

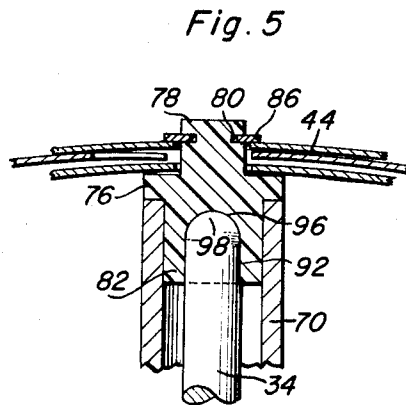
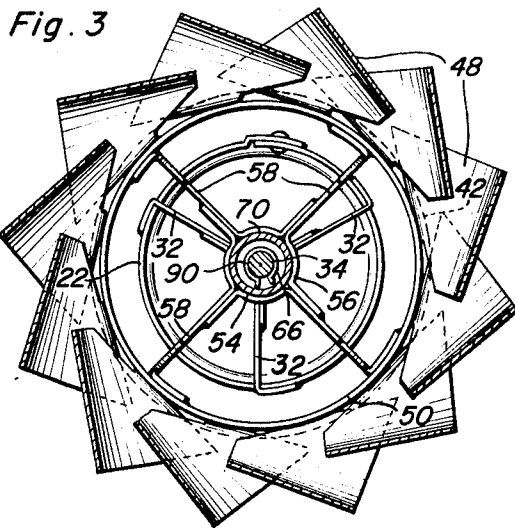
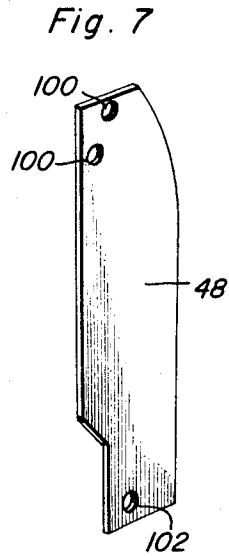
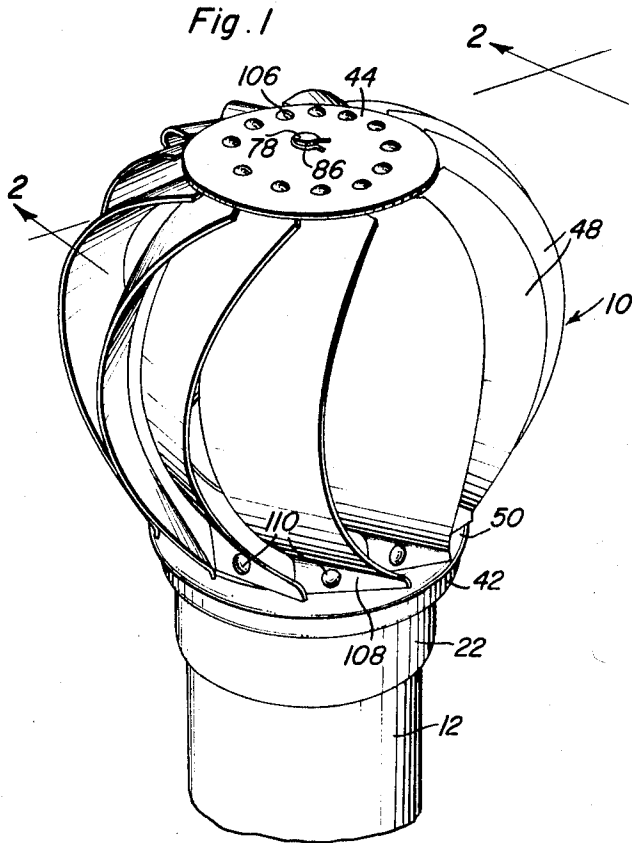
Aug. 23, 1966

E. J. ARTIS ET AL
TURBINE VENTILATOR

3,267,833

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2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 2

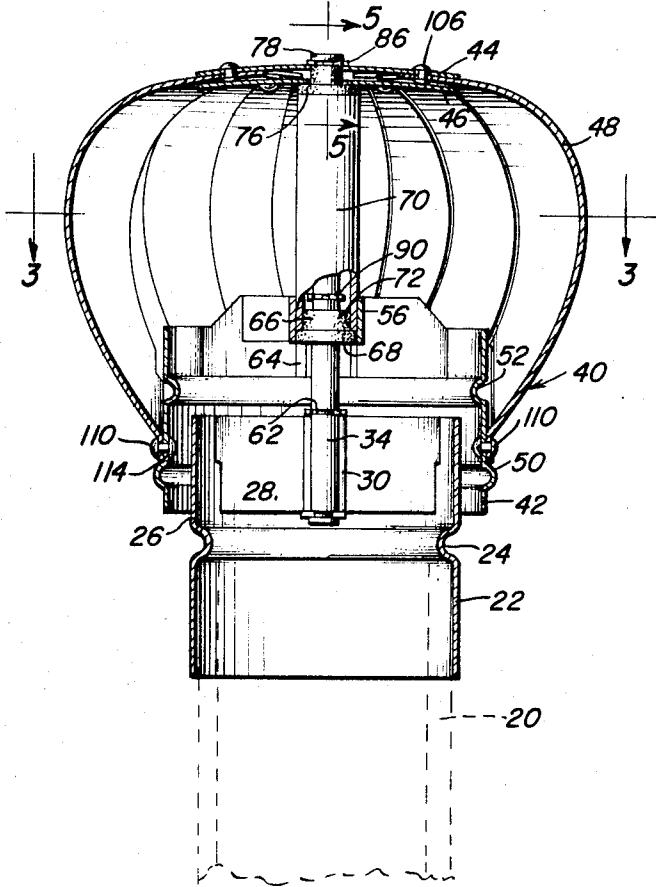
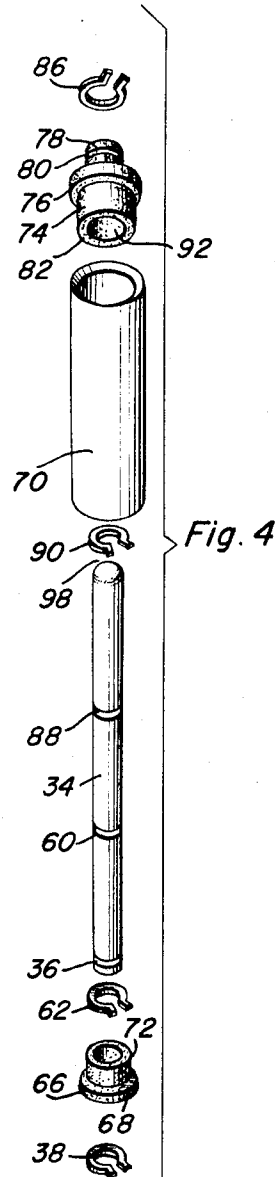
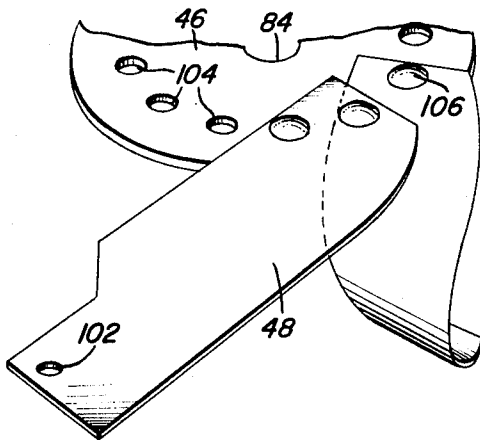


Fig. 6



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3,267,833

TURBINE VENTILATOR

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 Filed June 22, 1964, Ser. No. 376,708
 4 Claims. (Cl. 98-72)

This invention relates to a novel and useful turbine or rotary ventilator and more specifically to a rotary turbine ventilator constructed in a manner so that the various components thereof may be more readily assembled without the use of special jigs or holders of any type. Further, the rotary turbine ventilator includes bearing means adapting it to be rotatably supported from the upper end of a ventilating or smoke pipe and constructed in a manner such that no maintenance in the form of lubrication is necessary and the costs of the components of the bearing means will be maintained at a minimum.

The main object of this invention is to provide an improved rotary turbine ventilator whose component parts may be assembled in an efficient manner without the use of jigs or holders.

Another object of this invention is to provide a rotary turbine ventilator designed in a manner such that the individual vanes thereof may be individually secured to the other components of the ventilator in an exacting manner and with no special knowledge required by the person assembling the ventilator.

Still another object of this invention is to provide a rotary turbine ventilator including component parts which may be readily assembled by workmen possessing no special skill with assurance that the completed ventilator will be substantially perfectly balanced.

A further object of this invention is to provide a rotary turbine ventilator including bearing means for rotatably supporting the ventilator which requires no periodic maintenance in the form of lubrication.

Yet another object of this invention is to provide a rotary turbine ventilator which may be readily constructed of inexpensive and readily available sheet material such as aluminum whereby the rotary ventilator will have a long life expectancy.

A further object of this invention is to provide a rotary ventilator constructed in a manner such that the various component parts thereof may be joined together to form a durable and strong unit even though lightweight sheet metal is used in its construction.

A still further object of this invention is to provide a rotary ventilator in accordance with the preceding objects constructed primarily of sheet material which may be readily precisely cut and formed by mass production methods.

A final object of this invention to be specifically enumerated herein is to provide a rotary turbine ventilator in accordance with the preceding objects which will conform to conventional forms of manufacture, be of simple construction and easy to assemble so as to provide a device that will be economically feasible, long lasting and inexpensive to produce.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a perspective view of the rotary turbine ventilator of the instant invention shown mounted atop a ventilation or smoke pipe;

FIGURE 2 is a vertical sectional view taken substantially upon a plane indicated by the section line 2-2 of FIGURE 1;

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FIGURE 3 is a horizontal sectional view taken substantially upon the plane indicated by the section line 3-3 of FIGURE 2;

FIGURE 4 is an exploded perspective view of the bearing means utilized to rotatably support the turbine assembly of the ventilator;

FIGURE 5 is a fragmentary enlarged transverse vertical sectional view taken substantially upon the plane indicated by the section line 5-5 of FIGURE 2;

FIGURE 6 is a fragmentary perspective view of the top portion of the turbine assembly shown with portions thereof removed and the manner in which the turbine assembly may be assembled; and

FIGURE 7 is a perspective view of one of the turbine blades of the turbine assembly.

Referring now more specifically to the drawings, the numeral 10 generally designates the rotary turbine ventilator of the instant invention. The turbine ventilator 10 may be seen to be mounted atop a ventilation or smoke pipe 20 by means of an upstanding tubular mounting member 22 having a circumferential groove 24 formed therein intermediate its opposite ends and disposed with its lower end telescopically engaged with the upper end of the smoke pipe 20. The upper end portion 26 of the upstanding tubular mounting member 22 includes a spider 28 defining a central hub portion 30 and including a plurality of generally radial arms 32 interconnected between the hub 30 and the upper end portion 26 of the tubular mounting member 22. An upstanding shank portion 34 has its lower end frictionally retained within the hub 30 and includes a circumferential groove 36 on its lower end portion projecting through the hub 30 in which a snap ring 38 is engaged to prevent upward movement of the shank portion 34 relative to the hub 30.

The turbine ventilator 10 includes a rotary turbine assembly generally referred to by the reference numeral 40 and it may be seen from FIGURE 2 of the drawings that the assembly 40 includes a lower upstanding sleeve portion 42 and upper and lower mounting plates 44 and 46 between which a plurality of strap-like vanes or vane members 48 are secured.

The sleeve portion 42 includes a lower circumferential ridge 50 and an upper circumferential groove 52. The ridge 50 and the groove 52 serve to reinforce the sleeve portion 42 and other purposes to be hereinafter more fully set forth.

The sleeve portion 42 also includes a spider which is referred to by the reference numeral 54 and includes a hub 56 and a plurality of generally radial arms 58 secured together at their inner ends to form the hub 56 and to the sleeve portion 42 at their outer ends.

The shank portion 34 includes a second circumferential groove 60 in which a snap ring 62 is secured and it may be seen from FIGURE 2 of the drawings that the snap ring 62 is seated in the groove 60 and prevents downward movement of the shank portion 34 relative to the hub portion 30. A suitable lower sleeve 66 including a lower flange 68 is provided and rotatably received on the shank portion 34 above the snap ring 62. A tubular spacer 70 is disposed about the shank portion 34 and has its lower end telescoped over the upper end portion of the sleeve 66 with the lower end of the spacer 70 butting against the flange 68. The lower angulated inner end portions 64 of the arms 58 underlie the sleeve 66 and prevent downward axial shifting of the shank portion 34 relative to the hub 56. The upper end portion 72 of the sleeve 66 is frictionally secured in the lower end of the spacer 70 and it may be seen that a second upper sleeve 74 is provided including an upper flange 76 and an extension 78 which projects above the flange 76 and includes a circumferential groove 80. The sleeve 74 is rotatably disposed about the upper end of the shank portion 34 and has its lower end

portion 82 frictionally received in the upper end of the spacer 70 with the flange 76 abutting against the upper end of the spacer 70. The upper and lower plates 44 and 46 are centrally apertured as at 84 and are disposed on the extension 78 with the snap ring 86 being provided and engaged in the groove 80 to prevent withdrawal of the upper and lower plates 44 and 46 from the upper end of the shank portion 34. In addition, it may be seen from FIGURE 2 of the drawings that the shank portion 34 also includes a third circumferential groove 88 disposed above the sleeve or sleeve member 66 and within the spacer 70. A snap ring 90 is seated in the groove 88 and therefore prevents downward movement of the shank portion 34 relative to the sleeve 74 beyond a predetermined point. The lower end of the sleeve 74 includes a downwardly opening blind bore 92 having a concave semispherical upper end wall 96. The upper end of the shank portion 34 is convex semispherical as at 98 and seatingly abuts the upper end wall 96.

The vanes 48 each have a pair of apertures 100 formed in their upper end and a single aperture 102 formed in their lower end. In addition, the upper and lower plates 44 and 46 have a plurality of circumferentially arranged apertures 104 formed therein with the apertures 104 of the plates 44 and 46 being registrable with each other.

The ends of the vanes 48 having the pair of apertures 100 formed therein are arranged in overlapped relation as illustrated in FIGURE 2 of the drawings and are secured in sandwiched relation between the upper and lower plates 44 and 46 by means of suitable fasteners 106. In this manner, it will be noted that the ends of the vanes 48 secured between the plates 44 and 46 are disposed tangentially to a circle containing their inner end portions and that the vanes 48 are thereafter curved downwardly and inwardly and provided with laterally directed tab portions 108 on their lower ends which abut the outer surfaces of the sleeve portion 42 immediately above the ridge 50 and with the lower edge portions of the tab portions 108 abutting against the upper portions of the rib 50. Thereafter, suitable fasteners 110 are secured through the apertures 102 and the corresponding apertures 114 formed in and circumferentially spaced about the sleeve portion 42 a spaced distance above the ridge 50.

Inasmuch as the vanes 48 are each formed identical and the apertures 104 are spaced circumferentially about the plates 44 and 46, the spacing between the finished curved vanes 48 is identical and it may be seen that each of the vanes 48 may be individually secured to the upper and lower plates 44 and 46 and then individually secured to the sleeve portion 42 without the benefit of jigs or other work-holding tools. Therefore, the manufacture of the turbine ventilator of the instant invention may be readily simplified and performed by workmen not possessing high skills. Further, inasmuch as the sleeves 66 and 74 are preferably constructed of Teflon or Delrin or any other suitable bearings material that does not require lubrication, the turbine ventilator 10 of the instant invention will be substantially trouble free in operation.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A turbine ventilator including an upstanding rotor assembly adapted to be supported for rotation about a vertical axis and in vertically spaced relation above the upper end of an upstanding ventilation or smoke pipe, said rotor assembly including a lower upstanding sleeve portion and an upper horizontal support plate supported in vertically spaced relation above said sleeve portion for rotation therewith, a plurality of strap-like vane members including one set of corresponding end portions, means securing said one set of end portions to said upper support plate with said one end portions substantially horizontally disposed in a circle about said plate, and with the longitudinal centerlines of the end portions of said set of end portions disposed tangential to said circle, the free end portions of said vane members curving smoothly downwardly and inwardly toward and secured to corresponding portions of said sleeve portion, said ventilator including an upstanding tubular mounting member having its upper end loosely telescoped into the lower end of said sleeve portion, said tubular mounting member being adapted to be secured to the upper end of said pipe in telescopic engagement therewith, said mounting member including a spider supporting a centrally disposed mounting portion, an upstanding shank portion supported at its lower end from said spider, said sleeve portion including a second spider disposed above said tubular mounting member and defining a centrally disposed hub spaced above the first-mentioned spider, an antifriction sleeve supported in said hub and journaled on said shank portion, said plate being provided with a centrally disposed aperture, an antifriction cap secured through said aperture and depending downwardly therefrom, the lower end of said cap having a vertical blind bore formed therein including a concave semispherical upper end wall, said upstanding shank portion including a convex semispherical upper end seated against said upper end wall, and a spacer sleeve disposed about said shank portion with its upper and lower ends telescopically engaged with said cap and said antifriction sleeve, respectively.

2. The combination of claim 1 wherein said one set of end portions are disposed over the upper surface of said plate, a second plate disposed over said one set of end portions, and a plurality of fasteners secured through said plates and said one set of end portions.

3. The combination of claim 2 wherein a plurality of said fasteners are secured through each end portion of said one set of end portions to prevent angular displacement of the one set of end portions about upstanding axes relative to said plates.

4. The combination of claim 1 wherein the end portions of said vane members remote from said one set of end portions thereof include angulated end tabs lying in planes tangential to said sleeve portion by which said vane members are secured to said sleeve portion.

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