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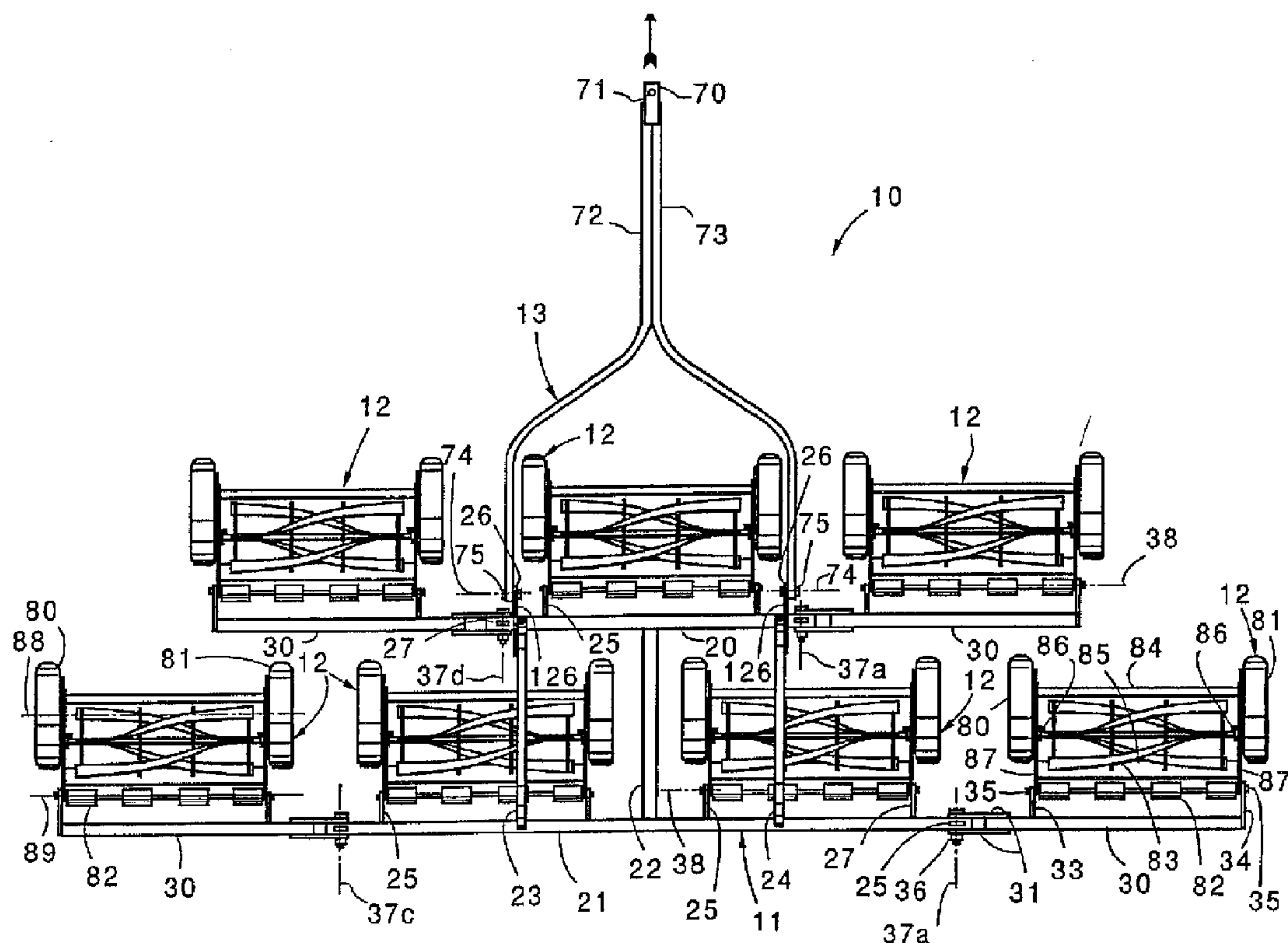
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A gang mower (10) for garden tractors includes a frame (11), a hitch (13) and either three, five or seven reel-type mower units (12) attached to the frame (11). The frame (11) is attached below the forward wheel axis (88) of each mower unit (12). In action, the frame (11) leverages the forward drive wheels (80, 81) downward to turn the mower blades (85) when the frame (11) is pulled forward by a garden tractor.



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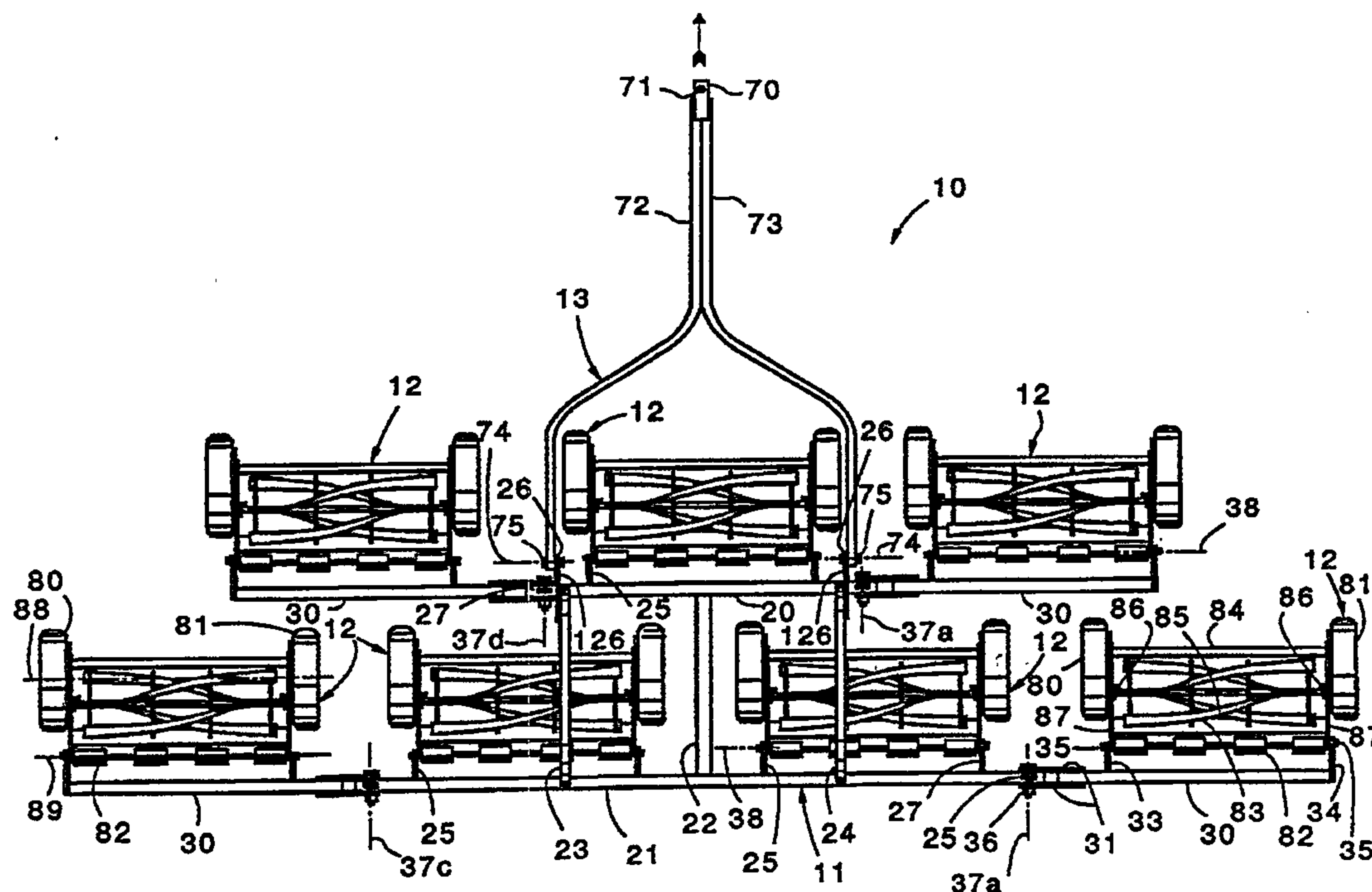
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(54) Title: GANG MOWER



(57) Abstract

A gang mower (10) for garden tractors includes a frame (11), a hitch (13) and either three, five or seven reel-type mower units (12) attached to the frame (11). The frame (11) is attached below the forward wheel axis (88) of each mower unit (12). In action, the frame (11) leverages the forward drive wheels (80, 81) downward to turn the mower blades (85) when the frame (11) is pulled forward by a garden tractor.

GANG MOWER

FIELD OF THE INVENTION

5 The present invention relates generally to reel-type gang mowers, and in particular to gang mowers for use with home garden tractors or draft animals.

BACKGROUND OF THE INVENTION

10 Reel-type gang mowers have long been known in the art, and are most often identified with golf courses and other wide open areas requiring an attractive contoured cut. Gang mowers are often recognized for their ability to mow a given area in a significantly shorter amount of time than that
15 possible with conventional power mowers. This is due in part to the relatively large swath (8 feet or more) possible with gang mowers, whereas power mowers typically cut a swath of four feet or less with each pass. Gang mowers can also usually be pulled faster than a comparable power mower
20 without sacrificing on the quality of the cut. Therefore, not only are gang mowers well known for their ability to make an attractive contoured cut, they are also known to be significantly faster than the largest counterpart power mowers, provided one has a tractor with sufficient power to
25 pull the gang mower.

 Most prior art gang mowers are relatively heavy and normally require a relatively powerful tractor to pull the gang mower. In other words, home garden tractors have typically not been sufficiently powerful to pull most
30 commercially available gang mowers. Thus, most if not all homeowners with relatively large estates (several acres or more) must choose between one of a variety of home garden tractors with power mower attachments for use in mowing their large lawns. These tractor power mowers typically have a
35 rotating blade on the order of three feet in diameter but rarely, if ever, exceeding four feet in diameter. This is because larger decks, 40 inches or larger, will often scalp the ground on one side while being too far off the ground on

the other when the mower encounters even moderate contouring. Thus, the homeowner that desires an attractive cut must necessarily choose a smaller sized deck and spend multiple hours each week riding his or her lawn mower back and forth
5 around their yard. Reel-type gang mowers have not been a realistic alternative to these homeowners because the gang mowers of the prior art typically require a large storage area, and relatively larger tractors, which are prohibitively expensive and also require their own added storage space.

10 One of the reasons that gang mowers of the prior art are relatively heavy is because the individual mower units are typically attached to the gang mower frame in a way that requires a relatively large downward force in order to maintain the individual mower units in proper contact with
15 the ground at all times. In particular, prior art gang mower frames are typically attached above and forward from the individual mower units, with the consequence being that the frames (and mower units) must be relatively heavy in order to maintain both the drive wheels and the trailing rollers of
20 the individual mower units in contact with the ground. Examples of such gang mowers include but are not limited to the gang mowers shown in U.S. Patent Number 1,663,900 to Braun, U.S. Patent Number 1,902,928 to Worthington and Patent Number 2,830,421 to Blue et al.

25 A more recent gang mower assembly illustrated in U.S. Patent Number 4,287,706 to Tobin Jr., overcomes some of the weight problems of the prior art to produce a gang mower suitable for use with home garden tractors. Tobin Jr. accomplishes this by making a gang mower frame that attaches
30 to the handle studs of the individual reel-type mower units. Thus, in theory the frame pushes forward and downward on the handle studs of the individual mower units when the frame is pulled forward by a garden tractor. In other words, the individual mowers units are pushed forward when the frame is
35 pulled. While this concept apparently permitted a lower weight frame suitable for use with garden tractors, a number of problems have persisted in the Tobin Jr. gang mower design. Not the least of which is the recognition by Tobin

that a spring is often required in order to apply a moment about the handle studs of the mower units in order to help maintain the rollers of the individual mowers on the ground at all times. It is well known that it is absolutely
5 critical for the proper functioning of a reel-type mower that both the drive wheels and the trailing roller always remain in contact with the ground. Tobin Jr., also suffers from a number of other problems that have persisted in the art, including the inability to back up when the gang mower is
10 attached to a tractor, the inability to store the gang mower in a relatively small space, the inability of the gang mower to properly follow lawn contours, and other problems.

In view of the prior art, what is needed is a reel-type gang mower that is low weight, capable of being stored in a
15 relatively small space, is suitable for use with home garden tractors and overcomes many of the practicality problems encountered with the various gang mowers of the prior art.

SUMMARY OF THE INVENTION

20 In responding to this need, the present invention provides a gang mower for garden tractors comprising a frame, a hitch attached to and extending forward from the frame, and a plurality of reel-type mowers attached to the frame. Each of the reel-type mowers has a pair of forward wheels and a
25 rear roller. The forward wheels are rotatable about a forward axis, and the rear roller is rotatable about a rear axis that is substantially parallel to the forward axis. The frame is attached to each of the reel-type mowers at a position higher than the rear axis, lower than the forward
30 axis and a sufficient distance away from forward axis that a majority of the frame's weight is supported by the rollers of the reel-type mowers instead of by the forward wheels of the reel-type mower units. When in action, the frame pushes the reel-type mower forward when the frame itself is pulled
35 forward by the hitch.

The present invention can include a number of enhancements including the possibility of a frame that is substantially rigid with respect to a vertical axis such that

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the relative positioning of the reel-type mowers in a plane perpendicular to the vertical axis remain substantially constant regardless whether the gang mower is being pulled forward around curves or pushed backward. Also, the reel-type mowers can be attached to the frame at pivot points that permit the individual mower units to pivot with respect to the frame about horizontal axes through the pivot points. In another enhancement the frame can include a plurality of outer portions that are attached to the central frame at pivot points that permit the outer mower units to pivot about horizontal axes. Both pivoting enhancements allow the mower to follow lawn contours and produce a more attractive cut. Furthermore, the outer frame units and the hitch can be made to pivot to a stowed position so that the gang mower can be stored in a relatively small space. Other aspects and potential enhancements of the invention will be more thoroughly identified and discussed in the detailed description of the invention.

One object of the present invention is to provide a gang mower that will permit a homeowner to mow their lawn in a fraction of the amount of time possible with counterpart power mowers.

Another object of the present invention is to provide a gang mower for garden tractors that overcomes the storage and backing up problems of the prior art.

Still another object of the present invention is to provide a relatively light-weight gang mower.

Still another object of the present invention is to provide homeowners with a professional looking contoured cut to

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their lawns at a fraction of the price possible with counterpart riding power mowers.

Another object of the present invention is to provide an improved gang mower for garden tractors.

5 In summary this invention seeks to provide a gang mower comprising: a frame having a weight and including a central portion and a plurality of outer portions, and each of said outer portions being attached to said central portion at pivot points, and being pivotable with respect to said central
10 portion about horizontal axes; a plurality of reel-type mowers each of said reel-type mowers having forward drive wheels that rotate about a forward axis to drive rotation of a cutting reel and a rear roller that rotates about a rear axis, and being attached to said frame on a fixed relative orientation to one
15 another about a vertical axis, a portion of said reel-type mowers being attached to said central portion of said frame, and another portion being attached to said outer portions; means, including a positioning of said frame relative to said reel-type mowers, for causing a majority of said weight to be
20 supported by said rear rollers.

 This invention further seeks to provide a gang mower comprising: a frame that includes a forward subframe attached to, and positioned in front of, a rearward subframe; a plurality of reel-type mowers each of said reel-type mowers
25 having forward drive wheels that rotate about a forward axis to drive rotation of a cutting reel and a rear roller that rotates about a rear axis, and being attached to said frame on a fixed relative orientation to one another about a vertical axis, but being pivotable about first horizontal axes that are parallel
30 to said rear axis, and a portion being pivotable about second horizontal axes that are perpendicular to said first horizontal

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axes; a first portion of said reel-type mowers being positioned substantially in front of, and attached to, said forward subframe; a second portion of said reel-type mowers being positioned substantially in front of, and attached to, said rearward subframe; said frame being positioned such that a majority of said weight is supported by said rear rollers.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a top view of a gang mower for garden tractors according to the present invention.

Figure 2 is a side elevational view of a gang mower for garden tractors according to the present invention.

Figure 3 is a front elevational view of a gang mower for garden tractors according to the present invention in its
5 stowed configuration.

Figure 4 is an enlarged side elevational view of a portion of a gang mower frame according to one aspect of the present invention.

Figure 5 is a side diagrammatic illustration of a reel-
10 type mower unit contrasting the force distribution of the frame of the present invention versus that of the prior art.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

15 Referring now to Figure 1, a gang mower for garden tractors 10 according to the present invention includes a frame 11, a hitch 13 and seven individual reel-type mower units 12. Frame 11 includes a central portion made up of a forward sub-frame 20 and a rearward sub-frame 21 arranged
20 behind and substantially parallel to the forward sub-frame. Sub-frames 20 and 21 are interconnected by a horizontal stiffener 22 and a pair of arched stiffeners 23 and 24. Forward sub-frame 20, rearward sub-frame 21 and horizontal stiffener 22 are preferably made from square metal tubing
25 welded to one another in a conventional manner. Arched stiffeners 23 and 24 are preferably formed from square steel bar stock and welded at each end to the forward and rearward sub-frames. The shape of the arched stiffeners is best illustrated in Figure 2.

30 A pair of brackets 25 are welded to extend forward of forward sub-frame 20, and serve as a means by which the central mower in the front row is attached to the frame. Likewise, four substantially identical brackets 25 are welded to extend forward of the rearward sub-frame 21, and serve as
35 a means by which the central two mower units 12 in the second row are attached to the frame. Brackets 25 are preferably cut from steel bar stock, on the order of at least one quarter inch thick, and welded into place. Each of brackets

25 includes a bore that facilitates attachment of the individual mower units 12 through a pin arrangement (best illustrated in Figure 4) that permits the individual mower units to pivot with respect to the frame about a pivot axes 5 38. This aspect of the invention allows the individual mower units to independently pivot and follow contours 6 encountered as the gang mower is pulled forward over the ground 5, as shown in Figure 2.

Hitch 13 is attached to frame 11 via a pair of brackets 10 26 that are substantially similar to brackets 25 discussed earlier. Brackets 26, which are partially obscured in Fig. 1 by upper brackets 126, are welded to and extend forward from forward sub-frame 20. When the gang mower is reduced to three central mower units and the mower is to be pulled by a 15 draft animal, upper brackets 126 (see also Fig. 2) are used as the mounting location for hitch 13 via bore 127. Upper brackets 126 are welded to arched stiffeners 23 and 24. Hitch 13 includes a pair of symmetrically bent square steel bars 72 and 73. Bars 72 and 73 are bent generally into the 20 shape shown in Figure 1 and are welded at a number of locations along their contact surfaces. A pair of flanges 70 are attached to one end of bar 72 and 73. Flanges 70 are preferably made from steel bar stock on the order of about one quarter inch in thickness and are machined to include a 25 bore 71, which facilitates hitching the gang mower to an ordinary garden tractor in a conventional manner. The other end of bars 72 and 73 include a bore (not shown) which facilitates the attachment of hitch 13 to brackets 26 via a pair of nut/bolts 75. Thus, hitch 13 has the ability to 30 pivot with respect to frame 11 about axis 74 to better facilitate the gang mower following contours when going over the top of hills or the bottom of valleys between hills. Furthermore, this feature allows the hitch to be pivoted to an upright stowed position (Figure 3) to better facilitate 35 storing the gang mower in a relatively small space.

Attached to the rigid central frame 11 are four outer sub-frames 30. In particular, Figure 1 shows a forward left sub-frame, a forward right sub-frame, a rearward left sub-

frame and a rearward left sub-frame. Although the outer sub-frames 30 are located in different positions and inverted with respect to one another, their individual structures are substantially identical. In particular, each outer sub-frame 30 includes a length of square tubular stock welded adjacent one end to a pair of extension members 31, which are preferably cut from a length of steel bar stock on the order of about one quarter inch in thickness. Extensions 31 each include a bore that permits attachment to the central frame 11 via a nut/bolt set 36, as best shown in Figure 4. This permits the outer sub-frames to pivot about individual horizontal axes 37a-d. This allows the outer mower units to float with the contour of the lawn independently of one another. Also, outer sub-frames 30 have the ability to pivot to an upright stowed position (Figures 3 and 4) in order to better facilitate storage of the gang mower in a relatively small space. Outer sub-frames 30 also include a pair of brackets 33 and 34 which are substantially similar to brackets 25 discussed earlier, except that bracket 34 is slightly longer and welded to one end of the particular outer sub-frame 30. Brackets 33 and 34 include a bore that facilitates an attachment of a mower unit 12 via a pin arrangement that permits pivoting about a horizontal axis 38. Thus, the outer sub-frames can pivot about first horizontal axes 37a-d and each of the mower units can pivot about a separate and perpendicular horizontal axis 38. This permits the outer mower units to have two degrees of rotational freedom so that gang mower can easily follow virtually any ground contour.

The individual reel-type mower units 12 are commercially available from a variety of known sources, and can be utilized without modification in the present invention. Each mower unit includes a pair of forward wheels 80 and 81 that define a localized forward axis 88. Each mower also includes a rear roller 82 with the ability to rotate about a localized rearward axis 89. Rear roller 82 and forward wheels 80, 81 are interconnected via a pair of supports 87. Rotating blades 83 are attached between supports 87 and are driven to

rotate adjacent cutting bar 85 when four forward wheels 80 and 81 are rotated in the forward direction. A stabilizer bar 84 extends between brackets 87, and apparently serves to give the individual mower unit 12 greater rigidity. The
5 mower units also include a pair of handle mounting studs 86 which will be discussed infra in relation to Figure 5. Thus, mower units 12 are off the shelf components except that the individual handles for the reel-type mowers are excluded. Cutting height can be adjusted by connecting the rear roller
10 82 to different locations along height adjustment bracket 40 (see Fig. 2 and 5). Height adjustment brackets are positioned and attached within a channel on supports 87.

The gang mower of the present invention permits a portion of the individual mower units 12 to pivot about a
15 pair of mutually perpendicular horizontal axes with respect to one another. Furthermore, the pivoting ability of the hitch better facilitates cutting over the top and at the bottom of relatively steep hills. However, it should be noted that none of the mower units have the ability to rotate
20 with respect to one another about any vertical axis. This permits the user to back up the gang mower 10 without risking the jack-knifing problems encountered with prior art mower units that have the ability to rotate with respect to one another about a vertical axis. This feature also permits the
25 mower to effectively complete zero radius turns while maintaining the proper overlapping cutting arrangement afforded by the two staggered rows of gang mowers shown in Figure 1.

Although the gang mower 10 shown in Figure 1 includes
30 seven individual mower units 12, the present invention can also utilize either five or three mowers if a thinner mower swath is desirable. In its basic form, only the central frame 11 is included with three individual mower units, giving the overall gang mower a cutting swath on the order of
35 about four feet. The next extension up to approximately a six foot cutting swath is accomplished by adding a pair of outer sub-frames 30 to forward sub-frame 20 as discussed earlier. Such a configuration would have three mowers in the

front row and two mowers in the back row and have a cutting swath on the order of about six feet or more. The next enhancement comes by adding another pair of mower units 12 to the rearward sub-frame 21 via another pair of outer sub-frames 30. Thus, it should be clear that the present invention has the versatility to accommodate several different cutting swaths to suit virtually any individual user. Furthermore, maintenance on the present invention is relatively low since the individual mower units can be replaced at a relatively low cost and the underlying frame is virtually maintenance free. Prior art mower units are typically specially modified for use in the gang mower and often require costly maintenance and repairs when problems occur.

Figure 3 shows the gang mower 10 of Figure 1 in its stowed configuration for storage. Each of the outer sub-frames 30 has the capability of pivoting about its individual axis 37a-d (Figure 1) to an upright stowed position. The outer sub-frames 30 can be locked in their stowed configuration via the pin arrangement illustrated in Figure 4. In particular, at the connection with each outer sub-frame 30 an upright bracket 27 is welded to the underlying sub-frame 20 or 21 (see Figures 1, 2 and 4). Upright brackets 27 each include a bore which aligns with bores made through extensions 31. When in the stowed configuration, these bores align and permit the insertion of a pin 28 which is kept in place via a retaining pin 29, or another equivalent arrangement known in the art. Thus, each of the outer units is locked in an upright stowed position and the hitch is pivoted to an upright stowed position when it is desired to store the gang mower. If proper clearances are maintained, the gang mower can still be pulled forward or pushed in reverse when in its stowed configuration as shown in Figure 3. In such a case, the weight of the gang mower, which is typically on the order of about 200 pounds, is supported by the three central mower units. Thus, the user can quickly pivot and lock the outer mower units to their stowed configuration and simply back the gang mower into a

storage place within a garage or barn. Gang mower 10 takes up the space about equal to that of a motorcycle when in its stowed configuration, or less than half the space of its deployed configuration as shown in Figure 1.

5 Figure 4 is an enlarged view illustrating the interconnection between rearward right sub-frame 30 and rearward sub-frame 21. Nevertheless, the attachment of each outer sub-frame to the central frame is identical since all the outer sub-frames are structurally identical. As
10 discussed earlier, the framing is attached to the individual mower units via a pin arrangement 35 that permits the mower units to pivot about an axis 38. Outer sub-frame 30 is attached to rearward sub-frame 21 via aligning bores (not shown) which receive a bolt 36a. The bolt is secured in
15 placed with a conventional nut 36b. When the outer sub-frame 30 is pivoted to its upright stowed configuration, the bores in extensions 31 and upright bracket 27 align and permit the insertion of a pin 28. Pin 28 is held in place via a removable retaining pin 29 that is inserted through a hole in
20 one end of pin 28. When the outer sub-frames 30 are lowered into their deployed configuration, pin 28 is reinserted through bracket 27 and left in place until needed. The pin and retaining pin arrangement shown for attaching the frames to the individual mower units and for locking the outer sub-
25 frames in an upright position could have a variety of other mechanical connections substituted therefore which are known in the art. For instance, a nut and bolt arrangement could be substituted for each of the pin/retaining pin connections illustrated.

30 Referring now to Figure 5, the force distribution aspect of the present invention is contrasted with that of the closest known prior art (U.S. Patent #4,287,706 to Tobin, Jr.). In particular, Figure 5 shows a diagrammatic view of a mower unit 12 having a forward wheel 80 that is rotatable
35 about a forward axis 88. The rear roller 82, which is rotatable about a rearward axis 89 is attached to the forward mower via a height adjusting bracket 40. The present invention is preferably attached directly above rearward axis

89 so that the weight of the frame (W_f) is supported by the rear rollers. Although the present invention would perform well with the mowers attached either forward or aft of rearward axis 89, attaching directly above rearward roller 82 is the most easily facilitated because height adjusting bracket 40 typically includes several bores for adjusting the height of rollers 82. Roller units 12 are preferably attached directly above roller 82. It is also important to note that the frame is attached lower than forward axis 88 but higher than rearward axis 89. The result being that the force (F_p) supplied by pulling the gang mower always intersects a line 90 connecting axis 88 and axis 89. The result being that each individual mower unit is leveraged downward when pulled forward to increase the friction contact between drive wheels 80, 81 and the ground. This contrasts with the Tobin connection via a bracket 111 that attaches to handle studs 86. Handle studs 86 are typically located relatively close to forward axis 88. Thus in the Tobin mower, the majority of the frame's weight is supported by the forward wheels rather than the rear roller. The consequence being that the rear roller tends to bounce along the ground when the Tobin mower is pulled forward. Tobin attempted to eliminate this problem by including a spring which constantly supplies a restoring moment to maintain the rollers in contact with the ground. The present invention solves the roller bouncing problem inherent in the Tobin gang mower.

It should be understood that the above description is intended to serve only in aiding those skilled in this art to understand the present invention, and is therefore intended for illustrative purposes only. Although a number of enhancements to the present invention have been discussed above, those skilled in the art may also recognize additional enhancements to the present invention. For instance, a spiked roller could be substituted for the smooth rollers 82 illustrated for purposes of allowing the user to aerate their lawns as they mow. Another variation might be the inclusion of a slightly modified hitch so that the present invention could be pulled by a horse or other draft animal. Still

another variation might be accomplished by utilizing reel-type mowers that have no rear roller. In such a case, the frame might be supported by its own rollers or wheels attached at strategic locations with the ability to adjust the height of the frame off the ground in order to adjust the cutting height of the individual mower units. Thus, while it may be preferable to use off the shelf reel-type mowers, modifications can be made to the illustrated invention without departing from the intended scope of the present invention.

Still other enhancements to the present invention might include utilizing the present frame with a plurality of golf ball retrievers substituted in place of the reel-type mower units. Such an alternative might prove attractive in retrieving balls at driving ranges. The present invention could also be utilized as a trailer for a number of other lawn implements including aerators, fertilizer units, or any other suitable lawn implement that could be substituted for the reel-type mower units illustrated. There is also the possibility of attaching implements requiring electrical power to the frame of the present invention and supplying power via a hook up to the alternator or battery of the garden tractor. This possibility may be especially attractive in attaching a number of weed eater units to the frame in order to cut any stemmy weeds or fescue grasses that are difficult to cut in a single pass with a reel-type mower. Finally, there is also the possibility of mounting a fertilizer tank on the frame and running a number of nozzles from the tank along the rearward base of the frame so that the user could distribute liquid fertilizers over their lawn while cutting. Thus, the above description is clearly not meant to limit in any way the intended scope of the present invention, which is defined solely in terms of the claims as set forth below.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A gang mower comprising:

a frame having a weight and including a central portion and a plurality of outer portions, and each of said outer portions being attached to said central portion at pivot points, and being pivotable with respect to said central portion about horizontal axes;

a plurality of reel-type mowers each of said reel-type mowers having forward drive wheels that rotate about a forward axis to drive rotation of a cutting reel and a rear roller that rotates about a rear axis, and being attached to said frame in a fixed relative orientation to one another about a vertical axis, a portion of said reel-type mowers being attached to said central portion of said frame, and another portion being attached to said outer portions;

means, including a positioning of said frame relative to said reel-type mowers, for causing a majority of said weight to be supported by said rear rollers.

2. The gang mower of claim 1 wherein that portion of said frame that is attached to an individual one of said reel-type mowers is positioned substantially behind said individual one of said reel-type mowers.

3. The gang mower of claim 2 wherein said outer portions of said frame are pivotable between a horizontal deployed position and an upright stowed position.

4. The gang mower of claim 3 wherein said frame consists essentially of:

a plurality of metal tubing pieces attached to one another in an orientation parallel to said horizontal axes; and

a plurality of brackets attached to said metal tubing pieces.

5. The gang mower of claim 4 wherein said plurality of reel-type mowers is seven;

three of said seven being attached to said central portion of said frame; and

four of said seven being attached to said outer portions of said frame.

6. The gang mower of claim 5 wherein said reel-type mowers are independently pivotable with respect to one another about pivot axes that are perpendicular to said horizontal axes and said vertical axis.

7. A gang mower comprising:

a frame that includes a forward subframe attached to, and positioned in front of, a rearward subframe;

a plurality of reel-type mowers each of said reel-type mowers having forward drive wheels that rotate about a forward axis to drive rotation of a cutting reel and a rear roller that rotates about a rear axis, and being attached to said frame in a fixed relative orientation to one another about a vertical axis, but being pivotable about first horizontal axes that are parallel to said rear axis, and a

portion being pivotable about second horizontal axes that are perpendicular to said first horizontal axes;

a first portion of said reel-type mowers being positioned substantially in front of, and attached to, said forward subframe;

a second portion of said reel-type mowers being positioned substantially in front of, and attached to, said rearward subframe;

said frame being positioned such that a majority of said weight is supported by said rear rollers.

8. The gang mower of claim 7 wherein said forward subframe is attached to said rearward subframe with a plurality of rigid connecting members.

9. The gang mower of claim 7 wherein said plurality of gang mowers includes a first group of at least three attached to said forward subframe and a second group of at least three attached to said rearward subframe; and

two of said first group and two of said second group being independently pivotable about said second horizontal axes.

10. The gang mower of claim 7 wherein said frame consists essentially of:

a plurality of metal tubing pieces attached to one another in an orientation parallel to said first axes; and

a plurality of brackets attached to said metal tubing pieces.

11. The gang mower of claim 7 wherein said plurality of reel-type mowers is seven;

three of said seven being attached to said frame in fixed relative orientation about said second axes; and

four of said seven being positioned on opposite sides of said three and pivotable about different ones of said second axes.

12. The gang mower of claim 11 wherein said four are pivotable between a horizontal deployed position and an upright stowed position.

13. A gang mower comprising:

a frame having a weight;

a plurality of reel-type mowers attached to said frame and each of said reel-type mowers having a rear roller and forward drive wheels to drive rotation of a cutting reel; and

a majority of said frame being positioned relative to said reel-type mowers such that a majority of said weight is supported by said rear rollers.

14. The gang mower of claim 13 wherein said forward drive wheels rotate about a forward axis and said rear roller rotates about a rear axis; and

said frame producing a force on each of said reel-type mowers that intersects a line connecting said forward axis to said rear axis, when said frame is pulled forward.

15. The gang mower of claim 13 wherein said frame includes a forward subframe attached to a rearward subframe;

said plurality of reel-type mowers including at least two attached to, and substantially in front of, said forward subframe and at least two attached to, and substantially in front of, said rearward subframe.

16. The gang mower of claim 13 wherein said frame leverages said forward wheels of said reel-type mowers downward when said frame is pulled forward.

17. The gang mower of claim 13 wherein said frame is substantially rigid with respect to a vertical axis such that a relative positioning of said reel-type mowers in a plane perpendicular to said vertical axis remains substantially constant regardless whether said gang mower is being pulled forward around curves or pushed backward.

18. The gang mower of claim 13 wherein each of said reel-type mowers is attached to said frame at pivot points; and

said reel-type mowers being pivotable with respect to said frame about horizontal axes.

19. The gang mower of claim 13 wherein said frame includes a central portion and a plurality of outer portions;

each of said outer portions being attached to said central portion at pivot points;

said outer portions being pivotable with respect to said central portion about horizontal axes that are perpendicular to said rear roller.

20. The gang mower of claim 14 wherein a portion of said plurality of reel-type mowers can pivot between a horizontal deployed position and an upright stowed position.

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PATENT AGENTS

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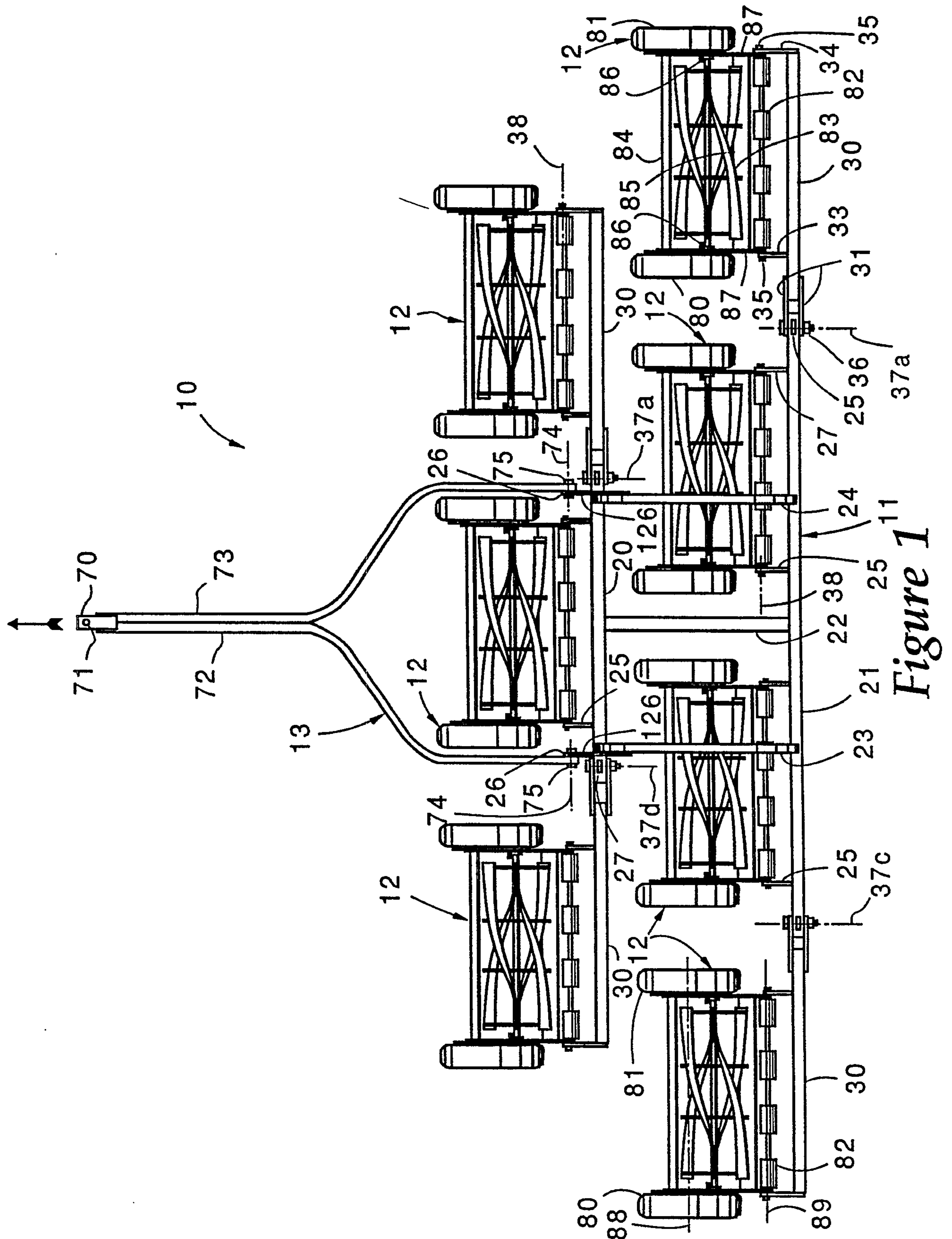


Figure 1

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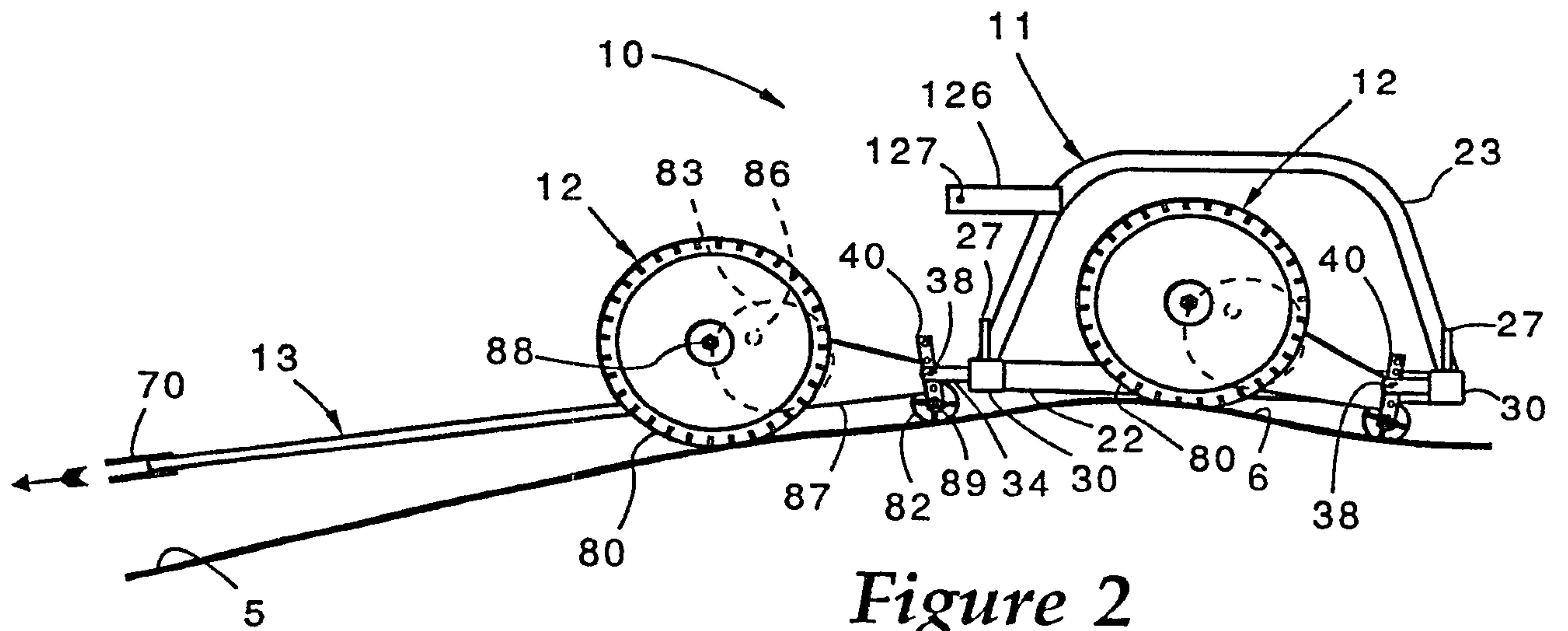


Figure 2

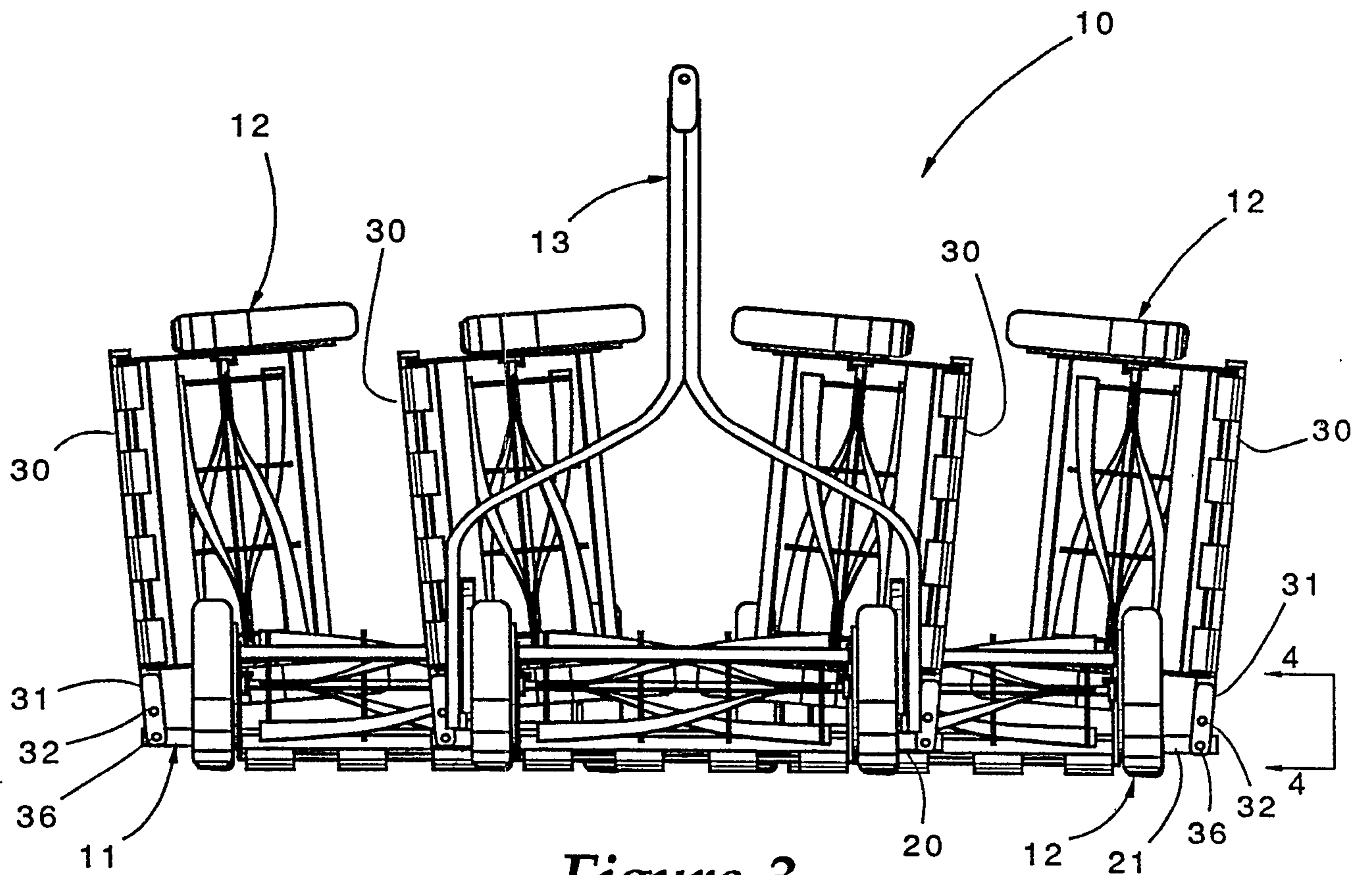
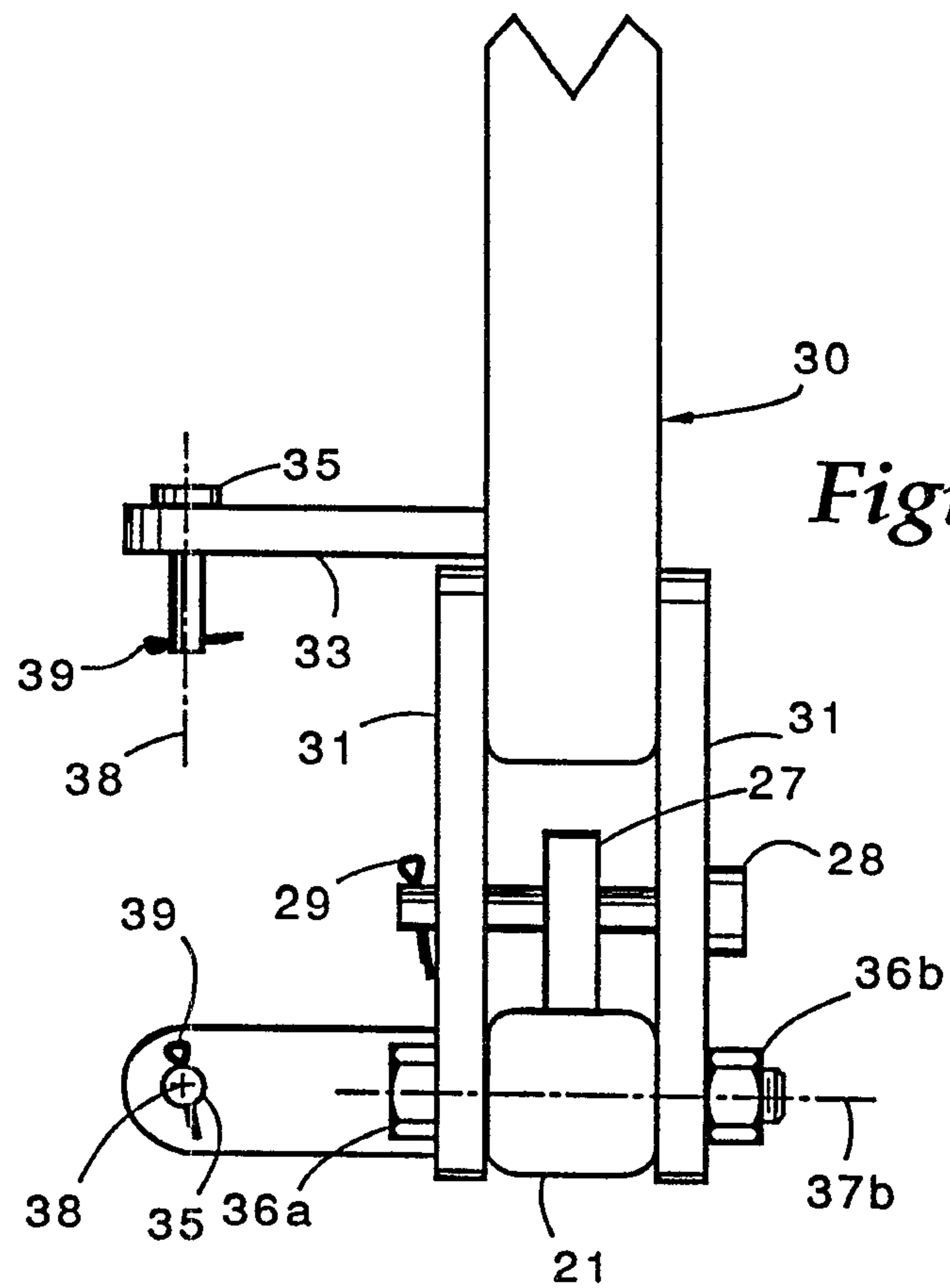
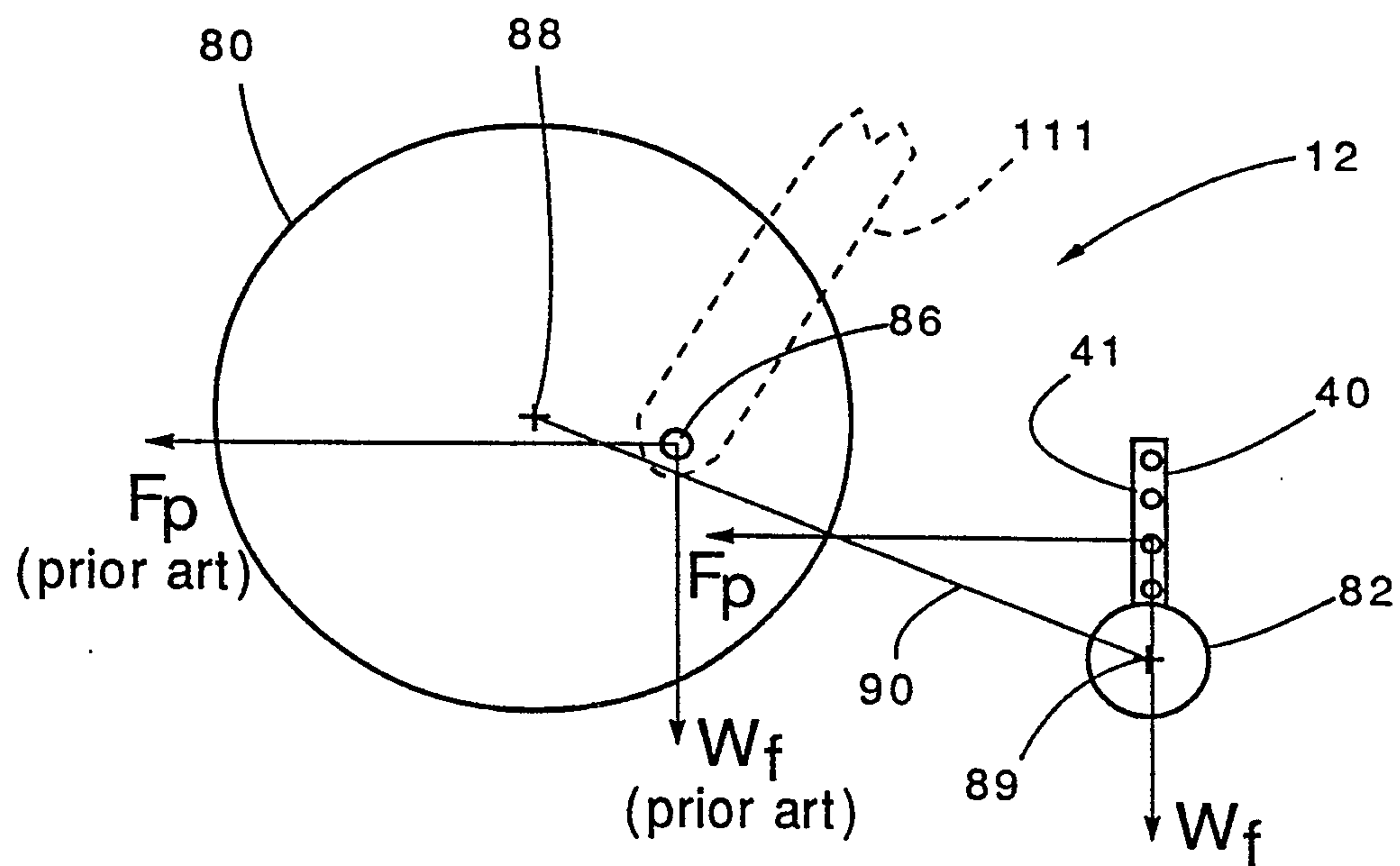


Figure 3

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*Figure 4**Figure 5*

