July 29, 1969 D. B. KIRK 3,457,940

PNEUMATIC CONTROL APPARATUS

Filed Feb. 28, 1967

FIG. 1

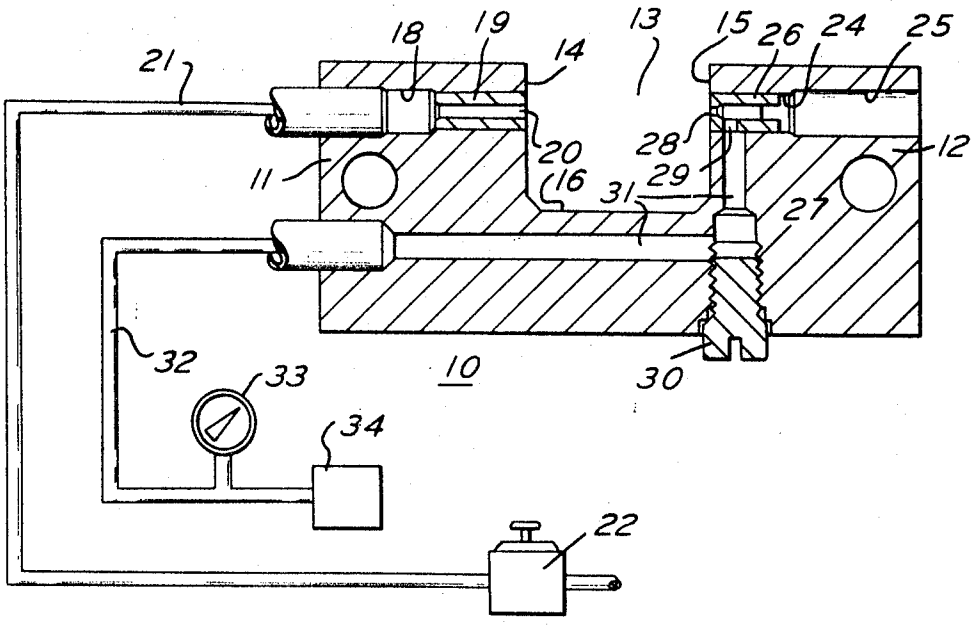
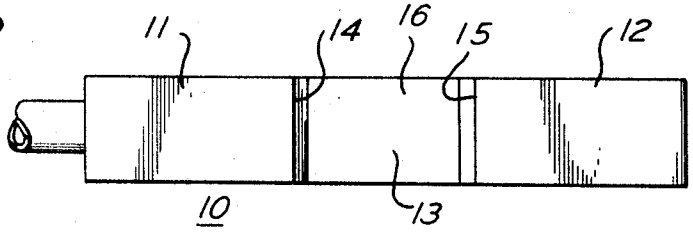


FIG. 2



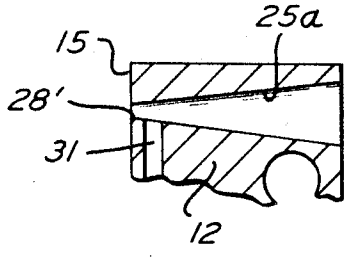


FIG. 3

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PNEUMATIC CONTROL APPARATUS

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U.S. Cl. 137—83 1 Claim

ABSTRACT OF THE DISCLOSURE

A pneumatic detector having a fluid nozzle and a receiver for fluid from the nozzle with a pick off of subatmospheric pressure generated along the edge of the fluid jet from the nozzle, the subatmospheric pressure providing a signal.

Background of the invention

Field of the invention.—This invention comprises a pneumatic detector employing a nozzle which provides a fluid jet, the fluid jet being interrupted by the presence of an object to provide a detector of the presence of the object, the jet being directed to a receiving location which has a subatmospheric pressure pickup for providing a signal.

Description of the prior art.—It has heretofore been proposed to provide a plurality of nozzles, one a supply nozzle and the other a pickup nozzle operating at a lower pressure, the nozzles being supplied from a common source of fluid thereby preventing aspiration or introduction of dirt particularly into the pickup nozzle.

Summary of the invention

It is the principal object of the present invention to provide pneumatic control apparatus responsive to the presence or absence of an object, which is simple in construction, reliable in its operation, and in which a fluid jet is employed directed across the expected path of the object.

It is a further object of the present invention to provide simple but effective apparatus for detecting the presence or absence of an object in which a fluid jet directed across the expected path or location of the object, to a receiving location produces an output signal which varies dependent on whether or not an object is in the detection path or location.

It is a further object of the present invention to provide apparatus of the character aforesaid which is free from likelihood of clogging with dirt which would affect its operation.

Other objects and advantageous features of the invention will be apparent from the description and claims.

Brief description of the drawing

The nature and characteristic features of the invention will be more readily understood from the following description taken in connection with the accompanying drawings forming part thereof, in which:

FIGURE 1 is a view partly diagrammatic and partly in cross section of a preferred embodiment of the invention;

FIG. 2 is a plan view of the mounting block shown in FIG. 1; and

FIG. 3 is a fragmentary view showing a different form of discharge passageway.

It should, of course, be understood that the description and drawings herein are illustrative merely, and that various modifications and changes can be made in the structure disclosed without departing from the spirit of the invention.

Like numerals refer to like parts throughout the several views.

Description of the preferred embodiment

Referring now more particularly to FIGS. 1 and 2 of the drawings, a mounting block **10** is shown which has spaced legs **11** and **12** with a central transverse space **13** therebetween. The space **13** can be bounded by opposed faces **14** and **15** and a connecting face **16**.

The block **10**, in the leg **11**, has a bore **18** therein for the reception of a supply nozzle insert **19** having a nozzle opening **20**. The axis of the nozzle opening **20** is located so that a jet from the nozzle opening **20** intersects the space **13**, as hereinafter explained.

The bore **18** is connected by a pipe **21** to a suitable source of pressure regulated fluid such as that from an adjustable pressure regulator **22**. While any desired fluid may be employed, air can advantageously be used for many purposes.

The leg **12**, which provides a jet receiving location for a fluid jet from the nozzle opening **20** has a discharge passageway in communication with the atmosphere which may include a cylindrical bore **25**, extending from the face **15** for free discharge of fluid from the jet.

The bore **25** is primarily to provide a location for a connection at which a partial vacuum generated by the jet from the nozzle opening **21** can be utilized. For this purpose a ring or tubular insert **26** can be employed which has a central discharge opening **27** therethrough with a rim or barrier **28** having therebeyond a pressure take off opening **29** in intersecting relation to the opening **27** and communicating with a fluid passageway **31**. The passageway **31** extends through the body **10** with a closure plug **30** to facilitate manufacture. The passageway **31** has a fluid connection **32** extending therefrom to any suitable subatmospheric pressure responsive device or devices, such as an indicating gage **33** and a vacuum operated switch **34** for indicating, recording or controlling, as required and desired.

While the bore **25** as shown in FIG. 1, is cylindrical, it can be of any desired shape, such as an open side channel, or flared, as at **25***a* in FIG. 3, with a barrier **28'** and the fluid connection **31** downstream thereof for pressure takeoff.

Fluid, such as air, under pressure is supplied from the pressure regulator **22** through the supply pipe **21** and the nozzle opening **20** in the form of a fluid jet which is delivered across the space **13**. The jet has an aspirating action along its exterior and as it passes the barrier **28**, and the take off opening **29** entrains the air at that location thereby creating a subatmospheric pressure or vacuum at the opening **29**, the passageway **31** and the fluid connection **32** which is effective at the gage **33** and switch **34**. The bore **25** or bared bore **25***a* permits free escape of the jet to the atmosphere.

If now, an object to be detected is moved into the path of the jet from the nozzle opening **20**, the jet will be obstructed and will not be effective at the opening **29** so that the pressure at the opening **29** and in the fluid connection **32** and at the gage **33** and switch **34** will rise and will remain at substantially atmospheric level until the jet is again effective at the opening **29**.

The apparatus of the present invention can be used in any desired orientation and has been found to be free from clogging with dirt without the necessity for employing any source of purging fluid.

I claim:

1. Pneumatic control apparatus comprising:

a connection to a supply of pressure fluid,

a nozzle with which said connection is in communication,

a receiver spaced from said nozzle with the space therebetween providing an object detecting location,

said receiver having a surface portion subject to the aspirating action of said jet from said nozzle along which said jet passes, and

a pressure takeoff connection in intersecting relation to said surface portion,

said receiver having an inserted ring, and

said pressure take-off connection having a portion thereof in said ring.

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