Dec. 6, 1938. J. G. CATRANIS 2,139,112

BLOWER

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Fig. 1.

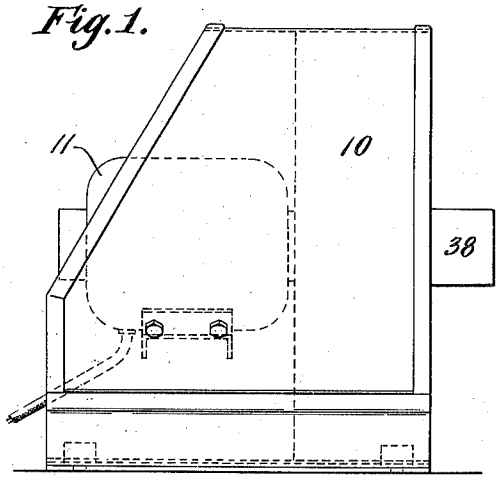


Fig. 2.

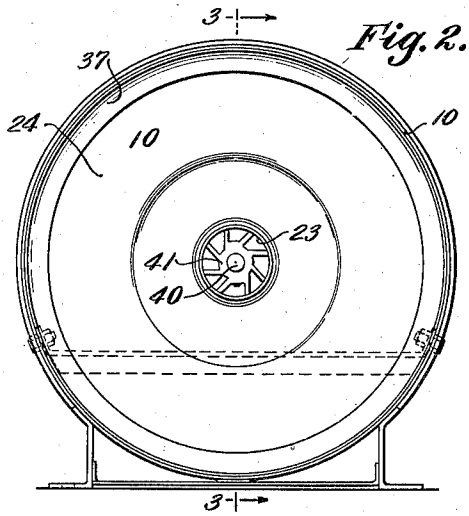
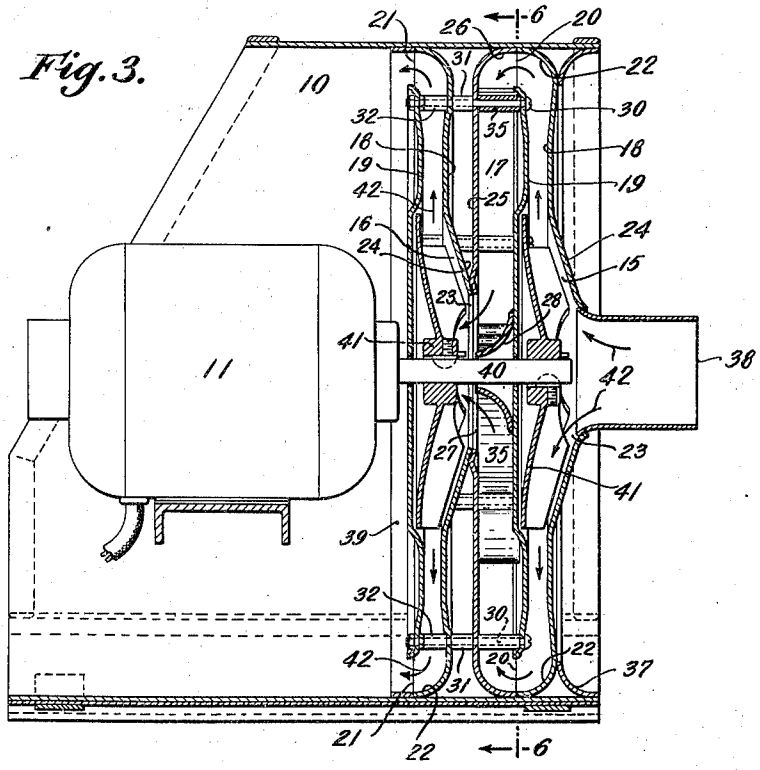


Fig. 3.



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Fig. 4.

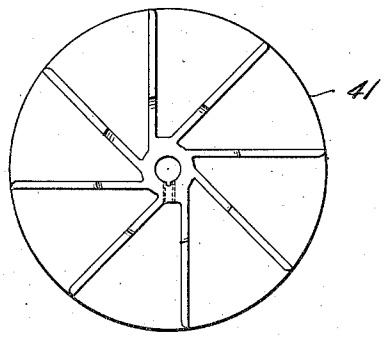


Fig. 5.

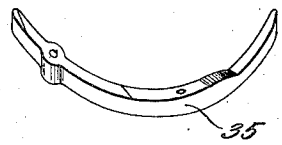


Fig. 6.

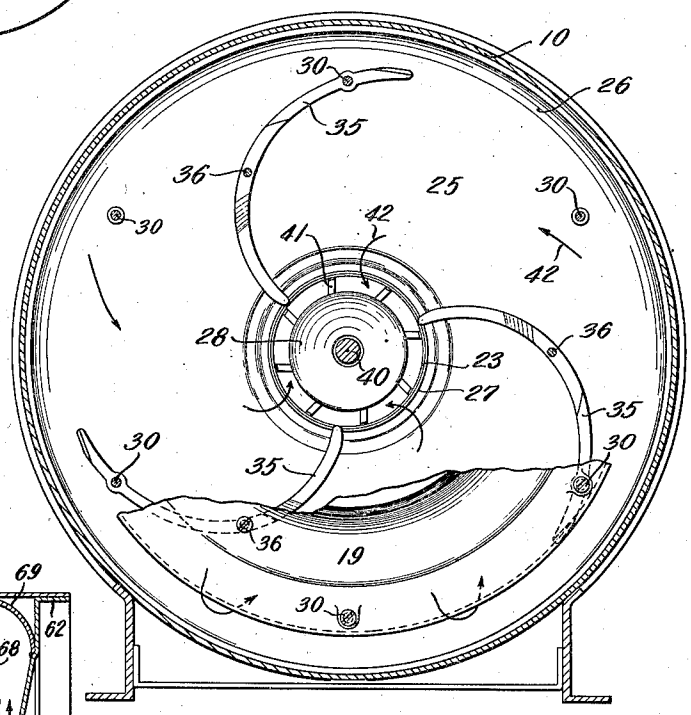
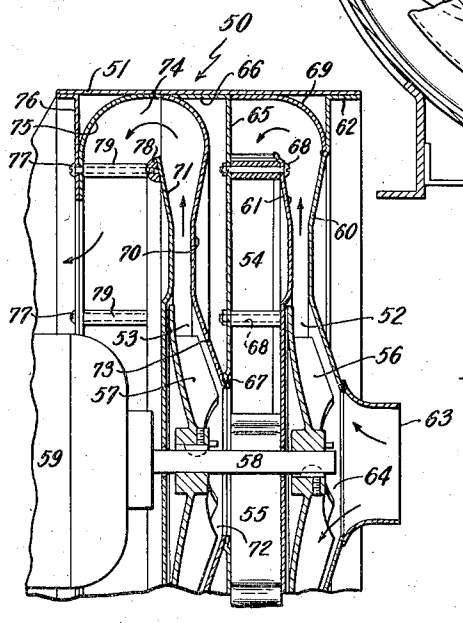


Fig. 7.



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UNITED STATES PATENT OFFICE

2,139,112

BLOWER

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Application December 11, 1936, Serial No. 115,380

6 Claims. (Cl. 230—130)

This invention relates to an improvement in blowers and has for its primary object the provision in a blower of an open exhaust whereby back pressure is reduced to a minimum and the heat generated by the motor is dissipated, and as a further object the structural features of the blower, all as will appear from an examination of the following description and of the drawings which form a part thereof and in which

Figs. 1 and 2 illustrate in side and front elevation, respectively, a blower embodying this invention;

Fig. 3 is an enlarged sectional view taken along the line 3—3 in Fig. 2;

Fig. 4 is a front view of an impeller used in the blower;

Fig. 5 is a perspective view of a deflector vane used in the blower;

Fig. 6 is a sectional view taken along the line 6—6 in Fig. 3 illustrating the vane assembly; and

Fig. 7 is a side view of the upper portion of another form of blower embodying this invention.

The blower selected to illustrate this invention is of the two stage type having a housing 10 and a motor 11. Within the housing are provided a primary fan chamber 15, a secondary fan chamber 16 and a compartment 17 connecting said chambers. Each fan chamber is formed by a front wall 18 secured at its periphery to the housing wall and a rear wall 19 spaced at its periphery from the housing wall to provide annular air passages 20 and 21. Each front wall 18 is cup shaped having a rearwardly extending peripheral flange 22 which bears against the housing wall and a central opening 23 defined by a forwardly inclined flange 24.

The compartment 17 is formed by the rear wall 19 of the primary fan chamber 15 and a partition 25. The partition 25 is cupped having a peripheral flange 26 which bears against the housing wall and a central opening 27 which registers with the central opening 23 of the secondary fan chamber 16. The partition is upset around the opening to insure surface contact with the flange 24 to which it is suitably secured. A conical ring 28 is mounted on the rear wall 19 of chamber 15 and extends across the compartment 17 for a purpose which will appear hereinbelow.

The walls 19, partition 25 and wall 18 of the secondary fan chamber are connected by screw bolts 30 and the wall 18 is fixed in position between the partition 25 and wall 19 by collars 31 and 32 enclosing the bolts 30. Mounted in the compartment 17 are a plurality of deflector vanes 35 supported upon the bolts 30 and further secured in position by set screws 36 carried by the rear wall 19. The vanes 35 rest at their side faces against the plate 19 and partition 25 and thus assist the bolts in positioning the plate 19 and partition 25. A ring 37 mounted at the forward end of the housing wall bears against the front wall 18 of the forward fan chamber. An air inlet nozzle 38, mounted upon the flange 24 leads to the opening 23 of the primary fan chamber.

The motor 11 rotates a shaft 40 which extends through the centre of the housing and on which are mounted impellers 41 one in each fan chamber. When rotated the impellers 41 set up a flow of air (as indicated by arrows 42 in Fig. 3) through the primary fan chamber 15, the air passage 20, the compartment 17, the opening 23, the secondary fan chamber 16 and the air passage 21. The flow through the compartment is directed by the stationary vanes 35 and the conical ring 28.

It will be noted that the air leaving the secondary fan chamber 16 through the annular passage 21 passes directly to the atmosphere unrestricted. That passage will hereafter be referred to as the exhaust outlet. Heretofore it has been the practise in blowers to provide a restricted exhaust outlet the result of which is the creation of considerable back pressure particularly in a multistage blower of the type here shown and of excessive heat within the blower housing due to the frictional resistance to the air flow set up by the exhaust outlet. Such back pressure is reduced to a minimum by the structure here disclosed and in addition the exhausted air flowing freely over the motor serves to dissipate the heat generated thereby.

It has been found that by providing an annular exhaust outlet of this type and thereby decreasing back pressure the overall efficiency of the blower is increased so that a greater volumetric displacement is possible without increasing the horse-power input. Furthermore in a two stage blower of the type shown the impeller in the secondary chamber boosts the air approximately equal to the initial air of the primary chamber so that the air displacement is substantially balanced.

The blower 50 shown in Fig. 7 while differing structurally in some respects, as will be pointed out below, embodies this invention in that an open air exhaust is provided whereby the advantages possessed by the blower shown in Figs. 1,

2 and 3 are attained. Within the housing 51 are formed primary and secondary fan chambers 52 and 53 and an intermediate compartment 54, provided with deflector vanes 55, through which the air flows from the primary to the secondary chambers. Mounted in the chambers 52 and 53 are impellers 56 and 57 carried by a shaft 58 driven by a motor 59.

The primary chamber 52 is defined by front and rear walls 60 and 61. The front wall 60 is mounted at its periphery upon the housing wall through an outwardly projecting peripheral flange 62. The inlet passage 63 is secured to the wall 60 about a central opening 64 therein.

The compartment 54 is defined by the rear wall 61 of the primary chamber and a partition 65 terminating at its outer periphery in a rearwardly projecting flange 66 secured to the housing wall and having a central opening therein defined by an annular bead 67. The wall 61 and partition 65 are connected by bolts 68 by which the vanes 55 are mounted in the compartment. A band 69 bearing against the housing wall extends between the partition 65 and the front wall 60 of the primary chamber being seated in a shoulder therein so that a smooth flow of air is provided.

The secondary fan chamber 53 is defined by a front wall 70 and a rear wall 71. The front wall is secured at its periphery to the housing wall and has a central opening 72 defined by a forwardly inclined flange 73. The opening 72 registers with the opening in the partition 65 and the bead 67 thereon bears upon and is preferably secured to the flange 73. An annular exhaust outlet 74 is formed by the peripheries of the walls 70 and 71.

The air leaving the housing through the outlet 74 is directed inwardly toward the motor by an annular baffle 75 secured to the housing and braced at its free periphery by a ring 76 mounted upon the housing wall. A plurality of bolts 77 connect the baffle 75 and ring 76 to the rear wall 71 of the secondary fan chamber. The bolts 77 enter an annular bead 78 at the periphery of the wall 71 and are surrounded by sleeves 79.

While two embodiments of this invention have been shown and described it will be understood that the invention is not limited thereto and that other embodiments may be made without departing from the spirit and scope thereof as set forth in the following claims.

I claim:

1. A blower including a housing having therein a primary and a secondary fan chamber and a compartment through which the air passes from the primary fan chamber to the secondary fan chamber, motor operated impellers in said chambers by which the air is set into motion, said fan chambers being each defined by a front wall, bearing at its periphery upon the housing wall and having a central opening therein, and a rear wall and said compartment being defined by the rear wall of the primary chamber and a partition bearing at its periphery upon the housing wall and having a central opening therein in register with the opening in the front wall of the secondary chamber said front wall and said partition being in contact at the periphery of said opening and an annular air outlet formed between the peripheries of the front and rear walls of the secondary chamber leading directly to atmosphere.

2. A blower including a housing having therein a primary and a secondary fan chamber and a compartment through which the air passes from the primary fan chamber to the secondary fan chamber, motor operated impellers in said chambers by which the air is set into motion, said fan chambers being each defined by a front wall, bearing at its periphery upon the housing wall and having a central opening therein, and a rear wall and said compartment being defined by the rear wall of the primary chamber and a partition bearing at its periphery upon the housing wall and having a central opening therein in register with the opening in the front wall of the secondary chamber said front wall and said partition being in contact at the periphery of said opening, deflector vanes mounted in said compartment between the rear wall of the primary chamber and said partition and an annular air outlet formed between the peripheries of the front and rear walls of the secondary chamber leading directly to the atmosphere.

3. A blower including a housing having therein a primary and a secondary fan chamber and a compartment through which the air passes from the primary fan chamber to the secondary fan chamber, motor operated impellers in said chambers by which the air is set into motion, said fan chambers being each defined by a front wall, bearing at its periphery upon the housing wall and having a central opening therein, and a rear wall and said compartment being defined by the rear wall of the primary chamber and a partition bearing at its periphery upon the housing wall and having a central opening therein in register with the opening in the front wall of the secondary chamber said front wall and said partition being in contact at the periphery of said opening and means in said compartment for deflecting air flowing therein to the registered openings.

4. A blower including a housing having therein a primary and a secondary fan chamber and a compartment through which the air passes from the primary fan chamber to the secondary fan chamber, motor operated impellers in said chambers by which the air is set into motion, said fan chambers being each defined by a front wall, bearing at its periphery upon the housing wall and having a central opening therein, and a rear wall and said compartment being defined by the rear wall of the primary chamber and a partition bearing at its periphery upon the housing wall and having a central opening therein in register with the opening in the front wall of the secondary chamber said front wall and said partition being in contact at the periphery of said opening and a conical ring in said compartment mounted upon the rear wall of the primary chamber and extending across the compartment terminating at the opening in said partition for deflecting air flowing in the compartment to said opening.

5. A blower including a housing having therein a primary and a secondary fan chamber and a compartment through which the air passes from the primary fan chamber to the secondary fan chamber, motor operated impellers in said chambers by which the air is set into motion, said fan chambers being each defined by a front wall bearing at its periphery upon the housing wall and having a central opening therein, and a rear wall and said compartment being defined by the rear wall of the primary chamber and a partition bearing at its periphery upon the housing wall and having a central opening therein in register with the opening in the front wall of the secondary chamber said front wall and said partition being in contact at the periphery of said opening, stationary vanes mounted in said compartment between the rear wall of the primary chamber and said partition and a conical ring

mounted at the center of said compartment, said vanes and ring deflecting the air flowing in the compartment to the registered openings in said partition and the front wall of the secondary chamber.

6. A blower including a housing having therein a primary and a secondary fan chamber and a compartment through which the air passes from the primary fan chamber to the secondary fan chamber, motor operated impellers in said chambers by which the air is set into motion, said fan chambers being each defined by a front wall, bearing at its periphery upon the housing wall and having a central opening therein, and a rear wall and said compartment being defined by the rear wall of the primary chamber and a partition bearing at its periphery upon the housing wall and having a central opening therein in register with the opening in the front wall of the secondary chamber said front wall and said partition being in contact at the periphery of said opening, deflector vanes mounted in said compartment between the rear wall of the primary chamber and said partition, means for joining said wall and partition to the front and rear walls of the secondary chamber and fixedly spacing the front wall of the secondary chamber between the rear wall thereof and said partition and an annular air outlet formed between the peripheries of the front and rear walls of the secondary chamber leading directly to the atmosphere.

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