May 3, 1960 A. L. BURTON 2,935,256

PREDETERMINER COUNTER

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FIG. 1

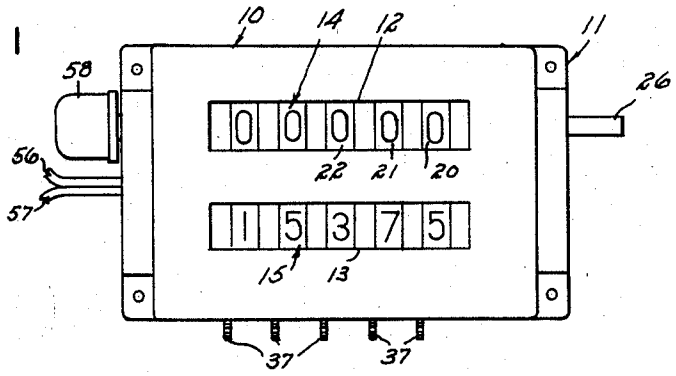


FIG. 3

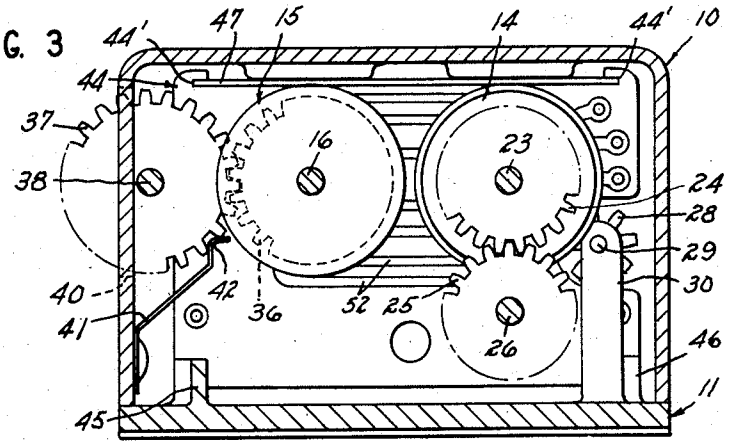
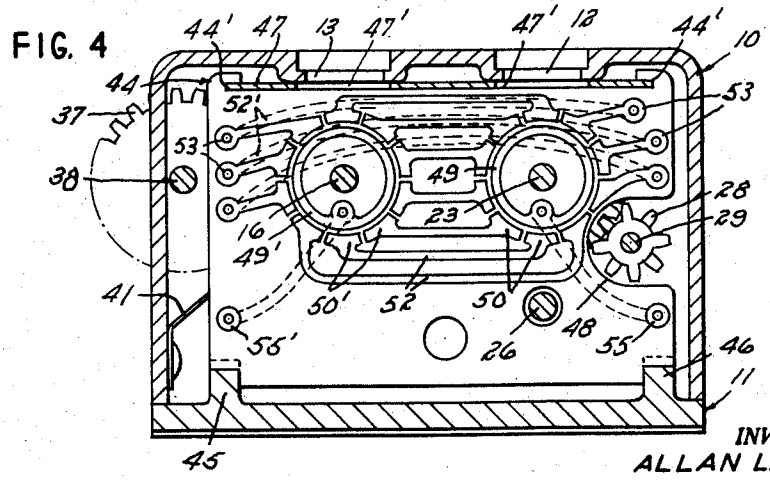


FIG. 4



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FIG. 2

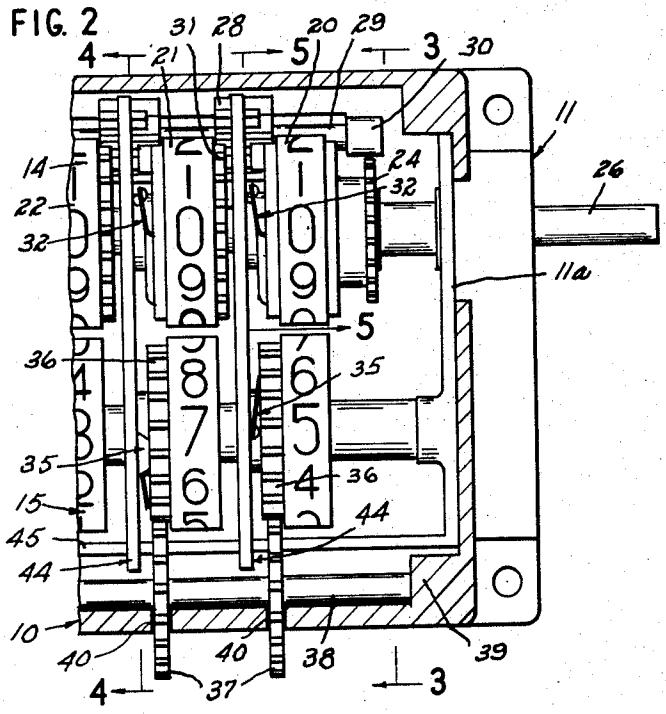
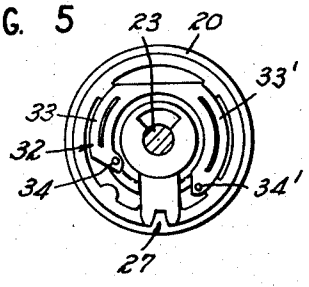


FIG. 5



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PREDETERMINER COUNTER

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Application June 19, 1956, Serial No. 592,341

5 Claims. (Cl. 235—132)

This invention relates generally to counters or registers of the predeterminer type having means for providing an electrical signal at a predetermined rotated position of the number wheels. The invention is directed, more particularly, to a novel and improved means for setting the counter to provide an electrical signal at a selected predetermined rotated position of the number wheels.

It is usual in counters of the type described that in order to establish or change the predetermined number at which an electrical signal will be provided, it is necessary to rearrange the electrical connections which normally are located internally of the counter and this frequently requires at least a partial disassembly of the counter. Also, in counters of this type there normally are no means which will provide an external visual indication when the counter has been reassembled of the predetermined number for which the counter has been set.

It is, therefore, an object of the present invention to provide in a counter of the type described novel and improved means to set the predetermined number for the counter without requiring any disassembly of the counter.

It is another object of the invention to provide a counter of the type described whereby an indication of the predetermined number is always visually apparent to the operator.

It is further an object of this invention to provide a counter of the type described whereby the predetermined number may be changed by a simple adjustment of a control member externally of the counter.

It is still further an object of this invention to provide a counter of the type described which is simple and economical to manufacture yet which is rugged and which will provide trouble-free operation over long periods of use.

Other objects will be in part obvious, and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereafter set forth and the scope of the application of which will be indicated in the appended claims.

In the drawings:

Fig. 1 is a top view of a counter embodying the present invention;

Fig. 2 is a fragmentary top view of the counter of Fig. 1 with a portion of its housing removed to reveal a portion of the internal elements;

Fig. 3 is a cross sectional side view of the counter of Fig. 2 taken along the line 3—3;

Fig. 4 is a cross sectional side view of the counter of Fig. 2 taken along the line 4—4; and

Fig. 5 is a cross sectional view showing the inner side of the first number wheel and taken along the line 5—5 of Fig. 2.

With reference to the drawings wherein is shown a specific embodiment of a counter incorporating the present invention, the counter is generally comprised of an

enclosing housing 10 mounted upon a base 11 having upstanding end walls such as 11*a*. The housing 10 is provided with a pair of parallel spaced-apart viewing apertures 12 and 13 through which may be viewed numerical indicia on the number wheels of a counter 14 and on a plurality of selector wheels 15, the purpose of which will be hereinafter explained.

The counter 14 is comprised of a plurality of aligned number wheels such as 20, 21 and 22, as seen in Fig. 2, rotatably mounted on a reset shaft 23 journaled in the end walls of the base 11. The lowest order number wheel 20 is connected for rotation with a driven gear 24 rotatably mounted on the shaft 23, the gear 24 being in engagement with a pinion 25 fixed to a shaft 26 which extends outwardly at one end from the end wall 11*a* of the base and is adapted to be connected to the means driving the counter. With the exception of the highest order number wheel of the counter, each number wheel is provided with a locking ring and a two-toothed gear segment, such as generally indicated at 27 in the case of the number wheel 20, which locking ring and gear segment are engageable with the mutilated portion of a mutiliated pinion 28 rotatably mounted on a shaft 29 journaled on upright supports such as 30 on the base 11. The unmutilated portion of the pinion 28 engages a driven gear such as 31 on the next highest order number wheel whereby when a lower order number wheel is rotated one full revolution the next highest order number wheel will be rotated $\frac{1}{10}$ of a revolution.

For a purpose to be more fully hereinafter explained, in the specific embodiment a bridging element 32, as can be seen in Fig. 5, is mounted on each of the number wheels of the counter for rotation therewith. The bridging elements 32 are each provided with a pair of leg portions 33, 33′ which are electrically connected and which carry at their free ends contact portions 34, 34′.

In accordance with the invention, there is provided a plurality of movable selector members or wheels 15 provided with numeral indicia corresponding to the indicia of the number wheels of the counter and rotatably mounted on a shaft 16 disposed parallel to the axis of the counter and journaled in the end walls of the base 11. There is provided one selector wheel 15 for each of the number wheels of the counter and for a reason to be hereinafter explained, each of the selector wheels is provided with an electrical contacting element which in the specific embodiment is a bridging element 35 similar to and mounted similarly to the bridging element 32 on the number wheels. Any suitable means may be provided for changing the rotated position of the selector wheels 15. In the specific embodiment, gear 36 is mounted on each of the selector wheels 15 for rotation therewith, and a setting gear 37 rotatably mounted on a shaft 38 journaled in the housing as at 39 is drivingly engaged with each of the gears 36. As can be seen in Figs. 2 and 3 elongated slots 40 are provided in the housing 10 to accommodate the gears 37, whereby a portion of the gears 37 extends outwardly of the housing to permit them to be turned manually from the exterior of the housing.

Associated with each gear 37 is a holding detent in the form of a leaf spring 41 which, as can be most clearly seen in Fig. 3, has one end mounted on the side wall of the housing and is provided at the other end with a V-shaped detent portion 42 engageable with the teeth of gear 37 so as to impede rotation thereof and thus maintain the selector wheels 15 in selected position.

In accordance with the invention, an elongated relatively thin stator plate 44 is mounted parallel to and closely adjacent the side of each associated pair of number wheels and selector wheels and is supportingly received in slots disposed transversely of supporting mem-

bers 45 and 46 integral with and extending longitudinally of the base 11. A transverse supporting plate 47 extends across the tops of the stator plates 44 and is received in slots therein as at 44'. The plate 47 is provided with elongated apertures 47' registering with the viewing apertures 12 and 13 of the housing 10. The stator plates 44 are further provided with a recess 48 in one edge thereof for the reception of the transfer pinions 28 associated with the number wheels of the counter.

The stator plates 44 are formed of a material which is electrically nonconductive and, as most clearly seen in Fig. 4, there is formed thereon by suitable means, such as printing, an electrical circuit comprising an electrically conductible common or ground ring 49, 49' associated respectively with the number wheels of the counter and the selector wheels 15, as well as a plurality of individual electrically conductible contact segments as indicated at 50 and 50' of a number corresponding to the number of numeric indicia on the number wheels and selector wheels. Each contact segment 50 is electrically interconnected with a similar segment 50' either by the conductive portions or strips as indicated at 52 on the same side of the plate 44 or by printed strips 52' on the reverse side which are connected to the segments through eyelets 53. Each stator plate is provided with terminals 55, 55' which, as can be seen in Fig. 4, are connected respectively to the ground or common rings 49, 49'. The bridging elements 32 and 35 described above are disposed such that one of the contact portions of each carried by the legs thereof is in continual wiping contact with the associated ground or common rings 49, 49' while the other contact portion of each will sequentially contact the individual contact portions such as 50, 50', as the number wheel or selector wheel is rotated. The contact portions are so located that when the same number appears on both the number wheel and the associated selector wheel as viewed through apertures 12, 13, a circuit will be completed by bridging element 32 from ground ring 49 to the contact segment 50 which is connected to the contact segment 50' which is in turn connected by bridging element 35 to the ground ring 49'.

The purpose of the counter is to provide an electrical signal by closing an electrical circuit when a predetermined number is reached by the entire counter. Accordingly, the stator plates are connected in series which is to say the terminal 55 or 55' of the first plate is connected to the terminal 55 or 55' of the second plate, the remaining terminal 55 or 55' of the second plate being connected to the terminal 55 or 55' of the third plate, and so forth, until all of the plates are connected in series. The connecting wires between the plate terminals have been omitted from the drawing for simplicity and clarity of presentation. The outside lead lines 56, 57 are connected to remaining terminal 55 or 55' of the first and last plates, respectively.

In the operation of the counter, the setting gears 37 are first turned manually to set the selector wheels 15 to indicate the predetermined count in viewing window 13 at which an electrical signal will be given by the counter 14 and the counter 14 is preferably reset to zero such as by turning the reset handle 58. During the counting operation, the counter 14 will advance from zero to the same number indicated by the selector wheels 15 whereupon the electric circuit to lead wires 56 and 57 will be closed. At any time a different predetermined number can be set merely by turning the setting gears 37 and the predetermined number is always readily visible through the aperture 13.

From the above, it can be seen that there has been provided a predetermining counter of the type described whereby the predetermined number may be easily changed by a simple adjustment of an externally accessible member and whereby the predetermined number set in the counter is visually apparent to the operator at all times to assure proper and easy setting.

For simplicity and brevity of presentation, the specific embodiment of the invention shown in the drawing is one in which an electrical signal is produced at a single predetermined count of the counter 14 as set by a single set of selector wheels 15. It is not intended to limit the invention to the use of a single set of selector wheels 15 since duplicate sets of selector wheels may readily be added within the scope of the invention.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

I claim:

1. In a predeterminer type of counter, a set of coaxially mounted operatively connected counter wheels, a set of coaxially mounted independently rotatable selector wheels corresponding in number to the counter wheels, the selector wheels being radially aligned with their corresponding counter wheels, means for manually setting said selector wheels a series of fixed stator plates each extending transversely of and closely adjacent a selector wheel and corresponding counter wheel, an electrical contact member carried by each of the selector wheels and counter wheels, and electrical circuit means on each of the stator plates cooperating with the contact members to provide a series circuit through said contact members when the counter wheels and selector wheels are in predetermined rotated position.

2. In a predeterminer type of counter, a set of coaxially mounted operatively connected counter wheels having numerical indicia thereon, a set of coaxially mounted independently rotatable selector wheels corresponding in number to the counter wheels, the selector wheels being radially aligned with their corresponding counter wheels and having indicia thereon corresponding to the indicia on the counter wheels, a series of stator plates each extending transversely of and closely adjacent a selector wheel and corresponding counter wheel, an electrical contact member carried by each of the selector wheels and counter wheels, electrical circuit means on each of the stator plates cooperating with the contact members when the counter wheels and selector wheels are in selected rotated position to provide a series connection through said contact members, a housing enclosing the counter wheels and selector wheels having means for viewing said wheels, and means operable externally of the housing for manually setting the selector wheels at a selected predetermined count.

3. In a predetermining counter, an enclosing housing, a plurality of coaxially aligned operatively connected rotatable counter wheels within the housing having indicia thereon, an electrical contact member carried by each counter wheel, a first set of electrically conductive elements mounted about the axis of eah of the counter wheels for cooperation with the contact members, a plurality of coaxially aligned independently rotatable selector wheels mounted within the housing and having indicia thereon corresponding to the indicia on the number wheels, a second set of electrically conductive elements respectively connected to said first set and arranged about the axis of each of the selector wheels, contact means on the selector wheels electrically cooperable with said second set of conductible elements to provide a current path to one of said first set of electrically conductive elements depending upon the rotated position of the se-

lector wheel, and means for presetting the rotated position of the selector wheels.

4. In a predetermining counter, an enclosing housing, a plurality of coaxially aligned operatively connected rotatable counter wheels mounted within the housing and having indicia thereon, a plurality of independently rotatable coaxially aligned selector wheels mounted within the housing and provided with indicia thereon corresponding to the indicia on the counter wheels, a single stator plate disposed transversely of the axis of each selector wheel and corresponding counter wheel provided with electrically conductive ring portions disposed coaxially of the wheels and a set of circularly arranged electrically conductive individual contact portions disposed radially of each of the ring portions with each individual contact portion of one set respectively electrically connected to the corresponding individual contact portion of the other set, a bridging contact element mounted on each wheel having electrically connected contact portions for cooperation respectively with the ring and individual contact portions of the stator plate, and means to set the selector wheels at a predetermined count.

5. In a predetermined counter of the type having an enclosing housing, a plurality of coaxially aligned operatively connected rotatable counter wheels mounted within the housing and having indicia thereon, a set of electrically conductible elements arranged about the axis of each of the counter wheels, a plurality of independently rotatable coaxially aligned selector wheels mounted within the housing and provided with indicia corresponding to the indicia on the number wheels, a drive gear attached to each selector wheel, a manually rotatable setting member for each selector wheel having gear teeth engaged

with the drive gear of the selector wheel and with a manually engageable portion of said member extending externally of the housing, a second set of electrically conductive elements respectively connected to the first set of electrically conductive elements and arranged about the axis of each of the selector wheels, and contact means on the counter wheels and selector wheels electrically cooperable with said conductive elements to provide a current path when the readings on the counter wheels and selector wheels are the same.

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