

[54] **AUTOMATIC UNLOADING SPOUT**  
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 284, 392; 53/59 R; 222/523

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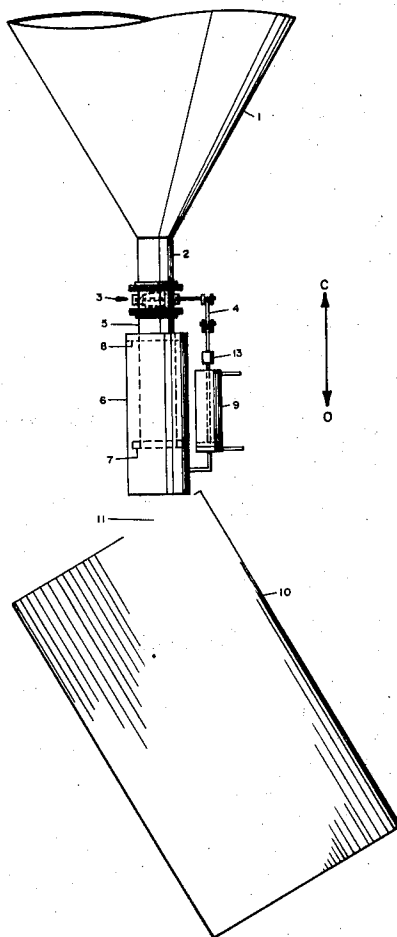
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## [57] ABSTRACT

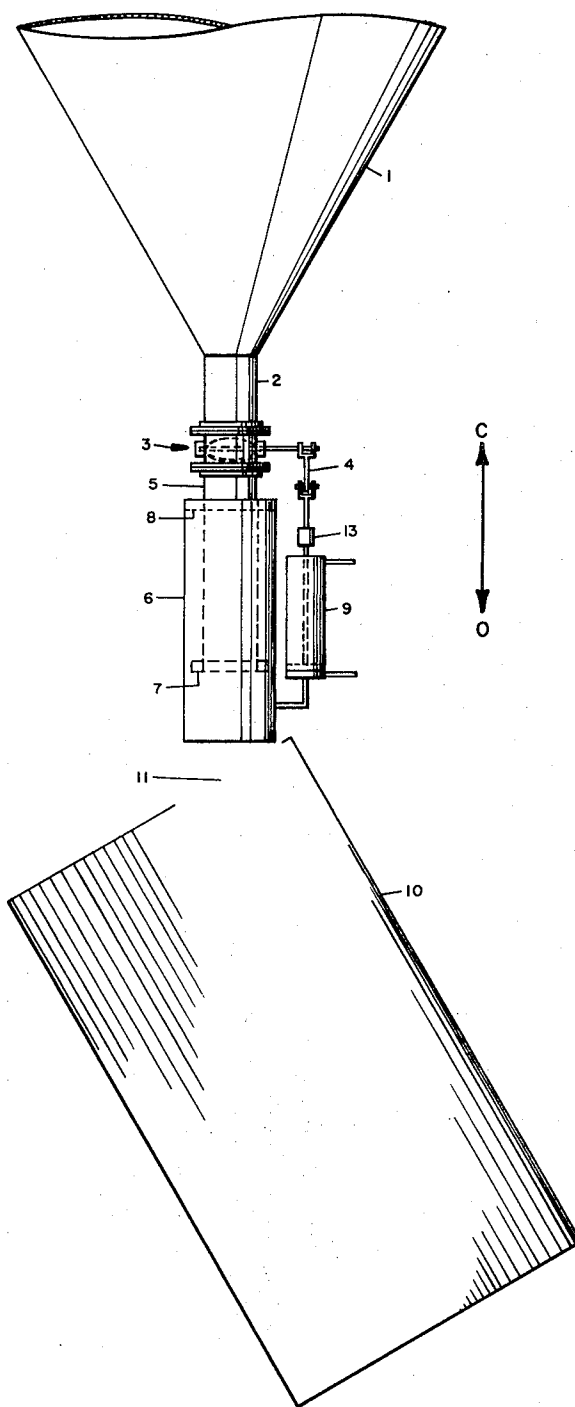
A container-filling device featuring two concentric tubes mounted under a storage bin for dry particulate solids. The outer tube, which is slideable on the inner tube, is lowered into the container by an air cylinder which also actuates a lever opening the valve to the bin. When the container is full, the flow of material stops and the air cylinder actuates the lever to close the valve and then continues its upward movement to lift the outer tube out of the container.

**7 Claims, 1 Drawing Figure**



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## AUTOMATIC UNLOADING SPOUT

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

This invention pertains to a device for automatically filling bins or cartons. The invention is particularly applicable to the filling of a container, containing a small aperture at the top thereof, with a dry particulate solid material such as pelleted carbon black, fertilizer, etc.

#### 2. Description of the Prior Art

Applicant is not aware of any prior art describing his invention. The problem presented by prior devices designed for the same purpose is in obtaining complete filling of the container and then stopping the flow of material before there is spillage.

### OBJECTS OF THE INVENTION

The principle object of the invention is to provide means for automatically filling a container with a dry particulate solid so as to secure a full load and then stopping the flow of material before there is spillage. Other objects will become apparent from the detailed description and drawings.

### SUMMARY OF THE INVENTION

This invention is a device for filling a container with dry particulate solids comprising: a first conduit in communication at its top with a source of said solids and at its bottom with a valve; said valve being connected to a lever; a second conduit open at its bottom and in communication at its top with said valve; a third conduit of greater diameter than the second conduit and concentrically surrounding and slideably attached to said second conduit; a first stop means attached to the outside of the second conduit at the lower portion thereof; a second stop means attached inside the upper portion of the third conduit, said second stop means being positioned so that the two stop means come into registry when the second and third conduits are extended with reference to one another; actuating means, operably connected to said lever and said third conduit, for extending said third conduit and opening said valve, and for closing said valve and retracting said third conduit. The actuating mechanism is preferably an air cylinder. The distance between the two stops is preferably adjustable.

### BRIEF DESCRIPTION OF THE DRAWING

The drawing is an elevation view of the preferred embodiment of the invention.

### DESCRIPTION OF THE PREFERRED EMBODIMENT

The elements of the preferred embodiment of the invention consist of the following as numbered on the drawing:

1. A storage container, hopper, or bin.
2. A first conduit attached to the bottom of the container.
3. A valve associated with the conduit.
4. An operating lever for the valve.
5. A second conduit associated with the valve and arranged to receive a flow of material from the valve.

6. A third conduit concentrically surrounding the second conduit and slideably attached to the second conduit.

7. A first stop attached outside the second conduit at the lower portion thereof.

8. A second stop attached inside the upper portion of the third conduit, operable with the first stop 7 attached to the second conduit, in such a manner that the two stops will come in registry when the two conduits 5 and 6 are extended in the "O" direction.

9. An actuating mechanism (such as an air cylinder), operably attached between the valve operating lever 4 and the third conduit 6 and in linear relationship to the second conduit 5.

10. A product container such as a bin or carton.

The resistance to movement by the actuating mechanism, of the third conduit 6, in relation to the second conduit 5 in the "O" direction (as indicated in the drawing), is designed so as to be less than the resistance to the movement of the valve actuating lever arm 4.

The resistance to movement of the third conduit 6 in relationship to the second conduit 5 in the "C" direction is designed so as to be greater than the resistance of the movement of the valve actuating lever arm 4.

As suggested in the previous two paragraphs, the "O" direction is in the direction of the open position of the valve 3 and the "C" direction is toward the closed position of the valve.

When the actuating mechanism 9 (e.g., the air cylinder) is actuated in the "O" direction, the valve lever arm 4 is used as a fulcrum together with gravity so that the conduit 6 is lowered into the container 10 until stop 8 contacts stop 7. At this time the air cylinder 9, using the conduit 6 as a fulcrum, actuates the valve lever 4, thereby opening the valve 3.

With the mechanism in this position, the material will flow from the container 1 through the first conduit 2, the second conduit 5, and the third conduit 6 until the material fills the container to the bottom opening of the third conduit 6, at which time the flow of material will stop.

When the air cylinder 9 is operated in the "C" direction, the cylinder uses, as a fulcrum, the weight of the third conduit 6, air cylinder 9, and the resistance of movement between the third conduit 6 and the second conduit 5, so as to actuate the valve actuating arm 4, thereby closing the valve and stopping the flow of material. After the valve is closed and comes to a stop, the cylinder 9 will use the resistance of the valve lever arm 4 as a fulcrum to retract conduit 6, i.e., to lift it out of the container 10 and back to the position shown in the drawing.

By adjusting the distance between the stops on the second conduit 5 and the third conduit 6, a predetermined amount of material can be trapped in these conduits to fill any void left in the container after the flow of material has been stopped by the valve. This can be accomplished by installing an adjustable stop 7 and/or 8.

A weight 13 can be attached to the third conduit 6 to vary the resistance of the third conduit to movement in the "C" direction. This feature would be desirable so that dry materials of different bulk densities or flow characteristics could be handled satisfactorily.

If the container 10 is placed on a vibrator and there is a compacting of the material, the mechanism can be

left in the "O" position a predetermined time and material will flow as long as there is compacting of the material in the container. This will provide a preferred means of securing maximum loading of containers.

As shown in the drawing, it is preferred that container 10 be tilted to allow for maximum loading of the container. In this case, the relatively small aperture 11 is preferably located in one of the upper corners of the container 10.

While I have thus described the preferred embodiments of the present invention, many variations will be suggested to those skilled in the art. The foregoing description and drawing should therefore not be considered limitative; and all such variations and modifications as are in accord with the principles described are meant to fall within the scope of the appended claims.

I claim:

1. Apparatus for filling a container with dry particulate solids comprising:

a first conduit in communication at its top with a source of said solids and at its bottom with a valve;

said valve being operably connected to a lever;

a second conduit open at its bottom and in communication at its top with said valve;

a third conduit of greater diameter than the second conduit and concentrically surrounding and slideably attached to said second conduit;

a first stop means attached to the outside of the sec-

ond conduit at the lower portion thereof;

a second stop means attached inside the upper portion of the third conduit, said second stop means being positioned so that the two stop means come into registry when the second and third conduits are extended with reference to one another;

reversible actuating means, operably connected to said lever and said third conduit, for first extending said third conduit and then opening said valve when actuated in a first direction, and for first closing said valve and then retracting said third conduit when actuated in a second direction opposite said first direction.

2. The apparatus of claim 1 in which the actuating means is an air cylinder.

3. The apparatus of claim 2 in which the position of one of said stop means is vertically adjustable with respect to the conduit carrying said one stop means to vary the distance between the two stop means.

4. The apparatus of claim 2 in which the third conduit includes means for varying the weight thereof.

5. The apparatus of claim 1 in which the position of one of said stop means is vertically adjustable with respect to the conduit carrying said one stop means to vary the distance between the two stop means.

6. The apparatus of claim 5 in which the third conduit includes means for varying the weight thereof.

7. The apparatus of claim 1 in which the third conduit includes means for varying the weight thereof.

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