Feb. 5, 1952 L. SPANSKI 2,584,750

VENDING MACHINE FOR BULK MATERIAL

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Fig. 1

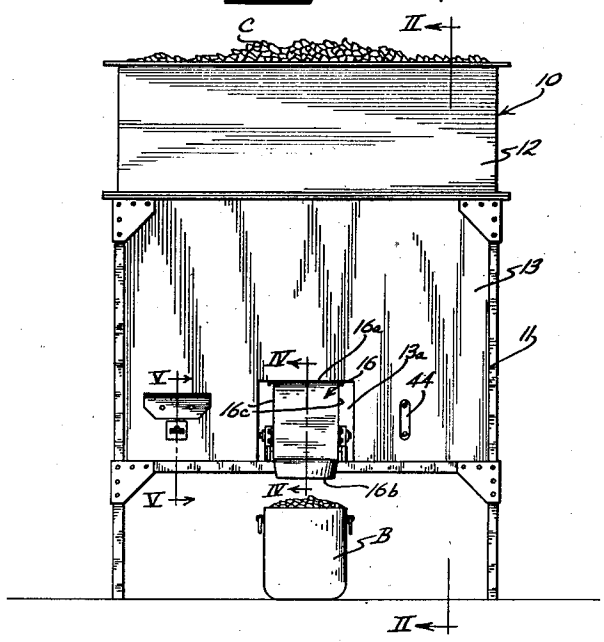
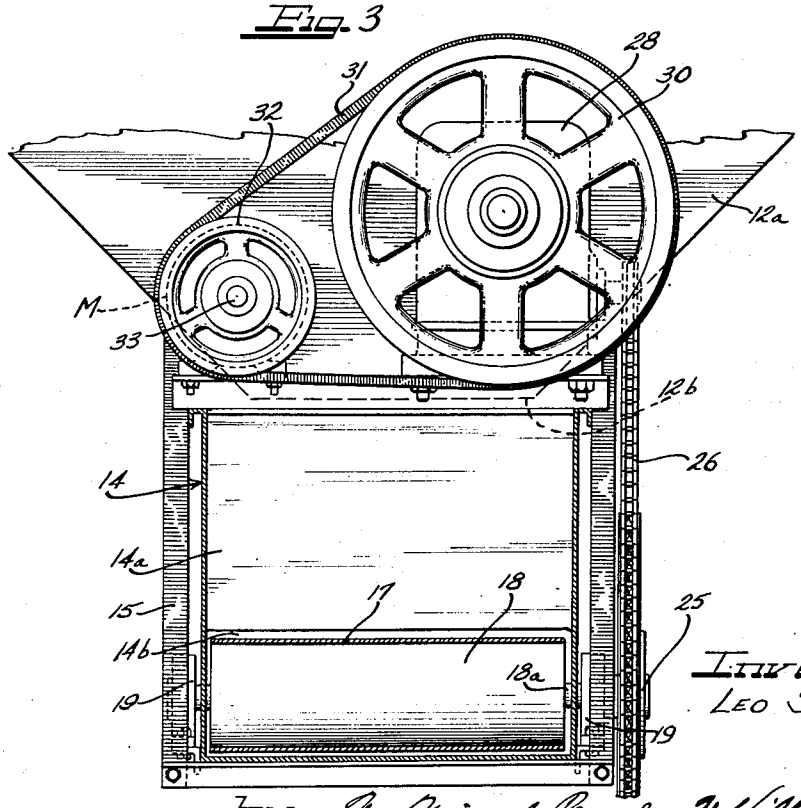


Fig. 3



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Fig. 2

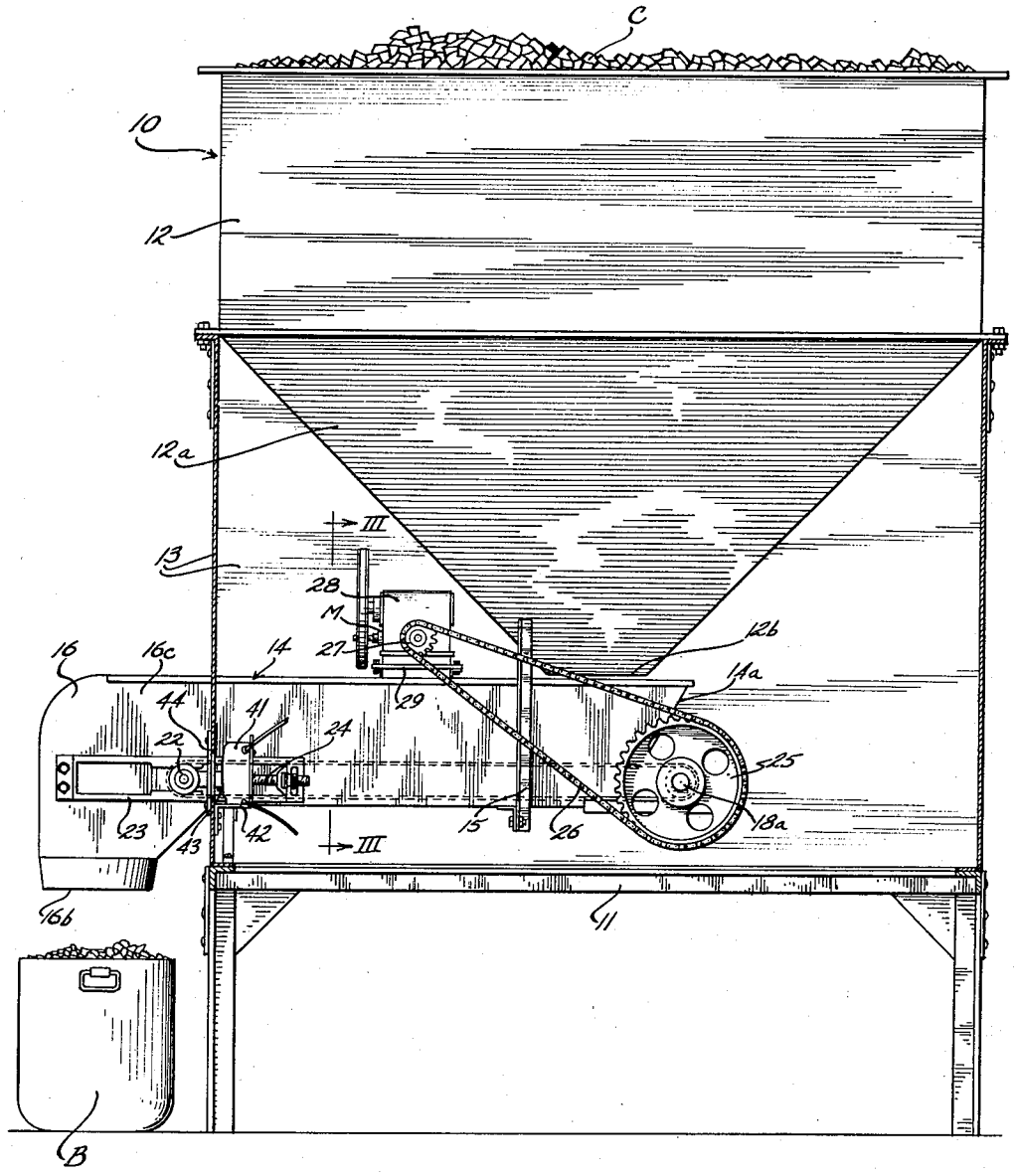
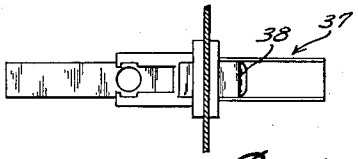


Fig. 6



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Fig. 4

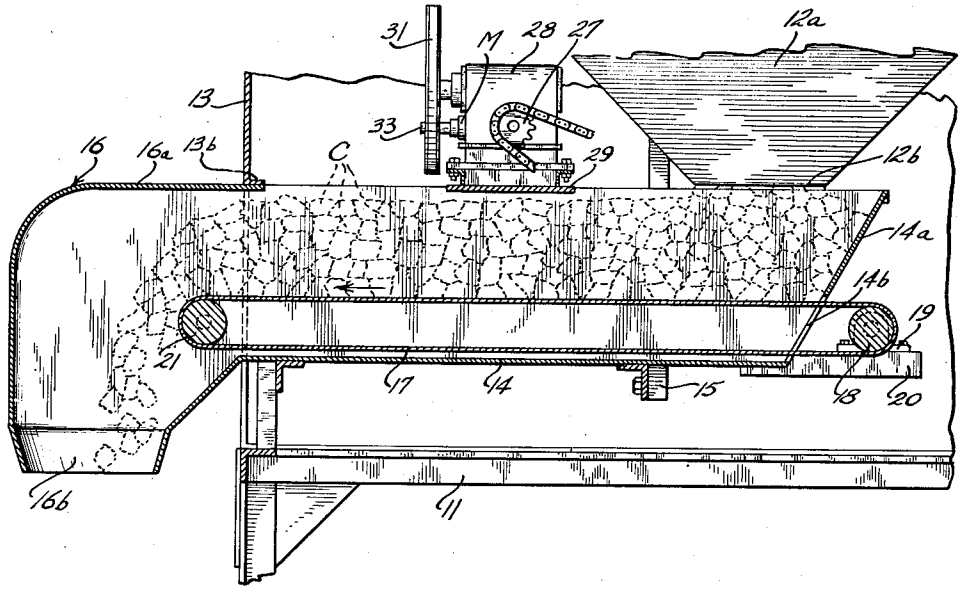


Fig. 5

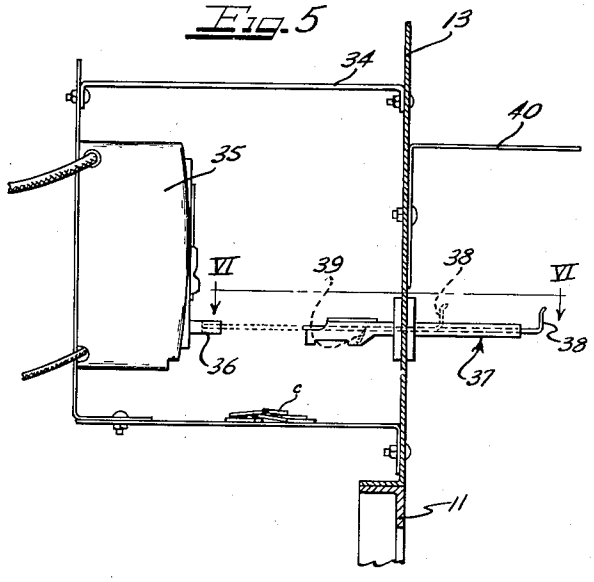
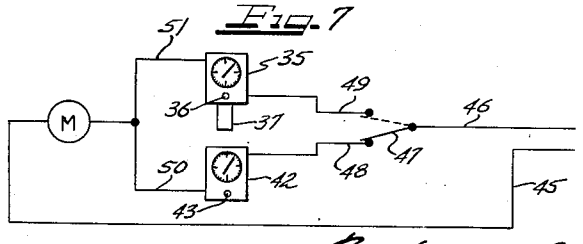


Fig. 7



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UNITED STATES PATENT OFFICE

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VENDING MACHINE FOR BULK MATERIAL

Leo Spanski, Chicago, Ill.

Application August 17, 1949, Serial No. 110,741

2 Claims. (Cl. 222—70)

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This invention relates to a machine for vending bulk material such as coal, sand, gravel, and the like from a hopper, and specifically relates to a coal-vending machine that is automatically operated during a predetermined time period for delivering a predetermined amount of coal.

While the invention will be hereinafter specifically described as embodied in a coal-vending machine, it should be understood that the invention is not limited to any particular usage, since the principles thereof are generally applicable to the automatic vending of bulk material from a hopper to deliver successive predetermined amounts of the material.

The machine of this invention includes a hopper with a converging bottom discharging through a small bottom opening into an open-topped trough. An endless conveyor belt has an upper run through the bottom of the trough for conveying material received from the hopper along the length of the trough to a discharge spout at the end of the trough. The conveyed material will fall freely off of the end of the conveyor to be delivered through the discharge spout. The conveyer is driven by a prime mover such as an electric motor which is selectively energized to operate at a predetermined time period, so that each energization of the motor will result in delivery of the same amount of coal. The trough is so arranged relative to the bottom of the hopper that a uniform depth of coal will be maintained on the belt, thereby insuring delivery of the same amount of coal for each identical length of movement of the belt.

A feature of the invention resides in the coin actuation of the timer mechanism so that the machine can be used to automatically vend the same amount of material for each coin deposited in the machine.

The machines of this invention have great utility in coal yards and avoid the necessity for the services of a yard man to vend small purchases of coal such as in bushel basket, sack, or bag lots. The machine of this invention makes possible self service by the customer.

It is, then, an object of the invention to provide a machine for vending successive equal amounts of bulk material from a hopper.

A further object of the invention is to provide a coin actuated coal vending machine.

A still further object of the invention is to provide a device for vending heavy bulk material, such as sand, coal, gravel, or the like from a hopper to deliver successive equal amounts of the material from the hopper without the necessity of weighing each batch of material.

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A specific object of the invention is to provide a coal vending machine which operates on a time cycle principle to vend successive equal amounts of coal without the services of a yard man.

Other and further objects of the invention will be apparent to those skilled in the art from the following detailed description of the annexed sheets of drawing which, by way of a preferred example only, illustrates one embodiment of the invention.

On the drawings:

Figure 1 is a front elevational view of a coal-vending machine according to this invention.

Figure 2 is a vertical cross-sectional view, with parts in side elevation, taken along the line II—II of Figure 1.

Figure 3 is a vertical cross-sectional view, with parts in front elevation, taken along the line III—III of Figure 2

Figure 4 is a vertical cross-sectional view, with parts in side elevation, taken along the line IV—IV of Figure 1.

Figure 5 is an enlarged vertical cross-sectional view, with parts in side elevation, taken along the line V—V of Figure 1.

Figure 6 is a horizontal cross-sectional view, with parts in top plan, taken along the line VI—VI of Figure 5.

Figure 7 is a wiring diagram, of the timer circuit.

As shown on the drawings:

The machine 10 of this invention shown in Figures 1 and 2 is composed of suitable upright framework 11 supporting a hopper 12 with a tapered bottom 12a that converges to a small rectangular bottom opening 12b. The frame 11 carries walls 13 surrounding the tapered part 12a of the hopper. An open topped trough 14 is mounted on the framework 11 inside of the walls 13 and extends under the open bottom 12b of the hopper. Suitable supports 15 are provided to firmly anchor the trough in spaced aligned relation under the opening 12b of the hopper. The trough 14 extends laterally from the hopper bottom to a discharge spout-shaped end 16 that extends through an opening 13a in the front wall 13 of the machine. This discharge spout end 16 has a top wall 16a secured to an inturned flange 13b along the top end of the opening 13a, an open bottom 16b spaced above the ground level so that a container such as a coal bag B (Figures 1 and 2) can fit freely under the spout and receive therefrom, and vertical side walls 16c spaced inwardly from the sides of the opening 13a.

The trough 14 has a sloping rear end wall 14a

beyond the hopper opening 12b. This wall 14a has a slot 14b through the bottom portion thereof. An endless conveyor belt 17 has both runs thereof extending through the slot 14b to the discharge spout 16. A roll type pulley 18 rotatably mounted on suitable bearings 19 carried by an extension frame 20 on the trough receives the belt 17 therearound. A second cooperating roller type pulley 21 is rotatably mounted across the inlet mouth 16a of the spout 16 and, as shown in Figure 2, is carried on suitable bearings 22 which are slidably mounted in tracks 23 carried on the side walls 16c of the spout and extending through the spaces between these side walls and the sides of the opening 13a. A stretching mechanism 24 mounted on the side walls of the trough 14 behind the front wall 13 acts on the bearings 22 to urge the roll 21 away from the roll 18 for maintaining the belt in a taut condition. As shown, both the top and the bottom runs of the belt are tight. The bottom run 17 is spaced slightly above the bottom of the trough. As shown in Figure 3, the belt 17 extends across the full width of the trough and has only slight operating clearance relationship with the side walls of the trough.

The rear pulley 18 has an axle 18a extending beyond one bearing 19 and receiving a sprocket gear 25 thereon. This gear 25 is driven by a sprocket chain 26 from a gear 27 that is driven by a gear reducing unit 28 mounted on a plate 29 extending across the top of the trough 14 adjacent the hopper bottom 12a. The gear reducing unit 28 is driven by a pulley wheel 30 with a V-belt 31 therearound. The V-belt is driven by a pulley wheel 32 on the shaft 33 of a motor M. Thus when the motor M is energized, the belt 31 will drive the gear reducer 28 which drives the chain 26 at a materially reduced rate to rotate the sprocket 25 and thus drive the conveyor 17 to move its upper run toward the spout in the direction of the arrow shown in Figure 4. Lumps of coal C will fall by gravity through the open bottom 12b of the hopper into the trough 14 to be deposited on the upper run of the belt 17. As this upper run is moved forwardly, the entire trough will be filled substantially to its top with the lumps of coal. While the bottom 12b of the hopper may be slightly above the top of the trough, it is nevertheless effective to level off a uniform depth of coal on the belt and as belt moves forward, this uniform layer or depth of coal falls freely off of the end of the belt through the discharge spout. Since a uniform depth of coal is maintained along the length of the trough, it follows that the amount of coal delivered through the discharge opening 16b will depend upon the length of movement of the belt and since this length of movement is controlled by a constant speed motor M, it follows that the length of time of energization of the motor will determine the amount of delivery without necessitating weighing of the material.

As shown in Figure 5, a small box 34 is mounted on the inner face of the front wall 13 of the machine. A timer mechanism 35 is mounted on the rear wall of this box 34. This timer mechanism is of the type that can be set to close an electric circuit for any desired time period. Thus, the unit 35 can be set so that when it is actuated it will hold a circuit closed for the set period. The timer 35 has a push-button actuator 36 and when this actuator is depressed the timer will close the circuit for a predetermined amount of time.

The front wall 13 carries a coin mechanism 37 with a coin slide 38 having a coin-receiving aperture which when filled with a coin will depress a lock 39 to permit the slide to be moved against the timer actuator 36 as shown in dotted lines. As soon as the slide 38 is moved to the dotted line position for moving the actuator 36 the coin c will drop into the bottom of the box and the actuator 36 will be released. However, the timer 35 will remain in circuit closing position for the period of time that has been selected.

A guard 40 is preferably mounted over the coin mechanism 37 to protect it from the elements.

As shown in Figure 2, a second timer mechanism 41 is also preferably provided on the opposite side of the trough 14 from the timer 35. This timer 41 is merely carried on a suitable bracket 42 from the front wall 13 and has its actuator 43 aligned with an opening in the front wall. This opening is normally closed with a plate 44 but the plate can be removed to expose the actuator. The second timer is provided so that the machine can be operated without the use of coins in the event that it is desired to load a plurality of bags or other receptacles, thereby using the machine as a loader instead of a coin vendor.

As shown in Figure 7, the motor M is connected in parallel with both timers 35 and 42. One energizing wire 45 of a two-wire circuit extends directly to the motor M. The other wire 46 extends to a switch 47 which can be manually shifted to energize either a wire 48 or a wire 49. The wire 48 leads to the timer 42 while the wire 49 leads to the timer 35. The timers, in turn, are connected through wires 50 and 51 to the other side of the motor. The switch 47 can be positioned in a convenient hidden place on the machine and when thrown to the solid line position the timer 42 will energize the machine for a predetermined period each time its exposed actuator 43 is depressed by the operator. On the other hand, when the switch 47 is shifted to the dotted line position, the timer 35 will be the controlling unit and it can only be actuated by the coin mechanism 37.

From the above descriptions it will be understood that this invention now provides a vending machine which is selectively coin operated or push-button operated to vend successive equivalent amounts of bulk material from a hopper or the like.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

1. A vending machine for successively delivering predetermined amounts of bulk material comprising a hopper having a tapered bottom converging to a small bottom opening, an open topped trough mounted under said opening and extending laterally from the hopper, said trough having side walls and a bottom wall, a downturned discharge spout on an end of the trough remote from the hopper opening, an endless conveyor belt having an upper run extending along the length of the trough near the bottom thereof to convey material in the trough from the hopper opening through the discharge spout, said discharge spout having a closed top at a level above the upper run of the conveyor belt and not lower than the open bottom of the hopper, together with an open bottom at a level spaced materially below said upper run of the conveyor belt, said

tapered bottom of the hopper being effective to level off material fed through the bottom opening onto the conveyor belt as said material is moved out of registry with said opening, an electric motor for driving said belt at a constant rate, an energizing circuit for said motor including a timer determining the period of energization of the motor, said timer being adjustable to vary said period of energization to preselect the desired period of operation of the conveyor belt for delivering a predetermined amount of bulk material, an actuator for said timer, and walls preventing free access to material in the trough and to said timer, whereby successive operation of said actuator will effect successive movement of said conveyor belt to move material from said hopper at a level determined by the tapered bottom of the hopper and unimpeded by the top wall of the discharge spout to successively deliver uniform predetermined amounts of material through the open bottom of the discharge spout without providing access to the material before it is discharged through said open bottom.

2. A coin controlled vending machine for successive delivery of predetermined amounts of bulk material comprising an upright frame, a hopper mounted on said frame and having a tapered open bottom portion inwardly of said frame, vertical walls on said frame surrounding said tapered open bottom portion in spaced relation, one of said walls having an opening therethrough, a trough mounted on said frame within the space enclosed by said walls and extending under the open bottom of the hopper to receive material therefrom to a top level controlled by said tapered open bottom portion of the hopper,

said trough having a discharge spout on one end thereof extending through the opening in said one wall, a conveyor belt trained through the bottom of said trough and extending into the discharge spout to discharge material thereon of a height controlled by said tapered open bottom portion of the hopper from the trough into the spout, said spout having a bottom outlet spaced below said belt and arranged to prevent access to material on the belt, an electric motor for driving said conveyor belt at a constant rate, a circuit for energizing said motor, a timer in said circuit, said timer being adjustable to vary the time of said circuit energization and a coin mechanism mounted on said one wall for actuating said timer, whereby coin actuation of the timer will energize the motor to drive the belt through a predetermined adjusted time period for moving a predetermined amount of material from the hopper through the discharge spout without giving access to the material before it discharges out of the bottom of the spout.

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