

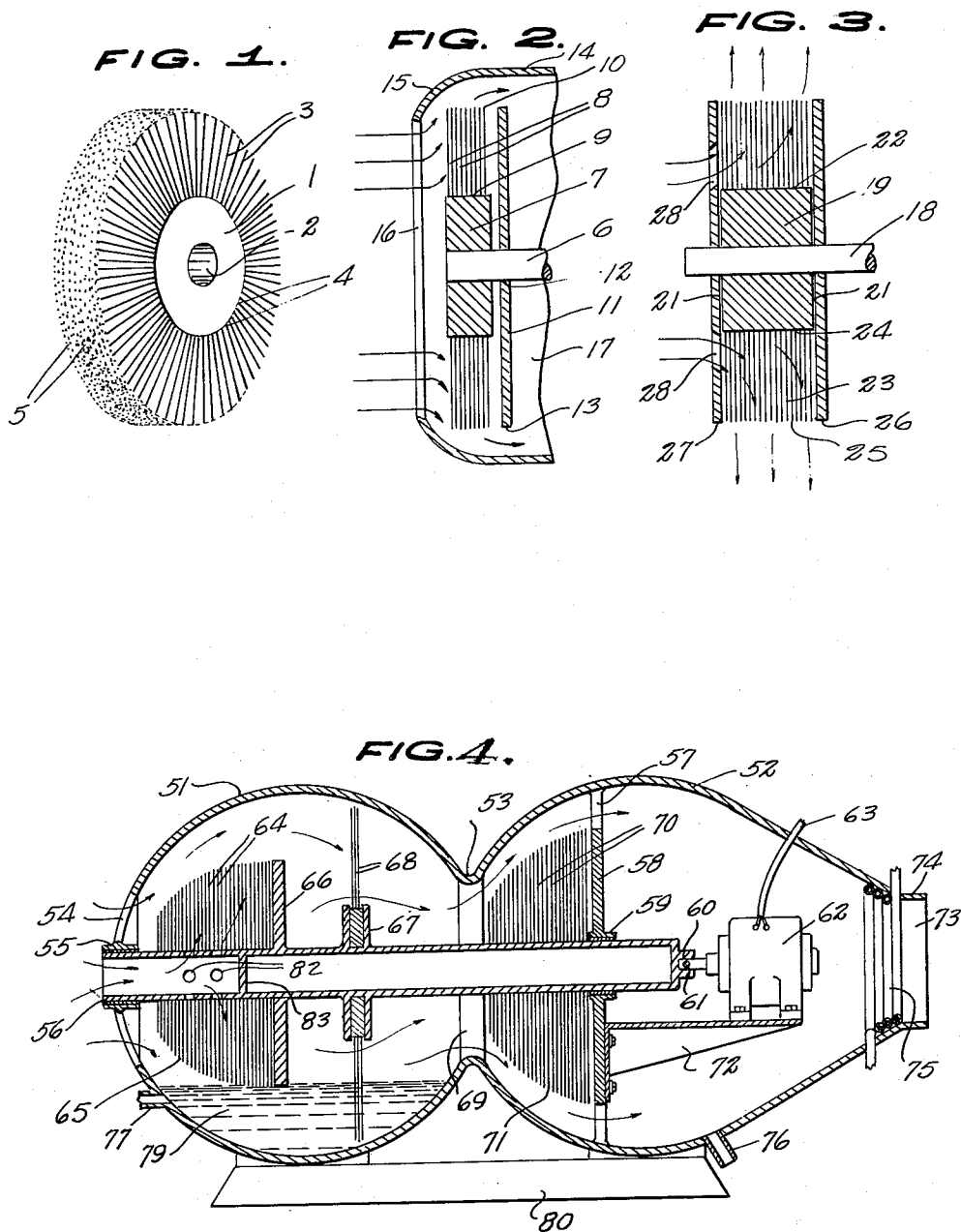
Aug. 29, 1961

R L. HOLLINGSWORTH

2,998,099

GAS IMPELLER AND CONDITIONING APPARATUS

Filed Nov. 20, 1957



INVENTOR.
R LEE HOLLINGSWORTH,
BY
Linton + Linton
ATTORNEYS.

1

2,998,099 GAS IMPELLER AND CONDITIONING APPARATUS

R Lee Hollingsworth, 514 Hempstead Ave.,
West Hempstead, N.Y.
Filed Nov. 20, 1957, Ser. No. 697,556
5 Claims. (Cl. 183-23)

The present invention relates to impellers for gases and more particularly is concerned with means for moving, changing the direction, and varying the speed of gases and also capable of being driven by gases in motion.

The principal object of the invention is to provide devices for moving gas and air capable of high rotational speeds with greater safety and durability than devices as presently known for this purpose and which devices are economical to produce and maintain utilizing substantially the means of FIGURE 1 as an impelling means.

Another important object of the invention is to provide devices for drawing and moving gases and air in given directions, and at varying speeds and it is also an object of the invention to use such devices for conditioning air by scrubbing the same to remove impurities therefrom as well as vary the moisture content of the air.

A still further and equally important object of the invention is to provide new and improved turbine rotors capable of driving and being driven by moving gases, steam, products of combustion and the like and which rotors are suitable as substitutes for known types of rotors in gas and steam turbines as well as substitutes for known general types of impellers, propellers, fan blades and the like for moving or being moved by gases, vapors, or air.

Still further objects of the invention will be in part obvious and in part pointed out in the following detailed description of the accompanying drawings, in which:

FIG. 1 is a perspective view of a type of impeller according to the present invention.

FIG. 2 is a longitudinal sectional view of a modified form of the impeller showing utilization means associated therewith.

FIG. 3 is a cross-sectional view of a further modification of the impeller of FIG. 1, such as for air circulation horizontally up to a given height in a room.

FIG. 4 is a longitudinal sectional view of an air and gas scrubber and conditioner.

Referring now more particularly to the accompanying drawings, wherein like and corresponding parts are designated by similar reference characters, FIG. 1 discloses a brush like wheel suitable for use as a gas, vapor or fluid impeller rotor or driven wheel and which has been described in my co-pending application Serial No. 651,060, filed April 5, 1957, now Patent No. 2,922,489 of January 26, 1960, and which wheel comprises a hub 1 having a central bore 2 and a plurality of elongated fingers 3 connected by any suitable means to hub 1 at one of their ends and extending around hub 1 and radially therefrom with the free ends 5 of said fingers providing the annular periphery of the wheel-like unit. Said fingers 3 are slightly spaced apart to provide small passages therebetween and can be formed of rigid or flexible material and which material may vary according to the particular application to which the wheel is to be employed. These fingers are each in the form of an elongated slender rod generally described as a wire of metallic material, and when subjected to extreme temperatures, of a durable and heat resistant metal.

FIG. 2 shows an apparatus employing the present wheel for the purpose of impelling media at considerable speed and which includes a driving axle 6 with hub 7 fixedly mounted thereon and with spaced apart fingers 8 connected at their inner ends 9 to hub 7. Said fingers 8 ex-

2

tend radially from and equally around hub 7 to provide a balanced wheel and with their outer free ends 10 spaced from the interior surface of an annular casing 14. The space between said ends 10 and expanding curvature of the casing 14 is predetermined to be in accordance with the velocity of movement of air or gases to be moved thereby. An annular baffle plate 11 has a central opening 12 through which extends shaft 6 which shaft can be fixedly connected thereto or the baffle plate loosely mounted thereon but prevented from longitudinal movement by any suitable means as desired. Said plate has a periphery 13 substantially corresponding to the ends 10 of said wires and the plates extend substantially parallel to and along one side of said wires for preventing air being drawn back into the wires from that down stream side of the wires.

Annular casing 14 has a rounded shoulder 15 and an open end 16 extending along side of said fingers and providing for the inlet of air and gases to said fingers.

In the operation of the present device, shaft 6 is rotated, rotating fingers 8 therewith, whereupon air or gases is drawn through opening 16 in the direction of the arrows and sucked in between said fingers and thereafter discharged longitudinally of said fingers from the ends 10 thereof. The discharged media striking the expanding curvature of the curving shoulder 15 of casing 14 is guided substantially at right angles and discharged into the atmosphere or into other devices as may be desired, but at a considerable speed, particularly depending upon the speed of rotation of shaft 6.

In FIG. 3 there is disclosed a centrifugal impeller which comprises a driven shaft 18 having a hub 19 fixedly mounted thereon which hub has straight parallel sides 21 and an annular periphery 22. The plurality of spaced fingers 23 are connected at their inner ends 24 to said hub while their opposite ends 25 are free. A substantially flat annular baffle plate 26 is mounted upon shaft 18 upon one side of said fingers and extends substantially parallel thereto while a further annular substantially flat baffle plate 27 is also mounted upon shaft 18 upon an opposite side of said fingers, but also extends substantially parallel thereto. Plate 27 has one or more openings 28 provided therethrough placing the inner portion of said fingers in communication with the exterior of said plate 27. Both plates 26 and 27 may be supported without being attached to the shaft as shown in FIGURE 4 at 58.

Upon rotating shaft 18 and fingers 23, air or gases are drawn in through openings 28 by said fingers and into the passageways between said fingers whereupon they are discharged along the length of said fingers through the centrifugal action of the same in the direction of the arrows as indicated on the drawing.

In FIG. 4 there is disclosed an apparatus conceived for the purpose of stepping up the thrust of air or gases from the inlet to the exhaust end thereof and which device is further used for the purpose of scrubbing and modifying the moisture content of that media passing therethrough. This apparatus consists of an annular casing 51 connected to a spheroidal casing 52 at their reduced portions 53. Casing 51 has spaced apart openings 54 provided in one end thereof around a bearing 55 supported by said casing and in which bearing is rotatably mounted preferably a hollow shaft 56.

Air exhaust ports 82 extend air from the intake end of the hollow shaft 56 into the area of fingers 64 to cause media to move through the shaft, and into the main air stream. Two distinct air or gas intakes are therefore provided, namely the openings into the compressor or air mover area and by the open ended shaft.

Legs 57 extend radially to casing 52 from and support a baffle plate 58 therein and laterally thereof. Said plate

58 has a central bearing 59 through which extends and is rotatably supported in the end of a shaft 56. Said shaft has a cylindrical end 60 in which is fixedly connected a driving shaft 61 of an electric motor 62 connected to a source of electrical current through wires 63.

A plurality of fingers 64 are fixedly connected at one end of shaft 56 adjacent openings 54 and are of graduated lengths whereby the resulting periphery thereof gradually tapers outwardly and inwardly on a curve substantially corresponding to the curvature of casing 52. A baffle plate 66 is fixedly mounted on shaft 56 adjacent the innermost of said fingers 64 and extends substantially parallel thereto. A hub 67 is fixedly mounted on shaft 56 within casing 51 and has a plurality of elongated fingers 68 connected thereto and extending laterally therefrom with fingers 68 being considerably longer than fingers 64. Restricted opening 69 places the interior of containers 51 and 52 in communication and a plurality of fingers 70 are fixedly connected at one end to shaft 56 within casing 52 but adjacent said opening 69. Said fingers 70 are gradually increased lengths providing an upwardly and inwardly curved periphery to the free ends 71 thereof while the innermost of said fingers extends along side of and is of substantially the same radius as the radius of baffle 58. A support 72 is connected to said baffle 58 and has motor 62 mounted thereon.

Casing 52 has its end opposite to its connection at 53 to casing 51 truncated providing an exhaust opening 73 provided by the bore of a ring 74. A coil of tubes 75 is mounted within casing 52 adjacent said exhaust 73 and which tubes are connected to a source of hot or cold media for varying the temperature of air or gas or fluid passing exteriorly therearound when desired. Casing 52 (and 51 not shown) further has an outlet 76 for contaminated fluid in the bottom of said casing and which outlet may be connected to conduits or pipes leading into the ground for dispensing said contaminated fluid therein. Casing 51 has an inlet pipe 77 connected to a supply of liquid connected with means not shown for maintaining a level of liquid 79 within said casing for being contacted by fingers 68 and also at least a portion of the fingers 64 if desired. Both said casings 51 and 52 are supported upon a base 80.

What I claim is:

1. A gas scrubber and conditioner comprising a casing having openings at opposite ends thereof, a driven shaft extending axially of said casing openings, a plurality of fingers of graduated lengths connected at one end to said shaft and extending radially thereof within one open end of said casing, a baffle plate carried by said shaft on a side of said fingers opposite to said casing open end, a second plurality of fingers of greater length than said first mentioned fingers and being connected at one end to said shaft while extending radially thereof, a third plurality

of fingers connected at one end to said shaft and extending radially thereof, said third plurality of fingers being of graduated lengths, said casing having the interior thereof of spaced substantially uniformly from the free ends of said pluralities of fingers and a restricted portion between said second and third plurality of fingers, a second baffle plate positioned along side of said third plurality of fingers on a side thereof facing the second of said casing openings and means for maintaining a fluid within said casing for being contacted by said second plurality of fingers.

2. A gas scrubber and conditioner as claimed in claim 1 wherein a coil is positioned adjacent said second of said casing openings for receiving a medium capable of changing the temperature of media passing said coils.

3. A gas scrubber and conditioner as claimed in claim 1, wherein said casing has an opening for discharging contaminated fluid therein and means are connected to said casing in communication with said opening for dispensing said contaminated fluid into the earth.

4. A gas scrubber and conditioner as claimed in claim 1, wherein said shaft is hollow and extends into the first-mentioned of said casing openings, said shaft further has peripheral openings at the connected end of said first plurality of fingers for introducing media received at said casing opening thereto and a baffle closes the bore of said shaft beyond said peripheral openings.

5. A gas scrubber and conditioner as claimed in claim 1, wherein said shaft is hollow and is open at said first mentioned casing open end and a portion of the intake is propelled by shaped intake ports inside of the shaft into the hub area of said fingers.

References Cited in the file of this patent

UNITED STATES PATENTS

179,303	Hall et al.	June 27, 1876
261,551	Isbell	July 25, 1882
551,694	Slocum	Dec. 17, 1895
638,005	Chandler et al.	Nov. 28, 1899
951,452	Prims	Mar. 8, 1910
1,927,376	Schroder et al.	Sept. 19, 1933
2,036,929	Durnell et al.	Apr. 7, 1936
2,426,328	Wandel et al.	Aug. 26, 1947
2,433,325	Slaughter	Dec. 23, 1947
2,587,197	Mousel	Feb. 26, 1952
2,922,489	Hollingsworth	Jan. 26, 1960

FOREIGN PATENTS

10,442	Great Britain	1908
41,697	Denmark	Feb. 11, 1930
396,648	Great Britain	Aug. 10, 1933
438,694	Great Britain	Nov. 21, 1935
609,180	France	May 8, 1926
1,034,841	France	Apr. 15, 1953