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PATENTS LAW, 5727-1967

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Application For Patent

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אני, (שם המבקש, מענו ולגבי גוף מאוגד - מקום התאגדותו)
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(בעברית) (Hebrew) מכונה לדחיסת חבילות

(באנגלית) (English) A mechanical baler

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hereby apply for a patent to be granted to me in respect thereof. מבקש בזאת כי ינתן לי עליה פטנט

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No. מס'	No. מס'			
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~~filed on a previous case~~ ~~חוגש בענין קודם~~

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Signature of Applicant

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By: —

היום This 14th בחודש of Feb. שנת 1984 of the year

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מכונה לדחיסת חבילות

A mechanical baler

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C: 64027

The present invention concerns a mechanical baler for producing compact bales of bulk fibrous, shredded or otherwise particulate material. One particularly preferred application of the mechanical baler according to the invention is for baling picked cotton and the invention will be described hereinafter with reference to such application, it being understood that it is not confined thereto.

For the transportation of picked cotton to the gin the cotton is baled and conventionally balers are used which are associated each with a tractor serving for power supply and traction. Known balers comprise a container into which the picked cotton is dumped and wherein it is subjected to pressure compression, either in a single stroke or a series of strokes each comprising the steps of dumping and compression.

Balers are open below so that the dumped cotton and subsequently also the compressed bale rests on the ground. At the end of the baling operation wheels associated with the side walls of the baler are lowered by means of a hydraulic system controlled from the tractor whereby the baler is lifted so as to clear the ground and from this position it is drawn away by the tractor leaving the bale behind. The baler is then drawn to a new site where the same operation is repeated.

The pressure compaction of bulk material such as picked cotton consumes relatively much energy and also requires cumbersome equipment. It is therefore the object of the present invention to provide an improved and simpler baler.

In accordance with the present invention there is provided a tractor-drawn baler comprising a bottomless container adapted to rest on the ground and wheels which can at will be withdrawn off the ground and lowered onto the ground, characterised by the provision of pliable cover means for covering the container from above and means for evacuating air from the container thereby to cause the compaction of bulk material therein by the action of the ambient atmospheric pressure.

Thus, whereas convention balers use an elevated pressure for the compaction, in the baler according to the invention the pressure in the bulk material inside the container is reduced whereby the bulk material collapses and is compressed by the ambient atmospheric pressure. It has been found that the baling operation according to the invention is simpler and faster and thereby also considerably cheaper than the conventional one.

The invention is illustrated, by way of example only, in the accompanying drawings in which:

Fig. 1 is a perspective view of a baler according to the invention, partly broken open, with bulk material inside;

Fig. 2 shows the baler of Fig. 1 covered from above;

Fig. 3 is a top view of the covered baler of Fig. 2 also showing part of the tractor;

Fig. 4 is a front view of the baler of Fig. 1 also showing one of the covering sheets in a transitionary upright position;

Fig. 5 is an end view of the baler of Fig. 1, again with one of the covering sheets in a transitionary upright position;

Fig. 6 is a fragmentary detail of the air evacuation arrangement;

Figs. 7 and 8 are fragmentary side elevation showing a covering sheet in the withdrawn and intermediary upright positions, respectively; and

Fig. 9 is a perspective view showing the baler in the course of withdrawal from a finished bale.

The baler here illustrated comprises a bottomless container 1 which in Fig. 1 is shown to contain bulk material 2, e.g. picked cotton. The lower part of container 1 consists of a frame 3 of frustopyramidal shape and made of rigid material, e.g. of metal plates and having a flap 4 hinged at the rear end. The lower edges of frame 3 are preferably sharpened so that when the container rests on the ground as shown in Figs. 1 and 2, the frame digs into the ground whereby the interface container-ground becomes essentially airtight. The upper part of container 1 is of

essentially rectangular prismatic shape and it consists of a railing comprising a plurality of upright bars 5, two lateral cross-bars 6 and two longitudinal cross-bars 7, which railing is lined from within with pliable heavy duty sheets, e.g. tarpaulins, such as lateral sheets 8 and longitudinal sheets 9. The lining sheets extend beyond the cross-bars 6 and 7 and can be withdrawn as shown in Figs. 1, 7 and 9 drawn out as shown in Figs. 2, 3, 4, 5 and 8. In their drawn out state the extensions of the lateral lining sheets 8 form lateral flaps 10 and the extensions of the longitudinal lining sheets 9 form longitudinal flaps 11.

Alongside the upper portions of longitudinal side walls of frame 3 there are mounted two identical shafts 12 fitted each with a crank 13. Each of shafts 12 is associated with

a plurality of wires or ropes 14, the lower part of each such wire or rope being anchored in the shaft while the upper part is connected to an associated flap. Thus all the ropes 14 associated with one crank are connected to one lateral flap 10 and one longitudinal flap 11 and the ropes associated with the other shaft 12 are connected to the other lateral flap 10 and longitudinal flap 11. As can be seen from Figs. 2, 3, 4 and 5, each rope 14 is connected to the associated flap at several points so that when a flap is withdrawn it folds in the manner shown in Figs. 1, 7 and 9.

In operation, starting from the withdrawn position shown in Figs. 1, 7 and 9 cranks 12 are rotated manually by means of cranks 13 so as to give off rope and in consequence the associated flaps can be drawn out and folded over into the covering position shown in Figs. 2 and 3, possibly via an intermediary upright position shown in Figs. 4, 5 and 8.

Along the two side walls and the front wall of frame 3 there extends a U-shaped air duct 16 and on the lateral portion thereof there is mounted an exhauster 17 driven by means of a drive shaft 18 via a transmission 19. Drive shaft 18 is connectable to a prime mover, e.g. a tractor engine. On its inner side facing the receptacle 1 the air duct 16 is fitted with a wire net 19 which enables the suction of air while arresting the bulk material in the receptacle.

On each side of container 1 there is provided a wheel 20 mounted on an arm 21 articulated to a lug 22 and associated with a hydraulic cylinder-piston assembly 23. By the action

of the assembly 23 wheels 20 can be at will withdrawn into the position shown in Figs. 1 and 2 or lowered into the position shown in Fig. 9. The hydraulic cylinder-piston assembly 23 is controlled from the tractor in a manner known per se and not shown.

Container 1 comprises at its front side a traction shaft 25 for linking to a tractor 26 as shown in Figs. 3 and 9.

The operation of the baler according to the invention is as follows:

Starting from the position at which the baler rests on the ground and the flaps 10 and 11 are withdrawn, as shown in Fig. 1, bulk material 2 such as picked cotton, is dumped into the container as shown in Fig. 1. When the container is full to capacity flaps 10 and 11 are drawn out and folded over into the covering position as shown in Figs. 2 and 3. In that position the tarpaulin essentially prevents airflow into the container. From this position exhauster 17 is operated and as a consequence there occurs a pressure drop inside the container which results in a collapse and compaction of the bulk material therein into a bale, the tarpaulins 6 and 7 being lowered together with flaps 10 and 11 until they reach the level of frame 3.

At the end of the baling operation a bale has formed having the shape and size of frame 3.

Experience has shown that one compaction stroke in a baler according to the invention lasts only several seconds but suction is as a rule continued for several minutes in order to consolidate the bale. It has also been found that for effective compaction it is sufficient to reduce the pressure inside the sealed container by one-tenth of an atmosphere and it is easily understood that the energetic requirement for this are comparatively low.

Although the tarpaulins 6 and 7 are essentially airtight there remains some air passages between the overlying flaps 10 and 11 and as a result the system is not entirely airtight. Consequently exhauster 17 is designed for over-capacity. For example, where the container has a total volume of 60 m^3, the exhauster will be designed for a suction capacity of 15 m^3/sec. and for the creation of a pressure drop inside the container of about 0.2 atm.

Upon completion of the baling operation the flaps 10,11 are withdrawn and folded back into the starting position (see Fig. 9) and the hydraulic assemblies 23 are now operated so as to lower wheels 20 onto the ground thereby to lift and tilt container 1 into the position shown in Fig. 9. At the same time flap 4 is opened and by this the container due to the frustopyramidal shape of frame 3 becomes dissociated from the similarly shaped bale 27 and can be withdrawn therefrom. The container 1 is then drawn onto a new site whereupon it is lowered back into the position of Fig. 1 and the operation can be repeated.

The great advantages achieved by the novel mechanical baler according to the invention become apparent from the fact that whereas a conventional mechanical baler can service only two mechanical cotton picking machines, a novel mechanical baler according to the invention can service five such machines or even more.

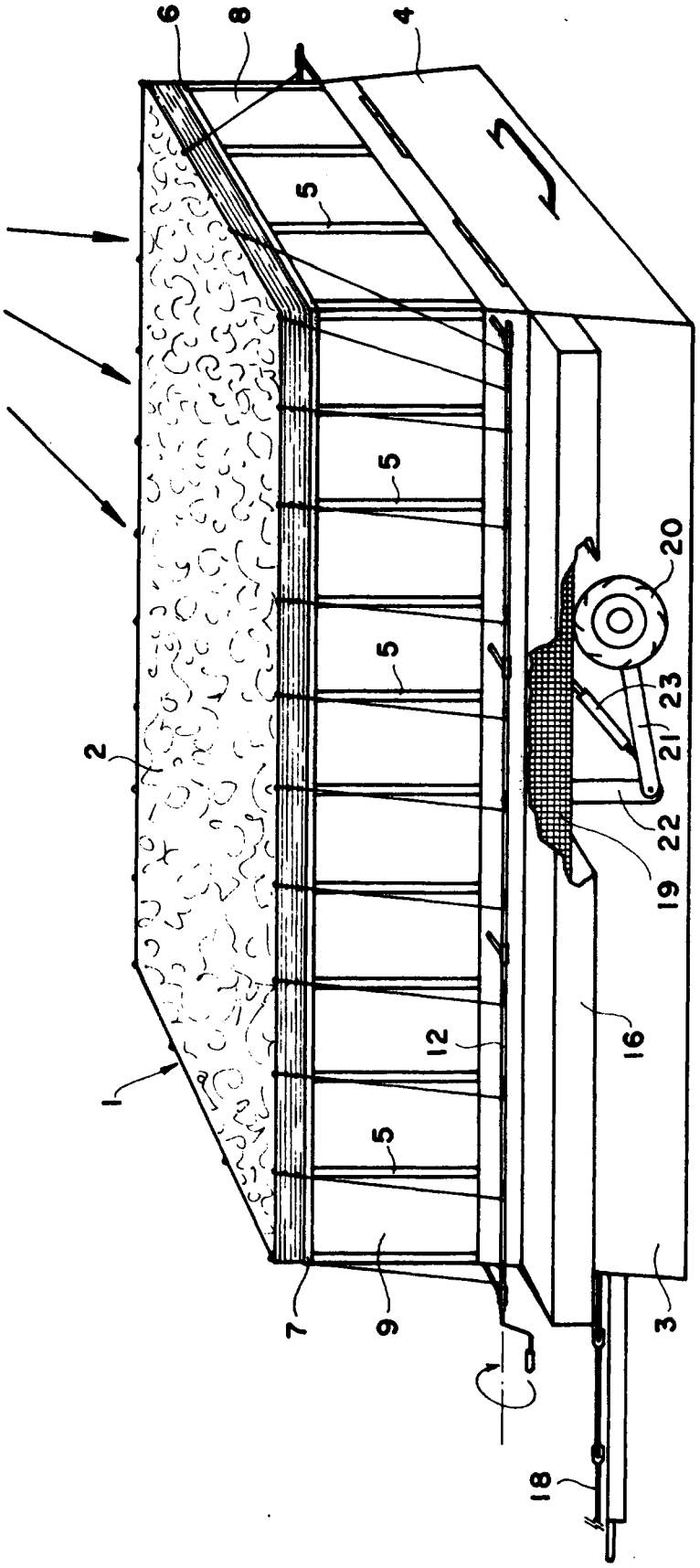

Fig.1

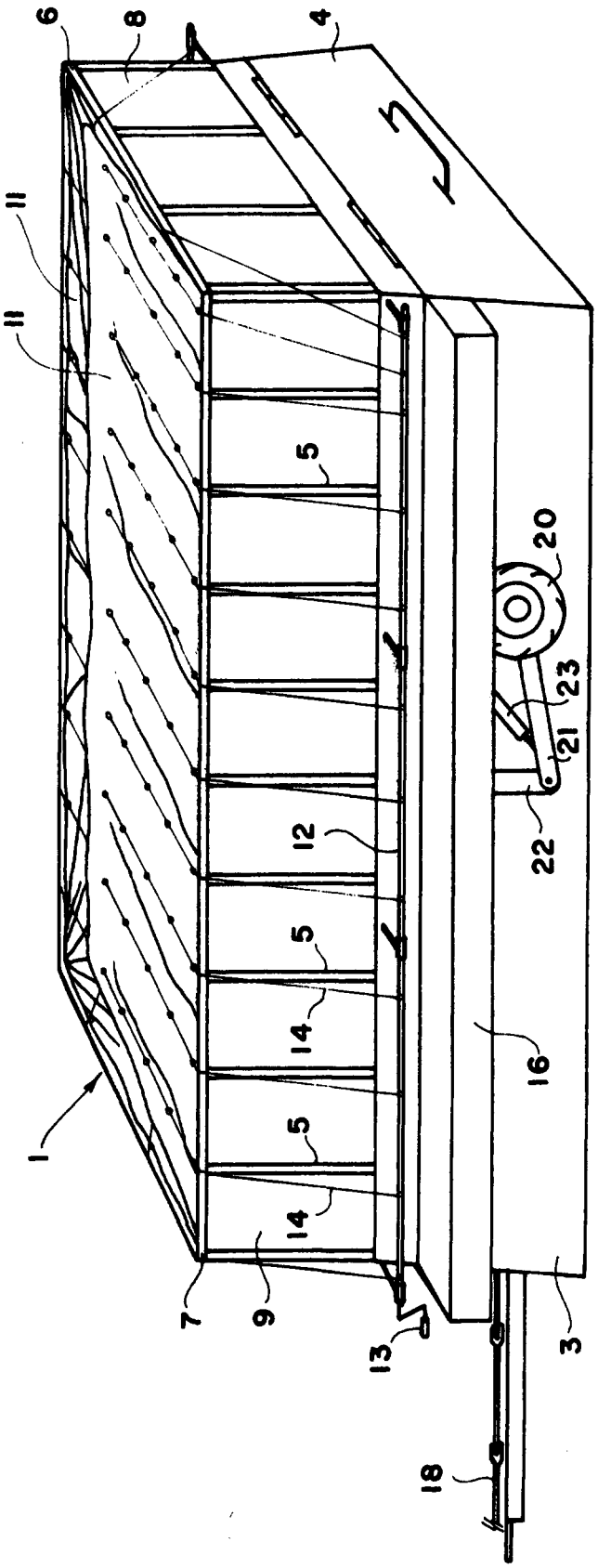

Fig.2

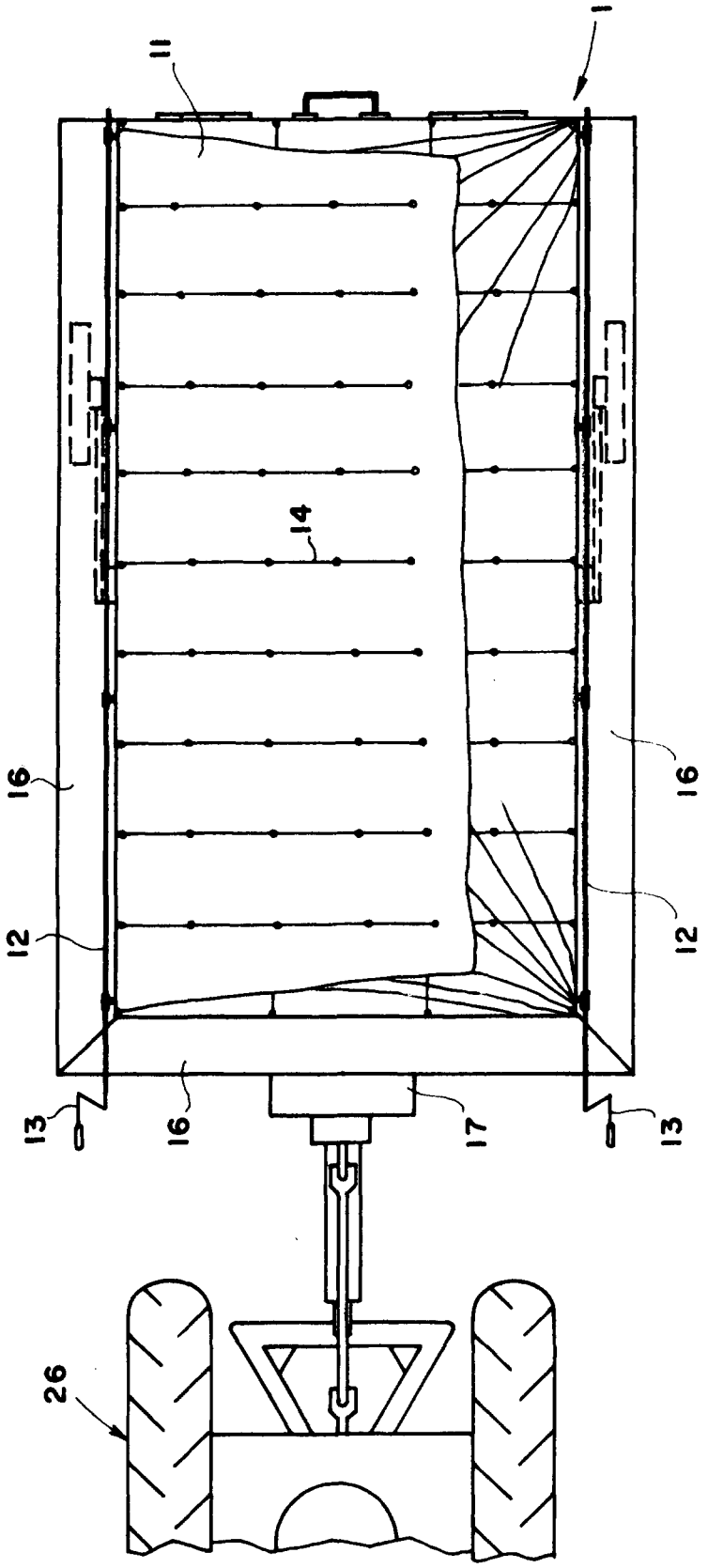

Fig.3

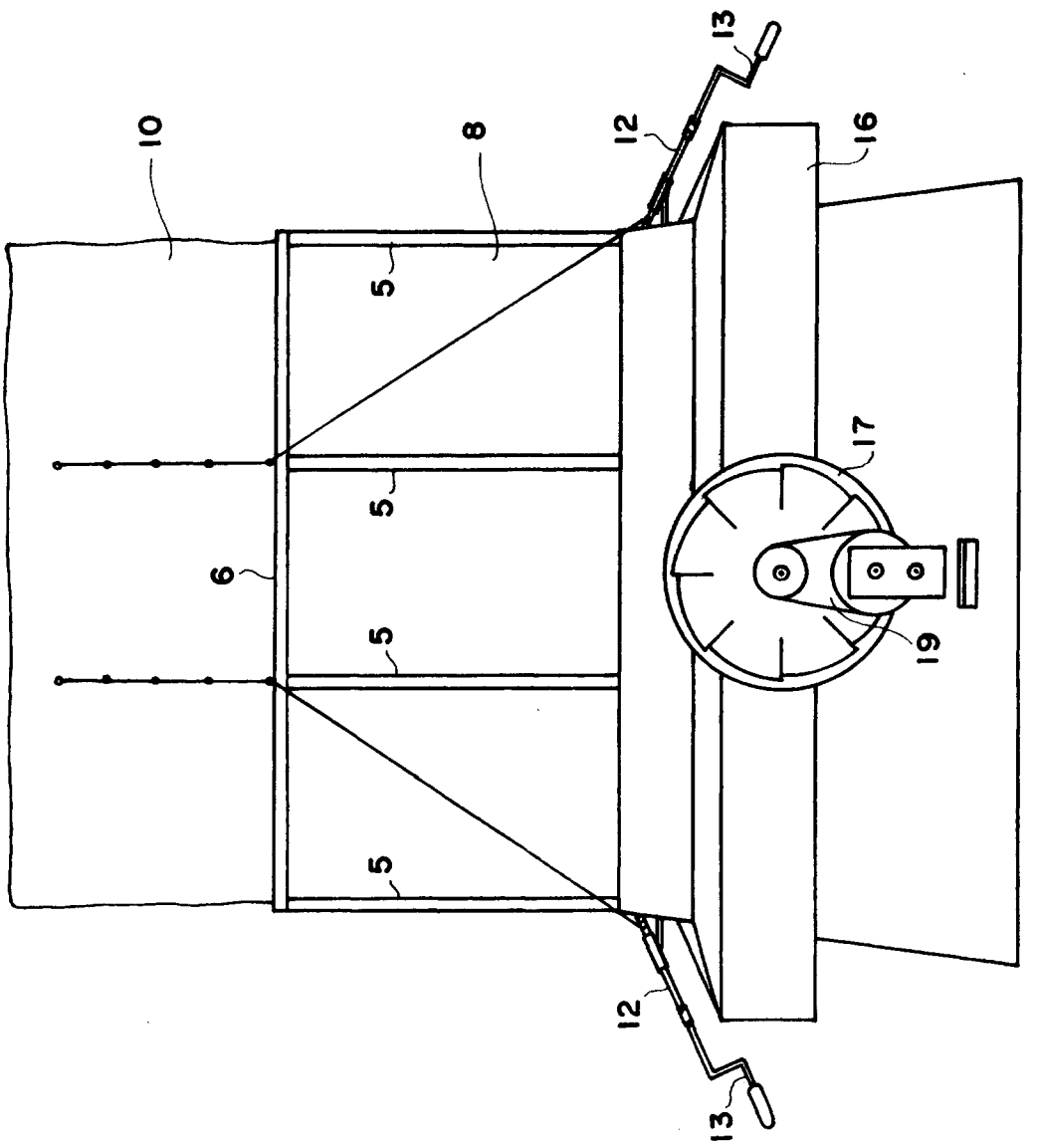

Fig. 4

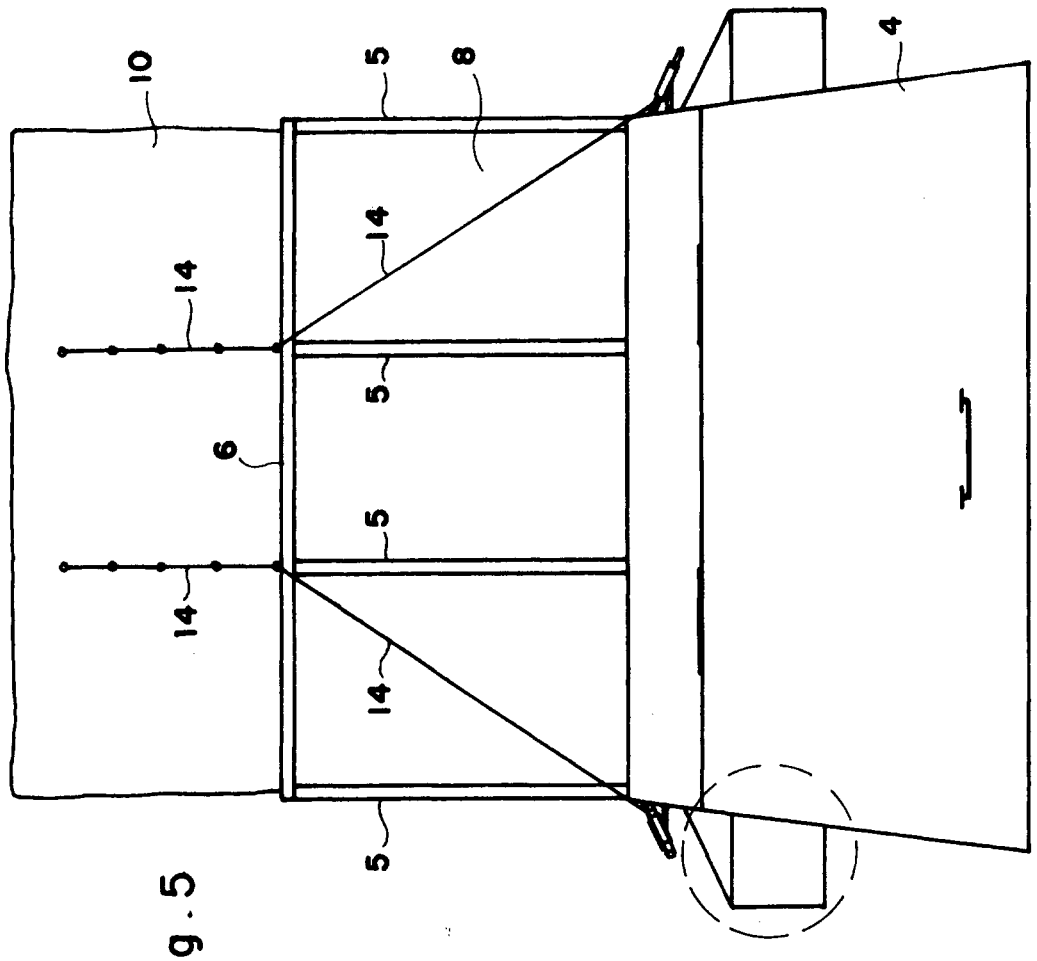

Fig.5

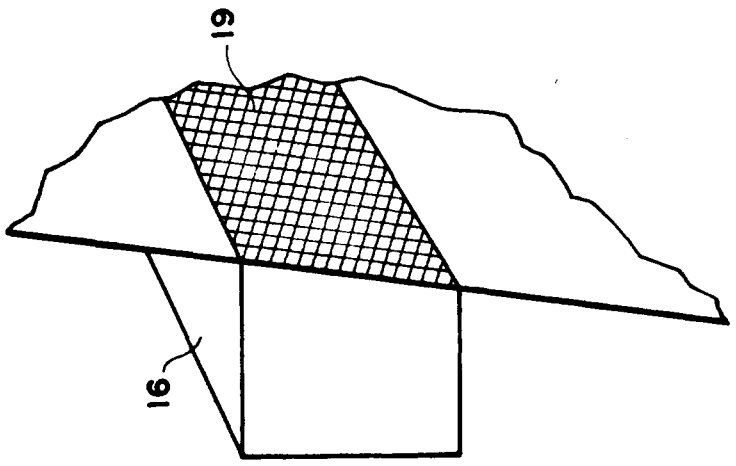

Fig.6

Fig.7

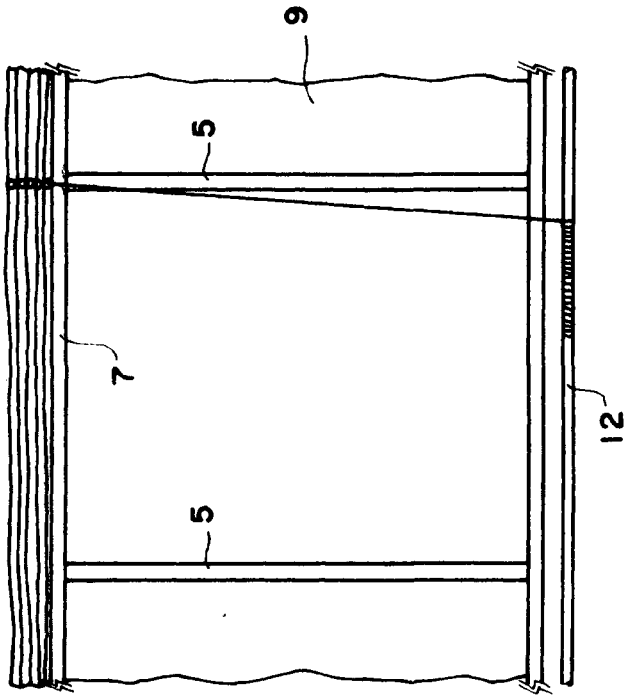

Fig.8

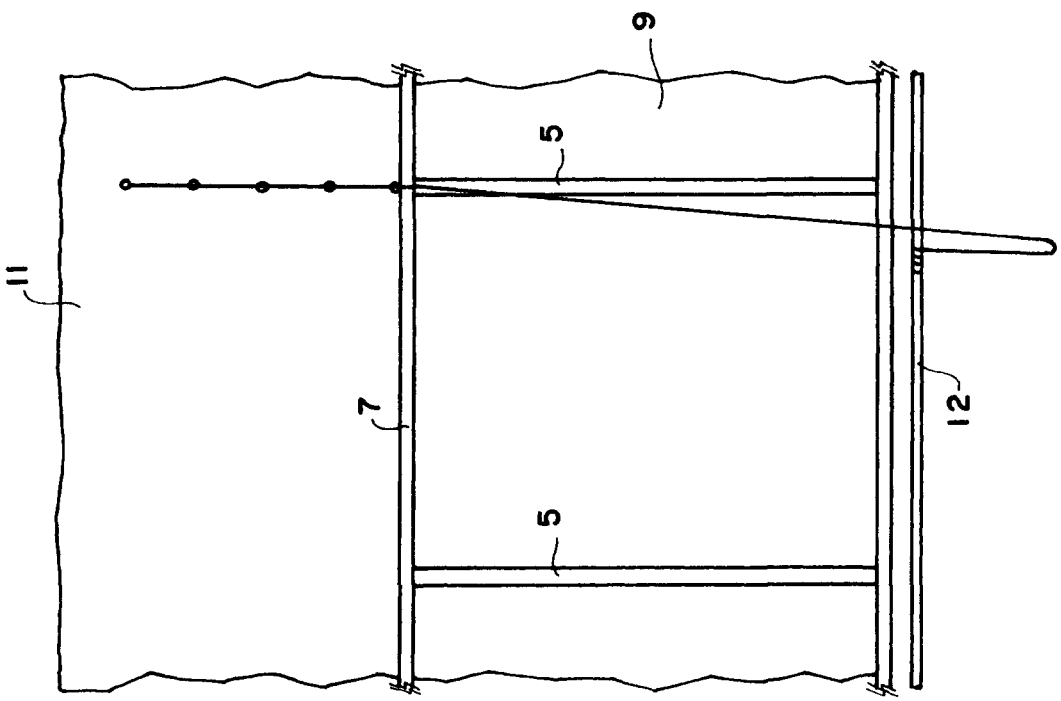

Fig. 9