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DUAL PRESSURE ATTACHMENT FOR PUMPS

Filed Jan. 27, 1958

2 Sheets-Sheet 1

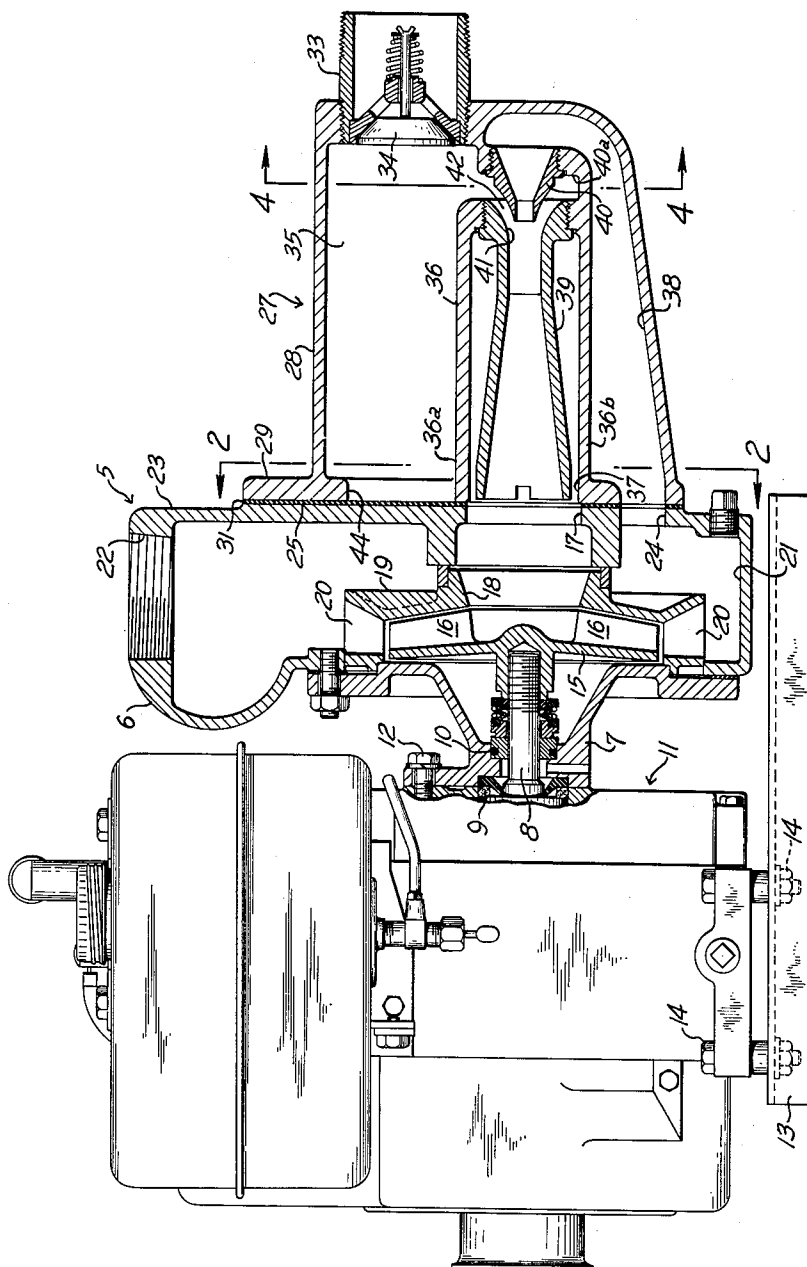


FIG. 1

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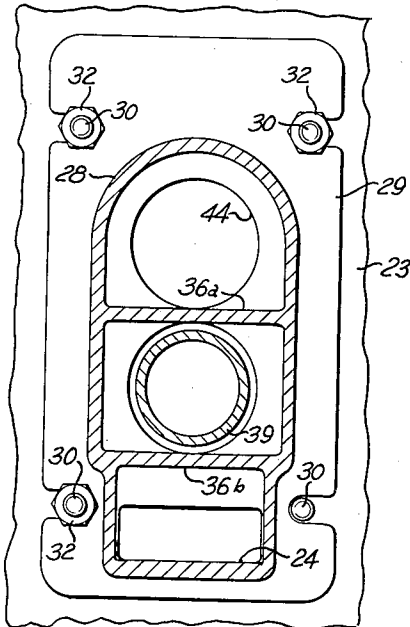


FIG. 2

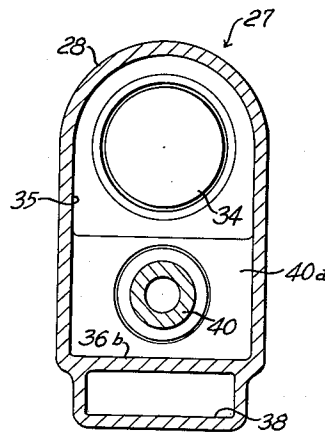


FIG. 4

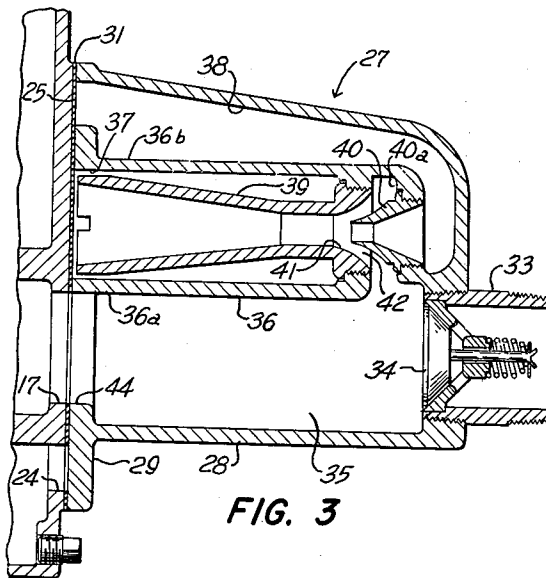


FIG. 3

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DUAL PRESSURE ATTACHMENT FOR PUMPS

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9 Claims. (Cl. 103-10)

This invention relates in general to pumps and, more particularly, to an attachment for a pump that can be readily converted so that the pump can produce different discharge pressures.

In certain prior art devices of this general type, in order to convert the pump to produce different discharge pressures, it was necessary to disassemble the pump and either remove or add certain parts. As a result a considerable amount of trouble and delay was necessary to effect the conversion.

The present invention provides a feed attachment for a pump through which the fluid supply is introduced and which attachment can be easily reversed to provide different feed characteristics to the pump.

More particularly, the invention contemplates a feed attachment for a pump which may be reversed from one position to another to provide either a jet feed to boost the output of the pump or a direct feed where the jet is by-passed and which results in normal operation of the pump.

The above attachment finds particular utility when used with a centrifugal type pump.

Generally, the invention provides an improved dual pressure pump.

Other objects and advantages will appear hereinafter as this disclosure progresses, reference being had to the accompanying drawings, in which:

FIGURE 1 is a side elevational view, partially in section, of the invention as applied to a centrifugal pump for jet feed operation.

FIG. 2 is a cross sectional view taken on line 2-2 of FIGURE 1;

FIG. 3 is a fragmentary side elevational view of the pump, showing the inlet attachment in the normal pump operating position; and

FIG. 4 is a cross sectional view taken on line 4-4 of FIGURE 1.

Referring in greater detail to the drawings, the pump 5 is of the centrifugal type and has a housing or casing 6 and an adapter 7 in which the drive shaft 8 is rotatably mounted. A shaft oil seal 9 is provided between the engine 11 and a shaft water seal 10 is provided between the housing 6 and shaft.

The shaft 8 is driven by a power source which is shown here as an internal-combustion engine 11. The housing 6 is rigidly secured to the engine 11 by bolt means 12 and the assembly is in turn mounted on a support frame 13 by bolt means 14.

The single suction pump shown for illustration includes the impeller 15 which is secured to shaft 8 for rotation thereby. The impeller has circumferentially spaced blades 16 which impart pressure and kinetic energy to the fluid pumped and direct it into the casing 6.

The pump suction inlet is defined by the circular opening 17 in the side wall of casing 6 and which is in alignment with opening 18 in the central portion of the diffuser member 19. The diffuser has the conventional guide vanes 20 through which the fluid passes into the discharge chamber 21 for ultimate discharge from the pump via discharge port 22.

The side wall 23 of the casing 6 has another opening 24 extending therethrough and a finished mounting surface 25 on its outer side.

A feed attachment 27 is located on the side of the

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pump through which fluid passes before entering the pump casing 6. This feed attachment is selectively positionable to provide different types of fluid feed into the pump, to thereby permit the pump to deliver different discharge pressures.

The feed attachment 27 comprises a feed casing 28 which has a flange 29 that together with the sealing gasket 31 abuts against and is secured to surface 25 by the four bolts 30 which may be permanently secured in the casing 6. Nuts 32 are tightened to rigidly secure the attachment to the pump and are removed when it is desired to reverse the attachment. In other words, the spacing of the bolts 30 is such as to permit the assembly of casing 28 to casing 6 in either of the positions shown in FIGURE 1 or 3. It will be noted that the flange 29 is relatively wide.

The feed casing 28 has a fluid inlet conduit 33 threadably engaged therein and containing an inlet valve 34 which admits supply fluid into the upper chamber 35 of the casing.

The feed casing includes an integrally formed inner portion 36 which divides the casing into the upper fluid intake chamber 35 and a lower pressure chamber 38. The portion 36 is formed by divider walls 36a and 36b and defines a jet feed outlet 37 adapted to be in registry with the pump suction inlet 17. The portion 36 has a venturi-shaped sleeve 39 threadably engaged therein. The discharge end of the sleeve 39 is adjacent to the jet feed outlet 37. Thus the sleeve 39 forms a passage between the intake chamber 35 and the pump inlet 17.

Portion 36 also supports a nozzle 40 which is threadably secured in connecting wall 40a and which extends into the combining section 41 of the venturi sleeve 39. Chamber 38 places the nozzle in fluid communication with the pump discharge chamber 21 via the opening 24. Supply fluid from chamber 35 enters the venturi sleeve via the space 42 between the nozzle and the sleeve.

When the feed casing 28 is in the position shown in FIGURE 1, the feed attachment functions as a jet feed for the pump as follows. The normal feed passage 44 is blocked by the pump and, therefore, is inoperative. The supply fluid from chamber 35 passes through annular space 42, sleeve 39 and is thrown by the impeller into the discharge chamber 21. A portion of the pressure fluid in chamber 21 then passes through port 24, into lower chamber 38 and through nozzle 40. This stream or jet of fluid pressure that is then directed through the venturi sleeve tends to drive or carry the contiguous particles of fluid, which enter from chamber 35, along with it. Thus, in this position, the jet feed serves to boost the output of the pump, providing a high pressure jet pump.

When the feed casing 28 is inverted from the position shown in FIGURE 1 and fastened to casing 6 as shown in FIG. 3, the normal feed opening 44 in the casing 28 is then in registry with inlet opening 17 of the pump housing. The jet feed passage including the venturi sleeve 39 and chamber 38 are then sealed or blocked by the surface 25 of the pump. The wide portion 29 of the flange blocks the port 24. When the attachment is in this position, supply fluid passes directly from conduit 33 and into the pump and normal operation thereof then takes place and the pump delivers fluid at a lower pressure.

In order to effect the change between normal feed and jet feed, it is only necessary to remove nuts 32 and rotate casing 28 to the desired position. There is no need to otherwise alter the structure or add or remove baffle plates or other parts. The changeover is easily and quickly accomplished and there are no parts to get out of adjustment to become lost.

Various modes of carrying out the invention are con-

templated as being within the scope of the following claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention.

I claim:

1. An attachment adapted to be secured to a fluid pump selectively in one of at least two positions, said attachment comprising, a pump feed casing having a fluid inlet chamber and a separate pressure chamber, a venturi sleeve in communication with said inlet chamber and through which supply fluid is adapted to pass into an inlet of said pump when said attachment is in one of said positions, and a jet nozzle between said pressure chamber and said sleeve and adapted to be in communication with a discharge side of said pump when said attachment is in said one position whereby pressure fluid passes through said pressure chamber and is directed into said sleeve by said nozzle for a jet feed effect, said casing having a normal feed outlet which is adapted to be blocked by said pump when said attachment is in said one position, and when said attachment is in the other of said positions said normal feed outlet is adapted to be in registry with said pump inlet and both the jet feed outlet and pressure chamber are adapted to be blocked by said pump whereby a normal feed thereto is provided.

2. An attachment adapted to be secured selectively in different positions to a fluid pump having a fluid inlet and a discharge outlet comprising, a feed casing having separate inlet and pressure chambers, a venturi sleeve in fluid receiving communication with said inlet chamber through which supply fluid may pass into the inlet of the pump when said attachment is in one position, a nozzle between said pressure chamber and said sleeve and in communication with the discharge outlet of said pump via said pressure chamber when said attachment is in said one position whereby pressure fluid passes through said pressure chamber and is directed into said sleeve for a jet feed effect, said casing also having a normal feed outlet from said inlet chamber and which is adapted to be blocked by said pump when said attachment is in said one position, and said normal feed outlet being adapted to be in registry with the inlet of said pump and said jet feed outlet and said pressure chamber being adapted to be blocked by said pump when said attachment is in the other of said positions to thereby provide a normal feed to said pump.

3. A reversible attachment adapted to be secured to a fluid pump selectively in one of at least two positions, said attachment comprising, a pump feed casing having a fluid inlet chamber and a separate pressure chamber, a jet feed outlet in said casing adapted to be in communication with an inlet side of said pump when said attachment is in one of said positions, a venturi sleeve between said inlet chamber and said jet feed outlet through which supply fluid may pass, a jet nozzle between said pressure chamber and said sleeve and adapted to be in communication with a discharge side of said pump when said attachment is in said one position whereby pressure fluid passes through said pressure chamber and is directed into said sleeve for a jet feed effect, said casing having a normal feed outlet which is adapted to be blocked by said pump when said attachment is in said one position, said normal feed outlet adapted to be in registry with the inlet side of said pump when said attachment is in the other of said positions at which time said jet feed and said pressure chamber are adapted to be blocked by said pump whereby a normal feed to said pump can be provided.

4. In combination with a fluid pump having a casing provided with a supply inlet and a discharge outlet, a feed attachment having a normal feed passage and also jet feed passage means extending therethrough, and said attachment being rotatably securable to said pump in either a jet feed position in which said jet feed passage means is in fluid delivering communication with

the inlet of said pump and said normal feed passage is blocked by the casing of said pump, or a normal feed position in which said normal feed passage is in fluid delivering communication with the inlet of said pump and said jet feed passage means is blocked by the casing of said pump.

5. In combination with a fluid pump having a casing provided with a supply inlet and also a port from its discharge side, a feed attachment having a normal feed passage and also jet feed passage means extending therethrough, said attachment securable to said pump in either a jet feed position in which said jet feed passage means is in registry with both said supply inlet and said port and in which said normal feed passage is blocked by the casing of said pump, or a normal feed position in which said normal feed passage is in registry with said supply inlet and in which said jet feed passage means and said port are blocked by said casing and said feed attachment, respectively.

6. A dual pressure centrifugal pump unit comprising in combination; a pump having a mounting surface with a fluid inlet and a fluid pressure port therethrough; a feed attachment securable to said surface selectively in a jet feed or normal feed position, said attachment having a fluid inlet chamber and a pressure chamber, a jet passageway in communication with said inlet chamber and positioned to discharge fluid into said pump inlet when said attachment is in said jet feed position, a jet nozzle between said pressure chamber and said passageway and in communication with said pump via said pressure port and said pressure chamber when said attachment is in said jet feed position whereby pressure fluid is directed by said nozzle into said passageway for a jet feed of fluid, said attachment also having a normal feed outlet which is blocked by said surface when said attachment is in said jet feed position; said normal feed outlet being in registry with said pump inlet when said attachment is in said normal feed position at which time said passageway and pressure chamber are blocked by said surface.

7. A dual pressure pump unit comprising in combination; a pump having a mounting surface with a fluid inlet and a fluid pressure port therethrough; a feed attachment detachably secured to said surface in either a jet feed or normal feed position, said attachment having a fluid inlet chamber and a pressure chamber, a venturi sleeve in communication with said inlet chamber and positioned to discharge fluid into said pump inlet when said attachment is in said jet feed position, a jet nozzle between said pressure chamber and said sleeve and in communication with said pump via said pressure port and said pressure chamber when said attachment is in said jet feed position whereby pressure fluid is directed by said nozzle into said sleeve for a jet feed of fluid, said attachment also having a normal feed outlet which is blocked by said surface when said attachment is in said jet feed position; said normal feed outlet being in registry with said pump inlet when said attachment is in said normal feed position at which time said sleeve and pressure chamber are blocked by said surface and said pressure port is blocked by said attachment.

8. As an article of manufacture, an attachment adapted to be secured to a fluid pump selectively in a normal feed or a jet feed position, said pump having a housing provided with a fluid supply inlet, jet feed passage and a fluid discharge outlet, said attachment comprising, a casing having a fluid inlet chamber and a separate pressure chamber, a venturi sleeve in said casing and disposed in fluid receiving communication with said inlet chamber and disposed in communication with a jet feed outlet in the casing and adapted to communicate with the supply inlet of the pump when the attachment is in the jet feed position to thereby discharge fluid to said supply inlet, said pressure chamber being disposed in communication with the jet feed passage of the pump when the attachment is in said

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jet feed position, a jet nozzle disposed between said pressure chamber and said venturi sleeve whereby fluid can pass from the jet feed passage of the pump through said pressure chamber and is directed into the venturi sleeve for a jet feed effect, and said casing also having a normal feed outlet communicating with the fluid inlet chamber and spaced from said venturi sleeve, said normal feed outlet adapted to be blocked by the pump housing when the attachment is in the jet feed position and said normal feed outlet being in registry with the supply inlet of said pump housing when the attachment is in the normal feed position at which time said jet feed outlet and said pressure chamber are adapted to be blocked by said pump

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housing whereby a normal feed to the pump is provided.
 9. The structure of claim 8 and including means connected to said casing for blocking the jet feed passage of the pump when the attachment is disposed in the normal feed position.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,987,002

June 6, 1961

James Schipper

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 3, line 66, after "feed" insert -- outlet --;
column 4, line 5, for "in" read -- is --.

Signed and sealed this 17th day of October 1961.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

DAVID L. LADD

Commissioner of Patents

USCOMM-C