Feb. 3, 1942. F. H. C. COPPUS 2,271,627

INDUCED DRAFT BLOWER

Filed March 7, 1938 2 Sheets-Sheet 1

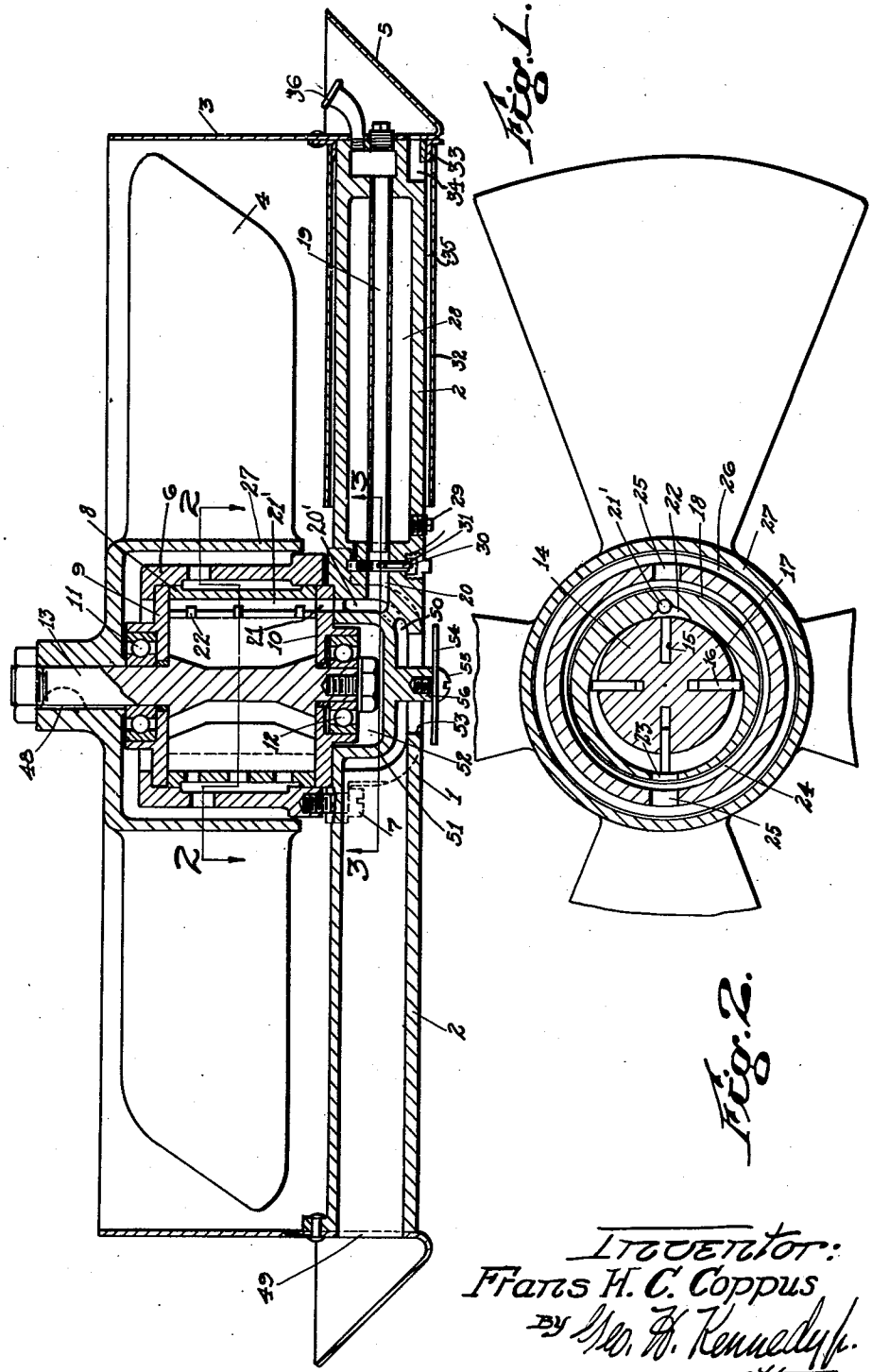


Fig. 1.

Fig. 2.

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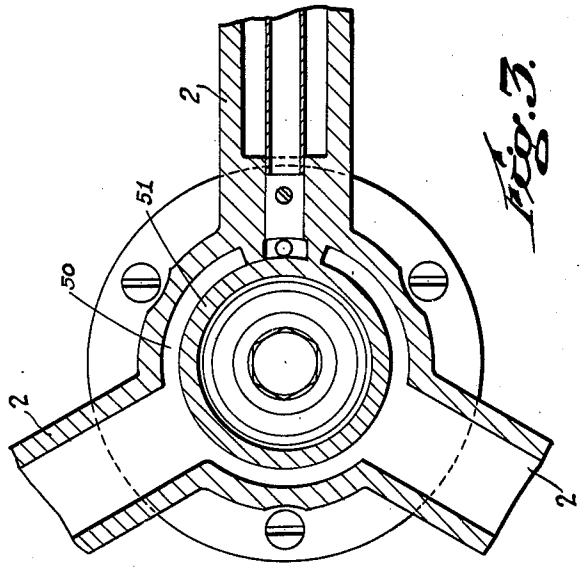


Fig. 3.

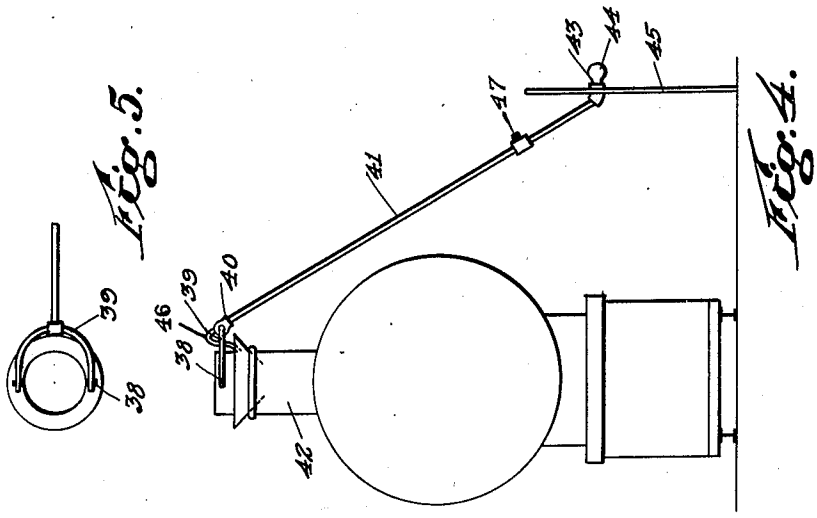


Fig. 4.

Fig. 5.

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Patented Feb. 3, 1942 2,271,627

UNITED STATES PATENT OFFICE

2,271,627

INDUCED DRAFT BLOWER

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Application March 7, 1938, Serial No. 194,257

10 Claims. (Cl. 110—159)

The present invention relates to an air driven blower for inducing draft, especially in the stack of a boiler. The blower is particularly adapted for drafting or ventilating locomotive or other movable boilers. One of the objects of the present invention is to provide a readily portable blower which can easily be placed manually in a position for use.

In prior devices for drafting locomotives, as shown for example, in the Coppus Patent No. 1,858,581, dated May 17, 1932, there has been a provision for preventing the transfer of heat to the motor from the hot gases surrounding the motor, the structure by which this was accomplished being a double-walled hub with an air space between. One feature of this invention resides in the provision of means for keeping the driving motor and its associated parts cool during the operation of the blower, and to this end the compressed air utilized by the motor for driving the fan also serves to prevent the transfer of heat from the hot gases to the motor. A further feature of the invention resides in a provision for lubricating the motor automatically in order to minimize wear on the parts and to assure satisfactory operation of the device.

Other and further objects and advantages of the invention will hereinafter more fully appear from the following detailed description taken in connection with the accompanying drawings in which—

Fig. 1 is a vertical sectional view through the blower embodying the invention.

Fig. 2 is a horizontal sectional view along the line 2—2 of Fig. 1.

Fig. 3 is a horizontal sectional view along the line 3—3 of Fig. 1.

Fig. 4 is a front elevation of a locomotive showing a blower in position on top of the locomotive stack.

Fig. 5 is a plan view of the device of Fig. 4.

Like reference characters refer to like parts in the different figures.

With reference first to Figs. 1 and 3, the device has a base 1 in the form of a spider having radially extending hollow legs 2, to the outer ends of which is connected a cylindrical shell 3 which surrounds the fan 4. The lower edge of the shell has an outwardly and upwardly extending flange 5 which is engageable with the top of the locomotive stack, as shown in Fig. 4, for supporting the device.

A cylindrical housing 6 is mounted centrally on the base, as by cap screws 7, and within the housing is positioned a vertical sleeve 8 which forms the cylinder for the driving motor. End caps 9 and 10 at opposite ends of the sleeve provide antifriction bearings 11 and 12 which support the motor shaft 13 for rotation. Inside the sleeve 8 is positioned a cylinder 14 which is preferably integral with the shaft 13, and this cylinder has radial slots 15 in which are positioned radially extending vanes 16. The inner bore 17 of the sleeve 8 is eccentric to the cylinder 14 and also to the outside surface 18 of the sleeve, which latter is concentric to the axis of the cylinder 14.

Air under pressure for driving the motor is supplied by a pipe 19 extending centrally through one of the hollow arms 2 and communicating at its inner end with a horizontal channel 20 in the base which intersects a chamber 20' in the base. The chamber 20' is in line with a vertical channel 21 in the end plate 10 and a bore 21' in the sleeve 8. As best shown in Fig. 2, the vertical channel 21 communicates with the inside of the sleeve 8 by means of arcuate slots 22 which intersect the channel. It will be apparent that these slots are so arranged that air from the vertical channel is discharged into the space between the sleeve 8 and the cylinder adjacent to and at one side of the point where the cylinder and sleeve are tangent.

Opposite to the slots 22 the sleeve 8 has exhaust ports 23 for the exhaust of air from the motor. These ports communicate with an annular space 24 between the sleeve 8 and the housing 6. The latter has openings 25 therein which permit the exhaust of air from the annular space into another annular space 26 between the housing and a depending annular flange 27 on the fan. The annular flange 27 constitutes the hub of the fan and forms a housing within which the motor is positioned, and as above stated, the flange 27 is spaced from the housing 6 to define the annular space 26. The lower end of the flange is spaced slightly from the housing 6 to provide for the escape of air therebetween.

For lubricating the motor the air which drives the motor has oil supplied thereto by an injector. To this end the hollow leg 2 through which the compressed air pipe extends has its opposite ends closed to form a chamber 28 which can be filled with oil through a plug 29. Intersecting the horizontal channel 20 at the end of the air pipe is a nozzle 30 having a needle valve 31 by which to control the amount of oil delivered from the oil chamber to the air passage. The lubricating mechanism is of well-known construction and need not be described in detail.

The oil in the chamber 28 is kept cool by a cy-

lindrical shell 32 surrounding the leg 2 and held in spaced relation thereto by a flanged ring 33 at the outer end of the leg. An air passage 34 in the outer end wall of the leg communicates with the chamber 35 between the shell and leg and admits cool air thereto from the atmosphere outside of the shell 3. A coupling 36 is also positioned in the end wall of the leg 2 and communicates with the pipe 19.

As best shown in Figs. 4 and 5, the shell 3 has projecting pins 38 on opposite sides thereof which are engageable in the ends of a yoke 39, the center of which is provided with a cross fitting 40 to which a pipe 41 is attached. By this means the blower may be manually placed upon the smoke stack 42 of a locomotive. To prevent the weight of the pipe from overbalancing the blower when the latter is in operation, the lower end of the pipe has a suitable coupling 43 with a thumbscrew 44 by which the coupling may be secured to a vertical post 45, extending upwardly from the floor.

In operation, the device having been placed upon the smoke stack in the position of Fig. 4, air is admitted to the motor by a flexible hose connection 46 between the fitting 40 and the air pipe 19, the coupling 36 being provided for this purpose. Air is admitted to the pipe 41 through a coupling 47 adjacent the lower end of the pipe. As air enters within the bore of the sleeve 8, it causes a clockwise rotation, Fig. 2, of the cylinder 14 and, accordingly, of the shaft 13, which is integral therewith. The fan 4 is keyed, as at 48, or otherwise secured to the upper end of the shaft 13. As the cylinder 14 rotates, the vanes 16 move in and out, as shown in Fig. 2, to remain in contact with the sleeve 8, in order that the motor may function. Air escaping into the annular space 26 between the housing and the radial flange or hub 27 on the fan aids in maintaining the motor and associated parts at the proper temperature. This air is obviously continually changed by the discharge of air from the motor.

For a more complete cooling of the lower bearing for the fan shaft, the legs 2, except for the one in which the oil chamber is located, are hollow and are in line, at their outer ends, with openings 49 in the shell 3 to communicate with the atmosphere outside of the shell. These hollow legs communicate at their inner ends with an annular chamber 50 which extends around an annular portion 51 of the base. Within the annular portion 51 is a grease chamber 52 for the anti-friction bearing at the lower end of the shaft. The annular air space in the base communicates with a central opening 53 in the underside of the base, this opening being shielded by a plate 54 connected, as by a screw 55, to a downwardly projecting boss 56 on the portion of the base which forms the grease chamber. The suction of the fan causes a circulation of air through the legs 2, chamber 35 and the chamber 50 to keep the lubricating oil and the grease chamber 52 from overheating.

I claim:

1. In a device of the class described, a base adapted to rest on an opening, said base having hollow legs in one of which is located an oil chamber, a motor centrally positioned on the base, a fan driven by the motor, and means surrounding said chamber and communicating with the atmosphere outside of the opening for circulating cooling air around said chamber as a result of fan rotation.

2. In a device of the class described, a base adapted to rest on an opening, said base having hollow legs in one of which is located an oil chamber, a motor centrally positioned on the base, a fan driven by the motor, and means extending through the leg in which the oil chamber is located for supplying air to said motor, including a nozzle associated with said oil chamber to inject oil into the air entering the motor.

3. In a blower, a base, a compressed air motor on said base, a fan driven by said motor, bearings for said motor and fan, a chamber having a lubricant supply for at least some of said bearings, and means associated with and at least partially surrounding said chamber to circulate cooling air therearound as a result of fan rotation, said means communicating with the atmosphere at a point out of the air stream caused by the fan rotation.

4. In a blower, a base, a compressed air motor on said base, a fan driven by said motor, a chamber having an oil supply for lubricant to the motor, means for directing air to said motor, including a conduit passing through the oil chamber, and means associated with said air directing means for injecting oil from the chamber into the air before it reaches the motor.

5. In a device for handling hot gases, a base, a fan having a hub, a compressed air motor on said base for driving said fan, said motor being positioned within the fan hub and a housing within the hub and surrounding said motor to define a chamber into which the exhaust air from the motor is discharged, said housing being spaced from the inner surface of the fan hub whereby the chamber between the hub and housing is substantially annular.

6. In a device of the class described, a base adapted to rest on an opening, said base having hollow legs communicating at their outer ends with the atmosphere outside the opening, a motor centrally located on said base, a fan driven by said motor and having a hub surrounding said motor, means for circulating air through the hollow legs as a result of fan rotation, and means for directing the exhaust air from the motor to the inside of the fan hub for cooling said motor.

7. In a blower, a base adapted to rest on an opening, a compressed air motor positioned centrally of the base, a fan connected to said motor and driven by said motor, a handle hingedly connected to said base for positioning the blower, a connecting element on said handle remote from the base to which an air supply may be connected, a flexible conduit from said handle to the motor and means on said handle adjacent the end remote from the base for supporting the handle and thereby avoiding displacement of the blower on the opening.

8. In a light-weight device for drafting locomotives, a base engageable with the stack of a locomotive, a compressed air motor positioned centrally of the base, a fan driven by the motor and positioned within the base for circulation of air therethrough, a handle hingedly connected to the base for positioning the blower on the stack, and means adjacent the end of the handle remote from the base for supporting that end of the handle in predetermined relation to the ground on which the locomotive rests.

9. In a light-weight device for drafting locomotives, a base engageable with the stack of a locomotive and having a plurality of radially extending legs for supporting the base centrally of the locomotive stack, a compressed air motor positioned centrally of the base, and a fan driven

by the motor for circulating air through the locomotive stack, at least one of said legs being hollow to permit circulation of air through said leg, the base having a chamber communicating with said hollow leg, and means associated with the chamber for causing a flow of air therethrough as a result of the rotation of the fan.

10. In a blower for drafting locomotives, a base having radially extending legs for supporting the base centrally of a locomotive stack, a compressed air motor on said base, a fan driven by said motor, and a shell engageable with the outer ends of the legs and adapted to engage the locomotive stack, one of said legs having an air passage therein through which compressed air from a source outside the shell is directed to the motor.

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