

Nov. 21, 1939.

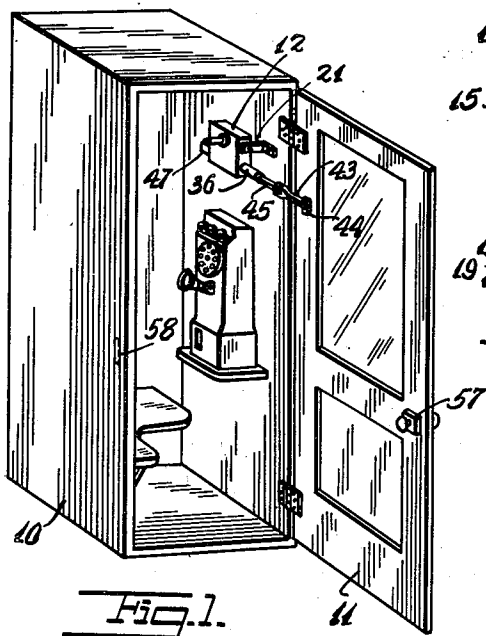
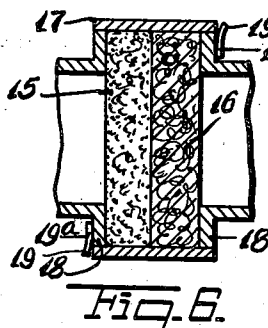
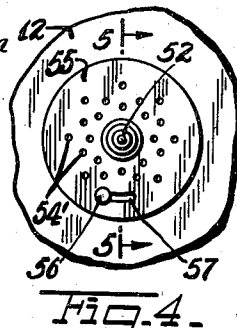
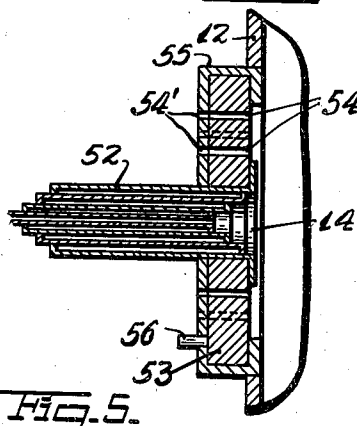
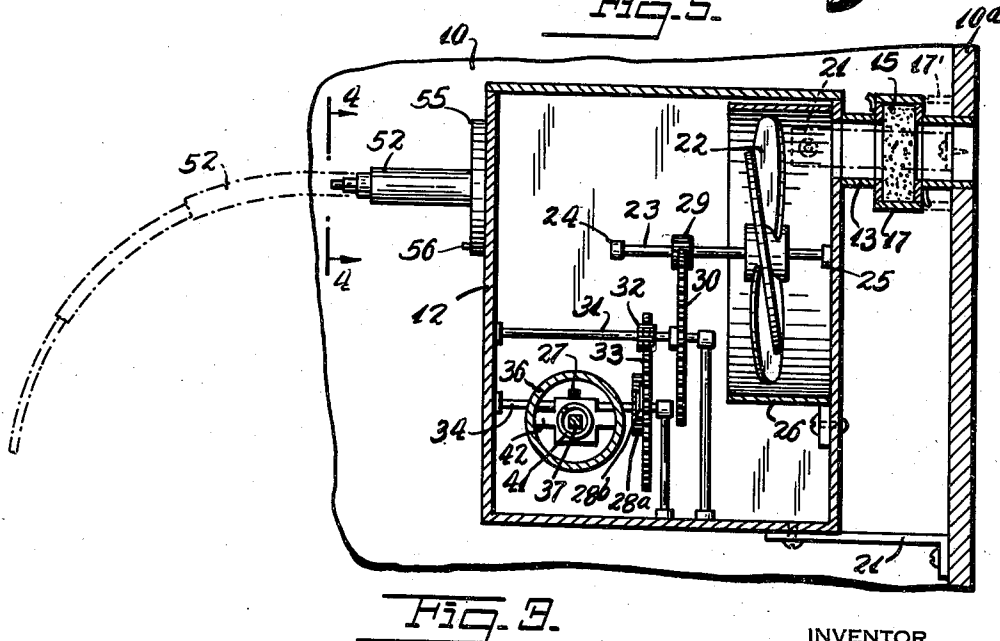
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2,180,967

AUTOMATIC DISINFECTING DEVICE

Filed March 10, 1939

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

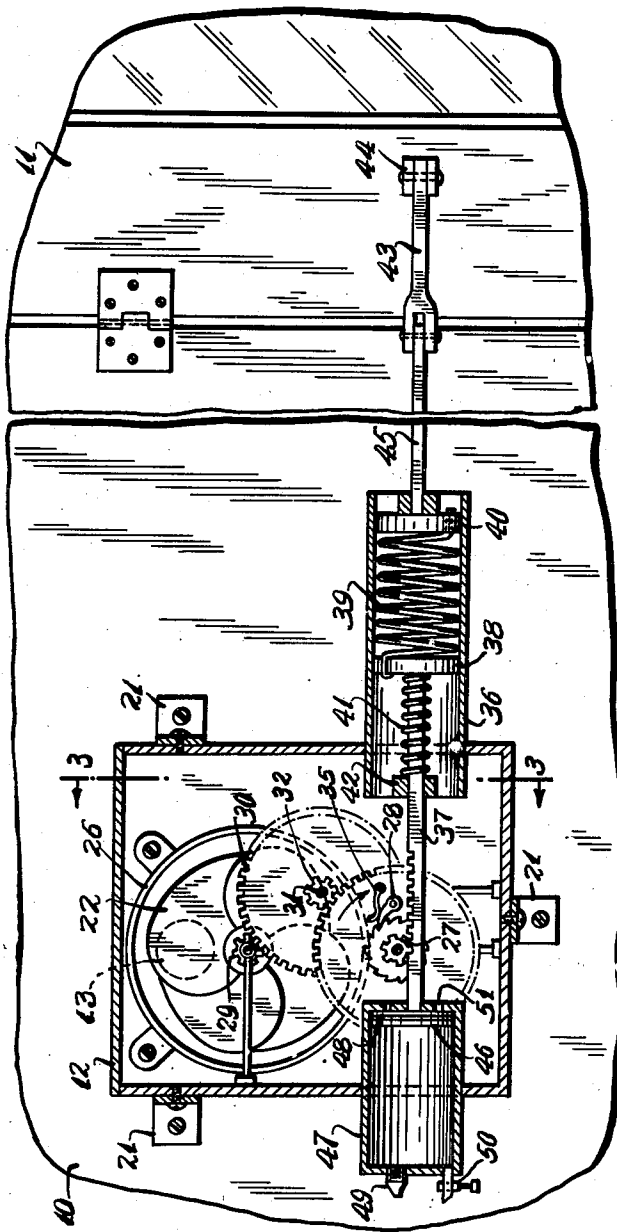


Fig. 2.

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UNITED STATES PATENT OFFICE

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AUTOMATIC DISINFECTING DEVICE

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Application March 10, 1939, Serial No. 260,883

8 Claims. (Cl. 21-77)

This invention relates to new and useful improvements in an automatic disinfecting device.

The invention proposes an automatic device for use in telephone booths; toilets, nurseries and other enclosed spaces accessible through a closeable door, and operative automatically upon movement of the door.

More specifically, the invention contemplates the provision of a hollow body having an air inlet and a control discharge, and means for chemically treating the air entering the inlet, and an arrangement for discharging the disinfected air from said body.

Still further the invention contemplates the use of a fan within the body for drawing air through said inlet and forcing it from said discharge, and a transmission speed up system for driving said fan, operative by the movement of the door previously mentioned.

Another object of the invention resides in so controlling the disinfected air discharge that it may be sprayed upon articles such as a telephone, or it may be directed in a general desirable direction.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is a perspective view of a telephone booth with an automatic disinfectant device mounted thereon in accordance with this invention.

Fig. 2 is a fragmentary transverse vertical sectional view of a portion of Fig. 1 taken immediately behind the front wall of the hollow body of the disinfectant device.

Fig. 3 is a transverse vertical sectional view taken on the line 3-3 of Fig. 2.

Fig. 4 is a fragmentary elevational view looking in the direction of the line 4-4 of Fig. 3.

Fig. 5 is a fragmentary enlarged sectional view taken on the line 5-5 of Fig. 4.

Fig. 6 is a fragmentary enlarged view similar to a portion of Fig. 3 but illustrating a modified form of the invention.

The automatic disinfecting device, according to this invention, may be used in a telephone booth, toilet, nursery or other compartment or space. As illustrated in Fig. 1, it is shown applied to a telephone booth 10 having a closeable door 11. The automatic disinfecting device includes a hollow body having an inlet 13 and a con-

trolled air discharge 14. A means is provided for chemically treating the air entering the inlet. This means includes a porous cake of chemical material 15 or other similar substance. In Fig. 6 a modified form of the chemical is shown characterized by the addition of a sponge 16 or other moisture retaining element arranged adjacent to the chemical 15.

The chemical material 15 is supported by an annular member 17 which is engaged upon a pair of spaced flanges 18. These flanges are arranged transversely of the inlet 13. The inlet 13 extends through a side wall 10^a of the telephone booth so as to connect with the atmosphere outside of the booth. The annular member 17 is held in position on the flanges 18 by several leaf springs 19. These leaf springs are welded or in any other manner secured at their inner ends 19^a to the material of the flanges 18 and their outer ends resiliently extend upwards and engage against the sides of the annular member 17. However, this annular member may be shifted laterally in one direction or the other, as for example, indicated by the dot and dash lines 17' in Fig. 3. This exposes the chemical material 15 and also the sponge when used. This permits these materials to be changed or replaced when required. The hollow body 13 is supported by several brackets 21 to one of the walls of the telephone booth 10.

A fan 22 is rotatively supported within the body 10 by a shaft 23 engaging in bearings 24 and 25. This fan 22 is arranged transversely of a tubular member 26 which engages over the inlet 13. The parts are so arranged that the fan 22 is capable of drawing air from the inlet 13 and discharging it into the interior of the body 12. A transmission system is provided for driving the fan and this system includes a driver pinion 27 and a ratchet 28 operative in one direction only.

More specifically, the transmission system comprises a pinion 29 fixed on the shaft 23 and meshing with a gear 30 fixed upon a rotatively supported shaft 31. This shaft 31 is provided with a pinion 32 meshing with a gear 33 freely supported upon a shaft 34. The ratchet wheel 28^a of the ratchet is fixed upon the shaft 34 while the pawl 28^b of the ratchet is mounted upon the gear 33 and resiliently urged against the teeth of the ratchet wheel by a spring 35 also mounted upon the gear 33. The pinion 27 is fixedly mounted on the shaft 34.

A cylinder 36 extends through one side of the body 12. A rack 37 is slidably supported and meshes with the pinion 27 and is connected with

a piston 38 slidable in the inner end of the cylinder 37. A compression spring 39 is housed within the cylinder 36 and engages the piston 38 and its inner end is connected with the piston. Another piston 40 is slidably engaged in the outer end of the cylinder 36 and engages against and is connected with the outer end of the compression spring 39.

A relatively weak spring 41 is arranged coaxially on the rack 37 and acts against the piston 38 and a transverse bar 42 mounted across the inner end of the cylinder 36 and serves to normally urge the piston 38 outwards.

A means is provided for connecting the door 12 with the piston 40 for compressing the spring 39 when the door is closed and for freeing the spring 39 when the door is opened. This means includes a lever 43 which is hingedly connected at its inner end upon a bracket 44 mounted on the door 11. The outer end of the lever 43 pivotally connects with a piston rod 45 connected with the piston 40.

A means is provided for modulating the speed of the inward motion of the rack 37 under the pressure of the compression spring 39. This modulating means includes a piston 46 which is fixedly mounted on the rack 37 and which is slidable within a cylinder 47. The piston 46 is provided with peripheral rings 48 to form an air tight joint in conjunction with the inner surface of the cylinder 47. A one way valve 49 is mounted upon the outer end of the cylinder 47 is adapted to admit air into the cylinder 47 and prevent the escape of air from the cylinder. A needle controlled valve 50 is also mounted on the cylinder 47 and controls the escape of air from the cylinder. The inner end of the cylinder 47 is formed with several openings 51 to permit the passage of air. The construction permits a rapid outward motion of the rack 37.

The controlled discharge 14 connects with a telescopic pipe 52 formed from a plurality of inter-engaged sections which may be collapsed to the condition illustrated in full lines in Figs. 3 and 5. These sections may be pulled and extended as indicated by the dot and dash lines in Fig. 3. These telescopic sections are formed from flexible material so that they may be directed in various directions. A disc 53 is coaxially pivotally mounted upon the outer one of the telescopic tubes 52 and is formed with a plurality of perforations 54. This disc 53 is encased by a stationary perforated casing 55. A handle 56 is mounted upon the disc 53 and projects from an arcuate slot 57 in the casing 55. The arrangement is such that in one position of the handle 56 the perforations 54 are aligned with the perforations 54' of the casing 55, and in another position the perforations are out of alignment so that air cannot pass.

A lock 57 is mounted upon the door 11 and is cooperative with a keeper 58 mounted upon the door jamb so that the door 11 may be held in its closed position.

The operation of the device is as follows:

When one enters the telephone booth 11 he closes the door and locks the door closed with the lock 57. When the door is closed the lever 53 will move the piston rod 45 inwards. This moves the piston 40 inwards and the spring 39 is compressed. The inner end of the spring now exerts a pressure against the piston 38 which is connected with the rack 37. The dashpot 46, 47, etc. modulates the rate at which the rod 37 may

one inch per minute. The total stroke of the rod 37 may be eight inches and consequently the rod may move during an eight minute period. The motion of the rod 37 is stepped up by the step up transmission which drives the fan 22 which can revolve about 1,000 R. P. M. The fan draws in air from the inlet 13 and this air is purified by passing through the porous chemical 15 and if desired, through the wetted sponge 16. The air is then blown by the fan 22 out from the discharge 14 and out from the perforations 54 and 54'. These perforations direct the air in a general direction. If desired the handle 56 may be closed to cut off the discharge of air through the perforations 54 and 54'. All the air then discharges through the discharge 14 and the telescopic tube 52. This tube may be extended and the disinfected air directed against parts of the telephone or in other desirable directions.

When the door 11 is opened the piston 40, spring 39 and piston 38 will immediately return to their original positions.

It is to be understood that the casing and the various parts may be made of any desired material, and the device may be secured in place at any suitable height or location of the enclosure where it is used to automatically disinfect the air or any object.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:

1. In combination with an enclosed space accessible through a closable door, a hollow body having an air inlet and a controlled air discharge, means for chemically treating the air entering said inlet, a fan within said body for drawing air through said inlet and forcing it from said discharge, a transmission speed step up system for driving said fan and including a driver pinion and ratchet to be operative in one direction only, a cylinder extending through said body, a rack meshing with said pinion and connected with a piston slidable in the inner end of said cylinder, a compression spring within said cylinder and connected with said piston, a piston slidable in the outer end of said cylinder and connected with the outer end of said compression spring, means connecting said door and latter piston for compressing said spring when the door is closed and freeing said spring when the door is opened, and means for modulating the speed of inward motion of said rack under the pressure of said compression spring.

2. In combination with an enclosed space accessible through a closable door, a hollow body having an air inlet and a controlled air discharge, means for chemically treating the air entering said inlet, a fan within said body for drawing air through said inlet and forcing it from said discharge, a transmission speed step up system for driving said fan and including a driver pinion and ratchet to be operative in one direction only, a cylinder extending through said body, a rack meshing with said pinion and connected with a piston slidable in the inner end of said cylinder, a compression spring within said cylinder and connected with said piston, a piston

connected with the outer end of said compression spring, means connecting said door and latter piston for compressing said spring when the door is closed and freeing said spring when the door is opened, and means for modulating the speed of inward motion of said rack under the pressure of said compression spring, said controlled air discharge including a telescopic flexible tube adapted to be extended and directed in various directions.

3. In combination with an enclosed space accessible through a closable door, a hollow body having an air inlet and a controlled air discharge, means for chemically treating the air entering said inlet, a fan within said body for drawing air through said inlet and forcing it from said discharge, a transmission speed step up system for driving said fan and including a driver pinion and ratchet to be operative in one direction only, a cylinder extending through said body, a rack meshing with said pinion and connected with a piston slidable in the inner end of said cylinder, a compression spring within said cylinder and connected with said piston, a piston slidable in the outer end of said cylinder and connected with the outer end of said compression spring, means connecting said door and latter piston for compressing said spring when the door is closed and freeing said spring when the door is opened, and means for modulating the speed of inward motion of said rack under the pressure of said compression spring, said controlled air discharge including a telescopic flexible tube adapted to be extended and directed in various directions, and a perforated disc rotative about said tube within a perforated casing, and means for turning said disc to align said perforations or to disalign them.

4. In combination with an enclosed space accessible through a closable door, a hollow body having an air inlet and a controlled air discharge, means for chemically treating the air entering said inlet, a fan within said body for drawing air through said inlet and forcing it from said discharge, a transmission speed step up system for driving said fan and including a driver pinion and ratchet to be operative in one direction only, a cylinder extending through said body, a rack meshing with said pinion and connected with a piston slidable in the inner end of said cylinder, a compression spring within said cylinder and connected with said piston, a piston slidable in the outer end of said cylinder and connected with the outer end of said compression spring, means connecting said door and latter piston for compressing said spring when the door is closed and freeing said spring when the door is opened, and means for modulating the speed of inward motion of said rack under the pressure of said compression spring, said means for chemically treating the air including porous chemical material and means for holding said material in the passage of the air.

5. In combination with an enclosed space accessible through a closable door, a hollow body having an air inlet and a controlled air discharge, means for chemically treating the air entering said inlet, a fan within said body for drawing air through said inlet and forcing it from said discharge, a transmission speed step up system for driving said fan and including a driver pinion and ratchet to be operative in one direction only, a cylinder extending through said body, a rack meshing with said pinion and connected with a piston slidable in the inner end of said

cylinder, a compression spring within said cylinder and connected with said piston, a piston slidable in the outer end of said cylinder and connected with the outer end of said compression spring, means connecting said door and latter piston for compressing said spring when the door is closed and freeing said spring when the door is opened, and means for modulating the speed of inward motion of said rack under the pressure of said compression spring, said means for chemically treating the air including porous chemical material and means for holding said material in the passage of the air, and a chemical sponge adapted to be held adjacent said chemical material.

6. In combination with an enclosed space accessible through a closable door, a hollow body having an air inlet and a controlled air discharge, means for chemically treating the air entering said inlet, a fan within said body for drawing air through said inlet and forcing it from said discharge, a transmission speed step up system for driving said fan and including a driver pinion and ratchet to be operative in one direction only, a cylinder extending through said body, a rack meshing with said pinion and connected with a piston slidable in the inner end of said cylinder, a compression spring within said cylinder and connected with said piston, a piston slidable in the outer end of said cylinder and connected with the outer end of said compression spring, means connecting said door and latter piston for compressing said spring when the door is closed and freeing said spring when the door is opened, and means for modulating the speed of inward motion of said rack under the pressure of said compression spring, said means for connecting the piston and door comprising a lever hingedly connected with the door and pivotally connected with a piston rod connected with said piston.

7. In combination with an enclosed space accessible through a closable door, a hollow body having an air inlet and a controlled air discharge, means for chemically treating the air entering said inlet, a fan within said body for drawing air through said inlet and forcing it from said discharge, a transmission speed step up system for driving said fan and including a driver pinion and ratchet to be operative in one direction only, a cylinder extending through said body, a rack meshing with said pinion and connected with a piston slidable in the inner end of said cylinder, a compression spring within said cylinder and connected with said piston, a piston slidable in the outer end of said cylinder and connected with the outer end of said compression spring, means connecting said door and latter piston for compressing said spring when the door is closed and freeing said spring when the door is opened, and means for modulating the speed of inward motion of said rack under the pressure of said compression spring, comprising a dashpot connected with said rack.

8. In combination with an enclosed space accessible through a closable door, a hollow body having an air inlet and a controlled air discharge, means for chemically treating the air entering said inlet, a fan within said body for drawing air through said inlet and forcing it from said discharge, a transmission speed step up system for driving said fan and including a driver pinion and ratchet to be operative in one direction only, a cylinder extending through said body, a rack meshing with said pinion and connected with a

piston slidable in the inner end of said cylinder, a compression spring within said cylinder and connected with said piston, a piston slidable in the outer end of said cylinder and connected with the outer end of said compression spring, means 5 connecting said door and latter piston for compressing said spring when the door is closed and freeing said spring when the door is opened, and means for modulating the speed of inward mo-

tion of said rack under the pressure of said compression spring, comprising a dashpot connected with said rack, and including a piston working in an air cylinder, a one way valve for permitting the transmission of air into the cylinder, and a 5 needle valve for controlling the escape of air from the cylinder.

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