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RUBBISH CHUTE SEAL

Field of the Invention

This invention relates to a sealing mechanism for sealing the opening of a chute. In particular, it has an application to a door at the vertical opening of a rubbish chute.

Background of the Invention

It is common in high-rise residential and other buildings to incorporate rubbish chutes to allow rubbish to be disposed of without having to manually deliver the rubbish to the ground floor. These rubbish chutes are typically accessed through a rectangular hole in the wall of the building. These openings are usually framed with a metal piece. A rubbish chute door covers the opening in order to prevent foul odours and pests (eg. cockroaches) from reaching the interior of the building. The rubbish chute door is usually hinged along one side of the frame of the chute, so that to open the door one pulls downwardly on a handle and the door swings open into the room.

Typically, affixed to the inside of the door is an open container generally referred to as a Flipper. The Flipper is shaped as a quadrant cylinder (with the circumference as the open side). The Flipper has four walls, being two generally rectangular walls disposed about 105° to each other, with two quadrant side walls extending between the opposed pairs of edges of the rectangular walls to form the Flipper. Such a Flipper is included in the chute illustrated in Figure 3 which is referred to below in describing the invention. The Flipper is identified by reference numeral 40. After rubbish is placed in the Flipper and the door is returned to its closed position, the Flipper rotates in an arc with respect to the door frame, and "flips" the rubbish down the rubbish chute by allowing the rubbish to slide out of the Flipper under the force of gravity. The Flipper also serves to prevent the placement of long items into the chute which could become lodged in the rubbish chute.

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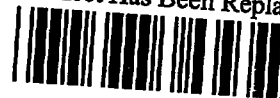


In a resting position, the door is closed. It is known to provide for a rubber seal or gasket along the rim of the rubbish chute door where it meets with the frame in a closed position so as to substantially prevent foul odours and pests gaining access to the interior of the building. However such seals are typically
5 imperfect, as the rubber may not be a perfect fit with the corresponding metal frame on the periphery of the chute. Degradation of the rubber over time also gives rise to poor sealing.

It is known to provide a counterweight or a spring-loaded mechanism to assist in keeping the door in a closed position. The effectiveness of the sealing
10 arrangement is then dependent on the force exerted by the counterweight or spring load, which forces the door shut against the periphery of the frame. The pressing action should be such as to compress the rubber gasket. To be completely effective, this would require quite substantial force. However, to open the door, the occupant has to pull against this substantial force. A practical
15 compromise therefore has to be reached, thus seals of this type are often inherently unable to prevent air leakage.

When rubbish is cleared from the base of these chutes, it is common for a gust of wind to channel up the rubbish chute. The force exerted by spring-loaded or counterweight mechanisms may not be sufficient to hold the door of the rubbish
20 chute closed against the wind gusts thereby allowing the gust of wind carrying foul odours and small particles of rubbish to enter the room. All rubbish chutes generally have an inherent updraft, thus there is always a positive air pressure within the chute. If the sealing arrangement of the rubbish chute door is inadequate, there will be a perpetual leakage of air allowing foul odours and pests
25 to enter the room.

There therefore exists the need to provide a seal for a rubbish chute that compensates for irregularities present on the surface of the rubbish chute frame; can fill the irregular gap between the wall-frame and the door; is durable so as to be able to withstand the harsh, often acidic, environment inside the rubbish chute
30 and yet remain flexible; is easily deformed so as to enhance durability especially in those parts of the seal which have to withstand stress when the rubbish door is



opened and closed, and is of reduced cost by removing additional parts such as counterweights and spring-loaded mechanisms, thus simplifying the overall manufacture process..

5 The object of the invention, at least in part, is to alleviate all or some of the above problems with prior art sealing arrangements.

Summary of the Invention

10 The invention accordingly provides a sealing mechanism for a door at the opening of a rubbish chute, the door being movable between a closed position and an open position permitting access to the chute, the sealing mechanism including:

- a magnetic metal frame member;

- a seal disposed opposite the frame member and including magnetic material;

- such that, with the door in the closed position, the chute is sealed.

15 The invention also envisages a sealing mechanism as described above, in which the magnetic metal frame member is located around at least a portion of the door of the rubbish chute, and the seal is located around at least a portion of the periphery of the opening of the chute, and vice versa. The invention can be used whether or not an open container (such as the Flipper 40 in Figure 3) is affixed to
20 the inside of the door.

25 Preferably, the seal is formed from an elastomeric material such as rubber or the like which undergoes partial deformation and/or compression when sealing the opening of the rubbish chute to form a substantially air tight seal with the metal frame of the rubbish chute. More preferably, the seal is formed from a thermoplastic elastomer.



Preferably, the magnetic material is in the form of a magnetic rod, bar, or strip. In this embodiment, the seal preferably includes a longitudinal sleeve adapted to contain the magnetic material.

Alternatively, the magnetic material may be in particulate form and dispersed within the seal during manufacture. The magnetic material may also be a coating on the outer surface of the seal.

Advantageously, the seal is adapted to be fitted along the outer periphery of the door of the rubbish chute. The seal may be attached to the door using an adhesive or similar.

Advantageously, the seal has a sealing surface to form the seal and an opposed supporting surface affixed in use to either the door or the frame, the mechanism further including a gas-filled cavity or cavities along a sufficient portion of the seal to adsorb part of the energy of the door when forcefully closed. Preferably, the cavity is longitudinal along the seal and elastic to permit the sealing surface to move further from, as well as closer to, the supporting surface at different points of the seal along its length.

Preferably, the cavity is wider than the sleeve and located between the sleeve and the supporting surface.

Advantageously, the mechanism further includes a longitudinal flange extending along one or both edges of the sealing surface and projecting generally perpendicularly to the sealing surface, each flange being sufficiently elastic to fold when pressed against an opposed surface with the door in the closed position, so as to substantially prevent dust building up between seal and the metal frame and to improve the seal formed.

The invention also provides a method for sealing a door at the opening of a rubbish chute, the door being movable between a closed position and an open position permitting access to the chute, the method including:



providing a magnetic metal frame member;

providing a seal opposite the frame member, the seal including magnetic material;

closing the door thereby sealing the chute.

- 5 Advantageously, the method includes locating the magnetic metal frame member around at least a portion of the door of the rubbish chute, and locating the seal around at least a portion of the periphery of the opening of the chute. Alternatively, the method may include locating the magnetic metal frame member around at least a portion of the periphery of the opening of the chute, and locating
10 the seal around at least a portion of the door of the rubbish chute.

Preferably the method includes attaching the seal to the periphery of the chute or the door using an adhesive or similar.

- Advantageously, the method of sealing includes a seal with a longitudinal sleeve. Preferably, a magnetic rod, bar, or strip is enclosed within the longitudinal
15 sleeve. Alternatively, magnetic material in particulate form is dispersed within the seal during manufacture. Alternatively, magnetic material is coated on the outer surface of the seal.

- Advantageously, the method includes the seal having a gas-filled cavity or cavities along a sufficient portion of the seal to adsorb part of the energy of the
20 door when forcefully closed.

- Preferably, the method further includes the seal being formed integrally with a longitudinal flange extending along one or both edges of the sealing surface and projecting generally perpendicularly to the sealing surface, each flange being sufficiently elastic to fold when pressed against an opposed surface with the door
25 in the closed position.



Brief Description of the Drawings

The invention will now be described by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a cross sectional view of a seal according to an embodiment of the invention.

Figure 2 is a cross sectional view of the seal of Figure 1 *in situ*.

Figure 3 is a perspective view of the sealing mechanism in a second embodiment of the invention.

Figure 4 is a cross sectional view of the seal of Figure 1 upon forceful closing of the door of the rubbish chute.

Description of Preferred Embodiments

The seal shown in the Figures illustrates one embodiment of the profile of the seal of the invention. It is to be understood that the seal can take any profile within the scope of the present invention.

Referring to the Figures, seal 10 is formed substantially from material 11 divided into an elongate pocket 12 extending along seal 10 which is adapted to receive magnetic material 14, and air cushion 16. The seal further includes a rigid base 18 and flanges known as "scrapers" 20, 22. Outer face 30 is designed to abut wall frame 24 in use.

The material 11 forming the seal 10 is advantageously a thermo-plastic elastomer. Such elastomer has a high content of synthetic rubber which retains its flexibility in harsh environments. Conventional seals are formed of soft PVC which can harden over time particularly in harsh environments. The flexibility of the seal is important in compensating for any gaps between the door 33 and the metal frame 24. It is not uncommon for the doors of rubbish chutes to be



manufactured slightly twisted. Doors can also become twisted over time. As a result, the gap between the door and the frame can be greater at one side of the frame than at another side. The seal of the invention compensates for this difference by compressing at the side where the gap is small and stretching to
5 make contact with the frame at the side where the gap is larger. The seal of the invention is designed to compensate for a gap difference up to 5mm between the door and the metal frame (ie. when on part of the door is in contact with the frame, the gap between another part of the door and the frame can be up to 5 mm and a complete seal can still be achieved).

10 Pocket 12 is formed by side walls 26, 28, outer face 30, and inner wall 32. Inner wall 32 serves to divide the seal 10 so that an air cushion 16 can be formed. In this embodiment, air cushion 16 is formed by a continuous outer wall 34. In the event that the door is closed forcefully, air cushion 16 serves to absorb the initial compression of the seal.

15 Rigid base member 18 is also formed of thermo plastic elastomer and is moulded as part of seal 10. Base member 18 is attached to the door of the rubbish chute using adhesive.

Ideally, the entire seal illustrated in Figure 1 is extruded as one piece.

As illustrated in Figure 2, the periphery of the rubbish chute includes a
20 metal frame member 24 that provides a magnetic contact for the seal 10.

In Figure 3, the invention is shown installed in a rubbish chute which contains Flipper 40 affixed to the inside surface of the door of the chute. Such a Flipper is known to those skilled in the art. As will be apparent, the size of the Flipper may be varied and is not relevant to the application of the invention.

25 In use, the door of the rubbish chute remains closed unless the handle is pulled on to uncover the rubbish chute opening. By pulling downwardly on the handle, door is pulled outwardly and downwardly about hinge means provided on the lower horizontal edge of the door. After rubbish is placed in the Flipper where



present, or otherwise in the chute, the door is returned to its closed position. When the door is closed, seal 10 contacts and is magnetically attracted to the metal frame of the rubbish chute opening. The magnetic force exerted pulls the door against the opening of the rubbish chute thereby partially deforming the material of the seal and forming a substantially airtight seal. The door may be counter-weighted/spring loaded so as to bias the door to the closed position. The effectiveness of the seal is further enhanced by scrapers 20, 22 which are forced to press against the metal frame of the rubbish chute when the door is fully closed.

10 It will be appreciated that the present invention provides an effective sealing means for sealing rubbish chute openings. By employing a magnetic seal, the sealing of the gap between the door and the frame of the chute is improved by taking advantage of both the positive magnetic force and the deforming/compensating effect of the rubber seal.

15 It will be understood that the invention disclosed and defined herein extends to all alternative combinations of two or more of the individual features mentioned or evident from the text or drawings. All of these different combinations constitute various alternative aspects of the invention.

**THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:**

- 1 A sealing mechanism for a door at the opening of a rubbish chute, the door being movable between a closed position and an open position permitting access to the chute, the sealing mechanism including:
 - 5 a magnetic metal frame member;

a seal disposed opposite the frame member and including magnetic material;

such that, with the door in the closed position, the chute is sealed.
- 2 A sealing mechanism according to claim 1, wherein the magnetic metal
10 frame member is located around at least a portion of the door of the rubbish chute, and the seal is located around at least a portion of the periphery of the opening of the chute.
- 3 A sealing mechanism according to claim 2, wherein the seal is attached to the periphery of the chute using an adhesive or similar.
- 15 4 A sealing mechanism according to claim 1, wherein the magnetic metal frame member is located around at least a portion of the periphery of the opening of the chute, and the seal is located around at least a portion of the door of the rubbish chute.
- 5 A sealing mechanism according to claim 4, wherein the seal is attached to
20 the door using an adhesive or similar.
- 6 A sealing mechanism according to any preceding claim, wherein the seal is formed from an elastomeric material such as rubber or the like.
- 7 A sealing mechanism according to any preceding claim, wherein the seal is formed from a thermo-plastic elastomer.





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- 8 A sealing mechanism according to any preceding claim, wherein the magnetic material is in the form of a magnetic rod, bar, or strip.
- 9 A sealing mechanism according to claim 8, wherein the seal includes a longitudinal sleeve adapted to contain the magnetic material.
- 5 10 A sealing mechanism according to any one of claims 1 to 7, wherein the magnetic material is in particulate form and dispersed within the seal during manufacture.
- 11 A sealing mechanism according to any one of claims 1 to 7, wherein the magnetic material is coated on the outer surface of the seal.
- 10 12 A sealing mechanism according to any preceding claim, the seal having a sealing surface to form the seal and an opposed supporting surface affixed in use to either the door or the frame, the mechanism further including a gas-filled cavity or cavities along a sufficient portion of the seal to adsorb part of the energy of the door when forcefully closed.
- 15 13 A sealing mechanism according to claim 12 wherein the cavity is longitudinal along the seal and elastic to permit the sealing surface to move further from, as well as closer to, the supporting surface at different points of the seal along its length.
- 20 14 A sealing mechanism according to any one of claims 1 to 9, the seal having a sealing surface to form the seal and an opposed supporting surface affixed in use to either the door or the frame, the mechanism further including a gas-filled cavity or cavities along a sufficient portion of the seal to adsorb part of the energy of the door when forcefully closed, in which the cavity is wider than the sleeve and located between the sleeve and the supporting surface.
- 25 15 A sealing mechanism according to any one of claims 12 to 14, the seal having a sealing surface to form the seal and an opposing supporting



- 5 surface affixed in use to either the door or the frame, the mechanism further including a longitudinal flange extending along one or both edges of the sealing surface and projecting generally perpendicularly to the sealing surface, each flange being sufficiently elastic to fold when pressed against an opposed surface with the door in the closed position.
- 16 A sealing mechanism according to claim 15, wherein the seal is adapted to be affixed to the door such that the flanges are pressed against the metal frame to improve the seal between the door and the frame.
- 10 17 A sealing mechanism substantially as herein described with reference to, and with reference to and as illustrated in, the accompanying drawings.
- 18 A seal for use in a sealing mechanism according to any one of claims 9 to 16.
- 15 19 A method for sealing a door at the opening of a rubbish chute, the door being movable between a closed position and an open position permitting access to the chute, the method including:
- providing a magnetic metal frame member;
- providing a seal opposite the frame member, the seal including magnetic material;
- closing the door thereby sealing the chute.
- 20 20 A method of sealing according to claim 19, including locating the magnetic metal frame member around at least a portion of the door of the rubbish chute, and locating the seal around at least a portion of the periphery of the opening of the chute.
- 25 21 A method of sealing according to claim 20, including attaching the seal to the periphery of the chute using an adhesive or similar.



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- 22 A method of sealing according to claim 19, including locating the magnetic metal frame member around at least a portion of the periphery of the opening of the chute, and locating the seal around at least a portion of the door of the rubbish chute.
- 5 23 A method of sealing according to claim 22, including attaching the seal to the door using an adhesive or similar.
- 24 A method of sealing according to any one of claims 19 to 22, in which the seal has a longitudinal sleeve.
- 10 25 A method of sealing according to claim 24, in which a magnetic rod, bar, or strip is enclosed within the longitudinal sleeve.
- 26 A method of sealing according to any one of claims 19 to 24, in which magnetic material in particulate form is dispersed within the seal during manufacture.
- 15 27 A method of sealing according to any one of claims 19 to 24, in which the magnetic material is coated on the outer surface of the seal.
- 28 A method of sealing according to any one of claims 19 to 27, in which the seal has a gas-filled cavity or cavities along a sufficient portion of the seal to adsorb part of the energy of the door when forcefully closed.
- 20 29 A method of sealing according to any one of claims 19 to 27, in which the seal is formed integrally with a longitudinal flange extending along one or both edges of the sealing surface and projecting generally perpendicularly to the sealing surface, each flange being sufficiently elastic to fold when pressed against an opposed surface with the door in the closed position.
- 25 30 A method of sealing substantially as herein described with reference to, and with reference to and as illustrated in, the accompanying drawings.