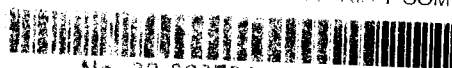


SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 26

SECRETARÍA DE ECONOMÍA



No. 02-033781-00007-0000

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Eve 379 FASENACIONALII
Folios: 11

RECIBO OFICIAL DE PAGA , 00 7,450
FECHA : ABRIL 27 DE 2000

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DEPOSITANTE	TIPO DEPO	CANAL	CUENTA	NO. PAG	FECHA PAG	VF. PAG
MC 170 ASSOCIATES	CONSIGNACION	CANAL DE DEPOSITA	002754397	2810-00	27/01/2000	12,257,399.04

[illegible]

CHART	RENTION/DO	CONCEPTO	TOTAL CONCEPTO
1	80005 01 03	CAMBIO DE MODALIDAD Y MODIFICAR	100,000.00
		TOTAL :	100,000.00

1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 26

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Colo 13467-841-001-7

TIRE PUNCTURE PREVENTIVE

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Fecha de publicación: 1998-01-20
Inventor: UCHIDA MITSUHIKO
Solicitante: THREE BOND CO LTD
Clasificación:
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C08K7/02; C08L29/04; C09K3/10; C08K5/00;
C08K7/00; C08L29/00; (IPC1-7): C09K3/10;
C08K5/053; C08K7/02; C08L29/04
- europea:
Número de solicitud: JP19960207524 19960703
Número(s) de prioridad: JP19960207524 19960703

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Resumen de JP10017851

PROBLEM TO BE SOLVED: To solve the problems that, through a tire puncture preventive injected in advance into a tire to prevent puncture is currently available, it cannot prevent the puncture due to a relatively large hole or crack and that conventional preventives are effective only temporarily and do not allow a car with a holed tire to be further driven. **SOLUTION:** This preventive is a compsn. comprising 100 pts.wt. water, 5-30 pts.wt. polyvinyl alcohol, 1-20 pts.wt. short fibers having an average length of 0.1mm or higher, and 20-100 pts.wt. 2-4C glycol. Pref. the fibers are multibranched and esp. pref. are hemp fibers and/or polyethylene fibers. The compsn. is excellent in toughness, softness, and durability. Multibranched short fibers are liable to be twined with each other, facilitating holes bored with nails, etc., in a tire to be blocked up.

Datos suministrados desde la base de datos esp@cenet - Worldwide

United States Patent [19]**Kageyama et al.**[11] **4,116,895**[45] **Sen 26 1978**[54] **PUNCTURE SEALANT COMPOSITION**[75] Inventors: **Kunio Kageyama, Yokohama;**
Mituharu Iwakura, Hiratsuka, both
of Japan[73] Assignee: **The Yokohama Rubber Co., Ltd.,**
Tokyo, Japan[21] Appl. No.: **802,046**[22] Filed: **May 31, 1977**[30] **Foreign Application Priority Data**

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May 10, 1977 [JP] Japan 52-52586

[51] Int. Cl.² **B60C 21/08**[52] U.S. Cl. **260/5; 152/347;**
252/72; 260/29.7 B; 260/29.7 D; 260/29.7 M;
260/29.7 N; 260/29.7 NR; 260/29.7 UA[58] Field of Search **260/29.7 B, 29.7 UA,**
260/29.7 NR, 5, 29.7 M, 29.7 N, 29.7 D;
152/347; 252/72

[56]

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Primary Examiner—Eugene C. Rzucidlo
Attorney, Agent, or Firm—Armstrong, Nikaido,
 Marmelstein & Kubovcik

[57]

ABSTRACT

Disclosed are a puncture sealant composition in emulsion for a tubeless pneumatic tire comprising a butyl rubber emulsion, a saturated hydrocarbon polymer emulsion, a crosslinking agent for the rubber and a crosslinking activator. A composition further containing a diene type unsaturated polymer emulsion and/or a natural rubber latex is also disclosed. These compositions are suitable for use in the production of a self-sealing vehicle tire.

18 Claims, No Drawings

PUNCTURE SEALANT COMPOSITION

The present invention relates to a puncture sealant composition in emulsion and, more specifically, it relates to a puncture sealant composition in emulsion suitable for use in a puncture sealing material for a tubeless pneumatic vehicle tire.

It is, in general, recognized that a tubeless tire is relatively safe against going flat when penetrated by nails and the like. This is because, since the nails and the like do not easily come out of the tire, and since air does not escape around the penetrated nails, a sudden drop of the air pressure in the tire does not occur.

However, in fact, when a tubeless tire penetrated by nails and the like runs for a long period of time, especially at a high speed, the nails and the like tend to easily come out of the tire because of the centrifugal force. Once the penetrated nails and the like come out of the tire, an air leakage, that is, puncture, occurs so that the vehicle provided with such tires becomes as dangerous as that provided tube tires. In order to prevent such danger, it is necessary to assure that the air leakage does not occur even when penetrated nails and the like come out of the tire when the vehicle is moving.

For this purpose various methods of coating sealant compositions on the inner surface of the tires so that a puncture is sealed by the sealant as soon as it occurs and various sealant materials have been proposed.

For instance, there have been proposed: a method of coating the inside of the crown of a tire with a blend of coal tar pitch or petroleum pitch having a melting point of not less than 10° C. and polyisobutylene (Japanese Patent Publication No. 31-9489); a method of applying adhesive rubber to the inside of the crown, followed by bonding to the adhesive rubber an air permeable cloth strip, such as looped fabric and the like (Japanese Patent Publication No. 31-17402); a method of forming an anti-puncture layer by densely packing adhesive material which comprises a partially crosslinked blend of polybutene, process oils and the like and butyl rubber into honeycomb structure (Japanese Patent Publication No. 34-1095); a sealant material for tires which comprise a blend of a crushed product of urethan foam, short fibers of polyvinylidene chloride and the like, and methyl cellulose with a rubber latex, alcohols and ethylene glycol (Japanese Patent Publication No. 39-18744); a liquid sealant material for tires which comprises a blend of rubber particles such as the particles of used tires and an emulsion containing, as main components, vinyl acetate and the ester of acrylic acid (Japanese Utility Model Publication No. 47-7442); a sealant for tires which comprises a combination of a liner layer made of foam and an adhesive material (Japanese Laid-Open Patent Application No. 50-21402); a sealant material for tires which comprises a blend of polybutene, a filler and ethylene-propylene rubber (Japanese Patent Publication No. 50-39453); a sealant for tires which comprises a blend of randomly hydrogenated styrene-butadiene copolymer and an aromatic oil and a rosin type resin (Japanese Patent Publication No. 51-5433); a sealant material for tires which comprises a partially crosslinked blend of a large amount of oil having good compatibility and depolymerized natural or synthetic rubber (Japanese Patent Publication No. 52-4801); a method for preparing two liquids, one of which is prepared by dissolving butyl rubber in a solvent and the other of which is prepared by dissolving liquid rubber

(liquid butyl rubber), carbon black, polybutene, styrene-butadiene rubber obtained from hydrogenation solution polymerization and a crosslinking agent, and then, mixing them immediately before spraying to thereby cure the rubbers (Japanese Laid-Open Patent Application No. 52-10354).

However, the methods and materials of these proposals are accompanied by the following problems. That is, cold flow or flow at a high temperature occurs, the centrifugal force created in the tire when the vehicle is operated at a high speed tends to cause the sealant composition to move into the central crown portion of the tire, the use of a large amount of solvents cause safety and working environment problems, and the sealing properties of the sealant materials are not sufficient for a practical use.

Accordingly, the objects of the present invention are to obviate these problems of the aforementioned prior puncture sealant compositions and to provide a novel puncture sealant composition in emulsion which is capable of forming a puncture sealant layer on the inner surface of a tire having an excellent sealing property and is also capable of facilitating the application process of the sealant layer of a tire.

In accordance with the present invention, there is provided a puncture sealant composition in emulsion for a tubeless pneumatic tire comprising a butyl rubber emulsion, at least one saturated hydrocarbon polymer emulsion, a crosslinking agent for the rubber and a crosslinking activator.

In accordance with the present invention, there is further provided a puncture sealant composition in emulsion for a tubeless pneumatic tire comprising a butyl rubber emulsion, at least one additional rubber component selected from the group consisting of diene type unsaturated hydrocarbon polymer emulsions and a natural rubber latex, at least one saturated hydrocarbon polymer emulsion, a crosslinking agent for the rubbers and a crosslinking activator.

For brevity's sake, the diene type unsaturated hydrocarbon polymer emulsion is referred to as "diene type rubber emulsion" hereinbelow.

The butyl rubber emulsion employed in the present sealant composition includes any emulsion containing a so-called butyl rubber and, preferably, includes those which are prepared by emulsifying isobutylene-isoprene copolymer or partially halogenated (e.g. chlorinated or brominated) isobutylene-isoprene copolymer with any surface active agent. The total solid content of the butyl rubber emulsion is preferably 60% by weight or more. This is because, when the total solid content of the butyl rubber emulsion is less than 60% by weight, a large amount of heat energy is necessary for vaporizing the water content in the sealant composition after it is applied to the inside surface of the tire.

The types of diene type rubber emulsion employed in the present sealant composition are those which are compatible with said butyl rubber emulsion, and can be cured (or crosslinked) with the crosslinking agents and the crosslinking activators to form a three-dimensional structure. Examples of such diene type rubbers are polyisoprene, polybutadiene (BR), styrene-butadiene copolymer (SBR), acrylonitrile-butadiene copolymer (NBR), ethylene-propylene-diene terpolymer (EPDM) and their derivatives. For instance, a polyisoprene emulsion can be prepared as follows. First, polyisoprene having a high cis-1,4 content and polymerized in the solution in the presence of an organometallic catalyst is

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type of emulsion (e.g. anionic, cationic or nonionic type) of the saturated hydrocarbon polymers used in the present sealant composition must conform to those of the butyl rubber emulsion, the diene type rubber emulsion and the natural rubber latex.

The saturated hydrocarbon polymer emulsion can be blended with the butyl rubber emulsion or the butyl rubber emulsion and the additional rubber component (for brevity's sake, they are referred to as a "rubber component" hereinbelow) in any blending ratio. However, in view of the adhesion property and the sealing property of the sealant layer after coating, the amount of the saturated hydrocarbon polymer is preferably within the range from 50 to 500 parts by weight (solid content), more preferably, from 80 to 200 parts by weight (solid content), based upon 100 parts by weight of the solid rubber component.

The blend of the butyl rubber emulsion, at least one member of the diene type rubber emulsions and the natural rubber latex, and at least one saturated hydrocarbon polymer emulsion can be used as the sealant layer of the tire. However, according to the present invention said blend is further partially cured (or crosslinked) to form the three-dimensional bridge structure by the use of crosslinking, such as, for example, the crosslinking of the double-bond present in the rubber component and the crosslinking derived from the removal of the hydrogen present in the α -methylene group.

Any known crosslinking agents for the butyl rubber and the diene type rubber can be suitably used in the present sealant composition. However, the curing of the present sealant composition is preferably carried out under moderate conditions, for example, at a temperature within the range from room temperature to approximately 70° C., in order not to decrease the working properties of the manufacturing step and the quality of the products. For this reason, a so-called quinoid curing or resin curing is preferably utilized in the present invention.

In the quinoid curing system, p-quinone dioxime or p-quinone dioxime dibenzoate is preferably used as a crosslinking agent, and organic or inorganic peroxides are also used as a crosslinking activator together with the crosslinking agent. Examples of suitable organic peroxides are: benzoyl peroxide; lauroyl peroxide; 2,4-dichloro benzoyl peroxide; t-butyl peroxybenzoate; bis(p-monomethoxy benzoyl)peroxide; bis(p-nitrobenzoyl)peroxide; 2,5-dimethyl-2,5-bis(benzoyl peroxy)-hexene; cumene hydroperoxide, and; t-butyl hydroperoxide. Hydrogen peroxide is also used. Examples of the suitable inorganic peroxide are manganese peroxide, lead peroxide and the other metal peroxides which do not react with water.

In the resin curing system, alkylphenol resins are used, as the crosslinking agent, and stannous or stannic chloride is used as the crosslinking activator together with the alkylphenol resin.

The amounts of the crosslinking agent and the crosslinking activator used in the present sealant composition mainly depend upon the amount of the unsaturated bond present in the rubber component of the present sealant composition or the amount of the α -methylene group. Thus, depending upon the degree of unsaturation of the butyl rubber employed, the degree of unsaturation and the amount of α -methylene group of the diene type rubber and the natural rubber employed, and the blending ratio of these rubbers, those skilled in the

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art can determine the amounts of the crosslinking agent and the crosslinking activator employed, in accordance with the conventional polymerization techniques for crosslinked polymers. In a case where the amount of the crosslinking agent used is too small, problems, such as, for example, lack of the sealing property at a high temperature and flow of the sealant during high speed operations occur, since the crosslinking density is low. On the other hand, in a case where the amount of the crosslinking agent is too large, the crosslinking density of the sealant is so high that the modulus of the sealant increases to such an extent that the function of the sealant cannot be accomplished.

For instance, in the quinoid curing system, the amount of the quinone dioximes employed in the present sealant composition is preferably within the range of from 1 to 15 parts by weight, more preferably from 3 to 10 parts by weight, based upon 100 parts by weight of the solid rubber component. Further, the peroxides are usually used in an amount of from 0.5 to 1.5 equivalent weight to one equivalent weight of the quinone dioximes. Although the stoichiometric amount of the peroxides to one equivalent weight of the quinone dioximes equals 1.0, the amounts of the crosslinking agent and the crosslinking activator are practically determined within said range in view of the dispersibility, and the solubility of the crosslinking agent and the crosslinking activator into the emulsion. In a case where the crosslinking activator is small, an effective curing or crosslinking reaction does not occur, even when an excess amount of the crosslinking agent is used. On the other hand, in a case where the amount of the crosslinking activator is too large, the excess amount of the crosslinking activator (peroxides) unpreferably degrades the molecule of the butyl rubber and causes crosslinking of the other diene rubbers.

In the resin curing system, for instance, the amount of the alkylphenol resin used is preferably within the range of from 1 to 15 parts by weight, more preferably from 3 to 100 parts by weight, based upon 100 parts by weight of the solid rubber component. Further, the ratio of the stannous or stannic chloride to the alkylphenol resin is preferably within the range of from 3:1 to 10:1.

The present sealant composition can further include, if desired, inorganic fillers (pigments) such as, for example, silicic anhydride (silica), silicic acid, clay, talc, mica, calcium carbonate, alumina, titanium white, and carbon black and organic fillers such as, for example, micro crystal of cellulose. The blend of these fillers ensures the increase of the solid content of the emulsion, the prevention of cold flow and flow during and immediately after the coating and the improvement of the heat resistance of the crosslinked sealant layer. Only for the purpose of preventing cold flow, an anti-cold flow agent (thixotropic agent) can be incorporated into the present sealant composition.

The amount of the fillers if employed is preferably 50 parts by weight or less based upon 100 parts by weight (solid content) of the emulsion. When the amount of the fillers is more than 50 parts by weight based upon 100 parts by weight (solid content) of the sealant composition in emulsion, the sealing property of the sealant composition tends to decrease.

The present sealant composition is generally applied to materials to be sealed (i.e. the inside surface of the tire and the like) by a conventional spraying or coating technique. For the purpose of obtaining better use of the present sealant composition, it is preferable that the first

blend comprising the butyl rubber emulsion and the crosslinking agent and, if used, the diene type rubber emulsion and/or the natural rubber latex, and the second blend comprising the unsaturated hydrocarbon polymer emulsion and the crosslinking activator, are separately prepared, and that the two blend systems are mixed with each other immediately before the sealant composition is used. This is because, if the crosslinking activator such as peroxides and stannous or stannic chloride, is previously incorporated into the emulsion of the rubber component of the present sealant composition, the double bond and the hydrogen atom of the α -methylene group, both present in the rubber molecules, are interacted with the crosslinking activator to form the crosslinking structure and, therefore, the viscosity of the sealant composition increases with the lapse of time. This results in a decrease of the working properties when the sealant composition is sprayed or coated. Contrary to this, when the crosslinking activator is incorporated into the saturated polymer emulsion, said change of the viscosity with the lapse of time does not occur. If the crosslinking agent, such as p-quinone dioxime and alkylphenol resin, is incorporated into the emulsion of the rubber component, the crosslinking reaction does not occur unless the crosslinking activator is present. Accordingly, it is preferable that the first blend containing the emulsion of the rubber component and the crosslinking agent, and the second blend containing the saturated hydrocarbon polymer emulsion and the crosslinking activator, are separately prepared and, then, the two blends are combined immediately before the sealant composition is used. This does not result in a decrease of the quality of the sealant composition, for example, an increase of the viscosity which decreases the working properties does not occur before spraying and coating and, thus, the sealant layer having outstanding properties can be easily formed. Of course, in the mixing of the two blends, the saturated hydrocarbon polymer emulsion can be previously incorporated into the rubber emulsion without the addition of the crosslinking activator.

As mentioned hereinabove, when the present sealant composition is applied to the material to be sealed, for example, the inside surface of the tire, as the puncture sealing layer, it is preferable to combine the two separately prepared blends immediately before the application. Then, after the combined sealant composition is applied to the predetermined portion by spraying or coating, it is allowed to stand at an ambient temperature or is heated to a temperature of up to 60° through 70° C., to thereby vaporize the water content in the sealant composition and simultaneously cause the curing or crosslinking reaction. Since the sealant layer thus formed has a high elongation property and an outstanding self-sealing property, it exhibits an excellent effect as a puncture sealing material for tubeless pneumatic tires and seals the tires against puncture. The present sealant composition is also suitable for use, as a sealing material in the fields of civil engineering and the like.

The present invention is further illustrated by, but by no means limited to the following examples, in which all parts and percentages are by weight unless otherwise noted.

EXAMPLE 1

In 100 parts of butyl rubber emulsion (Exxon Butyl Latex 100, Trade Name, Exxon Chemical Company,

solid content 62%, viscosity 3500 cps at 25° C.) 4 parts of p-quinone dioxime (Actor Q, Trade Name, Kawaguchi Chemical Industry Co., Ltd.) was dispersed. In addition, polyisobutylene (Vistanex LMMH, Trade Name, Exxon Chemical Company) was emulsified in a homogenizer by using a surface active agent (Pluronic L-64, a copolymer of propylene oxide and ethylene oxide, Trade Name, Asahi Denka Kogyo K.K.), and into 100 parts of the resultant emulsion (solid content 80%) 20 parts of silicic anhydride and 4 parts of benzoyl peroxide were added and dispersed therein homogeneously. These two type emulsions were mixed with each other and uniformly applied to the inside surfaces of steel radial tires by using a spray machine provided with a two-liquid mixing type static mixer. Then, the applied sealant composition was dried with hot air (approximately 60° C.) to form sealant layers having a thickness of approximately 2.5 through 3 mm. The compositions and the properties of the sealant are shown in Table 2 below.

The tires treated as described above were fitted in rims and inflated with air at a pressure of 1.9 kg/cm² for the following tests. Sixty nails were driven into each of the pressurized tires, each of which nails had a diameter of 6 mm and a length of approximately 90 mm. Then, at 10 minutes, 1 hour and 24 hours after the nails were driven into the tires, 20 nails were, respectively, pulled out of each of tires and the pressure of the tires was measured. Five tires were used for each test under the same temperature conditions. The portions into which the nails were driven in were the crown and shoulders of the tires. The results are shown in Table 1 below.

Table 1

Time	Air Pressure Drop		
	Temperature		
	-30°	25° C	80° C
After 10 minutes	0	0	0
After 1 hour	0	0	0
After 24 hours	0	0	0

Other tires with nails driven into them were revolved on a steel drum at a tire speed of 80 km/hr for 2 hours, then, at a speed of 120 km/hr for 30 minutes and, after that, at a speed of 128 km/hr for 30 minutes. Then, the revolving speed of the tires was further increased 8 km/hr every 30 minutes until the nails were forced out of the tires by centrifugal force. All of the nails were forced out at a speed within the range of from 130 km/hr to 160 km/hr. As soon as all of the nails were forced out, the steel drum was stopped and the air pressure of the tire was measured to check the air leakage from the tire. A decrease in the tire air pressure was not observed in any of the five tested tires and the sealant layer on the shoulders of the tires did not flow after the test.

EXAMPLES 2 through 15

Sealant compositions were prepared from the ingredients listed in Table 2 and were applied to tires in the same manner as in Example 1. The tires thus treated were tested in the same manner as described in Example 1. In all cases neither a decrease of the air pressure nor a flow of the sealant were observed.

Table 2

	Ex. No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Butyl Latex 100	*1	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Polybutene HE 1975	*2	100	500	300					50			300			100	
Polybutene HE 375	*3				100	400					200		300			100
Polypentene Emulsion	*4						100	300						200		
Polyisobutylene Emulsion	*5							100	100	200	100		50	100	200	50
Carbon Black (SRF)					10					10		10			20	
Carbon Black (FT)						20							10			
Silicic Anhydride		20						20	10	5					10	
Silicic Acid			30								10			20		
Colloidal Silica							15						10			20
Talc									10							
Clay																
Antioxidant		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
p-Quinone Dioxime		4		6		6	6			8	8				6	
p,p'-Dibenzoylquinone			6		6			6	7							
Dioxime																
Benzoyl Peroxide		4	4		4	4	4		3	3	4				4	
tert.-Butyl Hydroperoxide				4							4					
Alkylphenol Resin												10	15	10		15
Stannic Chloride												2	2	2		2
Gelling Time (min)	*6	5	6	4	5	5	5	7	5	6	6	10	12	10	5	12
Tensile Strength (kg/cm ²)	*7	3.7	4.2	3.2	4.8	4.1	3.8	4.4	4.9	3.7	3.8	3.3	4.6	4.5	3.8	3.9
Elongation (%)	*7	500	600	560	500	600	500	800	700	750	650	550	500	650	800	650
Total Solid Content (%)	*8	71.4	74.2	72.0	67.1	73.6	73.3	77.4	74.1	75.1	74.4	74.0	74.8	80.0	76.2	75.5

(NOTE)

*1 Butyl Latex 100: Trade Name, Exxon Chemical Company, solid content 62%.

*2 Polybutene HE 1975: Trade Name, Nippon Petrochemicals Co., Ltd. This is prepared by emulsifying Polybutene HV-1900 (Trade Name, Nippon Petrochemicals Co., Ltd.) having a solid content of 75%.

*3 Polybutene HE-375: Trade Name, Nippon Petrochemicals Co., Ltd. This is prepared by emulsifying Polybutene HV-300 (Trade Name, Nippon Petrochemicals Co., Ltd.) having a solid content of 75%.

*4 Polypentene Emulsion: This is prepared by adding 5 parts of potassium stearate to 100 parts of Quintone B-170 (Trade Name; polypentene, Nippon Zeon Co., Ltd.) and, then, by adding 26 parts of water gradually at a temperature of approximately 80° C. in a powerful mixing apparatus (e.g. a Baker-Perkins type mixer provided with a steam or hot water jacket). (Solid Content 80%).

*5 Polyisobutylene Emulsion: This emulsion is prepared from 100 parts of polyisobutylene, 5 parts of potassium stearate and 26 parts of water in the same manner as mentioned above. (Solid Content 80%).

*6 Gelling Time: The time when the viscosity of the sealant composition after mixing two liquids becomes 100,000 cps at 25° C. The viscosity is measured by using a Brookfield rotation viscometer.

*7 Tensile Strength and Elongation: These values are measured in a Schopper testing machine by using dumbbell specimens. The test speed is 100 mm/min.

*8 Total Solid Content: The total solid content is determined from the residue after the sealant composition is dried at a temperature of 100° C. for 2 hours.

EXAMPLE 16

Chlorinated butyl rubber emulsion was prepared by dissolving chlorinated butyl rubber (Esso Butyl HT, Trade Name, Exxon Chemical Company) into toluene and by emulsifying the solution in the same mixer as the Vistanex LMMH was emulsified in Example 1. The total solid content of the resultant emulsion was 63%.

100 parts of the chlorinated butyl rubber emulsion and 4 part of p,p'-quinone dioxime perbenzoate were blended, while, in 200 parts of polybutene emulsion HE 1975, 50 parts of polyisobutylene emulsion, 30 parts of silicic acid, 1 part of anti-oxidant and 3.2 parts of benzoyl peroxide were well dispersed. These two liquids were mixed with each other and uniformly applied to the inside surfaces of tubeless tires, by using the spray machine described in Example 1, and the applied sealant composition was dried to form sealant layers having an approximately 2.5 mm thickness.

The tires thus treated were statically and dynamically tested in the same manner as described in Example 1. Similar puncture sealing effects as those described in Example 1 were obtained.

EXAMPLE 17

100 parts of butyl rubber emulsion (Exxon Butyl Latex 100, Trade Name, Exxon Chemical Company, solid content 62%, viscosity 3500 cps at 25° C.) and 50

parts of polyisoprene emulsion (refer to footnote *2 of Table 4 hereinbelow) were mixed and, then, 5 parts of p-quinone dioxime (Actor Q, Trade Name, Kawaguchi Chemical Industry Co., Ltd.) was dispersed in the mixture. In addition, into 100 parts of polybutene emulsion (refer to footnote *11 of Table 4 hereinbelow), 20 parts of carbon black (SRF) and 8.4 parts of benzoyl peroxide were added and dispersed therein homogeneously. These two types of emulsions were mixed with each other and uniformly applied to the inside surface of steel radial tires by using a spray machine provided with a two-liquid mixing type static mixer. Then the applied sealant composition was dried with hot air having a temperature of approximately 60° C. to form sealant layers having an approximately 2.5 through 3 mm thickness. The compositions and the properties of the sealant are shown in Table 4 below.

The tires having the above described sealant layer were fitted in rims and were pressurized with air at a pressure of 1.9 kg/cm² for the following tests. Sixty nails were driven into each of the pressurized tires, each of which nails had a diameter of 6 mm and a length of approximately 90 mm. Then, at 10 minutes, 1 hour and 24 hours after the nails were driven into the tires, twenty nails were pulled out of each of the tires and the pressure of the tires was measured. Five tires were used for each test under the same temperature conditions. The portions into which the nails were driven in were the crown and shoulders of the tires. The results are shown in Table 3 below.

Table 3

Time	Decrease of Air Pressure		
	Temperature		
	-30° C	25° C	80° C
After 10 minutes	0	0	0
After 1 hour	0	0	0
After 24 hours	0	0	0

Other tires having the penetrated sixty nails were rotated on a steel drum at a tire speed of 80 km/hr for 2 hours, then, at a speed of 120 km/hr for 30 minutes and, after that, at a speed of 128 km/hr for 30 minutes. Then, the revolving speed of the tires was further increased 8 km/hr every 30 minutes until the nails were forced out of the tires by centrifugal force. All of the nails were forced out at a speed within the range of

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIVISIÓN DE NUEVAS CREACIONES

2020
Bogotá, D.C., 22, 02, 2008

Abogado
EMILIO FERRERO

ASUNTO	Radicación	02088781
	Trámite	002
	Evento	001
	Actuación	430
	Oficio	3132
	Folios	010

Patente de Invención ☒ Patente de Modelo de Utilidad ☐

Vía Nacional ☐

Vía PCT (fase nacional) ☒ Cap. I ☐ Cap. II ☒

No. Sol. Internacional PCT / JP01/ 02664

Fecha de Presentación Internal. Marzo 29, 2001.

Como resultado del examen de fondo, realizado con fundamento en el artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le comunica:

1. Documentos estudiados

- 1.1. Descripción: Folios: 48 a 62 como se radicó inicialmente.
- 1.2. Reivindicaciones: Folio: 63 como se radicó inicialmente.
Folio: 119 modificadas.
- 1.3. Dibujos: Folios: 66 a 68 como se radicó inicialmente.
- 1.4. Prioridad: 5 de abril de 2000, JP 2000-108019.
- 1.5. Respuesta del solicitante: Folios: 111 a 121.

2. Objeto de la invención

Título de la solicitud: "Un sellante para impedir pinchazos, una llanta sin neumático y un neumático para llanta".

El objeto de la presente solicitud de patente de invención consiste en impedir los pinchazos de las llantas de vehículos mediante un sellante, el cual, fluya en forma fácil debido a una baja viscosidad durante el viaje del vehículo y tenga una fluidez

difícil debido a una alta viscosidad cuando se deja quieto el vehículo, manteniéndose el balanceo de la llanta.

El problema planteado en esta solicitud se debe al desbalanceo que se genera en las llantas de los vehículos al usarse sellantes contenidos en la cámara de aire, esto provoca vibraciones y ruido al rodar la llanta en especial a alta velocidad.

Para solucionar este problema técnico la solicitud en estudio proporciona un sellante para impedir pinchazos, con una viscosidad en el rango de 25 a 35 dPa•s y un índice tixotrópico en el rango de 5,5 a 11,0, compuesto por 65% en peso de agua, 30% en peso de propilenglicol, 2.0% en peso de un espesante, 0.5% en peso de una fibra de nylon, 1.4% en peso de una fibra de algodón, 0.5% en peso de un polvo de cerámica, 0.1% en peso de un tinte. Este sellante se introduce en la llanta dentro de una cámara en toda su periferia, destinada para él.

El objeto de la invención definido anteriormente se clasificó de acuerdo con el IPC así: C09K 3/10.

3. Determinación del Estado de la Técnica

La fecha que se ha tenido en cuenta para determinar el Estado de la Técnica es:

Fecha de presentación de la solicitud prioritaria, Abril 5 de 2000.

Teniendo en cuenta la fecha indicada se realizó la búsqueda en el estado de la técnica de documentos relacionados con la solicitud, encontrándose los siguientes documentos más relevantes:

Nº	Documento	Título	Fecha de publicación*
D1	JP 10017851	"Tire puncture preventive"	1998-01-20
D2	US 4116895	"Puncture sealant composition "	1978-09-26

4. Análisis de patentabilidad (artículo 14 D486)

Nivel inventivo (artículo 18 D486)

1) Reivindicación 1 de la solicitud en estudio:

La reivindicación independiente 1 de la presente solicitud enseña lo siguiente:

"Un sellante para impedir pinchazos que es llenado en una cámara de sellante (6) definido para extenderse a lo largo de la periferia exterior de una cámara de aire (5) en una llanta (T), dicho sellante tiene una viscosidad en el rango de 25 a 35 dPa•s, y un índice tixotrópico en el rango de 6,5 a 11,0, donde dicho sellante comprende 65% en peso de agua, 30% en peso de propilenglicol, 2.0% en peso de un espesante, 0.5% en peso de una fibra de nylon, 1.4% en peso de una fibra de algodón, 0.5% en peso de un polvo de cerámica, y 0.1% en peso de un tinte".

2) El documento **JP 10017851** (nombrado de ahora en adelante como **D1**) se refiere a una composición para impedir pinchazos en llantas, compuesta por:

20 a 100 partes por peso de glicol con 2 a 4 átomos de carbono tal como el propilenglicol,

5 a 30 partes por peso de alcohol polivinílico, que proporciona la viscosidad adecuada a la composición,

1 a 20 partes por peso de una pluralidad de tipos de fibras cortas,

en correspondencia 100 partes por peso de agua,

y el contenido adicional de un tinte, según lo requiera.

Se observa que el documento **D1** no define un valor de viscosidad o de un índice tixotrópico, pero debido a la similitud entre la composición enseñada en la presente solicitud y la descrita en el documento **D1**, se puede estimar que la composición para impedir pinchazos en llantas expuesta en **D1**, satisface los valores del rango de viscosidad e índice tixotrópico definidos en la reivindicación 1 de la presente solicitud.

*Ver el resumen del documento **D1** en el folio 122.*

3) Por otra parte, el documento **US 4116895** (nombrado de ahora en adelante como **D2**) divulga el uso de un agente tixotrópico incorporado a la composición, para prevenir el efecto de cargas por fuerzas centrífugas debido a un fluido no uniforme del sellante cuando la llanta viaje a altas velocidades, lo que afectaría el balanceo de la llanta.

Es de notar, que el documento **D2** también sugiere que la composición tenga una viscosidad definida en 3500 cps (centipoise), equivalentes a 35 dPa•s.

*Ver el resumen, columna 2 renglones 10 a 14, columna 6 renglones 44 a 56, columna 8 renglón 1, columna 9 renglón 68, del documento **D2** en folios 123 a 127.*

4) Teniendo en cuenta que el problema técnico que resuelve la solicitud en estudio, consiste en impedir el desbalanceo que se genera en las llantas de los vehículos al usarse sellantes contenidos en su cámara de aire y la generación de vibraciones y ruido al rodar la llanta, en especial a alta velocidad, se observa que el documento **D1** propone también solucionar este problema técnico mediante el uso de un sellante que impide pinchazos en las llantas, introducido en la cámara de aire y que tiene una composición similar a la enseñada por la presente solicitud.

Se observa que complementando la solución propuesta por **D1** con en el documento **D2**, que divulga el uso de una composición sellante con un agente tixotrópico incorporado y una viscosidad de 35 dPa•s, una persona del oficio normalmente versada en la materia técnica correspondiente, utilizando lo revelado en **D1** y **D2** e inspirada en el problema técnico a solucionar, podría deducir la misma solución propuesta por la presente solicitud, por lo que carecería de nivel inventivo.

(31)

De acuerdo a lo anterior la solicitud en estudio se vería afectada por falta de nivel inventivo.

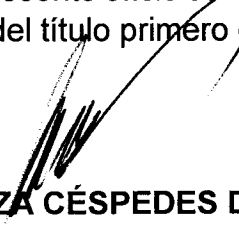
6. Conclusión:

Los requisitos de patentabilidad de la presente solicitud se encuentran afectados así:

N°	Documento N°	Reivindicaciones afectadas	Requisito que afecta
D1	JP 10017851	1	Nivel inventivo
D2	US 4116895	1	Nivel inventivo

En cumplimiento del artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le indica que debe dar respuesta dentro del término de sesenta días contados a partir de la fecha de notificación de la presente comunicación. En caso de no dar respuesta al presente requerimiento, o si a pesar de la respuesta subsistieran los impedimentos para la concesión, se denegará la patente.

Notifíquese el presente oficio conforme a lo dispuesto en el numeral 5.2, literal e), del capítulo quinto del título primero de la Circular Única N° 10 de 2001.


ALIX CARMENZA CÉSPEDES DE VERGEL
Jefe de División de Nuevas Creaciones

El anterior requerimiento fue notificado por fijación en lista, de fecha _____

CONCEPTO TÉCNICO No. 363	EXAMINADOR TÉCNICO Código No. 202065
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7/12/11