

Aug. 18, 1925.

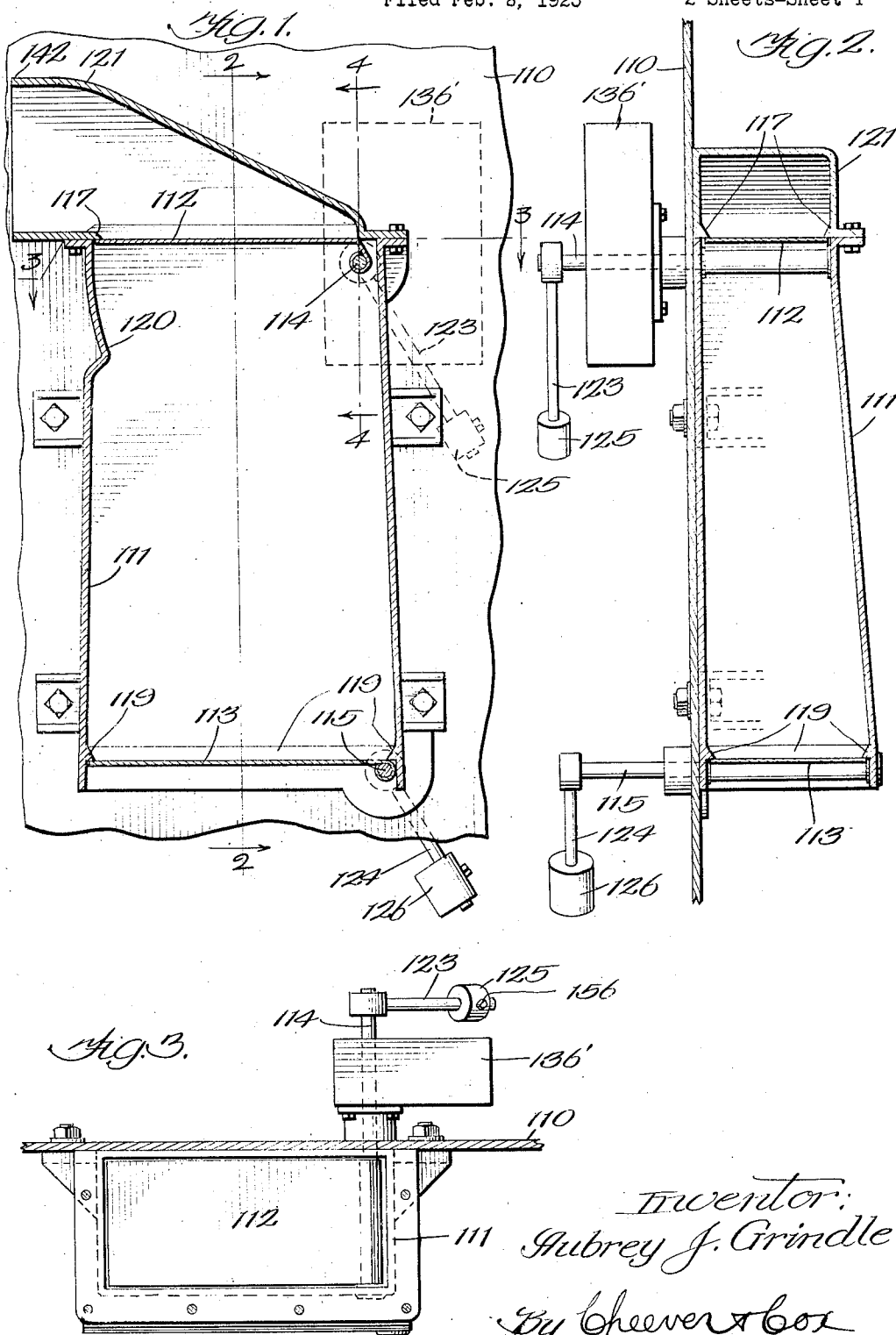
A. J. GRINDLE

1,549,967

POWDERED MATERIAL LEVEL INDICATING DEVICE

Filed Feb. 8, 1923

2 Sheets-Sheet 1



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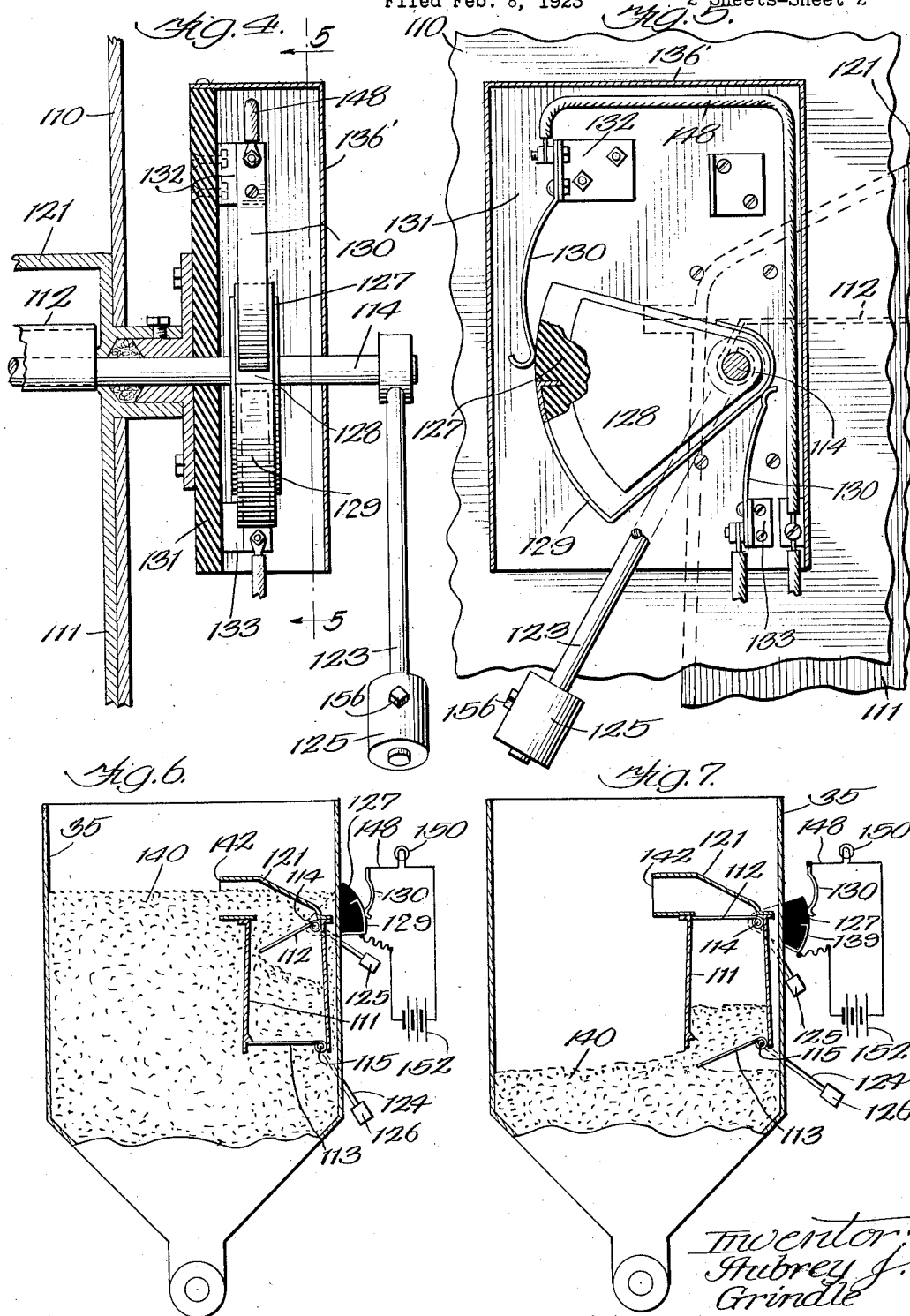
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POWDERED MATERIAL LEVEL INDICATING DEVICE

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2 Sheets-Sheet 2



Inventor:
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UNITED STATES PATENT OFFICE.

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*POWDERED-MATERIAL-LEVEL-INDICATING DEVICE.

Application filed February 8, 1923. Serial No. 617,786.

To all whom it may concern:

Be it known that I, AUBREY J. GRINDLE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Powdered-Material-Level-Indicating Devices, of which the following is a specification.

This invention relates to apparatus of the general type illustrated by my prior patent application No. 440,007, filed January 26, 1921, for distributing powdered material from a central station to various sub-stations. The invention itself is a device by which the powdered material in a tank as, for instance, the one at a sub-station in such a system operates mechanism outside the tank for some useful purpose, one example of which—lighting a lamp—is shown in the drawings.

The object of the invention is to provide mechanism of this class which can be so applied to a powdered material tank that it operates accurately for the purpose desired, without any of the parts of the mechanism being in danger of injury.

The invention consists in means for attaining the foregoing objects; which can be easily and cheaply made; is satisfactory in use and is not readily liable to get of order.

More particularly, the invention consists in many features and details of construction which will be hereafter more fully set forth in the specification and claims.

Referring to the drawings in which like numerals designate the same parts throughout the several views:

Figure 1 is a side elevation largely in section of mechanism illustrating this invention in its preferred form.

Figure 2 is a sectional detail view on the line 2—2 of Figure 1.

Figure 3 is a plan view on the line 3—3 of Figure 1.

Figure 4 is a sectional detail view on the line 4—4 of Figure 1.

Figure 5 is a side elevation of a switch mechanism taken on the line 5—5 of Figure 4.

Figures 6 and 7 are diagrammatic views of the mechanism of this invention applied to a powdered material receptacle, the parts being in different positions which they assume in the course of operating to perform the functions desired.

This application is, in its essential elements, a continuation of the structure shown and described in Figures 11 and 12 of said prior application No. 440,007, but not there claimed. For the convenience of the reader in identifying the parts of the present drawings which are in function identical with those of the prior application, numerals below 138 used herein are here applied as in said prior application; while numerals 140 and above refer to new features or modifications not specifically shown or referred to in said earlier application. For the same reason, the early part of the specification follows quite closely the description of the parts below 138 in the specification of said original application No. 440,007.

The device is secured to a wall 110 and on the interior of a powdered material containing hopper 35 whose condition is to be indicated, and comprises a box-like casing 111, having trap doors 112 and 113 at its top and bottom, respectively. The doors are pivoted upon shafts 114 and 115 projecting through the wall 110 of the hopper to its exterior. An inwardly extending flange 117 is formed on the inside of the upper end of casing 111, and a flange 119 is formed in the lower end of the casing. When the doors 112 and 113 are closed, they abut against the lower sides of flanges 117 and 119, respectively.

To prevent the passage of fuel lying on top of the door 112 before the door has moved a certain minimum distance, a curved surface 120 is formed in the inside of the casing 111 in such a position as to lie closely adjacent to the path of travel of the edge of the door 112 as it opens. To prevent fuel falling into the casing 111 as it is delivered to the hopper, a shield 121 is placed above the top of the casing. To keep the doors 112 and 113 normally closed, each shaft 114 and 115 is provided with a weighted arm 123 and 124, each arm carrying a weight 125, 126.

A sector-shaped block 127 of insulating material, secured between a pair of plates 128, is secured to the shaft 114 and has fixed upon a portion of its edge a metallic contact member 129. A second contact member 130, carried by a block 131 of insulating material, is positioned to make contact with the edge of the sector-shaped block 127 when the door 112 is closed, as shown in Figure 7, and to contact with the contact member 129

as shown in Figure 6 when the door opens. The block 131 is secured to the exterior of the wall of the hopper, and carries binding posts 132 and 133. Binding post 132 directly supports spring contact 130 and post 133 is in constant communication with contact 129 through a spring 130. A cover 136', shown in Figure 4 may be placed over the contacts, if desired.

When the level of fuel in the hopper 35 is as shown in Figure 7 somewhat below the range of movement of the edge of the door 113, any fuel 140 which has found access to the interior of the casing 111 will, by its weight on door 113, overbalance weight 126 and be discharged, leaving the casing empty, whereupon the door 113 automatically closes. Fuel subsequently delivered to the hopper cannot fall into the top of the casing 111 and onto door 112 because of shield 121. When, however, the hopper becomes nearly full, the fuel angle between the outer edge 142 of the shield 121 and the outer edge 117 of the top of the casing 111 being less than the angle of repose of the material, the fuel will, as indicated in Figure 6, slide into the casing. The fuel thus received by the door 112 will, as shown in Figure 6, overbalance the weight 125 and open door 112, thus bringing contacts 129 and 130 together, thus closing electric circuit 184 through lamp 150 and battery 152 to light the lamp and show the operator that hopper 35 is full. Any other electric current operated device may be substituted for lamp 150 without departing from the invention.

The device of the drawings improves upon that of said original patent application principally in that the flanges 117 and 119 are made as integral parts of the casing 111 instead of by the use of separate angle irons;

in that the curved surface 120 is formed in casting the case 111 and that the cover 121 is formed as a suitable casting instead of by merely bending a sheet of metal. The weights which control the doors 112 and 113 are quite obviously adjustable along the lever arms which carry them by the use of the set screws 156. By properly positioning these weights, the device may be adjusted to take care of powdered materials having widely different specific gravities.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In mechanism of the class described, in combination with a hopper for powdered material, a small receptacle, open top and bottom therein, a downwardly opening self-closing door at each of said openings, a cover open at its side to material in the hopper but protecting the upper door from material falling into the hopper, and means extending from the upper door outside the hopper, there operating a selected electrical device.

2. In mechanism of the class described, in combination with a hopper for powdered material, a small receptacle, open top and bottom therein, a downwardly opening door at each of said openings, means outside the hopper normally urging each door to close, means adjusting the amount of closing urge, a cover open at its side to material in the hopper but protecting the upper door from material falling into the hopper, and means extending from the upper door outside the hopper, there operating a selected electrical device.

In witness whereof, I have hereunto subscribed my name.

AUBREY J. GRINDLE.