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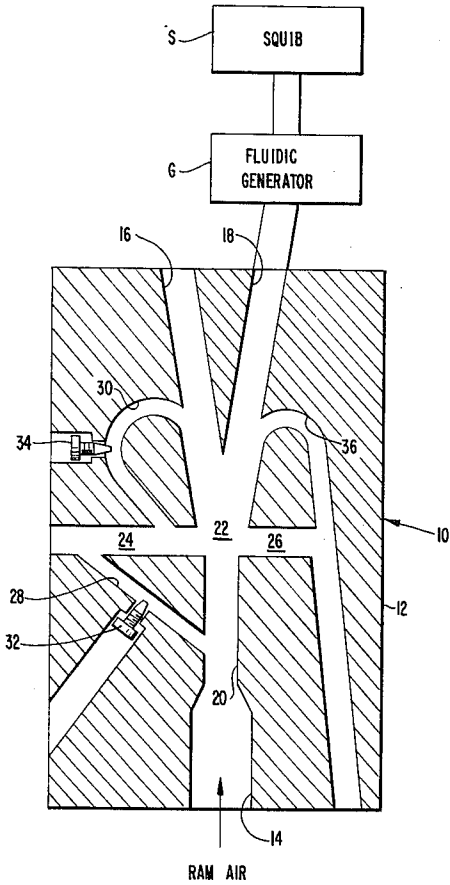
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[54] **FLUERIC VELOCITY DISCRIMINATOR**
3 Claims, 1 Drawing Fig.
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[50] Field of Search **137/81.5**

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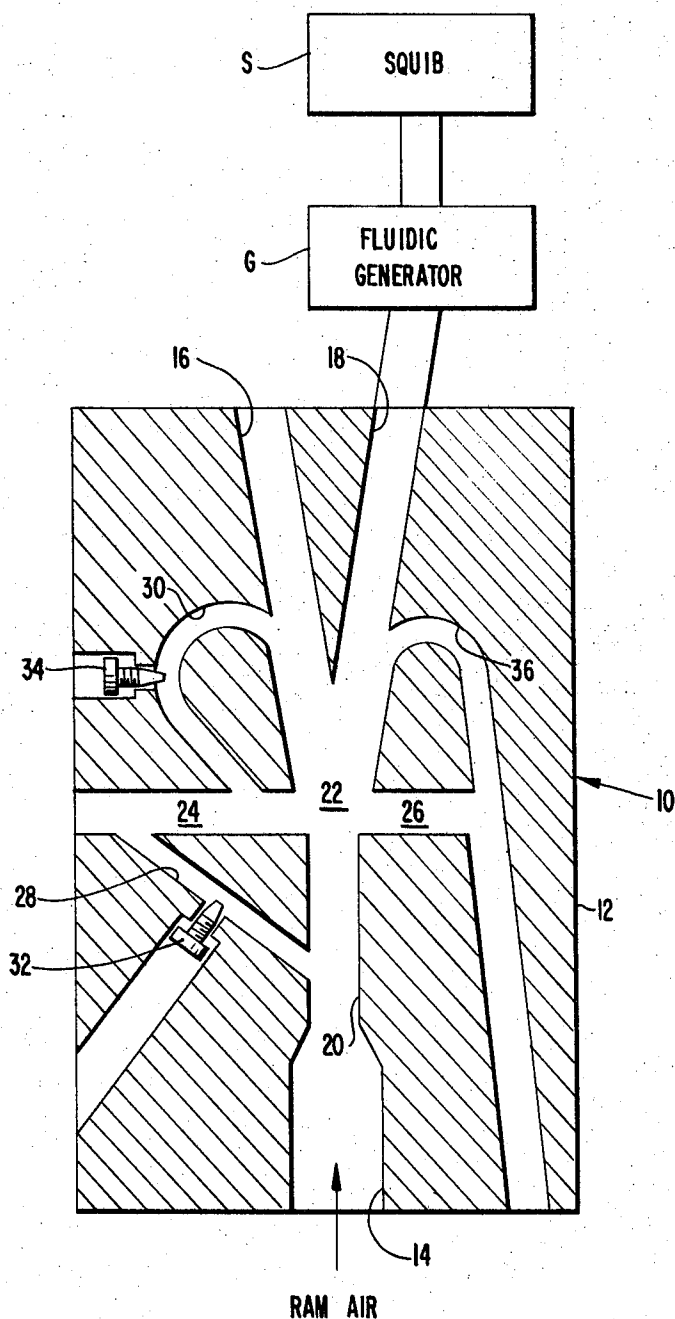
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ABSTRACT: The discriminator includes a housing having an inlet passage and a pair of outlet passages opposite the inlet passage, the inlet passage having a reduced diameter passageway for creating a high velocity fluid stream. A pair of lateral passages communicate with the junction of the inlet and outlet passages and a bias passage communicates between the inlet passage and one of the lateral passages to create a low-pressure condition on one side of the fluid stream and thereby direct it through one of the outlet passages. A feedback passage communicates between the one outlet passage and the one lateral passage and deflects the fluid stream from the one outlet to the other outlet passage in response to a predetermined minimum pressure. A flow maintaining passage communicates with the other outlet passage and the other lateral passage to create a low-pressure condition on the other side of the fluid stream and thereby maintains fluid communication between the inlet and other outlet passages.



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FLUERIC VELOCITY DISCRIMINATOR

The present invention relates to a fluid-pressure discriminator and particularly relates to a fluid-pressure regulator operable to deflect incoming fluid from one outlet to another outlet passage in response to a predetermined inlet pressure.

A primary object of the present invention is the provisions of a fluid-pressure discriminator having no moving parts, and therefore not subject to wear and malfunction, a fluid discriminator which is simple in construction, compact and easily manufactured, and which has high reliability and accuracy.

It is another object of the present invention to provide a fluid-pressure discriminator for diverting a fluid stream under pressure from one to another outlet passage in response to a predetermined input pressure.

It is still another object of the present invention to provide a fluid-pressure discriminator having an inlet passage for communicating a stream of pressure fluid into a junction which, in turn, lies in communication with a pair of outlet passages opposite the inlet passage and including a lateral passage in communication with the junction on one side of the fluid stream, and further including a pair of passages communicating with the lateral passage and with the respective inlet and one of the outlet passages whereby the fluid stream is diverted from the one outlet passage to the other outlet passage in response to a predetermined input pressure.

It is still another object of the present invention to provide a fluid-pressure discriminator including a housing having an inlet passage for directing a stream of pressure fluid into one or the other of a pair of outlet passages lying generally opposite the inlet passage and control passages for diverting the pressure fluid from one of the outlet passages to the other outlet passage in response to a predetermined input pressure and further including a passage communicating with the other outlet passage and the other side of the fluid stream for maintaining the fluid stream diverted through the other outlet passage.

It is still another object of the present invention to provide a fluid-pressure discriminator having the foregoing characteristics and wherein the predetermined inlet pressure which effects diversion of the fluid stream from the one outlet passage to the other outlet passage can be selectively adjustable to various pressures as desired.

It is a still further object of the present invention to provide a fluid-pressure discriminator for diverting a fluid stream from one outlet to another outlet passage in response to a predetermined inlet pressure and wherein this function is performed solely without moving parts and by a particular arrangement of the fluid passages through the regulator.

It is a related object of the present invention to provide a fluid-pressure discriminator connected to a fluid generator operable to fire a squib, the discriminator being operable in response to a predetermined minimum input pressure to divert fluid flow to the fluid generator and thereby fire the squib.

These and further objects and advantages of the present invention will become more apparent upon reference to the following specification, claims, and appended drawing, wherein the sole drawing FIGURE is a schematic illustration of a fluid-pressure discriminator constructed in accordance with the present invention and shown connected with a fluid generator and firing squib.

Referring to the drawing, there is illustrated a fluid-pressure discriminator generally indicated at 10 comprising a housing 12 having an inlet passage 14 and a pair of outlet passages 16 and 18 communicating with inlet passage 14. Fluid inlet passage 14 includes a reduced diameter passage 20 whereby fluid under pressure entering inlet passage 14 is increased in velocity to provide a fluid stream flowing toward outlet passages 16 and 18. The inner ends of outlet passages 16 and 18 and inlet passage 20 meet at a junction indicated at 22 with outlet passages 16 and 18 diverging one from the other on the opposite side of reduced inlet passage 20. A pair of lateral passages 24 and 26 lie in communication with junction 22 on opposite sides of the fluid stream flowing therethrough, the opposite ends of lateral passages 24 and 26 communicating through openings in housing 12 with a pressure dump. Outlet

passage 16 likewise lies in communication with a pressure dump. Outlet passage 16, however, may be utilized otherwise for mechanisms requiring a fluid pressure below the predetermined triggering inlet pressure at which pressure the discriminator hereof diverts the fluid stream from outlet passage 16 to outlet passage 18 as described below. Outlet passage 18 may, for example, lie in communication with a fluid generator G, which in turn connects with a firing squib S.

A fluid stream biasing passage 28 communicates at one end with reduced inlet passage 20 and at its other end with the lateral passage 24 in a manner to direct fluid flowing therethrough to the pressure dump. It will thus be seen that fluid under pressure entering passage 20 is partially diverted through the passage 28 and 24 to the fluid dump, whereby a low-pressure condition is created on one side (the left-hand side) of the fluid stream exiting from inlet passage 20 through junction 22. This low-pressure condition on one side of the fluid stream diverts the fluid stream for flow through the outlet passage 16. Under this condition, the pressure fluid flowing in outlet passage 18 is minimal and practically nonexistent. A feedback passage 30 communicates at one end with the outlet passage 16 and at its other end with the lateral passage 24 in a manner such that the fluid exiting therefrom into the lateral passage 24 from the outlet passage 16 is directed laterally against the fluid stream flowing through junction 22 into outlet passage 16, tending to divert the fluid stream flowing through junction 22 to the other outlet passage 18. Suitable fluid restrictors 32 and 34 are provided in passages 28 and 30, respectively, and may comprise threaded screws whereby the cross-sectional area of these passages may be selectively enlarged or reduced. A feedback passage 36 communicates at one end with the outlet passage 18 and at its other end with a pressure dump, passage 36 lying in communication with the lateral passage 26 on the opposite side of junction 22 and at the end of passage 26 remote from junction 22 for reasons as will become clear.

In use, the fluid under pressure enters inlet passage 14 and flows through the reduced passage 20 to provide an increased velocity fluid stream flowing toward junction 22. A portion of the fluid stream, however, is diverted through passage 28 into the lateral passage 24 to one side of the fluid stream flowing through junction 22. A diverted portion of the fluid stream creates a low-pressure condition on the left-hand side of the fluid stream flowing through junction 22 as seen in the drawing FIGURE and this diverts the fluid stream into the outlet passage 16 with minimal or no flow through outlet passage 18. A portion of the fluid flowing through the outlet passage 16 flows into feedback passage 30 and into the lateral passage 24 with the fluid exiting from the feedback passage 30 being directed laterally against one side of the fluid stream flowing through junction 22 tending to divert the fluid stream toward the other outlet passage 18. When the pressure of the fluid exiting from feedback passage 36 and directed against the fluid stream in junction 22 exceeds the low-pressure condition created by the passages 28 and 24, the feedback fluid directs the stream into outlet passage 18. By selective adjustment of the restrictor screws 32 and 34, the minimum pressure which will divert the fluid stream from the outlet passage 16 to the outlet passage 18 can be selected as desired.

With the fluid stream thus diverted into outlet passage 18, it will be seen that a portion of the diverted stream enters the feedback passage 36 for communication to the pressure dump. The flow through passage 36, however, creates a low-pressure condition in lateral passage 26, tending to maintain the fluid stream through junction 22 diverted for flow through outlet passage 18. The low-pressure created in lateral passage 26 is sufficient to maintain the fluid stream in communication through outlet passage 18 notwithstanding a reduction in inlet pressure below the predetermined triggering pressure or initial stream diverting pressure.

Outlet passage 18 may be connected, for example, to fluid generator G which may be used as a power supply to fire a squib. When the inlet pressure is initially below the predeter-

mined triggering pressure of the discriminator, the fluid stream flows through the inlet passages 14 and 20 and into the outlet passage 16 by the fluid biasing means previously described. Accordingly, fluid generator G does not produce any electrical power. However, when the inlet pressure exceeds the predetermined triggering pressure of the discriminator, the fluid stream is diverted from outlet passage 16 to outlet passage 18 as previously described to actuate fluid generator G and thereby provide electrical power to the squib. The latter is accordingly fired only when the inlet pressure exceeds the selected inlet pressure. Obviously, the fluid-pressure discriminator hereof can be employed in other fluid systems and the foregoing description of the discriminator in connection with a generator and squib is for exemplary purposes only and not intended to limit usage of the discriminator hereof.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the means and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

We claim:

1. A fluid-pressure discriminator comprising a housing, a fluid inlet in said housing for admitting fluid under pressure and including a first passage in said housing in communication with said inlet for providing a stream of fluid, first and second fluid outlet passages disposed generally opposite said stream for receiving the stream of fluid, a second passage in communication with said fluid inlet for biasing the stream of fluid into said first fluid outlet, and a third passage in communication with said first fluid outlet and directed to flow fluid substantially laterally against the fluid stream in said first passage on

one side thereof for diverting the fluid stream from said first outlet passage to said second outlet passage in response to a fluid inlet pressure above a predetermined pressure, including a fourth passage in communication with said second fluid outlet passage and with said first passage on the opposite side of the fluid stream in said first passage for maintaining flow of fluid to said second outlet passage.

2. A discriminator according to claim 1 wherein said fourth passage is arranged to create a low-pressure condition on said opposite side of the fluid stream, the fluid stream being thereby biased to said opposite side to maintain flow of fluid to said second outlet passage.

3. A fluid-pressure discriminator comprising a housing, a fluid inlet in said housing for admitting fluid under pressure and including a first passage in said housing in communication with said inlet for providing a stream of fluid, first and second fluid outlet passages disposed generally opposite said stream for receiving the stream of fluid, a second passage in communication with said fluid inlet for biasing the stream of fluid into said first fluid outlet, and a third passage in communication with said first fluid outlet and directed to flow fluid substantially laterally against the fluid stream in said first passage on one side thereof for diverting the fluid stream from said first outlet passage to said second outlet passage in response to a fluid inlet pressure above a predetermined pressure, said second passage being arranged to create a low-pressure condition on said one side of the fluid stream, the fluid stream being thereby biased toward said one side for flow to said first fluid outlet passage when the fluid inlet pressure is below said predetermined pressure, and a fourth passage in communication with said second fluid outlet passage and with said first passage on the opposite side of the fluid stream in said first passage for maintaining flow of fluid to said second outlet passage.

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