

UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF PENNSYLVANIA

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FMS TECHNOLOGIES, LLC  
SUE ANN REIBMAN,

Plaintiffs

v.

**COMPLAINT**

KEE GOLD CORP,

Defendant

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**COMPLAINT FOR PATENT INFRINGEMENT**

Plaintiffs, FMS Technologies and Sue Ann Reibman, by and through their attorneys, Miller Law Group, PLLC, complaining of the Defendant, Kee Gold Corp, hereby allege as follows:

**THE PARTIES**

1. Plaintiff, FMS Technologies, LLC ("FMS"), is a limited liability company organized under the laws of the Commonwealth of Pennsylvania having principal offices located at One North Fourth Street, Hamburg, Pennsylvania 19526.
2. Plaintiff, Sue Ann Reibman, is a Pennsylvania resident sui juris, and co-owns the rights to the patents described herein along with Plaintiff FMS Technologies.
3. Defendant, Kee Gold Corp, is a corporation organized and existing under the laws of the Commonwealth of Pennsylvania, having offices located at 20 East Penn Avenue, Cleona, Pennsylvania 17042 ("KEE").

**JURISDICTION AND VENUE**

4. This civil action arises under the Patent Laws of the United States, Title 35, United States Code (U.S.C.), including sections §§ 271 and 281-87. This Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331, 1332(a), 1338(a), 1338(b) and 1367(a).

5. Defendant is subject to personal jurisdiction in this judicial district. Personal jurisdiction over the Defendant is based on, *inter alia*, Defendant, either directly or through intermediaries, committed acts within the Commonwealth of Pennsylvania giving rise to this action and/or regularly does business, derives substantial revenues, and has established minimum contacts within the Commonwealth such that the exercise of jurisdiction would not offend traditional notions of fair play and justice.

6. Venue is proper in this Court under 28 U.S.C. § 1391(b) and (c) and 28 U.S.C. § 1400(b). Defendant has maintained a regular and established place of business, and is doing business in this judicial district, and has committed acts of infringement arising out of its contacts in and are causing injury to Plaintiffs in this judicial district.

**AS AND FOR A FIRST CAUSE OF ACTION**

7. Paragraphs 1-5 set forth above are incorporated herein by reference.

8. This cause of action is for patent infringement and arises under the Patent Laws of the United States, Title 35, United States Code.

9. Plaintiff FMS is in the business of manufacturing and selling a state of the art gold testing device, the Auracle AGT-1, which is used to measure the quality and/or quantity of gold in jewelry and other metallic devices. FMS's AGT-1 product has achieved widespread market success.

10. On March 30, 1999, United States Patent No. 5,888,362 (“the ‘362 Patent”), entitled “Apparatus For Analyzing Precious Metals”, was duly and legally issued to inventor Lloyd V. Fegan, Jr. The ‘362 Patent has been duly and legally assigned to Plaintiff Reibman who has granted an exclusive license to Plaintiff FMS. Under agreement between the parties, both Plaintiffs share equally the right to bring suit for infringement of the ‘362 Patent. A true and correct copy of the ‘362 Patent is attached hereto and marked as “Exhibit A”.

11. Plaintiff FMS and Plaintiff Reibman are the co-owners of the rights to the ‘362 Patent by assignment and by exclusive license, and together have the full right to bring suit to enforce the ‘362 Patent, and recover for any and all infringement thereof.

12. Upon information and belief, without the consent of either Plaintiff and in disregard of Plaintiffs’ rights, Defendant has been and is now infringing the ‘362 Patent, by making, offering for sale, selling, importing, and/or using products in the United States that embody the patented inventions described and claimed in the ‘362 Patent within the Middle District of Pennsylvania and elsewhere in the United States. Upon information and belief, the infringing product line of Defendant specifically includes, but is not necessarily limited to, the “Kee Gold Tester, Model M-509GM, ‘The Prospector’”, as marketed by Defendant on-line at [www.keegold.com](http://www.keegold.com). A Claim Chart has been attached hereto and marked as “Exhibit B”.

13. On information and belief, Defendant has been and will continue to import, manufacture, use, offer to sell and/or sell infringing products in this judicial district and elsewhere in the United States, which products infringe the ‘362 Patent. Plaintiffs are without adequate remedy to address these unlawful acts unless the ongoing infringement is enjoined by this Court under 35 U.S.C. § 283.



14. By letter and other documentation, on October 14, 2011, Plaintiff FMS communicated with Defendant and identified its basis for its opinion that Defendant is producing products which infringe Plaintiffs' '362 Patent. Despite these communications, Defendant has refused to cease and desist its infringement of the '362 Patent, despite knowledge of the '362 Patent and despite an objectively high likelihood that its actions constituted infringement of one or more valid claims of the '362 Patent (as Defendant knew or should have known), warranting an award of increased damages, a finding of willful infringement, and a finding that this case is "exceptional" pursuant to 35 U.S.C. §§ 284 and 285.

15. On information and belief, all of the acts alleged above will continue unless enjoined by this Court. Defendant has damaged Plaintiffs by reducing Plaintiffs' sales, has injured Plaintiff FMS's reputation and has injured and deceived the public, thus causing Plaintiffs irreparable harm, the extent of which is presently unknown.

16. Defendant's acts of infringement have been without an express or implied license by either Plaintiff, and is in violation of the rights owned by both Plaintiffs.

17. Further, as a result of Defendant's infringement, Plaintiffs have been and will be greatly and irreparably damaged in the amount of which damages Plaintiffs cannot ascertain except by an accounting, but which is in excess of \$75,000.

**AS AND FOR A SECOND CAUSE OF ACTION**

18. Paragraphs 1-16 set forth above are incorporated herein by reference.

19. This cause of action is for patent infringement and arises under the Patent Laws of the United States, Title 35, United States Code.

20. On April 18, 2000, United States Patent No. 6,051,126 ("the '126 Patent"), entitled "Method For Analyzing Precious Metals", was duly and legally issued to inventor Lloyd

V. Fegan, Jr. The '126 Patent has been duly and legally assigned to Plaintiff Reibman who has granted an exclusive license to Plaintiff FMS. Under agreement between the parties, both Plaintiffs share equally the right to bring suit for infringement of the '126 patent. A true and correct copy of the '126 Patent is attached hereto and marked as "Exhibit C".

21. Plaintiff FMS and Plaintiff Reibman are the co-owners of the rights to the '126 Patent by assignment and by exclusive license, and together have the full right to bring suit to enforce the '362 Patent, and recover for any and all infringement thereof.

22. Upon information and belief, without the consent of either Plaintiff and in disregard of Plaintiffs' rights, Defendant has been and is now infringing the '126 Patent, by making, offering for sale, selling, importing, using products and/or inducing its customers to use its products in the United States that utilize the patented inventions described and claimed in the '126 Patent within the Middle District of Pennsylvania and elsewhere in the United States. Upon information and belief, the infringing product line of Defendant specifically includes, but is not necessarily limited to, the "Kee Gold Tester, Model M-509GM, 'The Prospector'", as marketed by Defendant on-line at [www.keegold.com](http://www.keegold.com). A Claim Chart has been attached hereto and marked as "Exhibit D".

23. On information and belief, Defendant has been and will continue to import, manufacture, use, offer to sell infringing products and/or inducing its customers to use its products in this judicial district and elsewhere in the United States, the use of which products infringe the '126 Patent. Plaintiffs are without adequate remedy to address these unlawful acts unless the ongoing infringement is enjoined by this Court under 35 U.S.C. § 283.

24. By letter and other documentation, on October 14, 2011, Plaintiff FMS communicated with Defendant and identified its basis for its opinion that Defendant is producing

and selling products, the use of which products by its customers infringe Plaintiffs' '126 Patent. Despite these communications, Defendant has refused to cease and desist its infringement and the inducement of infringement of the '126 Patent, despite knowledge of the '126 Patent and despite an objectively high likelihood that its actions constituted infringement of one or more valid claims of the '126 Patent (as Defendant knew or should have known), warranting an award of increased damages, a finding of willful infringement, and a finding that this case is "exceptional" pursuant to 35 U.S.C. §§ 284 and 285.

25. On information and belief, all of the acts alleged above will continue unless enjoined by this Court. Defendant has damaged Plaintiffs by reducing Plaintiffs' sales, has injured Plaintiff FMS's reputation and has injured and deceived the public, thus causing Plaintiffs irreparable harm, the extent of which is presently unknown.

26. Defendant's acts of infringement have been without an express or implied license by either Plaintiff, and is in violation of the rights owned by both Plaintiffs.

27. Further, as a result of Defendant's infringement, Plaintiffs have been and will be greatly and irreparably damaged in the amount of which damages Plaintiff cannot ascertain except by an accounting, but which is in excess of \$75,000.

WHEREFORE, Plaintiffs pray that this Court enter judgment and decree for Plaintiffs and against the Defendant as follows:

A. A judgment to Plaintiffs finding that Defendant has infringed, contributed to the infringement of, threatened to infringe, and/or induced the infringement of both the '362 Patent and the '126 Patent;

B. An injunction against the promotion, importation, manufacture, offering for sale and sale of any "Kee Gold Tester, Model M-509GM, 'The Prospector'" or any other product



which infringes the inventions contained in the '362 Patent and/or the '126 Patent by Defendant, its respective officers, directors, representatives, successors and assigns and all those in active concert and in active participation with Defendant and those acting under the authority and control or in privity with Defendant;

C. Ordering that Defendant, its respective officers, directors, representatives, successors and assigns and all those in active concert and in active participation with Defendant and those acting under the authority and control or in privity with the Defendant be preliminarily and perpetually enjoined from committing further acts of infringement of both the '362 Patent and the '126 Patent and from aiding or abetting or inducing, or in any way contributing in the infringement of the '362 Patent and/or the '126 Patent;

D. Ordering that Defendant, its respective officers, directors, representatives, successors and assigns and all those in active concert and in active participation with Defendant and those acting under the authority and control or in privity with Defendant be required to account to Plaintiffs for all gains and profits derived by the Defendant from the acts described herein;

E. Ordering that Defendant, its respective officers, directors, representatives, successors and assigns and all those in active concert and in active participation with Defendant and those acting under the authority and control or in privity with Defendant be required to pay Plaintiffs all costs of this action and Plaintiffs' reasonable attorney's fee pursuant to the provisions of 35 U.S.C. §285, because of the calculated and deliberate nature of the infringing activities of the Defendant sought to be enjoined hereby making an exceptional case warranting such an award;

F. Awarding to Plaintiffs an accounting for profits and damages arising out of infringements, and that such damages be trebled because of the willful nature of infringement by the Defendant, their respective officers, directors, representatives, successors and assigns and all those in active concert and in active participation with Defendant and those acting under the authority and control or in privity with Defendant, as provided by 35 U.S.C. §§ 284 and 285;

G. Ordering Defendant to deliver up to the Court for destruction all products called the "Kee Gold Tester, Model M-509GM, 'The Prospector'", as well as any other product violating either the '126 Patent or the '362 Patent;

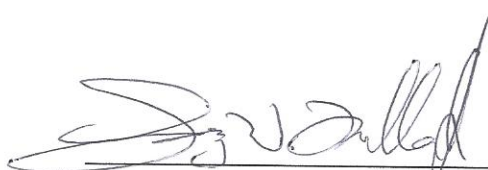
H. An order to Defendant to recall all infringing products from wholesalers and retailers to whom Defendant has sold products which infringe either the '126 Patent or the '362 Patent, including any and all products called the "Kee Gold Tester, Model M-509GM, 'The Prospector'", and to cancel in writing orders for Defendant's infringing products, with copies to be provided to Plaintiffs through Plaintiffs' counsel;

I. An order requiring Defendant to provide Plaintiffs with a list of all wholesalers/retailers to whom Defendant has sold infringing products and/or offered to sell such products with full contact information for each such wholesale/retail entity;

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

Respectfully submitted,

Date: 1-18-2013



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US005888362A

# United States Patent [19]

## Fegan, Jr.

[11] Patent Number: 5,888,362

[45] Date of Patent: Mar. 30, 1999

[54] APPARATUS FOR ANALYZING PRECIOUS METALS

[76] Inventor: Lloyd V. Fegan, Jr., 1173 Meadowbrook Cir. West, Allentown, Pa. 18103

[21] Appl. No.: 811,874

[22] Filed: Mar. 5, 1997

### Related U.S. Application Data

[63] Continuation of Ser. No. 346,616, Nov. 30, 1994, abandoned.

[51] Int. Cl.<sup>6</sup> ..... G01N 27/26

[52] U.S. Cl. .... 204/400; 205/775; 205/790; 401/198

[58] Field of Search ..... 204/400, 434, 204/435; 205/775, 790; 401/198, 19

### [56] References Cited

#### U.S. PATENT DOCUMENTS

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3,000,804	9/1961	Cahoon et al.	204/435
3,152,058	10/1964	Hutchison et al.	204/196
3,203,025	8/1965	Schreur	401/198
3,282,804	11/1966	Stearn	204/153.1
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3,510,934	5/1970	Koelichen	401/198
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4,758,324	7/1988	Winneti et al.	204/435
4,799,999	1/1989	Medvinsky et al.	204/434
4,842,712	6/1989	Seshimoto	204/418
5,080,766	1/1992	Moment et al.	204/153.1
5,183,550	2/1993	Mattiessen	204/415
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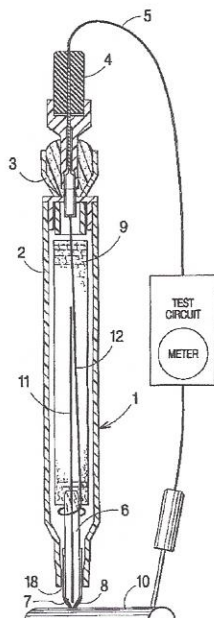
Primary Examiner—T. Tung

Attorney, Agent, or Firm—Charles A. Wilkinson; Harris A. Wolin

### [57] ABSTRACT

The nature of a metal sample, such as the purity of precious metals and metal alloys such as gold, is determined using a handheld probe having an electrode embedded in an electrolyte in a reservoir of the probe and arranged to conduct electrically with the sample through the electrolyte and a fibrous tip. The tip can resemble the point of a marker or writing instrument. The tip is in fluid communication with the reservoir containing the electrolyte, and preferably has the electrode embedded therein. An electrical connection with the electrode is made at the rear of the probe. For testing gold purity, the electrode is preferably a thin platinum wire extending through the reservoir and into the tip to just behind the tip surface. A battery is coupled to a calibration potentiometer whereby the voltage on a millivoltmeter is set to full scale when the probe is open circuited. When coupled to the sample in a circuit, the galvanic cell formed by the sample, the electrode and the electrolyte reduces the voltage sensed at the meter, as a function of the extent of galvanic action. Preferably the electrolyte is a weak acid including nitric acid and ammonium chloride salt in aqueous solution.

13 Claims, 5 Drawing Sheets



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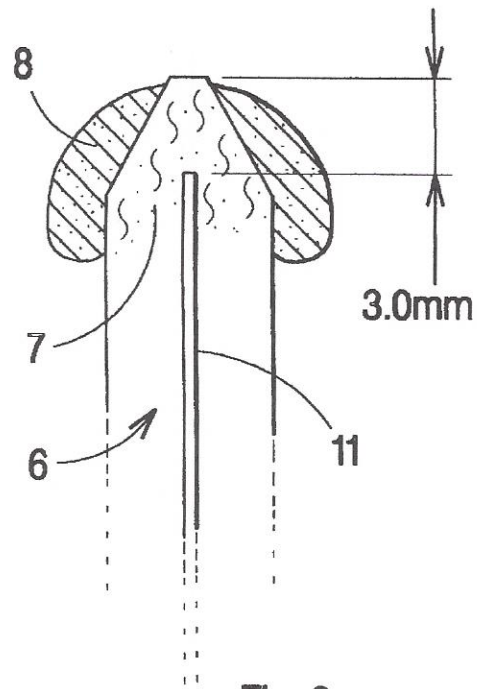
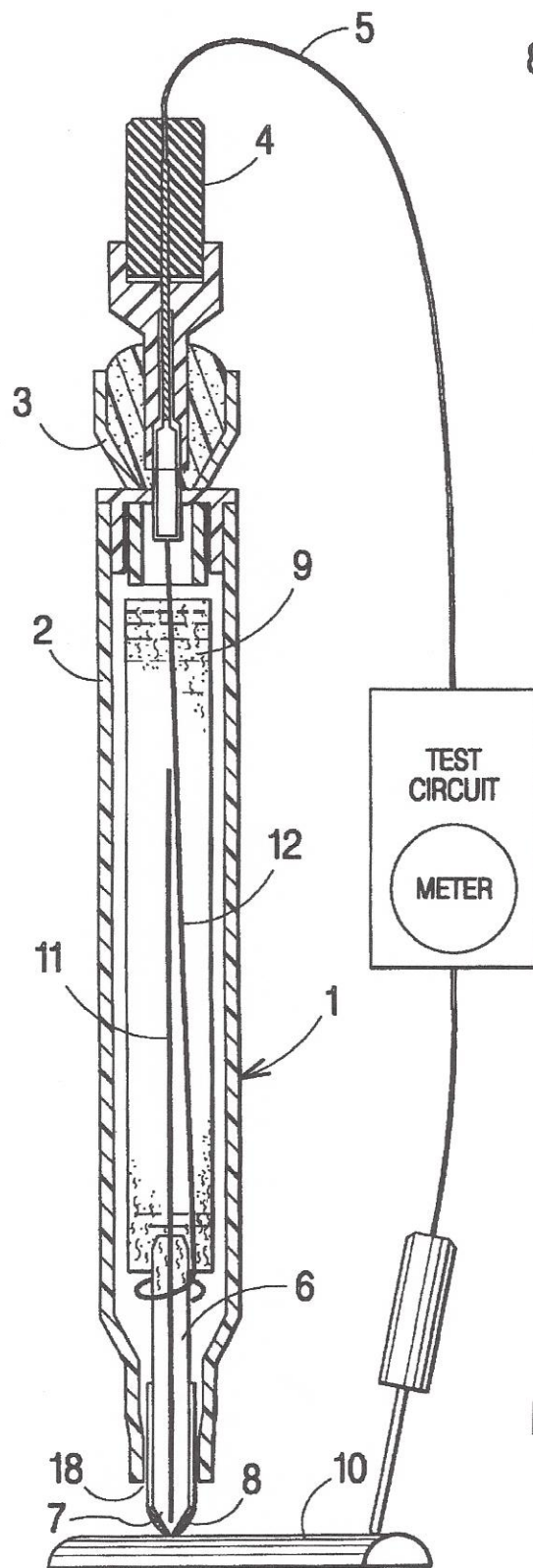


Fig. 2

Fig. 1

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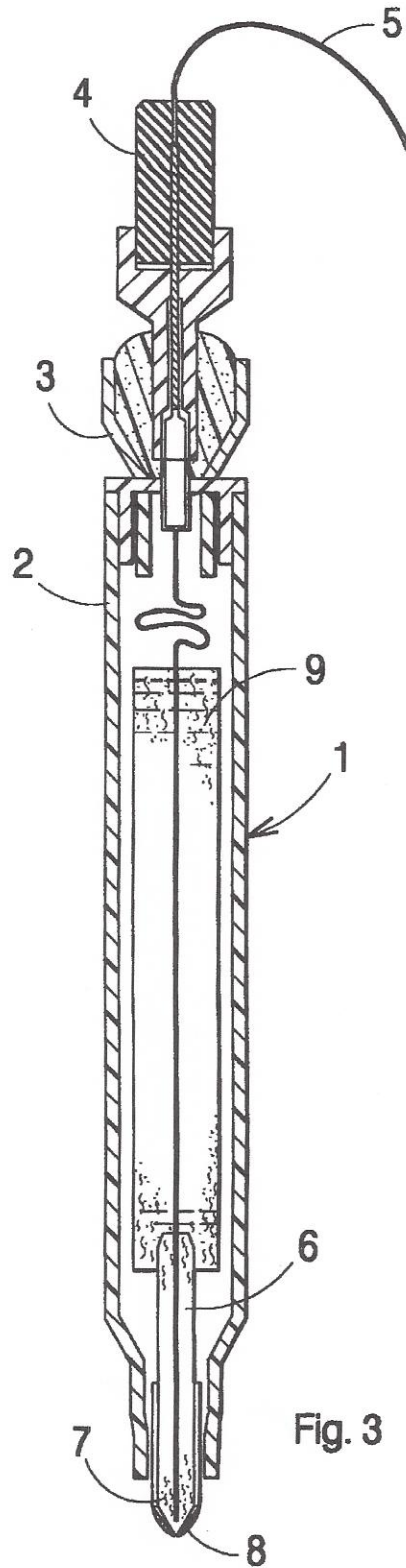


Fig. 3

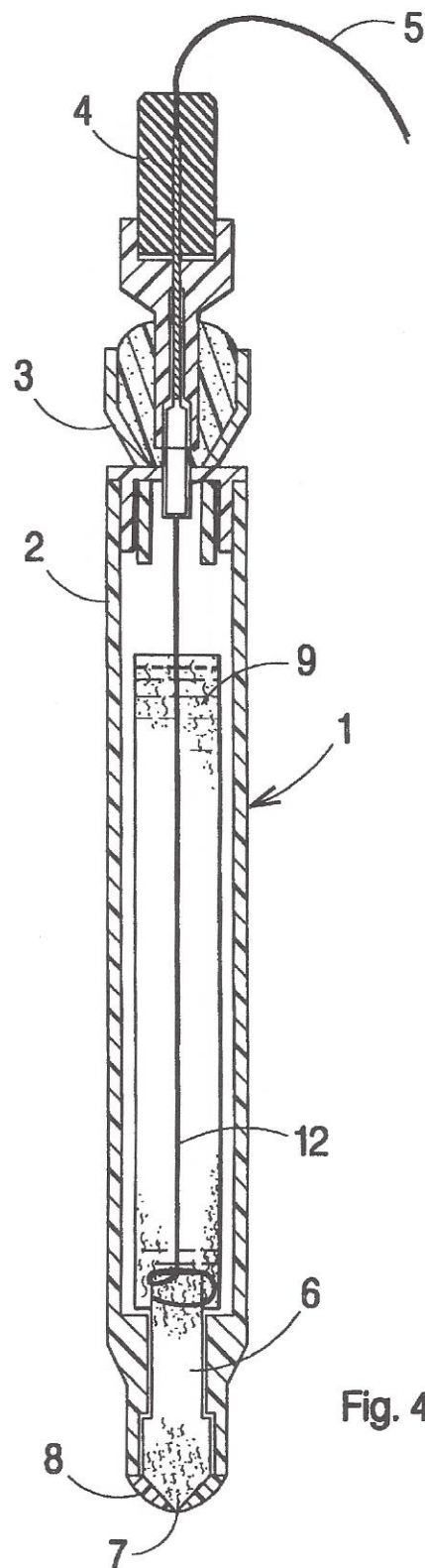


Fig. 4



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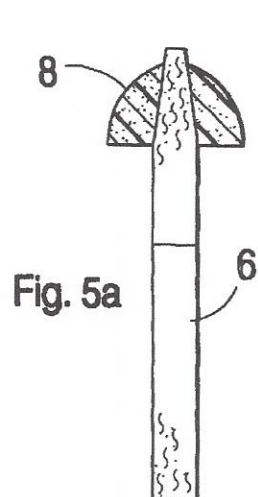


Fig. 5a

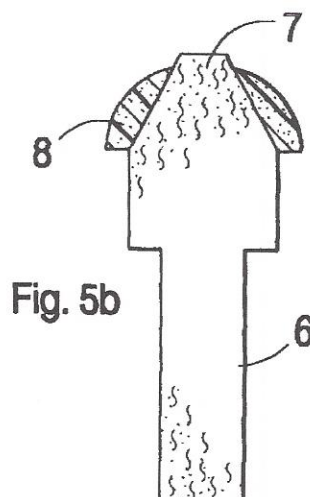


Fig. 5b

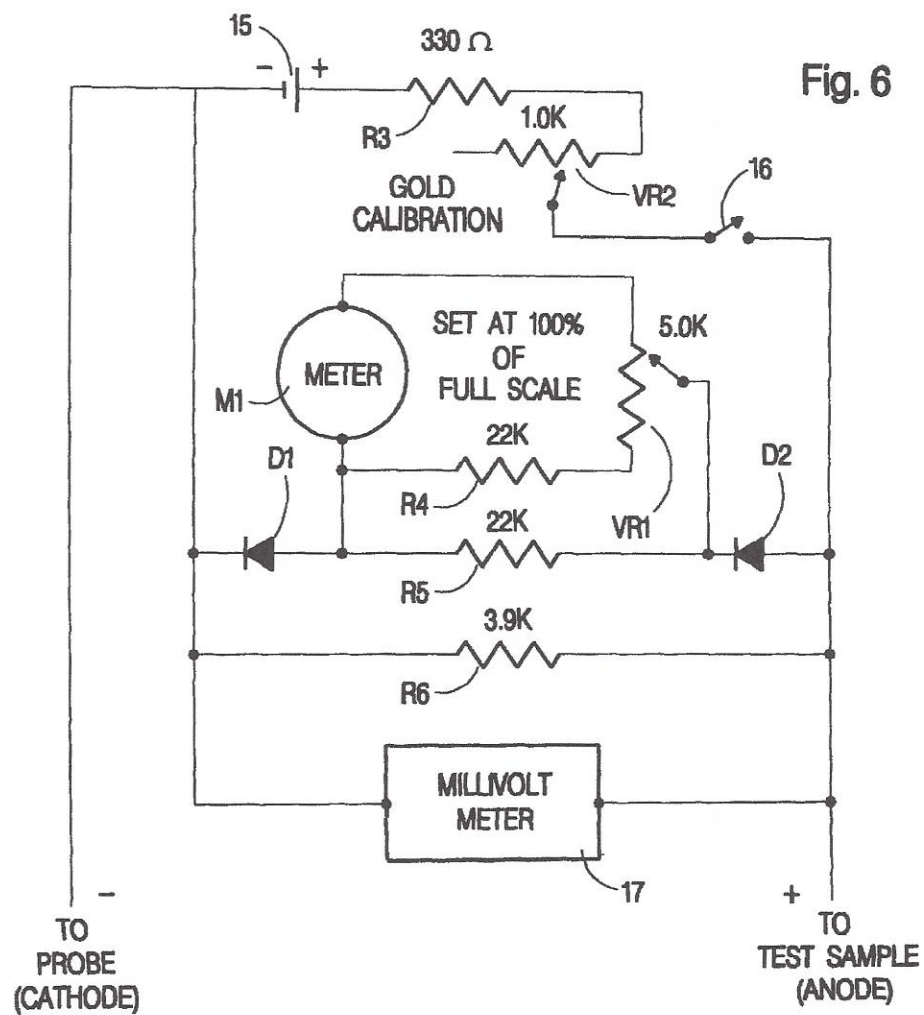


Fig. 6

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Fig. 8

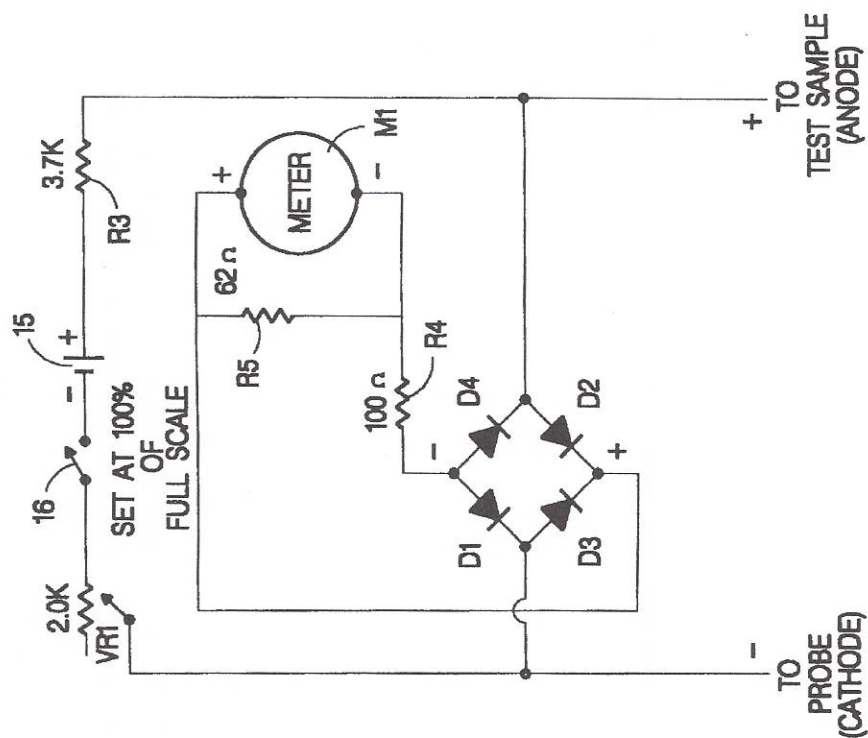
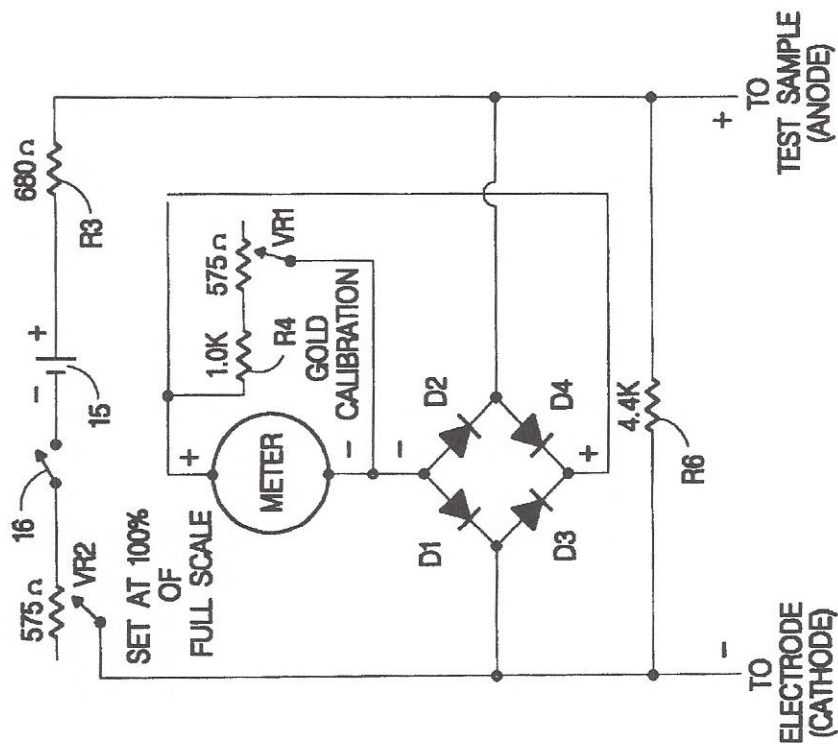


Fig. 7



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Fig. 10

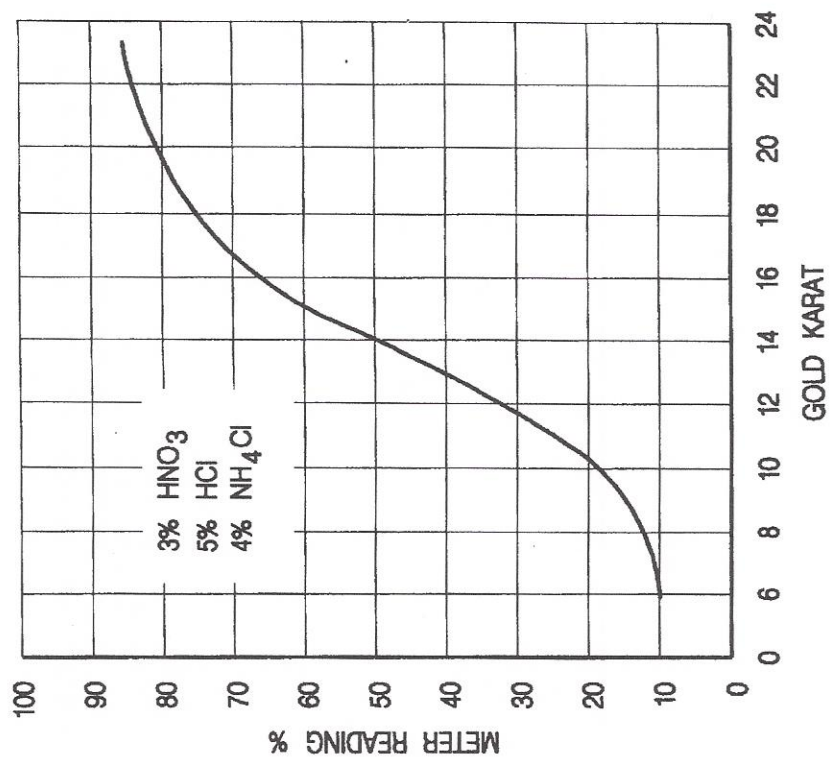
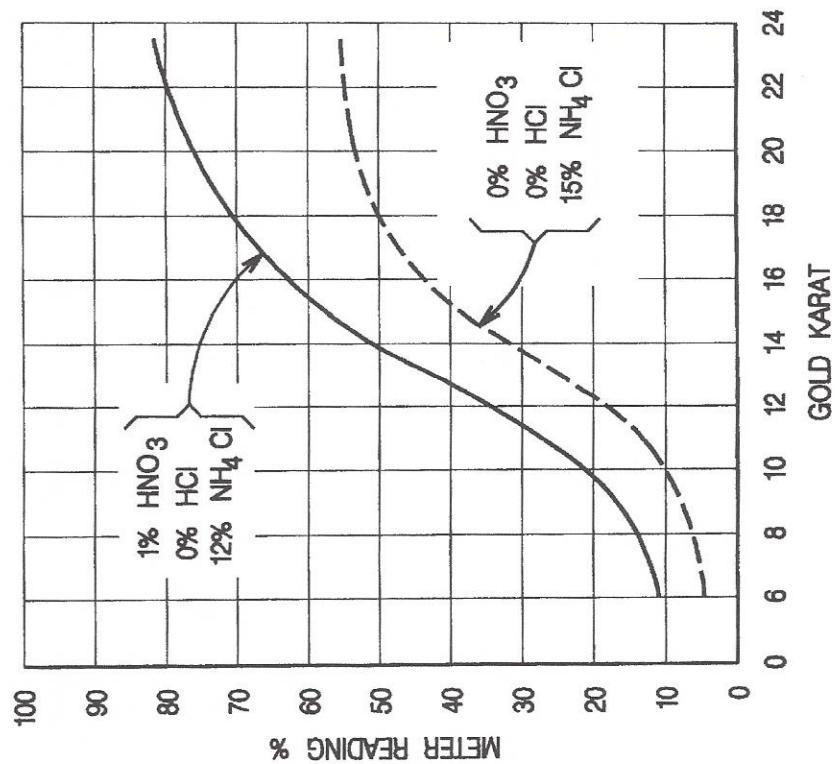


Fig. 9





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# APPARATUS FOR ANALYZING PRECIOUS METALS

This application is a continuation of application Ser. No. 08/346,616, filed Nov. 30, 1994, now abandoned.

## BACKGROUND OF THE INVENTION

### 1. Field of the Invention

The invention relates to apparatus and methods for assay of metals, especially for assessing the purity of precious metals and alloys. A meter circuit coupled to an inventive probe measures the extent of galvanic action of dissimilar metals in the presence of an electrolyte, one of the metals being the sample to be assayed. The invention is useful for testing the metal content of coins, art objects jewelry, and the like, in that the probe can simply be touched against the sample to provide a reading. The reading is developed by measuring the extent to which a biasing voltage is reduced by galvanic action between the sample and a preferably platinum probe conductor embedded in a fibrous absorbent medium containing an electrolyte.

### 2. Prior Art

There are a number of analytical techniques used to assess the nature of metal samples, for example to determine the precious metal content of coins, art objects and items of jewelry. A traditional test used by jewelers and precious metals traders to determine the purity of gold alloys, for example, relies on a set of "gold pencils" that are used in comparing the results of a scratch test. In this method, the jeweler has a number gold alloy "pencils" or rods used as references. The gold alloy pencils can be graduated, for example, over a range of 4 to 24 karat gold alloy compositions.

The reference gold alloy pencils are used to mark an abrasive stone or touchstone, for comparison with a mark made using the sample. The jeweler makes a small scratch using the specimen to be analyzed, and reference scratches with the gold alloy rods or pencils, in each case leaving a trace quantity of metal. The jeweler then places an acid such as nitric acid or aqua regia (an aqueous solution of hydrochloric and nitric acids) on the abrasive stone and compares the color of the traces produced by the specimen scratch with the color of the traces of the several gold alloy rod scratches, to assess the karat value of the sample.

An experienced jeweler can estimate the amount of gold in karats in the specimen being analyzed by comparing the colors of the sample trace and reference traces. This method, which is still widely used, is dependent on the skill and experience of the jeweler employing the test. Such testing is time consuming and causes some damage to the sample. Moreover, the results can turn on subjective judgment. Errors made in technique or in judgment in this field, however, can be costly, either to the customer or to the jeweler.

More recently, attempts have been made to develop a more objective assaying technique using electrical testing apparatus. One technique is to measure the electromotive force (EMF) developed as a result of galvanic action when the specimen to be analyzed is brought into conductive contact with a dissimilar metal. This is accomplished in the presence of an electrolyte. The sample and the dissimilar metal electrode produce a galvanic voltage in the manner of a very low power battery, which can be measured to assess the nature of the sample. Several of these prior apparatus and methods are described in the following United States patents:

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No. 2,531,747	Stearn	1950
No. 3,282,804	Stearn	1966
No. 4,376,027	Smith	1983
No. 4,799,999	Medvinsky	1989
No. 5,080,766	Moment	1992
No. 5,218,303	Medvinsky	1993

Whereas the electromotive force produced is relatively small and the differences in electromotive force to be measured between nearly comparable samples is even smaller (e.g., 20 karat vs. 22 karat gold), the accuracy of measurement turns on the precise manner in which the sample, electrolyte and electrode come into contact and interact. Insofar as the apparatus and methods described in these prior patents require the judgment and skill of an experienced user for setup and use, they could advantageously be improved. Furthermore, it would be advantageous to provide an objective form of test that is more convenient, does not stain or damage the specimen, and produces accurate results repeatably and reliably without a great deal of setup and adjustment.

The commercially available apparatus of the type described in U.S. Pat. Nos. 4,799,999 and 5,218,303 to Medvinsky are such that a quantity of electrolyte is applied to the sample for each test, for example being discharged from a syringe-like means. An electrode is brought into contact with the electrolyte and into proximity with the sample, without shorting directly against the sample, thereby making a so-called "wet junction." A gelatinous or viscous electrolyte or an electrolyte paste can be used. In other arrangements, the sample is dipped into a container of electrolyte.

When coupled into a circuit, galvanization anodizes the sample. As a result these procedures can leave a stain on the specimen. A stain of this type typically must be removed from the specimen after the test, for example with an abrasive that removes specimen material in a manner not unlike the use of a touchstone. In addition, such apparatus is not convenient for allowing tests to be performed quickly on several specimens in rapid succession, because a fresh supply of the gel or paste electrolyte must be dispensed for each test.

The voltage reading obtained using the test can be affected by the availability of free ions in the electrolyte and other factors. According to Medvinsky, an exciting voltage is applied to the galvanic circuit including the specimen for five seconds and then released, and the decaying galvanic voltage is measured after a predetermined time (e.g., five more seconds). Each test thus requires at least ten seconds and the accuracy of the results is dependent on timing. The galvanic potential achieved and the decay rate must be measured accurately. The results are compared to standards stored in the memory of the electronic apparatus or manually by comparison with tables developed by testing reference samples of known purity.

For repeatable results in galvanic testing, the test conditions must be identical from test to test. Thus the surfaces of the specimen(s) and the electrode, and their interaction with the electrolyte, cannot be materially different. This is difficult to achieve. The electrode tip of the prior commercial apparatus described in U.S. Pat. Nos. 4,799,999 and 5,218,303 requires frequent cleaning to remove dried and/or spent electrolyte paste from the tip. The electrolyte gel or paste, which comprises hydrochloric acid, can dry out between tests, which affects the repeatability of results. The electro-



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lyte also can become too liquified and flow out of the dispenser, which can be avoided if the electrolyte is refrigerated. It would be advantageous if an electrolyte could be deployed in a more convenient manner, while still obtaining accurate and repeatable results.

Other apparatus are similarly inconvenient. For example, the technique described in U.S. Pat. No. 5,080,766—Moment requires that the entire specimen be immersed in a container filled with electrolyte. This test also requires considerable waiting time to obtain a measurement of the galvanic electromotive forces being developed.

Further problems relate to the specific circuitry used to measure the galvanic action, and typically to provide a reference voltage level that is coupled to the galvanic circuit. It is desirable to obtain a reasonable measurement span in order to obtain good resolution, ideally to distinguish down to a karat or fraction of a karat. This is also difficult to achieve, particularly at high karat levels, because the slope of a curve of galvanic action vs. karat level or purity, drops off at higher karat levels.

### SUMMARY OF THE INVENTION

It is therefore an object of this invention to provide apparatus and method for making objective analyses of the composition of metals, in particular precious metal alloys, that is reliable, accurate and simple to use.

It is a further object of this invention to provide apparatus and method for analyzing the composition of precious metal alloys that can be used quickly and easily for a number of tests on a number of specimens in rapid succession.

It is a still further object of this invention to provide apparatus and method for analyzing the composition of a number of precious metal alloys, such as gold, silver, platinum, and palladium alloys that produces minimal damage or staining of the specimen.

It is another object of this invention to provide a apparatus for analyzing the composition of precious metal alloys that provides a direct, easily understood reading to the user.

It is a further object of the invention to provide an improved electrode and electrolyte handling technique for a galvanic analyzer, that overcomes the inconvenience and variability of known devices.

These and other objects are attained according to the invention in a hand held probe for analyzing a test specimen, especially for precious metal content, comprising a tubular reservoir containing an electrode in an electrolyte, such as hydrochloric acid or aqua regia, but also possibly a non-corrosive electrolyte such as ammonium chloride for providing free ions. The probe has an absorbent, non-conductive, acid resistant fiber tip at the front end of the probe, the tip carrying the electrolyte and enclosing the metal electrode, namely a thin platinum electrode having one end extending into the fiber tip and the other end extending into the acidic electrolyte in the reservoir. A first electrical connection at the rear end of the probe is electrically connected to a test circuit having a substantially constant voltage source such as a battery, and a meter for measuring the EMF developed between the electrode and the sample. A second electrical connection is made with the sample directly, for example with a touch probe or alligator clip. The EMF generated by galvanic reaction between the platinum electrode and that portion of the test specimen contacted by the electrolyte-saturated fiber tip is subtracted from the substantially constant EMF from the battery to produce a voltage signal that can be compared to reference values for determining the nature of the specimen. For

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measuring precious metal content such as the purity of gold, the signal developed varies with the precious metal content of the test specimen.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a cross-sectional view of a hand-held test probe according to a first embodiment of the invention.

FIG. 2 is an enlarged view of the tip of front end of the hand-held test probe of FIG. 1.

FIG. 3 is a partial section view of an alternative probe embodiment.

FIG. 4 is a partial section view showing another alternative probe embodiment.

FIGS. 5a and 5b are section views showing a preferred fiber tip for use in the probe.

FIG. 6 is a schematic circuit diagram of a first test circuit useful with the foregoing probes.

FIGS. 7 and 8 are schematic diagrams showing two alternative circuits

FIGS. 9 and 10 are graphs showing test results comparing meter readings as percent of full scale, for different electrolytes used in the probes and circuits of FIGS. 1-8.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

In general, the apparatus and method of this invention for analyzing a test specimen for gold content or other precious metal content is based on developing and measuring an electromotive force (EMF) due to electrical conduction between two dissimilar metals or metal alloys, namely an electrode and the sample to be analyzed. U.S. Pat. Nos. 2,531,747 and 3,282,804 to Stearn generally describe this type of analytical technique for analyzing metal alloys, and the patents are hereby incorporated. The galvanic voltage results from the difference in availability of electrons in the different metals or alloys, and provides a net current when the metals or alloys are coupled through an electrolyte.

The galvanic voltage generated by the dissimilar metals or metal alloys is generated using the touch probe of the invention, and is measured by subtracting the galvanic EMF from that of a battery or similar reference level at a constant reverse polarity voltage. The test circuit is adjusted to provide a full scale reading and the net galvanic output voltage measured as percentage of full scale. The measurement is roughly proportional to the gold or other precious metal content of the test specimen and provides a means by which the purity of the sample can be tested. This technique is potentially useful to determine the nature of the metal in the sample, but is primarily useful for determining the purity of precious metals such as gold.

It is an aspect of the invention that such a measurement is made using an improved form of electrode probe. FIG. 1 is a cross-sectional view of a first embodiment of the hand-held test probe of the invention. Probe 1 generally comprises a cylindrical body 2 made of plastic or other substantially electrically non-conductive material. A top cap 3 on the probe 1 is fitted with a jack 4 to enable electrical connection of the probe to a lead or wire 5 coupled to the electrical circuitry for providing the reference voltage and making the EMF measurement. The electrical connection can be made via a miniature phone jack and plug as shown.

The end of probe 1 to be touched against the sample is fitted with an adsorbent, non-conductive, acid resistant synthetic compressed fiber tip 6. The tip is advantageously of