

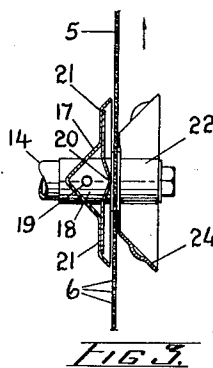
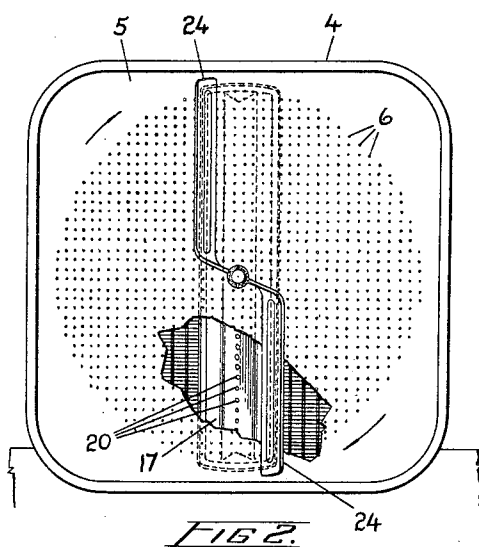
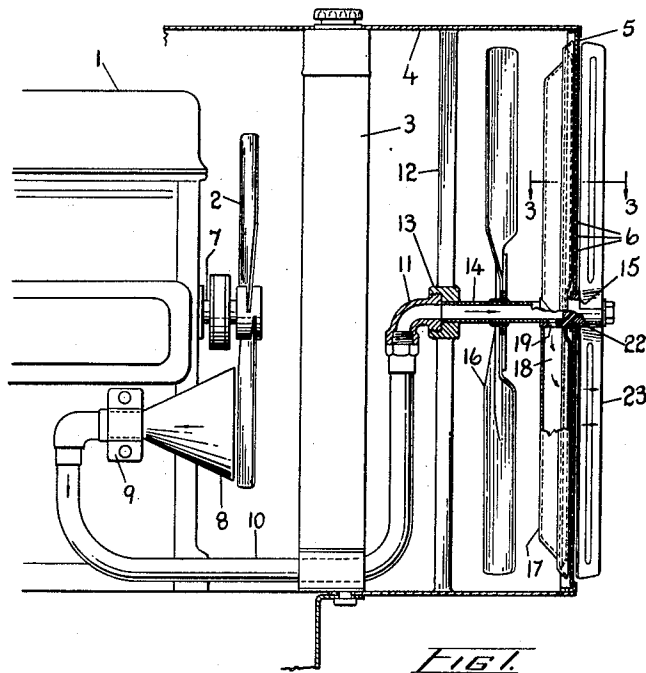
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CLEANER FOR AIR SCREEN

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CLEANER FOR AIR SCREEN

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This invention relates to a device for cleaning an air screen of solid matter trapped by the screen, and is particularly concerned with cleaning radiator screens of combines and other travelling agricultural machines.

It is an object of the invention to provide a simple and effective screen cleaning device.

A preferred embodiment of the invention is illustrated in the accompanying drawings in which:

FIGURE 1 is a side view of the front end of an internal combustion engine for a combine, with a radiator in front of the engine, showing in section an air screen mounted in front of the radiator and, partly in section and partly broken away, means for cleaning the air screen;

FIGURE 2 is a front view, partly broken away, of the apparatus of FIGURE 1; and

FIGURE 3 is a cross-sectional view taken along the line 3-3 in FIGURE 1.

The drawings are not to scale, the size of parts of the screen cleaning means having been exaggerated for clarity of illustration.

In the drawings the numeral 1 indicates an internal combustion engine of a combine. The engine 1 has at its front end a fan 2 which draws primary air through a cooling radiator 3 in front of the fan.

The primary air intake for the radiator 3 is by a casing or housing 4 which fits closely around the radiator 3 and confines the air flowing to the radiator. The housing 4 has at its front end a flat screen 5 provided with numerous openings 6 on a circular area, as shown in FIGURE 2. The screen filters from the primary air any chaff, straw or other debris which would otherwise lodge in the radiator and clog it. Rearwardly of the fan 2 and below the fan drive shaft 7 is a funnel-shaped air scoop 8. The air scoop 8 is supported from the engine 1 by means of a bracket 9. Some of the primary air is blown by the fan 2 into the air scoop 8 and flows as a secondary air stream through a tube or pipe 10 which passes below the radiator 3 and then upwards in front of the radiator to an elbow 11. The elbow 11 is supported by a strut 12 and directs the secondary air stream through a bearing 13 into a rotatable, tubular shaft 14. The shaft 14 is journaled in the bearing 13 of the strut and in a bearing 15 in the screen 5, the latter being formed of perforated sheet metal and therefore having ample stiffness to support the shaft and the devices assembled upon it.

Between the screen 5 and the strut 12 a propeller 16 is fixed on the shaft 14. Being in the stream of primary air, the propeller 16 rotates the shaft. Also fixed on the shaft 14 is a radial baffle 17 which provides an elongated conduit 18 downstream of but adjacent to the screen, the conduit communicating through holes 19 with the interior of the shaft 14 and having along the length of the conduit a series of openings 20 facing and close to the screen. As seen in FIG. 3, the baffle also has a pair of wings 21 extending outwardly from the conduit near the screen to obstruct flow of primary air through the narrow strip of the screen in front of the baffle. The baffle 17 extends at its opposite ends to the periphery of the perforated area of the screen 5 but does not rub against the screen.

The shaft 14 includes a solid stub 22 which protrudes through the bearing 15 to the outside of the screen 5, and a sweeper 23 is fixed to the stub 22 close to but not rubbing against the front or upstream side of the screen.

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As best seen in FIGURE 2, the sweeper consists of two radial vanes 24 near the baffle 17 and extending to the periphery of the perforated area of the screen. The vanes are inclined to the screen with their leading edges just clear of the screen. One sweeper vane is located in front of one wing 21 of the baffle 17 and the other sweeper vane is located in front of the other wing, so that the leading edges of the vanes slightly trail the baffle openings 20 as the shaft 14 rotates.

The operation of the device will now be described. The primary air, after passing inwardly through the screen 5, impinges upon the propeller 16 and causes the shaft 14 to rotate. After passing through the radiator 3, a portion of the primary air is blown by the fan 2 into the air scoop 8 and becomes secondary air. The secondary air travels under the pressure created by the fan 2, through the pipe 10 and shaft 14 and into the conduit 18 of the baffle 17 where it is discharged through the openings 20 and thence through the screen 5, from rear to front, dislodging any solid matter that has been screened from the primary air. Since the baffle 17 is rotating, successive strips or segments of the screen are subjected to the stream of secondary air from the openings 20. The sweeper vanes 24, trailing the discharge of secondary air outwardly through the screen 5, bat or fling away from the screen the solid matter dislodged by the secondary air, and the vanes also create turbulence which seems to be helpful in dispelling chaff and the like. The baffle prevents inward flow of primary air in the region of secondary air flow through the screen, since primary air flow in this region would of course tend to hold the solid matter on the screen.

It will be seen that the screen cleaning device using the propeller 16 does not require a mechanical drive extending from the engine past the radiator, and that the arrangement of secondary air blowing baffle 17 and sweeper 23 requires no frictional rubbing or brushing of the screen.

The propeller 16 is shown in a location directly behind the baffle 17, but it can of course be fixed at a different angle on the shaft so as to be more in the main stream of primary air. The invention may also be used in an arrangement in which the baffle 17 and sweeper 23 are stationary and the screen 5 is rotated. The supply of secondary air can be taken from a scoop rearward of the propeller 16, near its periphery, so that the tube 10 need not extend from one side of the radiator to the other. If desired, secondary air can be provided by a special power driven blower fan.

What I claim as my invention is:

1. In a travelling agricultural machine having a unit that draws in a stream of primary air, an air intake housing for the unit, the housing having an air screen for filtering the primary air drawn through the screen and into the housing by the unit, a rotatable shaft extending through the screen, a propeller fixed to the shaft within the housing for rotation by the primary air stream, an elongated conduit fixed to the shaft within the housing and having along its length outlet openings facing and close to the screen, an air scoop located in the primary air stream and downstream of the screen, an air passage extending from the air scoop through the shaft to the elongated conduit to supply part of the primary air to the conduit and thence through the openings and the screen to dislodge solid matter screened from the primary air, and a sweeper fixed to the shaft outside the housing and extending from the shaft close to the screen and conduit to clear away the dislodged matter.

2. The apparatus claimed in claim 1, wherein the sweeper just clears the screen and comprises a vane inclined to the screen with a leading edge close to the screen, the vane being fixed to the shaft in such a position

that as the shaft rotates the leading edge slightly trails the conduit openings.

3. In a travelling agricultural machine having an internal combustion engine and a cooling radiator therefor and an engine driven fan located rearwardly of the radiator for drawing cooling primary air through the radiator, a flat screen spaced forwardly of the radiator, a housing confining primary air flow through the screen to the radiator, a tubular rotatable shaft having a first bearing supported by the screen near the center of the screen and having a second bearing supported within the housing, a propeller fixed to the shaft within the housing and rotatable by the primary air stream to rotate the shaft, an air scoop located rearwardly of the engine driven fan, a tubular connection from the scoop through the housing and the second bearing to the interior of the tubular shaft, an elongated air baffle fixed to the shaft and located rearwardly of and just clear of the screen and extending at opposite ends to substantially the periphery of the screen and thus obstructing primary air flow through radial strips of the screen in front of the baffle, the baffle including a conduit communicating with the interior of the shaft and having outlet openings close to the screen along said strips whereby air collected by the scoop passes through the tubular connection, the second bearing, the tubular shaft and the conduit and is directed by the outlet openings through the screen from rear to front to dislodge solid matter that has been screened from the air flowing through the screen to the radiator, and a sweeper fixed to the shaft forwardly of and just clear of the screen, the sweeper comprising a pair of vanes each extending from the shaft to the periphery of the screen, each vane being inclined to the screen with a leading edge close to the screen, the vanes being so located relatively to the conduit that said leading edges slightly trail the conduit openings as the shaft rotates.

4. In a travelling agricultural machine having a unit that draws in a stream of primary air, an air intake housing for the unit, the housing having an air screen for filtering the primary air drawn through the screen and into the housing by the unit, a cleaner assembly for the screen comprising an elongated air baffle and a sweeper, the baffle having a longitudinal conduit, means for moving one of the screen and cleaner assemblies whereby the baffle and sweeper traverse the screen, the baffle being located downstream of and close to the screen within the housing and thus obstructing primary air flow through a strip of the screen, means in the primary air stream and downstream of the screen for supplying part of the primary air to the conduit, the conduit having outlet means facing and close to the screen along the elongated baffle whereby air from the conduit is directed through said strip outwardly of the housing to dislodge solid matter that has collected on the outside of the screen from the primary air flowing through the screen to the unit, the sweeper being located outside the housing but near the baffle to clear away the dislodge solid matter.

5. The apparatus claimed in claim 4, wherein the means for supplying part of the primary air to the conduit comprise an air scoop and an air passage extending from the air scoop inside the housing to the conduit of the baffle.

6. The apparatus claimed in claim 4, wherein the sweeper is close to but does not rub the screen.

7. The apparatus claimed in claim 4, wherein the cleaner assembly is fixed to a rotatable shaft and a propeller is fixed to the shaft and is located within the housing in the primary air stream to be rotated thereby.

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