

Oct. 1, 1968

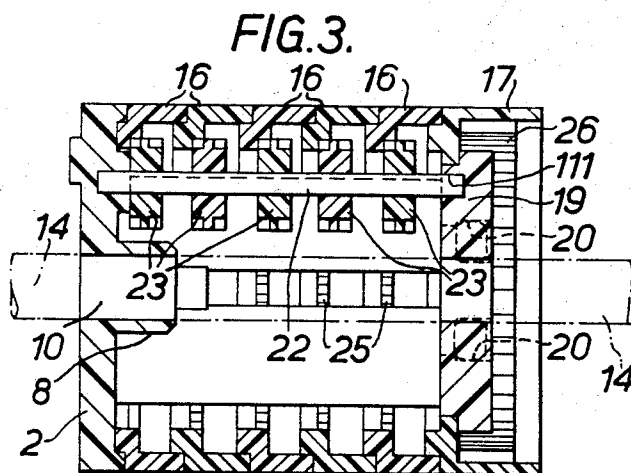
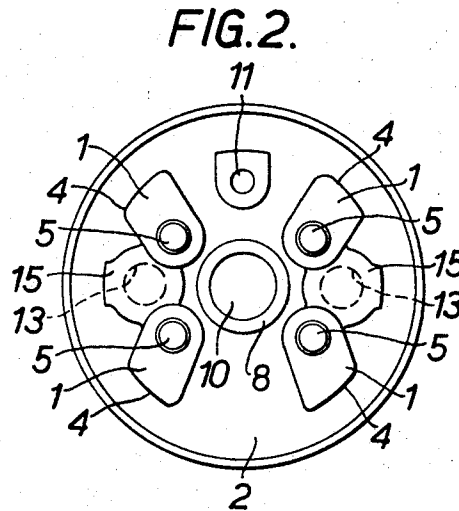
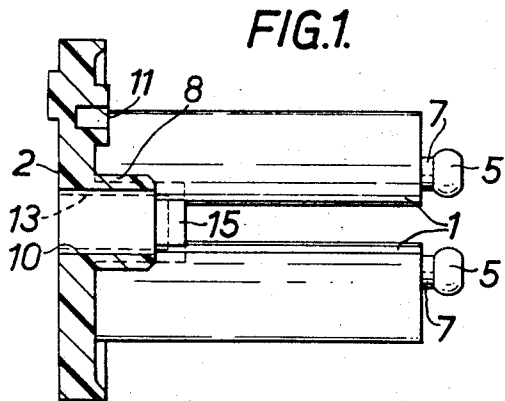
K. RECHLIN.

3,403,851

COUNTER MECHANISM

Filed July 18, 1967

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FIG. 4.

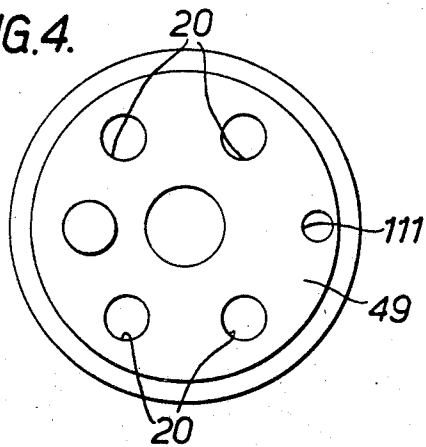


FIG. 5.

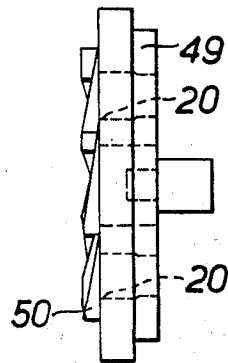


FIG. 6.

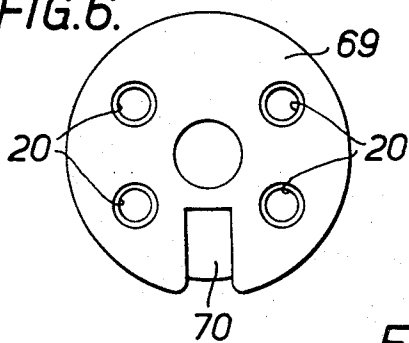


FIG. 7.

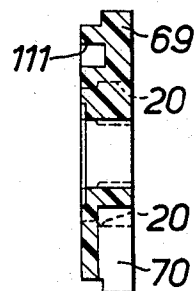
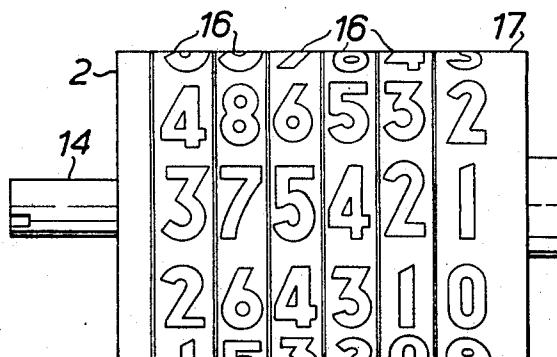


FIG. 8.



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3,403,851

COUNTER MECHANISM

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Claims priority, application Great Britain,
July 29, 1966, 34,159/66
9 Claims. (Cl. 235-117)

ABSTRACT OF THE DISCLOSURE

A counter mechanism is disclosed which comprises a plurality of coaxial number rings. The number rings are carried on a plurality of support arms which extend through the number rings and are arranged uniformly around the axis of rotation of the number rings.

Background of the invention

The invention relates to counter mechanisms, and especially to a mechanism for mounting a plurality of number wheels of a counting device.

Mechanical counter devices are well known. Counter devices have been proposed which utilize diecast members for supporting diecast number wheels and diecast end plates for holding the counting mechanism together. Furthermore, a specific mechanism for operating a counting device has been described in United Kingdom patent specification, No. 816,938, of English Numbering Machines Limited.

Summary of the invention

The present invention consists in a counter mechanism comprising a plurality of coaxial number rings, preferably of mouldable plastic material, which are carried on support means of mouldable plastic material, said support means comprising a plurality of support arms arranged uniformly around the axis of rotation of the number rings, each arm having an arcuate surface engaging the inner peripheries of the number rings, means being provided on the arms for fastening an end plate, preferably of mouldable plastic material, to the support arms by snap action, said end plate retaining the number wheels on the support arms. Also, otherwise usual transfer pinions are preferably made of plastic material. This has the advantage, that the need for lubrication may be eliminated; the masses involved are reduced so that higher operating speeds are possible. Furthermore, the disadvantages of different coefficients of thermal expansion between plastic number wheels and mating metal components are avoided by a construction entirely of plastic material with identical or at least very similar coefficients of thermal expansion. In addition, disadvantages resulting of uneven shrinkage at a connecting flange of a single cylindrical wheel support are avoided by using a plurality of support arms.

Brief description of the drawings

To make the invention clearly understood, reference will now be made to the accompanying drawings which are given by way of example, and in which:

FIG. 1 shows a side view in section of a number ring support means;

FIG. 2 shows an end view of the support means of FIG. 1;

FIG. 3 shows a side view in section of a counter mechanism incorporating the support means of FIGS. 1 and 2;

FIGS. 4 and 5 show an end view and a side view, respectively, of one form of end plate;

FIGS. 6 and 7 show an end view and a side view, respectively, of another form of end plate; and

FIG. 8 shows in perspective, a counter mechanism of the invention.

Description of the preferred embodiments

The internally geared counter mechanism shown in FIG. 8 has six rings 16, 17, which may be made of plastic material, on which black figures are shown on a white background. Only an input shaft 14 and a circular central joining portion 2 of the number ring support means are visible, the remaining part of the number ring support means and an end plate being hidden by the number rings.

The support means shown more clearly in FIGS. 1 and 2 is a one piece moulding of synthetic plastic material and has four spaced parallel support arms 1 extending from one side of a circular central joining portion 2.

Each arm 1 has an arcuate surface 4 extending the length of the arm, and is formed at its end opposite the joining portion 2 with a barrel-shaped pin comprising a barrel portion 5 secured to the corresponding arm 1 by a neck 7.

The joining portion 2 is formed with a sleeve portion 8 extending between the arms 1 with a cylindrical hole 10 extending through the joining portion 2 and the sleeve portion 8.

A hole 11 is formed on the same side of the joining portion 2 as the arms 1, and two further holes 13 which are open at the opposite side of the joining portion 2 extend into protusions 15, the holes 13 being threaded for receiving securing screws (not shown) and being blind to prevent the entry of dust or other contamination into the counter mechanism through the holes 13.

Five number rings 16 (see FIG. 3) are supported by their inner peripheries on the arcuate surfaces 4 of the support arms 1 (not shown in FIG. 3) and a sixth number ring 17 is held in position by an end plate 19 which is secured to the support arms 1 by snap action engagement of the barrel portions 5 in holes 20 in the end plate 19.

A transfer pinion shaft 22 is secured at one end in the hole 11 and at its other end engages in a hole 111 in the end plate 19. Five transfer pinions 23 on the shaft 22 mesh with internal toothing 25 on the number rings 16, which are provided with the customary transfer teeth (not shown).

An input drive is applied to internal toothing 26 on the number ring 17 by any suitable means. Such means may for example comprise a gear wheel (not shown) keyed to the shaft 14 and meshing with the internal toothing 26. As one modification, a ratchet wheel secured for rotation with the shaft 14 by a pin extending through the shaft may be spring-biased along the shaft 14, to engage ratchet teeth on one side of a further ratchet wheel on the shaft 14, the further ratchet wheel having peripheral projections engaging the internal toothing 26 on the number ring 17 and a further ratchet toothing engaging a ratchet toothing on a modified form of the end plate. Such mechanism has been described in greater detail in said United Kingdom patent specification, No. 816,938. The modified form of the end plate is shown in FIGS. 4 and 5 and indicated by reference numeral 49, the ratchet toothing on the end plate 49 being shown at 50.

The end plate 19 of FIG. 3 may be replaced by a modified end plate 69, which is shown in FIGS. 6 and 7, and has a radial groove 70 for guiding a pinion (not shown) radially movable by an eccentric (not shown) on the shaft 14 into engagement with the internal tooth-

ing 26 for intermittently driving the number ring 17 in response to rotation of the shaft 14.

Some synthetic plastics materials are liable to differential shrinkage after moulding. By providing a number of support arms 1 which are interconnected only at their ends the effect of differential shrinking may be eliminated or reduced.

Furthermore, the snap action for connecting the end plate 19 or 49 or 69 with the support arms 1 enables holding these parts together without the use of screws. Thereby distortion of the end plate by over-tightening of screws, and loosening of the screws owing to vibrations which may occur in use of the mechanism are avoided.

Modifications of the embodiments described are possible. For example, while four support arms 1 have been shown, the number of these arms may be varied, depending on the size of the mechanism and the limits of the moulding process used to form the support means. One or more or all of the support arms may be formed in one piece with the end plate instead of in one piece with the joining portion, or may be formed separately from the joining portion and the end plate and secured thereto, for example, by a snap action. Although it is preferred to interconnect the support arms only at their ends, it is nevertheless possible for the support arms to be also joined together along their lengths by one or more bridge portions. Moreover, while the embodiment described has a barrel-shaped portion on each arm engageable by snap action in the end plate, such portion may be of any other suitable shape for engaging by snap action in a suitably shaped hole in the end plate. Again, one or more of these portions may be omitted or replaced by a pin or other portion which is engageable without snap action in the end plate, or the end plate may be secured by screws to the support arms. Still alternatively, the portions or pins may be provided on the end plate for engaging by snap action or otherwise in holes provided in an adjacent end surface of the support arms.

The number rings illustrated in FIG. 3 are intended to provide a visual indication and may be replaced by number printing rings for printing the setting of the counter mechanism. The number rings need not be made of plastic material but could be made of metal. A different number of these rings to meet different requirements may be provided.

The counter mechanism may be completely enclosed, for example, in a cylindrical cover cast or moulded as an extension of the joining portion 2.

The support arms need not be of one piece with the joining portion 2 but may be fixed thereto, for example by a sliding fit in recesses of the joining portion 2.

I claim:

1. A counter mechanism comprising, a plurality of coaxially mounted number rings, a plurality of spaced arms arranged around the axis of rotation of said number rings, and means supporting said spaced arms in fixed relationship to each other, said arms extending through each of said number rings and supporting the same.

2. A mechanism as defined in claim 1, wherein said support arms each have an arcuate surface engaging the inner peripheries of said number rings.

3. A mechanism as defined in claim 1, and further comprising an end plate, and means fastening said end plate to said support arms, said end plate retaining said number rings on said support arms.

4. A mechanism as defined in claim 3, wherein said fastening means comprise a portion at the end of each support arms, said portions being shaped for engaging complementary holes in said end plate by snap action.

5. A mechanism as defined in claim 4, wherein said means supporting said spaced arms carrying said support arms, said joining portion and said support arms being of synthetic plastic material.

6. A mechanism as defined in claim 5, wherein said means supporting said spaced arms and said support arms form a unitary single structure.

7. A mechanism as defined in claim 6, and further comprising a shaft, and a plurality of transfer pinions carried by said shaft, said shaft being supported at one end by said means supporting said spaced arms and at its opposite end by said end plate.

8. A mechanism as defined in claim 7, and further comprising an input shaft passing through holes in said means supporting said spaced arms and said end plate.

9. A mechanism as defined in claim 8, wherein said number rings, said transfer pinions and said shaft carrying said transfer pinions are of synthetic plastic material.

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