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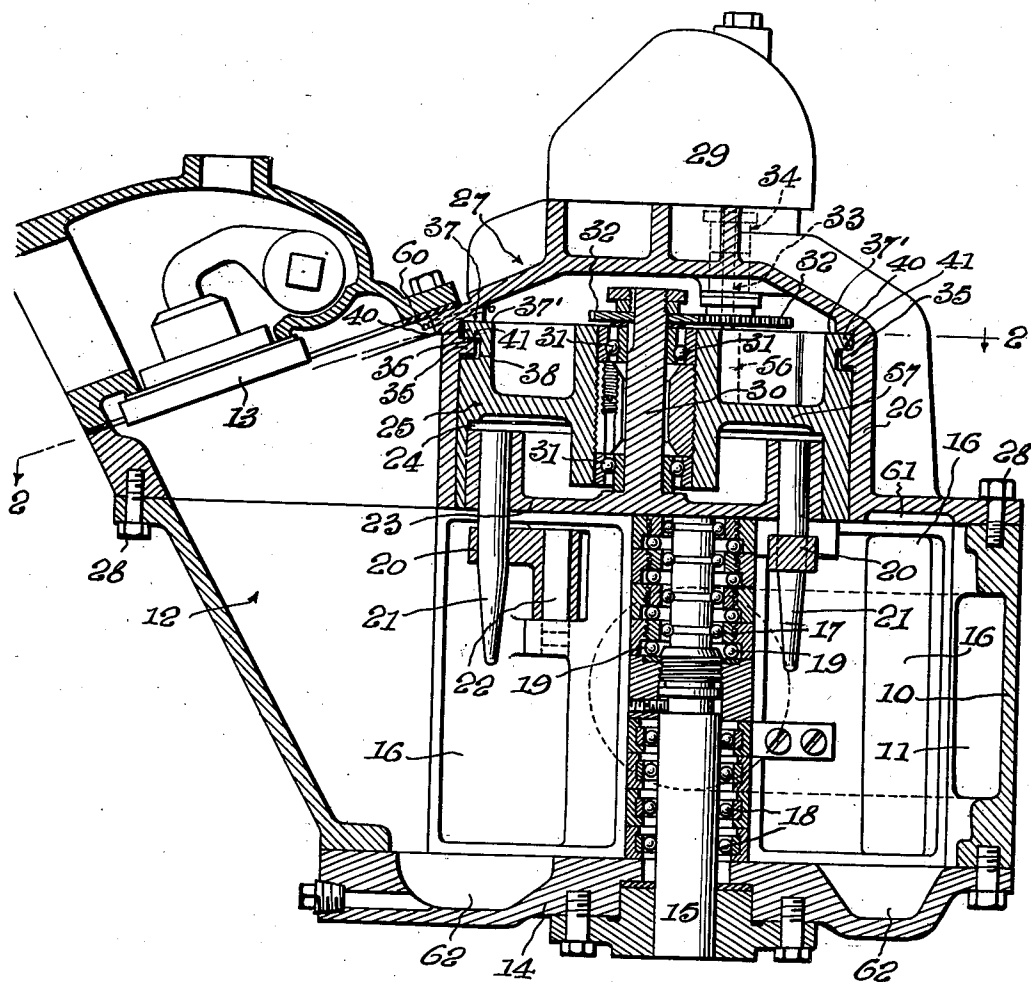
W. P. SIEBECKER ET AL
ROTARY METER

2,197,322

Filed July 12, 1939

3 Sheets-Sheet 1

Fig. 1.



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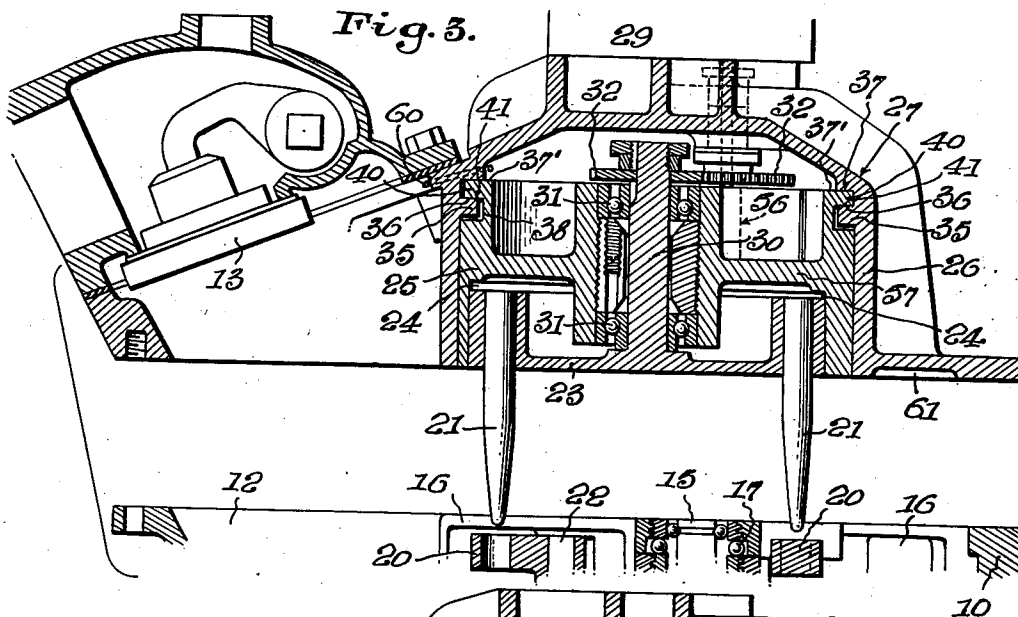


Fig. 4.

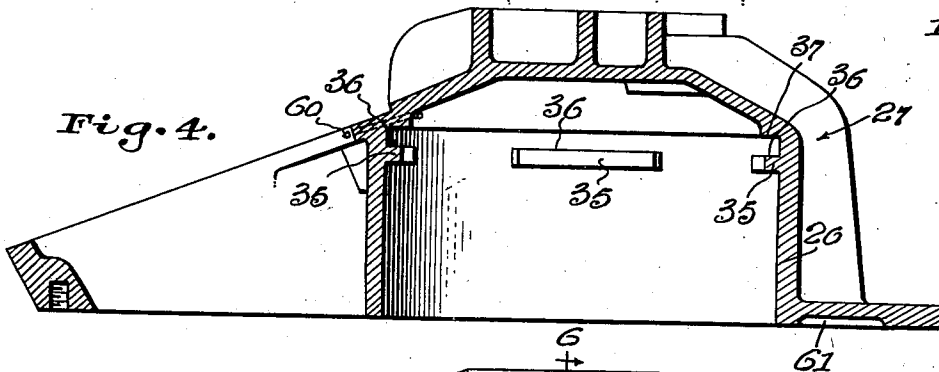
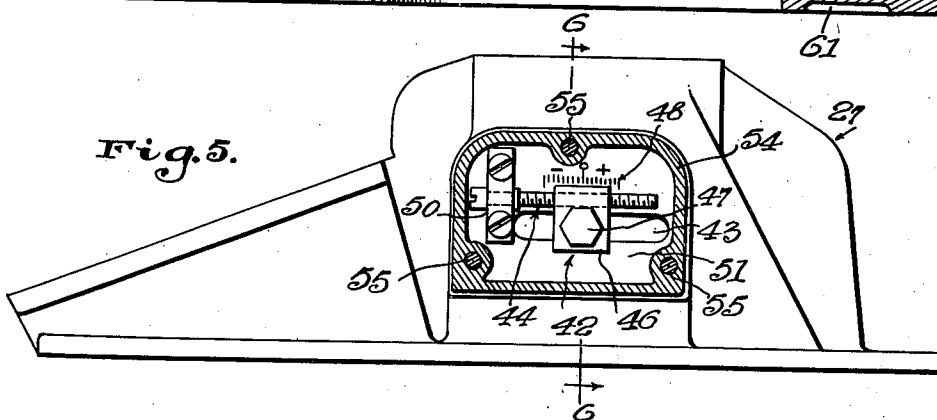


Fig. 5.



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UNITED STATES PATENT OFFICE

2,197,322

ROTARY METER

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Application July 12, 1939, Serial No. 284,086

6 Claims. (Cl. 73—253)

The invention relates primarily to meters of the general type disclosed in the U. S. patent to Armas J. Saarinen, No. 2,131,236 of September 27, 1938. In this type of meter, vanes for relative opening and closing movements are rotatable about a common axis in a fluid-conducting casing and are operatively connected with a register-driving disk, said disk being eccentric to the vane axis and being carried by a rotatively adjustable head in the casing, adjustments of said head serving to increase the maximum and decrease the minimum angles between vanes, or vice versa, to obtain agreement between meter output and register reading.

The present invention aims to provide improved means for mounting the aforesaid rotatively adjustable head, improved means for adjusting said head and improved means for holding said head in adjusted position.

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 vertical sectional view through the meter.

Figure 2 is a top plan view partly in horizontal section.

Figure 3 is a view similar to the upper portion of Figure 1 but showing the casing cover and contained parts removed from the major portion of the casing.

Figure 4 is a vertical section through the casing cover.

Figure 5 is a vertical section on line 5—5 of Figure 2.

Figure 6 is an enlarged vertical section on line 6—6 of Figure 5.

In the drawings above briefly described, a substantially cylindrical casing 10 is shown having a fluid inlet 11 and an outlet 12, a faucet valve 13 being shown associated with said outlet. Suitably secured to the lower end wall 14 of the casing 10, we have shown a central shaft 15 upon which the vanes 16 are mounted by means of upper and lower sets of radial bearings 17 and 18 and additional ball bearings 19, the latter supporting the weight of said vanes 16. These vanes 16 are operatively connected by links 20, and pins 21 and 22, or other suitable means, with a register-driving disk 23, the axis of said disk being eccentric to the axis of the shaft 15 to cause relative opening and closing of the vanes 16 as the meter operates. The disk 23 is rotatably mounted in a recess 24 of

a rotatively adjustable head 25, said head being mounted in an upstanding neck portion 26 of a cover 27 which is secured by cap screws or the like 28 upon the casing 10, the upper side of said cover being adapted to support a register 29. The disk 23 is provided with a central register-driving shaft 30 mounted in suitable bearings 31 carried by the head 25, said shaft 30 being operatively connected by gearing 32 with the register shaft 33 extending through a stuffing box 34 in the top of the cover 27 and into the register casing.

During rotation of the vanes 16 and disk 23, said vanes relatively open and receive fluid from the inlet 11, and relatively close and discharge the fluid into the outlet 12, and said disk drives the register 29 to register the fluid passed through the meter. The maximum opening movements of the vanes 16 and minimum closing movements thereof and vice versa, may be varied, to insure agreement of fluid delivered and register reading, by varying the eccentricity of the disk axis with respect to the vane axis, and this is accomplished by relatively adjusting the head 25 within which the disk 23 is eccentrically mounted. The present invention not only provides improved means for adjusting the head 25 and holding it in adjusted position, but provides novel connecting means between said head 25 and the cover 27, of advantage when assembling and disassembling the meter.

The neck 26 is provided with inwardly projecting circumferentially spaced ribs 35 each having an upwardly facing end-thrust surface 36, and above said ribs said neck is provided with a downwardly facing end-thrust shoulder 37. The periphery of the head 25 is grooved at 38 to receive the ribs 35, and above said groove is notched at 39, leaving circumferentially spaced ribs 40 between the notches, which ribs 40 are provided with end-thrust surfaces 41 resting slidably upon the end-thrust surfaces 36 of the ribs 35, holding the head 25 against downward movement. The upper end of this head is formed with an end-thrust surface 37' contacting with the end-thrust shoulder 37, holding the head against upward shifting. The interengaged ribs 35 and 40 so connect the head 25 with the cover 27 that said head and cover and the disk 23 carried by the head, are removable as a single unit from the major portion of the casing 10, should access to interior parts be required, for repair. After this unit is removed, the head 25 may be turned until the ribs 40 thereof are between the ribs 35 of the neck 26, whereupon said

head 25 and the disk 23 carried thereby, may be bodily withdrawn from the cover 27. While the cover 27, the head 25 and the disk 23 are being removed unitarily from the major portion of the casing, the pins 21 simply withdraw from the links 20. Obviously, assembly or reassembly may be effected by a reversal of the operations just described and to facilitate engagement of the pins 21 with the links 20, said pins are preferably downwardly pointed as shown.

A clamping device 42 extends rigidly outward from the head 25 through a slot 43 in the neck 26 for normally holding said head tightly against said neck, and an adjusting device 44 is connected with said clamping device for moving the latter and said head to rotatively adjust this head as required. The devices 42 and 44 are preferably of the construction now to be described.

A clamping screw 45 extends through the slot 43 and is threaded into the head 25, and a block 46 is mounted on this screw between the head 47 thereof and the outer side of the neck. The screw is normally tight and clamps the head 25 against rotation but when said screw is loosened, it may be moved laterally along the slot 43 to adjust the head 25 as required. Preferably, the neck 26 carries a scale 48 for coaction with an indicator 49 on the block 46 to aid in making any required plus or minus adjustment. After adjustment, tightening of the screw 45 will tightly clamp the head 25 in any position to which it has been adjusted.

The adjusting device 44 is shown in the form of a screw rotatably mounted in a bearing 50 secured to the exterior of the neck 26, said screw being threaded through the block 46. Rotation of this screw, when the screw 45 is loosened, will so move the block 46 as to move said screw 45 in the slot 43, turning the head 25 to the desired adjusted position. This adjustment of the head 25, it will be recalled, varies the eccentricity of the disk axis (axis of shaft 30) with respect to the vane axis (axis of shaft 15) to so vary the opening and closing movements of the vanes 16 as to obtain agreement between meter output and register reading. By turning screw 44 in one direction, a plus adjustment is effected which slightly increases the meter output, whereas turning said screw in the other direction produces a minus adjustment slightly decreasing the output. Thus by making the proper adjustment, strict agreement may be obtained between output and register reading.

The surface 51 against which the block 46 is slidable, is parallel with the axis of the adjusting screw 44 and when said block is in its neutral or zero position, the axis of the clamping screw 45 is at right angles to said surface 51 and said block 46. As the screw 44 is turned in either direction, however, to move screw 45 along slot 43, the angular relation of said screw 45 with respect to the surface 51 changes, and as block 46 must slide along said surface 51, the angular relation of this block with respect to screw 45, must vary. To permit this, the opening 52 in the block 46, through which screw 45 passes, is of flared formation. Preferably, a washer 53 is seated in one end of the opening 52 and contacts with the screw head 47.

A cap 54 normally covers and protects the clamping and adjusting means above described, said cap being detachably secured to the neck 26 by cap screws or the like 55. When adjustment of head 25 is required, the cap 54 is detached,

screw 45 is loosened, and screw 44 is turned in the proper direction. Tightening of screw 45 then tightly clamps the head 25 in the position to which it has been adjusted.

It will be seen from the foregoing that novel and advantageous provision has been made for attaining the desired ends and while preferred features of construction have been disclosed, variations may of course be made within the scope of the invention as claimed. While a screw 45 having a head 47 has been shown for clamping the head 25 in adjusted position, obviously a stud could well project from said head to take the place of said screw 45 and a nut on the stud would then take the place of said head 47. Also, the adjusting device 44 need not take the identical form shown nor be mounted and connected with block 46 in the exact manner illustrated.

The part 56 is merely a curved upstanding flange on the central web 57 of the head 25, upon which flange the register shaft 33 rests. 58 denotes a tapped opening in the lower side of head 25 for use in assembly. 59 is a vent from the lower to the upper side of the head 25, and another vent 60 extends from the portion of the cover 27 over said head, to the outlet 12. 61 and 62 merely denote "cored out" portions of the upper and lower end walls of the casing 10 where sealing engagement with the vanes 16 is not required. 46' in Figs. 2 and 6 simply denotes lugs on block 46 received in slot 43, relieving the screw 44 of the duty of holding said block against turning.

What is claimed is:

1. In a mechanism of the class described having a casing, vanes rotatable about a common axis in said casing, a cover for said casing removable therefrom by movement unidirectionally with said axis, a rotary disk eccentric to said axis, a rotatively adjustable head carrying said disk for varying the eccentricity of the disk axis with respect to the shaft axis, and connecting means between said disk and said vanes including disk-carried and vane-carried members separable from each other by axial movement of said disk away from said vanes; means connecting said head and cover for removal as a single unit from the casing, said head and cover connecting means comprising a series of circumferentially spaced connecting portions carried by said cover, and a second series of circumferentially spaced connecting portions carried by said head and slidably engaged with the cover-carried connecting portions, whereby, after said cover, head and disk are bodily removed from the casing, said head may be disconnected from said cover by turning said head until its connecting portions are disposed between those of said cover, said head and said disk being then bodily removable from the cover by shifting said head toward the casing-engaging side of said cover.

2. In a mechanism of the class described having a casing, vanes rotatable about a common axis in said casing, a rotary disk eccentric to said axis, means connecting said vanes with said disk, and a rotatively adjustable head in said casing carrying said disk for varying the eccentricity of the disk axis with respect to the vane axis; interengaged connecting means for holding said head against axial movement in said casing, said connecting means comprising two series of slidably engaged circumferentially spaced connecting portions, one of said series being carried by said casing and the other by said head, the head-carried connecting portions being

disengageable from the casing-carried portions by turning said head until said portions thereof are disposed between said portions of the casing.

3. In a mechanism of the class described having a casing, vanes rotatable about a common axis in said casing, a rotary disk eccentric to said axis, means connecting said vanes with said disk, and a rotatively adjustable head carrying said disk for varying the eccentricity of the disk axis with respect to the vane axis, said casing having a neck surrounding said head; a series of circumferentially spaced ribs carried by and projecting inwardly from said neck, and a second series of circumferentially spaced ribs carried by said head, the two series of ribs being slidably engaged with each other and having contacting end-thrust surfaces in a plane at right angles to the disk axis and holding the head against axial shifting in one direction, said neck and head having additional end-thrust surfaces holding said head against axial shifting in the other direction, the head-carried ribs being disengageable from the neck-carried ribs by turning said head until said ribs thereof are disposed between said ribs of said neck.

4. In a mechanism of the class described having a casing, vanes rotatable about a common axis in said casing, a rotary disk eccentric to said axis, means connecting said vanes with said disk, and a rotatively adjustable head carrying said disk for varying the eccentricity of the disk axis with respect to the vane axis, said casing having a neck surrounding said head; a series of circumferentially spaced ribs carried by and projecting inwardly from said neck, said ribs having end-thrust surfaces facing away from said vanes and disposed in a plane at right angles to the disk axis, said neck having an end-thrust shoulder spaced from and facing said end-thrust surfaces of said ribs and disposed in a plane parallel therewith, said head having an end-thrust surface abutting said end-thrust shoulder of said neck, said head being also provided with circumferentially spaced ribs having end-thrust surfaces contacting with said end-thrust surfaces of said neck-carried ribs, the head-carried ribs being disengageable from the neck-carried ribs by turning said head until its ribs are disposed between the ribs of said neck.

5. In a mechanism of the class described having a casing, vanes rotatable about a common axis in said casing, a rotary disk eccentric to said axis, means connecting said vanes with said disk, and a rotatively adjustable head in said casing carrying said disk for varying the eccentricity of the disk axis with respect to the vane axis, said casing having a portion contacting with said head, a threaded clamping member carried by said head and projecting rigidly therefrom through said casing portion, said threaded clamping member having a rotatable part at the

exterior of said casing portion by means of which it may be loosened and tightened, a block contacting with the outer side of said casing portion and having an opening through which said threaded clamping member passes, said block being disposed between and in contact with said rotatable part and said casing portion, whereby said head and said block are normally clamped against the inner and outer sides of said casing portion respectively to hold said clamping member against creeping, and an adjusting device mounted on the exterior of said casing portion at an angle to said threaded clamping member and connected with said block for moving the latter and said threaded clamping member to rotatively adjust said head after said threaded clamping member is loosened, said casing portion having a slot through which said threaded clamping member extends and in which this clamping member is movable as said adjusting device is operated.

6. In a mechanism of the class described having a casing, vanes rotatable about a common axis in said casing, a rotary disk eccentric to said axis, means connecting said vanes with said disk, and a rotatively adjustable head in said casing carrying said disk for varying the eccentricity of the disk axis with respect to the vane axis, said casing having a portion contacting with the periphery of said head; a threaded clamping member carried by said head and projecting rigidly therefrom through said casing portion, said threaded clamping member having a rotatable part at the exterior of said casing portion by means of which it may be loosened and tightened, said casing portion being provided with a flat outer side transverse to said threaded clamping member, a block normally clamped between said rotatable part and said flat side and having an opening through which said threaded clamping member passes, and a threaded adjusting device rotatably mounted on the exterior of said casing portion on an axis parallel with said flat side thereof, said threaded adjusting device being connected with said block for moving the latter and said threaded clamping member to rotatively adjust said head after said threaded clamping member is loosened, said casing portion having a slot through which said threaded clamping member passes and in which said threaded clamping member is movable as said adjusting device is operated, said opening of said block being shaped to permit the block to angle with respect to said threaded clamping member as said block slides along said flat side of said casing portion concurrently with movement of said clamping member and said head about the head-axis during operation of said adjusting device.

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