due to the design into gas velocity and gas pressure in different manners.

The rotary compressor **3** is provided with a compressor wheel with a diameter of less than 40 mm and with an electric drive motor **21** in a very compact form as one assembly unit, which is connected to the breathing mask **2**. Batteries or rechargeable batteries are used as the energy source **5**. The energy and optionally signals are transmitted by means of the electric connection **4**. The rotary compressor **3** has sufficiently large gas flow cross sections of at least 75 mm^2 for the breathing gases and generates the gas pressures of up to 5,000 Pa needed for pressure-supported respiration. Both the electric drive and the compressor wheel have a very low inertia of the rotating masses, totaling at most 2 $g \times cm^2$. The breathing gases are delivered into the breathing mask **2** through a filter **7** made of paper fibers for particles and microorganisms from the ambient air **8**, which said filter is arranged directly upstream of the rotary compressor **3**, and auxiliary gas lines **9**, carrying gases such as oxygen or nitrogen monoxide, are optionally added, and the gases are thus available to the patient **1** directly at the access to the lungs. The filter **7** is also used at the same time for sound absorption of sound emissions from the rotary compressor **3** and it improves the comfort of wear directly at the patient **1** as a result.

The rotary compressor **3** generates the pressure increase necessary for the respiration support in the breathing mask **2** due to the impartation of momentum to the breathing gas as a function of the circumferential velocity of the compressor wheel of the rotary compressor **3**. Due to the low inertia of the rotating masses of the radial compressor used, the speed of rotation and consequently also the respiration pressure can be changed so rapidly by means of a control unit **6** that the device can follow the spontaneous breathing efforts of the patient **1**. Due to the low inertia of masses of the moving components, the energy consumption for the acceleration is so small that a mobile, autonomous use at the patient **1** is possible with a small energy storage unit **5** and electric connection **4** to the rotary compressor **3** for the pressure-supported respiration of the patient. The rotary compressor **3** makes possible deep breathing in both directions to the ambient air **8** corresponding to the double arrows shown, so that a separate expiration valve does not necessarily have to be present in or at the breathing mask **2**.

A respiratory flow sensor **10**, which is designed especially as a pressure sensor and transmits measured signals to the control unit **6** via the electric connection **4**, is optionally located in the breathing mask **2** in the path of the gas flow. As a result, the control unit **6** is actuated as a function of the measured signals of the respiratory flow sensor **10** and the speed of rotation of the rotary compressor **3** and consequently the resulting respiration pressure for the patient **1** are changed highly dynamically, without a delay due to line losses.

The compact and lightweight design of the device according to the present invention makes possible the mobile, autonomous use of the device directly at the patient **1** to be respirated for pressure-supported respiration with very small dead spaces and flow resistances in the path of the breathing gas. The mass of such a device is about 100 g with dimensions of about 50 mm (edge length) for the drive unit with the compressor wheel. Depending on the particular embodiment of the device, different respiration pressures are set either only according to preset, fixed pressure stages or changed in a time-dependent manner corresponding to the respiration pressure curves stored in the control unit **6**, i.e., especially with an intermittent respiration pressure curve, which enables the patient **1** to breath out independently and is set highly dynamically solely on the basis of the variable speed of rotation of the rotary compressor **3** used, which has small moving masses, as a function of the measured signals of the respiratory flow sensor **10**, which are received by the control unit **6**. In the simplest case, the control unit **6** is used only to set a permanently preset respiration pressure or one of several selectable respiration pressures on the basis of the speed of rotation of the drive motor and of the driven compressor wheel of the compressor **3**, which speed is constant for a given respiration pressure.

While a specific embodiment of the invention has been shown and described in detail to illustrate the application of the principles of the invention, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. A device for respiration support, the device comprising:

a rotary compressor with an electric drive motor;

a filter arranged directly upstream of the rotary compressor with no intermediary with respect to a direction of gas flow;

a user interface part including one of a breathing mask and a breathing tube, the compressor being arranged directly upstream of said breathing mask or breathing tube with no intermediary with respect to a direction of gas flow; and

a control unit for setting a respiration pressure on the basis of the speed of rotation of said rotary compressor, said control unit being connected to said drive motor.

2. A device in accordance with claim **1**, wherein said rotary compressor is one of a radial compressor, an axial compressor, a drum-type compressor or a cross flow compressor.

3. A device in accordance with claim **1**, wherein a speed-dependant or time-dependent respiration pressure curve is used by said control unit to set said speed of rotation of said drive motor of said compressor, said speed-dependent or time-dependent respiration pressure curve being stored in said control unit.

4. A device in accordance with claim **1**, further comprising a respiratory flow sensor connected to said control unit and arranged in said user interface part, said control unit being actuated as a function of measured signals of said respiratory flow sensor.

5. A device in accordance with claim **1**, wherein said filter consists of a nonwoven or fiber material.

6. A device in accordance with claim **1**, wherein said tube is an endotracheal tube or a tracheometry tube.

7. A device in accordance with claim **1**, further comprising a feed line for feeding an auxiliary gas or an aerosol simultaneously with ambient air, said feed line being provided in an inflow area of said compressor facing away from a high pressure side.

8. A device in accordance with claim **4**, wherein said respiratory flow sensor is a pressure sensor with a measuring transducer containing a piezo crystal or a strain gauge.

9. A device in accordance with claim **1**, wherein said breathing mask is provided with a heating means.

10. A device in accordance with claim **1**, wherein said device is adapted to be connected to a patient for mobile, autonomous, pressure-supported patient respiration in medicine.

11. A method of respiration support, the method comprising:

providing a rotary compressor with an electric drive motor;

providing a user interface part including one of a breathing mask and a breathing tube;

arranging a filter directly upstream of the rotary compressor with no intermediary between said compressor and said user interface with respect to a direction of gas flow;