An on-vehicle massage system for a passenger vehicle that utilizes an air compressor on the passenger vehicle as a source of dynamic force and the power supply on the passenger vehicle as an electric power source to inflate and deflate air bags mounted in seats of the passenger vehicle to provide massage action. A pressure detecting circuit detects the air pressure in an air cylinder of the air compressor, so that the on-vehicle massage system is actuated only when a detected pressure value is high enough for normal and safe operation of the passenger vehicle. The on-vehicle massage system is economical and safe for use to relieve passengers' stiff muscles caused by long distance journey on the vehicle.
ON-VEHICLE MASSAGE SYSTEM FOR A PASSENGER VEHICLE

BACKGROUND OF THE INVENTION

0001 The present invention relates to an on-vehicle massage system for a passenger vehicle, and more particularly to a massage system that utilizes power from air compressor and power supply of a passenger vehicle to massage passengers seated on seats, so that passengers could feel relaxed and more comfortable on travel.

0002 Trains and buses are two very common passenger vehicles for long distance travels, and in areas where trains are not available, buses would become the major selection of travelers. To reduce the uncomfortable feeling of stiff muscles due to sitting in the same position on the bus for a prolonged period of time, one of many ways is to adopt high-class seats similar to that on a passenger aircraft. However, passengers on buses for long journey would eventually feel tired and get stiff neck, back and waist no matter how soft and comfortable the seats are.

0003 A massage device has been developed for mounting on individual seats of buses in an attempt to massage and thereby relieve the passengers’ stiff muscles. Such massage device typically includes an air bag attached to the seat, and a small air pump for inflating the air bag, so that the air bag is repeatedly inflated and deflated to produce a massage action on the passenger’s muscles. Such massage device is individually mounted on each seat of the bus and requires considerably high cost and is therefore not economical for bus operators.

SUMMARY OF THE INVENTION

0004 It is therefore a primary object of the present invention to provide an on-vehicle massage system for a passenger vehicle that utilizes an air compressor normally provided on a bus as a source of dynamic force to inflate and deflate air bags attached to individual seats in a controllable and economical manner.

0005 Another object of the present invention is to provide an on-vehicle massage system for a passenger vehicle that is actuated to provide massage action only when a pressure value of air in an air cylinder of the passenger vehicle is detected as high enough for normal and safe operation of the passenger vehicle.

0006 To achieve the above and other objects, the on-vehicle massage system of the present invention mainly includes a predetermined number of air bags provided on each seat of the passenger vehicle, two pressure regulating valve, an electromagnetically controlled air valve, and an air distribution valve having multiple air delivery pipes. Air provided by the air compressor of the passenger vehicle is regulated by the pressure regulating valve to a pressure low enough for comfortable massage purpose and then supplied to the air bags via the air distribution valve. The air bags are repeatedly inflated and deflated through control of electromagnetic valves in the air distribution valve.

0007 The on-vehicle massage system of the present invention also includes a central processing unit, a power circuit, a pressure detecting circuit, an input circuit, and an output circuit. The power circuit reduces a power supplied by the passenger vehicle to a DCSV current for use in the massage action. The pressure detecting circuit detects a pressure value of air in the air cylinder of the passenger vehicle and sends a signal to the central processing unit. The central processing unit actuates the on-vehicle massage system only when the pressure detecting circuit detects a pressure value high enough for normal and safe operation of the passenger vehicle.

BRIEF DESCRIPTION OF THE DRAWINGS

0008 The structure and the technical means adopted by the present invention to achieve the above and other objects can be best understood by referring to the following detailed description of the preferred embodiments and the accompanying drawings, wherein

0009 FIG. 1 is a circuit and structural diagram of the on-vehicle massage system for a passenger vehicle according to the present invention; and

0010 FIG. 2 is a schematic perspective view of a seat on a passenger vehicle equipped with the massage system of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

0011 Please refer to FIG. 1 that is a circuit and structure diagram of an on-vehicle massage system for a passenger vehicle according to a preferred embodiment of the present invention. The on-vehicle massage system of the present invention is designed for implementation on a passenger vehicle equipped with at least an air compressor 10 and at least an air cylinder 11 communicably connected to the air compressor 10. The on-vehicle massage system mainly includes a predetermined number of air bags 16 provided on each seat 30 (see FIG. 2) of the passenger vehicle, a first and a second pressure regulating valve 12, 13, an electromagnetically controlled air valve 14, and an air distribution valve 15 having multiple air delivery pipes 151.

0012 The two pressure regulating valves 12, 13 are serially and communicably connected to the air cylinder 11 via a first pipe 17. The first pressure regulating valve 12 is adapted for a coarse regulation of pressure within the range from 1 to 10 kg/cm² and the second pressure regulating valve 13 is adapted for a fine regulation of pressure within the range from 0 to 1 kg/cm² that is suitable for generating a comfortable massaging effect. The electromagnetically controlled air valve 14 is a three-way valve and includes an air inlet connected to the first pipe 17, an air outlet 18, and a second pipe 19 communicating the air valve 14 with the air distribution valve 15. The air delivery pipes 151 of the air distribution valve 15 are separately led to individual air bags 16 mounted on seats and are opened or closed through electromagnetic valves (not shown).

0013 A circuitry for controlling the on-vehicle massage system of the present invention includes a central processing unit 20, a power circuit 21, a pressure detecting circuit 22, an input circuit 23, and an output circuit 24.

0014 The power circuit 21 regulates a DC12V power supply 27 from the passenger vehicle to a DCSV current usable by the massage system of the present invention. The pressure detecting circuit 22 detects a pressure value of air in the air cylinder 11 of the air compressor 10 on the passenger vehicle and sends a signal representing the
detected pressure value to the central processing unit 20. The input circuit 23 sends signals from individual push buttons on the seats 30 to the central processing unit 20. The output circuit 24 receives instructions from the central processing unit 20 and timely actuates the electromagnetically controlled air valve 14 and the electromagnetic valves in the air distribution valve 15 according to the received instructions. Indicating lamps in the form of light-emitting diodes (LED) provided in the massage system at predetermined positions corresponding to these valves are lighted at the same time.

[0015] When the pressure value detected by the pressure detecting circuit 22 is high enough for a normal operation of the passenger vehicle, a signal from the input circuit 23 to the central processing unit 20 is sent to the output circuit 24 and accordingly the air distribution valve 15, so that a certain or some of the electromagnetic valves of the air distribution valve 15 is or are actuated to repeatedly inflate and deflate specific air bag or bags 16 corresponding to the signal. On the other hand, when the pressure value detected by the pressure detecting circuit 22 is lower than a preset valve representing a low limit of pressure needed by the passenger vehicle to work normally and the central processing unit 20 would send a signal to the output circuit 24 to close the electromagnetically controlled air valve 14, so that the air distribution valve 15 does not act. Thus, the pressure detecting circuit 22 is also a protective circuit ensuring the passenger vehicle to always have sufficient dynamic force supplied by the air compressor 10 to maintain a normal operation thereof. It is preferable that the preset pressure value for the pressure detecting circuit 22 is sufficiently higher than the low limit of pressure needed by the passenger vehicle to work normally, so that the whole on-vehicle massage system of the present invention could be used without endangering the safety of the vehicle and the passengers. In the event the air pressure in the air cylinder 11 lowers to a level lower than the preset pressure value while the on-vehicle massage system is in operation, the central processing unit 20 would immediately send a signal to the output circuit 24 to close the second pipe 19 communicating the electromagnetically controlled air valve 14 with the air distribution valve 15, and a signal to the air distribution valve 15 for the latter to stop working.

[0016] Please refer to FIGS. 1 and 2 at the same time. To effectively relieve passengers' tired feeling caused by stiff neck, back and waist, each seat 30 is preferably provided at a back thereof with upper, middle and lower sets of air bags 16 to massage a passenger's neck, back and waist, respectively. The seat 30 is provided at an armrest 31 thereof with a group of push buttons 25 and a group of indicating lamps 26. The push buttons 25 include three start buttons 251 for separately controlling the actuation of the upper, the middle and the lower air bag 16, a time-selection button 252, and a power button 253. The indicating lamps 26 include three start lamps 261 that become lighted when the three start buttons 251 are depressed, some time lamps 262 for indicating selected time periods, and a power lamp 263. A protective plate 32 openably covers these push buttons 25, 252, 253 and indicating lamps 261, 262, 263, so that they would not be unexpectedly touched.

[0017] When the electromagnetically controlled air valve 14 works, air from the air cylinder 11 is admitted into the air distribution valve 15 via the second pipe 19. And, when the air valve 14 stops working, the second pipe 19 is closed and air in the air distribution valve 15 and the air bags 16 is discharged from air outlets (not shown) in the air distribution valve 15. When a passenger depresses one or more start buttons 251 and selects a time via the time button 252, the selected air bags 16 are repeatedly inflated and deflated within the selected time period to provide a massage action.

[0018] In brief, the on-vehicle massage system of the present invention utilizes the air compressor on the passenger vehicle as a source of dynamic force and the power supply on the passenger vehicle as an electric power source, and provides massage action only when the pressure in the air cylinder of the air compressor is detected by the pressure detecting circuit as sufficient for normal and safe operation of the passenger vehicle. The on-vehicle massage system of the present invention is therefore economical and safe for use to relieve passengers' stiff muscles caused by long distance journey on the vehicle.

What is claimed is:

1. An on-vehicle massage system for a passenger vehicle, said passenger vehicle being equipped with at least an air compressor and at least an air cylinder communicably connected to said air compressor, said on-vehicle massage system comprising:

   a plurality of air bags being separately mounted on seats of said passenger vehicle;

   first and second pressure regulation valves being communicably connected to said air cylinder via a first pipe, said first pressure regulation valve being adapted for a coarse regulation to largely reduce a pressure of air supplied from said air cylinder, and said second pressure regulation valve being adapted for a fine regulation of a pressure of air passed through said first pressure regulation valve to a predetermined pressure range for massage purpose;

   an electromagnetically controlled air valve serially connected to said second pressure regulation valve and including an air outlet and a second pipe;

   an air distribution valve being communicably connected to said electromagnetically controlled air valve via said second pipe, and having a plurality of air delivery pipes separately led to said air bags, and said air delivery pipes being controlled through respective electromagnetic valves to open or close;

   a power circuit for reducing a voltage of a power supplied by said passenger vehicle to a voltage usable for massaging purpose;

   a pressure detecting circuit for detecting a pressure value of air in said air cylinder of said passenger vehicle and outputting a signal of said detected pressure value;

   an input circuit via which signals generated by depressing push buttons provided on seats of said passenger vehicle are output;

   a central processing unit for receiving and processing signals from said power circuit, said pressure detecting circuit and said input circuit to output a signal; and

   an output circuit receiving said signal from said central processing unit to timely actuate said electromagneti-
cally controlled air valve and said electromagnetic valves in said air distribution valve to start or stop inflating and deflating said air bags, and said output circuit also lighting a plurality of LED indicating lamps provided on said seats corresponding to said push buttons on said seats that have been depressed.

2. The on-vehicle massage system for a passenger vehicle as claimed in claim 1, wherein said central processing unit instructs said output circuit to close said electromagnetically controlled air valve and disenable said air distribution valve when said pressure detecting valve detects a pressure value that is lower than a preset value representing a low limit of pressure needed by said passenger vehicle to operate normally and safely.