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(72) Inventor; and
(71) Applicant : **SASVÁRI, Gábor** [HU/HU]; H-2612 Kosd, Csabakirályfi u. 2. (HU).

(74) Agent: **SZILÁGYI, Ildikó**; patent attorney, H-1111 Budapest, Bertalan L. u. 20. Fsz. 3/A. (HU).

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(54) **Title**: METHOD FOR PREPARING FLEXIBLE STONE CLADDINGS HAVING NATURAL SURFACE

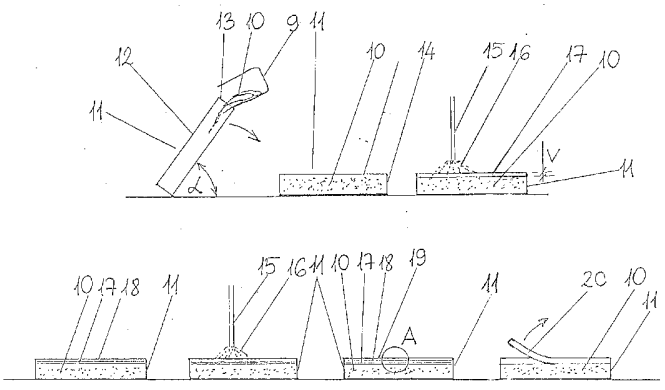

FIG. 2

(57) **Abstract**: The subject of the invention is method for preparing flexible stone claddings having natural surface, which method makes it possible, that thin and flexible stone claddings can be created, which are of identical surface shaping with stone claddings created by nature. During the method according to the invention a definite color and quantity of coloring agent (5) from a color feeder (4) are fed onto the crushed stone (3) filled into more then one mixing container (1) then having mixed them, the colored crushed stones (6,7,8) and in case of demand, dark crushed stone (22) are layered in a sliding unit (9) in reclined state, then after having mounted the sliding unit (9), the intermingled colored crushed stone (10) is produced by the slight sliding of the colored crushed stones (6,7,8) and in given case the dark crushed stone (22), then the intermingled colored crushed stone (10) is poured into a work box (11) situated at a - angle, provided with covering falsework (12), then the filled work box (1 1) is moved into almost horizontal position after having fixed the closing element (14) on it, and after having removed the covering falsework (12) from the work box (11), binding material (16) is spread in thickness V from the disperser head (15) onto the intermingled colored crushed stone (10), forming this way the layer of stone surface (17), then a carrier material (18) is laid onto the layer of the stone surface (17), saturated with binding material (16), then with the help of the

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disperser head (15) binding material (16) is spread onto the carrier material (18) forming this way the back layer (19), after the setting of the binding material (16), the flexible stone cladding (20) consisting of stone surface (17) of thickness S and back layer (19) containing carrier material (18) is peeled-off the intermingled colored crushed stone (10) filled into the work box (11).

Method for preparing flexible stone claddings having natural surface

The subject of the invention is method for preparing flexible stone claddings having natural surface, which method makes it possible, that thin and flexible stone claddings can be created, which are of identical surface shaping with stone claddings created by nature.

Natural rock is often applied for the covering of inside and outside surface of buildings. However use of natural rocks is partly very expensive, partly very labor-intensive process, as well the application is partly limited, as covering of arched surfaces is either not possible, or too labor-intensive. Application of natural rock is limited also due to its weight, for example in case of application as covering, big weight must be taken into consideration, that is, it can be used in case of walls of proper stability. To overcome this problem, the industry has been producing such covering materials, which imitate natural rock in their outer appearance, but at the same time very thin, light, and in given case flexible as well. One of the weak points of the rock-like covering materials produced artificially is, that it is difficult to produce covering materials with visually similar surface to natural rocks.

In the state of the art the P 9900480 Hungarian patent application makes known a stone covering produced for floorings and walls using covering base elements for making covering sheets for floorings and walls. When using the invention, the traditional washed concrete solution is combined with the technology of stone claddings as well as with the adhesive technology of inlaid coverings, which is suitable for covering plain, arched, or raised, even hollow surfaces, eg. for covering columns. The essence of the invention is: a filling element layer of classified pebbles is stuck onto a base net of glass-fibre of easy handling with covering layer to create raised aesthetical surface using erasing movements.

The WO2000DE00963 patent application makes known a work method, that makes possible creating of set sand layers, having the required structures, which are reinforced by carrier layers, resulting in the possibility of applying visible coverings.

The P 04 00428 patent application titled breakstone flat-plate structure, makes known such a solution, that refers to the flat-plate structure of breakstone suitable for covering building walls. The characteristic of flat-plate structure of breakstone is, that it contains breakstone and self-adhesive paper foil embedded in flexible binding material of afterhardening type.

The DE 200620013010U German utility modell application makes known a flat material with a natural stone surface of which comprises at least one layer of a multilayer stone material. The flat material has a flexible, pullable carrier layer, wich carrier the surface layer, and an adhesive layer for fastening the flat material to a base.

The US 20020432607 American patent application makes known such a laminated rock, that includes a rock layer, as well as a flexible layer. The rock layer has several pores, suitable for housing liquids. The flexible layer is placed above the rock layer. Beside these, the method of making the laminated rock is made known as well.

The WO 2004052561 patent application makes known such a laminated rock, that includes a rock layer and a flexible layer. The rock layer has several pores suitable for housing liquids. The flexible layer is placed above the rock layer, a part of it adjoins the pores of the rock layer. Beside these, the method of making the laminated rock is described as well. The method includes the process of technology for making the rock layer and the exposed surface, as well as the application of such a polymer, that can bind with the exposed rock layer. The polymer is separated from the rock together with the adjoining part of the exposed surface.

The drawbacks of the solutions described above are, that resulting from the artificial production method, the flexible stone claddings can not ensure the proper similarity to the natural rock surface, and the method of producing a flexible stone cladding material containing natural rock layer separated from a natural stone with a suitable technology is a quite expensive and laborious procedure.

When working out the solution according to the invention we aimed at creating such a method, with the help of which it was possible to produce in a simple way, in big quantity a thin, flexible stone cladding similar to an optionally chosen natural rock surface.

We realized, when working out the solution according to the invention, that in case the crushed stone is colored in such a way, that it is divided into several parts, the parts are colored the shades of each other's color, and a crushed stone of stronger color is used for creating nervation, then these colored crushed stones are layered in a bedded sliding unit in optional version, then mounting the sliding unit, and the colored crushed stone intermingled this way is poured into a work box tilted in an optional angle, then after having layed down the work box, having removed the covering falsework, binding material is spread on the intermingled colored crushed stone in such a way, that a thin surface layer of the intermingled crushed stone is soaked, forming a stone surface, then a carrier material is layed on it, then again binding material comes, and after the setting of the binding material, the flexible stone covering created this way is pulled off the intermingled colored crushed stone, then the set aim can be achieved.

The invention is a method for preparing flexible stone claddings having natural surface, containing crushed stone, embedded in flexible binding material provided with carrier material. According the method a definite color and quantity of coloring agent from a color feeder are fed onto the crushed stone filled into more then one mixing container then having mixed them, the colored crushed stones and in case of demand, dark crushed stone are layered in a sliding unit in reclined state, then after having mounted the sliding unit, the intermingled colored crushed stone is produced by the slight sliding of the colored crushed stones and in given case the dark crushed stone, then the intermingled colored crushed stone is poured into a work box situated at α – angle, provided with covering falsework, then the filled work box is moved into almost horizontal position after having fixed the closing element on it, and after having removed the covering falsework from the work box, binding material is spread in thickness V from the disperser head onto the intermingled colored crushed stone, forming this way the layer of stone surface, then a carrier material is laid onto the layer of the stone surface, saturated with binding material, then with the help of the disperser head binding material is spread onto the carrier material forming this way the back layer, after the setting of the binding material, the flexible stone cladding consisting of stone surface of thickness S and back layer containing carrier material is peeled-off the intermingled colored crushed stone filled into the work box.

In one prefered application of the method according to the invention filling of the work box with the intermingled colored crushed stone from the sliding unit(s) takes place in a nearly horizontal position of the work box, from the top, forming heaps until the work box is completely full.

In another prefered application of the method according to the invention the colored crushed stone, as well as in given case the dark crushed stone forming the nervation are put into a mounted container in required layers, then poured from the container into the work box positioned at α – angle, provided with covering falsework.

In a further prefered application of the method according to the invention the impression taken from the surface of the natural stone block is slightly pressed onto the surface of the intermingled colored crushed stone filled into the work box, then forming of the stone surface of thickness V and that of the back layer provided with carrier material takes place.

In a further prefered application of the method according to the invention a pattern provided with cutting(s) is put onto the surface of the intermingled colored crushed stone placed in the work box in horizontal state, then thinner binding material is spread onto the surface of the pattern from the disperser head, where the binding material saturates deeper the intermingled colored crushed stone, than the cuttings of the pattern, then following the removal of the pattern, binding material is spread again from the disperser head onto the whole surface of the intermingled colored crushed stone placed in the work box.

In a further prefered application of the method according to the invention sand, or other grain material is spread onto the carrier material laid on the stone surface layer saturated with binding material beside the binding material spread with the help of the disperser head, forming a thicker, rougher back layer.

In a further prefered application of the method according to the invention the tilting angle of the work box is $\alpha = 0°- 90°$, preferably 30°-60°.

In a further prefered application of the method according to the invention the particle size of the crushed stone is 0.2-1 mm, preferably 0.2 – 0.5 mm.

In a further prefered application of the method according to the invention the raw material of the binding material is: aqueous dispersion synthetic resin, within this especially aqueous dispersion synthetic resin acrylate-styrene of low viscosity, or acrylate, aqueous dispersion synthetic resin butyl-acrylate-styrene copolymer of low viscosity.

In a further prefered application of the method according to the invention the raw material of the carrier material is: fabric, mull, gauze, glass net, glass fibre.

The method according to the invention is furthermore set forth by the enclosed drawings:
The Fig 1 shows the method according to the invention, a possible preferable realization of the coloring of crushed stone as well as a possible making of the intermingled colored crushed stone.
The Fig 2 shows the method according to the invention of a possible realization of forming a natural stone surface, as well as a possible preferable process of realization of a flexible stone cladding.
The Fig 3 depicts the enlarged „A" detail marked in Fig 2.
The Fig 4 shows another possible realization of the forming of a natural stone surface of the method according to the invention.
The Fig 5 shows another possible production of the intermingled colored crushed stone of the method according to the invention.
The Fig 6 shows another possible realization of the forming of a natural stone surface of the method according to the invention.
The Fig 7 shows the surface image of the flexible stone cladding realized with the method according to the invention.
The Fig 8 shows a special surface realization of the forming of a natural stone surface of the method according to the invention.

The Fig 1 shows the method according to the invention, a possible preferable realization of the coloring of crushed stone as well as a possible making of the intermingled colored crushed stone. The mixing containers 1, where the crushed stone 3 is placed, can be seen in the drawing. Furthermore the color feeders 4, from which the coloring agent 5 quantity necessary for the crushed stone to be mixed in the given mixing container 1 are

fed. The crushed stone 3 and the coloring agent 5 placed in the containers 1 are mixed together with the help of the mixing head 2, and the colored crushed stone 6,7,8 of different shades are produced this way. In the next phase of the method, the colored crushed stones 6,7,8 are layered in the reclined state of the sliding unit 9, then the sliding unit 9 is mounted, when the colored crushed stone 6,7,8 layers are slightly intermingled, mixed, and this way the intermingled colored crushed stone 10 is produced.

The Fig 2 shows the method according to the invention of a possible realization of forming a natural stone surface, as well as a possible preferable process of realization of a flexible stone cladding. The work box 11 placed at α – angle provided with covering falsework 12 can be seen in the drawing. The intermingled colored crushed stone 10 produced in the sliding unit 9 is poured into the work box 11, preferably in such a way, that the work box 11 is completely filled with the intermingled colored crushed stone 10, and the colored crushed stones 6,7,8 are further mixed during this pouring. Following this the closing element 14 is fixed onto the filled work box 11, and the work box 11 is reclined, or is taken into nearly horizontal state. After having removed the covering falsework 12 of the work box 11, binding material 16 is spread from the disperser head 15 onto the intermingled colored crushed stone 10 saturating the intermingled colored crushed stone 10 in a thickness V of the binding material 16 creating this way the stone surface 17 of thickness V. Following this a carrier material 18 is laid onto the layer of the stone surface 17 soaked with binding material 16, and then binding material 16 is poured onto the carrier material 18 with the help of the disperser head 15, forming this way the back layer 19. Keeping the setting time conforming with the material of the binding material 16, the flexible stone cladding 20 consisting of the stone surface 17 of thickness V and back layer 19 containing carrier material 18 is pulled off the intermingled colored crushed stone 10 filled into the work box 11.

The Fig 3 depicts the enlarged „A" detail marked in Fig 2. The drawing shows the intermingled colored crushed stone 10 with the stone surface 17 saturated with binding material 16 of thickness V formed on it, and the back layer 19 provided with carrier material 18 forming the flexible stone cladding 20 of thickness S.

The Fig 4 shows another possible realization of the forming of a natural stone surface of the method according to the invention. The intermingled colored crushed stone 10 is poured in heaps to the work box 11 placed horizontally, from the sliding unit 9 in such a way, that finally the intermingled colored crushed stone 10 poured into the work box 11 fills completely with nearly horizontal surface the work box 11.

The Fig 5 shows another possible production of the intermingled colored crushed stone of the method according to the invention. The colored crushed stones 6,7,8 already produced are layered into the container 23 placed vertically. A thinner dark crushed stone 22 layer is inserted among the colored crushed stone 6,7,8 layers, then the colored crushed stone 6,7,8 layered into the the container 23, and the dark crushed stone 22 are poured into the work box 11 placed in α – angle, provided with covering falsework 12.

The sliding and mixing of the colored crushed stone 6,7,8 layers takes place now, during the process of pouring, and resulting from this pouring process the slided intermingled colored crushed stone 10 is produced.

The Fig 6 shows another possible realization of the forming of a natural stone surface of the method according to the invention. It can be seen in the drawing, that an impression 25 is made from the surface of the natural stone block 24, then with the solutions described earlier, on the surface of the intermingled colored crushed stone 10 filled into the work box 11 the impression 25 is pressed slightly, then removed.

The Fig 7 shows the surface image of the flexible stone cladding realized with the method according to the invention. The surface image of the flexible stone cladding 20 can be seen in the drawing, with the surfaces formed by the intermingled colored crushed stone 6,7,8, as well as the nervations 21 formed by the dark crushed stones 22.

The Fig 8 shows a special surface realization of the forming of a natural stone surface of the method according to the invention.
The pattern 26 with cuttings 27 can be seen in the drawing, which is placed onto the surface of the intermingled colored crushed stone 10 placed in the work box 11. Then it can be seen, that this case a slightly thinner binding material 16 is sprayed from the disperser head 15. Then after having removed the pattern 26, binding material 16 is sprayed from the disperser head 15 onto the whole surface of the intermingled colored crushed stone 10.

In a preferably advantegaous application of the method according to the invention the coloring of the crushed stone 3 takes place in the first phase of the method. To make sure, that the flexible stone cladding has a natural stone surface finish, it is necessary to produce colored crushed stone 6,7,8 of several, slightly different shades imitating the natural rock and a dark crushed stone 22 darker then the base color of the stone, conforming with the darker nervations is produced.

To ensure this the crushed stone 3 is poured into the preferably two-four pieces mixing containers 1. Coloring agent 5 is fed following this onto the crushed stone 3 filled into the containers 1 from the color feeders 4. In order to produce harmonizing, slightly different shades of colored crushed stones 6,7,8 a quantity of coloring agent 5 of identical color of slightly different quantities of coloring agent 5 is fed into the same quantity of crushed stone 3. To achieve shaping of nervation 21, implicitly the production of slightly different, or darker coloring agent 5 is used to produce the dark crushed stone 22.

During the feeding of the coloring agent 5 to the crushed stone 3 the mixing process is carried out with the help of the mixing head 2, resulting in the coloring agent 5 coloring the crushed stone 3 producing this way the colored crushed stone 6,7,8 as well as the dark crushed stone 22 which are still basically dry, as the very small quantity of pectins of the coloring agent 5 diluted with water stick to the particles of the crushed stone 3, so practically there is no liquid material among the particles.

Following this the second phase of the method takes place, namely the production of the intermingled colored crushed stone 10 similar to the surface of natural rock, imitating it, appearing in different sturctures, shades.

One of the possible production methods is, when the colored crushed stone 6,7,8 is layered in the reclined position of the sliding unit 9 and in case of demand, a smaller quantity of dark crushed stone 22 layer is inserted among the colored crushed stone 6,7,8 layers. Following this the sliding unit 9 is mounted, when the colored crushed stone 6,7,8 layers and the dark crushed stone 22 layers slide together a little, mix together and so the intermingled colored crushed stone 10 is produced.

In the third phase of the method the intermingled colored crushed stone 10 is poured into the work box 11 placed at α – angle, provided with covering falsework 12. In this pouring phase the layers of colored crushed stone 6,7,8 mix respectively slide further on each other.

Following this the closing element 14 is fixed onto the filled work box 11 and the work box 11 is laid down, or put into nearly horizontal state. After having removed the covering falsework 12 from the work box 11, binding material 16 is spread on the intermingled colored crushed stone 10 from the disperser head 15. The thickness V saturation of the intermingled colored crushed stone 10 in the work box 11 can be regulated by the quantity and density of the binding material 16, forming the layer of stone surface 17.

Following this a carrier material 18 is laid on the layer of the stone surface 17 saturated with the binding material 16, then again binding material 16 is spread on the carrier material 18 with the help of the disperser head 15 forming this way the back layer 19. This case it is preferable to put such additive material into the binding material 16, that makes it denser. When forming the back layer 19 if needed, sand can be spread onto the surface together with the binding material 16, so a thicker back layer 19 is produced, which sticks better during covering.

In the last phase of the method, keeping the setting time conforming with the material of the binding material 16, the flexible stone cladding 20 consisting of the stone surface 17 of thickness V and back layer 19 containing carrier material 18 is pulled off the intermingled colored crushed stone 10 filled into the work box 11. Following this the above described process is repeated over and over with the remaining quantity of the intermingled colored crushed stone 10 in the work box 11 until layers of proper thickness S can be removed from it. Then the outer layer of the stone surface 17 of the flexible stone cladding 20 is provided with an impregnating layer, eg. silicone layer to prevent the outside particles of the stone surface 17 from peeling off.

In the second phase of the method according to the invention the intermingled colored crushed stone 10 can be poured from the top in heaps to the work box 11 placed horizontally, from the sliding unit 9 until the work box 11 is full. With this solution a

flexible stone cladding 20 of such surface can be produced, that imitates the slightly concentric, prolated nervation of the surface of the natural rock.

In case of the method according to the invention, if the colored crushed stone 6,7,8 is compacted during pouring it into the work box 11 tilted with α – angle, then a more natural, wavier nervation can be produced in case of the flexible stone cladding 20 made.

In case of the method according to the invention the binding material 16 can be put on the carrier material placed on the intermingled colored crushed stone 10 with a brush instead of a disperser head 15.

In case of surface formation of the flexible stone cladding 20 with natural stone surface, produced with the method according to the invention, the surface of the intermingled colored crushed stone 10 filled into the work box 11 can be made more diverse, if an impression 25 taken from the surface of a natural stone block 24 is pressed onto the surface of the intermingled colored crushed stone 10, then after having removed the impression 25, the remaining part of the production of the stone surface 17 and the back layer 19 as described above is carried out. By this the inverse of the stone surface on the impression 25 appears on the surface of the flexible stone cladding 20 produced this way. This solution makes possible the production of an even more genuine stone surface.

The surface formation of the flexible stone cladding 20 with natural stone surface, produced with the method according to the invention, can take place in such a way as well, when the surface of the intermingled colored crushed stone 10 placed in the work box 11 is formed in such a way, that the surface of the intermingled colored crushed stone 10 is blown for a short time with a ventillator, creating an effect imitating stone foldings. Following this the flexible stone cladding 20 is made according to the method described above.

In case of surface formation of the flexible stone cladding 20 with natural stone surface, produced with the method according to the invention, the stone surface 17 of the flexible stone cladding 20 can be shaped in such a way as well, that areas slightly protruding from the surface or sunken into it are formed, as if these areas, or the areas outside these were carved into the stone itself. This solution can be realized with the method according to the invention in such a way, that the pattern 26 with cuttings 27 is placed on the intermingled colored crushed stone 10 in the work box 11, then this case a little thinner binding material 16 is sprayed onto the surface of the pattern 26, where the areas below the cuttings 27 get saturated in a determined layer with the binding material 16. Following the removal of the pattern 26, binding material 16 is sprayed again from the disperser head 15 onto the whole surface of the intermingled colored crushed stone 10. Resulting from this on the areas of cuttings 27 of the pattern 26 the intermingled colored crushed stone 10 is saturated with the binding material 16 in a thicker layer, than on the areas outside this. With the help of this solution, when the ready flexible

stone cladding 20 is peeled off from the surface of the intermingled colored crushed stone 10, then on the stone surface 17 of the flexible stone cladding 20 the shapes corresponding with the cuttings 27 slightly protrude from the surface.

The negative forming of this solution can be produced as well, in which case the required shape is situated sunken on the stone surface 17, this case the parts of the cutting 27 of the pattern 26 are spread with denser binding material 16, whereas the area outside the area of cutting 27 is spread with thinner binding material 16. Optional shapes, inscriptions as embossments, or recessed geometrical shapes can be made on the flexible stone cladding 20 produced this way.

Aesthetically more improved finish can be achieved, if the binding material 16 used above the cutting 27 in the flexible stone cladding 20 produced this way is colored, or vica versa. This case an even more impressive visual contrast can be ensured.

If we want, that the stone surface of the flexible stone cladding 20 should not be perfectly flat, but the nervations 21 should be a bit sunk, like in case of natural rocks, then at the production of the dark crushed stone 22 or at the production of the crushed stone 3 mixed for the nervation 21, silicone oil is mixed to the coloring agent 5 or in given case to the dyeing agent of the crushed stone 3 resulting in becoming slightly water-repellent, so at the production of the flexible stone cladding 20 the nervation 21 slightly sinks.

In case of the method according to the invention the colored crushed stone 6,7,8 is mixed together evenly as required, in given case using crushed stone 3 of bigger particle size, 0.5-1 mm, and the mixture produced this way is poured into the work box 11. Then the flexible stone cladding 20 produced according to the method described above, forms a homogeneous surface, like in case of certain granite rocks.

The particle size of the crushed stone 3 used in case of the method according to the invention is 0.2-1mm, preferably 0.2-0.5 mm. In order to achieve an effect closest to the surface of the natural stone cladding, 5-10% crushed stone 3 of one millimeter particle size is mixed into the crushed stone 3 of 0.2-0,5 mm particle size.

The material of the crushed stone 3 is: crushed granite, crushed limestone, crushed sandstone, preferably crushed marble, sand, crushed stone of very fine grain.

The raw material of the binding material 16 is: aqueous dispersion synthetic resin, within this especially aqueous dispersion synthetic resin acrylate-styrene of low viscosity, or acrylate, aqueous dispersion synthetic resin butyl-acrylate-styrene copolymer of low viscosity. In case flexibility as a characteristic is not of primary importance in case of the stone cladding produced, or only minimal flexibility is sufficient, this case we can use epoxy resin, polyester resin and vinyl ester resin too.

The material of the impregnating material is: butyl-acrylate-styrene styrene copolymer, aqueous dispersion of synthetic resin of low viscosity, synthetic resin dispersion of acrylic acid ester base of low viscosity.

The flexible stone cladding 20 produced with the method according to the invention is suitable for outdoor and indoor cladding. The thickness S size of the flexible stone cladding 20 can be set in conformity with the quantity of the binding material 16 spread on the intermingled colored crushed stone 10, forming this way the stone surface 17 thickness V, respectively in given case sand is fed onto the carrier material 18 forming this way the thickness of the back layer 19.

An optional size flexible stone cladding 20 can be made with the method according to the invention, as on the one hand the size of the work box 11 used for the production can be made optionally of big size. On the other hand from the intermingled colored crushed stone 10 filled into the work box 11 numerous flexible stone claddings 20 of identical structure, with nervation 21 situated identically can be made, so for example by placing these flexible stone claddings 20 suitably on top of each other, eg. joining them through their characteristic nervations, then cut on each other and joined along the edges, it is possible to create surfaces of coherent patterns, nervations, and this joining method can be repeated in every direction in optional quantity.

The plates of the ready flexible stone cladding 20 can join each other in a way, where the edges of the adjacent flexible stone claddings 20 are slightly heated with a heater, and after the slight melting of the binding material 16, the two edges are pressed together.

During the production of the flexible stone cladding with natural stone surface according to the invention further steps can be made to ensure an even more life-like flexible stone cladding:
- One of the methods is to form primarily dark spots beside the already formed nervations in the stone surface 17. This takes place in a way as described above, spots of quite different color than the intermingled colored crushed stone 10, primarily brown color, are injected into the intermingled colored crushed stone 10 placed in the work box 11, with a syringe, or other suitable device. Its course is, that the needle is pushed to the bottom of the intermingled colored crushed stone 10, then while pulling out of it, it is continously injecting simultaneously the given color, so the intermingled colored crushed stone 10 is saturated in its depth spot-like in the given places. The flexible stone cladding is made from the intermingled colored crushed stone 10 prepared this way on basis of the steps made known earlier.

A possible realization of the genuine stone surface, primarily granite-like stone surface is, that a certain type, first of all darker color, conforming with the color of the required granite imitation colored crushed stone 6 is poured into the work box 11. Then the work box 11 is tilted at $\alpha = 30°\text{-}40°$ angle, then water is sprayed into it from the top to the whole surface of the colored crushed stone 6, while with the help of the ventillator

located on the top, higher end of the work box 11, strong lateral air-flow is created, parallel with the surface of the colored crushed stone 6, resulting in producing colored granules of diameter increasing from 0.2-3 cm rolling like an avalanche from upward downward.

The colored granules can be produced in a concrete mixer as well, in such a way, that quartzsand, or marble powder is poured into the concrete mixer, then some quartz powder is added, then during mixing, with water spraying, that is during earth-moist consistency mixing also, small, round granules of 0.2-3 cm diameter are produced.

Following this the colored granules produced in one or more colors are mixed in the work box 11 with the colored crushed stone 8 of the basic color. The mixing of the crushed stone and the granules can take place in the traditional way, or with a concrete mixer. By this we achieve, that patterns of circle form, like in case of genuine granite, are formed on the surface of the flexible stone cladding 20 when the flexible stone cladding 20 is produced layer-by-layer according to the method described above. This solution can be varied with the solution of spot-like injection made known above to achieve an even more natural effect.

The flexible stone cladding 20 produced with the method according to the invention can be cut into optional forms, for example with the help of a press, or any other cutting device, or the flexible stone cladding 20 can even be broken after folding along the given line. Different forms can be made with such manual breaking techniques, which are more similar to the natural rocks, to their interesting outlines. In case smaller surface units of brick or stone pattern are formed, then keeping the suitable joints, impressive surfaces can be created by clipping the joints.

The raw material of the carrier material 18 in case of a preferable realization is: fabric, mull, glass net, gauze, textile-glass. The thickness V size of the stone surface 17 is 1-10 mm, preferably 2 mm.

The tilting angle of the work box 11 is $\alpha = 0°\text{-}90°$ in the method according to the invention, preferably 30°- 60°. The determination of α – angle of tilt depends on the surface and structure of the flexible stone cladding 20 similar to the natural stone surface to be formed. If the α – angle of tilt is steeper, then a surface with marked relief nervation can be formed.

The coloring agent 5 can be any optional paint, dyeing agent, primarily of water-based coloring agent. According to our findings it is preferable first to mix the water-soluble coloring agent in a small extent 1:1 proportion and it should be fed to the crushed stone 3 only afterwards.

The flexible stone cladding 20 produced with the method according to the invention can be used eg. at thermal insulation of buildings in such a way, that the flexible stone cladding 20 is fixed with adhesive on the polystyrene plate to be fixed to the house. This

case the thermal insulation can be fixed with elements already provided with outer covering, so no subsequent surface treating is necessary. Furthermore resulting from its flexibility it can be used for cladding ornamental polystyrene elements of different profile shaping, as well as plastic sills and metal elements.

The advantages of the solution according to the invention are, that it makes possible the production of thin flexible stone cladding with optionally chosen surface, similar to a natural stone surface in a simple way, in big quantities. An additional advantage is, that optionally big surfaces can be cladded with its help, creating the impression as if it was genuine stone. Further advantage is, that a flexible stone cladding surface conforming with any color and quality rock can be created.

List of references:

1 – mixing container
2 – mixing head
3 – crushed stone
4 – color feeder
5 – coloring agent
6 – colored crushed stone
7 – colored crushed stone
8 – colored crushed stone
9 – sliding unit
10 – intermingled colored crushed stone
11 – work box
12 – covering falsework
13 – intake opening
14 – closing element
15 – disperser head
16 – binding material
17 – stone surface
18 - carrier material
19 – back layer
20 – flexible stone cladding
21 – nervation
22 – dark crushed stone
23 – container
24 – natural stone block
25 – impression
26 – pattern
27 – cutting

V – thickness (V)
S – thickness S
α – angle

CLAIMS:

1. Method for preparing flexible stone claddings having natural surface, containing crushed stone, embedded in flexible binding material provided with carrier material,

characterized by that,

a definite color and quantity of coloring agent (5) from a color feeder (4) are fed onto the crushed stone (3) filled into more then one mixing container (1) then having mixed them, the colored crushed stones (6,7,8) and in case of demand, dark crushed stone (22) are layered in a sliding unit (9) in reclined state,
then after having mounted the sliding unit (9), the intermingled colored crushed stone (10) is produced by the slight sliding of the colored crushed stones (6,7,8) and in given case the dark crushed stone (22),
then the intermingled colored crushed stone (10) is poured into a work box (11) situated at α – angle, provided with covering falsework (12),
then the filled work box (11) is moved into almost horizontal position after having fixed the closing element (14) on it, and after having removed the covering falsework (12) from the work box (11), binding material (16) is spread in thickness V from the disperser head (15) onto the intermingled colored crushed stone (10), forming this way the layer of stone surface (17),
then a carrier material (18) is laid onto the layer of the stone surface (17), saturated with binding material (16), then with the help of the disperser head (15) binding material (16) is spread onto the carrier material (18) forming this way the back layer (19),
after the setting of the binding material (16), the flexible stone cladding (20) consisting of stone surface (17) of thickness S and back layer (19) containing carrier material (18) is peeled-off the intermingled colored crushed stone (10) filled into the work box (11).

2. Method according to Claim 1 characterized by that, filling of the work box (11) with the intermingled colored crushed stone (10) from the sliding unit(s) (9) takes place in a nearly horizontal position of the work box (11), from the top, forming heaps until the work box (11) is completely full.

3. Method according to Claim 1 characterized by that, the colored crushed stone (6,7,8) as well as in given case the dark crushed stone (22) forming the nervation (21) are put into a mounted container (23) in required layers, then poured from the container (23) into the work box (11) positioned at α – angle, provided with covering falsework (12).

4. Method according to any of Claim 1-3 characterized by that, the impression (25) taken from the surface of the natural stone block (24) is slightly pressed onto the surface of the intermingled colored crushed stone (10) filled into the work box (11), then forming of the stone surface (17) of thickness V and that of the back layer (19) provided with carrier material (18) takes place.

5. Method according to any of Claim 1- 4 characterized by that, a pattern (26) provided with cutting(s) (27) is put onto the surface of the intermingled colored crushed stone (10) placed in the work box (11) in horizontal state,
then thinner binding material (16) is spread onto the surface of the pattern (26) from the disperser head (15), where the binding material (16) saturates deeper the intermingled colored crushed stone (10), than the cuttings (27) of the pattern (26),
then following the removal of the pattern (26), binding material (16) is spread again from the disperser head (15) onto the whole surface of the intermingled colored crushed stone (10) placed in the work box (11).

6. Method according to any of Claim 1-5 characterized by that, sand, or other grain material is spread onto the carrier material (18) laid on the stone surface (17) layer saturated with binding material (16) beside the binding material (16) spread with the help of the disperser head (15), forming a thicker, rougher back layer (19).

7. Method according to any of Claim 1-6 characterized by that, the tilting angle of the work box (11) is $\alpha = 0°- 90°$, preferably 30°-60°.

8. Method according to any of Claim 1-7 characterized by that, the particle size of the crushed stone (3) is 0.2-1 mm, preferably 0.2 – 0.5 mm.

9. Method according to any of Claim 1-8 characterized by that, the raw material of the binding material (16) is: aqueous dispersion synthetic resin, within this especially aqueous dispersion synthetic resin acrylate-styrene of low viscosity, or acrylate, aqueous dispersion synthetic resin butyl-acrylate-styrene copolymer of low viscosity.

10. Method according to any of Claim 1-9 characterized by that, the raw material of the carrier material (18) is: fabric, mull, gauze, glass net, glass fibre.

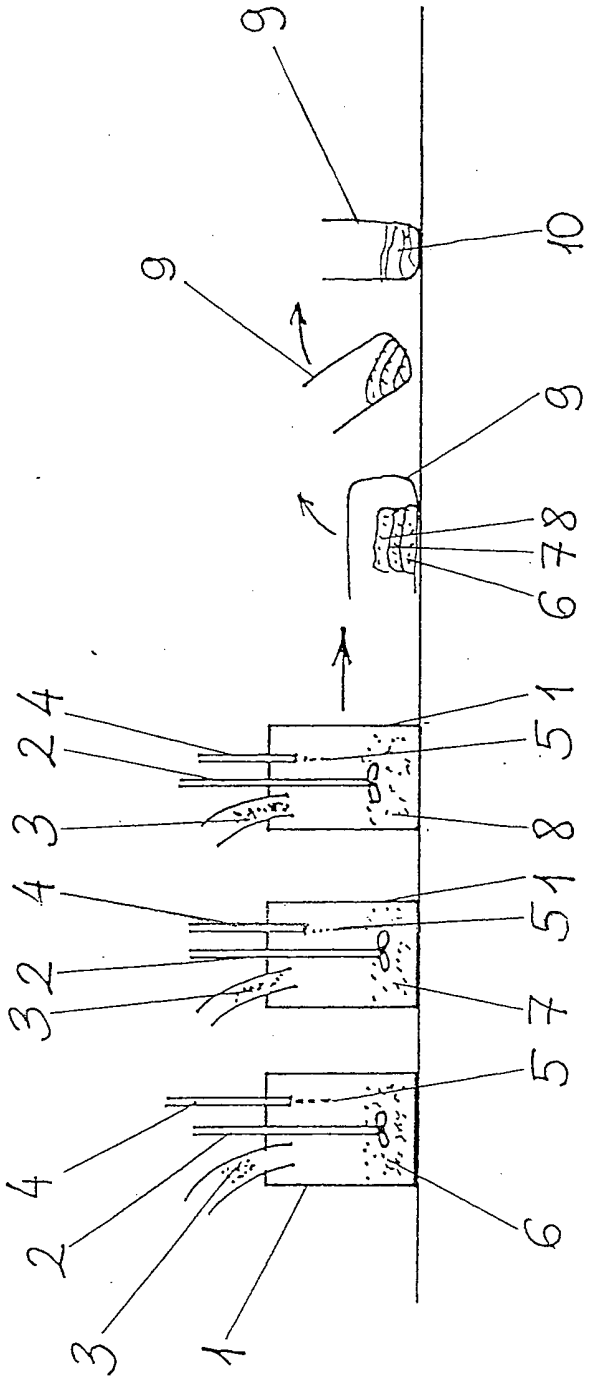
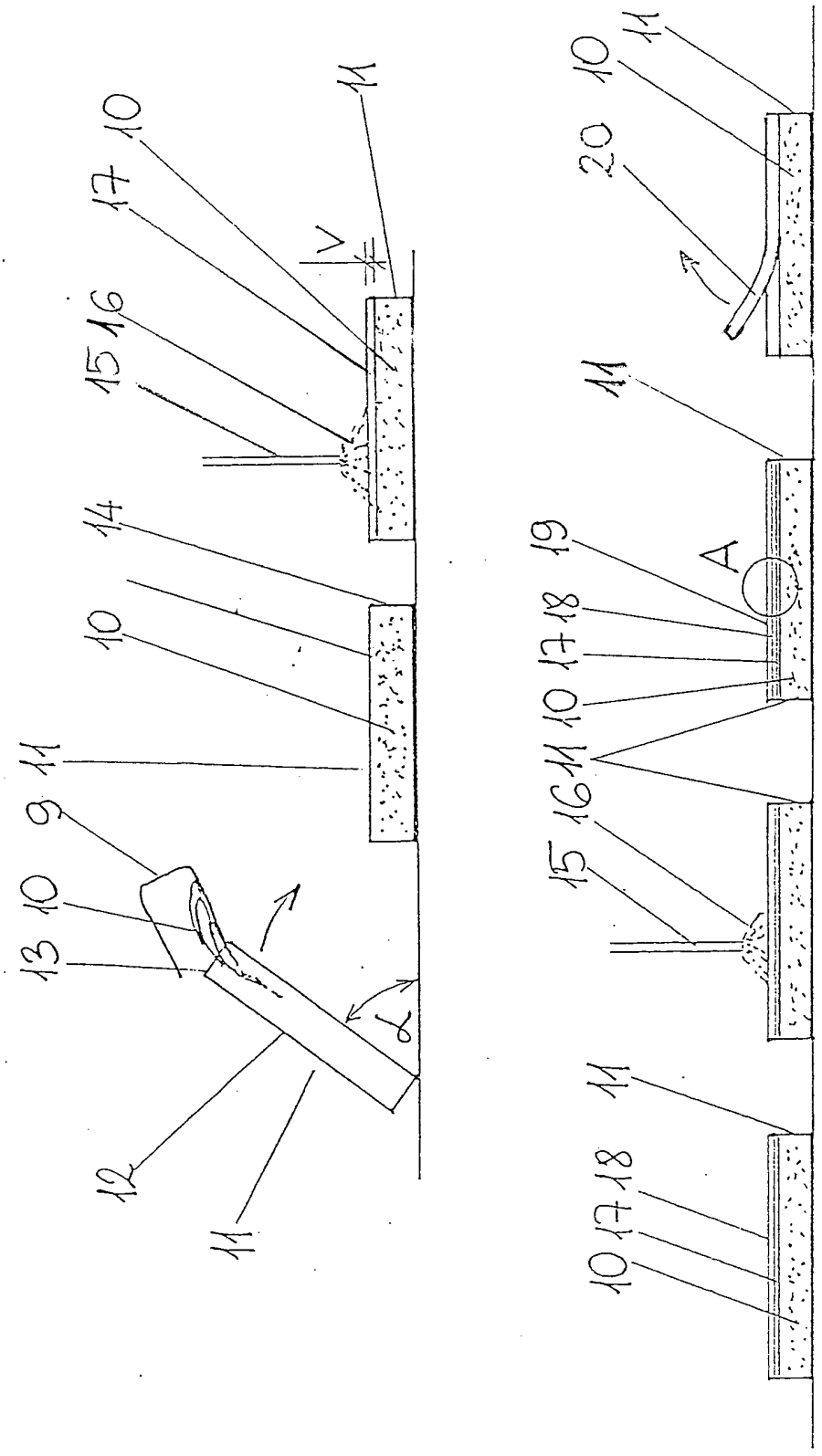


FIG. 1


11
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17
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A
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FIG. 2

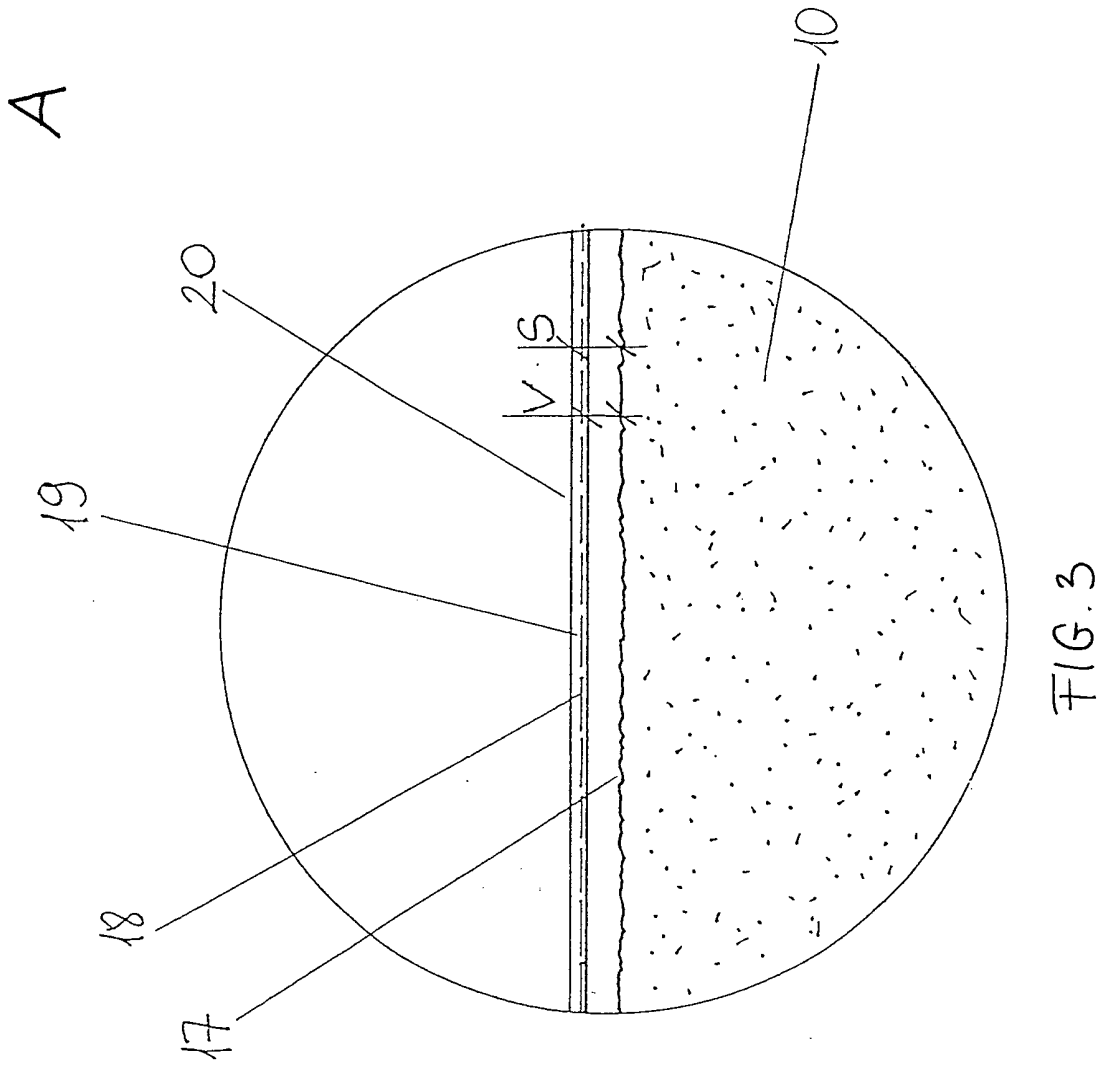

FIG. 3

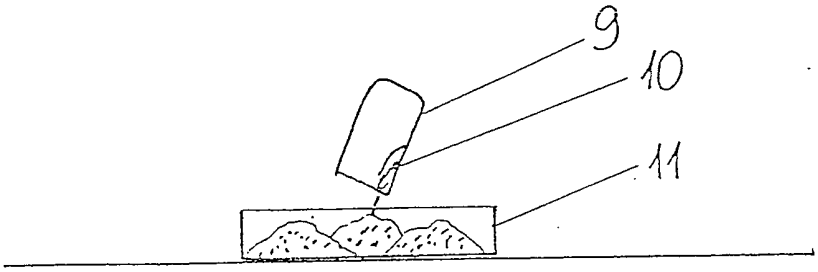

FIG. 4

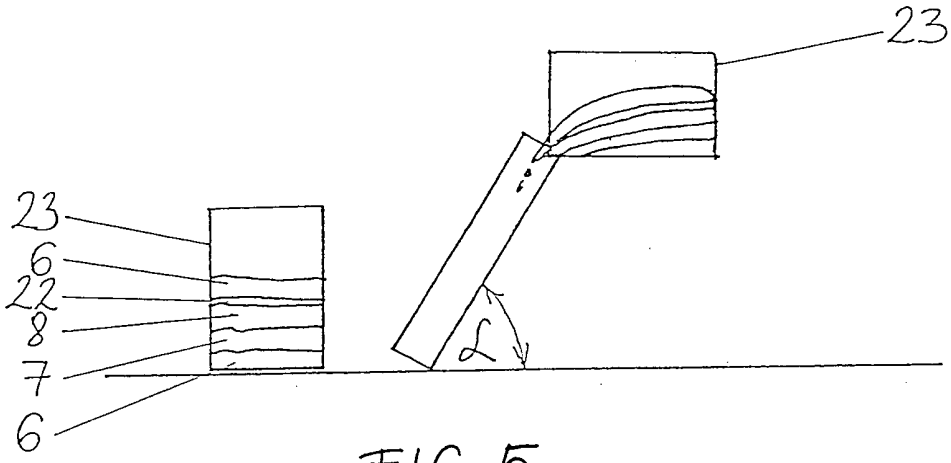

FIG. 5

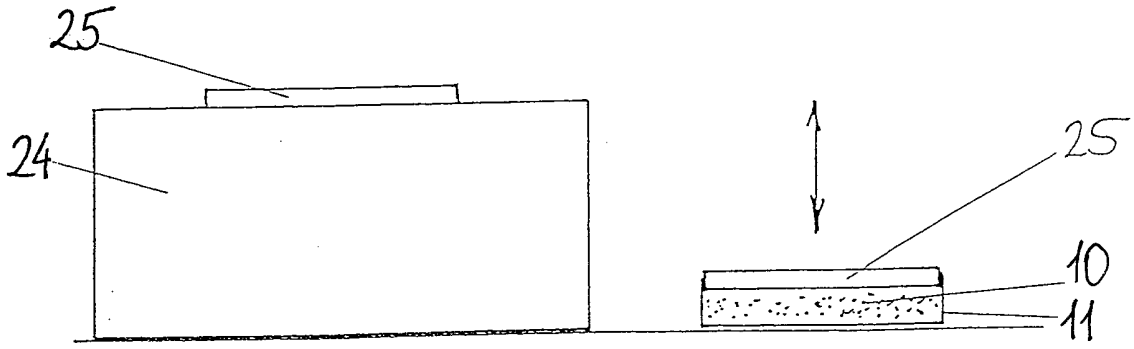

FIG. 6

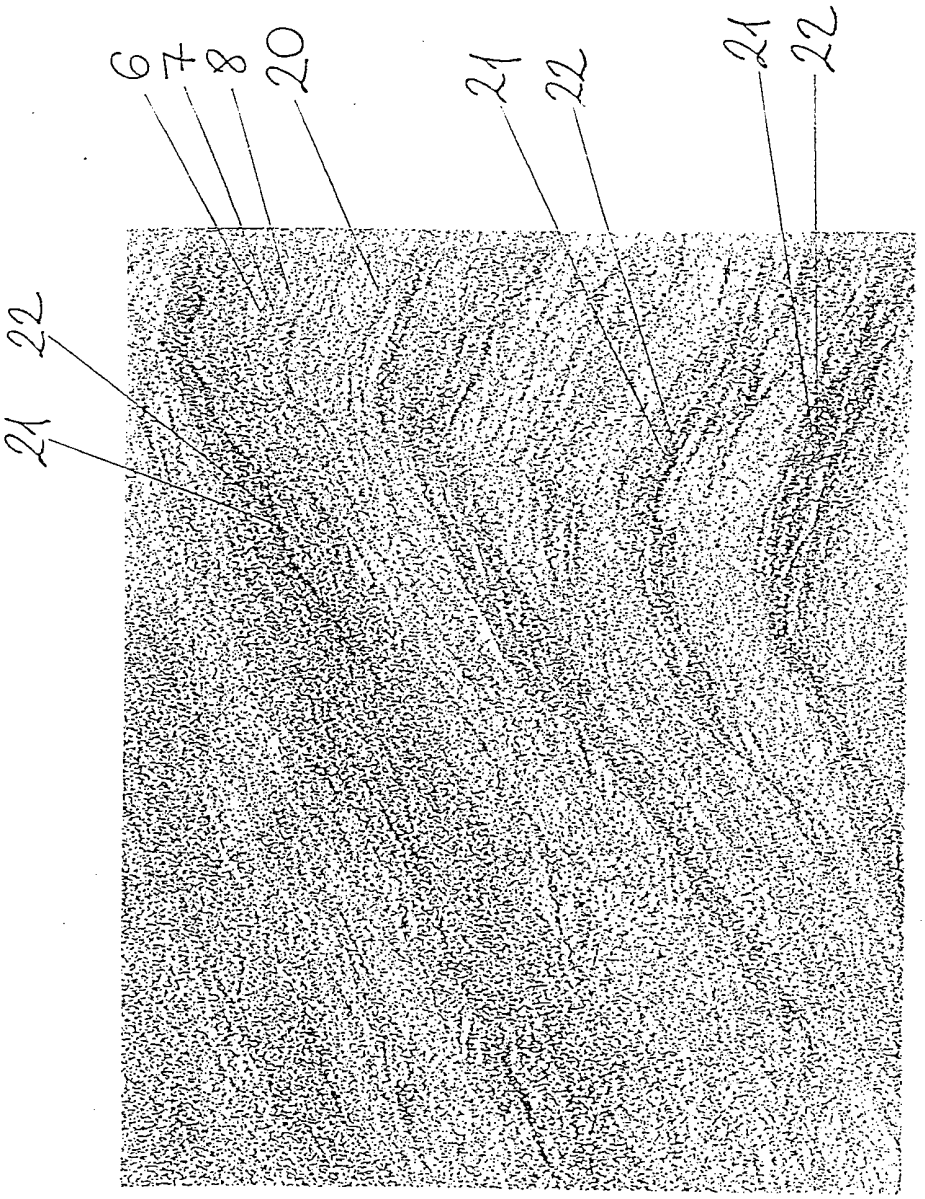

FIG. 7

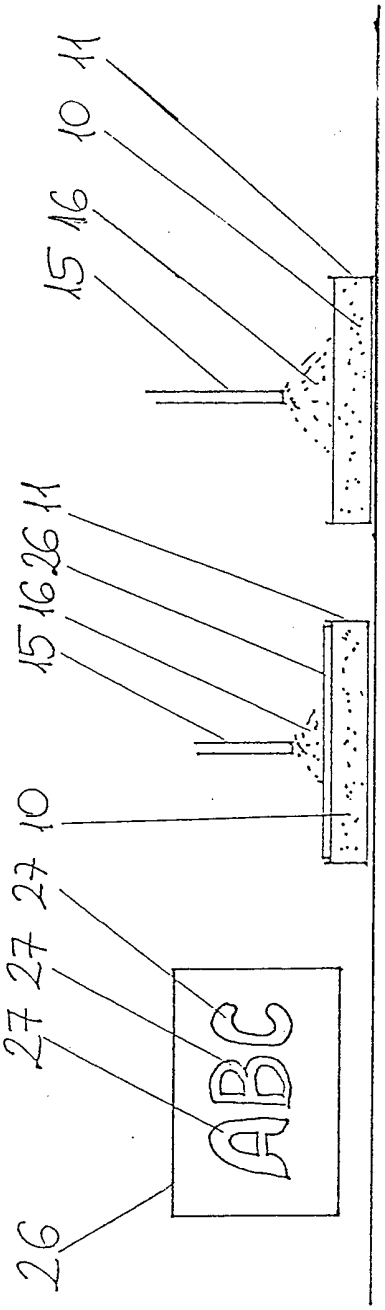

FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/HU 2011/000085

A. CLASSIFICATION OF SUBJECT MATTER ***B28D 1/00*** *(2006.01)*
B44C 5/04 *(2006.01)*
E04F 13/14 *(2006.01)*

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)
B28D 1/00, 1/32, B44C 1/00, 1/10, 5/04, E04F 13/14

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 practicable, search terms used)
Esp@cenet, DWPI, БД ФИПС

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2004052561 A1 (SMARTSLATE INC et al.) 24.06.2004	1-10
A	WO 0175246 A1 (NEUPERT HEIKO et al.) 11.10.2001	1-10
A	P 0400428 (ENDRODI LASZLO) 18.02.2004	1-10

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 November 2011 (18.11.2011)	24 November 2011 (24.11.2011)
Name and mailing address of the ISA/ FIPS Russia, 123995, Moscow, G-59, GSP-5, Berezhkovskaya nab., 30-1 Facsimile No. +7 (499) 243-33-37	Authorized officer Fedotov A. Telephone No. +7 (499) 240-25-91

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