July 29, 1941. H. F. SACKNUS 2,250,726

DISK METER

Filed Jan. 14, 1938

Fig.1.

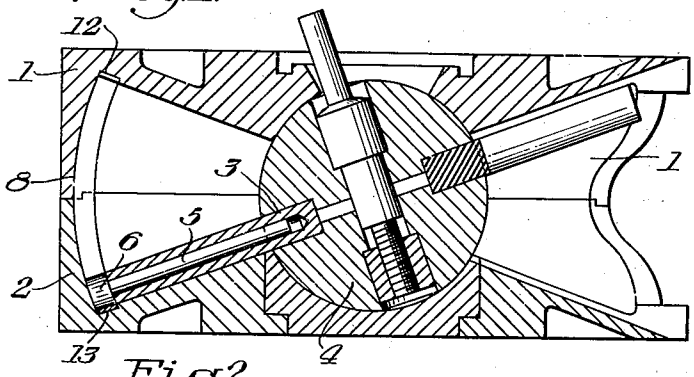


Fig.2.

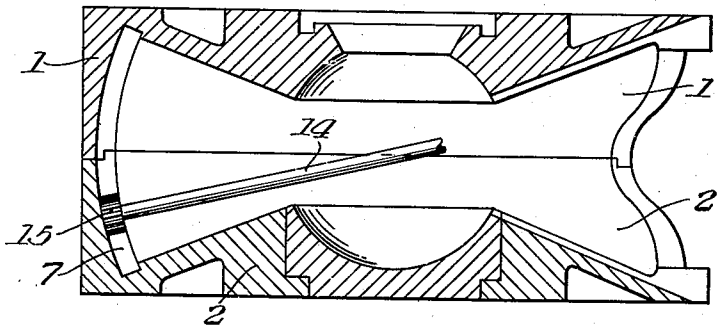


Fig.5.

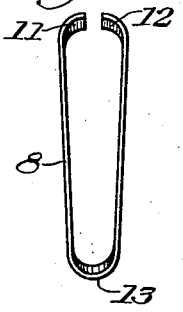


Fig.6.

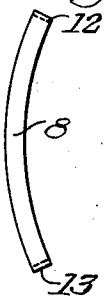


Fig.3.

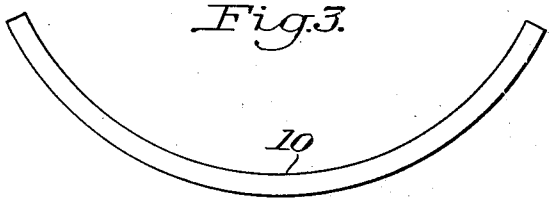
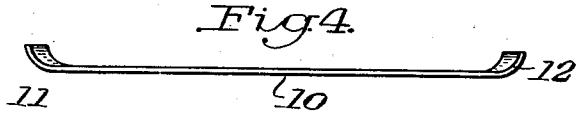


Fig.4.



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2,250,726

UNITED STATES PATENT OFFICE

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DISK METER

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Application January 14, 1938, Serial No. 184,977

5 Claims. (Cl. 121—69)

This invention relates to improvements in fluid meters of the nutating disk type, and relates particularly to improvements in the construction of the disk chamber and disk whereby an improved operation of the meter is obtained.

In nutating disk meters, particularly when intended for measurement of water, it has heretofore been proposed to support a thrust roller on the disk with its axis on a radius of the disk and slot the meter chamber to provide a lateral surface against which the roller operates. The disadvantage of this construction is that the roller wears the edge of the slot, and when the slot becomes too wide at any point due to wear, it allows fluid to bypass and thus renders the operation of the meter inaccurate. Once the meter chamber is worn, it has to be replaced by a new chamber. It has been heretofore proposed to eliminate this wear by placing a hardened plate against one wall of the slot so that the thrust roller will bear against this plate. This construction has the disadvantage that the meter chamber has to be cut nearly in half to permit insertion of the plate, and because of the weakening of the disk chamber it is easy for the disk chamber to be accidently deformed so as to render the meter inoperative or inaccurate.

According to the present invention, I provide an insert or liner for the thrust roller slot of the meter chamber which is retained in position when the top and bottom half sections are assembled without providing screws or similar fastening means. The liner may cover one wall or both walls of the slot, as desired. However, I have found that the force acting on the thrust roller during operation is such that if its movement were not confined it would follow a path substantially similar to a figure 8, and by providing a liner for both walls of the recess the wear on the chamber walls is entirely eliminated. The insert may be in the form of a single strip, preferably bent on the spherical curvature of the chamber wall, with its ends bent over and is retained in position in the slot by reason of the ends of the slot being cut to a depth at its ends beyond the bottom and top walls of the disk chamber. However, where it is desired to provide a liner for both walls of the recess, the liner may take the form substantially of a hairpin with its ends bent inwardly, the whole liner being formed on the spherical curvature of the meter chamber wall. While I prefer to retain the liner in position by forming the recess beyond the bottom and top walls of the chamber, it will be understood that any other suitable means for holding the liner in position may be employed. For suitable materials for the insert or liner, I may use Monel metal, phosphor bronze or any other suitable wear resisting metal or alloy.

The invention will be described in connection with the accompanying drawing, wherein I have shown a preferred embodiment of my invention by way of illustration and wherein:

Figure 1 is a vertical section taken through a meter chamber and disk showing my invention applied thereto.

Figure 2 is a partly diagrammatic view showing the manner of cutting the thrust slot in the meter chamber wall,

Figure 3 is an elevation showing the blank form used in making the insert,

Figure 4 shows a blank form with the ends turned inwardly,

Figure 5 shows an end view of the finished insert ready to be placed in the meter chamber, and

Figure 6 shows a side view of the insert.

Referring to the drawing, there is shown a meter chamber comprising a top half section 1 and a bottom half section 2, the edges of the half sections being rabbeted and interfitting in assembled position in known manner. The top half section and bottom half section have suitable slots, adapted to receive a division plate (not shown) and a bifurcated disk 3 secured to the central ball 4 is suitably journalled in the meter chamber. The disk has a radial bore opposite the division plate in which is inserted a rotatable pin 5 carrying a thrust roller 6 secured thereon, or the thrust roller may be journalled for rotation in any other suitable manner. The top and bottom sections of the meter chamber have a slot 7 formed in the spherical wall thereof which may be located diametrically opposite the division plate, or in any other suitable position. The lower end of slot 7 extends beyond the inner bottom surface of the disk chamber and the upper end of the slot 7 extends beyond the inner top surface of the disk chamber. This slot 7 may be cut by a milling cutter 15 on a shaft 14 oscillated about a center corresponding to the center of the meter chamber so that the back wall of the slot is cut on a sphere and the ends of the slots are automatically cut on the proper radius, as diagrammatically shown in Figure 2, each half section being slotted separately before assembly.

The insert 8 shown in Figures 5 and 6 is made from a blank strip of metal 10 (Figure 3). The first operation of making the insert after cutting the strip to sufficient width and length comprises

bending the strip 10 in a curve corresponding to the spherical curvature of the back wall of the slot. In the next operation the ends 11 and 12 of the strip are bent over on a radius equal to the radius of the end of the slot 7. The insert then is bent at its middle 13 on a radius equal to the radius of the end of slot 7, and the insert is ready for assembly into the meter.

In assembly, the insert is first placed in one half section of the chamber, as for example, the lower half. The disk assembly and division plates are then placed in position, and the upper half section is assembled to the lower half section with the insert extending into the slot 7 in the upper half of the chamber. As the slot is cut beyond the bottom and top chamber walls and the insert is received in the extended portion of the slot, the insert is automatically held in position when the two half sections are assembled. The thrust roller 6 works against the sides of the insert as the disk nutates and will bear against first one side of the insert on one half of the stroke and then against the other side on the other half of the stroke. When the insert becomes badly worn the upper and lower chambers may be separated and a new insert placed in the slot. Even if the insert is worn through entirely and part of the chamber wall becomes worn, the insertion of a new insert will remedy this condition and enable the old meter chamber to be used, whereas otherwise it would have to be discarded.

The invention may be embodied in other forms without departing from the spirit and scope thereof. For example, if only one side of the slot is to be lined, the insert may take the form of a single strip curved on a sphere with the ends turned over, the insert being retained in the meter chamber in substantially the same way as previously described.

What I claim as my invention and desire to secure by Letters Patent is:

1. A fluid meter comprising a meter chamber, a disk in said chamber journalled for nutating motion therein, a slot in the wall of the meter chamber, a lining strip of wear resisting material in said slot, and a thrust roller journalled on said disk and extending into said slot, at least one end of the lining strip being curved to conform on its interior substantially to the surfaces of the thrust roller.

2. A fluid meter comprising a meter chamber, a disk in said chamber journalled for nutating motion therein, a slot formed in the wall of the meter chamber and extending only part way into said wall, a lining strip of wear resisting material in said slot, the strip being formed on a curve corresponding to the wall of the chamber, and a thrust roller journalled on said disk and extending into said slot.

3. A fluid meter comprising a meter chamber, a disk in said chamber journalled for nutating motion therein, a slot in the wall of the meter chamber having rounded ends, a lining strip of wear resisting material in said slot substantially of hair-pin shape with the ends bent over conforming to the ends of the slot, and a thrust roller journalled on said disk and extending into said slot.

4. A fluid meter comprising a meter chamber, a disk in said chamber journalled for nutating motion therein, a slot in the wall of the meter chamber providing a wall of reduced thickness and having its ends cut beyond the chamber top and bottom, a lining of wear resisting material in said slot substantially of hair-pin shape with the ends bent over and retained in position between the end portions of said slot and reduced wall, and a thrust roller journalled on said disk and extending into said slot.

5. An insert for the guide slot in the disk chamber of a nutating disc meter comprising a strip substantially of hair-pin shape with its ends bent over inwardly, the whole liner being formed on a curve corresponding to the wall of the chamber.

HERBERT F. SACKNUS.