This invention relates to fans in combination with internal combustion engines and, more particularly, to reversible fans for cooling the engine of a tractor, bulldozer, or the like.

In previous inventions, fans have been provided in combination with a tractor wherein the fan can be reversed to blow air away from the operator. Also, when it is desirable or when it is deemed warranted under certain conditions, it can be again reversed to blow the air toward the operator.

The present invention discloses a fan wherein the blades thereof are individually reversible so that they can be reversed on an engine even if the fan is mounted so close to the radiator that it is difficult or impossible to reverse fans having other types of reversible means. In the present application, the fan disclosed is made specifically for the purpose of making it easy to reverse the individual blades without interference between the fan and the engine and/or radiator is very close and where other fans would not be reversible.

It is, accordingly, an object of the present invention to provide a reversible fan which is simple in construction, economical to manufacture, and simple and efficient in operation.

Another object of this invention is to provide a fan in combination with an internal combustion engine wherein the blades are individually reversible.

A further object of the invention is to provide an improved fan.

Yet a further object of this invention is to provide a new combination of reversible fan and internal combustion engine having a radiator with the fan mounted very close to the radiator.

With the above and other objects in view, the present invention consists of the combination and arrangement of parts hereinafter more fully described, illustrated in the accompanying drawing and more particularly pointed out in the appended claim, it being understood that changes may be made in the form, size, proportions, and minor details of construction without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawing:
FIG. 1 is a front view of a reversible fan according to the invention;
FIG. 2 is a side view taken on line 2—2 of FIG. 1 of a reversible fan according to the invention; and
FIG. 3 is a broken away view of the front part of a tractor having a reversible fan according to the invention mounted thereon.

Now with more specific reference to the drawing, a fan 10 is shown supported on a tractor or vehicle 11. The fan 10 is supported on an engine 12 of the vehicle 11 in the usual manner. The fan 10 has blades 13 supported on a hub 14.

The hub 14 is in the form of a hollow cylindrical member having an inwardly radially directed flange 17 and a cylindrical portion 16. The cylindrical portion 16 has peripherally spaced, outwardly directed integral bosses 15 on the outer periphery thereof and inwardly, radially directed integral bosses 18 on the inner periphery thereof. The inwardly directed cylindrical bosses 18 have circumferentially spaced notches 19 therein. The notches 19 receive pins 20.

The bosses 15 and 18 are generally concentric with each other and have a bore 24 extending completely therethrough. The bore 24 receives shafts 21 which have the fan blades 13 attached to them by means of rivets 23 or other well known fastening means which hold the blades 13 to the shafts 21.

A radially disposed hole in each of the shafts 21 receives a pin 20. The pins 20 are longer than the outside diameter of the bosses 18 and, therefore, when the fan blades 13 are rotated into one position, one end of each pin 20 engages the flange 17. In the other position, the other end of each pin 20 engages the flange 17. Thus, the degree of rotation of the fan blades 13 is limited.

Helical compression springs 24a are received on the shafts 21 and rest against washers 25 which are in turn supported against edges 26 of the fan blades 13.

A dust cap 35 is in the form of a disk-like plate attached to the cylindrical portion 16 by means of screws 36. This plate prevents dust and other foreign material from entering and depositing in the pins 20 and on the shafts 21. Dust would prevent the shafts 21 from operating in the respective bores. The plate 35 is slightly disked to receive the ends of the pins 20 and thus allows them to swing freely during adjustment of the blades 13. The outer edge of the dust cap 35 terminates in a flange.

The fan hub 14 is attached to a pulley 27 by means of studs 28 which extend through spaced holes 29 in the flange 17 and engage tapped holes 30 in the fan belt pulley 27. The fan belt pulley 27 has a groove 32 for receiving a conventional V-type fan belt.

During operation, in warm weather, the operator will want the air from the engine fan to be directed away from him so he will rotate the fan blades 13 so that they will direct the air away from the seat on the tractor. In this position, the pins 20 will be in a pair of the slots 19. When the weather changes and the operator wishes the warm air to be blown towards him, he will rotate each of the fan blades 13 to bring the pins 20 into another pair of slots 19 and, in this position, the opposite ends of the pins 20 will rest against the flange 17.

The foregoing specification sets forth the invention in its preferred practical forms but the structure shown is capable of modification within a range of equivalents without departing from the invention which is to be understood is broadly novel as is commensurate with the appended claim.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

A fan for an engine having a fan pulley, said fan having blades thereon, means to support said blades on said fan to direct air from said engine and to selectively direct air away from said engine, said fan having a hub comprising a cylindrical ring having an inwardly directed flange thereon, spaced holes in said flange, studs extending through said holes attaching said hub to said pulley, circumferentially spaced, outwardly directed, radially extending bosses on the outer periphery of said ring, a circumferentially spaced, inwardly directed, radially extending boss concentrically disposed with relation to each said outwardly directed boss and integrally attached to the inner periphery of said ring, a radially extending bore through each of said outwardly directed bosses and each of said inwardly directed bosses and through said ring, two pairs of spaced notches in the inner end of each said inwardly directed boss, said fan blades each having a shaft attached thereto, said notches terminating at said said ring and being disposed adjacent said flange, the notches of each pair of notches being disposed on each side of a diameter of each said shaft perpendicular to said flange, each said shaft being received in one said bore, a pin in the inner end of each said shaft extending radially therethrough, the ends of each said pin being disposed in
one pair of said notches with one of its ends in close relation to said flange, and a spring, one on each said shaft and extending around each said shaft and engaging said ring on one end and one said blade on the other and urging said blades outwardly, each of said blades being movable inwardly against the force of one of said springs to move said pins out of said notches and allow said blades to be rotated to bring each said pin into another pair of said notches, each said pin extending from each said shaft a distance greater than the distance from the inside of said bores to said flange whereby one end of each said pin engages said flange when said blades are rotated to limit the amount said shafts may rotate and thereby direct said pins into one pair of said notches when moved from one said notch to the other, the axis of each pin and the axis of its corresponding pair of spaced notches being coplanar when an end of the pin engages said flange.

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