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(54) Gas containers

(57) A gas supply device comprising at least two gas containers, each containing a different gas, is provided with a mixer device in direct engagement with the at least two containers A moveable carrier unit supports the at least two containers. The mixer device has means for varying the quantity of gas supplied from each container and an outlet for supplying the mixture of gases.

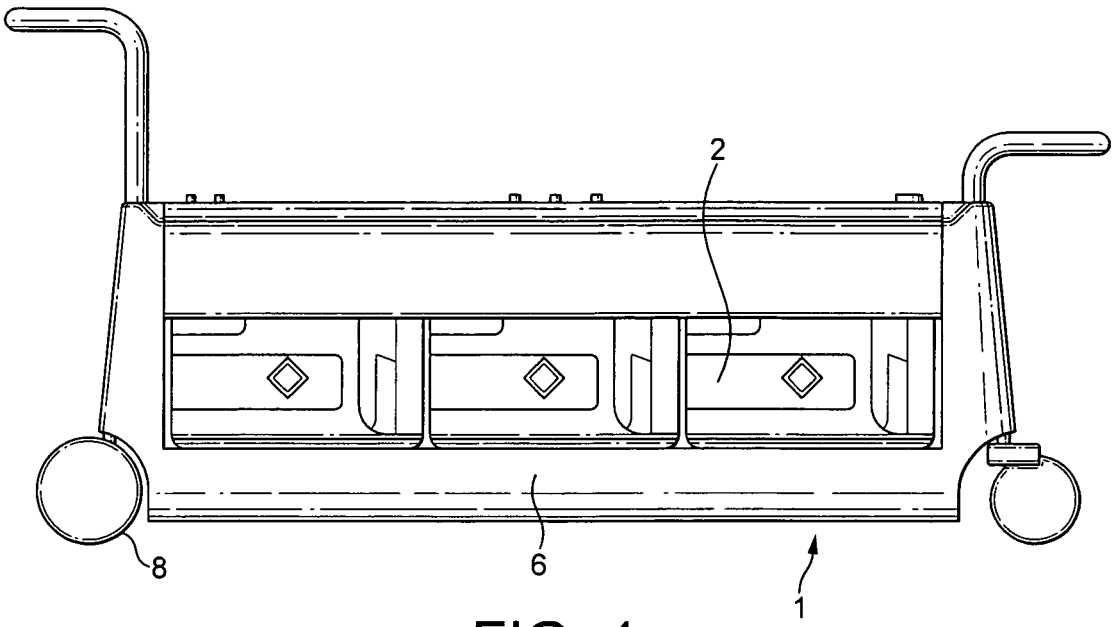

FIG. 1

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Description

[0001] The present invention relates to the field of gas cylinders, in particular to portable composite cylinders.

[0002] Conventional gas cylinders are long and narrow, having a flattened bottom at one end to enable it to stand upright on a level surface. The top end of the cylinder has a port through which the gas exits the cylinder. This is typically via a valve installed on the cylinder. Within the valve is a flow path that runs from the inlet (inside of the cylinder) to the outlet (atmospheric side). The flow path is opened and closed by means within the valve. When the gas in the cylinder is not required a cap or other closure means is provided to be located over the valve. This protects the valve from damage should the cylinder fall over or otherwise be knocked. The closure means may comprise a protective collar around the valve.

[0003] When the gas is required the closure means is removed and a pressure regulating assembly is attached to the valve. The pressure regulating assembly can be adjusted to control the pressure of gas out of the cylinder to the apparatus that requires the gas supply.

[0004] Many industrial and healthcare applications use mixtures of more than one gas. Each gas is extracted from its own cylinder under pressure and taken to a point by means of a gas hose to where each gas is mixed together, at either a wall mounted or floor mounted mixer. Alternatively the gases are mixed together previously in a known ratio in a single cylinder.

[0005] However many users may require a range of different mixes for basically the same application. For example in MAG welding steel argon + 5 to 25% CO_2 mixtures are commonly used. Several mixtures may be required on one site. These mixtures are typically supplied at the present time in large, heavy, steel or aluminium cylinders in a range of capacities. This entails the storage of a large number of cylinders all having different ratios of gases therein.

[0006] There is a need to provide more versatile and flexible arrangements in which the end user or customer may vary the composition of the gases used.

[0007] The invention aims to provide a portable compact cylinder arrangement which allows an end user to vary and mix his own gas using a mixing device. The apparatus or arrangement can provide variation in the composition ratio of the mixture.

[0008] According to the present invention there is provided a gas supply device comprising at least two gas containers, each containing a different gas, a mixer device in direct engagement with the at least two containers and a moveable carrier unit which supports the at least two containers, the mixer device having means for varying the quantity of gas supplied from each container and an outlet for supplying the mixture of gases.

[0009] Preferably the gas containers are composite cylinders rather than similar sized metallic cylinders.

[0010] Preferably the mixer device may be digitally controlled.

[0011] The use of more than one cylinder allows the gases to be held separately until needed and then mixed in the ratio required. This allows a range of different compositions to be provided, thus increasing the versatility of the supply device or unit. Different production requirements can thus always be met on site.

[0012] Due to the use of composite cylinders the unit is lighter than conventional steel cylinders thus making the unit lightweight. This allows the unit to be more easily transported to the appliance where the gas mixture is required.

[0013] The provision of wheels, or alternative means of moving the unit, greatly enhances the portability of the unit.

[0014] In order that the invention may be more clearly understood reference will now be made to the accompanying drawings, given by way of example only, in which:

Figure 1 is a side view of a supply device in accordance with one embodiment of the invention;

Figure 2 is a perspective view of the supply device; and

Figure 3 is a view of another embodiment of the invention.

[0015] Figure 1 shows an embodiment of the gas supply device in accordance with the invention and designated generally by reference numeral 1. In the embodiment illustrated in Figure 1 there are three containers 2 located on the base 6. However it will be understood by those skilled in the art that it is only necessary to have at least two gas containers. Three are not essential. Each container 2 contains a different gas. The gases will depend on the application required by the customer. For example, if the invention is to be used by welders the gases will be argon and carbon dioxide or argon and helium. It will be appreciated by those skilled in that art that the container does not have to be a cylinder. The present invention does not limit the shape of the gas container.

[0016] The containers 2 fit onto the base or carrier unit 6. The base unit is designed and sized such that the gas containers snap fit into place and do not move relative to each other once located on the base unit. The base unit 6 may be provided with wheels 8 to allow the supply device 1 to be moved to the location where the gas supply is required. The portability of the unit greatly enhances its use. It allows the supply device to be stored away from the area of use until it is required. Furthermore it allows the device to be easily moved from one area of use to another.

[0017] A mixer device 4 is located above the containers 2 and is in direct engagement therewith. The mixer device is provided with means to vary the flow out of each container to provide the exact mix required by the customer. The mixer also contains a mechanism for adjusting the

flow of shielding gas to that required by the process.

[0018] A handle 12 may also be provided to increase the ease with which the supply unit can be moved.

[0019] In operation the customer wheels the supply device 1 from its storage location to the location of the appliance which requires the mixture of gas. At this location the customer adjusts the controls of the mixer 4 to give the ratio of gases required. It is then a simple matter to connect the output of the supply device to the appliance that needs the gas. The mixer can be adjusted whenever necessary, i.e. whenever a different ratio of the gases within the containers is required.

[0020] Preferably the mixer device 4 has means for indicating how much gas is left in each container.

[0021] To allow the unit to be portable the cylinders should be as lightweight as possible. Therefore composite cylinders should be used in the supply unit rather than metallic cylinders. Composite cylinders have a thin structural liner produced from a suitable grade of steel wrapped with a structural fibre composite. The composite can be, for example, glass fibre or carbon fibre. The liner provides strength with ductility and the composite wrap increases strength and resistance to deformation and bursting. This is effectively a pressure vessel. The outer portion of the cylinder is a protective shell for protection against external damage. This outer portion is usually a plastic material. These composite cylinders are of much lower weight compared to similar sized metallic pressure vessels. Full composite cylinders in which the inner liner is also made of a composite material may also be used.

[0022] Figure 3 illustrates an alternative embodiment of the invention.

[0023] In this embodiment the composite pressure vessels 2 are enclosed in an outer plastic jacket or shell 10. The mixer unit 4 is built in to the shell 10. The shell 10 is provided with wheels or rollers.

[0024] The range of mixtures will depend on the application and the individual gases. For example in the field of beverages dispensing mixtures between 30 and 60 % carbon dioxide in nitrogen is used. In food applications nitrogen plus 10 to 40% CO_2 is used. In medical applications the percentage of helium will vary 5 to 20% with the residual being air or an oxygen and nitrogen mixture.

[0025] Examples of different gas combinations for welding include: argon plus 2 to 30% CO_2; argon plus 20 to 80% helium; argon plus 15 to 60% He plus 2 to 20% CO_2.

[0026] The invention allows the product, i.e. the specific mixture of gas required for the particular application, and the mixer, which allows this specific mixture to be produced, to be moved together as one complete package to where the particular gas mixture is to be used.

[0027] The invention has been described mainly with reference to welding applications. It will be understood by those skilled in the art that the invention is not limited to such an application. The invention may also be used in food preservers and small food packer industries and by other small to medium sized customers who would not be able to afford to buy a range of gas cylinders which could provide optimal performance. Other applications will readily be recognised by the person skilled in the art.

[0028] The invention has been described above with respect to a preferred embodiment. It will be understood by those skilled in the art that changes and modifications may be made thereto without departing from the scope of the invention as set out in the appended claims.

Claims

1. A gas supply device comprising at least two gas containers, each containing a different gas, a mixer device in direct engagement with the at least two containers and a moveable carrier unit which supports the at least two containers, the mixer device having means for varying the quantity of gas supplied from each container and an outlet for supplying the mixture of gases.

2. A device as claimed in claim 1 wherein the carrier unit comprises a trolley like device upon which the gas containers are fitted.

3. A device as claimed in claim 1 wherein the carrier unit comprises an outer shell configured to enclose the at least two containers.

4. A device as claimed in claim 3 wherein the shell is provided with wheels or rollers.

5. A device as claimed in any preceding claim wherein the containers are composite containers.

6. A device as claimed in claim 5 wherein the containers have an inner steel liner wrapped with a fibre composite and provided with a protective shell.

7. A device as claimed in claim 5 wherein the containers have an inner fibre composite liner wrapped with a fibre composite and provided with a protective shell.

8. A device as claimed in any preceding claim further provided with handle means.

9. A device as claimed in any preceding claim wherein the mixer device includes means for indicating the amount of gas left in each container.

10. A device as claimed in any preceding claim wherein the mixer device is digitally controlled.

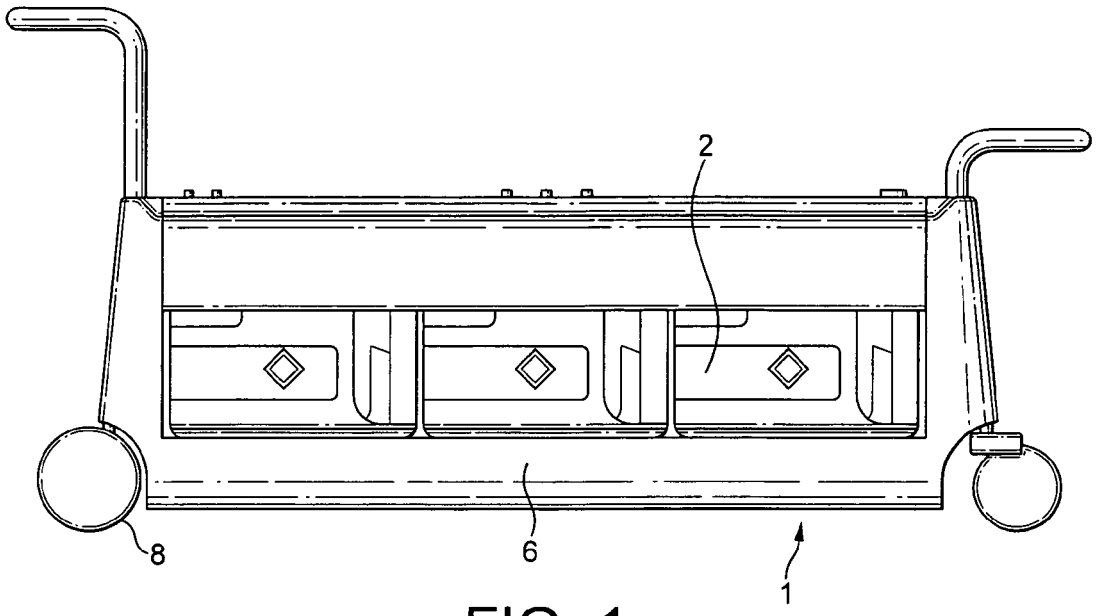

FIG. 1

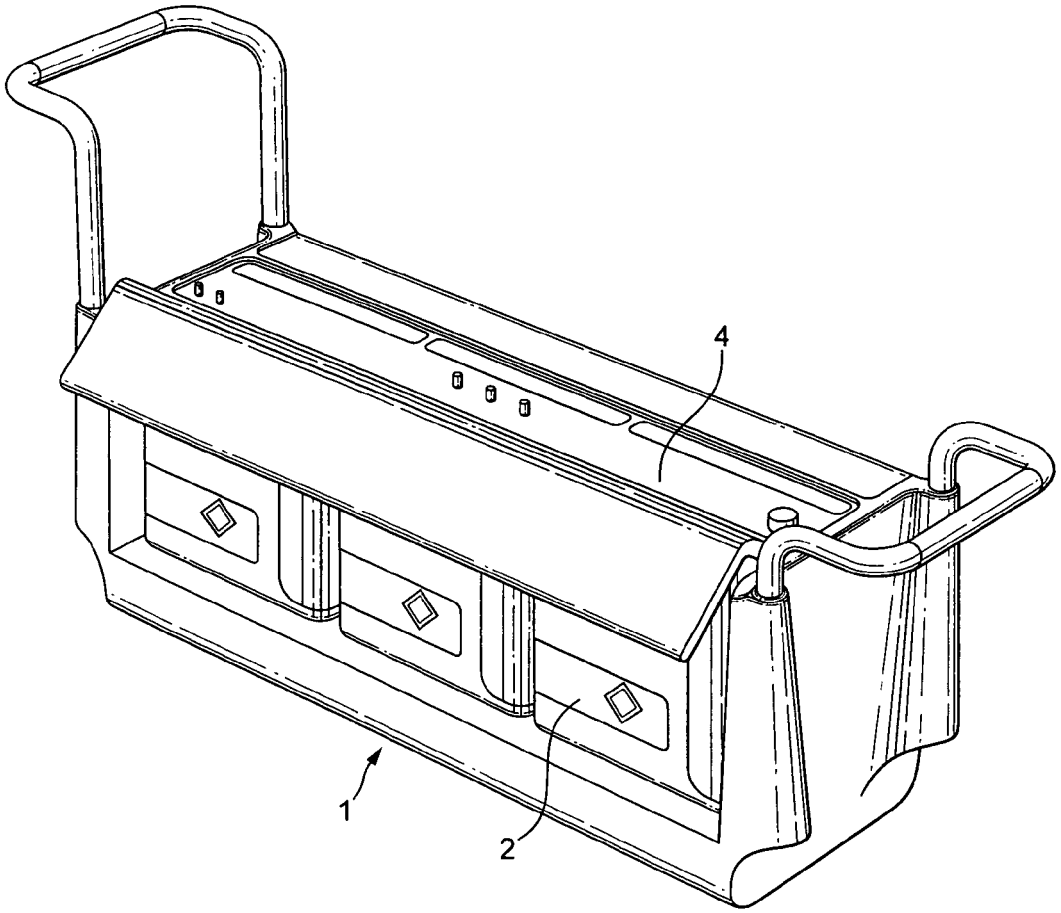

FIG. 2

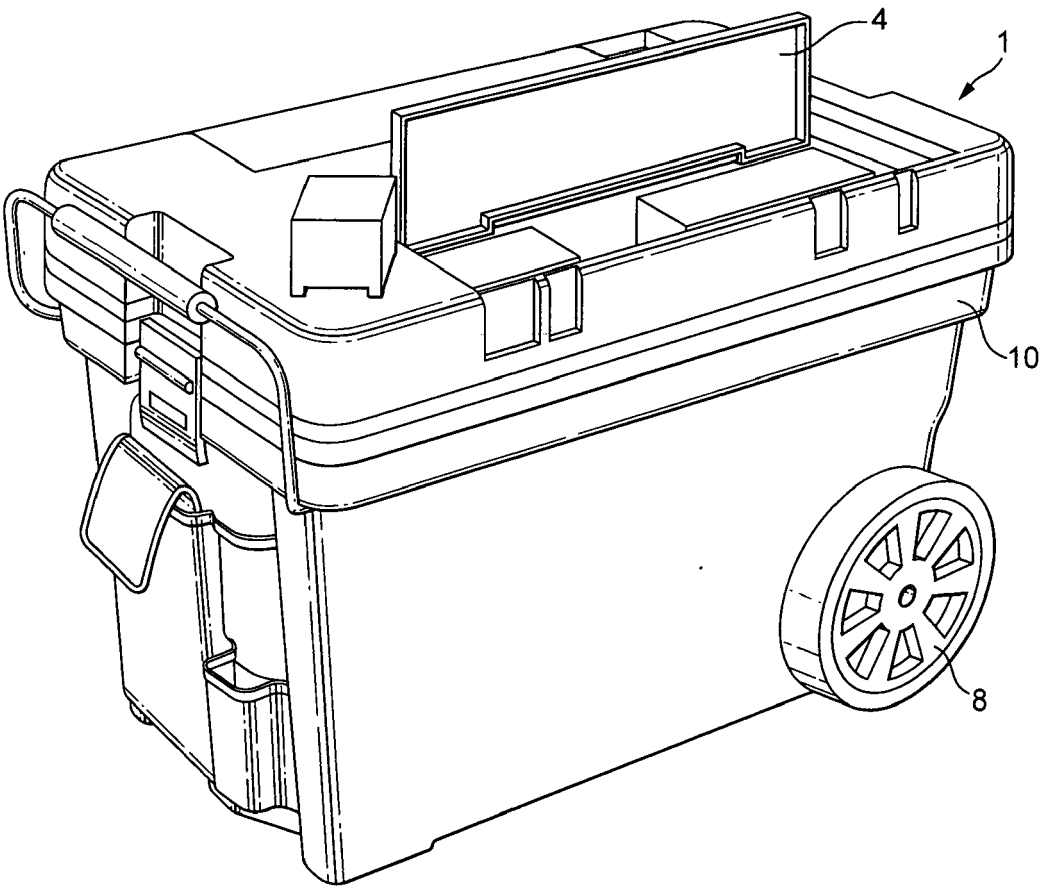

FIG. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 10 25 1090

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	5 October 2010	Stängl, Gerhard

CATEGORY OF CITED DOCUMENTS

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