Feb. 27, 1934. W. S. BRUBAKER 1,949,006

METER ADJUSTING MEANS

Filed June 22, 1932 2 Sheets-Sheet 1

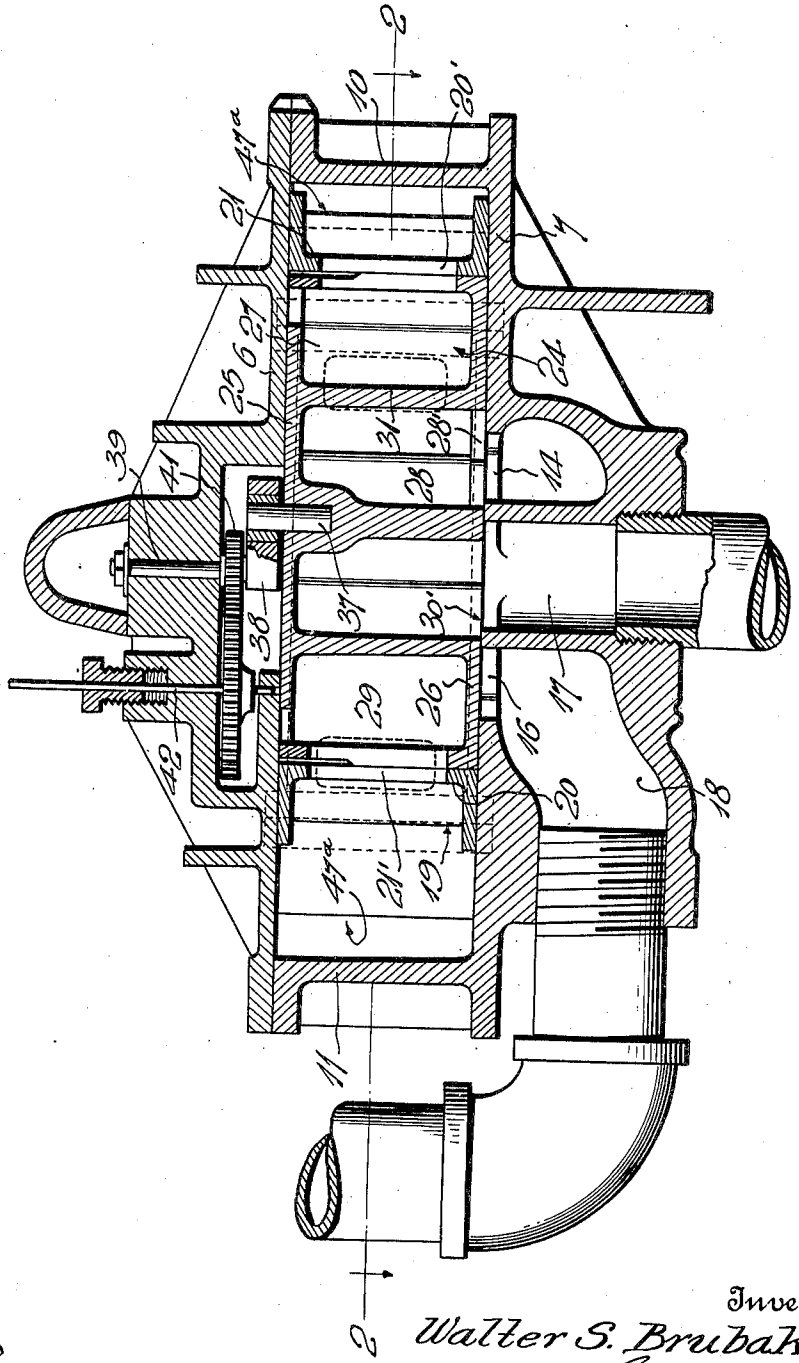


Fig. 1.

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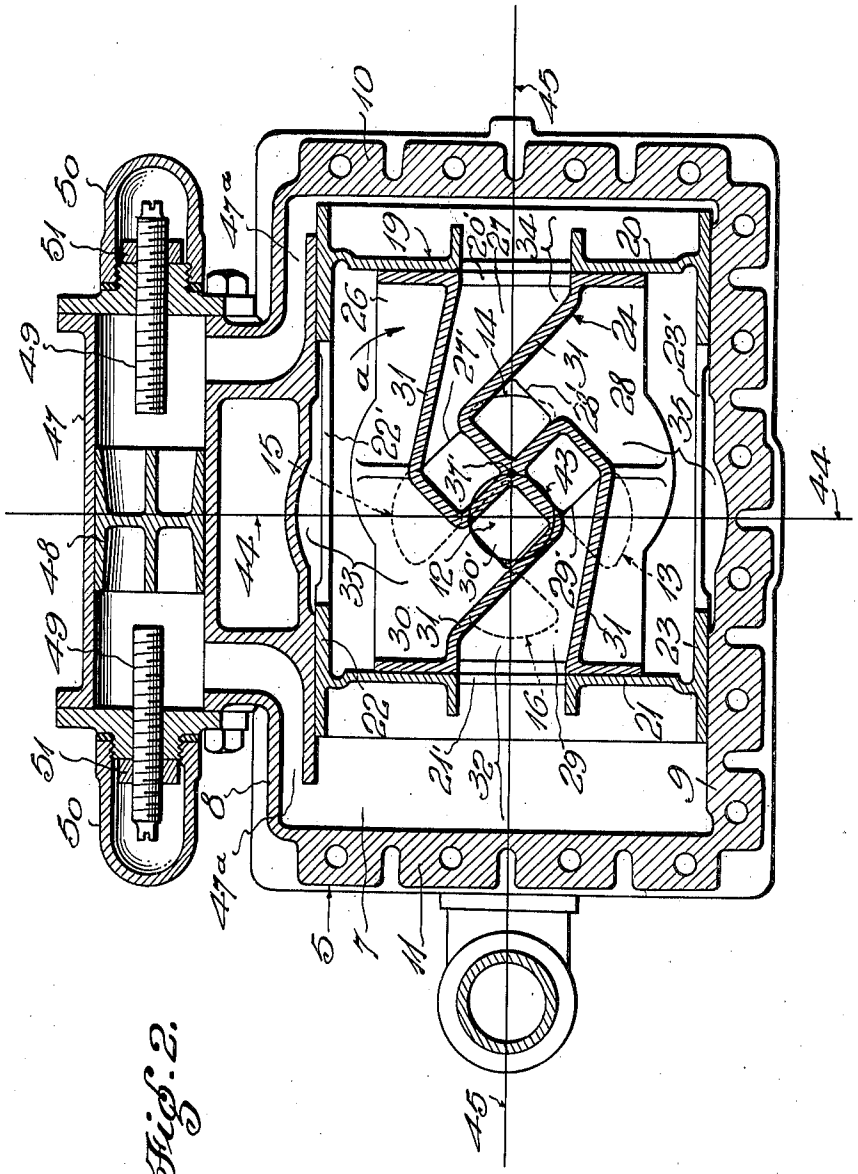


Fig. 2.

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METER ADJUSTING MEANS

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4 Claims. (Cl. 73—30)

The invention relates to fluid meters of the type embodying expansible and contractible measuring chambers. Such meters are commonly provided with registers to show the fluid output, and it is necessary to make provision for adjusting the meter to so vary its displacement as to obtain agreement between register reading and fluid delivered. My invention aims to provide new and improved means for this purpose.

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.

Fig. 1 is a central vertical longitudinal section through a meter improved in accordance with the present invention.

Fig. 2 is a horizontal sectional view on line 2—2 of Fig. 1.

The meter structure shown is of the same general type as that shown in U. S. patents to Granberg, 1,460,715 of July 3, 1923, Reissue 15,476 of October 24, 1922, and 1,479,961 of January 8, 1924, but to accomplish the new result, variations are made which will be fully described. One general description will first be employed, and from this general description, reference to the improvements, will be purposely omitted, but this deficiency will later be satisfied by explaining the variations over the old structure to accomplish the required result.

The meter casing 5 embodies parallel top and bottom side walls 6 and 7, substantially parallel edge walls 8 and 9 and end walls 10 and 11. Formed through the bottom wall 7 are a central admission port 12 and four discharge ports 13, 14, 15 and 16 spaced equidistantly around said admission port 12. The port 12 communicates with a passage 17 for connection with a pipe line or the like leading from an elevated tank or from a pump connected with storage. The ports 13, 14, 15 and 16 all communicate with an exhaust manifold 18 for connection with piping or the like extending to any required delivery point.

Disposed within the casing 5 in sliding contact with the casing walls 6, 7, 8 and 9, is a reciprocatory valve-guiding frame or piston member 19, itself having parallel ends 20 and 21, and parallel sides 22 and 23, said ends and sides having ports 20', 21', 22' and 23', respectively. Within the frame 19 is a gyratory valve or piston member 24 having top and bottom side plates 25 and 26 between which are compartments 27, 28, 29 and 30 separated by webs 31. These compartments are provided with combined admission and discharge ports 27', 28', 29' and 30', respectively, all formed through the valve bottom 26 and said compartments co-act with the edge and end walls 8, 9, 10 and 11 of the casing 5 in forming fluid measuring chambers 32, 33, 34 and 35 which alternately expand and contract as the valve member 24 gyrates. As these chambers 32, 33, 34 and 35 expand, they receive the fluid to be measured from the admission passage 17, said fluid entering through the admission port 12 and the ports 27', 28', 29' and 30' and serving to drive the meter. As the chambers 32, 33, 34 and 35 contract, they expel the fluid through the aforesaid ports 27', 28', 29' and 30', and the discharge ports 13, 14, 15 and 16 respectively, to the manifold 18.

The valve member 24 always travels on a truly circular path, being confined to said path by part of the means which establishes a driving connection between said valve member and the conventional register (not shown). In the present showing (see Fig. 1), a crank pin or stud 37 on member 24 engages a crank 38, said crank 38 being secured to the lower end of a shaft 39 which carries the main driving gear 41 for the register shaft 42. The path of the crank pin 37 and hence the path of the center of valve member 24, is shown by the circular line 43 on Fig. 2, the direction of travel being indicated by arrow *a*. On this same view, I have placed the lines 44 and 45 for ease in explaining the intake and discharge "strokes" of the meter. These lines are at 90° to each other and pass through the axis of rotation of the crank. During the 180° travel of the crank pin 37 "below" the line 45, chamber 32 is contracted from the large extreme of its size to the small extreme thereof. Similarly, during said 180° crank travel "below" line 45, chamber 34 becomes expanded from the small extreme of its size to the large extreme thereof. The reverse with regard to the chambers 32 and 34 takes place during the 180° travel of crank pin 37 "above" the line 45. During the 180° travel of the crank pin 37 at the left of the line 44, chamber 33 is contracted from its large to its small size extreme, and chamber 35 is expanded from its small to its large size extreme, and during the 180° travel of said crank pin at the right of said line 44, the reverse takes place with respect to said chambers 33 and 35. When the valve or piston member 24 is in the position shown in Figs. 1 and 2, the axis of the crank pin 37 is in alinement with the point 37' at which the line 45 intersects the right hand portion of the circle 43 (Fig. 2). As the chambers expand they receive the driving fluid from the

passage 17, and as they contract, they expel the fluid through the manifold 18, the admission and discharge of the fluid being controlled by the above described ports and the valve member 24 which controls registration thereof.

A conduit or cylinder 47 having a partition or piston 48 movable by means of the pressure difference between the chambers 32 and 34 during inletting of one and outletting of the other, is carried by the meter casing 5, said conduit or cylinder having its ends in communication with the chambers 32 and 34, as shown at 47^a, and adjustable screws 49 are employed to adjust or limit the strokes of piston 48. It will readily be seen that if the meter initially under-delivers with respect to the register reading, it is only necessary to properly adjust the screws 49 to allow further travel of the piston 48 until the discrepancy is rectified. If over-delivery occurs, the screws 49 are reversely adjusted. These screw adjustments, by limiting the maximum movements of the piston 48, change the maximum cubic capacities and therefore the volumetric displacement of the chambers 32 and 34, for the ends of the cylinder 47 and the piston 48 co-act with said chambers 32 and 34 in forming two of the measuring chambers of the meter.

The screws 49 are normally covered and protected by removable caps 50 and conventional lock nuts 51 may be employed for said screws.

I claim:

1. In a meter, a piston member and means for confining it to predetermined extents of movement, and means complementary with said piston member in forming two chambers one of which expands and admits fluid while the other is contracting and discharging fluid, and vice-versa, said chambers having valve-controlled inlet and outlet means, said complementary means including a meter casing, a conduit whose ends are in permanent communication with said chambers respectively, a partition in said conduit movable by means of the pressure difference between said chambers during inletting of one and outletting of the other, and adjustable means for limiting the pressure-effected movements of said partition.

2. In a meter, a gyratory piston member and means for confining it to a circular path of predetermined diameter, and means complementary with said piston member in forming two chambers one of which expands and admits fluid while the other is contracting and discharging fluid, and vice-versa, said chambers having valve-controlled inlet and outlet means, said complementary means including a meter casing, a conduit whose ends are in permanent communication with said chambers respectively, a partition in said conduit movable by means of the pressure difference between said chambers during the inletting of one and outletting of the other, and adjustable means for limiting the pressure-effected movements of said partition.

3. A meter comprising a casing having parallel side walls and parallel edge walls, one of said side walls having an admission port and a plurality of discharge ports spaced around said admission port, fluid-discharge means communicating with said discharge ports, a reciprocatory valve-guiding frame within said casing slidably engaging said parallel side and edge walls and itself having parallel end walls, a gyratory register-driving valve member within said valve-guiding frame slidably engaging said end walls thereof and said side walls of said casing and co-operating with said ports; said casing, frame and valve member having co-acting portions forming expansible and contractible chambers, each of said chambers being adapted to communicate with said admission port during chamber expansion and with a discharge port during chamber contraction; a conduit whose ends communicate permanently with two of said chambers respectively, one of said two chambers being an inletting chamber and the other an outletting chamber, a partition in said conduit movable by means of the pressure difference in said two chambers during inletting of one and outletting of the other, and adjustable means for limiting the movements of said partition.

4. A meter comprising a casing having parallel side walls and parallel edge walls, one of said side walls having an admission port and a plurality of discharge ports spaced around said admission port, fluid-discharge means communicating with said discharge ports, a reciprocatory valve-guiding frame within said casing slidably engaging said parallel side and edge walls and itself having parallel end walls, a gyratory register-driving valve member within said valve-guiding frame slidably engaging said end walls thereof and said side walls of said casing and co-operating with said ports, said casing, frame and valve member having co-acting portions forming expansible and contractible chambers, each of said chambers being adapted to communicate with said admission port during chamber expansion and with a discharge port during chamber contraction; a cylinder carried by said casing, two passages from the ends of said cylinder to two of said chambers respectively, one of said two chambers being an inletting chamber and the other an outletting chamber, a piston in said cylinder movable by means of the pressure difference between said two chambers during inletting of one and outletting of the other, and means adjustable from the exterior of the casing for limiting the movements of said piston.

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