

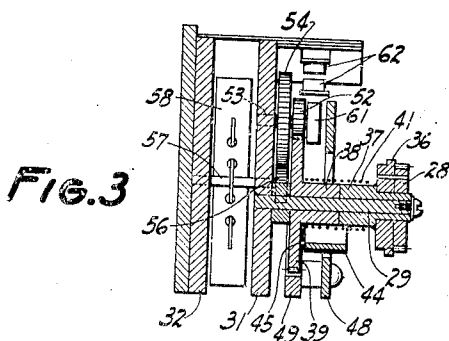
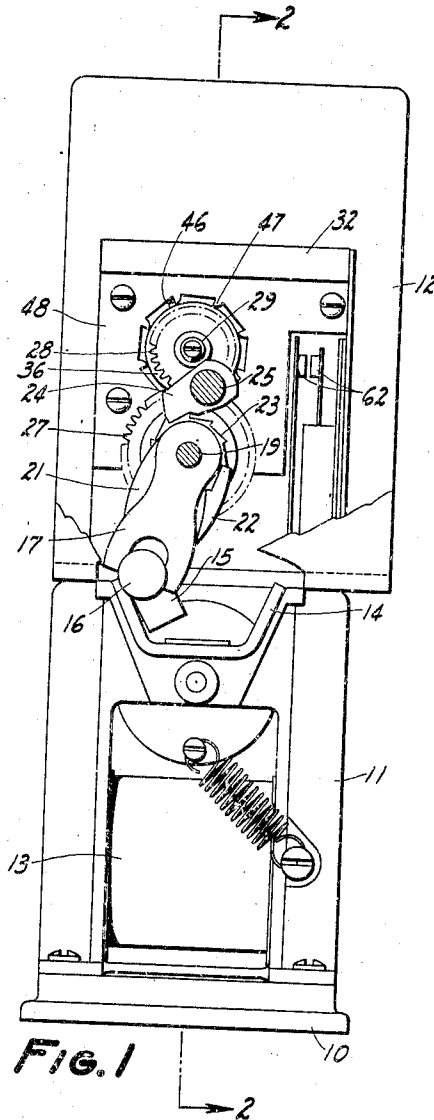
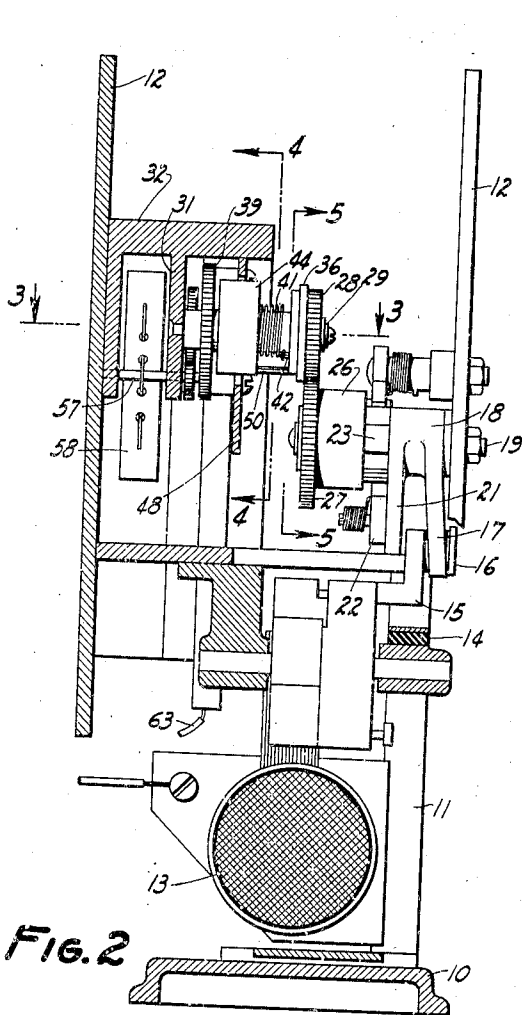
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H. J. MUMMA
COUNTER MECHANISM

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2 Sheets-Sheet 1



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2 Sheets-Sheet 2

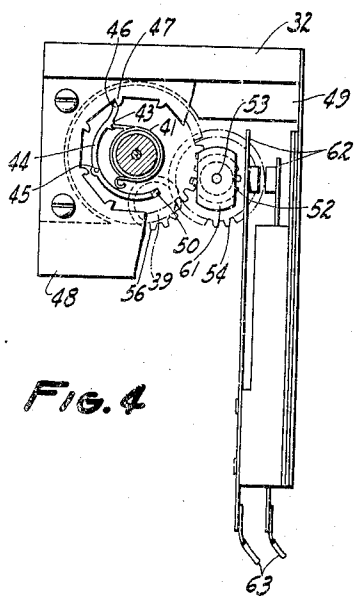


FIG. 4

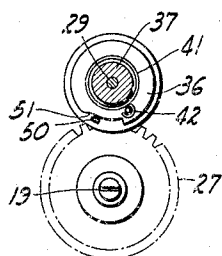


FIG. 5

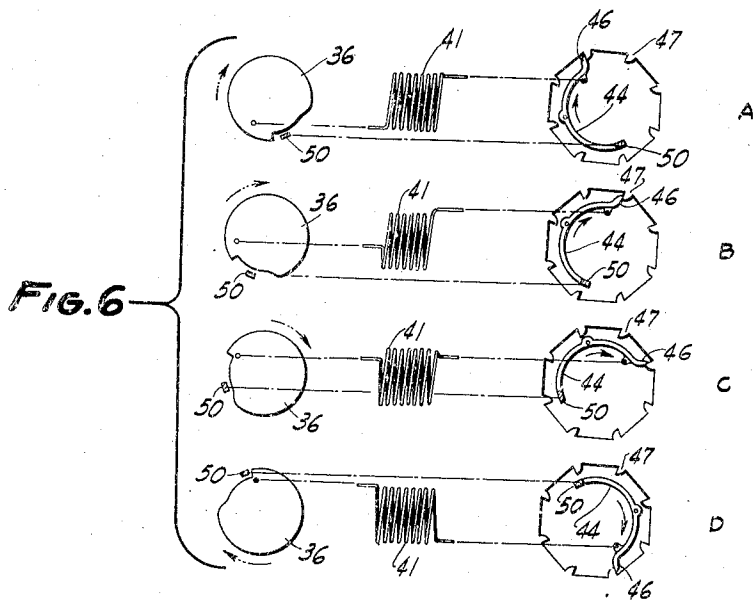


FIG. 6

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COUNTER MECHANISM

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This invention relates to counter mechanisms and is concerned more particularly with the provision of a conversion or computer mechanism in such counters which will change a non-decimal count to a decimal count.

In packing many food products, particularly fresh fruits and vegetables, it is common practice to pack non-decimal amounts in a box. For example, in packing avocados it is customary to pack eight of the fruit to a box. Also with other fruits, such as, oranges, apples and grapefruit, the number packed to the box depends upon the size of the fruit.

In counting the number of fruit packed, it is desirable to count the number of boxes and any fraction of a box in approximate tenths to facilitate entry in registering mechanisms and calculations as to price.

The instant invention is designed to count a non-decimal figure as a box unit and to count tenths of such units for entry in a conventional counting mechanism.

It is an object of the invention to provide an improved conversion mechanism which will change a non-decimal count to a decimal count for entry into a counter.

Another object of the invention is to provide a mechanism of the above character which can be readily adapted for a different number of pieces in a box or unit to be counted.

Another object of the invention is to provide an improved mechanism of the above character which is simple in construction and reliable in operation.

Another object of the invention is to provide an improved mechanism of the above character employing an escapement mechanism for converting the non-decimal figure to a decimal figure.

Other objects and advantages of the invention will be apparent from the following description of a preferred embodiment thereof, as illustrated in the accompanying drawings, in which:

Figure 1 is an elevational view of a conversion mechanism embodying the instant invention.

Figure 2 is a sectional view with certain parts shown in elevation taken as indicated by the line 2—2 in Figure 1.

Figure 3 is a fragmentary sectional view through the conversion mechanism taken as indicated by the line 3—3 in Figure 2.

Figure 4 is a fragmentary elevational view of the driven part of the conversion mechanism, partially in section, taken as indicated by the line 4—4 in Figure 2.

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Figure 5 is a detailed sectional view of the driving part of the conversion mechanism taken as indicated by the line 5—5 in Figure 2.

Figure 6 is a composite diagrammatic view of the escapement drive illustrating the relation of the parts during the count of four successive pieces of fruit.

In general, the conversion mechanism includes a step-by-step actuator which receives one step of movement for each piece of fruit counted and serves to actuate the driving part of the conversion mechanism in step-by-step fashion. The driving part of the conversion mechanism is connected to the driven part by a spring drive and escapement mechanism which, in turn, closes contacts to send electrical impulses to a conventional form of an electrically actuated counter mechanism.

Referring to the drawings, the conversion mechanism includes a base 10 (Figures 1 and 2) upon which an upright standard or bracket 11 is suitably secured and which, in turn, supports a U-shaped frame 12 which carries the conversion mechanism proper. The standard 11 carries an electrically operated impulse motor 13 having an armature 15 which oscillates between the opposite arms of a rubber pad 14 and has a pivoted connection by means of a pin 16 with the forked lower end of an arm 17 of an actuating collar 18 pivotally mounted on shaft 19. The shaft 19 is fixedly secured on the frame 12. The collar 18 has a second arm 21 on which is pivoted a spring urged actuating pawl 22 operatively engaged with a ten-tooth ratchet wheel 23. A centering and holding pawl 24 is pivotally mounted on a stud 25 which is also carried by the frame 12.

The ratchet wheel 23 forms part of a drive assembly including a collar 26 and a gear 27 which are secured to the ratchet wheel 23 and are journaled therewith on the shaft 19 and held in place thereon by suitable retaining means. The gear 27 meshes with a smaller gear 28 which is journaled about a shaft 29 secured in a depending flange 31 of a bracket 32 suitably secured to the frame 12. Secured to the gear 28 (Figures 2 and 3) is a disk 36 which together with the gear 28 forms the driving part of the conversion mechanism, the disk 36 having a hub 37 which abuts a similar hub 38 of a gear 39 also journaled about the shaft 29.

A drive connection is established between the driving element, including gear 28 and cam disk 36, and the driven element which includes the gear 39. This drive connection comprises a spirally-wound torsion spring 41, (Figures 2—5) which is

fastened to the disk 36 at 42 and at its opposite end is connected at 43 to an arcuate escapement pawl 44 pivoted at 45 in off center position on the gear 39. The pawl 44 has a tooth 46 associated with the escapement teeth 47 cut in a plate 48 which is secured by suitable screws and spacers to a wall 49 of the bracket 32. The pawl 44 is also provided with a laterally extending trip arm 50 which is disposed within a cutaway portion of the cam disk 36 to provide a lost-motion connection therewith and for operation by cam rise 51 at one end of the cutaway portion.

The driven elements of the escapement mechanism operate a contact mechanism to provide electrical impulses for transmission to a counter, as described above. For this purpose the gear 39 (Figures 3 and 4) meshes with a pinion 52 secured on a shaft 53 suitably journaled on wall 31 of the bracket 32. Shaft 53 also carries a gear 54 meshing with a pinion 56 on a shaft 57 which is journaled in adjacent walls of the bracket 32 and carries a fly-wheel element 58. The shaft 53 also carries a double-ended contact closing cam 61 cooperatively related to normally spaced-apart spring contact members 62. As seen in Figure 4, the spring contact members 62 have suitable leads 63 which extend therefrom to a conventional electrically actuated counter mechanism to enter impulses in the "tenths" order of such counter mechanism.

The operation of the device to count eight avocados to the box is as follows, each item or piece of fruit being counted, through a suitable contact mechanism, sends an electrical impulse to the motor 13 which, through the operation of its armature, causes the arm 15 to be moved clockwise and back to advance the ratchet wheel 23 one step. A one-step movement of the ratchet wheel 23 provides a partial rotation of the gear 28 by virtue of the gear ratio between the gears 27 and 28 so that the driving part of the conversion mechanism is advanced five thirty-seconds of a turn. The movement of the gear 28 and the associated disk 36 is transmitted through the torsion spring 41 and the escapement pawl 44 to the gear 39. The spring 41 is tightened for subsequent driving movement of the gear 39. Subsequently cam rise 51 of the disk 36 engages and lifts the arm 50 of the pawl 44 to disengage the tooth 46 of the pawl 44 from the tooth 47 with which it is engaged, allowing the gear 39 to advance one-eighth turn under the influence of the spring 41 until the tooth 46 engages the next adjacent escapement tooth 47 considered clockwise as viewed in Figure 4. The spring 41 is so formed, as shown in Fig. 4, as to yieldably return the pawl 44 to a position where the tooth 46 thereof will engage the next tooth 47 which lies in its path. During the one step movement of the pawl 44 and gear 39 the cam 61 is advanced one-half turn to effect one closing of the contacts 62 and to thereby cause entry of a one-tenth count in the associated counter. This condition of the parts is illustrated by the position shown in row A in Figure 6.

During this movement, the gear 28 and the disk 36 forming the driving element of the escapement mechanism, have moved farther than the movement permitted to the driven gear 39 by the spacing between the adjacent escapement teeth 47 so that the spring 41 retains part of the tension imparted thereto by the step of movement. Also, the arm 50 of the pawl 44 is positioned closer to the cam rise 51 so as to be tripped earlier in the next step of movement of the cam disk 36.

The next step of movement received from the motor 13 causes the same cycle of operations, the driven element comprising gear 28 and 36 advancing, tensioning the spring 41, releasing the pawl 44 for another one-step movement and a corresponding advance of the gear 39 and another half rotation of the contact operating cam 61. Again the spring 41 accumulates part of the tension and in the condition illustrated in row B of Figure 6 the arm 50 of the pawl 44 is positioned still closer to the cam rise 51.

Upon the third impulse or third item counted, a similar operation occurs and the parts are conditioned, as seen in row C of Figure 6 where the arm 50 of the pawl 44 is closely adjacent the associated cam rise 51.

Upon the fourth count by the motor 13 and the fourth-step movement by the driving members 28 and 36, the arm 50 of the pawl 44 is operated by the cam rise 51 in the first part of the movement of the cam disk 36 to allow a first escapement step and the pawl arm 50 continues to ride on and be operated by the cam rise 51 at the conclusion of said first escapement step to provide a second escapement step. The accumulated tension of the spring 41 is sufficient to drive the pawl 44 and the gear 39 for the two-step escapement to the fifth tooth 47 from the beginning of the count. In this manner on each fourth item a double count will be made, i. e., a double closing of the contacts 62 is effected and for every four items counted five-tenths of a box is registered in a counter.

It will be appreciated that with the condition illustrated in row A of Figure 6 a one-tenth count has been entered in the counter, the condition in row B of Figure 6 results in a two-tenths count, the condition in row C of Figure 6 results in a three-tenths count, while in row D a five-tenths count has been entered. At the end of four actuations, the driving and driven parts of the conversion mechanism have moved through the same angular distance, and are conditioned for a succeeding similar series of counts. Thus eight counts are received by the conversion mechanism, and this mechanism transmits ten "tenths" counts to the counter which registers "one" in its units column to show that one box of fruit has been counted.

By appropriately altering the gear ratio of the gears 27 and 28, the tension or strength of the spring 41, the spacing of escapement teeth 47, and the design of cam 36, the conversion mechanism can be adapted to count other increments of a given order in terms of increments of a different order.

It is to be understood that where the spacing of the teeth 47 is changed, the gear ratio of gear 39 and pinion 52 must also be altered so that for each step movement of gear 39, pinion 52 and cam 61 will make one-half of a revolution.

While a preferred embodiment of the invention has been disclosed herein, it is apparent that the invention can also be embodied in other forms.

I claim:

1. In a counter for converting non-decimal units to a decimal count, means for supplying decimal increments to the counter, an element operable in response to said non-decimal units, and an escapement mechanism for driving said supplying means from said element; said escapement mechanism including an endless series of escapement teeth, an escapement member movable from tooth to tooth of said escapement teeth, and resilient means for driving said member

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from said element, said element including means for tripping said escapement member, the extent of movement of said element being slightly greater than the spacing of said teeth to effect gradual tensioning of said resilient means and to cause said tripping means to advance with respect to said escapement member and to periodically disengage said member from said teeth and effect a plural tooth escapement thereof during one step of movement of said element.

2. In a counter for converting non-decimal units to a decimal count, means for supplying decimal increments to the counter, an element operable step by step in response to said non-decimal units, and an escapement mechanism for driving said supplying means from said element; said escapement mechanism including a circular array of escapement teeth, an escapement member movable from tooth to tooth of said escapement mechanism teeth, resilient means for driving said member from said element, and tripping means on said element for operating said escapement member.

3. In a counter for converting non-decimal units to a decimal count, means for supplying decimal increments to the counter, an element operable step by step in response to said non-decimal units, and an escapement mechanism for driving said supplying means from said element; said escapement mechanism including a circular array of escapement teeth, an escapement member having a drive connection with said increment supplying means and movable from tooth to tooth of said escapement during driving of said member from said element, resilient means for driving said member from said element, and means on said element for operating said escapement member, the extent of movement of said member by said element being repeatedly incrementally less than the movement of said element so that said element is effective to periodically disengage said member from said teeth to effect a plural tooth escapement thereof during a single step of movement of said element.

4. In a counter for converting non-decimal units to a decimal count, coaxial driving and driven elements, a spring forming the drive connection between said elements and connected for tensioning upon movement of the driving element, an escapement pawl carried by the driven element and receiving an end of said spring, a circular array of escapement teeth for cooperation with said escapement pawl, and means for imparting a step-by-step movement to the driving element, each step of movement of said driving element being greater than the permitted step of movement of said driven element by adjacent teeth of said circular array.

5. In a counter for converting non-decimal units to a decimal count, coaxial driving and driven elements, a spring forming the drive connection between said elements and connected for tensioning upon movement of the driving element, an escapement pawl carried by the driven element and receiving an end of said spring, a circular array of escapement teeth for cooperation with said escapement pawl, means for imparting a step-by-step movement to the driving element, each step of movement of said driving element being greater than the permitted step of movement of said driven element by adjacent teeth of said circular array, and means for transmitting an increment of count from said driven

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element to a decimal counting mechanism upon each step of movement thereof.

6. In a counter for converting non-decimal units to a decimal count, coaxial driving and driven elements, a spring forming the drive connection between said elements and connected for tensioning upon movement of the driving element, an escapement pawl pivotally mounted upon the driven element in a radially displaced position, a circular array of escapement teeth for cooperation with said escapement pawl, said pawl receiving an end of said spring to transmit the drive to said drive element, an arm on said pawl having a lost motion connection with said driving element, a cam face on said driving element engageable with said arm to withdraw said pawl from an associated tooth, and means for imparting a step-by-step movement to the driving element, each step of movement of said driving element being greater than the permitted step of movement of said driven element by adjacent teeth of said circular array.

7. In a counter for converting non-decimal units to a decimal count, coaxial driving and driven elements, a spring forming the drive connection between said elements and connected for tensioning upon movement of the driving element, an escapement pawl carried by the driven element and receiving an end of said spring, means providing a lost motion connection between said pawl and said driving element to provide for overdriving of said driving element with respect to said driven element, a circular array of escapement teeth for cooperation with said escapement pawl, and means for imparting a step-by-step movement to the driving element, each step of movement of said driving element being greater than the permitted step of movement of said driven element by adjacent teeth of said circular array.

8. In a counter for converting non-decimal units to a decimal count, coaxial driving and driven elements, a spring forming the drive connection between said elements and connected for tensioning upon movement of the driving element, an escapement pawl pivotally mounted upon the driven element in a radially displaced position, a circular array of escapement teeth for cooperation with said escapement pawl, said pawl receiving an end of said spring to transmit the drive to said drive element, means providing a lost-motion connection between said pawl and said driving element to provide for overdriving of said driving element with respect to said driven element and to provide for tripping of said pawl, and means for imparting a step-by-step movement to the driving element, each step of movement of said driving element being greater than the permitted step of movement of said driven element by adjacent teeth of said circular array.

9. In a mechanism for converting non-decimal units to decimal units, the combination of: a rotary actuator for supplying decimal counting units step-by-step to a counter; a rotary element operable step-by-step in response to said non-decimal units; resilient means for transmitting rotary motion from said element to said actuator; and escapement means for converting said motion thus transmitted to said actuator from non-decimal units to decimal units.

10. In a mechanism for converting non-decimal units to decimal units, the combination of: a rotary actuator for supplying decimal counting units step-by-step to a counter; a rotary element operable step-by-step in response to said non-

decimal units; resilient means for transmitting rotary motion from said element to said actuator; a series of stops for halting rotation of said actuator at intervals; and means responsive to rotation of said element to successively release said actuator from said stops.

11. In a mechanism for converting increments of a primary order into increments of a secondary order and transmitting the latter to a counter, the combination of: a rotary driven counter actuator; a rotary driving element; means for rotating said element step-by-step with increments of said primary order; resilient means for transmitting rotary motion from said element to said actuator; means to halt rotation of said actuator at intervals dividing said rotation into increments

of said secondary order; means responsive to said driving element to release said actuator from said rotation halting means to initiate step-by-step rotation of said actuator in increments of said secondary order; and means for submitting said increments of a secondary order to a counter.

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10 The following references are of record in the file of this patent:

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