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(54) **APPARATUS AND METHOD FOR INDIVIDUAL TO MAINTENANCE AIR CONDITIONING UNIT**

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(57) **ABSTRACT**

An air conditioning maintenancing system employs a lifting unit which does not in operation require a specialized support structure that must be used and transported with the lifting unit. Instead the lifting unit is designed for utilization with commonly existing construction equipment that can, after being utilized with the lifting unit, be used at separate locations to carry out different tasks.

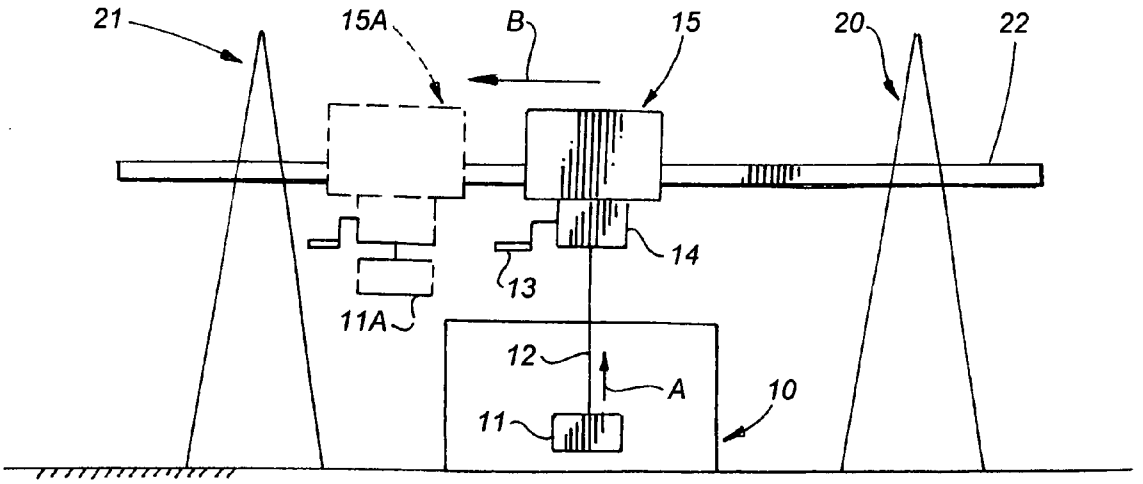
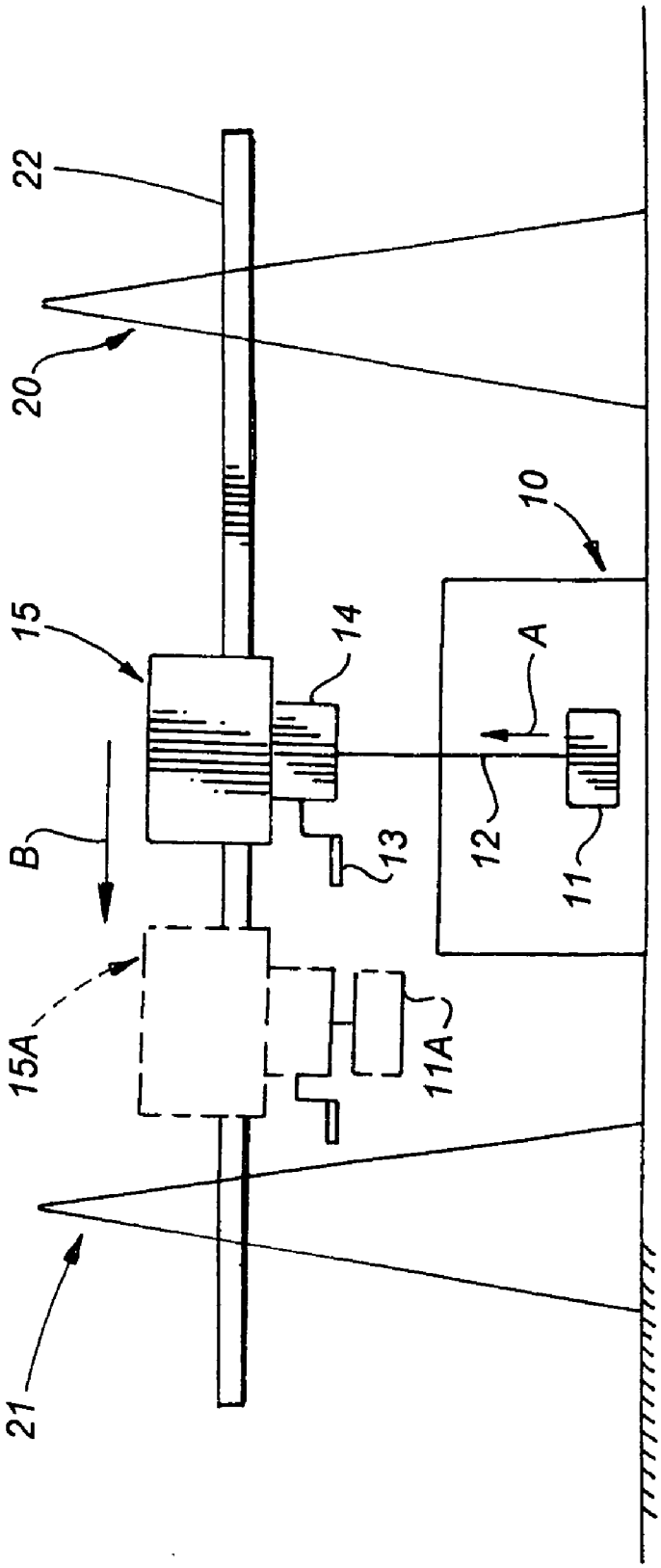


FIG. 1



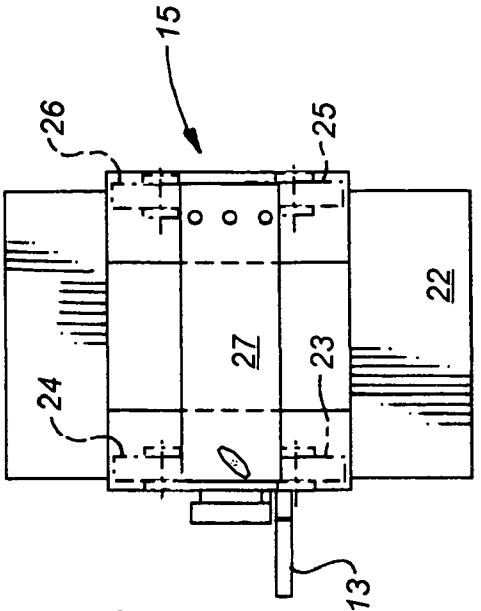


FIG. 2

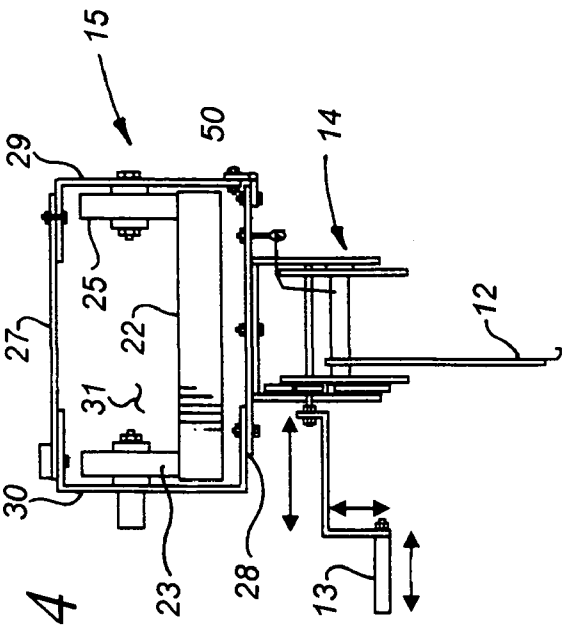


FIG. 4

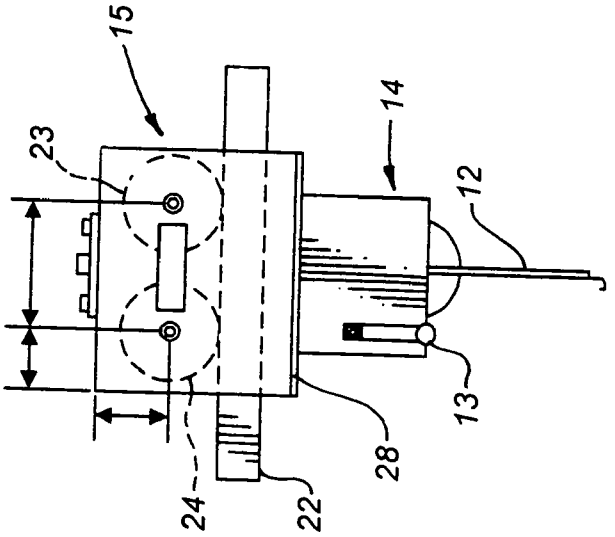


FIG. 3

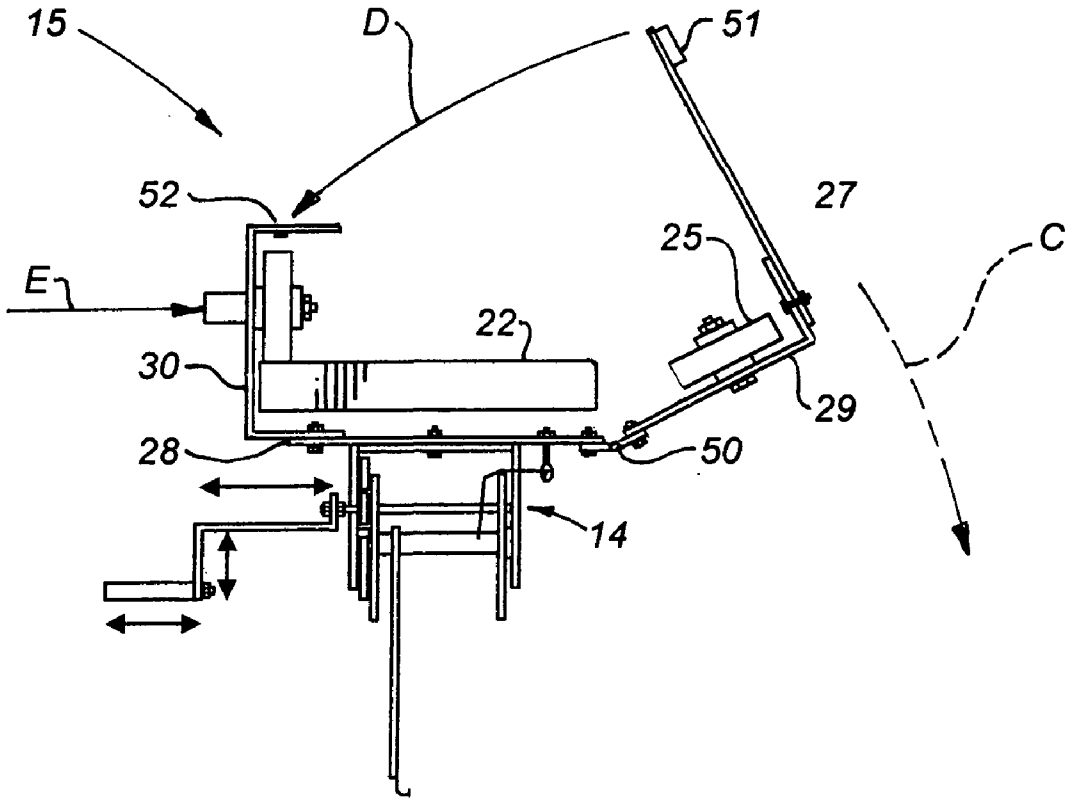


FIG. 5

APPARATUS AND METHOD FOR INDIVIDUAL TO MAINTENANCE AIR CONDITIONING UNIT

[0001] This invention relates to air conditioning units.

[0002] More particularly, the invention relates to a method and apparatus to maintenance an air conditioning unit.

[0003] Those of skill in the art have for many years attempted to improve procedures for maintenancing an air conditioning unit.

[0004] Accordingly, it would be highly desirable to provide an improved method and apparatus to maintenance an air conditioning unit.

[0005] Therefore, it is a principal object of the instant invention to provide an improved system to assemble equipment at remote site to maintenance an air conditioning unit at the remote site.

[0006] This and other, further and more specific objects and advantages of the invention will be apparent to those skilled in the art from the following detailed description thereof, taken in conjunction with the drawings, in which:

[0007] FIG. **1** is a side view illustrating an air conditioning unit maintenancing system constructed in accordance with the invention;

[0008] FIG. **2** is a top view of a portion of the system of FIG. **1** illustrating additional construction details thereof;

[0009] FIG. **3** is a side view of the apparatus of FIG. **2** illustrating additional construction details thereof;

[0010] FIG. **4** is a front view of the portion of the apparatus of FIG. **2** illustrating additional construction details thereof; and,

[0011] FIG. **5** is a front view of the portion of the apparatus of FIG. **2** illustrating the mode of operation thereof.

[0012] Briefly, in accordance with the invention, provided is an improved method for an individual to maintenance at a remote site an air conditioning unit which includes a compressor. The improved method includes the step of providing at a first location a lifting unit for use in conjunction with a horizontally oriented elongate orthogonal wood plank having an upper surface, a bottom surface, and a pair of parallel spaced apart edges. The lifting unit includes a hollow generally orthogonal housing. The housing includes a top; a bottom opposed to and spaced apart from the top; a first side interconnecting the top and the bottom; a second side interconnecting the top and the bottom and spaced apart and opposed to the first side and pivotally connected to the bottom; a first open end; and, a second open end spaced apart from and opposed to the first open end. The top, bottom, and sides circumscribe a hollow inner area. At least a first pair of wheels is rotatably mounted on the first side in the hollow inner area a first selected distance above the bottom. At least a second pair of wheels is rotatably mounted on the second side in the hollow inner area a second selected distance above the bottom and opposed to and spaced apart from the first pair of wheels. A winch is mounted on and extending outwardly away from the bottom and the hollow inner area. The lifting unit is shaped and dimensioned to mount on the orthogonal wood plank such that the plank extends from and through the first open end to and through the second open end, and intermediate the wheels and the bottom such that the wheels freely roll along the upper surface. The first side and top are pivotally adjustable between two operative positions, a first open operative position which permits said lifting unit to be laterally slid onto the plank, and a second closed operative position. The improved method also includes the steps of mounting the lifting unit on a transport vehicle at a first location separate from the remote work site to maintenance the air conditioning unit; driving the vehicle from the first location to the remote work site; obtaining at the remote work site the orthogonal wooden plank; obtaining at the remote work site a pair of free standing A-frame ladders each including a plurality of steps for climbing the ladder; positioning the free standing ladders on either side of the air conditioning unit; positioning the plank to rest on a step in each ladder and to extend horizontally over the air conditioning unit from one of the ladders to the other of the ladders; pivoting the first side and top to the first open operative position; mounting the lifting unit on the plank such that the plank extends intermediate the wheels and the upper surface of the lifting unit such that said wheels freely roll along said upper surface; pivoting the first side and top to the second closed operative position; manually pushing the lifting unit along the plank to a position above the compressor in the air conditioning unit; utilizing the winch to lift the compressor upwardly out of the air conditioning unit; manually pushing the lifting unit along the plank to a position to remove the compressor from the winch; removing the compressor from the winch; removing the lifting unit from the plank and placing the lifting unit on the transport vehicle; storing the ladders and the plank at the remote site; and, driving the transport vehicle from the remote work site to the first location. Each of the foregoing steps is carried out by the same individual.

[0013] Turning now to the drawings, which describe the presently preferred embodiments of the invention for the purpose of illustrating the practice thereof and not by way of limitation of the scope of the invention, and in which like characters refer to corresponding elements throughout the several views, FIG. **1** illustrates an air conditioning maintenance system in accordance with the invention and including an orthogonal lifting unit **15**, orthogonal plank **22**, and a pair of free standing A-frame ladders **20** and **21**. Ladders **20** and **21** each include, in conventional fashion, a series of spaced apart horizontally oriented steps that an individual uses to climb the ladder. Orthogonal plank **22** includes a planar upper surface, a planar bottom surface that is spaced apart from and parallel to the planar upper surface, and includes a pair of spaced apart parallel sides which extend between and interconnect the upper and bottom surfaces. The upper and bottom surfaces have a width equal to something less than twelve inches. The side surfaces have a width equal to something less than two inches. In FIG. **4**, wheels **23** and **25** set on the upper surface of plank **22**.

[0014] Lifting unit **15** includes planar top **27**, and planar bottom **28** that is generally parallel to top **27**. Planar side **29** extends between and is normal to top **27** and bottom **28**. Planar side **30** extends between and is normal to top **27** and bottom **28**. Side **30** is also spaced apart from and parallel to planar side **29**. Top **27**, bottom **28**, and sides **29** and **30** circumscribe hollow inner area **31**. Unit **15** includes a pair of spaced apart open ends. In FIG. **3**, one of the open ends is on the left hand side of unit **15** while the other of the open ends is on the right hand side of unit **15**. Plank **22** extends into the open end on the left hand side of unit **15**, extends through unit **15**, and extends out through the open end on the right hand side of unit **15**.

[0015] At least one pair of wheels **23** and **24** is rotatably mounted on side **30** in hollow area **31** a first selected distance

above bottom **28**. At least one pair of wheels **25** and **26** is rotatably mounted on side **29** in hollow area **31** a second selected distance above bottom **28**. The first and second selected distances are sufficient to permit plank **22** to extend intermediate bottom **28** and wheels **23** to **26** in the manner illustrated in FIGS. **3** and **4**. The distance of one wheel **23** above bottom **28** can vary from that of the remaining wheels **24** to **26**, and, the size of one wheel **23** with respect to that of the remaining wheels **24** to **26** can vary. However, it is presently preferred that each wheel **23** to **26** have a size equivalent to the other wheels **23** to **26** and that the distance of each wheel above bottom **28** be equivalent.

[0016] When unit **15** is properly oriented on plank **22**, only the wheels **23** to **26** contact plank **22**. The top **27**, bottom **28**, and sides **29**, **30** are spaced apart from plank **22** such that the wheels **23** to **26** of unit **15** can freely roll along the upper surface of plank **22** without any other part of unit **15** contacting plank **22**. Sides **29** and **30** are, however, preferably spaced only a short distance apart from the sides of plank **22**. The distance of a side **29**, **30** from a side of plank **22** is in the range of 1/16 of an inch to one inch, preferably in the range of 1/16 of an inch to one-half inch. The short distance between the sides of plank **22** and sides **29** and **30** means that if unit **15** begins to move off line and is not moving in a direction parallel to the longitudinal axis of plank **22**, the sides **29** and **30** will contact the sides of plank **22**, requiring a user to reorient unit **15** such that it is moving straight along plank **22** in a direction of travel parallel to the longitudinal axis of plank **22**.

[0017] Winch unit **14** is attached to and extends outwardly from bottom **28**. Unit **14** includes a spindle or axle which is rotated by manually turning and operating handle **13** to deploy cable **12** from the spindle or, alternatively, to draw in and coil cable **12** about the spindle. As would be appreciated by those of skill in the art, a drill or other mechanism can, instead of handle, be utilized to rotate the spindle to dispense or draw in cable **12**.

[0018] While the maintenancing operation set forth in the following example can be carried out collectively by two or more individuals, a particular advantage of the invention is that the process can be performed by a single individual. Accordingly, in the example, reference is made to only a single technician.

EXAMPLE

[0019] An air conditioning unit **10** at a remote site is identified for maintenancing. A technician provides a lifting unit **15** at a starting location. He loads unit **15** onto a transport vehicle at a starting location. The transport vehicle is driven by the technician from the starting location to the remote site. The technician prepares compressor **11** for removal from air conditioning unit **10**. He removes the lifting unit **15** from the transport vehicle. He locates a plank **22** at the remote site, and locates a pair of free-standing A frame ladders at the remote site. He places each ladder **20**, **21** on an opposite side of air conditioning unit **10** in the manner illustrated in FIG. **1**. The ladders (along with plank **22**) are located at the remote site by unloading them from the transport vehicle, by obtaining them from other source before the transport vehicle reaches the remote site or after the transport vehicle reaches the site. Each ladder **20**, **21** includes a plurality of spaced apart steps (not visible) utilized by an individual to climb the ladder. Plank **22** is mounted by the technician in a horizontal orientation on ladders **20** and **21** such that one end of plank **22** is supported by a step on ladder **20** and the other end of plank **22** is supported by a step on ladder **21**. Plank **22** is positioned on ladders **20** and **21** at a sufficient height above air conditioning unit **10** to permit compressor **11** to be raised clear of unit **10** so that the compressor **11** and unit **15** can be rolled along plank **22** in the direction of arrow B (FIG. **1**) to a position in which compressor **11** is no longer over air conditioning unit **10**. Lifting unit **15** is mounted by the technician on plank **22** and is manually pushed so that wheels **23** to **26** roll along the top surface of plank **22** to a desired position with winch unit **14** positioned over a compressor **11** in air conditioning unit **10**. The technician operates winch unit **14** to extend cable **12** down to compressor **11**. He connects cable **12** to compressor **11** and operates winch unit **14** to draw cable **12** about the spindle in unit **14** to lift compressor **11** upwardly out and clear of air conditioning unit **10**. Lifting unit **15** is manually pushed by the technician such that wheels **23** to **26** roll over the upper surface of plank **22** and unit **15** moves in the direction of arrow B in FIG. **1** to the position indicated by dashed lines **15**A and **11**A in FIG. **1**. He then removes the compressor **11**A from cable **12**. If desired, before compressor **11**A is removed from cable **12**, winch unit **14** can be operated such that cable **12** is extended and compressor **11**A drops to a position on the ground or on some other surface below compressor **11**A. The lifting unit **15** is placed by the technician in the transport vehicle and he drives the vehicle back to the starting location or to some other location. The ladders **20** and **21** and plank **22** can be stored at the remote location by loading them on the transport vehicle, or by storing them at some other selected location. The ladders **20** and **21** and plank **22** can be returned to the starting location or can be transported to some other location. As would be appreciated by those of skill in the art, a new compressor can be installed in air conditioning unit **10** by simply reversing the sequence of steps described in this paragraph in order to remove the compressor **11** from unit **10**.

[0020] Unit **15** can be mounted on plank **22** utilizing any desired procedure. In one procedure, unit **15** is rolled onto one end of plank **22** before plank **22** is mounted on ladders **20** and **21**. In another procedure, one side **29** is temporarily removed from unit **15** and the remaining portions of unit **15** are laterally moved onto plank **22**, after which side **29** is reattached to unit **15**. A further procedure for mounting unit **15** on plank **22** is illustrated in FIG. **5** and can be readily achieved by an individual, as can setting up ladders **20** and **21**, and mounting plank **22** in the ladders. The lower end of side **29** is pivotally attached to bottom **28** by a piano hinge **50** extending along one edge of bottom **28**. Latch **51** detachably secures top **27** to lip **52**. When latch **51** is opened, top **27** and side **29** are pivoted about hinge **50** in the direction of arrow C to an open position which permits bottom **28**, side **30**, and wheels **23** and **24** to be laterally slid in the direction of arrow onto plank **22** to the position illustrated in FIG. **5**. Once bottom **28**, side **30**, and wheels **23** and **24** are in the position depicted in FIG. **5**, top **27** and side **29** are pivoted about hinge **50** in the direction of arrow D back to the position illustrated in FIG. **4** and latch **51** is manipulated to secure top **27** to lip **52**.

[0021] One advantage of the invention is that specialized support structures are not, as is the case in the prior art, required to utilize lifting unit **15**. Another advantage of the invention is the lifting unit **15** is utilized with common construction equipment that can readily be found in many different locations. A further advantage of the invention is that the common construction equipment that is utilized in combination with lifting unit **15** can, after being utilized with lifting unit **15**, be utilized in a variety of other construction projects.

Still another advantage of the invention is that when lifting unit **15** is transported to a work site, specialized support structures need not be transported with unit **15**. Still a further advantage of the maintenance system of the invention is that it can be operated by a single individual. Yet still another advantage of the invention is that plank **22** and ladders **20** and **21** can readily be carried on pickup trucks that often are utilized by individual maintenancing air conditioning units. Yet still a further advantage of the invention is that plank **22** and ladders **20** and **21** can, instead of be located at the remote site at which an air conditioning unit is being maintenance, be loaded onto a vehicle with a lifting unit **15** before the vehicle departs for the remote site, or, at some intermediate location at which the vehicle stops on the way to the remote site.

[0022] Having set forth the presently preferred embodiments of our invention in such terms as to enable those skilled in the art to make and use the invention.

I claim:

1. A method for an individual to maintenance at a remote site an air conditioning unit which includes a compressor, comprising the steps of

(a) providing at a first location a lifting unit for use in conjunction with a horizontally oriented elongate orthogonal wood plank having an upper surface, a bottom surface, and a pair of parallel spaced apart edges, said lifting unit including

(i) a hollow generally orthogonal housing including

a top,

a bottom opposed to and spaced apart from said top,

a first side interconnecting said top and said bottom,

a second side interconnecting said top and said bottom and spaced apart and opposed to said first side and pivotally attached to said bottom,

a first open end, and

a second open end spaced apart from and opposed to said first open end,

said top, bottom, and sides circumscribing a hollow inner area,

(ii) at least a first pair of wheels rotatably mounted on said first side in said hollow inner area a first selected distance above said bottom,

(iii) at least a second pair of wheels rotatably mounted on said second side in said hollow inner area a second selected distance above said bottom and opposed to and spaced apart from said first pair of wheels,

(iv) a winch mounted on and extending outwardly away from said bottom and said hollow inner area,

said lifting unit shaped and dimensioned to mount on the orthogonal wood plank such that the plank extends from and through said first open end to and through said second open end, and

intermediate said wheels and said bottom surface such that said wheels freely roll along said upper surface,

said first side and top being pivotally adjustable between two operative positions,

a first open operative position which permits said lifting unit to be laterally slid onto to plank, and

a second closed operative position;

(b) mounting said lifting unit on a transport vehicle at said first location separate from the remote work site to maintenance the air conditioning unit;

(c) driving said vehicle from said first location to the remote work site;

(d) obtaining while at the remote work site the orthogonal wooden plank;

(e) obtaining while at the remote work site a pair of free standing A-frame ladders each including a plurality of steps for climbing the ladder;

(f) positioning said free standing ladders on either side of the air conditioning unit;

(g) positioning the plank to rest on a step in each ladder and to extend horizontally over the air conditioning unit from one of said ladders to the other of said ladders;

(h) pivoting said first side and top to said first open operative position;

(i) laterally mounting said lifting unit on the plank such that the plank extends intermediate said wheels and said upper surface of the plank such that said wheels freely roll along said upper surface;

(j) pivoting said first side and top to said second closed operative position;

(k) manually pushing said lifting unit along the plank to a position above the compressor in the air conditioning unit;

(l) utilizing said winch to lift the compressor upwardly out of the air conditioning unit;

(m) manually pushing said lifting unit along the plank to a position to remove the compressor from the winch;

(n) removing the compressor from the winch;

(o) removing said lifting unit from the plank and placing said lifting unit on the transport vehicle;

(p) storing while at said remote site said ladders and said plank; and,

(q) driving said transport vehicle from the remote work site to said first location;

each of said above steps carried out by the same individual.

* * * * *