(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 109 191**
A2

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **83306239.1**

(22) Date of filing: **14.10.83**

(51) Int. Cl.³: **B 65 G 1/00**, B 65 G 57/00

(30) Priority: **14.10.82 ZA 827517**
29.11.82 ZA 828761

(43) Date of publication of application: **23.05.84**
Bulletin 84/21

(84) Designated Contracting States: **BE DE FR GB SE**

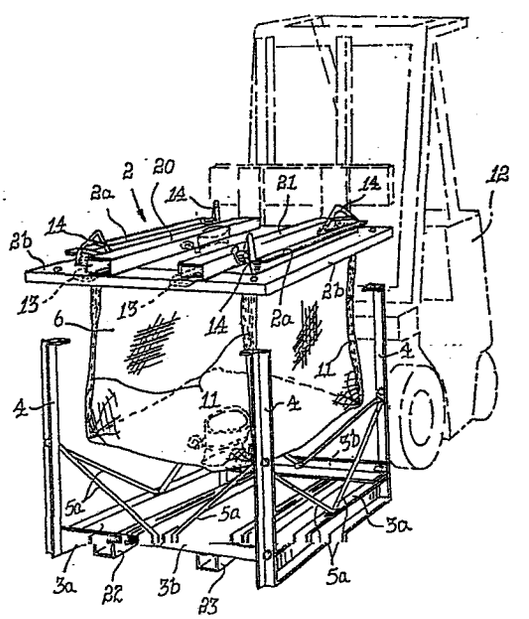
(71) Applicant: **Shambrook, Robert Feiron, 187 Anderson Avenue, Northcliff Johannesburg Transvaal (ZA)**
Applicant: **Campbell, Ian Claude Thomas, 30 Northleigh Crescent River Club, Sandton Johannesburg Transvaal (ZA)**

(72) Inventor: **Shambrook, Robert Feiron, 187 Anderson Avenue, Northcliff Johannesburg Transvaal (ZA)**
Inventor: **Campbell, Ian Claude Thomas, 30 Northleigh Crescent River Club, Sandton Johannesburg Transvaal (ZA)**

(74) Representative: **Carpmael, John William Maurice et al, CARPMAELS & RANSFORD 43 Bloomsbury Square, London, WC1A 2RA (GB)**

(54) Bulk bag stacking.

(57) The invention is concerned with a stacking frame 1 which is useful to improve the storage and handling of particulate materials contained in bulk bag container means 6. The stacking frame 1 is capable of stacking one on top of another as much as five such frames so that the bulk containers therein are stored with good stability. Since the bag is suspended from a carrier frame section 2 which is removable from the legs 4 of the stacking frame 2 the movement of a bulk bag 6 into the frame 1 for stacking purposes or out of the stacking frame 1 when the bag 6 is to be utilized to deliver its contents, is facilitated.



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"BULK BAG STACKING"

THIS invention relates to materials handling.

As an alternative to the packing of particulate materials such as polymer pellets, chemical compounds and ores in the common fifty or one hundred kilogram bags, it has been proposed to utilise bulk bags adapted to hold a tonne or more. Such bags may have quick filling inlet spouts at the top, similar emptying spouts at the bottom and tie means to effect a sound but easily removed closure for the spouts. The bags may be made from polypropylene so that they have little tendency to stretch under load and also are extremely tough so that they have a long life. Yet another advantage of the bulk bag handling system is derived from the speed with which particulate materials may be packed and transported in bulk and the cost savings which flow therefrom. Hanger or lifting straps provided on the bags enable them to be supported upon a gantry from which position access to the contents via the lower outlet is facilitated.

A disadvantage is, however, experienced in the stacking of bulk bags in storage. The particulate materials tend to flow within the bags causing unstable stacks and there is a likelihood of bags becoming so displaced or even toppling that engagement of the lifting straps on the bags by fork lift trucks is rendered most difficult.

It is an object of the invention to provide bulk bag stacking means which minimises or eliminates the above problem.

According to the invention there is provided a bulk bag stacking frame comprising a carrier frame section, legs for supporting the carrier frame and which are adapted to stand upon the carrier frame of a similar bulk bag stacking frame, anchor means on the carrier frame to suspend a filled bulk bag therefrom so that with the carrier frame supported by the legs the bag is located within the stacking frame, and stabilizer formations on the stacking frame for engagement with the tines of a fork lift to facilitate lifting of the stacking frame.

Preferably the legs include struts extending therebetween and the stabilizer formations comprise spaced channel members extending between struts on the opposite sides of the stacking frame.

Also according to the invention the carrier frame and legs are separate and have separate stabilizer formations thereon for engagement with the tines of a fork lift whereby the stacking frame as a whole can be raised or the carrier frame and the bag suspended therefrom can be raised separately from the legs.

In this arrangement the stabilizer formations on the carrier frame also comprise spaced channel members which extend between opposite sides of the carrier frame and on the upper side thereof.

Further according to the invention the carrier frame includes upstanding guide means adapted to facilitate stacking of one stacking frame upon another.

Preferably the lower and upper zones of stacked frames nest one within another to a small extent to provide stability without fouling of the bags. It is envisaged that the carrier frame section may be circular or triangular or other polygonal shape but the preferred structure is in the nature of a box-frame. Thus in the preferred structure the carrier frame section is rectangular or square and legs are located at the corners thereof.

The frame may be constructed principally from lengths of angle section with the lower frame zone being so constructed as to permit the nesting of frames one on top of another.

Thus the guide means may comprise spaced upstanding rods or plates, preferably at the corners of a square upper frame section, the guides extending from zones on the carrier frame section which permit neat location of a lower frame zone therearound.

Such guide means may usefully take the form of rods bent to inverted V-shape. This provides a good strong guide structure and the outer arm of the inverted V acts as a guide, so providing a quick, clean nesting location of one frame upon another without the necessity accurately to align the frames before lowering one upon the other.

Further acccording to the invention, the bag support means on the frame comprises spaced hooks to engage the hanger straps on the bag. Thus the arrangement is preferably one in which a bag suspended within the frame hangs from its straps with its base slightly raised from the floor.

Still further according to the invention the bag support means incorporates spaced bars about which the hanger straps may be laced before being anchored to a hook. In this way a sufficient length of the hanger strap may be used to suspend the bag at the required elevation.

Preferably the spaced bar and hook bag support means are also located at the corners of the upper frame section.

In order to illustrate the invention a preferred embodiment is described below with reference to the accompanying drawings in which:-

Figure 1 is a perspective view of a bulk bag stacking frame according to the invention illustrating a bulk bag being raised together with the carrier frame section, which forms a part of the stacking frame, by a fork lift shown in chain dotted outline;

Figure 2 is a perspective view of three frames according to the invention stacked one upon another with bags located in each frame a portion of the lowermost frame being broken away;

Figure 3 is an enlarged detail of a corner zone of the carrier frame section of the stacking frame of figures 1 and 2; and

Figure 4 is a diagrammatic detail illustrating the manner of supporting the bag upon the frame.

Referring to the drawings a bulk bag stacking means comprises a rigid frame designated generally by the reference numeral 1. Such frame 1 incorporates a carrier frame section 2 and leg members 4. The leg members have struts 3a and 3b extending therebetween at the lower zone of the frame 1.

In the frame embodiment illustrated the carrier frame section 2 rests freely upon the legs 4 and the legs are accordingly also provided with strengthening ties 5.

The carrier frame 2 and opposite struts 3b have stabilizer formations in the form of spaced lip channel members 20 and 21 secured to the upper surface of carrier frame section 2 and similar lip channel members 22 and 23 secured to the lower struts 3b.

In use a bulk storage bag 6 ordinarily for a particulate material and having hangar straps 7 secured to four corners of the bag, is mounted within a frame 1 by anchoring the hanger straps 7 to bag support hooks 10 provided at each of the four corners of the upper frame section 2. For example, the carrier frame section 2 may be lifted off its legs 4 and placed upon the upper end of the filled bag 6 so that the hanger straps 7 of the bag can be laced over and under strap supporting bars 8 and 9, the strap then being secured by placing an end loop 11 thereof over the free end 10a of the hook 10. This is done at the four corners of the bag 6 and carrier frame section 2 whereafter the carrier frame section can be lifted by fork lift means 12 by locating the fork lift tines 13 in the channels 20 and 21 so that by raising the carrier frame section 2 the bag is raised with it suspended by means of its straps 7 from the bag support means 8, 9 and 10.

The carrier frame section 2 is then lowered onto legs 4 so that the bag 6 is suspended within the frame 1 with its base raised from the floor and the whole frame 1 together with the bag 6 can then be raised by locating the tines 13 in the channel sections 22 and 23. The raised frame 1 and bag 6 may then be stacked upon a similar frame and suspended bag arrangement so that the struts 3a of the upper frame 1 straddle angle sections 2a of the carrier frame section 2 of the lower frame 1 and rest upon ledge 2b thereof. In figure 2 there is illustrated three frames with their suspended bags stacked one upon another.

In order to facilitate the stacking of one frame upon another, the upper carrier frame sections 2 are provided with corner guides 14 in the form of bars bent to inverted "V" shape. These guides are effective properly

to locate a frame which is being lowered onto another frame but which is turned slightly either clockwise or anti-clockwise relative to the frame below it. Thus the guides 14 automatically align the upper frame 1 with the lower frame 1 by causing it to turn on engagement of the struts 3a with the guides 14.

The stacking frame 1 of the present invention is made up of four substantially flat frame sections which may be transported and stored in dismantled form and assembled only when the frame is to be used for bulk bag storage. Thus the stacking frame comprises the separate carrier frame assembly 2 as one frame section. Two further frame sections are provided by leg pairs 4 and the struts 3a secured to the lower ends of each leg pair as well as the tie means 5a which are welded to legs and struts. The fourth frame section is comprised of the struts 3b upon which the channels 22 and 23 are mounted. To assemble the frame 1 the fourth frame section is bolted to the spaced apart leg pair frame sections and tie means 5b are bolted in place.

CLAIMS:

1. A bulk bag stacking frame comprising a carrier frame section, legs for supporting the carrier frame and which are adapted to stand upon the carrier frame of a similar bulk bag stacking frame, anchor means on the carrier frame to suspend a filled bulk bag therefrom so that with the carrier frame supported by the legs the bag is located within the stacking frame, and stabilizer formations on the stacking frame for engagement with the tines of a fork lift to facilitate lifting of the stacking frame.

2. The bulk bag stacking frame of claim 1 in which the legs include struts extending therebetween and the stabilizer formations comprise spaced channel members extending between struts on opposite sides of the stacking frame.

3. The bulk bag stacking frame of claim 1 or claim 2 in which the carrier frame and legs are separate and have separate stabilizer formations thereon for engagement with the tines of a fork lift whereby the stacking frame as a whole can be raised or the carrier frame and bag suspended therefrom can be raised separately from the legs.

4. The bulk bag stacking frame of claims 2 and 3 in which the stabilizer formations on the carrier frame also comprise spaced channel members which extend between opposite sides of the carrier frame and on the upper side thereof.

5. The bulk bag stacking frame of any one of the above claims in which the carrier frame includes upstanding guide means adapted to facilitate stacking of one stacking frame upon another.

6. The bulk bag stacking frame of any one of the above claims in which the lower and upper zones of stacked frames nest one within another.

7. The bulk bag stacking frame of any one of the above claims in which the carrier frame section is rectangular and the stacking frame includes legs located at the corners thereof.

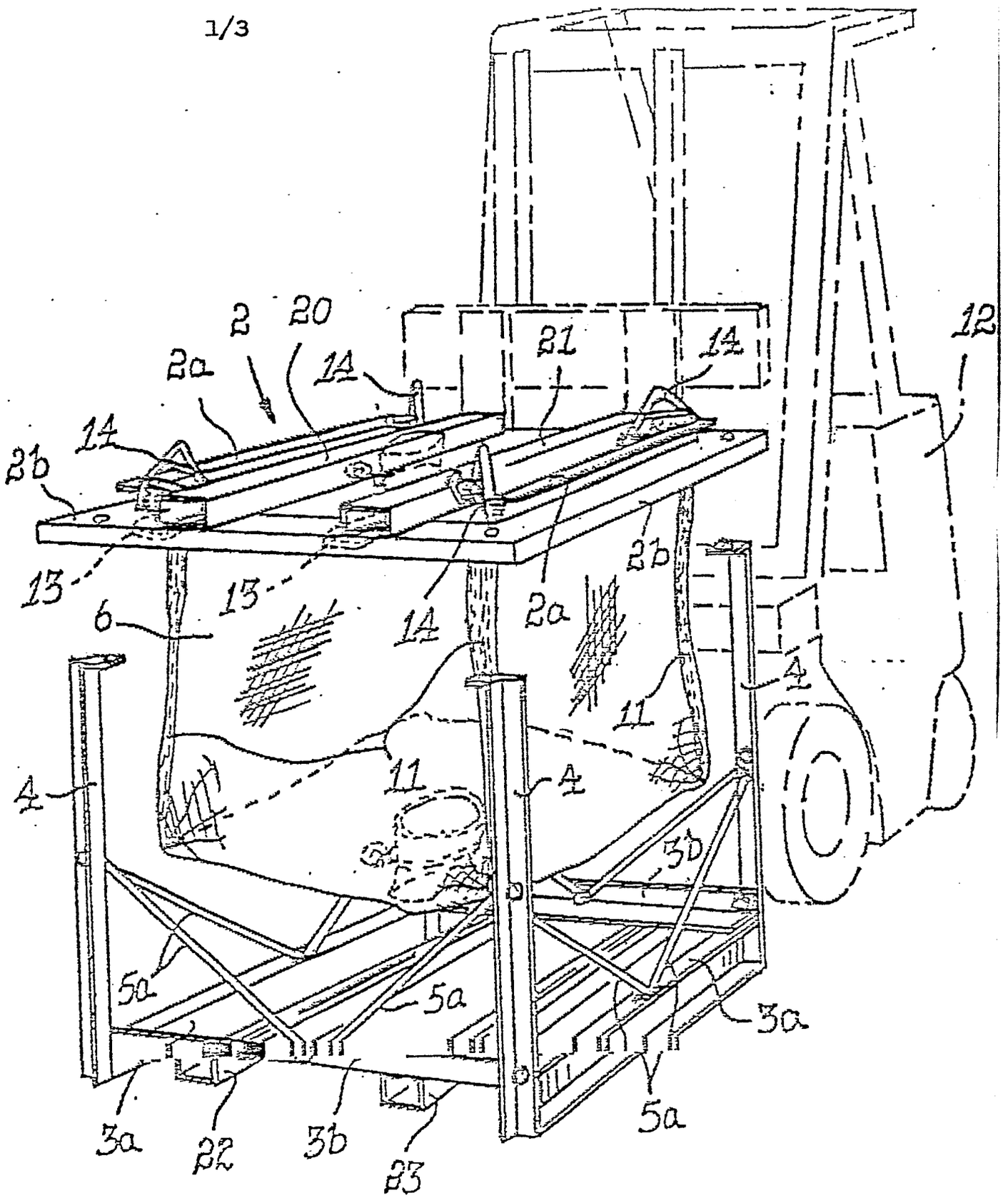
8. The bulk bag stacking frame of claim 7 in so far as it is dependant upon claim 5 in which the guide means comprise inverted V-shaped rods located at the corners of the carrier frame.

9. The bulk bag stacking frame of any one of the above claims in which the anchor means on the carrier frame comprises hooks spaced around the carrier frame to engage the hanger straps on a bulk bag.

10. The bulk bag stacking frame of claim 9 in which each hook is associated with at least one bar member spaced from the hook about which a hanger strap may be laced before being anchored to a hook.

11. The bulk bag stacking frame of claims 8 and 10 in which hook and bar anchor means are located at each corner of the carrier frame, at least one bar extending between the limbs of the inverted V-shaped guide rods towards the apices thereof.

12. A method of stacking bulk bags comprising suspending a bag within a frame member and stacking similar frame members, with bags suspended therein, one upon another.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2a
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21
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2b
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FIG1

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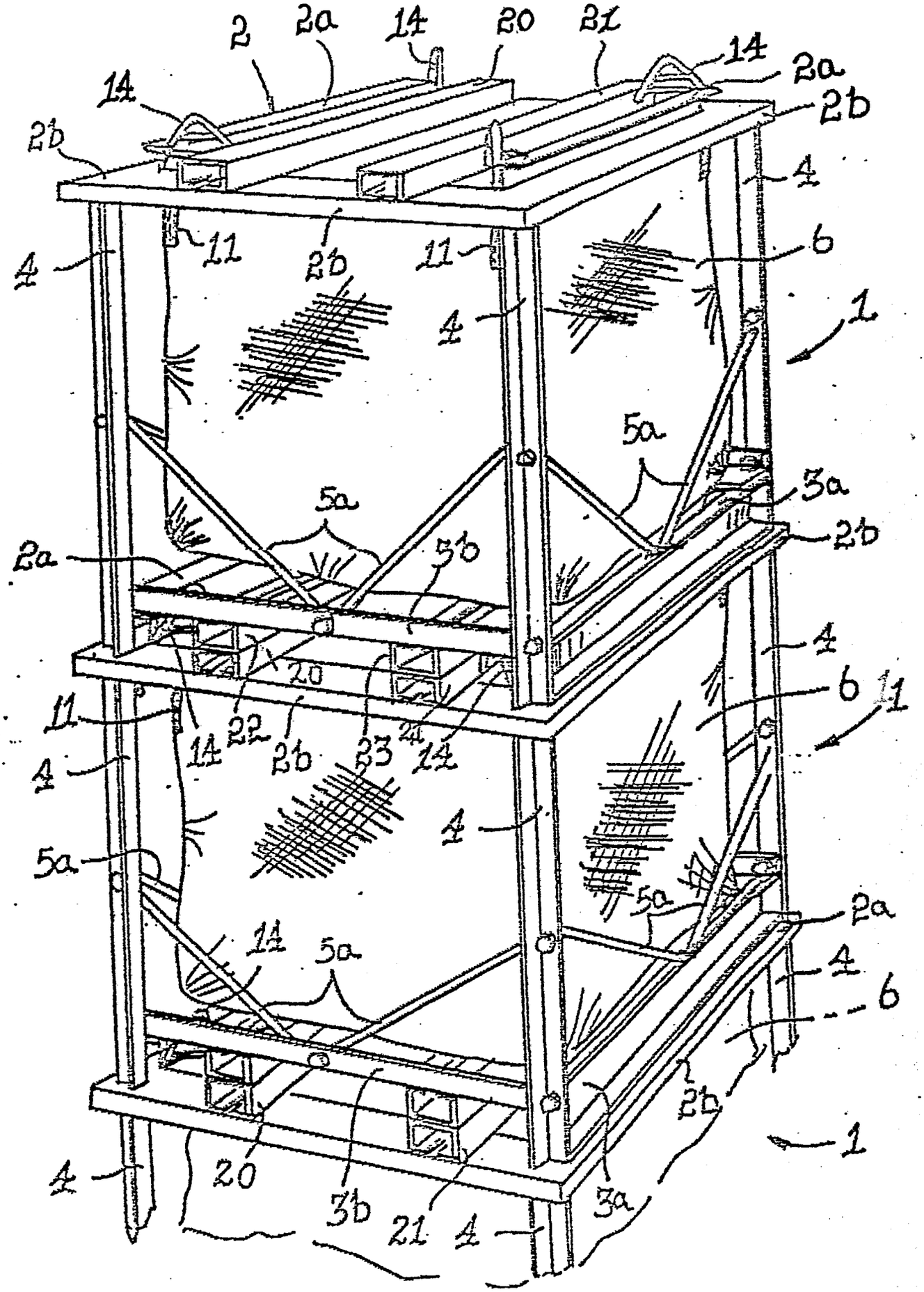

FIG 2

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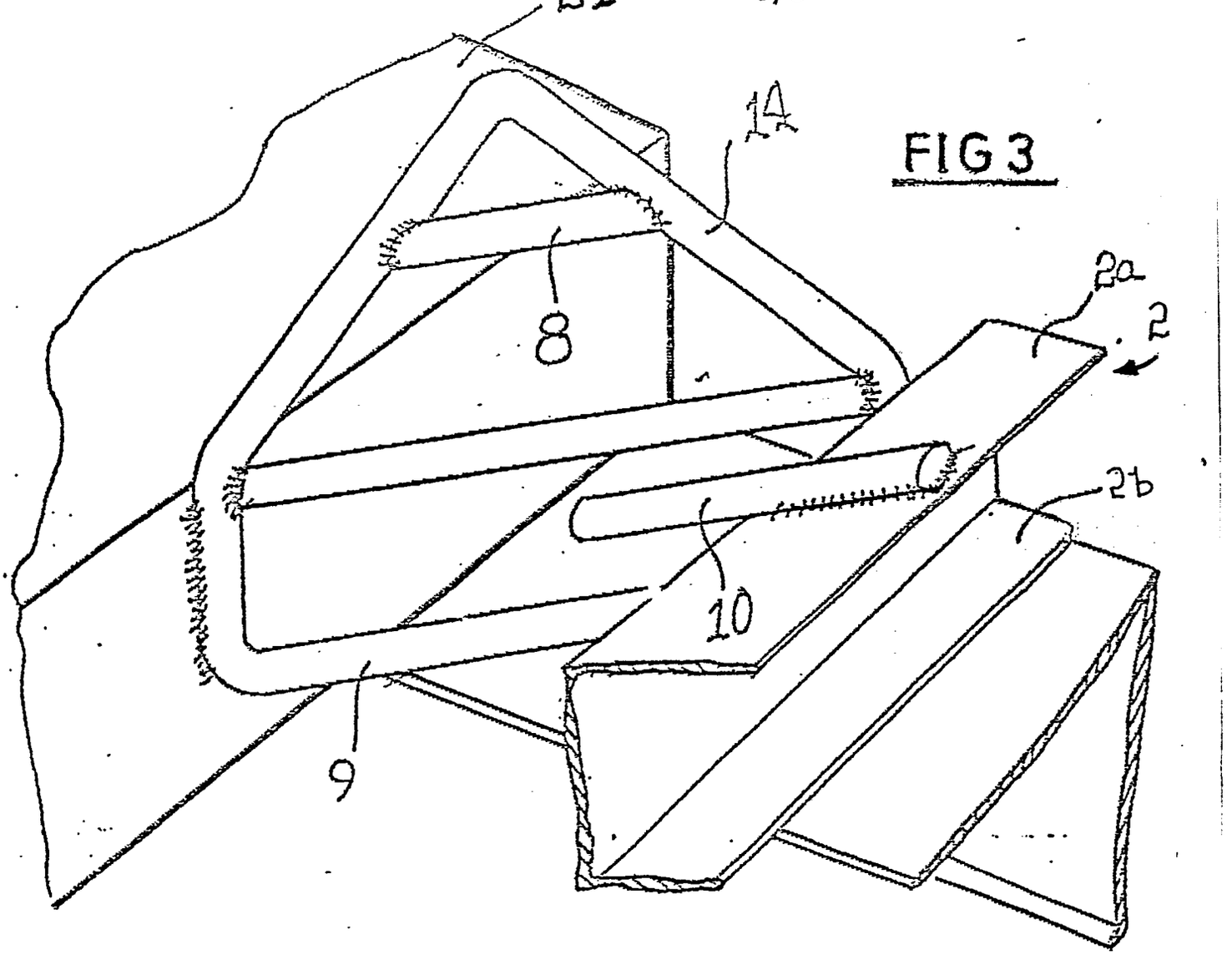

FIG 3

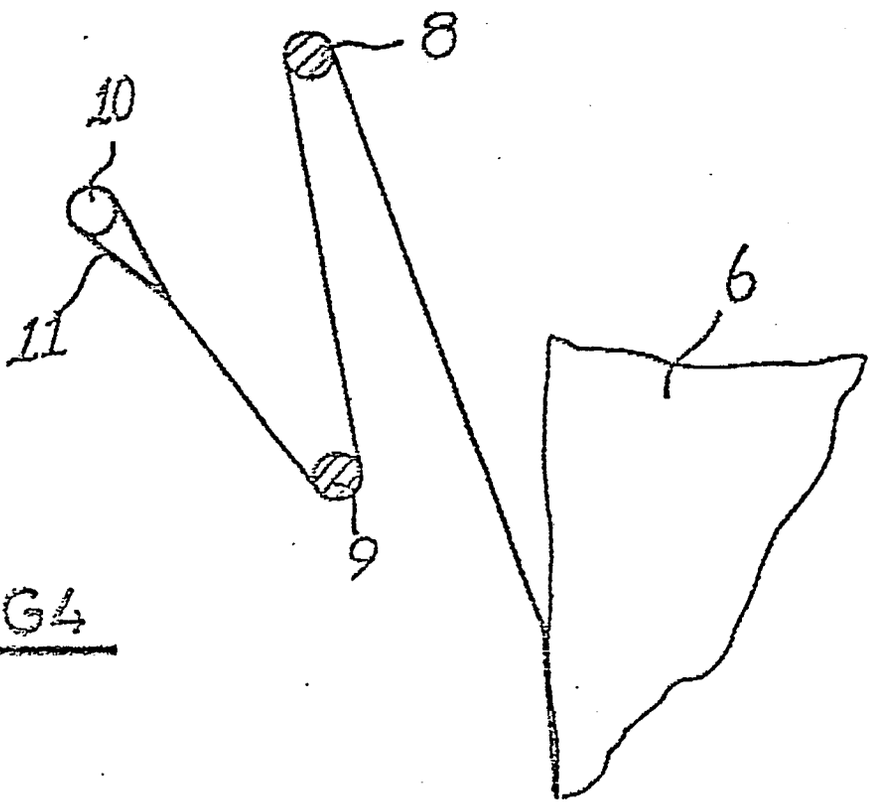

FIG4