Jan. 21, 1941. T. D. BARNES 2,229,435

WATT HOUR METER

Filed June 9, 1937

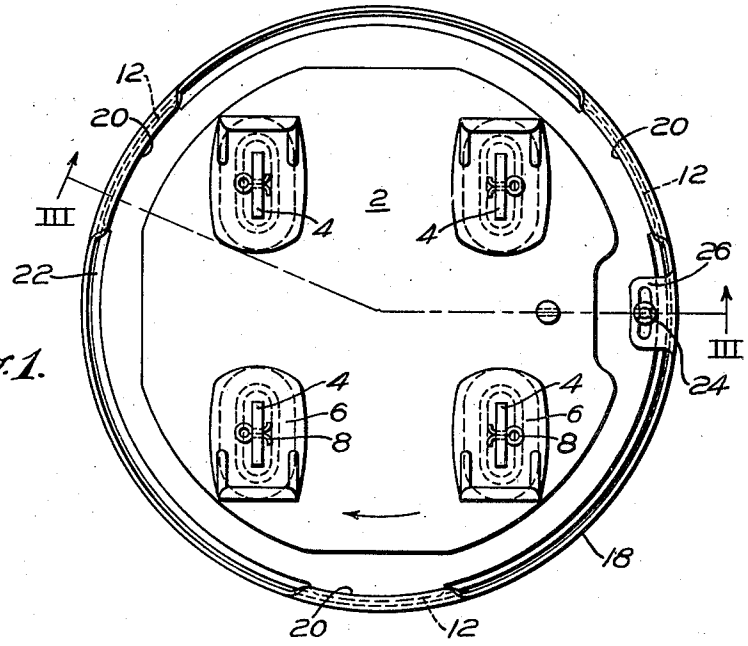


Fig. 1.

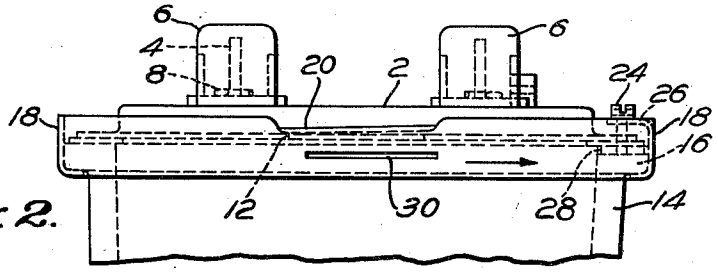


Fig. 2.

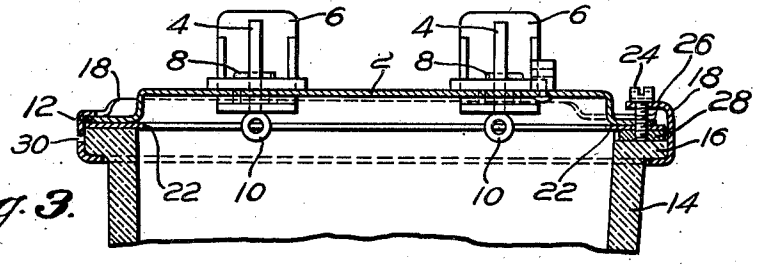


Fig. 3.

WITNESSES:

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WATT-HOUR METER

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3 Claims. (Cl. 220—61)

The present invention relates to an improved form of clamping device and is described with specific reference to a means for clamping the base and cover of a watt-hour meter of the detachable type. It should be obvious from the following description that the invention is of wider application.

In meters of the so-called detachable type, the meter movement is mounted upon a comparatively flat circular base plate and is enclosed by a glass cover, the rim of which rests upon such plate. The cover and plate are suitably clamped in interlocking relation to exclude foreign matter, as by providing inter-engaging means on the base plate and on a flange secured to the rim of the cover to be engaged by relative rotation between the cover and base plate. For example, the flange on the cover may be provided with spaced inwardly projecting portions to constitute cam surfaces, and segmental projections on the base plate may be forced under such portions to a desired extent to clamp the base and cover together. A set screw or similar device cooperating with the base plate and flange may then be used to prevent further relative rotation.

The position of the set screw must be predetermined, that is, the base plate and flange must always be rotatable to a predetermined relative position for cooperation with the screw. This is difficult because manufacturing discrepancies incident to large quantity production result in sufficient variation in the dimensions of the plate and flange to cause the clamping action to be too tight or too loose when the parts are in position to receive the set screw.

The type of construction described above is shown in some detail in Bradshaw et al. Patent 1,969,499, issued August 7, 1934.

It is an object of the present invention to provide a clamp structure including a cam surface with means for slightly relieving the cam action as the clamped position is approached so that a more uniform clamping action may be obtained in spite of manufacturing discrepancies to prevent freezing of the clamped parts but at the same time insuring a desired clamping action.

Other objects will be apparent from the following description and the accompanying drawing, in which:

Figure 1 is a view in rear elevation of a watt-hour meter of the so-called detachable type,

Fig. 2 is a view with parts broken away in elevation of the structure in Fig. 1, and

Fig. 3 is a view in section taken on the line III—III of Fig. 1.

With more specific reference to the drawing, the meter casing comprises a base plate 2 having a centrally raised portion and four contact blades 4 suitably secured to and insulated from the base plate by insulation 6 and cotter pins 8 which cooperate with the blade terminal 10 (Fig. 3) on the opposite side of the plate to retain the blade in position.

The periphery of the base plate 2 is provided with three outwardly projecting segmental portions 12 (Fig. 1) which constitute part of the interlocking structure of the invention.

Referring to Figs. 2 and 3, showing the meter casing in inverted position for the purpose of clearness, the plate 2 is provided with a glass cover 14 of cup shape having an outwardly extending peripheral rim 16. A metallic rim 18 is secured to the flange 16 in any suitable manner, as for example, as disclosed in the aforesaid patent to Bradshaw et al. No. 1,969,499.

The rim 18 has an inwardly extending flange embracing the cover flange 16 and the rim extends vertically to a point above the normal plane of the periphery of plate 2.

As shown in Fig. 1, at three equally spaced points the vertically extending portion of rim 18 is bent inwardly and, as shown in Fig. 2, the inwardly bent portion is not parallel to the plane of the base but is inclined thereto so that the undersurface of it will constitute a cam surface.

In assembling the structure described, a gasket 22 (Fig. 3) is placed upon the face of the cup edge and the base 2 is laid upon it in such position that the projecting segments 12 are to the right of the inwardly extending portions 20 of the rim 18. The base 2 is then rotated in the direction of the arrow in Fig. 1, bringing the segments 12 under the cam surfaces formed by projections 20. Under ideal conditions with a given turning force applied to the base 2 such rotation will properly clamp the base to the cover 14 at such position that a set screw 24 extending through an inturned lip 26 on the rim 18 will register with an aperture in the base plate 2 and a nut 28 in a recess in the cover face for securing the parts in clamped relation. As a practical matter, however, particularly in a case involving quantity production of thousands of meters per month, exact dimensions of the parts described cannot be adhered to and there is certain to be sufficient inaccuracies to render it difficult to rotate the base plate 2 to its clamped position and at the same time have the lip 26 in proper position for the screw to extend through the aperture in the base plate 2.

In order to correct this difficulty, it is proposed that the rim 18 be provided with slots 30 extending beneath the cam portions 20. The slots in effect weaken the vertical portion of the rim 18 at different points to afford more latitude in rotating the plate segments 20 beneath the cam surfaces. It will be noted that in this case the slots extend from the open end of the cam to a point short of the lower end of the cam and are substantially parallel with the plane of the plate 2. As a result, the increasing clamping action imposed by the cam, as the plate 2 is rotated into position, is progressively relieved as the final or clamped position is approached. However, the slot terminates short of the final position, at which the set screw 24 may be applied, so that the relief in pressure is abruptly terminated to prevent the base from being pulled through the cam beyond such final position. Quite obviously, the extent of the relief in pressure depends upon the distance between the slot and the face of the cam and such distance may be so chosen that with a given force for rotating the base 2 with respect to the cover, the base may be brought into its proper clamping position to receive the set screw 24 in an expeditious manner. Also the action may be varied as desired by lengthening the slot or changing its position with respect to the cam surface.

Quite obviously, the invention is capable of modification within the spirit thereof and it is intended that it be limited only by the scope of the appended claims.

I claim as my invention:

1. In combination with a receptacle of cup shape and a cover therefor, a rim secured to the receptacle having an upstanding flange with inwardly projecting portions on the periphery thereof, means carried by said cover proportioned to extend under said projecting portions to be clamped thereby against the edge of the receptacle, said projecting portions being so proportioned that upon relative rotation of the receptacle and cover said means may enter under one end of the projecting portion and be pressed against the receptacle edge with an incrasing force as it is moved toward the other end of the projecting portion, means comprising a slot in said rim extending along said projecting portion for relaxing said force as said other end is approached and means for securing the rim and cover in a final position against further relative movement.

2. In combination with a receptacle of cup shape and a cover therefor, a rim secured to the receptacle having an upstanding flange with inwardly projecting portions on the periphery thereof, means carried by said cover proportioned to extend under said projecting portions to be clamped thereby against the edge of the receptacle, said projecting portions being so proportioned that upon relative rotation of the receptacle and cover said means may enter under one end of the projecting portion and be pressed against the receptacle edge with an increasing force as it is moved toward the other end of the projecting portion, means comprising a slot in said rim extending along said projecting portion substantially parallel to the plane of said cover for relaxing said force as said other end is approached and means for securing the rim and cover in a final position against further relative movement.

3. In a detachable enclosure assembly, a base member, a cover member, said members cooperating to define an enclosure, and means for detachably connecting said members including a substantially circular rim carried by said cover member and projecting outwardly from its point of attachment to said cover member and beyond the end thereof toward said base, a camming structure including circumferentially spaced cam elements carried by said rim and extending circumferentially thereof, each cam being positioned beyond the point of attachment of said rim to said cover member, a slot in said rim positioned adjacent each cam and extending circumferentially of the rim between each cam and said point of attachment, each of said slots extending from a point adjacent the forward end but terminating short of the rear end of each cam thus providing a partially detached weakened rim portion, and a lip element carried by said base member cooperating with said cam to clamp the cover to said base in camming relationship, said weakened rim portion being adapted to yield during the initial camming movement.

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