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FAN UNIT WITH A REMOVABLE BLADE ASSEMBLY

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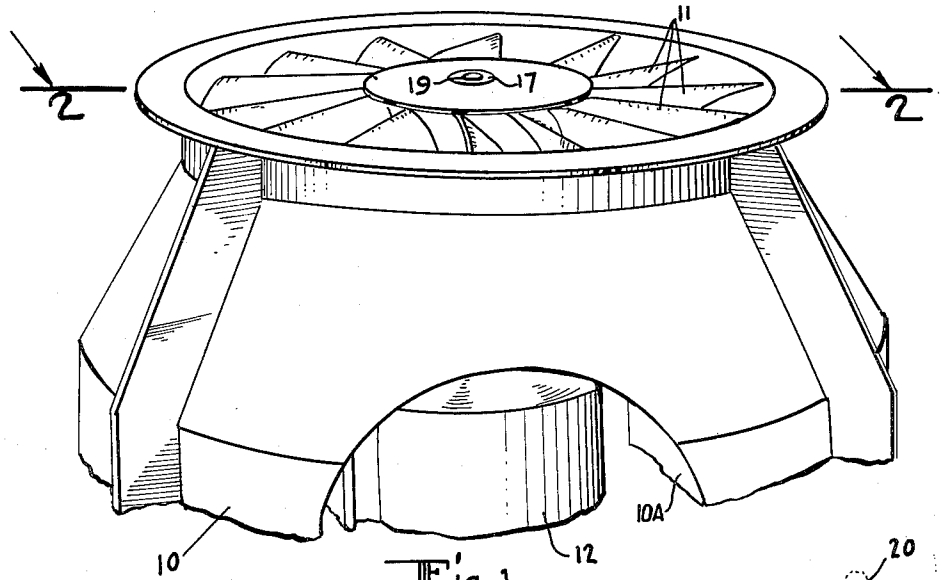


Fig. 1

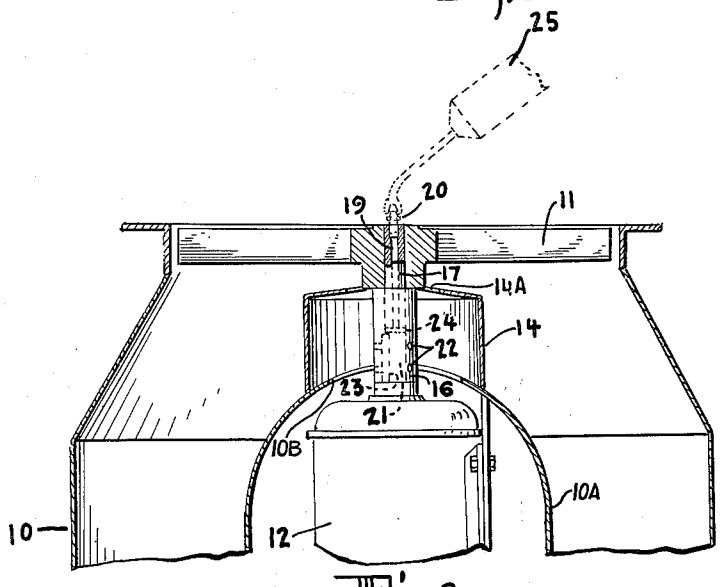


Fig. 2

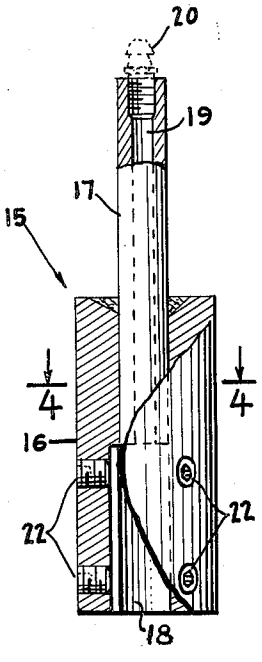


Fig. 3

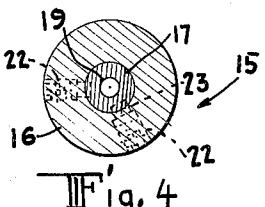


Fig. 4

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FAN UNIT WITH A REMOVABLE BLADE ASSEMBLY

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1 Claim. (Cl. 230—117)

This invention relates to an industrial fan assembly for removing contaminated air from manufacturing installations, and particularly to an assembly having a removable fan blade thereon.

The invention is particularly adapted for use with industrial fans where it may be desirable to remove the fan blade to replace or clean the fan. Since the assemblies are usually constructed so that the shaft which supports the fan blades is not readily accessible, it is desirable that some means for removing the fan blade by acting on the forward portion of the fan blade supporting shaft be devised.

It is an object of this invention to provide a fan assembly in which the fan blade is removable from the assembly.

Another object of this invention is to provide a fan assembly in which the fan blade is removed from the assembly by injecting fluid at the forward end of the fan blade supporting shaft.

It is a further object of this invention to provide a fan assembly in which the fan blade is removable by injecting grease under pressure into a bore in the fan blade supporting shaft.

The fan assembly of the invention includes a motor and a motor shaft rotatable by the motor. A second shaft for supporting the blade means or air mover is also provided. In order to transmit rotation from the motor shaft to the blade supporting shaft, a sleeve is provided which closely fits and overlies the free ends of said shafts. This sleeve is removably secured to one of the shafts and may be permanently secured to the other shaft; and positioned so that the free ends of the shaft are spaced from each other. This spacing defines a sealed cavity in the sleeve between the free ends. A passage connecting the cavity to the ambient atmosphere is formed so that fluid may be injected from the exterior of the assembly into the cavity. Means for injecting fluid through the passage and into the cavity is included in the assembly of the invention so that, when the sleeve is loosened from the shaft to which it is releasably secured, the shafts are forced apart by the fluid injected into the cavity, thereby releasing the fan blade to permit its ready removal by hand.

The foregoing and other objects, features and advantages hereof will become apparent from the following description and drawings which are merely exemplary.

In the drawings:

Fig. 1 is a perspective view of the upper portion of a fan assembly of the type utilized in the invention;

Fig. 2 is a cross sectional view taken along the line 2—2 of Fig. 1 looking in the direction of the arrows;

Fig. 3 is an enlarged view, partly in cross section, of the shaft extension utilized in the assembly of the invention; and

Fig. 4 is a cross sectional view taken along the line 4—4 of Fig. 3 looking in the direction of the arrows.

The device of the invention is shown in connection with an industrial fan of the type in which the housing

10 is formed so that the fluid flows through the housing without coming into contact with the motor 12 which is mounted in a casing 10A formed in the body of housing 10. Casing 10A forms a space which is completely closed off from the fluid flow in the housing and is uninterrupted except for opening 10B formed at the top (Fig. 2). This prevents the deterioration of the motor, due to various substances which may be in the fluid being moved by the assembly. The fluid is moved by fan blades 11 which are rotated by the motor 12. A walled extension 14 is provided for segregating the area between the motor and the fan blades from fluid flow in the duct. Extension 14 is connected to casing 10A so as to close off opening 10B and has an opening 14A at its upper end (Fig. 2) large enough to permit free rotation of the fan blades 11 relative thereto.

In order to permit the removal of the fan blades 11 without the removal of motor 12, a shaft extension structure 15 is provided. This structure includes a fan blade shaft 17 upon which the blades are connected for rotation therewith. At the outside end of shaft 17 a grease fitting 20 is provided which may be threadingly engaged in bore 19. If desired, this fitting may be normally taken off of the shaft, and a screw threaded member may be inserted therefor when the fan assembly is operating.

A sleeve 16 is fitted over the inner end of shaft 17 and is fixedly secured thereto, as for example, by welding. The interior bore of this sleeve is of a diameter slightly greater than the outer diameter of motor shaft 21.

The fan blades are connected to the motor drive shaft 21 by the shaft extension 15 in the following manner: the bore 18 is fitted over the motor shaft 21; keyway 23 on motor shaft 21 is positioned so as to fit into a slot in the sleeve 16; and set screws 22 are then tightened against keyway 23 so that the shaft extension 15 will rotate with motor shaft 21.

The shaft extension is constructed so that, when it is in its secured position on motor shaft 21, the free end of motor shaft 21 is spaced from the inner end of shaft 17, thereby forming a sealed cavity 24 between these ends. In order to release the fan blades and shaft extension 15 from motor shaft 21 to remove the fan blade assembly from the housing 10, the set screws are released and a grease gun 25 is connected to grease fitting 20. Grease is then injected from grease gun 25 under pressure through fitting 20 and bore 19 to cavity 24. This results in the forcing of shaft 17 away from shaft 21, thereby breaking any adhesion between shaft extension 15 and the motor shaft 21 to permit removal of the blade assembly by hand. As can be seen in Fig. 2, the set screws are engageable by a person outside of housing 10 due to the construction of extension 14 and the inner wall of housing 10.

It is to be understood that the described exemplary embodiment is merely intended for the purpose of illustration, and that the principles of the invention are not intended to be limited thereto, except as defined in the appended claim.

What is claimed is:

A fan unit comprising a tubular housing, a casing in said housing, said casing having an aperture, a fan motor located within said casing, said motor having a shaft rotatable thereby, a walled extension closing off the aperture in said casing and said extension having an opening therein opposite the aperture in the casing, a second shaft having blade means connected adjacent one end thereof located outside of said walled extension and in said housing, said second shaft having an axial bore therethrough, a sleeve enclosing the other end of said second shaft and permanently attached thereto, said sleeve being slidable over the said motor shaft, said

motor shaft having a keyway therein, locking means entering said keyway for releasably holding said sleeve in position on said motor shaft for rotation therewith, so that said motor shaft, said sleeve and said second shaft rotate in unison in response to the operation of said motor when said sleeve is held on said motor shaft, the unit formed by said shafts and said sleeve extending through and being surrounded by said walled extension, a grease fitting attached to said one end of said second shaft in said axial bore for injecting fluid under pressure into said bore and against said motor shaft so that, when said sleeve is released from said motor shaft, said sleeve and said second shaft are forced away from said motor shaft.

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