April 18, 1961 W. W. HOFFMANN 2,980,329

COUNTER RESETTING MEANS

Filed Sept. 28, 1956 2 Sheets-Sheet 1

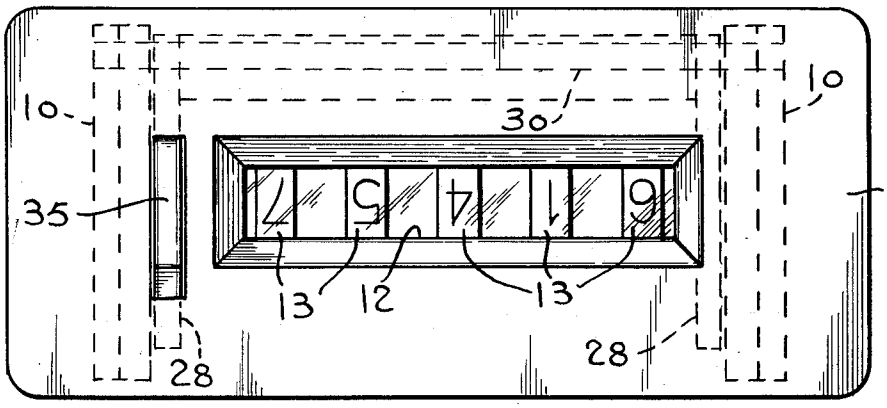



FIG. 1

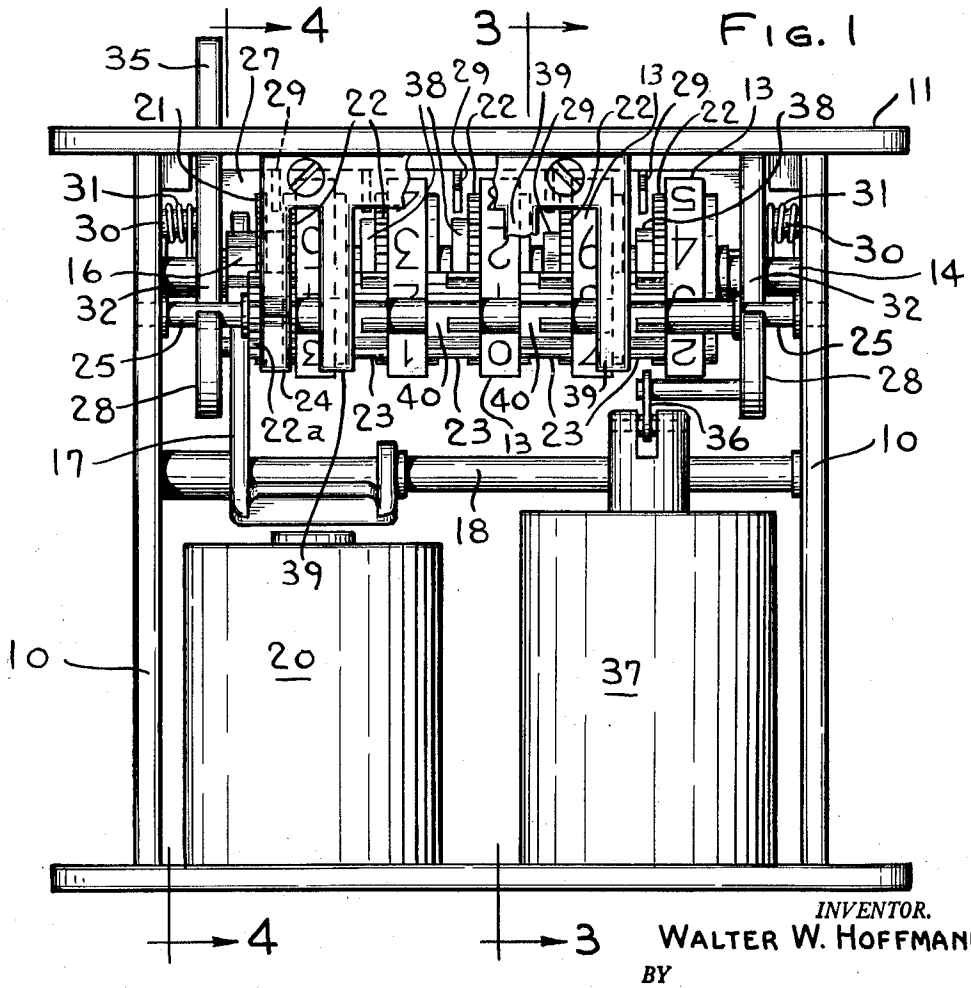



FIG. 2

INVENTOR.
WALTER W. HOFFMANN
BY
John W. Michael
ATTORNEY

April 18, 1961 W. W. HOFFMANN 2,980,329

COUNTER RESETTING MEANS

Filed Sept. 28, 1956 2 Sheets-Sheet 2

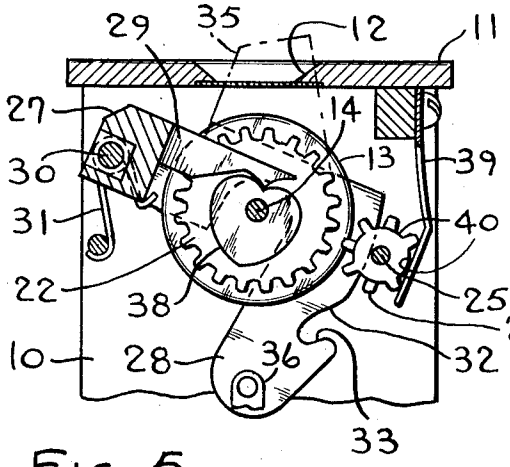



FIG. 5

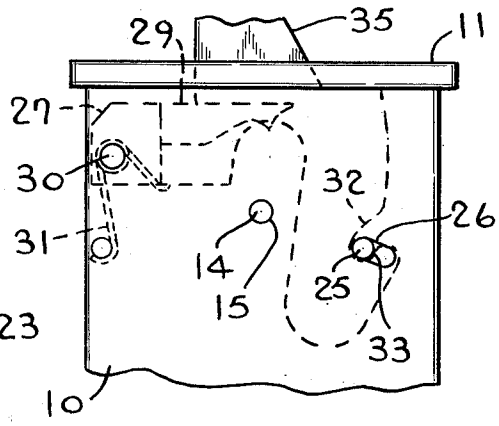



FIG. 6

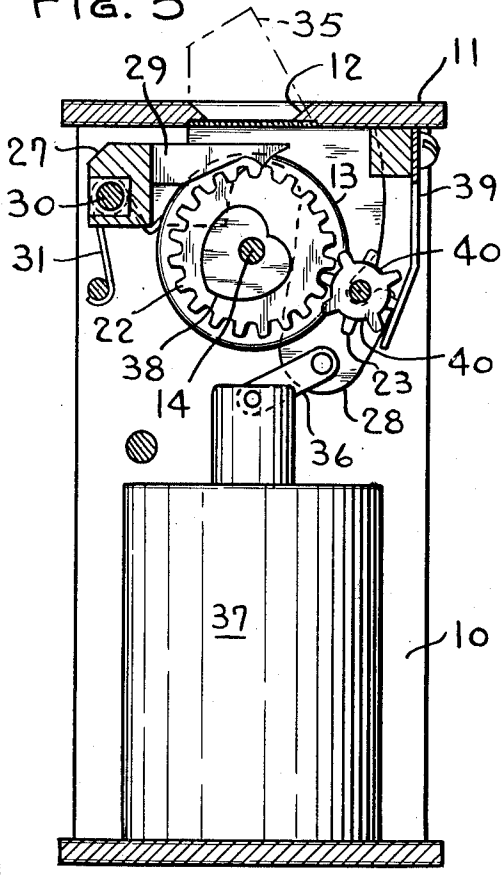



FIG. 3

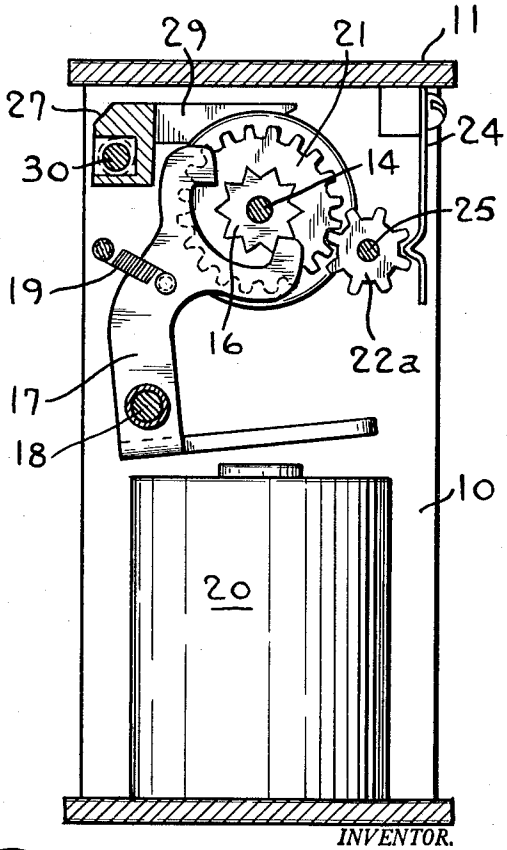



FIG. 4

INVENTOR.
WALTER W. HOFFMANN
BY
John W. Michael
ATTORNEY

United States Patent Office 2,980,329
Patented Apr. 18, 1961



2,980,329

# COUNTER RESETTING MEANS

Walter W. Hoffmann, Waukesha County, Wis., assignor to Durant Manufacturing Co., Milwaukee, Wis., a corporation of Wisconsin

Filed Sept. 28, 1956, Ser. No. 612,718

4 Claims. (Cl. 235—139)

This invention relates to improvements in electric counters of the type in which the transfer pinions are disengaged from the number wheel gears during the resetting operation and which can be reset by either manual or electrical means.

There has been a problem in the design of counters of this type keep the transfer pinions positively in mesh with the wheel gears during the counter operation without unnecessary friction and without disengagement at high speeds. In the past, such engagement has been accomplished by spring means connected to the transfer pinion shaft to bias it toward the number wheel gears. This arrangement has proved unsatisfactory because of excessive wear caused by the spring pressure, undue vibration of the transfer pinion shaft at high speeds and consequent intermittent disengagement resulting in inaccurate counting.

The primary object of this invention, therefore, is to provide an electric counter of this type which does not have such disadvantages.

Another object is to provide a counter of this type which is of compact construction with all operating elements enclosed.

Another object is to provide a counter of this type in which the resetting means is easily actuated and self-returning.

These objects are attained by adding to the customary disengaging cams for moving the transfer pinion shaft to reset position, locking cams or detents which move such shaft into and lock it in driving position without any resilient force effecting further or continued movement of such shaft toward the number wheel gears. Consequently, frictional wear between transfer pinions and number wheel gears is reduced. A positive driving engagement preventing disengagement at all speeds is also obtained since no spring energy has to be overcome in moving the shaft out of driving position it will be easier to move the customary disengaging cams toward reset position by either manual or electrical means.

The transfer pinions are properly positioned for engagement with the number wheel gears when the transfer pinion shaft is in reset position, and held in such position on its return to driving position by locating leaf springs which engage cut-out portions of alternate transfer pinion teeth. While these locating leaf springs are not operative in the driving position of the transfer pinion shaft, they may be used to move it into initial contact with the locking cams or detents.

The disengaging and locking cams (together with the reset fingers) are formed on the outer ends of the arms of a yoke pivoted within the counter frame and housing. A manual reset button integral with one arm extends outwardly of the housing and the yoke is manually swung to reset position by merely depressing such button. When the counter is designed for remote resetting, one of such arms is connected by linkage to a solenoid reset actuator also mounted within the housing with the usual counter



actuator. Thus, all operating elements are enclosed and compactly arranged.

Other objects and advantages will be pointed out in, or be apparent from the specification and claims, as will obvious modifications of the embodiment shown in the drawings, in which:

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

Fig. 2 is a side elevation view of the counter with the side walls removed;

Fig. 3 is a sectional view taken along line 3—3 of Fig. 2 showing the transfer pinions engaged and locked;

Fig. 4 is a view taken along line 4—4 of Fig. 2 showing the actuating mechanism;

Fig. 5 is a view similar to Fig. 3 but with the parts in the reset position; and

Fig. 6 is a fragmentary end elevation view showing how the transfer pinion shaft is mounted in the casing.

Referring to the drawings, the counter mechanism including electrically operated actuating mechanism, number wheels and transfer pinions all of well-known construction is mounted in a casing **10** with top **11** having a viewing opening **12**. Number wheels **13** are rotatably mounted on a number wheel shaft **14** fixedly mounted in openings **15** in opposite walls of the casing. The first number wheel on the left, as viewed in Figs. 1 and 2, is driven by a ratchet wheel **16**, operated by a drive-arm assembly **17** of standard design pivotally mounted on a shaft **18** and biased by a return spring **19**. The drive-arm assembly is actuated by a solenoid **20** which may be attached to a sensing unit (not shown) which is designed, for example, to count articles moving along a conveyor.

The rotary movement of the ratchet wheel **16** is transmitted to such first number wheel by a driving gear **21** attached to the ratchet wheel and connected to a wheel gear **22** on such first number wheel by a whole tooth pinion **22a** mounted on a shaft **25**. Such first number wheel and each succeeding number wheel drives the number wheel next to the right by customary fractured tooth transfer pinions **23** also rotatably mounted on the shaft **25** and engaged with the wheel gears **22** on such number wheels. Pins (not shown) on each of the number wheels contact the fractured tooth pinions once in each revolution to cause each succeeding number wheel to move one number for each ten numbers of the preceding number wheel. An overthrow spring **24** overlies the whole tooth pinion **22a** and bears against it to prevent momentum from carrying the first number wheel more than one number at a time when driven by the actuating mechanism.

The shaft **25** is mounted in elongated openings **26** (Fig. 6) in the sides of casing **10**, so that it can move from the position shown in Figs. 3 and 4 to that shown in Fig. 5 for the purpose of disengaging the pinion **22a** and pinions **23** from the number wheel gears **22** during the resetting of the device. A resetting yoke **27** (Fig. 5) with arms **28, 28** at either end and resetting fingers **29** projecting from the yoke at points intermediate the arms is pivotally carred by a shaft **30** mounted in the sides of casing **10** and biased to the counting position of Fig. 3 (with arms **28** abutting top **11** of casing **10**) by coiled springs **31, 31** on such shaft acting between the arms **28** and the housing. Disengaging cam surfaces **32, 32** and oppositely facing locking cam surfaces **33, 34** are formed on the arms **28, 28** to engage the shaft **25**. The cam surfaces **32, 32** move the shaft from the position shown in Figs. 2, 3 and 4 to the position shown in Fig. 5 as the yoke is swung down. The lower portions of cam surfaces **32, 32** and **33, 33** engage the shaft **25** and hold it in the position shown in Figs. 2, 3 and 4 when the yoke is in raised position with arms **28** held against top

11 by the force of springs 31, 31. Such holding maintains engagement between the pinions and number wheel gears without application of spring tension and consequent frictional losses. Reset button 35 integral with one arm extends outwardly of the housing for manual actuation of the yoke to resetting position by merely depressing the button. Remote resetting is provided by a solenoid reset actuator 37 mounted in casing 10 and connected to one arm 28 by link 36.

To reset the counter, the yoke 27 is first swung from the position shown in Figs. 2, 3 and 4 to that shown in Fig. 5 and disengaging cam surfaces 32, 32 move the shaft 25 outwardly in openings 26 to disengage all pinions from the number wheel gears. As this takes place fingers 29 engage heart-shaped resetting cams 38 on each number wheel and rotate them to the zero position. During disengagement the transfer pinions 23 are placed in and maintained in proper position for re-engagement with number wheel gears 22 by locating leaf springs 39 which rest in the fractured tooth portions 40 of such pinions. Such leaf springs also serve to move the shaft 25 into initial contact with locking cam surfaces 33, 33. After the number wheels are at zero position the yoke 27 is allowed to swing up under the force of springs 31 to counting position of Figs. 2, 3 and 4 with arms 28 abutting top 11. The locking cam surfaces 33, 33 carry transfer pinion shaft 25 into driving position where it is held by the opposing action of the lower portions of both cam surfaces 32, 32 and 33, 33 to rigidly limit the movement of pinion shaft 25 preventing undue vibration thereof and consequent intermittent disengagement of the transfer pinions and wheel gears thereby insuring accurate counting at all speeds. Such engagement is maintained without the application of a resilient force pressing the pinions into tight engagement with the number wheel gears. Consequently, frictional wear between transfer pinions 23 and number wheel gears 22 is minimized. Since the only spring energy to be overcome in moving the pinion shaft out of driving position is that of the yoke return springs 31, very little force is required to swing the resetting yoke 27 down to the reset position manually by push button 35 or electrically by reset solenoid 37.

I claim:

1. A counter comprising, a number wheel shaft, a series of coaxial rotary number wheels on said shaft, means for actuating one of said number wheels, transfer means for transferring rotary motion from wheel to wheel, said transfer means including transfer pinions on a transfer pinion shaft slidably mounted for free movement between counting and resetting positions, means for resetting said number wheels to a position of zero reading, means for rendering said transfer means inoperative during the resetting operation, and locking means for positively locking said transfer means in position during the counting operation, said locking means including a pivotally mounted yoke swingable from counting to resetting positions, said yoke having a first cam for engaging said transfer pinion shaft to slide it to resetting position and a second cam for engaging said transfer pinion shaft to slide it to counting position, said cams coacting with each other when said yoke is in counting position to positively lock said transfer pinion shaft in counting position to thereby restrain sliding movement of the shaft either towards or away from said number wheels.

2. A counter according to claim 1 in which there are resilient means to properly align said transfer pinions while in said resetting position, said resilient means cooperating with said second cam to move said transfer pinion shaft toward counting position.

3. A counter comprising, a number wheel shaft having number wheels mounted thereon, means for actuating one of said number wheels, transfer means for transferring rotary motion from wheel to wheel, said transfer means including a transfer pinion shaft having transfer pinions mounted thereon, means for resetting said number wheels to a position of zero reading, a pivotally mounted yoke member, a stop member, spring means urging said yoke member towards said stop member, a first cam means on said yoke adapted to engage said transfer pinion shaft and move it to a resetting position when said yoke is pivoted away from said stop member against the bias of said spring means, and a second cam means on said yoke adapted to engage said transfer pinion shaft and move it to a counting position when said yoke is pivoted towards said stop member by said spring means, said stop member positioned so that when said yoke is held in counting position against said stop member by said spring means the main force of said spring means will be absorbed by said stop member instead of by said transfer pinion shaft to thereby prevent said second cam means from continuously urging the transfer pinions on the transfer pinion shaft into engagement with the number wheels on the number wheel shaft when the transfer pinion shaft is in counting position.

4. A counter according to claim 3 in which said yoke has a notch therein in which said transfer pinion shaft seats when in counting position, said first and second cam means formed by the oppositely facing edges of the notch in said yoke.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 545,034 | Balzer | Aug. 20, 1895 |
| 1,321,648 | Landsiedel | Nov. 11, 1919 |
| 1,356,607 | Dixon | Oct. 26, 1920 |
| 1,409,547 | Hosch | Mar. 14, 1922 |
| 2,219,636 | Schwartz | Oct. 29, 1940 |
| 2,769,596 | Loosli | Nov. 6, 1956 |