

Specification

Title of Invention: ERASER-LIKE CLEANER

Technical Field

[0001] The present invention relates to an eraser-like cleaner, and more particularly, to an eraser-like cleaner which can remove contamination such as stains on wallpaper just by rubbing like erasing characters with an eraser, and moreover, make removed contamination or grinding sludge adhering and cohesive on the cleaner body without scattering the contamination or grinding sludge in the vicinity, so that the vicinity is not contaminated.

Background Art

[0002] Conventionally, as cleaners for the removal of contamination such as stains on wallpaper, solvents and neutral detergents are described, and erasers are also described (Non-patent Literature 1). Further, eraser-type cleaners containing components dissolving stains and an abrasive material are commercially available (Non-patent Literature 2). Furthermore, eraser-type cleaners comprising melamine, vinyl chloride and phenyl glycol are also commercially available (Non-patent Literature 3).

Citation List

Non-patent Literature

[0003] Non-patent Literature 1:

<http://www.homepro.co.jp/info/kabegami/basics/kiso009.shtml>

Non-patent Literature 2:

http://www.kenko.com/product/item/itm_6910183872.html

Non-patent Literature 3:

<http://www.rakuten.co.jp/brico/429250/515337/708655>

Summary of Invention

Technical Problem

[0004] However, the solvents are difficult to obtain by ordinary homes and include the problems in safety and health. Moreover, the neutral detergents have a drawback that it takes a long time to remove the stains. Furthermore, erasers are insufficient in removal of stains, and erasers containing an abrasive material tend to damage the surface of wallpaper.

[0005] Specifically, eraser-type cleaners, for example, comprising a rubber or a resin composition, if necessary, further containing an abrasive material can be easily manufactured by molding a composition including a rubber or a resin composition or further an abrasive material into a solid form with the use of an extruder or the like. In addition, in use, dirty fingerprints and brackish stains and the like can be removed by rubbing, as if characters were erased with an eraser, and the usability is thus favorable. Moreover, contamination removal effects in mint condition can be always achieved, because new surfaces of the cleaners are exposed for each use.

[0006] Meanwhile, in the case of removing contamination with the use of the eraser-type cleaner, the surface of the cleaner is refaced by adsorbing the contamination onto the cleaner, and separating the contamination adsorbed surface of the cleaner as shavings, so as to be able to adsorb contamination again, and used repeatedly.

Therefore, the generation of shavings is essential to the cleaners, and cleaners which generate no shavings will not reface the cleaner

surfaces to keep contamination adhering on the cleaner surfaces, and thus, removals with such cleaners will result in poor contamination removal performance, and in the worst case, result in rubbing contamination on contaminated objects to be subjected to contamination removal such as wallpaper.

[0007] As described above, in the case of the eraser-type cleaners, the generation of shavings is related to contamination removal, and there is a tendency to also increase the contamination removal performance as the amount of shavings is increased.

However, when a large amount of shavings is generated, the shavings will scatter on objects to be subjected to contamination removal and in the vicinity thereof or fall to the floor to cause the contamination thereof, and the cleanup will require a troublesome work. In addition, the same applies to cases where removed contamination remains on objects to be subjected to contamination removal.

[0008] The present invention is, in view of the above-mentioned circumstances, intended to solve the problem of the prior art, and provides an extremely easy-to-use eraser-like cleaner which is favorable in terms of cohesiveness of shavings generated when contamination is removed with the cleaner, which tends to adhere to the cleaner body, with removed contamination adsorbed on the shavings, so that the shavings will not scatter on objects to be subjected to contamination removal or in the vicinity thereof, or will not fall to the floor to cause the contamination thereof, thus requiring no cleanup or only simple cleanup after contamination removal.

Solution to Problem

[0009] The present invention has been achieved in order to solve the above-mentioned problems, and has the following features.

(1) An eraser-like cleaner comprising a molded article of a composition containing a base resin and an uncrosslinked rubber, characterized in that the molded article has initial hardness of 50 or more, and there is a variation difference between the initial hardness and hardness after 3 seconds is in a range of from 3 to 9:

wherein:

Initial hardness: the value of a scale marking read off in terms of integer, immediately on bringing an indenter of a testing machine vertically in contact with, under pressure, the surface of a test piece kept in a horizontal position with the use of a hardness testing machine (C-type hardness tester) in accordance with JIS S 6050;

Hardness after 3 seconds: the value of a scale marking read off in terms of integer 3 seconds after the measurement of the initial hardness.

(2) The eraser-like cleaner in which the base resin is a styrene elastomer.

(3) The eraser-like cleaner in which the styrene elastomer comprises at least one selected from a styrene-butadiene-styrene (SBS) copolymer, a styrene-isoprene-styrene (SIS) copolymer, a styrene-ethylene/propylene-styrene (SEPS) copolymer, styrene-ethylene/butylene-styrene (SEBS) copolymer, and a styrene-ethylene/ethylene/propylene-styrene (SEEPS) copolymer.

(4) The eraser-like cleaner in which the uncrosslinked rubber is at least

one selected from a butyl rubber, a natural rubber, a styrene-butadiene rubber, an ethylene-propylene rubber, an isoprene rubber, and a butadiene rubber.

- (5) The eraser-like cleaner further containing a tackifier.
- (6) The eraser-like cleaner further containing a softener.
- (7) The eraser-like cleaner further containing a filler.
- (8) The eraser-like cleaner in which the composition comprises 40 to 95 parts by weight of the base resin and 60 to 5 parts by weight of the uncrosslinked rubber.
- (9) The eraser-like cleaner in which the tackifier is 5 to 35 parts by weight with respect to 100 parts by weight in total of the base resin and uncrosslinked rubber.
- (10) The eraser-like cleaner in which the softener is 15 to 35 parts by weight with respect to 100 parts by weight in total of the base resin and uncrosslinked rubber.
- (11) The eraser-like cleaner in which the filler is 200 to 700 parts by weight with respect to 100 parts by weight in total of the base resin and uncrosslinked rubber.
- (12) The eraser-like cleaner for the removal of stains on wallpaper.

Advantageous Effects of Invention

[0010] The eraser-like cleaner according to the present invention is favorable in terms of cohesiveness of shavings generated when contamination is removed, which adhere to the cleaner body without scattering in the vicinity, is also likely to adsorb the removed contamination, and extremely easy-to-use, with no cleanup or only simple

cleanup required for shavings or removed contamination, because troubles are avoided such as the fact that shavings or removed contamination scatter on objects to be subjected to contamination removal and in the vicinity thereof, or fall to the floor to cause the contamination thereof.

In addition, when the eraser-like cleaner is used for removal of stains on wallpaper, the surface of the wallpaper is not damaged.

Description of Embodiments

[0011] The base resin for use in the present invention is preferably a styrene elastomer in terms of favorable cohesiveness. Examples of the styrene elastomer include, for example, styrene-ethylene/propylene-styrene (SEPS) copolymers, styrene-ethylene/butylene-styrene (SEBS) copolymers, styrene-isoprene-styrene (SIS) copolymers, styrene-butadiene-styrene (SBS) copolymers, and styrene-ethylene/ethylene/propylene-styrene (SEEPS) copolymers, and the like.

[0012] The styrene-ethylene/propylene-styrene (SEPS) copolymers include, for example, SEPTON 2002, SEPTON 2006, SEPTON 2063, and SEPTON 2104 (all from Kuraray Co., Ltd.), furthermore, the styrene-ethylene/butylene-styrene (SEBS) copolymers include, for example, SEPTON 8076 and SEPTON 8104 (all from Kuraray Co., Ltd.), furthermore, the styrene-isoprene-styrene (SIS) copolymers include, for example, HYBRAR 5127 (from Kuraray Co., Ltd.), furthermore, the styrene-butadiene-styrene (SBS) copolymers include, for example, TUFPRENE A, TUFPRENE 126, and ASAPRENE T-475 (all from Asahi Kasei Chemicals Corporation), KRATON D-4271 (from Kraton Polymers Japan Ltd.), and PB575 (from CHIMEI CORPORATION), and furthermore,

the styrene-ethylene/ethylene/propylene-styrene (SEEPS) copolymers include SEPTON4033, SEPTON 4055, and SEPTON 4077 (all from Kuraray Co., Ltd.). These are used singly or in combination of two or more, if necessary.

[0013] Examples of the uncrosslinked rubber for use in the present invention include, for example, butyl rubbers such as EXXONBUTYL 065, EXXONBUTYL 365, and EXXONBUTYL 268 (all from ExxonMobil Chemical Ltd.), BayerButyl 301, BayerButyl 100, and BayerButyl 402, (all from Bayer Corporation), JSR Butyl 065, JSR Butyl 268, and JSR Butyl 365 (all from JSR Corporation), and Oppanol B50, Oppanol B80, Oppanol B100, Oppanol B150, and Oppanol B200 (all from BASF Japan Ltd.); natural rubbers such as RSS#1 (produced in Indonesia); styrene-butadiene rubbers such as SBR 1502; ethylene-propylene rubbers such as EP 33; isoprene rubbers such as IR 2200; and butadiene rubbers such as BR 18 (all from JSR Corporation), and these rubbers are used singly or in combination of two or more, if necessary.

[0014] The tackifier for use in the present invention is used for adjusting the hardness and viscoelasticity, in particular, viscoelasticity of the eraser-like cleaner, if necessary. By the use of the tackifier, cohesiveness of the removed contamination and shavings, and adhesion thereof to the cleaner body can be enhanced. Examples of this tackifier include olefin resins such as butene copolymers, terpene resins, coumarone-indene resins, petroleum resins, and rosin resins. These materials are used singly or in combination of two or more, if necessary.

[0015] The softener for use in the present invention is used for adjusting

the hardness and viscoelasticity, in particular, hardness of the eraser-like cleaner, if necessary. Mineral oils, animal and vegetable oils, or plasticizers derived from those oils can be used as this softener. The mineral oils specifically include paraffinic process oils, naphthenic process oils, and aromatic process oils. The animal and vegetable oils specifically include rapeseed oils, refined rapeseed oils, castor oils, cotton seed oils, flaxseed oils, soybean oils, sesame oils, corn oils, safflower oils, palm oils, coconut oils, peanut oils, Japan wax, rosins, pine tar, and tall oils. The plasticizers derived from the animal and vegetable oils include glycerin fatty acid esters, and specifically include glycerin diacetomonoaurate, glycerin triacetate, and glycerol diacetate. These softeners are used singly or in combination of two or more, if necessary. In order to provide environment-adaptable eraser-like cleaners, biomass-derived animal and vegetable oils or plasticizers derived from the oils can be used as renewable resources.

[0016] The filler for use in the present invention is used for adjusting the weight increase and hardness of the eraser-like cleaner, if necessary. Examples of this filler include heavy calcium carbonate, light calcium carbonate, silica, diatomite, magnesium oxide, titanium oxide, talc, sericite, quartz powders, montmorillonite, powders of shells such as scallops, oysters, and freshwater clams, eggshell powders, organic hollow particles, and inorganic hollow particles. These fillers are used singly or in combination two or more, if necessary. In order to provide environment-adaptable eraser-like cleaners, biomass-derived powders of shells such as scallops and oysters, or eggshell powders can be used which are generated

in large amounts as waste.

[0017] The eraser-like cleaner according to the present invention is made to have the form of a solid molded article by various molding machines, rubbed against contamination such as stains or the like to adsorb the contamination onto the surface of the cleaner, as if characters were erased with an eraser, and prepared for the next removal by refacing the cleaner surface through abrasion of the contamination adsorbed surface of the cleaner like shavings, and in this regard, a feature of the cleaner consists in having cohesiveness for adhesion of the shavings to the cleaner as much as possible without separating the shavings from the cleaner and dispersing the separated shavings in the vicinity.

[0018] In order to remove contamination with the cleaner according to the present invention, there is a need for hardness (initial hardness) with which the cleaner can be held by hand and rubbed against contamination. Next, the surface of wallpaper, for example, is concave and convex, and the stains are present on the concave and convex surface. Accordingly, in order to remove the stains present on the concave and convex surface, it is necessary for the cleaner to transform and follow the concave and convex surface of stains to contact with the stains. The cleaner is repeatedly shuttled for friction several times until the contamination is scraped off, at this point, the hardness is decreased to provide viscoelasticity (hardness after 3 seconds) in order to contact with the concave and convex surface of stains and attach shavings adsorbed by scraping off the contamination to the cleaner, thereafter, there is a need to restore the original hardness for the next use.

More specifically, there is a need for a moderate shape retention property in order to hold the cleaner by hand and rub the cleaner against contamination, there is a need for moderate hardness which causes no plastic deformation, and there is a need to have no adhesion such as adhering to fingers. Furthermore, there is a need for moderate hardness and moderate viscoelasticity in order to contact with the concave and convex surface of stains and to rub the cleaner for scraping off contamination.

On the other hand, there is a need for the shavings adsorbed by scraping off the contamination to have viscoelasticity without being separated from the cleaner, and there is a need to restore and maintain the original hardness, shape retention property, of the cleaner for reuse after removing the contamination.

In order to provide the satisfactory properties, there is a need for the hardness at the start of contamination removal, that is, the initial hardness to be 50 or more, and there is a need for the variation difference between the initial hardness and the hardness after 3 seconds to fall within a required range, that is, not less than 3 and not more than 9. When the eraser-like cleaner is used for wallpaper, the upper limit of the initial hardness is preferably around 80, depending on the wallpaper materials such as paper, cloth, vinyl chloride resin, and the like. If the initial hardness exceeds 80, the wallpaper tends to be damaged. The initial hardness less than 50 is too soft to achieve a sufficient shape retention property and a sufficient scraping off of contamination, thereby reducing the ease of rubbing and the cleanness. In addition, when the

variation difference between the initial hardness and the hardness after 3 seconds is 2 or less, the cleaner is difficult to transform and follow the concave and convex surface of stains due to insufficient viscoelasticity, on the other hand, when it is 10 or more, the ease of rubbing and the cleanness are reduced, and in addition, cohesiveness is also reduced. Moreover, it becomes difficult to restore and maintain the original hardness, shape retention property, of the cleaner for reuse.

It is to be noted that the initial hardness refers to the value of a scale marking read off in terms of integer, immediately on bringing an indenter of a testing machine vertically in contact with, under pressure, the surface of a test piece kept in a horizontal position with the use of a hardness testing machine (C-type hardness tester) in accordance with JIS S 6050, and the hardness after 3 seconds refers to the hardness 3 seconds after the measurement of the initial hardness, that is, the value of a scale marking after 3 seconds in contact with the surface under pressure as in the case of the measurement of the initial hardness.

[0019] The respective components according to the present invention are blended so as to provide the satisfactory hardness and viscoelasticity. The proportions of the components blended also vary depending on the types of the respective components used, and it is thus difficult to definitely specify the proportions. Accordingly, without necessarily wishing to be bound, when presented as a tentative guide, the base resin is 40 to 95 parts by weight and the uncrosslinked rubber is 60 to 5 parts by weight (the total of the both components is 100 parts by weight). In addition, in the case of blending the tackifier, the softener, and the filler, with respect to 100 parts

by weight in total of the base resin and uncrosslinked rubber, the tackifier is 5 to 35 parts by weight, the softener is 15 to 35 parts by weight, and the filler is 200 to 700 parts by weight.

[0020] Furthermore, for the purpose of modifying the properties, resins such as ethylene, polypropylene, polyethylene vinyl acetate, polyethylene ethyl acrylate, chlorinated polyethylene, and poly (meth) acrylate, surfactants, antioxidants, light resistance stabilizers, lubricants, ultraviolet absorbers, mildew-proofing agents, colorants, perfumes, etc. can be added to the cleaner according to the present invention. These additives are on the order of 1 to 15 parts by weight with respect to 100 parts by weight in total of the base resin and uncrosslinked rubber.

[0021] The cleaner composition including the components as described above is subjected to kneading, made into a solid molded article by press molding, injection molding, extrusion molding, or the like, cut into a predetermined size, to be an eraser-like cleaner.

[0022] The eraser-like cleaner of the present invention is excellent in cohesiveness, and the shavings absorbed contamination and the removed contamination well adhere to the cleaner body, preferably about 80 % or more, more preferably about 90 % or more, most preferably about 100 % adheres to the cleaner body. The shavings adsorbed contamination which do not adhere to the cleaner body is also cohesive without scattering in the vicinity, and thus cleanup is very simple.

The eraser-like cleaner of the present invention is suited for the removal of contamination on objects to be subjected to contamination removal which tend to be damaged with cleaners containing an abrasive

material, and especially useful for contamination removal of wallpaper (paper, vinyl, cloth wall paper), the surface of which tends to be damaged.

Examples

[0023] The present invention will be described in further detail with reference to examples and comparative examples, but the present invention is not limited by these examples in any way.

Table 1 shows materials used in the following examples and comparative examples. It is to be noted that the cleaner compositions in Tables 2 to 4 have numbers (amounts) in terms of weight basis, unless otherwise noted. Moreover, in Tables 2 to 4, the amounts of the tackifier, the filler, the softener and the surfactant are based on 100 parts by weight in total of the base resin and the uncrosslinked rubber.

[0024] [Table 1]

Product name	Material name	Maker name
PB575	SBS (base resin)	CHIMEI CORPORATION
KRATON D-4271	SBS (base resin)	Kraton Polymers Japan Ltd.
SEPTON 2002	SEPS (St30%) (base resin)	Kuraray Co., Ltd.
SEPTON 8076	SEBS (St30%) (base resin)	Kuraray Co., Ltd.
SEPTON 2063	SEPS (St13%) (base resin)	Kuraray Co., Ltd.
SEPTON 4055	SEEPS (St30%) (base resin)	Kuraray Co., Ltd.
EXXONBUTYL 268	butyl rubber (uncrosslinked rubber)	ExxonMobil Chemical Ltd.
RSS#1	natural rubber (uncrosslinked rubber)	produced in Indonesia
SBR1502	styrene-butadien rubber (uncrosslinked rubber)	JSR Corporation
EP33	ethylene-propylene rubber (uncrosslinked rubber)	JSR Corporation
IR2200	isoprene rubber (uncrosslinked rubber)	JSR Corporation
BR18	butadien rubber (uncrosslinked rubber)	JSR Corporation
RT-2730	olefin resin	Huntsman Corporation
KRATON U-185	petroleum resin (tackifier)	ZEON CORPORATION
ESTERGUM AAG	ester gum (rosin) (tackifier)	Arakawa Chemical Industries, Ltd.
TAMANOL 901	terpene phenolic resin (tackifier)	Arakawa Chemical Industries, Ltd.
SS-80	heavy calcium carbonate (filler)	NITTO FUNKA KOGYO K.K.
VN-3	silica (filler)	TOSOH SILICA CORPORATION
process oil PW-32	paraffinic process oil (softener)	Idemitsu Kosan Co., Ltd.
EXCEL S-95	glycerol monostearate (surfactant)	Kao Corporation

[0025] Examples 1 to 21 and Comparative Examples 1 to 3

The cleaner compositions with the components and blending proportions shown in Table 2 and Table 3 were subjected to kneading, and then extrusion molding with the use of a metal mold of predetermined size to obtain test pieces of eraser-like cleaners of solid molded articles.

On the test pieces obtained, the initial hardness, the hardness after 3 seconds, the variation difference between the both values of hardness, the cohesiveness of shavings (and stains removed), the ease of rubbing, the cleanness and the state of wallpaper were measured or evaluated by the following methods. The results are shown in Table 2 and Table 3.

[0026] Measurement and Evaluation Methods

Initial hardness: After storing the test pieces for 2 hours in a high-temperature and high-humidity bath of $23^{\circ}\text{C} \times 50\% \text{ RH}$, the value of a scale marking was read off in terms of integer, immediately on bringing an indenter of a testing machine vertically in contact with, under pressure, the surface of the test piece kept in a horizontal position with the use of a hardness testing machine (C-type hardness tester) in accordance with JIS S 6050.

Hardness after 3 seconds: The value of a scale marking was measured in terms of integer 3 seconds after the measurement of the initial hardness.

[0027] Cohesiveness: The test piece was pushed with a force of 1 kg load against contamination (red colored pencil) adhering on a vinyl wallpaper, and shuttled for friction 10 times, and a visual evaluation was then made on how much shaving adsorbed contamination powder and contamination powder removed were cohesive while adhering on the test pieces(cleaners).

The results are indicated by the proportion (%) of the shavings and the removed contamination adhered to the total amount of those generated.

○: Approximately 90 to 100%

△: Approximately 80 to less than 90%

×: Approximately less than 80%

[0028] Ease of rubbing: The test piece was pushed with a force of 1 kg load against contamination adhering on a vinyl wallpaper, and shuttled for friction 10 times, and a visual evaluation was then made on whether or not the original shape of the test piece was maintained.

○: maintained

△: substantially maintained

×: not maintained

[0029] Cleanness: The test piece was pushed with a force of 1 kg load against contamination adhering on a vinyl wallpaper, and shuttled for friction 10 times, and a visual evaluation was then made on cleanness of the wallpaper.

○: clean

△: substantially clean

×: not clean

[0030] State of wallpaper: The test piece was pushed with a force of 1 kg load against contamination adhering on a vinyl wallpaper, and shuttled for friction 10 times, and a visual evaluation was then made on the presence or absence of damages (tearing off) on the surface of wallpaper.

○: not damaged

△: slightly damaged

x: damaged

[0031]

[Table 2]

Composition of cleaner (parts)		Examples												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Base resin	PB575: SBS	35	18	0	18	0	15	35	15	35	53	0	35	35
	KRATON D-4271: SBS	0	0	0	0	0	0	0	0	0	0	44	0	0
	SEPTON 2002: SEPS (St30%)	35	53	0	0	0	15	0	15	0	0	44	35	35
	SEPTON 8076: SEBS (St30%)	0	0	71	53	0	0	0	0	0	0	0	0	0
	SEPTON 2063: SEPS (St13%)	0	0	0	0	71	45	35	0	0	0	0	0	0
	SEPTON 4055: SEEPS (St30%)	0	0	0	0	0	0	0	45	35	18	0	0	0
Uncrosslinked rubber	EXXONBUTYL 268: butyl rubber	30	29	29	29	29	25	30	25	30	29	12	30	30
Tackifier	RT2730: olefin resin	29	29	29	29	29	15	18	15	18	18	18	18	18
Filler	SS-80: heavy calcium carbonate	294	294	294	294	294	250	294	250	294	294	305	294	294
	VN-3: silica	6	6	6	6	6	5	6	5	6	6	6	6	6
Softener	PW-32: paraffinic process oil	31	31	31	31	31	26	31	26	31	31	32	31	31
Surfactant	EXCEL S-95: glycerol monostearate	7	7	7	7	7	6	7	6	7	7	7	7	7
Base resin		70	71	71	71	71	75	70	75	70	71	88	70	70
Uncrosslinked rubber		30	29	29	29	29	25	30	25	30	29	12	30	30
Hardness														
Initial hardness		70	75	70	63	62	60	57	82	70	65	78	65	75
Hardness after 3 seconds		63	70	66	57	55	52	48	79	67	61	75	60	69
Variation difference between the both values of hardness		7	5	4	6	7	8	9	3	3	4	3	5	6
Evaluation														
Cohesiveness		○	○	○	○	○	○	○	○	○	○	○	○	○
Ease of rubbing		○	○	○	○	○	○	△	○	○	△	○	○	○
Cleanness		○	○	○	○	○	○	○	○	○	○	○	○	○
State of wallpaper		○	○	○	○	○	○	○	△	○	○	○	○	○

[0032]

[Table 3]

Composition of cleaner (parts)		Examples								Comp.Examples		
		14	15	16	17	18	19	20	21	1	2	3
Base resin	PB575: SBS	35	22	22	44	35	35	35	35	0	0	50
	KRATON D-4271: SBS	0	0	0	0	0	0	0	0	71	35	0
	SEPTON 2002: SEPS (St30%)	35	22	22	44	35	35	35	35	0	35	50
Uncrosslinked rubber	EXXONBUTYL 268: butyl rubber	30	56	0	0	0	0	0	0	29	30	0
	RSS#1: natural rubber	0	0	56	12	0	0	0	0	0	0	0
	SBR1502: styrene-butadien rubber	0	0	0	0	30	0	0	0	0	0	0
	EP33: etylene-propylene rubber	0	0	0	0	0	30	0	0	0	0	0
	IR2200: isoprene rubber	0	0	0	0	0	0	30	0	0	0	0
	BR18: butadien rubber	0	0	0	0	0	0	0	30	0	0	0
Tackifier	RT2730: olefin resin	18	11	11	22	18	18	18	18	18	18	25
Filler	SS-80: heavy calcium carbonate	647	278	278	305	294	294	294	294	294	294	313
	VN-3: silica	6	6	6	6	6	6	6	6	6	6	6
Softener	PW-32:paraffinic process oil	31	29	29	32	31	31	31	31	31	31	33
Surfactant	EXCEL S-95: glycerol monostearate	7	7	7	7	7	7	7	7	7	7	8
Base resin		70	44	44	88	70	70	70	70	71	70	100
Uncrosslinked rubber		30	56	56	12	30	30	30	30	29	30	0
Hardness												
Initial hardness		78	57	74	79	69	72	72	71	60	73	83
Hardness after 3 seconds		75	50	70	76	62	65	68	64	50	71	82
Variation difference between the both values of hardness		3	7	4	3	7	7	4	7	10	2	1
Evaluation												
Cohesiveness		○	○	○	○	○	○	○	○	△	△	×
Ease of rubbing		○	○	○	○	○	○	○	○	△	○	○
Cleanness		○	○	○	○	○	○	○	○	△	○	○
State of wallpaper		○	○	○	○	○	○	○	○	○	×	△

[0033] As is clear from the results in Table 2 and Table 3, Examples 1 to 21 containing the base resin and uncrosslinked rubber, where the test pieces have initial hardness of 50 or more, and the variation difference between the initial hardness and the hardness after 3 seconds is in a range of from 3 to 9, are excellent in all respects of cohesiveness, ease of rubbing, cleanness, and the state of wallpaper, while maintaining the shapes of the eraser-like cleaners.

On the other hand, Comparative Examples 1 where the test piece has the variation difference between the initial hardness and the hardness after 3 seconds being 10, does not maintain the shape of the eraser-like cleaner because of being too soft, and thus, is inferior in cohesiveness, ease of rubbing and cleanness. Comparative Examples 2 and 3 where the test pieces has the variation difference of 2 or 1, are inferior in cohesiveness and damage the wallpaper though maintaining the shapes of the eraser-like cleaners and being favorable in ease of rubbing and cleanness.

[0034] Examples 22 to 27

As shown in Table 4, test pieces of eraser-like cleaners were obtained, and measured or evaluated in the same way as in Examples 1, except for changing the blending amount and type of the tackifier. The results are shown in Table 4.

[0035] [Table 4]

Composition of cleaner (parts)		Examples					
		22	23	24	25	26	27
Base resin	PB575: SBS	35	35	35	35	35	35
	SEPTON 2002: SEPS (St30%)	35	35	35	35	35	35
Uncrosslinked rubber	EXXONBUTYL 268: butyl rubber	30	30	30	30	30	0
Tackifier	RT2730: olefin resin	0	6	35	0	0	0
	KRATON U-185: petroleum resin	0	0	0	18	0	0
	ESTERGUM AAG: ester gum (rosin)	0	0	0	0	18	0
	TAMANOL 901: terpene phenolic resin	0	0	0	0	0	18
Filler	SS-80: heavy calcium carbonate	294	294	294	294	294	294
	VN-3: silica	6	6	6	6	6	6
Softener	PW-32: paraffinic process oil	31	31	31	31	31	31
Surfactant	EXCEL S-95: glycerol monostearate	7	7	7	7	7	7
Base resin		70	70	70	70	70	70
Uncrosslinked rubber		30	30	30	30	30	30
Hardness							
Initial hardness		77	75	65	86	70	82
Hardness after 3 seconds		74	71	59	83	65	79
Variation difference between the both values of hardness		3	4	6	3	5	3
Evaluation							
Cohesiveness		△	○	○	○	○	○
Ease of rubbing		○	○	△	○	○	○
Cleanness		○	○	○	○	○	○
State of wallpaper		○	○	○	○	○	○

[0036] As is clear from the results in Table 4, even when the blending amount or the type of the tackifier is changed, the eraser-liked cleaners having well balanced properties in respects of of cohesiveness, ease of rubbing, cleanness and the state of wallpaper are obtained, as in Example 1.

Industrial Applicability

[0037] As described above, the eraser-like cleaner according to the present invention is excellent in shape retention property, thus easily rubbed with the cleaner grasped by use of the fingers, excellent in cleanness, and extremely easy-to-use, with no cleanup or only simple cleanup required after contamination removal, because troubles are avoided such as the fact that shavings or contamination powders removed adhere to the cleaner, and scatter on the object to be subjected to contamination removal and in the vicinity thereof, or fall to the floor to cause the contamination thereof. Further, when the eraser-like cleaner is used for the removal of stains on wallpaper, the surface of the wallpaper is not damaged.

Claims

1. An eraser-like cleaner comprising a molded article of a composition containing a base resin and an uncrosslinked rubber, wherein the molded article has initial hardness of 50 or more, and a variation difference between the initial hardness and hardness after 3 seconds is in a range of from 3 to 9:

wherein:

Initial hardness: the value of a scale marking read off in terms of integer, immediately on bringing an indenter of a testing machine vertically in contact with, under pressure, the surface of a test piece kept in a horizontal position with the use of a hardness testing machine (C-type hardness tester) in accordance with JIS S 6050;

Hardness after 3 seconds: the value of a scale marking read off in terms of integer 3 seconds after the measurement of the initial hardness.

2. The eraser-like cleaner according to claim 1, wherein the base resin is a styrene elastomer.

3. The eraser-like cleaner according to claim 2, wherein the styrene elastomer comprises at least one selected from a styrene-butadiene-styrene (SBS) copolymer, a styrene-isoprene-styrene (SIS) copolymer, a styrene-ethylene/propylene-styrene (SEPS) copolymer, styrene-ethylene/butylene-styrene (SEBS) copolymer, and a styrene-ethylene/ethylene/propylene-styrene (SEEPS) copolymer.

4. The eraser-like cleaner according to claim 1, wherein the uncrosslinked rubber is at least one selected from a butyl rubber, a natural rubber, a styrene-butadiene rubber, an ethylene-propylene rubber, an

isoprene rubber, and a butadiene rubber.

5. The eraser-like cleaner according to claim 1, further containing a tackifier.

6. The eraser-like cleaner according to claim 1, further containing a softener.

7. The eraser-like cleaner according to claim 1, further containing a filler.

8. The eraser-like cleaner according to claim 1, wherein the composition comprises 40 to 95 parts by weight of the base resin and 60 to 5 parts by weight of the uncrosslinked rubber.

9. The eraser-like cleaner according to claim 5, wherein the tackifier is 5 to 35 parts by weight with respect to 100 parts by weight in total of the base resin and uncrosslinked rubber.

10. The eraser-like cleaner according to claim 6, wherein the softener is 15 to 35 parts by weight with respect to 100 parts by weight in total of the base resin and uncrosslinked rubber.

11. The eraser-like cleaner according to claim 7, wherein the filler is 200 to 700 parts by weight with respect to 100 parts by weight in total of the base resin and uncrosslinked rubber.

12. Use of the eraser-like cleaner according to claim 1, for the removal of stains on wallpaper.