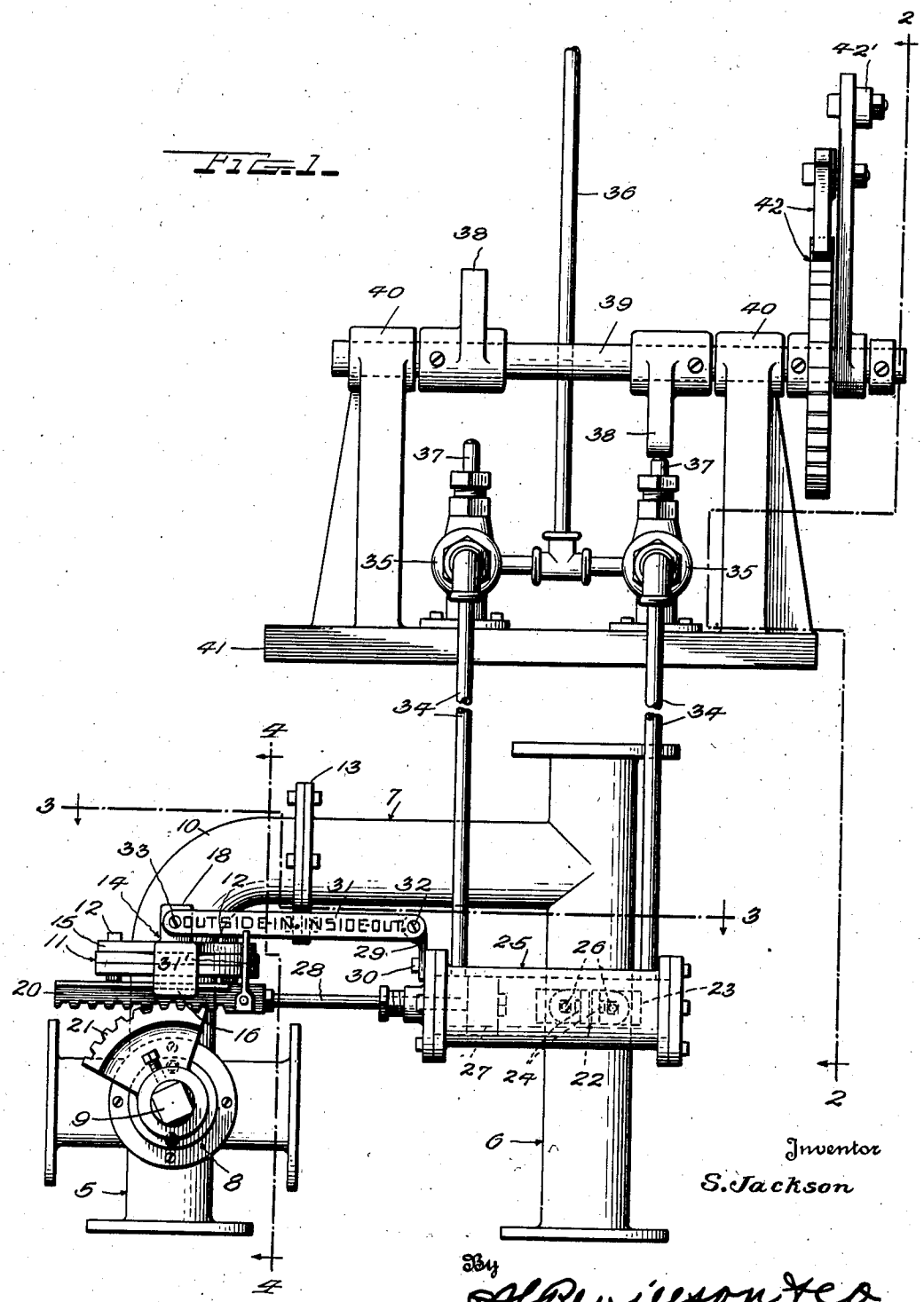
June 6, 1944. S. JACKSON 2,350,763

VALVE-ACTUATING MEANS

Filed March 11, 1943 3 Sheets-Sheet 1

FIG. 1



Inventor
S. Jackson

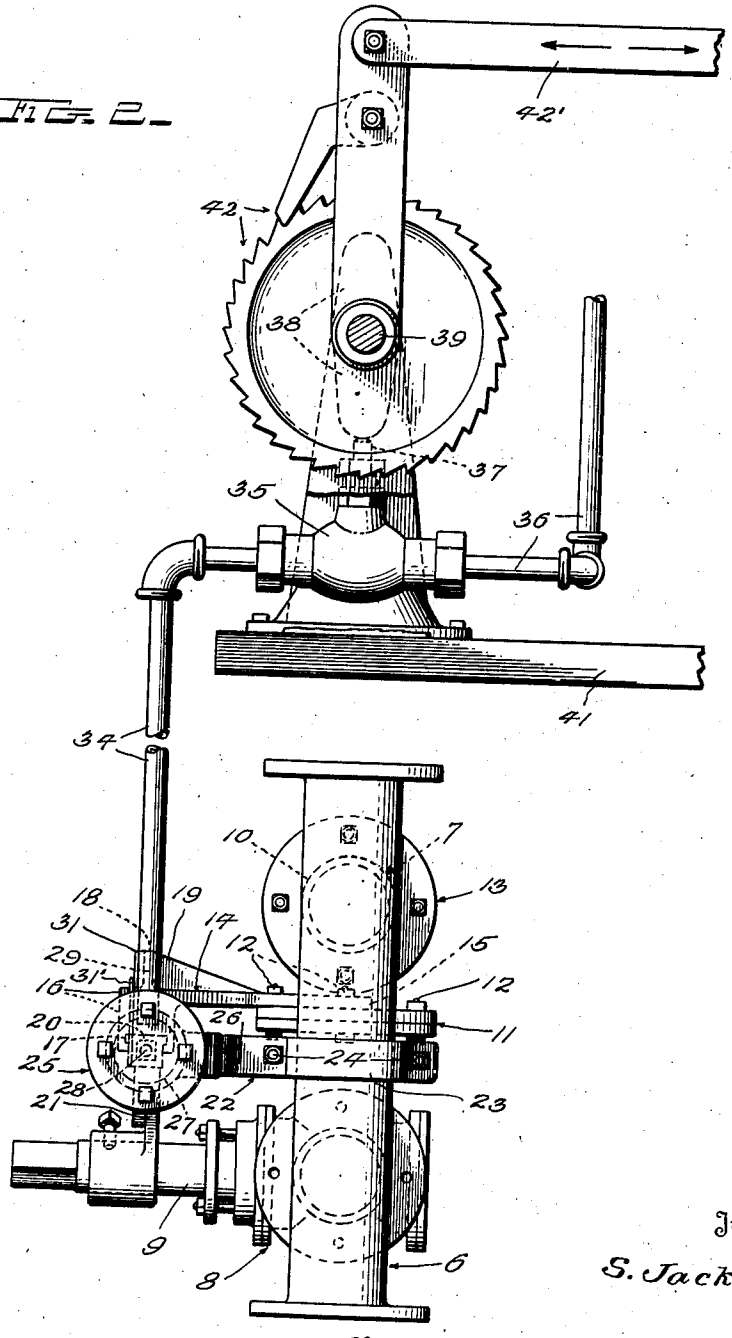
By
A. B. Wilson & Co.
Attorney

June 6, 1944. S. JACKSON 2,350,763

VALVE-ACTUATING MEANS

Filed March 11, 1943 3 Sheets-Sheet 2

FIG. 2.



Inventor

S. Jackson

By

Attorney

June 6, 1944. S. JACKSON 2,350,763

VALVE-ACTUATING MEANS

Filed March 11, 1943 3 Sheets-Sheet 3

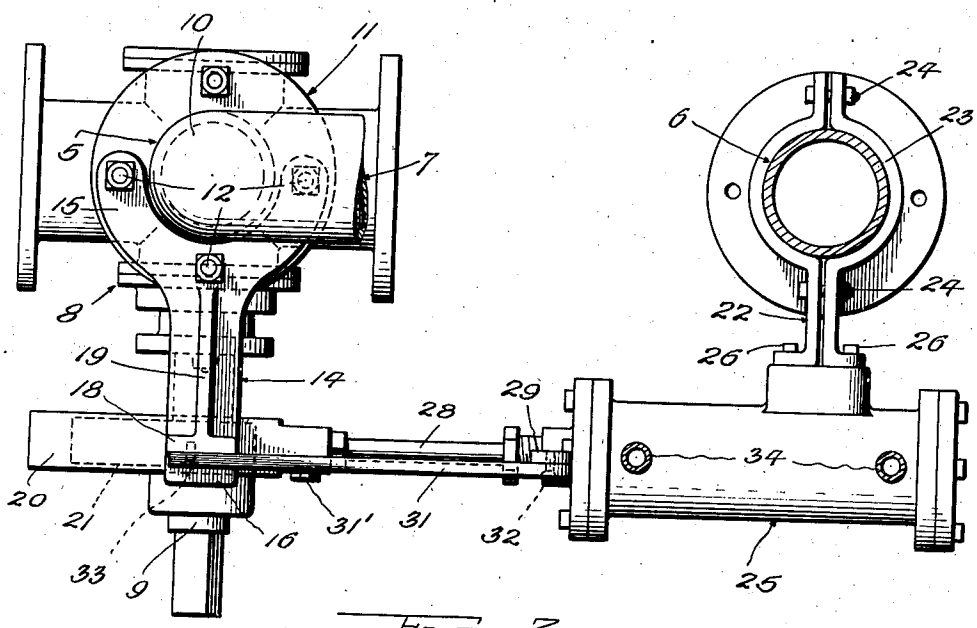
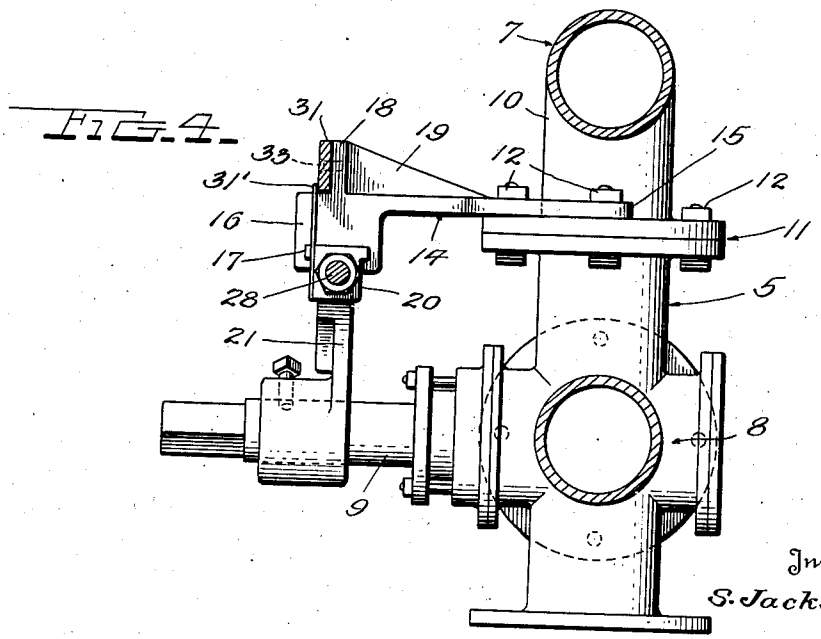


FIG. 3

FIG. 4



Inventor
S. Jackson

By
A. B. Wilson & Co.
Attorney

Patented June 6, 1944 2,350,763

UNITED STATES PATENT OFFICE

2,350,763

VALVE-ACTUATING MEANS

Stonewall Jackson, Columbus, Ga., assignor to Morton Machine Works, Columbus, Ga., a corporation of Georgia

Application March 11, 1943, Serial No. 478,801

4 Claims. (Cl. 137—78)

The invention relates to valve actuation and is designed primarily for the operation of the flow-reversing valve of a dye vat or the like, to alternately direct the dye liquor from the outside in, and from the inside out, and the principal object is to provide a rather simple, yet reliable mechanism for automatically attaining this end. In this connection, a further aim is to make novel provision for showing at a glance in which direction the dye liquor is flowing

The actuating mechanism for the reversing valve is operated by a pressure fluid (preferably compressed air) acting against a piston in a cylinder, and another object is to provide for easily mounting said actuating mechanism and for holding it rigidly in place.

The above mentioned pressure fluid must be directed first to one end of the pressure cylinder and then to the other, and a still further aim is to make novel provision for accomplishing this end.

With the foregoing in view, the invention resides in the novel subject matter hereinafter described and claimed, description being accomplished by reference to the accompanying drawings.

Figure 1 is a front elevation showing the invention.

Figs. 2, 3 and 4 are sectional views as indicated by the lines 2—2, 3—3 and 4—4 of Fig. 1.

A preferred construction has been illustrated and will be rather specifically described, with the understanding, however, that within the scope of the invention as claimed, variations may be made. Moreover, while the invention is intended primarily for use in connection with dyeing equipment, it is to be understood that it is not restricted to this particular field of use.

Liquid-conducting means is shown including two laterally spaced parallel reaches 5 and 6 rigidly connected by a branch 7. The reach 5 includes a valve body 8 in which there is an oscillatory valve member 9, this reference character 9 being applied to the operating or shaft portion of the valve member as it is the only portion shown in the drawings. One end of the branch 7 is, in the present disclosure, formed by an elbow 10 secured by a flanged coupling 11 to the upper end of the valve body 8, the bolts which secure the flanges of this coupling together, being shown at 12 for further reference. The reach 6 and the branch 7 are preferably formed from a T coupled at 13 to the elbow 10. Thus, the fluid-conducting means formed by the elements 6, 7, 13, 10, 11, 12 and 8, is of inherently rigid nature.

A rigid bracket 14 is secured to the reach 5 and projects forwardly therefrom, said bracket being in the present disclosure provided with a forked inner end 15 which straddles the lower end of the elbow 10 and is secured to the flanged coupling 11 by a number of its bolts 12. The outer end of this bracket 14 has an integral head 16 projecting downwardly therefrom, the lower side of said head being formed with a horizontal T-slot 17. Immediately above the head 16, a lug 18 projects upwardly from the bracket 14, and a reinforcing web 19 may well be integral with said lug and bracket as shown.

A horizontal rack 20 of T-shape in transverse section is slidably mounted in the T-slot 17, said rack being in mesh with a gear segment 21 secured to the oscillatory valve member 9 so that by sliding said rack 20, the valve member 9 will be turned to one position or the other, to alternately reverse the flow of the dye liquor.

A second bracket 22 of rigid construction, is rigidly secured to the reach 6 of the liquid-conducting means, said bracket and reach being preferably secured together by providing the former with a clamp 23 surrounding said reach, said clamp including clamping bolt 24. The outer or forward end of the bracket 22 rigidly supports a pressure cylinder 25 which is secured thereto by cap screws or the like 26. Cylinder 25 contains a piston 27, the piston rod 28 of which is secured to the rack 20 above described, the rack being thus operable by means of the piston.

A small bracket 29 is shown secured to one end of the cylinder 25 by one of the cylinder head bolts 30. A horizontal tie bar 31 is secured to this bracket 29 by a screw or the like 32, and the opposite end of said tie bar is similarly secured at 33 to the lug 18 of the bracket 14. The outer side of this tie bar 31 preferably carries the words "Outside-In" and "Inside-Out," cooperable with a pointer 31' secured to the rack to indicate at any time the direction in which the dye liquor is flowing.

It will be observed that the bracket 14 is so anchored to the flanged coupling 11 that there is no danger whatever of said bracket swinging to any extent about the axis of the liquid-conducting reach 5. The bracket 22 carrying the cylinder 25, however, is simply clamped around the reach 6 and might, therefore, have a tendency to creep about the axis of said reach 6. By tying the cylinder 25 to the bracket 14 by means of

the tie bar 31, however, any such tendency is effectively overcome.

Two pressure lines 34 are connected with the opposite ends of the cylinder 25, and two valves 35 are connected with these lines for directing the pressure fluid from a supply line 36 into either end of said cylinder for the purpose of moving the piston 27 first in one direction and later in the other. Each valve 35 includes a depressible operating plunger 37, the two plungers being normally raised. Let it be assumed that when both plungers are in raised position, they open both ends of the cylinder 25 to the atmosphere, and that when either plunger is depressed, it cuts off communication between one end of the cylinder and the atmosphere and simultaneously directs the pressure fluid into said end. Thus, the piston will be driven toward the other end of the cylinder and this end will, at the same time, exhaust to the atmosphere.

I provide two cams 38 for depressing first one and then the other of the plungers 37, said cams being secured to a cam shaft 39 mounted in appropriate bearings 40. These bearings are secured upon a base 41 located wherever desirable, and the two valves 35 are also secured to said base. A suitable ratchet mechanism 42 is operatively connected with the cam shaft 39 for turning it in a step-by-step manner, and said ratchet mechanism may be driven by means of an electric motor, for instance, mounted on the base 41. The motor may well drive a crank or the like (not shown) and motion may be transmitted to the ratchet mechanism 42 from said crank or the like, by means of a link 42'.

With respect to operation, the ratchet mechanism 42 slowly turns the cam shaft 39 and when one of the cams 38 depresses the subjacent plunger 37, the pressure fluid is admitted into one end of the cylinder 25 to force the piston 27 in one direction. This causes the rack 20 and segment 21 to turn the valve member 9 to one position to direct the dye liquor in one direction, for example, from the outside in. The valve member and associated parts remain in this position until the other cam 38 depresses the plunger 37 with which it is cooperable, whereupon the positions of parts are reversed with the result that the flow of dye liquor is reversed. These operations continue automatically as long as the mechanism is in operation.

From the foregoing, taken in connection with the accompanying drawings, it will be seen that novel and advantageous provision has been made for carrying out the objects of the invention, and while preferred features have been illustrated and described, attention is again invited to the possibility of making variations within the scope of the invention as claimed.

It will be understood that the valve-actuating mechanism may be used for operating or controlling a plurality of die vats or other machines since in order to do that it is only necessary to use larger valves and feed lines.

I claim:

1. A hand mechanism of the class described comprising fluid-conducting means including two laterally spaced unidirectional reaches and a branch rigidly connecting said reaches, one of said reaches having an oscillatory valve member at right angles to said branch, one bracket secured to said one of said reaches, a second bracket secured to the other of said reaches, said brackets projecting from said reaches in a direction at right angles to said branch, a cylinder mounted on the outer end of said second bracket and containing a piston, the outer end of said one bracket being provided with a guide substantially in alinement with said cylinder, a reciprocatory member slidably engaged at one end with said guide and connected at its other end with said piston, means operatively connecting said reciprocatory member with said valve member, and actuating-fluid-control means for said cylinder.

2. A structure as specified in claim 1; together with a rigid tie parallel with said reciprocatory member and secured at its ends to said outer end of said one bracket and said cylinder respectively, said tie and reciprocating member being adapted to carry indicating means for showing the position of said valve member.

3. A mechanism of the class described comprising fluid-conducting means including two laterally spaced unidirectional reaches and a branch rigidly connecting said reaches, one of said reaches having an oscillatory valve member at right angles to said branch, said one of said reaches including a flanged coupling and bolts securing the flanges thereof together, one rigid bracket secured to said flanged coupling by means of said bolts, a second rigid bracket having an attaching clamp surrounding the other of said reaches, both of said brackets projecting from said reaches in a direction at right angles to said branch, a cylinder secured to the outer end of said second bracket and containing a piston, the outer end of said one bracket being provided with a guide substantially in alinement with said cylinder, a reciprocatory member slidably engaged at one end with said guide and connected at its other end with said piston, means operatively connecting said reciprocatory member with said valve member, and actuating-fluid-control means for said cylinder.

4. A structure as specified in claim 3; together with a rigid tie parallel with said reciprocatory member and secured at its ends to said outer end of said one bracket and said cylinder respectively, said tie and reciprocatory member carrying coacting indicating means for showing the position of said valve member.

STONEWALL JACKSON.