UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF NEW YORK

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SANFORD L.P.,

Plaintiff,

DRI MARK PRODUCTS, INC.,

Defendant.

: Civil Case No.

CV 12

SEYBERT, J

BOYLE M.J.

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COMPLAINT

Plaintiff Sanford L.P. (hereinafter "Plaintiff"), through its undersigned counsel, complains of Defendant Dri Mark Products, Inc. (hereinafter "Plaintiff" or "Dri Mark" or "DriMark") as follows:

NATURE OF THE ACTION

1. This is an action for declaratory judgment that Plaintiff and its products do not infringe any claim of United States Patent No. 6,561,713 B2, entitled "Metallic Ink Composition For Wick Type Writing Instruments" (the "'713 patent"), and for declaratory judgment that the '713 patent, and each claim thereof, is invalid and unenforceable.

THE PARTIES

2. Plaintiff Sanford L.P. is an Illinois limited partnership with its principal place of business at 2707 Butterfield Road, # 130, Oak Brook, Illinois 60523. Plaintiff is a wholly-owned subsidiary of Newell Rubbermaid, Inc.

3. Upon information and belief, Defendant Dri Mark Products, Inc. is a New York corporation with its principal place of business at 15 Harbor Park Drive, Port Washington, New

York 11050. From time to time, Dri Mark Products, Inc. alternatively describes itself as DriMark Products, Inc.

4. Defendant asserts that it is the owner by assignment of the '713 patent.

5. A true and correct copy of the '713 patent is attached as Exhibit 1.

JURISDICTION AND VENUE

6. This action arises under the patent laws of the United States, 35 U.S.C. § 1 *et seq.*, and under the Federal Declaratory Judgment Act, 28 U.S.C. §§ 2201 and 2202. This Court has subject matter jurisdiction over this action pursuant to 28 U.S.C. §§ 1331, 1338(a), 2201, and 2202.

7. This Court has personal jurisdiction over Defendant because, upon information and belief, Defendant, through its officers, agents and/or employees, transacts or is doing business in this district, including soliciting business in this district, shipping goods into this district, and deriving substantial revenue from intrastate and interstate commerce, which has an effect in this district. In addition, Defendant's principal place of business is within this district.

8. Venue is proper in this district under 28 U.S.C. §§ 1391 and/or 1400 because Defendant resides within this district and is subject to personal jurisdiction within this district.

COUNT I – DECLARATORY JUDGMENT OF NON-INFRINGEMENT

9. Plaintiff realleges and incorporates herein by reference each and every allegation contained in Paragraphs 1 through 8 above.

10. This is a claim for declaratory relief arising under 28 U.S.C. §§ 2201 and 2202 for a declaration that Plaintiff has not infringed and does not infringe in any manner any claim of the '713 patent.

11. Plaintiff offers for sale and sells Sharpie® Metallic Permanent Markers (hereinafter "Plaintiff's Products") to its customers.

12. Defendant has accused Plaintiff's Products of infringing the '713 patent in a written communication to Plaintiff's corporate parent, Newell Rubbermaid, Inc., dated July 26, 2012. Specifically, the written communication states: "Your company is infringing the '713 patent by making, using, selling, offering for sale and/or importing the following markers: *Sharpie® Metallic Permanent Marker*. DriMark demands that your company immediately cease and desist from making, using, selling, offering for sale and/or importing all configurations of the foregoing markers, whether sold separately or in multi-pack configurations." (Emphasis in original.) A copy of the July 26, 2012 written communication is attached as Exhibit 2.

13. In Defendant's July 26, 2012 written communication, Defendant threatened to file a patent infringement lawsuit in this district relating to Plaintiff's offer for sale and sale of Plaintiff's Products. Specifically, the written communication states: "If we do not hear from you by August 9, 2012, DriMark will assume that you have no interest in entering into a license. DriMark reserves all of its rights, including filing litigation in the United States District Court for the Eastern District of New York where DriMark is headquartered."

14. Plaintiff denies that Plaintiff's Products, or any other products of Plaintiff, infringe in any manner any claim of the '713 patent.

15. Because of Defendant's accusation of infringement, its demand for Plaintiff to cease its activities relating to Plaintiff's Products, and its threat of litigation, Plaintiff desires a judicial determination of its rights and duties and a declaration that Plaintiff has not infringed and does not infringe in any manner any claim of the '713 patent.

16. A judicial determination is necessary and appropriate at this time under the circumstances in order that Plaintiff may ascertain its rights and prevent threats of infringement.

17. An actual and justifiable controversy exists between Plaintiff and Defendant with respect the alleged infringement by Plaintiff of the '713 patent.

COUNT II – DECLARATORY JUDGMENT OF PATENT INVALIDITY

18. Plaintiff realleges and incorporates herein by reference each and every allegation contained in Paragraphs 1 through 17 above.

19. The '713 patent, and each claim thereof, is invalid in that the '713 patent does not comply with one or more of the statutory requirements under 35 U.S.C. § 101 *et seq.*, including but not limited to, 35 U.S.C. §§ 101, 102, 103, and/or 112.

20. A judicial determination is necessary and appropriate at this time under the circumstances with respect to the alleged validity of the '713 patent.

21. An actual and justifiable controversy exists between Plaintiff and Defendant with respect to the alleged validity of the '713 patent.

COUNT III – DECLARATORY JUDGMENT OF PATENT UNENFORCEABILITY

22. Plaintiff realleges and incorporates herein by reference each and every allegation contained in Paragraphs 1 through 21 above.

23. The '713 patent, and each claim thereof, is unenforceable due to inequitable conduct before the United States Patent & Trademark Office.

24. The '713 patent issued on May 13, 2003, from U.S. Application No. 10/121,828 (the "'828 application"). The '828 application was filed on April 11, 2002.

25. The '713 patent is related to, and claims priority to, U.S. Patent Nos. 6,402,412 B2 (the "'412 patent") and 6,224,284 B1 (the "'284 patent"). The '713 patent, '412 patent and '284 patent all share the same patent specification.

26. Defendant previously brought an action alleging infringement of the '284 patent against National Ink, Inc. and Dixon Ticonderoga Co., which action was styled *Dri Mark Products Inc. v. National Ink, Inc., et al.*, Civ. Action No. 01-cv-6541 (HB) (S.D.N.Y.) (the "Prior Action").

27. In an Opinion and Order dated April 10, 2002 (the "Order"), and subsequently affirmed by the Federal Circuit, the United States District Court for the Southern District of New York construed the claims of the '284 patent and granted the defendants' motion for summary judgment of non-infringement in the Prior Action.

28. Citing the specification and prosecution history of the '284 patent, the Order held, in pertinent part, that the use of an "anti-settling agent" was an essential component of Defendant's alleged invention.

29. The Court stated: "In short, *Dri Mark's innovation can be described as a wick type writing instrument, or marker, that uses metallic ink vis a vis, among other things, an 'anti-settling agent.*' '284 Pat. col. 1:42-44. Metallic ink, which is able to leave distinct writing on dark surfaces, shiny surfaces or glass, contains metal particles that tend to clog and settle in the interior parts of conventional markers. To accommodate this problem, metallic ink markers prior to Dri Mark's invention utilized a system of valves or pumps that required the user to shake the marker in order to disburse the settled particles. '284 Pat. col. 1:8-17. Without the shaking or the valves, the ink was traditionally unable to properly flow though the writing instrument, thereby preventing the user from writing with an even consistency. In contrast, Dri Mark's

marker requires no shaking, valves or pumps. *Instead, it delivers the metallic ink via 'capillary action' that is possible, in part, because Dri Mark utilizes 'an anti-settling agent to keep aluminum flakes in suspension.*' '284 Pat. col. 1:56-57." (Emphasis added.) This identical cited specification language appears in the '713 patent.

30. The Order further held that the essential anti-settling agent of the '284 patent was further limited by the specification and prosecution history of the '284 patent to an anti-settling agent with "ionic and polycarboxylic qualities." The Court cited, *inter alia*, the following language from the specification of the '284 patent, which appears identically in the '713 patent: "The anti-settling agent additive is of particular importance because of the aluminum flakes readiness to settle out. The ionicly charged sites on the additive bond themselves to the aluminum flakes suspending them in solutions for extended period and keeping them tightly adhered to the surfaces of the colored pigments. '284 Pat. col. 4:28-34 (emphasis added)."

31. One day following the Order, which confirmed that this specific anti-settling agent was an essential component of Defendant's alleged invention, Defendant, its employees and its representatives filed the '828 application as a continuation. In the '828 application, and the ensuing '713 patent, Defendant, its employees and its representatives purported to remove any express reference to the "anti-settling agent" from the independent claims in an attempt to circumvent the consequences of the Order.

32. During the course of prosecution of the '713 patent, Defendant, its employees and its representatives withheld the Order from the United States Patent & Trademark Office (the "PTO"). While Defendant, its employees and its representatives provided the PTO with certain documents served in the Prior Action, they did not provide the PTO with the Order or otherwise

alert the PTO to the contents of the Order and its impact on the pending prosecution of the claims of the '713 patent.

33. The Order, and its non-disclosure by Defendant, its employees and its representatives, is material to the patentability of the claims of the '713 patent. The '713 patent would not have issued as such but for the non-disclosure of the Order by Defendant, its employees and its representatives, because the PTO would not have allowed the claims of the '713 patent to issue in their current form had the PTO been aware of the undisclosed Order. In the alternative, the conduct of Defendant, its employees and its representatives constitutes acts of egregious misconduct for purposes of establishing materiality.

34. Defendant, its employees and its representatives acted with specific intent to deceive the PTO. The timing of the filing of the '828 application, Defendant's purported removal of any express reference in the independent claims of the '828 application and the ensuing '713 patent to the "anti-settling agent" in an attempt to circumvent the consequences of the Order, the contents of the Order and the nature of the non-disclosure of the Order, together demonstrate that Defendant, its employees, and its representatives made a deliberate decision to withhold the Order, which Defendant, its employees and its representatives knew of and knew to be material.

35. A judicial determination is necessary and appropriate at this time under the circumstances with respect to the alleged enforceability of the '713 patent.

36. An actual and justifiable controversy exists between Plaintiff and Defendant with respect to the alleged enforceability of the '713 patent.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff prays for judgment against Defendant as follows:

A. That this Court issue a declaration that Plaintiff has not infringed and does not infringe in any manner any claim of the '713 patent;

B. That this Court issue a declaration that the '713 patent, and each claim thereof, is invalid pursuant to Title 35 of the United States Code;

C. That this Court issue a declaration that the '713 patent, and each claim thereof, is unenforceable due to inequitable conduct before the United States Patent & Trademark Office;

D. For an award to Plaintiff of its costs of suit incurred herein as permitted by law;

E. For an Order declaring that this is an exceptional case, and awarding Plaintiff its costs, expenses, disbursements, and attorney's fees under 35 U.S.C. § 285 and any other applicable statutes and rules.

F. For such other and further relief as this Court may deem just and proper.

Dated: August 7, 2012
New York, New York

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Exhibit 1

EXHIBIT 1

US006561713B2

(12) **United States Patent**
Sukhna et al.

(10) **Patent No.: US 6,561,713 B2**
(45) **Date of Patent: *May 13, 2003**

(54) **METALLIC INK COMPOSITION FOR WICK TYPE WRITING INSTRUMENTS**

(75) Inventors: **Chhman Sukhna**, Queens, NY (US); **Charles Reichmann**, Queens, NY (US)

(73) Assignee: **Dri Mark Products, Inc.**, Port Washington, NY (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **10/121,828**

(22) Filed: **Apr. 11, 2002**

(65) **Prior Publication Data**

US 2002/0197096 A1 Dec. 26, 2002

Related U.S. Application Data

(63) Continuation of application No. 09/839,937, filed on Apr. 19, 2001, now Pat. No. 6,402,412, which is a continuation of application No. 09/416,359, filed on Oct. 12, 1999, now Pat. No. 6,224,284.

(51) **Int. Cl.**[7] **B43K 5/00**
(52) **U.S. Cl.** **401/198**; 401/196
(58) **Field of Search** 401/198, 199, 401/196

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,752,462	A	4/1930	Smith
2,002,891	A	5/1935	Hall
2,144,953	A	1/1939	Ziehl
3,190,295	A	6/1965	Touey et al.
3,369,543	A	2/1968	Ronco
3,393,684	A	7/1968	Touey et al.
3,400,998	A	9/1968	Daugherty et al.
3,406,137	A	10/1968	Terry et al.
3,425,779	A	2/1969	Fisher et al.
3,442,739	A	5/1969	Johnson
3,455,856	A	7/1969	Voedisch et al.
3,558,392	A	1/1971	Goodenow et al.
3,563,779	A	2/1971	Higaki et al.
3,565,655	A	2/1971	Higaki
3,614,245	A	10/1971	Schwartzman
3,614,247	A	10/1971	Otsuka

(List continued on next page.)

FOREIGN PATENT DOCUMENTS

EP	0480362	10/1991
EP	0890620	3/1997
EP	0837113	10/1997
EP	0987304	10/1997
EP	0903384	2/1998
WO	WO9312175	6/1993
WO	WO9735935	2/1997

OTHER PUBLICATIONS

International Search Report for Application No. PCT/JP97/00984 dated Jun. 17, 1997.

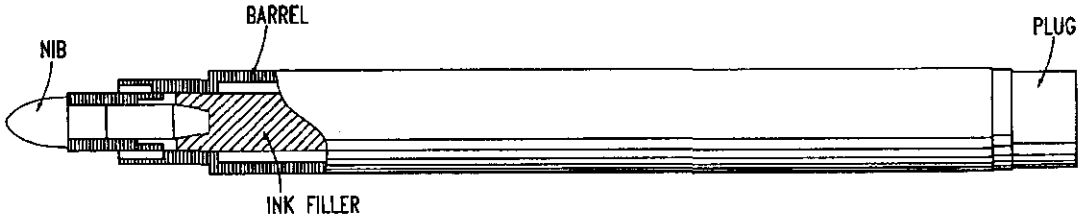
Primary Examiner—David J. Walczak
(74) *Attorney, Agent, or Firm*—Ostrolenk, Faber, Gerb & Soffen, LLP

(57) **ABSTRACT**

An ink composition or system for writing instruments constructed with a polyester fiber reservoir and a porous oriented fiber nib. This ink system will write on both black and white surfaces. On black surfaces, it will reveal itself as being opaque and metallic almost iridescent in appearance. On white surfaces, a tint of color is observed with distinct flecks of silver. The ink system is composted of water as a carrier, a permanent water-based binder, a colored pigmented permanent water-based dispersion of sub-micron particle size, a unique aluminum dispersion of specific particle size in a special carrier, a humectant, a surfactant that lowers surface tension, an anti-settling additive, a preservative and a base acting as a pH adjuster.

12 Claims, 2 Drawing Sheets

STANDARD MARKER CONSTRUCTION



U.S. PATENT DOCUMENTS

3,623,941	A		11/1971	Goodenow et al.
3,767,520	A		10/1973	Dick et al.
3,778,495	A		12/1973	Woolley
3,839,254	A		10/1974	Fang
3,864,183	A		2/1975	Hori
3,875,105	A		4/1975	Daugherty et al.
3,941,584	A		3/1976	Tundermann et al.
3,945,869	A		3/1976	Miller et al.
3,949,132	A		4/1976	Seregely et al.
3,969,127	A		7/1976	Robitaille et al.
3,972,629	A		8/1976	Whalen, Jr.
3,985,568	A		10/1976	Swenson et al.
3,992,559	A		11/1976	Day et al.
4,056,230	A		11/1977	Decobert
4,065,060	A		12/1977	Booz
4,065,215	A	*	12/1977	Otsuka 401/199
4,069,188	A		1/1978	Canard et al.
4,071,487	A		1/1978	Linden et al.
4,076,551	A		2/1978	Bernhard et al.
4,077,727	A		3/1978	Kramer et al.
4,077,807	A		3/1978	Kramer et al.
4,082,467	A		4/1978	Kaplan
4,097,290	A		6/1978	Muller et al.
4,125,499	A		11/1978	Howard
4,130,691	A		12/1978	Canard et al.
4,138,270	A		2/1979	Ishjima et al.
4,147,823	A		4/1979	Lavallee
4,158,074	A		6/1979	Uchiyama et al.
4,170,669	A		10/1979	Okada
4,173,720	A		11/1979	Megelas
4,180,407	A		12/1979	Gibson et al.
4,191,581	A		3/1980	Hamilton
4,214,250	A		7/1980	Fujita et al.
4,231,146	A		11/1980	Nakagawa et al.
4,233,195	A		11/1980	Mills
4,243,565	A		1/1981	Nishino et al.
4,251,164	A		2/1981	Nakagawa et al.
4,269,526	A		5/1981	Dupre
4,283,730	A		8/1981	Graf
4,286,005	A		8/1981	Berger
4,297,260	A		11/1981	Ferree, Jr. et al.
4,306,819	A		12/1981	Schüsseler
4,311,403	A		1/1982	Liguori
4,328,042	A		5/1982	Ostertag et al.
4,329,262	A		5/1982	Muller
4,329,264	A		5/1982	Muller
4,349,639	A		9/1982	Muller
4,350,535	A		9/1982	Ishijima et al.
4,354,889	A		10/1982	Berger
4,356,500	A		10/1982	Graf
4,384,800	A		5/1983	Dyama
4,389,499	A		6/1983	Riesgraf
4,390,646	A		6/1983	Ferguson
4,391,927	A		7/1983	Farmer, III
4,401,470	A		8/1983	Bridger
4,407,985	A		10/1983	Muller
4,410,290	A		10/1983	Ito et al.
4,410,643	A		10/1983	Muller
4,471,079	A		9/1984	Enami
4,482,374	A		11/1984	Osborn et al.
4,484,951	A		11/1984	Uchimura et al.
4,486,225	A		12/1984	Osborn et al.
4,490,177	A		12/1984	Shioi et al.
4,529,329	A		7/1985	Hirabayashi et al.
4,545,819	A	*	10/1985	Shioi et al. 106/23
4,567,490	A		1/1986	Afzali-Ardakani et al.
4,577,203	A		3/1986	Kawamura
4,604,139	A		8/1986	Shioi et al.
4,621,112	A		11/1986	Backhouse et al.
4,629,512	A		12/1986	Kondis
4,654,082	A		3/1987	Frilette
4,657,591	A		4/1987	Shioi et al.
4,666,519	A		5/1987	Akiyama et al.
4,722,124	A		2/1988	Serikawa et al.
4,729,808	A		3/1988	Berger
4,738,725	A		4/1988	Daugherty et al.
4,744,826	A		5/1988	Iijima
4,761,277	A		8/1988	Valdes et al.
4,795,286	A		1/1989	Shimoishi et al.
4,812,492	A		3/1989	Eckes et al.
4,842,433	A		6/1989	Otsuka
4,867,793	A		9/1989	Franz et al.
4,872,905	A		10/1989	Bourne et al.
4,885,032	A		12/1989	Okai et al.
4,931,093	A		6/1990	Brenke et al.
4,940,628	A		7/1990	Lin et al.
4,978,394	A		12/1990	Ostertag et al.
5,000,605	A		3/1991	Schneider
5,009,536	A		4/1991	Inoue et al.
5,013,543	A		5/1991	Mercado et al.
5,028,639	A		7/1991	Treutlein et al.
5,037,475	A		8/1991	Chida et al.
5,039,343	A		8/1991	Umeda et al.
5,102,458	A		4/1992	Lent et al.
5,104,922	A		4/1992	Chang
5,106,881	A		4/1992	Inoue et al.
5,110,450	A		5/1992	Culross et al.
5,124,205	A		6/1992	Raynolds et al.
5,124,405	A		6/1992	Erickson
5,127,951	A		7/1992	Imasato et al.
5,131,776	A	*	7/1992	Mott 401/198
5,151,125	A		9/1992	Kuwajima et al.
5,174,814	A		12/1992	Burwell et al.
5,176,947	A		1/1993	Afzali-Ardakani et al.
5,183,504	A		2/1993	Kuwajima et al.
5,215,579	A		6/1993	Keemer et al.
5,218,008	A		6/1993	Parrish
5,219,560	A		6/1993	Suzuki et al.
5,259,418	A		11/1993	Hamrick
5,261,955	A		11/1993	Nadkarni
5,270,430	A		12/1993	Parrish
5,279,850	A		1/1994	DeCrosta et al.
5,281,261	A		1/1994	Lin
5,288,160	A		2/1994	Li et al.
5,294,206	A		3/1994	Makunoki
5,296,032	A	*	3/1994	Jenkins et al. 106/404
5,302,195	A		4/1994	Helbrecht et al.
5,308,390	A		5/1994	Pennaz
5,320,673	A		6/1994	Carpenter
5,324,354	A		6/1994	Jesse et al.
5,338,351	A		8/1994	Pennaz
5,347,595	A		9/1994	Bokser
5,348,579	A		9/1994	Jenkins et al.
5,356,469	A		10/1994	Jenkins et al.
5,372,638	A		12/1994	DePue et al.
5,373,028	A		12/1994	McAfee et al.
5,374,306	A		12/1994	Schlegel et al.
5,374,687	A		12/1994	Cooperman et al.
5,378,574	A		1/1995	Winnik et al.
5,382,282	A		1/1995	Pennaz
5,383,901	A		1/1995	McGregor et al.
5,431,721	A		7/1995	Pennaz et al.
5,451,263	A		9/1995	Linn et al.
5,474,603	A		12/1995	Miyashita et al.
5,494,512	A		2/1996	Yamamoto et al.
5,520,473	A		5/1996	Durham
5,521,722	A		5/1996	Colvill et al.
5,549,741	A		8/1996	Pennaz et al.
5,599,853	A		2/1997	Loftin
5,640,225	A		6/1997	Nakata
5,662,738	A		9/1997	Schmid et al.

5,691,033 A	11/1997	Davies	
5,712,328 A	1/1998	Inoue et al.	
5,718,753 A	2/1998	Suzuki et al.	
5,743,949 A	4/1998	Kainz	
5,762,694 A	6/1998	Yokoi et al.	
5,767,172 A	6/1998	Fuksasawa	
5,802,818 A	9/1998	Doll et al.	
5,831,651 A	11/1998	Usui et al.	
5,861,558 A	1/1999	Buhl et al.	
5,868,511 A	2/1999	Osada	
5,876,242 A	3/1999	Furukawa	
5,906,446 A	5/1999	McCulloch et al.	
5,919,858 A	7/1999	Loftin	
5,931,996 A	8/1999	Reisser et al.	
5,944,886 A	8/1999	Hashizume	
5,961,706 A	10/1999	Bechly	
5,965,326 A	10/1999	Ellis	
5,988,921 A	11/1999	Medhin	
5,994,494 A	11/1999	Wakui	
6,056,463 A	5/2000	Nishio et al.	
6,063,176 A	5/2000	Lyen	
6,076,987 A	6/2000	Sekine et al.	
6,083,311 A	7/2000	Kanbayashi et al.	
6,099,629 A	8/2000	Morita et al.	
6,114,412 A	9/2000	Kanbayashi et al.	
6,120,590 A	9/2000	Miyamoto et al.	
6,171,381 B1	1/2001	Yoshimura et al.	
6,224,284 B1	5/2001	Sukhna et al.	
6,267,523 B1	7/2001	Poels et al.	
6,283,662 B1	9/2001	Inoue et al.	

* cited by examiner

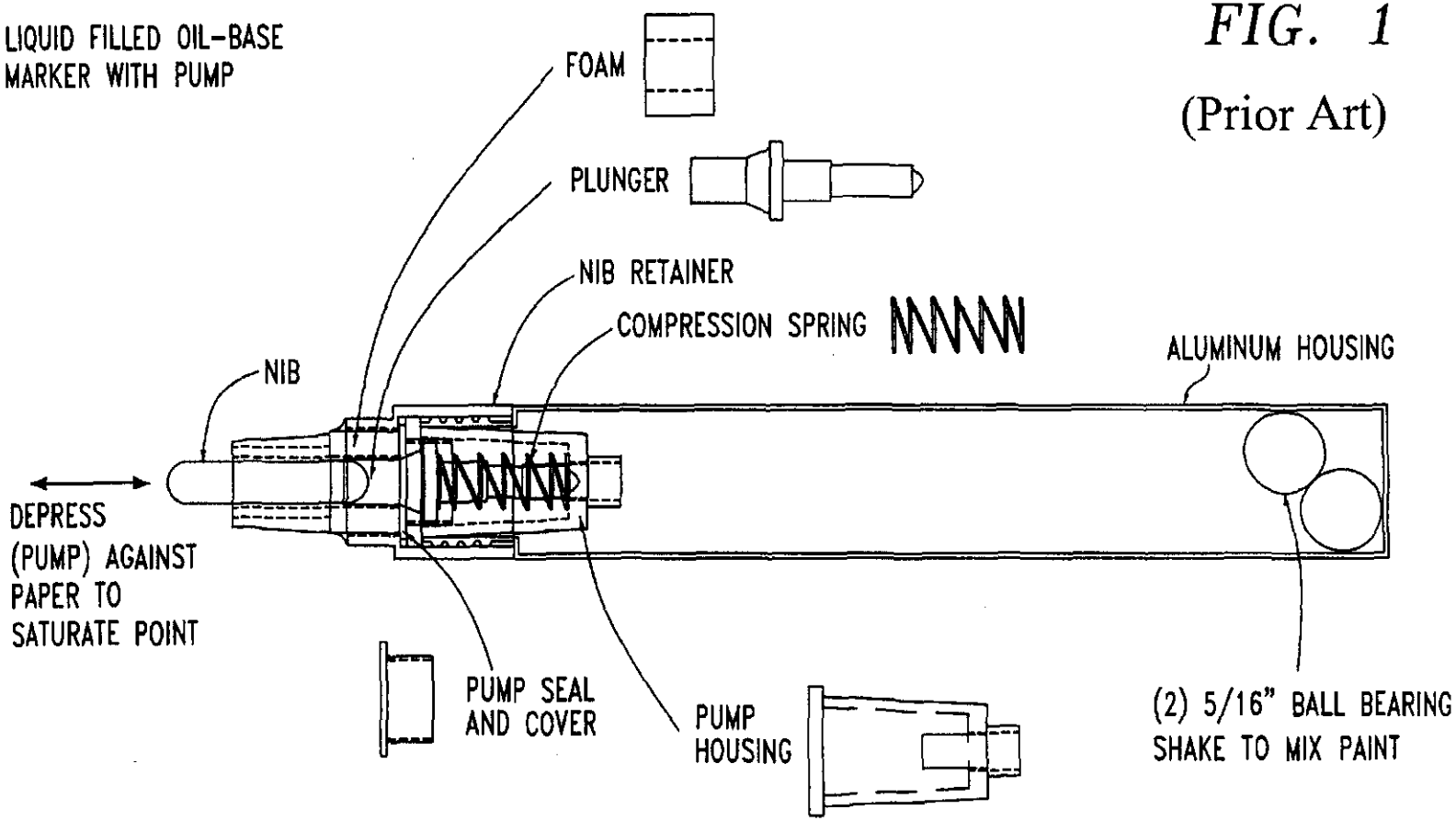


FIG. 1

(Prior Art)

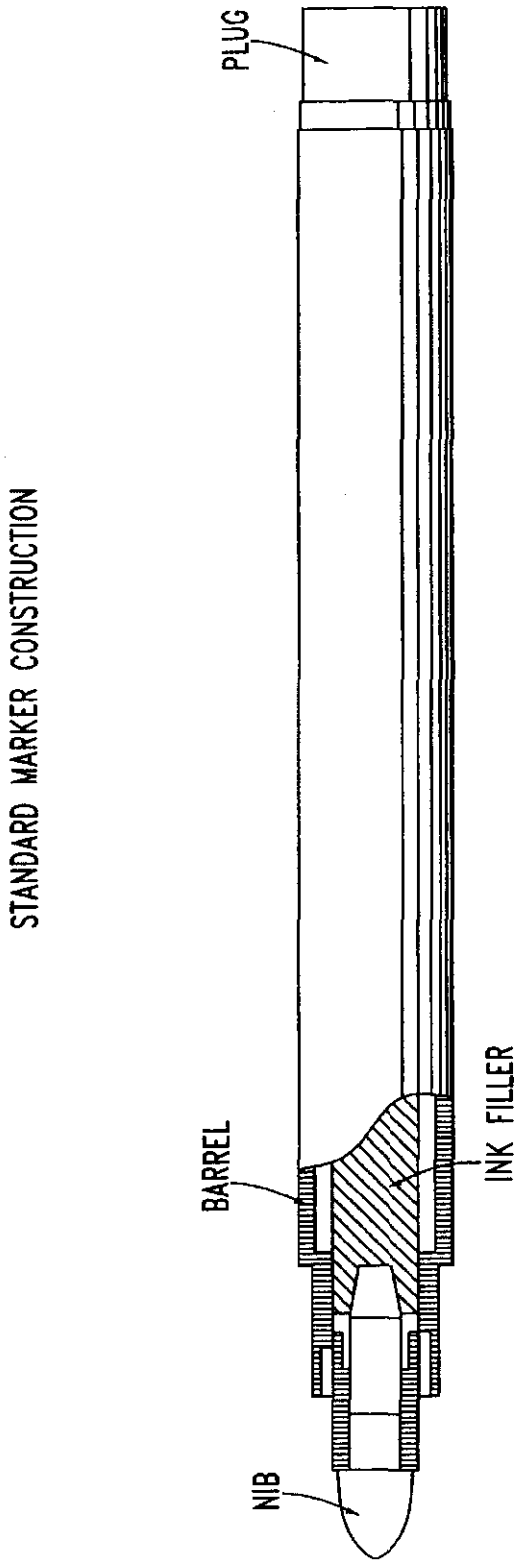


FIG. 2

METALLIC INK COMPOSITION FOR WICK TYPE WRITING INSTRUMENTS

CROSS-REFERENCES

The present application is a continuation under 37 C.F.R. §1.53(b) of prior application Ser. No. 09/839,937 filed Apr. 19, 2001, now U.S. Pat. No. 6,402,412, which is a continuation of application Ser. No. 09/416,359 filed Oct. 12, 1999, now U.S. Pat. No. 6,224,284, by Chhman SUKHNA and Charles Reichmann entitled METALLIC INK COMPOSITION FOR WICK TYPE WRITING INSTRUMENTS.

BACKGROUND OF THE INVENTION

The present invention relates to metallic ink based writing instruments and, more particularly, to metallic ink compositions for wick type writing instruments.

Currently, metallic ink writing instruments are enjoying great popularity. These are almost entirely in the form of a conventional style marker currently called a valve action marker (see FIG. 1). From the diagram, one can see that this is a complex device involving elaborate assembly. The valve action marker also involves shaking back and forth and then depressing, or pumping, the nib several times before ink will come down. As one can see, this is a rather cumbersome process.

Historically, metallic pigments have a large particle size greater than 20 microns; therefore, passage through a wick-style marker has not been possible. Instead, a valve-action marker is constructed with two steel balls in its ink chamber and a spring mechanism at the front in contact with the nib or tip. Since the specific gravity of the aluminum pigment is greater than water, it tends to settle rapidly. This is overcome by shaking back and forth, thereby re-mixing the aluminum particles in the ink. The pumping action on the paper forces the large particle aluminum pigments through the tip by applying pressure through the tip, thereby, producing ink and making writing possible.

Related conventional art includes U.S. Pat. No. 5,013,543 to Mercado; U.S. Pat. No. 5,219,560 to Kazuhiro; U.S. Pat. No. 5,106,881 to Hiroshi; U.S. Pat. No. 4,761,277 to Valdes; U.S. Pat. No. 4,872,905 to Bourne and U.S. Pat. No. 4,604,139 to Shoi, the contents of which are incorporated by reference herein. Regardless, the prior art has not delivered to date a wick-style marker which can deliver metallic pigments, i.e. inks, in writing instruments. As a result, metallic ink writing instruments have been more expensive, more complex to build and maintain, less reliable and have not fully realized their potential.

SUMMARY OF THE INVENTION

The general object of the present invention is to provide metallic ink compositions that work reliably in wick type writing instruments.

The foregoing and other objects of the invention are realized by the present invention which shows how one can overcome the aforementioned drawbacks of the prior art using a comparatively inexpensive wick-style marker that works by capillary action eliminating a costly assembly process.

The objects of the invention are achieved by mainly utilizing:

1. A small particle size aluminum dispersion less than 12 microns;
2. an anti-settling agent to keep aluminum flakes in suspension;

3. a densely packed highly porous polyester fiber filler;
4. a highly porous oriented polyester fiber nib with many channels;
5. a non-volatile humectant; and
6. a sub-micron colored pigmented dispersion.

This invention will work for a conventional simple wick-style marker that carries a cylindrical shaped reservoir (filler) that absorbs the ink and transports it to a porous oriented fiber nib that feeds on the filler by capillary action (see FIG. 2).

The invention results in a minimum of metallic particles settling out. The marker can be stored either vertically or horizontally; overcoming a traditional problem associated with pigmented ink systems. This wick-ink system, when filled into the writing device (FIG. 2), will also lay-down a thick opaque line capable of being seen on both black and white surfaces.

Traditional inks that work with pens (FIG. 2) cannot write on black paper since they are translucent, therefore, this market has been occupied by the valve-action marker of FIG. 1 which permits the flow of large particle size pigments. This invention solves this problem in a wick-style writing instrument (FIG. 2) that is user friendly and much simpler, not to mention a cheaper alternative.

The present invention is based on the startling discovery that based on the disclosed, specific ink formulation, a writing instrument can be made that carries a cylindrical shaped reservoir which feeds into a fiber nib by capillary action and remains for extended periods without settling out or blocking the nib or tip. This invention also eliminates the use of an expensive valve type marker.

Thus, an object of the invention is that a single wick-type pen can be used to write on both black and white surfaces and achieve a metallic almost iridescent appearance.

Another object of the invention is a pen that may possibly be used for decorative poster work on both black and white surfaces.

A further object of the invention is the ability to write on human skin to achieve decorative effects similar to temporary tattoos, with an intense opaque metallic look, and washable with soap and water.

Still further, an object of this invention is to attain, by changing the permanent binder to a temporary one, a damp erase or dry erase writing instrument that can be made to write on black and white melamine, porcelain and all non porous boards.

The invention composition includes water as a carrier, an acrylic resin in solution as a binder although a polyvinylpyrrolidone polymer can be substituted to make temporary inks, a pigmented dispersion as a coloring agent, a unique aluminum dispersion of particle size 1 to 12 microns, a surfactant to reduce surface tension, an anti-settling agent to suspend aluminum particles along with a preservative, and a pH adjuster in the form of an amine.

The components of the writing instrument utilized in this invention are of some importance. The polyester filler, or reservoir chosen, must be densely packed and porous to allow flow of aluminum particles and at the same time keep settling to a minimum. Polyester fiber is chosen because it is non-reactive and very porous. The tip, or nib, of the writing instrument must be a porous, oriented polyester nib that has many channels to allow aluminum pigments to pass freely. Many other types of fibers will filter the aluminum and only allow the colored pigment to pass through, thus creating a non-metallic appearance.

One additional detail should be noted about this invention. Dyes are not used in this composition. This is because

dyes wash away easily, they do not provide bonding to the aluminum pigments and are more of an outline as described in U.S. Pat. No. 4,604,139.

This invention utilizes a permanent and semi-permanent opaque metallic ink, which may display iridescent qualities depending on the surface written on—black or white.

Other features and advantages of the present invention will become apparent from the following description of the invention which refers to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 diagrammatically illustrates a conventional valve action ink dispensing writing implement.

FIG. 2 illustrates a conventional, wick-style writing implement.

DETAILED DESCRIPTION OF THE INVENTION

The present invention illustrates the considerable ease and convenience of an ink system in a simple wick type writing instrument (FIG. 2), compared to the complexity of conventional valve-action markers (FIG. 1) that are currently used to deliver metallic inks.

This invention is accomplished by providing an aqueous one-phase ink composition having a viscosity of 5 cps to 10 cps at 25° Celsius with a pH of 7.5 to 8.5 suitable for use in a wick-style writing instrument with a porous oriented fiber nib.

This ink system contains an aluminum pigmented dispersion of no greater particle size than about 12 microns, a sub-micron pigmented colored aqueous dispersion to impart a tint and contribute to permanency, an anti-settling agent to keep aluminum particles from settling out, and a binder to bind the aluminum pigments together and to impart adhesion, water resistance, gloss, and permanency to different surfaces.

In addition to the foregoing important ingredients, this ink system may contain other additives including a preservative, a surfactant to reduce surface-tension, a pH adjuster in the form of an amine, and a rheology modifier such as a starch or clay.

As noted before, one of the important aspects of the present invention is the particle size of the aluminum pigments. If the particle size is too large, greater than 12 microns, they will not flow through the pathways of the filler and nib. This is one of the main reasons why metallic inks have been confined to be used only in valve markers (FIG. 1), which is essentially a free-flowing system, and the pumping action imparts pressure on the aluminum particles forcing them through the nib.

The present invention solves the problem by using a carefully monitored particle size aluminum dispersion, along with a customized filler of high density with many pathways, and a highly porous oriented fiber nib with many channels.

The aluminum flakes are dispersed initially in water and binder of starch with the pH adjusted anywhere between 7.0 and 8.0. This prevents the build up of hydrogen gas, which is a notorious and dangerous problem associated with aluminum pigments. The finished ink system is adjusted to a pH of 7.5 to 8.5; this is to ensure this problem does not occur.

The dispersion used in the present invention is of the type Stapa Hydrolac AW from Eckart and Roto Vario from Eckart. The amount needed to impart a metallic look varies from about 10% to 25% by weight depending upon the desired intensity of the color.

It is very interesting to note that on black surfaces, the pigmented color and the aluminum pigments bond together to impart a uniform metallic line. On white paper, the color is separated from the metallic flakes showing a line that is tinted in color and flecked with aluminum to impart a silver appearance.

The aluminum dispersions of the present invention are very stable at temperatures of 100° F. to 125° F. and do not dry up easily. This contributes to the long shelf life of the marker. The ink system is more stable because starch which bonds the aluminum flakes in the dispersion has even more cohesion with the marker binder of the system thereby contributing to it staying in solution and keeping the aluminum flakes suspended which, of course, provides an anti-settling effect.

The binder in the present invention is an acrylic resin solution of about 40% to 50% solids. This binder forms a clear film at room temperature on drying. It is resistant to water and adheres well to most surfaces. The pH is between 7.5 and 8.5. The viscosity is 100 to 150 cps and the glass transition temperature t.g. °C30. The binder must be able to form a film at room temperature. This is the only way the aluminum flakes will bond to writing surfaces on drying. Typical resins of this type include GA-1590 from B. F. Goodrich and Joncryl 537 from S. C. Johnson.

Many other polymers will come to mind of those skilled in the art. The binder is used at about 10% to 25% by weight depending on the desired resistance properties.

The pigmented colored dispersion is of great importance since this dispersion imparts the desired color to the overall metallic ink system and makes it pleasing to the eye. The present invention utilizes a dispersion of about 35% to 45% solids, pH 8.0 to 9.0, and viscosity of 100 to 150 cps at 25° C. The pigments are grounded in an acrylic binder or surfactant to a particle size less than 0.5 micron enhancing their bonding ability to the aluminum pigments. Common dispersions used in the invention include Heucosperse colors from Heucotech and Acroverse colors from Penn Color. A percentage of 10% to 20% by weight is used depending on the desired color intensity.

The anti-settling agent additive is of particular importance because of the aluminum flakes readiness to settle out. The ionicly charged sites on the additive bond themselves to the aluminum flakes suspending them in solutions for extended periods and keeping them tightly adhered to the surfaces of the colored pigments. This ensures that the ink traveling down the polyester filler into the nib and onto the writing surfaces is metallized. Without the anti-settling agent, the aluminum flakes would separate very quickly from the colored pigments. The resulting system will be one that writes very non-uniform by, with colored lines appearing with no metallic appearance. The anti-settling agent utilized in this invention is ionic in nature and derived from a polycarboxylic acid. Examples are phtalic acid, adipic acid and tri-metallic acid. A percentage of 0.25% to 1.5% by weight is utilized, an example of this agent is BYK105 from Byk Chemie.

A humectant is utilized in this invention to keep the finished writing instrument from drying out on extended storage in warm and humid conditions. Polyglycols are particularly adept in these applications, although glycerin may be utilized. This invention uses Polyglycols of molecular weight of 400 to 725 at about 5% to 10% by weight. Examples are Carbowax 400 and Carbowax 700 distributed by Pride Chemicals.

With many water based ink systems the surface tension is very high. A surfactant helps reduce this property so that

proper flow through the filler and wetting on different surfaces are achieved. This ink composition has a surface tension of about 37 to 40 dynes/cm and utilizes a fluro chemical surfactant similar to one provided by 3M FC-170C and zonyl FSN supplied by DuPont Chemicals. A percentage of 0.5% to 0.75% by weight is used in this invention.

To discourage improper use of the marker, a water-soluble organic solvent such as denatured ethanol is utilized in this invention. This also contributes to its drying speed on different surfaces. An example would be SOF-642 distributed by Pride Chemicals. A quantity of 3% to 10% is utilized.

As mentioned before, the ink system needs to be maintained at a pH of 7.0 to 8.5 so as to avoid the build up of hydrogen gas. Therefore, an amine pre-mixed with water to avoid shocking the aluminum flakes is utilized to adjust and stabilize the pH. This invention uses Triethanolamine (99%) at about 0.25% to 1.0% by weight, distributed from Pride Chemicals. Other common amines such as AMP-95 distributed by Angus Chemicals can also be used.

Finally, a preservative is utilized to keep fungi and bacteria from build up in the writing instrument on extended storage. A number of preservatives will come to mind of one skilled in the art. The preferred product in this invention is Germaben II from ISP Polymers used at 1.0% to 3.0% by weight.

The following examples will demonstrate this ink system that utilizes a simple wick-style marker (FIG. 2).

All figures are percentage by weight.

Red Permanent Metallic Ink		
	Distilled Water	57.00
B. F. Goodrich	GA1594	10.00
Pride Chemical	Carbowax 400	5.00
Eckart	Stapa Hydolac AW	15.00
Penn Color	Acroverse Red 5123	10.50
ISP Polymers	Germaben II	1.25
Pride Chemical	Triethylanolamine 99%	0.25
Byk Chemie	Byk 105	1.00
		100.00
Blue Permanent Metallic Ink		
	Distilled Water	42.25
B. F. Goodrich	GA1594	10.00
Pride Chemical	Carbowax 400	5.00
Eckart	Roto Vario RV5000	25.00
Heuback	Heucosperse BS5525	15.00
ISP Polymers	Germaben II	1.25
Pride Chemical	Triethylanolamine 99%	0.50
Byk Chemie	Byk 105	1.00
		100.00
Green Permanent Metallic Ink		
	Distilled Water	50.25
S. C. Johnson	Joncryl 537	11.00
Pride Chemical	Carbowax 400	4.00
Eckart	Roto Vario RV5008	20.00
Penn Color	Acroverse Green 32G120	12.00
ISP Polymers	Germaben II	1.25
Angus Chemical	AMP-95	0.25
Byk Chemie	Byk 105	1.25
		100.00
Gold Permanent Metallic Ink		
	Distilled Water	44.50
S. C. Johnson	Joncryl 537	10.00
Pride Chemical	Carbowax 400	7.00

-continued

Heubach	Heucosperse III YS5345	15.00
Eckhart	Roto Vario RV5008	20.00
ISP Polymers	Germaben II	2.00
Angus Chemical	AMP-95	0.25
Byk Chemie	Byk 105	1.25
		100.00

Semi-Permanent Wet Erase Metallic Ink For Black and White Melamine, Porcelain and All Non Porous Boards

Blue Ink Wet Erase Metallic		
	Distilled Water	63.75
Pride Chemical	Carbowax 400	7.00
ISP Technologies	PVP/VA630	2.00
Heubach	Heucosperse 33S5528	10.00
Eckhart	Roto Vario RV5008	15.00
ISP Technologies	Germaben II	1.00
Angus Chemical	AMP-95	0.25
Byk Chemie	Byk 105	1.00
		100.00
Red Ink Wet Erase Metallic		
	Distilled Water	67.75
Pride Chemical	Carbowax 400	4.00
Penn Color	Heucosperse Red 5123	15.00
ISP Technologies	Germaben II	1.00
Eckart	Roto Vario RV5308	10.00
Pride Chemical	Triethanolamine 99%	0.50
Byk Chemie	Byk 105	0.75
ISP	PVP/VA 670	1.00
		100.00

Summarizing, the present invention comprises a metallizing system for writing instruments having a densely packed polyester fiber reservoir and a porous polyester oriented fiber nib with channels allowing passage of specific particle size aluminum pigment (less than 12 microns). This nib is in contact with the reservoir shown in the writing instrument illustrated in FIG. 2 and the system functions by capillary action.

As described, the ink system includes: distilled water as a carrier, at about 40% to 70% by weight; a water soluble organic solvent having an evaporation rate greater than 1.0 at 25° C. using butyl acetate at about 1.0 as a basic; a liquid acrylic resin solution at about a 40% to 50% solids and present in the ink system from about 10% to 20% by weight; said humectant being selected from a group of polyglycol molecular weight 400 to 1025 and present in the ink system from about 5% to 15% by weight; an aluminum pigmented dispersion of about 10% to 15% solids at less than about 12 microns particle size and present at 10% to 25% by weight with a pH of about 7.0 to 8.5; a fluro chemical surfactant with a pH of about 9.0 and surface tension of about 25 dynes/cm and present at 0.25% to 1.0% by weight; an anti-settling agent chosen from a lower molecular weight unsaturated polycarboxylic acid that has an ionic charge present in an amount 0.25% to 1.25% by weight; and an ammoniacal base for adjusting the pH of the ink system to about pH 7.5 to 8.5 present in an amount 0.25% to 1.5% by weight; and a colored water-based pigmented dispersion of about 35% to 45% solids having a particle size less than about 0.5 microns and present in amount 10% to 20% by weight.

The ink system also includes a binder than is an acrylic resin solution present at about 10% to 25% by weight

selected from a group or class of acrylic resin solutions that have a t.g. °C −16 to 30, MFFT °C<25°C., a viscosity of about 50 cps to 150 cps, and a solid content of about 40% to 50%.

Although the present invention has been described in relation to particular embodiments thereof, many other variations and modifications and other uses will become apparent to those skilled in the art. It is preferred, therefore, that the present invention be limited not by the specific disclosure herein, but only by the appended claims.

What is claimed is:

1. A writing instrument, comprising:

a fibrous reservoir with passageways defined therein and a porous nib with channels allowing passage of an ink therethrough;

an ink formulation in the fibrous reservoir, the ink formulation including a color pigmented dispersion and a metallic dispersion; and

the nib being in contact with the fibrous reservoir and being able to absorb the metallic dispersion solely by capillary action and the ink formulation being formulated to permit the metallic dispersion to pass through the fibrous reservoir passageways and the channels in the nib without clogging or blocking the passageways and the channels.

2. The writing instrument of claim **1**, including;

an anti-settling agent to keep the metallic particles in suspension;

a humectant; and

said color pigmented dispersion having a sub-micron particle size.

3. The writing instrument of claim **2**, wherein the metallic dispersion comprises an aluminum-pigmented water-based dispersion whose particle size is no greater than 12 microns made from bright leafing aluminum flakes.

4. The writing instrument of claim **3**, wherein said aluminum flakes are dispersed in a medium of starch and water to prevent settling and a pH of 8.0 and 8.5 to prevent hydrogen gas build up and is stable at 100° F. to 125° F. so as to prevent drying out of the writing instrument.

5. The writing instrument of claim **2**, wherein said ink formulation includes, as an anti-settling agent based on a lower molecular weight, unsaturated polycarboxylic acid with ionic activity that will bond with aluminum pigments and keep them in suspension for extended periods in a low viscosity ink system.

6. The writing instrument of claim **2**, wherein said anti-settling agent increases color strength and prevents hard settling of the metallic dispersion.

7. The writing instrument of claim **2**, wherein said ink formulation utilizes a humectant chosen from a group of polyglycol of molecular weight 400 to 1025.

8. The writing instrument of claim **2**, wherein said ink formulation includes a pH adjuster in the form of a base capable of stabilizing said formulation to a pH of 8.0 to 8.5.

9. The writing instrument of claim **2**, wherein said fibrous reservoir is made of polyester that is tightly bonded in a wrapped polypropylene skin and the reservoir is in contact with the nib which is a multi-channel highly porous oriented fiber nib said ink formulation having a viscosity of 5 cps to 10 cps at 25° C., a surface tension of less than 40 dynes/cm at 25° C., a pH about 7.0 to 8.5 capable of making permanent or semi-permanent metallic lines on black and white surfaces.

10. The writing instrument of claim **2**, wherein said writing instrument is capable of making semi-permanent opaque metallic lines on human skin and nails that are washable with soap and water.

11. A writing instrument, comprising:

a non valve-action barrel with an opening that is closed off by a fiber nib;

a fibrous reservoir in physical contact with the nib;

an ink formulation in the fibrous reservoir, the ink formulation containing a metallic pigmented dispersion of not greater particle size than about 12 microns, a pigmented dispersion to impart a tint, and a binder; the ink formulation flowing to the nib solely by capillary action.

12. The writing instrument of claim **11**, further including a preservative, a surfactant to reduce surface-tension, and a pH adjuster.

* * * * *

Exhibit 2

EXHIBIT 2

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VIA UPS EXPRESS

July 26, 2012

Newell Rubbermaid Inc.
Mr. John K. Stipancich, Senior VP
General Counsel and Corporate Secretary
3 Glenlake Parkway
Atlanta, Georgia 30328

Re: Infringement and Licensing of U.S. Patent No. 6,561,713

Dear Mr. Stipancich:

Our firm represents DriMark Products, Inc. in patent litigation and licensing matters. DriMark is the owner of U.S. Pat. No. 6,561,713 titled "Metallic Ink Composition for Wick Type Writing Instruments" (the '713 patent), a copy of which is enclosed.

Your company is infringing the '713 patent by making, using, selling, offering for sale and/or importing the following markers:

Sharpie® Metallic Permanent Marker.

DriMark demands that your company immediately cease and desist from making, using, selling, offering for sale and/or importing all configurations of the foregoing markers, whether sold separately or in multi-pack configurations. DriMark has licensed the '713 patent previously for a reasonable royalty. Please contact me to discuss licensing the '713 patent from DriMark. A license is required to avoid liability for past damages and/or future damages for infringement of the '713 patent.

If we do not hear from you by August 9, 2012, DriMark will assume that you have no interest in entering into a license. DriMark reserves all of its rights, including filing litigation in the United States District Court for the Eastern District of New York where DriMark is headquartered.

Sincerely,

Peter Gergely

Peter Gergely

US006561713B2

(12) **United States Patent**
Sukhna et al.

(10) **Patent No.: US 6,561,713 B2**
(45) **Date of Patent: *May 13, 2003**

(54) **METALLIC INK COMPOSITION FOR WICK TYPE WRITING INSTRUMENTS**

(75) Inventors: **Chhman Sukhna**, Queens, NY (US); **Charles Reichmann**, Queens, NY (US)

(73) Assignee: **Dri Mark Products, Inc.**, Port Washington, NY (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **10/121,828**

(22) Filed: **Apr. 11, 2002**

(65) **Prior Publication Data**

US 2002/0197096 A1 Dec. 26, 2002

Related U.S. Application Data

(63) Continuation of application No. 09/839,937, filed on Apr. 19, 2001, now Pat. No. 6,402,412, which is a continuation of application No. 09/416,359, filed on Oct. 12, 1999, now Pat. No. 6,224,284.

(51) **Int. Cl.**[7] **B43K 5/00**
(52) **U.S. Cl.** **401/198**; 401/196
(58) **Field of Search** 401/198, 199, 401/196

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,752,462	A	4/1930	Smith
2,002,891	A	5/1935	Hall
2,144,953	A	1/1939	Ziehl
3,190,295	A	6/1965	Touey et al.
3,369,543	A	2/1968	Ronco
3,393,684	A	7/1968	Touey et al.
3,400,998	A	9/1968	Daugherty et al.
3,406,137	A	10/1968	Terry et al.
3,425,779	A	2/1969	Fisher et al.
3,442,739	A	5/1969	Johnson
3,455,856	A	7/1969	Vocdisch et al.
3,558,392	A	1/1971	Goodenow et al.
3,563,779	A	2/1971	Higaki et al.
3,565,655	A	2/1971	Higaki
3,614,245	A	10/1971	Schwartzman
3,614,247	A	10/1971	Otsuka

(List continued on next page.)

FOREIGN PATENT DOCUMENTS

EP	0480362	10/1991
EP	0890620	3/1997
EP	0837113	10/1997
EP	0987304	10/1997
EP	0903384	2/1998
WO	WO9312175	6/1993
WO	WO9735935	2/1997

OTHER PUBLICATIONS

International Search Report for Application No. PCT/JP97/00984 dated Jun. 17, 1997.

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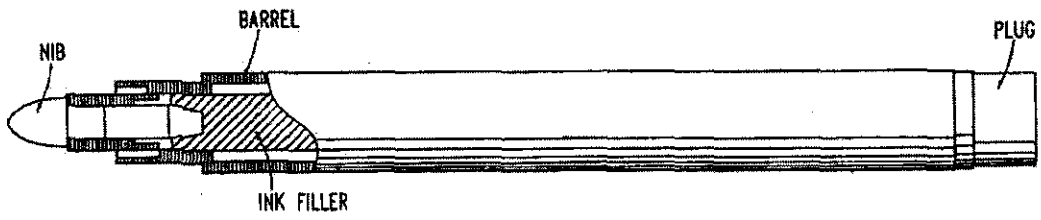
(57) **ABSTRACT**

An ink composition or system for writing instruments constructed with a polyester fiber reservoir and a porous oriented fiber nib. This ink system will write on both black and white surfaces. On black surfaces, it will reveal itself as being opaque and metallic almost iridescent in appearance. On white surfaces, a tint of color is observed with distinct flecks of silver. The ink system is composted of water as a carrier, a permanent water-based binder, a colored pigmented permanent water-based dispersion of sub-micron particle size, a unique aluminum dispersion of specific particle size in a special carrier, a humectant, a surfactant that lowers surface tension, an anti-settling additive, a preservative and a base acting as a pH adjuster.

12 Claims, 2 Drawing Sheets

STANDARD MARKER CONSTRUCTION



U.S. PATENT DOCUMENTS

3,623,941	A		11/1971	Goodenow et al.
3,767,520	A		10/1973	Dick et al.
3,778,495	A		12/1973	Woolley
3,839,254	A		10/1974	Fang
3,864,183	A		2/1975	Hori
3,875,105	A		4/1975	Daugherty et al.
3,941,584	A		3/1976	Tundermann et al.
3,945,869	A		3/1976	Miller et al.
3,949,132	A		4/1976	Seregely et al.
3,969,127	A		7/1976	Robitaille et al.
3,972,629	A		8/1976	Whalen, Jr.
3,985,568	A		10/1976	Swenson et al.
3,992,559	A		11/1976	Day et al.
4,056,230	A		11/1977	Decobert
4,065,060	A		12/1977	Booz
4,065,215	A	*	12/1977	Otsuka 401/199
4,069,188	A		1/1978	Canard et al.
4,071,487	A		1/1978	Linden et al.
4,076,551	A		2/1978	Bernhard et al.
4,077,727	A		3/1978	Kramer et al.
4,077,807	A		3/1978	Kramer et al.
4,082,467	A		4/1978	Kaplan
4,097,290	A		6/1978	Muller et al.
4,125,499	A		11/1978	Howard
4,130,691	A		12/1978	Canard et al.
4,138,270	A		2/1979	Ishjima et al.
4,147,823	A		4/1979	Lavallee
4,158,074	A		6/1979	Uchiyama et al.
4,170,669	A		10/1979	Okada
4,173,720	A		11/1979	Megelas
4,180,407	A		12/1979	Gibson et al.
4,191,581	A		3/1980	Hamilton
4,214,250	A		7/1980	Fujita et al.
4,231,146	A		11/1980	Nakagawa et al.
4,233,195	A		11/1980	Mills
4,243,565	A		1/1981	Nishino et al.
4,251,164	A		2/1981	Nakagawa et al.
4,269,526	A		5/1981	Dupre
4,283,730	A		8/1981	Graf
4,286,005	A		8/1981	Berger
4,297,260	A		11/1981	Ferree, Jr. et al.
4,306,819	A		12/1981	Schüsseler
4,311,403	A		1/1982	Liguori
4,328,042	A		5/1982	Osterlag et al.
4,329,262	A		5/1982	Muller
4,329,264	A		5/1982	Muller
4,349,639	A		9/1982	Muller
4,350,535	A		9/1982	Ishijima et al.
4,354,889	A		10/1982	Berger
4,356,500	A		10/1982	Graf
4,384,800	A		5/1983	Dyama
4,389,499	A		6/1983	Riesgraf
4,390,646	A		6/1983	Ferguson
4,391,927	A		7/1983	Farmer, III
4,401,470	A		8/1983	Bridger
4,407,985	A		10/1983	Muller
4,410,290	A		10/1983	Ito et al.
4,410,643	A		10/1983	Muller
4,471,079	A		9/1984	Enami
4,482,374	A		11/1984	Osborn et al.
4,484,951	A		11/1984	Uchimura et al.
4,486,225	A		12/1984	Osborn et al.
4,490,177	A		12/1984	Shioi et al.
4,529,329	A		7/1985	Hirabayashi et al.
4,545,819	A	*	10/1985	Shioi et al. 106/23
4,567,490	A		1/1986	Afzali-Ardakani et al.
4,577,203	A		3/1986	Kawamura
4,604,139	A		8/1986	Shioi et al.
4,621,112	A		11/1986	Backhouse et al.
4,629,512	A		12/1986	Kondis
4,654,082	A		3/1987	Frilette
4,657,591	A		4/1987	Shioi et al.
4,666,519	A		5/1987	Akiyama et al.
4,722,124	A		2/1988	Serikawa et al.
4,729,808	A		3/1988	Berger
4,738,725	A		4/1988	Daugherty et al.
4,744,826	A		5/1988	Iijima
4,761,277	A		8/1988	Valdes et al.
4,795,286	A		1/1989	Shimoishi et al.
4,812,492	A		3/1989	Eckes et al.
4,842,433	A		6/1989	Otsuka
4,867,793	A		9/1989	Franz et al.
4,872,905	A		10/1989	Bourne et al.
4,885,032	A		12/1989	Okai et al.
4,931,093	A		6/1990	Bronke et al.
4,940,628	A		7/1990	Lin et al.
4,978,394	A		12/1990	Ostertag et al.
5,000,605	A		3/1991	Schneider
5,009,536	A		4/1991	Inoue et al.
5,013,543	A		5/1991	Mercado et al.
5,028,639	A		7/1991	Treutlein et al.
5,037,475	A		8/1991	Chida et al.
5,039,343	A		8/1991	Umeda et al.
5,102,458	A		4/1992	Lent et al.
5,104,922	A		4/1992	Chang
5,106,881	A		4/1992	Inoue et al.
5,110,450	A		5/1992	Culross et al.
5,124,205	A		6/1992	Reynolds et al.
5,124,405	A		6/1992	Erickson
5,127,951	A		7/1992	Imasato et al.
5,131,776	A	*	7/1992	Moll 401/198
5,151,125	A		9/1992	Kuwajima et al.
5,174,814	A		12/1992	Burwell et al.
5,176,947	A		1/1993	Afzali-Ardakani et al.
5,183,504	A		2/1993	Kuwajima et al.
5,215,579	A		6/1993	Keemer et al.
5,218,008	A		6/1993	Parrish
5,219,560	A		6/1993	Suzuki et al.
5,259,418	A		11/1993	Hamrick
5,261,955	A		11/1993	Nadkarni
5,270,430	A		12/1993	Parrish
5,279,850	A		1/1994	DeCrosta et al.
5,281,261	A		1/1994	Lin
5,288,160	A		2/1994	Li et al.
5,294,206	A		3/1994	Makunoki
5,296,032	A	*	3/1994	Jenkins et al. 106/404
5,302,195	A		4/1994	Helbrecht et al.
5,308,390	A		5/1994	Pennaz
5,320,673	A		6/1994	Carpenter
5,324,354	A		6/1994	Jesse et al.
5,338,351	A		8/1994	Pennaz
5,347,595	A		9/1994	Bokser
5,348,579	A		9/1994	Jenkins et al.
5,356,469	A		10/1994	Jenkins et al.
5,372,638	A		12/1994	DePue et al.
5,373,028	A		12/1994	McAfee et al.
5,374,306	A		12/1994	Schlegel et al.
5,374,687	A		12/1994	Cooperman et al.
5,378,574	A		1/1995	Winnik et al.
5,382,282	A		1/1995	Pennaz
5,383,901	A		1/1995	McGregor et al.
5,431,721	A		7/1995	Pennaz et al.
5,451,263	A		9/1995	Linn et al.
5,474,603	A		12/1995	Miyashita et al.
5,494,512	A		2/1996	Yamamoto et al.
5,520,473	A		5/1996	Durham
5,521,722	A		5/1996	Colvill et al.
5,549,741	A		8/1996	Pennaz et al.
5,599,853	A		2/1997	Loftin
5,640,225	A		6/1997	Nakata
5,662,738	A		9/1997	Schmid et al.

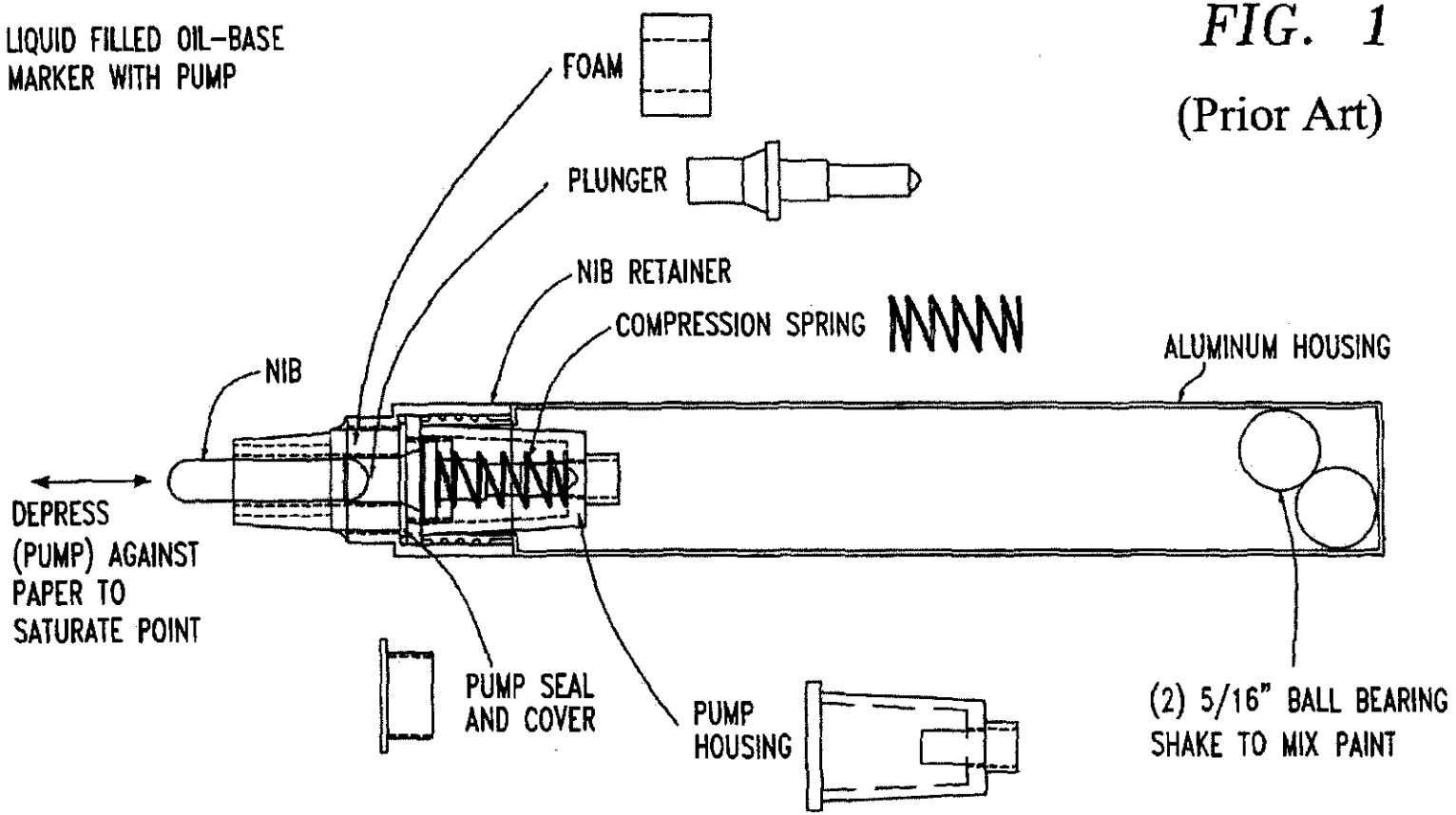


FIG. 1

(Prior Art)

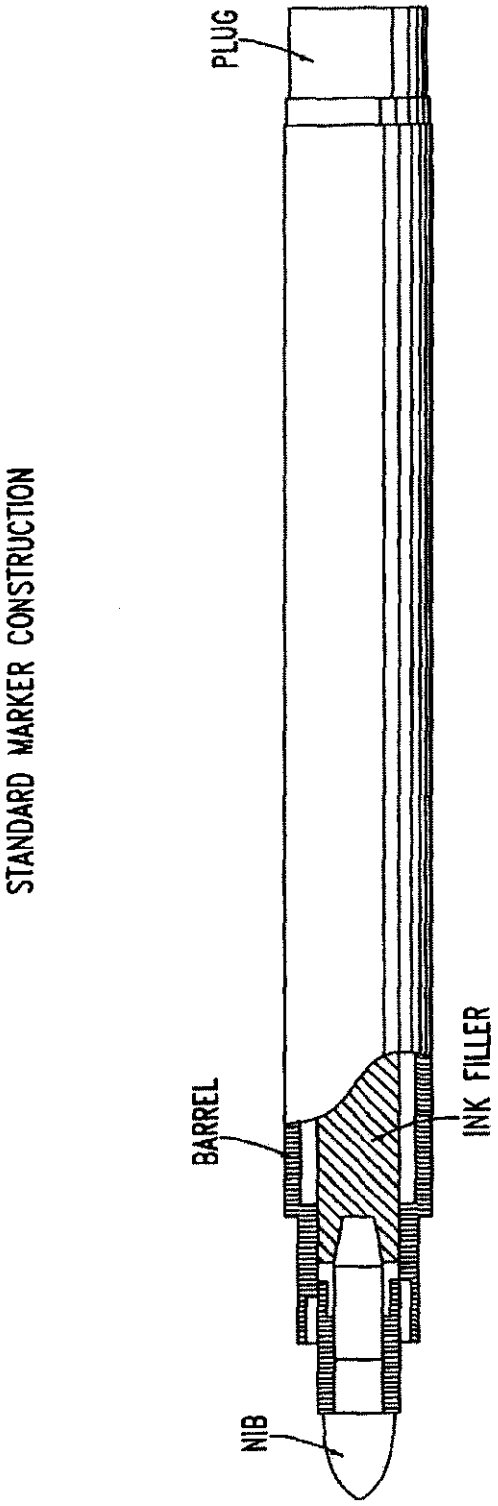


FIG. 2

METALLIC INK COMPOSITION FOR WICK TYPE WRITING INSTRUMENTS

CROSS-REFERENCES

The present application is a continuation under 37 C.F.R. §1.53(b) of prior application Ser. No. 09/839,937 filed Apr. 19, 2001, now U.S. Pat. No. 6,402,412, which is a continuation of application Ser. No. 09/416,359 filed Oct. 12, 1999, now U.S. Pat. No. 6,224,284, by Chhman SUKHNA and Charles Reichmann entitled METALLIC INK COMPOSITION FOR WICK TYPE WRITING INSTRUMENTS.

BACKGROUND OF THE INVENTION

The present invention relates to metallic ink based writing instruments and, more particularly, to metallic ink compositions for wick type writing instruments.

Currently, metallic ink writing instruments are enjoying great popularity. These are almost entirely in the form of a conventional style marker currently called a valve action marker (see FIG. 1). From the diagram, one can see that this is a complex device involving elaborate assembly. The valve action marker also involves shaking back and forth and then depressing, or pumping, the nib several times before ink will come down. As one can see, this is a rather cumbersome process.

Historically, metallic pigments have a large particle size greater than 20 microns; therefore, passage through a wick-style marker has not been possible. Instead, a valve-action marker is constructed with two steel balls in its ink chamber and a spring mechanism at the front in contact with the nib or tip. Since the specific gravity of the aluminum pigment is greater than water, it tends to settle rapidly. This is overcome by shaking back and forth, thereby re-mixing the aluminum particles in the ink. The pumping action on the paper forces the large particle aluminum pigments through the tip by applying pressure through the tip, thereby, producing ink and making writing possible.

Related conventional art includes U.S. Pat. No. 5,013,543 to Mercado; U.S. Pat. No. 5,219,560 to Kazuhiro; U.S. Pat. No. 5,106,881 to Hiroshi; U.S. Pat. No. 4,761,277 to Valdes; U.S. Pat. No. 4,872,905 to Bourne and U.S. Pat. No. 4,604,139 to Shoi, the contents of which are incorporated by reference herein. Regardless, the prior art has not delivered to date a wick-style marker which can deliver metallic pigments, i.e. inks, in writing instruments. As a result, metallic ink writing instruments have been more expensive, more complex to build and maintain, less reliable and have not fully realized their potential.

SUMMARY OF THE INVENTION

The general object of the present invention is to provide metallic ink compositions that work reliably in wick type writing instruments.

The foregoing and other objects of the invention are realized by the present invention which shows how one can overcome the aforementioned drawbacks of the prior art using a comparatively inexpensive wick-style marker that works by capillary action eliminating a costly assembly process.

The objects of the invention are achieved by mainly utilizing:

1. A small particle size aluminum dispersion less than 12 microns;
2. an anti-settling agent to keep aluminum flakes in suspension;

3. a densely packed highly porous polyester fiber filler;
4. a highly porous oriented polyester fiber nib with many channels;
5. a non-volatile humectant; and
6. a sub-micron colored pigmented dispersion.

This invention will work for a conventional simple wick-style marker that carries a cylindrical shaped reservoir (filler) that absorbs the ink and transports it to a porous oriented fiber nib that feeds on the filler by capillary action (see FIG. 2).

The invention results in a minimum of metallic particles settling out. The marker can be stored either vertically or horizontally; overcoming a traditional problem associated with pigmented ink systems. This wick-ink system, when filled into the writing device (FIG. 2), will also lay-down a thick opaque line capable of being seen on both black and white surfaces.

Traditional inks that work with pens (FIG. 2) cannot write on black paper since they are translucent, therefore, this market has been occupied by the valve-action marker of FIG. 1 which permits the flow of large particle size pigments. This invention solves this problem in a wick-style writing instrument (FIG. 2) that is user friendly and much simpler, not to mention a cheaper alternative.

The present invention is based on the startling discovery that based on the disclosed, specific ink formulation, a writing instrument can be made that carries a cylindrical shaped reservoir which feeds into a fiber nib by capillary action and remains for extended periods without settling out or blocking the nib or tip. This invention also eliminates the use of an expensive valve type marker.

Thus, an object of the invention is that a single wick-type pen can be used to write on both black and white surfaces and achieve a metallic almost iridescent appearance.

Another object of the invention is a pen that may possibly be used for decorative poster work on both black and white surfaces.

A further object of the invention is the ability to write on human skin to achieve decorative effects similar to temporary tattoos, with an intense opaque metallic look, and washable with soap and water.

Still further, an object of this invention is to attain, by changing the permanent binder to a temporary one, a damp erase or dry erase writing instrument that can be made to write on black and white melamine, porcelain and all non porous boards.

The invention composition includes water as a carrier, an acrylic resin in solution as a binder although a polyvinylpyrrolidone polymer can be substituted to make temporary inks, a pigmented dispersion as a coloring agent, a unique aluminum dispersion of particle size 1 to 12 microns, a surfactant to reduce surface tension, an anti-settling agent to suspend aluminum particles along with a preservative, and a pH adjuster in the form of an amine.

The components of the writing instrument utilized in this invention are of some importance. The polyester filler, or reservoir chosen, must be densely packed and porous to allow flow of aluminum particles and at the same time keep settling to a minimum. Polyester fiber is chosen because it is non-reactive and very porous. The tip, or nib, of the writing instrument must be a porous, oriented polyester nib that has many channels to allow aluminum pigments to pass freely. Many other types of fibers will filter the aluminum and only allow the colored pigment to pass through, thus creating a non-metallic appearance.

One additional detail should be noted about this invention. Dyes are not used in this composition. This is because

dyes wash away easily, they do not provide bonding to the aluminum pigments and are more of an outline as described in U.S. Pat. No. 4,604,139.

This invention utilizes a permanent and semi-permanent opaque metallic ink, which may display iridescent qualities depending on the surface written on—black or white.

Other features and advantages of the present invention will become apparent from the following description of the invention which refers to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 diagrammatically illustrates a conventional valve action ink dispensing writing implement.

FIG. 2 illustrates a conventional, wick-style writing implement.

DETAILED DESCRIPTION OF THE INVENTION

The present invention illustrates the considerable ease and convenience of an ink system in a simple wick type writing instrument (FIG. 2), compared to the complexity of conventional valve-action markers (FIG. 1) that are currently used to deliver metallic inks.

This invention is accomplished by providing an aqueous one-phase ink composition having a viscosity of 5 cps to 10 cps at 25° Celsius with a pH of 7.5 to 8.5 suitable for use in a wick-style writing instrument with a porous oriented fiber nib.

This ink system contains an aluminum pigmented dispersion of no greater particle size than about 12 microns, a sub-micron pigmented colored aqueous dispersion to impart a tint and contribute to permanency, an anti-settling agent to keep aluminum particles from settling out, and a binder to bind the aluminum pigments together and to impart adhesion, water resistance, gloss, and permanency to different surfaces.

In addition to the foregoing important ingredients, this ink system may contain other additives including a preservative, a surfactant to reduce surface-tension, a pH adjuster in the form of an amine, and a rheology modifier such as a starch or clay.

As noted before, one of the important aspects of the present invention is the particle size of the aluminum pigments. If the particle size is too large, greater than 12 microns, they will not flow through the pathways of the filler and nib. This is one of the main reasons why metallic inks have been confined to be used only in valve markers (FIG. 1), which is essentially a free-flowing system, and the pumping action imparts pressure on the aluminum particles forcing them through the nib.

The present invention solves the problem by using a carefully monitored particle size aluminum dispersion, along with a customized filler of high density with many pathways, and a highly *porous* oriented fiber nib with many channels.

The aluminum flakes are dispersed initially in water and binder of starch with the pH adjusted anywhere between 7.0 and 8.0. This prevents the build up of hydrogen gas, which is a notorious and dangerous problem associated with aluminum pigments. The finished ink system is adjusted to a pH of 7.5 to 8.5; this is to ensure this problem does not occur.

The dispersion used in the present invention is of the type Stapa Hydrolac AW from Eckart and Roto Vario from Eckart. The amount needed to impart a metallic look varies from about 10% to 25% by weight depending upon the desired intensity of the color.

It is very interesting to note that on black surfaces, the pigmented color and the aluminum pigments bond together to impart a uniform metallic line. On white paper, the color is separated from the metallic flakes showing a line that is tinted in color and flecked with aluminum to impart a silver appearance.

The aluminum dispersions of the present invention are very stable at temperatures of 100° F. to 125° F. and do not dry up easily. This contributes to the long shelf life of the marker. The ink system is more stable because starch which bonds the aluminum flakes in the dispersion has even more cohesion with the marker binder of the system thereby contributing to it staying in solution and keeping the aluminum flakes suspended which, of course, provides an anti-settling effect.

The binder in the present invention is an acrylic resin solution of about 40% to 50% solids. This binder forms a clear film at room temperature on drying. It is resistant to water and adheres well to most surfaces. The pH is between 7.5 and 8.5. The viscosity is 100 to 150 cps and the glass transition temperature t.g. °C30. The binder must be able to form a film at room temperature. This is the only way the aluminum flakes will bond to writing surfaces on drying. Typical resins of this type include GA-1590 from B. F. Goodrich and Joncryl 537 from S. C. Johnson.

Many other polymers will come to mind of those skilled in the art. The binder is used at about 10% to 25% by weight depending on the desired resistance properties.

The pigmented colored dispersion is of great importance since this dispersion imparts the desired color to the overall metallic ink system and makes it pleasing to the eye. The present invention utilizes a dispersion of about 35% to 45% solids, pH 8.0 to 9.0, and viscosity of 100 to 150 cps at 25° C. The pigments are grounded in an acrylic binder or surfactant to a particle size less than 0.5 micron enhancing their bonding ability to the aluminum pigments. Common dispersions used in the invention include Heucosperse colors from Heucotech and Acroverse colors from Penn Color. A percentage of 10% to 20% by weight is used depending on the desired color intensity.

The anti-settling agent additive is of particular importance because of the aluminum flakes readiness to settle out. The ionicly charged sites on the additive *bond* themselves to the aluminum flakes suspending them in solutions for extended periods and keeping them tightly adhered to the surfaces of the colored pigments. This ensures that the ink traveling down the polyester filler into the nib and onto the writing surfaces is metallized. Without the anti-settling agent, the aluminum flakes would separate very quickly from the colored pigments. The resulting system will be one that writes very non-uniform by, with colored lines appearing with no metallic appearance. The anti-settling agent utilized in this invention is ionic in nature and derived from a polycarboxylic acid. Examples are phtalic acid, adipic acid and tri-metallic acid. A percentage of 0.25% to 1.5% by weight is utilized, an example of this agent is BYK105 from Byk Chemie.

A humectant is utilized in this invention to keep the finished writing instrument from drying out on extended storage in warm and humid conditions. Polyglycols are particularly adept in these applications, although glycerin may be utilized. This invention uses Polyglycols of molecular weight of 400 to 725 at about 5% to 10% by weight. Examples are Carbowax 400 and Carbowax 700 distributed by Pride Chemicals.

With many water based ink systems the surface tension is very high. A surfactant helps reduce this property so that

proper flow through the filler and wetting on different surfaces are achieved. This ink composition has a surface tension of about 37 to 40 dynes/cm and utilizes a fluro chemical surfactant similar to one provided by 3M FC-170C and zonyl FSN supplied by DuPont Chemicals. A percentage of 0.5% to 0.75% by weight is used in this invention.

To discourage improper use of the marker, a water-soluble organic solvent such as denatured ethanol is utilized in this invention. This also contributes to its drying speed on different surfaces. An example would be SOF-642 distributed by Pride Chemicals. A quantity of 3% to 10% is utilized.

As mentioned before, the ink system needs to be maintained at a pH of 7.0 to 8.5 so as to avoid the build up of hydrogen gas. Therefore, an amine pre-mixed with water to avoid shocking the aluminum flakes is utilized to adjust and stabilize the pH. This invention uses Triethanolamine (99%) at about 0.25% to 1.0% by weight, distributed from Pride Chemicals. Other common amines such as AMP-95 distributed by Angus Chemicals can also be used.

Finally, a preservative is utilized to keep fungi and bacteria from build up in the writing instrument on extended storage. A number of preservatives will come to mind of one skilled in the art. The preferred product in this invention is Germaben II from ISP Polymers used at 1.0% to 3.0% by weight.

The following examples will demonstrate this ink system that utilizes a simple wick-style marker (FIG. 2).

All figures are percentage by weight.

Red Permanent Metallic Ink		
	Distilled Water	57.00
B. F. Goodrich	GA1594	10.00
Pride Chemical	Carbowax 400	5.00
Eckart	Stapa Hydolac AW	15.00
Penn Color	Acroverse Red 5123	10.50
ISP Polymers	Germaben II	1.25
Pride Chemical	Triethylanolamine 99%	0.25
Byk Chemie	Byk 105	1.00
		100.00

Blue Permanent Metallic Ink		
	Distilled Water	42.25
B. F. Goodrich	GA1594	10.00
Pride Chemical	Carbowax 400	5.00
Eckart	Roto Vario RV5000	25.00
Heuback	Heucosperse BS5525	15.00
ISP Polymers	Germaben II	1.25
Pride Chemical	Triethylanolamine 99%	0.50
Byk Chemie	Byk 105	1.00
		100.00

Green Permanent Metallic Ink		
	Distilled Water	50.25
S. C. Johnson	Joncryl 537	11.00
Pride Chemical	Carbowax 400	4.00
Eckart	Roto Vario RV5008	20.00
Penn Color	Acroverse Green 32G120	12.00
ISP Polymers	Germaben II	1.25
Angus Chemical	AMP-95	0.25
Byk Chemie	Byk 105	1.25
		100.00

Gold Permanent Metallic Ink		
	Distilled Water	44.50
S. C. Johnson	Joncryl 537	10.00
Pride Chemical	Carbowax 400	7.00

-continued

Heubach	Heucosperse III YS5345	15.00
Eckhart	Roto Vario RV5008	20.00
ISP Polymers	Germaben II	2.00
Angus Chemical	AMP-95	0.25
Byk Chemie	Byk 105	1.25
		100.00

Semi-Permanent Wet Erase Metallic Ink For Black and White Melamine, Porcelain and All Non Porous Boards

Blue Ink Wet Erase Metallic		
	Distilled Water	63.75
Pride Chemical	Carbowax 400	7.00
ISP Technologies	PVP/VA630	2.00
Heubech	Heucosperse 33S5528	10.00
Eckhart	Roto Vario RV5008	15.00
ISP Technologies	Germaben II	1.00
Angus Chemical	AMP-95	0.25
Byk Chemie	Byk 105	1.00
		100.00

Red Ink Wet Erase Metallic		
	Distilled Water	67.75
Pride Chemical	Carbowax 400	4.00
Penn Color	Heucosperse Red 5123	15.00
ISP Technologies	Germaben II	1.00
Eckart	Roto Vario RV5308	10.00
Pride Chemical	Triethanolamine 99%	0.50
Byk Chemie	Byk 105	0.75
ISP	PVP/VA 670	1.00
		100.00

Summarizing, the present invention comprises a metallizing system for writing instruments having a densely packed polyester fiber reservoir and a porous polyester oriented fiber nib with channels allowing passage of specific particle size aluminum pigment (less than 12 microns). This nib is in contact with the reservoir shown in the writing instrument illustrated in FIG. 2 and the system functions by capillary action.

As described, the ink system includes: distilled water as a carrier, at about 40% to 70% by weight; a water soluble organic solvent having an evaporation rate greater than 1.0 at 25° C. using butyl acetate at about 1.0 as a basic; a liquid acrylic resin solution at about a 40% to 50% solids and present in the ink system from about 10% to 20% by weight; said humectant being selected from a group of polyglycol molecular weight 400 to 1025 and present in the ink system from about 5% to 15% by weight; an aluminum pigmented dispersion of about 10% to 15% solids at less than about 12 microns particle size and present at 10% to 25% by weight with a pH of about 7.0 to 8.5; a fluro chemical surfactant with a pH of about 9.0 and surface tension of about 25 dynes/cm and present at 0.25% to 1.0% by weight; an anti-settling agent chosen from a lower molecular weight unsaturated polycarboxylic acid that has an ionic charge present in an amount 0.25% to 1.25% by weight; and an ammoniacal base for adjusting the pH of the ink system to about pH 7.5 to 8.5 present in an amount 0.25% to 1.5% by weight; and a colored water-based pigmented dispersion of about 35% to 45% solids having a particle size less than about 0.5 microns and present in amount 10% to 20% by weight.

The ink system also includes a binder than is an acrylic resin solution present at about 10% to 25% by weight

selected from a group or class of acrylic resin solutions that have a t.g. °C −16 to 30, MFFT °C<25°C., a viscosity of about 50 cps to 150 cps, and a solid content of about 40% to 50%.

Although the present invention has been described in relation to particular embodiments thereof, many other variations and modifications and other uses will become apparent to those skilled in the art. It is preferred, therefore, that the present invention be limited not by the specific disclosure herein, but only by the appended claims.

What is claimed is:

1. A writing instrument, comprising:

a fibrous reservoir with passageways defined therein and a porous nib with channels allowing passage of an ink therethrough;

an ink formulation in the fibrous reservoir, the ink formulation including a color pigmented dispersion and a metallic dispersion; and

the nib being in contact with the fibrous reservoir and being able to absorb the metallic dispersion solely by capillary action and the ink formulation being formulated to permit the metallic dispersion to pass through the fibrous reservoir passageways and the channels in the nib without clogging or blocking the passageways and the channels.

2. The writing instrument of claim 1, including;

an anti-settling agent to keep the metallic particles in suspension;

a humectant; and

said color pigmented dispersion having a sub-micron particle size.

3. The writing instrument of claim 2, wherein the metallic dispersion comprises an aluminum-pigmented water-based dispersion whose particle size is no greater than 12 microns made from bright leafing aluminum flakes.

4. The writing instrument of claim 3, wherein said aluminum flakes are dispersed in a medium of starch and water to prevent settling and a pH of 8.0 and 8.5 to prevent hydrogen gas build up and is stable at 100° F. to 125° F. so as to prevent drying out of the writing instrument.

5. The writing instrument of claim 2, wherein said ink formulation includes, as an anti-settling agent based on a lower molecular weight, unsaturated polycarboxylic acid with ionic activity that will bond with aluminum pigments and keep them in suspension for extended periods in a low viscosity ink system.

6. The writing instrument of claim 2, wherein said anti-settling agent increases color strength and prevents hard settling of the metallic dispersion.

7. The writing instrument of claim 2, wherein said ink formulation utilizes a humectant chosen from a group of polyglycol of molecular weight 400 to 1025.

8. The writing instrument of claim 2, wherein said ink formulation includes a pH adjuster in the form of a base capable of stabilizing said formulation to a pH of 8.0 to 8.5.

9. The writing instrument of claim 2, wherein said fibrous reservoir is made of polyester that is tightly bonded in a wrapped polypropylene skin and the reservoir is in contact with the nib which is a multi-channel highly porous oriented fiber nib said ink formulation having a viscosity of 5 cps to 10 cps at 25° C., a surface tension of less than 40 dynes/cm at 25° C., a pH about 7.0 to 8.5 capable of making permanent or semi-permanent metallic lines on black and white surfaces.

10. The writing instrument of claim 2, wherein said writing instrument is capable of making semi-permanent opaque metallic lines on human skin and nails that are washable with soap and water.

11. A writing instrument, comprising:

a non valve-action barrel with an opening that is closed off by a fiber nib;

a fibrous reservoir in physical contact with the nib;

an ink formulation in the fibrous reservoir, the ink formulation containing a metallic pigmented dispersion of not greater particle size than about 12 microns, a pigmented dispersion to impart a tint, and a binder; the ink formulation flowing to the nib solely by capillary action.

12. The writing instrument of claim 11, further including a preservative, a surfactant to reduce surface-tension, and a pH adjuster.

* * * * *