May 2, 1967 R. W. WALSH 3,317,131

COUNTER-ACTUATOR DEVICE

Filed Sept. 23, 1965 2 Sheets-Sheet 1

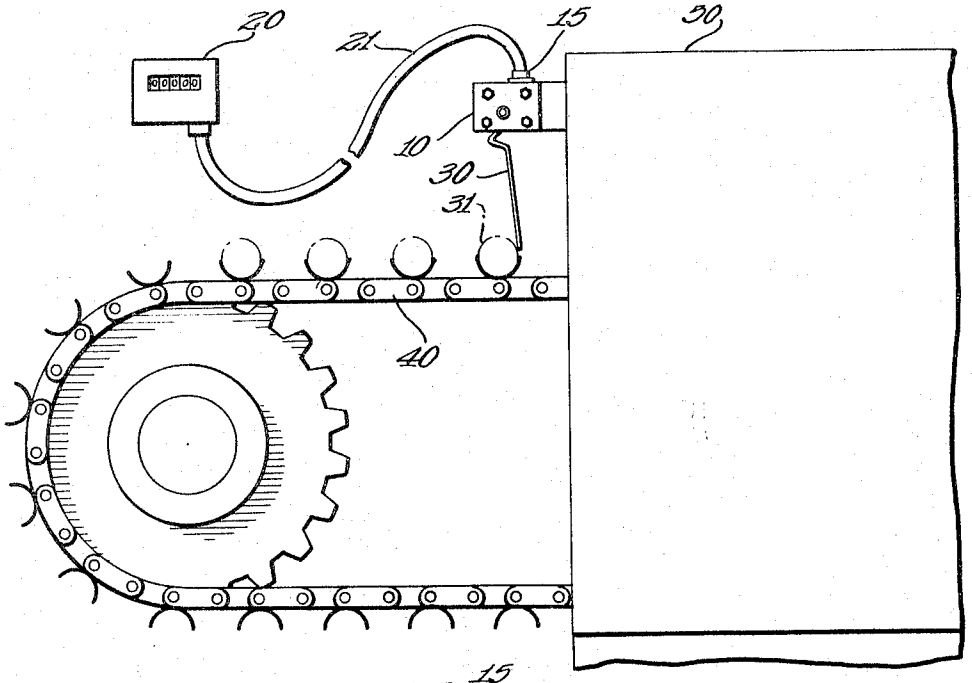



Fig. 1

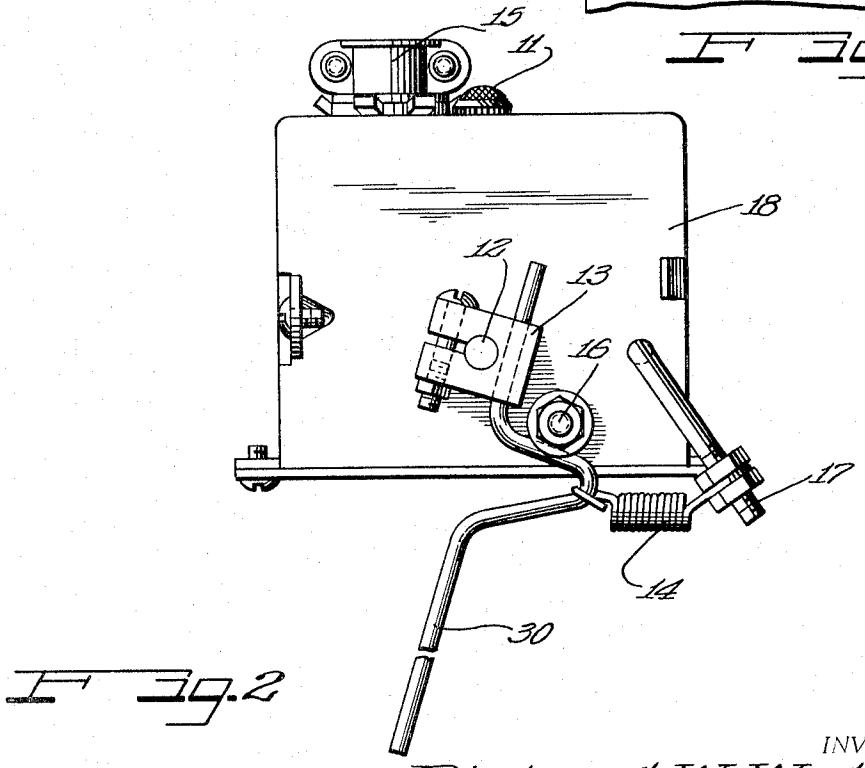



Fig. 2

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Fig. 3

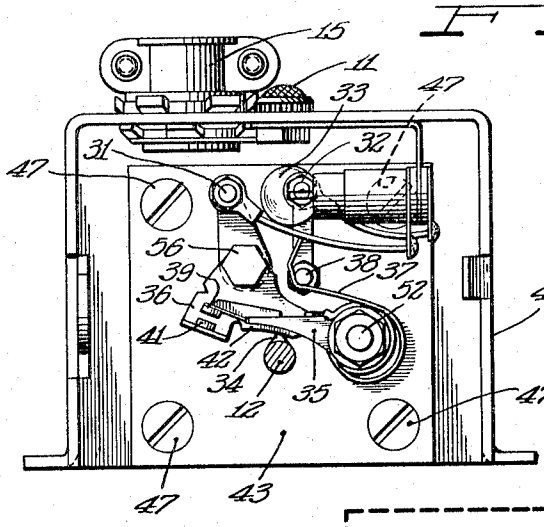



Fig. 5

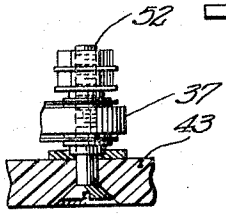



Fig. 8

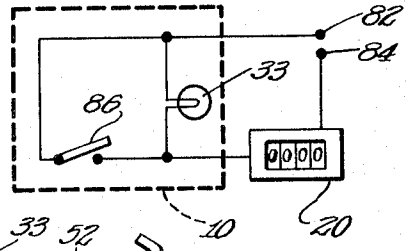



Fig. 4

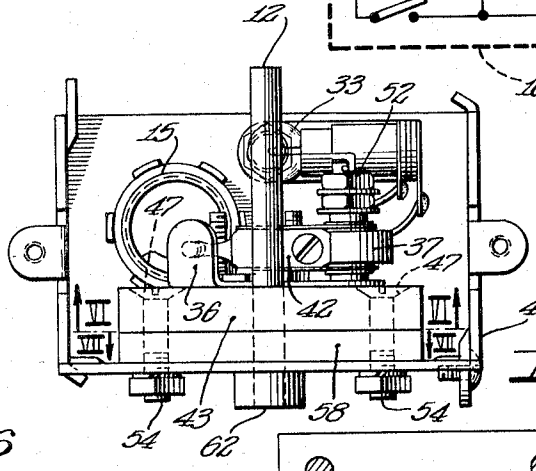



Fig. 7

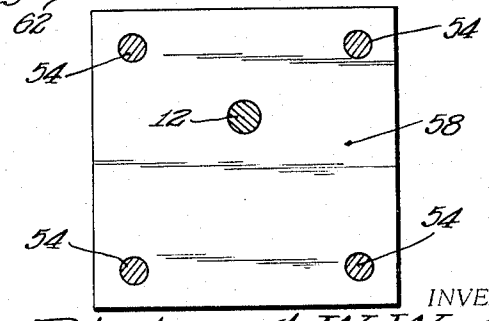
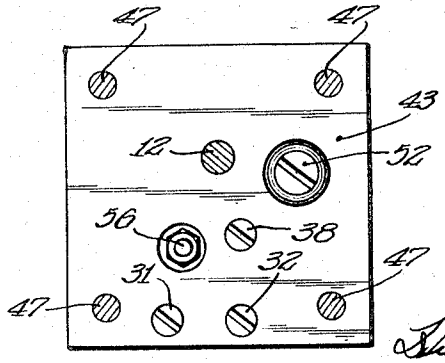



Fig. 6




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# COUNTER-ACTUATOR DEVICE

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10 Claims. (Cl. 235—98)

This case relates to a counter-actuator device, and more particularly, to a switch for actuating an electric counter to count moving objects.

In the past, many different types of counter-actuating devices have been known for counting vegetables, fruit, cans, or other similar objects as they moved along on conveyor belts or similar transmission media. The counter-actuator devices, such as those disclosed in United States Patents to Beamish 2,730,301 and Magnuson et al. 2,889,986, used a rod or similar means to contact the moving objects in order to operate a switch, thereby actuating an electric counter. However, each of the counter-actuator devices known in the prior art fail to perform satisfactorily and reliably, when used in connection with heavy-duty machinery such as corn-husking machines. The heavy-duty machinery has tended to cause the actuator device to malfunction, because the machinery produces severe vibration.

An object of this invention is to provide a counter-actuator device having a rugged construction that will perform reliably for use with heavy-duty machinery.

Another object of this invention is to provide a simple and economic counter-actuator device.

A still further object of this invention is to provide a counter-actuator device that will prevent the rod used for contacting the moving objects from carrying unwanted electrical current, thereby reducing the danger of electrical shocks.

According to the invention, the counter-actuator device is constructed with a pair of contacts normally held open but which close for completing an electrical circuit to the electric counter in response to the movement of means comprising a rod responsive to a moving object. The contacts are held in an open condition by means of a cam on the rod so that accidental movement of said pair of contacts into electrical contact in response to the vibration from heavy-duty machinery is prevented.

Further according to the invention, the electrical contacts are insulated from the frame of the counter-actuator device and also from the rod that contacts the moving objects. Therefore, the electric current that is carried by the contact pair is prevented from flowing into the frame or the rod, which thereby prevents accidental shocks to the operators of the machinery.

Other objects, advantages and features will become more apparent with the teaching of the principles of the present invention in connection with the disclosure of the preferred embodiment thereof in the specification, claims and drawings, in which:

FIGURE 1 is a schematic view illustrating the counter-actuator device in the preferred environment;

FIGURE 2 is a side view of the counter-actuator device;

FIGURE 3 is a side view of the counter-actuator device with the side panel thereof removed illustrating the mechanism employing principles of the present invention;

FIGURE 4 is a bottom view with the bottom plate removed;



FIGURE 5 is a detail view of a portion of the mechanism as shown in FIGURE 4;

FIGURE 6 is a sectional view taken substantially along the line VI—VI of FIGURE 4;

FIGURE 7 is a sectional view taken substantially along the line VII—VII of FIGURE 4; and

FIGURE 8 is a schematic circuit diagram with respect to the counter-actuator device.

As shown on the drawings:

In FIGURE 1, a counter-actuator device **10** is used for actuating an electric counter **20** in response to a rod **30** contacting a moving object, such as an object **31**, for example corn, as moved by means of a conveyor belt **40**. The actuator device **10** causes the counter **20** to register successively the count of each of the moving objects while a heavy duty machine **50**, such as a corn-husking machine, is processing the objects, viz. ears of corn, without causing malfunction or mis-count of operation the actuator device **10**.

Referring now to FIGURES 2, 3 and 4, it will be observed that the device **10** comprises an enclosing housing having removable side wall panels, including **18**, a generally U-shaped frame **45** and a removable bottom panel. An electrical coupler **15** on the frame **45** connects to the actuator device **10** an end portion of an electrical cable **21** extending therefrom and connected to the electric counter **20**. Furthermore, a red glass window **11** is shown adjacent thereto which emits a signal light during inactive condition of the actuator **10** and is extinguished each time a moving object is counted. The rod **30** is shown pivotally mounted on a cam shaft **12** by means of a coupler **13**. The rod **30** moves toward the left as seen in FIG. 2 (or to the right side as seen in FIG. 1) as it comes into contact with a moving object. After the object has passed, a spring **14** pulls the rod **30** back into its normal position against a stop **16** which engages an angular generally upwardly facing shoulder on the rod as shown. The spring **14** is connected between the rod **30** and a post **17** mounted on the side closure panel **18** of the housing of the actuator device **10**.

In FIGURE 3, the actuator device **10** is illustrated with the rod **30**, the spring **14**, the post **17**, and the side panel **18** of the actuator device **10** removed. The connection with the electric counter **20** via the electric cable **21**, shown in FIGURE 1, is made through terminal posts **31** and **32**. An electric lamp **33**, carried by a bracket mounted inside the housing on the frame **45**, is connected across the terminals **31** and **32** and lights responsive to power supplied by the cable **21** to the terminals **31** and **32**, thereby causing the red signal window **11** aligned therewith to glow.

The cam shaft **12** is caused to rotate in response to the rod **30** being contacted by a moving object. A metal cam **34** is welded onto the cam shaft **12** in order to maintain a contact arm **35** in a normally-open condition relation to a contact arm **36** while the rod **30** remains in its normal position against the stop **16**. When the rod **30** is moved by a moving object, the rod **30** causes the cam shaft **12** to rotate in a clock-wise direction as seen in FIG. 3 so that the cam **34** moves away from and no longer contacts the arm **35**. As a result, a torsion leaf spring **37**, which bears at one end portion against a post **38** and at its opposite end against the arm **35**, tends to expand to

thereby bias the arm **35** to move in a downward direction. Thereby, a contact **39** on the arm **35** is biased inward contact with an opposed fixed contact **41** on the arm **36** to complete an electrical circuit for actuating the counter **20**.

An insulator **42** carried by the arm **35** is engaged by the cam **34** and prevents any electrical current from flowing from the contact arm **35** to the cam **34** and thence to the cam shaft **12**. Therefore, unwanted electrical current is prevented from flowing through the rod **30**.

Furthermore, the contact arms **35** and **36** are mounted on an insulator block **43**, which is in turn mounted to the inner side of the side panel of the housing which is at the opposite side from the panel **18**, by means of bolts **47**.

Referring now to FIGURE 4, a bottom view of the actuator device **10** is shown with the side panel **18** and the bottom panel of the housing removed together with the rod **30**, which has been disconnected from the cam shaft **12**. This view clearly shows a supporting shaft **52** on the block **43** and about which the contact arm **35** is pivotally mounted. An insulator block **58** is mounted in coextensive laminar relation between the insulator block **43** and the side panel, both of the blocks being bolted together against the side panel by means of the bolts **47** having shanks **54**.

FIGURE 5 shows the supported assembly on the shaft **52** in greater detail. A supporting shaft **52** pivotally mounts the contact **35** to the insulator block **43**. The spring **37** is wrapped around the pivot of the contact arm **35**.

FIGURE 6 discloses the side of the insulator block **43** which faces the block **58** and shows the base of the supporting shaft **52** and the nut for a bolt **56** that secures contact arms **36** to the insulator block **43**. Also, the heads of the bolt **38** and of bolts **31, 32** are disclosed which are similarly numbered as the corresponding terminals secured thereby to the insulator block **43**.

FIGURE 7 shows the cam shaft **12** passing through the insulator block **58**. Thence the shaft **12** passes through the side panel to which the block **58** is secured. On its outer end, viz. opposite to the end carrying the arm **30**, the shaft **12** has attached thereto a retainer **62**, as shown in FIGURE 4.

A schematic circuit diagram is shown in FIGURE 8 to illustrate the electrical operation of the system including the counter **20** and the actuator device **10**. The actuator device **10** is schematically illustrated as including a switch **86** (see the contacts **39** and **40**) which is normally open and closes in response to the rod being contacted by a moving object. Thereupon, a circuit is closed from the source of power, which is connected to terminals **82** and **84**, and to the electric counter **20**. The closing of switch **86** causes the counter **20** to register; and also, the electric lamp **33** is short circuited thereby and hence is extinguished until the switch **86** is restored to normal open condition. Therefore, it is readily apparent that the lamp **33** is lighted when the power is connected to terminals **82** and **84** and remains lit until switch **86** is closed. The source of power, not shown, can either be ordinary alternating current from a power line, or a low voltage D.C. source, such as 6–48 volts.

Thus it will be seen that I have provided an improved counter-actuator device which meets the objectives and advantages above set forth and which accomplishes an accurate count of moving objects while they are processed by heavy-duty machinery.

The drawings and specification present a detailed disclosure of the preferred embodiments of the invention, and it is to be understood that the invention is not limtied to the specific form disclosed, but covers all modifications, changes and alternative constructions and methods falling within the scope of the principles taught by the invention.

I claim as my invention:

**1.** A counter-actuator for actuating an electric counter to count moving objects during processing of said objects by heavy-duty machinery comprising:

means providing a housing;

means within the housing fixedly mounting an electrical contact;

means within the housing pivotally mounting an arm movably carrying an electrical contact opposed to said fixed contact and normally biased toward engagement of the arm-carried contact with the fixed contact;

means for electrically connecting said contacts with the counter;

a shaft rotatably mounted on and in traversing relation through said housing adjacent to said arm and having a contact rod fixedly mounted thereon outside the housing and adapted to be disposed in the path of moving objects to engage and swing the rod and correspondingly rotate said shaft;

means carried by said housing normally biasing said rod into one position from which the rod is swung by the objects;

and a cam on said shaft operative to thrust said arm against its bias into said one position wherein the contact carried thereby is open relative to the fixed contact, and said cam releasing said arm to close the contacts when said rod is engaged and swung in opposition to its bias by an object.

**2.** A counter-actuator as defined in claim **1**, including a stop mounted on said housing and engaged by said rod in said one position.

**3.** A counter-actuator as defined in claim **2**, in which said rod has an angular shoulder engaging said stop.

**4.** A counter-actuator as defined in claim **1**, in which said arm has an insulating block mounted thereon in opposition to said cam and engaged by the cam whereby to electrically insulate the arm from the cam and the shaft.

**5.** A counter-actuator as defined in claim **1**, in which said housing is metallic, and an insulating mounting attached to the inside of said housing and mounting said electrical contact mounting means, and said arm having an insulating block thereon opposing and providing contact means with said cam.

**6.** A counter-actuator as defined in claim **1**, including an electrically operated signal device carried by said housing and connected with said contacts and responsive to opening and closing of the contacts.

**7.** A counter-actuator as defined in claim **6**, in which said signal means comprise a lamp mounted within the housing, and a window on the housing aligned with the lamp and illuminated by the lamp.

**8.** A counter-actuator for actuating an electric counter to count moving objects during processing of said objects by heavy-duty machinery comprising:

means providing a housing;

an electrical switch mounted within the housing;

an electrical circuit connecting said switch operatively with the counter;

a shaft rotatably mounted on and in said housing and having switch operating means thereon operative to actuate the switch when oscillated from a normal position into a second position;

a contact rod fixedly mounted on said shaft outside of said housing and adapted to be disposed in the path of the moving objects to engage and swing the rod from said normal position to said second position;

means carried by said housing normally biasing said rod into said normal position of the shaft, and means on the housing providing a stop against which the rod is biased by said biasing means.

**9.** A counter-actuator as defined in claim **8**, in which said housing has a lamp mounted therein and connected in said circuit to be operative responsive to operations of said switch, and an observation window on said hous-

ing aligned with said lamp to be illuminated thereby to afford visual signaling of operations of said switch by illumination from said lamp.

**10**. A counter-actuator as defined in claim **8**, in which said switch is normally open, and a signal lamp is carried by said housing and is connected in said circuit in parallel with said switch and is illuminated in the open condition of the switch and is shorted out in the closed condition of the switch, said switch being closed when the arm is moved against its bias away from said stop by a moving object.



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