

Dec. 16, 1930.

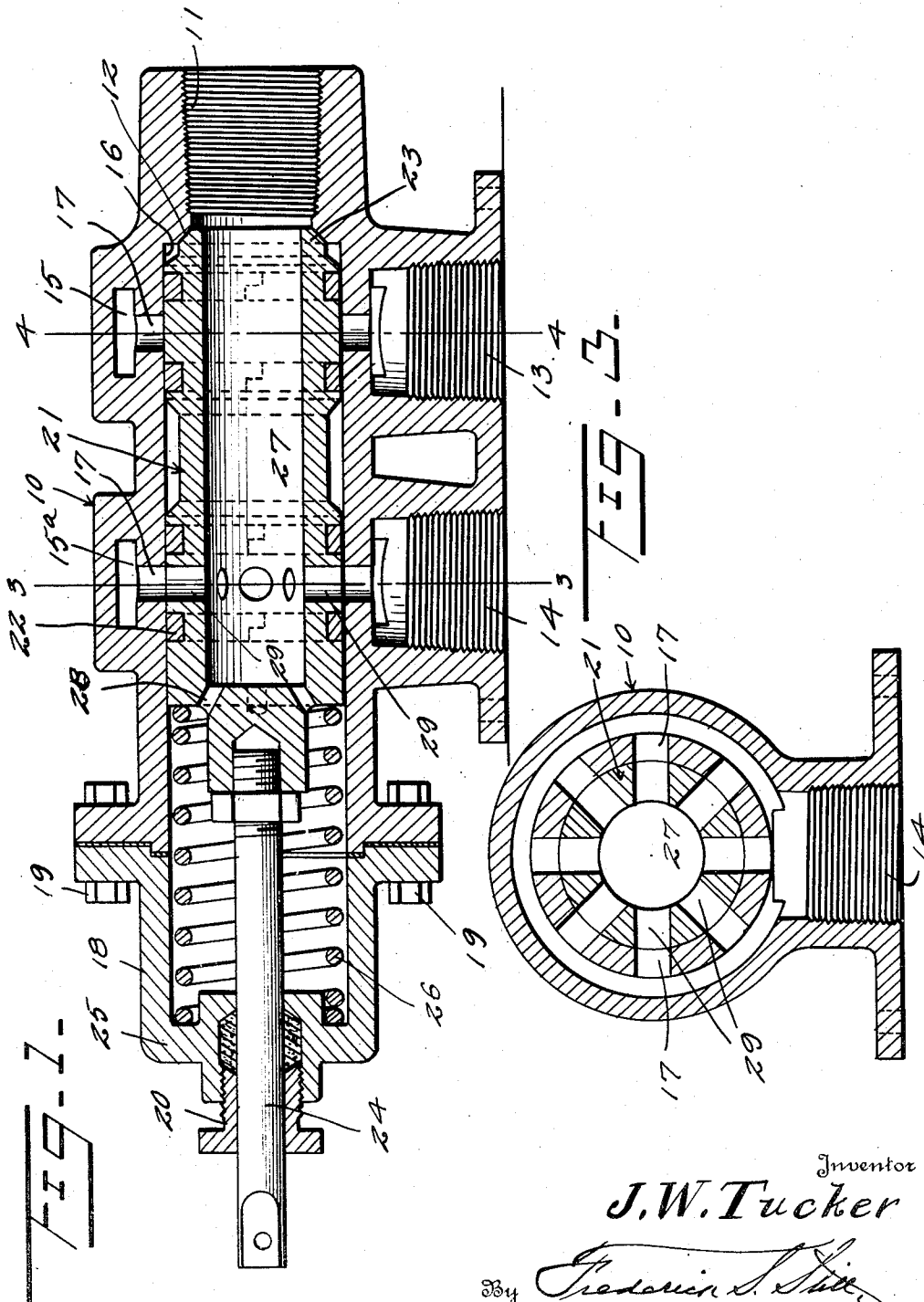
J. W. TUCKER

1,785,289

BALANCED VALVE

Filed April 24, 1923

2 Sheets-Sheet 1



UNITED STATES PATENT OFFICE

JOHN WILSON TUKER, OF BEAUMONT, TEXAS

BALANCED VALVE

Application filed April 24, 1928. Serial No. 272,495.

This invention relates to balanced valves and more particularly to a valve structure for controlling rams, presses and the like where intake and exhaust of the pressure fluid to and from the operating cylinder take place through the same opening.

An important object of the invention is to provide in a device of this character a structure such that the pressure to which the valve is subjected and which opposes movement of the valve may be balanced, whether this pressure be of intake or exhaust fluid.

A further object of the invention is to provide a device of this character which may be comparatively cheaply manufactured and which will, at the same time, be durable and efficient in service.

These and other objects I attain by the construction shown in the accompanying drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention and wherein:—

Figure 1 is a longitudinal sectional view through a valve constructed in accordance with my invention, the valve element being shown in the position which it occupies in exhausting fluids;

Figure 2 is a similar view with the valve in the position which it occupies during the intake, the valve element being shown in elevation;

Figure 3 is a section on the line 3—3 of Figure 1;

Figure 4 is a section on the line 4—4 of Figure 1.

Referring now more particularly to the drawings, the numeral 10 generally designates a valve barrel having at one end thereof an axial port 11, the inner end of which is formed as a valve seat 12. In the side wall, the barrel is formed with radial intake and exhaust ports 13 and 14, which communicate with annular passages 15 and 15a respectively formed in the wall of the barrel. These annular passages in turn communicate with the bore 16 of the barrel through radially directed ports 17. At its head end, the barrel is provided with a bonnet 18 which is removably secured thereto, as at 19, and is provided with an axial packing gland 20. Slid-

able in the bore of the barrel is a piston valve, generally designated at 21, which is provided with circumferentially extending packing elements 22 arranged in spaced pairs. These pairs are so spaced from one another that in the closed or exhaust position of the valve, they lay at opposite sides of the circumferential rows of radial ports 17, placing the annular passages 15a in communication with the bore of the barrel.

The inner end of the valve is formed with a seat 23 which, with the valve in this position, engages the valve seat 12 and seals thereagainst. The outer end of the barrel has a stem 24 attached thereto which extends through the packing gland 20 for engagement with an operating element (not herein shown). Between the inner end of this valve and the head 25 of the bonnet, a spring 26 extends, which constantly urges the valve to the exhaust position.

The body of the valve is provided with an axial bore 27 opening through the inner end thereof and at its outer end communicating with the space between the bonnet and the valve through ports 28. The side wall of the valve is provided with ports 29 which, when the valve 23 is engaged with the seat 12, align with the ports 17 of the exhaust channel 15a.

It will be obvious that when the valve is withdrawn against the spring 26, to place the ports 17 of the channel 15 in communication with the port 11 and thus place the ports 13 and 14 in communication, fluid pressure entering through the port 13 will pass to the port 11. It will also pass through the bore 27 of the valve and ports 28 to the bonnet 18, so that pressure against opposite ends of the valve is equalized and upon release of the stem 24, the spring 26 will close the valve 23 against the seat 12, cutting off the intake of fluid and placing the ports 11 and 14 in communication through ports 29 of the valve and the ports 17 of the channel 15a of the valve body. At the same time, fluid pressure produced in the bonnet is relieved through the ports 28, so that the pressure in this chamber reduces to the exhaust pressure and the equalization of pressures upon the valve

maintained. Such a valve may be very readily produced and being extremely simple in its construction is not likely to get out of order.

5 Since the construction hereinbefore set forth is capable of a certain range of change and modification without materially departing from the spirit of the invention, I do not limit myself to such specific structure except
10 as hereinafter claimed.

I claim:—

In a valve, a barrel provided at one end with an axial port and provided between its ends with longitudinally spaced intake and
15 exhaust ports, the barrel being provided with annular passages communicating with the intake and exhaust ports and with annular series of radial ports communicating therewith and with said axial port, a bonnet
20 secured to the other end of the barrel, an annular valve seat within the barrel about the axial port, a piston slidable within the barrel for adjustment into closed or opened position and provided with a longitudinal bore opening
25 out through its inner and outer ends and in constant communication with the bonnet and axial port, the piston extending across one of the annular series of radial ports when in closed position and having its inner end
30 arranged between the series of these ports when in opened position, the piston being provided with radial ports communicating with the bore and communicating with one of the series of radial ports when the piston
35 is in closed position, and an annular seat on the inner end of the piston contacting with said first seat when the piston is in closed position.

40 In testimony whereof I affix my signature.
JOHN WILSON TUKER.

45

50

55

60

65