

March 12, 1946.

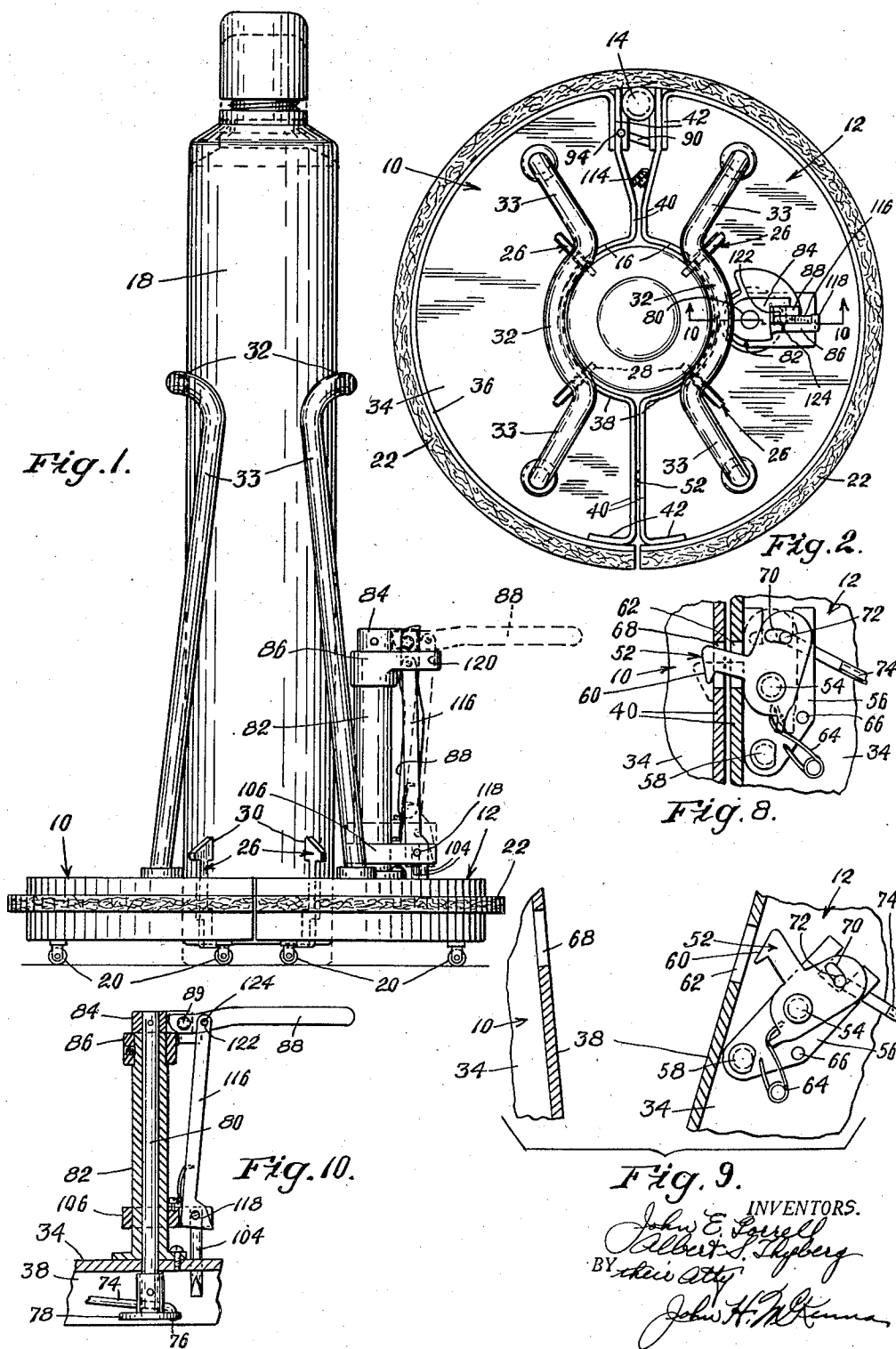
J. E. GORRELL ET AL

2,396,368

CARRIER APPARATUS

Filed Jan. 25, 1945

2 Sheets-Sheet 1



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Fig. 3.

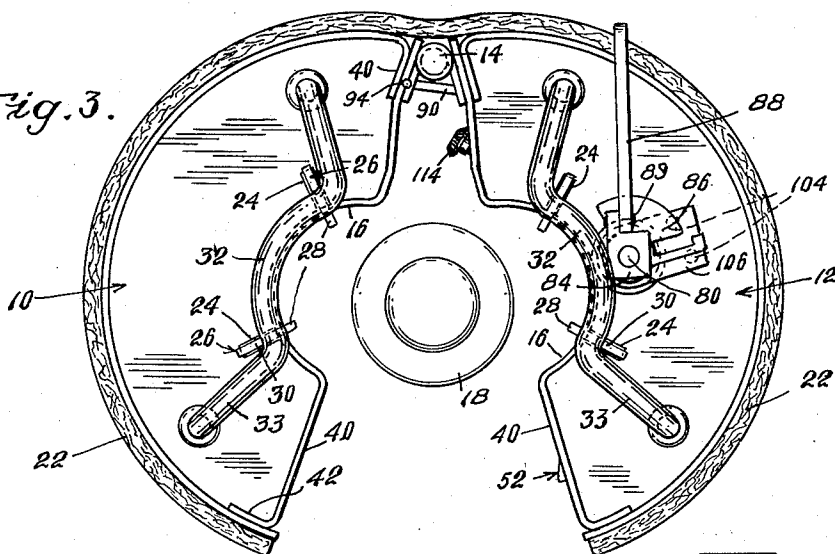
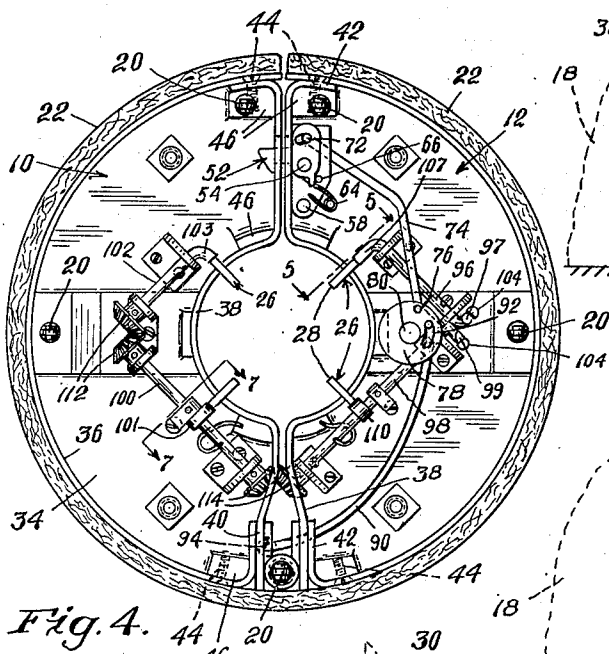


Fig. 4.

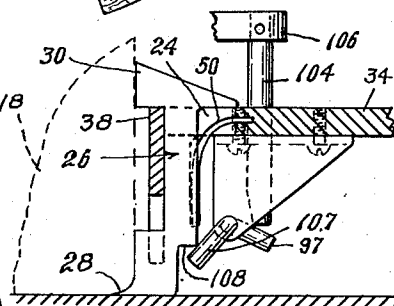


Fig. 5.

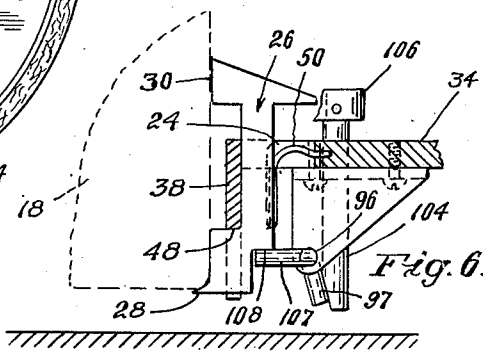
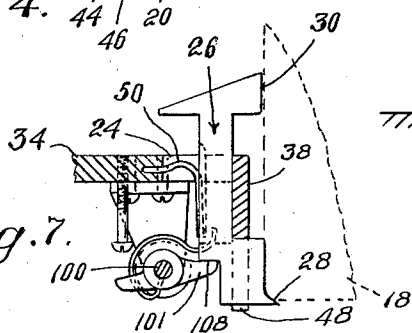


Fig. 6.

Fig. 7.



UNITED STATES PATENT OFFICE

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CARRIER APPARATUS

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10 Claims. (Cl. 214—65.4)

This invention relates to apparatus for lifting and transporting objects of the general sort which are adapted to rest on a floor or the like. More particularly it provides apparatus which has special utility for the safe and efficient handling of oxygen cylinders and the like where extreme care is required to avoid any possibility of the cap or closure becoming broken, or disengaged accidentally, and the valve opened or broken, as may happen with dire results if a charged cylinder is dropped or tipped over. However, our invention has utility for handling and transporting various kinds and shapes of objects without need for manual lifting of the object and with assurance that the object cannot be damaged by tipping or falling in the course of handling and transport thereof from place to place. Hence our invention provides safety for the person handling the object as well as for the object itself.

Oxygen cylinders ordinarily have capacity for holding either one hundred ten or two hundred twenty cubic feet of oxygen gas, and have shape which gives to them a general top-heaviness when standing on end. Their high center of gravity renders them generally unstable and easy to tip over. Charged cylinders constitute a hazard wherever they may be lest one be accidentally tipped over and its valve broken or opened in case the cap comes off. They constitute a still greater hazard when being lifted and carried from place to place as is requisite in hospitals and like institutions wherein the cylinders frequently must be transported from a storage space to the bedside of a patient.

Prior devices for handling and transporting oxygen cylinders have been in the nature of hand trucks which are subject to being accidentally tripped over with one or more cylinders therein, and which do not protect the cylinders against accidentally being banged against a wall or door jamb in the course of transportation of the cylinders. Also the loading and unloading of the prior trucks have involved a tilting of the cylinders in getting them on and off the truck with danger that a cylinder may slip and fall or tip over with the attendant danger of serious consequences.

It is among the objects of our invention to provide apparatus which is adapted to be moved into straddling relation to an object to be lifted, and to be closed around the base of the object while the object continues erect and resting on end on a floor or the like, followed by an elevating of the object within the apparatus to lift it clear of the floor preparatory to movement of the

apparatus with the object erect therein to a desired destination.

Another object is to provide a carrier apparatus having hinged base sections closable around an object to be transported, the base having wheels at its under side elevating the base only relatively little above the floor, and the base having relatively large area obviating possibility of tipping over of the base.

A further object is to provide a carrier apparatus having hinged base sections closable around an object to be lifted and having means operable to secure the base sections closed about the object and simultaneously operable for elevating the object within the apparatus preparatory to a movement of the apparatus with the object supported therein.

Still another object is to provide a carrier apparatus having hinged base sections closable around an object to be lifted and having object embracing means rising from the respective base sections for maintaining the object against tipping relative to the base.

A yet further object is to provide hinged base sections in a carrier apparatus and means for closing said sections around an object to be lifted and for elevating the object within the closed sections, and having means operable to open the base sections only after said object has been lowered within the apparatus.

It is, moreover, our purpose and object generally to improve upon prior carrier devices, especially carrier devices for transporting oxygen cylinders and the like.

In the accompanying drawings:

Figure 1 is a side elevation of a carrier apparatus embodying features of our invention, and having an oxygen cylinder mounted therein;

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

Figure 3 is a view similar to Figure 2 but showing the base sections in open condition;

Figure 4 is a bottom plan view of the apparatus of Figure 1;

Figure 5 is a fragmentary detail sectional view on line 5—5 of Figure 4, showing a cylinder-engaging lifting element in its lowermost position;

Figure 6 is a similar view showing the lifting element elevated;

Figure 7 is a fragmentary detail sectional view on line 7—7 of Figure 4, showing a different lifting element in its elevated position;

Figures 8 and 9 are fragmentary detail sectional views of the latch mechanism for the hinged base sections; and

Figure 10 is a fragmentary detail sectional view on line 10—10 of Figure 2, but with the operating handle elevated.

Referring to the drawings, our improved carrier apparatus as shown is designed especially for handling oxygen cylinders, although the various features thereof may be embodied in a carrier capable of lifting and transporting objects of different shapes and character without departing from the basic inventive principles involved.

In the embodiment illustrated, the base is generally circular in form and comprises the two sections 10, 12 hinged together at 14. Each of the base sections has a central semi-circular cut out 16 which together define a central circular hole extending through the base, within which the lower end of an oxygen cylinder 18 is adapted to extend loosely. The base, when its sections are closed together as in Figs. 1 and 2, constitutes a relatively large-area disk having swivelled casters 20 on the under side of the sections on which the apparatus readily may be wheeled from place to place. Preferably the casters are of size to elevate the base only a small distance above the floor. If desired, strips 22 of rubber or other resilient material may be provided on the peripheries of the base sections to serve as bumpers.

A series of radial slots 24 are distributed around the central opening 16, two such slots being shown in each base section, disposed equidistant from each other when the base sections are closed together. Mounted for vertical bodily movement in each slot 24 is a lifting element 26 provided at its lower end with an inwardly projecting finger 28 for engaging under the lower end of an oxygen cylinder and at its upper end with a guiding head 30 adapted to engage against the cylinder a little above the base to guide and steady the cylinder in the apparatus. Also rising from the base sections are the cylinder retaining elements 32 which engage relatively high up around the cylinder when the base sections are closed together, the generally vertical portions 33 thereof constituting handles which may be grasped to push or pull the apparatus from place to place.

Referring to Fig. 4 and the detail views, it will be observed that each base section as represented comprises a top plate 34 having the outer and inner depending flanges 36, 38, respectively, the two flanges being connected at opposite sides of the central cut out 16 of each section by the connecting flanges 40, 42. Conveniently, the flanges may be pieces of strap iron shaped to the contour of a plate 34 and secured by screws 44 or the like to lugs or bosses 46 on the under side of each plate 34. With this construction, the previously mentioned radial slots 24 may be formed as radial grooves in the plates 34 and the inner strap iron flange 38 constitutes the inner wall of the slots 24. Also the inner flanges 38 of the base sections are notched as at 48 from the lower edges of the flanges upward, adjacent each slot 24, so that the lower portions of the lifting elements 26 can project through the notches 48, each being urged downward by a spring 50.

The mechanism for operating the lifting elements 26 and for latching and unlatching the base sections 10, 12 conveniently is located between the outer and inner flanges 36, 38 on the under sides of the base plates 34. Any of various operating means may be employed, and the particular mechanism herein shown and described is a representative mechanism which is both simple and effective so that any person of ordinary

intelligence can readily and safely control and operate the carrier for handling oxygen cylinders or other comparable relatively heavy objects.

As shown, the latch lever 52 for the base sections is pivotally mounted at 54 on a plate 56 which itself is pivotally mounted at 58 on the under side of a base plate 34, adjacent the connecting flange 40 thereof, on the side remote from the hinge 14. The hook arm 60 of the latch lever extends through a slot 62 in the connecting flange 40, and a light spring 64 constantly urges the latch lever counter-clockwise about its pivot, in Fig. 4, with a stop pin 66 limiting its counter-clockwise movement. The corresponding connecting flange 40 of the other base section has a slot 68 therein for reception of the hook arm 60 of the latch lever when the base sections are closed together, the spring 64 urging the hook arm into latching engagement with a wall of the slot 68. The latch lever has a slot 70 therein and the bent end 72 of an actuating rod 74 extends through the plate 56 and engages in the slot 70 so that a pull on rod 74 will swing plate 56 clockwise about its pivot 58 and will ensure that latch lever 52 will be positively pulled out of latching engagement.

The opposite end of actuating rod 74 is pivotally connected at 76 to a disk 78 which is secured on the lower end of a rock shaft 80 which extends upward through the base plate 34 and axially within the tubular standard 82 which is secured on the upper side of the base plate and has substantial vertical extent upward from the base. The upper end of the rock shaft 80 extends out through the upper end of tube 82 and has fixed thereto a head piece 84 which has a bearing on bearing element 86 which is fixed on the upper end of tubular standard 82. An operating lever 88 is pivoted at 89 on the head piece 84 of the rock shaft by means of which, when the lever is in horizontal position, the rock shaft may be rocked to move the latch lever 52 into and out of latching position and to swing the base section 12 about the hinge 14 for opening and closing the base sections. When the base sections are closed together and latched, the initial motion of rock shaft 80 rotates the disk 78 thereon clockwise in Fig. 4, thereby to release the latch due to clockwise swinging of plate 56, pulled by actuating rod 74. Further rocking movement of rock shaft 80 in the same direction swings base section 12 about its hinge through the medium of a second actuating rod 90 which has one end pivotally engaged in a short slot 92 in disk 78 and its other end extending loosely through the connecting flange 42 of the base section on which it is mounted and pivotally anchored at 94 on the corresponding connecting flange 42 of the other base section.

The particular mechanism herein disclosed for elevating the lifting elements 26 comprises four horizontally disposed rock shafts 96, 98, 100 and 102, each mounted in suitable bearings at the under sides of the base plates 34. The rock shafts 96, 98 are arranged in converging relation on opposite sides of the disk 78 and each of these shafts has a cam element 97, 99 at its end which is adjacent to disk 78 in position for the two cam elements 97, 99 to be engaged simultaneously by a pair of pins 104 which are carried on a slide member 106 on tubular standard 82 and which depend therefrom in parallelism and slidably project through the base plate 34. As represented, the cam elements 97, 99 are end portions of the respective rock shafts 96, 98, bent approximately at right angles to the respective rock shaft axes

so as to underlie the depending pins 104. Hence, a downward movement of pins 104 will rock the shafts 96, 98.

The other end of rock shaft 96 has a bent end cam element 107 disposed opposite a lifting element 26, and said element has a downward facing shoulder 108 thereon against which the cam element 107 engages when shaft 96 is rocked as previously described, thereby to cause elevation of the lifting element 26.

Similarly, the rock shaft 98 has a cam element 110 fixed thereon opposite a lifting element 26 for engaging the downwardly facing shoulder 108 of this element as shaft 98 rocks in unison with rock shaft 96. Hence, it will be obvious that depression of the pins 104 results in simultaneous rocking of rock shafts 96, 98 and simultaneous elevating of two of the four lifting elements 26.

The other two rock shafts 100, 102 are on the other base section, disposed in converging relation with adjacent ends of the two shafts geared together as at 112 so that both shafts will rock in unison. The opposite end of rock shaft 100 has a bent end cam element 101 thereon set opposite the third lifting element 26 for elevating said element as previously described for the first two. Also, the rock shaft 102 has a cam element 103 for coacting with the fourth lifting element, to lift said element.

Inasmuch as base section 10, 12 must be free to open and close about their hinge 14, we provide a breakable driving connection between the rock shafts 98, 102 so that, when the base sections are closed together all four of the horizontally disposed rock shafts will be rocked in unison whenever the pins 104 are depressed. Each of rock shafts 98, 102 has fixed at its end which is toward hinge 14 a bevel gear 114 projecting enough through an opening in the adjacent connecting flange 42 so that the two gears 114 are brought into mesh whenever the base sections 10, 12 are closed together.

Depression of the pins 104, to rock the shafts 96, 98, 100 and 102 and thereby to elevate the lifting elements 26, may be accomplished through the medium of an arm 116 pivotally mounted at 118 on the slide member 106 and extending upward beside standard 82. The upper end of arm 116 is slidably retained in guided relation to a projection 120 on the bearing element 86 at the top of the standard 82, the arm 116 having a socket 122 at its upper end for reception of a laterally projecting pin 124 on operating lever 88 when the lever is swung in horizontal position, in direction to close the base sections. Then, with the pin 124 engaged in socket 122 of arm 116, a downward swing of the operating lever 88 to vertical position will cause a downward movement of slide member 106 and the pins 104 carried thereon.

In use of our carrier apparatus for transporting oxygen cylinders, the apparatus, with its base sections 10, 12 closed and latched together, may be wheeled on its casters 20 to any desired destination without any tilting of the base. Assuming that an oxygen cylinder is standing on end at a storage location in a hospital and is to be transported to the bedside of a patient, the apparatus will be wheeled to the storage location, as above described, by gripping the retaining elements 32 as handles and either pushing or pulling the apparatus as may be desired.

At the storage location, the operator elevates operating lever 88 to horizontal position thereby releasing the lifting elements 26 so that they may

drop into engagement with the floor. Then, an initial swing of lever 88 counter-clockwise as viewed in Fig. 2, will unlatch the base sections and subsequent counter-clockwise swinging of lever 88 will cause the base sections to spread open about hinge 14, as indicated in Fig. 3. In this condition the apparatus may be wheeled to position straddling the oxygen cylinder 18 which is shown dotted in Fig. 3, after which the lever 88 may be swung clockwise to close the sections 10, 12 around the cylinder, the final swinging movement of the lever causing latching of the sections and also bringing its pin 124 into socket 122 of arm 116. The closing together of the base sections will have caused the inwardly projecting fingers 28 of lifting elements 26 to engage under the end of the cylinder 18, and a downward movement of operating lever 88 causes elevating of the lifting elements 26 and a lifting of the cylinder bodily thereon, without any tilting of either carrier or cylinder, and with the cylinder safely retained and guided by the retaining elements 32. The cylinder is safely and securely held erect a sufficient distance above the floor so that the apparatus may be easily and conveniently wheeled to a bedside without any danger of accidental tipping or dropping of the cylinder. The large-area base and the low center of gravity eliminate the possibility of the apparatus tipping over. At the bedside, the cylinder may continue thus safely held while oxygen is being administered, or the apparatus may be detached and withdrawn, to leave the cylinder standing on end at the bedside. However, before the base sections 10, 12 can be opened for withdrawal, the operating lever 88 must first be elevated to horizontal position to lower the cylinder to the floor, after which a swing of lever 88 will unlatch the sections and then swing them open.

We claim as our invention:

1. Carrier apparatus comprising a sectional base whose sections are hinged together and are openable for engaging around an object to be carried and closable around said object, a plurality of lifting elements mounted on the base sections in distributed relation about the vertical axis of the base, latching means for releasably retaining the base sections in their closed together relation, an operating lever, and actuating connections between the lever and said latching means and between the lever and said lifting elements, said actuating connections including means for effecting raising and lowering of said lifting elements in response to predetermined movements of said lever, and including means for effecting latching and unlatching of the base sections in response to other predetermined movements of said lever, and still other predetermined movements of said lever effecting opening and closing of the base sections.

2. Carrier apparatus comprising a pair of rigid arcuate members hinged together and openable about their hinge for straddling an object to be carried and closable together about their hinge for engaging loosely around said object, object lifting means mounted on said arcuate members and adapted to engage under said object when said members are closed around the object, an operating lever, and connections between said lever and said object lifting means whereby the lifting means lift the engaged object within and relative to the arcuate members in response to a predetermined movement of said lever.

3. Carrier apparatus comprising a pair of rigid

arcuate members hinged together and openable about their hinge for straddling an object to be carried and closable together about their hinge for engaging entirely around said object, object lifting means mounted on said arcuate members and reaching to positions to engage under said object when said members are closed around the object, connections between the lever and said object lifting means responsive to a predetermined movement of said lever for lifting the engaged object within and relative to the arcuate members, and means obstructing the said predetermined movement of said lever until said arcuate members have been closed together.

4. Carrier apparatus for lifting and transporting an object standing on end on a floor, comprising a pair of base members hinged together and having area at least twice the cross-sectional area of the object to be lifted and transported, said base members having wheels on their under sides elevating the base only relatively little above the floor and each said member having a concave surface for fitting loosely around approximately one-half of said object, object lifting means projecting beyond said arcuate surfaces toward the floor and engageable under the end of said object on the floor, an operating lever for swinging said base members relatively on their hinge between open and closed positions, and connections between the lever and said object lifting means and actuatable in response to a predetermined movement of said lever for lifting said object within and relative to the base sections.

5. Carrier apparatus comprising a base in the general form of a disk with a central opening therethrough, said base comprising two sections hinged edgewise together and openable and closable by relative swinging of the sections on their hinge, a latch for releasably securing said sections closed, lifting means projecting into the central opening in the base, an operating lever, latch releasing means responsive to a predetermined movement of said lever, and connections between said lever and said lifting means whereby a different predetermined movement of said lever effects an actuation of said lifting means.

6. Carrier apparatus comprising a sectional base in the general form of a disk with a central opening therethrough, said base having over-all area at least twice the area of its said central opening and having casters on its under side maintaining the base in slightly spaced general parallelism with a floor, a hinge at the juncture of sections of the base on which a base section is swingable for opening the base so that it can be wheeled into straddling relation to an object to be carried, means for closing the base sections together around the object with the object within the said central opening, lifting elements distributed around the central opening and projecting into the opening in positions to engage under said object, and means for actuating said lifting elements only when the base sections are closed together thereby to raise and lower the object within the base.

7. Carrier apparatus comprising a sectional base openable and closable about an object to be

carried, said base being in the general form of a large-area disk and having casters on its under side maintaining the base in slightly spaced general parallelism with a floor, means for bodily lifting an object about which the base sections have been closed while the axes of the object and the base continue approximately stationary and while said base maintains its said general parallelism with the floor, and object retaining means rising to a substantial height above the base and loosely engaging said object from opposite sides, said retaining means constituting a handle by which the apparatus may be wheeled from place to place.

8. Carrier apparatus comprising a base having hinged sections openable and closable for engaging loosely around an object to be carried, a latch for releasably securing the sections closed, lifting elements vertically movable in the base and engageable under an object about which the base sections have been engaged, means operative to elevate said lifting elements only when said base sections are closed and latched, and means operative to release said latch only when said lifting elements are in their lowermost positions.

9. A carrier for lifting and transporting oxygen cylinders and the like comprising a base having area several times greater than the cross-sectional area of an oxygen cylinder, and having a central opening therethrough slightly larger in diameter than the diameter of an oxygen cylinder, said base comprising two generally arcuate sections hinged together and openable for straddling an oxygen cylinder resting on end on a floor and closable about the said cylinder, a plurality of lifting elements engageable under the end of the cylinder as the base sections are closed together, means for latching the sections closed, and means operable to actuate said lifting elements for bodily lifting the cylinder within the base only after the base sections have been latched closed, there being anti-friction means on the under side of the base facilitating movement of the carrier from place to place.

10. A carrier for lifting and transporting oxygen cylinders and the like comprising a base having area several times greater than the cross-sectional area of an oxygen cylinder, and having a central opening therethrough slightly larger in diameter than the diameter of an oxygen cylinder, said base comprising two generally arcuate sections hinged together and openable for straddling an oxygen cylinder resting on end on a floor and closable about the said cylinder, a plurality of lifting elements engageable under the end of the cylinder as the base sections are closed together, retaining elements rising to a substantial height above the base and engageable with the oxygen cylinder from opposite sides for maintaining a cylinder erect in the carrier, said base having casters thereon, and said retaining elements constituting handles whereby the carrier may be wheeled from place to place, and means for actuating said lifting elements to elevate the cylinder above the floor prior to a transporting movement of the carrier.

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