

Oct. 1, 1935.

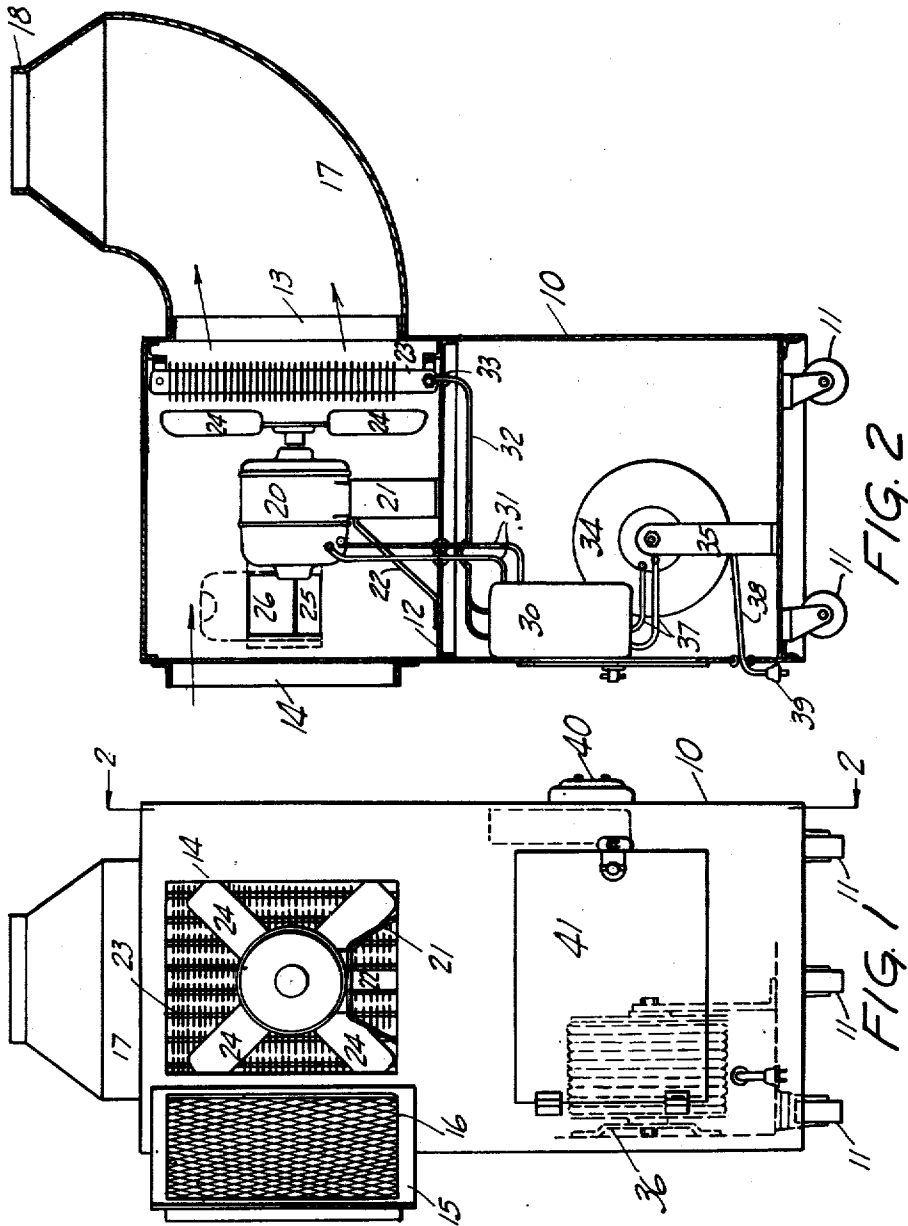
E. WITZEL

2,015,982

PORTABLE ELECTRIC PREWARMER FOR AIRSHIP ENGINES

Filed Aug. 7, 1933

3 Sheets-Sheet 1



INVENTOR  
Ernst Witzel  
BY ASKROTH  
ATTORNEY

Oct. 1, 1935.

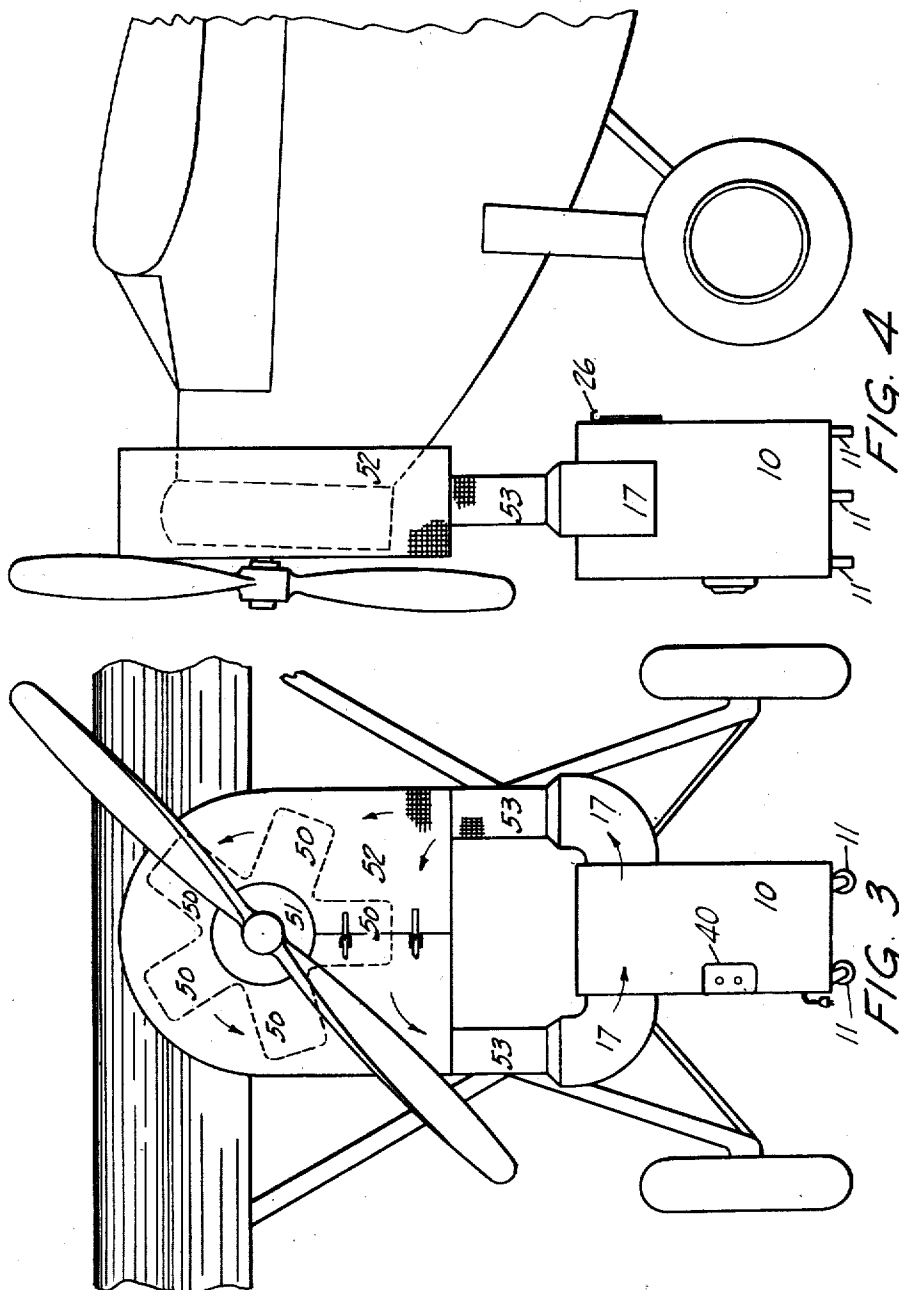
E. WITZEL

2,015,982

PORTABLE ELECTRIC PREWARMER FOR AIRSHIP ENGINES

Filed Aug. 7, 1933

3 Sheets-Sheet 2



INVENTOR  
Ernest Witzel  
BY *W. Skroby*  
ATTORNEY

Oct. 1, 1935.

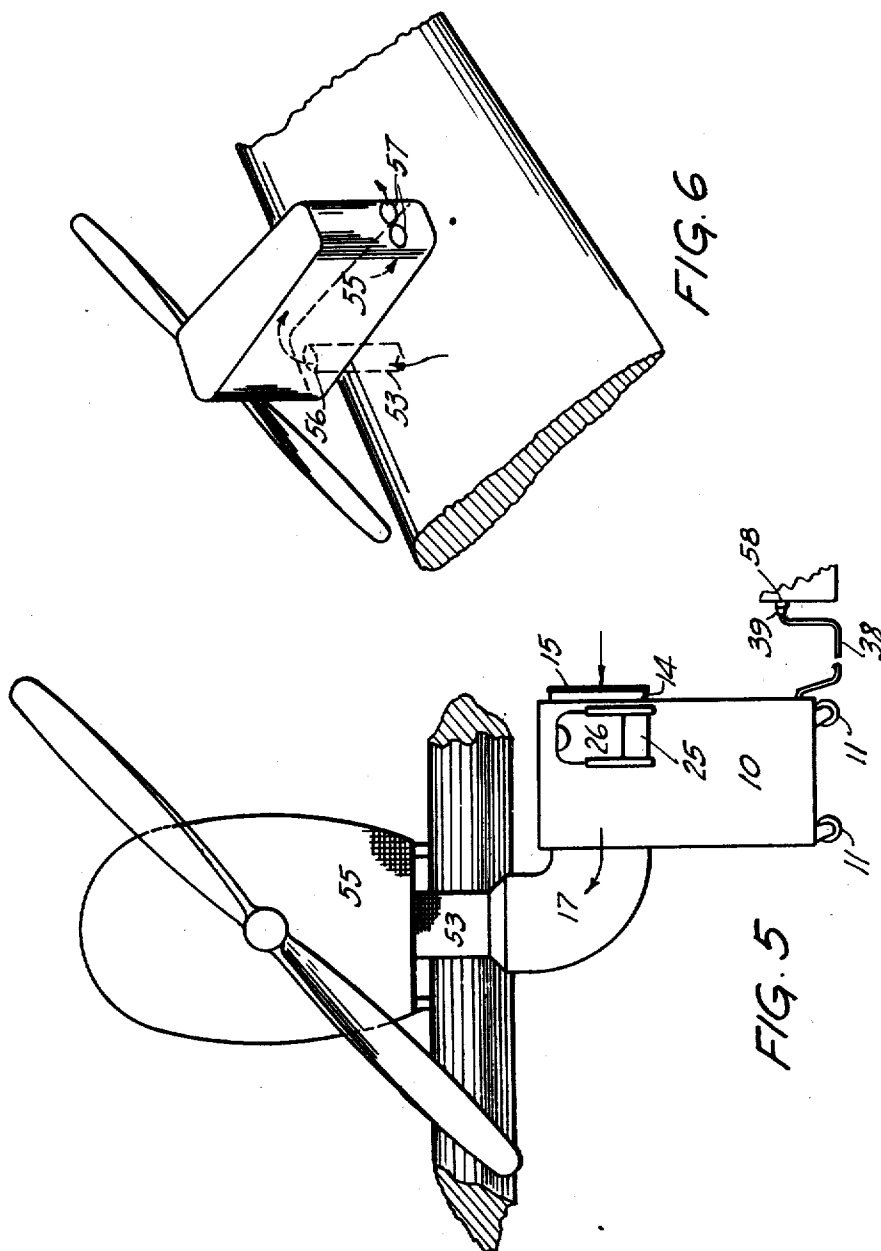
E. WITZEL

2,015,982

PORTABLE ELECTRIC PREWARMER FOR AIRSHIP ENGINES

Filed Aug. 7, 1933

3 Sheets-Sheet 3



INVENTOR  
Ernst Witzel  
BY *ASKROTH*  
ATTORNEY

## UNITED STATES PATENT OFFICE

2,015,982

PORTABLE ELECTRIC PREWARMER FOR  
AIRSHIP ENGINESErnst Witzel, Racine, Wis., assignor to Young  
Radiator Company, Racine, Wis.

Application August 7, 1933, Serial No. 684,073

4 Claims. (Cl. 219—39)

My invention relates to convenient, economical and safe portable means for pre-warming airship engines and the like by exterior means.

It is well known that cold internal combustion engines start hard, and when started, they operate for a time uncertainly and erratically. There is, therefore, an element of danger during cold weather if the pilot takes off before the engine is sufficiently warmed. Furthermore, this pre-warming, for obvious reasons, cannot always be conveniently done by operating the engine for a time before taking off. Therefore, it is desirable, in order to insure a quick and safe get-away, to pre-warm the engine before starting it for the take-off.

I provide a means adapted to temporarily cover the engine and a portable electric air circulating and heating device adapted to be readily connected to the covering means whereby air is heated and caused to pass through the engine covering means to thereby pre-warm the engine before starting.

My device may be provided with two air connections to the engine cover, one an inlet for the heated air and the other an outlet whereby the air may be returned to the heating device, thus to circulate the air over and over as a means to efficiency. Or an inlet for heated air connection only may be made to the engine cover, in which there is provided means for the escape of the air after it passes therethrough. Thus a fresh supply of air is warmed and forced through the engine cover for the purpose of pre-warming the engine.

The air circulating and heating can be done most efficiently by my improved portable heater when equipped with a heating unit similar to that shown in applicant's pending application, Serial No. 653,396, filed Jan. 25, 1933. I am, therefore, disclosing features of this heating unit in the present application.

Airports are numerous and practically all have electric power connections. All that is necessary in order to equip an airport to make use of my invention, is properly positioned electric plug-in connections.

My portable heating device is provided with a cable of a suitable length whereby the portable unit may be moved to the airship, even if a considerable distance from the plug-in connection therefor.

To these and other useful ends, my invention resides in features of construction, the parts and combinations thereof and mode of operation, or their equivalents, as hereinafter set forth and

claimed and shown in the accompanying drawings in which:

Figure 1 is a rear elevation of my portable electric heating unit.

Figure 2 is a longitudinal sectional view of the unit shown in Figure 1, taken on line 2 of Figure 1.

Figure 3 is a front fractional elevation of an airplane showing my temporary cover as positioned over the engine, and also showing my heating unit as connected thereto.

Figure 4 is a fractional side elevation of the airplane and assembly, as shown in Figure 3.

Figure 5 is a fractional front elevation of another type of airplane, showing my engine cover as positioned over the engine and showing my heating unit connected thereto.

Figure 6 is a fractional perspective view of an airplane showing the engine cover in position, as illustrated in Figure 5.

As thus illustrated, 10 designates the cabinet or housing of my portable heating unit. This unit is preferably provided with caster wheels 11 whereby the unit may easily be moved about and placed in the proper position for air tube connection to the engine cover, when used for pre-warming airplane engines.

My improved heating unit is provided with a partition 12, thus to form an upper and a lower compartment therein. The upper compartment 30 is provided with front and rear flanged openings 13 and 14, thus supplying inlet and outlet openings for the circulating air which is caused to pass through the unit, as indicated by arrows in Figure 2, in a manner which will hereinafter appear.

My heating unit may be used for heating rooms when placed therein, in which case no air outlet and inlet pipe connections are used and the openings 13 and 14 are each provided with hinged doors 15, as shown in Figure 1. These doors are provided with grilles 16 to thereby prevent foreign matter from entering the upper compartment, or accidental injury to the operator when the fan is in motion.

In Figures 1 and 2, I illustrate the unit having an outlet elbow 17, which is provided with a circular flanged outlet opening 18 to thereby provide convenient means for pipe extensions. Under some conditions, wherein a pipe connection is needed for the inlet side of the unit, the door 15 may be removed and an outlet connection 17 attached instead.

I will now describe my air circulating and heating means. I provide a suitable electric fan motor

20 which is supported in a central position in the upper compartment by means of bracket 21 and brace 22, as clearly shown in Figures 1 and 2.

Heating elements 23 are preferably vertically positioned and closely spaced in parallel relation, forming a transverse row of these elements across the outlet 13. Suitable fan blades 24 are provided and preferably positioned between the motor 20 and the elements 23.

Obviously, other forms of heating elements may be used and under some conditions I may also elect to use some other form and position of motor and fan and a differently formed and positioned air outlet and inlet.

I provide a small auxiliary air inlet 25 having a manually operated lid 26 whereby any desired amount of fresh air may be permitted to enter the upper chamber. This feature is useful only when the air is circulated over and over, as in the construction shown in Figures 3 and 4, whereby in case of gas leakage in the enclosure, dangerous saturation may be prevented.

I provide a suitable switch box 30 in the lower compartment from which suitable electric connecting wires 31 lead to the motor 20, and suitable wires 32 which lead to the heating elements 23. These wires each pass through the partition 12 and are suitably insulated therefrom by means of insulating sleeves 33, in the usual manner. Thus the upper compartment will be practically sealed or isolated from the lower compartment.

In order to provide convenient means for connecting my unit to the source of electric supply in the form of stationary plug-in connections, I preferably provide a cable-holding reel 34, which is rotatably mounted to the floor of the lower chamber by means of post 35 and to the wall by means of bracket 36.

This reel may be supplied with an automatic winding-up spring or a manually operated crank. In either event, I preferably provide contact rings having connections to the inner ends of a two-wire cable 38, and brush connections to the switch 30 by means of wires 37.

In Figure 2, I show this reel wound up whereby only the free end of the cable 38 is exposed. This end of the cable is provided with a suitable plug-in socket 39.

Thus it will be seen that my air heating and circulating unit is adapted to be easily moved to places remote from the source of electrical supply, and that I have supplied convenient means for making a connection to this supply.

In apparatus of this class, it is the custom to provide an enclosed quick acting electrically operated switch. I contemplate this type of switch and position it in the box 30. I provide a manually operated primary switch and mount it preferably on the outside of the housing as at 40. The form of these switches and manner and form of connections are too well known to require further illustration or description.

As a means of convenient access to the lower chamber, I provide a large hinged door 41 having a suitable latch. Thus the operator may use the lower chamber for carrying cable and other things necessary in a device of this class.

When my heating unit is used for pre-warming airplane engines, I provide preferably a canvas engine cover, whereby a temporary enclosure is formed around the engine, and warmed air is forced into this enclosure. A special air outlet may be supplied, although in some cases the air will escape through various loosely fitted joints, or otherwise.

In one form of my invention, I provide an air inlet and an air outlet to the engine cover, in which case two members 17 are provided and these members are suitably connected to the inlet and outlet openings in the engine cover preferably by means of flexible canvas tubes 53. Thus the air will circulate through the system to thereby economize in the power consumption.

I will now describe my improvements as illustrated in Figures 3, 4, 5 and 6.

Engine covers for the purpose described could have no definite form. Every make requires a different form of cover. I have, therefore, shown two types of engines only, one of which is illustrated in Figures 3 and 4 wherein the engine extends forward of the fuselage and the engine cylinders 50 are arranged radially around the cylinder block 51.

The engine cover 52 is preferably made from canvas fabric material, having proper openings 20 and parting lines to make it convenient to place over the engine and sufficiently air-tight for the purpose. The connecting tubes 53 are preferably made from canvas fabric material, having rings at intervals, whereby they are somewhat flexible and will retain a practical shape when bent or compressed slightly.

When the heating unit is in operation, air will be warmed and circulated through the system, as indicated by arrows. Thus the engine will be pre-warmed and prepared for a safe and quick getaway the construction of my engine cover, heating unit and air connections therebetween and the cable connecting means being such as will require but a few minutes to attach and detach from the airplane.

In Figures 5 and 6, I illustrate another form of engine cover which is designated by numeral 55, having an air inlet only, as at 56. In this type of airplane the engine (not shown) is positioned above the wings or fuselage structure of the airplane, the front end extending a short distance ahead. Thus there is room for the one inlet only. In practice it is the custom to provide an air outlet, as at 57, for escape of the air after it has passed through the cover.

In Figure 5 I have shown the cable 38 and its connecting plug 39, as engaging a supply socket 58, which may be mounted on the wall of the building or in any other suitable position.

Thus I have provided novel temporary enclosures for airplane engines and the like, and novel means for heating and circulating air there-through, and for heating rooms by circulating and heating the air therein, or by forcing heated air into the room.

Obviously, applicant's device can be put to uses too numerous to mention, and many forms of enclosures too numerous to mention may be used.

Thus it will be seen that many changes in detail may be made without departing from the spirit and scope of this invention.

Having thus shown and described my invention, what I claim and desire to secure by Letters Patent is:

1. A pre-warmer of the class described, comprising a detachable enclosure for the device to be warmed, having an air inlet, a portable heating unit having upper and lower compartments, an air inlet and outlet in said upper compartment and an electric fan and heating elements therebetween, said elements positioned transversely across the air path and adjacent said air outlet, flexible means for connecting said upper com-

partment air outlet to the air inlet of said temporary enclosure, electrical controlling means in said lower compartment having wire connections leading to said motor and elements through said partition, a flexible cable having a holding reel therefor, positioned in said lower compartment and having connections to said controlling means whereby a temporary connection may be made by the free end of said cable to a remote source of electrical supply.

2. A pre-warmer of the class described, comprising a detachable enclosure for the device to be warmed, having an air inlet and an air outlet, a portable heating unit having a chamber, an air inlet and outlet in said chamber and an electric fan and heating elements therebetween, said elements positioned transversely across the air path and adjacent said air outlet, flexible means for connecting said detachable enclosure air inlet and outlet to the air inlet and outlet of said chamber, electrical controlling means on said heating unit positioned exterior to said chamber, having connections which lead through insulated openings into said chamber and to said motor and elements, a holding reel having a flexible cable and suitable connections to said controlling means mounted on said unit, exterior to said chamber, whereby an electrical connection may be conveniently made by the free end of said cable to a remote source of electrical supply.

3. An electric heating device, comprising a temporary enclosure for the device to be heated

having an air inlet and outlet, a portable heating unit comprising a housing having an air inlet and outlet, an electric fan and electric heating elements in said housing, positioned between the air inlet and outlet, said elements positioned across the path of air current adjacent said outlet, a flexible cable adapted to form a temporary connection to a permanent source of electric supply, whereby air may be circulated and heated, temporary flexible means for connecting said air inlets and outlets, whereby the heated air is circulated through said enclosure, an adjustable opening between said air inlet and fan whereby a limited supply of fresh air may be admitted to said housing.

4. An electric heating device comprising a portable cabinet, a horizontal partition in said cabinet forming upper and lower compartments, air inlet and outlet openings in opposite sides of said upper compartment having an electric fan and motor therebetween, whereby an air current is forced therethrough, heating elements in said upper compartment positioned across the air path, adjacent said air outlet, suitable wire connections leading from the motor of said fan and from said elements through said partition to a terminal box in said lower compartment, said terminal box having a flexible cable connection and means whereby said terminal box may be electrically connected to a remote electrical supply.

ERNST WITZEL.