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### (54) Method and device for baling waste cardboard

(57) A device for baling waste cardboard takes the form of a container (1) having side faces (2a,2b), a base (3) and a rear face (4). The rear face (4) has a vertical rectangular aperture (5) in its centre through which a strap (14) passes from where one end of it is secured

to a bar (12) positioned at the base of the rear face (4). A roller (9) is secured to the front of the base (3) through which the other end of the strap (14) passes. Sisal twine is fed from supplies (7a,7b) secured behind the rear face (4) through apertures (6a,6b) to the front of the rear face to allow a compressed bale of cardboard to be secured.

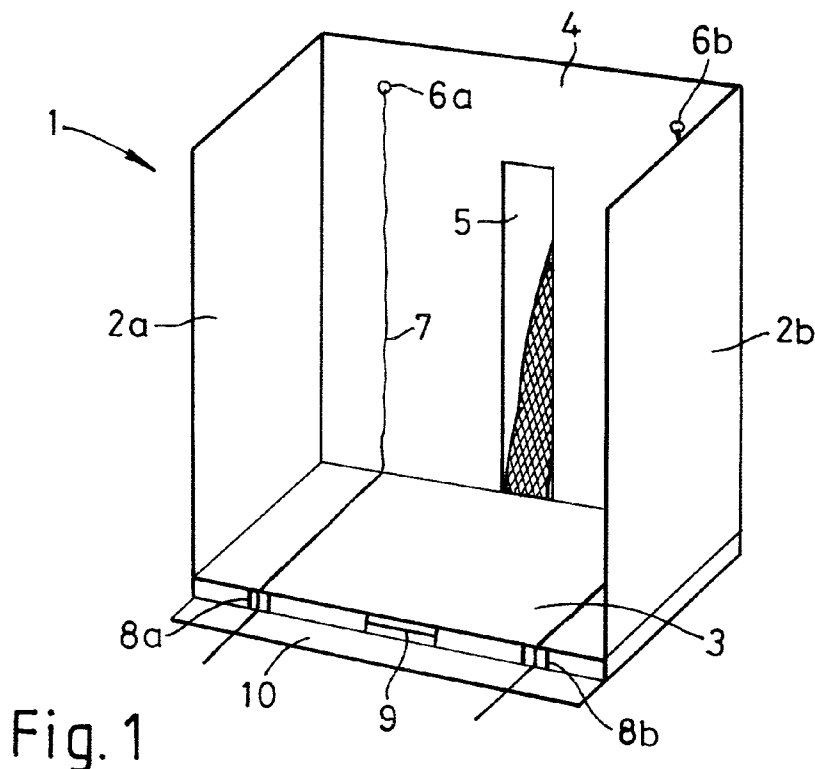


Fig. 1

## Description

The present invention relates to a device for baling waste cardboard.

The problem of disposing of used cardboard, such as cardboard boxes, is widespread amongst many commercial outlets. Generally the unwanted boxes are put in large cages or bins and are taken away with other refuse to be incinerated or dumped in a landfill site.

There are many problems associated with the present form of disposal, the boxes awaiting collection by the refuse collectors are usually stored outside and are exposed to the rain and the wind. The boxes may be blown around by the wind if the cages are too full causing environmental problems such as litter. If the boxes are exposed to rain they become difficult and unpleasant to handle.

Dumping of refuse in a landfill site is generally not considered to be very environmentally friendly and recycling is the preferred option wherever possible. There are many collection points for recyclable articles such as paper and bottles, however problems arise in transporting a large amount of waste cardboard to such points.

With the above problems in mind we have now developed a device for baling waste cardboard, such as boxes, to enable them to be stored tidily and in a limited space and also to facilitate transportation to a recycling point.

Accordingly from one aspect the present invention provides a device to bale waste cardboard comprising a container with a base, rear and side portions, strap means associated with the container for temporarily compressing cardboard stacked in the container into a bale and means for securing the compressed cardboard in bale form.

One end of the strap means may be secured to the rear of the container and means may be provided at the front of the container to receive the other end of the strap whereby cardboard deposited in the container may be compressed between the strap and the base of the container.

The means at the front of the container may be a roller under which the free end of the strap may be passed.

One end of the strap means may be secured to the rear of the container by any suitable means, for example by bolts or by including a looped portion in the strap means secured to the rear of the container by a bar means passing through the loop and itself being secured to the rear of the container.

The free end of the strap preferably has fastening means to allow it to temporarily hold the bale of waste cardboard in compression while the bale is permanently secured.

Preferably the fastening means is Velcro. Alternatively the fastening means may be a buckle or other suitable fastening means having, for example, male and fe-

male portions.

Preferably a vertical slot is provided in the rear face of the container that may extend 2/3 of the way up the rear face. Such a vertical slot is provided to allow the strap means to pass from the back to the front of the rear face of the container and over the waste cardboard deposited on the base of the container.

Preferably at least one aperture is provided in the rear face remote from the base through which the means to secure the compressed cardboard in bale form may be provided from a supply thereof.

Most preferably there are two apertures for the securing means, one on either side of the rear face of the container.

The supply may be a reel of suitable material which may be housed in a bag secured to the back of the rear face of the container. The reel may alternatively be housed on a rod protruding from the back of the rear face of the container and held in position by a stopper. Alternatively the reels may be housed in pockets secured to or integral with the back of the rear face.

The means for permanently securing the cardboard in a bale may be of any suitable material such as wire or woven plastics material. Preferably the securing means is sisal twine

The base may be provided with means positioned at the front thereof for holding the free ends of the securing means while the waste cardboard is stacked and compressed, preferably the holding means are cleats.

The base may be raised off the ground and may be provided with footplates.

The container may be made of metal such as galvanised steel sheets. Alternatively it may be made of any other suitable material such as a plastics material. The container may be flatpacked to allow for easy transportation.

The strap is preferably made from a woven polypropylene fabric.

The length of the strap should be sufficient to pass over the bundle of cardboard and to enable a person to compress the cardboard in the container by pulling on the free end of the strap.

Preferably the completed bale weighs no more than 20kg. The weight and size of the bale is such that it can be lifted by an average person without requiring any special training.

This device allows waste cardboard such as flattened boxes to be placed on the base of the container in a stack and can be added to until there is enough to make up a bale. In a preferred embodiment the strap can be passed through the vertical aperture in the rear face of the container over the bale and under the roller. Tension can be applied to the bale by pulling on the free end of the strap. When exerting a pulling force standing in the upright position is very advantageous as the maximum possible force which can be exerted is 120% of the total body weight, it is also a safe position as regards injury to the person exerting the force. The fastening

means on the strap enables the tension on the bale to be maintained whilst the twine is tied around the bale.

From a second aspect the present invention provides a method of baling waste cardboard, such as cardboard boxes, comprising the steps of placing broken down cardboard boxes or waste cardboard in a container having base, side and rear portions and adding to the stack until the predetermined height is obtained, passing strap means over the stack of cardboard, compressing the stack of cardboard by tightening the strap, holding the stack under compression using fastening means on the strap and securing the resulting bale with securing means whilst under compression.

An embodiment of the present invention will now be described in detail as example only with reference to the figures of which:-

**Figure 1** shows a front view of the baling device

**Figure 2** shows a back view of the baling device.

Figure 1 shows a cardboard baling device with a container 1 having side faces 2a,2b, a base 3 and a rear face 4 formed from thin gauge galvanised steel sheets. A vertical rectangular slot 5 rises approximately 2/3 of the way up the rear face 4 from the base 3.

At the top of the rear face 4 on either side of the vertical slot 5 are two small apertures 6a,6b. Sisal twine 7 is fed through these apertures 6a,6b from supplies 7a, 7b (Fig 2), secured behind the rear face.

Two cleats 8a,8b are secured to the front of the base 3. A roller 9 of approximately the same width as the vertical slot 5 is secured to the front of the base 3 in line with the vertical slot 5. A footplate 10 is provided in front of the base 3.

Figure 2 shows the back of the container 1. Supplies 7a,7b of the twine 7 are secured to the back of the rear face 4 in bags 11a,11b positioned near the top of the rear face 4 underneath the apertures 6a,6b.

At the bottom of the vertical slot 5 a horizontal bar 12 is bolted to protruding brackets 13a,13b. The bar 12 is of approximately the same width as the vertical aperture 5. A strap 14 of woven polypropylene fabric and having a width of less than that of the aperture 5 is secured to the bar 12 by looping the free end of the strap 14 around the bar 12 and fastening free end of the strap to the main part of the strap by stitching or by other suitable means.

The strap 14 is provided with receiving Velcro along a portion of its length on its upper side and with attaching Velcro along another portion of its upper side such that these two portions can be pressed together to hold the bale of cardboard under compression.

The container is 900mm high, 800mm wide and 600mm deep.

When the baling device 1 is in use the sisal twine 7 is fed from the supply reels 7a,7b, held in the bags 11a, 11b through the apertures 6a and 6b. The twine 7 is tak-

en down the front of the rear face 4 and across the base 3. The twine 7 is passed through the cleats 8a and 8b which hold it in place during the stacking process.

Broken down cardboard boxes and other flattened waste cardboard are stacked on the base 3 on top of the twine 7. The cardboard is kept tidily in the container 1 and the stack can be added to until the desired height to yield a bale has been obtained. At this point the strap 14 is fed from the back of the rear face 4 through the vertical slot 5 and over the waste cardboard stacked on the base 3. The free end of the strap 14 is then passed under the roller 9 and pulled upwards until the bale has been fully compressed.

The Velcro pieces on the strap 14 are pressed together to hold the stack of cardboard under tension whilst the bale is tied by taking the sisal twine 7 out of the cleats 8a,8b and tying it with twine 7 pulled through and cut off at apertures 6a,6b.

To remove the bale the Velcro on the strap 14 is released and the strap 14 is removed from under the roller 9 and passed back over the bale through the vertical slot 5 to the back of the rear face 4. The bale can then be lifted out of the container 1 and stored until it is transported to a recycling point.

## Claims

1. A device to bale waste cardboard comprising a container with a base, rear and side portions, strap means associated with the container for temporarily compressing cardboard stacked in the container into a bale and means for securing the compressed cardboard in bale form.
2. The device according to claim 1 wherein one end of the strap means is secured to the rear of the container and means are provided at the front of the container to receive and secure the other end of the strap.
3. The device according to claim 2 wherein one end of the strap means is secured to the back of the container by bolts.
4. The device according to claim 2 wherein one end of the strap means includes a looped portion secured to the rear of the container by bar means passing through the looped portion and being secured to the container.
5. The device according to claim 2 wherein the means at the front of the container is a roller under which the free end of the strap is passed.
6. The device according to any preceding claim wherein the free end of the strap means includes means to secure the said end to the means provid-

ed at the front of the container.

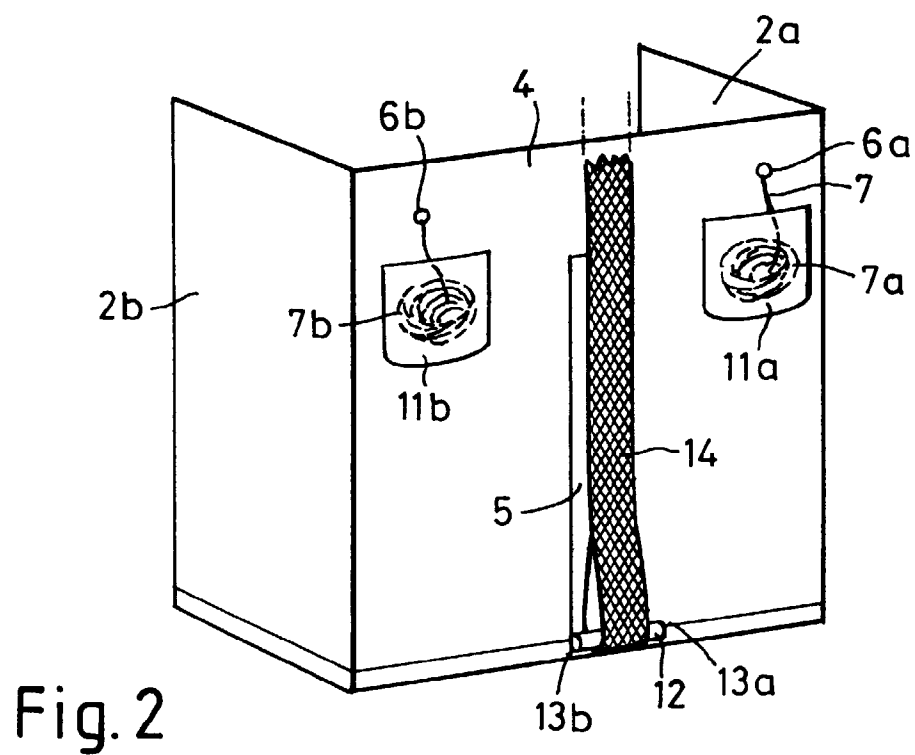
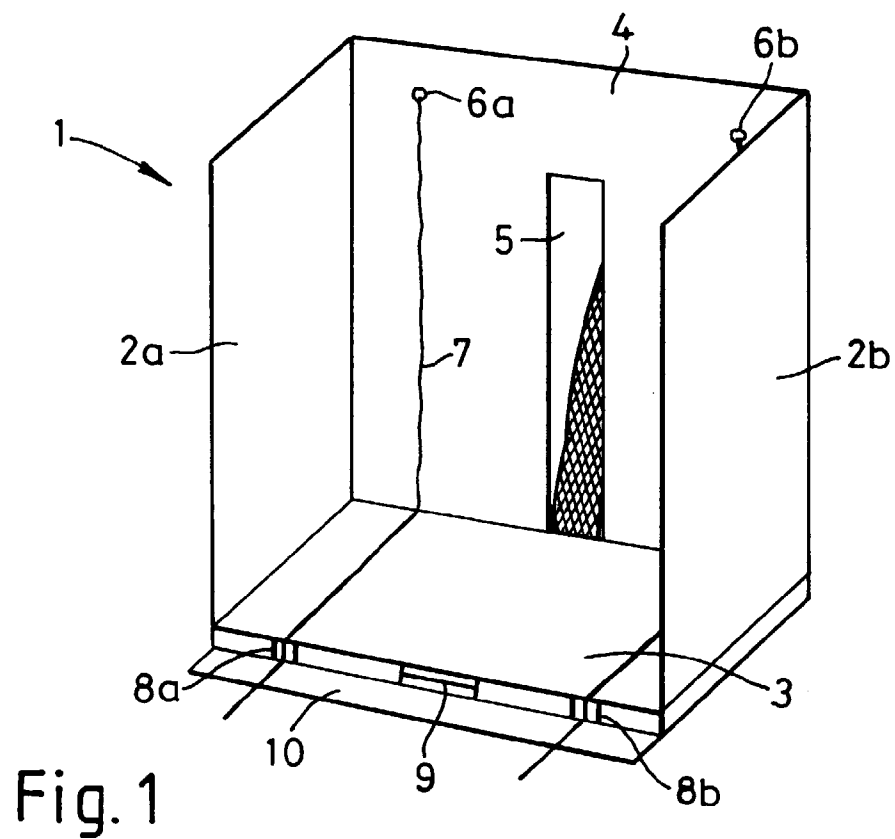
7. The device according to any preceding claim wherein a vertical slot is provided in the rear face of the container that extends 2/3 of the way up the rear face. 5
8. The device according to any preceding claim wherein at least one aperture is provided in the rear face remote from the base through which means for securing the cardboard in bale form are provided from at least one supply thereof. 10
9. The device according to any preceding claim wherein the means for securing cardboard in bale form is wire or a woven plastics material. 15
10. The device according to any preceding claim wherein the base is provided with means positioned at the front thereof for holding the free ends of the securing means. 20
11. The device according to claim 10 wherein the holding means are cleats. 25
12. A method of baling waste cardboard, comprising the steps of placing waste cardboard in a container having base, side and rear portions and adding to the stack until a predetermined height is obtained, passing strap means over the stack of cardboard, compressing the stack of cardboard by tightening the strap, holding the stack under compression and securing the resulting bale with securing means whilst under compression. 30  
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# EUROPEAN SEARCH REPORT

Application Number  
EP 97 30 7181

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 3 826 186 A (J. MECHLER) * column 2, line 26 - column 3, line 57 * * figures 1-4 *	1,8-10, 12	B65B27/08
A	US 3 903 789 A (T. HURLEY) * column 2, line 38 - line 48 * * figures 1,7 *	1,8-12	
A	DE 27 38 468 A (JÄRUND DEVELLO AB) * page 5, line 10 - line 35 * * figure 1 *	1,9-12	
A	US 4 068 576 A (R. SMITH) * column 1, line 52 - line 58 * * column 2, line 64 - column 3, line 14 * * figure 1 *	1,12	
A	US 5 155 977 A (M. DUPONT) * column 2, line 46 - column 3, line 2 * * figure 1 *	1,12	
A	US 2 912 151 A (R. CRABS)		TECHNICAL FIELDS SEARCHED (Int.Cl.6) B65B B65F B30B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 17 November 1997	Examiner Smolders, R
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