March 18, 1941. H. J. MUMMA 2,235,035

COUNTING APPARATUS

Filed July 29, 1938

FIG_1_

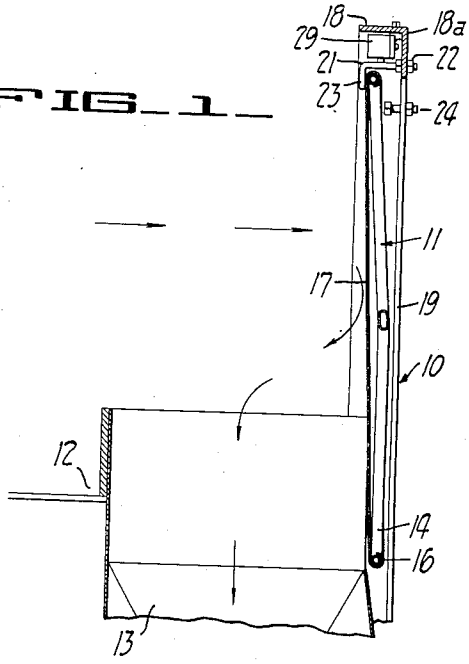


FIG_3_

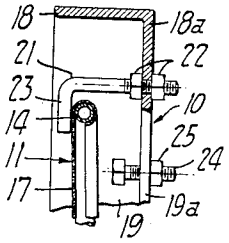


FIG_4_

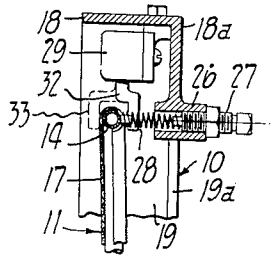


FIG_2_

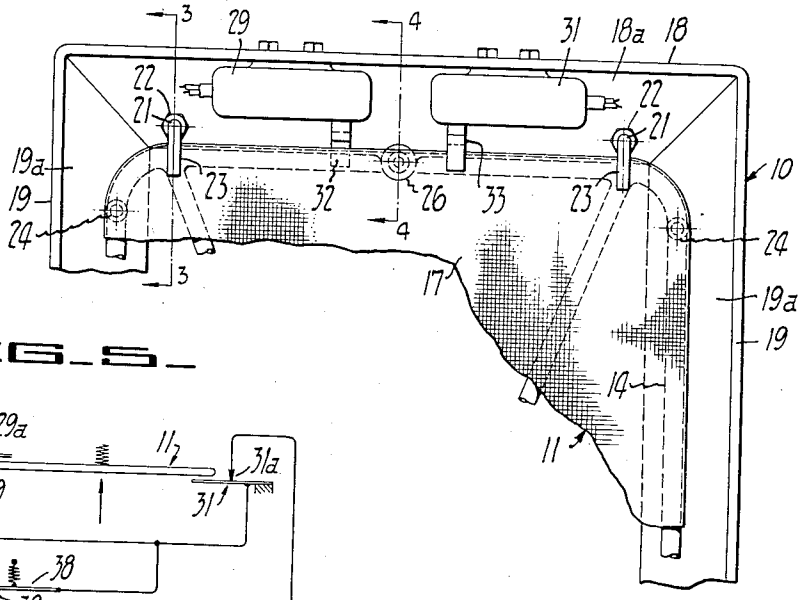
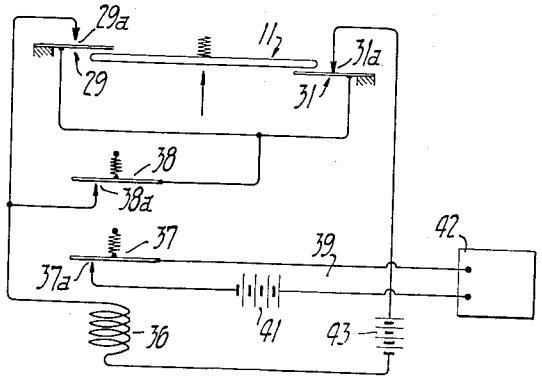


FIG_5_



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Patented Mar. 18, 1941 2,235,035

UNITED STATES PATENT OFFICE

2,235,035

COUNTING APPARATUS

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Application July 29, 1938, Serial No. 221,995

3 Claims. (Cl. 235—98)

This invention relates generally to apparatus of the type disclosed in co-pending application of William A. Scholz, Serial No. 178,361, filed December 6, 1937, which makes possible the counting of articles of relatively light weight, such as articles of laundry. The invention also relates to electrical contacting and registering means, such as are applicable to operating a counting device.

It is an object of the invention to provide improved means of the above character which will prevent false operation. In attaining this object I make use of both front and back contacts operated by a member movable when impacted with an article of laundry, and these contacts are connected to an interlocking type of relay, which in turn controls an energizing circuit for a response device, such as a counter.

Further objects of the invention will appear from the following description in which the preferred embodiment of the invention has been set forth in detail in conjunction with the accompanying drawing.

Referring to the drawing:

Fig. 1 is a side elevational view, in cross-section, illustrating apparatus making use of the present invention.

Fig. 2 is an enlarged front view of a portion of the apparatus shown in Fig. 1, Fig. 2 illustrating particularly the relationship of the panel with respect to the frame, and contacting devices associated with the panel.

Fig. 3 is a cross-sectional detail taken along the line 3—3 of Fig. 2, and showing adjustable means for limiting movement of the panel.

Fig. 4 is a cross-sectional detail taken along the line 4—4 of Fig. 2, and showing adjustable means for biasing the panel in one direction.

Fig. 5 is a circuit diagram illustrating electrical means connected to the contacting devices of Fig. 2, and serving to control a response device such as a counter.

In the aforesaid co-pending application of William A. Scholz, there is disclosed laundry counting equipment making use of one or more relatively light weight panels, which are mounted in a generally vertical position for limited lateral movement, and which are actuated by the impact of an article of laundry. In order to count movements of the panel, electrical contacting means are employed for controlling an energizing circuit, which in turn operates a counter or like registering device.

Referring to the drawing, Fig. 1 illustrates apparatus of the general type disclosed and claimed in the aforesaid copending application. This apparatus includes an upstanding rigid frame 10, which is generally rectangular in shape, and within which there is an upright panel 11. At the lower end of frame 10 there is another frame or structure 12, in conjunction with a receiving hopper 13. Articles of laundry to be counted are tossed against the panel or screen 11, and after impacting upon this panel they drop down into the hopper 13.

The panel itself can be formed as disclosed in the aforesaid Scholz application, as for example it can consist of a light tubular metal frame 14, the lower corners of which are provided with pivotal connections 16 to the stationary frame 10. A piece of canvas or like material 17 is stretched across and secured at its edges to the frame 14.

As illustrated more clearly in Figs. 2 to 4 inclusive, the frame includes an upper horizontal member 18, together with the upright members 19. These members can be in the form of structural steel angles, having their ends welded together.

Fig. 3 illustrates adjustable means for limiting the movement of the panel. Thus a rod 21 extends through an opening in the flange 18a, and is threaded to receive the adjustable nuts 22. The forward end of this rod has a downwardly bent portion 23 against which the panel frame 14 engages. Screw 24 is also threaded in the flange 19a, and is retained in an adjusted position by the lock nut 25. Screw 24 forms a limiting stop against which the panel frame 14 engages, when it swings rearwardly. Members 21 and 24 are provided in duplicate, as shown in Fig. 2.

Adjustable means for biasing the panel towards its forward limiting position, is shown in Fig. 4. In this instance a tubular shell 26 is attached to flange 18a, and this shell is internally threaded to receive the adjusting screw 27. A compression spring 28 has its one end seated upon the adjacent portion of the panel frame 14, and its other end extending into shell 26, and seated upon the inner end of screw 27. By changing the setting of screw 27, the degree of tension or bias applied by spring 28 to the panel, can be adjusted between desired limits.

Electrical means operated by movements of the panel is illustrated diagrammatically in the circuit diagram of Fig. 5, and makes use of contacting devices 29 and 31, which can be mounted upon the upper structural member 18. The details of construction of these devices need not be described. Device 29 includes within its housing

a pair of relatively movable electrical contacts, normally biased toward open position. A small finger 32 projects from the housing of device 29, and this finger extends in position to be engaged by the panel frame 14, as the panel swings back towards its rear limiting position. For the final portion of the movement of the panel to its rear limiting position, finger 32 is moved sufficiently far to close the contacts of device 29.

Contacting device 31 can be similar to 29, except that its electrical contacts are normally biased towards closed position. The movable finger 33 projecting from the housing of device 31, extends in front of the panel frame 14, whereby it is moved for the final portion of movement of the panel to the forward limiting position. Movement of finger 33 by forward movement of the panel, serves to open the contact of device 31.

Referring now to the circuit connections of Fig. 5, a magnetic relay 36 is provided, and this relay is provided with a pair of magnetic armatures 37 and 38, or some equivalent means for operation of two sets of contacts. One set of contacts 37*a*, operated by armatures 37, is connected in series with a circuit 39. This circuit includes a source of current represented by battery 41, and an electrically operated device 42, such as a counter. The relay contacts 38*a*, controlled by armature 38, are connected in shunt with the contacts of the device 29.

The magnetic winding of relay 36 has its one terminal connected to one side of contacts 38*a*, and its other terminal is connected to a source of current, such as battery 43, with the other side of this battery connecting in series with contacts 31*a* of device 31, to the other side of the contacts 29*a*.

Operation of the apparatus described above can be reviewed as follows: When the panel 10 is struck with an article of laundry, it swings to its rearward limiting position, and during the first portion of such movement contacts 31*a* are closed while during the final portion of such movement contacts 29*a* are closed. Closing of these contacts immediately causes the current from battery 43 to pass through the windings of relay 36, because contacts 29*a* and 31*a* are now connected in series with respect to battery 43. Energizing of relay 36 causes closing of the two relay armatures 37 and 38, with the result that closing of contacts 37*a* energizes the counter 42, while closing of contacts 38*a* shunts and locks out contacts 29*a*. As the panel 10 returns back to its initial forward position, opening of contacts 29*a* does not immediately result in deenergization of the relay 36, because as pointed out contacts 29*a* are shunted by contacts 38*a*. Therefore if some chattering should occur, that is a chattering tending to repeatedly open and close contacts 29*a*, no false count can occur. During the last portion of the forward movement of the panel 11, contacts 31*a* are moved to open position, and this serves to interrupt the flow of current from battery 43, through the winding of relay 36. Therefore the relay is immediately de-energized and both the armatures 37 and 38 move to open position, to deenergize the counter 42, and to again make the contacts 29*a* receptive to a new count.

It will be evident that the apparatus can be adjusted in accordance with the weight or type of article being counted. For very light articles it is desirable to limit the amplitude of movement of the panel, by changing the setting of members 21 and 24, with corresponding changes in the positioning of the contacting devices 29 and 31. While it is necessary that contacts 29*a* are positively closed as the panel swings to its rear limiting position, the biasing spring 28 can have its tension adjusted so that its thrust upon the panel is insufficient to move contacts 31*a* to open position. In such event the momentum of the panel, as it swings to its forward limiting position, can serve to momentarily open the contacts 31*a*.

I claim:

1. In counting apparatus of the character described, an upright panel movably mounted and adapted to be actuated by impact of an article of laundry against the same, means forming limiting stops for lateral movement of said panel, means tending to continuously urge the panel in one direction whereby when impacted with an article of laundry the panel is moved from a forward limiting position to a rear limiting position, a pair of control contacts adapted to be closed by movement of the panel to said rear limiting position, a second pair of control contacts adapted to be opened when said panel returns to its forward limiting position, a response device, an energizing circuit for said response device, a magnetic relay having contacts included in said response circuit for controlling the same, said relay also having a winding and having a second set of contacts, said second set of contacts being closed upon energizing the winding of said relay, electrical connections whereby said second set of relay contacts are connected in shunt with said first-named pair of control contacts, a source of energizing current for the windings of said relay, and electrical connections whereby said first and second named control contacts are connected in series and with the windings of said relay and said source of current for the same, whereby when both said first and second named control contacts are closed said winding is energized, and whereby when said second named control contacts are opened by return movement of the panel, the winding of said relay is de-energized, the connection of said first-named pair of control contacts in shunt with said second set of relay contacts serving to maintain said winding energized until opening of said second named pair of control contacts irrespective of opening of said first-named pair of control contacts.

2. In counting apparatus of the character described, a panel movably mounted and adapted to be actuated by impacting an article of laundry against the same, means for limiting movement of said panel, means tending to continuously urge the panel in one direction whereby when impacted with an article of laundry the panel is moved in an opposite direction the limit of its permissible movement, a pair of contacts adapted to be closed by movement of the panel against said biasing means, a second pair of contacts adapted to be opened when said panel returns to its initial position under the urge of said biasing means, a response circuit including a source of current, a relay having one pair of contacts included in said response circuit, and serving to control energization of the same, and means serving to electrically connect said relay with said first and second named pairs of contacts, said last named means including means for maintaining said relay energized after opening of said first-named pair of contacts, whereby said relay is energized upon closing said first-named pair of contacts, and is maintained energized until opening of said second-named pair of contacts.

3. In apparatus of the character described, a magnetic relay having a winding and having two

pair of contacts, a response circuit associated with said relay, said response circuit including a source of current and a response device, said response circuit having one pair of said contacts connected in series with the same, whereby when the winding of the relay is energized the response circuit is closed, two pair of relay controlling contacts, said relay controlling contacts being normally opened, one pair of said controlling contacts being connected in shunt with the second pair of relay contacts, and the second pair of said controlling contacts being connected in series with the first pair of controlling contacts, a source of energizing current for the winding of the relay, and electrical connections between the source of current for the relay and the winding of the same, whereby when both pairs of said controlling contacts are closed, the winding of the relay is energized to close both pairs of said relay contacts, the second pair of relay contacts when closed serving to shunt said first-named pair of controlling contacts to prolong energization of the relay until the second pair of controlling contacts is opened.

HAROLD J. MUMMA.