

(19) **DANMARK**



Patent- og
Varemærkestyrelsen

(10) **DK/EP 2914385 T3**

(12) Oversættelse af
europæisk patentskrift

-
- (51) Int.Cl.: **B 05 D 5/06 (2006.01)** **B 05 D 1/04 (2006.01)** **B 05 D 7/00 (2006.01)**
B 05 D 7/14 (2006.01)
- (45) Oversættelsen bekendtgjort den: **2020-07-27**
- (80) Dato for Den Europæiske Patentmyndigheds
bekendtgørelse om meddelelse af patentet: **2020-04-15**
- (86) Europæisk ansøgning nr.: **13829035.8**
- (86) Europæisk indleveringsdag: **2013-10-16**
- (87) Den europæiske ansøgnings publiceringsdag: **2015-09-09**
- (86) International ansøgning nr.: **DE2013000603**
- (87) Internationalt publikationsnr.: **WO2014059963**
- (30) Prioritet: **2012-10-16 DE 102012020197**
- (84) Designerede stater: **AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV
MC MK MT NL NO PL PT RO RS SE SI SK SM TR**
- (73) Patenthaver: **Zbrodov, David, Bildstraße 87, 74223 Flein, Tyskland**
- (72) Opfinder: **Zbrodov, David, Bildstraße 87, 74223 Flein, Tyskland**
- (74) Fuldmægtig i Danmark: **Novagraaf Brevets, Bâtiment O2, 2 rue Sarah Bernhardt CS90017, F-92665 Asnières-sur-
Seine cedex, Frankrig**
- (54) Benævnelse: **FREMGANGMÅDE TIL BELÆGNING AF OBJEKTER**
- (56) Fremdragne publikationer:
WO-A2-2008/097415
US-A- 6 126 999
US-B1- 6 964 989
**DATABASE WPI Week 200023 Thomson Scientific, London, GB; AN 2000-265040 XP002722371, & JP 2000
070839 A (KANSAI PAINT CO LTD) 7. März 2000 (2000-03-07)**

Description

[0001] The invention relates to a method for coating objects, in particular vehicles and vehicle components, a film coating that can be removed from a vehicle or sprayed over after use and a vehicle provided with a film coating.

Prior Art

[0002] Vehicles are typically coated and painted in several layers by means of spraying methods. There are also coatings known without spraying methods, in which coated films are applied to a substrate, for example a motor vehicle body. Here the films can be provided on one side with one or more coating layers and can have an adhesive layer on the same or the other side, so that the film can be secured on the substrate. The films can be laminated onto the substrate so that they remain secured on the substrate.

[0003] For example, a "Method for Producing Paint Coatings " (DE 603 04 093 T2) is known, in which a paint coating layer in the form of an exterior coating layer is proposed. The coating layer is a component of a multiple layer coating and comprises a thermosetting coating composition that avoids the use of spray application. It does not have a separate adhesive layer or a base, as is the case for example with a film.

[0004] The substrate, in particular being provided with a preliminary coating, is coated with the additional coating layer, which is applied from a thermosetting coating composition and thermoset.

[0005] This method has the disadvantage that the film is difficult to remove. The range of colors for this method is restricted and the glossy effect is often unsatisfactory.

[0006] Likewise known is a "Paint System and Method for Producing film-like removable Coatings in the form of film with non-cross-linked Polymers" (DE 41 10 135 A1). A paint system including sprayable, linear polymers is proposed. This system is intended to provide vehicles with a weather-resistant coating, in order to protect said vehicles from corrosion and mechanical impact, but said coating should be removable after a period of time. Polymers are used for this purpose, which use liquid or lipoid softeners of the alkyd resin type for film coating. The paint system is applied to the object to be coated and subsequently the film forming liquid film is dried for forming a film with non-cross-linked, soluble polymers. This results in removable films.

[0007] JP 2000 070839 A discloses a "Temporary Coating of Color Changing Technique". In the process, a separable aqueous coating means, which forms a soluble film, which is formed using an emulsion coating materials, consisting of rubber, styrene, butadiene rubber, isoprene rubber, chloroprene rubber, nitrile-butadiene rubber, silicone rubber, fluoro rubber, urethane rubber, acrylic rubber or a derivative thereof, to which an outer coating material is applied, which contains a color pigment and a metal pigment

and has at least 50% spreading rate of a formed film, in order to form a detachable composite film.

[0008] US 6 126 989 B1 shows a "Urethane-acrylic rubber coating and method of forming a vehicle bed liner ". A method for forming a rubber-based elastic coating is described. The first step of the method involves providing a water curable liquid rubber and a water-based acrylic polymer. Subsequently, the rubber and the acrylic-polymer are combined into a curing rubber-acrylic composite. This curing rubber-acrylic-composite is applied onto the surface of a substrate and is allowed to completely cure at a temperature in the range of 35°F. to 110°F., in order to form a rubber-based coating.

[0009] US 6 964 989 B1 shows a "Peelable coating composition". This disclosure relates in general to water-resistant, removable protective and decorative, clear or pigmented coating compositions and in particular to solvent- and water-based polymer coating compositions, which form a protective and/or decorative coating on a plurality of substrates, including automotive paints, metals, plastics, concrete, natural and synthetic elastomers and ceramics.

[0010] WO 2008/097415 A2 describes "Removable coating compositions". A composition for forming a removable coating is disclosed, wherein the composition comprises an aqueous carrier, a water dispersible polyvinyl butyral and an acrylic latex compound.

[0011] This coating does not achieve a color effect similar to conventional color lacquer. The film has little adhesive force, so that it is suitable designed only for a short use as a protective cover.

[0012] Therefore, the invention addresses the problem of providing a method enables a coating of objects with a greater variety of colors, matte and high gloss or also only short-term color changes for vehicles or vehicle components.

Disclosure of the invention

[0013] A method for coating objects, in particular of vehicles and vehicle components, a film coating that can be removed from a vehicle or sprayed over after use and a vehicle provided with the film coating are proposed.

[0014] The invention is defined by the dependent claims.

[0015] In the process, the vehicle is sprayed to produce a film coating. A liquid rubber is used for this purpose, which is applied to the vehicle in several layers. In this way, layer for layer a "rubber film" builds up, which in the finished state cannot be distinguished from a normal paint job and which can be removed again completely and without residues. This method is suitable for application onto the base coat of the vehicle. This

coating can be transparent or combined with color pigments, so that matte or high gloss transparent or color coatings are achieved.

[0016] The following steps are performed on the vehicle prior to this:

- Cleansing and degreasing with suitable substances such as silicone remover or alcohol
- If necessary, taping of the components not to be coated

[0017] The ideal processing conditions are an air temperature of + 10 ° C or more and up to 75 % relative humidity.

[0018] Subsequently one or more of the following steps:

1st Exemplary embodiment

a) A first exemplary embodiment will be explained on the basis of the following steps:

[0019]

- Liquid rubber is diluted at least in a ratio of 1:1 with an acrylic thinner. So-called "short" diluting (a few seconds to a couple of minutes) is advantageous, "long" diluting also works (several minutes). The dilution ratio can also be increased, in order to achieve an optimized viscosity. In so doing, the dilution ratio is geared to the air pressure: higher pressure - more dilution. To obtain a color film coating a diluted acrylic paint can be admixed.
- The diluted liquid rubber is poured into a spray gun with a nozzle (for example with a nozzle size of 1.4-1.8) or into an electric spraying device through a strainer. Any nozzle size is conceivable, typical nozzle sizes range from 0.6 to 1.9 mm.
- The air pressure should range between at least 2 bar and a maximum 4 bar. The higher the pressure, the finer the liquid rubber is applied. In the case of higher pressure more dilution must be added, so that no liquid rubber dries in the pistol or in the air. In the process web-like particles would form. If the dilution is too high there is a danger that the material will run when being applied
- The ready-to-spray material is applied to the surface. The first layer is applied relatively dry. All further layers are applied uniformly wet. One indication of an optimum application is that the wet surface is similar to an orange peel
- Wait at least 10 minutes between the application of each layer, perhaps even longer, until all dilution parts have faded. This may be recognized by the fact that the layer is "finger dry" or matte. Between 2 and virtually an infinite number, preferably between 4 and 7 layers should be applied, depending on how thick the finished film is supposed to be
- Wait at least 30 minutes after the last layer, until it is dry.

[0020] Upon completion of these steps of the method according to the invention a **transparent or color film with a matt finish** is obtained.

b) To produce a high gloss film, perform the following steps of the method:

[0021]

- Spray the film with transparent plastic adhesion promoter and let dry at least 15 min. [this step is not absolutely necessary]
- Mixing of clear coat (e.g. 1 l) with 10 % softener (e.g. 100 ml) [this step is also not absolutely necessary]. The clear coat is preferably a scratch resistant 2K-HS-clear coat based on reflow technology. This clear coat has a high resistance to Micro scratches and chemicals. It is VOC-compliant. After that the total volume is mixed with the curing agent in a ratio of usually 2:1 to the clear coat. This total volume is followed, if necessary, by up to 30% of a thinner, for example an acrylic thinner
- Spray this ready-to-spray clear coat dry onto the film. After that, apply one to two further wet layers. Wait at least 10 minutes between each layer. After the last layer, allow the clear coat to flash off at least 15 minutes. Afterwards it can be blow dried and/or burnt at approximately 80 degrees Celsius. Let cure. After curing the surface can be sanded and polished until the desired result has been achieved.

[0022] Upon completion of these further steps a **transparent or color film with a high gloss finish** is obtained.

2nd Exemplary embodiment

a) A further advantageous embodiment of the invention will be described in this second exemplary embodiment:

[0023]

- Dilute transparent liquid rubber with acrylic thinner at least in a 1:1 ratio. This occurs advantageously with the so-called “short” dilution, a “long” dilution also works. The dilution ratio can also be increased, in order to achieve the optimum viscosity. It is important to coordinate this to the air pressure. A higher pressure requires more dilution.
- Mix undiluted acrylic-based paint with acrylic thinner in a ratio of 1:1 or use ready-to-spray acrylic paint; instead of acrylic paint an acrylic-based single coat paint may also be used. Mix the ready mixed, transparent liquid film in a ratio of min. 2:1, max. 1:1, with the diluted paint. For clarification, here is a **sample**

calculation:

1l ready-to-spray colored liquid film containing 700 ml diluted transparent liquid rubber and 300 ml diluted acrylic paint

- The diluted liquid rubber is poured into a spray gun (for example with a nozzle size of 1.4-1.8) or into an electric spraying device through a strainer
- The air pressure should be at least 2 bar and a maximum 4 bar. The higher the pressure, the finer the liquid rubber is applied. In the case of higher pressure, more thinner must be added, so that no liquid rubber dries in the pistol or in the air and web-like particles do not form. If the dilution is too high there is a danger that the material will run when being applied
- Now apply the ready-to-spray colored material either directly onto the surface or apply 1 -2 layers of transparent "base film" beforehand; this promotes better resistance. Apply the first layer relatively dry. Apply all further layers uniformly wet. One indication for a perfect application is that the wet surface is similar to an orange peel
 - Wait at least 10 minutes between each layer, if necessary, also longer, until all dilution parts have faded. This may be recognized by the fact that the layer is "finger dry". Apply between 4 and 8 layers, depending on how thick the finished film is supposed to be and whether the desired paint coverage has been achieved
- Wait at least 30 minutes after the last layer, until it is dry.

[0024] Upon completion of these steps a **colored film with a matte finish** is obtained. Any color that can be manufactured on an acrylic basis is possible.

b) To obtain a colored film with a high gloss finish the following additional steps are performed in a further exemplary embodiment:

[0025]

- Spray the film with transparent plastic adhesion promoter and let dry for at least 15 min.
- Mix clear coat (e.g. 1 l) with 10 % softener (e.g. 100 ml). After that the total volume is mixed with the curing agent in a ratio of usually 2:1 to the clear coat. This total volume is followed by up to 15 % of a thinner, for example an acrylic thinner
- Spray this ready-to-spray clear coat dry onto the film. Then apply two further wet layers. Wait at least 10 minutes between each layer. After the last layer, allow the clear coat to flash off at least 15 minutes. Afterwards it can be blow dried and/or burnt at approximately 80 degrees Celsius. Then let it cure.

[0026] Upon completion of these steps a **colored film in any desired color with a high gloss finish** is obtained.

3rd Exemplary embodiment:

a) Here the steps for the mixing and coating with transparent liquid film and the subsequent painting using water-based paint will be explained:

[0027]

- Dilute transparent liquid rubber with acrylic thinner at least in a 1:1 ratio. A “short” dilution is best, a “long” dilution also works. The dilution ratio can also be increased, in order to achieve the optimum viscosity. It is important to coordinate this to the air pressure. A higher pressure requires more dilution.
- Dilute water-based paint conventionally or used diluted water-based paint
- Pour the diluted liquid rubber into the spray gun (for example with nozzle size 1.41.8) or into an electric spraying device through a strainer
- The air pressure should be at least 2 bar and a maximum of 4 bar. The higher the pressure, the finer the liquid rubber is applied. In the case of higher pressure more dilution must be added, so that no liquid rubber dries in the pistol or in the air and web-like particles do not form. If the dilution is too high there is a danger that the material will run when being applied
- Now apply the ready-to-spray transparent or colored liquid film to the surface. Apply the first layer relatively dry. Apply all further layers uniformly wet. One indication of an optimum application is that the wet surface is similar to an orange peel. Wait at least 10 minutes between each layer, if necessary, also longer, until all dilution parts have faded. This may be recognized by the fact that the layer is “finger dry”. Apply between 4 and 7 layers, depending on how thick the finished film is supposed to be
- Wait at least 30 minutes after the last layer, until it is dry
- Spray the film with plastic adhesion promoter and let dry at least 15 minutes
- Now the ready-to-spray water-based or acrylic-based paint can be applied to the film, as in conventional painting. Once the desired covering power and color have been achieved, let the film dry. The film can also be blow-dried or burned.
- Seal the water-based paint by applying matte clear coat or a conventional clear coat. Depending on the selection, one obtains a matte or glossy finish (cf. method example 3 b)

[0028] Upon completion of these steps, **a transparent film is obtained, colored by the application of a water-based paint, with a matte finish.** Any color that can be manufactured on a water basis is possible.

b) Perform the following steps for a high gloss film:

[0029]

- Mix clear coat (e.g. 1 l) with 10 % softener (e.g. 100 ml). After that the total volume is mixed with the curing agent in a ratio of usually 2:1 to the clear coat. This total volume is followed by up to 15 % of a thinner, for example an acrylic thinner
- Spray this ready-to-spray clear coat dry onto the film. Then apply two further wet layers. Wait at least 10 minutes between each layer. After the last layer, let the clear coat flash off min. 15 minutes. Afterwards it may be blow-dried and/or burned at approximately 80 degrees Celsius. Then let it cure.

[0030] After these steps, a **transparent film is obtained, colored by the application of a water-based paint, with a high gloss finish.**

4th Exemplary embodiment:

[0031] As a further exemplary embodiment, the vehicle provided with the film coating from the liquid rubber layers according to the invention can be sprayed with a single coat paint. As a result, a coloration of the film below can be achieved. A glossy or matte single coat paint can be applied.

[0032] The film is applied by spraying in several layers and dried as described, then the single coat paint is applied to the film coating, in particular sprayed on. Depending on the addition or use of a paint or the selection of a single coat paint (matte or glossy) one obtains the desired color and the desired finish. This exemplary embodiment has the advantage that the sealing is finished with the application of the single coat paint, no further layer (clear coat) is necessary.

[0033] All exemplary embodiments can also be modified to an alternative embodiment, wherein the application of the plastic adhesion promoter is omitted and instead another clear coat is applied.

[0034] The clear coat is configured such that it forms a bond with the film without plastic adhesion promoter. The clear coat is preferably a scratch resistant 2K-HS-Acryl-clear coat based on reflow technology. This clear coat has a high resistance to Micro scratches and chemicals auf. It is VOC-compliant.

[0035] At approximately 20° C the used clear coat has in particular a spraying viscosity of from 20 to 22 s 4 mm DIN. It can be applied with spray nozzles of from 1.2 to 1.4 mm at pressures between 2 - 3 bar with an internal nozzle pressure of 0.7 bar. The layer thickness of the dry film ranges from 50 to 60 µm. For an object temperature of 20°C to 60°C the drying time between 5 min and 24 h.

[0036] The used clear coats are acid and base and pollutant resistant.

[0037] Different proportions of curing agent may be added, e.g. clear coat-curing agent Vol. 2:1 bis 3:1. The curing agents typically contain aliphatic polyisocyanates.

[0038] To increase the elasticity of clear coats, colorless additives, e.g. softeners may also be used. This is in particular advantageous in the processing of deformable plastic components. The additives are colorless and are used in the in the mixing ratio of 10 - 50 % additives to the stock paint. The drying time using additives increases up to 100%.

[0039] The coloration can take place with matte water-based paint or matte acrylic paint. The clear coat is applied over it for sealing purposes. The coloration can also take place with a single coat paint. This single coat paint automatically seals the sprayed film. It can be matte or glossy.

[0040] The used liquid rubber is a rubber-based rubber, is elastic, resistant and easy to process. The rubber can be natural or synthetic and is vulcanized. To make the rubber sprayable, typically additives such as vulcanization accelerators or retarders, fillers, organic solvents, antioxidants and/or antiozonants are admixed to improve the shelf life and processability.

[0041] Synthetic materials such as silicones, thus poly(organo)siloxanes, in particular silicone rubbers, may be used. Silicone rubbers are transferable masses in the rubber elastic state, which contain poly(organo)siloxanes, which have accessible groups for cross-linking reactions.

Further advantages of the invention:

[0042] The method according to the invention has one further positive use: The film seals and protects the underlying base coat from scratches, weather effects, stone chipping and other signs of wear, as a result of which the value of the vehicle is preserved. Incidentally, rims or other vehicle components treated according to the method are also protected from salts in the winter.

[0043] The coloration can be designed specifically according to the customer's requirements. For example, paints, e.g. acrylic-based paints or solvent-based paints can be admixed to the liquid rubber and the single coat paint. Special color designs are also possible, for example phosphorescent coatings, which reemit the light in the darkness for hours. In addition, fluorescent effects can be achieved, which for example become visible when exposed to ultra-violet radiation.

[0044] With the method according to the invention, complex 3-dimensional objects such as rims, radiator grills, emblems and much more, which otherwise may not be filmed, but only painted, can be processed.

[0045] Additionally advantageous is the fact that no removal of vehicle components is necessary for application of the method, instead the vehicle may be provided with the film coating completely on one piece using the method according to the invention. This also influences the price and reduces costs. Moreover, only 1-2 workdays are required

for the colorization of a complete vehicle according to the invention. In contrast to car wrapping according to the prior art, this is a time savings of 50%.

[0046] In addition, the application of a transparent car wrapping is possible. This cannot be achieved with the known car wrappings from the prior art.

[0047] The film can, if for example a color change is desired, be easily removed again and a new coloration of the vehicle or vehicle components can be applied by means of the method according to the invention.

[0048] Also, a vehicle or vehicle component already provided with a film according to the invention can be provided with another film according to the invention without removing the existing film. The "new" film can be sprayed directly on the existing film. For example, a car that is sprayed in "red" today can be sprayed over with "black" tomorrow.

[0049] Further advantages and advantageous embodiments of the invention can be inferred from the following description of the figures, the drawing and the claims.

[0050] In the following, exemplary embodiments of the solution according to the invention will be described in greater detail on the basis of the attached drawing. The figures show the following:

Fig. 1 Shows a schematic sequence of the method.

[0051] Fig. 1 shows a schematic sequence of the method. The surface to be treated is first cleaned and degreased. Components that are not to be treated are taped if necessary.

[0052] Next, the liquid rubber is applied, which is diluted for better processability. The liquid rubber can be colored with paint additives. At least one layer of the liquid rubber is sprayed on, an application of four to seven layers of liquid rubber have proven well suited for a film coating. Each application is followed by a drying phase.

[0053] The resulting film coating is then sealed.

[0054] This can happen by applying an adhesion promoter and subsequent application of clear coat.

[0055] In the selection of specially formed clear coats, which do not require an adhesion promoter, such a clear coat is applied and a further clear coat is used for the final sealing.

[0056] In addition, a single coat paint may be used to seal the liquid rubber layers.

[0057] The single coat paint can achieve the respective desired result by the addition of paints or its development (matte/clear).

Patentkrav

1. Fremgangsmåde til belægning af objekter, specielt køretøjer og køretøjskomponenter,
5 som omfatter følgende trin:

- fortynding af flydende gummi med en akrylfortynder
- fyldning af det fortyndede flydende gummi i en sprøjtepistol eller en elektrisk
sprøjteanordning
- 10 • påføring af det fortyndede flydende gummi på overfladen af det objekt, der skal
belægges, ved hjælp af sprøjtepistolen eller den elektriske sprøjteanordning
- tørreperiode
- derved dannelse af en aftagelig filmbelægning, hvori påføringen af det fortyndede
flydende gummi sker i fire til otte lag, og hvori en fortyndet akrylmaling blandes med
15 det flydende gummi med akrylfortynderen, og hvori efter påføring af hvert lag en
tørreperiode aktiveres i hvert tilfælde,
- blanding af en klar lak med et hærdemiddel i et forhold på 2:1
- tilsætning af 10 %vol af akrylfortynder af den samlede mængde
- sprøjtning af en blanding af sprøjteklar klar lak og hærdemiddel tørt på
20 filmbelægningen;
- påføring af 1 - 2 yderligere våde lag, hvor der ventes mindst 10 minutter mellem hvert
lag,
- fordampning af den klare lag efter sidste lag.

25 2. Fremgangsmåden i henhold til krav 1, **kendetegnet ved, at** lufttrykket efter påføring
af det fortyndede flydende gummi er 2 til 4 bar.

3. Filmbelægning til lakerede køretøjsflader, som omfatter mindst fire lag sprøjteklart
flydende gummi, der er fortyndet ved hjælp af en akrylfortynder i henhold til den
30 filmbelægning, der er påført ved hjælp af produktionsmetoden i henhold til krav 1 eller
2, hvori laget af flydende gummi omfatter en fortyndet akrylbaserede maling, og mindst

ét lag klar lak er påført lagene af flydende gummi, hvori laget af klar lak omfatter en hærdemiddelkomponent.

4. Belagt artikel, specielt køretøj eller køretøjskomponent, **kendetegnet ved, at** det er
5 givet en filmbelægning i henhold til krav 3.

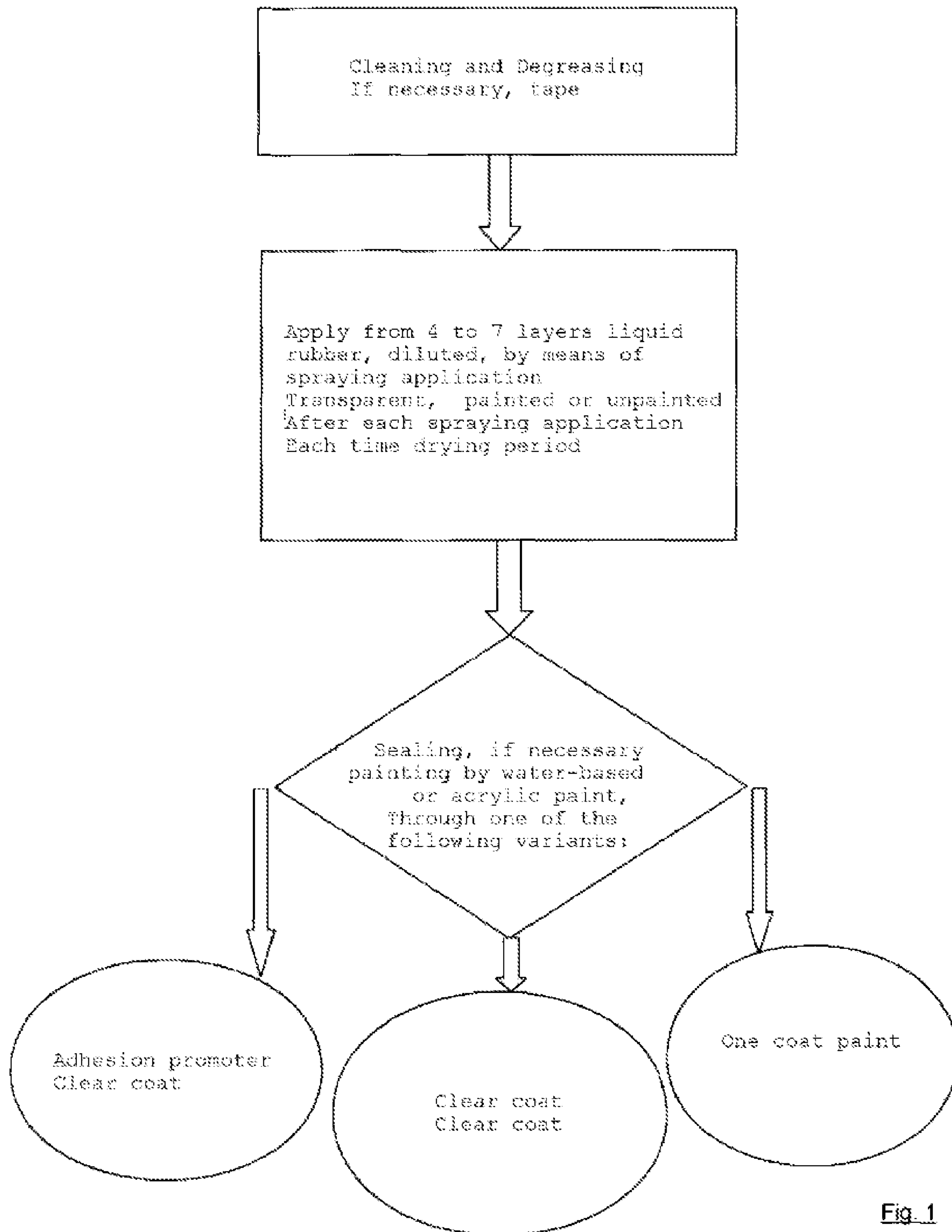


Fig. 1