Jan 6, 1931. C. A. CAMPBELL 1,787,509

TEST RACK

Filed July 17, 1928

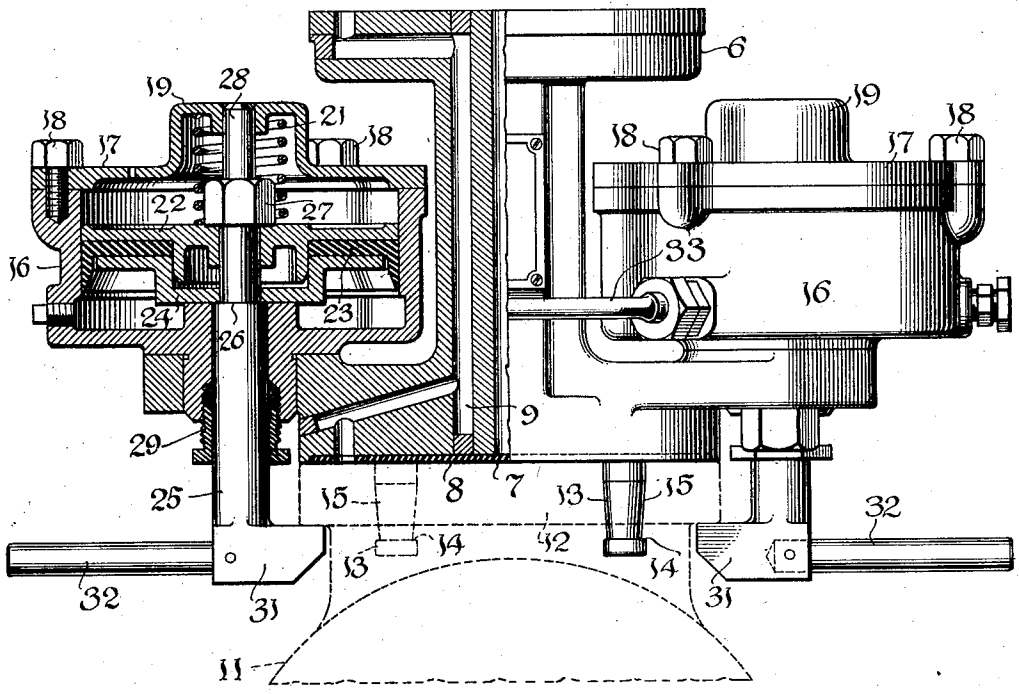


Fig. 1

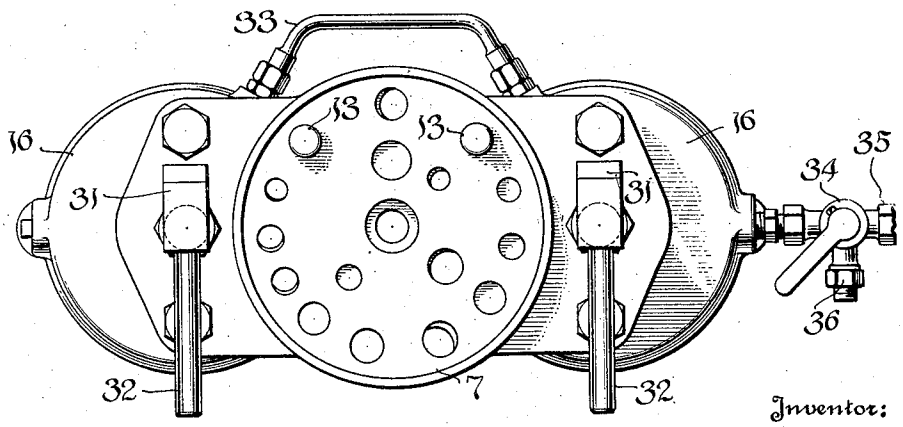


Fig. 2

Inventor:
Charles A. Campbell,
By Dodget Sons,
Attorneys

Patented Jan. 6, 1931 1,787,509

UNITED STATES PATENT OFFICE

CHARLES A. CAMPBELL, OF WATERTOWN, NEW YORK, ASSIGNOR TO THE NEW YORK AIR BRAKE COMPANY, A CORPORATION OF NEW JERSEY

TEST RACK

Application filed July 17, 1928. Serial No. 293,408.

This invention relates to test racks, and particularly to test racks for pneumatic devices, such as the triple valves used in air brake systems. Such test racks have a ported face against which the ported face of the triple valve is temporarily clamped, while the valve is subjected to various determined pressures for the purposes of ascertaining whether the valve functions correctly or not.

It has heretofore been proposed to exert the clamping pressure by means of a fluid pressure motor, but such prior devices used a single motor, did not always give equalized clamping pressure, and obstructed the clamping face in considerable degree so that with modern valves of large size which must be lifted by hoists, it is inconvenient, if not impossible, to mount the valves on the test rack rapidly.

According to the present invention a plurality of pressure motors are used in which the motive pressures are equalized as between the various motors. This insures equalized clamping pressure. The mechanism which engages the flange of the valve is so designed as to leave the clamping face of the rack absolutely free. Moreover, means are provided to engage the bolt holes in the flange and temporarily support the valve before and during the engagement of the clamping lugs.

The preferred embodiment of the invention is illustrated in the accompanying drawings, in which,—

Fig. 1 is a plan view, half in section, and showing a portion of a test rack with the present invention applied.

Fig. 2 is an elevation of the same on a slightly reduced scale.

In the drawings 6 represents a portion of the head of the test rack which has a recessed ported face 7. The recess in the face 7 is to receive a sealing gasket 8. The ports in the head 6 are indicated generally by the numeral 9, and there are, of course, like apertures in the gasket 8.

The body of the valve to be tested is indicated in dotted lines at 11, and has a bolting flange 12, of ordinary form, provided with bolt holes by means of which the valve is normally supported. When the valve is first placed in position on the test rack it is merely hung on two studs 13, which pass through two of the bolt holes in the flange 12. The studs are shouldered at 14 and to the rear of 14 are tapered, as shown at 15. The taper 15 terminates short of the ported face 7 as shown so that the studs adjacent face 7 approximately fill the holes in the flange 12 and thus accurately position the flange 12 relatively to the ported face 7. The purpose of the shoulder 14 is to keep the flange 12 from slipping off the studs 13. In effect each stud has a head which is small enough to pass through the bolt hole in the flange 12 and yet which will engage that flange and prevent the valve from slipping off the studs so long as it is supported solely by the studs.

This arrangement is very convenient when handling a heavy valve by means of a hoist. The valve is slung in a chain loop and lifted until the bolt holes can be slipped over the studs, after which the hoist is slacked away. The valve cants downward slightly by its own weight and the shoulders 14 retain it loosely in position. While so supported the pneumatic clamping means are engaged and actuated.

The pneumatic clamping means comprise a plurality of cylinders 16, two being illustrated because this number is ordinarily sufficient, but any desired number might be used. As the cylinders are the same a description of one will suffice.

Each cylinder 16 has a removable head 17 held by machine screws 18, and formed with a central projection or boss 19 which serves as a seat for the spring 21. The spring 21 acts against the piston 22 which works in the cylinder. The piston is made fluid tight in the cylinder by means of a cup leather 23 which is held in place by a follower 24. The piston 22 and follower 24 are mounted on the piston rod 25 and are clamped between a shoulder 26 on that rod and a nut 27 threaded on the rod.

The rod 25 has a reduced extension 28 which slides in the guideway formed in the boss 19 and serves as a tail-rod. The rod 25

passes through a stuffing box 29, of ordinary form, and carries at its end a laterally projecting lug 31 which is the lug that engages the flange 12 to clamp this in position.

The handle 32 is provided and is the means by which the rod 25 and piston 22 may be bodily swiveled to carry the lug 31 into and out of engagement with the flange 12.

33 is a pressure equalizing connection between the spaces within the cylinders 16 on the pressure side of the piston. 34 is an ordinary three-way valve which alternately connects one of the last named cylinder spaces with the pressure fluid supply indicated at 35 and an atmospheric exhaust indicated at 36. Because of the equalizing connection it is necessary to have only a single supply and exhaust connection to operate all the cylinders in unison and at equalized pressures.

The parts are shown in clamping position in Fig. 1. The valve which is clamped is indicated in dotted lines. The proceduce of mounting the valve for tests is as follows:

After the valve has been mounted on the studs 13, as already described, the handles 32 are turned to bring the lugs 31 into engagement with the flange 12. At this time the valve 34 is set to exhaust the cylinders to atmosphere. After the lugs 31 have been turned into engagement with the flange 12, the valve 34 is shifted to admit pressure fluid so that the piston rods 25 with their lugs 31 are drawn inwardly, pressing the cylinder 12 tightly against the gasket 8. This clamping pressure is maintained while the valve is subjected to test. Upon the completion of the test valve 34 is shifted to exhaust the cylinders. The handles 32 are turned to carry the lugs 31 clear of the flange 12 and the valve is removed from the test rack. Because of the equalized pressure in the different cylinders the pressure on the flange 12 will be uniform regardless of any irregularity in the thickness of the flange. The clamping lugs 31 swing to the side and leave the sealing face of the test rack entirely clear, a feature which facilitates the positioning of heavy valves.

While the drawings illustrate an embodiment of the invention which in practice has demonstrated highly satisfactory characteristics, the invention is capable of embodiment in slightly different forms, and the one shown is intended to be illustrative rather than limiting.

What is claimed is,—

1. The combination with a test rack having a ported sealing face against which a device to be tested is temporarily clamped, of a plurality of cylinders; pistons with rods therein; lugs carried by the rods shiftable by angular displacement about the axes of the rods alternately to engage and free the device to be tested; and means for admitting and exhausting pressure fluid to or from said cylinders.

2. The combination with a test rack having a ported face against which a device to be tested is temporarily clamped, of a plurality of cylinders; pistons in said cylinders; rods fixed to the pistons and each having a lateral extension capable of being brought into and out of engaging relation with the device to be tested by swiveling the pistons; and means for admitting and exhausting pressure fluid to or from said cylinders.

3. The combination with a test rack having a ported sealing face against which a device to be tested is temporarily clamped, of a plurality of similar pressure motors of the expansible chamber type mounted adjacent the periphery of said sealing face, in substantially diametrically opposed positions; means for causing said motors to engage said device; and means for admitting equalized pressure to said motors and for exhausting said motors.

4. The combination with a test rack having a ported sealing face against which a device having an apertured flange is temporarily clamped; of a stud on said face positioned to register with an aperture in said flange and having a head which will pass through said aperture, and a reduced shank; and means serving to engage said flange and draw the device against said ported face.

5. The combination with a test rack having a ported sealing face against which a device having an apertured flange is temporarily clamped; of a plurality of studs on said face positioned to engage with apertures in said flange, each having a head which will pass through the corresponding aperture, and a reduced shank on which said head forms an abrupt shoulder; and means serving to engage said flange and draw the device against said ported face.

6. The combination with a test rack having a ported sealing face against which a device having a flange with bolt holes is temporarily clamped; of at least one stud projecting from said face, said stud having a head and a portion adjacent the sealing face both of which will pass through one of said bolt holes, and an intervening tapered portion which terminates in a shoulder at said head; and power operated means adapted to engage said flange while supported by said stud and draw the flange against said sealing face.

7. The combination with a test rack having a ported sealing face against which a device having an apertured flange is temporarily clamped; of a stud on said face positioned to register with an aperture in said flange and having a head which will pass through said aperture, and a reduced shank; at least two cylinders; pistons with rods therein; lugs carried by the rods and

shiftable by angular displacement about the longitudinal axes of the rods to engage and free said flange; and means for admitting and exhausting pressure fluid to and from said cylinders.

In testimony whereof I have signed my name to this specification.

CHARLES A. CAMPBELL.