Stephen E. Moor
[redacted]
Pont Pleasant, NJ 08742
Telephone [redacted]

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY

STEPHEN E. MOOR

Plaintiff,

v.

HONEYWELL INTERNATIONAL INC., f/k/a ALLIEDSIGNAL INC., AUTOMOTIVE AFTERMARKET, AND DOES 1-100, INCLUSIVE,

Defendants.

CIVIL ACTION NO.
02CV3142 (FSH)

COMPLAINT
JURY TRIAL DEMAND

PARTIES

1. Stephen E. Moor ("Moor") is the inventor and the owner of record of patent 5,209,842, "OIL ENHANSING MULTIFUNCTION FILTER" (" '842 patent") a Teflon treated oil filter.

2. AlliedSignal, ("Allied") merged with Honeywell International ("Honeywell") in or about September 1999, and changed its name to Honeywell. Honeywell is a Delaware Corporation with its Corporate Headquarters located in Morristown, NJ. The Company referred to herein at all times will be known as Honeywell.

3. One of Honeywell's core businesses is the Automotive Aftermarket Business, which sells automotive products throughout the United States and Internationally. According to Honeywell, the Company is a leader in the Automotive Aftermarket Industry with sales exceeding $3.45 Billion Dollars.

4. Fram Oil Filters ("Fram") is a wholly owned subsidiary of Honeywell. According to Honeywell, Fram is a world leader in automotive oil filters. Fram makes substantial sales through retailers throughout North America, including, but not limited to Wal-Mart, AutoZone and Pep Boys.

5. Lawrence Bossidy ("Bossidy") was the Chief Executive Officer of Honeywell; Peter Kriendler ("Kriendler") was its Chief General Counsel; Donald Redlinger (Redlinger") was its Senior VP of Human Resources; John Donofrio ("Donofrio") was its Associate General Counsel and Chief Intellectual Property Counsel at all relevant times.

JURISDICTION AND VENUE

6. Jurisdiction of this Court is invoked pursuant to 28 U.S.C. 1338(a) and 1338(b). This is an action for patent infringement and misappropriation of trade secrets under the patent laws of the United States and the matter in controversy is between citizens of different states and exceeds the value of $75,000, exclusive of interest and costs, pursuant to 28 U.S.C. 1332. This Court also has jurisdiction pursuant to 28 U.S.C. 1367(a).

7. Venue is proper under 28 U.S.C. 1440(b) and 28 U.S.C. 1391 in that among other things, Honeywell is subject to personal jurisdiction in this district.

FACTS COMMON TO ALL COUNTS

MOOR'S BACKGROUND AND HIS OIL FILTER PATENTS

8. While in college, Moor took a leave of absence and hired on as a cross-country tractor-trailer driver. Later that same year, Moor purchased his first truck-tractor.

9. Upon graduation from the University of Connecticut in 1982, Moor bought his second truck-tractor and returned to truck driving. As a result of maintaining his own tractor, Moor had become adept in engine maintenance. It was during this period that Moor began to seriously focus his attention on the importance of oil filtration and oil filters. It was that experience which led Moor to design an oil filter and apply for a United States patent.

10. In or about 1988, Moor was granted United States Patent 4,751,901, titled "COMPOSITE OIL FILTER", (" '901 patent"), an additive treated oil filter patent. The filter was designed to help replace the oils critical additives, which become depleted as the oil performs its lubricating function. This patent demonstrates Moor's knowledge concerning the pre-treatment of an oil filters media with a beneficial additive. A copy of this patent is attached as **EXHIBIT 1** and covers both car and truck engines.

11. In 1988, when Moor's patent issued there was not an additive treated oil filter offered for sale by any oil filter manufacturer. Moor stood convinced that there existed an appreciable market for such a filter and hoped to license his patented technology to a major oil filter company.

12. By way of history, in or about March of 1998, Moor contacted Fram with the hopes of licensing his newly issued '901 patent to them. Moor's initial contact was

through Bruce Kennedy ("Kennedy") New Product Development Manager. Kennedy arranged a meeting, which included Anthony Caronia ("Caronia") Fram's Vice President Product Engineering and Henry Dorsett ("Dorsett") Fram's Group Vice President Manufacturing Operations, Kennedy and Moor. After an in-depth meeting, Caronia told Moor, that Moor's '901 patent did not exist. At that time, Caronia made it clear to Moor that he shouldn't contact Fram again concerning this filter concept.

13. In or about 1988, Moor got an idea for a new oil filter and memorialized his concept for a Teflon treated oil filter for both cars and trucks in front of a Notary, as attached as **EXHIBIT 2.**

14. In or about 1993, Moor was granted United States Patent 5,209,842; "OIL ENHANCING MULTIFUNCTION FILTER," a Teflon treated oil filter as attached as **EXHIBIT 3.**

15. According to Moor, the Teflon Treated Oil market had been around since 1978 and the market has shown consistent and steady growth with impressive sales. Presently, the sales of Teflon Treated Oil Additives are approximately $500,000,000 million dollars annually.

16. It had always been Moor's intention to license one or both of his patents to a major oil filter manufacture. Specifically, Moor wanted to license his Teflon treated oil filter patent to Fram. Moors business plan was straightforward; compete against the bottled Teflon Treated Oils by using an oil filter to deliver the Teflon to the engine instead of a bottle. Moor believed that his patent would provide an exclusive avenue for Fram to enter this lucrative market. Moor had every reason to believe that if successful, he would be protected since he held the patents and trade secrets.

17. According to Fram, the company sells approximately 100,000,000 million oil filters annually and has approximately 28% of the North American oil filter market.

18. Approximately 500,000,000 million oil filters are sold in annually in the United States.

19. Industry wide, over a Billion Dollars worth of automotive oil filters are sold annually in the United States at an average retail price of approximately $3.50 apiece.

HONEYWELL AND ITS DEALINGS WITH MOOR AND HIS '842 PATENT

THE FRAM MEETING

20. In or about January 1994, Moor called on the Fram Oil Filter Company, this time in reference to his newly issued '842 patent, a Teflon Treated oil filter. Moor spoke to a Kevin Gill ("Gill"), Manager, Product Marketing Filter Products.

21. In or about February 1994, Gill informed Moor that the engineering department was not receptive to his patent. Gill informed Moor that the engineers believed that Teflon did not belong in motor oil. At that time, Gill let Moor know that he was still interested in Moor's concept and encouraged Moor to go and obtain the proof necessary to convince the engineers that the concept was viable. Please see Gill's letter as attached as **EXHIBIT 4.**

22. In or about June 1994, Moor sent six separate engineering test studies to Gill. These studies provided information that supported that Teflon in oil did provide a

real benefit to an engines lubricating system. Gill advised Moor that he would forward these studies along to Fram's engineers, which he did.

23. In or about October 1994, Moor signed a "Proprietary Information Agreement" in preparation for an October 7, 1994 meeting which Moor was to attend at Fram's Headquarters in Rumford, RI as attached as **EXHIBIT 5.**

24. In or about October 1994, Moor made a presentation to Fram's senior management, which included the engineering department, the marketing department and legal department. The purpose for the gathering was to ascertain if Moor had something unique and of value to offer Fram.

25. During that meeting, Moor explained in detail his patented concept, which included trade secret information.

26. The Chief Engineer, Caronia and the Head of Manufacturing, Dorsett whom Moor had met in 1998 were both present at that meeting. During that meeting, Caronia made his sentiments clear that he opposed Moor's idea for a Teflon treated oil filter. John M. McGrath ("McGrath") the Senior VP of Marketing for Fram overrode Caronia's objections and offered Moor a pre-licensing agreement with Fram.

27. Here is partial list of the attendees at the October 7,1994 meeting:

Kevin Gill ("Gill"); Manager Product Marketing Filter Products; Rumford, RI.

John M. McGrath ("McGrath"); VP & General Manager; Rumford, RI.

Dianne Z. Newman ("Newman"); Director Business Planning & Development; Rumford, RI.

Anthony J Caronia ("Caronia"); VP of Product Engineering; Perrysburg, Ohio.

Henry Dorsett ("Dorsett"); Group VP Manufacturing Operations; Perrysburg, Ohio.

Gerard R. Lamarre ("Lamarre"); Product Manager Passenger Car Filter Products; Rumford, RI.

Bijan Kheradi ("Kheradi"); Engineering Manager Filter Materials; Perrysburg, Ohio

A complete roster of attendees will be furnished when Honeywell produces the minutes of that meeting.

28. During the meeting, Moor shared his proprietary information and trade secrets with the group, which included, but was not limited to treating the filter media with Acheson Colloids SLA 1612 ("SLA 1612"), a colloidal dispersion of Teflon and oil.

29. In or about October 1994, Moor and Fram entered into a 180 day Test Marketing Agreement, which included a detailed Confidentiality Section as attached as **EXHIBIT 6**.

30. At that meeting Fram represented to Moor that the proposed filter would be featured at the following years Specialty Equipment Manufactures Association ("SEMA") trade show in Las Vegas, Nevada, herein referred to as the ("show"). Fram promised Moor that this new filter would be the "Headliner" for the upcoming 1995 "show." The SEMA show in Las Vegas is the biggest of the automotive aftermarket trade shows.

31. In or about November 25, 1994, Moor sent a certified letter addressed to Dianne Newman memorializing the disclosure of Acheson Colloids SLA 1612 at the October 7, 1994 meeting. Please see the letter as attached as **EXHIBIT 7**.

MEETING THE FRAM ENGINEERS

32. In or about December 1994, Moor was flown out by Honeywell to Fram's North American Filter Research Facility located in Perrysburg, Ohio. Moor was to meet with a Gary Bilski ("Bilski"), Fram's Engineering Team Leader so that Moor could transfer to Bilski all of the necessary details needed to produce a Teflon treated oil filter.

33. The following is a complete list of the engineers in attendance:

Gary Bilski ("Bilski"); Team Leader Passenger Car/Light Truck Filter Engineering; Perrysburg, Ohio.

Anthony J. Caronia ("Caronia"); VP of Product Engineering; Perrysburg, Ohio.

Gordon W. Jones ("Jones"); Director Filter Engineering; Perrysburg, Ohio.

Bijan Kheradi ("Kheradi"); Engineering Manager Filter Materials; Perrysburg, Ohio.

Greg Vackle ("Vackle"); P. Engineer, Manager Manufacturing Services; Stratford, Ontario, Canada.

Ronald Rohrback ("Rohrback"); Ph.D., Material Science; Honeywell Corporate Headquarters; Morristown, NJ.

34. Moor delivered a physical sample of Acheson Colloids SLA 1612 with the material safety handling sheet and a sample of Dupont's MP1100 micro powder with its corresponding material safety handling sheet to the engineers.

35. At the meeting, Moor disclosed his proprietary information and trade secrets with the engineers. Moor clearly demonstrated how to produce a Teflon treated oil filter, which included the use of Acheson Colloids 1612 as a means for treating the media.

36. The minutes of that meeting clearly provide that the engineers from the onset took their own independent view as to how best produce this filter. The engineer's first method of choice was to insert a dollop of Teflon and grease on the inside of the filter can. Please see the minutes of the meeting dated December 13, 1994 as attached as **EXHIBIT 8**.

37. As of December 1994, Fram's Project Leader Bilski did not hold a single United States patent to his credit.

38. As of December 1994, none of Fram's engineering staff held any patents pertaining to a Teflon treated oil filter.

39. As of December 1994, and proceeding back to June of 1988, [the date when Moor's '901 patent issued] Fram had never brought to market nor offered for sale a single oil filter containing Teflon.

40. In or about 1992, Fram's Filter Division had conducted a study to determine if Teflon in motor oil would clog up their oil filters, [Honeywell will provide that study]. The article, "Navigating Through the Maze of Friction-Reducing Formulas," by Rik Paul ("Paul") published in the October 1994 issue of Motor Trend Magazine clearly points out that up until that time; Fram's only interest concerning the presence of Teflon in motor oil was to make sure that it did not restrict the flow of oil circulating through their filters. A true copy of that article is provided as attached as **EXHIBIT 9**.

41. In or about March 1995, Moor called Gill to voice his concerns about the engineering departments inability to replicate his Teflon delivery system. Moor reports to Gill that he feared the engineers were about to drop the ball on the filters delivery system.

42. In or about March 1995, Moor out of exasperation with the engineering department addressed a letter to Gill outlining a possible new delivery system. Please see a copy of that letter as attached as **EXHIBIT 10.**

43. In or about March 1995, Moor met Newman [at Newman's insistence] at Newark's International Airport in NJ to discuss the extension of the Test Marketing Agreement, because Bilski needed more time. Moor agreed to a 60-day extension, extending the agreement to June 26, 1995 as attached as **EXHIBIT 11.**

44. During March and April of 1995, Moor had several direct conversations with Bilski and it was during this period that Moor emphatically and directly told Bilski to treat the filter media with Acheson Colloids SLA 1612.

FRAM'S MARKETING TEAM MEETING

45. In or about April 11, 1995, Moor attended a major marketing meeting for the project in Rumford, RI. Engineering leader, Gary Bilski was flown in from Ohio. At the meeting, Moor was strident in his insistence that Fram needed to use Dupont's Teflon in the filter. Moor disclosed to the group that he had already been approved by Dupont to use their trademark and detailed the process.

46. At the meeting, Moor's marketing advice to co-brand the oil filter with Dupont was accepted by Fram. Moor explained that Dupont required that any finished product bearing their trademark must at a minimum, contain 51 % of their trademarked ingredient, [in this case Teflon]. At this time, Honeywell had a fluoropolymer division and made their own version of PTFE, but Honeywell did not manufacture a product similar to Acheson's SLA 1612, nor did they choose to develop such a product of their

own for this filter. Please see a copy of the marketing meetings minutes as attached as **EXHIBIT 12.**

47. At this same meeting, Bilski reported to the Group that he had been in communication with Acheson Colloids ("Acheson"), with regard to SLA 1612. Bilski reported to the group that it would cost Fram approximately 85 cents to treat each filter with Acheson Colloids SLA 1612.

48. The Fram Double Guard Oil Filter ("Double Guard") was the name given Moor's Teflon treated oil filter at the meeting. Henceforth, the filter will be referred to as the Double Guard.

49. At this same meeting and at other various times Fram promised Moor that there would be a first class promotional campaign including a Television commercial. Moor was told that Fram intended to run TV commercials featuring the Double Guard during The World Series, The Super Bowl and the NBA play-offs. At that same meeting, Karen Borger, ("Borger") Fram's in-house Marketing Director reported that she was already working on the storyboard for the TV commercial.

50. In or about May 5, 1995, Gary Bilski's inventor's record stated that he authored the claims for Honeywell's patent 5,725,031. Please see Bilski's inventors record as attached as **EXHIBIT 13.**

51. In or about May 12, 1995, Newman asked Moor for a copy of his patent 5,209,842. During that conversation, Newman asked Moor [for the very first time] if he had filed any overseas patents. Previously, Moor had hand delivered a copy of his patent to Newman on the afternoon of October 7,1994 at the meeting in Rhode Island. Please see Moor's written response to Newman as attached as **EXHIBIT 14.**

NEGNOTIATING THE LICENCE WITH FRAM

52. In or about May 1995, Moor met Gill and Newman in Rumford, RI to go over the proposed license agreement which Fram had drawn.

53. On May 31, 1995, Moor found out purely by accident from Gill's secretary, Jodi McGee ("Jodi") that Gill was leaving the Company in just 2 days time on June 2, 1995.

54. On the afternoon of May 31, 1995, Moor took leave of Newman and Gill and headed for home. Moor left the meeting fully convinced that the three had reached an agreement in principal. Please see as attached the original version of license agreement as attached as **EXHIBIT 15**.

55. On July 7, 1995, Project Engineer Bilski, called Moor on the phone and then followed up with a fax requesting that Moor call Slick Fifty to get some confidential information for him as attached as **EXHIBIT 16**.

56. In or about Mid July 1995, Newman informed Moor that the engineers had found a way to make a Teflon treated oil filter outside the scope of Moor's patent. During that conversation Newman told Moor that the Company didn't owe Moor anything and "that Honeywell had decided to go on without him and that contractually, Honeywell didn't owe Moor a thing."

57. In or about Mid July 1995, both Newman and Ross had told Moor that according to Gus Hampilos ("Hampilos"), Honeywell's Assistant General Counsel and Chief Automotive Counsel, Moor had "plagiarized" another inventors patent, therefore rendering Moor's relationship with Fram a fraud.

58. Despite the Company's sudden adversarial position, Moor still desired to enter into a contractual relationship with Honeywell. Moor firmly believed that this horrific situation was somehow all a mistake and that he could straighten out this matter once a contract was signed and the Company got on with the business of launching the Double Guard.

59. In or about July 1995, Ross and Moor proceeded to negotiate an amended licensing agreement. The contract for all intended purposes remained identical, with the exception that the term of the license was cut down from 17 years (or the life of Moor's patent) to five years. The license agreement was now set to expire on September 1, 2001 instead of 2014, as provided for in the original license. Please refer back to EXHIBIT 15.

60. In or about late August 1995, Newman informed Moor that Fram was shipping several cases of the filters cross-country. Newman reminded Moor that they would be shipped in the heat of the summer in very hot trailer trucks and that if one single filter should leak, the deal between Moor and the Honeywell would be over.

61. In or about September 1995, Honeywell and Moor signed a licensing agreement, specifically noting Moor's patent 5,209,842. Please see the final licensing agreement signed between Moor and Honeywell as attached as **EXHIBIT 17.**

62. According to Honeywell, for more than 60 years, FRAM filters have been in the forefront of oil filter technology. According to the Company, the spin-on oil filter was introduced by the Fram Filter Corporation in 1957. The advent of putting Teflon inside of an oil filter was the next great quantum leap in the development of the oil filter by Honeywell. Nothing had been done like it in 40 years... **"The FRAM DOUBLE**

GUARD engine protection system – the most significant oil filter innovation in history." Please see Fram's public declaration as attached as **EXHIBIT 18.**

HONEYWELL AND ITS POST-LICENSE DEALINGS WITH MOOR

BROKEN AGREEMENT

63. In or about November 1995, The Fram Double Guard missed the "Show" in Las Vegas because the Company had missed the target date promised Moor.

64. In or about January 1995, Fram missed the crucial product "roll-out" date and scheduled plano-gram changes critical to the Double Guard's successful launch. This is a major disaster for a new product rollout, since new products in the automotive aftermarket are traditionally introduced specifically in late December, early January.

65. In or about late May 1996, the Double Guard was offered for sale in Wal-Mart, six months behind schedule. The late release had already unfairly consumed the first six months of Moor's contract.

66. Immediately during this period, the customers in Wal-Mart began stealing the Double Guard.

67. In or about June 1996, Moor called Ross and informed him of the filter theft that was plaguing Wal-Mart. Ross's response to Moor was that Wal-Mart was making way too much of a miniscule amount of theft.

68. In or about June 1995, Honeywell released a television commercial featuring the Double Guard. The commercial was telecast during the NY Yankee games. The television commercial ran for approximately 1-½ months before it abruptly ceased.

69. In or about July 1996, The Wall Street Journal reported that an internal memo from Honeywell Chairman Bossidy had been leaked to that paper. The article stated that the Company was having a serious cash flow issue and that Bossidy had been exhorting his managers to improve things as attached as **EXHIBIT 19**. Moor can only venture a guess as to why the marketing funds were cut off, however this does little to explain why the marketing funds for Double Guards promotion were never reinstated.

70. In or about August 1996, all television, radio and print advertising for the Double Guard ceased, even though Moor was promised by Fram that marketing for the Double Guard campaign called for heavy capital spending through 1998.

71. In or about October 1996, Wal-Mart had directed Fram to remove the entire line of Double Guard oil filters [24 different models in all] from its 2000 stores, citing excessive theft and lack of in inventory control. After six long months of pilferage, Fram had yet to deal with the packaging problem.

72. In or about November 1996, Moor met John Fusaro ("Fusaro"). Fusaro is the owner the owner of Dana Automotive, a very large automotive warehouse distributor ("WD") located in Nutley, NJ. Dana is a distributor of Fram filter products. Fusaro told Moor that two of Fram's salesmen told Fusaro not to bother ordering the Double Guard oil filter, "because it was a dog and that it wouldn't be around much longer."

73. In or about December 1996, Moor met with Ross in Rumford, RI to discuss Moor's mounting concerns regarding Fram's poor handling of the Double Guard. At that meeting, Ross told Moor that the Double Guard would not enter the $750,000,000 million dollar installed sales market. The reason given Moor was that Fram had authorized a Jiffy Lube Franchisee in Kansas City to conduct an installed sales test

marketing survey, which had failed. When Moor inquired as to why, Ross explained that the individual overseeing the test was "against putting any additives in motor oil."

74. Moor then asked Ross to explain Fram's prior survey, which showed that 85% of all consumers would buy the Double Guard as [originally referred to in EXHIBIT 18].

75. At the end of that meeting Moor told Ross that he wanted to meet with Fram's new General Counsel Richard Bjelde ("Bjelde"). Ross said that he would arrange the introduction.

76. In or about December 1996, Moor discovered that Honeywell had been holding back a significant portion of Moor's royalties. When Moor inquired of the accounting department, he was told that he [Moor] was held accountable for the filters that were still being stolen from Wal-Mart.

77. As per the final licensing agreement, [as originally referred to in EXHIBIT 17], Honeywell was in direct violation of Moor's contract as specified on page 8., Section 8. under PAYMENTS, which states that Moor shall be paid in lawful money of the United States and that there shall be no discount or offset to Moor.

78. In or about December 1997, Moor addressed a letter to the CEO Bossidy, with regard to Honeywell holding back on Moor's royalties. The letter specifically cited the prohibitions of such behavior as put forth in the Licensing Agreement. Honeywell never responded to Moor regarding this issue and as a matter of record, the Company continued for the next 3 years to hold back a portion of Moor's royalties. A true copy of that letter is as attached as **EXHIBIT 20**.

79. In or about February 1997, The Double Guard had returned to the shelves of Wal-Mart, this time in theft-proof packaging. It took Fram 6 months to accomplish this simple task and in the process the Company had unfairly consumed another 6 months of Moor's contract.

80. In or about April 1997, Honeywell's Annual Report to Shareholders featured The Double Guard Oil Filter as the high water mark for the $4.2 Billion Dollar Worldwide Aftermarket's new product for the year as attached as **EXHIBIT 21.**

81. In or about February 22, 1997, Moor met with Bjelde in Rumford RI. Moor recited a list of complaints that he had with Fram regarding the contract and the subsequent implosion of the Double Guard marketing program. Moor told Bjelde that he would put everything down on paper for him and send it to him as attached as **EXHIBIT 22.**

82. In or about April 1997, Fram's attorney Bjelde summarily rejected Moor complaint and closed any further avenue of communication with Moor on the subject.

83. In or about April 1997, Moor met with Donald Redlinger ("Redlinger"), Honeywell's Senior VP of Human Resources. Moor summarized for Redlinger all he had been subjected to at the hands of the Fram.

84. Redlinger advised Moor to put the facts down on paper so that Redlinger could intervene on Moor's behalf. In the interim, Redlinger advised Moor to call Steve Price ("Price") the President of Fram and employ his help.

85. Redlinger promised Moor that he would take action on this matter and advised Moor "that it would be to everyone's best interest to keep the lawyers out of it."

Moor was relieved that it finally appeared that this matter was going to get straightened out.

86. In or about April 1995, Moor provided the documentation, which Redlinger had requested to be delivered to his home. Moor had furnished Redlinger an identical set of documents, which he had provided Bjelde the previous month, [as originally referred to in EXHIBIT 22]. Additionally, Moor furnished a 5 page transcript describing his meeting with Bjelde, as attached as **EXHIBIT 23**.

87. In or about May 1997, Moor acting on Redlinger's advice contacted Steve Price, the President of Fram. Price would not come to the phone despite Moor telling his secretary that he was calling Price at the request of Redlinger. Price through his secretary directed Moor to speak with Fram's VP of Marketing, John Ypma ("Ypma"). Moor placed several calls to Ypma, but Ypma would not speak with Moor on the matter either. Ypma directed Moor to speak with Jeff Bye ("Bye") of Fram Brand Management.

88. Nearly a month passed, but no response was forthcoming from Redlinger concerning Moor's documentation, so Moor then placed a follow-up call to Redlinger's office.

89. In or about May 1997, Moor received a letter from Honeywell's Chief Intellectual Property Attorney, John Donofrio ("Donofrio"). The letter stated that he had gone over the materials, which Moor had furnished Redlinger. Donofrio's letter stated that "Moor's involvement with Honeywell had been sporadic and that Honeywell chose to make a product that was not covered by Moor's patent," as attached as **EXHIBIT 24** in Donofrio's letter to Moor.

90. In or about June 1996, Moor met with Jeff Bye, the Manager of Fram Brand Marketing. Bye told Moor that he should consider himself "lucky" that Fram was selling the Double Guard oil filter at all, and that Moor should be thankful that he (Bye) wasn't around when Moor had originally cut his deal with Fram because, he wouldn't have promised Moor anything.

91. In or about August 1996, Gary Bilski filed a US patent application for a Teflon treated oil filter, which issued as Patent Number 5,725,031 "METHOD FOR INTORODUCING PTFE (Teflon) INTO A SPIN-ON OIL FILTER" as attached as **EXHIBIT 25**.

92. Moor was totally unaware of Bilski's intention to file this patent application for Fram. As a matter of truth, Moor had not spoken to Bilski since the fall of 1995 when Moor called Bilski and asked him to send along a case of filters.

93. Bilski's public disclosure of Moor's trade secrets was in direct violation of the test marketing agreement signed by both Moor and Fram as set forth in ARTICLE 4. CONFIDENTIALITY specifically, section 4.01 Definitions (a). 4.02 Restriction on Use and Disclosure and 4.06 Extent of Confidentiality Obligation as [previously referred to as EXHIBIT 6], entitled "TEST MARKETING AGREEMENT".

94. In or about April 1997, Bilski filed a second US patent application for a Teflon treated oil filter which issued as Patent Number 6,045,692 "OIL FILTER TO INTRODUCE ANTI-WEAR ADDATIVES INTO ENGINE LUBRICATING SYSTEM" as attached as **EXHIBIT 26**.

95. Moor was unaware of Bilski's intention to file this patent application either. Moor's position is clear; Moor was totally unaware as to how Honeywell was conducting themselves behind his back.

96. In or about June of 1997, Honeywell purchased Prestone Products Company ("Prestone") for approximately $400,000,000 million dollars. Prestone is a recognized leader in automotive care products and is a market leader in the installed sales venue. On the surface there seemed nobody more capable than Prestone to reinvigorate the Double Guard's marketing campaign; but they didn't.

97. In or about August 2000, Moor while in Wal-Mart; saw for the very first time patent numbers printed on the filter box! Moor immediately recognized that none of the numbers were his. Moor then immediately contacted the Patent Office and ordered copies of all 3 patents. Upon examination, Moor was horrified to see that Honeywell's '031 had been stolen directly from Moor.

98. Since Honeywell had virtually cut off all communication with Moor, Moor's only means of means of keeping tabs on Fram was provided by his monthly visits to Wal-Mart.

99. In or about October 2000, Moor through his attorney contacted Honeywell and put Honeywell on notice concerning the authorship of Honeywell's '031 patent. After six months and a series of letters, Honeywell remained defiant.

100. In or about January, 2001, Honeywell through their Assistant General Counsel Paul Marshall ("Marshall"), sent Moor's attorneys a copy of Bilski's inventors record which clearly stated that Bilski was the inventor of Honeywell's '031 patent and not Moor. As Bilski's own record points out, he came up with this idea only 16 days

prior to Moor entering into licensing negotiations with Honeywell for Moor's Teflon treated oil filter as [previously referred to as EXIIIBIT 13].

101. On or about April 2001, Moor was asked by the law firm representing him if he would consent to having them represent Honeywell on "some non-related patent prosecution matters." Moor was then asked by the law firm representing him if he would sign off on a "conflict of interest waiver." Upon Moor's refusal to sign such a document, the firm severed their relationship with Moor by discharging Moor.

102. Moor has diligently been seeking legal counsel ever since April of 2001 and has not found suitable representation. At this time Moor feels that it is in his best interest to proceed with a lawsuit against Honeywell and any other offending party.

Count I – Patent Infringement

103. Moor repeats and realleges all previous paragraphs of this Complaint as if fully set forth herein.

104. This is an action for patent infringement arising under the patent laws of the United States. This court has jurisdiction over the provisions of 28 U.S.C. 1338(a). Venue is proper under 28 U.S.C. 1400(b).

105. Prior to 1993, and the issue of Moor's '842 patent, there had not been a US patent granted for a Teflon treated oil filter.

106. For the last 60 years, standard oil filters have been limited in function to perform one job, to remove harmful particles of a certain size from the oil being filtered.

107. For the last sixty years, Fram has been in the business manufacturing oil filters without the presence of Teflon.

108. Moor invented a Teflon treated oil filter, which is pre-charged with Teflon, which is designed to be released into the lubricating oil in addition to the filter performing its normal function of catching and holding harmful particulate matter.

109. Prior to contacting The Fram Oil Filter Company in January 1994, Moor had already been granted US patent 5,209,842 for a Teflon treated oil filter and US patent 4,751,901 for an additive treated oil filter.

110. Fram evaluated Moor's patent and related materials for approximately 8 months before entering into a non-disclosure agreement with Moor.

111. In or about October of 1995, Moor entered into a non-disclosure agreement with Fram. Fram knew that Moor was in possession of a valuable technology regarding the manufacture and marketing of a Teflon treated oil filter.

112. In or about October of 1995, Moor began to disclose his trade secrets to Fram's senior management, which included but was not limited to the engineering department.

113. Simultaneous to Moor's acceptance of Fram's offer to enter into a non-disclosure agreement, Moor was contacted by an individual close to Dana Corporations ("Dana") Wix Filter Division ("Wix"). Moor was then asked if he would be interested in talking to Wix about his filter. Moor declined, telling Wix that he was going to give Fram an exclusive.

114. Moor disclosed to Fram in writing, verbally and in the form of a physical sample, Acheson Colloids SLA 1612 a colloidal dispersion of Teflon in 50-weight carrier oil.

115. Moor disclosed that the tapping plate of the Teflon oil filter should face up towards the sky.

116. Until the advent of the Double Guard, all of Fram's oil filters had come off the production line tapping plate down, with the finished filters boxed tapping plate down.

117. From onset of production, Fram has boxed the Double Guard with the tapping plate facing up.

118. In or about May of 1995, Engineer Bilski; Fram's Project Leader filed an inventor's record documenting how to patent a Teflon treated oil filter incorporating SLA 1612 and Moor's other trade secrets.

119. Moor had worked with Bilski on the delivery system for Moor's Teflon treated oil filter for approximately five months before Bilski filed his inventor's affidavit.

120. At the time in which Moor was introduced to Bilski in 1994, Bilski held no US patents to his credit.

121. Previous to Bilski meeting Moor, Bilski had not previously filed a US patent application for a Teflon treated oil filter nor had he filed an inventor's affidavit claiming he had come up with a process to make a such an oil filter.

122. Bilski submitted his inventor's affidavit to the US patent office, which was a breach of the non-disclosure agreement.

123. Moor had absolutely no idea what was going on behind his back. Moor had taught Bilski for 5 months how to make a Teflon treated oil filter.

124. In or about May 31, 1995, Moor began to negotiate a licensing agreement with Fram for his Teflon treated oil filter. Only 16 days prior, Bilski had filed an

inventor's affidavit stating that he originated the claims for a new Teflon treated oil filter patent application.

125. In or about August of 2000, Moor saw Fram's patent number 5,725,031 on the filter box while in Wal-Mart. Soon thereafter, Moor found out that Bilski and Fram had publicly disclosed Moor's trade secrets without Moor's expressed written approval as specified in the non-disclosure agreement.

126. Bilski's disclosure constitutes patent infringement on Moor's '842 patent.

127. Moor put Fram on notice on October 31, 2001 as to the violation of their written contract with Moor.

128. The Defendants have wrongfully taken the benefits of Moor's invention and Moor has lost royalties and profits he otherwise would have made but for the infringement. Moor is entitled to preliminary and permanent injunctive relief, barring the defendants or their licensees from using or disclosing any technology incorporating any component made by or containing said technology.

129. Moor wants the Court to reassign the defendants patents back to Moor.

Count II – Misappropriation of Trade Secrets

130. Moor repeats and realleges all previous paragraphs of this complaint as if fully set forth herein.

131. Jurisdiction for this claim exists by virtue of 28 U.S.C. 1338 (b) because it is an unfair competition action joined with a substantial related claim for patent infringement alleged in the first claim for relief. Jurisdiction over this claim also arises under the doctrine of pendant and supplemental jurisdiction since the facts are

intertwined with Moor's claims under Federal patent law. This claim for relief arises under the facts alleged in the First Claim for Relief. Trial of this claim in this court is in the interest of justice since, if viewed without regard to its Federal or state character, this claim would be tried in the same court as Moor's First Claim for relief and does not predominate over Moor's claim for patent infringement under 28 U.S.C. 1367(b).

132. Moor and defendant Honeywell, entered into a contract [as previously referred to as EXHIBIT 6].

133. Moor has done all of the things required to be done under the contract. Honeywell agreed not to disclose Moor's proprietary technology, without his express written consent, but nevertheless, Honeywell has done so in breach of this contract, [as previously referred to in EXHIBIT 6].

134. Defendant Honeywell falsely and fraudulently promised not to disclose Moor's proprietary technology, but filed patents 5,725,031 and 6,045,692 in breach of that contract.

135. Moor's technology, at the time of misappropriation, was secret and possessed real economic value. Moor's trade secrets consisted of a compilation of information not generally know to the public or to other persons who could gain economic value therefrom, and was subject to reasonable efforts under the circumstances to maintain its secrecy.

136. Certain information, hereto described, consisted of valuable trade secrets of Moor at both New Jersey Common Law and as defined by ~~and by~~ the Illinois Trade Secret Act, 765 Ill. Comp. Stat. 1065 et seq.

137. U.S.C. 28 Section 1332(a) Moor was damaged in the amount exceeding $75,000 and his actual losses were caused by the defendants' misappropriation. Moor is also entitled to recover the unjust enrichment obtained by Honeywell through misappropriation that is not taken into consideration in computing Moor's actual losses.

138. Because of Honeywell's misappropriation of trade secrets by improper means, plaintiff is entitled to compensatory damages, including Honeywell's profits and any other unjust enrichment not covered by Moor's compensatory damages and Honeywell's profits as stated under the law.

139. Because Honeywell's actions were willful and malicious, plaintiff seeks exemplary damages, attorneys' fees, costs and prejudgment interest as the law may provide.

140. By virtue of Honeywell's misappropriation of trade secrets by improper means, Moor is entitled to preliminary and permanent injunctive relief, barring defendants or their licensees from using or disclosing any technology derived from Moor, including the sales of any products incorporating any component made by or containing said technology.

Count III – For Fraud and Deceit

141. Moor repeats and realleges all previous paragraphs of this Complaint as if fully set forth herein.

142. Honeywell made specific promises to Moor that induced him to enter a non-disclosure agreement. Honeywell after inducing Moor to sign a non-disclosure

agreement, willfully and maliciously disclosed Moor's trade secrets to the public as Honeywell patents 5,725,031 and 6,045,692.

143. In committing the acts alleged here, Honeywell acted intentionally, maliciously and in conscious disregard of Moor's rights and therefore Moor is entitled to punitive and treble damages according to proof.

Count IV – Breach of Written Contract

144. Moor repeats and realleges all previous paragraphs of this complaint as if fully set forth herein.

145. Honeywell contracted with Moor.

146. Honeywell breached it contract with Moor.

147. As a direct and foreseeable result of the breaches herein alleged, Moor has lost opportunities and royalties according to proof in the amount exceeding $75,000.

148. As a result of Honeywell's breach of contract, Moor has suffered and will continue to suffer damage and irreparable injury for which there is no remedy at law.

Count V - Inducing Beach of Contract

149. Moor repeats and realleges all previous paragraphs of this complaint as fully set forth herein.

150. Honeywell consciously and maliciously conspired, through the premeditated actions of key individuals employed by Honeywell to misappropriate the plaintiff's trade secrets while inducing the plaintiff to compromise his position during the licensing negotiations.

151. Honeywell's alleged conduct herein constitutes a material breach of the written contract with Moor.

152. As a result thereof, Moor has sustained and continues to sustain the substantial losses alleged herein.

Count VI – Tortious Interference with Advantageous Business Relationships

153. Moor repeats and realleges all previous paragraphs of this complaint as if fully set forth herein.

154. The foregoing acts of the defendant constitute tortious interference with existing and prospective business relationships under the common law.

155. Moor had forgone the opportunity to pursue his contacts at Wix due to the numerous and overreaching representations Fram had made concerning the job that they would perform for Moor.

156. Fram never produced a single heavy-duty filter, though they required Moor to give them an exclusive for that aspect of the market as well.

157. In committing the acts herein alleged, the defendant acted intentionally and maliciously with conscious disregard of the plaintiff's rights and therefore the plaintiff is entitled to punitive damages according to proof.

Count VII - Fraud in the Inducement

156. Moor repeats and realleges all previous paragraphs of this Complaint as if fully set forth herein.

157. Honeywell induced Moor to divulge his trade secrets under the guise that his trade secrets were protected under the non-disclosure agreement.

158. Honeywell induced Moor to give Honeywell an exclusive license promising Moor that they would launch, distribute and deliver a marketing campaign that only a world leader was capable of delivering.

159. Instead, Honeywell chose to file patents with Moors trade secrets rather than carry out a marketing campaign befitting "the most significant innovation in oil filtration."

160. Moor has been maliciously and irreparably induced by the plaintiff and is seeking treble damages and any other remedy that the court sees fit to award Moor under the law.

Count VIII – Breach of Implied Covenant of Good Faith and Fair Dealing

161. Moor repeats and realleges all previous paragraphs of this Complaint as if fully set forth herein.

162. The actions of defendants alleged herein constitute a material breach of the legally implied covenant of good faith and fair dealing.

163. As a proximate result of defendants' material breach, the plaintiff has sustained and will continue to sustain substantial losses alleged herein.

Count IX – Unjust Enrichment and Constructive Trust

164. Moor repeats and realleges all previous paragraphs of this Complaint as if fully set forth herein.

165. As a direct, proximate and intended result of Honeywell's breaches of common law duties to Moor, Honeywell has received, or will receive, monies to which they are not entitled and for which Honeywell should be held accountable.

166. As a constructive trustee, Honeywell should be required to disgorge all monies that it has received as the result of its wrongful acts. Such monies received by Honeywell, are monies that Honeywell cannot lay claim to and therefore should be held to be a constructive trustee of such monies.

WHEREFORE, Moor prays:

(a) For judgment on the forgoing counts in the amount of $ 250,000,000 in compensatory damages, prejudgment interest, or such amount as may be deemed appropriate.

(b) For preliminary and permanent injunction enjoining Honeywell and all persons acting in concert with Honeywell, including its agents, servants, employees its or successors or assigns from:

(1.) Selling the Double Guard Oil Filter in any form or venue.

(2.) Any further representation that the Double Guard Oil Filter is the intellectual property of Honeywell and against any other misappropriation, which constitutes unfair dealing with Moor.

(c) For an order requiring Honeywell to pay over to Moor all of its sales, profits and advantages derived by it from patent infringement and misappropriation of trade secrets, breach of contact, tortious interference with advantageous business

relationships in conjunction with existing and perspective contracts, lost revenues and opportunities deprived Moor while Honeywell has controlled The Double Guard oil filter.

(d) For an order imposing a constructive trust on all monies received by Honeywell as a result of its wrongful acts.

(e) For an order requiring Honeywell to pay Moor damages, or Honeywell's profits, whichever is greater and that the Court enter judgment in Moor's favor for three times damages in the amount of damages or profits, pursuant to U.S.C. 35 Section 284.

(f) For an order requiring Honeywell to pay Moor, because the acts of infringement were willful. To pay Moor's reasonable attorney's fees and costs in his pursuant to protect his rights under U.S.C. 35 section 285.

(g) For an order requiring Honeywell to pay Moor punitive damages because the nature of Honeywell's infringement was willful and premeditated.

(h) For an order requiring Honeywell to pay Moor for any violation of the applicable statutes forbidding breach of contract, breach of a non-disclosure agreement, misappropriation of trade secrets and any unfair trade practices.

(i) For an order requiring Honeywell to pay Moor either Honeywell's profits or damages whichever is greater, and that the Court enter judgment in favor of Moor for three times the amount of such damages or profits, pursuant to Section 35 of the Lanham Act, 15 U.S.C. 1117 and 1125(a), because Honeywell has falsified the origin of the patent number on the filter and packaging.

(j) For an order requiring Honeywell to file with the court and to serve on Moor within thirty days after service of any preliminary injunction and/or of any permanent injunction issued herein, or such reasonable time as the Court shall direct, a

report in writing and under oath, setting forth in detail the manner in which the defendants have complied with such injunction.

JURY TRIAL DEMAND

Moor requests a jury trial on all questions of fact raised by this Complaint.

Dated: July 1, 2002

Stephen E. Moor, Pro Se

Respectfully submitted,

Stephen E. Moor

United States Patent [19]

Moor

[11] Patent Number: 4,751,901

[45] Date of Patent: Jun. 21, 1988

[54] COMPOSITE OIL FILTER

[76] Inventor: Stephen E. Moor, [redacted] Point Pleasant, N.J. 08742

[21] Appl. No.: 107,809

[22] Filed: Oct. 13, 1987

[51] Int. Cl.[4] F01M 1/00

[52] U.S. Cl. ..... 123/196 A

[58] Field of Search ..... 123/196 A; 252/10, 11; 427/421, 391, 389.9, 335; 210/168

[56] References Cited

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2,262,526	11/1941	Fairlie et al.	123/196 A
2,310,305	2/1943	Miller et al.	123/196 A
3,958,061	5/1976	Singer et al.	427/421
4,098,944	7/1978	Pollock	427/421
4,144,166	3/1979	De Jovine	252/10
4,232,087	11/1980	Trask	427/421

Primary Examiner—E. Rollins Cross

Attorney, Agent, or Firm—Charles F. Gunderson

[57] ABSTRACT

A filter for the engine oil systems of internal combustion engines, fits into a standard oil filter cartridge or receptacle. The filter cartidge may be of any conventional type, but should be of the best quality, and able to remove as much as possible of the particulate contaminents to provide the best possible mechanical filtering function. The body of this filter cartridge is impregnated with specific chemicals of the type normally added to the lubricating oils by the manufacturer before distribution to counteract the inevitable oxidation, nitration and changes in acidity that degrade a lubricating oil in normal use. The chemicals must be impregnated into the filter in such a manner as to leach into the crankcase oil, over a period of time, in amounts that will compensate for losses in the system, and the amounts and types of chemicals can be structured for any given car, for a given mileage, and for given driving conditions. Timely changes of this filter can prolong the life of the lubricating oil, and the engine.

4 Claims, 1 Drawing Sheet

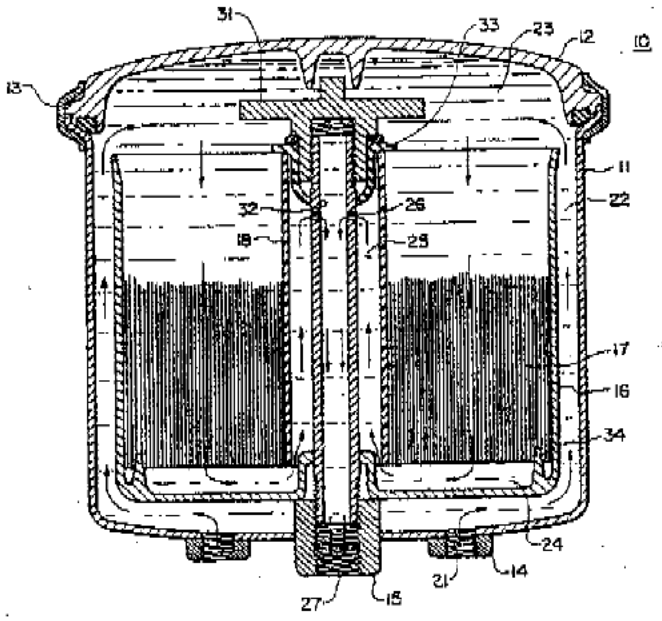

EXHIBIT 1

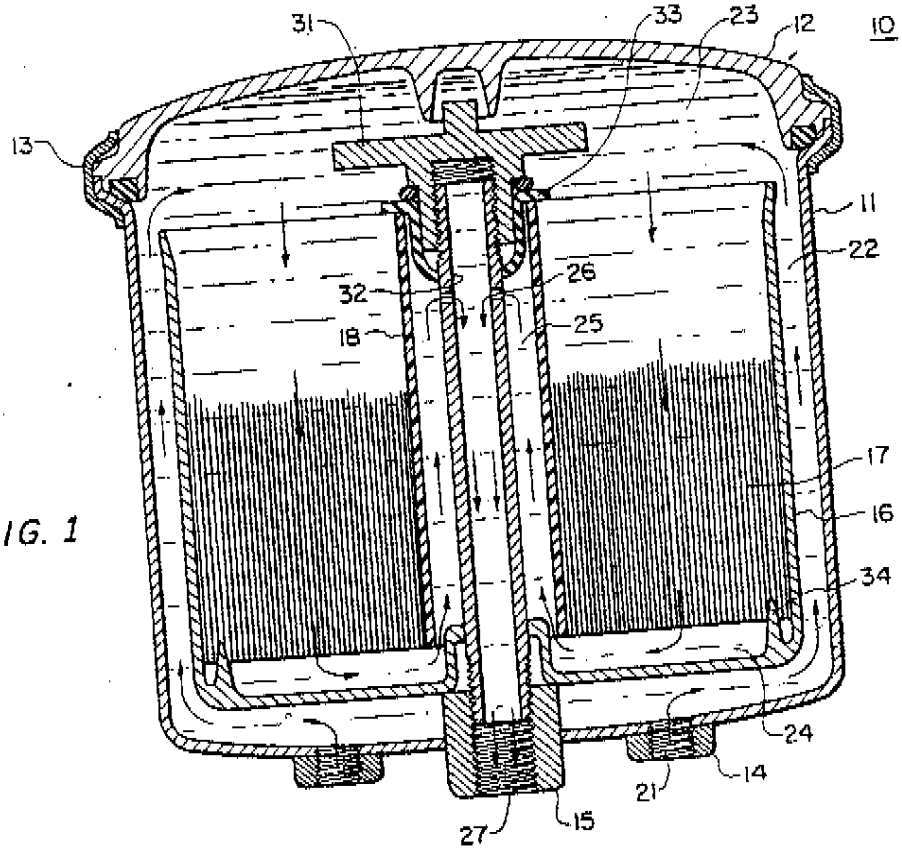

FIG. 1

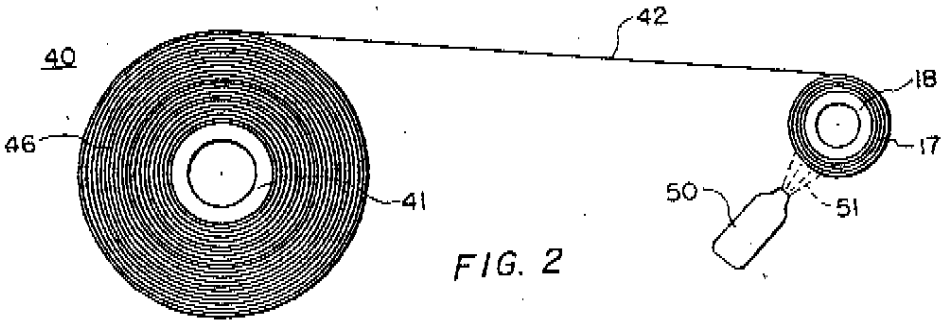

FIG. 2

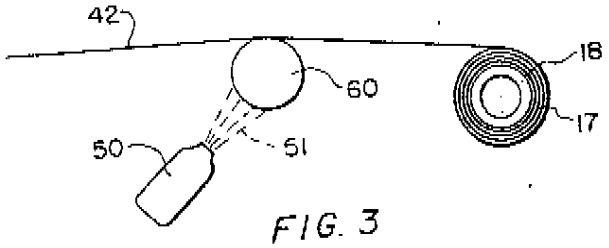

FIG. 3

COMPOSITE OIL FILTER

BACKGROUND OF THE INVENTION

The U.S. Bureau of Standards states that oil does not wear out mechanically. However, motor oil loses its ability to effectively perform its task in an engine's environment due to two main contributing factors; degradation and contamination.

Degradation refers to the destructive chemical changes which occur in a lubricating oil when it is exposed to the operating environment of an internal combustion engine. The results are: oxidation, nitration, loss of additive effectiveness, and an adverse change in viscosity.

Contamination refers to outside substances that have entered into the oil that do not belong there. They are: fuel, soot, water, coolant, solid particles of dirt, and wear metals. Of these particulate contaminants, the microscopic particles in the 5 through 1 micron range have been borne out to cause 50% of the engine wear. They act as lapping agents that get into the regions of critical tolerances and grind the moving parts down.

In almost all operating environments, several of these unwanted substances can be found simultaneously. Their effects and combination of effects vary, but their presence does mean the inevitable inability of the oil to perform its multi-faceted tasks leading to almost-certain motor damage if left unchecked.

The particulate contaminants are meant to be removed by the oil filter. However, the degree of contaminent removal greatly depends upon the quality of the filter (its micron rating); how many filters are employed; and how they are employed in the system.

Due to critical design constraints, such as the filter being placed in direct series with the flow of oil, as in the case of full flow filters, the filter is only able to do a cursory job of filtration. Its' ability to hold large amounts of particulate contaminants is limited and the side of the contaminants being trapped is calculated so as not to plug the filter. The filter's ability to hold fuel, water, coolant, and soot that gets into the system is almost non-existent. Hence, the system, as it presently exists, taxes even the most sophisticated oils and their additive packages from the standpoint of contamination.

One of the objects of this invention, therefore, is to provide a mechanical contaminant filter that has the highest possible degree of filtration; capable of trapping the most minute particulates that could cause abrasive damage to the engine.

In the case of degradation, the oils additive package, that is invariably included in all detergent motor oils—plays a major role in the critical job of keeping in check the forces of oxidation, nitration, and viscosity breakdown. The additive package is also responsible for holding in suspension some of the outside contaminants that have entered the system that the oil filter is unable to trap and hold. This is done by the various constituents of the additive package that are able to surround and hold these unwanted by-products and contaminants in suspension and shield the moving parts of the motor from their damaging effects until the oil filter can be changed, and the oil drained and replaced with new detergent motor oils.

This additive constituent is found in various diluted strengths of approximately 4 to 6% by volume in almost every detergent motor oil. A typical, almost-universal,

motor oil additive package would contain approximately 50% of an ashless dispersant; 15% of alkyl zink dithiophosphate; and 35% of metalic detergents, by volume.

It should be noted, here, that there are innumerable additives to oils, available at all automotive supply stores, that guaranty almost as many cures to oils and engines, but these are essentially supplements for the improvement of the viscosity of the oil that is lost due to chemical dilution of the oils, However, there are no additives, available on the retail market, that are actually intended for, or able to compensate for, the chemical changes in the oil, or for the reconstituting of the oil for that purpose.

It is therefore, another, and the primary, object of this invention to provide a filter that can systematically introduce the specific chemicals to the oil that can restore, as much as possible, the depleted additive-package chemicals of the oil, so as to minimize the potential damage to the engine by the build-up of destructive chemicals and contaminants.

This filter would be treated with a chemical solution or additive package, that would include as much as possible, the specific chemicals of the very-same commercially-available packages, that were put into the base oils at the blenders. However, the amounts of the specific chemicals will be chosen to compensate for those of the original additive package, to the extent that they will have been exhausted by natural depletion during engine use.

This solution can be applied to any and all types of oil filtration media, and is compatible with all oil filters, whether primary or full flow, axial or radial flow, spin-on or cartridge types, and in the case of heavy duty engines, such as diesels, to any and all configurations of secondary or bypass filters. The application of this solution should be done at the factory by the oil filters manufacturer to insure quality control and to insure that the strength of the solution added to each filter would be commensurate with a specific vehicles oil sump capacity, and its projected use. Degradation of the oil would, of course, be a function of the type of engine and its use.

This solution would leach out into the oil as the system called for its presence. Also the fact that the solution would be impregnated in the filters media would aid in the absorption of contaminants and improve the oil filter's ability to aid in the filtration process, because today's oil additives work as liquid filters in the oil.

It is a further object of this invention to provide a replaceable, disposable filter cartridge that will leach a measured portion of necessary additives into the lubricating system during the life of the cartirdge to reconstitute the chemical structure of the oil to continue compensating for the build up of acids, and other chemicals, in the lubricating system that would, eventually, damage the engine.

SUMMARY OF THE INVENTION

A filter cartridge for the oil systems of internal combustion engines, fits into a standard cartridge receptacle. While any standard filter may be modified and impregnated with he necessary chemicals to revitalize the crankcase oil, the filter cartridge chosen here is made up of rolled material that can remove contaminant materials of a fraction of a micron in size. The upper surface of the rolled filter provides an indication of what materials

are being filtered out—soot, fuel [illegible]er, or metal—and when the filter should be replaced.

The rolled filter paper lends itself to being impregnated with chemicals in a controlled manner while it is being wound into a filter roll. These chemicals will leach into the crankcase oil over a long period of time to replace those chemicals of the additive package—that are included in all engine lubricating oils on the market today—to restore the neutralizing effect of the chemicals in the oil that will have deteriorated from use, and inhibit the corrosive elements in the oil.

Ultimately, these filters could so completely revitalize crankcase oil—since, again, oil does not wear out mechanically—that the oil should be useable almost indefinitely. This system could virtually preclude oil changes—or extend them by many thousands of miles. For the economy of the country, considering the numbers of cars in use today, the savings in lubricating oil would be not less than astronomical figures. For the ecology of the country, the reduction in the waste oils would be an enormous help.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a cross section of a typical oil filter;
FIG. 2 shows one method for forming a filter; and
FIG. 3 shows another method for forming a filter.

DETAILED DESCRIPTION OF THE DRAWINGS

Referring now more particularly to FIG. 1 a typical oil filter is shown in cross section. This filter most resembles those found in the standard "750" housing that is found in heavy duty equipment, such as trucks, but the concepts here are intended for all prefabricated filters.

In this case, a filter **10** has an outer casing **11**, a lid or cap **12**, and a connecting seal **13**. An oil inlet is at **14**, and an outlet is at **15**. A replaceable filter cartridge has an outer casing **16**, containing an inner filtering medium **17**, that, in this case, is wound or wrapped around a tube **18**.

In this filter, the oil enters through the inlet **14**, at **21**, passes around the cartidge casing **16**, through the space **22** and up to a plenum **23**. It is then drawn through the filter material **17**, to the bottom of the cartridge at **24**, from which it is drawn up through the inside **25** of the tube **18** and through the holes **26** in an output tube, and down through the outlet **15**, at **27**.

In this embodiment, the filter cartridge is held in place by a cap **31**, that may be screwed down on the output tube **32**, to force the upper part of the tube **18** against a gasket **33** to direct the filtered oil into the output tube. This also pushes a rim **34** into the outer edges of the filter material **17** to further keep the filtered oil from diverting around the filter.

This is, again, only a typical section of a typical filter. all filters must, of course, have an input, a filtering medium, and an output, and the actual mechanical filtering material is not limited to the wound filter element shown here, although this appears to be one of the most effective, and desirable mechanically, as well as being quite adaptable to the addition of chemicals, in controlled amounts, to the internal surfaces of the filtering media for controllable release into the lubricating system, to provide for the equally-important, and currently-neglected, potential, chemical function of an oil filter.

This chemical function, and the reduction of the chemical contaminants is accomplished by the addition of ingredients that will b[illegible]scribed to reconstitute the chemical balance of the oil before the chemicals break down—or are exhausted to a dangerous level. These ingredients must be added to the filter material, and may be added in any suitable manner, so that they can leach out into the oil, little by little, over a long period of time, to replace, as quantitatively as possible, the chemicals that are being lost, in engine use, through degradation and contamination.

A typical technique for adding the desired chemical ingredients to the typical filter is shown in FIG. 2. This shows a roll of filter material **17** being wound on the tube **18**. The paper is supplied by a large roll **40** which consists of a drum **41** on which is pre-wound the paper **46**, which is transferred along **42** to the filter cartridge roll **17**.

As the filter roll is being wound, a source **50** of the prescribed chemicals under pressure can direct a fine spray **51** of the chemicals onto the filter paper as it is formed into the roll. This is essential, since the filter paper must be only lightly, but evenly, coated, or impregnated with the chemicals to provide a uniform leaching of the chemicals into the oil over a given time span.

A very significant way of extending the timing of the release of the essential chemicals, that is inherent in this system, is to vary the tension of the filter paper being wound on the spool, to vary closeness of the layers, and the resistance of that portion of the filter just enough to divert the flow of oil over various sections of the filter. The initial flow of oil would be through the more-loosely spaced portions, which would, gradually, clog up to divert the flow of oil, under more pressue, to the more tightly wound portions, and to new sources of unused chemicals, to extend the life of the filter.

This could be an automatic function, since the radius of the initial winding function is very much less than that of the final radius, and the tension, and the closeness of the layers being wound, must vary correspondingly.

FIG. 3 shows another way of applying the chemicals in a very-thin film to the paper as it is being coiled up on the filter cartridge roll. Here a roller **60** is pressed against the paper **42** on its way to be wound on the tube **18** to form the filter material **17**.

Other ways of impregnating this, or other filter media will suggest themselves to those skilled in the art.

Actually, it should be possible to predict and provide concentrations of the replacement additive chemicals for certain types of cars, or trucks, for given mileages or times for a given additive filter. The season, the location, the type of driving, the type and manufacture of a car or truck, and even the age of the engine can all be considered in the selection of the contents—or strength—of the composite filter. Obviously, these factors can be taken into account in the recommendations of the time or mileage for the replacement of a filter.

What is claimed is:

1. An oil filter cartridge for an internal combustion engine comprises a container having an inlet connected to the oil circulating system of the engine to receive unfiltered engine oil under pressure from said engine, and an outlet connected back into said oil circulating system or said engine to discharge filtered and reconditioned engine oil back into said engine; said container having a filter material to remove contaminents from said engine oil circulating through said filter material; said filter material being impregnated with specific con-

trolled amounts of certain of the essential additive chemicals that are initially supplied in engine oil by oil manufacturers, to replace a given proportion of those chemicals that are predictably lost in normal engine use over a given period of time, and under given conditions.

2. An oil filter, as in claim 1, wherein said filter material comprises an elongated sheet of filter material wound on a central shaft and positioned within said container.

3. An oil filter, as in claim 2, wherein said controlled amounts of certain of the essential chemicals are sprayed onto the surface of said elongated sheet of filter material to impregnate said filter material with said

additive chemicals while it is being wound on said central shaft.

4. An oil filter, as in claim 2, wherein said elongated sheet of filter material is wound on said central shaft with varying tension so that there will be a variable spacing between the layers of said filter material, so that said oil passing through said filter material will first seek the looser windings and assimilate their chemicals until said looser windings gradually become blocked to force the oil through increasingly tighter windings to delay the application of said additive chemicals over a considerable length of time.

* * * * *

United States Patent [19]
Moor

[11] Patent Number: 4,751,901
[45] Date of Patent: Jun. 21, 1988

[54] COMPOSITE OIL FILTER

[76] Inventor: Stephen E. Moor, [redacted] Point Pleasant, N.J. 08742

[21] Appl. No.: 107,809

[22] Filed: Oct. 13, 1987

[51] Int. Cl.[4] F01M 1/00
[52] U.S. Cl. ..... 123/196 A
[58] Field of Search ..... 123/196 A; 252/10, 11; 427/421, 391, 389.9, 335; 210/168

[56] References Cited

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4,098,944	7/1978	Pollock	427/421
4,144,166	3/1979	De Jovine	252/10
4,232,087	11/1980	Trask	427/421

Primary Examiner—E. Rollins Cross
Attorney, Agent, or Firm—Charles F. Gunderson

[57] ABSTRACT

A filter for the engine oil systems of internal combustion engines, fits into a standard oil filter cartridge or receptacle. The filter cartidge may be of any conventional type, but should be of the best quality, and able to remove as much as possible of the particulate contaminents to provide the best possible mechanical filtering function. The body of this filter cartridge is impregnated with specific chemicals of the type normally added to the lubricating oils by the manufacturer before distribution to counteract the inevitable oxidation, nitration and changes in acidity that degrade a lubricating oil in normal use. The chemicals must be impregnated into the filter in such a manner as to leach into the crankcase oil, over a period of time, in amounts that will compensate for losses in the system, and the amounts and types of chemicals can be structured for any given car, for a given mileage, and for given driving conditions. Timely changes of this filter can prolong the life of the lubricating oil, and the engine.

4 Claims, 1 Drawing Sheet

In reference to patent #4,751,901 an additional additive system may be employed. A friction reducing material may be added (teflon) or a similar such compound. This material may be introduced in conjunction with the additives mentioned above or in place thereof.

In reference to the application of these additives and/or the friction reducing material (teflon) these materials may be applied as the patent implies; by spraying on the filtration media. An additional method of application may be employed; mixing these materials (additives and/or teflon in with the media at the point of its manufacture at the paper mill or plant.

US005209842A

United States Patent [19]

Moor

[11] Patent Number: 5,209,842

[45] Date of Patent: May 11, 1993

[54] OIL ENHANCING MULTIFUNCTION FILTER

[76] Inventor: Stephen E. Moor, [redacted] Point Pleasant, N.J. 08742

[21] Appl. No.: 830,386

[22] Filed: Feb. 3, 1992

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 564,329, Aug. 8, 1990, abandoned.

[51] Int. Cl.[5] B01D 27/00

[52] U.S. Cl. ..... 210/168; 210/232; 210/209; 210/DIG. 17; 123/1 A; 123/196 A; 252/10; 252/58

[58] Field of Search ..... 210/168, 248, 206, 209, 210/DIG. 17, 232; 252/10, 58; 184/6.21, 6.24; 123/196 A, 196 R, 1 A

[56] References Cited

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Primary Examiner—Matthew O. Savage
Attorney, Agent, or Firm—Louis S. Gillow

[57] ABSTRACT

An oil filter cartridge for internal combustion engines that employ oil filters in their operation. The input side of the cartridge is filled with microscopic solid lubricating particles of polytetrafluoroethyline (PTFE) dispersed in an oil carrier base. The microscopic particles of PTFE are of varying sizes, with the finest below the minimum given size of the filter and pass immediately into the oil circulating system. The larger sizes are gradually broken down by the high temperature, pressure and swirling flow within the filter cartridge so as to gradually pass through the filter to provide enhanced lubrication by the circulating oil during the operating life of the oil filter cartridge.

4 Claims, 2 Drawing Sheets

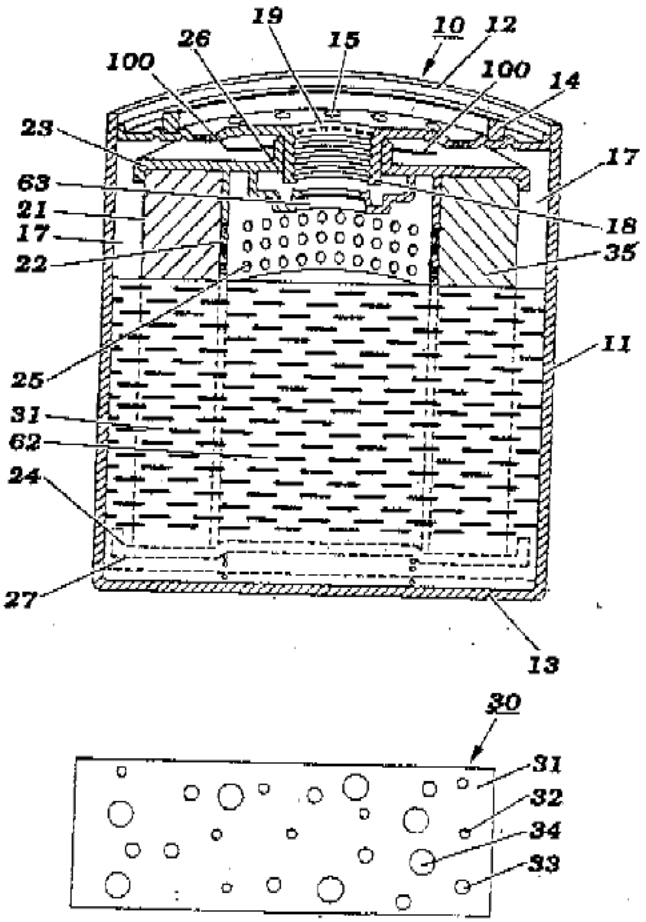

EXHIBIT 3

Fig. 1

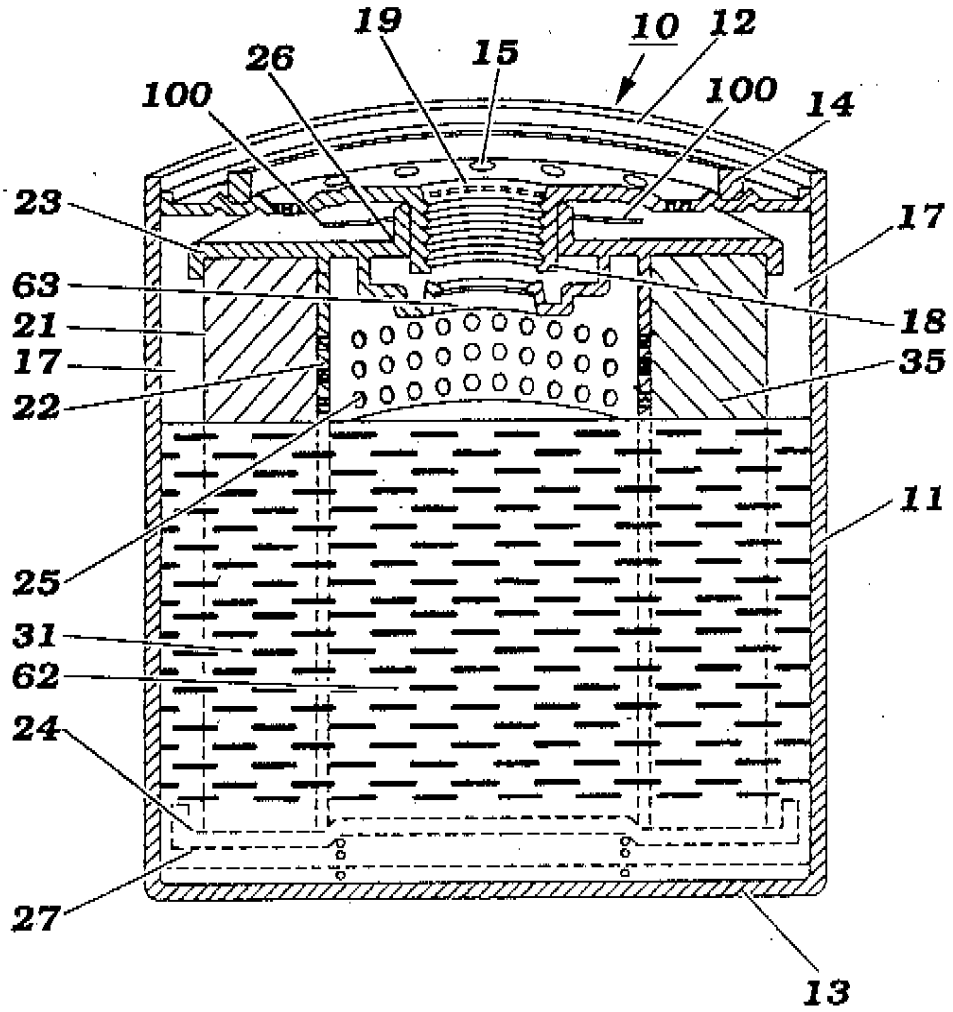
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Fig. 2

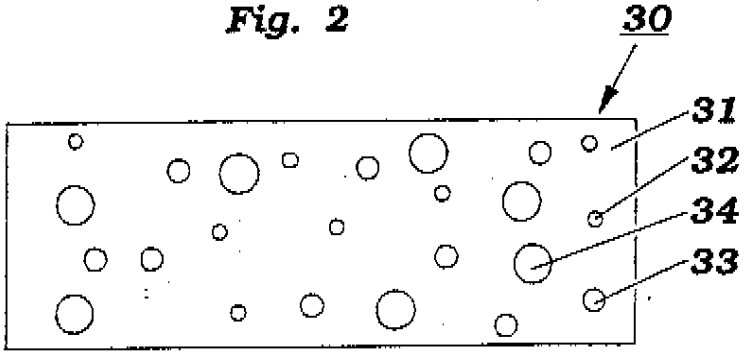
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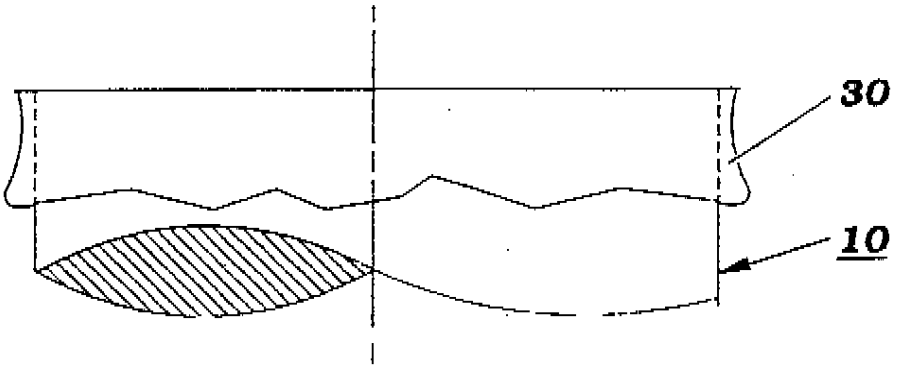
Fig. 3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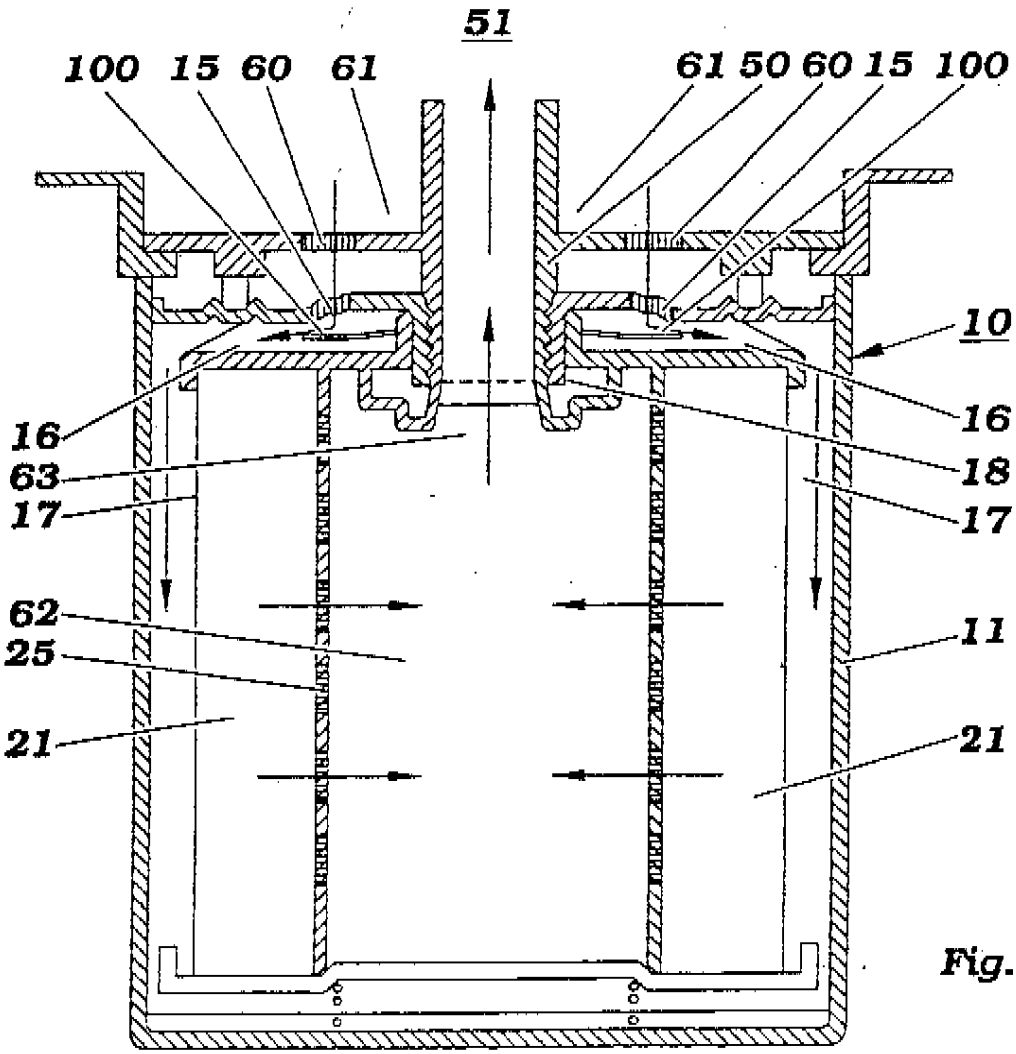
51
100
15
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100
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63
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21
11
21

Fig. 4

OIL ENHANCING MULTIFUNCTION FILTER

This is a continuation-in-part patent application of U.S. patent application Ser. No. 564,329 filed Aug. 08, 1990, now abandoned.

BACKGROUND OF THE INVENTION

The United States Bureau of Standards states that oil does not wear out mechanically. However, oil does get contaminated by exposure to an engine's environment. These contaminants are primarily soot, dirt, sludge, water, fuel metals, acids and oxidation products which gradually degrade the oil and are factors that ultimately break down the oil to reduce its effectiveness and contribute to engine wear.

There are two main contributing factors that are responsible for the breakdown of the integrity of the lubricating oil and the subsequent engine wear and ultimate damage: The first is particulate or mechanical, consisting of dust or grit from the air intake, carbon from combustion and wear metals from the metal to metal contact in the engine. The second factor is chemical in origin. Exposure to the high temperature of engine operation along with the combustion gases, such as CO, CO_2, and SO_2, combine with the moisture present in the lubricating system to form various acid based compounds harmful to both the oil and the engine.

DESCRIPTION OF THE PRIOR ART

In my earlier U.S. Pat. No. 4,751,901, most of the mechanical contaminants, which are mainly particulates, are removed by a mechanical contaminant filter that has the highest possible degree of filtration of the most minute elements of the particulates that might cause damage to the engine. However, the finer the filter the more impedance to the flow and circulation of the oil. Filters that are capable of removing particulates in the 10 micron range and below are typically used in secondary by-pass filtration and are not practical for primary full flow applications. In this earlier patent, the chemical contaminants, which are invisible but also harmful, are overcome by introducing a series of compensating chemicals into the body of the filter material or media and are released through the life of the oil filter cartridge, to maintain the chemical balance of the lubricating oil, and to minimize the corrosive damage to the engine. The use of my earlier patent adds considerably to the life of the engine.

Also found in the prior art, a container of polytetrafluoroethyline (PTFE) additives are poured directly into the crankcase. This has the effect of initially reducing friction, but it is an abrupt manner in which to introduce this material into a balanced lubricating system. Also, the prior art incorporates outside agents and compounds into their respective PTFE mixtures to make their respective formulations perform the task intended. (See U.S. Pat. nos. 3,933,656; 4,127,491; 4,284,518 and 4,888,122)

OBJECTS OF THE INVENTION

It is an object of this invention to provide an enhanced lubricant that includes particles of solid lubricating materials of the same size ranges as that of the contaminant abrasives. This will counteract the abrasive particles and improve the overall lubrication of the engine. This will also reduce the generation of certain of the mechanical contaminants, such as metallic engine wear particles. The oil filter will perform its primary function of removing the larger mechanical abrasive particles (on average 20 microns or more), and in due course permit the circulation of mechanical particulates along with enhancing lubricating particles and masses generally in the 20 micron range and below. The enhanced lubricant is in the form of a solid, rather than a liquid, consisting of various particle sizes of the solid lubricating PTFE material.

It is another object of the invention to add the solid lubricant to the engine oil supply in gradual increments that maintain a sustained release of additional solid lubricant for as long as is practical.

It is an additional object of the invention to provide the PTFE solid lubricant in microscopic units of varying sizes so that, as the finer units are liberated (at first to become an integral part of the oil composition and later burnished onto the engine metal surface), the larger units of the PTFE that are held back initially by the filter media, will be gradually reduced in size by by the high temperature, pressure and swirling flow in the cartridge so as to gradually break apart the bi-polar attracted PTFE particles so they will leach into the circulating oil system and enhance the lubricating process.

SUMMARY OF THE INVENTION

An oil filter for internal combustion engines that employ oil filters in their operation may be of any conventional type, but it is initially filled or treated at the point of manufacture with a liquid vehicle containing a dispersion of various sizes of PTFE solid lubricant. The liquid vehicle is an American Petroleum Institute (API) approved oil base, with or without a chemical supplement, such as disclosed in my U.S. Pat. No. 4,751,901 for maintaining ideal conditions of the lubricating oil. The PTFE particles are of various sizes dispersed in the liquid vehicle. The finest particles are able to pass through the filter media immediately. The larger particles of agglomerated masses gradually break apart and liberate smaller particles which then pass through the filter media so as to continually enhance the lubricating properties of the circulating oil.

The solid lubricating PTFE particles in the dispersion not only cushion the metal to metal contact between the engine surfaces, but also adhere to and become burnished onto the metal surfaces where heavy contact is made. The addition of PTFE is in sufficient quantities to provide additional lubricity to the circulating oil and, at the same time, not overburden the filter media so as to restrict its primary function of filtering out the mechanical abrasives. In this way the invention assures superior enhanced performance during the operation of the filter cartridge.

In the invention, the larger agglomerated masses of PTFE particles are held back by the filter media until they are gradually reduced in size by the high temperature, pressure and swirling flow in the filter cartridge. Then, gradually the particles and agglomerated masses below 20 microns will pass through the filter media in a time release manner to continually enhance the circulating oil during the usable life of the oil filter cartridge.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a cross section of a typical oil filter cartridge with the addition of an impregnated liquid vehicle therein;

FIG. 2 shows an enlarged cross section of a minute portion of the impregnated liquid vehicle with varying sizes of microscopic particulates and agglomerated masses of PTFE solid lubricant;

FIG. 3 shows a side view of the top portion of the oil filter cartridge after sealing for shipment; and

FIG. 4 shows a cross section of the oil filter cartridge installed on the engine with a schematic flow of the liquid vehicle and circulating oil.

DETAILED DESCRIPTION

An oil filter cartridge for internal combustion engines that employ full flow filters. The cartridge is pre-charged at the point of manufacture with a liquid vehicle containing a dispersion of PTFE solid lubricant. After installation on the engine the oil filter performs its standard function of filtering abrasive contaminants, and it performs the additional function of systematically and gradually adding PTFE solid lubricant to enhance the lubricity of the circulating oil during the operating life of the oil filter cartridge.

Referring now to FIGS. 1 and 4, the oil filter cartridge **10** is a sealable container with an outer casing **11**, a top section **12** and a bottom section **13**. The top section **12** joins with a standard coupling unit **50** the engine **51** to seal and isolate the input side **16** and the output side **62** of an oil circulating loop within the cartridge **10** so as to lubricate the engine **51** with circulating oil and an enhanced lubricant.

A gasket **14** seals the filter **10** to the engine **51**. Multiple holes or perforations **15** in the top section **12** direct the circulating oil into the upper plenum input side **16** of the cartridge **10** to flow down the side spaces **17** to be drawn through the filtering element or media **21** that removes the larger mechanical particulates that might abrade the moving parts of the engine **51**.

The filter media **21** is effectively mounted in a cartridge within the cartridge **10**. The filter element **21** is of a porous material (typically one layer of resin impregnated pleated paper rated at aproximately 20 micron filtration for the standard full flow spin-on oil filter), that is wrapped or positioned around the tubular core output side **22**, which is tightly secured to the top end cap **23** and the bottom end cap **24**. The output side **22** has a multiplicity of holes **25** for the flow of oil and liquid vehicle from the input side **16** and through the filter media **21**. The top end cap **23** has an annular top portion **26** that fits tightly around a tubular projection **18** from the top section **12** of the outer casing **11**. The projection **18** has inner threads **19** in its output opening **63** that can draw the cartridge **10** against the coupling unit **50** on the engine **51**.

The outer rim of the top section **23** folds over the filtering element **21** to hold it in place, and to allow the flow of circulating oil down the input side **16** to the side spaces **17** and then through the whole of the filtering element **21**. The outer edge of the bottom section forms a junction **27** that fits snugly against the outer casing **11** of the cartridge **10**.

The circulating oil, or the liquid vehicle **31**, flows down through the slots **60** in the crankcase **61**, passes through the holes **15**, is drawn into the input side upper plenum **16** and side spaces **17**, through the filtering element or media **21**, and through the holes or perforations **25** in the output side tubular core **22**, to the central output opening **63** to reenter the engine **51** through the tubular projection **18** and the coupling unit **50**. A rubber gasket **100** acts as a one way valve which allows the unfiltered circulating oil to enter through the input ports **15** while not allowing the oil to flow back out, once in.

An aluminum foil, laminated paper, or shrink wrapped material **30** is adhered to the top section **12**, the gasket **14** and the top rim **12** after filling the cartridge **10** to prevent leakage during shipping and handling, as shown in FIG. 3. The adhered material is removed by the installer prior to placement of the cartridge on the engine **51**.

FIG. 2 shows a cross section of a very minute portion of the liquid vehicle **31** containing the dispersed PTFE. FIG. 2 is very greatly enlarged to show the variations in sizes of particles and agglomerated masses of PTFE. In this case the finest microscopic particles and masses under 20 microns in size **32** will pass through the filtering element **21** to immediately enhance the lubrication of the engine **51**. The slightly larger agglomerated masses **33** will be held within the input side **16** and side spaces **17** until the high temperature, pressure and swirling flow of the circulating oil and liquid vehicle **31** reduce the agglomerated masses **33,34** to particles below 20 microns in size to enable them to pass through the filtering element **21** and add to those particles **32** that have been burnished onto the wear surfaces of the engine **51**. When all of the original PTFE particles **32** and the larger agglomerated masses **33,34** have been physically separated and are able to pass through the filtering element **21**, approximately 3000–4000 miles of engine use will have elapsed and it would be time to re-the oil filter cartridge **10** and the circulating oil.

The oil filtering element **21** of the cartridge **10** is pre-charged or treated at the point of manufacture with a controlled amount of the dry lubricant. The preferred dry lubricant is PTFE supplied under the tradename TEFLON ® MP 1100 by the E. I. DuPont de Nemours, Inc., Wilmington, Del. The PTFE is dispersed within a liquid vehicle **31** of 30 weight API approved carrier oil in aproximately: 1 ounce of carrier oil with ½ ounce of PTFE per 4 cylinder engine 1½ ounce of carrier oil with ¾ ounce of PTFE for a 6 cylinder engine; and 1¾ ounce of carrier with 1 ounce of PTFE for a 8 cylinder engine; etc.

PTFE has one of the lowest friction coefficients along with being rather chemically inert. TEFLON ® MP 1100 has a high melting point of 608° F. and it has an average particle size of 3 microns, with 90% smaller than 8 microns and 10% smaller than 2 microns. PTFE particles tend to stick to one another and further tend to draw moisture out of the atmosphere, like a desiccant. When PTFE and oil are mixed, the mixture must be agitated vigorously for a long period in order to become homogeneous. Even if a homogeneous mixture is achieved the PTFE particles tend to settle out in a rather short period of time. When the PTFE and carrier oil are added together with a gentle agitation, there is formed a dispersion of PTFE particles in the carrier oil. It has been found that 50% of the PTFE particles then tend to agglomerate in masses of aproximately 40–60 microns, designated as **34** in FIG. 2. 25% of the agglomerated PTFE particles form masses **32** that are in a range of 20 microns or less, which are small enough to pass immediately through the filter media **21**., which allows passage of agglomerated masses up to 20 microns. The remaining 25% of the agglomerated PTFE masses are in a size range of 20–40 microns, designated as **33** in FIG. 2. The larger agglomerated PTFE masses **33,34** above 20 microns are broken down by the high

temperature, pressure and swirling flow in the cartridge **10** to a size sufficiently small enough to pass through the 20 micron filter media **21**. In effect, this causes a sustained time release of PTFE particles into the circulating oil to gradually enhance its lubricity.

The filter media **21** is never in danger of being clogged or robbed of its filtering capacity because the surface area of the filter media **21** is much greater than the total of the agglomerated masses and the abrasive particulates in the side spaces **17**. In addition, the pressure grinding and swirling action of the internal operation of the engine **50** shears and separates the PTFE masses to smaller sizes. It is to be noted that the filter cartridge **10** should be placed in operation together with an oil change for best results. The temperature inside the crankcase **61** of most internal combustion engines **50** runs at about 350° F., and the pressure generated inside the cartridge **10** is approximately 50 psi when the engine **50** is running.

The combination of the high temperature, pressure and swirling flow within the cartridge **10** works to separate the agglomerated masses **33,34**, which gradually diminish in size to below 20 microns so as to pass through the filter media **21** in smaller masses or particle form.

The PTFE particles carry a negative charge within the liquid vehicle **31**. The negative charge varies over the surfaces of the particles, which, therefore behave as microscopic electrets having quasi-positive as well as negative charges. As a consequence, the bi-polar particles attract each other and agglomeration occurs. Because of the PTFE particles bi-polar affinity, they tend to agglomerate.

The high temperature, pressure and swirling flow within the cartridge **10** gradually separates the particles in the masses **33,34** from each other by breaking the bi-polar bonds and reducing the masses below 20 microns in size during the useful life of the filter. This causes all of the particles of PTFE to gradually pass through the the filter media **21** in enhancement of the lubricity of the circulating oil. The invention requires no other compounds such as surfactants or other outside compounds, to maintain a dispersion and to keep the PTFE particles from settling out. The majority of the particles will be impregnated into the filter media **21**. The PTFE particles that fall off of the filter media **21** due to settling during shipment will eventually be liberated into the lubricating system as previously explained. The introduction of the PTFE particles and masses **32,33,34** into the circulating oil is systematic because each cartridge **10** is filled with the proper amount of PTFE commensurate with the requirements of the engine **51** and the number of cylinders included. Delivery of the PTFE is gradual over the period of operation because the entire filter media **21** is impregnated and it takes many multiple passes of the circulating oil through the filter media **21** to liberate all of the agglomerated PTFE masses **33,34**. This is a more effective way to enhance the lubricating system by the time release of PTFE particles than by dumping a mixture of PTFE additive directly into the crankcase.

The filtering element **21** may be of any conventional type generally designed to filter out contaminants of appoximately 20 microns. The cartridge **10** is generally a spin-on full flow filter. This will clear out the majority of the abrasive particulates, but will allow the passage of a certain amount of the PTFE lubricating particles through the engine **51**.

The PTFE particles are agglomerated into different size masses, so that a proportion of the finer masses as well as particles below 20 microns circulate immediately through the filter media **21** to enhance the lubrication of the engine **51**. The finer particles **31** are circulating within the lubricating system and becoming part of the circulating oil's makeup or being burnished onto the internal parts of the engine **51**. The larger PTFE agglomerated masses **33,34** above 20 microns are reduced in size by the high temperature, pressure and swirling flow within the cartridge **10**. By the time the original finer particles **31** exhaust themselves, more particle masses **33,34** are reduced in size to pass through the filter media **21** to enhance the lubricating system.

The liquid vehicle **31** containing the PTFE dispersion can be anything from various kinds of engine oil to the most sophisticated of liquid lubricants. Ideally, it should be a liquid vehicle of additives as described in my U.S. Pat. No. 4,751,901.

In the invention, the filter media media **21** is pretreated or impregnated during manufacture of the cartridge **10** with PTFE in such a way that the PTFE leaches out gradually to enhance the lubricity of the circulating oil. In this way the engine **51** has enhanced protection against chemical corrosion as well as mechanical abrasion during the operating life of the cartridge **10**.

It is to be understood that the above description and the accompanying drawings are merely illustrative of the invention, and that no limitations are intended other than as defined in the appended claims.

I claim:

1. An improved oil filter cartridge, for an internal combustion engine, of a type having a container with an input port for connection to an output of an oil circulating system of the engine to receive unfiltered oil from said engine, and an output port for connection to an input of said oil circulating system of said engine to discharge filtered and reconditioned oil back into said oil circulating system, said container having filter means positioned between said input port and said output port for removing particulate contaminants above about 20 microns in circulating through said cartridge from said engine oil, said filter cartridge including an input side adjacent the input port and the filter means, wherein said improvement comprises: said input side of said cartridge being filled with a liquid lubricating vehicle having dispersed therein from about ½ ounce to about 1 ounce of agglomerated masses of particles of solid polytetrafluoroethylene, said particles having an average size of about 3 microns, said agglomerated masses ranging in size from about 60 to about 20 microns; said lubricating vehicle providing means for circulating said agglomerated masses of about 20 microns through said engine; whereby said agglomerated masses of about 20 microns are added to the oil circulating system as soon as the cartridge is connected into said oil circulating system, and, as the engine is operated, the agglomerated masses having a size above of about 20 microns gradually break apart to a size capable of passing through said filter means to provide constant addition of lubricating polytetrafluoroethylene particles to enhance lubrication of said engine by the oil circulating system during the life of said cartridge.

2. The improved oil filter of claim **1** wherein said lubricating vehicle is 30 weight carrier oil.

3. The improved oil filter of claim **1**, further including means for covering said input port and said output port

to contain said lubricating vehicle and said agglomerated masses of polytetrafluoroethylene particles within said cartridge during shipping and handling, whereby said means for covering is removed before mounting said cartridge into said oil circulating system.

4. The improved oil filter of claim 1 wherein said cartridge is a spin-on full flow oil filter for internal combustion engines.

* * * * *

AlliedSignal
AUTOMOTIVE

AlliedSignal Inc.
Automotive Aftermarket
105 Pawtucket Avenue
Rumford, RI 02916-2422

401 434 7000
401 431 3253 Fax

February 12, 1994

Mr. Steven Moor
[redacted]
Pt. Pleasant, NJ 08742

Dear Steven:

It was good talking with you today. As per our conversation I am returning your documents. Thank you again for giving AlliedSignal's FRAM the opportunity to review your fine concept.

At this time our Engineering group is not interested in pursuing this type additive technology. Although I am not one to dismiss a great marketing angle, my options at this point are certainly limited.

I will continue to speak to individuals within our company about your patented idea, and possibly the "mood" will change.

Thank you again, and best of luck.

Sincerely,

Kevin Gill
Manager, Product Marketing

EXHIBIT 4

PROPRIETARY INFORMATION AGREEMENT

Effective as of October 3, 1994

THIS AGREEMENT is between ALLIEDSIGNAL INC., "ALLIED", a Delaware corporation, having an office of its Automotive Sector at 105 Pawtucket Avenue, Rumford, Rhode Island 02916, and Trans-Eco Consultants, "COMPANY", a type-S New Jersey corporation having an office at [redacted] Point Pleasant, New Jersey

Company desires to transmit to ALLIED, and ALLIED desires to receive from COMPANY proprietary information under the following terms and conditions.

1. "Proprietary Information" means all documented information hereafter disclosed by COMPANY to ALLIED relating to the design, development, marketing and sales of a PTFE additive filter, which is clearly marked thereon with a written proprietary notice. If the Proprietary Information is orally disclosed, it must be reduced to written form and delivered to ALLIED within sixty (60) days of such oral disclosure.

2. For a period of three (3) years from the effective date of this Agreement, ALLIED shall not disclose Proprietary Information to any third party; provided, however, that ALLIED shall have no obligation with respect to any portion of such Proprietary Information which is at the time of receipt in the public domain or already known to ALLIED, as evidenced by documentary material in the possession of ALLIED.

3. ALLIED's obligation of non- disclosure shall immediately cease at the time such Proprietary Information:

(a) enters the public domain through no wrongful act of ALLIED;

(b) is received by ALLIED from a third party without similar restrictions thereon regarding non-disclosure;

(c) is furnished to a third party by COMPANY without a similar restriction on the rights of the third party;

(d) is approved for release by written authorization of COMPANY;

(e) is independently developed by ALLIED; or

(f) is disclosed in a product marketed by COMPANY.

4. ALLIED will not be liable for disclosure of Proprietary Information which occurs despite the exercise of the same degree of care and protection it takes to preserve its own proprietary information.

5. ALLIED shall not be liable for the unauthorized disclosure or use of Proprietary Information by persons who are employed by ALLIED and who are acting outside of the scope of their apparent authority or who have ceased to be in its employ, unless it fails to protect such Proprietary Information with the same degree of care it uses in handling its own proprietary information.

6. This Agreement shall terminate one (1) year after its effective date.

7. Nothing contained in this Agreement shall be construed as granting or conferring to ALLIED any patent rights or licenses either expressly or by implication.

ALLIED and COMPANY have caused this Agreement to be executed, in triplicate, by their respective duly authorized representatives on the dates indicated below.

COMPANY

By: Stephen E. Moor

Name: Stephen Moor

Title: PRESIDENT

Date: 10/7/94

ALLIEDSIGNAL INC.

By: Dianne Z. Newman

Name: Dianne Z. Newman

Title: Dir., Bus. Plng. & Development

Date: October 3, 1994

10039401

AlliedSignal Inc.
Automotive Aftermarket
105 Pawtucket Avenue
Rumford, RI 02916-24[redacted]

401 434 7000
401 [redacted] 3253 Fax

October 26, 1994

Mr. Stephen Moor
President
Trans-Eco Consultants
[redacted]
Point Pleasant, NJ 08742

Dear Steve:

Enclosed are two copies of the required Test Marketing Agreement which will govern AlliedSignal's relationship with you and with Trans-Eco Consultants during our evaluation of the PTFE treated oil filter concept. The Agreement incorporates the two changes we discussed earlier today:

- a reduction from 15 to 10 days in the amount of time that we can require from you during the term of the Test Marketing Agreement.

- substitution of a new fax number to be used as one primary contact venue with you.

Please sign one copy and return it to me at your earliest convenience. I will meet with our marketing personnel to set up a specific task list and timetable as soon as we receive the signed copy; and will be back in touch with you shortly thereafter.

We look forward to working with you.

Sincerely,

ALLIEDSIGNAL AUTOMOTIVE AFTERMARKET

Dianne Z. Newman
Director, Business Planning & Development

DZN/mdb
100794

cc: A. Caronia
K. Gill
G. Jones
J. McGrath

EXHIBIT 6

TEST MARKETING AGREEMENT

TEST MARKETING AGREEMENT ("Agreement") made among Trans-Eco Consultants, a Type S New Jersey Corporation; Stephen Moor, an individual inventor residing in Point Pleasant, New Jersey; (collectively referred to as "Moor"); and AlliedSignal Inc., a Delaware corporation ("AlliedSignal").

Moor has developed and been issued patent protection covering a PTFE - Treated oil filter ("PTFE Filter") for internal combustion engines. This filter holds a PTFE material that is released into the oil circulating system over time to provide enhanced lubrication via the circulating oil. "Covered Products" as defined in this Agreement shall mean the PTFE Filter for use in the vehicle market, which "Covered Products" are described in United States Patent Number 5,209,842, dated May 11, 1992.

AlliedSignal's Automotive Aftermarket business unit markets products in the vehicle aftermarket.

Moor and AlliedSignal wish to enter into an agreement under which AlliedSignal will test the commercial feasibility of the Covered Products as set forth in this Agreement.

The parties therefore agree as follows:

ARTICLE 1. TEST MARKETING PRIVILEGE

1.01 Appointment. Moor grants AlliedSignal the exclusive right (subject to the other provisions of this Article 1) to test the Covered Products for manufacturing and commercial feasibility and market acceptance ("test market" as set forth in Section 2.01). AlliedSignal accepts such grant and shall comply with the terms and conditions of this Agreement.

1.02 Term. The term of this Agreement ("Term") shall commence on the date this Agreement is signed by AlliedSignal and Moor ("Date of Execution"), and expire one hundred and eighty (180) days after the Date of Execution of this Agreement, or immediately upon written notification by AlliedSignal to Moor in accordance with Section 5.03. In the event such Date of Execution represents two different dates, the Date of Execution shall be the latter of the two dates.

1.03 Obligations beyond Term.

(a) All rights and obligations under this Agreement shall cease after the Term expires, except the rights set forth in Article 4 and Section 5.02.

(b) Nothing in this Agreement shall bind Moor or AlliedSignal to any production, marketing, distribution, licensing or sales arrangement during or after the Term other than as specified herein, absent a written definitive agreement to such effect executed by Moor and AlliedSignal ("Definitive Agreement").

(c) Within fourteen (14) days after the expiration of the Term, AlliedSignal shall provide to Moor either (1) written confirmation of such expiration or (2) written notice of its intent to begin negotiations towards the closing of a Definitive Agreement.

1.04 Right of Notice and Right of First Refusal. During the Term and for a period of ninety (90) days thereafter, neither Moor nor any of its Representatives (as defined in Section 4.01 (d)) shall enter into any agreements with respect to the test marketing, marketing, distribution, licensing or sale of any

Covered Products without first giving written notice to AlliedSignal clearly identifying the entity or entities (if more than one entity, notices must be given for each entity) with whom Moor intends to enter into such an agreement, and first offering to AlliedSignal the substantially comparable terms and conditions plus exclusive marketing rights in the vehicle market. AlliedSignal shall have the right ("Right of First Refusal"), extending thirty (30) days after receipt of the written notice, either to accept the terms and conditions (plus exclusive marketing rights) for an agreement between AlliedSignal and Moor, and to disallow any agreement between Moor and the entity identified in the written notice described in this Section (1.04), or to allow Moor to proceed with the execution of a marketing, test marketing, distribution, licensing or sales agreement with the entity or entities identified in notices according to this Section (1.04). If AlliedSignal gives written notice of termination of this Agreement to Moor according to Section 1.02 or 1.03 (c) (1), the rights granted to AlliedSignal by this Section 1.04 shall immediately be forfeited.

ARTICLE 2. RESPONSIBILITIES OF ALLIEDSIGNAL

During the Term, AlliedSignal shall have the following responsibilities:

2.01 Test Marketing. AlliedSignal shall test market Covered Products. Test marketing shall be limited to the following, to be conducted as AlliedSignal, in its sole discretion, deems appropriate:

(a) Contacting wholesalers, retailers and other merchandisers within AlliedSignal's existing distribution network for vehicular components and demonstrating the Covered Products

(b) Analyzing pricing and other marketing or sales issues relating to the Covered Products;

(c) Contacting automobile original equipment manufacturers to determine the impact, if any, of the PTFE-Treated filter product on vehicle warranties;

(d) Reviewing appropriate technical information and holding discussions with technical experts to determine the impact, if any, of the PTFE-Treated Filter on filter disposal and recycling;

(e) Conducting focus groups composed of potential end users of the Covered Products and demonstrating the Covered Products to them;

(f) If warranted by the above, preparing a preliminary plan for the sale and distribution of the Covered Products within AlliedSignal's existing distribution network for vehicular components.

Moor shall be provided the data and information accumulated by AlliedSignal arising out of the activities set forth in this section (which data and information shall be deemed to be AlliedSignal's Evaluation Material for purposes of Article 4 of this Agreement), and, at AlliedSignal's request, Moor shall provide comments and evaluations regarding such data and information.

2.02 Compliance With Law. AlliedSignal will comply with all laws and maintain in effect all required licenses and permits applicable to the test marketing activities conducted by AlliedSignal.

ARTICLE 3. RESPONSIBILITIES OF MOOR

During the Term, Moor shall have the following responsibilities:

3.01 Technical Assistance. At AlliedSignal's request (with adequate notice), Moor shall provide, at its own expense (reasonable travel costs, however, to be reimbursed by AlliedSignal), technical personnel to participate for up to ten (10) working days in any product or market testing at AlliedSignal's facilities or other reasonable locations designated by AlliedSignal.

3.03 Technical Information. At AlliedSignal's request, Moor shall provide AlliedSignal with technical materials, blue prints, or other information AlliedSignal needs to evaluate the feasibility and cost of manufacturing PTFE Treated Filters, provided that Moor will not be expected to incur costs cumulatively exceeding U.S. $500 in the provision of such information.

ARTICLE 4. CONFIDENTIALITY

This Article 4 sets forth the confidentiality of the parties.

4.01 Definitions. For the purposes of this Article 4, certain terms are defined as follows:

(a) "Evaluation Material" means all information, regardless of whether specifically identified as "confidential" or "proprietary", which has been or is furnished to a Party in connection with the transaction covered by this Agreement, including information which is documented, machine readable and interpreted (electronic or otherwise), oral, contained in physical components, information gathered by visual inspection or otherwise in connection with visits to the laboratories and facilities of the other Party and all analyses, compilations, studies or other documents prepared by a Party, or by its Representatives which contain or otherwise reflect such information. The term "Evaluation Material" does not include information which (i) was or becomes generally available to the public other than as a result of a disclosure in violation of this Agreement by a Party or its Representatives, (ii) is received by a Party or its Representatives from a source other than the Party or its Representatives, provided that such source is not prohibited from disclosing such information by an obligation to the other Party or its Representatives; (iii) was already known to a Party or its Representatives on a non-confidential basis prior to its disclosure to such Party by the other Party or its Representatives as evidenced by documentary material in the possession of such Party; or (iv) is developed by a Party independently of Evaluation Material received from a Party or its representatives, provided such independent development is accomplished by personnel of such Party who had no access to Evaluation Material;

(b) "Party" means either AlliedSignal or Moor.

(c) "Person" as used in this Agreement shall be broadly interpreted to include without limitation any corporation, company, partnership, entity or individual; and

(d) "Representatives" means a Party's present or former agents, attorneys, accountants, financial advisers, directors, officers and employees.

4.02 Restriction on Use and Disclosure. The Evaluation Material will be used solely for the purpose of transactions covered by this Agreement, which include its disclosure as AlliedSignal requires according to Section 2.01 (Test Marketing). The Evaluation Material and any discussions concerning such possible transactions will be kept confidential and not used in any way detrimental to the other Party; provided, however, that (i) any of the Evaluation Material may be disclosed to its Representatives who need to know such Evaluation Material for the purpose of evaluating such possible transactions (it being understood that Representatives shall be informed of the confidential nature of such Evaluation Material and shall be directed to treat such Evaluation Material confidentially in accordance with this Agreement), (ii) any disclosure of the Evaluation Material may be made which is approved in writing by the Party furnishing such Evaluation Material and (iii) any disclosure of the Evaluation Material may be made which may be required by applicable law, regulation or legal process.

4.03 Public Announcements. Except to the extent required by applicable law, regulation or legal process, neither Party will, unless the prior written consent of the other Party is obtained, disclose to any Person either the fact that discussions or negotiations are taking place between the Parties or any of the terms, conditions, or other facts with respect to any transaction, including the status thereof, and both Parties shall direct their Representatives not to make any such disclosures.

4.04 Return of Evaluation Material. Upon the expiration of the Term and at the written request of either Party, each Party shall promptly redeliver to the other Party all written Evaluation Material and any prototypes or mock-up units furnished by the other Party or its Representatives, and will not retain any copies, extracts or other reproduction in whole or in part of such Evaluation Material or prototypes or mock-up units.

4.05 No Warranties. Although each Party will endeavor to include in the Evaluation Material only information that is believed to be reliable and relevant for the purpose of evaluating the transaction covered by this Agreement, neither Party makes any representation or warranty as to the reliability, accuracy or completeness of the Evaluation Material. Accordingly, none of the Parties or their representatives shall have any liability to the other Parties or their Representatives resulting from the use of the Evaluation Material by them or their representatives, except as otherwise expressly provided in this Agreement.

4.06 Extent of Confidentiality Obligation. All confidentiality obligations under this Article 4 shall terminate upon the earlier of (i) the closing of a Definitive Agreement containing its own confidentiality provisions, or (ii) the date one year following the Date of Execution of this Agreement by AlliedSignal, and Moor. Each Party understands that the agreement to maintain the confidentiality of, and to maintain the restrictions on use and disclosure set forth in Section 4.02 above on, the Evaluation Material of the other Party shall survive any termination or expiration of this Agreement and the return of the Evaluation Material for a period of three (3) years from the Date of Execution of this Agreement.

ARTICLE 5. MISCELLANEOUS

5.01 Independent Contractor. The relationship of Moor on the one hand, and AlliedSignal on the other hand, is wholly that of independent contractors, and neither shall be construed in any way as the agent of the other.

5.02 Indemnification. Moor shall indemnify and hold AlliedSignal harmless from any liabilities, costs or expenses (including reasonable attorney's fees) arising out of any claim that, during the Term of this Agreement and in connection with the activities undertaken pursuant to this Agreement, the Covered Products infringed a patented or other intellectual property right with respect to the Covered Products as delivered by Moor to AlliedSignal (as opposed to such claims arising out of packaging or other changes to the product undertaken by AlliedSignal).

5.03 Assignments. This Agreement is entered into by AlliedSignal in reliance on the personal abilities of the principle owner and other controlling persons or key technical employees of Moor. Moor may not license or assign its rights or obligations under this Agreement without the prior written consent of AlliedSignal. If Moor transfers ownership or intends to transfer ownership of the PTFE - Treated Filter technology or patents, or replace the present Moor management, AlliedSignal has the right to immediately terminate this Agreement upon written notice to Moor.

5.04 Governing Law. This Agreement shall be governed by the laws of the state of Rhode Island, without regard to conflicts of laws.

5.05 Notices. Any notice or other communications required or permitted by this Agreement must be in writing and will be deemed given when delivered in person or by telefax, or by delivery to a reputable courier service with instructions for delivery within one week to the following addresses:

If to AlliedSignal:

Dianne Z. Newman
Director, Business Planning & Development
AlliedSignal Automotive Aftermarket
105 Pawtucket Avenue
Rumford, RI 02916-2422
Fax: (401) 431-3162 or (401) 431-3253

If to Moor:

Stephen Moor
President
Trans-Eco Consultants
[redacted]
Point Pleasant, New Jersey 08742
Fax: (908) 295-7169

or to such other address the Party receiving the communication may have designated in writing to the other.

5.06 Waivers: No failure of AlliedSignal or Moor to insist on performance by the other of any of its obligations in one instance will waive the right of AlliedSignal or Moor to insist on performance of that or any other obligation in the future.

5.07 Amendments: This Agreement may not be modified except by a written document executed by AlliedSignal and Moor.

5.08 Parties. Subject to the provisions of Section 5.03, this Agreement is for the benefit of, and binds, AlliedSignal, Moor and their respective successors and assigns.

5.09 Counterparts. This Agreement may be executed in separate counterparts, which together shall constitute one contract.

STEPHEN MOOR

Stephen Moor

Date: 10/27/94

TRANS-ECO CONSULTANTS

By: Stephen E. Moor

Its: President

Date: 10/27/94

ALLIEDSIGNAL, INC.

By: Dianne Z. Newman

Its: Director Business Planning and Development

Date: 10/26/94

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