

[54] **NUMERICAL COUNTER WITH COAXIAL
DISPLAY DRUMS**

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[56]

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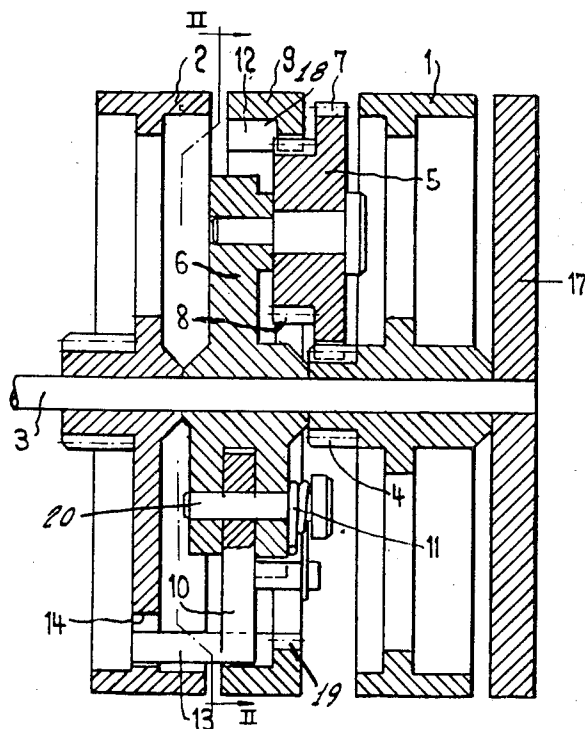
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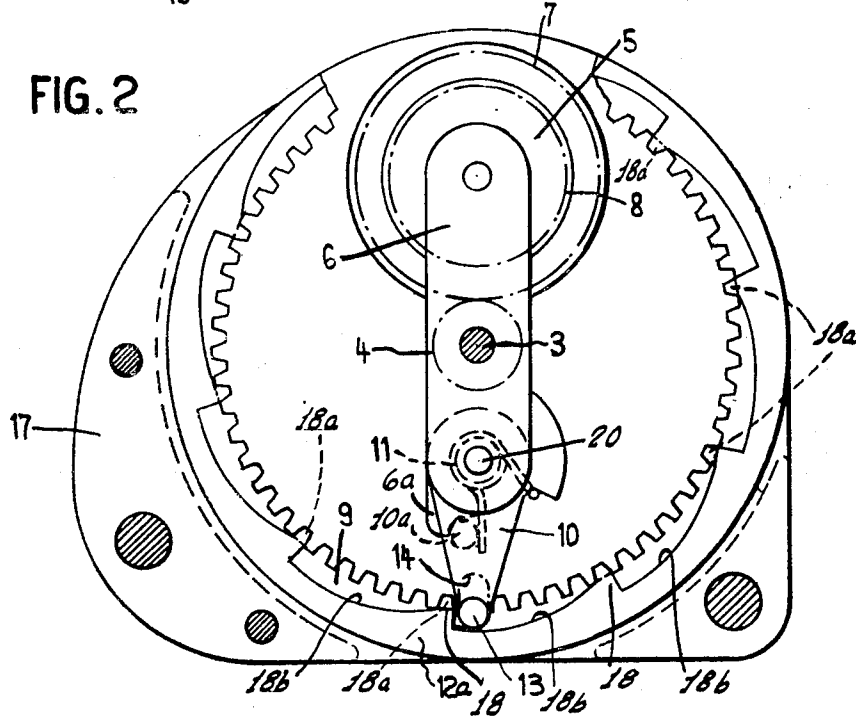
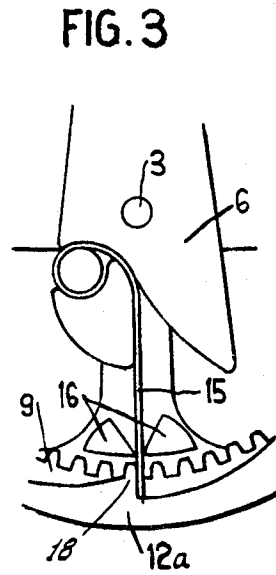
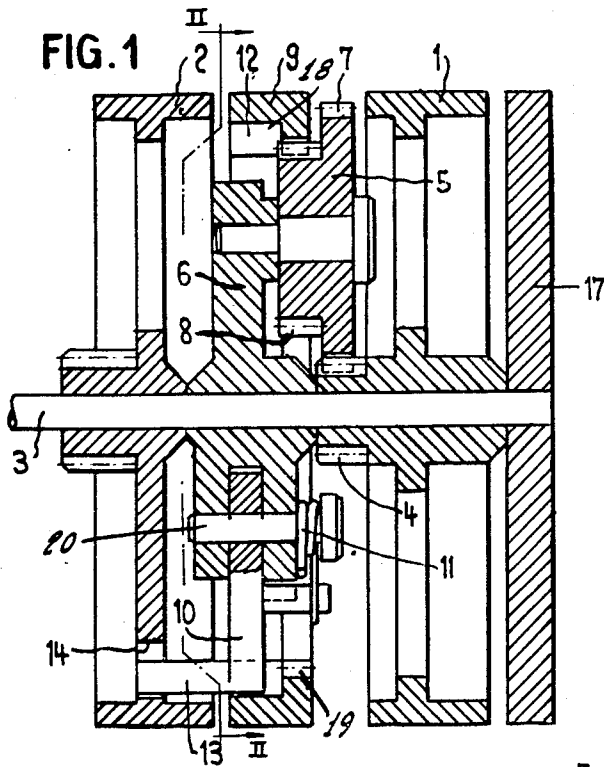
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ABSTRACT

A numerical counter having coaxial drums, wherein a driving drum entrains a planet wheel pivoted on a planet wheel carrier and rolling inside a fixed sun wheel, the device being such that when the driving drum turns in a predetermined direction it turns the planet wheel carrier, a resilient member is primed gradually and then abruptly drives a subsequent drum.

7 Claims, 3 Drawing Figures





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NUMERICAL COUNTER WITH COAXIAL DISPLAY DRUMS

BACKGROUND OF THE INVENTION

Numerical counters, especially those with coaxial display drums, are well known in the mechanical art. They are e.g. used to display the time in a clock, as speedo-, gas-, electricity- and water-meters or as revolution counters. Those kinds of numerical counters are usually very complicated in construction and therefore voluminous. Moreover their function is not always reliable and correct, because they are sensible to mechanical shocks and vibrations.

SUMMARY OF THE INVENTION

The present invention provides numerical counters of a simple construction and high performance.

The numerical counter of this invention comprises coaxial drums, from which the driving drum engages a planet wheel pivoted on a planet wheel carrier and rolls inside a fixed sun wheel. An operating member, mounted on the said planet wheel carrier, engages at one end with a fixed ratchet wheel coaxial with the said sun wheel, the device being such that when the driving drum turns in a predetermined direction, it turns the planet wheel carrier so that the said operating member disengages itself little by little from the said ratchet wheel whilst priming a resilient member, and leaves the ratchet after a certain distance, the said operating member then abruptly entraining a subsequent (driven) drum.

BRIEF DESCRIPTION OF THE DRAWING

The accompanying drawing shows by way of example one embodiment, and a variation, of the numerical counter forming the subject of the invention. The drawing only show what is necessary for the understanding of the invention.

FIG. 1 is a view in axial section of an embodiment.

FIG. 2 is a view thereof in transverse section, along line II-II of FIG. 1.

FIG. 3 is a view of the variant.

DETAILED DESCRIPTION OF THE INVENTION

Referring specifically to the drawing, a numerical counter according to the invention as best shown in FIG. 1, comprises in a housing 17, several coaxial drums, e.g. display drums two only of which are shown. In the shown embodiment drum 1 acts as a driving drum, and drum 2 is a driven drum, which may drive a third drum (not shown) and so on, in succession. Each of the drums carries on its periphery a set of graduations, ciphers or signs.

The driving drum 1, freely mounted on a shaft 3, carries a pinion 4 which meshes with a planet wheel 5 pivoted on a planet wheel carrier 6. The planet wheel 5 presents two rings of teeth, one ring 7 meshing with the pinion 4, and another ring 8 meshing with a fixed sun wheel 9 having an inner ring of teeth 19, inside which the planet wheel 5 is adapted to turn.

A pawl 10, loosely mounted on an axis 20 of the planet wheel carrier 6, is under the action of a return spring 11 and normally rests against a tooth 18 of a fixed ratchet wheel 12 constituted by a ring 12a having inner ratchet teeth 18. Alternatively, the ratchet wheel 12 may be replaced by a series of gudgeon pins 18a as indicated by dotted lines in FIG. 2, equi-distantly dis-

posed round a circle. At its free end the pawl 10 carries a finger 13 engaging in a slot 14 of the driven drum 2.

When the driving drum 1 turns in a predetermined direction, e.g. in the clockwise direction of FIG. 2, its pinion 4 turns the planet wheel 5 which rolls inside the fixed sun wheel 9, so that the planet wheel carrier 6 turns around the shaft 3 in the clockwise direction of FIG. 2. Subsequently, the pawl 10, originally retained by a tooth 18 of the ratchet wheel 12, rotates around the pin 20 and radially slides outwardly on the tooth 18 of the said wheel 12 and simultaneously spring 11 is wound up. After a certain amount of rotative movement of the planet wheel carrier 6, the pawl 10 leaves the tooth 18 of the ratchet wheel 12 and abruptly entrains the driven drum 2 by way of its finger 13 engaging the slot 14.

In the numerical counter according to the invention, the driving drum 1 can only be rotated in one direction, namely in clockwise direction. If an attempt to rotate the drum in the reverse direction is made, it can be displaced through a limited angle only, then it is blocked, because the pawl 10 abuts against a ram 18b, separating two teeth 18 of the ratchet wheel 12. The pawl 10 cannot pivot backwardly, because its security pin 10a, which cooperates with the spring 11, abuts against a part 6a of the planet wheel carrier 6. The driven drum 2 cannot be rotated manually either forwardly or backwardly.

In the variant shown in FIG. 3 the pawl 10 and its spring 11 are replaced by a single leaf spring 15 mounted on the planet wheel carrier 6 and passing between two studs 16 of the driven drum 2. The free end of the spring 15 engages directly a tooth 18 of the ratchet wheel 12. Its function is similar to that of the elements 10, 11 and 13 of the embodiment shown in FIG. 2.

The numerical counter according to the invention ensures a good resistance against shocks, so that there is no risk of unwanted drum movement. The force necessary to rotate the driven drums is accumulated progressively during the rotation of the driving drum, the motive force of which is of saw tooth form. The driving drum 1 can turn in a continuous manner or intermittently.

What we claim is:

1. A numerical counter comprising at least two coaxial toothed drums, one of said drums being a driving drum and the other being a driven drum, a fixed double toothed ratchet wheel supported coaxially to said drums, a rotatable planet wheel carrier mounted coaxially to said drums and said ratchet wheel and carrying a planet wheel with two toothings and an operating member, one of said toothings of said planet wheel engaging the toothing of said driving drum, the other one of said toothings of said planet wheel engaging one of the toothings of said fixed ratchet wheel, said operating member cooperating with the second toothing of said ratchet wheel and with said driven drum to drive the latter abruptly when the driving drum has effected a predetermined number of revolutions.

2. A numerical counter in accordance with claim 1 wherein the said operating member comprises a pawl with a return spring.

3. A numerical counter in accordance with claim 2 wherein the said pawl carries a finger engaging in a slot of the driven drum.

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4. A numerical counter in accordance with claim 1 wherein the said operating member comprises a leaf spring.

5. A numerical counter in accordance with claim 4 wherein the leaf spring is located between two studs carried by the driven drum.

6. A numerical counter in accordance with claim 1

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wherein the said fixed ratchet wheel consists of a ring with inner ratchet teeth.

7. A numerical counter in accordance with claim 1 wherein the said fixed ratchet wheel is formed by a series of gudgeon pins equidistantly disposed round a circle coaxial to said drums.

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