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(54) Apparatus for and method of stacking rectangular objects.

(57) Apparatus for and method of stacking rectangular objects comprising a cage which has three closed vertical sides (2,3) formed by a lattice framework, the fourth side (4) being open. A rectangular base plate (1) of the cage has an openended slot (5) therein extending inwardly from the open front side (4) of the cage. The top of the cage is fitted with lifting lugs (8). The cage is suitable for lifting stacked bricks, the bricks being stacked in alternate transverse and longitudinal layers. One or more bricks placed end-to-end support the first transverse layer in overhanging fashion, so that the slot (5) of the cage base can accommodate the support bricks and lift the stacked layers by engagement between the base (1) and the underneath of the lowest transverse layer.

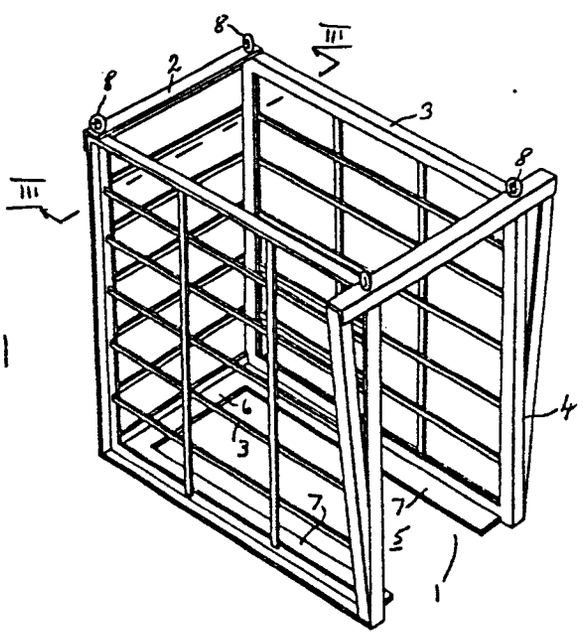

Fig. 1

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DESCRIPTION

APPARATUS FOR AND METHOD OF STACKING RECTANGULAR OBJECTS

The invention relates to an apparatus for containing stacked objects, in particular objects of rectangular cross section, such as bricks and concrete blocks both solid and cavity (hereinafter referred to as concrete blocks) and also to a method of stacking and lifting such objects.

In transporting concrete blocks to and around building sites a considerable amount of damage is often done to the blocks and this wastage is expensive. Damage to concrete blocks in a highly mechanised concrete block plant is minimised by using a very sophisticated form of pallet loading system. However, this system is relatively expensive and is in any case not suitable for use on the normal building site.

The invention is directed towards providing an apparatus for containing concrete blocks, and a method of stacking and lifting the concrete blocks, that is robust, inexpensive, and easy to use.

According to the invention there is provided a container characterised by a frame providing a pair of spaced parallel support surfaces for supporting opposed portions of objects spanning across between the surfaces, and means extending upwardly of the support surfaces in use to facilitate mechanical lifting of the frame, the frame providing an aperture between and above the support surfaces at at least one end thereof.

The invention further provides a method of stacking and transporting objects, the method being characterised by the steps of forming a first layer by placing a plurality of elongate objects side by side on a support with the ends of each object projecting beyond the support, forming a stack of one or more other layers of the objects on the first layer, and relatively moving the stack and a container according to the invention so that the stack enters the aperture and the ends of the objects of the first layer rest on the support surfaces.

Also according to the invention there is provided an apparatus for containing stacked concrete blocks characterised by a cage having a base, a rear side, an open front side, and two end sides, the base having a cut-out slot of rectangular shape the open mouth of the slot being adjacent to the open front side, thus communicating directly with the said front side. The width of the slot is less than the largest lineal dimension of one of the concrete blocks. Preferably lifting lugs are provided on the cage to assist its transport by crane.

The invention further provides a method of stacking and transporting concrete blocks characterised by the following steps:

a) laying a plurality of concrete blocks end to end to form a bottom layer;

b) laying a plurality of concrete blocks transversely side by side on the bottom layer to form a transverse layer;

c) laying a plurality of concrete blocks side by side and end to end on the second layer to form a longitudinal layer.

A further transverse layer followed by a further longitudinal layer may be laid until the requisite height of stack is achieved.

By stacking the blocks in the way set out in the present invention, support for the stack can conveniently be provided by a plurality of the blocks themselves.

The frame or cage is all that is then required safely and carefully to lift the stack and transport it from one location to another. It will be noted that there is no need for the time consuming and wasteful step of palletising the blcoks before transport and then depalletising them on arrival at the required location.

The invention will be more clearly understood from the following description of an embodiment thereof given by way of example only with reference to the accompanying drawings in which:

Fig. 1 is a perspective view of a cage according to the invention,

Fig. 2 is a perspective view of a number of concrete blocks stacked in accordance with the method of the invention, and

Fig. 3 is a sectional view in the direction of the arrows III-III of Fig. 1, the concrete blocks of Fig. 2 being shown by the interrupted lines.

Referring to the drawings there is provided a cage having a base 1 a rear side 2 end sides 3 and an open front side 4. The base 1 is formed from a plate and has a cut-out slot 5 of substantially rectangular shape, an end plate 6 and side furcations 7. The rear side 2 and the end sides 3 are of lattice framework construction. Lifting lugs 8 are provided.

Prior to using the cage to lift stacked concrete blocks, in this example solid concrete blocks, the concrete blocks are stacked as illustrated in Fig. 2.

Two concrete blocks 9 are laid end to end to form a bottom layer, indicated generally by the reference numeral 10. A layer of blocks 9 is then laid transversely side by side and the bottom layer to form a transverse layer, indicated generally by the reference numeral 11. A further layer of blocks 9 is then laid side by side and end to end on the layer 11 to form a longitudinal layer indicated generally by the reference numeral 12. A further transverse layer 11 is laid on top of the longitudinal layer 12 and so on until the requisite height

of stacked blocks is achieved. It will be appreciated that the top layer of blocks may be either a transverse layer 11 or a longitudinal layer 12.

With the blocks stacked as illustrated in Fig. 2 the front side 4 of the cage is offered up to the blocks 9. The furcations 7 are solid underneath the lowermost transverse layer 11 and on both sides of the bottom layer 10 until the cage embraces the blocks. The cage may then be lifted in conventional manner, its end plate 6 and side furcations 7 bearing against the bottom of the lowermost transverse layer 11 thus lifting the stacked blocks 9. The cage may then be placed on a lorry for transport to site, where it is unloaded. The blocks 9 may remain in the cage on site until required for use thus protecting the blocks 9 or alternatively the cage may be removed. Needless to say when on site the cage may be used to transport the blocks 9 from plate to place.

It will be appreciated that although the present invention solves the particular problem of careful handling of blocks on a building site, it can also be usefully employed at other locations.

The invention is not limited to the embodiment hereinbefore described above which may obviously be varied in constructional details.

CLAIMS

1. A container characterised by a frame providing a pair of spaced parallel support surfaces (7) for supporting opposed portions of objects (9) spanning across between the surfaces (7), and means (2,3,4,8) extending upwardly of the support surfaces (7) in use to facilitate mechanical lifting of the frame, the frame providing an aperture (5) between and above the support surfaces (7) at at least one end (4) thereof.

2. A container according to claim 1, characterised in that the support surfaces (7) and an interconnecting rear side (2) of the frame are formed from a plate, and in that the aperture (5) is a cut-out portion of the plate that is open at a front side (4) of the frame.

3. A container according to claim 1 or 2, characterised in that the lifting facilitating means (2,3,4,8) comprises three rectangular lattice-work portions (2,3,3) forming three closed sides of the frame, and open frame side (4) extending upwardly from the aperture (5), and lugs (8) at the top of the four frame sides (2,3,3,4).

4. A method of stacking and transporting objects, the method being characterised by the steps of forming a first layer (11) by placing a plurality of elongate objects (9) side by side on a support (10) with the ends of each object (9) projecting beyond the support (10), forming a stack of one or more layers (12,11) of the objects (9) on the first layer (11), and relatively moving the stack and a container according to any preceding claim so that the stack enters the aperture or slot (5) and the ends of the objects (9) of the first layer (11) rest on the support surfaces (7).

5. A method according to claim 4, characterised by providing the support (10) by one or more of the objects (9) extending transversely to the objects (9) forming the first layer (11).

6. An apparatus for containing stacked concrete blocks, characterised by a cage having a base (1), a rear side (2), an open front side (4), and two end sides (3),

the base (1) having a cut-out slot (5) of rectangular shape, the open mouth of the slot (5) being adjacent to the open front side (4), thus communicating directly with the said front side (4).

7. Apparatus according to claim 4, characterised in that the sides (2,3,4) of the cage are of a lattice-work construction.

8. A method of stacking and transporting concrete blocks characterised by the following steps:

a) laying a plurality of concrete blocks (9) end to end to form a bottom layer (10);

b) laying a plurality of concrete blocks (9) transversely side by side on the bottom layer (10) to form a transverse layer (11);

c) laying a plurality of concrete blocks (9) side by side and end to end on the transverse layer (11) to form a longitudinal layer (12).

9. A method according to claim 8, characterised in that the transverse layer (11) overhangs the bottom layer (10), and in that the transverse and longitudinal layers (11,12) are transported by the apparatus of claim 6 or 7, the apparatus co-operating with the layers of blocks (9) by having the underneath of the transverse layer (11) engaged by the base (1) of the cage and the bottom layer (10) lying freely within the slot (5) thereby to transport the transverse and longitudinal layers (11,12).

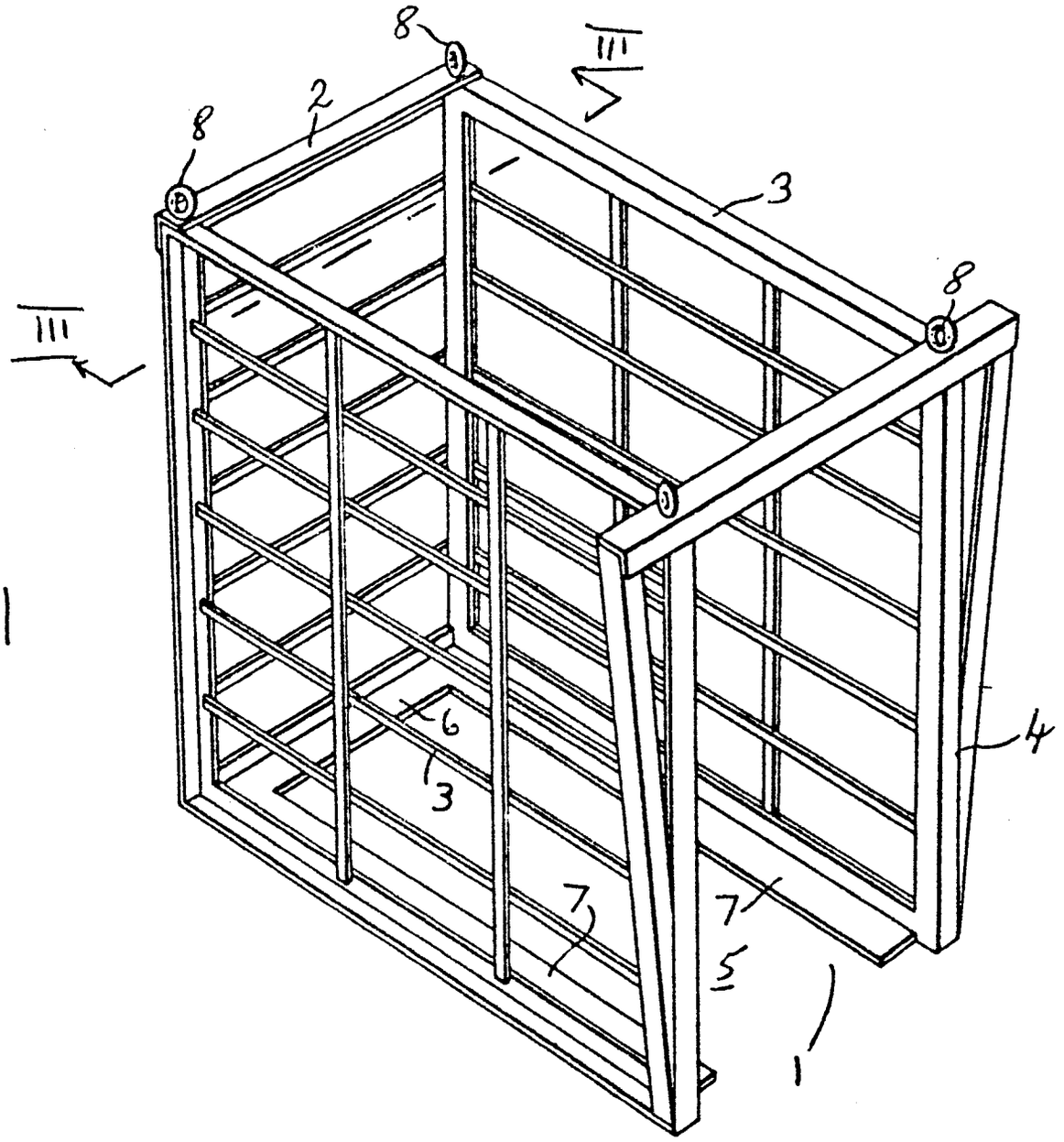

Fig. 1

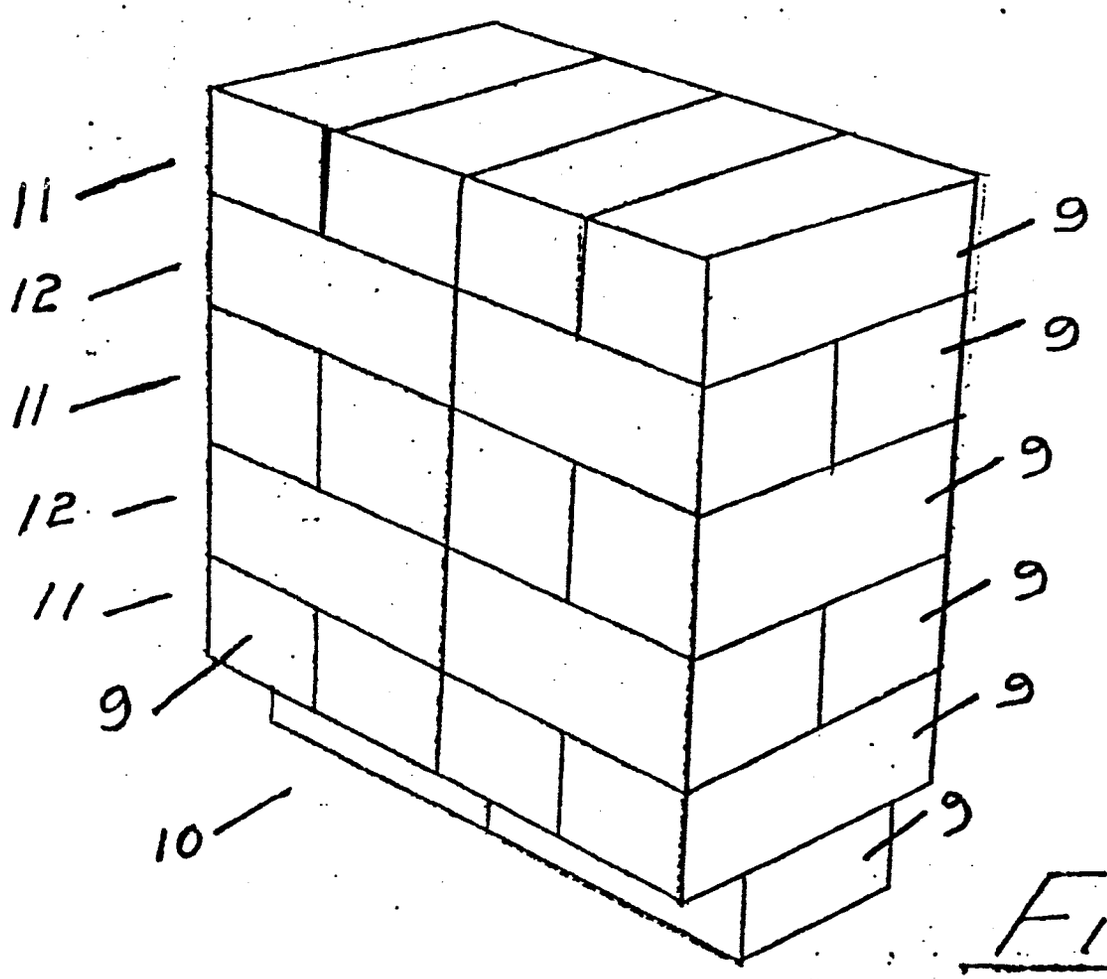

FIG 2

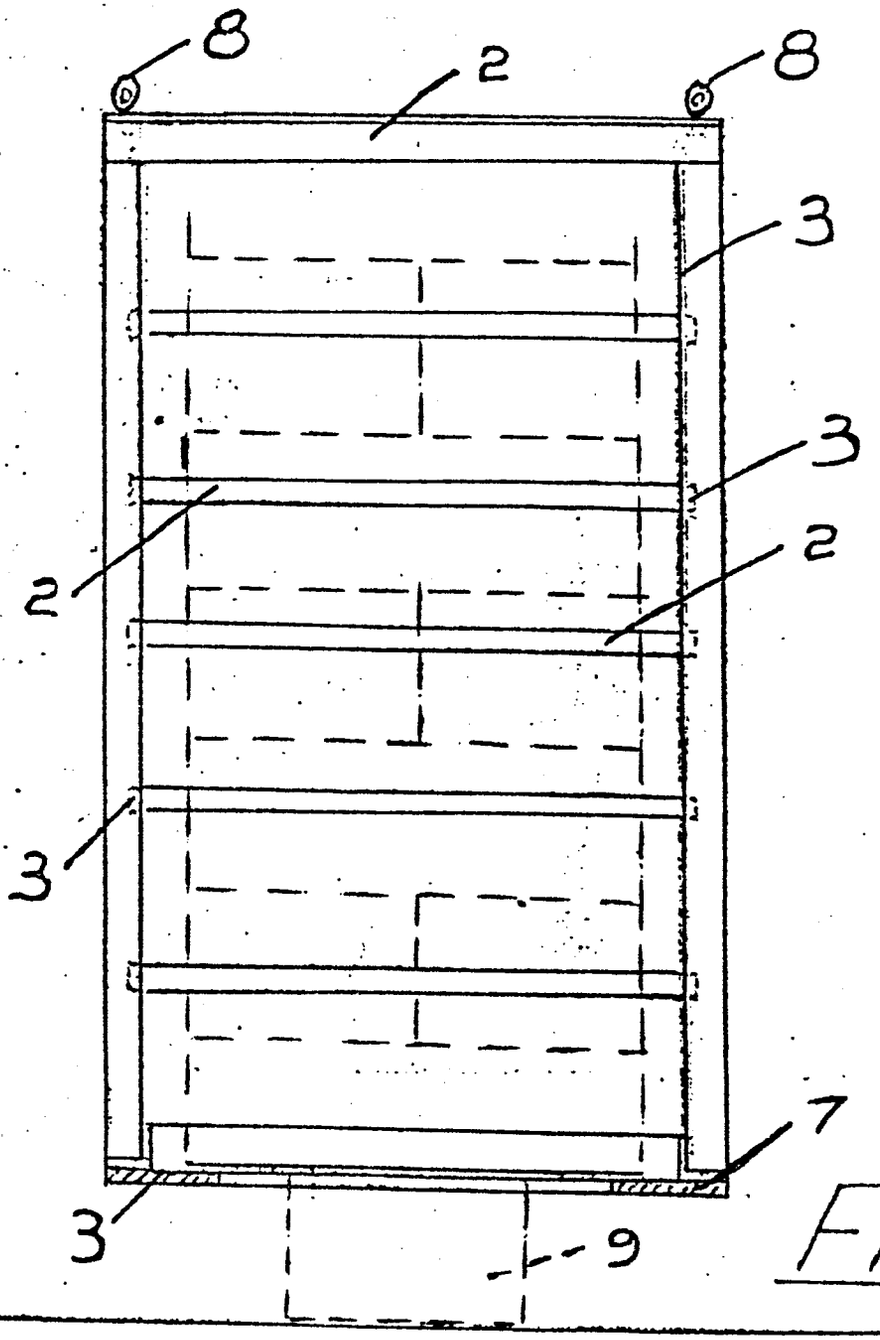

FIG 3

European Patent Office

EUROPEAN SEARCH REPORT

Application number
EP 79 30 0401

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
X	DE - B - 1 143 445 (BROMBACHER) * Column 2, lines 17-27 * --	1,3,6,7
	FR - A - 1 141 772 (ALZIARI) * Page 2, left-hand column, paragraph 2; figure 4 * --	4,5,8,9
A	FR - A - 1 145 996 (PUGGINI)	1
A	DE - C - 207 661 (KRUEGER)	1
A	DE - C - 800 547 (SCHMELZ)	1
A	FR - A - 450 799 (FENFIELD)	1
A	FR - A - 552 134 (LALLEMANT) ----	1

CLASSIFICATION OF THE APPLICATION (Int. Cl.³)

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B 66 C 1/28
B 65 G 57/00

TECHNICAL FIELDS SEARCHED (Int.Cl.³)

B 66 C
B 65 G
B 65 D
B 66 F

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	20-06-1979	VAN DEN BERGHE