PATENT APPLICATION
63/199,410
12/23/2020

SUPPLIED-AIR PROTECTIVE DEVICE FOR AIRCRAFTS

BACKGROUND OF THE INVENTION

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The present invention relates to safe air travel and, more particularly, to a commercial aircraft personal supplied-air social distancing device.

Air travel is significantly impacted by airborne pathogens, such as coronavirus disease 2019 (COVID-19). Scientific research strongly suggests that "social distancing" and individual face coverings such as masks provide some degree of protection. However, the economics dictate that social distancing on commercial airlines is cost-prohibitive due to the limited space on an aircraft. Further, the efficacy of various masks is questionable. This combination has resulted in a general public perception that flying commercially may be too risky.

Other conventional devices, such as masks, have significant limitations and require social distancing. Masks come in a wide variety of materials from many manufacturers. Many of them are not rated or approved or certified by any recognized agency.

As can be seen, there is a need for a device that ameliorates these aforementioned problems. In accordance with the present invention, given the opportunity to wear a personal supplied-air protective device, individuals could fly with significant protection to themselves and crew members and airlines could fill all their seats.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a picture of a hood of an embodiment of the present invention;

FIG. 2 is a picture of a breathing air tube of the embodiment of the present invention;

FIG. 3a is a picture of female quick connect of the embodiment of the present invention;

FIG. 3b is a picture of a male quick connect of the embodiment of the present invention;

FIG. 4 is a perspective view of the embodiment of the present invention, in use on an airline; and

FIG. 5 is a simplified schematic view of the embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The following detailed description is of the best currently contemplated modes of carrying out exemplary embodiments of the present invention. The description is not to be taken in a limiting sense but is made merely for the purpose of illustrating the general principles of the present invention, since the scope of the present invention is best defined by the appended claims.

Broadly, an embodiment of the present invention provides a device for use on an aircraft, the device comprising: a hood configured to be placed over the head of an individual; a breathing air tube coupled to the hood; and a coupling configured to removably connect to a cabin airflow line of the aircraft.

The ventilation systems on commercial airliners include makeup air from outside the aircraft and return air that is recirculated. The air is filtered through High Efficiency Particulate Air (HEPA) filters. The HEPA filters are typically rated at 99.97% efficiency for airborne aerosols 0.3u aerodynamic diameter and larger (per certification). In reality, the filters also capture smaller aerosols just as efficiently. In conjunction with typical major airline COVID-19 decontamination protocols, the air provided to an individual's personal air-supplied protective device (an embodiment of the present invention) will be as "clean" as it is practical.

The present invention will provide individuals with significantly clean air. Thus, airline companies will be able to fill all seats without social distancing (meaning leaving a large number of empty seats). Further, the present invention provides a much greater protection factor for the individual user than social distancing or a standard face mask. All components described herein are necessary, unless otherwise stated. The hood, which will be described in greater detail below, is individual-specific and located in a fixed location. The hood must be removed when movement around the cabin is necessary. An appropriate mask would be necessary for individuals when movement around the cabin is necessary.

Referring now to FIGS. 1-5, a hood 1 is provided that, in use, is placed over an individual's head and secured in place. In certain embodiments, the hood may be a 3M™ VERSAFLO™ Hood; however, it will be appreciated by those with skill in the art that other appropriate hoods for this use may be developed in accordance with the present invention. A breathing air tube 2 is attached to a hood connector 1a of the hood 1 at one end and a quick connect fitting 3 at the other end. The breathing air tube quick connect fitting 3 (either the female or male fitting) is connectable to a floor-mounted quick connect fitting (the other of the female or male fitting). The floor-mounted fitting is installed into a cabin airflow line 4a. FIG. 4 illustrates these Items and connections. FIG. 5 is a simplified schematic illustrating the High Efficiency Particulate (HEPA) air filtration system including the Condensing Cycle Air Cycle Machine and the air conveyance system.

The intent of the present invention is to provide everyone on the aircraft (when seated or at designated crew stations) breathing air that is as 'clean' as it is practical. To that end, 'clean' air is moved from the Condensing Cycle Air Cycle Machine (or another alternative system) to the

Flight Deck, Forward Cabin and Aft Cabin via cabin airflow lines 4a. Air pressure is maintained at an appropriate level. The air moves into quick connect fittings 3 installed into the cabin airflow lines 4a., and then moves into the individual breathing air tubes 2. The air then moves into the hood 1 via an inlet mechanism/hood connector 1a, which may be located in the back of the hood 1 near the top of the wearer's head. Next, the air cascades across the wearer's head and downward then out from under a shroud 1b of the hood 1 at or near the wearer's shoulders. The system maintains positive airflow allowing the individual user to breath only 'clean' air while the assembly is in use.

Embodiments of the present invention may be modified in a number of ways while staying in the spirit and scope of the present disclosure. For example, an alternative to the floor-mounted airflow assembly would be a ceiling mounted assembly. The components would be the same except the quick connect fittings 3 would attach the hood assembly 1 to an overhead cabin airflow supply instead of sub-floor cabin airflow line 4a. Positive flow air movement through the breathing air tube 2 and hood 1 would remain the same.

A method of making the present invention may include the following. The technology and components needed to assemble embodiments of the present invention are already well-developed (the basic hood structure, tubing and couplings) and would require only small (but functionally important) modifications or additions to devices and existing ventilation systems. Multiple major manufacturers already provide the equipment. HVAC system engineering of airlines is highly developed and understood. Airflow characteristics are also well understood. The entire assembly requires using readily available components (or later-developed products specifically for this purpose) and technology be brought together in a configuration allowing for the desired 'clean' air outcome.
A method of using the present invention may include the following. Given the opportunity to wear a personal supplied-air social distancing device could allow airlines to fill all seats while still providing significant protection to each individual passenger and crew members. An individual would either bring their hood/breathing air tube assembly with them to the boarding area or be issued the assembly at the boarding area. An alternative would be to have a new or disinfected hood or hood and assembly available at the seat and crew station. Individuals would board the aircraft while wearing the appropriate mask or face covering, find their seat and sit. The individual would plug the Hood assembly into either the floor (or overhead) quick connect fitting. If the hood assembly was already in place and set up for an individual this step would not be necessary. The individual would don the hood by pulling it down over their head and draping the hood cowling downward as appropriate. A best practice would be for the individual to keep wearing their appropriate face covering or mask. This would further reduce the risk of cross-contamination during the trip.

The present invention has been described in terms of exemplary embodiments solely for the purpose of illustration. Persons skilled in the art will recognize from this description that the invention is not limited to the embodiments described but may be practiced with modifications and alterations limited only by the spirit and scope of the appended claims.

Commercial Aircraft Personal Supplied-Air Social Distancing Device

Brief Description of Items 1-5

Item 1 is a 3M™ Versaflo Hood and Breathing Air Tube. It attaches to a 3M™ SA-2000 adapter kit or similar. Other manufacturers assemblies could be used.

FIG. 1

Hood

Item 2 is a Breathing Air Tube. This device is connected to the fitting on the hood at one end and the aircraft floor vent system on the other end.

FIG. 2

Breathing Air Tube

Item 3 are generic Male and Female Quick Connect devices. Note the hood/breathing air tube/quick connect assembly and components will vary depending on the manufacturer and style of hood. One quick connect is attached to the breathing air tube. The other is attached to cabin airflow line located below the floor. It is attached perpendicular to the cabin airflow line and protrudes upward through the floor into a protected cavity.

Female Quick Connect

FIG. 3a

Male Quick Connect

FIG. 3b

Item 4 is a Commercial Aircraft Personal Supplied-Air Social Distancing Device Conceptual Rendition

FIG. 4

Item 5 is a simplified schematic of a commercial airliner HVAC system.

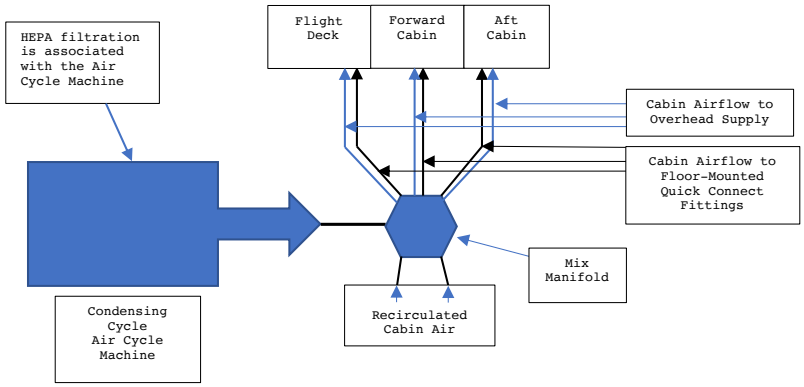

FIG. 5