Feb. 26, 1952 A. S. GORSHKOFF 2,587,140

DIFFUSER HEAD FOR FLUID FUEL BURNERS

Filed Aug. 28, 1948

Fig. 1.

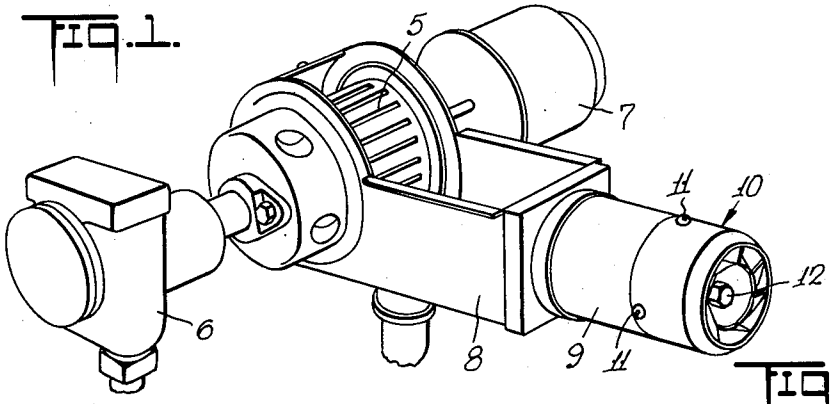


Fig. 2.

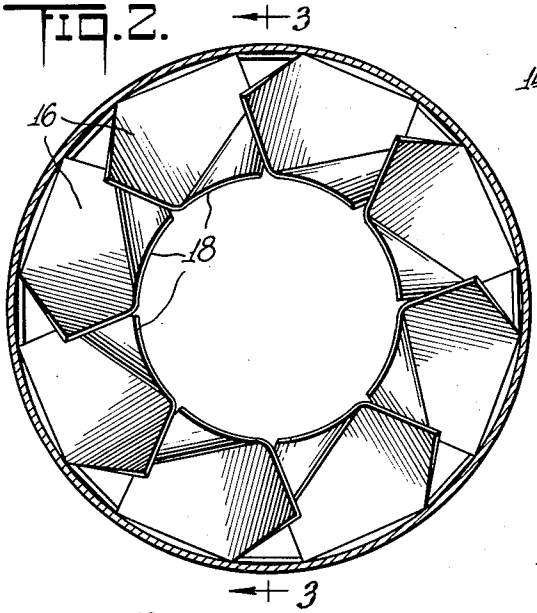


Fig. 3.

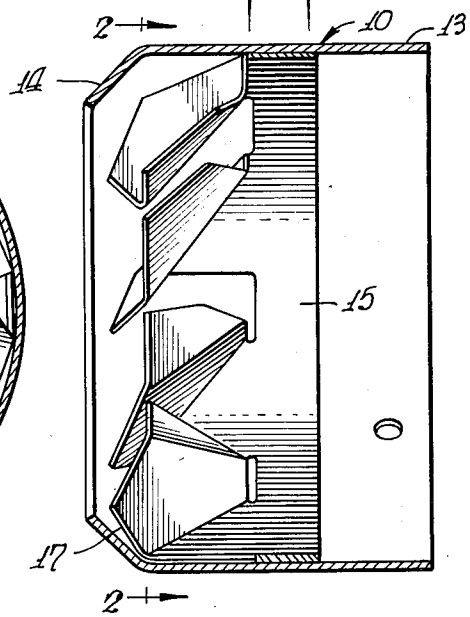


Fig. 4.

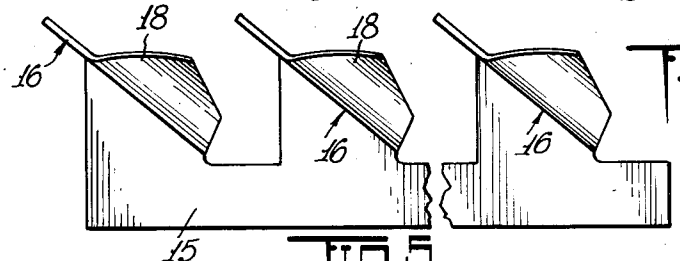
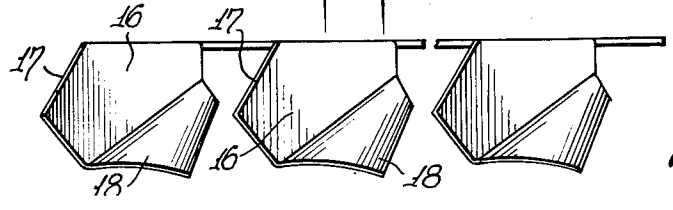


Fig. 5.



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Patented Feb. 26, 1952 2,587,140

UNITED STATES PATENT OFFICE

2,587,140

DIFFUSER HEAD FOR FLUID FUEL BURNERS

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Application August 28, 1948, Serial No. 46,565

1 Claim. (Cl. 158—1.5)

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My invention relates to a diffuser head for gun type oil burners.

In gun type burners there is an air blast pipe surrounding the burner nozzle and the air blast is so directed as to attempt to get the proper air and oil mixture for perfect combustion. The diffuser heads heretofore employed have usually been rather expensive in that they have usually been cast and the parts are necessarily somewhat cumbersome and the air passages considerably restricted.

It is an object of my invention to provide an improved diffuser head which is relatively simple in construction, cheap to manufacture and very efficient in use.

It is another object to provide a diffuser head having vanes or fins of extremely thin section to permit the maximum passage of air.

Another object is to provide a diffuser head fin section which may be formed of stamped sheet metal in strip form and later shaped.

And in general, the object is to provide an exceedingly simple, improved diffuser head.

Briefly stated, in a preferred form of the invention, I employ a cylindrical shell preferably having a spun or stamped inwardly directed flange at the front end for directing the air blast generally toward the axis of the shell. Within the shell is a strip bent into generally circular formation and provided with fins to direct an inner stream of air toward the axis of the shell and of the burner and to direct an outer current of air generally spirally. The fin strip is preferably formed with integral fins or blades in a press when in flat strip form and subsequently bent into generally circular shape and forced into the outer shell where it may be secured by any suitable means or held by its inherent resiliency.

In the drawings which show, for illustrative purposes only, a preferred form of the invention,

Fig. 1 is a perspective view of a more or less conventional gun type burner illustrating my improved diffuser head.

Fig. 2 is an enlarged sectional view taken substantially in the plane of the line 2—2 of Fig. 3 and viewed from the front of the diffuser head.

Fig. 3 is a sectional view taken substantially in the plane of the line 3—3 of Fig. 2.

Fig. 4 is a fragmentary side view of a strip having fins press-formed therein and before the strip is bent into circular form.

Fig. 5 is a top plan view of the strip shown in Fig. 4.

In the drawings, I show a more or less conventional gun type burner embodying the usual fan 5 and oil pump 6 both driven by the motor 7. The air from the fan passes through the box 8 and the blast tube 9 having my improved diffuser head 10 secured to the end thereof as by means of screws 11—11. The burner nozzle 12 may be of conventional form.

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My improved diffuser head preferably consists of a cylindrical shell 13 of a size to interfit with the blast tube 9 as will be clear. The front end of the shell 13 is preferably swaged or spun inwardly as indicated at 14 so as to be of more or less frusto-conical shape. Thus an air blast through the shell 13 will have the outer annular stratum deflected inwardly toward the axis of the shell so as to cause turbulence in the oil spray and thus promote combustion. The shell 13 is fitted with fins or deflector surfaces preferably so arranged as to direct an inner stream of air inwardly in more or less conical form and an intermediate or outer stream of air spirally, thus promoting considerable turbulence and proper combustion.

The fin assembly preferably consists of a strip 15 of sheet metal which has fins integrally formed thereon. The strip 15 is subjected to suitable punching and forming operations so as to provide at spaced intervals, flanges or fins 16 directed more or less at right angles to the body of the strip or plate 15. These flanges 16 have angularly directed edges 17 at such an angle as to more or less follow the contour of the inwardly directed flange 14 of the shell when the fin plate is assembled therewith. The flanges 16 in a preferred form are arranged at an angle to the length of the strip; that is, at an angle to the axis to the shell 15 when the parts are assembled so that the outer annular stream of air while being directed inwardly by the flange 14 will be directed generally spirally, as will be clear from the Figs. 2 and 3. At the inner edges of the fins or flanges 16 there are angularly bent, preferably arcuate, fins or flanges 18. These fins or flanges 18 when the strip is bent into circular form will form a part of a frustum of a central cone as will be clear from Figs. 2 and 3.

When the strip has been punched and formed substantially as heretofore described, it is cut (if formed in long strips) to a length substantially equal to the inner circumference of the shell 13. The strip 15 is then bent into generally circular form and forced into the shell 13 to substantially the position shown in Fig. 3. The strip may be held in the shell 13 by any suitable means, such as a spot weld, or if the ends of the strip are not

secured together, the strip may be held frictionally or by its own inherent resiliency.

It will be seen that when the fin strip is in place as shown in Figs. 2 and 3, the inner more or less arcuate flanges **18** will form a part of a frustum of a central cone to direct an inner stream of air in more or less conical form or across the oil spray from the nozzle **12**. It will furthermore be seen that the outer annular stream of air will be directed into generally a conical form by the flange **14** so as to tend to cut across the oil spray at a distance from the nozzle **12** and this outer stream will be directed in spiral fashion so as to cause great turbulence in the combining air and oil mist stream, thus promoting intimate mixture and proper combustion.

Thus, when the burner is in operation, the air from the blast tube will be directed into generally conical form or across the spray cone at the zone immediately surrounding the burner nozzle and the outer air will be directed generally conically or across the spray and also spirally by the flanges or fins **16** so that the combined action of the two sets of conical directors and the one set of spiral directors will be to cause great turbulence and the intimate mixture of the air and oil spray so as to promote complete combustion.

Since all the fins are preferably formed of sheet metal and by simple stamping or forming operations, the parts may be very thin so as to provide maximum air space and all surfaces may be very smooth so as to reduce air friction. The shell **13** may be formed of stainless steel and the fin strip may be made of any suitable sheet metal capable of resisting the temperatures encountered.

It will be apparent that I have provided a diffuser head which may be formed partially or entirely of sheet metal, punched, swaged or formed into shape. The fin plates may be rapidly and economically formed in standard type presses

and at minimum cost. Due to the thinness of the fins and the smoothness thereof, there will be a maximum air flow and with a minimum of friction. My improved diffuser head directs the air flow in such a manner as to promote maximum turbulence and therefore efficient mixture of the air and oil spray so as to promote complete combustion.

While the invention has been described in considerable detail and a preferred form illustrated, it is to be understood that changes may be made within the scope of the invention as defined in the appended claim.

I claim:

In a diffuser head, a generally cylindrical shell having a forward end of generally frusto-conical form and inclined inwardly toward the axis of the shell, a fin strip in generally circular form fitting flatwise against and within said shell and adjacent the forward end thereof, said fin strip having fins extending generally radially inwardly and inclined so as to direct an outer annular stream of air in generally spiral fashion and said fins having integral end fins at the inner ends of said first fins and directed so as to collectively form a frusto-conical surface to direct an inner stream of air in generally conical fashion inwardly toward the axis of the shell.

ALEXIS S. GORSHKOFF.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,370,083	Blackmore	Mar. 1, 1921
1,909,294	Lubbock et al.	May 16, 1933
2,181,527	Vollmer	Nov. 28, 1939
2,347,594	De Lin	Apr. 25, 1944
2,451,661	Cochrane	Oct. 19, 1948
2,458,372	Grimmeisen	Jan. 4, 1949