

Oct. 12, 1948.

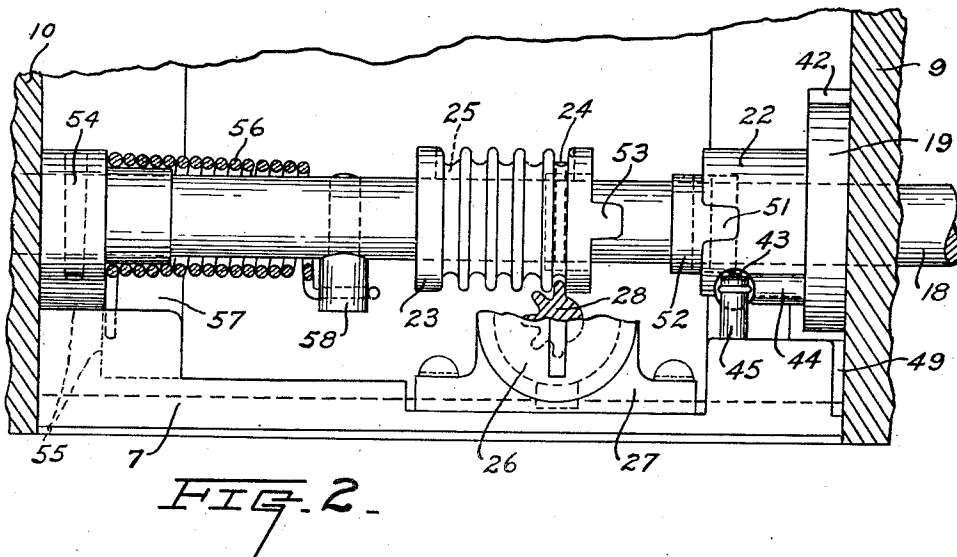
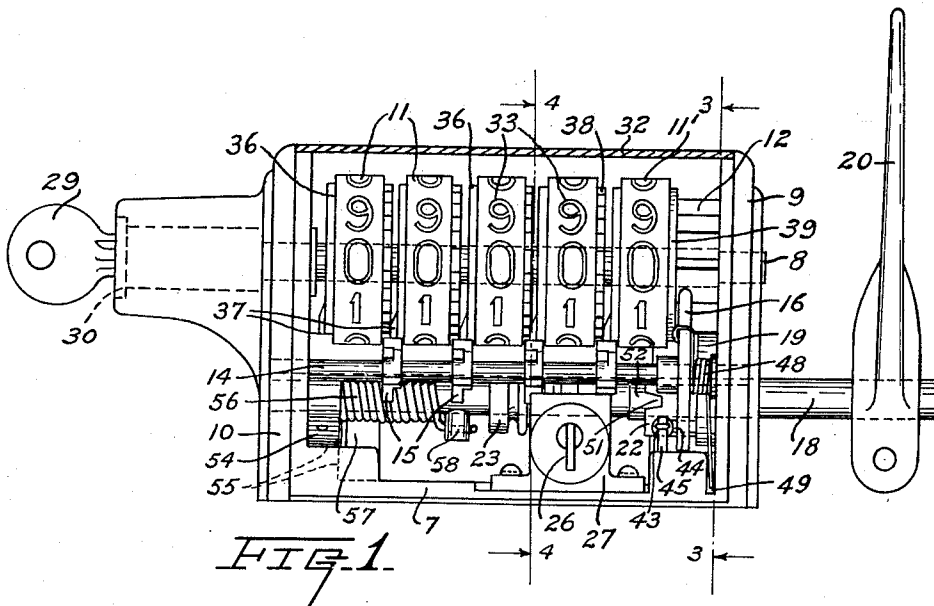
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2,451,084

LOCKING AND RESETTNG MEANS FOR COUNTERS

Filed Oct. 11, 1946

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

FIG. 3.

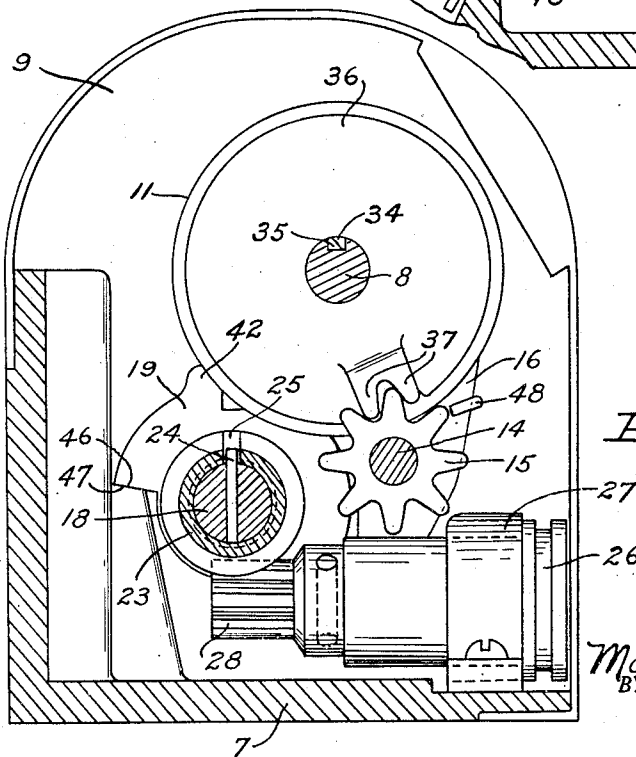
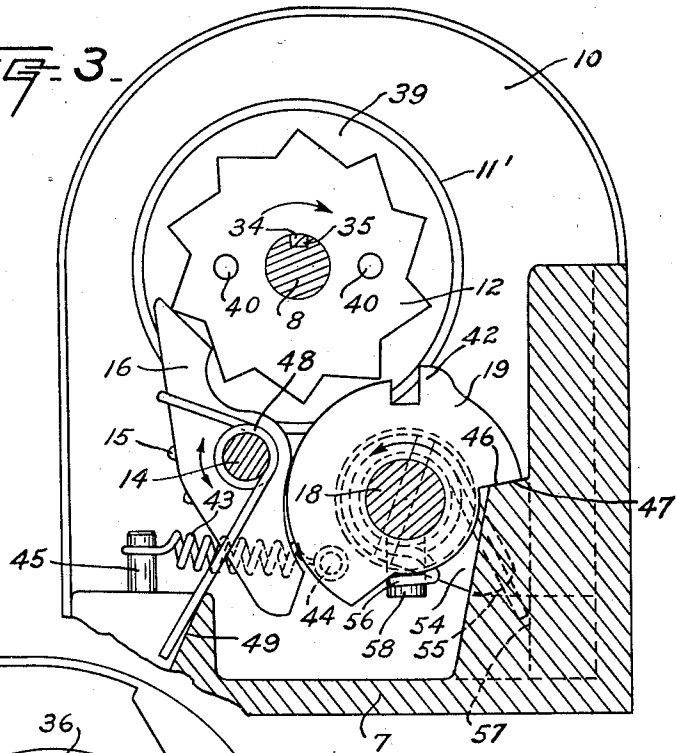


FIG. 4.

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2,451,084

LOCKING AND RESETTING MEANS FOR COUNTERS

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Application October 11, 1946, Serial No. 702,643

3 Claims. (Cl. 235—91)

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The present invention relates generally to improvements in the art of indicating or registering a succession of operations or occurrences of events, and relates more especially to improvements in the construction and operation of the driving mechanisms for mechanically driven counters or the like.

The principal object of my invention is to provide an improved counter drive which may be connected or disconnected at will, and the various parts of which may be positively locked in either active or inactive position.

Counters for indicating or registering a succession of machine operations or occurrences of events, have long been utilized for diverse purposes in various industries, and it frequently becomes desirable to prevent disturbance of readings indicated by such counters, at certain times, as during setting up of the machines with which the counters are associated, or during changes in shifts of the machine operators. While some previous counters may have embodied means for disconnecting the same from their actuating sources, these prior disconnecting devices did not prevent tampering and possible unauthorized changing of the readings because no provision was made to positively lock the numeral wheels against displacement when released from the driving source. It has also been customary in the construction of counters, to provide a tumbler lock for effecting resetting of the numeral wheels to zero when starting a new series of indications or registrations and I have found it very desirable to make use of the same key for both resetting and drive control purposes, so that a single responsible individual may have exclusive control of the counter operation.

It is therefore a more specific object of the present invention to provide improved instrumentalities for preventing unauthorized disturbance of the numeral wheels of a counter, and for positively locking the registering elements against tampering.

Another specific object of this invention is to provide improved counter driving clutch mechanism adapted to be embodied directly within a counting unit, and which may be actuated by a tumbler lock and key to positively retain the clutch elements in either active or inactive position.

A further specific object of the invention is to provide a counter assemblage wherein a group of numeral wheels may be connected to and disconnected from a driving source and locked in inactive position, or may be reset, with the aid

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of a common key cooperating with two identical locks associated with the wheel drive and with the resetting shaft respectively.

Still another specific object of my invention is to provide a simple, compact and durable counter locking assemblage, which is absolutely tamper-proof, and which may be manufactured at moderate cost and utilized effectively for diverse purposes.

These and other specific objects and advantages of the present invention will be apparent from the following detailed description.

A clear conception of the features constituting my present improvement, and of the mode of constructing and operating counting mechanisms embodying the invention, may be had by referring to the drawings accompanying and forming a part of this specification in which like reference characters designate the same or similar parts in the various views.

Fig. 1 is a front elevation of a typical counting unit embodying five numeral wheels operable by an oscillatory drive shaft and provided with tumbler locked resetting and drive disconnecting devices actuatable with the same key, the front portion of the cover having been broken away so as to reveal the interior of the unit;

Fig. 2 is an enlarged fragmentary longitudinal vertical section through the lower portion of the counting unit of Fig. 1, showing the improved tumbler lock actuated driving clutch in disconnected or inactive position;

Fig. 3 is a similarly enlarged transverse vertical section through the counting unit, taken along the line 3—3 of Fig. 1 and viewed in the direction of the arrows; and

Fig. 4 is a likewise enlarged transverse vertical section through the counting unit, taken along the line 4—4 of Fig. 1 and viewed in the direction of the arrows.

While the improvement has been shown and described herein as being advantageously applicable to a mechanical stroke counter having a limited number of numeral wheels operable by an oscillatory driving shaft, it is not my desire or intent to unnecessarily limit the invention or restrict the utility of the improved features by virtue of this typical embodiment.

Referring to the drawings, the mechanical counting unit shown therein by way of illustration, comprises in general a unitary main body or casing 7 having a normally fixed reset shaft 8 mounted in its opposite integral end walls 9, 10 and providing a support for a group of five rotary numeral wheels 11, and for a rotatable ratchet

wheel 12; a pinion shaft 14 fixedly mounted in the casing end walls 9, 10 and having a series of transfer pinions 15 rotatable thereon between the adjacent numeral wheels 11, and also providing a rocking support for a ratchet pawl 16 which is cooperable with the ratchet wheel 12 to normally prevent reverse rotation thereof; a drive shaft 18 journaled for oscillation in the end walls 9, 10 of the casing 7 and having secured thereto within this casing a Geneva gear member 19 which is cooperable with the ratchet wheel 12 and pawl 16 to normally rotate the wheel 12 and the numeral wheel 11 of lowest order one-tenth of a revolution for each successive oscillation of the shaft 18, by power applied to an actuating arm 20 secured to the drive shaft externally of the casing 7; a jaw clutch consisting of a female element 22 rigidly secured to the Geneva gear member 19, and a circular male or rack element 23 slidable along the shaft 18 and oscillatable therewith by a pin 24 secured to the shaft and coacting with a slot 25 formed in the rack; a tumbler lock 26 mounted in a bracket 27 secured to the base of the casing 7 and having a half-pinion 28 cooperable with the circular rack 23 and rotatable by means of a key 29; and another identical tumbler lock 30 operable by the same key 29 and being mounted upon the casing end wall 10 for cooperation with the reset shaft 8.

The main casing 7 is normally enclosed by a detachable cover 32 having the usual sight opening in the upper front portion thereof; and the reset shaft 8, the pinion shaft 14 and the driving shaft 18 are mounted in the casing end walls 9, 10 with the shaft axes parallel to each other. The rotary numeral wheels 11 are of similar construction, each comprising a central cylindrical body having a series of ten equally spaced numbers or indicia 33 upon its peripheral surface; a spring pressed reset pawl 34 swingably confined within each wheel body and coacting with a longitudinal groove 35 in the supporting shaft 8; a transfer disc 36 provided with two teeth 37 adapted to coact with an adjacent mutilated pinion 15; and a gear wheel 38 carrying a pawl coacting with internal ratchet notches in the body, in a well known manner, see Figs. 3 and 4. In the case of the numeral wheel 11' of lowest order, the gear wheel 38 is replaced by a disc 39 to which the ratchet wheel 12 is firmly secured as by rivets 40; and the counter wheel assemblage is such that each successive wheel 11 of higher order will have made one complete revolution whenever the next wheel 11 of lower order has made ten complete revolutions upon the shaft 8.

In the swing counter specifically illustrated, the main drive shaft 18 is oscillatable by the lever arm 20, and one count is registered during each oscillation of the arm, whenever the clutch elements 22, 23 are connected. The Geneva gear member 19 which is rigidly attached to the female clutch element 22, is provided with a peripheral tooth 42 which is cooperable with the successive teeth of the ratchet wheel 12 to intermittently revolve the latter in one direction whenever oscillation of the drive shaft 18 is being effected and the jaw clutch is active; and the member 19 is also provided with a return spring 43 connecting a laterally projecting pin 44 thereon with a fixed upright pin 45 on the casing 7, and with an abutment 46 cooperable with a stop 47 formed on the main casing. Rotation of the ratchet wheel 12 in the opposite direction is positively prevented by the ratchet pawl 16 which is swingably supported upon the pinion shaft 14 and

the upper end of which is engageable with the successive teeth of the wheel 12 as shown in Fig. 3. The upper end of the pawl 16 is constantly urged toward the ratchet wheel 12 by means of a spring 48 which embraces the shaft 14 and has opposite ends engaging the upper pawl end and another abutment 49 formed on the main casing 7.

The main driving shaft 18 which is journaled for rotation or oscillation in the spaced end walls 9, 10 of the main casing 7, is adapted to be connected to or disconnected from the Geneva gear member 19 at the will of the operator or attendant, with the aid of the main clutch and tumbler lock 26 and key 29, the construction of these parts being clearly shown in Figs. 2 and 4. The female clutch element 22 which merely embraces the shaft 18 but is not keyed or otherwise secured thereto, is provided with one or more notches 51 and is prevented from shifting along its supporting shaft by a collar 52 firmly secured to the shaft 18. The male clutch element or circular rack 23 which is slidable along the driving shaft 18 and is positively driven by this shaft through the pin 24 coacting with the slot 25, is provided with one or more end projections 53 formed for snug driving coaction with the end notches 51 of the element 22 when the circular rack element 23 is shifted to the right from its inactive position shown in Fig. 2. The end portion of the drive shaft 18 remote from the member 19 and element 22, is provided with an arm or cam 54 which is adapted to contact a fixed stop 55 formed on the casing 7, so as to arrest the reverse motion of the driving shaft 18 in a position whereby the projections 53 will be aligned with the notches 51, as shown in Figs. 2 and 3; and a coil spring 56 which embraces the shaft 18 has one end engageable with a fixed abutment 57 on the casing 7 while its opposite end is hooked about a radial pin 58 carried by the shaft 18 in order to constantly urge the cam 54 toward the stop 55.

During normal use of the improved stroke counting unit, after the same has been properly constructed and assembled as hereinabove described, the assemblage may be associated with diverse types of machines or apparatus in order to register successive operations thereof. When starting a series of counts, the key 29 may be applied to the tumbler lock 30 which is mounted upon the casing end wall 10 and coacts with the shaft 8, and manipulated so as to rotate the shaft 8 and to reset all of the numeral wheels 11, 11' to zero position as shown in Fig. 1. The key 29 may then be removed from the lock 30, thereby locking the shaft 8 against rotation whereupon the pawls 34 of the counter wheels 11, 11' will engage the longitudinal shaft recess 35 to prevent rotation of the numeral wheels in one direction about the fixed supporting shaft 8 while permitting revolution of these wheels in the opposite direction.

The same key 29 may subsequently be applied to the other tumbler lock 26 and manipulated to cause the half-pinion 28 to rotate a half-revolution and to thereby slide the circular rack element 23 of the jaw clutch toward the right as viewed in Fig. 2, until the end projections 53 of the element 23 enter the notches 51 of the element 22, thus drivingly connecting the clutch elements and establishing a positive drive between the driving shaft 18 and the Geneva gear member 19. The driving shaft 18 may then be oscillated with the aid of the lever 20 in accordance

with the performances of the machine with which the counter is associated, and the successive oscillations will thereafter be transmitted by the gear member tooth 42 to the ratchet wheel 12 and from this wheel to the numeral wheel 11' so as to intermittently revolve this wheel of lowest order about the stationary reset shaft 8. Continued rotation of the numeral wheel 11' will ultimately be transmitted to the numeral wheels 11 of higher order by the transfer pinions 15 in a well known manner.

When it becomes desirable to positively lock the counting unit against further registration, it is only necessary to re-apply the key 29 to the tumbler lock 26, and to thereafter manipulate the key so as to revolve the half-gear 28 and to thereby shift the rack element 23 to the left and to again disconnect the clutch as indicated in Fig. 2. Oscillation of the driving shaft 18 may then be continued without registration of counts, and the numeral wheels 11, 11' may either be maintained in the positions which they assumed upon clutch disconnection, or they may be reset to zero position by reapplying the same key 29 to the other tumbler lock 30. If the motion of the driving shaft 18 is discontinued, the coil spring 56 will cause this shaft and the circular rack 23 to automatically assume proper position for immediate entry of the projections 53 into the notches 51; and whenever the clutch is disconnected, the tension spring 43 will cause the abutment 45 on the Geneva gear member 19 to contact the fixed stop 47, thus also positioning the member 19 for immediate entry of the projections 53 within the notches 51.

It will thus be apparent that the present invention provides a simple, compact and reliable means for effecting rapid connection or disconnection of a counter with respect to a driving source, which is also positively protected against unauthorized manipulation. By utilizing similar tumbler locks 26, 30 and a common key 29 to control both the resetting and driving of the counting unit, a single individual may be made responsible for any unauthorized adjustment of or tampering with the numeral wheel settings. The improved mechanism may be readily applied within the casings of standard counters so as to provide compact unitary assemblages adapted for various purposes and uses, and is also protected against damage by the same cover 32 which normally conceals and protects the relatively delicate other counter parts.

While the improved clutch mechanism has been shown and described herein as having been applied to a relatively standard stroke counter wherein the successive registrations are derived from an oscillatory drive shaft which produces intermittent partial revolutions of the numeral wheels 11, 11', it may be just as readily, and perhaps more conveniently, applied to other standard counters in which the driving shaft 18 is rotating continuously or intermittently in the same direction so that the successive registrations represent revolutions of the drive shaft rather than oscillations thereof. The improved structure has proven highly satisfactory in actual use, and may obviously be manufactured and applied to standard counters at moderate cost and without undesirably complicating or degrading the appearance of such units; and the invention is especially useful for the purpose of positively preventing unauthorized displacement of the numeral wheels

when changing shifts, or during new set-ups of machines with which the counters are associated.

It should be understood that it is not desired to limit the invention to the exact details of construction or to the precise mode of use, herein shown and described, for various modifications within the scope of the appended claims may occur to persons skilled in the art. It is also intended that specific descriptive terms used herein shall be given the broadest possible meaning consistent with the prior art, without departing from the contemplated scope of the appended claims.

I claim:

1. A counting mechanism comprising, one or more numeral wheels, a common supporting shaft for said wheels, a drive shaft for revolving said wheels about said supporting shaft, a clutch interposed between said drive shaft and the numeral wheel of lowest order, a key actuated lock for disconnecting said clutch and for rendering said wheels inactive whenever the key is removed from said lock, another lock for effecting rotation of said supporting shaft, and common means for effecting actuation of both of said locks.

2. A counting mechanism comprising, a casing, one or more numeral wheels mounted within said casing and being adapted to register a succession of counts, a driving shaft journaled for rotation in said casing, a clutch interposed between said shaft and said wheels within said casing, a lock within said casing having means for disconnecting said clutch to thereby render said wheels inactive, and another lock within said casing for effecting rotation of said wheels independently of said driving shaft, both of said locks being operable by the same key.

3. A counting mechanism comprising, a casing, a normally fixed shaft mounted in said casing, a series of numeral wheels mounted upon said shaft within said casing, a driving shaft mounted in said casing, a gear member rotatably supported upon said driving shaft and cooperating with the numeral wheel of lowest order to impart counting rotation to said series, a clutch element secured to said gear member and being fixed against movement along said driving shaft, another clutch element movable along and rotatable by said driving shaft, said clutch elements being operable to connect said driving shaft and said gear member, a tumbler lock having means for shifting said movable clutch element along said driving shaft and for locking the same in inactive position, another tumbler lock for rotating said normally fixed shaft to zeroize said numeral wheels, and a common key for actuating both of said locks.

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