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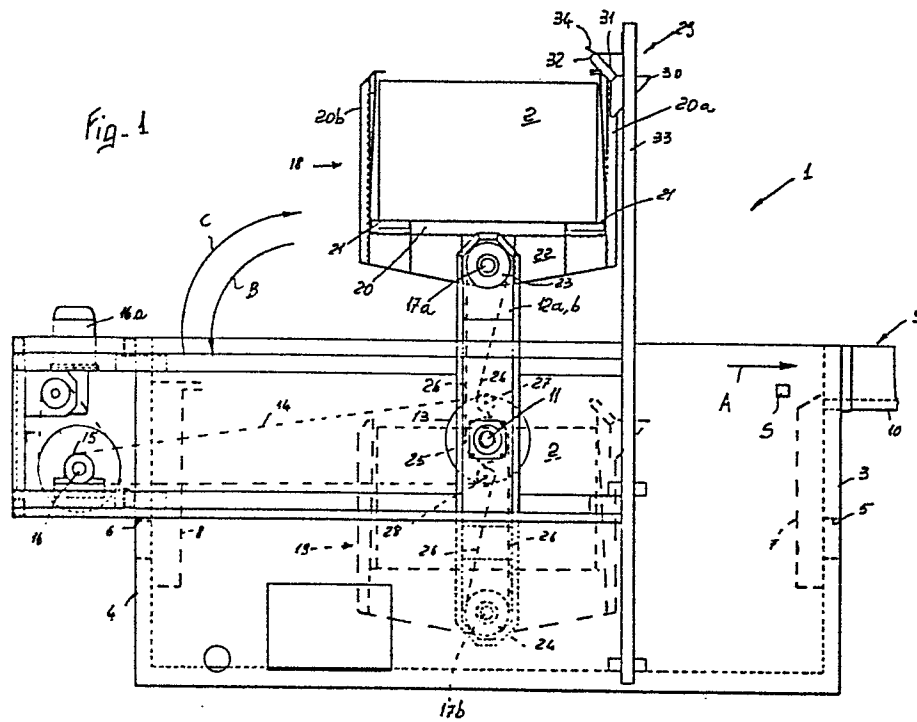
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⑤④ **Floatation tank for continuously emptying large boxes, in particular boxes containing vegetable and fruit produce.**

⑤⑦ A floatation tank (1) for continuously emptying boxes (2), in particular boxes (2) containing vegetable and fruit produce, comprising at least one arm (12a, 12b) journaled in an intermediate position (11) thereof, two box-type platforms (18,19) supporting respective one of said boxes (2), the lateral sides being articulated at a bottom to the ends of said arm (12a, 12b), a kinematic means for connecting the platforms (18,19) to the tank (1) and operative to rotate the platforms (18,19) relatively to the arms (12a,12b) as the arms are being rotated to hold said platforms (18,19) horizontal.



"FLOATATION TANK FOR CONTINUOUSLY EMPTYING LARGE BOXES,  
IN PARTICULAR BOXES CONTAINING VEGETABLE AND FRUIT PRODUCE"

This invention relates to a floatation tank for continuously emptying large boxes, in particular boxes containing vegetable and fruit produce such as apples.

5           It is known that some vegetable and fruit produce, e.g. apples, is loaded loose, on harvesting, into large capacity boxes having perforated walls; at the produce sorting establishments, such boxes must be emptied delicately, lest the produce may suffer damage,  
10           and as quickly as possible.

          For a gentle and fast emptying of the boxes, it is known to put them into tanks containing running water, wherein the produce is floated or allowed to surface by its own buoyancy, and an upflow of water,  
15           is created which will take the produce along in overflowing from one upper edge of the tank.  
          Currently available tanks on the market provide for the boxes to be immersed into the tank and later picked up by means of devices, platforms or the like,  
20           which are reciprocable in a vertical direction and involve considerable cycle time; that is, after a box is emptied, to lift it off the tank, take it away, pick up a fresh loaded box and dip it into the tank, a very long time is wasted during which the tank  
25           remains inoperative.

          It is the technical aim of this invention to provide a box emptying tank which affords greatly reduced cycle time for the replacement

of an emptied box with a loaded one.

Within the above technical aim, it is an object of this invention to provide a tank which has much reduced overall dimensions, especially compared to  
5 the outstanding bulk of the boxes.

It is another object of this invention to achieve the above aim with a simple construction of relatively easy fabrication, which is safe to use, effective in operation, and of comparatively low cost.

10 This aim and these objects are all achieved by the instant floatation tank for continuously emptying large boxes, in particular boxes containing vegetable and fruit produce, characterized in that it comprises a tank having a water inlet and a front formed with an overflow  
15 outlet for the water and produce, at least one arm journaled in an intermediate position thereof, two box-type platforms supporting respective one of said boxes, and having at least one of their respective lateral sides open for the introduction and withdrawal of said  
20 boxes, the platforms being articulated at a bottom portion thereof to the ends of said arm, a drive unit for said arms adapted to rotate them so as to successively bring said platforms from a raised position of introduction and withdrawal of a box to a lowered position of immersion  
25 of the box into the tank, a kinematic means for connecting said platforms to said tank and operative to rotate the platforms relatively to the arms as the arms are being rotated to hold said platforms horizontal, and a means for automatically locking the boxes and mounted on the  
30 open sides of said platforms, being adapted to be deactivated with the platform at the box introduction

or withdrawal position.

Further features will be more clearly understood from the following detailed description of a preferred, but not exclusive, embodiment of a tank according to the invention, with reference to the accompanying illustrative, but not limitative, drawings, in which:

Figure 1 is a partly sectional side view of a floatation tank according to the invention; and

Figure 2 is a front view of one portion of the tank shown in Figure 1.

With more particular reference to the drawing figures, indicated at 1 is a tank according to the invention, for continuously emptying large boxes 2.

The boxes 2, only shown diagrammatically in the drawings, are as usual of a type formed from a plastics material, have a parallelepipedic shape, and are open at the top, while having their walls perforated.

The tank 1 has an open top box-like shape and has, front 3 and rear 4 walls, two inlets 5,6 for admitting water, whereat there are arranged, on the tank interior, shaped deflector diaphragms 7,8 which are adapted to generate a surface stream of water travelling in the direction of the arrow A; the wall 3 is formed with a wide flattened water outlet 9 which is extended into a wide flattened channel 10 of sort for carrying away the overflowing water and the produce floating therein.

In a central area of the lateral sides of the tank 1, there are journalled in sealed relationship two trunnions 11 to an intermediate position whereon, inside the tank, are mounted two strong arms 12a,12b; on the tank exterior, there are keyed to the trunnions 11 respective sprocket wheels 13 which are connected by respective closed loop drive chains 14 to two sprocket wheels 15, mounted at the ends of a transverse drive shaft 16, at the exterior of the tank and in turn driven by a motor unit 16a, whose actuation results, in the arms being rotated in the direction of the arrow B to bring the arm ends to a configuration of immersion into the tank, and alternately in the direction of the arrow C to a configuration of lifting out of the tank.

The arms 12 are interconnected at their ends by two transverse idler shafts 17a,17b whereto respective platforms 18,19 are keyed; the platforms 18,19 are each comprised of a deck 20 which has, at the front and rear, two rows of cylindrical idler rollers 21 which facilitate introduction of the boxes by rolling engagement; the introduction of boxes takes place in a direction perpendicular to the plane of the drawing sheet of Figure 1 and the rollers 21 are rotatable each about a horizontal axis, parallel to the plane of the drawing sheet; on the sides of the deck, and under it, there extend two flattened isosceles triangle wings 22 for articulation to the shafts 17; at the front and rear, the decks 20 are

joined to a forward face 20a and a rearward face 20b.

On the shafts 17, at the arm 12a, there are mounted two sprocket wheels 23,24 of like diameters which are made fast with the platform 18 and platform 19, respectively; mounted rotatably on the shaft 11 is a sprocket wheel 25 which is fast with the lateral side of the tank 1 and has the same diameter as the sprocket wheels 23,24.

The sprocket wheels 23,24,25 are kinematically connected together by a closed loop chain 26, there being provided two idler sprockets 27,28 mounted on the arm 12 which are adapted to hold the chain engaged with the sprocket wheel 25. It should be noted here that the arm 12a is advantageously of hollow construction; and that the sprocket wheels 23,24,25, chain 26 and idler sprockets 27,28 are mounted on its inside.

Thus, the kinematic connection just described causes the platforms 18,19 to move, during the rotation of the arms 12, around the shaft 11 while remaining at all times horizontal.

At the sides of the forward face 20a of the deck 20, there are mounted oscillating stop means 29 for automatically stopping movement of the boxes; the means 29 comprise small fingers 30 pivotally connected by pins 31 to the face 20a of the deck 20 and having counterweights 32; from each of the tanks' lateral sides there extend upwards an upright 33 which has at the top a cam profile 34 extending therebetween and being adapted for abutment engagement with the counterweights 32 when the platforms reach their highest elevation or level. In the different configurations from those of maximum lift of

the platform, the fingers 30 are adapted to prevent the boxes from sliding, whereas in the condition of maximum lift, the boxes would be released to slide on the rollers 21.

5           It will be appreciated that the loading and unloading of the boxes 2 unto the platforms takes place when the platforms are at their highest level and during the loading und unloading stage the boxes are shifted in a direction perpendicular to the plane of the drawing of  
10 Figure 1 and are caused to run over the rollers 21. The stop means 29 allow this transverse movement in the position of highest elevation of the platform and stop such transverse movement of the boxes 2 when the platform is lowered owing to the disengagement of the stop means  
15 from the cam 34 and owing to the oscillating action of the counterweight 32 thereof. It should be noted that two stop means 29 may be provided for each box, one in front of the box and the other behind the box.

          It should be noted that the lateral sides (i.e. those  
20 parallel to the plane of the drawing) of the platforms 20 may be either both open and equipped with a locking means 29, or alternatively, one side closed by a fixed lateral side and the other side equipped with the locking means 29; in the former case, the boxes would be intro-  
25 duced from one side and withdrawn from the other side of the platform, whereas in the latter case, they would be introduced and withdrawn from the same side.

          The motor 16a driving the shaft 16, which is operated stepwise to successively and alternately submerge and  
30 raise the platforms into/from the tank, is operatively connected to sensors S for detecting the density of the

vegetable and fruit produce floating in the tank, thereby, on the detected density dropping below a preset value, the empty box would be lifted off and a fresh one to be emptied loaded into the tank.

5        It should be noted that while a box present on the platform submerged in the tank is being emptied by allowing the fruits to surface by buoyancy action of the water, there is sufficient time allowed to pick up from a lifted platform the emptied box and replace it with a  
10    filled one.

Thus, the invention achieves its objects.

The invention herein is susceptible to many modifications and changes without departing from the purview of the inventive concept.

15       Furthermore, all of the details may be replaced with other technical equivalents thereof.

In practicing the invention, the materials used, as well as the shapes and dimensions, may vary contingent on individual requirements without departing from the  
20    protection scope of the appended claims.

CLAIMS

1           1. A floatation tank for continuously emptying  
2 large boxes (2), in particular boxes (2) containing vege-  
3 table and fruit produce, characterized in that it com-  
4 prises a tank (1) having a water inlet (5,6) and a front  
5 formed with an overflow outlet (9) for the water and  
6 produce, at least one arm (12a,12b) journaled in an  
7 intermediate position (11) thereof, two box-type plat-  
8 forms (18,19) supporting respective one of said boxes  
9 (2), and having at least one of their respective lateral  
10 sides open for the introduction and withdrawal of said  
11 boxes (2), the platforms (18,19) being articulated at  
12 a bottom portion thereof to the ends of said arm (12a,  
13 12b), a drive unit (16,16a) for said arms adapted to  
14 rotate them so as to successively bring said platforms  
15 (18,19) from a raised position of introduction and with-  
16 drawal of a box (2) to a lowered position of immersion of  
17 the box into the tank, a kinematic means for connecting  
18 said platforms (18,19) to said tank (1) and operative to  
19 rotate the platforms (18,19) relatively to the arms (12a,  
20 12b) as the arms are being rotated to hold said platforms  
21 (18,19) horizontal, and a means (29) for automatically  
22 locking the boxes (2) and mounted on the open sides of  
23 said platforms (18,19), being adapted to be deactivated  
24 with the platform at the box introduction or withdrawal  
25 position.

1           2. A tank according to Claim 1, characterized in that  
2 the ends of said arms (12a,12b) are interconnected by  
3 idler transverse shafts (17a,17b) where to said platforms  
4 (18,19) are keyed.

1           3. A tank according to Claim 1, characterized

2 in that said platforms (18,19) have their bottoms pro-  
3 vided with cylindrical idler roller beds (21) to facil-  
4 itate introduction of the boxes (2) by rolling.

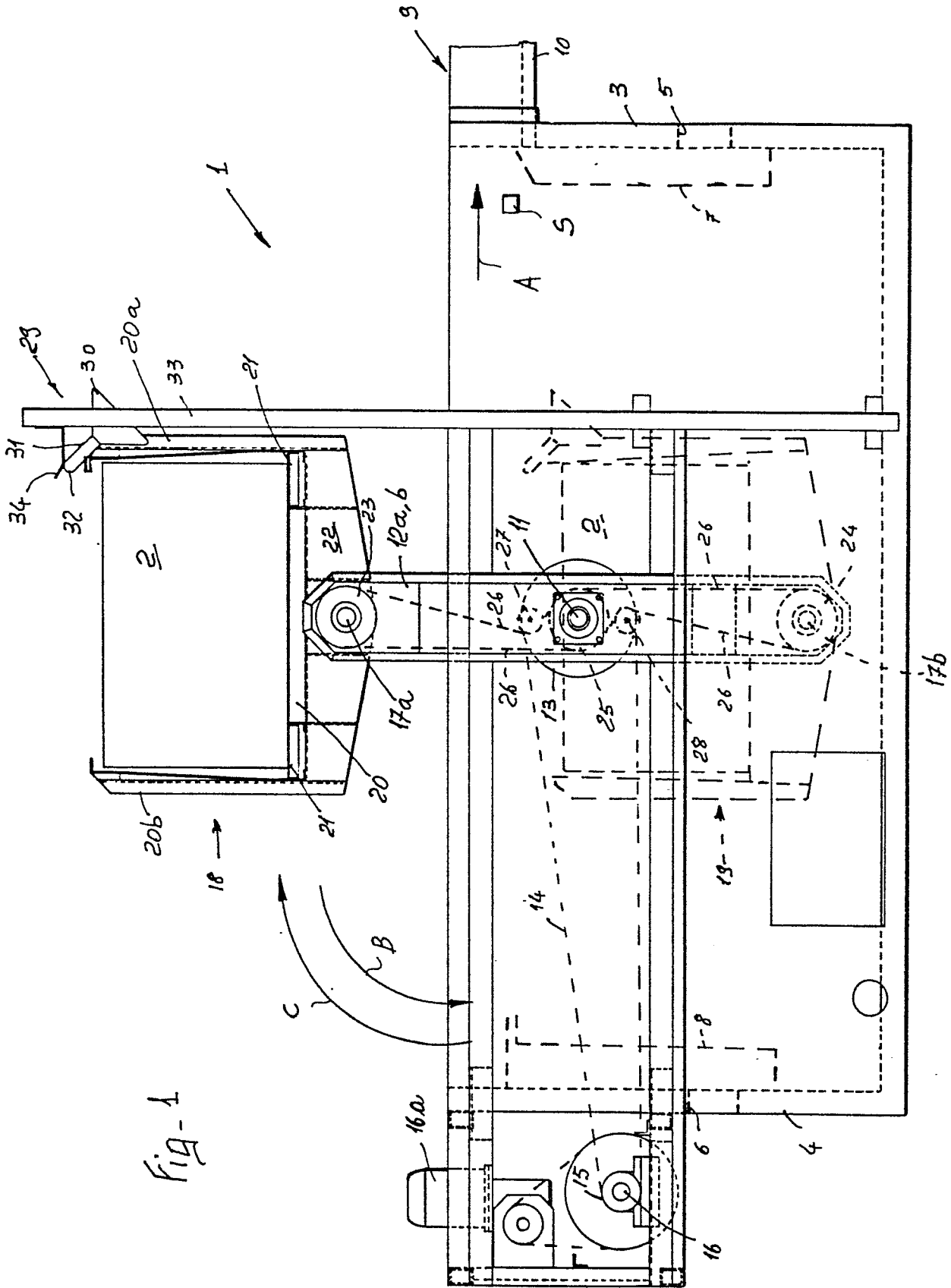
1 4. A tank according to Claim 1, characterized in  
2 that said automatic locking means (29) for the boxes  
3 comprises counterweighed fingers (32), articulated to  
4 the platforms (18,19) which, on rotating the arms (12a,  
5 12b), are brought to abut against a camming profile (34)  
6 affixed to the tank (4) at a position of maximum lift of  
7 the platform adapted to remove the fingers (32) from the  
8 box locking configuration.

1 5. A tank according to Claim 1, characterized in  
2 that said kinematic means of connecting the platforms  
3 (18,19) to the tank comprises two sprocket wheels (23,  
4 24) made fast with the platforms and being centered with  
5 their rotation axes with respect to the arms and with a  
6 sprocket wheel (25) fast with the tank (1) which are inter-  
7 connected by a closed loop chain (26), there being pro-  
8 vided idler sprockets (27,28) mounted on the arms (12a,  
9 12b) and in engagement with the chain, being adapted to  
10 ensure close contact of the chain with the sprocket  
11 wheels.

1 6. A tank according to Claim 1, characterized in that  
2 said drive unit comprises respective sprocket wheels (13)  
3 keyed to the trunnions (11) for said arms (12a,12b) exter-  
4 nally of the tank which are connected by closed loop  
5 drive chains (14) to two sprocket wheels (15) keyed to  
6 the ends of a transverse shaft (16) driven by a motor  
7 (16a).

1 7. A tank according to Claim 6, characterized in that  
2 said motor (16a) is operatively connected to a sensor (S)

detecting the density of the produce floating in the tank and adapted to energize said motor (16a) to introduce a filled box (2) into the tank (1) and withdraw an empty one therefrom upon the density of the produce in the tank dropping below a preset value.



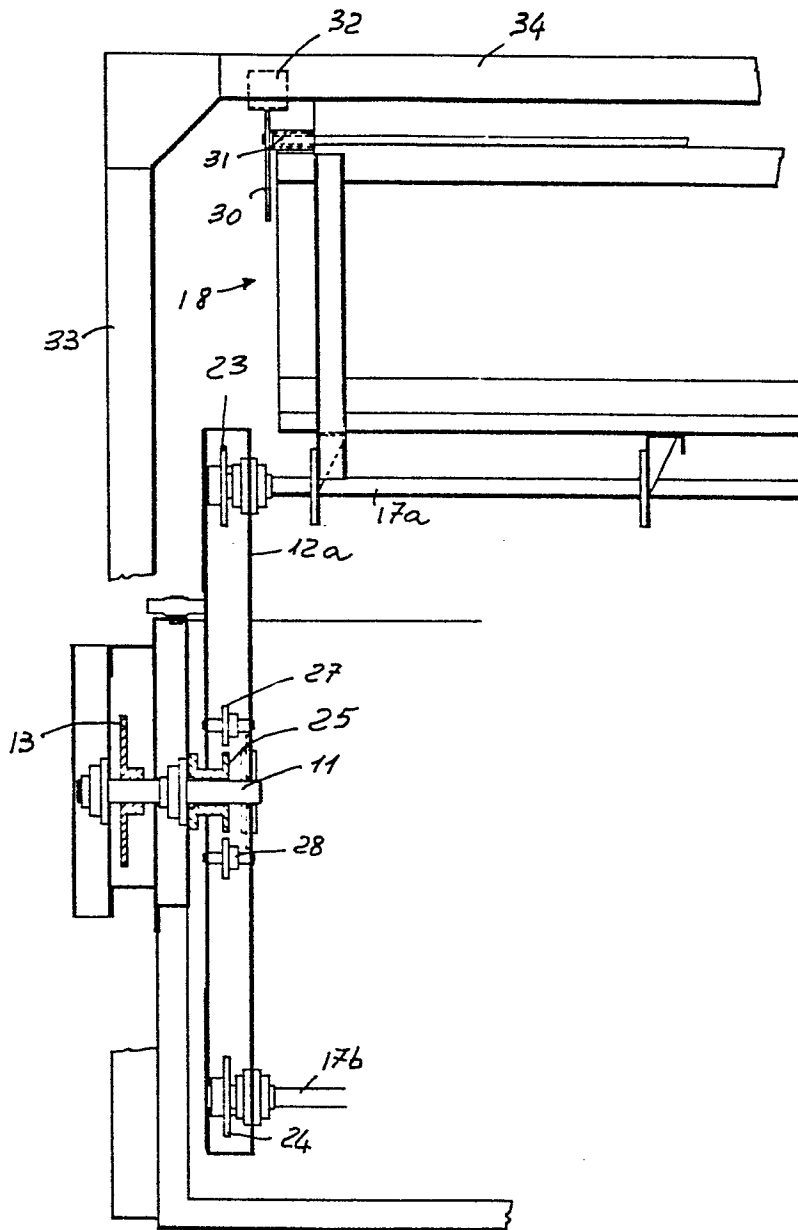


Fig. 2