

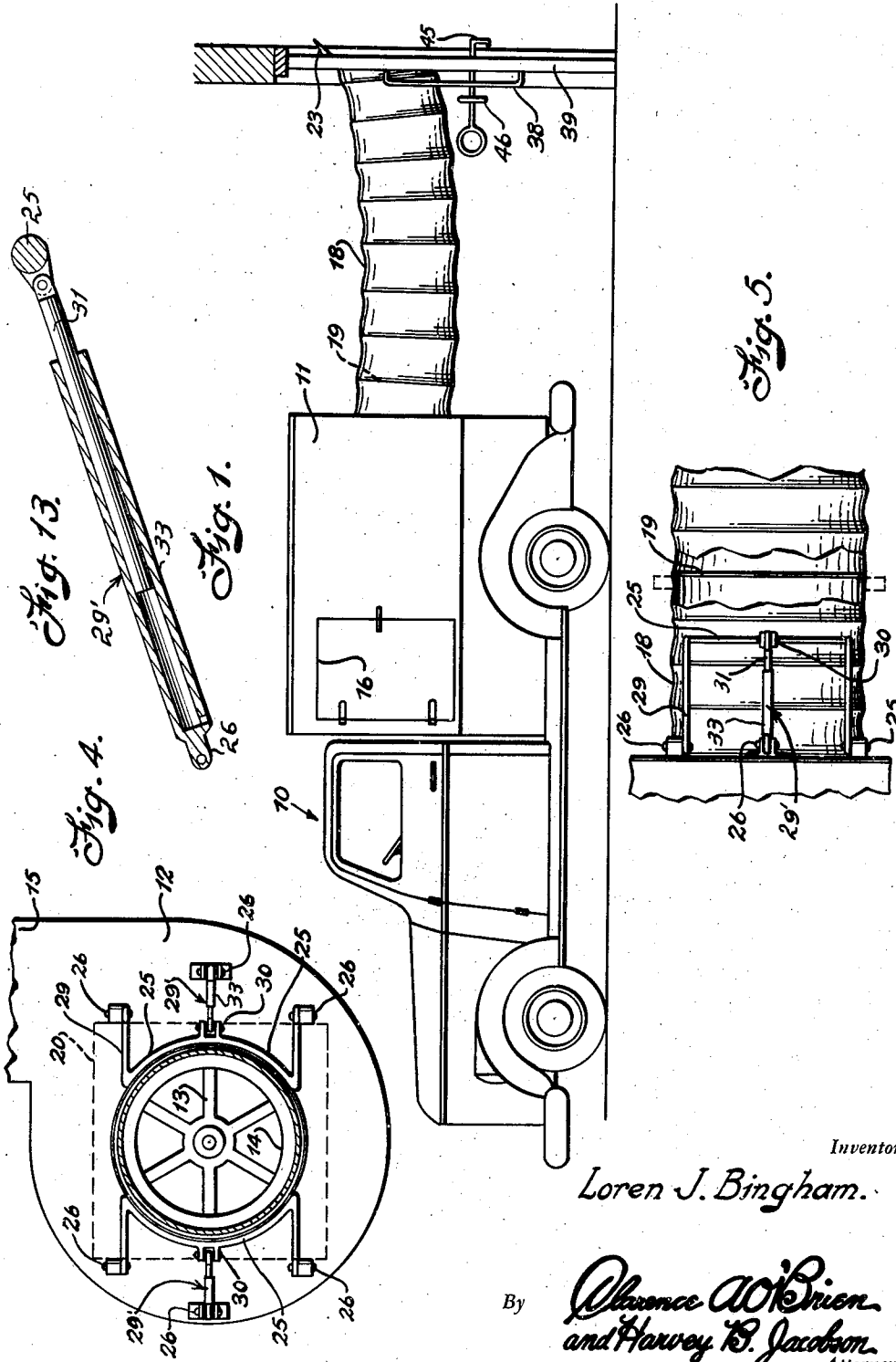
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L. J. BINGHAM
MECHANICAL VENTILATOR

2,480,441

Filed June 16, 1945

4 Sheets-Sheet 1



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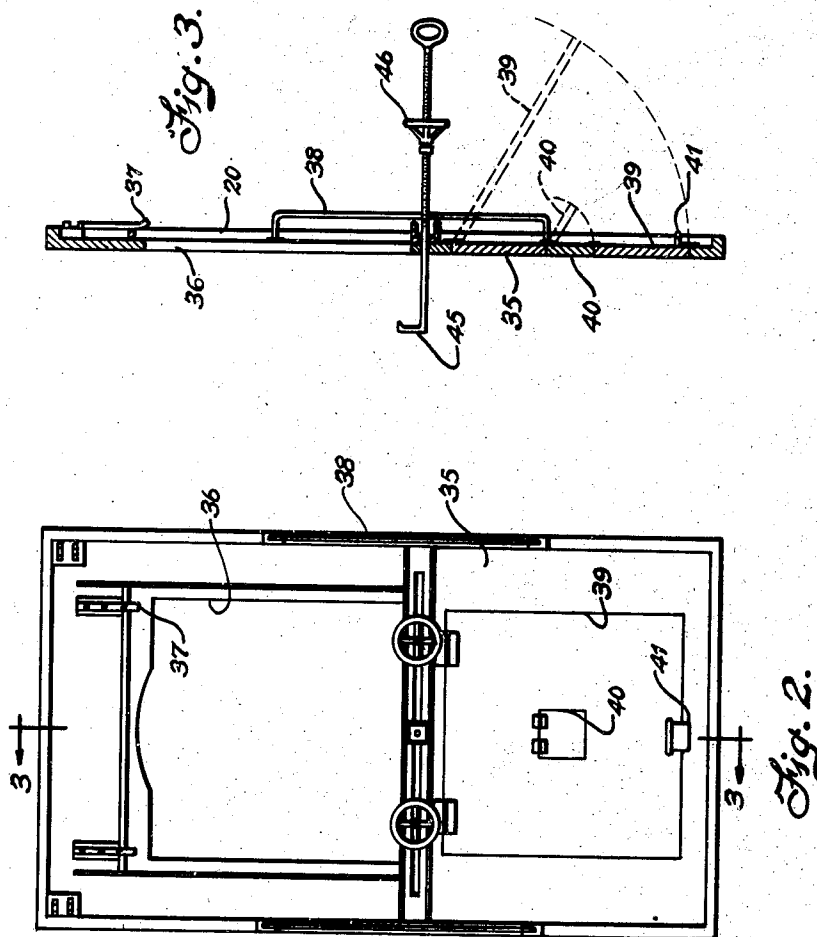
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MECHANICAL VENTILATOR

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4 Sheets-Sheet 3

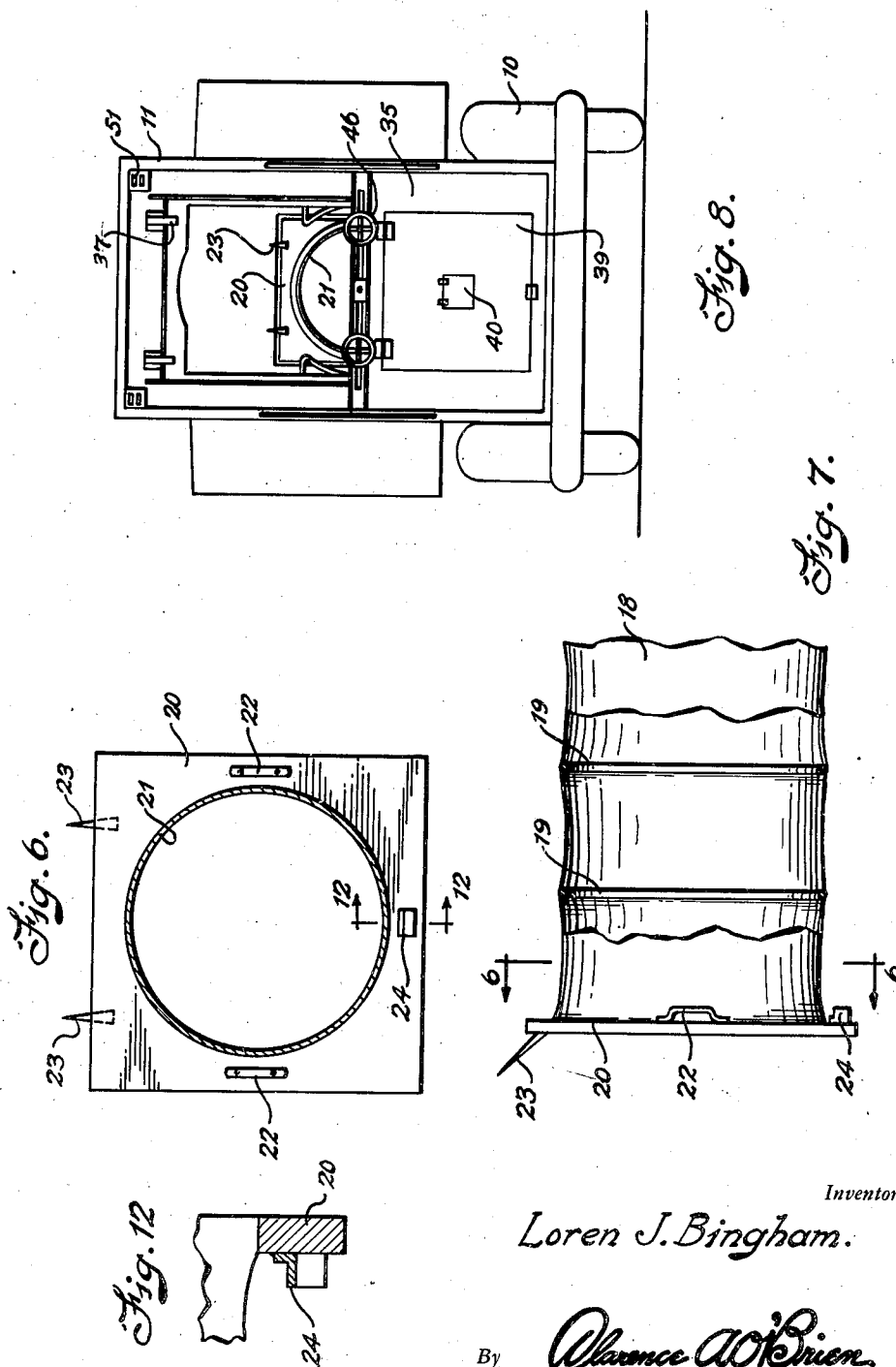


Fig. 12

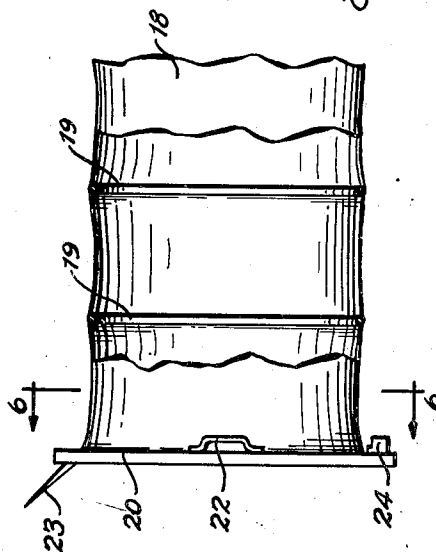
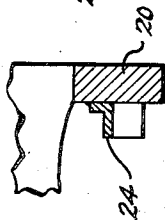


Fig. 7.

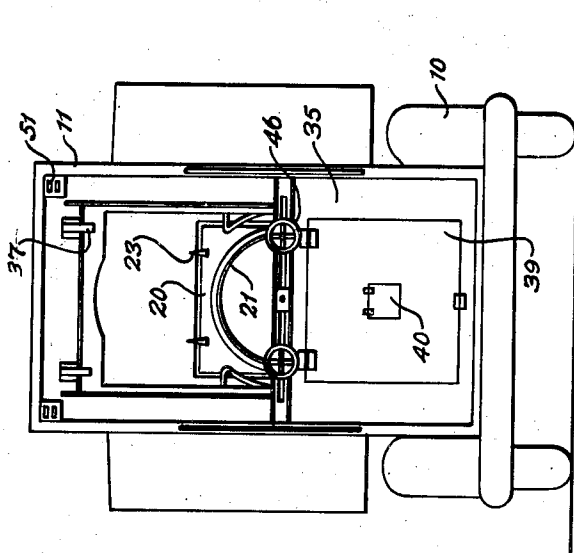


Fig. 8.

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4 Sheets-Sheet 4

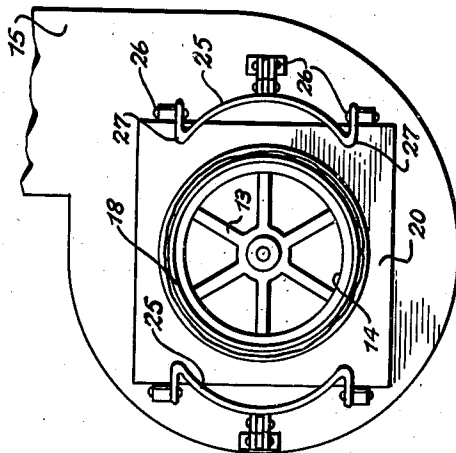


Fig. 11.

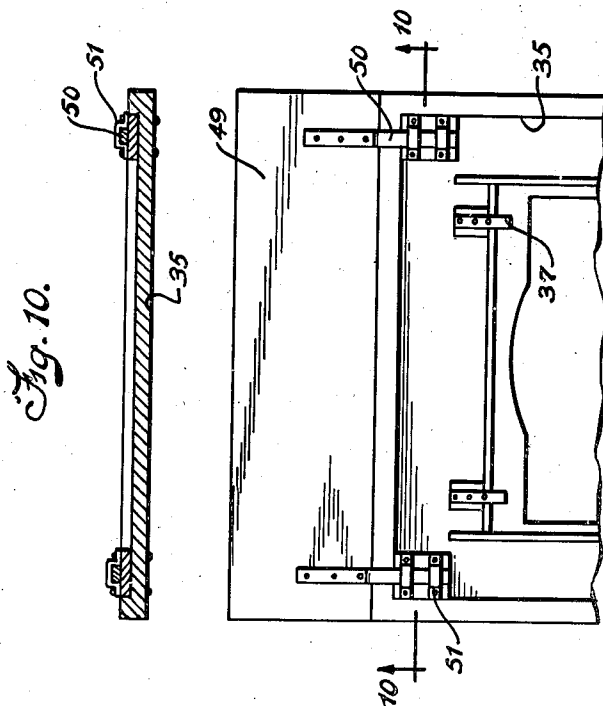


Fig. 10.

Fig. 9.

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UNITED STATES PATENT OFFICE

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MECHANICAL VENTILATOR

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Application June 16, 1945, Serial No. 599,913

7 Claims. (Cl. 98—43)

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This invention relates to a mechanical ventilator, and more particularly to such a device adapted to be mounted on a truck or similar vehicle for relative mobility from place to place as may be necessary.

A primary object of this invention is the provision of an improved mechanical ventilator, adapted to be mounted on a motor vehicle, or the like, designed particularly for the purpose of exhausting smoke, gases, chemical fumes, and the like, from buildings, such as might be engendered in case of fire, leaky tanks, or similar contingencies.

An additional important object of this invention is the provision of such a device particularly adapted for the use of fire departments, rescue squads, emergency squads, police rescue squads, military use as may be necessary, and similar service organizations.

A further object of the invention is the provision of such a device which may be readily applied to any suitable opening in the building, the balance of the opening sealed, and gases, smoke, and fumes drawn off and exhausted at a substantial distance from the building so treated.

A further and more specific object of the invention is the provision of such a device provided with a relatively long length of tubing, whereby the vehicle incorporating the ventilator machinery may be positioned at a substantial distance from the building undergoing treatment.

A further and more specific object is the provision of such a device including such a length of tubing which may be folded into a relatively compact housing in order to facilitate its transportation from place to place.

A further specific object of the invention is the provision of improved means for retaining such tubing in related assembly within the vehicle as desired.

An additional specific object of the invention is the provision of improved means including a mounting frame, adapted to be mounted on the vehicle, and substituted in any desired opening for the regular door thereof, incorporating means whereby the same may be readily secured within the door frame.

A further specific object is the provision of an extension for said door frame, which may be

readily removed from or applied thereto to accommodate a variety of sizes of doorways.

Still another object is the provision of means whereby the end of the exhaust tubing may be disassociated from the door, and readily applied to small openings, such as windows, or the like, and secured therein if necessary.

Still other objects reside in the provision of such a device which will be sturdy and durable in construction, reliable and efficient in operation, and relatively simple to operate, maintain and utilize.

Other objects reside in the combinations of elements, arrangements of parts, and features of construction, all as will be more fully pointed out hereinafter and disclosed in the accompanying drawing, wherein there is shown a preferred embodiment of this inventive concept.

In the drawings:

Figure 1 is a side elevational view of one form of vehicle embodying the apparatus of this inventive concept, the exhaust tube being shown in extended position, and the mounting frame at the extremity thereof being disclosed as applied to the door frame of a building, portions of the building being indicated in section.

Figure 2 is a rear elevational view of the mounting frame comprising a feature of the instant invention.

Figure 3 is a sectional view taken substantially along the line 3—3 of Figure 2.

Figure 4 is a front elevational view of a constructional detail, portions of the exhaust tube being shown in section, disclosing the means for retaining the exhaust tube in retracted position.

Figure 5 is a side elevational view of portions of the structure shown in Figure 1, the tube being shown in extended position.

Figure 6 is a sectional view taken substantially along the line 6—6 of Figure 7, as viewed in the direction indicated by the arrows.

Figure 7 is a fragmentary side view, partially in elevation and partially in section, disclosing the exhaust tubing and the extremity thereof as adapted to be applied to the mounting frame.

Figure 8 is a rear elevational view of the device showing the door and the exhaust tubing secured in position on the vehicle.

Figure 9 is a fragmentary enlarged view dis-

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closing the top of the door of the device, and certain constructional details thereof,

Figure 10 is a sectional view taken substantially along the line 10—10 of Figure 9 as viewed in the direction indicated by the arrows,

Figure 11 is a fragmentary detail view, disclosing certain portions of the apparatus as shown in Figure 4, but in a different position of adjustment, and

Figure 12 is a sectional view taken substantially along the line 12—12 of Figure 6.

Figure 13 is a longitudinal sectional view of the slidable friction clamp forming part of the instant invention.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Having reference now to the drawings, there is generally indicated at 10 a motor vehicle of any desired type, and provided with a truck body 11, within which is contained a turbine or similar pumping device, generally indicated at 12, and including a casing with rotor 13 therein (see Fig. 4), and having an inlet 14 in alignment with the vehicle body and an outlet 15, preferably extending through a suitable opening in the roof of the truck body 11. The turbine 13 may be driven by the motor of the vehicle, or in any other desired manner. A door 16 is the side of the body 11 provides access to the turbine for repairs as may be necessary.

Suitably secured to the inlet 14 of the turbine is a tubular ventilating member 18, comprised of canvas, fabric, or rubber tubing, having a plurality of metallic reinforcing rings 19 positioned interiorly thereof for the purpose of maintaining the same in expanded position when suction is exerted therethrough by means of the exhaust turbine 12. As best shown in Figures 6 and 7, the outer extremity of the tube 18 terminates in a rectangular member or plate 20, provided with a circular aperture 21, to which the outer end of the tube 18 is adapted to be secured. The member or plate 20 is provided on its inner side with oppositely disposed handles 22, that is, on the side adjacent the tube 18, and on its outer side adjacent the upper extremity thereof with a pair of angularly disposed extending prongs 23, the purpose of which will be more fully discussed hereinafter. A bracket member 24 is provided on the lower extremity of the member 20 beneath the tube 18.

Means are provided for securing the tube 18 and its associated end member 20 in relatively close juxtaposition to the inlet of the turbine 13, such means taking the form of arcuate members 25 pivoted at three points, as at 26, to the front wall of the turbine casing. The members 25 are positioned, as best shown in Figure 5, at a substantially spaced distance from the inlet 14 in order that the entire length of the tubing, when contracted, may be contained therewithin, and the extremities 27 of the arcuate members 25 engage over the edges of the member 20. In order to facilitate free pivotal movement of the members 25 and provide a locking device, extensions 29 extend therefrom to the pivot points 26, and the central extension 29' is pivoted, as at 30, to each of the arcuate members 25. Extensions 29 are slidable friction clamps for securing arcuate members 25 in any desired position. It will now be seen that when the members 25 are moved from the positions disclosed in Figure 11, the member 20 being retained therebehind, that the entire tube assembly may be contained within

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the body 11 of the truck. The specific structure of the sliding clamp means may be seen best in Figure 13, wherein there is disclosed a rod 31 slidably received and frictionally retained in a tube 33. The tube is pivoted at 26 to suitable brackets, while the rod 31 is pivoted to the aforementioned member 25. Friction between the telescopic members 31 and 33 retains the arcuate member 25 in a selected position. It will be seen, correspondingly, that any desired length of the tube 18 may be removed from the vehicle by displacement of the members 25, and, after the desired amount has been paid out, the members 25 moved inwardly to the position disclosed in Figure 4, and clamped between any two of the rings 19, thus retaining the balance of the tube within the truck body.

When utilized alone, as in conjunction with a small window, or the like, the member 20 is placed within the window, the handle 22 being utilized for such purpose, and the projections 23 engaged beneath the upper sill thereof, and the lower portion thereof held in position, as by means of a spike or the like inserted in the bracket member 24.

Means are also provided for utilizing the device in association with a large door, or the like, such means taking the form of a supplemental door or mounting frame 35 (see Figures 2 and 3), provided adjacent its upper portion with an aperture 36, extending into which are lugs 37 adapted to engage the upper extremity of the member 20. The mounting frame 35 is provided with elongated handle members 38 adapted for the suitable positioning of the same; and has, in its lower portion below the aperture 36, a hinged door 39 to permit access to the building, or the like, within the center of which is hinged a smaller door 40 of a dimension to permit the insertion of a fire hose nozzle, or the like. Suitable latch means 41 are provided for holding the door 39 in closed position. Means are also provided for securing the mounting frame 35 within a door frame, or the like, and such means take the form of hook members 45 extending through the inner side of the door through suitable apertures, of a relatively great length in order to accommodate varying thicknesses of wall. The inner threaded portions are provided with rotatable wheels 46, adapted to be tightened when the hooks are flared outwardly in desired position within the door frame to hold the same in relatively tight related assembly with relation thereto.

As best shown in Figures 9 and 10, means are provided for extending the height of the door in order to fully close relatively high door frames, such means taking the form of an extension 49, provided with depending tongue portions 50 adapted to engage in suitable brackets 51 on the upper extremity of the mounting frame 35.

When it is desired to remove smoke or gas, or similar fumes from a building, the frame 35 is first removed from the rear of the truck with which it is normally associated, the truck being moved as close to the building as convenient, and secured in position either with or without the extension 49, by means of the hooks 45. The truck is then moved to a suitable distance, the tube 18 being paid out as the truck moves away, or alternatively previously fed out by hand, as may be most expeditious, and when suitably tautened at a requisite distance from the building, the exhaust turbine is started and a powerful suction set up within the tube, and, correspondingly,

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within the building from which the fumes are to be extracted. This operation is continued as long as may be necessary, or until the fire or other condition pertaining therein is brought successfully under control. As previously pointed out, the door 39 within the mounting frame 35 is of sufficient dimensions to admit a man into the building while the frame is in place, while the door 40 is of sufficient dimensions to permit the passage of a fire hose readily therethrough. Correspondingly, as above pointed out, in the event that only a small aperture is available, the member or plate 20 may be utilized alone by detaching the same from the mounting frame 35.

From the foregoing, it will now be seen that there is herein provided an improved mechanical ventilator readily transportable, and adapted for the ready ventilation and removal of fumes, gases, smoke, or the like, from any desired location, which accomplishes all of the objects of this invention and others, including many advantages of great practical utility and commercial importance.

As many embodiments may be made of this inventive concept, and as many modifications may be made in the embodiment hereinbefore shown and described, it is to be understood that all matter herein is to be interpreted merely as illustrative and not in a limiting sense.

I claim:

1. In a ventilating device, the combination of a vehicle having a ventilating turbine which includes a casing and an inlet therein, an extensible and retractable flexible tube having one end secured to the inlet in said turbine casing, stiffener rings in said tube, means for embracing a selective amount of said tube by clamping the stiffener rings within said tube comprising arcuate members pivoted on opposite sides of said opening by means of arms, frictional sliding clamp means pivoted at opposite ends to said casing and said arcuate members for holding said arcuate members in selective open and closed positions, whereby the tube is held entirely or partially within the arcuate members, a mounting frame carried by the vehicle, said mounting frame having an opening and adapted to be secured in an aperture in a building to be ventilated, a plate secured to the opposite end of said tube, and means for detachably securing said plate in the opening in said mounting frame, said plate securing means including a lug secured to said mounting frame.

2. In a ventilating device, the combination of an automotively mounted ventilating turbine having a casing and an inlet therein, an extensible and retractable flexible tube having one end secured to the inlet in said casing, stiffener rings in said tube, means for embracing and holding a selective amount of said tube by clamping the stiffener rings within said tube including a pair of arcuate members pivoted on said casing on opposite sides of said inlet, frictional sliding clamps pivoted at each end to said casing and said arcuate members for holding the said arcuate members in selective open and closed positions, whereby the tube is held entirely or partially within the arcuate members, a mounting frame having an opening and adapted to be secured in an opening in a building to be ventilated, means secured to said frame for securing said frame in the building opening, a plate secured to said tube, means for detachably securing said plate in the opening in

said frame, said clamps including a rod pivoted to said arcuate members, a sleeve pivoted to said turbine casing, and said rod extensibly received in said sleeve.

3. A ventilating device comprising the combination of, automotively mounted air impelling means having a casing and an inlet in said casing, an extensible and retractable tube having one end in communication with the inlet in said casing, holder means pivotally secured to said casing, said holder means including arcuate members disposed on opposite sides of said inlet, stiffener means in said tube selectively engageable by said arcuate members for retaining in retracted position a selective amount of said tube, a mounting frame, means for detachably securing said frame in a building opening, said frame having an opening, a plate secured to an end of said tube, lugs on said frame for detachably retaining said plate in said mounting frame opening, a door in said mounting frame, said selective securing means including a tube pivoted to said casing having a rod frictionally retained therein, and means for pivoting said rod to one of said arcuate members.

4. A ventilating device mounted on a vehicle having a body comprising a turbine mounted on the vehicle body and having a casing with an inlet, a flexible tube having one end attached in communication with said inlet, stiffener rings in said tube, means carried by said casing for holding selected amounts of tube in the retracted position including arcuate members engaging opposite sides of said tube and having arms pivoted at their ends to said casing at opposite sides of said inlet, and means secured to said arcuate members and said casing for retaining said arcuate members in selected pivoted position.

5. A ventilating device mounted on a vehicle having a body comprising a turbine mounted on the vehicle body and having a casing with an inlet, a flexible tube having one end attached in communication with said inlet, stiffener rings in said tube, means carried by said casing for holding selected amounts of tube in the retracted position including arcuate members engaging opposite sides of said tube and having arms pivoted at their ends to said casing at opposite sides of said inlet, and means secured to said arcuate members and said casing for retaining said arcuate members in selected pivoted position, a plate secured to the opposite end of said tube adapted to be inserted in a building opening and means carried by said plate for releasably fixing said plate in a building opening.

6. A ventilating device mounted on a vehicle having a body comprising a turbine mounted on the vehicle body and having a casing with an inlet, a flexible tube having one end attached in communication with said inlet, stiffener rings in said tube, means carried by said casing for holding selected amounts of tube in the retracted position including arcuate members engaging opposite sides of said tube and having arms pivoted at their ends to said casing at opposite sides of said inlet, and means secured to said arcuate members and said casing for retaining said arcuate members in selected pivoted position, a plate secured to the opposite end of said tube adapted to be inserted in a building opening and means carried by said plate for releasably fixing said plate in a building opening, a mounting frame disposed on the vehicle adjustable means secured to said mounting frame for fixing said frame in a building doorway, said mounting frame having an

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aperture therein of slightly smaller size than said plate, and means carried by said frame adjacent the aperture in said frame for releasably retaining said plate therein.

7. The combination of claim 6 and a door carried in said mounting frame, and an extension detachably secured to said mounting frame.

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