United States Patent

Morton

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[54] JET PROPELLED MOTOR

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[52] **U.S. Cl.** **415/82,** 416/20, 416/90, 417/348

[51] **Int. Cl.**.....**F01d 1/18**

[58] **Field of Search** 415/80, 82; 416/20, 90; 417/348

[56] **References Cited**

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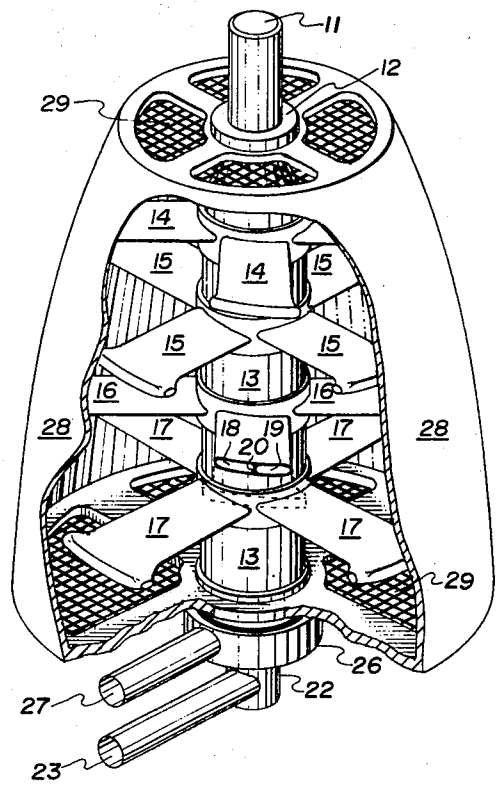
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Attorney—Richard K. Macneill

[57] **ABSTRACT**

A jet propelled motor in which a plurality of rotating blades is attached to a common shaft and terminates at one end in a drive shaft and at another end in a drive pressure inlet and a brake pressure inlet; the drive pressure inlet being coupled through the rotating shaft and a channel in each of the blades to a spring-biased ball valve which releases after a predetermined pressure and allows the pressure to exit through a jet drive exhaust on the end of the blade; the plurality of blades being disposed in a plurality of planes and progressively reducing in length; a valve seat in the blades in at least one of the planes for shutting off the jet exhaust to that plane of blades after the shaft has reached a predetermined rotational speed and a braking pressured input coupled through the shaft to an opposite edge of the blades for braking the rotation of the shaft when desired.

3 Claims, 3 Drawing Figures



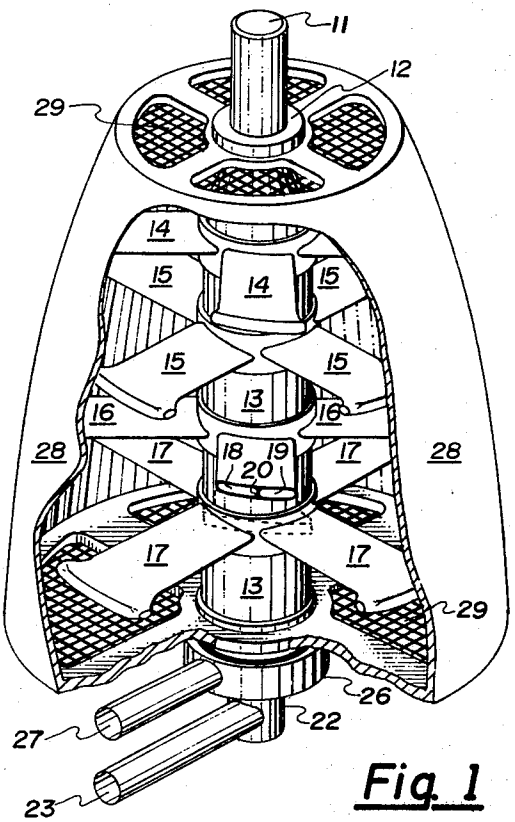


Fig. 1

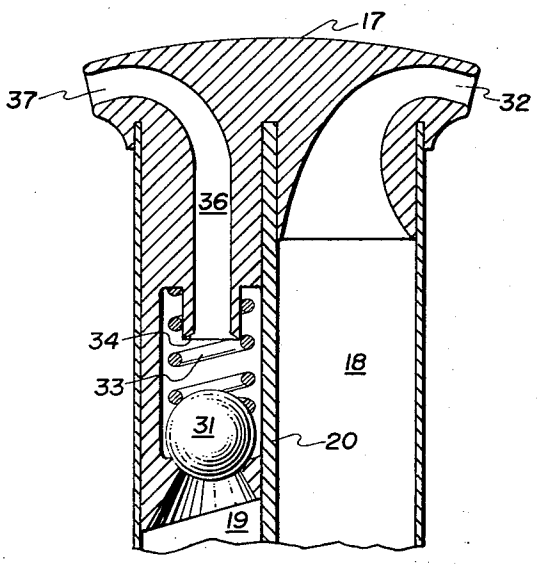


Fig. 3

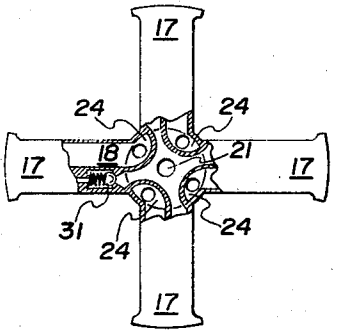


Fig. 2

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JET PROPELLED MOTOR

BRIEF DESCRIPTION OF THE INVENTION

The present invention relates to a jet propelled motor and more particularly to a jet propelled motor having a high starting torque.

According to the invention, a jet propelled motor is provided having a plurality of blades located in a plurality of planes on a rotating shaft. Each of the blades has a high-pressure fluid channel for providing jet propulsion at one surface of the blades. In the blades of at least one plane, a spring-biased valve is located for releasing upon the application of pressure and has a second valve seat for sealing when a certain centrifugal force is reached via a predetermined speed of the motor. This feature allows for less pressure to be utilized as the speed of the motor builds up and the torque necessary for starting is no longer required. Another feature of torque variation can be utilized in progressively reducing the length of the blades in each plane moving away from the high pressure intake, and thereby allowing the shorter blades to carry the load when the desired rotational speed has been achieved. A further feature lies in a braking high-pressure inlet which is directed to an opposite edge of the blades providing a braking jet when it is desired to stop the motor.

An object of the present invention is the provision of a high starting torque jet propelled motor.

Another object of the invention is the provision of a jet propelled motor utilizing a minimum of input when an operating rotational speed is achieved.

A further object of the invention is the provision of a jet propelled motor having an extremely efficient braking.

Yet another object of the invention is the provision of a jet propelled motor which is extremely versatile.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings in which like reference numerals designate like parts throughout the FIGS. thereof and wherein:

FIG. 1 is a perspective view partially sectioned of the preferred embodiment of the present invention;

FIG. 2 is a top view partially sectioned of one set of the blades of FIG. 1; and

FIG. 3 is a sectioned view of a typical blade of the embodiment of FIGS. 1 and 2.

DETAILED DESCRIPTION OF THE DRAWINGS

Referring to FIG. 1, a drive shaft 11 is coupled through a bearing 12 to a pressure shaft 13. Pressure shaft 13 is coupled to a plurality of blades 14 at one plane, 15 in a second plane, 16 in a third plane, and 17 in a fourth plane. One of blades 16 is partially sectioned to show a braking channel 18 and a drive channel 19 therein separated by a dividing web 20. A center portion 21 (not shown) of pressure shaft 13 is coupled through a sealed rotary coupling to a high-pressure drive inlet 23. Outer portions 24 (not shown) of pressure shaft 13 are coupled through a sealed rotary coupling 26 to a high-pressure braking inlet 27. The entire assembly is surrounded by a shroud 28 which has ventillating screens 29 at each end.

Referring to FIG 2, one plane of blades 17 is shown partially sectioned. A center portion 21 of pressure shaft 13 is shown coupled to a spring-biased ball valve 31 which is shown in a sealed off position. High-pressure braking channels which communicate with rotary coupling 26 are shown at 24.

Referring to FIG 3, one blade 17 is shown having a dividing web 20 dividing a braking channel 18 which is in communication with a braking jet 32. High-pressure drive channel 19 is in communication with ball valve 31 which is spring-biased by spring 33. A valve seat 34 is in communication with a high-pressure jet channel 36 further in communication with a drive jet 37.

OPERATION

Referring back to FIG. 1, it can be seen that if high-pressure air, for example, is introduced into inlet 27 and placed in communication with the jets 37 at one edge of blades 14, 15, 16 and 17, the entire pressure shaft 13 will be rotated along with power shaft 11. If a braking high-pressure air is introduced in inlet 23 and applied to jets 32 in the opposite ends or surfaces of blades 14, 15, 16 and 17, the entire rotating structure will be braked to a stop. In this regard, high-pressure inlet 23 is coupled to drive channel 19 and braking high-pressure inlet 27 is coupled to braking channel 18.

Referring to FIG 2, the drive channel 21 is shown in the center of blades 17 and communicates with the ball valve 31 which is spring-biased in a seated position. In a typical mode of operation, the biasing of the ball valves is less in the longer blades 17 than it is in the shorter blades 16 and 15 and much less than in blades 14. This will ensure the longer blades getting their jet power initially for the production of a high-starting torque. As the structure picks up rotational speed, the centrifugal force of the longer blades 17 being greater, and the spring-biasing being less, ball valve 31 will seat against the high speed valve seat 34 cutting off the jet supply to the longer blades. As the apparatus picks up further speed, the medium length blades 16 and 15 will likewise have their jet supply cut off and, finally, when the apparatus is rotating at its operational speed, only the shortest blades 14 will require a jet drive to keep the machinery moving. When it is desired to brake or stop the rotation, the high-pressure inlet 23 is cut off and high pressure is applied at braking inlet 27.

Referring to FIGS 2 and 3, it can be seen that the channels 24, which are coupled through rotary coupling 26 to inlet 27, are in direct communication through braking channels 18 with braking jets 32, which will effectively and rapidly brake the rotating apparatus.

It should be understood of course that the foregoing disclosure relates to only a preferred embodiment of the invention and that it is intended to cover all changes and modifications of the example of the invention herein chosen for the purposes of the disclosure which do not constitute departures from the spirit and scope of the invention.

The invention claimed is:

1. A jet propelled motor comprising:

a pressure shaft having a plurality of channels therein;

a shroud rotatably carrying said pressure shaft, said pressure shaft terminating in a drive shaft external to said shroud;

a plurality of blades coupled to said pressure shaft, each of said plurality of blades having at least one channel therein terminating in a jet outlet, said at least one channel in each of said plurality of blades communicating with at least one of said plurality of channels within said pressure shaft;

said at least one channel in each of said plurality of blades in at least one plane includes a valve, said valve being quiescently closed on a first seat and being opened upon application of pressure thereto and further closed on a second seat upon a predetermined centrifugal force being attained; and

pressure means coupled to said at least one of said plurality of channels in said pressure shaft.

2. The jet propelled motor of claim 1 wherein:

each of said plurality of blades includes a braking channel terminating in a second jet outlet opposite said first-mentioned jet outlet, said braking channel being in communication with another one of said plurality of channels in said pressure shaft; and further including

pressure means coupled to said another of said channels in said pressure shaft.

3. The jet propelled motor of claim 1 wherein:

said valves in the blades of one plane are operable for closing at a lower centrifugal force than the valves in the blades in another plane.

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