



(22) Date de dépôt/Filing Date: 2000/08/03

(41) Mise à la disp. pub./Open to Public Insp.: 2002/02/03

(62) Demande originale/Original Application: 2 315 046

(51) Cl.Int./Int.Cl. *B65G 65/02* (2006.01),
B65G 61/00 (2006.01), *B60P 1/36* (2006.01),
B65G 65/16 (2006.01), *B65G 67/12* (2006.01)

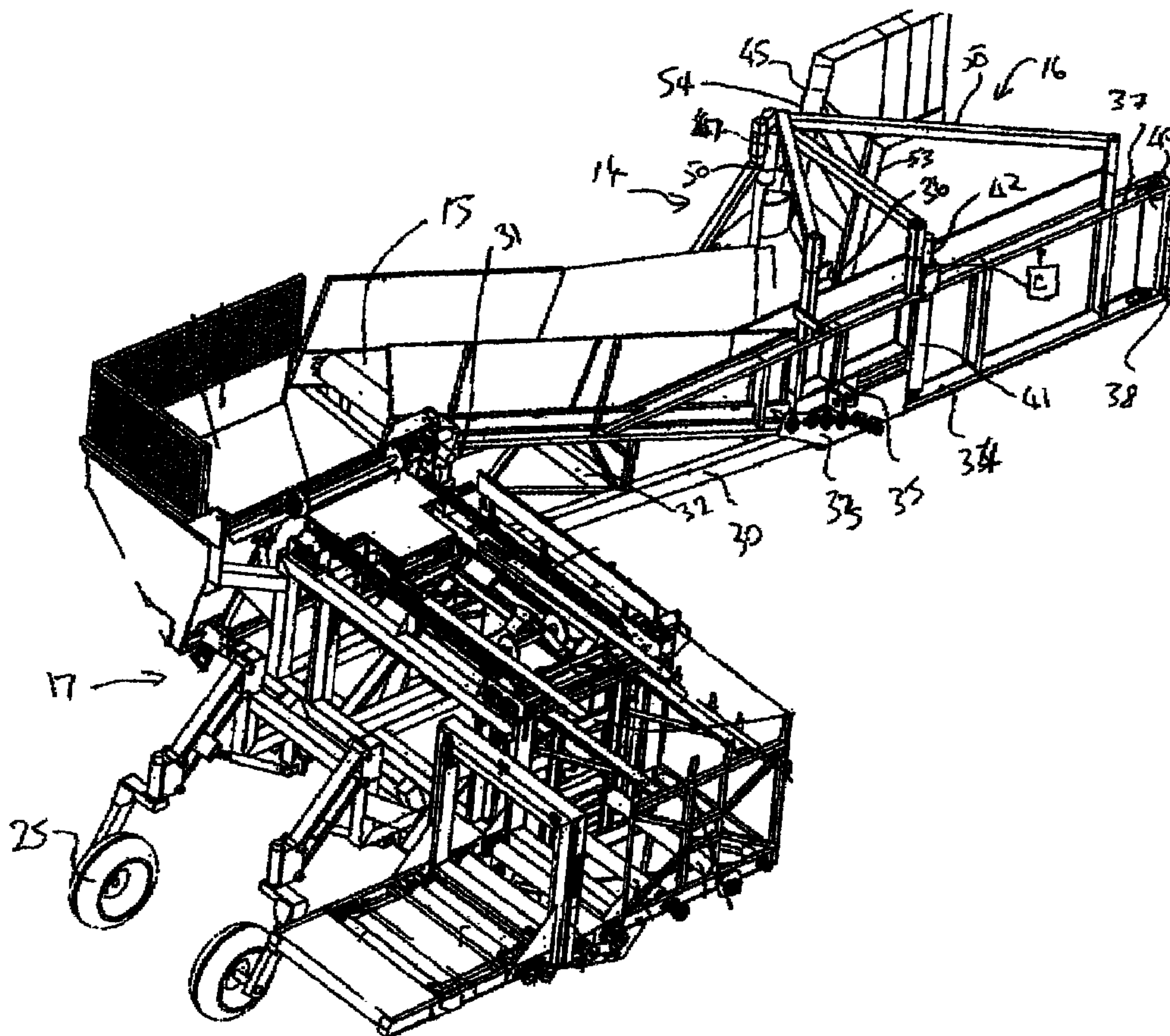
(71) Demandeurs/Applicants:
MCLEOD, JAMES A., CA;
PISONY, MURRAY, CA

(72) Inventeurs/Inventors:
MCLEOD, JAMES A., CA;
PISONY, MURRAY, CA

(74) Agent: BATTISON WILLIAMS DUPUIS

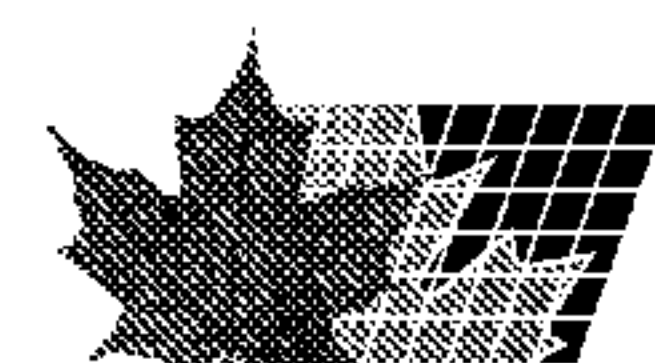
(54) Titre : APPAREIL POUR RAMASSER LES PIÈCES DE BOIS REPOSANT SUR LE SOL

(54) Title: COLLECTION OF LUMBER PIECES FROM THE GROUND



(57) Abrégé/Abstract:

An apparatus for picking lumber pieces from the ground for example for removing support lumber used during laying of a pipe line comprises a tracked vehicle to which is attached a frame carrying a transport conveyer along the side of the vehicle inclined



(57) **Abrégé(suite)/Abstract(continued):**

forwardly and downwardly toward the ground. A picking assembly is provided at the front of the conveyor and alongside the vehicle for lifting the pieces. This includes a front picking roller and a movable outer side blade which is inclined outwardly to the outer side of the picking roller and can be pivoted inwardly to close around the front of the picking roller to squeeze the lumber pieces to force them onto the conveyor.

ABSTRACT

An apparatus for picking lumber pieces from the ground for example for removing support lumber used during laying of a pipe line comprises a tracked vehicle to which is attached a frame carrying a transport conveyer along the side of the vehicle inclined forwardly and downwardly toward the ground. A picking assembly is provided at the front of the conveyer and alongside the vehicle for lifting the pieces. This includes a front picking roller and a movable outer side blade which is inclined outwardly to the outer side of the picking roller and can be pivoted inwardly to close around the front of the picking roller to squeeze the lumber pieces to force them onto the conveyer.

COLLECTION OF LUMBER PIECES FROM THE GROUND

This invention relates to an apparatus for collecting lumber pieces particularly but not exclusively those known as skids used in laying pipe-line.

5 BACKGROUND OF THE INVENTION

In laying pipe such as in a gas or oil pipe line it is conventional that lengths of the pipe are supported end to end on stack lumber pieces known as "skids" so that the pipe lengths can be held at a required height to be supported and aligned end to end for welding of the lengths prior to feeding of the completed
10 welded length into a trench adjacent to the stacks.

Thus the pipe lengths are initially arranged end to end and are properly aligned by arranging sufficient of the lumber pieces to support the pipe length at the required height. With the pipe lengths so supported, the welding is carried out to form the lengths into a continuous length for laying in the ground.

15 The pipe is then lifted from the supporting stacks and deposited in a continuous action along its length into the ground by a train of tracked vehicles at spaced positions along the length, each carrying suitable operation elements so that the continuous pipe length can be fed from the supported position into the trench. At some point during laying or after the pipe has been laid, it has been necessary to
20 remove the lumber pieces from the stacks and to collect the lumber pieces into a transport container for removal from the site and preferably for re-use at a further location along the pipeline.

A the present time the lumber pieces which are conventionally either four or five feet in length and 6 inches by 4 inches in cross section are lifted manually and handled manually for stacking onto a transport container. This manual process is expensive and time consuming since it requires a gang of laborers
5 working hard and commanding relatively high wage rates. In many cases that stack has been disturbed so that the pieces are strewn and in some cases the pieces are compressed into the ground by the tracks of the passing vehicles.

While this step relatively minor one in the process of laying the pipe line, it constitutes a significant expense and therefore provides a significant
10 opportunity for manufacturer of an effective machine which will carry out this step while eliminating or reducing the manual labor involved.

In US patent 5,934,861 issued August 10th 1999 to one of the present inventors, which corresponds to Canadian Application 2,241,682 published 26th February 1999, a first proposal was made for a machine which picks up the pieces
15 and conveys them to a transport truck to one side of the machine. While this proposal included a number of basic principles which are used herein and which form the basis of this invention, yet further improvements have been made herein to provide a machine with improved operation and ergonomics

SUMMARY OF THE INVENTION

20 It is a one object of the invention in accordance with a first aspect to provide an improved picking assembly for an apparatus of this type.

In accordance with a first aspect of the invention there is provided an apparatus for collecting elongate pieces, for example from a stack or pile of randomly oriented pieces comprising;

5 a frame arranged for attachment to a vehicle for moving in a direction of working movement across the ground between stacks on the ground of the elongate to be collected;

a picking assembly on the frame for lifting the elongate pieces from the ground;

10 a transport conveyer on the frame having a forward end for receiving the elongate pieces from the picking assembly and arranged to transport the elongate pieces rearwardly from the picking assembly;

the picking assembly comprising a first and a second side wall each on a respective first and second side of the forward end of the conveyer and extending generally forwardly therefrom for receiving the elongate pieces in front of the forward
15 end;

at least the second of the side walls being pivotal about a substantially upright axis at the second side of the forward end from a first collecting position extending forwardly and outwardly of the second side to a second confining position extending forwardly and inwardly of the second side;

20 the second side wall including a first portion which, in the first collecting position, extends forwardly and outwardly and a second portion which extends from a forward end of the first portion generally forwardly;

the first portion forming an inclined blade which is inclined from its bottom edge upwardly and rearwardly.

Preferably the first portion is arranged such that the bottom edge thereof in the confining position projects to a position inwardly of the respective side
5 of the transport conveyer such that the pieces can be squeezed by the side walls when moved to the confining position to a width less than that of the transport conveyer and can be released when moved out of the confining position to travel along the transport conveyer.

Preferably the side walls are arranged such that in the confining
10 position a forward end of the second side wall is closely adjacent a forward end of the first side wall so as to fully enclose and squeeze the collected pieces of the stack.

Preferably the first side wall includes a continuous belt having an inwardly facing inner run which stands substantially vertically upwardly and moves
15 horizontally along the first side wall, the belt having a belt drive operable for moving the inner run both forwardly and rearwardly for aligning the pieces generally along the conveyer. The belt can thus be used by the operator when required if the stack is resisting orientation of the pieces to push ends of individual pieces either forward or backward to start the orientation process. However in some cases the belt can be
20 omitted and the orientation effected solely by the co-operation between the two side walls.

Preferably the first side wall is fixed in position extending generally forwardly of the direction of movement. This arrangement is particularly preferred

because it requires drive to only one side wall and since the fixed side wall can be directed in the forward direction of movement by the driver to position it along side the stack of pieces. However the same characteristics as defined above can also be used with a device in which both side walls pivot inwardly to, in effect, clamp the
5 stack of pieces for orientation and separation of the pieces into individual elements for transport along the conveyer.

Preferably the picking assembly includes a row of one or more parallel spiked picking rollers each in front of another and each rotatable about a respective axis across the forward end of the conveyer.

10 According to a second aspect of the invention there is provided an apparatus for collecting elongate pieces comprising;

a frame arranged for attachment to a vehicle for moving in a direction of working movement across the ground between stacks on the ground of the elongate to be collected;

15 a picking assembly on the frame for lifting the elongate pieces from the ground;

a transport conveyer on the frame having a forward end for receiving the elongate pieces from the picking assembly and arranged to transport the elongate pieces rearwardly from the picking assembly;

20 the picking assembly comprising a first and a second side wall each on a respective first and second side of the forward end of the conveyer and extending generally forwardly therefrom for receiving the elongate pieces in front of the forward end;

at least the second of the side walls being pivotal about a substantially upright axis at the second side of the forward end from a first collecting position extending forwardly and outwardly of the second side to a second confining position extending forwardly and inwardly of the second side;

5 the side walls being arranged such that in the confining position a forward end of the second side wall is closely adjacent a forward end of the first side wall so as to fully enclose and squeeze the collected pieces;

at least the second side including a portion thereof which is arranged such that a bottom edge thereof in the confining position projects to a position
10 inwardly of the respective side of the transport conveyer such that the pieces can be squeezed by the side walls when moved to the confining position to a width less than that of the transport conveyer and can be released when moved out of the confining position to travel along the transport conveyer.

BRIEF DESCRIPTION OF THE DRAWINGS

15 In the accompanying drawings, which illustrate an exemplary embodiment of the present invention:

Figure 1 is an isometric view from the rear and one side of an apparatus including a pick-up section according to the present invention. Parts of a stacking unit are shown in the Figure but do not form part of the invention and are
20 not described.

Figure 2 is a top plan view of the apparatus of Figure 1.

Figure 3 is a top plan view of the apparatus on an enlarged scale relative to that of Figure 2 and showing only the pick-up and conveyer section in a closed position of the pick-up section.

DETAILED DESCRIPTION

5 The apparatus comprises a conventional track vehicle 10 having a cab and drive assembly (not shown) and tracks 12 by which the vehicle can move across the ground in a direction of working movement indicated at 13.

 The apparatus further includes a picking and conveyer assembly 14 having a main conveyer 15 attached to and arranged rearwardly of a picker 16. At
10 the rear of the conveyer 15 is provided a stacking assembly generally indicated at 17. The frame carrying these elements is attached to the vehicle by a four point hitch 23 at the rear of the vehicle and by a coupling assembly generally indicated at 24 at the side of the vehicle and inwardly of the picking and conveyer assembly 14. The frame is carried on a pair of rear wheels 25 projecting rearwardly from the frame.

15 The apparatus is arranged to be moved by the vehicle 10 from place to place for picking up pieces of lumber and primarily lumber stacks used as skids for supporting a pipeline during initial welding and prior to insertion of the pipeline into the ground. When a collection of pieces is encountered, the picking assembly 16 is operated to collate the pieces so that the pieces can move in groups or sequentially
20 along the conveyer 15 for subsequent handling. The vehicle is operated by a driver who moves the vehicle forwardly and operates the picking assembly.

 The conveyer 15 includes a conveyer belt having a forward end 26 and a rear end 27 and is mounted on a plurality of support rollers 28 so that an upper run

of the belt carries the pieces rearwardly and upwardly from the forward end 26 into the unscrambling hopper 18 at the rear end 27.

In front of the conveyer belt is provided a plurality of picking rollers 28 arranged in a row in front of the front roller of the conveyer. In the embodiment
5 shown there are five picking rollers but it will be appreciated that this number can be increased or decreased in accordance with the aggressiveness of the picking action required. Each picking roller comprises a transverse shaft together with a plurality of longitudinally spaced picking discs. The picking discs have angularly spaced spikes so that reverse rotation of the rollers tends to lift the pieces upwardly and onto the
10 top of the rollers for carrying the pieces rearwardly onto the belt. The discs of each shaft are arranged so that they interleave with the discs of the next adjacent shaft. In this way the shafts and the discs combine to form a grid or grate over which the pieces pass while allowing dirt and other materials to fall through the grid that is between the shafts and in between the discs.

15 The shafts are arranged so that the diameters increase from the smallest diameter at the front picking roller through to a larger diameter at the rear picking roller. The discs have a substantially common outside diameter so that the spikes of the discs of the first picking roller are larger and therefore more aggressive than the spikes of the last picking roller.

20 The picking rollers are mounted on the support frame so that they are arranged at or only slightly above ground level so as to prevent the pieces from passing underneath the picking rollers. The front picking rollers therefore act to lift the pieces off the ground or in some cases out of embedded position within the

ground by the spikes of the disc engaging into the pieces and lifting them upwardly onto the top of the rollers for movement rearwardly onto the conveyer.

The conveyer is mounted on a frame section of the main frame having a first side 30 and a second side 31. The frame sides are interconnected by transverse beams 32 to form a rigid frame structure holding the frame sides at a fixed spacing each on a respective side of the conveyer. The frame sides define support plates 32 for receiving the bearings of the rollers 28 and the picking rollers 29. The bottom of the side walls is defined by a horizontal skid plate 33 which engages the ground and slides along the ground to locate the side wall and thus the picking section at ground level for engaging the pieces on the ground. The side wall 30 includes mounting lugs 35 and 36 for receiving support elements of a coupling 24 which connects the side of the vehicle to the sidewall 30. The coupling element 24 includes a link which allows the frame to pivot inwardly and outwardly about a horizontal axis parallel to the direction 13 so that the picking section can pivot outwardly and upwardly or outwardly and downwardly to accommodate changes in ground contour. In addition the angle of the bottom skid 34 about a horizontal pivot axis transverse to the direction 13 can be changed by actuating the four point hitch connection 23 and/or by lifting the linkage 24.

The pickup section 16 includes a first fixed side wall 37 which forms an extension of the side wall 30 of a conveyer and projects directly forwardly therefrom to a front edge 38. Thus the side wall 37 of the pickup is directed along the line of motion 13 so that it can be moved by forward movement of the vehicle to a position along one side of a pile of the pieces to be collected

An inside face of the side wall 37 is defined by a belt 39 carried on rollers 40 and 41 and driven by a motor 42. The rollers stand vertical within the side wall 37 thus defining the belt 39 as the inside surface of the wall which can thus face and contact pieces within the pickup 16. The motor 42 is actuated by a control C shown schematically so that the motor can be driven in a forward direction and reverse direction thus causing movement of the belt in a direction forwardly and rearwardly respectively of the direction 13. The belt can thus be actuated by the driver of the vehicle who can see the pieces within the pickup area and can see how those pieces are oriented thus selecting a direction of movement of the belt to reorient the pieces to best move them to a position for lifting by the pickup rollers 29 for forwarding along the conveyer. In some cases the pieces are overlying and disorganized so that they can tend to jam within the opening area of the conveyer and thus a selection of one of the direction of movements or indeed operation in both forward and rearward movements alternately can cause the pieces to become reoriented so that one end is clearly in advance of the other to allow that piece to enter onto the conveyer.

On the other side of the pickup 16 is provided a movable side wall 44. This includes a first wall portion 45 and a second wall portion 46 at the forward outer end of the portion 45. The portions 45 and 46 are connected rigidly and both are pivotable about a vertical post 47 operated by a cylinder 48. The post 47 is mounted on a support element 49 carried on the side wall 31 at the forward end thereof. The mounting 49 includes a series of transverse braces 50 which extend across from posts on the side wall 30 so as to maintain the post 47 vertical and in fixed position.

The post is located at a position spaced outwardly and forwardly from the forward end of the side wall 31 that is at the first pickup roller 29.

The forward most part of the side wall 31 includes a top edge 51 which is located outwardly of the bottom edge so that the forward most part is inclined
5 upwardly and outwardly toward the top edge 51. This top edge extends rearwardly to a point 52 where it intersects with the vertical side wall 31 at a position partway along the conveyer.

The first portion 45 of the side wall 44 is also inclined upwardly and outwardly so that it has a bottom edge 53 which is in advance of the top edge 54.
10 This forms in effect a blade arrangement similar to that of a bulldozer with a leading front edge which scrapes over the ground surface in the forward movement of the pickup section.

In the open position of the pickup shown in Figure 2, the first portion 45 is thus inclined forwardly and outwardly to act in effect as a blade projecting to one
15 side of the conveyer and scraping material toward the conveyer for picking up by the pickup rollers onto the conveyer. Thus any individual pieces can simply enter the mouth defined by the pickup section and are diverted inwardly and rearwardly by the inclined blade 45 to the conveyer. The outer portion 46 in this outer position extends directly forwardly parallel to the side wall 40.

20 In a situation where a number of pieces have simultaneously entered the pickup section, for example, in a disorganized pile of the pieces, in some cases the pieces become oriented simply by their cooperation with the inclined blade 45. However in other cases the pile is sufficiently disorganized and tangled that it cannot

simply become reoriented by the engagement with the blade 45. In this situation the movable side wall 44 is moved to a position shown in figure 3 in which the side wall 44 is moved inwardly by actuation of the cylinder 48 to a position in which a front edge 53 of the outer portion 46 is located at or adjacent the front roller 40 of the side wall 37. This acts to enclose the pieces between the blade 45 and the belt 39. This squeezing action, which may take a number of strokes of the cylinder to be completed as the pieces become more organized, reduces the volume within which the pile is located thus tending to push the ends of the pieces forwardly and rearwardly acting to tend to align the pieces within the smaller volume between the closed sidewalls. At the same time the closing action tends to lift the pieces since they slide up the inclined wall 45. The volume of the pile is squeezed so that it has a width slightly less than that of the conveyer thus allowing the squeezed and more oriented pile to enter onto the conveyer over the pickup rollers 29. It will be noted that as shown in Figure 3, the bottom edge of the blade 45 is located inwardly of the side of the conveyer so that it tends to squeeze the pieces inwardly to a position inward of the side wall 31 of the conveyer. The rearmost edge 45A of the side wall blade 44 is spaced slightly inwardly from the adjacent bottom edge of the side wall portion of the side wall 31. The inclination of the forward portion of the side wall to the top edge 52 is at as similar angle to the inclination of the blade so that any lifted pieces can slide from the blade 45 onto the side wall 31 at the inclined portion so that they can be moved rearwardly and then drop onto the conveyer by sliding down the inclined portion of the side wall.

While the pieces are enclosed within the smaller volume shown in Figure 3, the belt 39 can be operated forwardly and/or rearwardly to assist in aligning the pieces while squeezed into the pile within the smaller volume. In this way substantially any pile of pieces, regardless of their tangled and transverse
5 orientations can be reoriented into a small enough and narrow enough volume so that they can be transported either one at a time or as a part or complete pile rearwardly along the conveyer.

In practice, therefore, in some cases the pieces are somewhat separated along the conveyer and in other cases, the pieces are arranged in
10 overlying tangled pattern on the conveyer as they move rearwardly along the conveyer.

The stacking unit generally indicated at 17, some parts of which are visible in Figures 1 and 3, are the subject of the above application from which the present application is divided and are not part of the subject matter of this
15 application so that they will not be described herein

While one embodiment of the present invention has been described in the foregoing, it is to be understood that other embodiments are possible within the scope of the invention. The invention is to be considered limited solely by the scope of the appended claims.

CLAIMS:

1. Apparatus for collecting elongate pieces comprising;
 - a frame arranged for attachment to a vehicle for moving in a direction of working movement across the ground between stacks on the ground of the
5 elongate to be collected;
 - a picking assembly on the frame for lifting the elongate pieces from the ground;
 - a transport conveyer on the frame having a forward end for receiving the elongate pieces from the picking assembly and arranged to transport the
10 elongate pieces rearwardly from the picking assembly;
 - the picking assembly comprising a first and a second side wall each on a respective first and second side of the forward end of the conveyer and extending generally forwardly therefrom for receiving the elongate pieces in front of the forward end;
 - 15 at least the second of the side walls being pivotal about a substantially upright axis at the second side of the forward end from a first collecting position extending forwardly and outwardly of the second side to a second confining position extending forwardly and inwardly of the second side;
 - the second side wall including a first portion which, in the first collecting
20 position, extends forwardly and outwardly and a second portion which extends from a forward end of the first portion generally forwardly;
 - the first portion forming an inclined blade which is inclined from its bottom edge upwardly and rearwardly.

2. The apparatus according to Claim 1 wherein the first portion is arranged such that the bottom edge thereof in the confining position projects to a position inwardly of the respective side of the transport conveyer such that the pieces can be squeezed by the side walls when moved to the confining position to a width less than that of the transport conveyer and can be released when moved out of the confining position to travel along the transport conveyer.

3. The apparatus according to Claim 1 wherein the side walls are arranged such that in the confining position a forward end of the second side wall is closely adjacent a forward end of the first side wall so as to fully enclose and squeeze the collected pieces.

4. The apparatus according to Claim 1 wherein the first side wall includes a continuous belt having an inwardly facing inner run which stands substantially vertically upwardly and moves horizontally along the first side wall, the belt having a belt drive operable for moving the inner run both forwardly and rearwardly for aligning the pieces generally along the conveyer.

5. The apparatus according to Claim 4 wherein the first side wall is fixed in position extending generally forwardly of the direction of movement.

6. The apparatus according to Claim 1 wherein the picking assembly includes a spiked picking roller rotatable about an axis across the forward end of the conveyer.

7. The apparatus according to Claim 6 wherein the picking assembly includes a row of parallel spiked picking rollers each in front of another and each rotatable about a respective axis across the forward end of the conveyer.

8. Apparatus for collecting elongate pieces comprising;

a frame arranged for attachment to a vehicle for moving in a direction of working movement across the ground between stacks on the ground of the elongate to be collected;

5 a picking assembly on the frame for lifting the elongate pieces from the ground;

a transport conveyer on the frame having a forward end for receiving the elongate pieces from the picking assembly and arranged to transport the elongate pieces rearwardly from the picking assembly;

10 the picking assembly comprising a first and a second side wall each on a respective first and second side of the forward end of the conveyer and extending generally forwardly therefrom for receiving the elongate pieces in front of the forward end;

at least the second of the side walls being pivotal about a substantially
15 upright axis at the second side of the forward end from a first collecting position extending forwardly and outwardly of the second side to a second confining position extending forwardly and inwardly of the second side;

the side walls being arranged such that in the confining position a forward end of the second side wall is closely adjacent a forward end of the first side
20 wall so as to fully enclose and squeeze the collected pieces;

at least the second side including a portion thereof which is arranged such that a bottom edge thereof in the confining position projects to a position inwardly of the respective side of the transport conveyer such that the pieces can be

squeezed by the side walls when moved to the confining position to a width less than that of the transport conveyer and can be released when moved out of the confining position to travel along the transport conveyer.

9. The apparatus according to Claim 8 wherein the first side wall
5 includes a continuous belt having an inwardly facing inner run which stands substantially vertically upwardly and moves horizontally along the first side wall, the belt having a belt drive operable for moving the inner run both forwardly and rearwardly for aligning the pieces generally along the conveyer.

10. The apparatus according to Claim 9 wherein the first side wall is
10 fixed in position extending generally forwardly of the direction of movement.

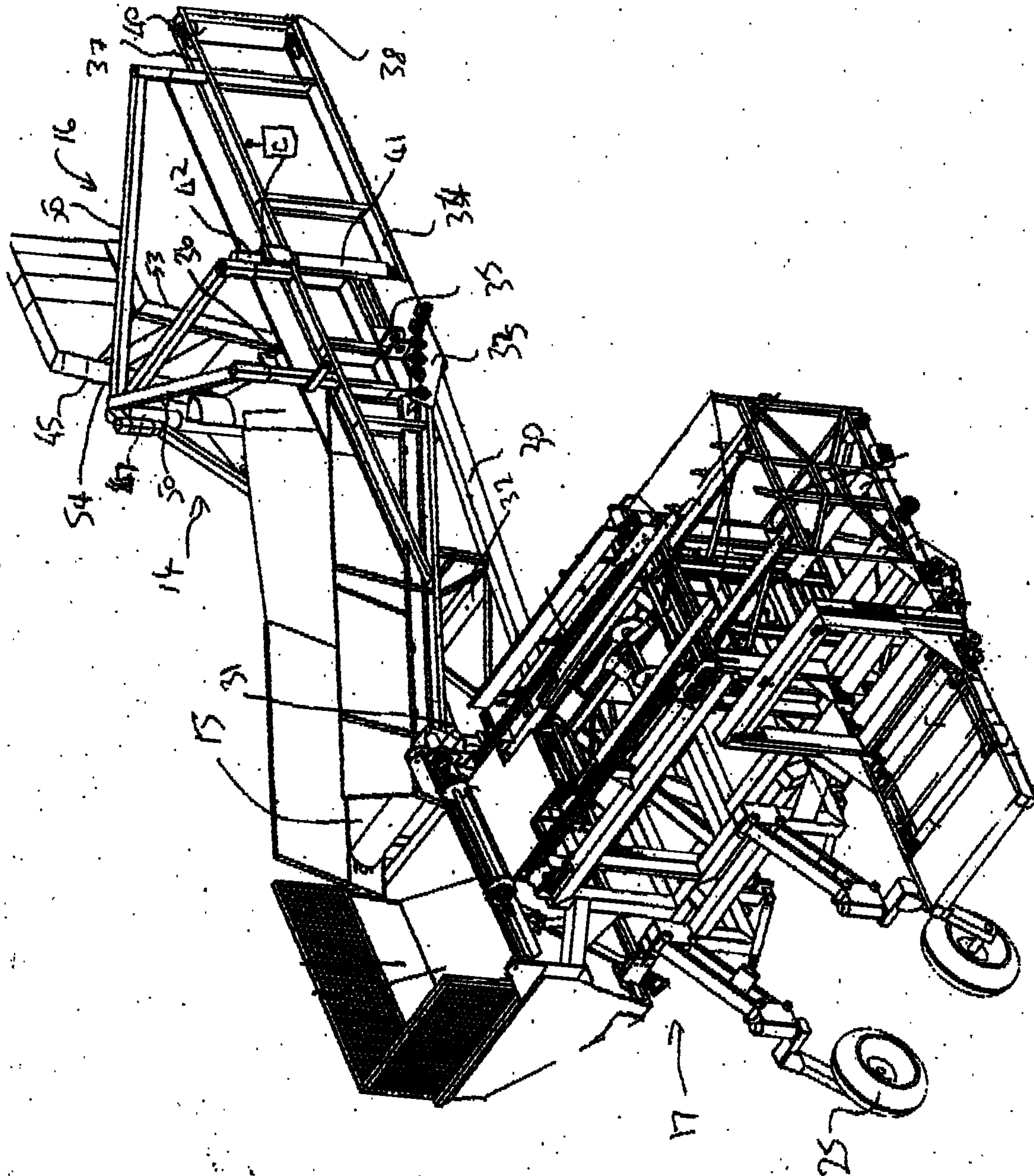
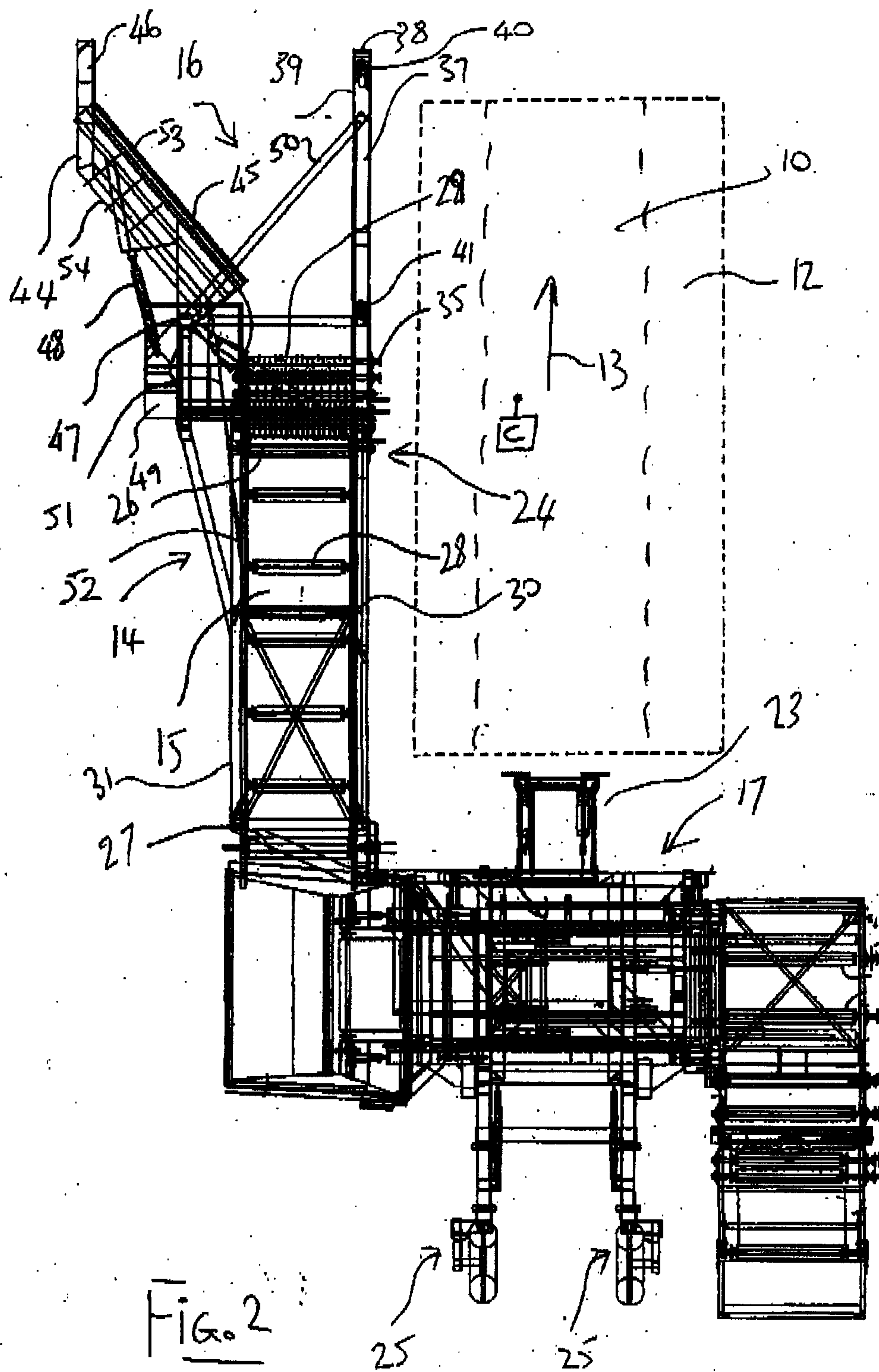
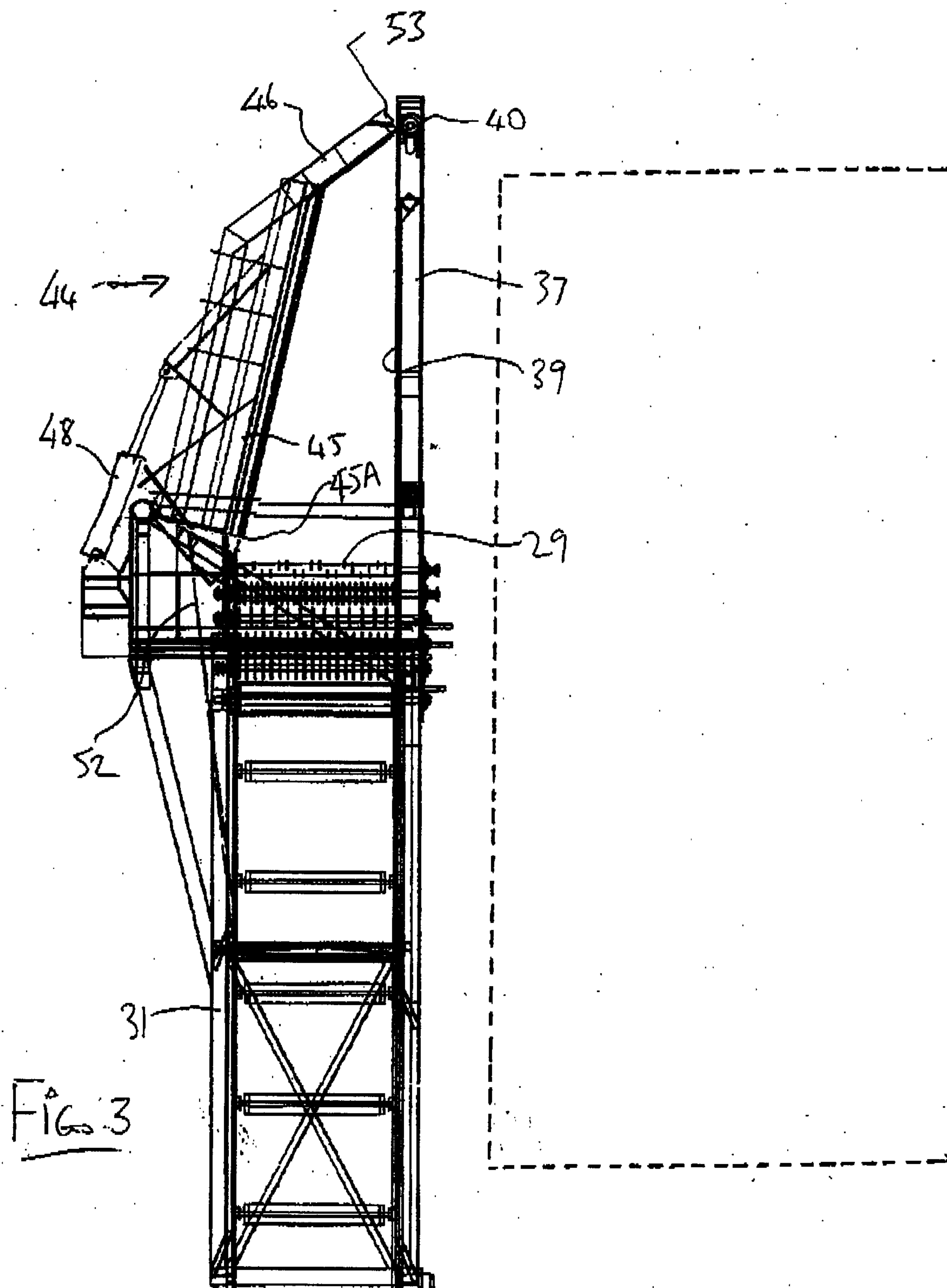


FIG. 1

INVENTORS:
JAMES A. MCLEOD & MURRAY PISONY
PER:
BATTISON WILLIAMS DUPUIS



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JAMES A. MCLEOD & MURRAY PISONY
PER:
BATTISON WILLIAMS DUPUIS



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JAMES A. MCLEOD & MURRAY PISONY
PER:
BATTISON WILLIAMS DUPUIS

