Oct. 7, 1969 H. SOUPENNE 3,471,085

OVERTHROW PREVENTING MECHANISM

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FIG.2.

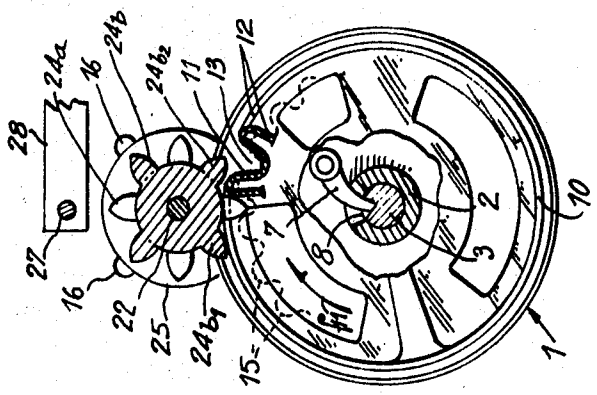
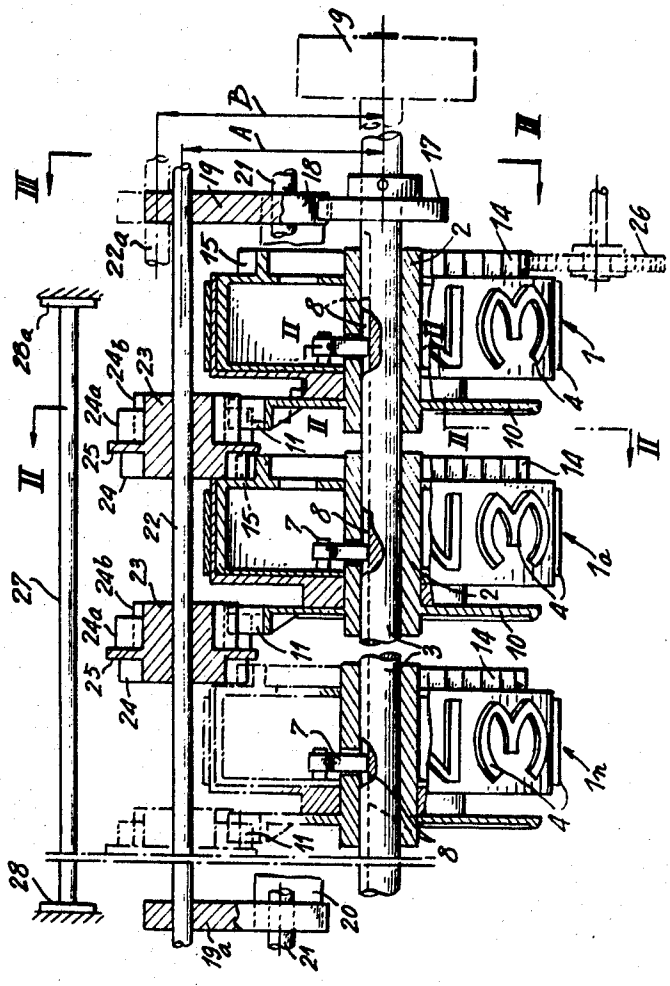


FIG.1.



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Fig. 4.

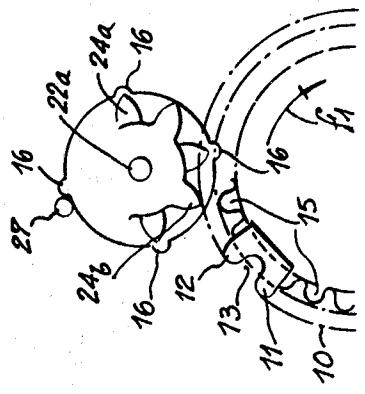
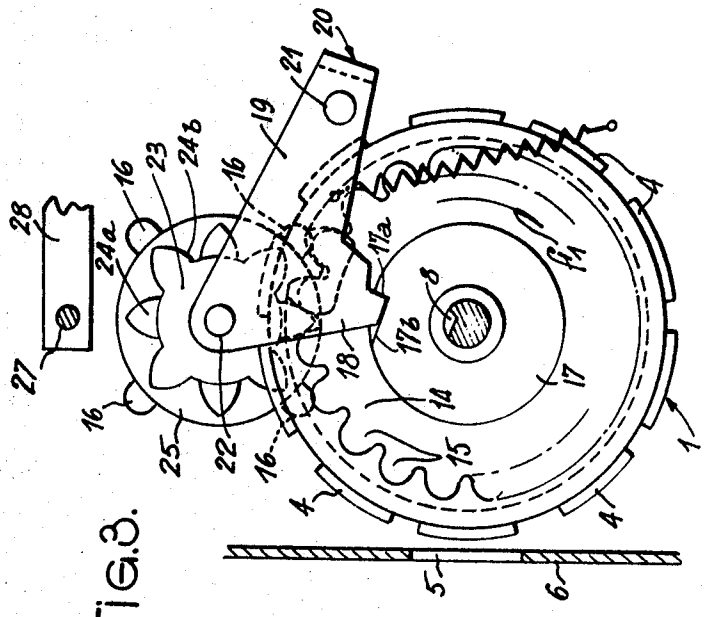


Fig. 3.



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OVERTHROW PREVENTING MECHANISM

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Int. Cl. G06c 25/00, 15/42
U.S. Cl. 235—131 4 Claims

ABSTRACT OF THE DISCLOSURE

Device for the resetting to zero of indicating mechanisms having drums carrying digits, controlled by the rotation of an axle carrying the drums after raising of the shaft carrying pinions which serve to register the amount transferred, said mechanism being characterized in that each pinion has a circular reinforcement wall provided with four equidistant embossments or studs which abut a fixed rod parallel to the axle carrying the pinions when said axle is raised at the beginning of the resetting operation and escape from said rod at the end of said resetting operation so as to allow the normal functioning of the mechanism when said axle is reset to its previous position, the drums then displaying the digit 9.

Indicating mechanisms, particularly provided for liquid volumes and prices thereof are known, such as those equipping gas-station pumps, and also the subsidiary mechanisms designed in a similar way to predetermine those quantities and eventually to print them.

The drums which carry the digits of such indicating mechanisms have to be reset to zero, and various known devices are provided to obtain this result. This resetting to zero has to be performed through low work means, either to relieve the work of the user, or to combine those means with automatic resetting systems taking their energy from the measuring mechanism, without affecting the accuracy of the measure. Moreover, said resetting must be made in only one operation which is not realized with conventional mechanisms in which a drum may accidently overpass the digit 0 if it has received too strong an impulse. It then becomes necessary to make a supplementary operation to obtain the resetting to zero in a convenient way.

The present invention has for its object the resetting to zero of the drums with a minimum of work, by simpler and more certain means than the presently known ones.

It consists essentially in providing blocking means for each drum, said blocking means acting at the moment when the digit 9 of a particular drum appears on the totalizator, and ceasing to act when all the drums register "9" so that all the drums simultaneously move to show the digit 0. After the rotation of the drive shaft during the resetting operation ends the operation continues in the same manner as in the course of normal counting, when the counter being at the maximum of its counting capacity, for example 9 999, goes back to 0 000.

The characteristics of the invention will be clear from the following description having reference to the accompanying drawings which show an illustrative but not limitative embodiment of the present invention and in which:

FIG. 1 is a partial longitudinal cross section of the device of the invention.

FIG. 2 is a section taken along line II—II of FIG. 1.

FIG. 3 is a section taken along line III—III of FIG. 1.

FIG. 4 is a diagrammatic elevation corresponding to FIG. 2 and illustrating a characteristic position of some parts of the device.

According to FIG. 1 the device comprises a plurality of

indicating drums **1**, **1***a* . . . **1***n* each one comprising a hub **2** rotatable on a shaft **3**. The drums **1** to **1***n* include at the periphery thereof digits 4 numbered 0 to 9, said digits are provided to appear through a window **5** of a mask **6** diagrammatically illustrated in FIG. 3. The hubs **2** of each drum are connected to the shaft **3** by means of ratchets **7** which may as shown in FIG. 2 penetrate a longitudinal slot **8** provided in the shaft **3**, that is to say the ratchets **7** constitute, so to speak, a free wheel mechanism allowing said drums to turn freely on the shaft **3** when they are driven in the direction designated by the arrow f_1 (FIG. 2) make it possible to drive said drums **1** to **1***n* when the shaft **3** is itself driven in the direction of the arrow f_1 for example by means of a handle **9**.

On one of their sides, as shown in FIGS. 1 and 2, the drums are rigidly connected to a ring **10** hereinafter called locking member or circle. This ring **10** is provided with two teeth **11** and **12** separated by a space **13**. The drawing shows, and more particularly in FIG. 1 that said two teeth **11** and **12** protrude laterally with respect to the ring **10**.

On the other side of the drums **1** to **1***n* there is provided a gear **14**, having teeth **15** which extend to a circumference of a radius smaller than the radius of the locking-circle **10**.

In addition to the drums **1** to **1***n* described in the preceding, the shaft **3** carries a cam **17**, see FIGS. 1 and 3. Said cam **17** is circular as shown on FIG. 3, but is provided with a stop **17***a* and a ramp **17***b*, to control a catch **18** forming a part of one of the wings **19** of a stirrup-piece, designated as a whole by the number **20** and comprising another wing **19***a* (FIG. 1). The stirrup-piece **20**, is mounted on an axle **21** having bearings not shown and in turn supports between the wings **19** and **19***a*, an axle **22** extending parallel to the shaft **3**. The axle **22** supports rotatable pinions **23** which serve to register the amount carried transfer and are hereinafter called transfer pinions. Said pinions include a gear **24** normally engaging with the gears **14** of the drums, and a gear **24***a* having the same number of teeth as gear **24** from which it is separated by a circular reinforcement wall **25**. The top of the teeth of the gear **24** extend around a circumference of a smaller radius than the circumference of the top of the teeth of the gear **24***a*. Moreover, the transfer pinions **23** comprise a third gear **24**b which is constituted by an extension of alternate teeth of the gear **24***a*. The gear **24***b* is disposed in the same plane as the one passing through the locking circle **10**, while the gear **24***a* extends in the plane passing through the protruding part of the teeth **11** and **12** of said locking circle **10**. The drawing also shows that the circular wall **25** is provided on the periphery thereof with embossments **16**, being for example four in number, as shown in FIG. 3.

When a drum turns, two teeth of gear **24***b*, being here the teeth $24b_1$, and $24b_2$ (FIG. 2), bear on the periphery of the locking circle **10**, preventing the transfer pinion **23** from rotating, said pinion **23** being then locked by the locking circle **10**. When one of the drums, drum **1** for example, being the drum of the units, has turned enough, then one of the teeth of the gear **24***a* is engaged by one of the teeth **11** or **12**, which caused transfer pinion **23** to turn, a tooth **24***b* of said pinion comes then into space **13** so that the pinion **23** is turned up to the moment when two new teeth of the gear **24***b* come to bear upon the locking circle **10**.

The movement of the transfer pinion **23** is obviously transmitted by the gear **24** to the gear **14** of the drum **1***a* which turns a measure corresponding to one unit that is to say the next higher digit of this pinion is brought to appear in front of the corresponding window **5**.

The working here above described is produced when the catch **18** is in the bottom of the notch of the cam **17**,

that is to say when the totalizing mechanism is driven by a mechanism not shown but indicated by a pinion **26** (FIG. 1) driving the gear **14** of the first drum.

As shown in FIG. 4, the drive of gears **14** by means of the teeth **15** and the gear **24** of the forward pinions **23** may cease as soon as the forward pinions **23** are raised when the axle **22**, initially at the distance A from the axis of the shaft **3**, is brought to a distance B from the axis of said shaft **3**. However, in this case, one of the teeth of the gear **24***b* may still bear on the locking circle **10** to prevent an hazardous rotation of the forward pinions **23** (see FIG. 4).

The raising of the forward pinions **23** by raising axle **22** is accomplished by the cam **17** which is chosen in such a manner that, when the mechanism is in its normal working position, that is to say when the drums are driven by the pinion **26**, the distance between the axle **22** and the axis of the shaft **3** is equal to A, which produces an in-gear position of the gears, especially of gears **24** and **14** and that this distance is brought to a measure B when the shaft **3** is positively driven by handle **9** so as to actuate the cam **17** to bring the catch **18** onto the circular bearing of said cam thus raising axle **22** to position **22***a*.

In addition the device further includes fixed abutments facing each forward pinion **23**. Such abutments are, for example, constituted by a rod **27** carried by supporting means **28** and **28***a*. The setting of the rod **27** is determined in order to permit the forward pinions **23** to turn freely when their supporting axle **22** is at distance A (FIG. 1) from the axis of the shaft **3** which is the case represented in FIG. 2, but that the embossments **16** will abut said rod **17** when the pinions **23** are raised by raising axle **22** to the position **22***a*, i.e., distance B from the axis of the shaft **3**.

In such circumstances, when the mechanism has been used to totalize a flow output, for example, and it becomes necessary to reset the drums to zero, one proceeds as follows:

By means of the operating handle **9**, the shaft **3** is actuated to rotate 360° in the direction of the arrow f_1 (FIG. 2), that is to say in the direction by which said shaft will drive the drums **1** to **1***n* by their ratchets **7**, said direction corresponding to the one in which the drums are driven during the counting operation. First of all, the ramp **17***b* of the cam **17** causes the catch **18** to raise and consequently, the stirrup-piece **20** pivots around the axle **21** so that the axle **22** is brought to position **22***a* as is shown in FIGS. 1 and 4 and the distance between said axle **22** and the axis of the shaft **3** is then B. In this way, the gears **24** of the transfer pinions **23** do not engage the teeth **15** of gears **14**, but one of the teeth of the gear **24***b* bearing on the locking circle **10** as in FIG. 4 prevents the rotation of said forward pinions **23**. The various drums **1** to **1***n* are thus driven without being braked when their ratchet **7** comes in the slot **8** of the shaft **3** during the rotation of said shaft.

As the movement transmitted to the shaft **3** by the handle **9** or by any other mechanism, may be relatively fast and the inertia of the drums **1** to **1***n* being obviously greater than zero, it could happen that said drums would go on turning when said handle **9** has completed 360°, so that a digit other than the digit 0 of each drum would appear in front of the windows **5**. However, this event can not happen in the case of the present invention because, when the teeth **11** and **12** of the locking circle **10** of one of the drums engage a tooth **24***b* of the corresponding transfer pinion **23**, said pinion can turn only by a limited amount, that is up to the moment when one of the embossments **16** comes against the rod **27**, thereby blocking the rotation of both the forward pinion and the considered drum. As the slot **8** of the shaft **3** is rectilinear, the same result occurs at the same angular position of each drum **1** to **1***n* and it is made so that said result occurs when the digit 9 of each drum appears in the window **5** and when the shaft **3** has been turned by $\frac{9}{10}$ of one turn or 324°.

During the last tenth of the turn of shaft **3**, the catch **18** (FIG. 3) engages stop **17***a* of the cam **17** which brings the axle **22** to its previous position at which said axle is at a distance A from the shaft **3**, and all the drums then pass from the digit 9 to the digit 0, said rotation being followed by a simultaneous rotation all of the forward pinions **23** which are then freed from the rod **27** in the very same way as occurs when said mechanism has come to the maximum of its counting capacity and thus passes again automatically to zero.

While there has been described and illustrated an embodiment of the invention, it is to be understood that it is not intended to be restricted solely thereto but it is intended to cover all modifications thereof which would be apparent to one skilled in the art which come within the spirit of the invention.

I claim:

1. A totalizating mechanism having a plurality of indicating digital drums arranged in series on a main shaft and means for positively rotating said drums on said shaft to indicate a series of progressively increasing values including means for resetting said drums to indicate zero which comprises,

ratchet means allowing said drums to rotate freely in one direction on the main shaft and to be positively driven by the main shaft when the shaft is driven in the same direction,

a locking circle rotatable with each drum and having teeth-engaging means at only one location on the periphery thereof,

a gear rotatable with each drum,

an axle having its axis parallel to the axis of the main shaft,

a plurality of interconnecting pinions rotatably mounted on said axle, each pinion having a plurality of sets of gear teeth which engage respectively with the teeth of the rotatable gear and with the locking circle of the preceding drum to prevent rotation of said pinion except when said pinion engages said teeth-engaging means at the one location and a plurality of embossments located about the periphery of each of said pinions,

means for positively rotating the main shaft for resetting the drums to zero,

means operable by said means for rotating the main shaft for displacing the axle with respect to the main shaft while maintaining the parallel relationship therebetween whereby each interconnecting pinion will be disengaged from the associated rotatable gear while continuing to engage the locking circle of a preceding drum to prevent rotation of said pinion except when said opinion engages said teeth-engaging means at the one location of said locking circle,

fixed abutment means located to permit rotation of said pinions when said pinions are engaged with the rotatable gears of the drums, and to prevent rotation of said pinions by obstructing movement of said embossments when said axle is displaced, said axle displacing means being operable to return the axle to its original position parallel to the main shaft when the digital drums have been reset to zero.

2. A totalizating mechanism as claimed in claim **1**, and further comprising means for viewing only one number on each digital drum at a time and in which said fixed abutment means abut the embossments of said pinions when the teeth-engaging means of said locking circle engage the associated set of gear teeth of said pinion only when the figure "9" on the digital drum can be viewed in said viewing means.

3. A totalizating mechanism as claimed in claim **1** in which the means for displacing the axle with respect to the main shaft comprise a cam element secured to said main shaft and means operable by said cam for displacing said axle while maintaining a parallel relationship with said main shaft when said main shaft is positively driven.

4. A totalizating mechanism as claimed in claim 1, wherein the fixed abutment means comprises a rod disposed in parallel relation to the axis for said pinions.

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U.S. Cl. X.R.

235—144