United States Patent

Warren

[15] **3,685,539**

[45] **Aug. 22, 1972**

[54] **MULTIPLE STATION COMBINATION VACUUM-PRESSURE SYSTEM**

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[21] Appl. No.: **95,526**

[52] **U.S. Cl.** **137/565,** 210/333, 210/341

[51] **Int. Cl.** **B01d 23/00**

[58] **Field of Search** 210/333, 341; 137/565, 608

[56] **References Cited**

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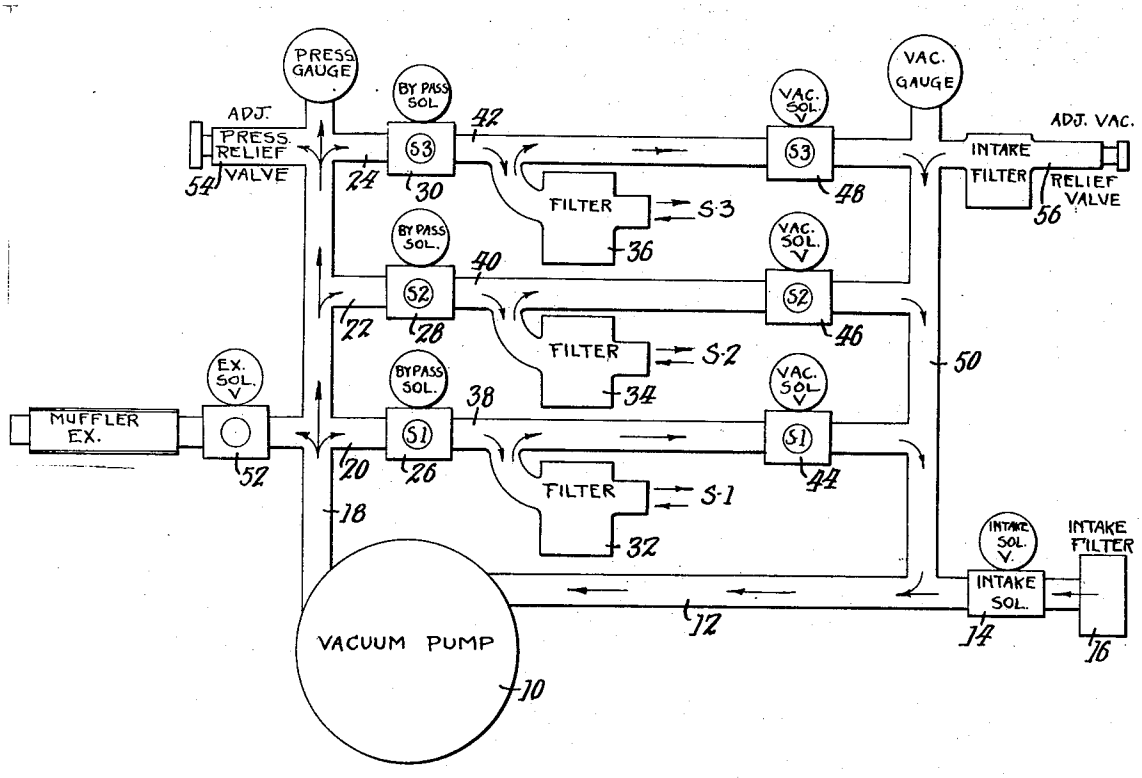
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[57] **ABSTRACT**

A vacuum-pressure system utilizing a single pump serving a plurality of stations for use selectively of either the vacuum or the pressure derived therefrom, each station having separate controls, by manual, electrical or mechanical means, providing either the vacuum or pressure, selectively, at any station without influencing any of the other remote stations.

2 Claims, 2 Drawing Figures



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2 Sheets-Sheet 1

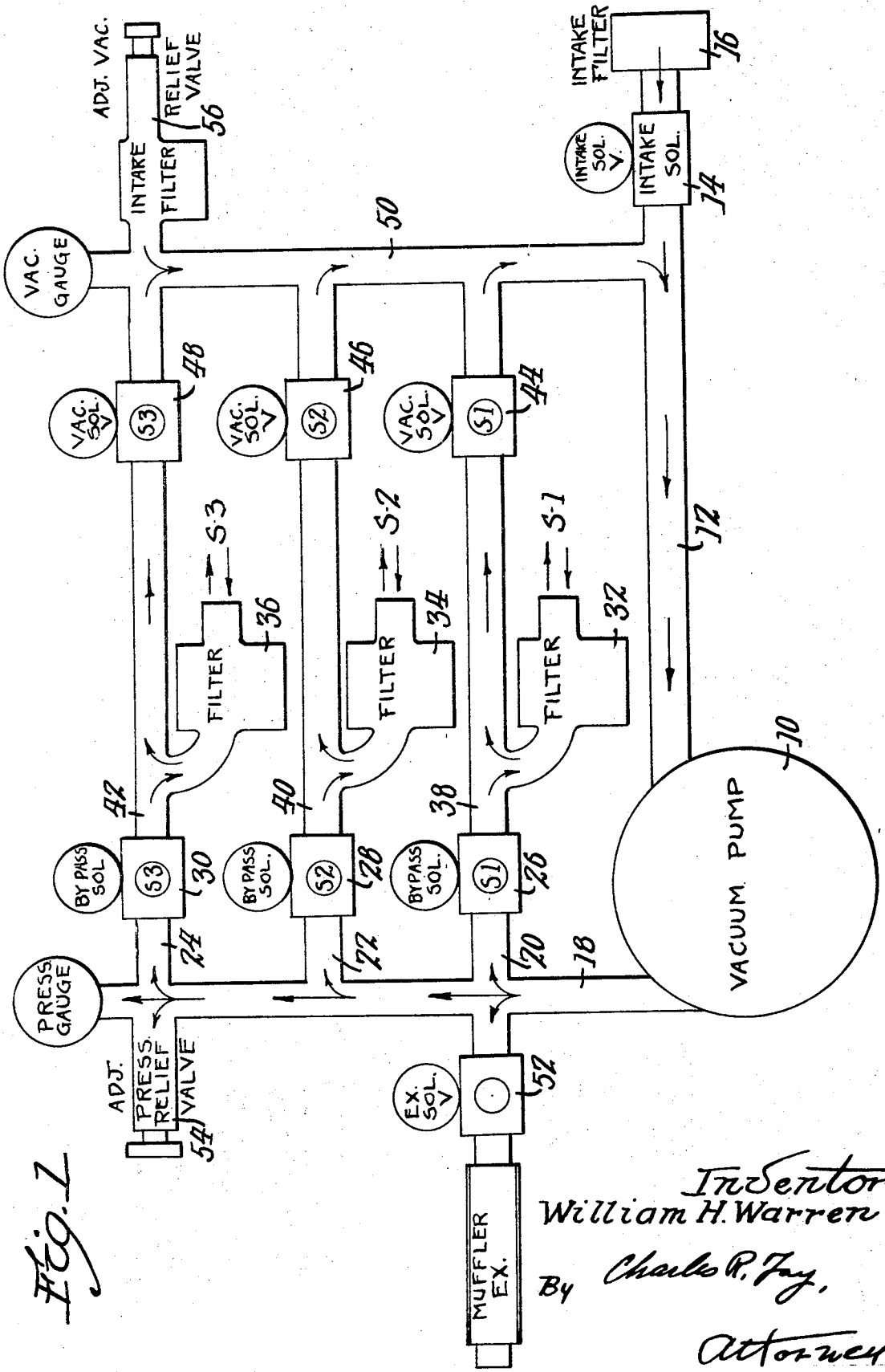


Fig. 1

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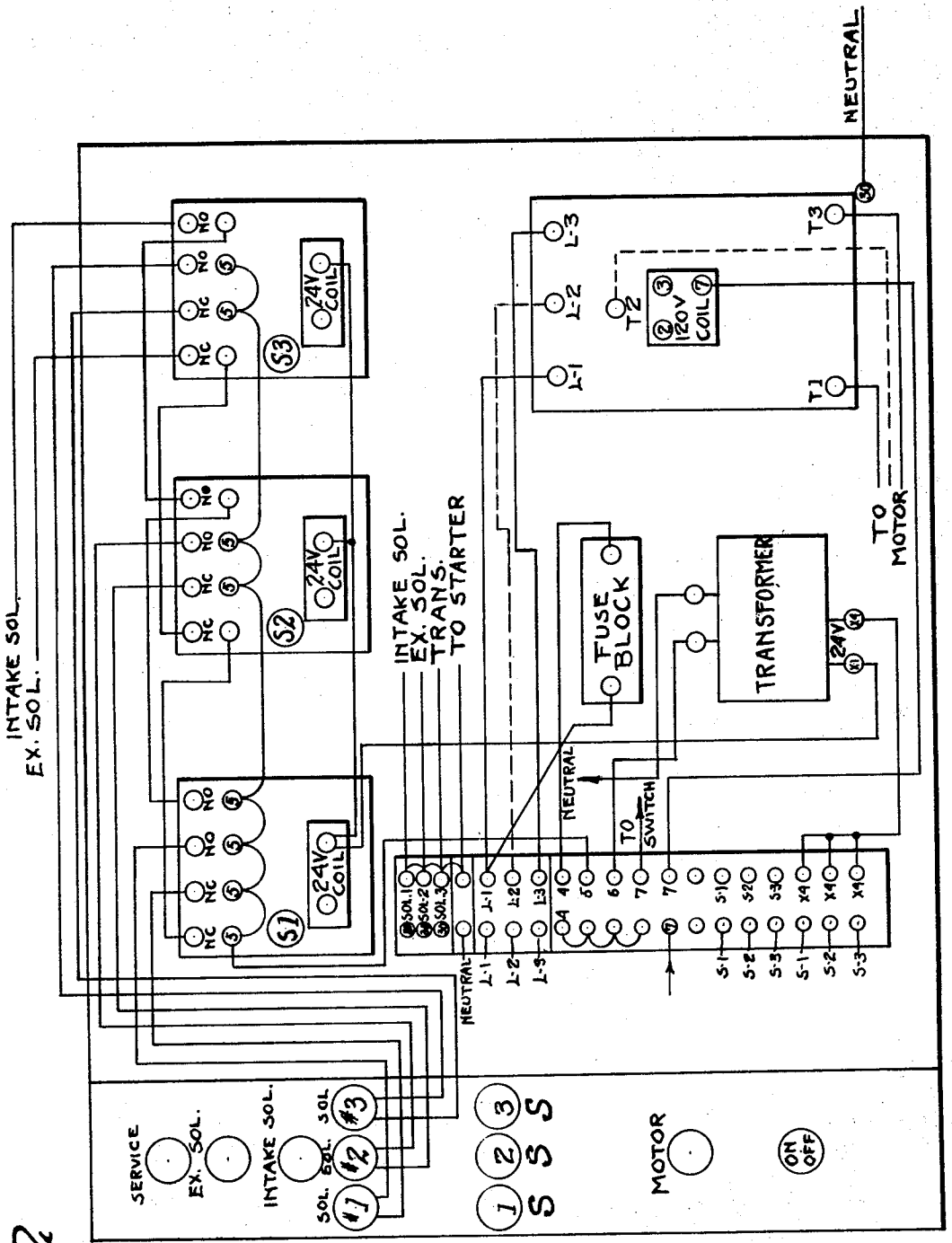

NEUTRAL
T3
T2
T1
L-3
L-2
L-1
120V COIL
24V COIL
S3
S2
S1
INTAKE SOL.
EX. SOL.
TRANS.
TO STARTER
FUSE BLOCK
TRANSFORMER
24V
TO MOTOR
NEUTRAL
TO SWITCH
SOL.1
SOL.2
SOL.3
SERVICE
EX. SOL.
INTAKE SOL.
SOL. SOL
#3
#2
#1
MOTOR
ON OFF

Fig. 2

MULTIPLE STATION COMBINATION VACUUM-PRESSURE SYSTEM

BACKGROUND OF THE INVENTION

There are many industrial and food processing plants, e.g., egg packaging and handling plants, that need and use more than a single remote vacuum or pressure device. It is not unusual to use a single vacuum pump to supply more than one use or station. However it is advantageous in certain cases to provide a vacuum pickup with a pressure discharge, for positive release of articles or for cleaning e.g., the picking up tool at each cycle, particularly in egg processing.

However with such a combination vacuum-pressure system when used with more than one station, the same being used at random from a single pump, each station may lose its control since it is influenced by other simultaneous uses in the system. That is, both vacuum and pressure can be reduced or lost at a particular station because of usage at other stations simultaneously. Also it is clear that if multiple stations could be supplied by the same pump, the cost per station necessarily becomes significantly lowered and the service and maintenance cost of a single pump is considerably less than using a pump at each use or station.

SUMMARY OF THE INVENTION

A system including a pump connected to a plurality of stations for use of vacuum, said pump also providing pressure in a system leading directly into the stations, the pipe conducting the pressure to the stations being connected to the intake side of the pump, each station having a pressure valve and a vacuum valve which can be opened with the corresponding vacuum or pressure valve closed, thus providing pressure or vacuum at each station without deterioration of the pressures and vacuums at the other stations.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a diagrammatic representation illustrating a single pump connected for use with respect to a plurality of different stations; and

FIG. 2 is an electrical diagram illustrating the controls therefor.

PREFERRED EMBODIMENT OF THE INVENTION

The pump is indicated at **10** and can take air in through a pipe **12** when the intake (solenoid controlled) valve is open. However this valve is closed except when the entire system calls for pressure, and extra air is required. The air comes in through an intake filter **16**.

The pump causes air under pressure to enter pipe **18** which may be referred to as a "header" having branches as shown in the example herein at **20, 22** and **24**. Each of these branches is provided with a by-pass (solenoid operated) pressure valve these being indicated by the reference numerals **26, 28, 30**. When any of these valves is open, air under pressure will enter the respective filters **32, 34, 36** from pipes **38, 40, 42**. Pipes **38, 40, 42**, etc., continue to additional (solenoid operated) vacuum valves indicated as at **44, 46**, and **48** and these lead into the intake header pipe generally indicated at **50** which leads back to the intake at **12**.

The muffler exhaust is controlled by the exhaust (solenoid operated) valve **52**. There is an adjustable pressure relief valve placed as shown at **54** and an adjustable vacuum relief valve corresponding thereto at **56**.

With any or all of valves **26, 28**, and **30** open and the corresponding valves **44, 46, 48** and exhaust valves **52** closed it is clear that the stations which are here indicated as at **S1, S2**, or **S3**, will operate under pressure when called upon to do so. However if any of the pressure valves is closed and the corresponding vacuum valve or valves are open, with intake solenoid **14** closed, then the same stations will operate under vacuum as indicated by the arrows in FIG. **1**. On the other hand, any particular station can be operated either way desired simply by the proper manipulation of the valves.

However if all of the stations are on pressure, atmospheric air enters the pump through the intake at **14** thereby providing additional volume to anticipate the need of the last station. Otherwise, air enters through the vacuum relief valve and/or through the remote station or stations.

It is clear that there may be as many stations as may be desired according to the capacity of the pump but in any event by placing the valves **26, 28**, and **30** and **44, 46**, and **48** at the proper locations at the various stations each station can provide for its own vacuum or pressure without affecting the operation of any of the other stations. The FIG. **2** wiring diagram is believed to be self-explanatory and it is to be understood that the various valves, etc., can be operated manually if this should be found to be desirable or by any other way, particularly with the electrical circuits shown in FIG. **2**.

I claim:

1. A multiple use vacuum and pressure system comprising a pump, a conduit leading therefrom, an exhaust in the conduit, a pipe connected to said conduit at one end, a pair of spaced valves in the pipe, a station for use of either pressure or vacuum connected with respect to said pipe and located between the valves, and

a second conduit connected to the intake for the pump and connected to the pipe at the opposite end thereof, said pump, pipe, and the two conduits forming a closed continuous system, and the pump providing pressure for one conduit, and vacuum for the other conduit.

2. The multiple use vacuum and pressure system of claim **1** including an extra intake valve to open the pump intake to atmospheric pressure.

3. The multiple use vacuum and pressure system of claim **1** including solenoid controls to operate the valves separately.

4. The multiple use vacuum and pressure system of claim **1** including a second pipe connected between the conduits, spaced valves in the second pipe, and second station for use of either pressure or vacuum connected to the second pipe between the two valves therein.

5. The multiple use vacuum and pressure system of claim **1** including a series of pipes connected between the conduits, a station for use in each pipe of the series, and a valve at each side of each station in each pipe.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,685,539 Dated Aug. 22, 1972

Inventor(s) William H. Warren

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Title: Multiple Station Combination Vacuum-Pressure System

The filing date should appear as Dec. 7, 1970

Signed and sealed this 19th day of March 1974.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

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