

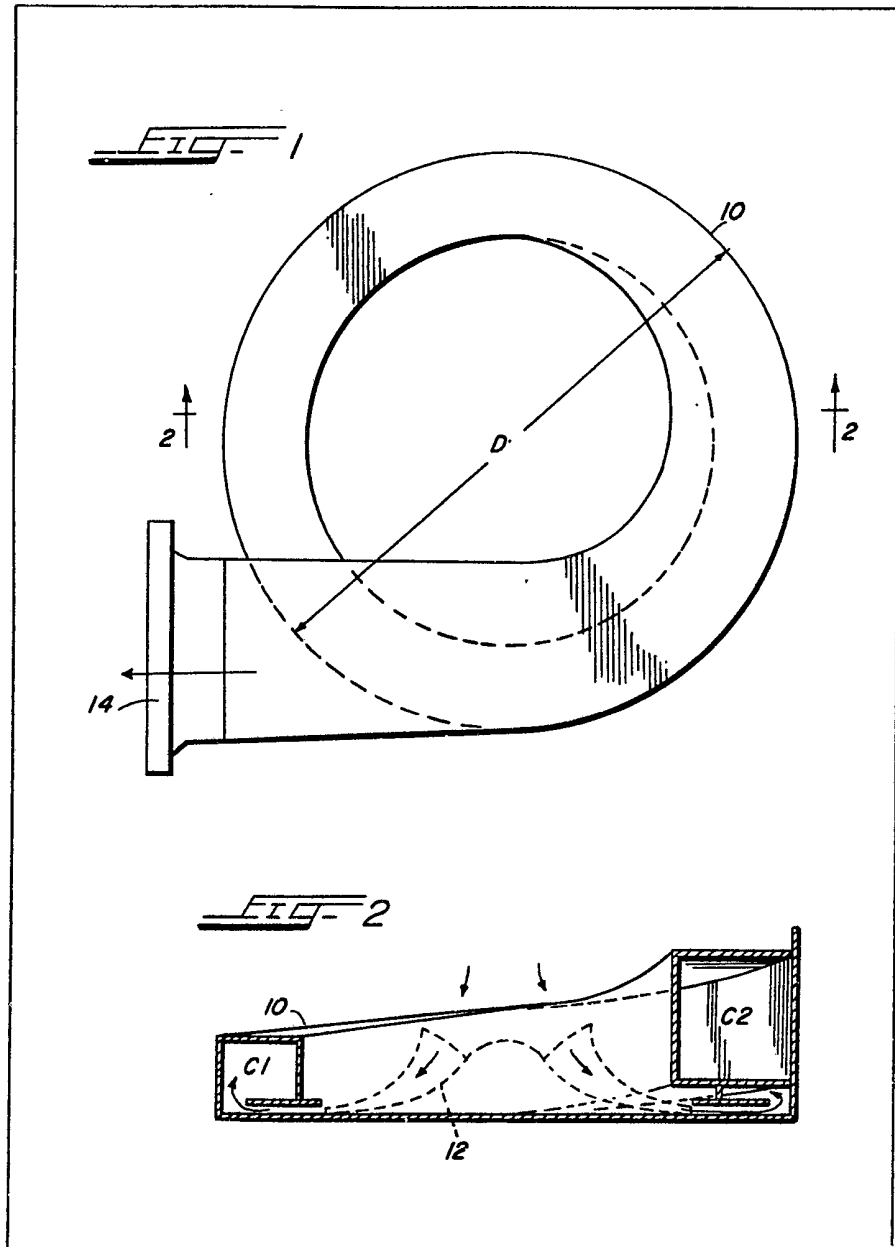
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(54) Expanding scroll diffuser for radial flow impeller

(57) In a discharge scroll 10 for a fluid flow device such as a compressor

having an impeller, the cross-sectional area C1—C2 of the scroll progressively increasing from entry to discharge, the outer diameter D is substantially uniform. The inner diameter may also be substantially uniform.



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FIG-1

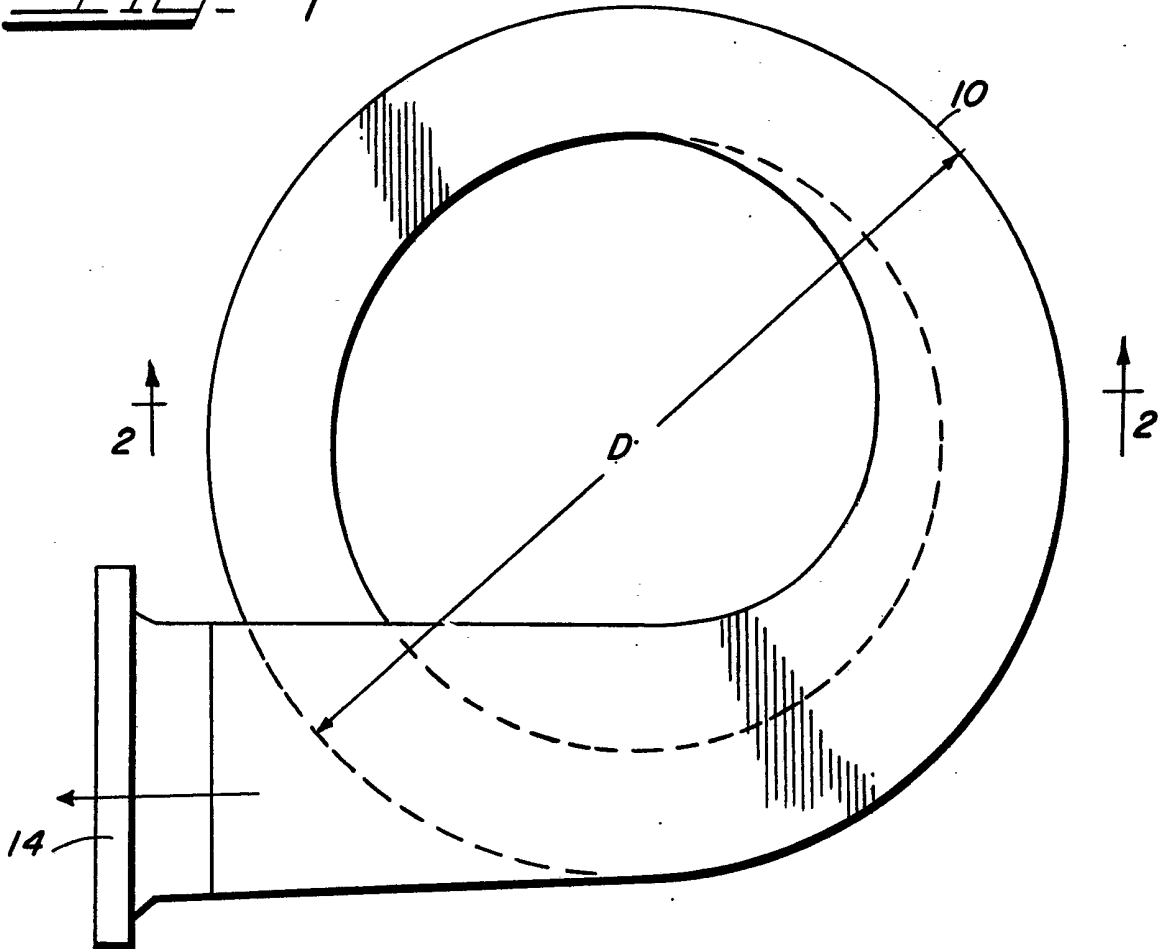
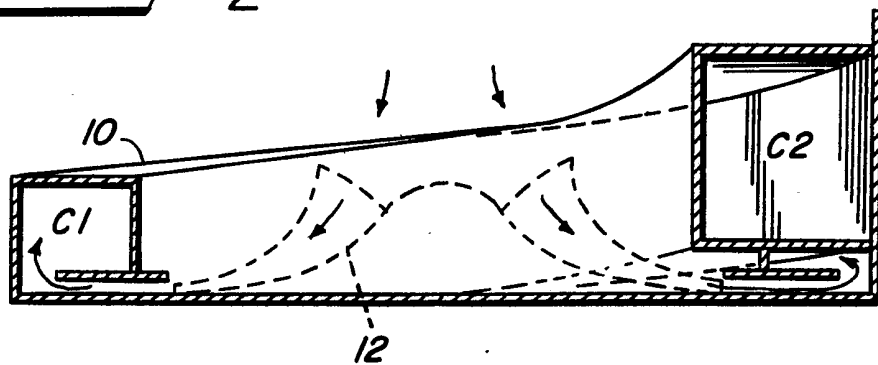
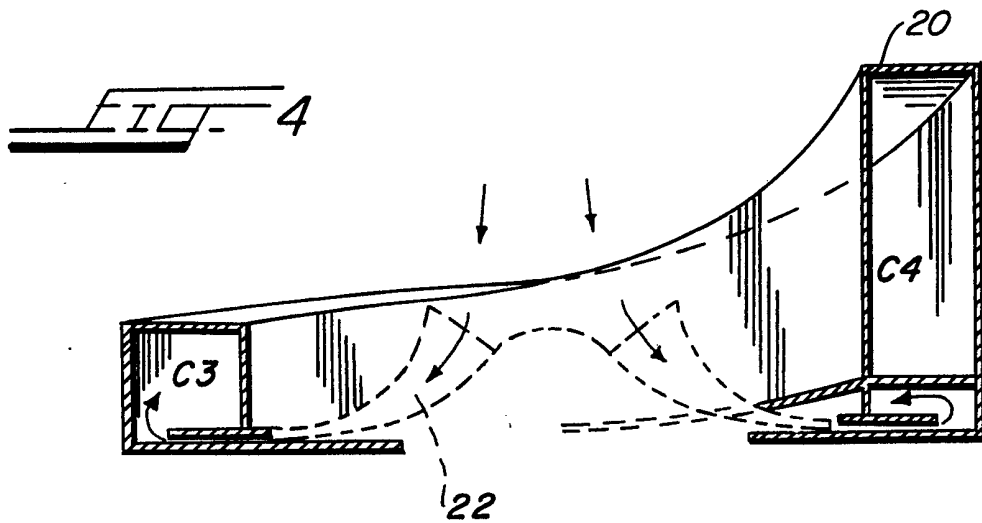
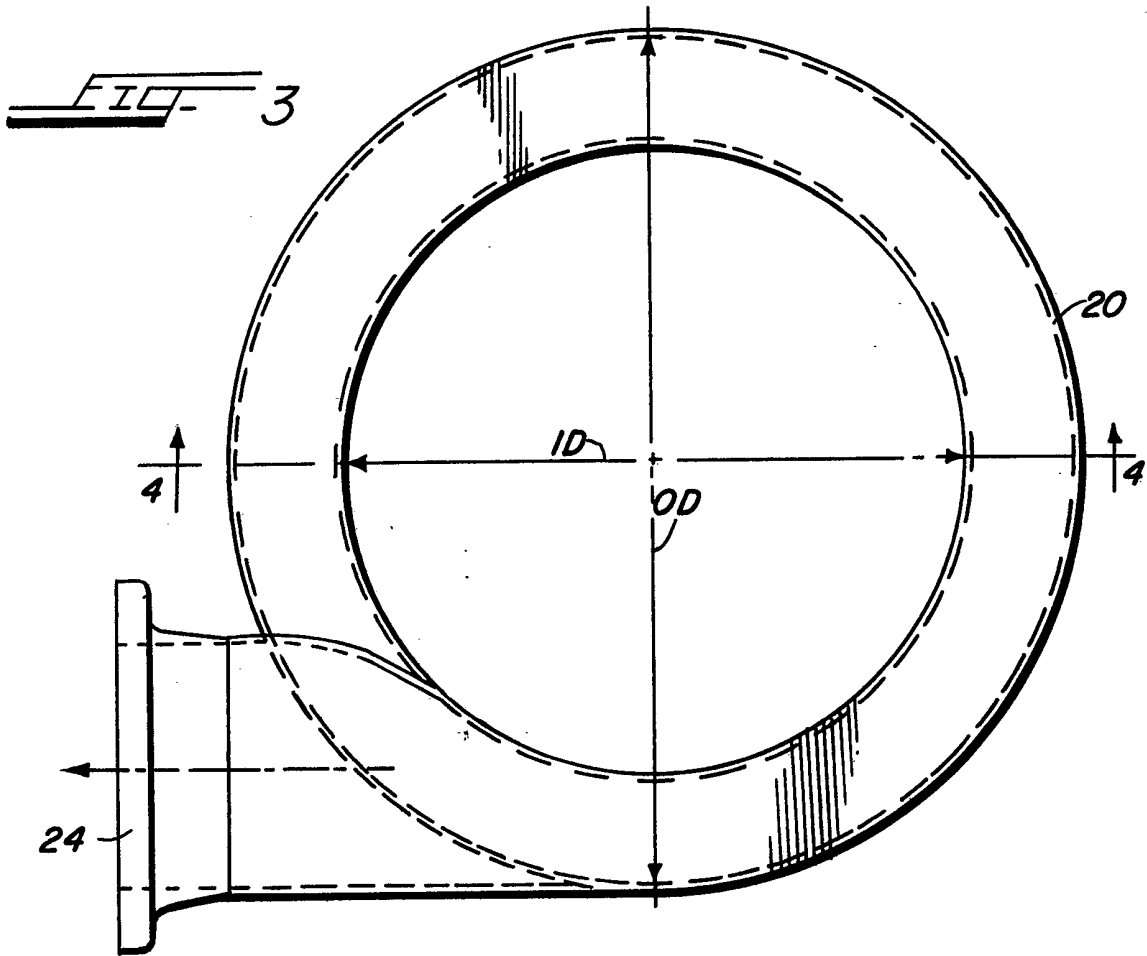


FIG-2





SPECIFICATION

Expanding scroll diffuser for radial flow impeller

Compressed gases exiting from a radial
 5 impeller diffuse in all directions at a relatively high
 gas velocity. To improve the efficiency of such a
 system, it is necessary to reduce the velocity of
 flow to a practical minimum. Friction flow losses,
 as a result, are reduced and better efficiencies are
 10 realized for the system.

Conventional diffusers associated with fluid
 devices, such as impeller compressors, are
 typically of the radial expansion type with a
 substantially constant axial dimension which feeds
 15 into a long, cone-shaped funnel-like expansion
 chamber. Such construction permits gradual
 reduction of the velocity of the fluid such as gases
 and the like.

It is desirable that the diffuser be part of the
 20 compressor housing or housing package to keep
 the unit size as small as possible without affecting
 the efficiency of the device.

According to the invention, a fluid flow device,
 such as an impeller compressor, is provided with a
 25 discharge scroll having a substantially uniform
 outer diameter and a progressively increasing
 cross-sectional area from inlet to discharge. In one
 embodiment the inner diameter of the discharge
 scroll is also uniform. Generally the progressively
 30 increasing scroll cross-sectional area is
 accommodated by progressively increasing the
 axial dimensions of the scroll.

The configuration provides a relatively small,
 compact unit without affecting the efficiency of
 35 the device.

One way of carrying out the invention
 is described in detail below with reference to
 drawings which illustrate only one specific
 embodiment, in which: —

40 FIG. 1 is a plan view of a one embodiment of a
 discharge scroll according to this invention;

FIG. 2 is a sectional view through the scroll of
 FIG. 1 with an associated impeller in broken lines;

45 FIG. 3 is a plan view of another embodiment of
 a discharge scroll of this invention; and

FIG. 4 is a sectional view of the discharge scroll
 of FIG. 3.

Looking now at the drawings, and especially

FIGS. 1 and 2, where a first embodiment is
 50 illustrated, there is shown a discharge scroll 10
 associated with an impeller 12 (FIG. 2) such that
 fluid is discharged with an impeller 12 (FIG. 2)
 such that fluid is discharged from the impeller, as
 indicated by appropriate arrows, into the scroll at
 55 the inside and expands and flows to the discharge
 14. When looking at FIG. 1, it is observed that the
 outer diameter, identified as D is constant while
 the inner diameter varies and becomes smaller
 from inlet to discharge; FIG. 2 indicates that the
 60 axial length progressively increases from intake to
 discharge. FIG. 2 also shows the cross section of
 the scroll (C1, C2) at two locations, such
 progressively increasing from intake to discharge.

Turning now to FIGS. 3 and 4, there is shown a
 65 second embodiment in which the discharge scroll
 20 is associated with an impeller 22 (FIG. 4). The
 fluid is discharged from the impeller into the scroll
 as indicated by appropriate arrows and expands
 and flows to the discharge 24. It is to be observed
 70 that the outer diameter OD as well as the inner
 diameter ID are constant, the axial length
 progressively increasing from intake to discharge.
 FIG. 4, as FIG. 2, shows the cross-section of the
 scroll (C3, C4) at two locations, such progressively
 75 increasing from intake to discharge.

CLAIMS

1. In a fluid flow device having an impeller and
 an associated discharge scroll in which the cross-
 sectional area increases from entry to discharge,
 80 the improvement comprising:

a substantially uniform outer diameter scroll
 with a progressively increasing cross-sectional
 area from entry to discharge.

2. In a fluid flow device as recited in Claim 1
 85 wherein said scroll progressively increases in axial
 length.

3. In a fluid flow device as recited in Claim 1
 wherein said scroll has a substantially uniform
 inner diameter.

90 4. In a fluid flow device as recited in Claim 1
 wherein said scroll has a substantially uniform
 inner diameter and progressively increases in axial
 length.

95 5. A fluid flow device substantially as herein
 described with reference to Figures 1 and 2, or
 Figures 3 and 4, of the accompanying drawings.