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Pipe welding system

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(71) Applicant(s)
Wayne Mitchell

(72) Inventor(s)
Mitchell, Wayne Gregory

(74) Agent / Attorney
Freehills Patent Attorneys, Level 43 101 Collins Street, Melbourne, VIC, 3000

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2013201635 07 Mar 2013

ABSTRACT

A truck trailer for transporting pipe lengths, including a trailer body having a front end and a rear end and being supported on at least one set of wheels; a storage area on the trailer body to hold pipe lengths during transport and storage; a feed area adjacent the storage area for feeding sequential pipes into a welding device located at or adjacent the rear end of the trailer body; and a pipe transfer arrangement for sliding said sequential pipes along the feed area into the welding device.

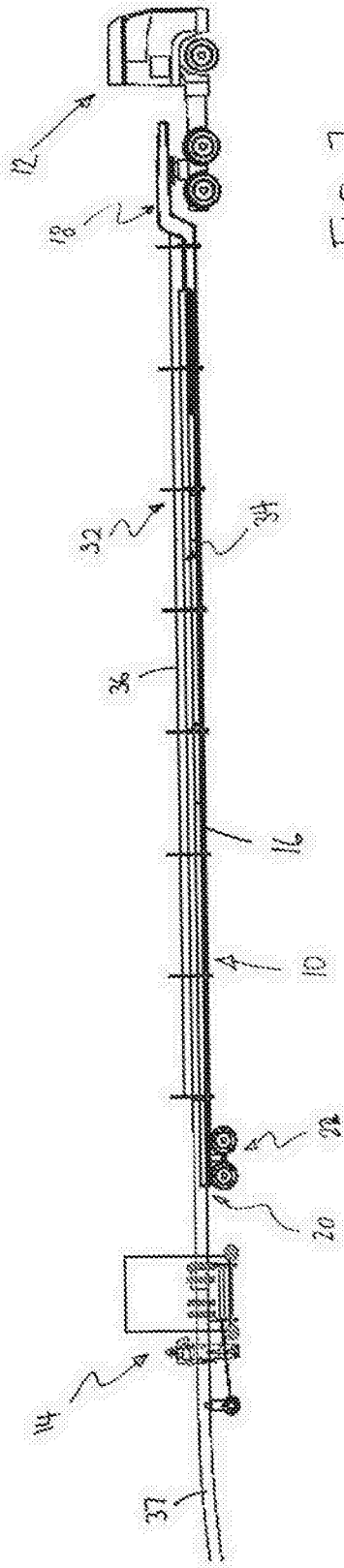


FIG 1

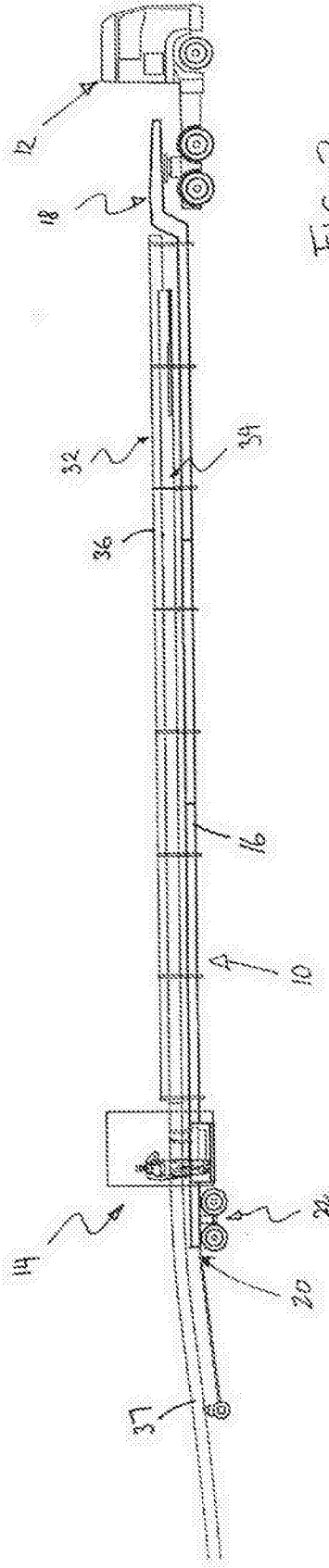


FIG 2

2013201635 07 Mar 2013

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COMPLETE SPECIFICATION STANDARD PATENT

Invention Title: **Pipe welding system**

The following statement is a full description of this invention, including the best method of performing it known to us:

Pipe welding system

Field of the invention

The invention relates to a pipe welding system for the joining of lengths of thermoplastic pipe at an installation site.

Background of the invention

Thermoplastic, preferably high-density polyethylene (HDPE), pipe is laid in trenches to provide a conduit for water or gas networks, or as a protective sheath for cabling. For pipe with a diameter typically under 120mm, the pipe is provided as a coil for transport and storage. The pipe is then unwound on site as it is placed into the trench. For pipe with a diameter over 10 120mm, due to its size and inability to coil, it is provided as lengths. Pipe typically comes in diameters up to 2000mm, with the diameter typically determining the length; generally the larger the diameter, the shorter the length in order for the overall weight of a pipe length to be manageable for transport. Pipe comes in standard lengths between 12metres and 21metres. As will be appreciated, the size and weight of such pipes makes manual handling hazardous.

15 The pipe is transported to site in lengths by truck. The pipe lengths are then lifted off the truck by a forklift and placed onto a holding frame. Before the pipe is laid in the trench, the lengths must be welded together on site to create a pipe string. This involves positioning the ends of two pipes in a welding machine. The machine performs butt fusion welding, where firstly facing occurs (where the ends are shaved off), a hot plate is then placed between the ends to heat 20 the polyethylene to molten. The hot plate is then removed and the two pipes are pushed together such that the molten ends fuse. This process can take between 15 minutes and 1 hour to complete depending on the diameter of the pipe.

When the pipe is required for welding, it is lifted off the holding frame and manoeuvred into a welding machine either by hand or with a forklift. As it is important that the pipe does not 25 touch the ground, which would contaminate the ends to be welded, the pipes are preferably held off the ground at all time prior to welding. This may be done by having the welding machine on wheels, so that it can be positioned next to the holding frame. There may be a roller that helps to feed the pipe into the welding machine; however the pipe still needs to be manually moved onto the rollers and pushed along the roller into the welding machine.

Once the first weld has been completed, the first end of the very first pipe is pulled by a vehicle until the second end of the second pipe is moved into position in the welding machine. This second end is then welded to a first end of another pipe, and so forth. Eventually a very long length of welded pipe is created. The first pipe is pulled, dragging the full length of the welded pipe string in order to advance the sequential pipes through the welding machine. The pipe string becomes very heavy and it is difficult and slow to drag the entire length of welded pipe.

As only a certain amount of pipe can be dragged due to weight and friction, the welding machine is periodically moved further down the trench, with additional pipe being welded together and dragged through until the first end is pulled to the end of the first string of welded pipe. Having to move the welding machine is time consuming, as the pipe on the holding frame must also be moved, either with a forklift or truck, and the holding frame itself must be moved. The whole set up then needs to be re-set up in the new location, having to realign the welding machine with the holding frame.

Another method, to avoid the dragging of the pipe, is to lay the pipe on the ground along the trench in an end to end fashion. The welding machine is then moved sequentially between each joint to be made. This reduces the amount of dragging that needs to be imparted on the pipe string. However, welding in this fashion requires a minimum of one lifting machine to manoeuvre the pipe into the welding jaws; although it is better achieved with two lifting machines, one on each side of the welding machine. The welding crew then moves along welding the pipe, stopping at the end of each pipe length, picking it up off the ground, performing the welding and then lifting it out of the welding machine. This method can create long pipe strings with minimal dragging, however it is highly labour intensive as lifting machine operators are required to manoeuvre the pipe into the welder, but are not utilised during the welding process itself.

The speed with which the pipe can be laid is dependent on the speed with which the pipe can be welded. It is therefore desired to increase the efficiency of pipe welding in such circumstances and also decrease the manual handling by workers.

Reference to any prior art in the specification is not, and should not be taken as, an acknowledgment or any form of suggestion that this prior art forms part of the common general

knowledge in Australia or any other jurisdiction or that this prior art could reasonably be expected to be ascertained, understood and regarded as relevant by a person skilled in the art.

Summary of the invention

The inventive concept comes from the inventor's realisation that efficient handling of pipe lengths can be provided by integrating the transport, onsite storage and welding of pipe lengths to create pipe strings for installation. Accordingly, the inventor has determined that a truck trailer can be used for both transport of the pipe lengths to site and for onsite storage, such that the pipe lengths can be fed directly from the trailer into the welding device, eliminating double handling and preventing the pipe from coming into contact with the ground until welded.

According to a first aspect, the present invention provides a truck trailer for transporting pipe lengths, including:

a trailer body having a front end and a rear end and being supported on at least one set of wheels;

a storage area on the trailer body to hold pipe lengths during transport and storage;

a feed area adjacent the storage area for feeding sequential pipes into a welding device located at or adjacent the rear end of the trailer body; and

a pipe transfer arrangement for sliding said sequential pipes along the feed area into the welding device, wherein the height of the feed area and the width of the feed area are adjustable to accommodate pipes of different diameter and such that said sequential pipes repeatably align with the welding device.

According to a second aspect, the present invention provides a pipe transport and welding system, including:

a truck connected to a truck trailer according to the first aspect of the invention; and

a welding device;

wherein pipe is transported on the truck trailer and in turn fed directly from the truck trailer into the welding device to be fused together to form a welded pipe string, whereby advancement of the truck allows the pipe string to fall off the rear of the welding device for installation.

Advantageously, the welding device is located within a housing that is integrally formed on the truck trailer and located at the rear end of the trailer body. The welding housing preferably includes a standing platform for the operator, with the welding device being aligned with the feed area, such that pipe lengths pushed off the rear end of the feed area slide straight into the jaws of the welding device.

Alternatively, the welding device may be a separate device on wheels that is towed, or separately driven, adjacent the rear end of the trailer. The welding device may sit atop a platform, with the height of the welding device or the platform being adjustable such that the jaws of the welding device may be aligned with the pipe lengths being fed from the feed area of the truck trailer.

Preferably, the storage area and the feed area are adjacent one another such that their lengths are parallel and align with the length of the trailer body. The storage area is preferably sloped downward towards the feed area such that pipe lengths will gravity feed into the feed area. The storage area is advantageously defined by a pipe support frame, which may comprise a plurality of parallel spaced arms which may support the pipe lengths above the trailer body. Each of the arms is preferably downwardly orientated, such that pipe lengths will automatically roll into the adjacent feed area when a previous pipe length is slid out of the feed area.

Advantageously, the storage area is defined at the front and rear by end walls, such that the pipe lengths cannot move forward or rearwardly during transport. Preferably, the length of the storage area, and parallel feed area, is variable, with the body of the trailer being extendible. Advantageously, the body comprises a longitudinal box section beam, having an outer tube and an inner tube telescopically housed within the outer tube, such that the overall length of the body can be altered to match the length of pipe being transported. The length of the storage area may be approximately 12 metres in the fully retracted position and 21 metres in the fully extended position.

The storage area is preferably defined on one of its outer sides by upright arms to prevent the pipe lengths from rolling off the edge of the trailer. The width of the storage area is also advantageously adjustable, whereby the plurality of parallel spaced arms comprise inner and outer tubular lengths, telescopically coupled.

The feed area is advantageously a long channel, sized to house a single pipe length, and preferably runs along the side of the storage area. The feed area is preferably defined by a series of spaced L-shaped brackets, which may extend outwardly from the trailer body. The width of the feed area is advantageously adjustable to match the width of the pipe lengths. The L-shaped brackets may have at least their substantially horizontal arm constructed as a telescopic arm, with an inner tube sliding within an outer tube. The upright arm of the L-shaped bracket preferably includes a substantially vertical roller. An additional substantially horizontal roller may also be provided that is supported on an adjustable upright arm, whereby the height of the roller may be adjusted to align with the height of the welding device. Again, the upright arm may be telescopic. This alignment of the pipe lengths with the height of the welding device means that the correct alignment can be set at the beginning of the process and all subsequent pipe lengths are automatically aligned to feed directly into the welding device from the feed area at the correct position without readjustment.

The position of the plurality of like rollers may be adjusted simultaneously, preferably with hydraulic screw jacks.

At least one cable is preferably provided that can be used to tie the pipe lengths to the storage area during transport. Advantageously, the cable(s) is connected to a winch system to wind the cable tight across the pipes.

The feed area preferably includes the pipe transfer arrangement for pushing the pipe lengths down the length of the feed area over the rollers. The pipe transfer arrangement may include an arm, located at the front of the feed area. The arm may be used to push against the front face of the pipe length. The arm is preferably moved forward and rearwardly along the length of the feed area, and may be actuated by a hydraulic ram. The hydraulic ram preferably sits in line with the trailer body and has an extended position, aligning the arm at the front of the feed area channel and a retracted position, where the arm is spaced rearwardly from the front of the feed area. The distance that the arm is moved is advantageously the same distance from the rear of the feed area to the centre of the jaws of the welding device, whereby a pipe held in the feed area is slid rearwardly into the welding device, aligning the pipe lengths rear end face in the welding device ready for fusing to another pipe length, that's front end face is in the rear half of the welding device. The combination of adjustable alignment of the height of the pipe length in

the feed area and the predetermined transfer distance allows for accurate and repeatable feeding of sequential pipe lengths into the welding device.

Also disclosed herein is a method of transporting and welding pipe to create a pipe string for installation, the method including:

5 loading lengths of pipe onto a truck trailer;

transporting said lengths of pipe to an installation site;

sequentially feeding said lengths of pipe directly from the trailer into a welding device located at or adjacent the rear of the truck trailer and welding said lengths together to create a welded pipe string;

10 advancing the truck trailer such that the pipe string falls off the rear of the welding device for installation.

Advantageously, said sequential feed involves moving the pipe lengths from the trailer a predetermined transfer distance such that they automatically align with the welding device. Once in the welding device, preferably an operator heat fuses two pipe lengths together before the
15 truck trailer is advanced and another sequential pipe length is transferred into the welding device.

As used herein, except where the context requires otherwise, the term "comprise" and variations of the term, such as "comprising", "comprises" and "comprised", are not intended to exclude further additives, components, integers or steps.

Further aspects of the present invention and further embodiments of the aspects described
20 in the preceding paragraphs will become apparent from the following description, given by way of example and with reference to the accompanying drawings.

Brief description of the drawings

The invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

25 Figure 1 is a side view of a pipe transport and welding system according to a first embodiment of the present invention;

Figure 2 is a side view of a pipe transport and welding system according to a second embodiment of the present invention;

Figure 3 is a view looking from the front along the trailer of a system according to a third embodiment of the present invention being a variation on the second embodiment;

5 Figure 4 is a view similar to Figure 3, with pipe loaded on the trailer;

Figure 5 is a perspective side view of a winch system associated with the third embodiment;

Figure 6 is a rear perspective view of part of the trailer of the third embodiment of the system, with a first pipe being pushed rearward;

10 Figure 7 is a front perspective view of a pipe in the welding device of the system according to the third embodiment;

Figure 8 is a view from the rear of the system of Figure 3;

15 Figure 9 is a perspective front view from a first side of a pipe transport and welding system according to a fourth embodiment of the present invention, being a variation on the second and third embodiments;

Figure 10 is a perspective front view from the other side of the system of Figure 9;

Figure 11 is a side view of a pipe transferring arrangement in a first extended position;

Figure 12 is a side view similar to Figure 11 with the pipe transferring arrangement in a second retracted position;

20 Figure 13 is a rear top view of the pipe transferring arrangement of Figure 12;

Figure 14 is a front view of the pipe transferring arrangement in the first extended position;

Figure 15 is a top front view of the pipe transferring arrangement in the first extended position;

25 Figure 16 is a rear perspective view of a section of the pipe transferring arrangement; and

Figure 17 is a rear side view of the system of Figure 9.

Detailed description of the embodiments

2013201635 07 Mar 2013

5 The present invention has come from the realisation that by combining the transportation and on-site handling of pipes the overall efficiency of the process of laying pipes can be increased, as double handling is removed. Current processes for installing pipe start with the delivering of pipe lengths to site, transferring it to a holding area; as required transferring the pipe lengths from the holding area to the welding machine and then pulling the entire length of welded pipe from the working area to the first end of a trench. The present invention removes this double handling by providing a truck trailer that is used to transport the pipe to site, holds 10 the pipe lengths whilst on site and pushes sequential pipe lengths into the welding device to create a length of welded pipe called a pipe string. The truck and trailer is then advanced from the first end of the trench along its length as the welded pipe string grows in length. This movement of the truck and trailer allows the pipe string to drop off the rear of the arrangement once it has been welded. This system means that there is very little, if any, manual handling of 15 the pipes required.

Two key embodiments of the invention are envisaged, as illustrated in Figures 1 and 2, respectively. The first system includes a truck trailer 10, pulled behind a truck 12, with a separate welding apparatus 14 that follows behind the trailer 10 when on site. This trailer may be dragged behind the trailer 10 or may be separately driven to follow behind the trailer. The alternative 20 second system shown in Figure 2 includes the welding apparatus 14 integrated into the truck trailer 10. The advantage of the follow along welding apparatus is that it can stay on site and two trucks can be used to alternatively transport pipe to the site, with one truck always remaining on site and being used to weld. However, the integral system provides for more accurate alignment of the pipes on the truck trailer as they enter the welding apparatus. Particularly for larger 25 diameter pipe, potentially a full days worth of pipe can be held on the trailer, so there is no need for the truck to return to pick up additional pipe throughout the day. Alternatively a second truck with another integral welding apparatus can also be provided with the trucks alternating between being on site and transporting another load of pipes. The more efficient system will be determined by the particular job. The remaining drawings illustrate the integral embodiment as 30 shown in Figure 2; however generally the same elements are provided in the follow along version.

The truck trailer 10 has a body 16 which is a longitudinal beam with a front end 18 and a rear end 20. The front end 18 connects to a truck 12 in the usual fashion, and the rear end 20 includes a set of four wheels 22. As can best be seen in Figure 3, in order to accommodate different lengths of pipe, the body 16 can be extended and retracted telescopically, with an inner box section tube 24 sliding into an outer box section tube 26 at opening 28.

As also best seen from Figure 3, across its width, the trailer 10 has a pipe support frame 30 that defines a storage area 32 above the body beam 16 and a feed area 34 adjacent to and below the storage area 32. It is from the feed area 34 that sequential pipes 36 are pushed rearwardly into the welding apparatus 14. Figure 4 shows the pipe 36 as it is transported to site.

Only a single layer of pipe 36 is shown, however it will be appreciated that multiple layers of pipe can be stacked depending on the size and weight of the pipe. The width of the storage area 32 can also be varied, as the support frame 30 comprises spaced parallel arms 38 of a telescopic nature, where a first arm portion 40 slides into and out of a second arm portion 42 to make the storage area 32 wider or narrower to accommodate the particular pipe being transported. The outer end of first arm portion 40 includes an upright bracket 44 to prevent the pipes 36 from rolling off the side of the trailer. As shown in Figure 4, the pipes are tied down with at least one cable 46 that extends over the top of the pipes.

The spaced arms 38 defining the storage area 32 are generally horizontal; however they have a slight angle downwards towards the feed area 34. This means that, if unrestrained by the cable 46, if the feed area 34 is empty, or partly empty, then the closest pipe 36 will fall under gravity from the storage area 32 into the feed area 34, as illustrated in Figure 6. This means that the pipe lengths 36 gravity feed into the feed area 34 lowering the manual handling requirements.

The feed area 34 is defined by a plurality of parallel spaced L-shaped arms 48 that extend out from the lower side of the body 16 (see Figure 5) to create a channel. Again box section tubular steel is used, with bracing elements providing rigidity to the structure. The horizontal portions 49 of arms 48 are similarly extendable with an inner tube 50 being telescopically slidable within an outer tube 52 to accommodate the different sizes of pipes. The upright portion 54 of arm 48 has an inner first vertical roller 56. A second horizontal roller 58 is held above the outer tube 52 by an upright support 60 that's height is also adjustable to accommodate different diameter pipes. The rollers 56, 58 allow the pipe 36 to be pushed along the length of the feed

area without drag from friction. The adjustment of the roller positions ensures that the pipe is aligned with the welding apparatus 14. The roller height and width adjustment may occur simultaneously through the use of hydraulic screw jacks.

The cable 46 extends across the bed of the storage area 32 from a winch system 62 located to one side of the body, the cable then loops over the top of the pipes 36 and is fastened with hooks 64 to the top of the upright portion 54 of an arm 48 (see Figure 5). The winch system 62 is used to tighten the cable 46 around the pipes 36 holding them onto the body of the trailer. Once on site, the cable hook 64 is unfastened and the first pipe 36a rolls under gravity into the feed area 34. If the first pipe 36a does not roll due to its stacking, the cable and winch system 62 can be used to drag the first pipe 36a into the feed area 34.

Once in the feed area 34, the second (front) end face 66 of the first pipe 36a is pushed by an arm 68 along the length of the feed area 34, until it is pushed into the welding apparatus 14. The very first pipe may be manual slid or roller driven until the second end 66 is positioned in the welding apparatus for joining to a subsequent pipe. As the first pipe 36a is pushed along the feed area, a second pipe 36b falls into the feed area (see Figure 6). Once the first pipe is clear of the feed area, the second end 66 of the second pipe 36b is pushed by the arm 68 until its first end 70 is positioned in the welding apparatus 14 (see Figure 7) for joining to the second end 66 of the first pipe 36a. Subsequent pipes are handled in the same way to create a long welded pipe string 37 (see Figure 8). A rear wall 72 is provided at the end of the storage area 32 to prevent pipes not in the feed area from entering the welding apparatus 14.

The welding apparatus 14 performs butt fusion welding, the two pipes 36a, 36b are clamped in place by pivoting jaws 74, facing occurs, where the ends of the pipes are shaved off; a hot plate is then placed between the ends to heat the polyethylene to molten. The hot plate is then removed and the two pipes are pushed together such that the molten ends fuse. Once joined, the truck 12 is advanced forward along the length of the trench, with the first pipe 36a and the first end of the second pipe 36b falling off the rear end of the system. The truck is stopped when the second end 66 of the second pipe 36b is located in the welding apparatus 14 ready to be joined to a subsequent third pipe, now located in the feed area 34. Using this system, the first time that a pipe comes into contact with the ground is after it has been welded; this reduces contamination of the pipe, both in terms of keeping the pipe ends clean for welding and reducing

07 Mar 2013

2013201635

the contaminants that enter the inside of the pipes prior to installation and use. The elimination of double handling also reduces the risk of pipe damage.

An important aspect of the design for reducing manual labour is the pipe transferring arrangement that assists in moving the pipe in the feed area 34 along its length. The pipe transferring arrangement includes the arm 68, see Figures 11 through 16. The arm 68 extends in an outward direction from the trailer body 16 and is positioned to extend across the front end 66 of a pipe 32 (see Figure 14), contacting the front surface of the pipe at at least one spot. The arm 68 is raised to the correct height by a supporting arm 69. The arms 68 movement is along the length of the trailer body 16 and is effected by a hydraulic ram 76 that is housed on a rail 78 that runs along the side of the body beam 16. The hydraulic ram 76 has a piston rod 80 that extends out from the cylinder barrel 82 that is affixed to the rail 78. The end of the piston rod is connected to the supporting arm 69 by pin 91 (see Figure 16). The piston rod 80 has an extended position shown in Figures 11, 14 and 15, which positions the arm 68 at the front of the feed area 34, in front of the first set of rollers 56, 58. To move the pipe rearwardly, the piston rod 80 is retracted into the cylinder barrel 82, pulling the arm 68 rearwardly forcing the pipe to travel over the series of rollers 56, 58 along the feed area. The main use of the pipe transferring arrangement is to accurately advance a pipe into the correct position in the welding apparatus 14. The pipe transferring arrangement is designed such that the length of the piston rod 80 and therefore the displacement of the arm 68 is equivalent to the distance from the rear of the feed area 34 and the centre of the welding apparatus clamping jaws 74. This is the distance that pipe 36 which has fallen into the feed area 34 needs to travel to be welded. The advancement of the pipe out of the welding apparatus 14 is effected by advancing the truck 12 forward, such that the welded pipe drops off the back of the truck trailer and welding apparatus. The accuracy of positioning the pipe into the welding apparatus automatically with the pipe transferring arrangement and adjustable rollers means that manual alignment is eliminated or reduced; this speeds up the overall welding process and reduces manual handling.

The integral welding apparatus 14 is located at the rear of the trailer 10, attached to the end of the body 16 and is contained within a welding booth 84, which has a platform 86 for the operator(s) to stand on. The booth 84 is preferably enclosed to protect equipment and personnel from contamination. As shown in Figure 7, the pipe is pushed out of the rear of the feed area 34 and over rearmost rollers 56, 58 onto a V-shaped roller arrangement 88, aligning the pipe with the welding apparatus jaws 74. The jaws 74 are interchangeable with jaws of different sizes to

match the size of pipe currently being laid. The booth 84 includes a roof 90 so that welding can be performed in all weather conditions. At the rear of the welding apparatus 14 is a detachable pipe roller 92, which is a wheeled frame 94 with a V-shaped roller 96 that supports the welded pipe string 37 and allows it to be gradually placed on the ground as the truck advances.

5 The advantages of this integrated system are that there is no need to handle the pipe during delivery to site and welding. The self alignment of the system reduces manual handling and speeds up the overall process as realignment time is removed with accurate repeatability being provided. This results in more pipe string being prepared in a shorter time frame. As the welding process constitutes the governing time factor for pipe installation, the faster it can
10 happen the faster the pipe is installed.

It will be understood that the invention disclosed and defined in this specification extends to all alternative combinations of two or more of the individual features mentioned or evident from the text or drawings. All of these different combinations constitute various alternative aspects of the invention.

07 Mar 2013

2013201635

CLAIMS

1. A truck trailer for transporting pipe lengths, including:
- a trailer body having a front end and a rear end and being supported on at least one set of wheels;
 - a storage area on the trailer body to hold pipe lengths during transport and storage;
 - a feed area adjacent the storage area for feeding sequential pipes into a welding device located at or adjacent the rear end of the trailer body; and
 - a pipe transfer arrangement for sliding said sequential pipes along the feed area into the welding device, wherein the height of the feed area and the width of the feed area are adjustable to accommodate pipes of different diameters and such that said sequential pipes repeatably align with the welding device.
2. A truck trailer according to claim 1, wherein the welding device is located within a housing that is integrally formed on the truck trailer and located at the rear end of the trailer body.
3. A truck trailer according to claim 2, wherein the welding housing includes a standing platform for the operator, with the welding device being aligned with the feed area, such that pipe lengths pushed off the rear end of the feed area slide straight into the jaws of the welding device.
4. A truck trailer according to claim 1, wherein the welding device is a separate device on wheels that is towed, or separately driven, adjacent the rear end of the trailer.
5. A truck trailer according to any one of claims 1 to 4, wherein the welding device sits atop a platform, with the height of the welding device or the platform being adjustable such that the jaws of the welding device may be aligned with the pipe lengths being fed from the feed area of the truck trailer.
6. A truck trailer according to any one of the preceding claims, wherein the storage area and the feed area are adjacent one another such that their lengths are parallel and align with the length of the trailer body.

7. A truck trailer according to claim 6, wherein the storage area is sloped downward towards the feed area such that pipe lengths will gravity feed into the feed area.
8. A truck trailer according to any one of the preceding claims, wherein the storage area is defined by a pipe support frame.
- 5 9. A truck trailer according to claim 8, wherein the pipe support frame comprises a plurality of parallel spaced arms which support the pipe lengths above the trailer body.
10. A truck trailer according to claim 9, wherein each of the arms is downwardly orientated, such that pipe lengths will automatically roll into the adjacent feed area when a previous pipe length is slid out of the feed area.
- 10 11. A truck trailer according to any one of the preceding claims, wherein the storage area is defined at the front and rear by end walls, such that the pipe lengths cannot move forward or rearwardly during transport.
12. A truck trailer according to claim 11, wherein the length of the storage area and parallel feed area is variable, with the body of the trailer being extendible.
- 15 13. A truck trailer according to claim 12, wherein the body comprises a longitudinal box section beam, having an outer tube and an inner tube telescopically housed within the outer tube, such that the overall length of the body can be altered to match the length of pipe being transported.
14. A truck trailer according to claim 9, wherein the storage area is defined on one of its outer
20 sides by upright arms to prevent the pipe lengths from rolling off the edge of the trailer.
15. A truck trailer according to claim 9 or 14, whereby the plurality of parallel spaced arms comprise inner and outer tubular lengths, telescopically coupled.
16. A truck trailer according to any one of the preceding claims, wherein the feed area is a long channel, sized to house a single pipe length, and runs along the side of the storage area.

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17. A truck trailer according to claim 16, wherein the feed area is defined by a series of spaced L-shaped brackets, which extend outwardly from the trailer body.
18. A truck trailer according to claim 17, wherein the L-shaped brackets have at least their substantially horizontal arm constructed as a telescopic arm, with an inner tube sliding within an outer tube.
19. A truck trailer according to claim 17 or 18, wherein the upright arm of the L-shaped bracket includes a substantially vertical roller.
20. A truck trailer according to claim 19, wherein an additional substantially horizontal roller is provided that is supported on an adjustable upright arm, whereby the height of the roller may be adjusted to align with the height of the welding device.
21. A truck trailer according to claim 20, wherein the upright arm is telescopic.
22. A truck trailer according to any one of claims 19 to 21, wherein the position of the plurality of like rollers may be adjusted simultaneously.
23. A truck trailer according to any one of the preceding claims, wherein the feed area includes the pipe transfer arrangement for pushing the pipe lengths down the length of the feed area over the rollers.
24. A truck trailer according to claim 23, wherein the pipe transfer arrangement includes an arm, located at the front of the feed area, the arm being used to push against the front face of the pipe length.
25. A truck trailer according to claim 24, wherein the arm is moved forward and rearwardly along the length of the feed area.
26. A truck trailer according to claim 25, wherein the arm is actuated by a hydraulic ram that sits in line with the trailer body and has an extended position, aligning the arm at

the front of the feed area channel and a retracted position, where the arm is spaced rearwardly from the front of the feed area.

27. A truck trailer according to claim 25 or 26, wherein the distance that the arm is moved is the same distance from the rear of the feed area to the centre of the jaws of the welding device, whereby a pipe held in the feed area is slid rearwardly into the welding device, aligning the pipe lengths rear end face in the welding device ready for fusing to another pipe length, that's front end face is in the rear half of the welding device.

28. A pipe transport and welding system, including:

a truck connected to a truck trailer according to any one of claims 1 to 27; and
a welding device;

wherein pipe is transported on the truck trailer and in turn fed directly from the truck trailer into the welding device to be fused together to form a welded pipe string, whereby advancement of the truck allows the pipe string to fall off the rear of the welding device for installation.

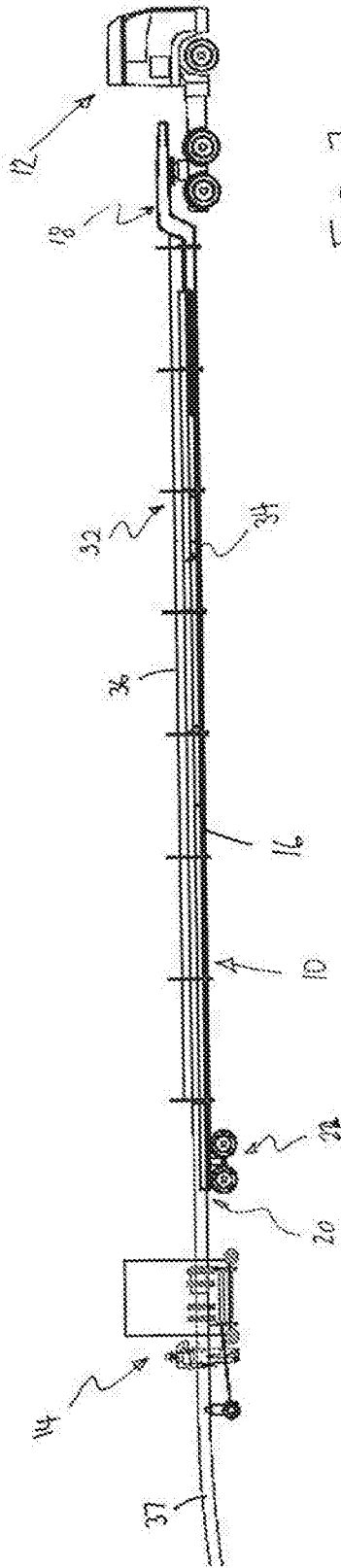


FIG 1

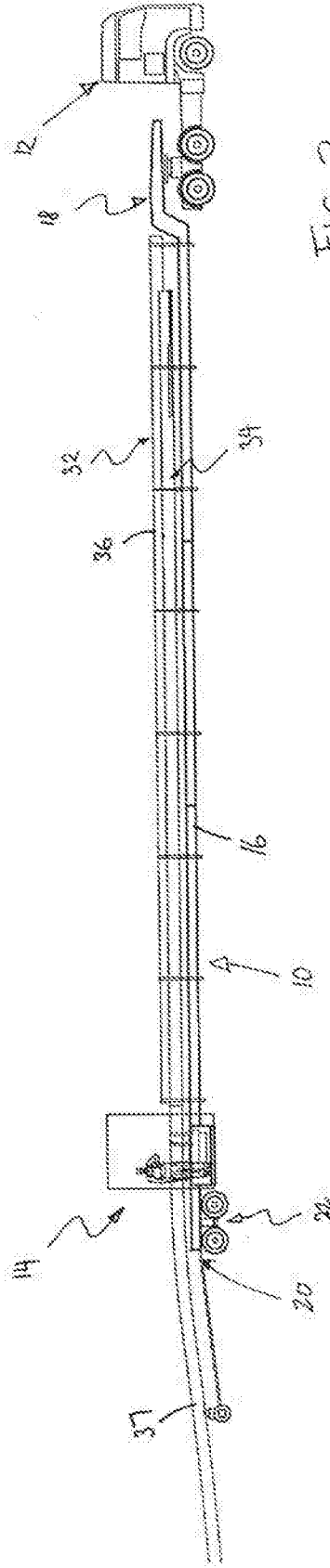


FIG 2

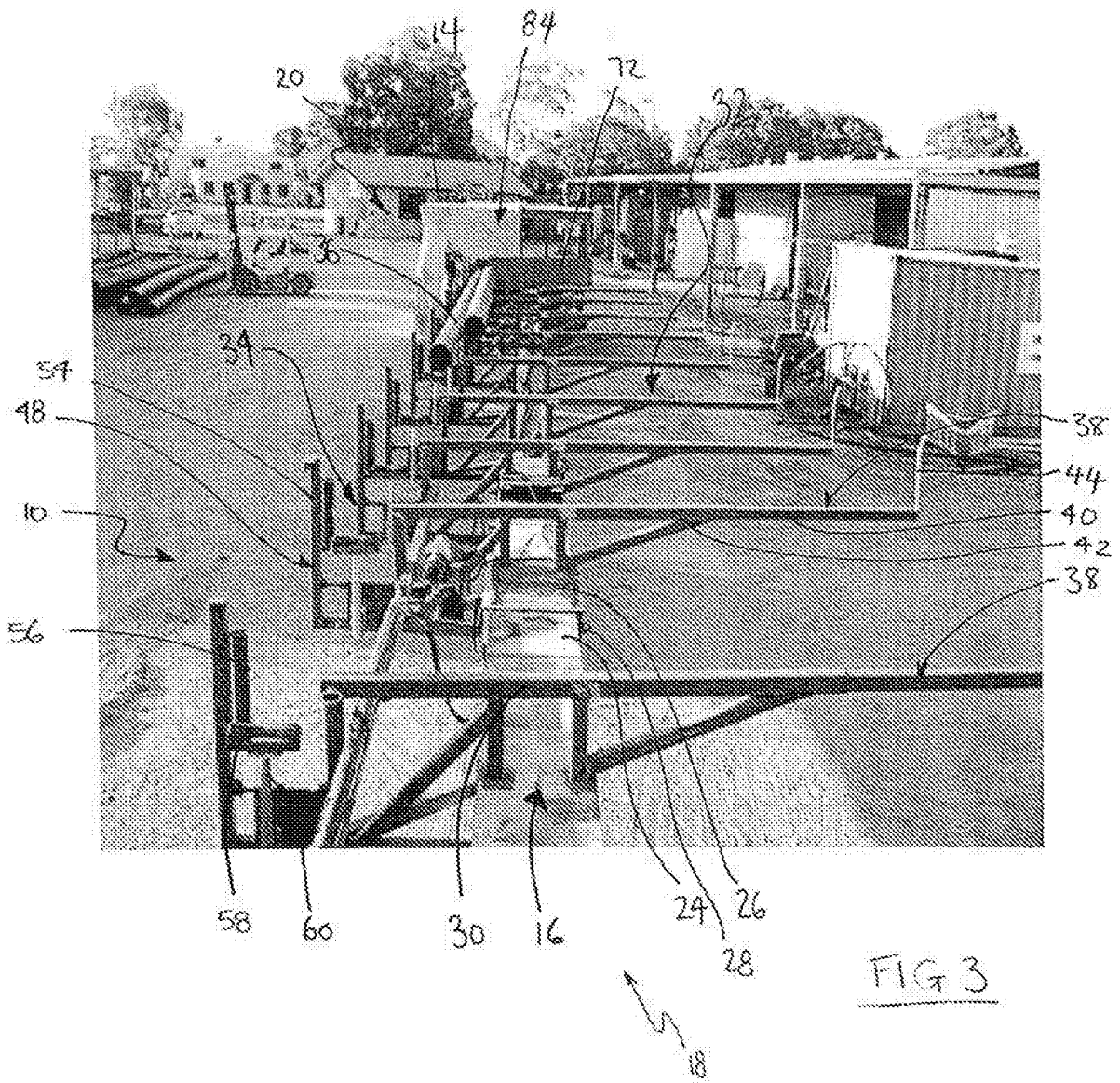


FIG 3

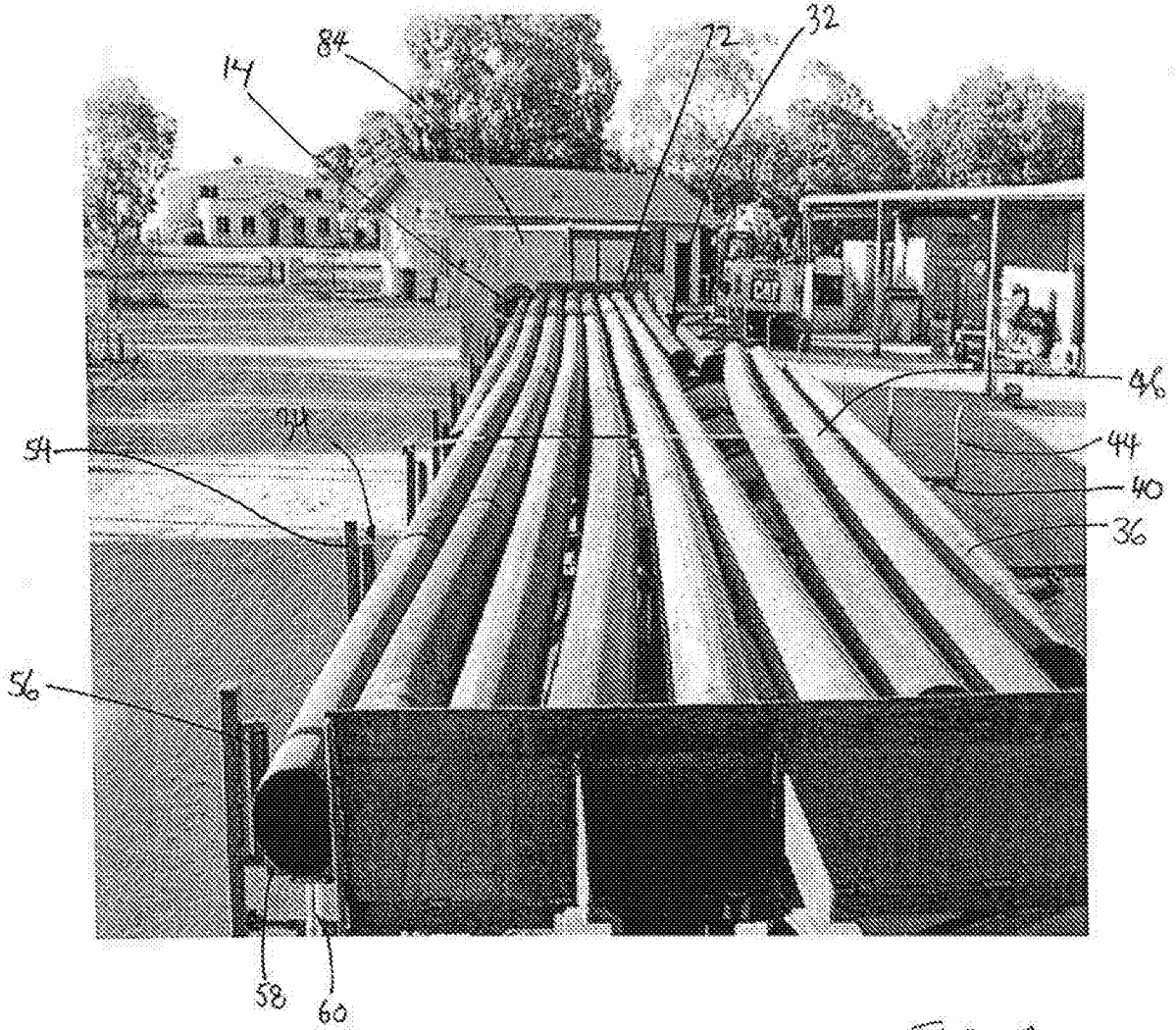


FIG 1

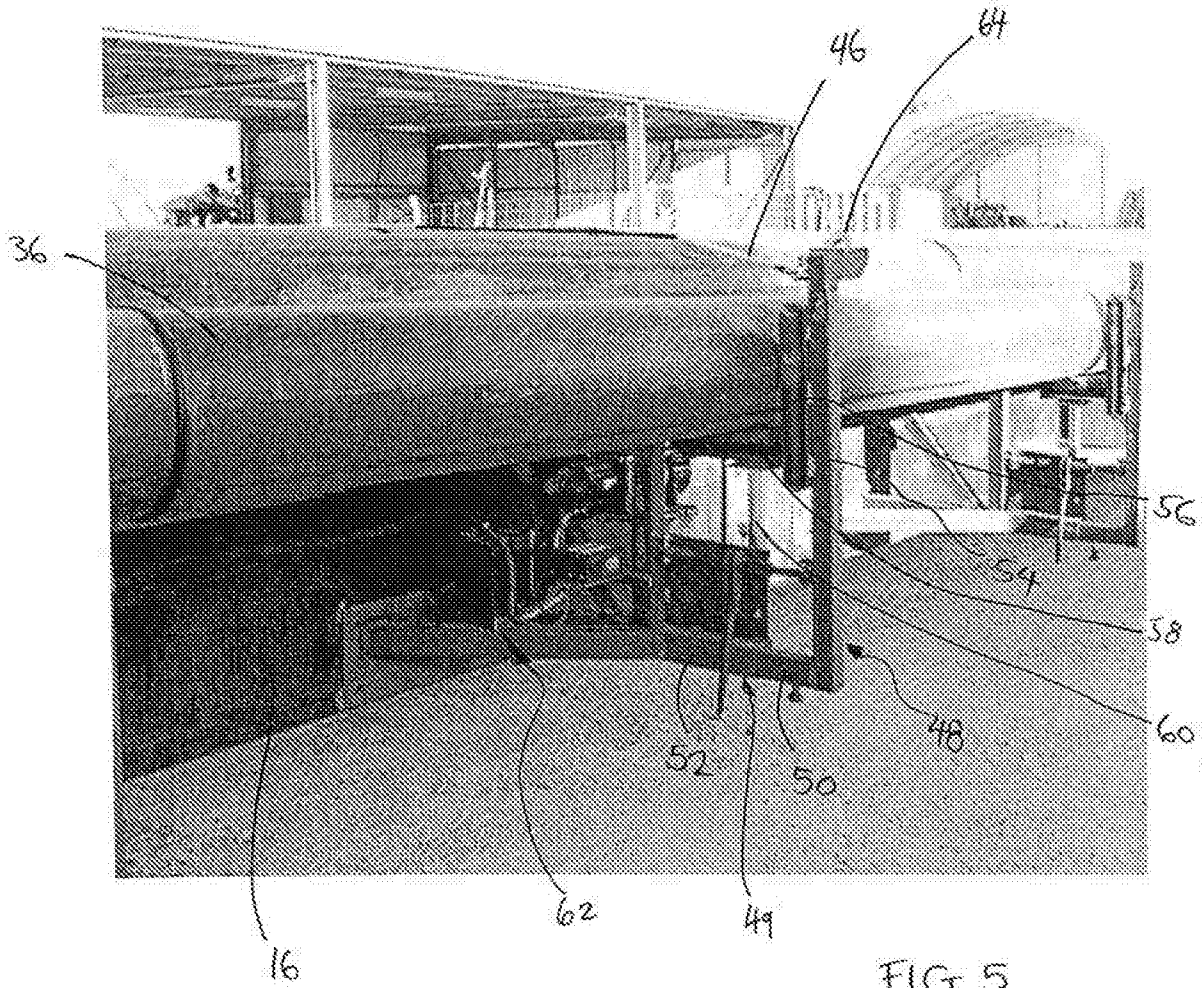


FIG 5

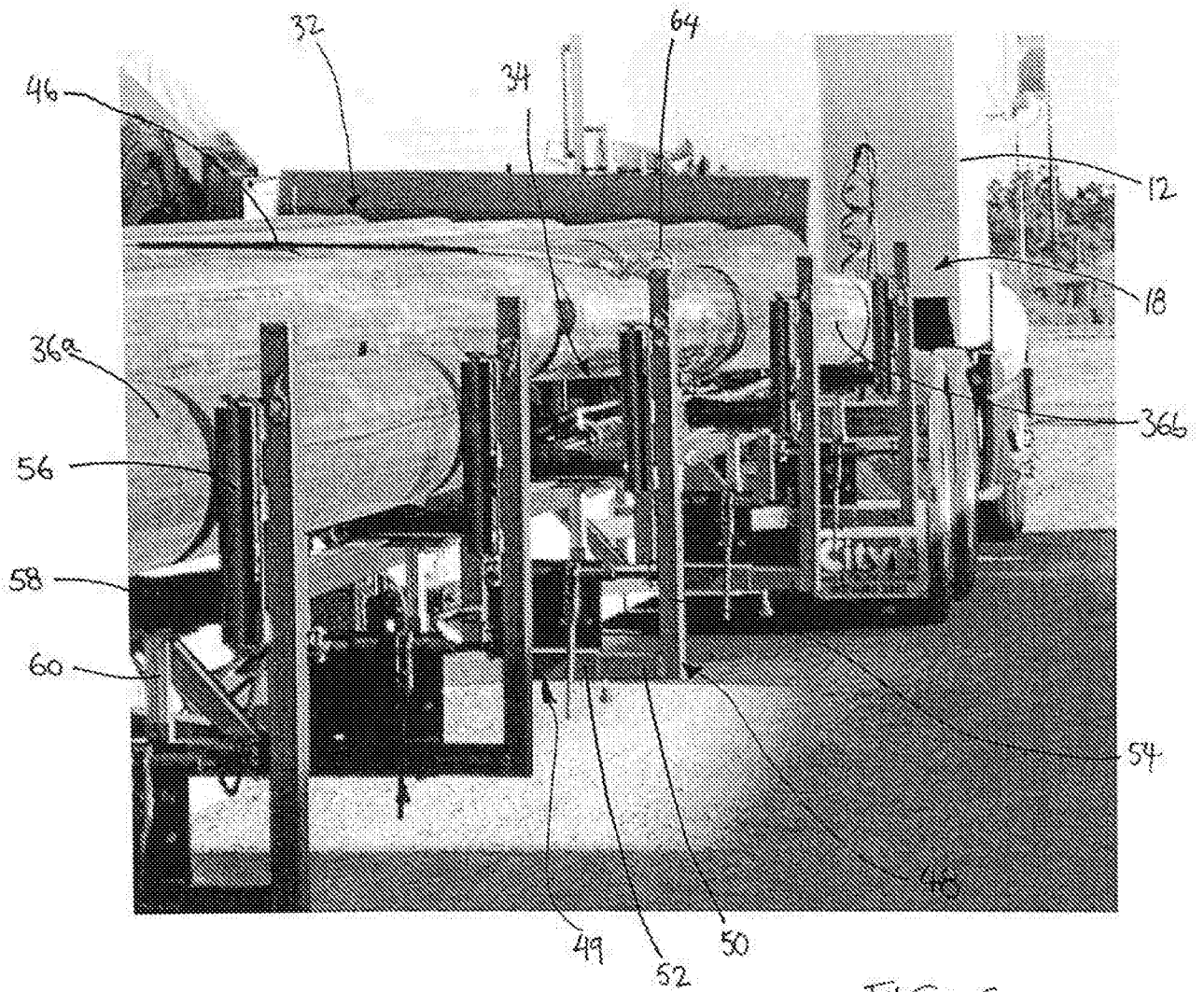
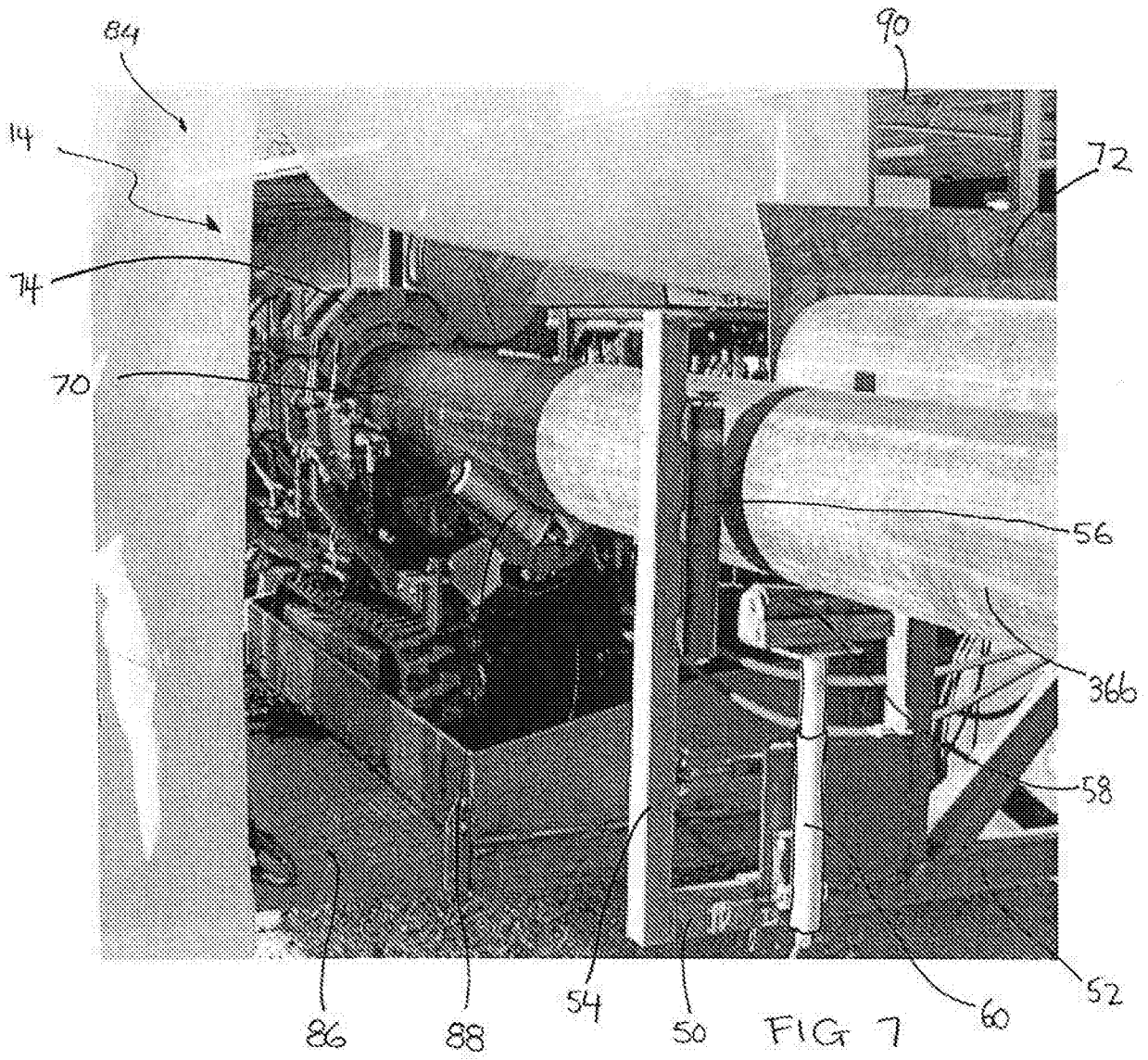


FIG. 6



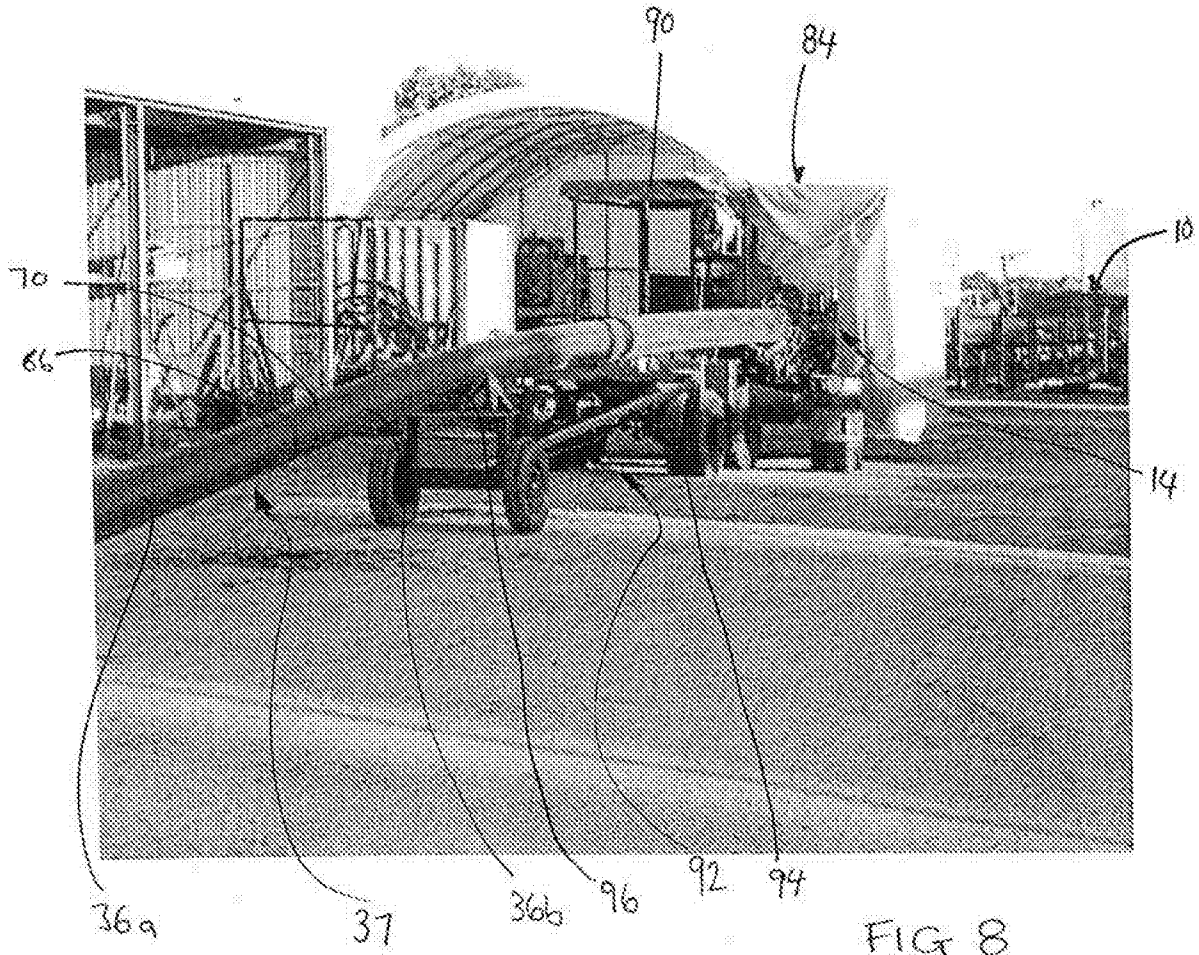


FIG 8

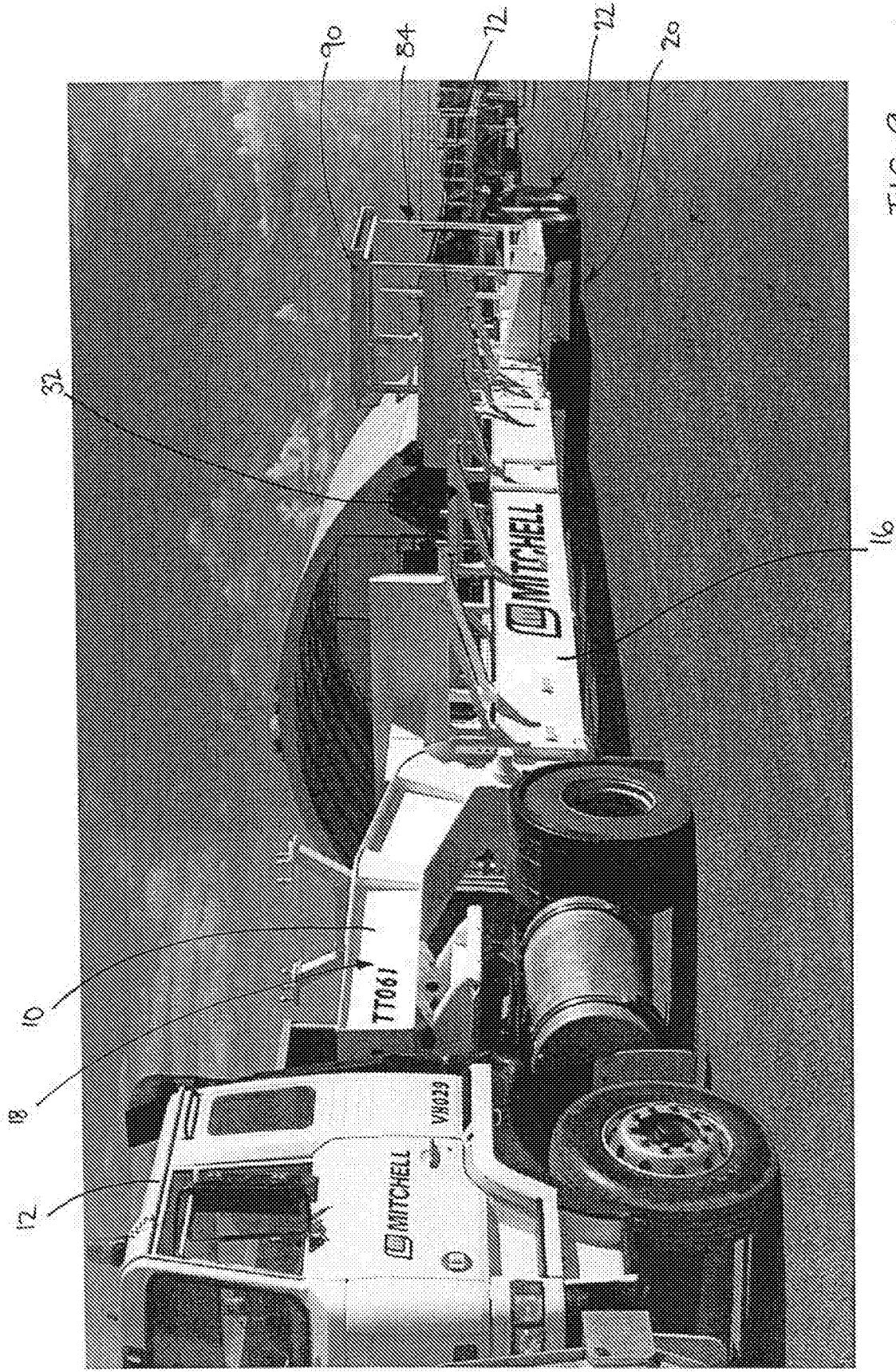
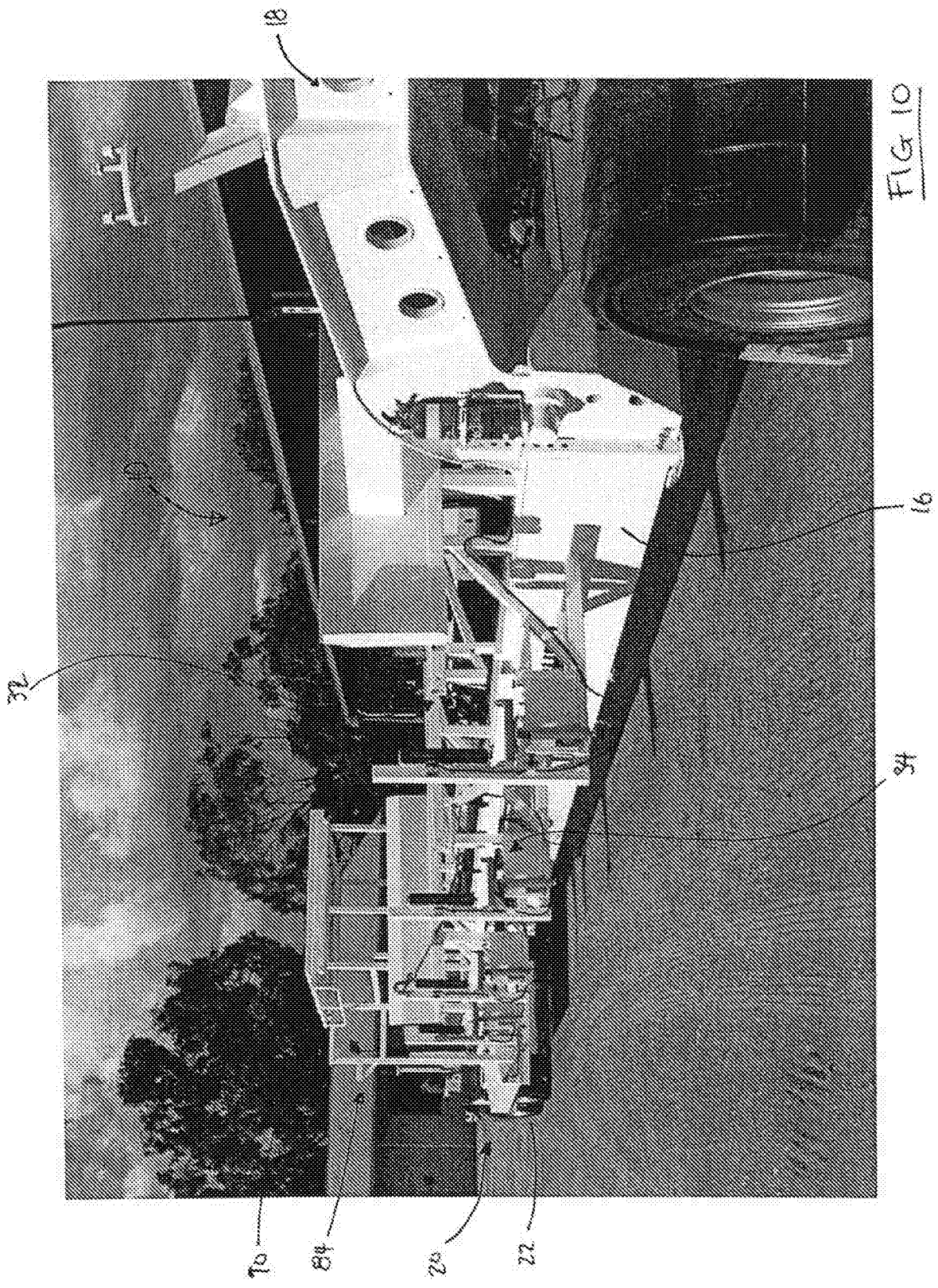


FIG 9



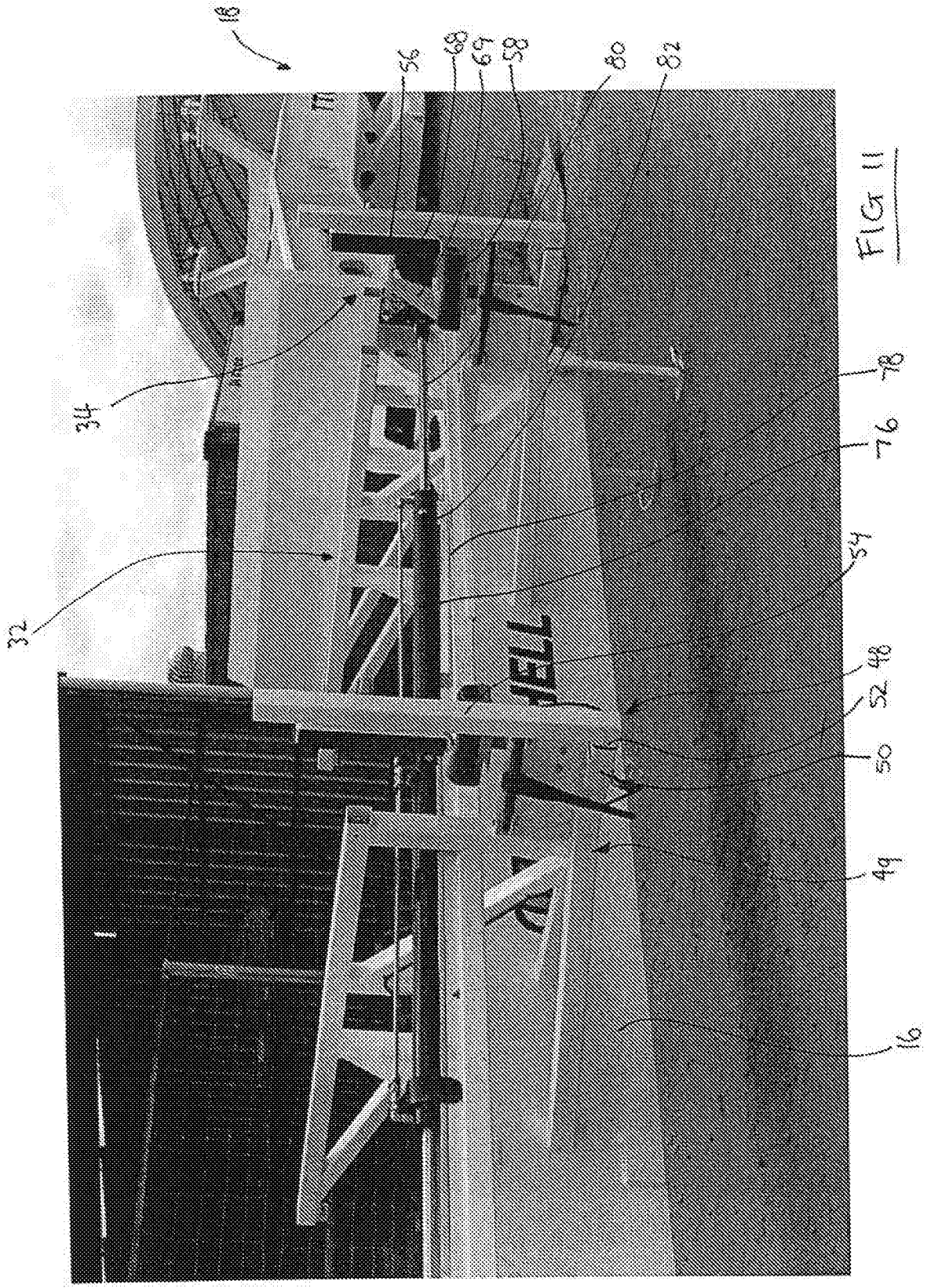




FIG 12

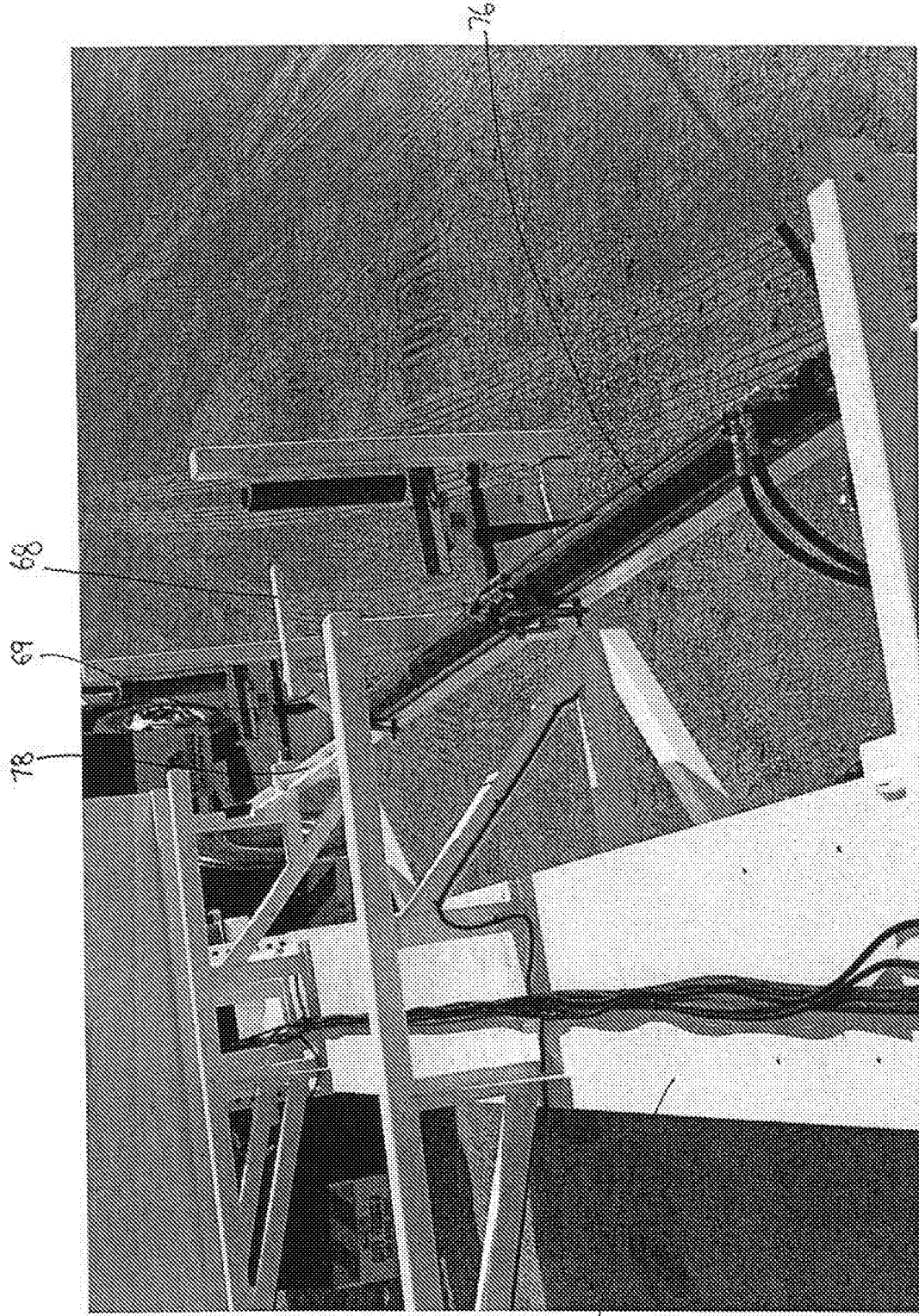


FIG. 13

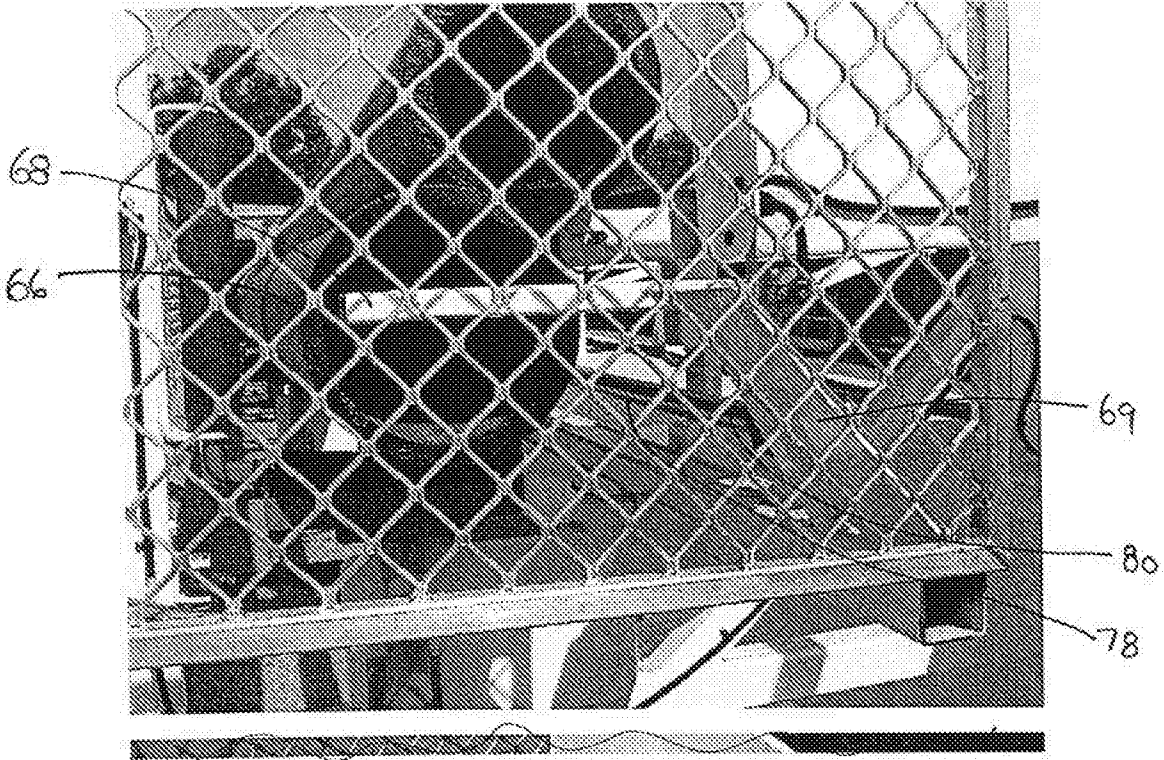
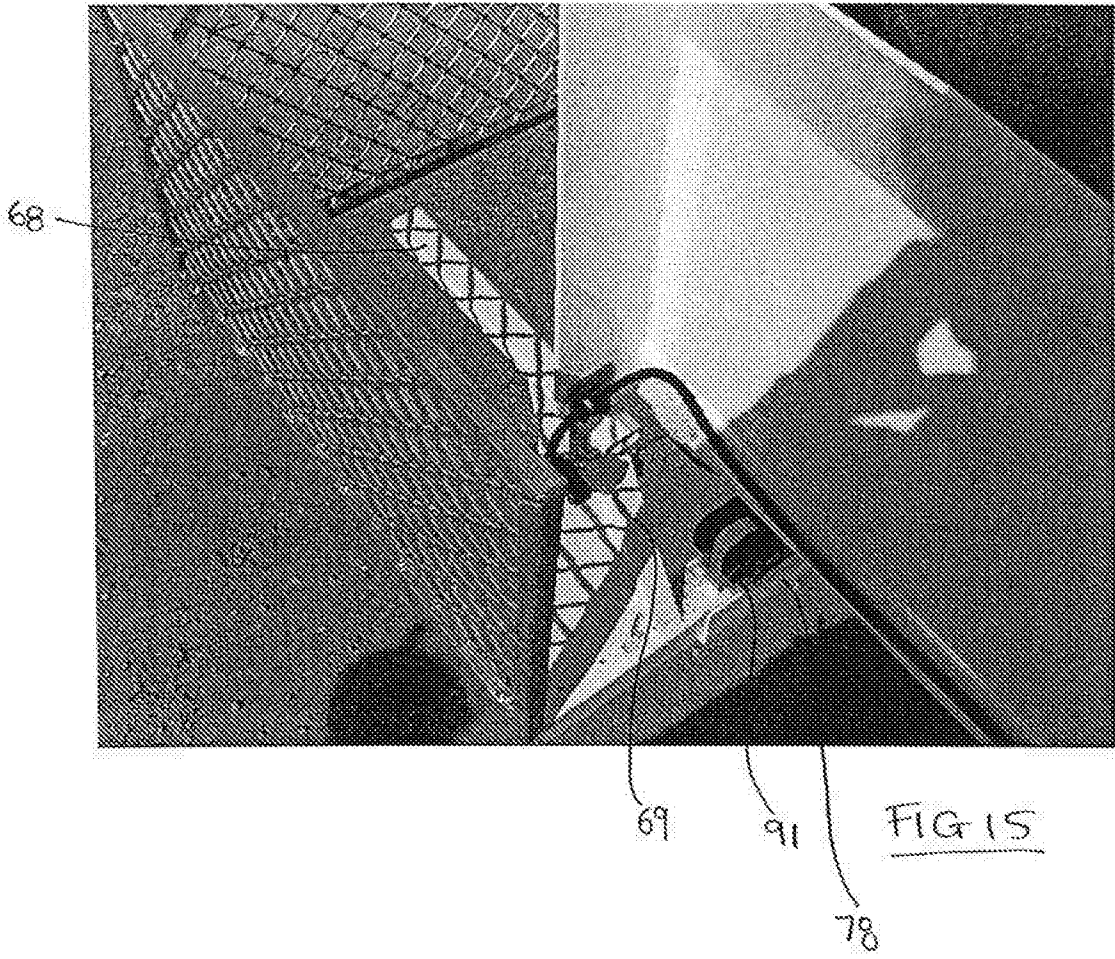


FIG 14



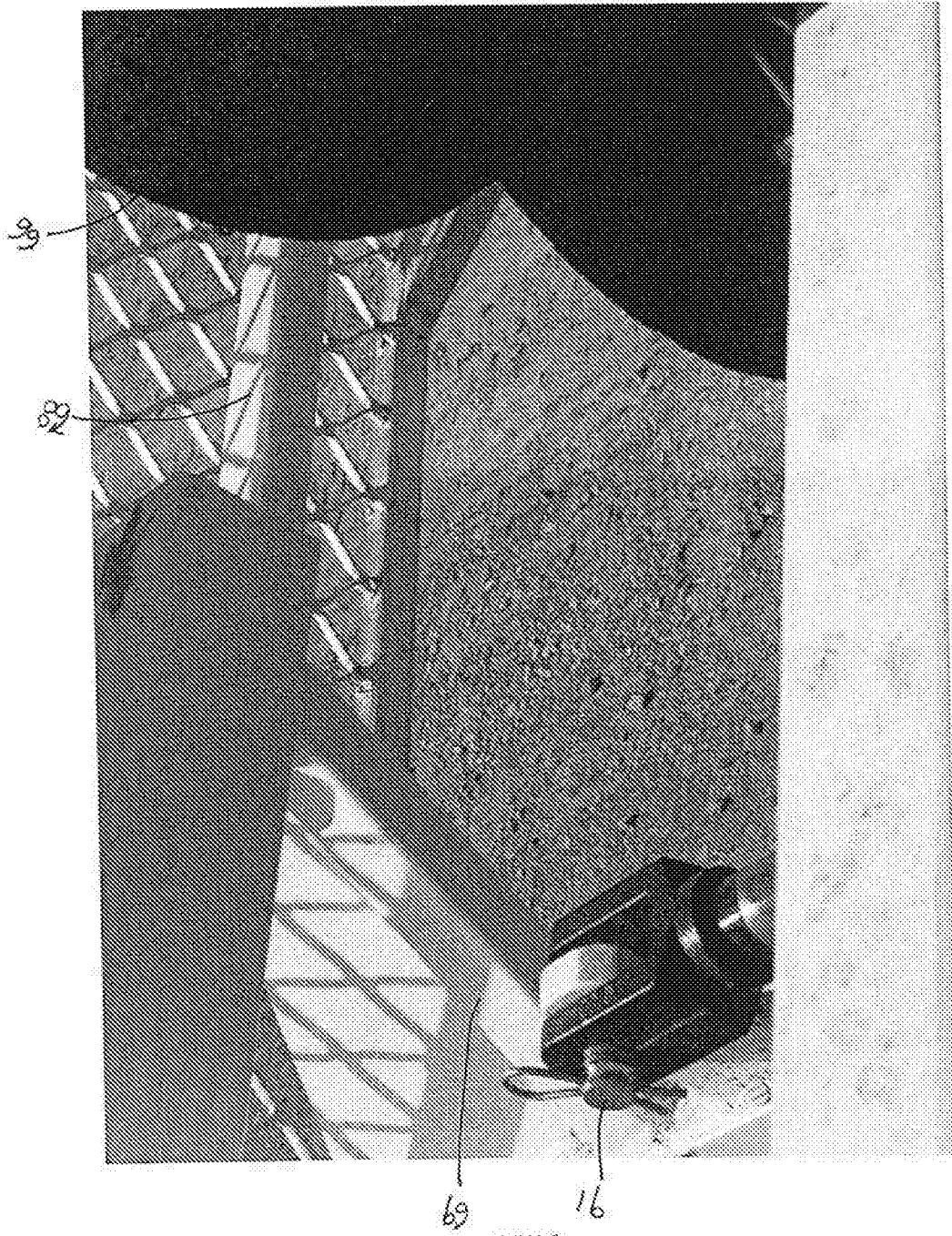


FIG 16

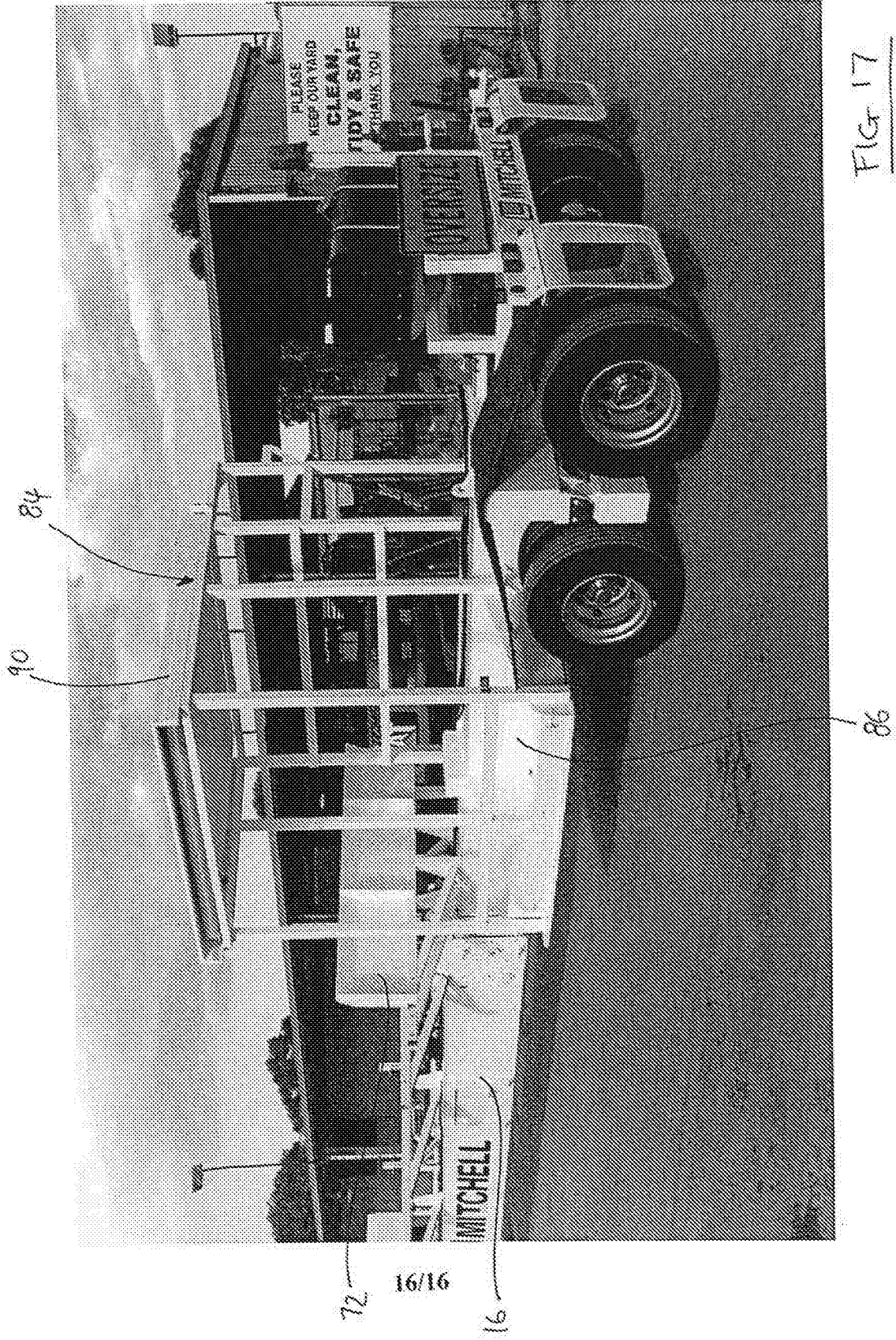


FIG. 17