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(54) Shock absorber for waste container

(57) A shock absorber (20) adapted for use on a pedal bin (1) in which the lid (7) of the pedal bin (1) is opened and closed by an actuating member, the shock absorber (20) comprising damping means connected to the actuating means to limit the speed of movement of the actuating means when the lid (7) of the bin is opened or closed.

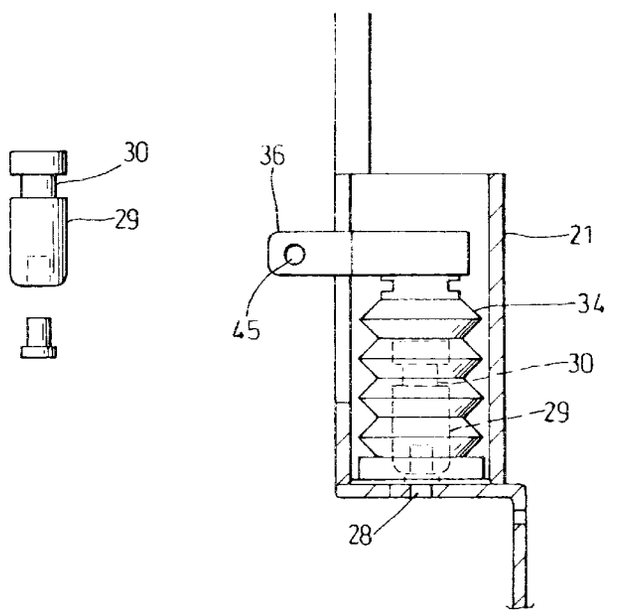

Fig. 3a

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Description

[0001] This invention relates to a shock absorber and, more particularly, to a shock absorber for use in a pedal bin to reduce the force with which the lid of the bin is returned to the closed condition during use.

[0002] Pedal bins are found in many different locations and have a particular usefulness ina hospital environment where a lid is required on the bin to keep any material in the bin isolated from the patients in the hospital. Pedal bins allow the operator to open the lid of the bin without having to manually operate the lid. This is particulary useful when the operator is carrying waste to be put into the bin and does not have a free hand.

[0003] The bins are operated by a pedal at the foot of the bin which is generally depressed inorder to raise the lid of the bin. Once material has been placed into the bin, the pedal is released thereby allowing the lid to fall back onto the bin under the force of gravity. Whilst this ensures that the bin is closed securely, the noise generated from such an action can cause a disturbance. This is especially so where a number of such bins are provided in one room, for example in a hospital. Here it is imperative to ensure that the patients are not disturbed more than is necessary.

[0004] It is an object of the present invention to provide a shock absorber for a pedal bin which is both efficient and quiet in closing the lid of a bin after use, thereby overcoming or at least mitigating the disadvantages of the known pedal bins.

[0005] According to one aspect of the present invention there is provided a shock absorber adapted for use on a pedal bin in which the lid of the pedal bin is opened and closed by an actuating member, the shock absorber comprising damping means connected to the actuating means to limit the speed of movement of the actuating means when the lid of the bin is opened or closed.

[0006] Preferably, the shock absorber further comprises a body which is adapted to be mounted on the bin adjacent to the actuating means of the bin, the damping means being mounted within the body.

[0007] Advantageously, the damping means comprises bellows mounted which may expand or retract within the body.

[0008] Conveniently, means are provided to connect the bellows to the actuating member of the bin.

[0009] Advantageously, the connecting means comprises a planar member, one end of which is provided with a recess to receive the actuating member and the other end of which is connected to the leading end of the bellows.

[0010] Preferably also, the recess is defined between two arms of the planar member and means are provided to alter the distance between the two arms thereby altering the size of the recess to allow the connecting means to be securely affixed to the actuating means of the bin.

[0011] Advantageously, the body of the shock absorber is provided with a longitudinal slot along at least part of the length thereof, though which the planar member extends as the bellows are expanded and retracted within the body.

[0012] Conveniently, the body is provided with an end cap closing the end of the body remote from the planar member.

[0013] Advantageously, the end cap comprises an integrally formed hollow boss which extends into the body and is received within the free end of the bellows.

[0014] Preferably also, an aperture is formed in outer surface of the end cap allowing air to be drawn into the hollow boss.

[0015] Conveniently, a weight is provided within the boss, the weight being moveable between a position wherein the aperture in the end cap is closed by the weight and a position where the weight is lifted free of the aperture to allow air to be drawn into the boss.

[0016] Advantageously, a limit stop is mounted on the boss to limit the movement of the weight between the two extreme positions.

[0017] Preferably, the body is formed of a rigid plastics material.

[0018] Preferably also, the bellows are formed of a resilient plastics material.

[0019] One embodiment of the present invention will now be described with reference to the accompanying drawings in which:

Figure 1 is a schematic side view of a pedal bin with a shock absorber according to one aspect of the present invention mounted thereon;

Figure 1a is a schematic rear view of the bin of Figure 1;

Figure 2 is an exploded side view of the shock absorber of Figure 1;

Figure 3 is a schematic side view of the shock absorber of Figure 1 when the lid of the bin is in a closed condition, and

Figure 3a is an enlarged view of the shock absorber as shown in Figure 3;

Figure 4 is a schematic side view of the shock absorber of Figure 1 when the lid of the bin is in an opened condition.

[0020] Turning now to the Figures there is shown in Figure 1 a pedal bin generally referred to as **1**. The pedal bin comprises a hollow body **2** with an opening **3** at one end which may be adapted to receive a waste receptacle such as a plastics waste bag for rubbish (not shown). The bin may be formed of a moulded plastics material.

[0021] The bin is provided with a hinged door **4** at the front thereof. This allows access to the bag when full, to

allow the bag to be removed from the bin and a new bag to be mounted within the body of the bin. The door is hinged **5** at one side to the body. A door knob **6** is mounted on the door approximately mid-way between the top and bottom of the door adjacent the edge remote from the hinges **5**.

[0022] The bin **1** is provided with a lid **7** which covers the opening **3** in the body. The lid extends **7a** beyond the rear of the bin and has a downward projecting lip **8** at the rear edge. The lip is extended **8a, 8b** around the sides of the lid which extend beyond the rear of the bin. An aperture **9** is provided through the lip at each side of the lid.

[0023] A pair of generally triangular flanges **10** extend upward from the rear of the bin **1**. The flanges are mounted to the bin adjacent the top edge and extend outwardly from the bin to a position level with the top edge of the bin and adjacent to the end of the lid **7**.

[0024] The flanges **10** are each provided with an aperture **11** which is of a similar size to the aperture **9** in the lip of the lid. A mounting pin **12** extends through the apertures in the flanges and the lip of the lid to hingedly connect the lid **7** to the bin **1**.

[0025] A handle **13** is provided adjacent the rear of the lid of the bin, between the flanges **10**.

[0026] At the base of the bin, the pedal **14** comprises a substantially rectangular plate **15** which is mounted underneath the bin. The front of the plate extends beyond the front of the bin. The plate is pivotally mounted to the underside of the bin on a pivot pin **16** which is retained in two apertures **17** in the sides of the lower section of the bin.

[0027] At the rear of the bin a wheel **18** is mounted at either side to enable the bin to be tilted back onto the wheels to allow the bin to be easily moved from one location to another.

[0028] An actuating rod **19** is mounted at the rear of the bin. The rod is centrally located between the wheels **18** at the base of the bin and extends between the rear of the rectangular plate **15** and the underside of the lid **7** between the flanges **10.**

[0029] A shock absorber **20** according to one aspect of the present invention is mounted between the base of the bin **1** and the actuating rod **19** as shown in Figure **1**. The shock absorber comprises a circular shroud **21,** open at both ends and provided with integrally formed mountings **22** at one end to allow the shroud to be mounted to the rear of the bin **1**. The shroud may be formed of any suitable plastics material and may be formed a known molding process.

[0030] A generally rectangular U-shaped slot **23** is provided in the shroud, the slot extending approximately three quarters of the length of the shroud and off-set from the centre of the shroud, towards one of the mountings **22** as shown in Figure

[0031] An end cap **24** is mounted in the lower end of the shroud **21** to close the lower side of the shroud. The end cap is generally circular and is of a similar diameter to the diameter of the shroud itself.

[0032] A hollow boss **25** extends from the centre of the end cap and is adapted to be received within the shroud **21**. The boss is generally circular in cross-section and is of slightly smaller diameter than the end cap thereby defining a rim **26** on the end cap. The boss is frustoconical in configuration and has a circular aperture **27** in the centre. The underside of the endcap **24a** is provided with an aperture **28** which connects the inner chamber of the end cap, within the boss **25** with the atmosphere.

[0033] A cylindrical spigot **29** is mounted within the chamber in the boss, the circumference of the spigot being slightly smaller than the circumference of the aperture **27** in the boss thereby allowing the spigot to move freely within the aperture. The end of the spigot within the boss is provided with a countersunk aperture and a rubber insert (not shown) is mounted in the aperture. The spigot has a groove **30** around the circumference thereof adjacent to the end of the spigot remote from the rubber insert.

[0034] A limit stop **31** is located adjacent to the spigot **29**, the limit stop having a generally circular body **32** and a flat head **33,** the head being received within the groove **30** in the body of the spigot. The head **33** of the limit stop is approximately a third of the height of the groove and therefore allows the spigot **29** to move within the aperture in the boss between two extreme positions in which the head of the limit stop contacts either the lower side of the groove or the upper side of the groove.

[0035] Bellows **34** are mounted within the shroud **21** of the absorber. The bellows are formed of a lightweight, flexible plastics material. The diameter of the bellows is slightly less than the internal diameter of the shroud to allow the bellows to contract and expand within the shroud. The bellows are mounted over the boss **25** of the end cap **24**.

[0036] The end of the bellows **34** remote from the cap is provided with a circular aperture **35**. An actuation member **36** of the absorber is mounted on the bellows. The actuation member comprises a bifurcated body **37** having a generally circular end **38** with an aperture **39** corresponding in shape and size to the aperture **35** in the end of the bellows. A threaded bolt **40** passes through the aperture **39** in the body and the aperture **35** in the bellows and is retained in position by a threaded nut **41**.

[0037] The other end of the body **37** is bifurcated to provide two arms **42,43.** A generally circular collar **44** is integrally moulded with the body where the arms join on the body. The diameter of the collar is slightly larger than the diameter of the actuating rod **19** to allow the actuating rod to be received in the collar.

[0038] An aperture **45** is provided through the end of each arm **42, 43** of the actuating member. A threaded bolt **46** is passed through the apertures and is retained within the apertures by a threaded nut **47** at either end.

[0039] The shock absorber **20** is mounted at the base

of the bin **1** at the rear in a recess **48.** The end cap **24** is placed over the end of the shroud **21,** the bellows **34** are mounted in the shroud over the cap and the actuating arm **36** is attached to the free end of the bellows.

[0040] The actuating rod **19** is then passed between the arms **42, 42** of the bifurcated actuating arm and is received in the collar **44**. The threaded nuts **47** are then tightened on the threaded bolt **46** to connect the shock absorber to the actuating rod.

[0041] When the lid **7** of the bin is in the closed condition, the bellows **34** are in the compressed condition as shown in Figure of the drawings. In this position the actuating member **36** is at the lower position within the slot **22** in the shroud **21.**

[0042] When the lid of the bin is to be lifted to place rubbish into the receptacle within the bin, the pedal **15** of the bin is depressed which causes the pedal to hinge around the mounting pin **16.** As the front of the pedal is lowered, the rear of the pedal is raised thereby lifting the actuating rod **19.** As the actuating rod is lifted, the end of the actuating rod contacts the underside of the rear of the lid **7a** of the bin and lifts the lid clear of the top edge of the bin allowing access to the receptacle.

[0043] As the actuating rod **19** is lifted to lift the lid **7** of the bin, the actuating member **36** moves upwards together with the rod, through the slot **22** in the shroud **21** and pulls the bellows **34** upwards within the shroud **21.**

[0044] As the bellows expand within the shroud, the spigot **29** is sucked from its seat within the boss **25** and is lifted until the head **33** of the limit stop contacts the lower edge of the groove **30** in the spigot, thereby preventing the spigot from lifting further. Whilst the spigot is lifted free from the aperture **28** in the end cap **25,** air is drawn in through the aperture and around the spigot into the bellows.

[0045] The lid **7** of the bin is held in the open condition whilst the operator's foot is on the pedal **15**. In this condition, the actuating rod **19** is raised thereby holding the lid **7** clear of the upper surface of the bin.

[0046] When it is required to close the lid **7** of the bin, the operator releases the pedal **15** of the bin which hinges upwards towards the bin. As the front of the pedal moves upwards, the rear of the pedal is hinged downwards thereby lowering the actuating rod **19** to allow the lid to be lowered towards the top of the bin and so causing a rapid compression of the air in the bellows. This in turn causes the cylindrical spigot 29 to be forced against its seat and so compressing the rubber insert and preventing escape of air in the chamber via the aperture 28.

[0047] This prevents the lid from slamming back into position, as the actuating rod **19** is lowered. During this time the actuating member **36** is lowered through the slot **22** in the shroud **21** thereby so that the bellows **34** are compressed within the shroud. However, once and equilibrium has been reached in the bellows 34, the second stage of the lowering then begins with the compressed air in the bellows 34 slowly escaping through the aperture 28 controlling the decent of the lid through the final quarter of it's movement.

[0048] As the air in the bellows **34** is forced through the aperture **28** in the cap, the actuating rod **19** is slowly returned from the raised to the lowered position thereby gently lowering the lid **7** of the bin onto the top edge of the bin.

[0049] The weight of the lid **7** of the bin retains the bellows **34** in the compressed condition shown in Figure.

[0050] It should also be noted that for any particular arrangement the volume of air within the bellows 34 is determined by the mass of lid which has to have it's movement controlled. The cylindrical spigot 29 is weighted to prevent leakage of air under rapid compression but to allow controlled release under other conditions. The weight of the spigot compresses the rubber insert, but not overly thereby enabling the controlled release. Further when the bellows 34 are extended the spigot 29 is not too heavy to stay seated but moves to allow air through aperture 28 into the bellows 34, but is heavy enough to remain located in the boss.

Claims

1. A shock absorber adapted for use on a pedal bin in which the lid of the pedal bin is opened and closed by an actuating member, the shock absorber comprising damping means connected to the actuating means to limit the speed of movement of the actuating means when the lid of the bin is opened or closed.

2. A shock absorber according to claim 1, wherein the shock absorber comprises a body which is adapted to be mounted on the bin adjacent to the actuating means of the bin, the damping means being mounted within the body.

3. A shock absorber according to claim 2, wherein the damping means comprises bellows mounted which may expand or retract within the body.

4. A shock absorber according to claim 3, wherein means are provided to connect the bellows to the actuating member of the bin.

5. A shock absorber according to claim 4, wherein the connecting means comprises a planar member, one end of which is provided with a recess to receive the actuating member and the other end of which is connected to the leading end of the bellows.

6. A shock absorber according to claim 5, wherein the recess is defined between two arms of the planar member and means are provided to alter the distance between the two arms thereby altering the size of the recess to allow the connecting means to

be securely affixed to the actuating means of the bin.

7. A shock absorber according to claim 5 or 6, wherein the body of the shock absorber is provided with a longitudinal slot along at least part of the length thereof, through which the planar member extends as the bellows are expanded and retracted within the body.

8. A shock absorber according to any one of claims 5 to 7, wherein the body is provided with an end cap closing the end of the body remote from the planar member.

9. A shock absorber according to claim 8, wherein the end cap comprises an integrally formed hollow boss which extends into the body and is received within the free end of the bellows.

10. A shock absorber according to claim 9, wherein an aperture is formed in the outer surface of the end cap allowing air to be drawn into the hollow boss.

11. A shock absorber according to claim 10, wherein a weight is provided within the boss, the weight being moveable between a position wherein the aperture in the end cap is closed by the weight and a position where the weight is lifted free of the aperture to allow air to be drawn into the boss.

12. A shock absorber according to claim 11, wherein a limit stop is mounted on the boss to limit the movement of the weight between the two extreme positions.

13. A shock absorber according to any one of claims 2 to 12, wherein the body is formed of a rigid plastics material.

14. A shock absorber according to any one of claims 3 to 13, wherein the bellows are formed of a resilient plastics material.

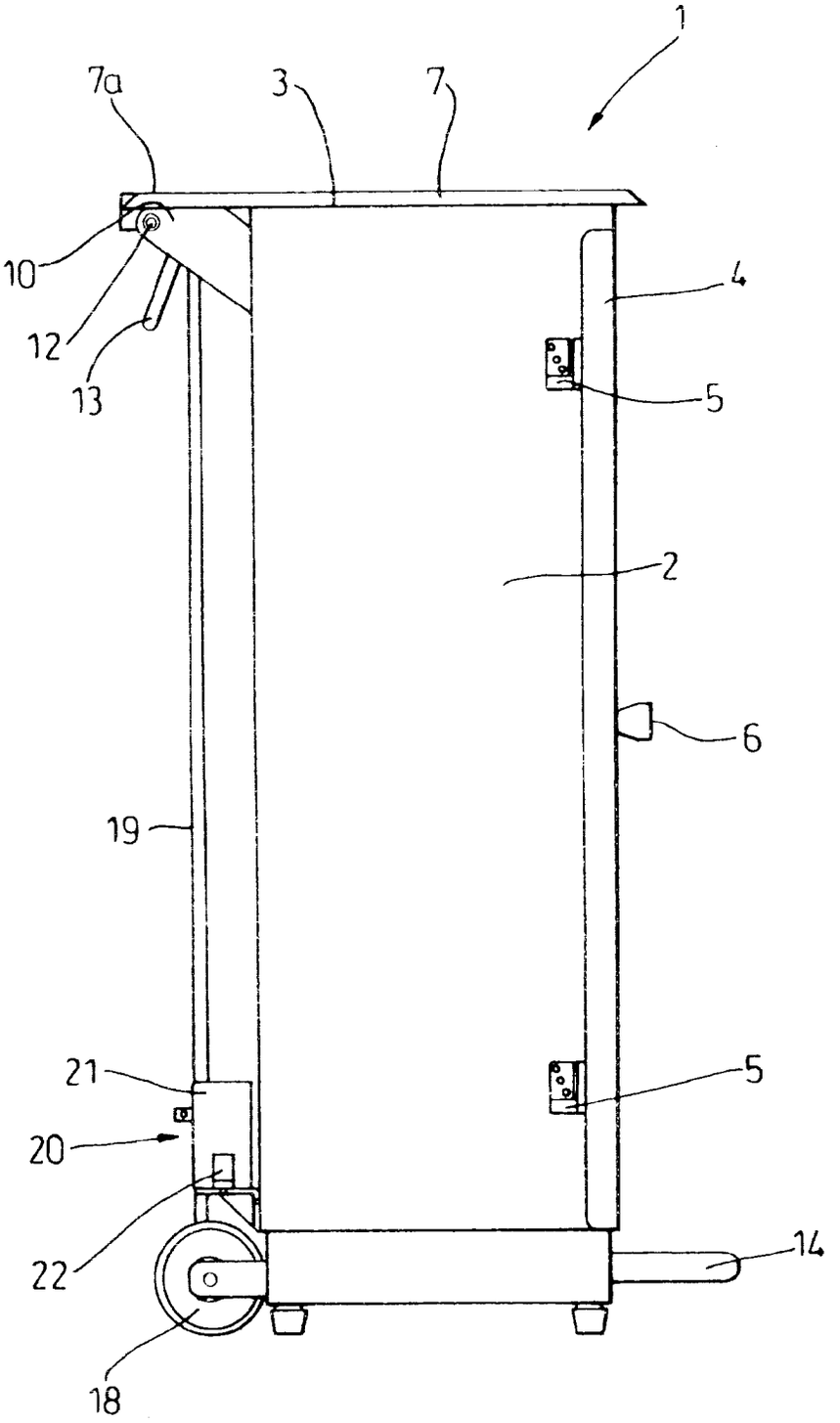

Fig. 1

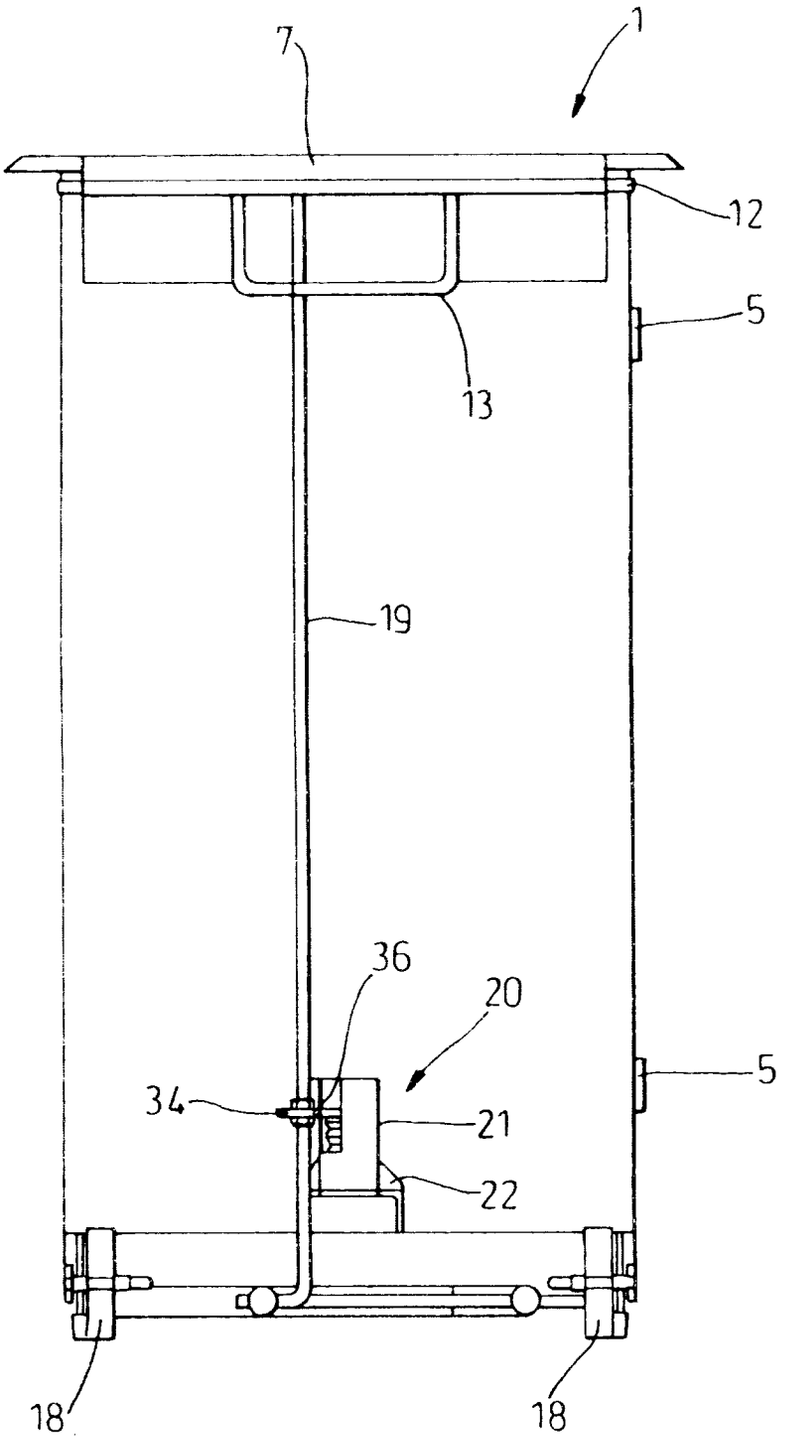

Fig. 1a

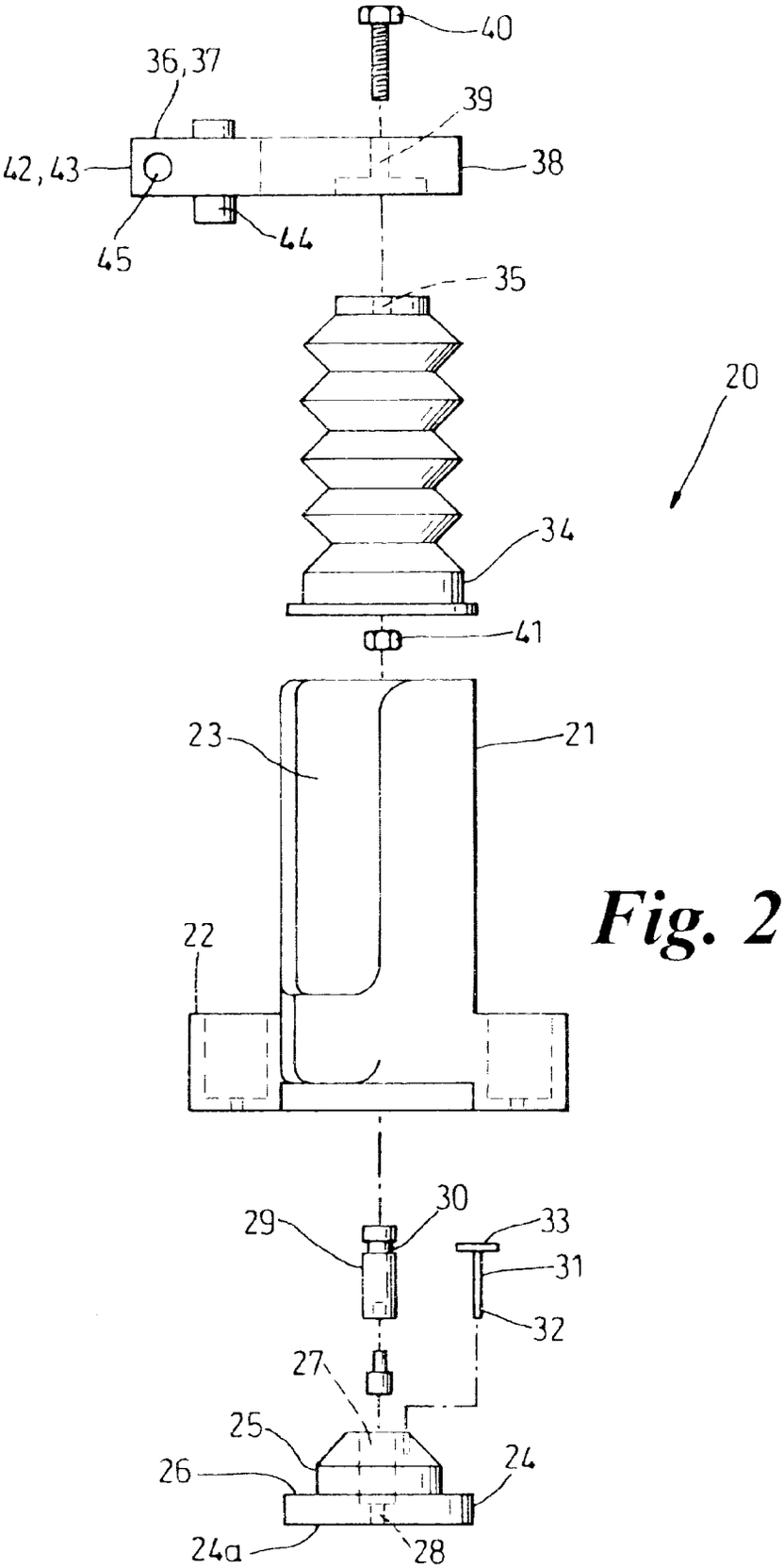
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Fig. 2

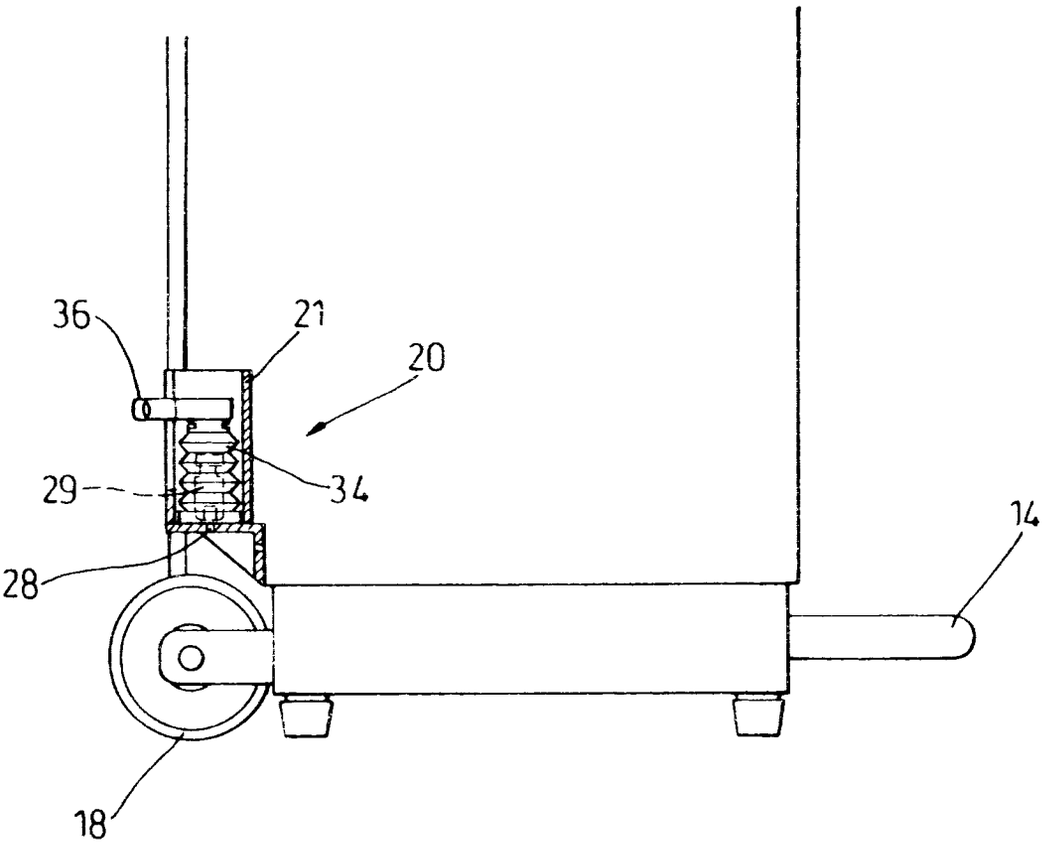

Fig. 3

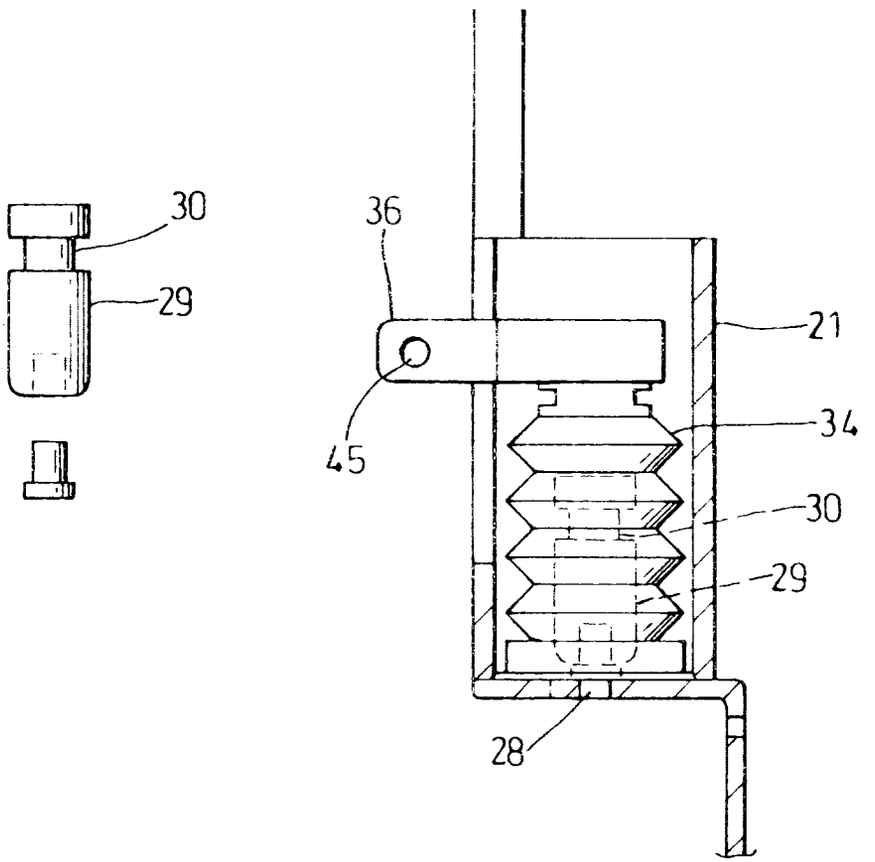

Fig. 3a

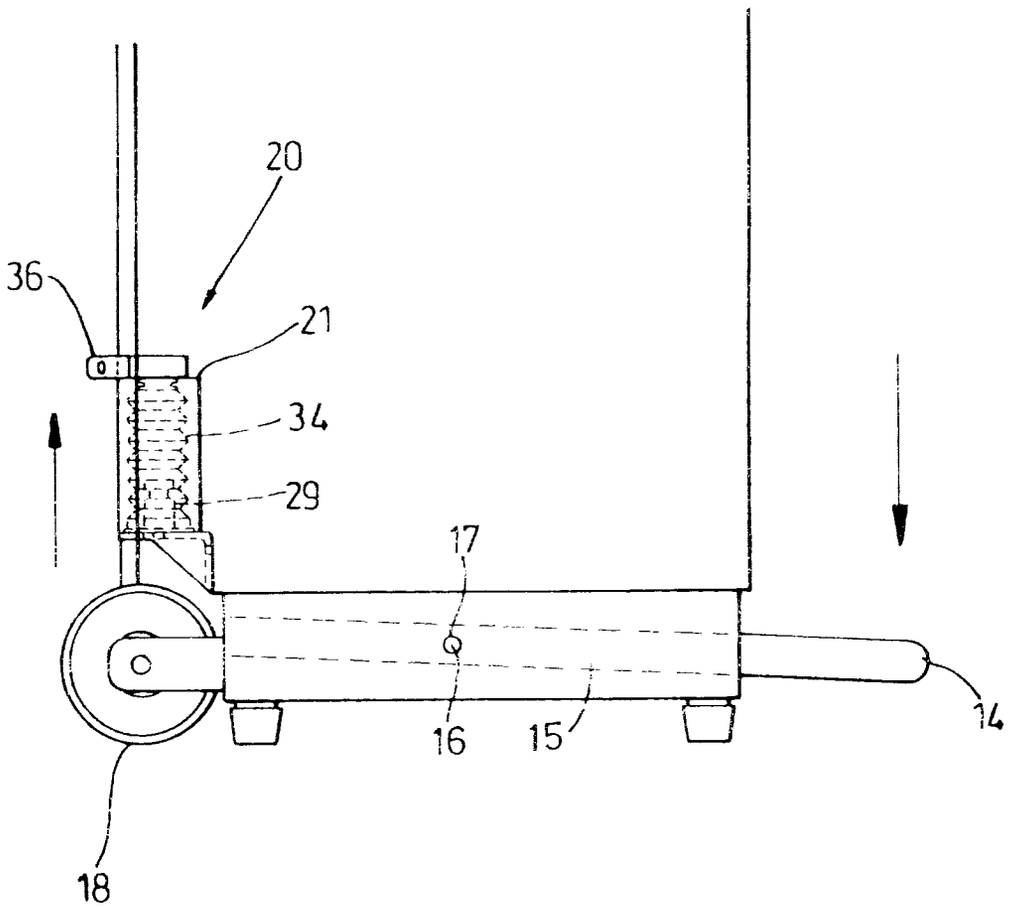

Fig. 4