US007721699B2

(12) **United States Patent**
Delgado

(10) **Patent No.: US 7,721,699 B2**
(45) **Date of Patent: May 25, 2010**

(54) **CALIBRATED AIR INTAKE TRACT HAVING AIR INFUSION INSERT**

(76) Inventor: **Ron Delgado**, ARD Technology, LLC, 285 Pioneer Pl., Pomona, CA (US) 91768

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 143 days.

(21) Appl. No.: **12/082,856**

(22) Filed: **Apr. 14, 2008**

(65) **Prior Publication Data**

US 2008/0195298 A1 Aug. 14, 2008

Related U.S. Application Data

(63) Continuation of application No. 11/511,907, filed on Aug. 28, 2006, now Pat. No. 7,359,795, and a continuation of application No. 11/893,577, filed on Aug. 15, 2007.

(51) **Int. Cl.**
F02M 35/10 (2006.01)

(52) **U.S. Cl.** **123/184.53**; 123/479

(58) **Field of Classification Search** 123/359, 123/479, 688, 690, 184.21, 184.26, 184.34, 123/184.36, 184.42, 184.44, 184.47, 184.49, 123/184.59

See application file for complete search history.

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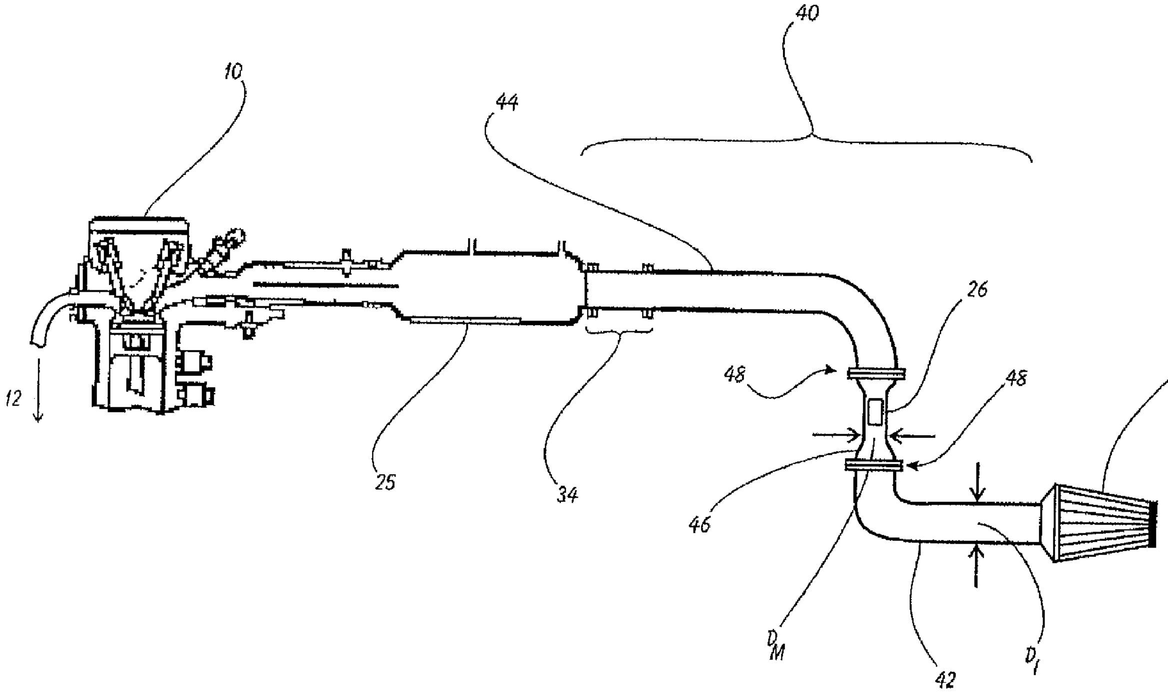
Primary Examiner—Stephen K Cronin
Assistant Examiner—Johnny H Hoang
(74) *Attorney, Agent, or Firm*—Steins & Associates, P.C.

(57) **ABSTRACT**

A Calibrated Air Intake Tract for Internal Combustion Engine is disclosed. The intake includes a Mass Airflow Sensor section that defines an inner diameter that differs from the diameter of the overall intake air tract piping. The Mass Airflow Sensor length and diameter are precision-tuned in order to provide the best engine performance without the typical "check engine" light being lit due to faulty mass airflow sensor readings. In those vehicles where necessary, an insert of the appropriate size and in the proper location is added to the interior wall of the MAFS section in order to correct final fuel trim level inadequacies.

13 Claims, 11 Drawing Sheets



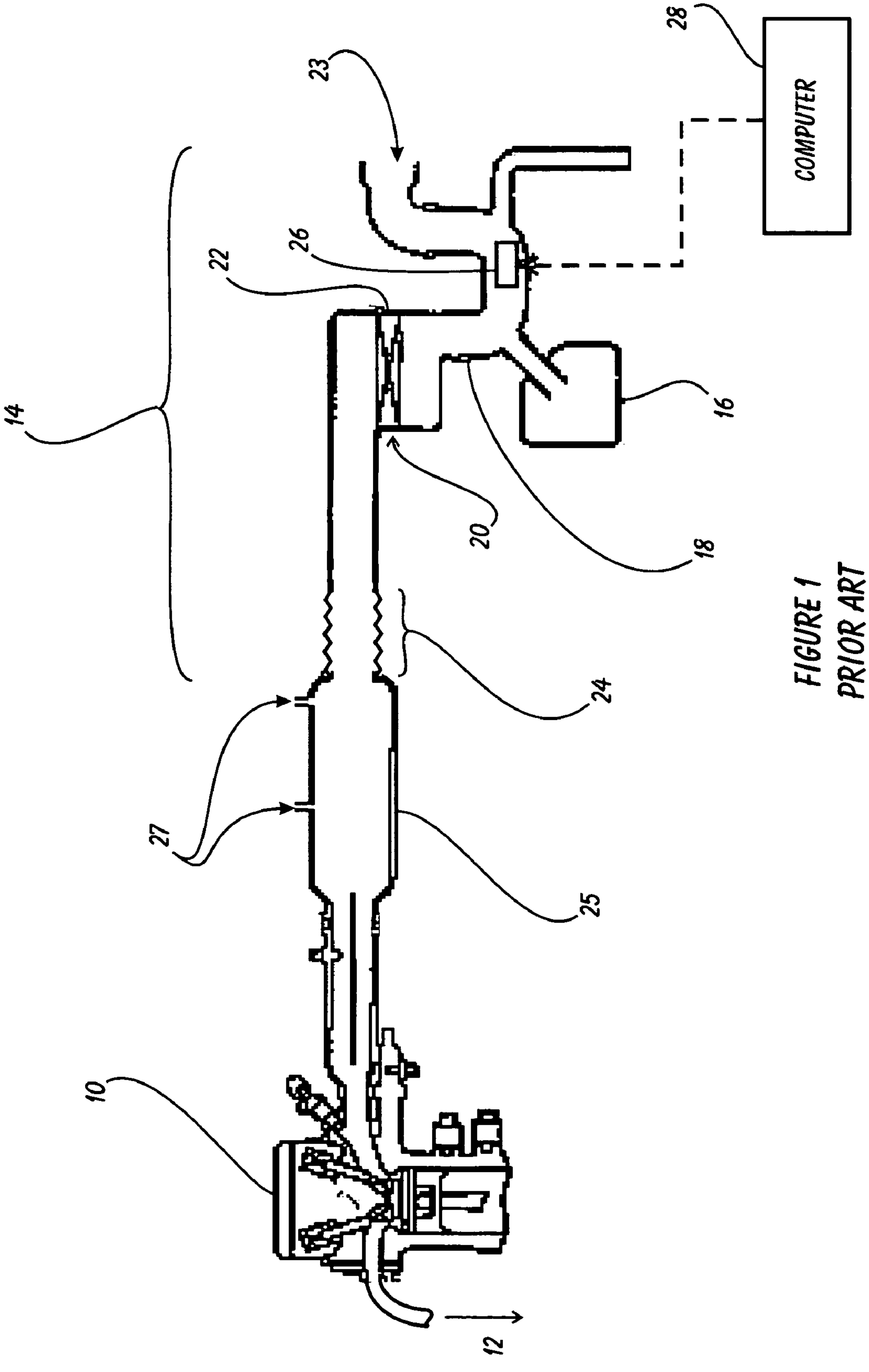


FIGURE 1
PRIOR ART

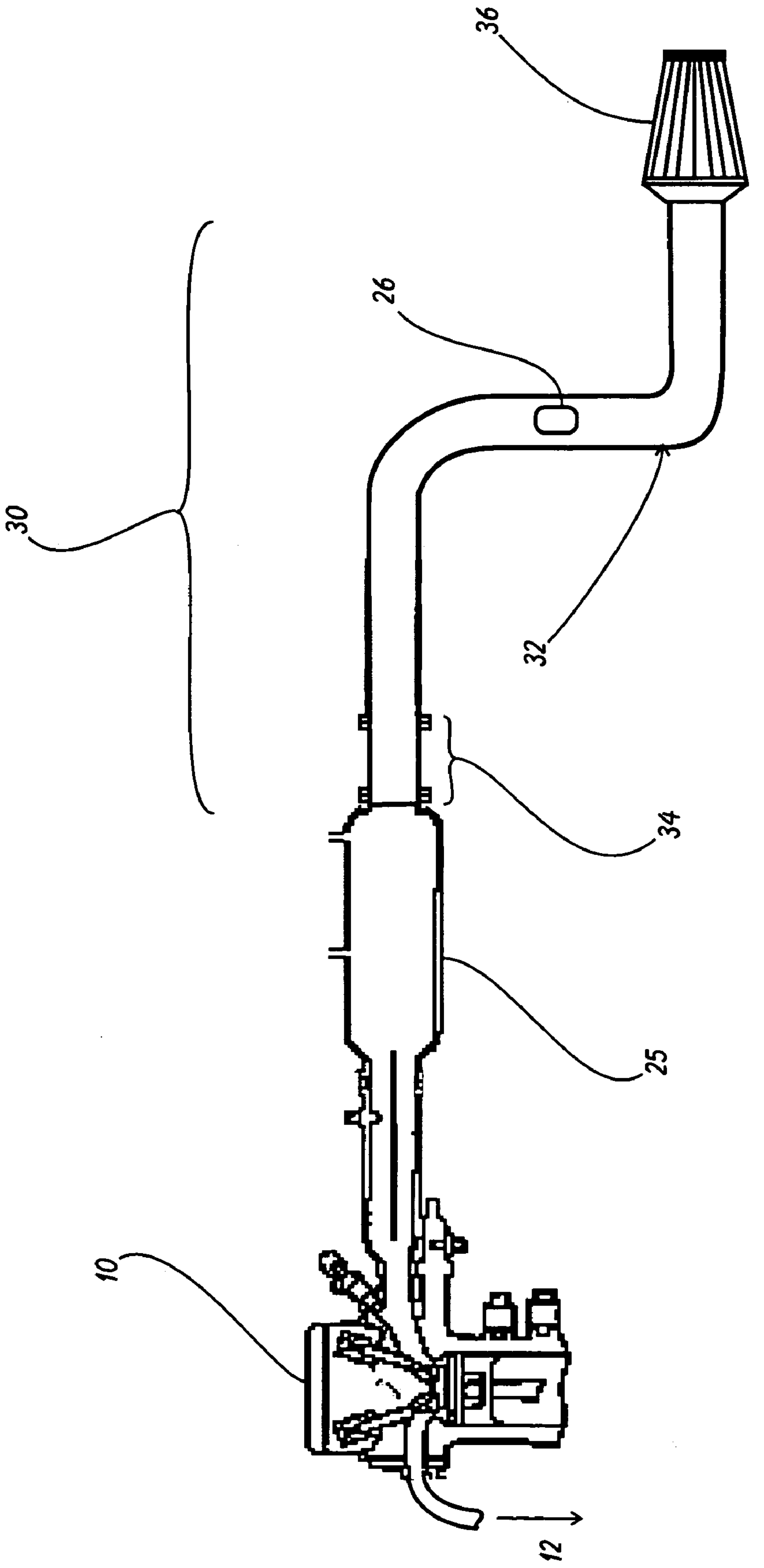


FIGURE 2
PRIOR ART

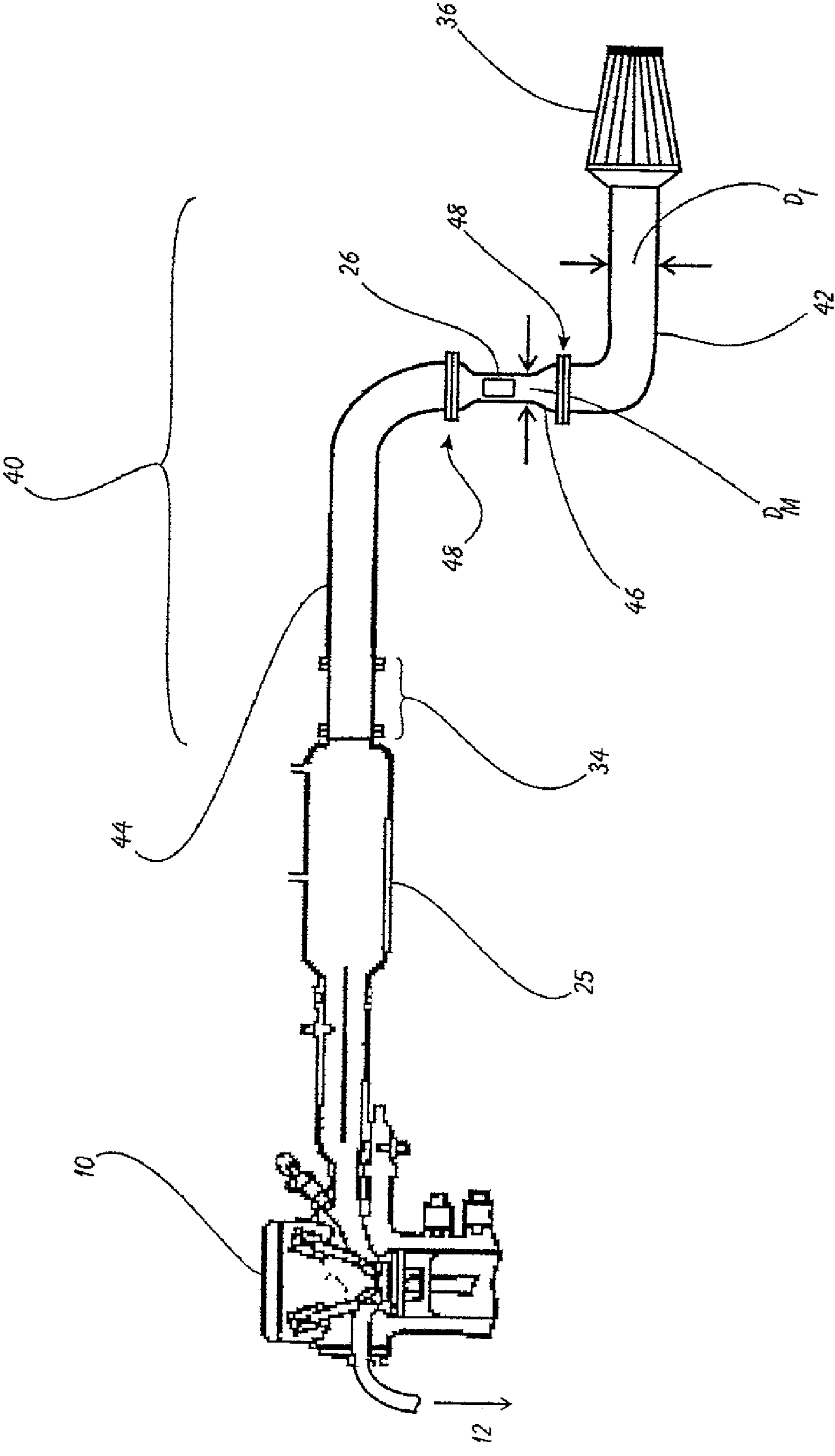


FIGURE 3

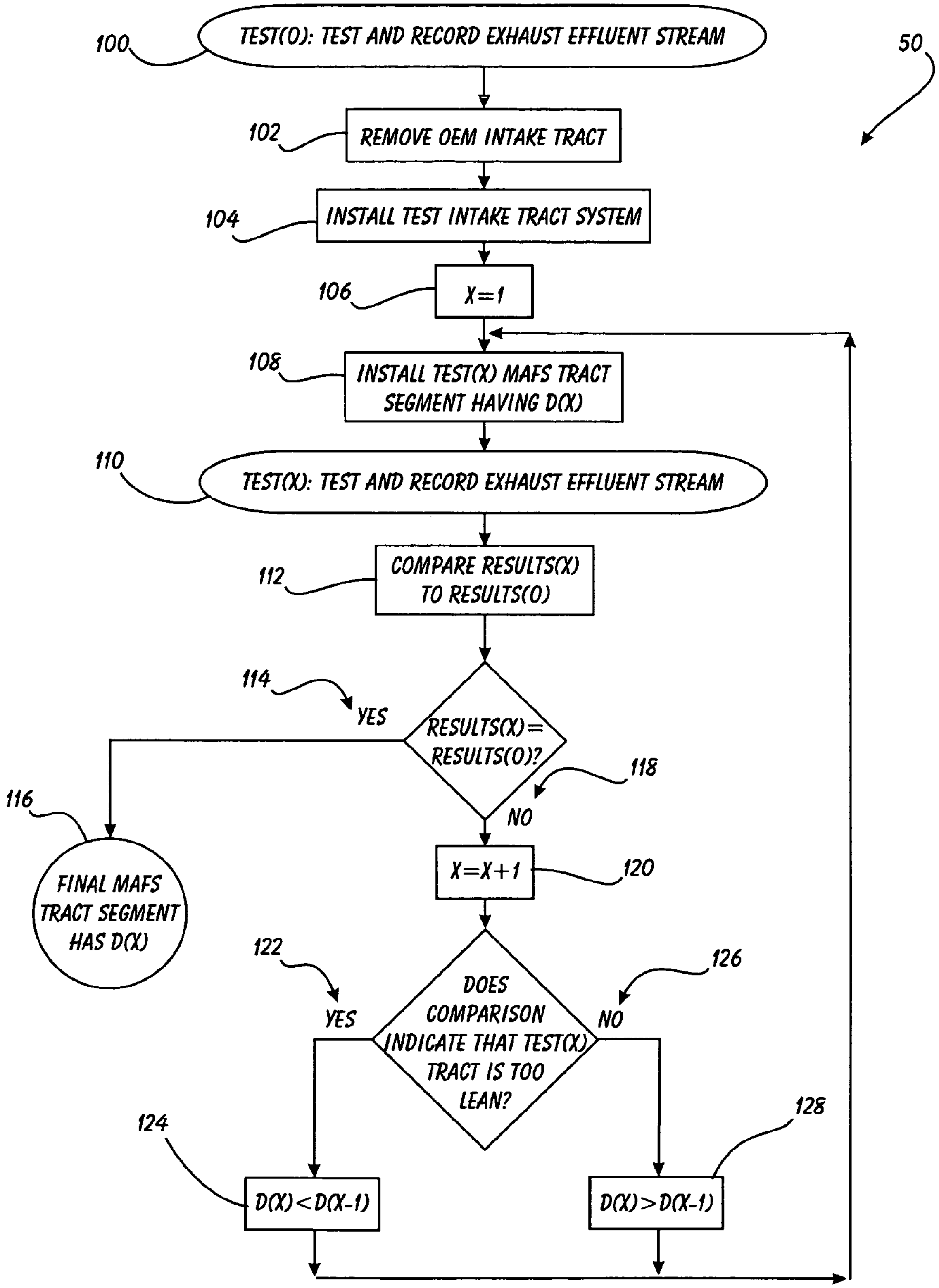
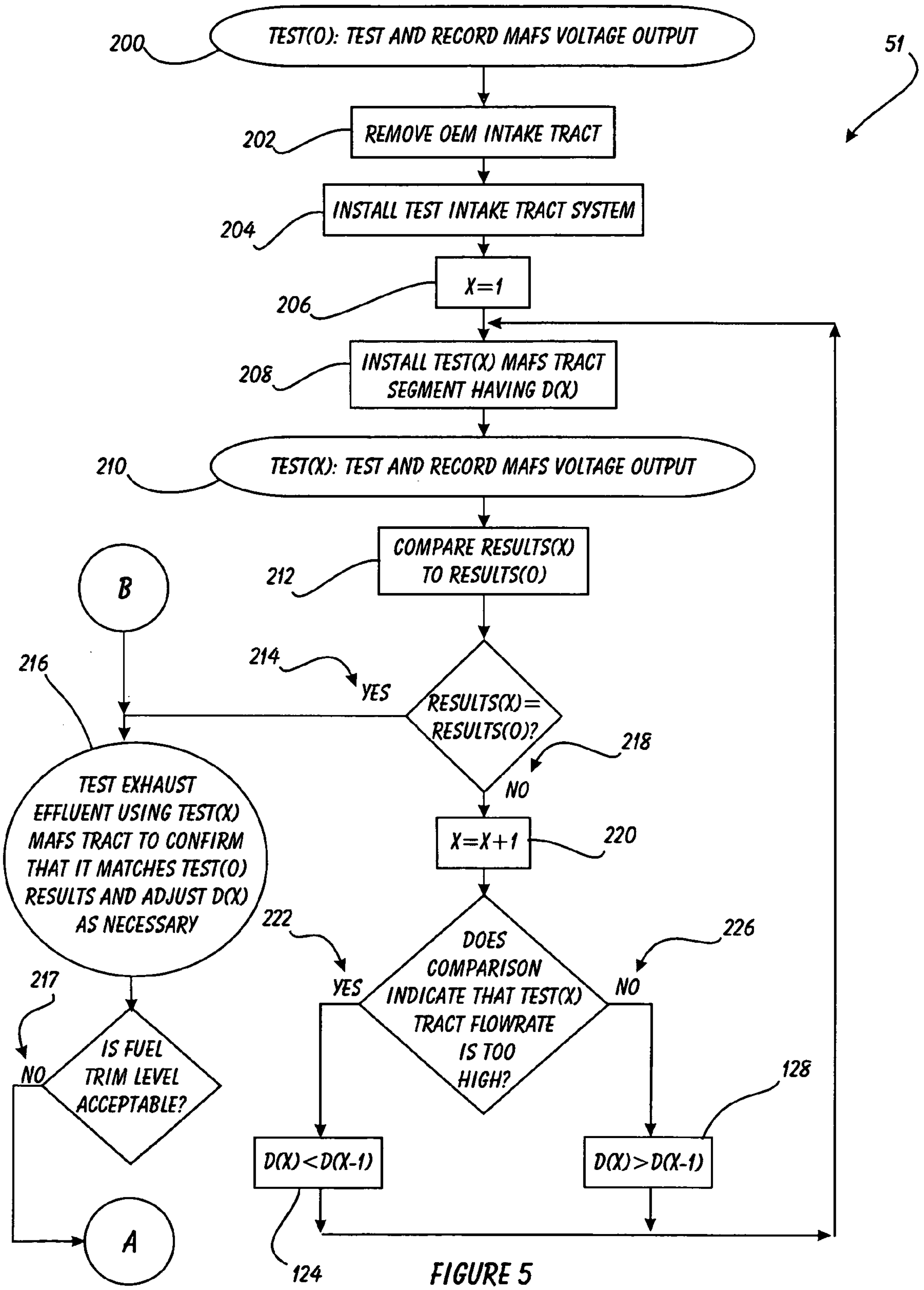

50
100
TEST(0): TEST AND RECORD EXHAUST EFFLUENT STREAM
102
REMOVE OEM INTAKE TRACT
104
INSTALL TEST INTAKE TRACT SYSTEM
106
X=1
108
INSTALL TEST(X) MAFS TRACT SEGMENT HAVING D(X)
110
TEST(X): TEST AND RECORD EXHAUST EFFLUENT STREAM
112
COMPARE RESULTS(X) TO RESULTS(0)
114
YES
RESULTS(X)=RESULTS(0)?
118
NO
116
FINAL MAFS TRACT SEGMENT HAS D(X)
X=X+1
120
122
YES
DOES COMPARISON INDICATE THAT TEST(X) TRACT IS TOO LEAN?
126
NO
124
D(X)<D(X-1)
128
D(X)>D(X-1)

FIGURE 4



200
TEST(O): TEST AND RECORD MAFS VOLTAGE OUTPUT
51
202
REMOVE OEM INTAKE TRACT
204
INSTALL TEST INTAKE TRACT SYSTEM
206
X=1
208
INSTALL TEST(X) MAFS TRACT SEGMENT HAVING D(X)
210
TEST(X): TEST AND RECORD MAFS VOLTAGE OUTPUT
212
COMPARE RESULTS(X) TO RESULTS(O)
B
216
214
YES
RESULTS(X)=RESULTS(O)?
218
NO
TEST EXHAUST EFFLUENT USING TEST(X) MAFS TRACT TO CONFIRM THAT IT MATCHES TEST(O) RESULTS AND ADJUST D(X) AS NECESSARY
X=X+1
220
222
YES
DOES COMPARISON INDICATE THAT TEST(X) TRACT FLOWRATE IS TOO HIGH?
226
NO
217
NO
IS FUEL TRIM LEVEL ACCEPTABLE?
128
D(X)<D(X-1)
D(X)>D(X-1)
A
124

FIGURE 5

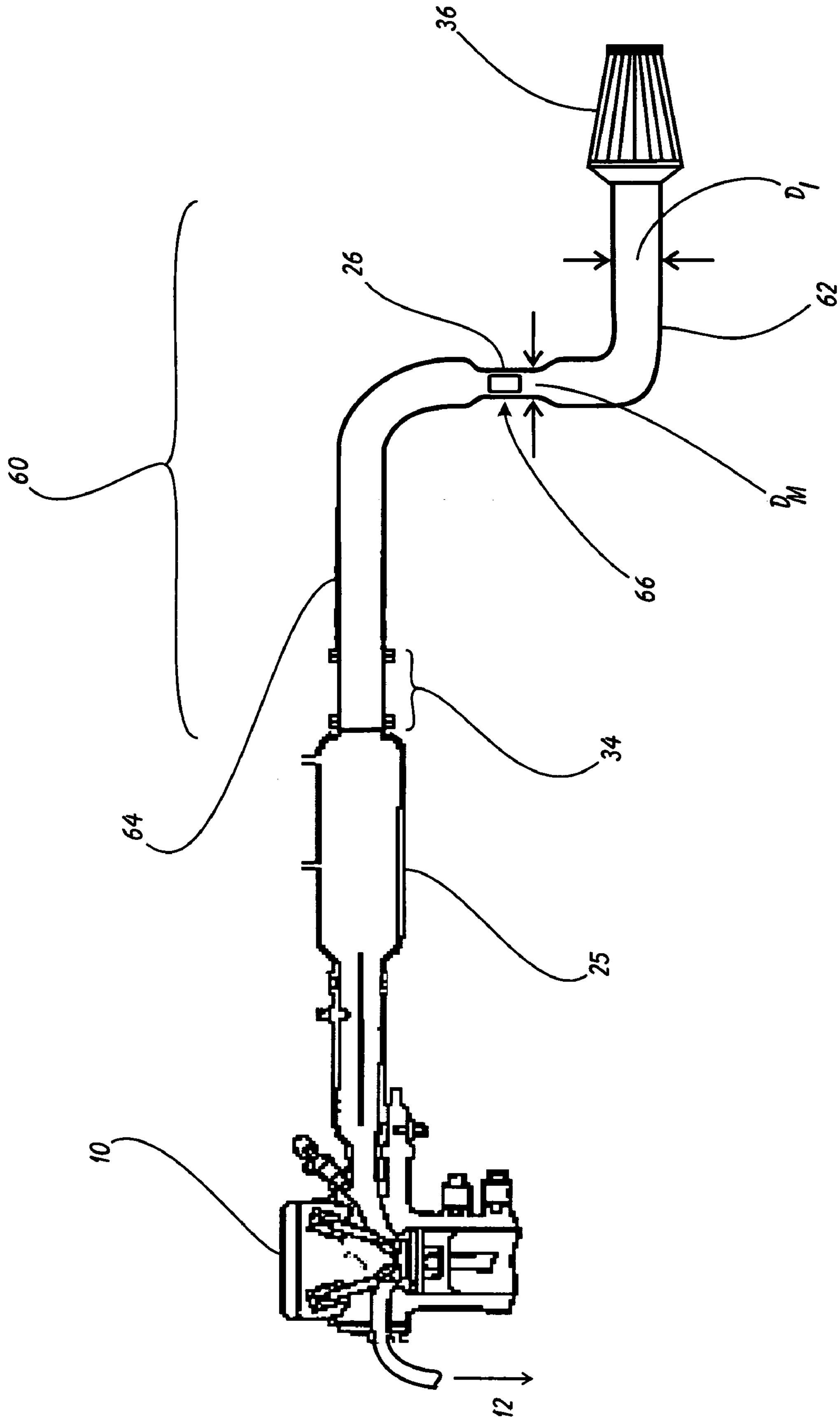


FIGURE 6

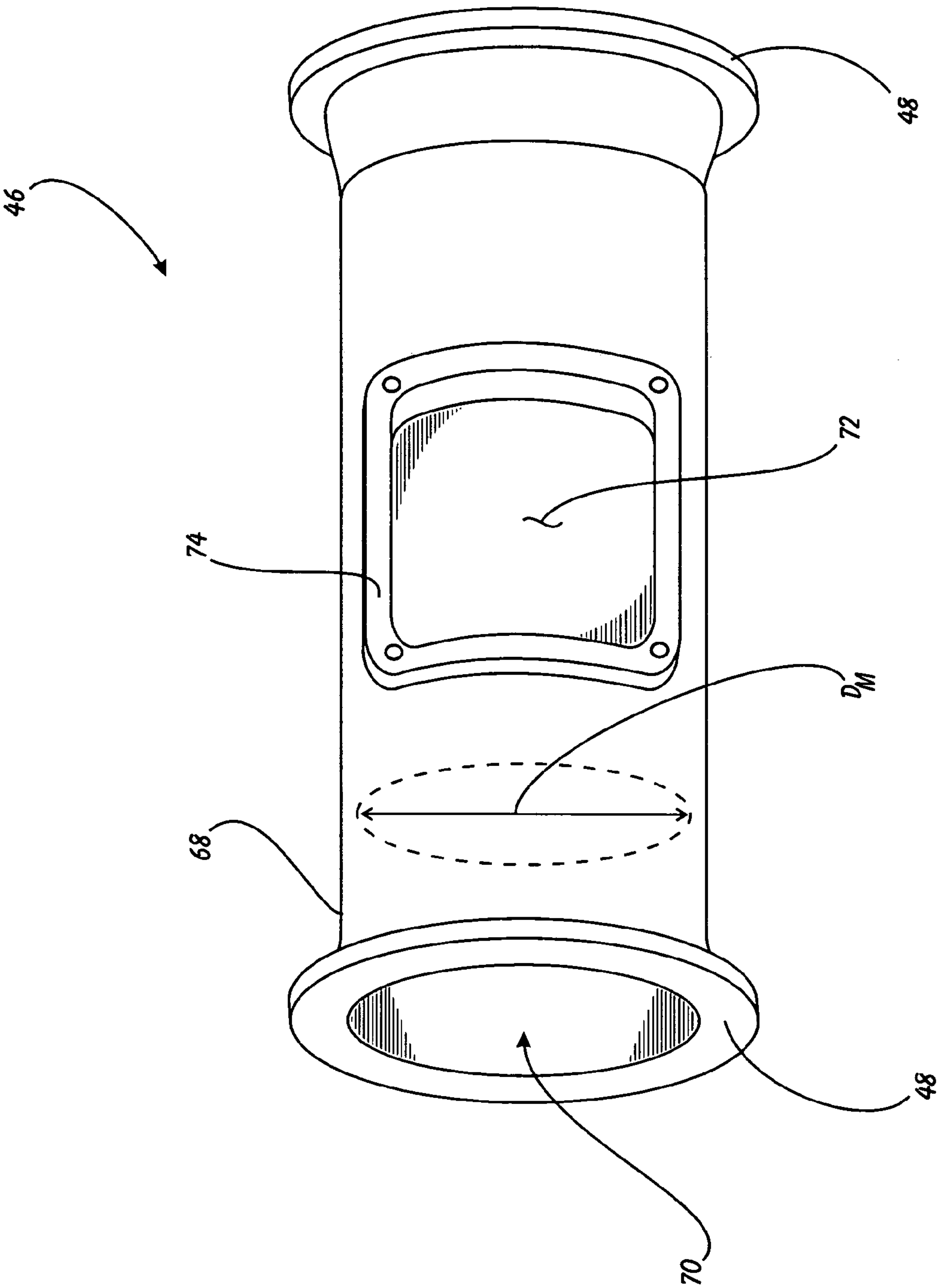


FIGURE 7

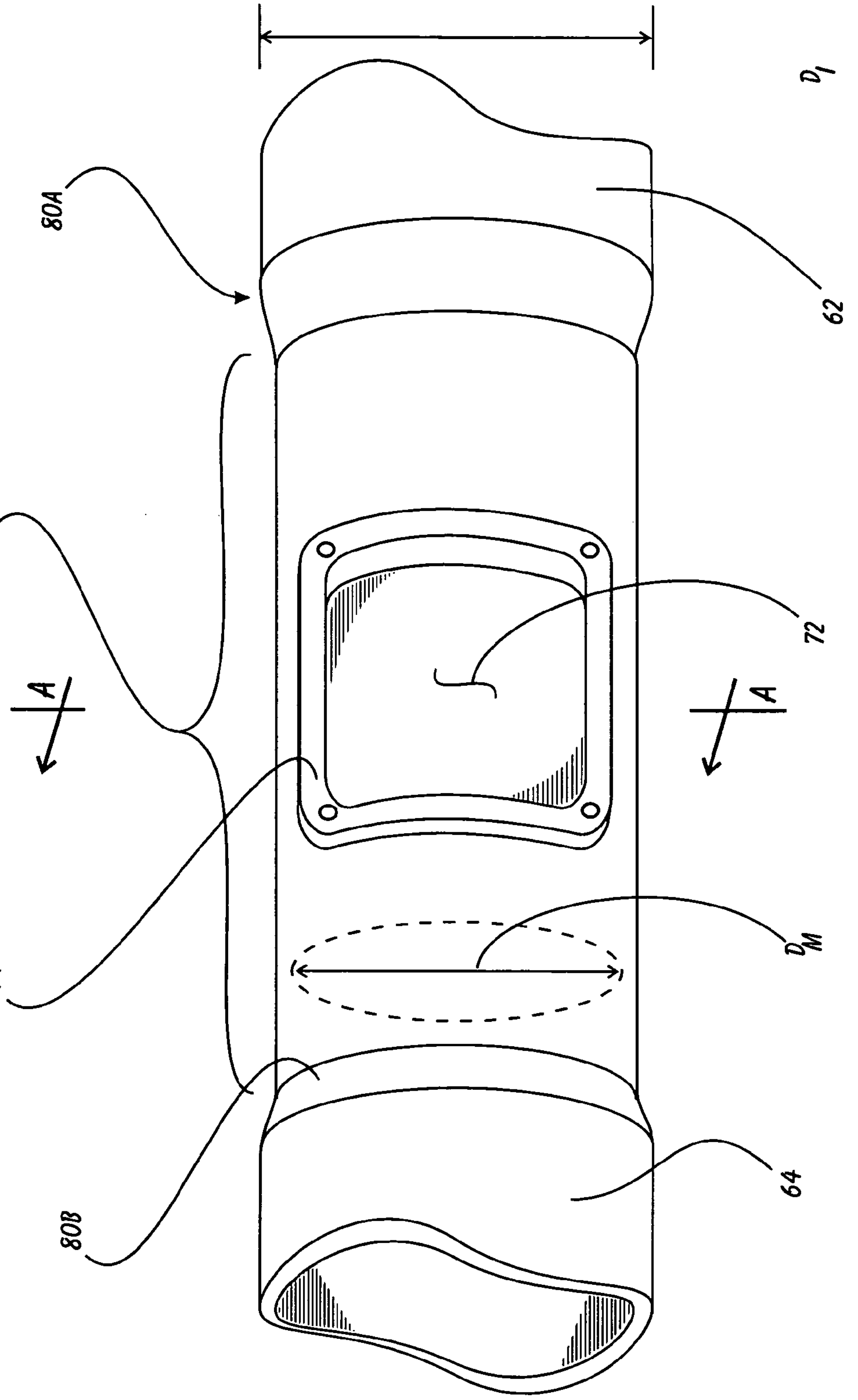


FIGURE 8

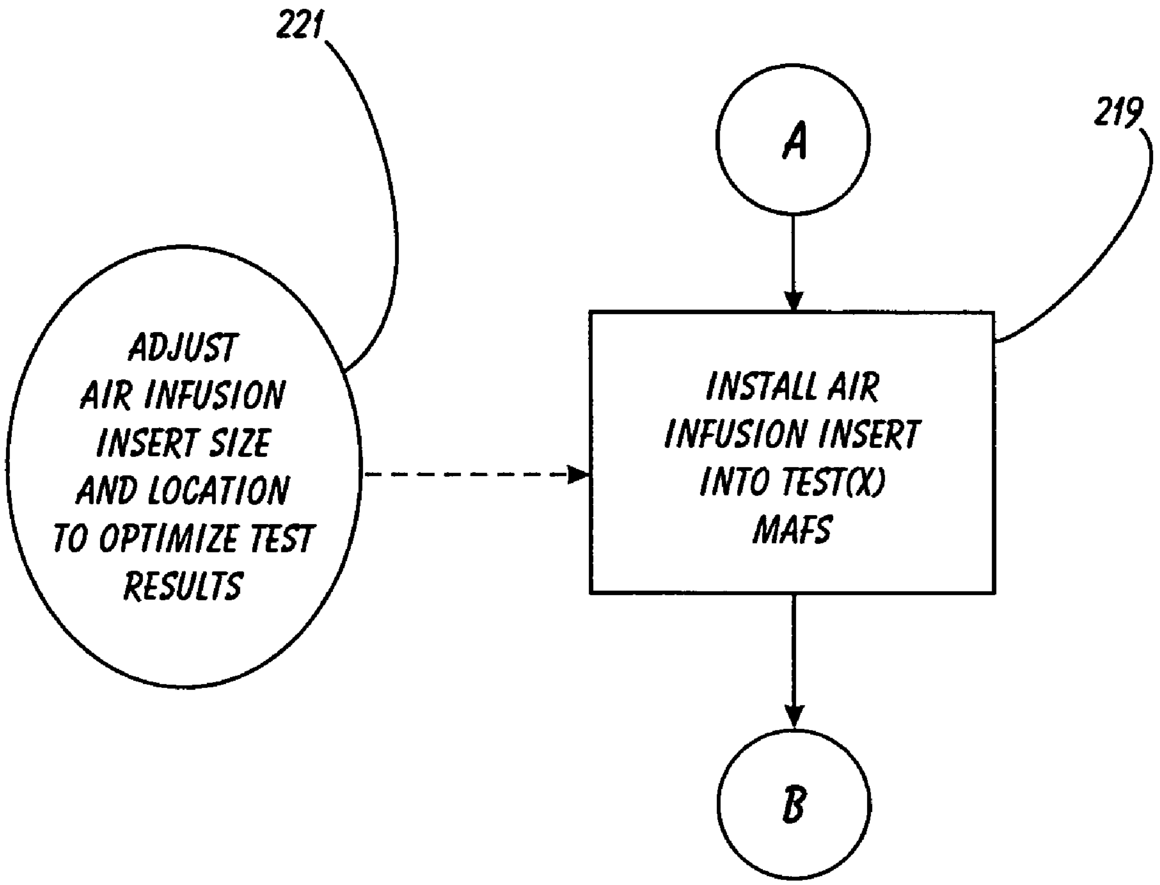
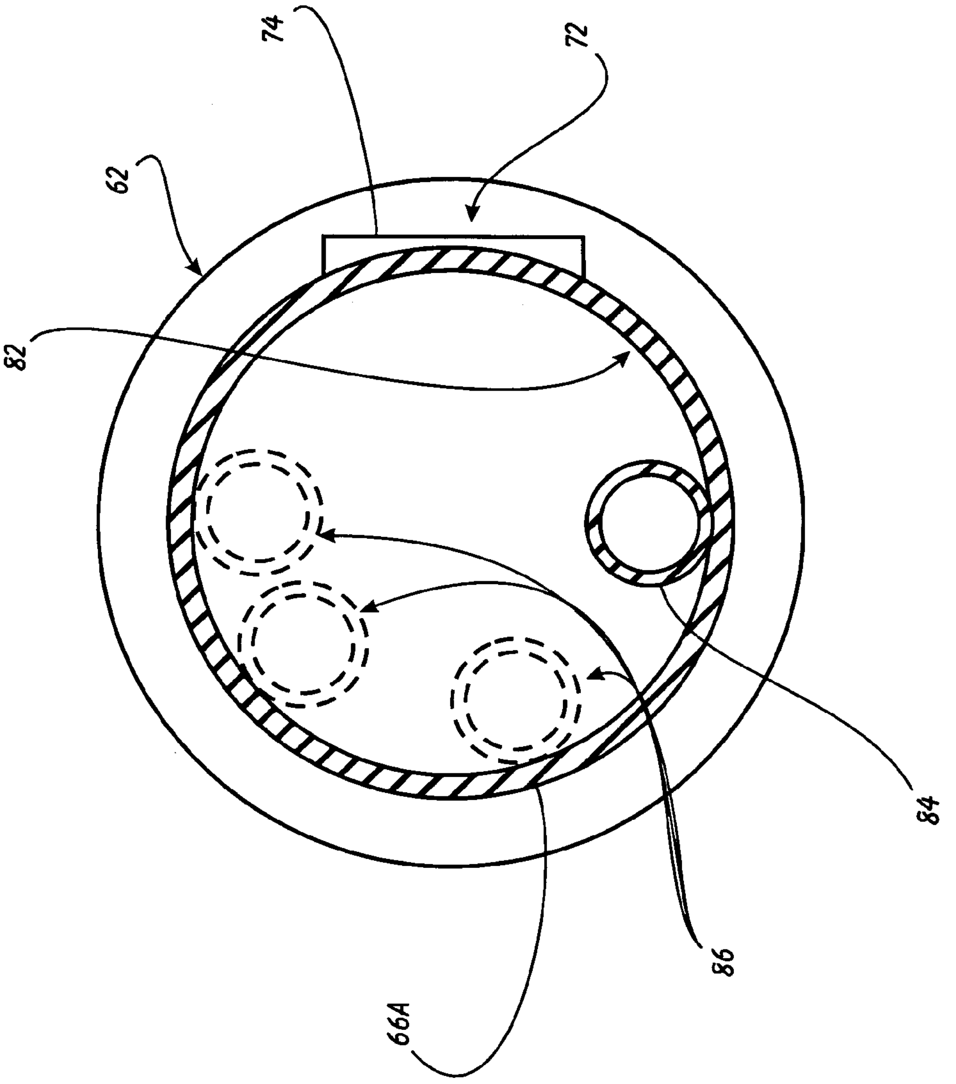

221
ADJUST AIR INFUSION INSERT SIZE AND LOCATION TO OPTIMIZE TEST RESULTS
A
219
INSTALL AIR INFUSION INSERT INTO TEST(X) MAFS
B

FIGURE 9



A - A
FIGURE 10

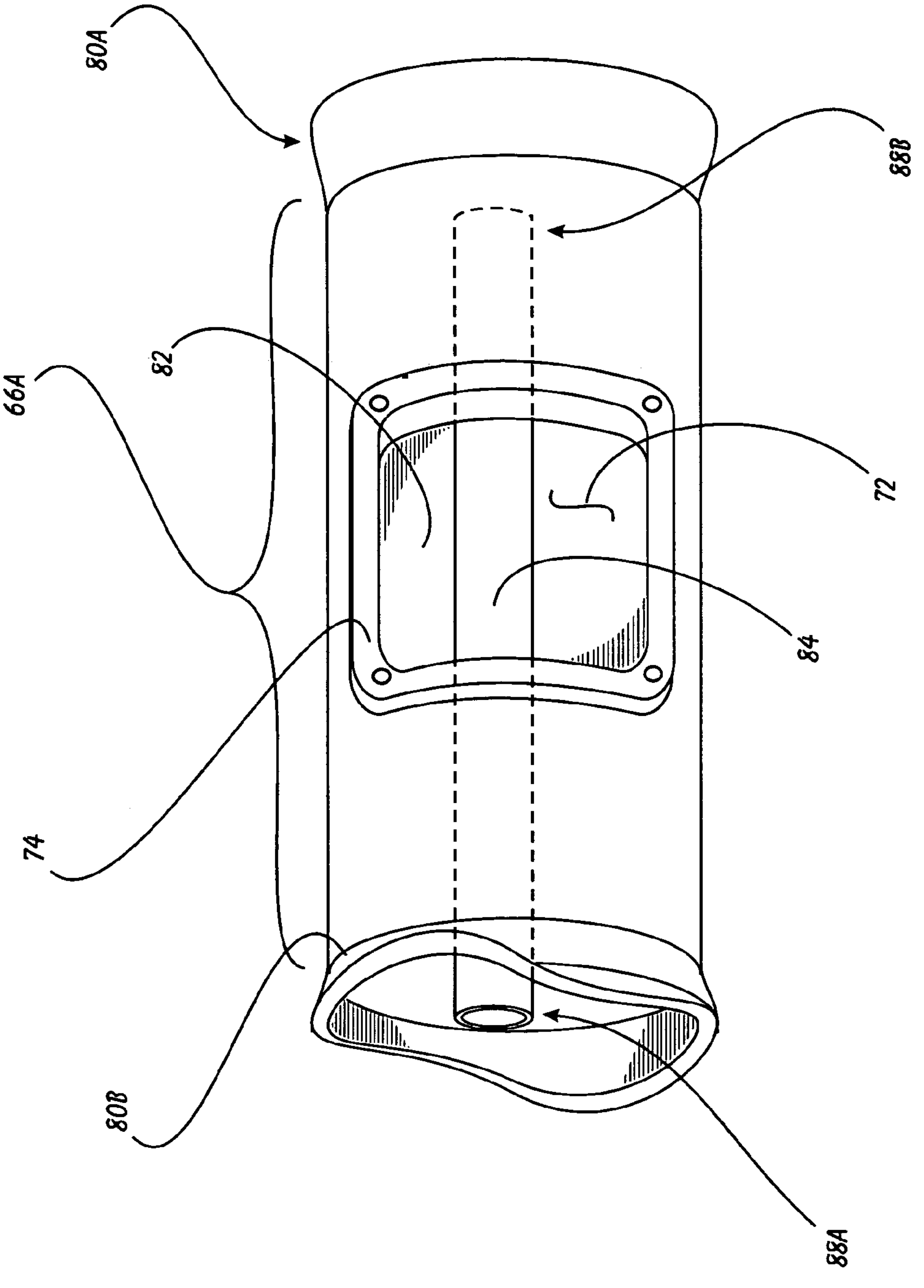


FIGURE 11

CALIBRATED AIR INTAKE TRACT HAVING AIR INFUSION INSERT

The present invention is a continuation of application Ser. No. 11/511,907 now U.S. Pat. No. 7,359,795, filed Aug. 28, 2006, and application Ser. No. 11/893,577, filed Aug. 15, 2007, both now pending.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to internal combustion engines and accessories therefor and, more specifically, to a Calibrated Air Intake Tract having Air Infusion Insert.

2. Description of Related Art

For the sake of this discussion, the phrase "intake system" is being used to describe the ducting and accessories that feed air to an internal combustion engine prior to the throttlebody, including the large duct, filter, and any other parts thereof. FIG. **1** is a schematic diagram of an internal combustion engine's intake tract. The mass airflow sensor **26** and emissions/central computer **28** are depicted here for reference, but will be described more fully in connection with FIG. **2** and beyond.

The original equipment manufacturer (OEM) intake system **14** on a typical production vehicle consists of an air inlet **23** leading to a resonator **16**, a substantial amount of plastic duct work **18**, a large metal or plastic air filter canister **20**, a paper air filter element **22**, and a rubber accordion hose **24** between the filter canister and the throttlebody. Usually, the intake system **14** will pick up air from behind the vehicle's fender or bumper, from the leading end of the plastic duct work and resonator. This design is the most favorable for OEM systems because the air taken in by the intake system is cooler than if the air was being taken from inside the engine compartment. Cooler air allows the engine to make more power than hot air. In cases where the intake system takes air from inside the engine compartment, lower-power performance from the engine should be expected.

Even if the OEM intake system is taking its air from outside the engine compartment, there still are performance-sapping design aspects to virtually all OEM intake system designs. First, the resonator **16** and the plastic duct work **18** tend to be very restrictive to air flow. These pieces are designed to reduce intake sound (i.e. engine sound), and therefore performance is not the priority. Performance can be improved by eliminating the resonator **18**, reducing the ductwork length and increasing the ductwork diameter.

Second, the OEM paper filter element **22** is usually a very low-cost, disposable unit. Paper elements typically restrict flow more than cotton gauze or cloth. "Aftermarket" cotton gauze or cloth filters provide a great deal more air flow with the added advantage that they are reusable and can be washed, re-oiled, and reinstalled in the intake tract for ten years of use, or more.

Third, the accordion hose **24** between the filter canister **20** and the throttlebody **25** does not encourage very good air flow. The ribs of the hose **24** extend into the air flow channel and cause turbulence, thereby reducing and/or corrupting the airflow in this section of the intake tract **14**.

One of the most popular horsepower-improving aftermarket products for vehicles is the "cold air intake" system. As the name suggests, one thing that these systems do is to locate (or relocate) the front end of the air intake tract to a location that is outside of the engine compartment (many times behind the vehicle's bumper).

The most common and most effective cold air intake **30** design is depicted in FIG. **2**. These systems use sections of mandrel bent pipe **32**, connected with turbo hose connectors **34**, leading from the throttlebody **25** and out of the engine compartment to the area behind the bumper or behind the fender, where a cone filter **36** is fitted to the pipe **32** to draw in cool air from outside the engine compartment. The combination of the cooler intake air and the reduction in flow resistance results in significant power increase. In addition, the modified intake tract **30** will typically be three or more feet in length, causing it to effectively act as an extension of the intake manifold of the engine, almost as if it were a header for the intake side of the engine, improving low and mid range torque.

Furthermore, the added length of the pipe work also encourages something called "laminar air flow effect" whereby the air passing through the pipe is unobstructed and begins to act somewhat more like a liquid than a gas, gaining momentum as it passes down the pipe and resisting anything that would stop its flow. This is known as an air ramming effect.

While the power improvements made available by cold air intake systems **30** are, well-known, so are the problems associated with them. First, the OEM intake tract **14** has a "Mass Airflow Sensor" (MAFS) **26** attached to it. The MAFS **26** is a very important sensor that detects the airflow in the intake tract and reports this information to the engine's central computer **28**. The central computer **28** uses this information to adjust the combustion performance factors of the engine so that the engine runs cleanly (low emissions) and smoothly.

It has been common to receive "check engine" lights when installing aftermarket cold air intake systems in vehicles because the flowrate of the incoming air has increased so much (because the theory has always been "more is better") that the values are outside those expected by the central computer **28**. In fact, some vehicle models and/or intake systems suspected to actually cause damage to the engine.

One solution for the check engine light problem has been to replace the MAFS **26** with a non-OEM unit that will scale down input to the central computer **28** so that it will be within the expected range. This is dangerous and further may actually void the manufacturer's warranty on the engine. The only other solution has been to reprogram (or "tune") the central computer **28** so that the MAFS **26** input is within the newly-programmed computer's range. This approach, while effective, only serves to add cost and uncertainty to the intake system "upgrade."

What is really needed is an aftermarket intake system and method for custom-designing such system so that the OEM MAFS and central computer system can be retained after the installation of the high-performance cold air intake system.

SUMMARY OF THE INVENTION

In light of the aforementioned problems associated with the prior devices and methods, it is an object of the present invention to provide a Calibrated Air Intake Tract having Air Infusion Insert. The intake should have a Mass Airflow Sensor section that defines an inner diameter that differs from the diameter of the overall intake air tract piping. The Mass Airflow Sensor length and diameter should be precision-tuned in order to provide the best engine performance without the typical "check engine" light being lit due to faulty mass airflow sensor readings. In those vehicles where necessary, an insert of the appropriate size and in the proper location should be added to the interior of the MAFS section in order to correct final fuel trim level inadequacies.

BRIEF DESCRIPTION OF THE DRAWINGS

The objects and features of the present invention, which are believed to be novel, are set forth with particularity in the appended claims. The present invention, both as to its organization and manner of operation, together with further objects and advantages, may best be understood by reference to the following description, taken in connection with the accompanying drawings, of which:

FIG. **1** is a schematic view of a conventional internal combustion engine and associated air intake tract;

FIG. **2** is a schematic view of a conventional cold air intake system;

FIG. **3** is a preferred embodiment of a combustion-tuning cold air intake test system for use with the present method invention;

FIG. **4** is a flowchart depicting the preferred combustion tuning method for mass airflow segment;

FIG. **5** is a flowchart depicting a second preferred method for combustion tuning the mass airflow segment, as modified for systems having persisting fuel trim level errors;

FIG. **6** is a schematic view of a combustion-tuned cold air intake system of the present invention;

FIG. **7** is a perspective view of a mass airflow sensor tract used in the method of calibrating the MAFS section of the system of the present invention;

FIG. **8** is a perspective view of the MAFS pipe portion of the system of the present invention depicted above in FIG. **6**;

FIG. **9** is a modification to the flowchart depicted above in FIG. **5**;

FIG. **10** is a cross-section of the MAFS section of the present invention further including examples of a preferred air infusion insert; and

FIG. **11** is a partial cutaway perspective view of the MAFS section of FIG. **10**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The following description is provided to enable any person skilled in the art to make and use the invention and sets forth the best modes contemplated by the inventor of carrying out his invention. Various modifications, however, will remain readily apparent to those skilled in the art, since the generic principles of the present invention have been defined herein specifically to provide a Calibrated Air Intake Tract having Air Infusion Insert.

The present invention can best be understood by initial consideration of FIG. **3**. FIG. **3** is a preferred embodiment of a combustion-tuning cold air intake test system **40** for use with the method of the present invention. The test system **40** is designed to provide the inventor with the necessary equipment to execute the cold air intake tuning method of the present invention, the completion of which will provide the inventor with the necessary information to produce production-quality, combustion-tuned cold air intake systems for each vehicle and/or model tested using the method.

The system **40** is similar to a conventional cold air intake system in that it has a cone filter **36** and turbo hose connectors **34** for attaching the system **40** to a conventional internal combustion engine. Rather than having a simple mandrel-bent piping system, however, the piping of the test system **40** can be modified quickly in the course of the testing process so that the desired combustion performance is attained. There is a distal intake pipe section **42** making up the first leg of the system **40**. There is a proximal intake pipe section **44** making up the final leg of the system **40**. Interconnecting the two sections **42** and **44** is the mass airflow sensor (MAFS) tract **46**. The MAFS tract **46** is a customized pipe section selected from a group of tracts constructed for the purpose of being used in the test system **40**. The OEM MAFS **26** (for the vehicle that the system testing is for) is attached to the tract **46** so that the airflow through the system **40** is sampled. Each MAFS tract **46** has flanged **48** ends so that tracts **46** can be installed and removed without disassembling the other components of the test system **40**.

The MAFS tract **46** defines an inner (flowpath) diameter of D_M. This diameter may be larger than, or smaller than D_I, which is the diameter of the distal and proximal sections **42** and **44**, depending upon the test results, as will be discussed in connection with FIG. **4**. What is critical to understand is that the configuration of the distal and proximal intake pipe sections **42** and **44** will not change during the testing process. These sections will be designed to fit within the profile of the engine compartment of the vehicle undergoing design testing, with a standardized gap left between the flanges **48** so that standard-sized MAFS tracts **46** can then be exchanged to fill this gap. The optimum internal diameter of the MAFS tract **46** will be determined by the testing process of FIG. **4**. For the purposes of FIG. **4**, the "test intake tract system" refers to the test system **40** minus the MAFS tract **46**.

FIG. **4** is a flowchart depicting the preferred combustion tuning method **50** for mass airflow segment. What is very unique to this method is that the intake air tract (at least the diameter of that portion in the vicinity of the MAFS) is being optimized by testing being done on the exhaust effluent stream. The idea is that if the intake can be "tuned" until the content of the exhaust effluent stream very nearly matches the content of this stream with the original equipment manufacturer intake air tract installed.

First, the exhaust effluent stream is tested having the OEM intake air system installed **100** (and recorded). Next, the OEM intake tract is removed **102** and the test intake tract **104** is installed in place of the OEM system. The step X=1 **106** serves to increment the test set as the method iterates.

Next, a selected MAFS tract segment is installed in the test system **108**. Here, Test(1) refers to a MAFS tract segment having an internal diameter of D(1) is installed in the system. Next, Test(1) is run by running the engine and testing the exhaust effluent stream content **110**. The results of Test(1) are compared to the results of Test(0) **112**. If the effluent content is substantially the same for Test(1) as were the results of Test(0) **114**, then the Final or Optimum MAFS tract segment diameter is determined to be D(1) for this particular powerplant.

If the exhaust stream content of Test(1) is not substantially the same as it was for Test(0) **118**, then after incrementing X to set up the next test **120**, the query of whether Test(X) results indicated that the engine was running too lean or too rich. If the results indicate that MAFS(1) caused excessively lean conditions **122**, then the next MAFS will be chosen so that its diameter is smaller than the diameter of the MAFS used in Test(1) **124**. If the results indicate that MAFS(1) caused excessively rich conditions **126**, then the next MAFS will be chosen so that its diameter is larger than the diameter of the MAFS used in Test(1) **128**.

Once the new diameter is determined (as being larger or smaller than for the previous test), step **108** and beyond are executed again using MAFS(2) (in this case), having the appropriate diameter as determined by the exhaust effluent stream contents.

As discussed earlier, once the original OEM exhaust performance is nearly duplicated, the test is concluded and the internal diameter of the MAFS tract segment has been optimized **116**. With the optimized MAFS tract segment installed, the "check engine" lights will no longer be received because the airflow, as determined by the MAFS in the MAFS tract segment having the optimized diameter (as well as the other emissions sensors in the vehicle) will conclude that OEM conditions are being maintained.

Since the aforementioned testing method can tend to consume a large amount of time and resources, a second version of this test method was developed; FIG. **5** depicts this alternate method.

FIG. **5** is a flowchart depicting a second preferred method for combustion tuning the mass airflow segment. Preliminarily (not shown here), the system is tested for exhaust gas emissions contents so that a final comparison can be made (see step **216**). While this step is not mandatory, it does confirm the results achieved in the "bench" testing approach described herein below.

First, **200**, the voltage output (or other form of signal output) of the MAFS is tested and recorded for the OEM intake system. Next, the OEM intake tract is removed from the engine **202**. The test intake tract system is then installed **204** on the IC engine. For test(1), the test(1) MAFS tract segment having D(1) is installed in the test tract **208**. The engine is started and the voltage (or other format) signal output of the MAFS is observed and recorded **210**. The signal output results for test(1) are compared with the signal output results of the baseline test(0). If they are unacceptably different **218**, then the MAFS tract segment will be exchanged with another segment having a diameter that is either greater or smaller than the test(1) segment (**124** or **128**), and the test **208**-**212** is re-run. These tests are run until such time as the MAFS signal output matches (or nearly) the baseline MAFS signal output results **214**.

In order to assure a correct configuration, the system is still combustion tested, namely, **216** the exhaust effluent is retested with the optimized MAFS tract segment installed (i.e. the segment having the configuration dictated by the "bench" testing), and compared to the baseline exhaust gas test results obtained when the system was first profiled prior to executing step **204**.

By running the initial calibrations on the system through bench testing of voltage output, the system can be reconfigured even more quickly than before (because the effluent testing tends to be much more time consuming), the optimized test tract configuration can be determined much more quickly than with the method of FIG. **4**. To be safe, however, the final test of FIG. **4** is still run to confirm the optimization of the combustion as well.

It has been noticed that certain intake and engine setups will not reach optimal power improvements and the other benefits by applying the empirically-based testing of the methods of either FIG. **4** or **5**. Exemplary vehicles are late model (as of this writing) Nissan™ vehicles. In these vehicles, the implementation of a restricted-diameter MAFS section is not insufficient, and the fuel trim level is not acceptable **217**. The details of the importance of fuel trim and the adjustments to the method of FIG. **5** are discussed below in connection with FIG. **9**.

Regarding FIGS. **4** and **5**, FIG. **6** shows the result of the aforementioned testing of the methods of these drawing figures.

FIG. **6** is a schematic view of a combustion-tuned cold air intake system **60** produced by the method of the present invention. What has changed here, as compared with the system of FIG. **3** is that the test MAFS segment no longer exists. Here, the piping is in one piece—defined by the distal intake pipe portion **62** and the proximal intake pipe portion **64** interconnected by the MAFS pipe portion **66**. As should be apparent, the MAFS pipe portion **66** has an internal diameter D_M that was determined through the testing discussed above in connection with FIG. **4** to be the optimum diameter for this particular system **60**. Since the distal intake pipe portion **62** and the proximal intake pipe portion **64** essentially duplicate the shape and parameters of the distal and proximal intake pipe sections **42** and **44**, there should be no variation in performance aspects between the test system and this final production system **60**. Finally, if we turn now to FIG. **7**, we can examine the specifics of the test section.

FIG. **7** is a perspective view of a mass airflow sensor tract **46** used in the method of the present invention. The tract **46** has a generally tubular center section **68** terminating in flanges **48** for connection to the test tract system. The airflow path **70** has an internal diameter D_M that is known—for the purposes of testing according to the claimed method, a group or series of tracts **46**, each having a unique D_M must are first created in order to provide for the necessary responsiveness to test results.

The wall of the tubular section **68** has an MAFS aperture **72** formed in its side, the perimeter of which is defined by a flange **74** for attaching the OEM MAFS thereto. Since there is no standardized MAFS design that all OEMs use, there must be a variety of tracts **46** having the same flange/aperture configuration, but for different internal diameters D_M. Once the groups of tracts **46** are assembled, testing can be conducted on a wide variety of internal combustion power systems so that the final system design can be ascertained without risk.

Once the aforementioned calibration method is complete and a particular vehicle intake tract has been "tuned," a complete intake tract having a "tuned" MAFS pipe portion can be created. Such a pipe portion is depicted in FIG. **8**.

FIG. **8** is a perspective view of the MAFS pipe portion **66** of the intake system of FIG. **6**. While D_M may be larger than D_I, the typical case is as depicted here. The distal intake pipe portion **62** is defined by a diameter D_I. The intake pipe then tapers down at the first neck portion **80**A to D_M, which is carried continuously through the MAFS pipe portion **66**. At the second neck portion **80**B, the pipe diameter expands again to D_I, where it remains through the remainder of the intake tract.

The MAFS mounting flange **74** is positioned on the side of the pipe within the MAFS pipe portion **66**, surrounding the MAFS aperture **72** formed within it. The first and second neck portions **80**A, **80**B are formed seamlessly within the intake piping. Since the neck portions **80**A, **80**B are formed in the continuous pipe, rather being made from welded pieces into the tract, the inner surface of the entire intake tract is smooth. The smooth interior surface inhibits turbulent flow within the tract, thereby providing smooth, predictable intake air flow and consistent horsepower increases.

FIG. **9** is a modification to the flowchart depicted above in FIG. **5**. As discussed above in connection with FIG. **5**, it has been determined that some vehicles do not respond favorably to the tuning methods of FIGS. **4** and **5**. Although an optimal diameter for the MAFS section of intake piping can be determined, there is very little gain in horsepower. It is believed that this phenomena is related to the fuel trim controls in the engine control computer.

Fuel trim is a term that refers to the adjustment of feedback signals emanating in a variety of engine combustion sensors. The purpose of fuel trim is to adjust fuel to air mixture so that the desired levels are maintained for the changing running conditions of an internal combustion engine.

There are two types of fuel trim—short range and long range. Short term fuel trim is the adjustment of feedback signals for conditions that are only temporary in nature. The settings for short term fuel trim are generally re-zeroed in between engine starts.

Long term fuel trim is the adjustment of the signals to compensate for persistent conditions (conditions that exhibit their change over a prolonged period of time), such as dirty fuel injectors or other vehicle-to-vehicle differences. Long term fuel trim settings are maintained between starts.

Fuel trim is expressed as a percentage, and is typically calculated by considering numerous sensor values, including front O2 sensors, intake air temperature/pressure (or MAFS reading), engine temperature, anti-knock sensors, engine load, throttle position and change thereof, and even battery voltage.

Once it is determined that the methods of FIG. **4** or **5** are insufficient to overcome conditions in the fuel trim level of the emissions control system of a particular engine, an air infusion insert is inserted into the MAFS section for the latest test **219**. It is believed that the air infusion insert somehow conditions the air flow within the MAFS section of piping so that the fuel trim computation compensates in a way the increases available horsepower. Several exemplary systems so modified were able to add at least ten horsepower to the engine's output. The diameter and location of the air infusion insert can also effect the engine performance, so these conditions are preferably altered and the system retested **221** until the optimum size and location of insert is determined. FIG. **10** introduces the technical details of the air infusion insert.

FIG. **10** is a cross-section, along section A-A of FIG. **8**, of the MAFS section **66**A of the present invention further including examples of a preferred air infusion insert. The MAFS section depicted here is identified as **66**A to denote that it is a modified version of the section shown in FIG. **8**. The modification involves the addition of the air infusion insert **84** within the inner chamber of the MAFS section **66**A.

In this depiction, the insert **84** is shown at ninety degree separation from the MAFS flange **74** and MAFS aperture **72**. The insert **84** may also be positioned in virtually any other sidewall location (see examples **86**) around the circumference of the inner wall **82** of the MAFS section **66**A in order to provide the optimum performance result. Testing has revealed that the diameter of the insert **84** is to be chosen from a group of diameters, including ½ inch, ⅝ inch ¾ inch and ⅞ inch. Other diameters (smaller than the diameter of the MAFS section **66**A) would likely be feasible, however, diminishing return is expected for very small incremental changes in diameter. FIG. **11** gives another view of the insert.

FIG. **11** is a partial cutaway perspective view of the MAFS section **66**A of FIG. **10**. As shown here, the insert **84** is defined by a first open end **88**A, a second open end **88**B and a main tubular middle section. Its length is equal to or less than the overall length of the MAFS section **66**A. What is critical is that the insert is oriented along the same longitudinal flow path as the MAFS section **66**A, so that the air flowing through the intake tract is not disturbed by its presence.

Those skilled in the art will appreciate that various adaptations and modifications of the just-described preferred embodiment can be configured without departing from the scope and spirit of the invention. Therefore, it is to be understood that, within the scope of the appended claims, the invention may be practiced other than as specifically described herein.

What is claimed is:

1. An intake air system for an internal combustion engine, comprising:

a distal intake pipe portion;

a MAFS pipe portion adjacent to said distal intake pipe portion;

an air infusion insert comprising an elongate member located within said MAFS pipe portion; and

a proximal intake pipe portion between said MAPS pipe portion and the internal combustion engine, and external to said internal combustion engine;

wherein said distal intake pipe portion defines a first inner diameter at its proximal end and said MAFS pipe portion defines a second inner diameter, said second inner diameter being less than said first inner diameter, the diameter of the distal end of said MAPS pipe portion being substantially the same as said first inner diameter.

2. The intake system of claim **1**, wherein said MAPS pipe portion defines a generally cylindrical segment of piping disposed between said distal and proximal intake portions, said MAFS pipe portion further defined by a MAPS aperture formed in its wall; and

said air infusion insert comprises a tubular member having a first open end and a second open end, said tubular member attached to said MAFS pipe portion within said inner diameter thereof.

3. The intake system of claim **2**, wherein said air infusion insert is defined by a length less than or equal to the length of said MAFS pipe portion.

4. The intake system of claim **3**, wherein said air infusion insert is defined by a diameter of less than 1 inch.

5. The intake system of claim **4**, further defined by a first neck portion disposed between said distal intake pipe portion and a first end of said MAPS pipe portion and a second neck portion disposed between an opposing end of said MAFS pipe portion and said proximal intake pipe portion, said first and second neck portions defining generally conical shapes.

6. The intake system of claim **5**, wherein said distal intake pipe portion, said first neck portion, said MAFS pipe portion, said second neck portion and said proximal intake pipe portion are formed from a continuous, unbroken piece of pipe material.

7. The intake system of claim **6**, wherein said MAFS pipe portion is further defined by an MAFS mounting flange encircling said MAPS aperture.

8. An air intake system for an internal combustion engine, comprising:

a distal intake pipe portion defined by an intake air filter at a first end;

a MAFS pipe portion adjacent to a second end of said distal intake pipe portion, said MAPS pipe portion sized to mate with said second end, said MAFS pipe portion having rigid walls;

an air infusion insert pipe disposed within said MAPS pipe portion and in longitudinal alignment therewith; and

a proximal intake pipe portion adjacent to an opposing end of said MAFS pipe portion, said proximal intake pipe portion adapted to attach to the internal combustion engine.

9. The intake system of claim **6**, further defined by a first neck portion disposed between said distal intake pipe portion and a first end of said MAFS pipe portion and a second neck portion disposed between an opposing end of said MAFS pipe portion and said proximal intake pipe portion, said first and second neck portions defining generally conical shapes; and said air infusion insert comprises a tubular member having a first open end and a second open end, said tubular member attached to said MAFS pipe portion within said inner diameter thereof.

10. The intake system of claim **9**, wherein said air infusion insert is defined by a diameter of less than 1 inch.

11. The intake system of claim **10**, wherein said distal intake pipe portion, said first neck portion, said MAFS pipe portion, said second neck portion and said proximal intake pipe portion are formed from a continuous, unbroken piece of pipe material.

12. The intake system of claim **11**, wherein said MAFS pipe portion defines a generally cylindrical segment of piping disposed between said distal and proximal intake portions, said MAPS pipe portion further defined by a MAPS aperture formed in its wall.

13. The intake system of claim **12**, wherein said MAFS pipe portion is further defined by an MAFS mounting flange encircling said MAPS aperture.

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