

HEAT SEALING GARBAGE CABINET

BACKGROUND OF THE INVENTION

Garbage can attract insects, roaches, rodents and, other vermin, both indoors and outdoors. It can be a breeding place for disease causing bacteria. Noxious, foul odors can emanate from it, especially if the garbage is ripe. Maximum containment with minimum handling is preferable for hazardous waste, such as medical waste. At the very least, garbage is unsightly and dirty. Therefore it is desirable to keep garbage out of sight and render it as innocuous as possible.

SUMMARY OF THE INVENTION

This invention relates to garbage handling and disposal. It is an object of the invention to render garbage inoffensive and innocuous by keeping it out of sight in a cabinet and sealed at all times. Garbage is kept in a plastic bag in the cabinet of the present invention. Upon opening the cabinet, the bag opens for insertion of garbage. Upon closing the cabinet door, a pleating unit folds or pleats the top of the bag. When the bag is but partially full, a heat sealing unit mounted across the front of the cabinet and an elastomeric strip mounted on the door combine to subject the bag to sealing pressure between mating surfaces when the door is securely latched. When the bag is full, the heat sealing unit permanently seals the bag. Additionally, a slitting unit may be employed to cut a handle-hole near the top of the bag for ease in carrying the bag when it is removed from the cabinet and disposed of.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows the heat sealing cabinet from the side.

Fig. 1A is an enlarged portion of Fig 1.

Fig. 2 is a frontal view of the heat sealing and slitting units (combined), and the pleating unit.

Figs. 3A-C demonstrate the bag pleating operation.

Fig. 4 is a side view of the bag pleating unit.

Fig. 5 is a view of the bag pleating unit from the back.

Figs. 6A and 6B are views of the snap-action bag holding unit, partially cut away.

Fig. 7 shows the bag slitter unit from the back, and Fig. 8 is a top view of the same.

Fig. 9 is a block diagram showing the sequence of electrical control events.

DETAILED DESCRIPTION OF THE INVENTION

Referring to Fig. 1, plastic bag 5 is contained inside of cabinet 10 when cabinet door 11 is closed against cabinet body 12. The term "cabinet body" is used herein to refer to the left portion of the cabinet in the drawing, i.e., the entire cabinet excluding the cabinet door. Variations in cabinet construction are held to be within the scope of the invention, for example, a "top loader," it being a trivial matter to arrange different mechanical linkages to accomplish the several functions of the invention.

A drip container 13 that is attached to and pivots outward with the cabinet door may be employed to support the garbage bag

and catch any drippings from a bag that develops a hole. When cabinet door 11 is closed and latched by means of latch 14, the top of the plastic bag is subjected to pressure between the frontal plate 19 which stretches across the cabinet opening and an opposing mating surface such as elastomeric strip 6 and thereby sealed. Referring to Fig. 1A, the elastomeric strip has a slot 7 cut in it to receive a knife blade that cuts a handle hole in the bag when it is time to dispose of the bag. The relationship of the slitting knife and the elastomeric sealing strip are seen more clearly in Fig. 8.

The latch 14 is preferably of the type that forces the door against the cabinet body with some pressure when the latch handle is turned, either by wedging action or screw action. While a drip container 13 is shown in this embodiment of the invention, a sliding drawer could also be used to contain the garbage bag.

Heat sealing is a highly desirable final step in the process of sealing garbage, to which end a heat sealing and slitting assembly 15 is mounted on frontal plate 19.

Pleating unit 17 pleats or folds the top of the bag before the door is closed, as shown in Figs. 3A-C. This confers several advantages. Otherwise the cabinet and the mating sealing surfaces would have to be excessively wide. It is also much more difficult to apply even pressure over a wide area than a small area. Also, a slit cut in the top of the bag through several plies of plastic for a handle-hole provides greater strength for carrying the bag to final disposal.

Referring to Fig. 2, the heat sealing unit comprises two heating wires 20 and 21, which are covered by fiberglass tape 22. An electrical timer such as time delay relay 23 provides timed heating for heat sealing. The heating wires and fiberglass tape are mounted across the front of the frontal plate 19. The relay is, of course, mounted elsewhere in a suitable location, but makes electrical contact with the wires, for ex., through holes in the frontal plate. Depending on the composition of plate 19, an additional layer of insulating fiberglass tape may be applied between the heating wires and frontal plate. Any heater that is flat enough to provide a surface against which the bag can be compressed and sealed can be employed in the present invention, or alternatively the opposing surface may be shaped to conform to the shape of the heater, if necessary for a good seal. Elastomeric strip 6 of Fig. 1 forces the bag against the taped-over heating wires when the cabinet door is closed, for pressure sealing when the bag is partially full and for heat sealing when the bag is full.

The operation of the pleating unit is best seen in the several drawings Figs. 2, 3A-C, 4, and 5.

Referring to Fig. 3A, The top of bag 5 is held securely at four points by suitable fastening means such as snap-action bag holder 30 (described fully later in the specification). When the cabinet door is fully opened, as in Fig. 3A, rollers 32 and 33 (Figs. 2, 4, and 5) are at their outermost position. Rollers 32 and 33 descend from roller plates 36 and 37 that pass through a

slot-defining portion 29 (Fig. 2) of frontal plate 19. As the door is closed, the rollers pull in the sides of the bag. Fig. 3B shows the bag partially folded or pleated, and in Fig. 3C the bag is almost fully pleated. Other folded configurations are of course within the perview of the present invention.

Referring to Figs. 4 and 5, The rollers 32 and 33 are guided in their lateral motion by suitable means, such as guide blocks 40 and 41, which have keyways in them that engage the ends 42 and 43 of guide channel bar 44. Springs 45 and 46 pull the guide blocks, and thus the rollers, to their centermost position as the cabinet door is closed, thus pleating the bag. Fig. 5 shows the blocks in both their outer and inner positions. In the outer position, the blocks may be held by roller plate latches such as 34 and 35 for ease of loading a garbage bag into the apparatus. These latches engage the roller plates 36 and 37 and pivot on the frontal plate 19.

Figs. 6A and 6B show the snap-action bag holders which are used to secure the bag to the cabinet and its door. A top portion 50 of the bag is inserted between holding finger 51, preferably ridged or knurled for holding power, and the body 52 of the bag holder. When lever 53 is depressed, spring-loaded sliding block 54 pulls holding finger 51 and the bag portion 50 into a recess in the body 52 to securely hold it. Handle 55 is used to restore the holding finger to its open position.

Figs. 7 and 8 show the slitter mechanism. Screw drive 58, driven by reversible motor 59, engages slitter block 60, moving

it back and forth. Switch pusher plate 61 is attached to slitter block 60. Floating switch actuator rod 62 passes through plate 61. Retractable knife 64 passes through a slot portion 39 cut in frontal plate 19, as can be seen in Figs. 2 and 8. Reference numeral 39 points to the lower surface of this slot.

Slitter block 60 is first driven to the left to cut a handle-hole in the bag. When plate 61 hits a reversing limit block 65 (preferably through a spring such as 63 to cushion the operation), the switch actuator rod 62 flips an SPDT reversing switch 67 to its alternate circuit to reverse the motor.

In the reverse direction (to the right in the drawing), when pusher plate 61 begins to push against spring 66, the reversing switch 67 is forced back to its starting position for the next cycle. Power for the motor is supplied from a holding relay, so the slitter block continues moving to the right in the drawing. As pusher plate 61 continues to the right, limit switch 69 is forced to its off (depressed) position by a second limit block 68 to terminate the electrical operation. At this point, slitter block 60 is at its "home" position ready for another cycle. In its home position, the slitter knife 64 is retracted for safety. In Fig. 8, knife holder 70 has an inclined surface that engages a pushing block 71 mounted on the frontal plate that pushes the knife holder back into its recessed position in the slitter block.

Fig. 9 is a block diagram of the electrical operation. With power on, a momentary keyswitch is turned on, and latches a

holding relay (also called a "latching" or "locking relay"), which supplies power for a complete cycle of heat sealing and slitting. This starts an electrical timer such as a time delay relay that turns on the heat sealer for sufficient time to seal the bag. At the same time the reversible motor starts moving towards reversing switch 67 to cut the bag handle-hole.

Limit switch 69 is initially off when slitter block 60 is in its home position, so the momentary switch must be held for an instant until switch 69 closes to maintain latching current to the holding relay. This alternate path is indicated by the dashed arrows in Fig. 9.

When SPDT switch 67 is flipped to its alternate circuit, this reverses the reversible motor. When slitter block 60 reaches limit switch 69, this switch is turned off, turning off latching current to the holding relay and bringing the operating cycle back to its initial state.