Feb. 20, 1951 H. E. EARL 2,542,121

MOTOR COMPRESSOR UNIT

Filed Sept. 9, 1947

FIG-1

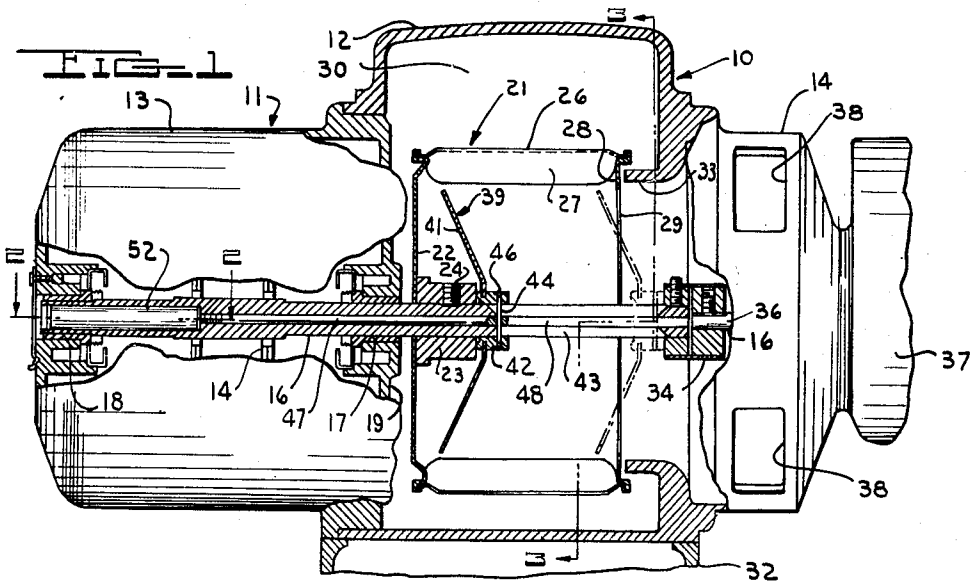
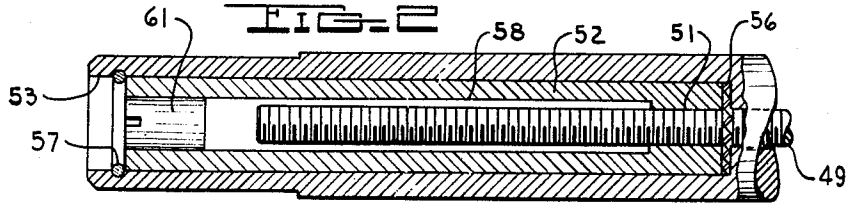


FIG-2



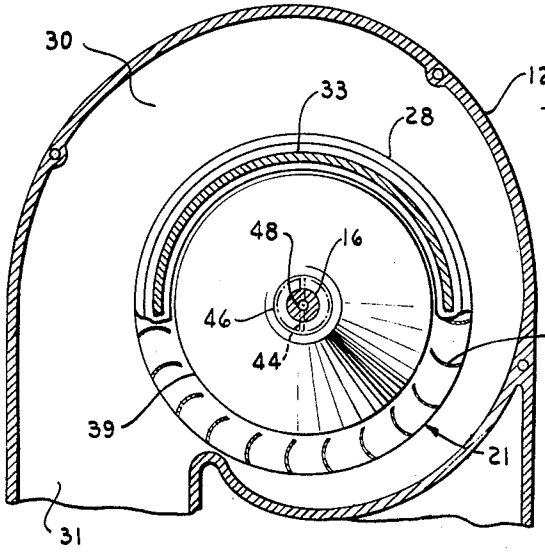
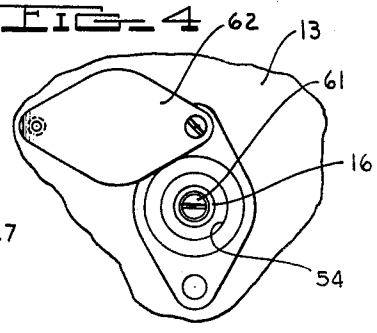


FIG-3

FIG-4



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MOTOR COMPRESSOR UNIT

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3 Claims. (Cl. 230—114)

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This invention relates to motor compressor units and has particular relation to a motor compressor unit in which a motor, a centrifugal fan, and a fuel and primary air pump unit are employed as a single unit for supplying the primary mixture and secondary air employed in the operation of low pressure oil burners.

An object of the invention is to provide a simple, reliable and inexpensive unit of this kind in which the unit may be employed in connection with installations requiring oil burners of different capacities, merely by adjusting a unit in such a way as to alter the capacity thereof.

Another object of the invention is to provide a motor compressor unit of this kind in which the unit will perform satisfactorily when used in connection with oil burner installations of different capacities.

Other and further objects of the invention will be apparent by reference to the accompanying drawings of which there is one sheet, which by way of illustration shows a preferred embodiment and the principles thereof and what I now consider to be the best mode in which I have contemplated applying these principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims. I also contemplate that of the several different features of my invention certain ones thereof may be advantageously employed in some applications separate and apart from the remainder of the features.

In the drawings:

Fig. 1 illustrates a side elevational view partly in cross section of a motor compressor unit embracing the principles of the invention;

Fig. 2 is an enlarged fragmentary longitudinal sectional view of the shaft employed in the motor compressor unit illustrated by Fig. 1 and illustrating particularly the centrifugal fan adjusting means disposed axially within the shaft;

Fig. 3 is a transverse sectional view through the centrifugal fan employed in the motor compressor unit illustrated by Fig. 1; and

Fig. 4 is a fragmentary view of one end of the motor compressor unit shown by Fig. 1 and illustrating particularly a cover for the centrifugal fan adjusting means illustrated by Figs. 1 and 2.

Referring particularly to Fig. 1, there is illustrated a motor compressor unit indicated generally by the numeral 10. The unit 10 comprises a motor compressor unit casing 11 consisting of

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a central support portion 12 having a pair of end casings 13 and 14 projecting in opposite directions therefrom. The end casing 13 encloses a motor 14 mounted on a shaft 16 which extends from within the casing 13 transversely across the central casing 12 and into the opposite end casing 14.

The end or motor casing 13 includes bearings 17 and 18 formed at opposite ends thereof in which the shaft 16 is rotatably mounted. End wall 19 supports the bearing 17 and separates the end casing 13 from the centrally disposed support section 12 of the casing 10. Disposed on the portion of the shaft 16 which projects within the casing portion 12 is a centrifugal fan 21 having a disc shape end 22 which is supported by a collar 23 rigidly secured on the shaft by a set screw 24. Secured to the flanged periphery of the disc 22 is a circular member 26 which is transversely slotted to provide angularly disposed vanes 27. The opposite end of the circular member 26 is likewise secured upon the flanged periphery of a supporting ring 28 provided with a centrally disposed opening 29 forming the fan inlet.

Rotation of the fan 21 by the motor 14 will cause air to be drawn inwardly of the fan 21 through the inlet 29 there to be discharged by the vanes 27 radially outwardly into the interior of the central casing 12 surrounding the fan. The space surrounding the fan 21 within the central casing 12 is formed to provide a scroll 30 of progressively increasing cross section around the periphery of the fan and leading to a fan outlet 31 where the air under pressure supplied by the fan is discharged from the fan casing 12 into the oil burner 32 to which the motor compressor unit 10 is secured. The scroll 30 within the fan casing 12 is separated from the fan inlet 29 by an inwardly projecting flange 33 formed on the fan casing 12, the end of which terminates adjacent the outside surface of the end ring 28.

Beyond the fan casing 12 the shaft 16 includes a universal coupling 34 by which a reduced portion 36 of the shaft is connected to the main portion thereof. Such reduced portion 36 of the shaft 16 extends beyond the coupling 34 across the casing end 14 and there drives a pump unit indicated generally at 37. When rotated by the shaft 16 the pump unit 37 is adapted to compress a small quantity of primary air, to pump and measure quantities of fuel to be mixed therewith, and all of which is supplied to the burner 32 to be there burned with the secondary air supplied by the fan outlet 31. Since specific

details of the pump unit 37 form no part of the present invention, the pump 37 may therefore comprise any kind of pump unit which it may be desired to employ. Nevertheless, a pump unit of a similar type is disclosed by the copending application of Robert R. Witherell, Serial No. 706,139, filed October 28, 1946, and assigned to the assignee of the present application.

In order to provide a sufficient quantity of air for operating the centrifugal fan 21 under all possible operating conditions, the end casing 14 is provided with a plurality of openings 38 which admit air to the interior of the flange ring 32 to be supplied to the centrifugal fan inlet 29.

In order to be able to vary the effective length of the vanes 27 and consequently the capacity of the fan 21 for delivering air to the outlet 31, there is provided inwardly of the vanes 27 an axially movable baffle 39. The baffle 39 comprises a frusto-conical disc 41 secured at its inner periphery upon a collar 42 adapted to slide longitudinally of the shaft 16 from the end of collar 23 supporting the fan to the end of the universal coupling 34. In order to provide means for adjusting the position of the baffle 39, such portion of the shaft 16 is provided with an elongated diametrically formed slot 43 having a pin 44 extending thereacross and projecting into diametrically opposed openings formed in the ring 42. The pin 44 is secured in position within such openings by a snap ring 46 which is disposed in a circumferential groove formed around the collar 42. The central portion of the pin 44 projects through an opening formed transversely across the end of a small actuating shaft or rod 47 which is disposed in an opening 48 formed axially within the shaft 16. The rod 47 projects through the opening 48 toward the motor end of the shaft 16 and in such region is threaded as is indicated at 49 for operative association with a threaded portion 51 formed at one end of a rotary adjusting member 52 rotatably disposed in an enlarged concentric portion 53 of the opening 48. The enlarged portion or opening 53 terminates at the motor end of the shaft 16 within the bearing 18 and is accessible from the end of the casing 13 through the bearing opening 54. A cover 62 is provided for rendering the opening accessible or inaccessible as desired.

The rotary member 52 is held in position within the opening 53 between a spring washer 56 disposed at one end thereof against a shoulder formed between two different sections of the axial opening 48 and a snap ring 57 disposed in a groove formed adjacent the outer end of the opening 53. Beyond the threaded portion 51 which cooperates with the threaded portion 49 of the rod 47, the interior of the rotary member 52 is provided with an enlarged axial opening 58 which terminates at the outer end of the rotary member 52 and which provides clearance for the threaded portion of the rod 47 extending within the interior of the rotary member 52. Beyond the end of the rod 47 the opening 58 in the rotary member 52 is closed by a diametrically slotted plug 61 which is secured rigidly within the end of the rotary member 52 in any suitable manner.

The slotted end of the plug is accessible through the bearing opening 54 in the casing end 13 for the insertion of a screw driver or other suitable means by which the rotary member 52 may be rotated within the shaft 16. When the member 52 is rotated, assuming the shaft 16 and the rod 49 to be stationary at such time, the rod 49 will be moved axially within the shaft 16 by the operatively associated threaded portions of the rotary member 52 and the rod 47. The threaded portion 49 of the rod 47 is of sufficient length to move the baffle 39 from one end to the other of the centrifugal fan 21 and consequently to render ineffective any desired portion of the length of the vane 27. However, the portion of the vanes not rendered ineffective by being cut off from the inlet by the baffle 39 continue to deliver air from the periphery of the fan 21 at the same velocity and pressure as such part of the vanes would deliver air were the baffle not employed.

With such provision for varying the effectiveness of the vanes 27, it is possible to employ the motor compressor unit 10 with any size oil burner below the maximum capacity of the unit 10 with an efficiency practically equal to the efficiency of any fractional size unit that might be constructed. It is not necessary, however, to manufacture such fractional size units because the unit 10 can be manufactured and employed with an oil burner required to deliver any amount of heat requiring all or a fraction of the full capacity of the unit 10. Under such circumstances it is necessary only to open the cover 62 and to adjust the position of the rotary member 52 in such a way as to position the baffle 39 within the centrifugal fan 21 to give the desired capacity for the oil burner with which the unit is to be employed. Thereafter the cover 62 may be closed, thus rendering inaccessible the means for adjusting the capacity of the fan 21 and closing the end casing 13 to protect the motor 14 and the bearings 17 and 18 from exposure to dirt and moisture.

While I have illustrated and described a preferred embodiment of my invention, it is understood that this is capable of modification, and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. In an oil burner a centrifugal fan casing having an air inlet in one side thereof, a motor secured at one side of said casing and provided with a hollow shaft having a slotted end projecting into said casing, a centrifugal fan comprising a blower wheel mounted on the slotted end of said shaft so as to be driven thereby and having axially extending blades and an open side presented toward said air inlet, an air deflecting baffle arranged within said wheel and comprising a circular member mounted on said shaft transversely thereof and for movement axially of said shaft toward and away from said opening, said circular member being concentric with said blower wheel and shaft and extending into close proximity with said blades and being shiftable axially of said wheel so as to increase or decrease the effective length of said wheel and to shut off the supply of air to those portions of said blades on the side of said member opposite said air inlet, a rod within said hollow shaft, means concentrically arranged relative to said shaft and forming a connection through the slotted end of said shaft between said baffille and said rod for moving said baffle axially of said shaft, said hollow shaft projecting through said motor, and means associated with said hollow shaft on the side of the motor remote from said fan casing for moving said rod axially relative to said shaft in order to adjust

the position of said baffle relative to said blower wheel and to said opening.

2. A device according to claim 1 wherein said member is shaped so as to have a central apex projecting toward said air inlet and said member is arranged so as to direct the air which flows axially into said blower wheel through said opening radially outward toward the blades of said wheel.

3. A device according to claim 1 wherein said means for moving said rod axially relative to said shaft includes threads on the end of said rod remote from the connection between said rod and said baffle, and rotary threaded means disposed in said shaft and in threaded engagement with said rod and operable upon rotation of said threaded means for shifting said rod and baffle axially of said shaft.

HOWARD E. EARL.

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