

**TITLE: A SYSTEM AND METHOD OF AIR ISOLATION FOR PASSENGERS
AND OTHERS**

CLAIMS OF PRIORITY

[0001] This patent application claims priority from the Provisional Patent Application No. 202241006600 filed on 8th February 2022.

[0002] FIELD OF TECHNOLOGY .

This disclosure relates generally to technical fields of air flow isolation and management for preventing pathogens from spreading among people in a confined space or environment .

SUMMARY

[0003] _The invention has been developed to enable a convenient and a fast deployable air isolation for passengers and others, in enclosed crowded places to prevent spread of air borne diseases in the constrained area , said system comprising of a frame to support movement of a dynamic carriage , passengers to move comfortably with separated air supply and said dynamic carriage having a sliding air connector with pipe and holding a head cover and a body cover in one embodiment and in a example case of a airplane, a means for automated loading of head and body cover and its removal for disposal after the journey at de boarding.

A person entering a airplane first gets a head cover held by carriage , the said cover provides isolated air supply to the person and allows movement within the confined space available to move inside a passenger airplane. and holding a head cover and a body cover in one embodiment and in a example case of a airplane, a means for automated loading of head and body cover and its removal for disposal after the journey at de boarding.

This is a complete system to prevent international passengers from spreading a virus to the whole group that disperses later, thereby preventing rapid spread of virus from country to country.

PRIOR ART

[0004] Prior art has individual air isolation systems with air filter and pump, however providing each one of the passenger with a separate air isolation system has the problem of sterilizing the unit after each use, for the use by the next passenger, It also is clumsy to handle, time consuming to fit or insert and carrying it by passenger, is a problem due to weight of battery and pump, whereas in the present invention, no weight is carried by the passenger. but due to the associated problems as mentioned above it is not a solution to practically handling or preventing the aerial spread of viruses and other pathogens, further you will find people opening the mask and coughing and sneezing and its impossible to control them. Using masks throughout the long journey is impractical and leads to suffocation. helps in building up the confidence of a flying passenger and greatly reduces the fear of traveling by air which is a inventive step as a method of reducing fear. Cost effective solution is not there in prior art. Prior art does not have the critically needed dynamic carriage for holding and providing the air supply pipes that free a person from the load of equipment. Pipe entanglement problem is correctly solved by the present system.

Prior art does not have a practical, air isolator from entrance of passenger into airplane till exit, without wasting time to fit or wear the individualized isolator and without helping staff needed to fit or wear and prior art does not have cartridge based attachment of disposable cover to a person and automated disposal of used covers as taught here.

[0005] People are lazy and careless including the present inventor, so systems have to be adoptive to this aspect of people and achieve solution to the problem wherein the said carriage has a sliding air connector which is adopted to move in contact with the air duct, a micro processor with associated instruction set to control the movement of the carrier, follow the person who is using the head cover by means of sensors.

Frame comprising of a main frame running along the length of the fuselage and side frames being present side wards towards the row of seats and support structure comprising of rods, bars, frame or tubing next to seat to hold the body carriage holding part of frame and movement enabling part of frame. A modified toilet with bottom to top shutter based door to allow the carrier holding head cover to move into the toilet and

hence allow the person to use the toilet with the modifications to prevent contamination of air and surfaces Body cover prevents air contamination when the person is eating food or taking drinks. The sliding air connector has an actuator for valves to open and close valves to provide air supply and air suction.

[0006] A cartridge based dispensing unit for automatically dispensing the head and body cover which is preformed along with holder and pipe connector. similarly a automated collection unit with collection box for collecting the used covers for safe disposal

A holder for the disposable cover has a means to connect the pipes from carriage by means of quick connector present on the holder of the cover.

A method and means to remove or pull up head cover when inside body cover and remove or pull up, body cover to enable movement of the person using the head cover in place is another inventive step that allows enforcement of isolation without grudge or rules based enforcement. Drive to pull up and pull down, head and body cover by means of rolling up assisted by a motor drive in one embodiment and manually operated where a low cost version or embodiment is needed.

Drive means for the carriage being one of on board electric motor, one of belt drive engaged by clutch, a winding cable drive, one of a linear electric motor with coils on the frame, and one of a pneumatic drive.

The system is added to a airplane without much change in major arrangement and fitted in existing airplane layout.

Regarding microprocessor being one in carriage and one as a main computer, the carriage management sub system has a pipe crossover control which allowing people to crossover each other in a narrow path, without entangled air supply pipes.

Passenger location, that is presence information is got from camera images and analysed by the computer instruction set. Status and position of each carriage is tracked and enumerated on a map to allow crossing of passengers walking in opposite direction.

Proximity sensor, image sensor, air leakage detecting sensor , oxygen sensor , micro controller , battery for backup is present ,and the frame carries power supply current and has cables for interfacing with computer. Air flow for suction pipes optimised to clear exhaled gases. The system is a computer based air isolator management system.

Drive by electric motor, for pipe holding spool, and having gear, spring and clutch with ratchet and release means for ratchet.

SCOPE OF THE INVENTION

[0007] Scope of invention, we cannot avoid virus and its mutants, we cannot avoid international air travel so there is a need for the present invention. as air travel involves traveling along with strangers and a mix of people.

The problem of isolating air during movement or motion and during sitting stationary is solved by the present invention, with additional benefits from the dual cover or multiple cover system.

System extended to even inside building of airport so that from the time a passenger gets into an airport, walks around, and goes out of airport, if he falls or pulls, an extension pipe being a flat roll, comes out to provide sufficient piping.

All care is taken to avoid weak points that enable transfer of virus to next user of the system.

The system greatly reduced sterilization needed, by using disposable plastic film base head and body cover in one of the embodiment.

[0008] The device, systems, and methods disclosed herein may be implemented in any means for achieving various aspects, and may be executed in a form of a machine-readable medium embodying a set of instructions that, when executed by a machine, cause the machine to perform any of the operations disclosed herein. Other features will be apparent from the accompanying drawings and from the detailed description that follows.

BRIEF DESCRIPTION OF THE DRAWINGS

[0001] Example embodiments are illustrated by way of example and not limitation, in the figures of the accompanying drawings, in which like references indicate similar elements.

[0002] **Figure 1 and 2** is a schematic view of a airplane showing the system for air isolation with passengers entering after getting head cover and going to take a seat.

- [0003] **Figure 3** is a schematic view of a airplane passenger using the cover for air isolation , according to one embodiment.
- [0004] **Figure 4A** is a schematic view of a airplane passenger having his head cover being pulled up, **Figure 4B** showing the body cover , according to one embodiment.
- [0005] **Figure 5** is a schematic view of a carriage showing head cover with holder , and **Figure 6** is a schematic view of central main frame , having a side frame to row of seats.
- [0006] **Figure 7** is a schematic view of frame showing slot or gap, with air duct attached, according to one embodiment.
- [0007] **Figure 8** is schematic view of a tubular frame showing a cut section.
- [0008] **Figure 9** is a schematic view of sliding air connector, according to one embodiment.
- [0009] **Figure 10** is a schematic view showing a tubular frame with sliding suspender meant for support , according to one embodiment.
- [0010] **Figure 11** is a schematic view showing a carriage drive unit .
- [0011] **Figure 12** is a schematic view showing a rod fixed from side of seat to support a body cover carriage with a holding frame, according to one embodiment.
- [0012] **Figure 13** is a schematic view showing a embodiment wherein carriage has the body cover being formed at the site required instead of being pre formed
- [0013] **Figure 14** is schematic view showing yet another embodiment where carriage has roll as described in figure 13 A and adjacent cover sheets are attached by a sleeve.
- [0014] **Figure 15** is shows an embodiment where the seat has a cover wall which is rigid sheet present on side of seat , according to one embodiment.
- [0015] **Figure 16** shows a embodiment where head and body cover are integrated as a single cover.
- [0016] **Figure 17** shows a modified toilet door with curtain .**Figure 18** is a schematic view showing a dispenser unit for cover attached to its holder which is pre formed and packed in a cartridge box.
- [0017] **Figure 19** is a schematic view of the frame which forms a grid to allow movement anywhere in the area with carriage and other use case of the system.
- [0018] Other features of the present embodiments will be apparent from the accompanying drawings and from the detailed description that follows.

DETAILED DESCRIPTION

[0019] A system and method of air isolation for passengers and others has been described. Although the present embodiments have been described with reference to specific example embodiments, it will be evident that various modifications and changes may be made to these embodiments without departing from the broader spirit and scope of the various embodiments.

[0020] **Figure 1** is a schematic view of a airplane showing the system for air isolation with air plane being 101, a platform 102, a passenger about to enter 103, dispenser of cover with holder 104, row of seats 105, a passenger walking inside with head cover on 107, a passenger sitting with body cover on 108, a toilet with modified door 109. according to one embodiment.

[0021] **Figure 2** is a schematic view of a airplane 201, a boarding platform 202, with dispenser of preformed cover with holder 203, a carriage 204, which is a head cover carriage in one method and in another method both head and body cover carriage together, a body carriage 205, a central main frame 206 and side frame to seats 207.

[0022] **Figure 3 A** a schematic view of head cover supported by carriage 303, **Figure 3 B** A schematic view of a airplane passenger 301 having his body surrounded by body cover 304, held by body cover carriage 305, having drinks 306 in a A schematic view of a airplane passenger 301 having his head surrounded by head cover 302, with said cover comfortable way. according to one embodiment

[0023] **Figure 4** is a schematic view of a airplane passenger 401 having his head cover 402 being pulled up, **Figure 4 B** schematic view of a airplane passenger 401 sitting with body cover 402 surrounding him, and showing the head cover being pulled up after deployment of body cover.

[0024] **Figure 5** A schematic view of head cover carriage 501, on a frame 502, showing internal parts namely spool for pipes 503, microprocessor based board 504, drive motor for wheels 505, air duct 506 having openings with valve 507, head cover holder 508, head cover pull string 509, said string pulled by drive motor 510 on the connector part on carriage side according to one embodiment.

[0025] **Figure 6** is a schematic view of central main frame 601, having a side frame to row of seats 602, a carriage 603, a gate on rail, with spring, to allow pipe to cross 604, seat 605, and a camera 606.

[0026] **Figure 7** is a schematic view of frame 701 showing slot or gap, with air duct 702 attached, having openings with valve 703 for air, which is engaged by a sliding air connector 704, a suspending rod 705 which holds the carrier 706, having pipes for air supply and suction 707, connector 708 with carriage side part of the connector, having drive motor 709 for giving drive to cover pull string which is connected to head cover 710 which comes as a pre formed cover on a cover holder 711, which is packed into a cartridge box in stacks for dispensing, according to one embodiment.

[0027] **Figure 8** is a schematic view of a tubular frame 801 showing a cut portion with carriage drive unit 802 which holds the carriage 803. **Figure 8 B** A schematic view of frame 801 showing slot on the bottom face 804 which allows cross over and turning of carriage drive unit into side frame from main frame.

[0028] **Figure 9** is a schematic view of sliding air connector 901 showing opening 902 with valve, and valve 903 being actuated to open position to allow air flow by actuating spring loaded rod 904 shown in figure 9 B, **Figure 9 C** showing a tubular frame cross section 905, **Figure 9 D** showing the said tubular frame having wheels 906 of carriage drive unit, **Figure 9 E** showing air duct 907 for fresh air, and adjacent air duct 908 for suction of exhaled air, sliding air connector 909 and carriage 910. according to one embodiment.

[0029] **Figure 10** is a schematic view showing a tubular frame 1001 with sliding suspender 1002 meant to support the suspended carriage 1003, having drive wheel 1004 pressing underside of frame and its motor, for forward and backward movement on main frame and drive wheel 1005 for sideward movement.

[0030] **Figure 11** is a schematic view showing a carriage drive unit 1101 with drive wheel set 1102, with wheel 1103 for forward and backward movement on main frame, **Figure 11 B** showing the carriage drive unit with drive wheel set 1104 for sideward movement, and lever 1105 to lift up drive wheel set 1102 when drive wheel set 1104 is being used.

Figure 11 C shows the carriage drive unit having wheels on caster 1106 and a shifting frame 1107 to help turn the wheels on said caster for sideward movement, and further Figure 11 E shows a caster wheel having a drive motor 1111 connected directly to wheel 1112 to enable movement in any required direction, Figure 11 D shows a ball based drive with drive ball 1108, drive wheel with motor 1109 for sideward and 1110 for forward movement.

[0031] Figure 12 is a schematic view showing rod 1201 fixed from side of seat to support a body cover carriage holding frame 1202 which holds the body cover carriage 1203 with a gripping part 1204 attaching at top of the said carriage, the holding frame 1202 moved up and down by one of a rack and pinion drive 1206, frame release latch 1205 present to allow body cover 1208 to come down from its cover holder, and further the head cover carriage 1207 is shown after going into the body cover carriage.

Figure 12 B shows a schematic view showing carriage 1209 having a string holding rod 1210 to enable the pull down of the cover and Figure 12 C shows the string holding rod 1210 being turned and moved down after which string 1213 shown in Figure 12 D which is an enlarged view of string holding rod, said string 1213 pulls down cover by winding into spool 1212, and said cover is pulled up by string 1211 shown in figure 12 C.

In yet another embodiment in figure 12 E carriage 2014 has cover pulled down by a push rod 1215 with top end having protrusion that moves in slot 1216 driven by string 1217, with string 2017 winding on a spool 1218 shown in figure 12 F as an enlarged view.

[0032] Figure 13 is a schematic view showing an embodiment wherein carriage 1301 has the body cover being formed at the site required instead of pre formed, with roll 1302 having sheets meant to form the cover 1304 with said roll having drive 1303, and with cover joined as shown in 1305 by sealing heater 1306 which heat seals the adjacent sheets and the cover has a frame 1307 to enable pull down and up, and a knife cutter 1308 with its drive. Figure 13 B is another embodiment with carriage 1309, roll 1310 glue dispenser 1311 with pipe 1312 for applying glue, a stapler 1313 and knife cutter with drive 1314.

Figure 13 C shows a carriage 1315 spit and wipe paper collecting bag 1316, an air scavenging pipe 1317 and microphone 1318 with its circuit board to detect cough and sneeze.

[0033] **Figure 14** is a schematic view showing yet another embodiment where carriage 1401 has roll as described in figure 13 A and adjacent cover sheets are attached by a sleeve 1402 which is pushed by a drive. Figure 14 B shows a embodiment wherein carriage 1403 has one side of the cover in front of person 1404 which opens to allow movement of the said person and attached back with a adhesive or hook and loop fastener. Figure 14 C shows an embodiment where carriage 1405 has sheet 1406 that folds down to form side walls of the cover and form the full cover 1407 as shown in Figure 14 D . Figure 14 E shows a carriage 1408 pre formed cover unfurled by stick frame 1409 , Figure 14 F shows a embodiment where carriage 1410 has cover side 1411 with segmented portions of cover sliding on each other , to form the full cover.

[0034] **Figure 15 A** shows an embodiment where the seat 1501 has a cover wall which is rigid sheet 1502 present on side of seat 1501, and cover sheet 1503 for top and front on back of seat driven by drive 1504. and Figure 15 B shows the cover in figure 15 A deployed.

Figure 15 C shows yet another embodiment where seat 1505 has sheet 1506 folded as shown on the seat and opened up to form cover wall as shown in figure 15 D.

Figure 15 E is a enhancement to luggage compartment 1507 with a engaging plate 1508 that rolls out and allows luggage 1509 to be loaded easily without damage to carriage frame. Figure 15 F shows a disinfectant dispensing system having pipe 1510 carrying disinfectant liquid at pressure and having valves 1511 which open on touch and hold of a hand 1512. This system is fitted where ever people grip or take support by touching. Figure 15 G shows a carriage 1513 and a head band 1514 which has color contract to allow image sensor in carriage connector 1515 and also has magnetic coating to allow detection of persons movement and enable carriage to follow. Figure 15 H shows a embodiment where air supply is directly given to a mask.

[0035] **Figure 16 A** shows a embodiment where head and body cover are integrated as a single cover 1601 with carriage 1602, expansion rod 1603 driven by one of rack and pinion 1604 , showing gap 1605 , Figure 16 B shows the cover after expansion wherein the cover folded on back of persons body comes out to expand the space.

[0036] **Figure 17** shows a modified toilet door 1701 with curtain 1702 having drive 1703, a person using toilet 1704 with head cover 1705 held by carriage 1706 , person

1704 using wash basin with cover 1707 having air suction pipe 1708 and shown a commode 1708.

[0037] **Figure 18** is a schematic view showing a dispenser 1801 for cover attached to holder 1802 pre formed and packed in a cartridge box with the holder being released one by one on latch 1803 activation, moved by conveyer 1804 to position and connector attached to the connector part from carriage 1805 with tool 1806 operating to press and attach the connector after which the head cover is ready to use by a passenger who gets in through door of airplane 1807. **Figure 18 B** is another embodiment where dispenser 1808 has cartridge box on the floor of platform, having a means 1809 to lift up the cover with holder stake, with cover holder moved by a conveyer 1810, and connected by connector 1811 to carriage 1812. by operation of a connecting tool. **Figure 18 C** shows a used cover collection box 1813 where a used cover 1814 is detached from the carriage 1815 which come along with the departing passenger and is detached by the help of a tool 1816.

[0038] **Figure 19 A** is a schematic view of the frame 1901 which forms a grid to allow movement anywhere in the area with carriage 1902, a head cover 1903 and an additional pipe 1904 for cool air supply under a personal protection clothing of the person 1905 as relief from long hours of wearing pp kit in hot weather, also used in cold weather with warm air supply. In another embodiment, a old person 1906 is supported from falling down by a support line 1907 being one of a rope, a cable, a chain, and a belt and said support line is held by a carriage 1908.

Figure 19 B shows a cantilever arm 1906 on a support rod 1907 allowing carriage 1908 to move in required area, similarly **figure 19 C** shows a carriage 1908 held by 4 cables 1909 wound on spools, to move the carriage with external pipe 1913 to form an air curtain for protection. **Figure 19 E** shows an embodiment being used in an office 1914 with carriage having cover.

Although the present embodiments have been described with reference to specific example embodiments, it will be evident that various modifications and changes may be made to these embodiments without departing from the broader spirit and scope of the various embodiments.

In addition, it will be appreciated that the various operations, processes, and methods disclosed herein may be embodied in a machine-readable medium and/or a machine accessible medium compatible with a data processing system (e.g., a computer system), and may be performed in any order (e.g., including using means for achieving the various operations). Accordingly, the specification and drawings are to be regarded in an illustrative rather than a restrictive sense.

CLAIMS:**I Claim;**

1. A device and system to isolate air supply to people in confined space by having a carriage to hold and move air supply pipes synchronous with the persons movement , with supporting frame for the carriage and comprising of
a carriage

a drive means for the carriage ;

a air duct with valves , supply pipe and suction pipe;

a frame to support the carriage;

a cover means for enabling isolated clean air supply ;

a microprocessor with sensors to manage the movement of carriage;

The devise is characterized by the carriage adopted to hold and manage the air supply pipes by following the person and a air duct with series of valves accessed by the connector of pipes and a frame that allows movement of carriage and associated pipes without entangling the pipes, when people cross over.

2 The devise as in claim 1

wherein the carriage as claimed in claim 1 carries the clean air supply pipes and suction pipes on a spool with winding drive, a drive means for the carriage , microprocessor with associated sensors, covers and having connector for cover wherein said connector carries a drive motors to pull down and up the cover and the carriage is suspended or supported by the frame and wherein the carriage also has sensors for detecting the pipe length needed by a person which is adjusted by driving the spool of the pipe and wherein the carriage also carries a spool with supporting line to support the person , supporting line being one of a rope, a belt and a chain for preventing fall of elderly people.

3. The devise as claimed in claim 1:

wherein the drive means as claimed in claim 1 comprising of one of electric motors which drive the wheels supporting or suspending the carriage, one of a linear electric motor, one of a cable drive and one of pneumatic drive, with carriage being suspended from frame with slots to allow cross over of carriage and pipes so people can walk

without entangled pipes, said slots also allow turning and movement of carriage from main frame to branch and side frames .

4. The devise as claimed in claim 1:

wherein the frame as claimed in claim 1 and the support for the frame , has slot for enabling sideward movement and tuning of the carriage ,and wherein the frame has air duct for supply and return of used air having valve engaged by connector in the carriage to connect and disconnect and reconnect duct with pipe , as the carriage moves over the frame to follow the persons movement and wherein the frame conducts the electric power needed for the drives.

5. The devise as claimed in claim 1:

Wherein a cover means as claimed in claim1, to isolate the air supply is comprised by one of disposable cover and one of a fixed cover formed from sections moved into place, the disposable cover being dispensed from a dispenser cartridge box and collected after use in a collection box and wherein the said disposable cover is made of plastic film which is pulled up or down as required by the drive motor connected through a string and wherein the said cartridge box dispenses the disposable cover at the entrance of a plane and at entrance of a place such as a hall, a room , and wherein the disposable cover is one of a head cover , a body cover and one of a integrated head and body cover, and wherein fixed cover comprises of sheets as sections which move, to form the cover region and the sections forming the said fixed cover also protects the person from injury.

6. The devise as claimed in claim 1:

wherein the air duct as claimed in claim 1 comprises of a duct having series of valves engaged by the connector on the carriage and wherein a air pump and filter which draws air external to the space and delivers through the air duct to the person and also removes by suction, the air that is exhaled and hence prevent any virus from spreading and wherein the air duct is one of a separate air duct and one of being part of the frame.

7. The devise as claimed in claim 1:

wherein the microprocessor as claimed in claim 1 has a instruction set to enable control of the carriage movement , the pull up and down of cover to locate the relative position of person with reference to the given space by analysing proximity sensor data and

camera images , provide signals for the drive motor operation of the carriage drive for control and movement, control the pipe length dispensed by spool by winding and unwinding, control roll up and roll down of the isolating cover , enable pipe management during cross over of people and their respective air supply pipes, process sensor data of air flow and wherein a central microprocessor coordinates all the carriages in the system.

8. The device as claimed in claim 1:

wherein a toilet is present , where the device as claimed in claim 1 is used wherein the said toilet is modified with door having shutter at top to allow continuation of the frame into the toilet so that the person does not contaminate the toilet with airborne pathogens and wherein a chemical sterilising agent is dispensed by pipes having valves which open using pressure from hand holding the pipe.

9. The device as claimed in claim 1:

wherein a dispenser means is used in the device as claimed in claim 1, which dispenses chemical sterilising agent through a release valve present on a pipe. a gripping surface and a holding surfaces where the sterilising agent which is sprayed from said holding surface through the said release valve actuated by pressure and ensures disinfection of the persons body part in contact with surface.

10. A method as claimed in claim 1:

Wherein method of providing clean isolated air supply to a person without the inconvenience and impracticality of each person carrying air supply pipes and pumps and power supply and allowing all the above functions to be done by a carriage and frame and air ducts with series of valves and the system being controlled by microprocessor with associated sensors and wherein a disposable cover which enables avoiding the sterilisation needed thus enabling use of the system by next person or passenger and where fixed cover is used ,sterilisation is done with chemical sterilising agent.