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(54) **RETRACTABLE PROTECTIVE
RESPIRATORY MASK**

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(57) **ABSTRACT**

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A retractable protective respiratory mask including disposable filters, which protects the respiratory system, covering the nose and mouth during inhalation while breathing in an atmosphere polluted by different agents, such as infectious, virulent, or pathogenic agents, or other toxic substances. The mask also protects non-infected persons from persons infected with a virus, as saliva and sputum expelled when coughing, breathing-out, and/or talking can be deposited inside the mask. The mask can include a collection-container filter, allowing a viral-infected wearer to breathe in a polluted atmosphere, to talk, to cough, to sneeze and/or to deposit saliva and sputum. The mask can be used as any other type of filter mask and/or disposable environmental air mask for industry in general, and also providing protection in rarefied natural atmospheres. The mask can be used as a container or packaging for drugs administered by means of bronchial airways, or as medical or rescue masks.

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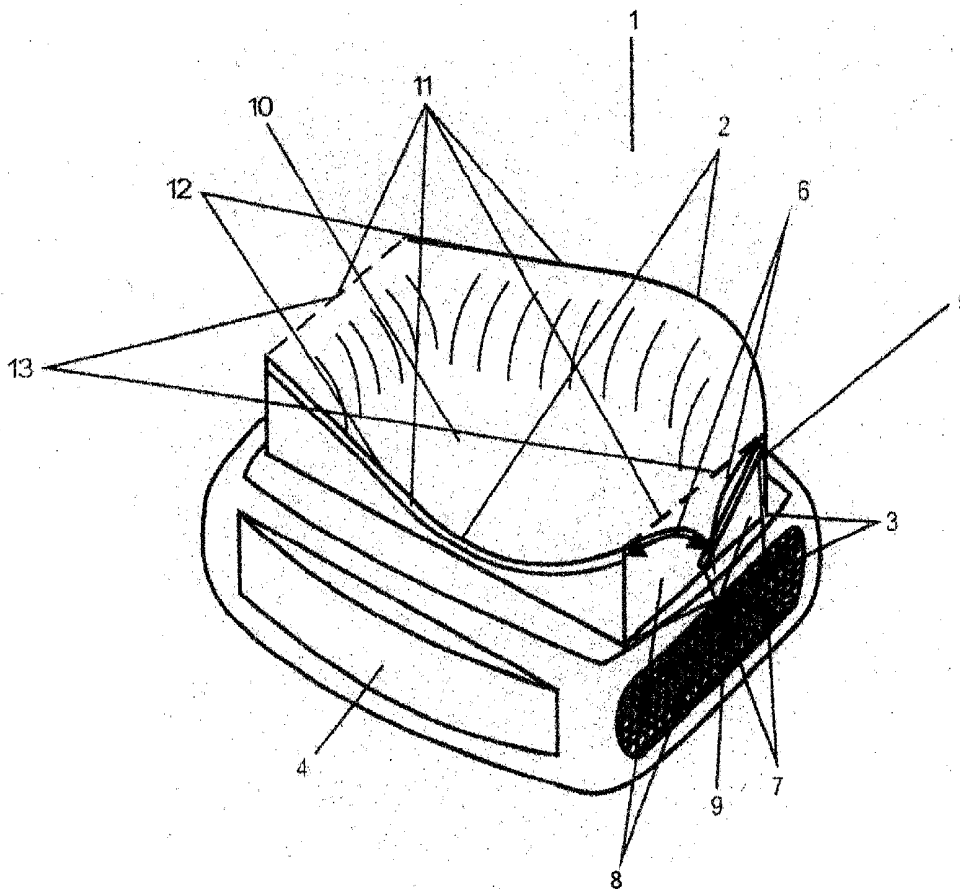


FIG 1

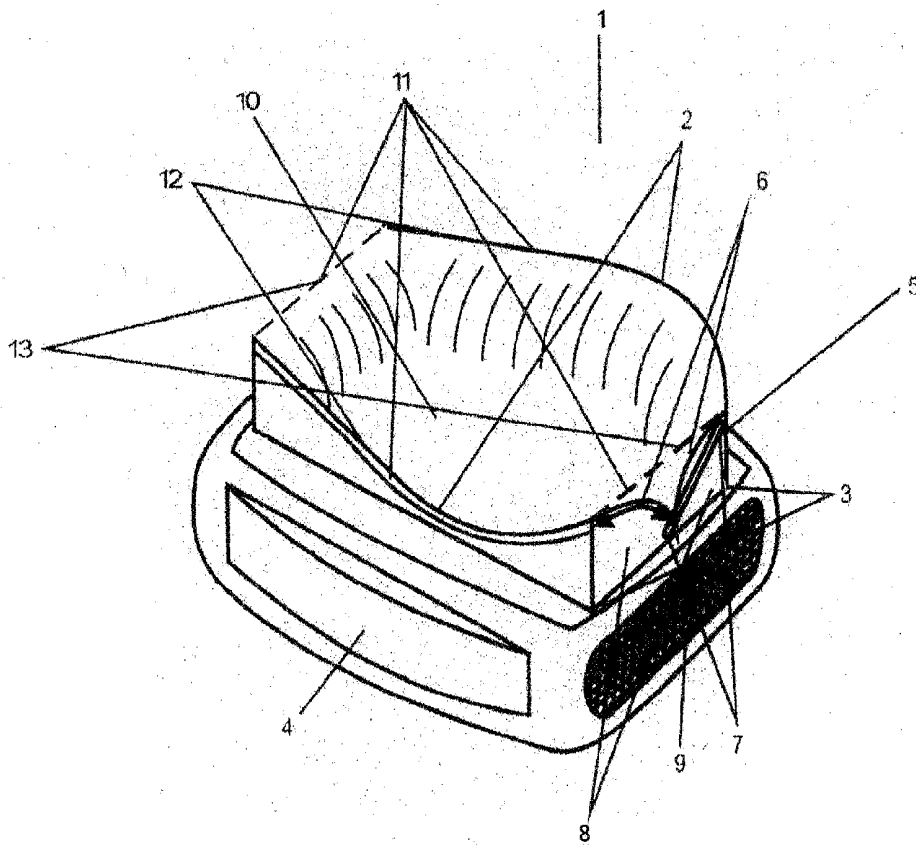


FIG 2

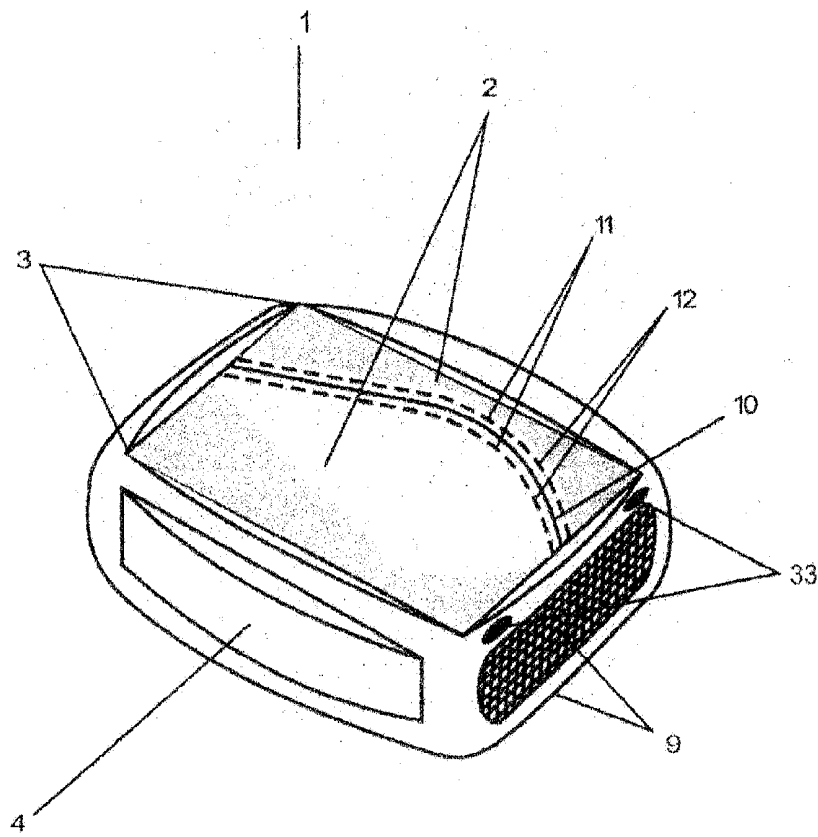


FIG 3

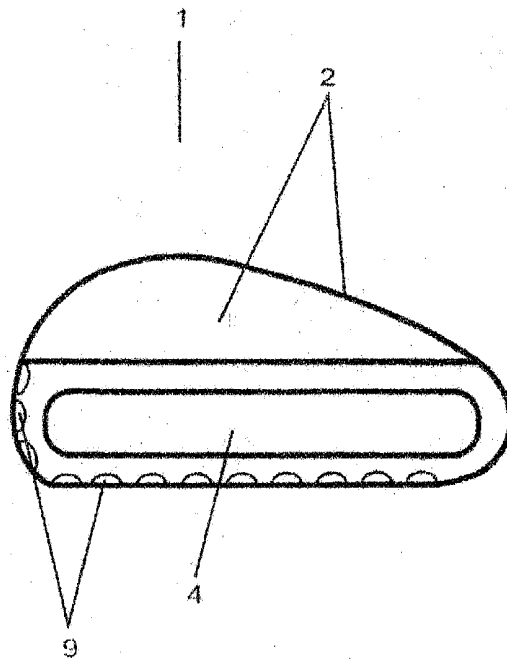


FIG 4

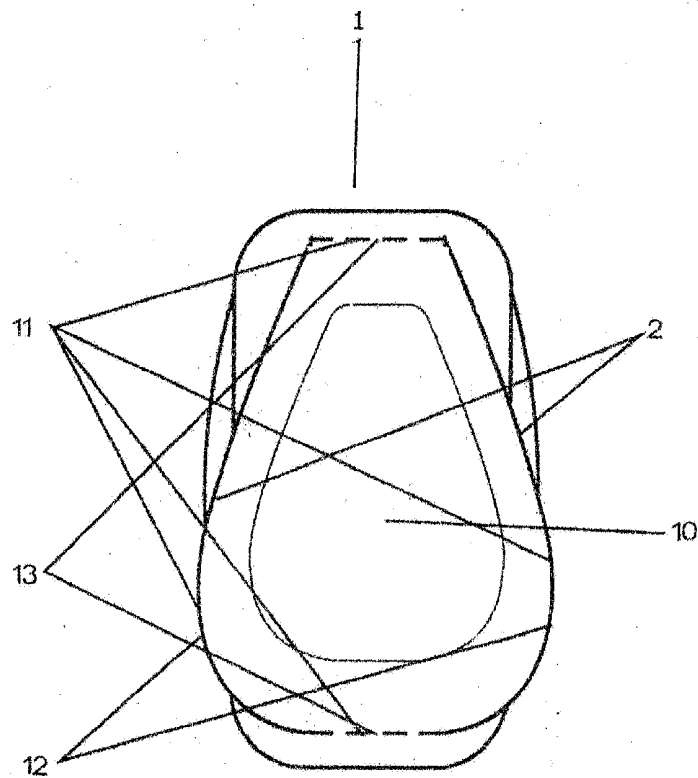


FIG 5

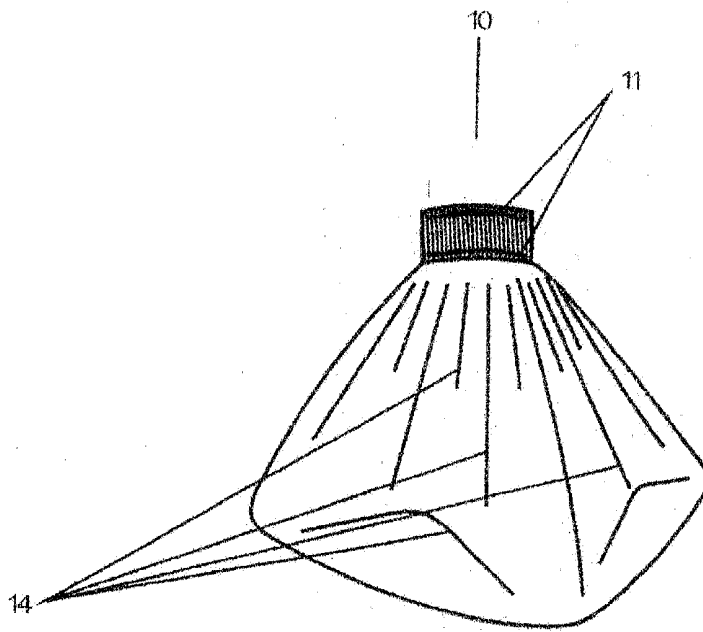


FIG 6

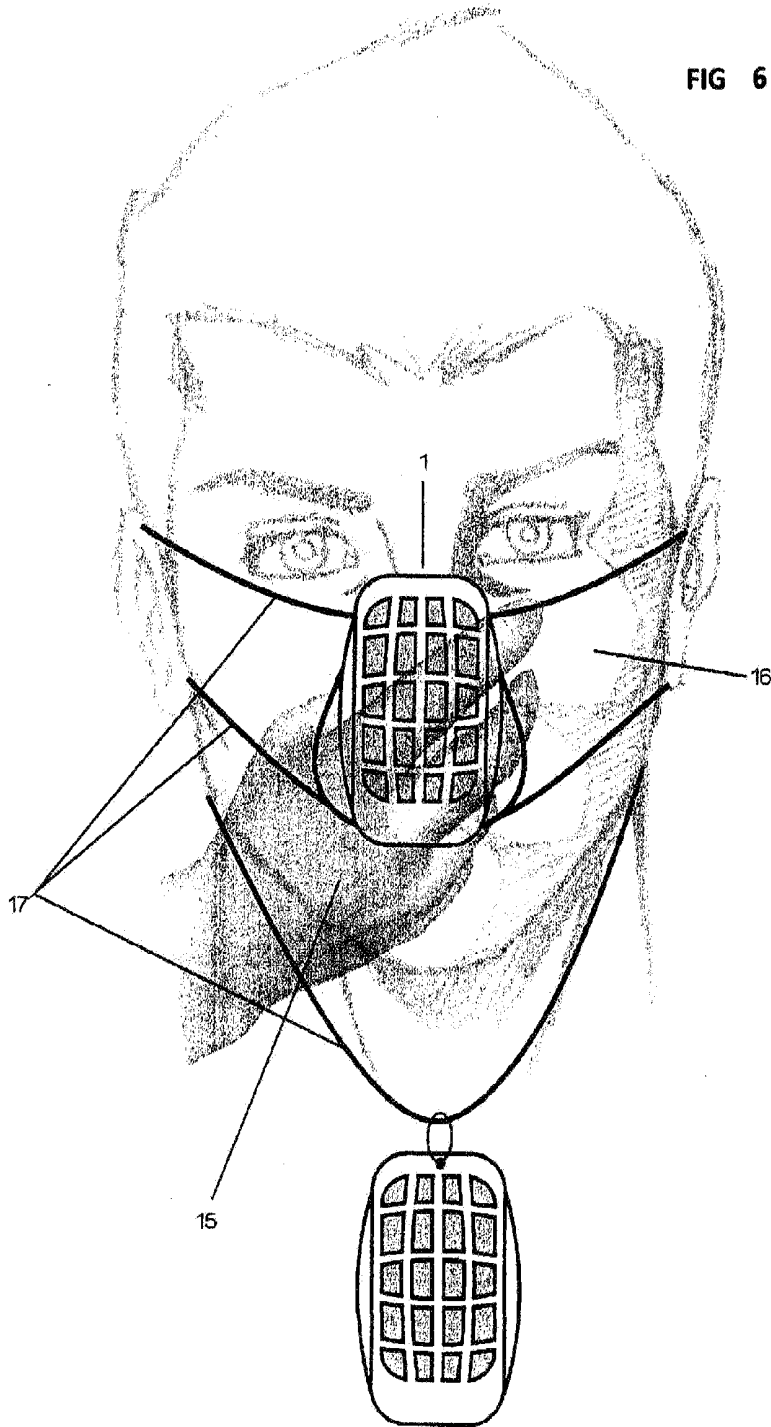


FIG 7

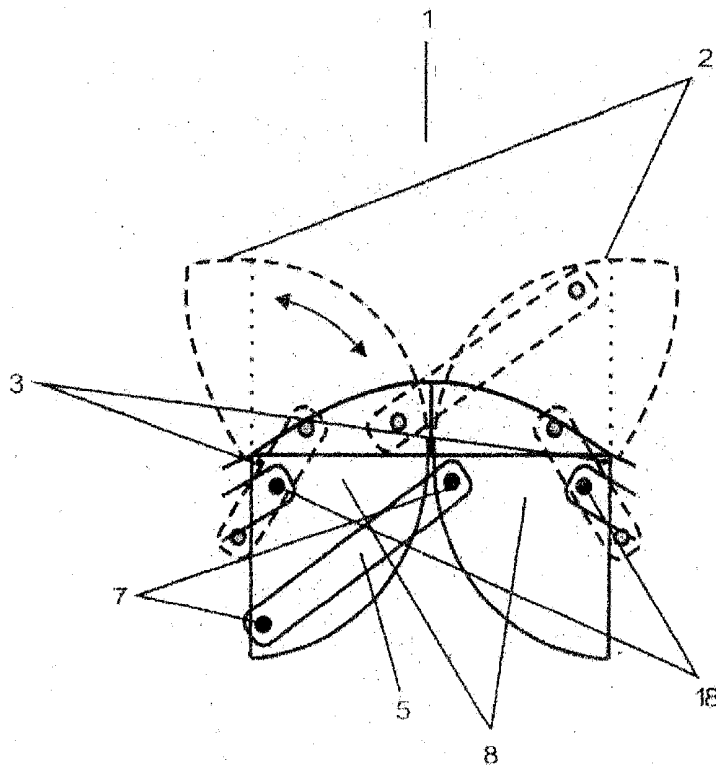


FIG 8

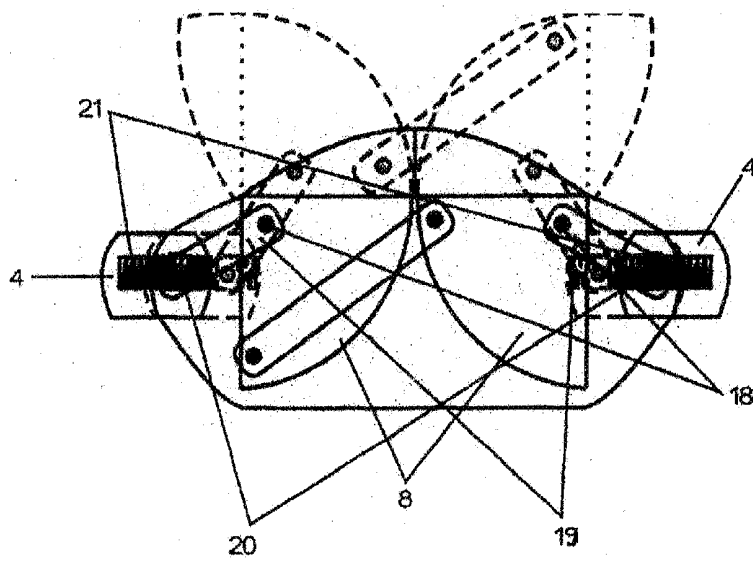


FIG 9

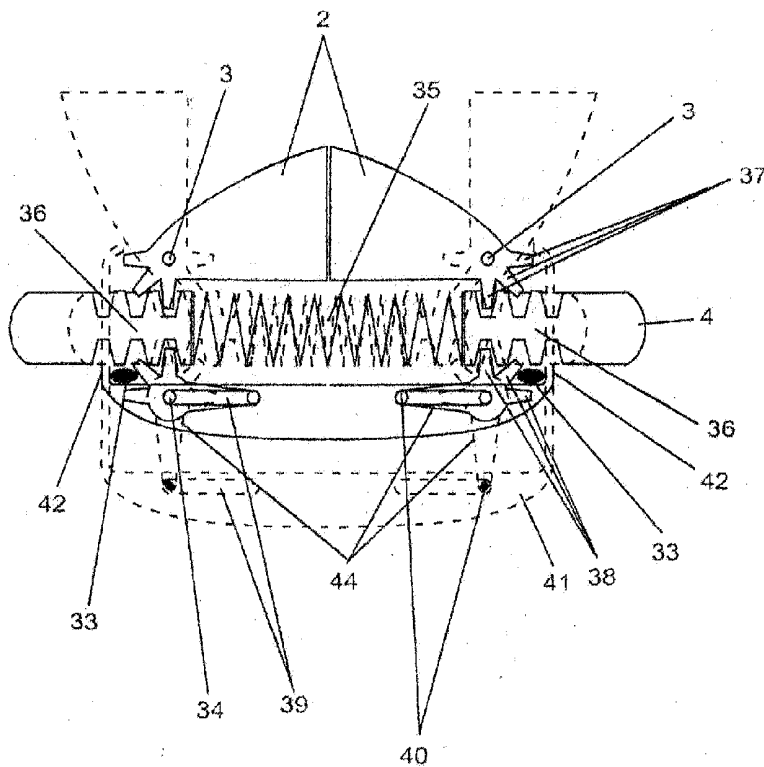


FIG 10

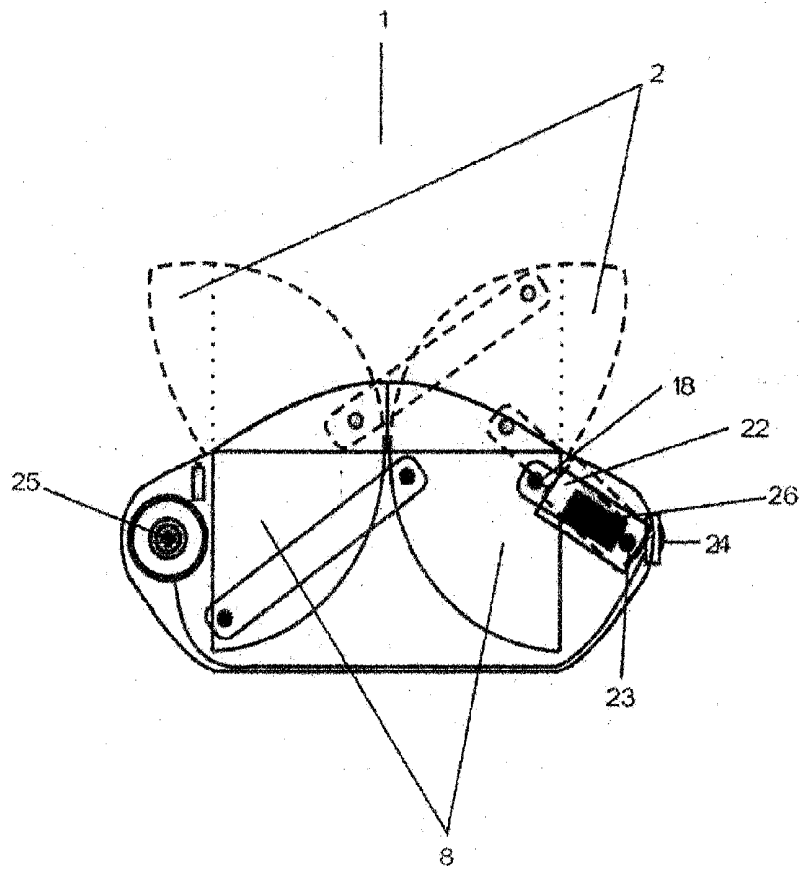


FIG 11

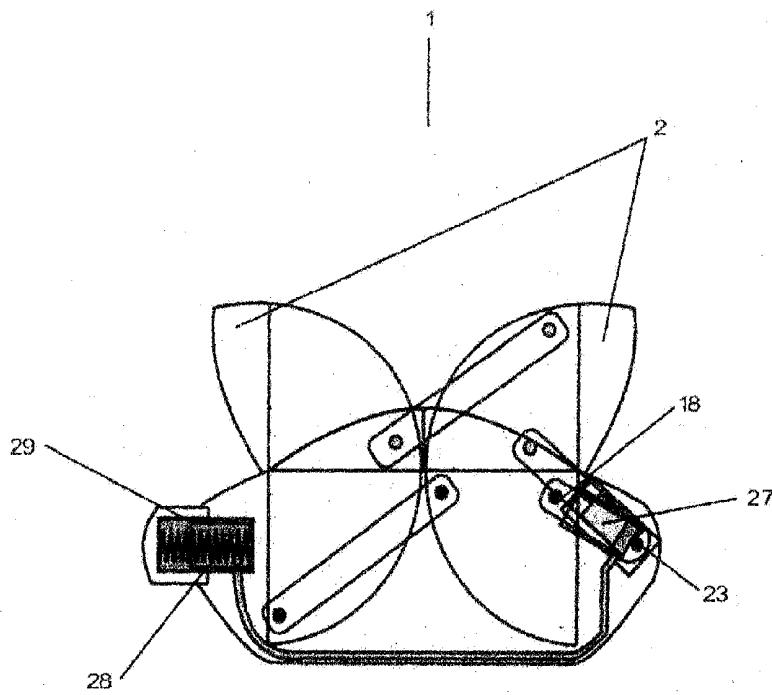


FIG 12

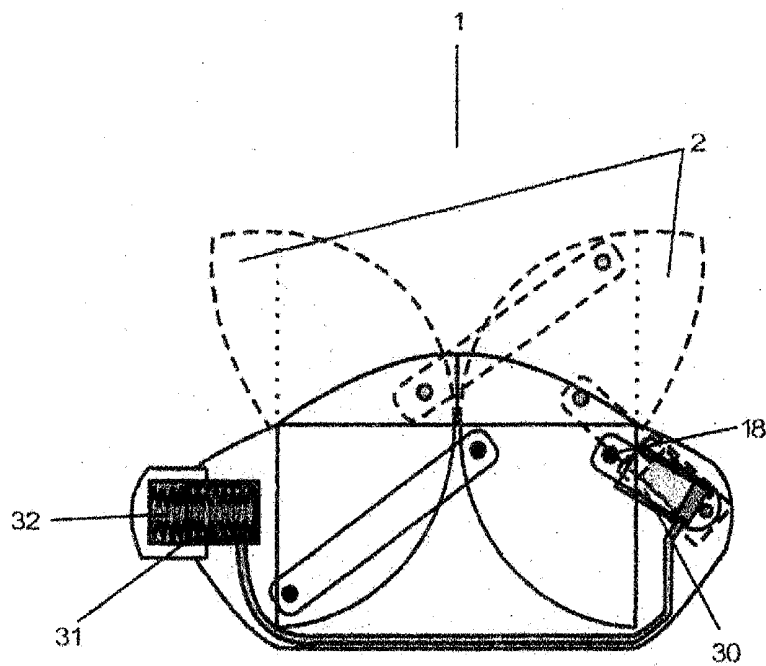
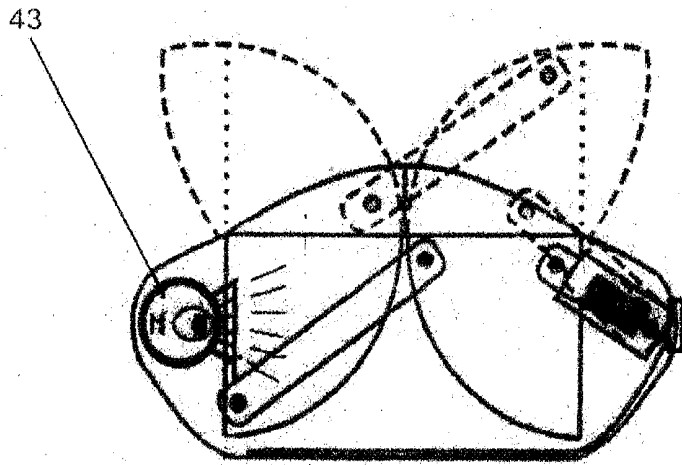


FIG 13



RETRACTABLE PROTECTIVE RESPIRATORY MASK

PRIOR ART OF THE INVENTION

[0001] It is now well known that environmental pollution levels (smog), which are affecting the entire planet, as evidenced in all the large cities such as Tokyo, New York, Peking, Mexico City, Los Angeles, as well as the evolution of different virus, that have created resistance to medications and treatments, mutating, for example, the influenzas, its level of transformation has caused, viruses that exclusively affected animals to mutate and infect man, as is the case of the influenzas A, H1N1. Due to their highly contagious quality, this virus is transmitted through the remnants of saliva expelled and which travel through the environment, when one talks, coughs, sneezes, and breathes, as well as by saliva and sputum cast onto the floor. Nowadays, viruses survive between 48 and 72 hours on smooth surfaces such as hands, handles, railings, floors, as well as tissues and fabrics. It also it is spread by talking, shaking hands or kissing. Although these viruses have claimed many lives throughout history, and today we are threatened by large-scale pandemics of multiple virus strains. This is due to not having the option to easily access effective drugs and by not consistently following the recommendations given by the authorities so that it does not spread. To avoid passing a contagious disease from person to person, several recommendations have been given, such as covering your nose and mouth with a disposable handkerchief when coughing or sneezing and not doing so directly into your hand. Not greeting others with a kiss or by shaking hands. Always wash your hands with soap and water after sneezing and after picking up things that other people have touched such as railings and bus handrails, as well as having to handle used disposable handkerchiefs, by putting them inside plastic bags and closing them before throwing them in the garbage. Do not spit on the floor, because when an uninfected person steps on this, they transport it to their homes on their shoes. Symptoms of these influenzas and in particular those of Influenza A and H1N1 and the like, most characteristics are: Persistent, intense cough, sore, burning throat, sneezing, difficulty breathing, severe headaches, high fever, and nasal congestion. So that coughing, talking, sneezing, breathing, and spitting from infected persons do not infect other people, it is recommended that non-infected people wear a traditional face mask with a filter, which fits over the ears or the head. It is well known that the existence of protective masks with air filters to protect the user from infections in the environment, as in the U.S. Pat. No. 5,468,8566 where a mask for filtering air inhaled and/or exhaled from the mouth and nose by creating an airtight seal. Different elements have been designed. For example, surgical masks, face masks, masks for breathing fresh air in polluted environments which purify the air exhaled through the mouth and nose, when coughing and sneezing in the cases of persons infected with flu, colds and other illnesses. However, they are not suitable for the accumulation of fluids. The elements used, to protect the respiratory system, covering the nose and mouth during inhalations, when breathing atmospheres contaminated by viruses from ill persons through contagious agents in the air are not sufficiently efficient to stop the propagation of the viruses such as the influenza viruses because generally, masks covering the mouth and nose are designed with a standard and rigid form as well as for the different types of noses, making it possible for air to be breathed through these leaks. The same is true for

face masks that have a wire on its interior. They do not allow an ergonomic fit over the nose from its apex to the half curve of the cheekbones.

OBJECT OF THE INVENTION

[0002] The principal purpose of the manufacture of the retractable protective respiratory mask device with air filter collectors, disinfectants, is to be able to have it on hand whenever the health of our respiratory system is threatened to be able to rely on an item that is simple, safe, effective and portable that makes it possible at any time during our daily life to immediately respond to situations such as having to go among vehicles that are contaminated, if we must use an elevator where there is someone with the symptoms of a severe infection, to be thus able to use it quickly and effectively in risky everyday situations where we become involved in exposures to infection from environments contaminated by toxic agents by having an ergonomic fit between the nose and mouth, which is retractable, that provides a 100% airtight seal between the environment and the mouth and nose and the respiratory system allowing entry of only filtered fresh air to the respiratory system and also makes it so that only clean filtered air will leave the respiratory system of people infected by some type of a virus and enter into the environment, to both protect a person breathing in areas polluted by some toxic agent, pathogen and/or influenza viruses, and vice versa for use by persons infected with a virus, and thus not allow it to spread.

[0003] Additionally this invention exists in the need to create a retractable protective respiratory mask device which allows persons infected with a virus or respiratory disease to be able to deposit the sputum and saliva within its absorbent filter bag with an elastic band several times before having to replace it with a new one. Another no less important object of this retractable mask is that it is designed so that the mask is only open at the time of use. Remaining permanently closed and secured, with no problem that the interior may become contaminated if it is used as a protective filter for the respiratory system, nor does it allow the escape of any infectious bacteria if used by persons infected by viruses or respiratory diseases when it is in repose or closed. Because this mask is retractable, its doors as well as the expandable filter cover, causes its size to be, while the doors and the expandable filter cap are closed, no larger than a cell phone, only a quarter of the total bulk volume of its size, when it is open, making it lightweight, comfortable, ergonomic, lightweight, easy to carry, due to being manufactured in thin, resistant plastic, this mask may be transported in several forms, from inside a pocket to hanging by a cord around the neck.

[0004] This invention fulfills these needs and has other related advantages such as that to be used as a traditional filter mask for ambient air and/or container and/or packaging for medicines for human use with application in the pulmonary bronchi and/or as a mask for different medical, safety or rescue equipment, only when the safety is applied is it in the open position. The novel characteristics which are considered as the source of the invention are set forth in detail in the appended claims, and will be explained in the detailed description together with its further advantages. Your understanding will be better with the clear description and its preferred embodiment, with due reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE FIGURES

[0005] To further clarify the invention and its advantages compared to the prior art, the possible illustrative embodiments are described below with the help of the annexed drawings, which do not limit the application of these principles.

[0006] FIG. 1 shows a view in perspective of the open retractable protective respiratory mask, with the filter bag in place.

[0007] FIG. 2 shows a lateral view in perspective of the closed retractable protective respiratory mask.

[0008] FIG. 3 shows a lateral view of the closed retractable protective respiratory mask.

[0009] FIG. 4 shows a top view of the open retractable protective respiratory mask, with the filter bag in place.

[0010] FIG. 5 shows a schematic view of the closed disposable filter bag or sleeve off the retractable protective respiratory mask.

[0011] FIG. 6 shows a front view of the face of the open retractable protective respiratory mask, and in the closed position hanging from the neck.

[0012] FIG. 7 shows an enlarged view of the simultaneous sealing mechanism of the retractable protective respiratory mask doors.

[0013] FIG. 8 shows an enlarged view of the mechanical system, impeller with sealing rods of the retractable protective respiratory mask doors.

[0014] FIG. 9 shows an enlarged view of the mechanical system rod impeller of the sealing mechanism through the rack and pinion system of the retractable protective respiratory mask doors.

[0015] FIG. 10 shows an enlarged view of the electrical system, sealing mechanism impeller of the retractable protective respiratory mask doors.

[0016] FIG. 11 shows an enlarged view of the pneumatic system, sealing mechanism impeller of the retractable protective respiratory mask doors.

[0017] FIG. 12 shows an enlarged view of the hydraulic system, sealing mechanism impeller of the retractable protective respiratory mask doors.

[0018] FIG. 13 shows a view wherein the mask also serves as a drug packaging system of the retractable protective respiratory mask.

DETAILED DESCRIPTION OF THE INVENTION

[0019] This invention concerns a device, a retractable protective respiratory mask that has doors which open and close, which have grooves over its doors to hold the filter bag or sleeve through the elastic bands that fit into the grooves in the doors that open making a perfect seal between the mouth and nose against the environment possible and allowing for the deposit of saliva and sputum, expelled when talking and/or sneezing, and/or coughing, and/or spitting, characterized in that this device possesses two doors in a curved shape which open in the same manner as the expandable filter cover by the action of the mechanical and/or electric, and/or hydraulic, and/or pneumatic systems, and closes the doors and at the same time contracts the cover of the expandable filter, through spring action, when pressure is not applied with the hand. Furthermore, when it is closed, its size is only one third of the total volume of its size when it is open, making it lightweight, comfortable, ergonomic, light and very easy to carry. These doors in a curved shape have grooves where the elastic bands surrounding the filter bag are connected, per-

mitting it to complete, between the corners of the two open doors, a pear shape when they are open, making it possible to conform itself around the mouth and nose in an airtight manner, as well as when it is removed and it automatically closes by the spring action that contract when there is no pressure applied by hand on the sealing systems. It also has a safety which is a pin that locks the mechanisms and makes it possible to leave the retractable protective respiratory mask device open without needing to continue squeezing the sealer and at the same time making it possible to lock the doors so that they cannot open once closed. More in particular, this invention concerns a collar, that while it is not used, functions as any other mask to filter the air that we breathe from the environment. FIG. 7, shows the simultaneous aperture mechanism of the doors 2, of the retractable protective respiratory mask that pivots over points 3, through action of the rod 5, located between points 7, from the lateral parts 8, of the doors 2, which are those that open or close them simultaneously. Powered by the action of the lateral push, from either one of the two points 18, with different means or systems of activation. FIG. 8, shows the retractable protective respiratory mask device 1, with an impeller door system 2, through a mechanical means, which consists of either one or two push buttons 4, that push the points 18, of the sides 8 to open the doors 2, through the small rods 19, that pivot over the points 20, of the push buttons 4, and the points 18, of the sides 8, of the doors 2. This mechanical system automatically closes the doors 2, through the action of the springs 21, located within the same plunger 4. When no pressure is exerted on FIG. 9, shows the retractable protective respiratory mask, with the push button system 4 with rack 36 that moves the pinion teeth 37 that by rotating on its pivoting axis 3 causes the doors 2 to open due to it being a single body this rack 36 has the possibility to be double so that pressing the push button 4, this rack below presses the pinion teeth 38 which makes an arm 44 rotate that goes from side to side, extracting the sliding cover 41 which slides on the guides 42 pushing it through the pins 40 of the arms 44 which run along the sliding cover 41 grooves 39 by rotating the arms 44 rotating up to 90° degrees. The doors 2 close and the sliding cover 41 contracts when pressure is not applied by the hand onto the push buttons 4 which sets the spring 35 action into effect which expands and makes the teeth of the rack 36 return to the point of origin the doors 2 and the sliding cover 41 by the rotation of the rack teeth 37 and 38, has a pin 33 which, upon introducing it, locks the pinion teeth 37 preventing it from opening or from closing the doors and it expands the sliding cover 41 depending on the position in which it is found when the pin 33 is put into operation. FIG. 10, shows the retractable protective respiratory mask 1, with an electric system to open the doors 2, due to having a small electromagnet 22, located in either of the two sides 8, anchored to the pivoting point on the housing 23, where the expansive pivotal core at the point 18, energized by the push button 24, and powered by the battery 25, and to close the doors 2, through the action of the contracting springs 26, of the electromagnet 22. FIG. 11, shows a retractable protective respiratory mask device 1, with a hydraulic system to open its doors 2, by means of a hydraulic plunger 27, anchored to the pivoting point on the housing 23, and connected on the other end with the point 18, of the side 8, of the door 2, which is actuated by a plunger, sealer and pressure oil feed 29. Closing the doors is performed through the springs 28, which go inside the sealing plunger 29, when pressure is not exerted. FIG. 12 shows a retractable protective respiratory

mask device 1, with a pneumatic system to open its doors 2, by pneumatic means which impel a pneumatic plunger 30, anchored to the pivoting point on the housing 23, and connected on the other end with the point 18, of the side 8, of the door 2, which is actuated by different pneumatic systems; sealing system by means of an air pressure, and/or bellows, and/or diaphragm plunger 31. Closing the doors is performed through the expansion springs 32, contained inside the previous systems. FIG. 13 shows a retractable protective respiratory mask device 1 where the mask also serves as a drug packaging system 43 for human use via the bronchial respiratory system.

LIST OF THE RETRACTABLE PROTECTIVE RESPIRATORY MASK ELEMENTS

- [0020] 1. Retractable protective respiratory mask
- [0021] 2. Curved doors in half pear shape
- [0022] 3. Pivot points on the curved doors
- [0023] 4. Manual push button for doors
- [0024] 5. Rod which pushes and opens the curved doors
- [0025] 6. Curved ends of the circular doors
- [0026] 7. Pivot point of the rods in the doors
- [0027] 8. Flat sides of the curved doors
- [0028] 9. Grids around the entire periphery of the protective mask
- [0029] 10. Filter bag or sleeve
- [0030] 11. Rubber bands along the edge of the filter bag or sleeve
- [0031] 12. Groove on the edges of the curved doors which hold the filter bags
- [0032] 13. Space between the door and curved door when open that by the action of the bag rubber makes the airtight seal over the nose.
- [0033] 14. Folds in the filter bags, that redirection to when it is open and it closes
- [0034] 15. Hand operating the protector
- [0035] 16. Face of the person that uses it
- [0036] 17. Band or cord that holds the protective mask
- [0037] 18. Pivot point for the plunger connector or manual push button
- [0038] 22. Electromagnet
- [0039] 23. Support points in the housing of the pneumatic hydraulic bottles.
- [0040] 24. Energizer and push button
- [0041] 25. Battery for operation with the electromagnet
- [0042] 26. Contracting springs
- [0043] 27. Hydraulic plunger
- [0044] 28. Springs inside and easy to recharge
- [0045] 29. Hydraulic oil impeller plunger
- [0046] 30. Pneumatic plunger
- [0047] 31. Pneumatic, bellows or diaphragm sealing system
- [0048] 32. Contracting springs or door closer
- [0049] 33. Pin that locks rack and pinion
- [0050] 36. Manual sealing rack
- [0051] 37. Pinion teeth of the pear shaped door
- [0052] 38. Pin teeth that extend the expandable cover
- [0053] 39. Groove in the expandable cover
- [0054] 40. Arm pins which expand
- [0055] 41. Sliding or expandable cover
- [0056] 42. Guides in the expandable cover
- [0057] 44. Arms that through their pins expand the cover.

1. Retractable protective respiratory mask device characterized in that it has mechanical (lever), and/or mechanical

(rack-pinion), and/or electric (electromagnet), and/or pneumatic (plunger), and/or hydraulic (plunger), to open its two doors (2) and expand the sliding cover (41) with fasteners that hold, and close the doors and contract the sliding cover by spring action, having on the inside a disposable filter bag.

2. Retractable protective respiratory mask device according to claim 1, characterized in that it has a rod (5) with pins (7) at each end of each of the doors (2) that connects the two doors by its sides with the difference of the pins at 90° from over the line of its axes with the other allowing the two doors to be opened or closed at the same time by only opening or closing either of the two doors

3. Retractable protective respiratory mask device according to claim 1, characterized in that each of the two doors (2) at each of its edges molding half into a pear shape, for when opening the full pear shape, complemented with the filter bag (10) in the spaces (13) where it is shaped around the nose

4. Retractable protective respiratory mask device according to claim 1, characterized in that each of the two doors (2) have grooves (12) before the edge so that when they open they may assemble the disposable collector filter bag (10) through the rubber (11) on its edge completing in this way the pear shape.

5. Retractable protective respiratory mask device according to claim 1, characterized in that a disposable collector filter bag (10) goes on its inside with folds (14) creating the rectangular shape on its base, with rubber (11) on its edge, that makes it permanently closed.

6. Retractable protective respiratory mask device according to claim 1, characterized in that it has mechanical means to push either of the two doors using a rod (19) that connects the door and the sealer (4) that when it activates it pushes the rod (19) and the latter pushes one of the doors so that both open.

7. Retractable protective respiratory mask device according to claim 1, characterized in that it has double or single racks (36) above or below on the plungers (4) where those that cause the rack teeth 37 of the doors and the arm (44) to rotate when it enters or exits the plunger (4).

8. Retractable protective respiratory mask device according to claim 1, characterized in that it has an arm (44) that pivots within the housing and rotates through the gear teeth of the pinion (38) which runs on the double rack (38) with pins at its end (40) which are those that push the sliding filter cover (41) through its grooves (39).

9. Retractable protective respiratory mask device according to claim 1, characterized in that it has a sliding filter cover (41) which runs along the guide (42) of the housing of the retractable protective respiratory mask (1) and has grooves (39) where the pins (40) enter from the arms (44)

10. Retractable protective respiratory mask device according to claim 1, characterized in that according to claims 1 and 3, characterized in that the doors (3) are activated because it has an electromagnet powered by a battery and controlled by a sealing connector.

11. Retractable protective respiratory mask devices according to claims 1, characterized in that the doors (3) are activated by the pneumatic plunger that is connected between the housing and either of the doors activated by a bellows or diaphragm plunger connected directly to the sealer which transmits pressure to the sealing plunger through a hose.

12. Retractable protective respiratory mask devices according to claim 1, characterized in that the doors (3) are activated by the hydraulic plunger that is connected between

the housing and either of the doors activated by another plunger, connected directly to the sealer which transmits pressure to the sealing plunger through a duct.

13. Retractable protective respiratory mask device according to claim 1, characterized in that the doors (3) are closed through the action of the springs (21) (28) and (35) which cause the doors to return to their site of origin (2) with different opening means once the plunger (8) stops being activated and/or when located within the actuating electromagnet (22) and/or inside the pneumatic (27) and hydraulic (30) plungers.

14. Retractable protective respiratory mask device according to claim 1, characterized in that it has a pin (33) which upon being introduced, locks either and/or both doors to leave them open in case one wishes to use it open like an ambient air filter mask or closed to leave it locked while it not being used and it is being transported.

15. Retractable protective respiratory mask device according to claim 1, characterized in that this device may be used as packaging for medications or as a medical equipment mask for human use for medicines that require devices such as masks, of application in the bronchial passages, respiratory or cardiac system.

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