5 extending around the entire periphery or perimeter covering the side edges 6 of magnetic layer 3. The closed periphery of the tile is conformed by the union between top layer 4 and magnetic layer 3 irrespective of how many intermediate layer are arranged between them.

[0035] Bottom magnetic layer 3 is comprised of a support material such as rubber or thermoplastic material within which a plurality of small magnetic particles are provided to conform a magnetic flexible layer with the property of adhering to ferromagnetic surfaces.

[0036] Top layer 4 is comprised of a covering layer that may comprise any appropriate cover or decorative material, either flexible or not, which in this description will be described as natural leather for a preferred embodiment of the invention. However, this material may be any other synthetic material such as synthetic leather or any other natural material preferably capable of “copying” the shape of the surfaces to which the covering is adhered. For example, the tiles of the invention may comprise also ceramic materials, glass, metals and others that are capable of being adhered to the magnetic layer by the intermediate lamina of the invention.

[0037] As mentioned above, the direct adherence between two materials with different properties, such as the leather layer 4 and the magnetic layer 3, by a known adhesive leads to the generation of shear stresses and skidding between the layers due to different dilatation index, surface textures, flexibility, etc. All these factors cause the adhesive to behave in different manners in connection to each of the layers. The humidity conditions and cold and heat variations, transit of pedestrians, form of the surface to which the covering is installed, generate stresses causing the stripping of the layers and/or appearing of air or gas bubbles and bending of the top layer respect of the magnetic layer.

[0038] To overcome the above mentioned problems and any other related to the structural stability of a tile, the present invention provides at least one textile lamina 2 that may be impregnated in an adhesive, such as a resin, or any other gum or adhesive that is spread properly between the top layer and the magnetic layer in a manner that a very cohesive multi-laminar construction is obtained wherein top layer 4 is affixed to magnetic layer 3 through the adhesive-impregnated textile lamina 2. As a result, the tile assembly of the invention has an enhanced resistance because the textile lamina, preferably a fabric, actuates as a resistant structure, providing cohesion, absorbing tensions and resisting the relative movements of the layers. In other words, the texture of the fabric, or the warp and weft thereof, is conveniently complemented with the random fiber of the inner surface of the leather and the plain and smooth surface of the magnetic layer. The fabric defines an effective transition between the both different surfaces to enhance the adherent effect of the adhesive. The fabric also provides the assembly with a tension resistance as well as it permits a high flexibility wherein the tile may accompany several shapes including different curve degrees and irregularities in the surface to be covered.

[0039] The affixing of two materials having different characteristics, such as the top layer having an inner surface with fibers layer 4 made of any decorative, lining material, and other materials having smooth surfaces, such as the rubber and plastics for the magnetic layer, is based in a very complex mechanism that fails in a short time causing the collapse of the assembly. According to the invention, an additional textile material, namely lamina 2, has been provided to form a transition between the top layer and the magnetic layer enhancing the cohesion or adherence between the involved layers.

[0040] The fabric improves the spreading or distributions of the adhesive in order to reach a uniform bonding. The warp and weft of the fabric forms a structure for the adhesive preventing the same from cracking and fissures generally appearing in common assemblies because of aging, shocks, humidity, temperature variations, etc. In addition, the fabric enhances the resistance and resiliency of the multi-layer assembly also providing tenacity to the inner or lower surface of the leather, resisting compression forces and preventing deformation of the top layer.

[0041] As it is shown in FIG. 2, the multi-layer covering 1 is comprised of the at least three layers affixed one to the other with edges 5 of top layer 4 extending downwardly around corresponding edges of the fabric 2 and bottom magnetic flexible layer 3. Layer 2 covers at least an inner surface of the bottom magnetic flexible layer and extends to laterally cover the periphery of the bottom magnetic flexible layer. This structure conforms a flexible resistant tile with the periphery thereof duly closed and sealed to prevent humidity and dust from entering the multi-layer assembly. Layer or lamina 2 may be a woven or non-woven fabric that permits the adhesive to pass through the fabric in order to impregnate the same and adhere to layers 3 and 4. Fabric 2 should have hydrophilic and oleophilic properties with the capacity of trapping and retaining liquids flowing through the leather by natural or migration or accidental spilling. This prevents that the liquid may pass through any cracks or fissures in the adhesive and reach the magnetic layer thus preserving the adhesiveness between leather 4 and magnetic layer 3.
The hydrophilic property of the fabric defines a humidity reservoir within the system that compensates the environmental variations. In conventional tiles, these variations and changes cause the tile structural deformations that spoil the leather appearance. Preferably, the top layer and the bottom magnetic flexible layer are impervious whereby the peripheral edges of the top layer extending downwardly around the corresponding edges of the bottom magnetic flexible layer form an impervious sealing perimeter.

Figure shows two tiles 1, 1', in cross section, magnetically adhered onto a substrate, surface or ferromagnetic plate 7 which in turn is arranged, adhered to, or form part of, a wall, a floor, a ceiling, furniture or ornament. Lips 5, 5' are arranged one against the other and preserve the periphery of both tiles and hence of the entire assemblies. Intermediate fabric laminae 2, 2', arranged between top layer 4 and magnetic layer 3 are also preserved against the outer environment. Magnetic layer 3 is firmly retained onto substrate 7 by a convenient magnetic force.

Lips 5, 5', forming the perimeter edges of the tiles, entirely cover the periphery of the underlying layers and are also adhered to the edges of the layers to guarantee an excellent cohesion and sealing. Considering that, also according to the invention, the leather is subject to a treatment to make it impervious, the free edge of the closing perimeter of the leather may be also impervious, by impregnation with proper agents, without affecting the appearance of the visible main upper surface.

Once the leather has been treated to be impervious as described above, and considering that the bottom magnetic layer is already impervious, the tile assembly will be entirely impervious and it is capable of being installed in under water surfaces. The inventive tiles have been successfully tested, and showed a high resistance, under water containing up to 3.5 grams of salt per liter of water, as in the sea water, what makes the tile to be capable of being used in boats also.

FIG. 4 shows another embodiment of the invention wherein the same reference numbers have been maintained because the general multi-layer structure of the tiles are the same except for the provision of a continuous fabric lamina 2 that extends all along several tiles in order to manufacture the tiles form larger sheets or plates comprising a plurality of tiles to facilitate installation in large surfaces. These sheets or plates may be commercialized in rolls and the like and arranged according to pre-designed decorative patterns. The impregnation of edges 5, 5' to make them impervious may be carried out like in the previous described embodiment, or as an additional step in the continuous manufacture line.

In any of the above embodiments, the downwardly extending peripheral edges of the top layer of a tile is in contact with corresponding downwardly extending peripheral edges of the top layers of adjacent tiles in a manner to form an impervious sealing perimeter for each tile.

The multi-layer tile of the present invention, having a flexible or rigid layer 4 and depending of the size thereof, may accommodate to any surface, uniform or irregular, flat or curved, and will remain firm and resistant. These properties are kept also when the intermediate fabric is arranged, as shown in the embodiment of FIG. 4, continuous along several tiles.

The enhanced flexibility and resistance of the tiles of the present invention permits the easy and quick installation and removal of the coverings with minimum, if any, deleterious effects from environmental conditions and with enhanced adherence between the layers of the tile.

While preferred embodiments of the present invention have been illustrated and described, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the scope of the invention as defined in the appended claims.

We claim:

1. A magnetic tile for covering surfaces, the tile being of the type for fixing onto a ferromagnetic substrate which is arranged in the surfaces to be covered, the tile comprising:
   a. top layer,
   b. a bottom magnetic flexible layer, and
   c. at least one intermediate textile lamina with adhesive means to affix to both the top layer and the bottom magnetic flexible layer, wherein the top layer has peripheral edges extending downwardly around corresponding edges of the bottom magnetic flexible layer.

2. The magnetic tile of claim 1, wherein the at least one intermediate textile lamina is a fabric lamina covering at least an inner surface of the bottom magnetic flexible layer.

3. The magnetic tile of claim 1, wherein the at least one intermediate textile lamina is a fabric lamina extending to laterally cover the periphery of the bottom magnetic flexible layer.

4. The magnetic tile of claim 1, wherein the top layer comprises a flexible material selected from the group consisting of natural leather, synthetic leather, furs, plastics, resins and natural and synthetic lining.

5. The magnetic tile of claim 1, wherein the top layer comprises a flexible material selected from the group consisting of glass, ceramics, building materials, cementitious materials, plastics, resins and metals.

6. The magnetic tile of claim 1, wherein the top layer and the bottom magnetic flexible layer are impervious whereby the peripheral edges of the top layer extending downwardly around the corresponding edges of the bottom magnetic flexible layer form an impervious sealing perimeter.

7. The magnetic tile of claim 1, wherein the adhesive means is a resin.

8. The magnetic tile of claim 1, wherein the at least one intermediate textile lamina is a hydrophilic lamina selected from the group consisting of a woven and non-woven fabrics.

9. The magnetic tile of claim 1, wherein the top layer is natural leather.

10. A magnetic covering assembly comprising a plurality side-by-side arranged magnetic tiles of claim 1, wherein downwardly extending peripheral edges of the top layer of a tile is in contact with corresponding downwardly extending peripheral edges of the top layers of adjacent tiles in a manner to form an impervious sealing perimeter for each tile.

11. The magnetic covering assembly of claim 10, the at least one intermediate textile lamina with adhesive means comprises one continuous lamina for at least a plurality of tiles, the continuous lamina extending below the impervious sealing perimeter for the tiles, formed by the downwardly extending peripheral edges of the top layer of each tile of the plurality of tiles.

12. The magnetic covering assembly of claim 10, wherein the at least one intermediate textile lamina is a fabric lamina covering at least an inner surface of the bottom magnetic flexible layer.
13. The magnetic tile of claim 10, wherein the at least one intermediate textile lamina is a fabric lamina extending to laterally cover the periphery of the bottom magnetic flexible layer.

14. The magnetic tile of claim 10, wherein the top layer comprises a flexible material selected from the group consisting of natural leather, synthetic leather, furs, plastics, resins and natural and synthetic lining.

15. The magnetic tile of claim 10, wherein the top layer comprises a flexible material selected from the group consisting of glass, ceramics, building materials, cementitious materials, plastics, resins and metals.

16. The magnetic tile of claim 10, wherein the top layer and the bottom magnetic flexible layer are impervious whereby the peripheral edges of the top layer extending downwardly around the corresponding edges of the top layer and the bottom magnetic flexible layer and the contact between the top layers of adjacent tiles form the impervious sealing perimeter.

17. The magnetic covering assembly of claim 10, wherein the adhesive means is a resin.

18. The magnetic covering assembly of claim 10, wherein the at least one intermediate textile lamina is selected from the group consisting of a woven and non-woven fabrics.

19. The magnetic covering assembly of claim 10, wherein the top layer is natural leather.

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