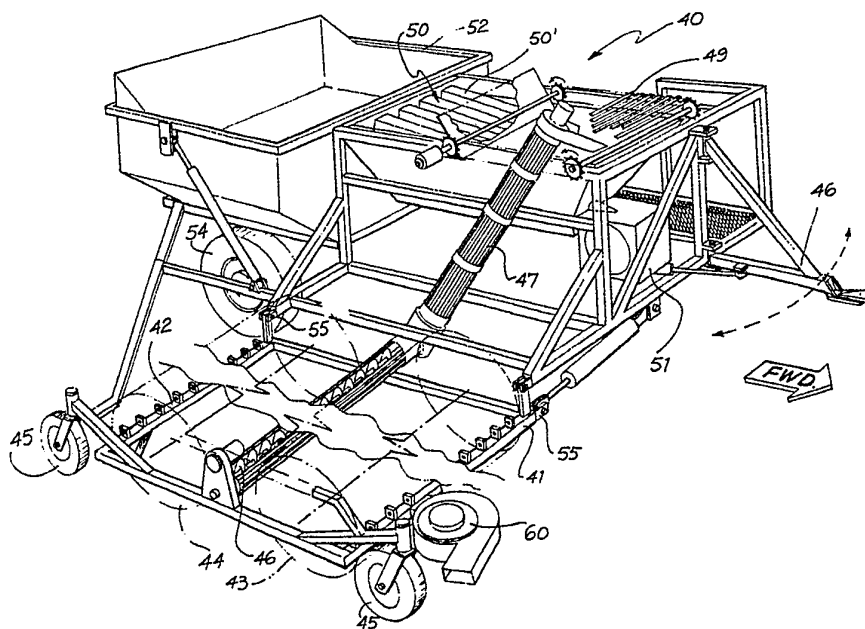


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(54) Title: NUT HARVESTER WITH DEHUSKING STATION**(57) Abstract**

A harvester (40) for collecting and processing nuts (10) from the ground having a nut pick up device (43, 44) for picking up nuts (10) and feeding them to a dehusking station (50) via feeders (46, 47, 48, 49) that facilitate trash removal from the collected nuts. The dehusker (50) removing husks from the nuts (10) and supplying dehusked and essentially trash free nuts (12) to a bin (52) or station for further processing. The nut pick up device (43, 44) comprises a plurality of discs, each disc having a plurality of radially projecting nut gripping and retaining fingers for contacting the ground. Ejector means are mounted in a static relationship relative to the axis of the associated discs to remove the nuts from the discs and convey them to the feeder (46).

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NUT HARVESTER WITH DEHUSKING STATION

TECHNICAL FIELD

The present invention relates to harvesters and, more particularly, to harvesters for nuts with particular but
5 not exclusive applicability to the harvesting of macadamia nuts.

BACKGROUND ART

A harvester has been devised by Andreas F Rau which is currently on sale and in use and presumed to be the
10 subject of Australian patent application No PJ9318. The harvester of Mr Rau is adapted to be hauled behind a tractor while attached to the latter's three-point linkage. The Rau harvester picks up nuts and a quantity of trash from the ground adjacent a row of nut trees by
15 means of rotating fingers mounted on a series of independently floating wheels. The finger pick-up system eliminates the sweeping or raking action of prior machines and reduces damage to the organic mulch layer between rows of trees, which is known to be necessary for the good
20 management of nut and, in particular, macadamia nut orchards. After the pick-up by the harvester, the nuts are removed from the rotating fingers and deposited onto a belt conveyor or paddle conveyor which transfers the nuts and any remaining trash directly to a fruit bin carried by
25 the harvester or a trailer independently towed in unison with the harvester. When a bin is full it can be removed and replaced by an empty one with the full bin being taken to a central location for outer husk removal and subsequent drying of the binned nuts.

30 There are many and various forms of nut harvesters which are in use and have been proposed which include forms as disclosed in Australian patent application 67012/90 as well as US patents 3613441; 3744225; 3995759; 4066179; 4593519; 3888370; and 5025620.
35 Other art in this area is shown in Australian patents

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580933; 464927; and 490870, with others being as shown in Australian applications 75441/81; 41207/85; 45691/89; and 63638/90.

Actual harvesters in production and on sale include the Ramacher Model Nos 6500, 9500, 9510, 9520, 9530, 9540, 9600, 9610, 9620, 9630, 9640, and 9650 nut sweepers; Flory Industries Model 8300; the Turbo 200 manufactured by Tonutti SpA; and the Weiss/McNair Self-Propelled Harvester Model No SP936H.

Typically, problems arise at a static site for dehusking with trash in situ which tends to jam the dehuskers, requiring downtime for removal of the jamming material whereafter the trash and chopped husks are taken back to the orchard for application as mulch.

DISCLOSURE OF THE INVENTION

In one form, the present invention consists in a nut harvesting apparatus comprising means for collecting nuts situate on the ground and delivering those nuts to means for substantially separating the nuts from any entrained trash, means for dehusking the nuts, means for separating the husks from the remainder of the nuts and furnishing the dehusked nuts for further handling and processing.

In one embodiment, the means for picking up nuts from the ground comprises a plurality of parallel spaced discs comprising radially extending fingers, the fingers of each disc being resilient and wherein the circumferential gap between adjacent fingers on a common disc and lateral spacing between fingers on adjacent discs being such as to grip and retain a generally spherically shaped article having a diameter within a predetermined range. The gripped article, such as a nut, being transported circumferentially between gripping fingers of a disc or adjacent discs for subsequent removal from those gripping fingers by ejectors such as resilient or biased fingers, prongs or levers fitted between adjacent discs to prise

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out articles gripped between fingers of adjacent discs. Preferably each ejector is mounted so as to maintain a substantially static position relative to the axle of the adjacent discs with which each ejector is associated. As
5 the articles are prised by the ejectors from the fingers of the discs, they preferably feed to a conveyor which delivers the articles and any unwanted material entrained with those articles to a sorting table in the form of a conveyor comprising a plurality of laterally disposed
10 spaced apart rods with gaps between adjacent rods sufficient to permit entrained material to fall through while transporting the articles.

In contrast with the Rau macadamia harvester, the present invention provides for the removal of trash at the
15 harvesting site and whereafter the nuts pass on from the sorting table to a dehusker for separation of the husks from the remainder of the nuts at the harvester. The dehusker can be of known type which heretofore has been mounted in a static position remote from a harvester. The
20 husks from the dehusker and the trash from the sorting table are preferably fed to a comminuting device such as a hammermill which exhausts the milled husks and trash back to the orchard floor as the harvester moves through the orchard harvesting nuts. The dehusked nuts are then fed
25 to a holding bin for subsequent transportation to a drying station where the moisture content of the harvested nuts may be reduced to improve their keeping qualities before removal of the kernels from the shells for consumption or further processing.

30 Another failing with the Rau harvester, as well as other prior art apparatus of this art, is in the provision of ejector fingers which are fixed relative to the frame of the apparatus, so that the position of the ejectors relative to the finger discs varies as the discs

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rise and fall while crossing the ground leading to problems in efficiently ejecting nuts which are trapped between the fingers of the discs.

Preferably the discs with radial fingers, which are
5 instrumental in picking up nuts from an orchard floor, merely roll across the ground due to the forward motion of the harvester, so that there is minimal slippage between the fingers and the ground, in order to avoid disturbing the orchard floor. To improve the pick-up efficiency of
10 the discs it may be necessary to add weights to the discs to increase their momentum and prevent stalling/skidding due to nuts loading the ejectors, particularly when harvesting in wet or damp conditions. It is preferred that the discs rotate by being rolled across the ground
15 due to forward motion of the harvester rather than be positively rotated and the addition of weights at greater rather than lesser radii from the hub of each disc or banks of discs greatly assists in the prevention of disc stall, thus improving the pick-up rate of the harvester.
20 In addition, multiple units of the discs with radial fingers can be independently suspended from an axle to take account of changes in terrain over which the harvester is hauled.

Prior to the present proposals in-field trash removal
25 or dehusking has not been possible. With the addition of the preferred comminution of the trash and husks and their return to the orchard floor, it can be seen that a further time saving advantage has been achieved in contrast with the prior art.

30 In another aspect the present invention consists in a nut harvesting apparatus comprising an open mesh or screen conveyor onto which harvested nuts and any contained trash are first deposited, said conveyer being upstream of a
sorting table on the harvester, the openings in the screen
35 conveyor being large relative to the size of nuts being

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harvested so as to collect large items of trash entrained with those nuts. The motion of the conveyor screen being transverse to the direction of motion of the sorting table so as to carry trash which does not pass through the mesh
5 to one side of the table for deposition back to the orchard floor. By including this screen conveyor on a nut harvester it may be possible to dispense with an operator who manually removes large items of trash which were heretofore carried along the sorting table because they
10 were too large to drop through that table as they were carried along the sorting table with the nuts.

It will be appreciated that the removal of large items of entrained trash before the nuts enter a dehusker is highly desirable.

15 In a further aspect the present invention consists in the provision of a caged auger feeding dehusked nuts from a bin on the harvester for collecting dehusked nuts. By the means of this form of the invention any residual trash entrained with the dehusked nuts has a chance of
20 being separated from the nuts as the latter are removed from the bin to the effect that there is a greater prospect of feeding substantially trash-free dehusked nuts from a harvester having this form of discharge auger.

In a still further embodiment of the present
25 invention a harvester of the kind proposed above is produced in a self-propelled form with preferably two transverse rows of nut pickup fingered discs at the head of the harvester but with the longitudinal axis of the body of the harvester to which the pickup discs are
30 mounted being offset to one side of the transverse centre line of those discs and wherein the downstream processing of harvested nuts occurs sequentially from the front to the rear of the harvester.

BRIEF DESCRIPTION OF DRAWINGS

35 The present invention will now be described by way of

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example with reference to the accompanying drawings, in which:

Fig. 1 is a cross-sectional view of a macadamia nut;

Fig. 2 is a schematic representation of a nut

5 harvesting method in accordance with the present invention;

Fig. 3 is a perspective view of a harvester apparatus in accordance with the present invention;

Fig. 4 is a front elevation view of the harvester of Fig. 3;

10 Fig. 5 is a side elevation view in partial cutaway of the harvester of Fig. 3;

Fig. 6 is a perspective view of a nut pick up unit as employed in the apparatus of Fig. 3;

Fig. 7 is an elevation view of a part of the pick up unit of Fig. 6 showing how nuts and trash are gripped by the pick up device of Fig 6;

Fig. 8 is a side elevation of a dehusker as employed in the apparatus of Fig. 3;

Fig. 9 is a side elevation view of the typical storage bin as mounted at the rear of the apparatus of Fig. 3;

Fig. 10 is a side elevation of an alternate form of nut collecting bin to be mounted in the apparatus of Fig. 3;

25 Fig. 11 is a schematic plan view of a relatively large mesh screen conveyor for removal of trash from nuts upstream of the sorting table and downstream of the lifting auger;

Fig. 12 is a side elevation of the schematic of Fig. 11;

Fig. 13 is an end elevation VIII-XIII of the schematic of Fig. 12;

Fig. 14 is a schematic plan view of a self-propelled harvester in accord with the present invention; and

35 Fig. 15 is a side elevation of the self-propelled harvester of Fig. 14.

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BEST MODES

In Fig. 1 a macadamia nut 10 is shown comprising an outer husk 11, a shell 12 and kernel 13.

As shown in Fig. 2 nuts in the form of Fig. 1 fall
5 from the trees and sit on the orchard floor 20, together with trash 14. Typically, a harvester picks up nuts and trash from the orchard floor at stage I and in accordance with the present invention the nuts 10 are dehusked at stage II with the husks 11 and trash 14 being comminuted
10 at stage III for return to the orchard as mulch with dehusked nuts 12 passing to storage bin 34 for further processing.

The harvester 40 of Figs. 3-5 comprises a pick-up module bounded by front and rear frame parts 41 and 42,
15 respectively, having nut pick-up heads comprised of plastic discs mounted together in independently sprung suspended units from frames 41 and 42. The discs of each unit comprise radial fingers which contact the ground as shown in Figs. 3, 4 and 6 as the harvester is hauled
20 through an orchard. Wheels 45 support the nut pick-up module relative to the remainder of the harvester as it is hauled through an orchard. Wheels 45 support the nut pick-up module relative to the remainder of the harvester as it is hauled through an orchard behind a tractor via
25 adjustable draw bar connection 46. It will be appreciated that it is not essential to the trash removal or dehusking functions of the invention that the pick-up module comprise leading and trailing rows of pick-up discs and that a suitable functioning could be achieved by a single
30 row of discs or, alternately, an entirely different form of pick-up arrangement such as a sweeping or blower device.

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As shown in Fig. 3 an open concave spiral auger 46 is mounted between the pick-up heads 43 and 44. The spacing between longitudinal bars of the open concave spiral auger 46 being such as to permit entrained trash to fall through to the ground while conveying harvested nuts toward encaged lifting auger 47. The function between the auger 46 and lift auger 47 is such as to allow movement, which results from movement of the pick-up heads 43,44 as they move over uneven terrain, while still retaining the picked up nuts within the augers 46,47. As nuts and any remaining trash are lifted via auger 47 a further proportion of that trash may drop through the cage of auger 47 before what remains is deposited via chute 48 which feeds sorting table 49.

Sorting table 49 is formed from plurality of transverse rods spaced apart so as to permit trash to fall through while conveying harvested nuts towards dehusker 50. Large size items of trash can be removed from sorting table 49 by hand and discarded back to the orchard while trash that falls through table 49 is carried by a conveyer (not shown) below table 49 towards a hammermill 51. The husks 11 removed from the nuts at dehusker 50 are directed downwardly to hammermill 51 where together with trash deposited from sorting table 49 they are comminuted before being dropped back onto the orchard floor as mulch.

The nuts leaving dehusker 50 are fed into bin 52 for subsequent removal via discharge elevator 53 (see Fig. 10) or by tipping of bin 52 (Figs. 3 and 9). The harvester 40 is also supported by wheels 54 on either side of a frame supporting bin 52. Preferably wheels 54 are mounted on adjustable swing axles so that the harvester can be raised or lowered relative to the ground. Similarly, wheels 45 may be vertically adjustable relative to the pick-up

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module with the pick-up module being pivotally connected to the remainder of the harvester about pivots 55 so that the pick-up module can be pivoted upwardly by hydraulic rams to remove the module from ground contact while the
5 harvester is being ferried to and from an orchard where it is to be employed (see Fig. 4).

Referring to Fig. 5 the section view through the pick-up module omits a hood with a vertically extending divider or baffle plate which is fitted over the pick-up
10 module when in use to direct nuts removed from pick-up fingers 56 by ejector fingers 57 into the open mouth of spiral auger 46. A conveyer could be employed in place of open spiral auger 46 but the former would not have the advantageous trash removal properties of spiral auger 46.

15 Each pick-up head unit as shown in Fig. 6 of each pick-up module 43 and 44 is independently pivotally mounted to respective frames 41 and 42 (Fig. 6) of modules 43 and 44 in contact with the ground 10 as the harvester 40 traverses an orchard. It is highly desirable
20 that the discs 58 are continuously rotating as the harvester traverses the ground with fingers 56 in contact with the ground so as to continually pick-up and eject nuts and this can be assisted by weighting discs 58 with rods or bars 58' as shown in Fig. 6 to avoid slipping
25 contact and maintain rolling contact between fingers 56 and the ground.

Each unit of the pick-up heads 43 and 44 is as generally shown in Fig. 6 which is formed by eight finger wheels or discs 58 mounted as a unit with each disc or
30 disc unit being independently rotatable with respect to the others on axis 59.

It can be readily appreciated from Figs. 5 and 6 that the ejector fingers 57 maintain a constant relationship to their respective finger wheels 58, thereby continuing to

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eject nuts from between fingers 56 with the same reliability whether or not the heads 43,44 are travelling across even or uneven terrain.

Fig. 8 shows sorting table conveyor 49 formed by rods 5 disposed transversely of harvester 40 for carrying nuts 10 toward a dehusking unit 50'. As shown by Figs. 3 and 4 the harvester 40 has four dehusking units which make up the dehusker 50. Each unit 50' comprises a spiral drive 61 for feeding nuts 10 past spring biased pivotal 10 toothed arms 62 which engage the nuts 10 and tear husks 11 away from the nut shells 12 as the nuts 10 are forced slightly uphill under the action of spiral drive 61. A gap between side plate 63 and spiral drive 61 enables the husks 11 to fall through while dehusked nuts 12 continue 15 to be moved by spiral drive 61 and are ejected into bin 52. As can be seen in Fig. 8 nuts 10 are deposited from table conveyor 49 into a feed trough 64 which acts as a reservoir of nuts being fed to the dehuskers 50' so that individual nuts 10 are deposited between each loop of 20 spiral 61. By feeding one nut into each loop of spiral 61, the dehusking unit 50' can operate at maximum throughput.

An hydraulic circuit (not shown) for powering a harvester in accordance with the present invention can be 25 driven from the hydraulic power take-off of a tractor in a known manner. It is preferred that the hydraulic system (not shown) be operative to enable reversal of the pick-up head auger 46 and lift auger 47 to facilitate debris removal which may get caught between those spiral augers 30 and their respective cages from time to time. A blower fan 60 as indicated in Figs. 3 and 5 is provided toward the outboard end of pick-up head 43 to force nuts on the ground outboard of the leading edge of the pick-up module toward the opposite side of a row of trees as the

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harvester passes down one side of that row. By this means nuts which are near to the base of each tree and between each tree in a row are driven to a position ready for pick-up by the harvester 40 as it returns along the
5 opposite side of the row of trees.

Referring to Figs. 11-15 there is shown an open mesh screen conveyor 70 onto which nuts and trash are deposited from auger 47, the mesh size of the conveyor 70 being such as to prevent relatively large items of trash falling
10 through with the nuts onto sorting table 49 which feeds to dehusker 50. By selecting the mesh size of screen conveyor 70 it is possible to decant off large items of trash which are fed from auger 47 and prevent their deposition onto sorting table 49 which would merely convey
15 those large trash items together with nuts to the dehusking unit 50. Heretofore it may have been necessary to station an operator at sorting table 49 to remove the large items of trash so as to prevent their ingestion to the dehusker 50 which would only reduce the effectiveness
20 of the operation of the dehusker as it became clogged with relatively large items of trash.

Figs. 14 and 15 show plan and side elevation schematic views of a self-propelled harvester in accordance with a further embodiment of the invention in
25 which like components are numbered as in the harvester embodiment of Figs. 3 and 5. The harvester 80 comprises pickup heads 43 and 44 transversely mounted at the leading end of the harvester with those heads offset for the right hand side as shown in Fig. 14. The harvester operator
30 being seated at location 71 and having controls to steer and operate the various functions of harvester 80. In this embodiment a conveyor 54 below table 49 for carrying trash that falls through table 49 to hammermill 51 is shown in Fig. 15.

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It will be appreciated by persons skilled in the art that numerous variations and/or modifications may be made to the invention as shown in the specific embodiments without departing from the spirit or scope of the
5 invention as broadly described. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive. The applicability of the present invention to harvesting of pecans, walnuts and other nuts will be readily apparent to the addressee.

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CLAIMS:-

1. A nut harvesting apparatus comprising means for collecting nuts situate on the ground and delivering those nuts to means for substantially separating the nuts from
5 any entrained trash, means for dehusking the nuts, means for separating the husks from the remainder of the nuts and furnishing the dehusked nuts for further handling and processing.
2. A nut harvesting apparatus as claimed in claim 1
10 wherein the means for delivering comprises at least one caged conveyor for feeding nuts to said dehusking means, said at least one caged conveyor facilitating gravitational separation of entrained trash from said conveyed nuts.
- 15 3. A nut harvesting apparatus as claimed in claim 1 or 2 wherein the means for delivering nuts comprises a spiral conveyor.
4. A nut harvesting apparatus as claimed in any one of the preceding claims comprising two caged conveyors
20 upstream of the dehusking means.
5. A nut harvesting apparatus as claimed in any one of the preceding claims comprising trash and husk comminuting means.
6. A nut harvesting apparatus as claimed in any one of
25 the preceding claims comprising an open mesh or screen conveyor immediately upstream of a sorting table.
7. A nut harvesting apparatus as claimed in claim 6 wherein the open mesh or screen conveyor moves transverse to the direction of motion of nuts on the sorting table.
- 30 8. A nut harvesting apparatus as claimed in any one of the preceding claims comprising a nut collecting bin for collecting nuts downstream of the dehusking means.
9. A nut harvesting apparatus as claimed in claim 8 comprising an auger for feeding nuts out of said bin.

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10. A nut harvesting apparatus as claimed in claim 9 wherein said auger is a caged auger facilitating removal of husks and trash as said nuts are fed out of said bin.

11. A harvesting apparatus as claimed in any one of the
5 preceding claims adapted to be coupled to motive means providing hydraulic power to said harvesting apparatus.

12. A harvesting apparatus as claimed in any one of claims 1 - 10 being a self-propelled apparatus.

13. A harvesting apparatus as claimed in any one of the
10 preceding claims wherein the nut collecting and delivering means comprises a plurality of discs, each disc having a plurality of radially projecting nut gripping and retaining fingers for contacting the ground, ejector means associated with said discs, said ejector means being
15 mounted to maintain a substantially static relationship relative to the axis of associated discs.

14. A harvesting apparatus as claimed in claim 13 wherein said discs are mounted into units which are independently suspended for travel across the ground.

20 15. A harvesting apparatus as claimed in claim 13 or 14 wherein said discs are weighted to attain a ground contact pressure on said fingers to resist slipping contact between said fingers and the ground during use.

16. An apparatus as claimed in any one of claims 13-15
25 comprising fore and aft pick-up heads, each pick-up head comprising a plurality of said discs.

17. An apparatus as claimed in claim 2, 3 or 4 wherein each conveyor is reversible to facilitate removal of debris trapped between each conveyor and its respective
30 cage.

18. An apparatus as claimed in claim 4 wherein one conveyor is disposed horizontally to receive nuts from the collecting means and feed those nuts to another conveyor for lifting the nuts above said one conveyor and further
35 wherein there is a flexible coupling between said one and

- 15 -

another conveyors.

19. An apparatus as claimed in any one of the preceding claims comprising a fan for blowing nuts across the ground transverse to the direction of travel of said apparatus.

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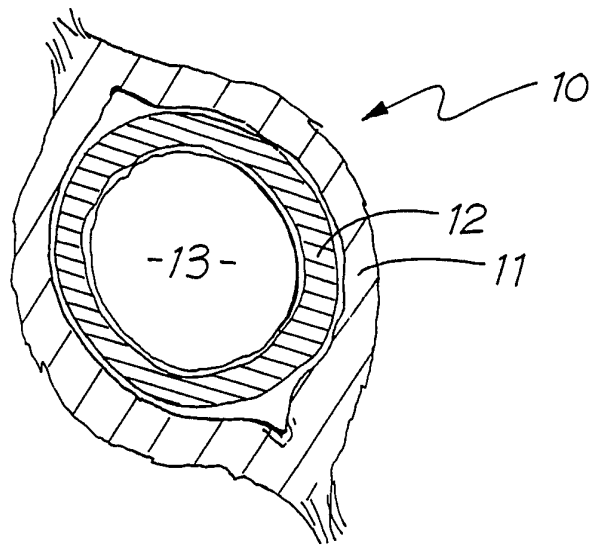
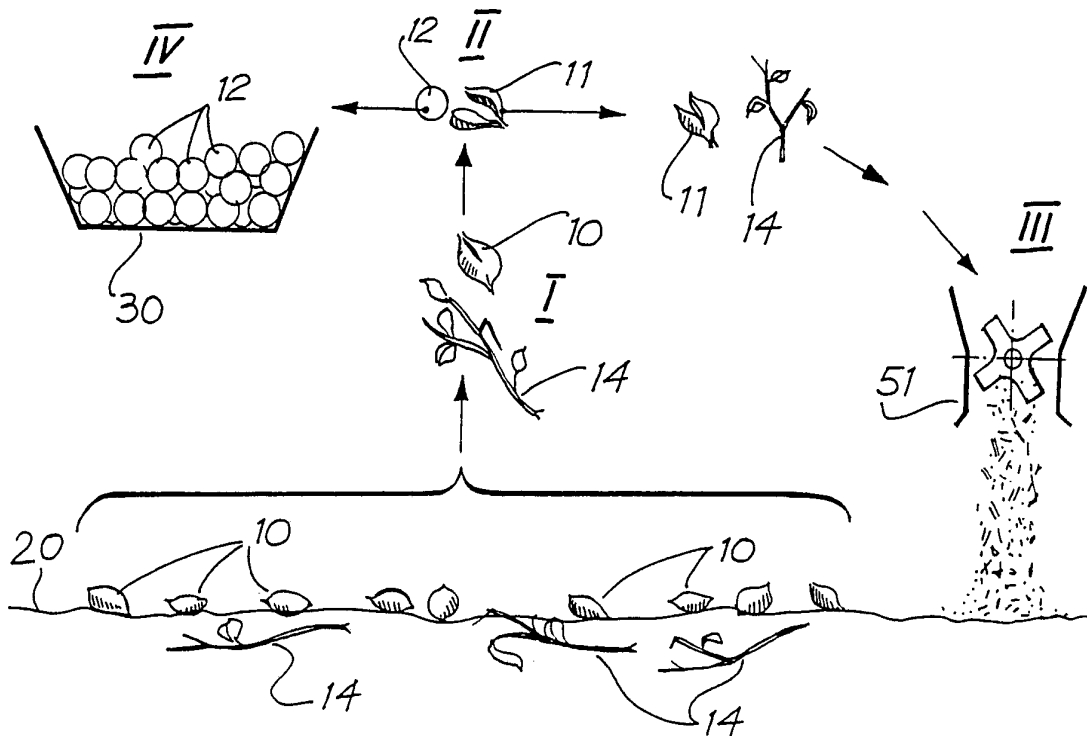
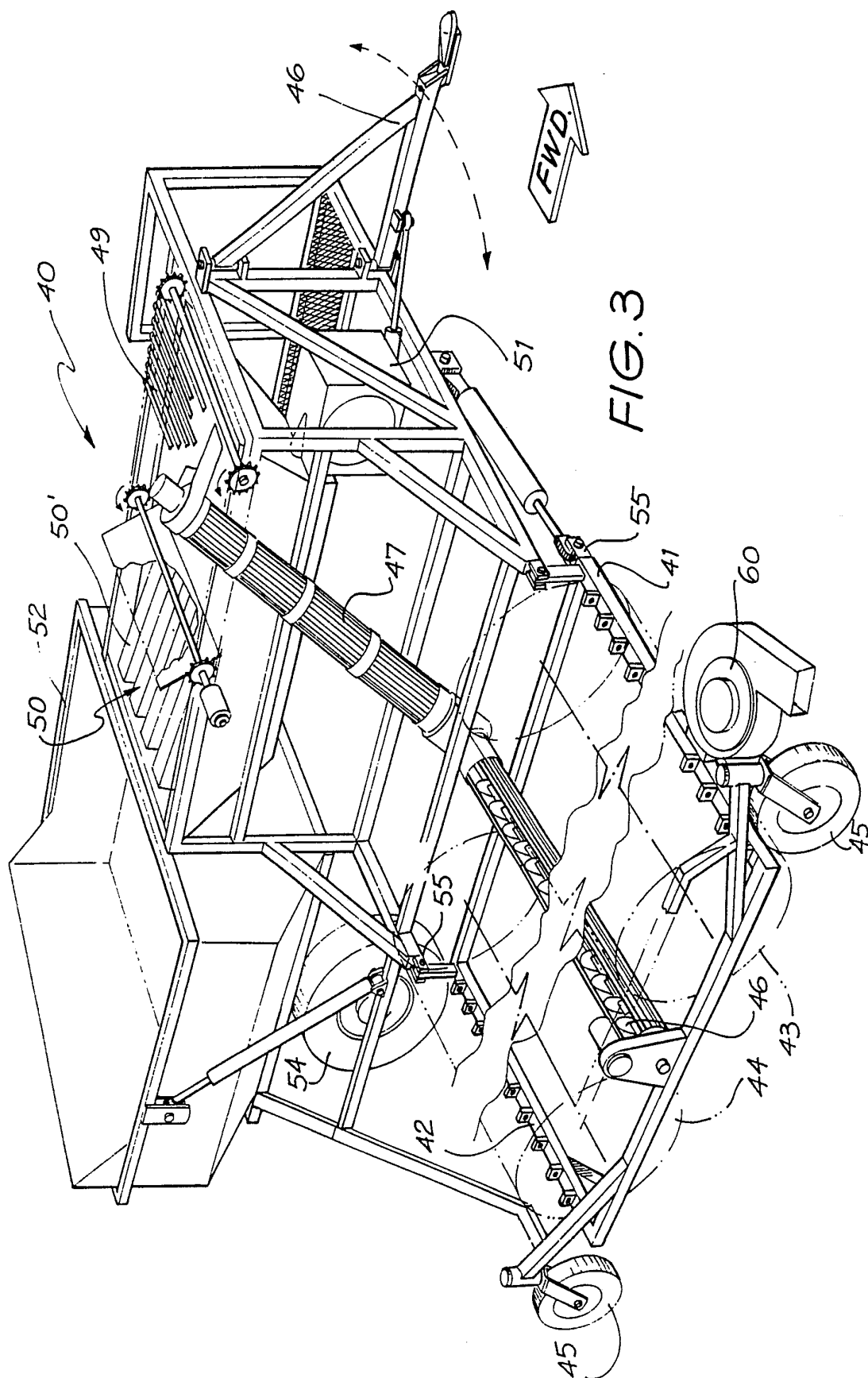


FIG. 1

FIG. 2



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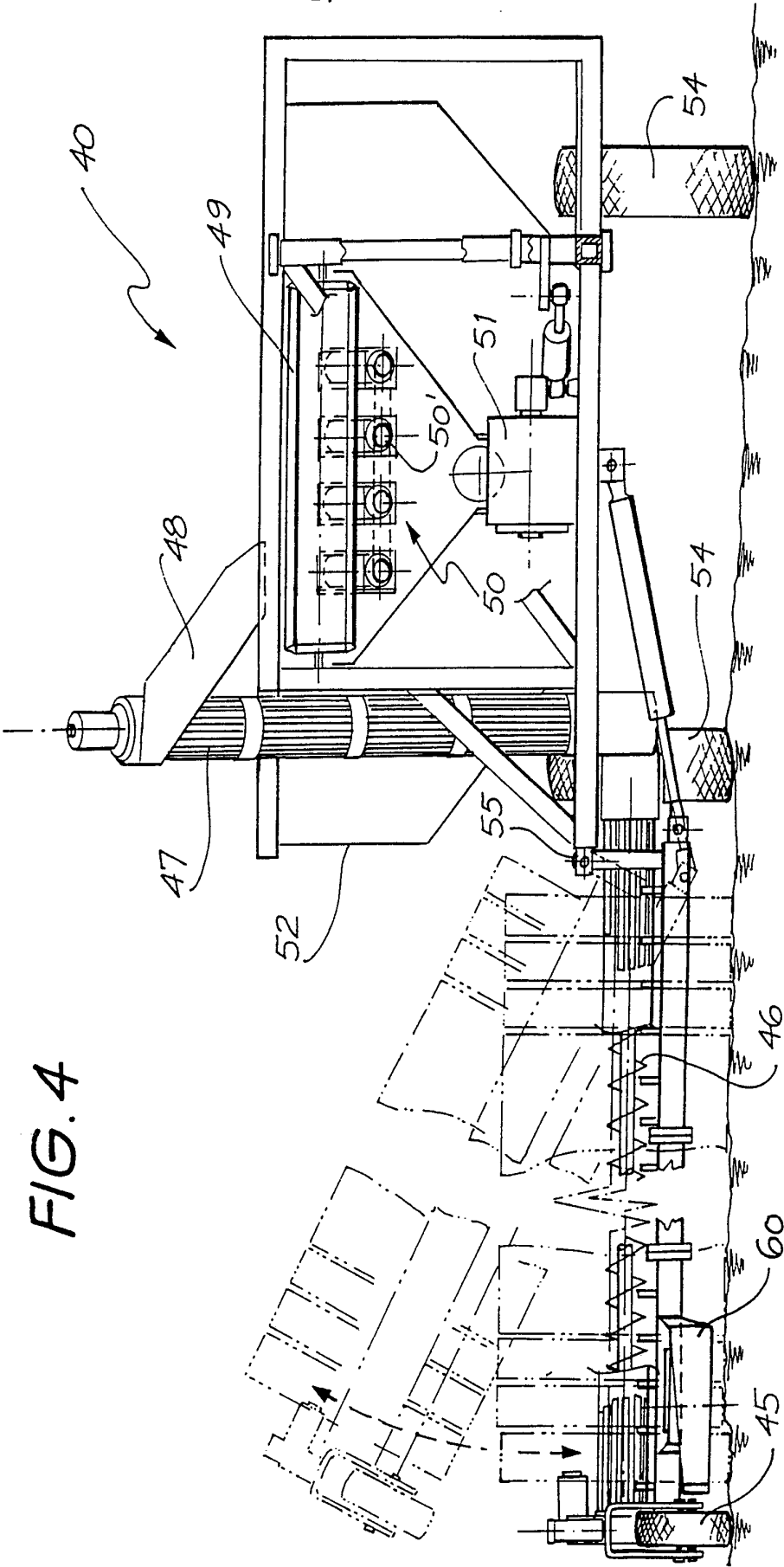
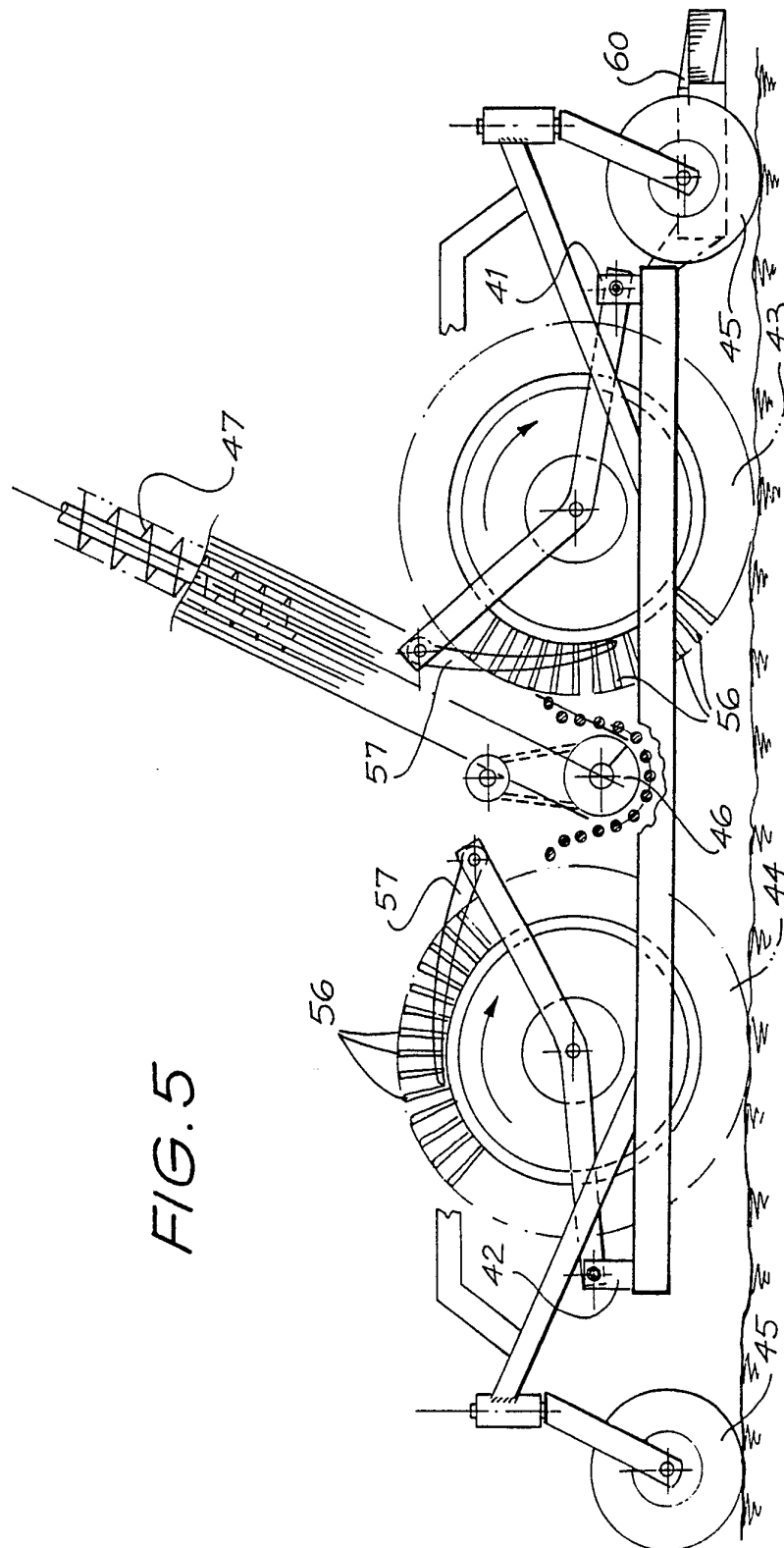


FIG. 4

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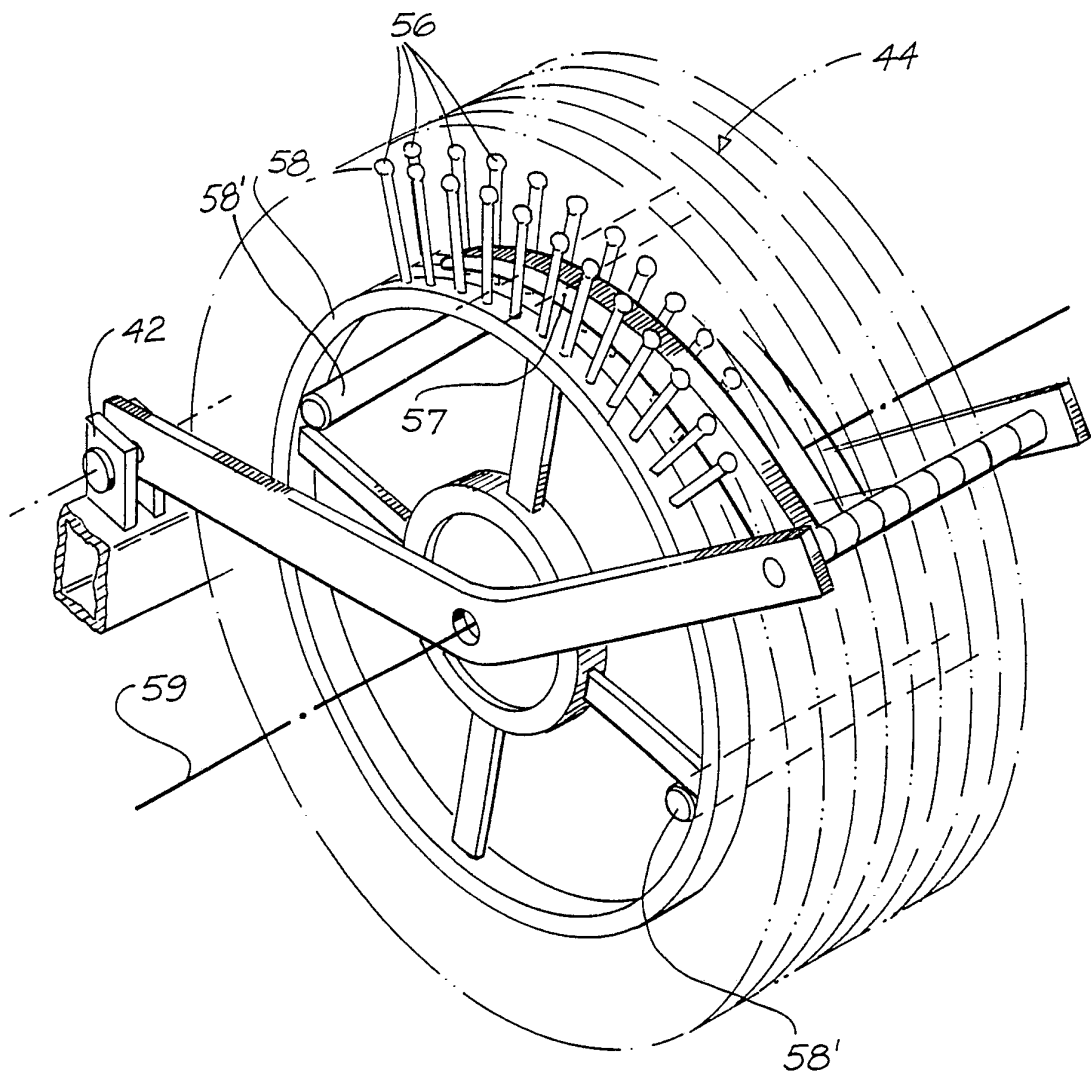


FIG. 6

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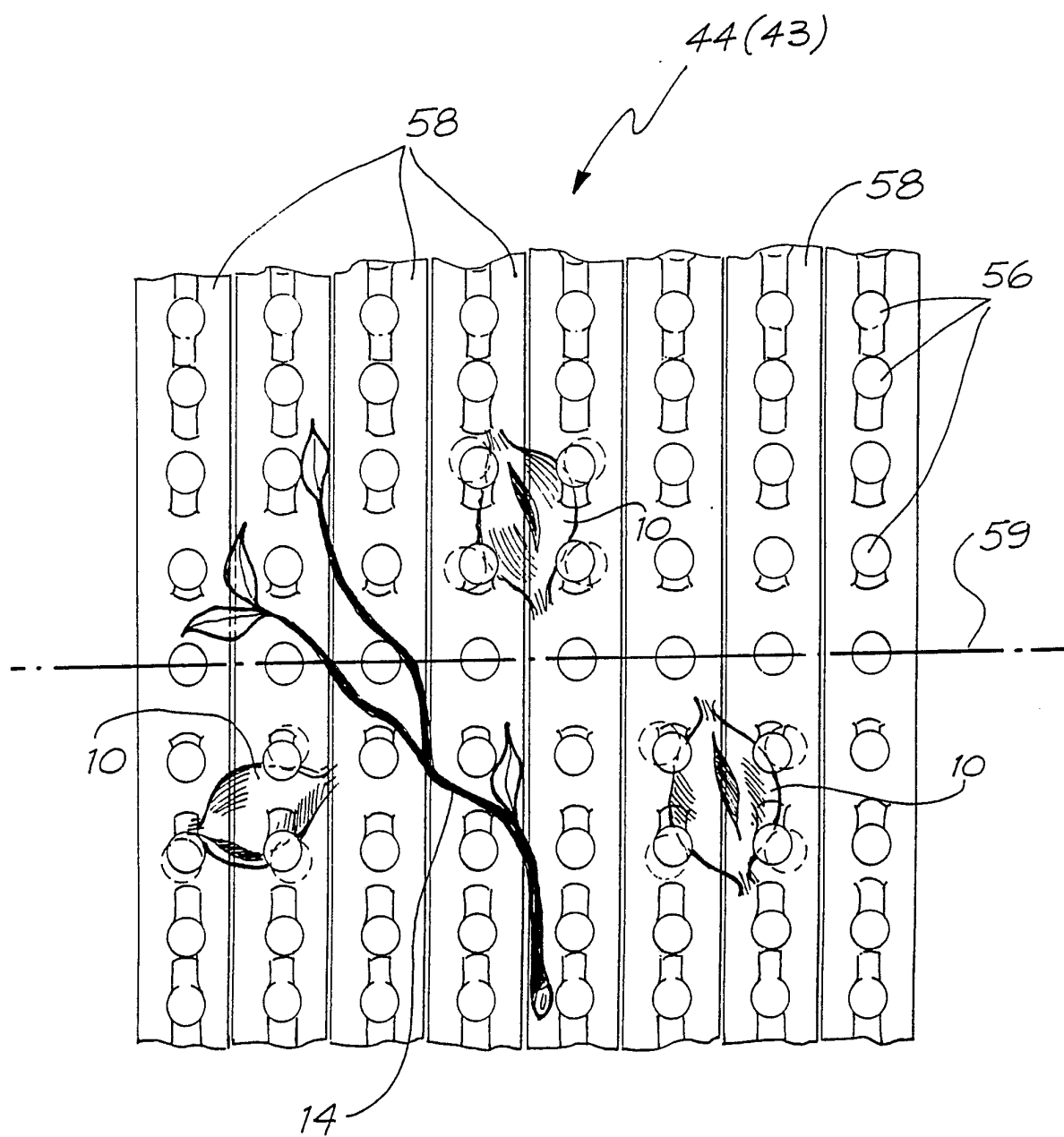


FIG. 7

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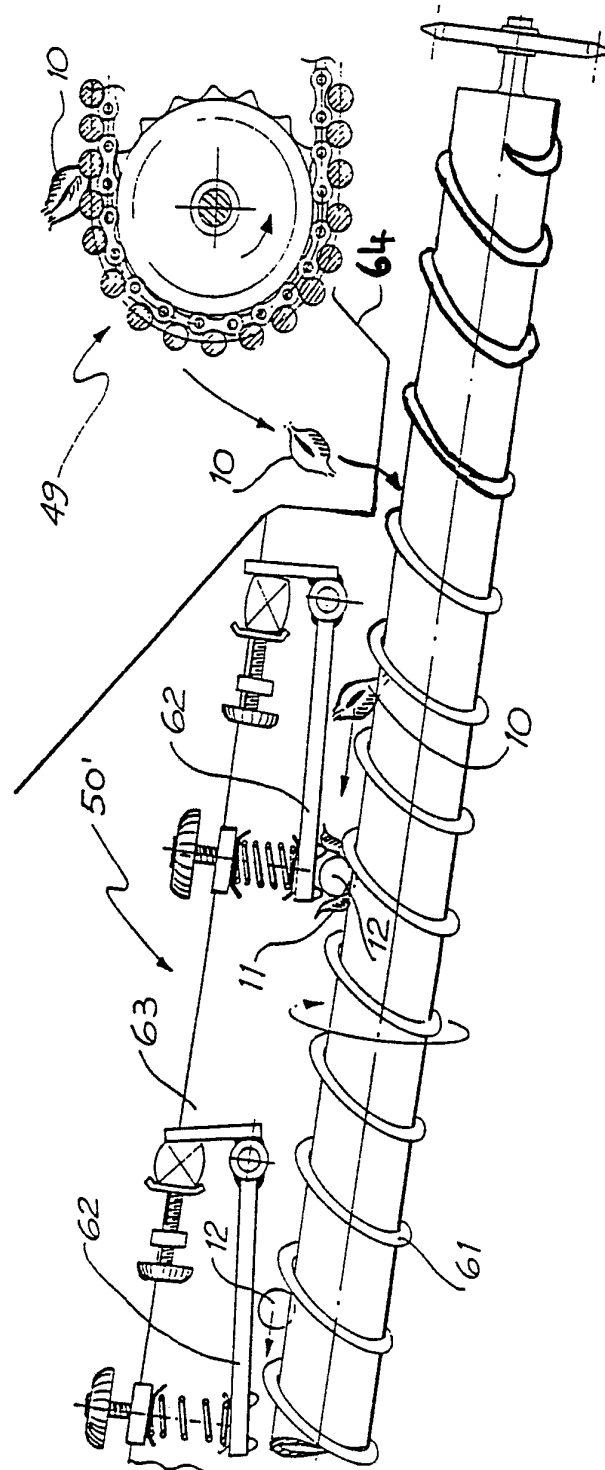
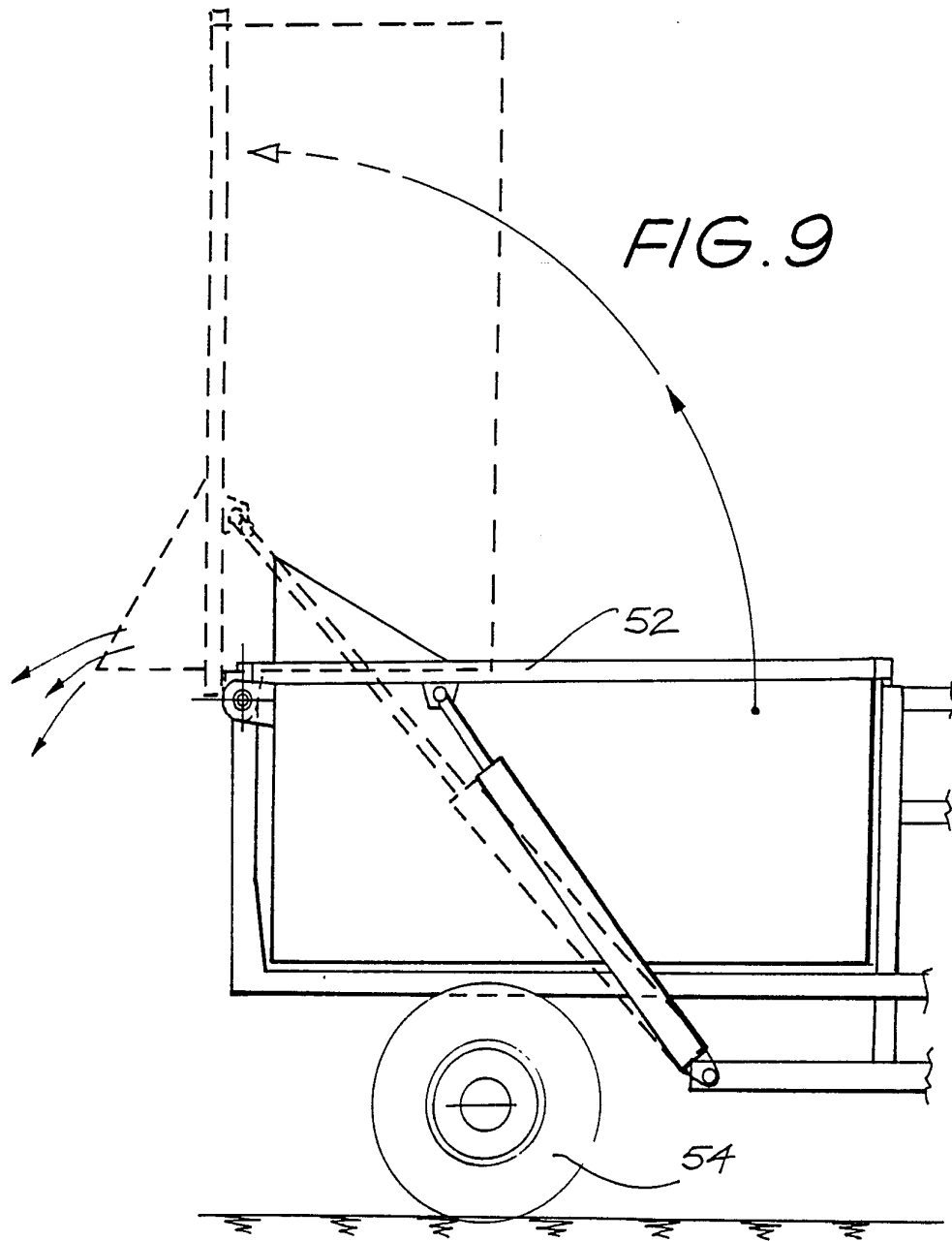
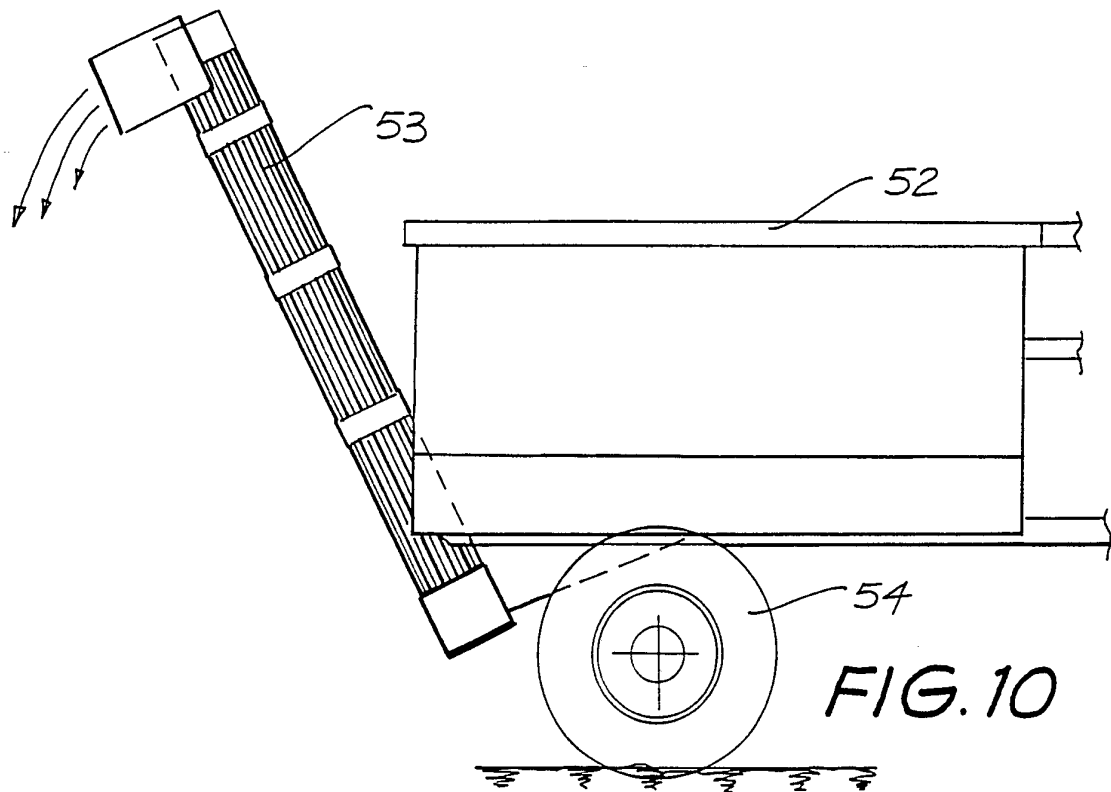


FIG. 8

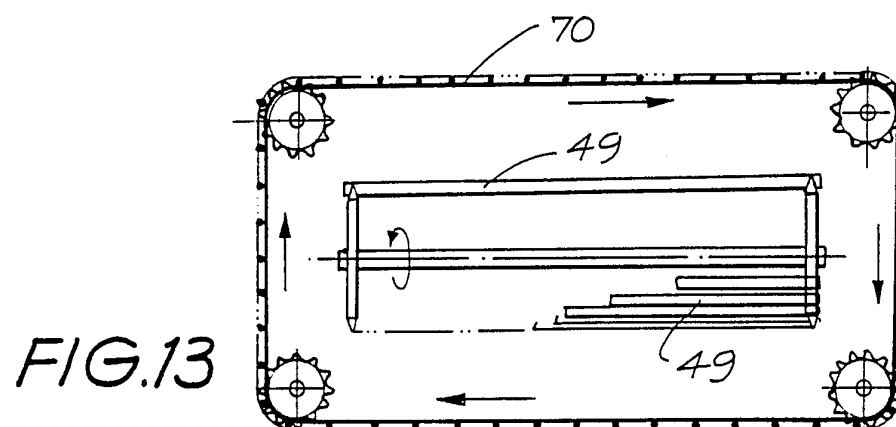
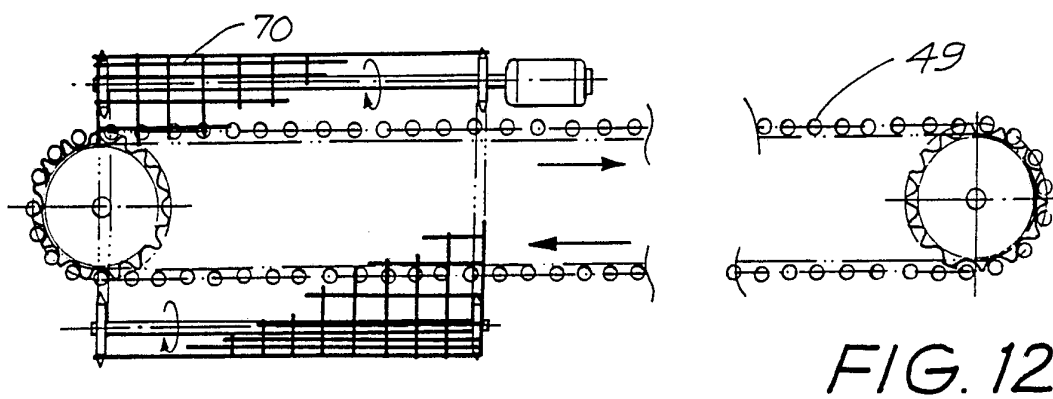
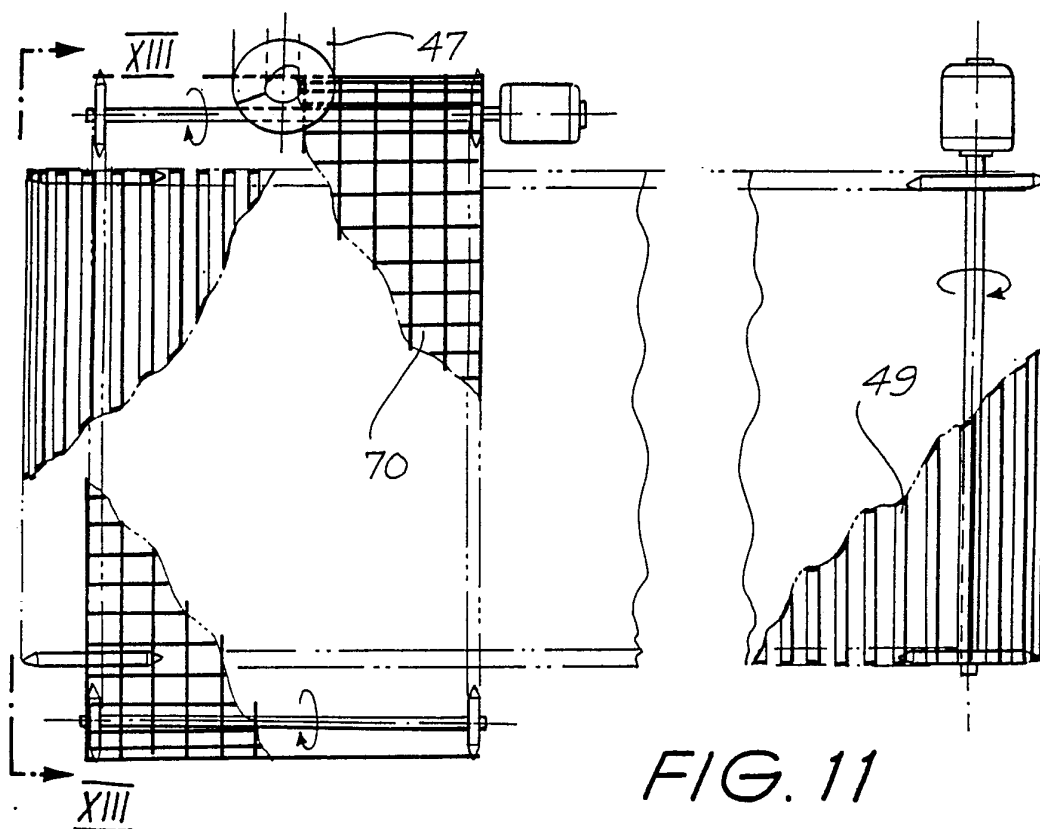
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FIG. 14

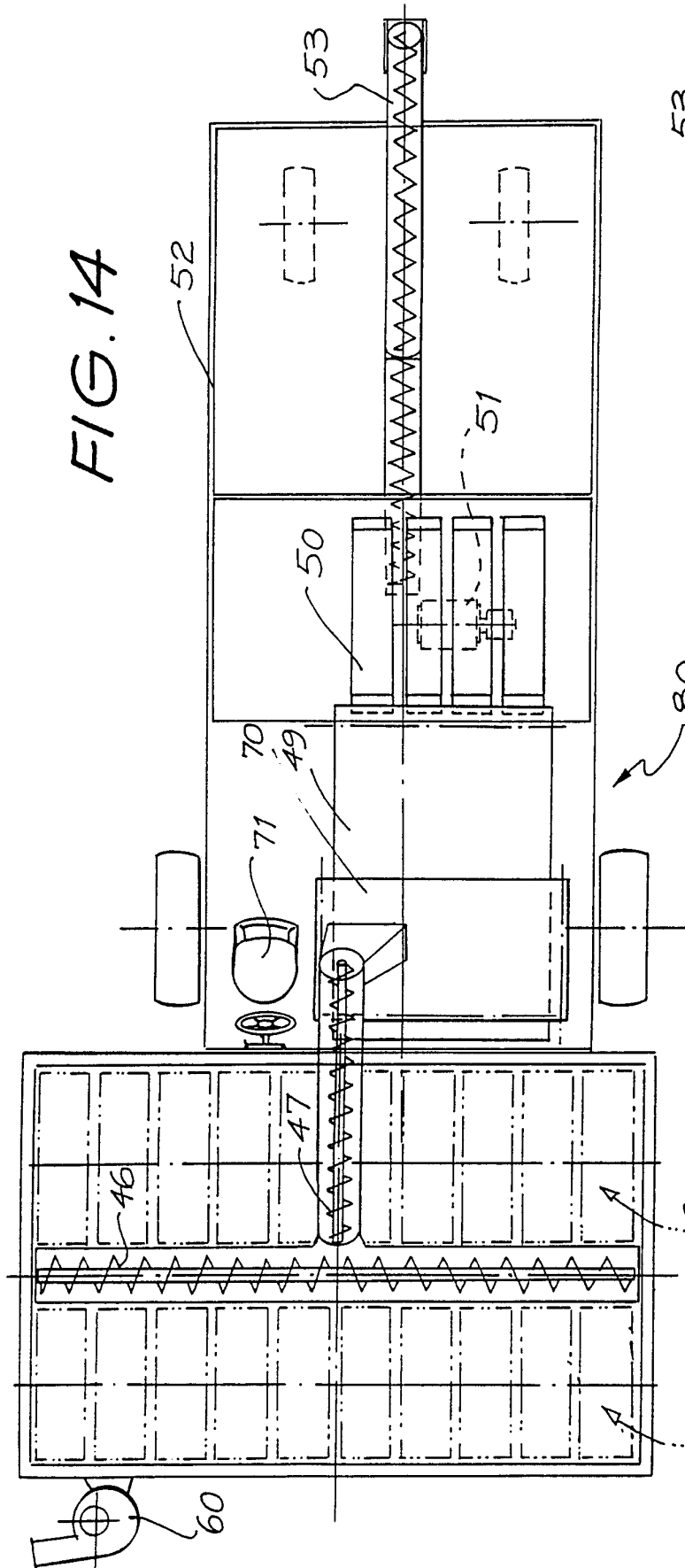
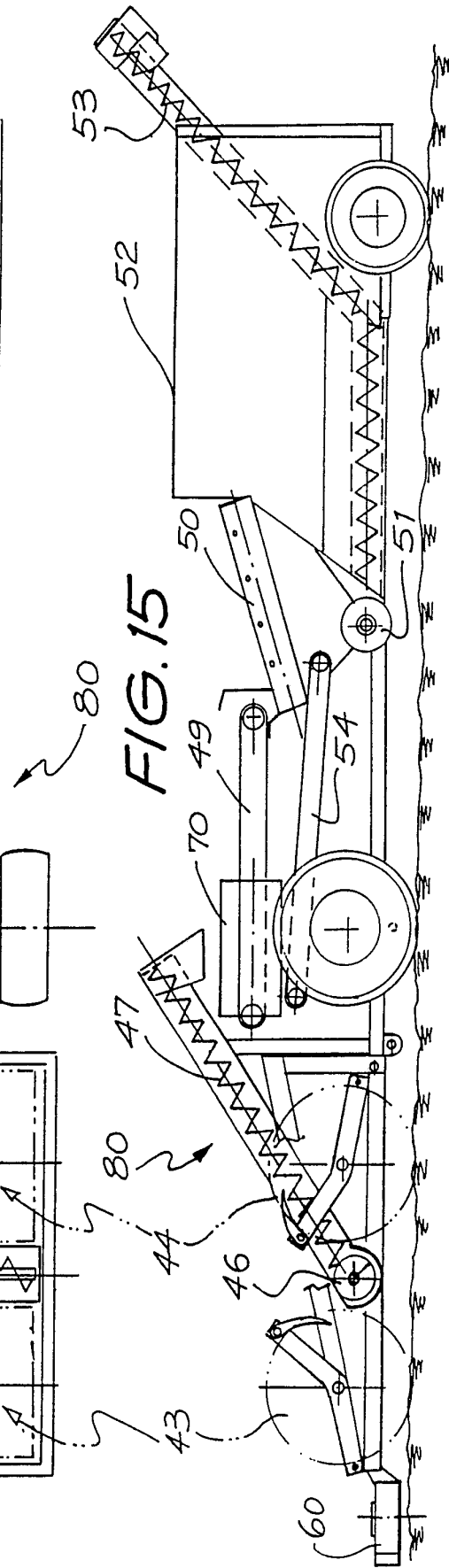
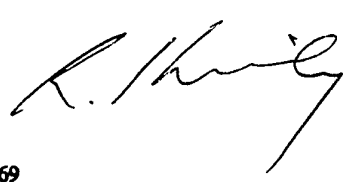


FIG. 15



A. CLASSIFICATION OF SUBJECT MATTER Int. Cl. ⁵ A01D 51/00, A23N 5/08 According to International Patent Classification (IPC) or to both national classification and IPC					
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC A01D 51/00, A23N 5/08 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU:IPC as above Electronic data base consulted during the international search (name of data base, and where practicable, search terms used) NIL					
C. DOCUMENTS CONSIDERED TO BE RELEVANT					
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.			
X Y	US,A,2679133 (AXEL O. SODERHOLM), 25 May 1954 (25.05.54) Whole document	1-12, 17-19 13-16			
X Y	US,A,2870594 (EVERETT P. LARSH), 27 January 1959 (27.01.59) Whole document	1-12, 17-19 13-16			
Y	AU,A,67012/90 (PATRICK WILLIAM BREEN, HELEN MARY BREEN), 13 June 1991 (13.06.91) Whole document, figures 4-6	13-16			
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.					
<table style="width: 100%; border: none;"> <tr> <td style="width: 30%; vertical-align: top;"> * Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed </td> <td style="width: 10%; vertical-align: top; text-align: center;"> "T" "X" "Y" "&" </td> <td style="width: 60%; vertical-align: top;"> later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art document member of the same patent family </td> </tr> </table>			* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" "X" "Y" "&"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art document member of the same patent family
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Date of the actual completion of the international search 30 September 1992 (30.09.92)		Date of mailing of the international search report 21 Oct 1992 (21.10.92)			
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No. 06 2853929		Authorized officer  R.J. KIRBY Telephone No. (06) 2832369			

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate of the relevant passages	Relevant to Claim No.
A	US,A,3107475 (CARL L. GUSTAFSON, WILLIAM H. ROEBER), 22 October 1963 (22.10.63) Nut Harvester	1
A	US,A,3591948 (THOMSON MACHINERY CO.), 13 July 1971 (13.07.91) Nut Harvester	1
A	AU,B,6014/55 (201069) (JAMES WINFIELD GARDNER), 7 July 1955 (07.07.55) Dehusking Means	1
A	GB,A,1104240 (ATSUMI NAKANO), 21 February 1968 (21.02.68) Nut Dehusker	1

INTERNATIONAL SEARCH REPORT

Information on patent family memb. -----

International application No.

PCT/AU92/00339

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report	Patent Family Member
AU 67012/90	
US 3591948	
END OF ANNEX	