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2,639,062

ELEVATING MEANS FOR LANCE TYPE LUBRICANT PUMPS

Filed Oct. 21, 1948

2 Sheets-Sheet 1

FIG. 1.

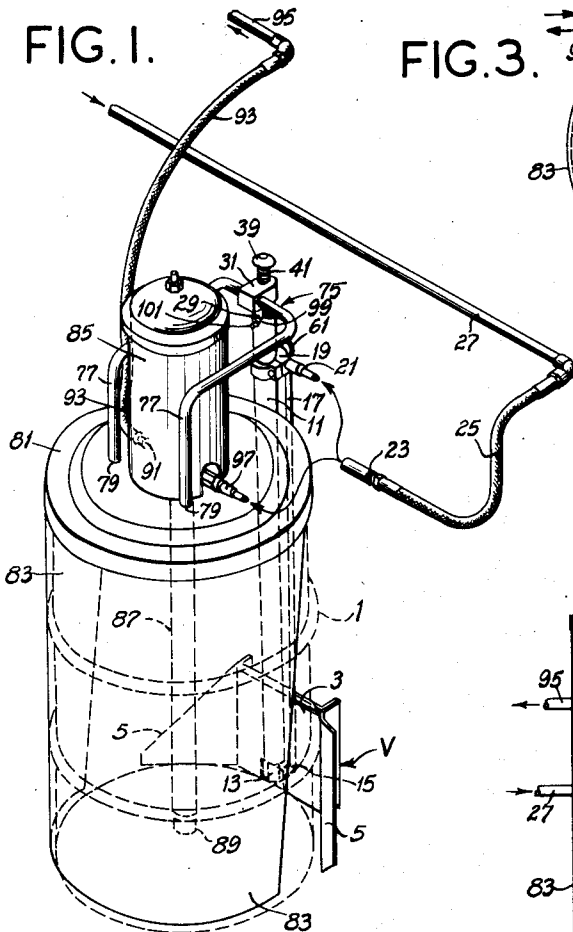


FIG. 3.

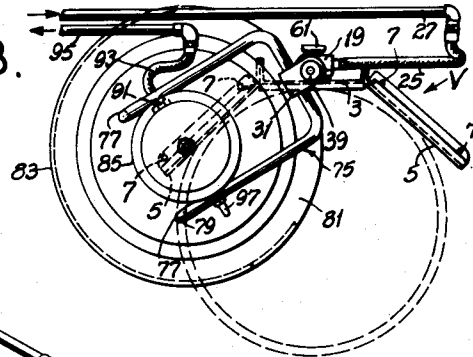


FIG. 2.

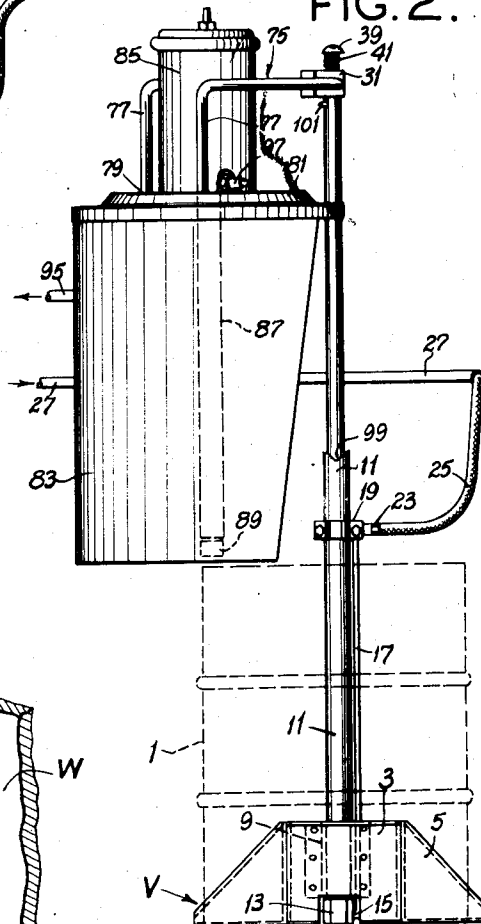
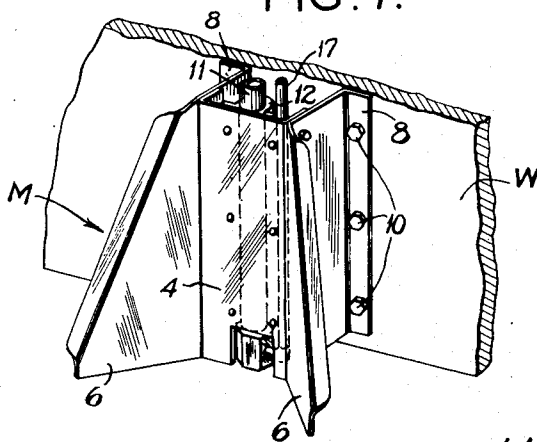


FIG. 7.



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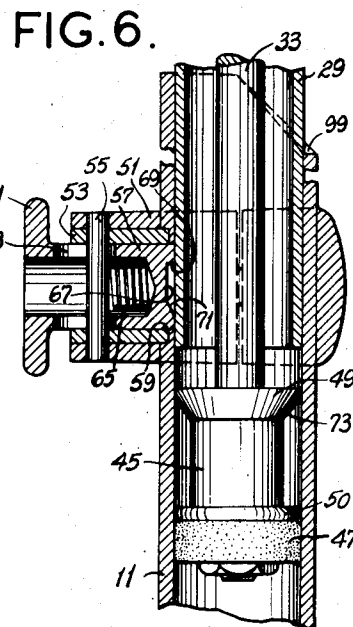
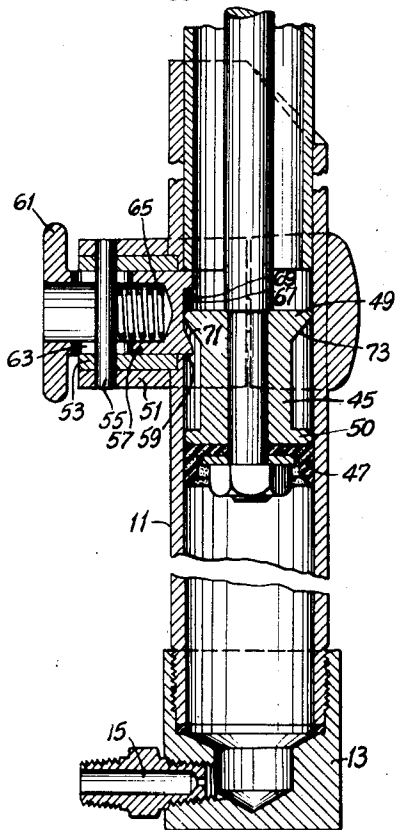
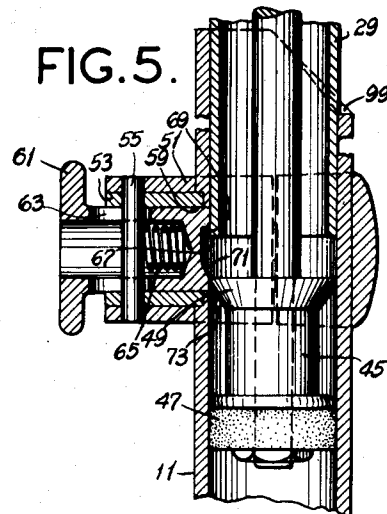
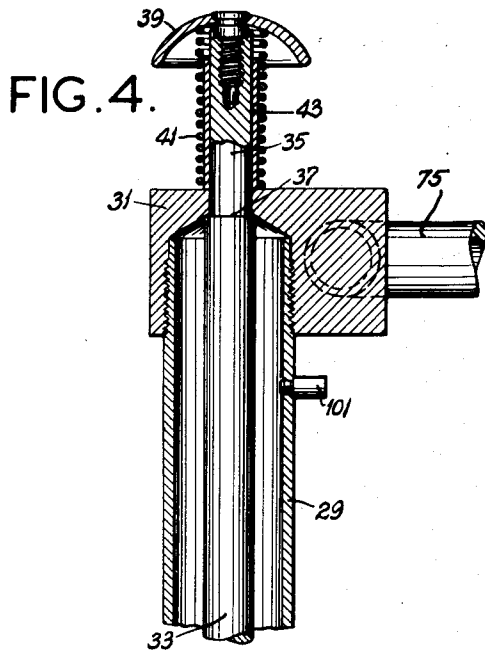
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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ELEVATING MEANS FOR LANCE TYPE
LUBRICANT PUMPSAlexander P. Fox, University City, Mo., assignor
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20 Claims. (Cl. 222—325)

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This invention relates to lubricant pumps, and with regard to certain more specific features, to an elevating lubricant-pump construction.

Among the several objects of the invention may be noted the provision of a simple, strong and conveniently operable elevating lubricant pump construction facilitating interchange of lubricant containers; the provision of an elevator type of pump construction requiring only a low number of parts in construction and a minimum of floor space for installation, without sacrifice of rigidity and strength; the provision of a construction of the class described which assures that the pump parts during interchange shall be protected against injury or contamination; and the provision of a device of this class which provides for a neat and orderly installed appearance. Other objects will be in part apparent and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structures hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, in which one of various possible embodiments of the invention is illustrated,

Fig. 1 is an isometric view illustrating the invention generally, with its parts in a lowered position;

Fig. 2 is a front elevation showing certain parts raised and swung aside;

Fig. 3 is a plan view of Fig. 2;

Fig. 4 is a vertical median section of certain elevator parts viewed from the left of Fig. 1, but in elevated position prior to being swung aside;

Fig. 5 is a fragmentary view similar to Fig. 4 but illustrating release of a tripping mechanism;

Fig. 6 is another fragmentary view similar to Fig. 5 showing what may be considered either to be lowering conditions after a trip mechanism release or raising conditions prior to latching by the tripping mechanism; and,

Fig. 7 is a perspective view of a modified form of supporting bracket.

Similar reference characters indicate corresponding parts throughout the several views of the drawings.

Referring now more particularly to Figs. 1-3, there is shown at numeral 1 in dotted lines a standard commercial lubricant container. It is common practice to align several drums such as 1 containing various different lubricants and to provide a so-called lance type of pump for each

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one. Typical details of suitable lance pumps may be found in U. S. Patents 1,925,832, 1,970,591, 2,122,020, and others. Such a pump needs to be lifted from its lubricant container whenever an interchange of containers is to be made, such as, for example, when the supply in a container is exhausted. A new container is then brought into place and the pump reinserted. It is important that when such a pump is removed from a container it be not laid about promiscuously because of the danger of damage to it or contamination of adhered lubricant on the pump barrel.

Heretofore gang elevators have been used for the pumps in rows of containers, but such elevators have been complex and expensive. They also unnecessarily raise all pumps when usually only one at a time requires placement. However, the prior art elevators had the advantage of a neat appearance.

By means of the present invention, a neat appearance is provided for a row of individually elevator-fitted containers, but the apparatus is simple, strong and less costly. It provides for individual elevator control of a given pump of a given container. Besides providing a neat appearance for a row of containers, each is accessible independently with minimum effort and maximum safety on the part of the user.

Referring again to the drawings, there is shown at V a vertical, trough-shaped base. This consists of a back plate 3 and two dihedral side plates 5 bolted thereto. The base is held to the floor, preferably near a wall (not shown), by means of fasteners 7. The base has no bottom so that containers may be slid into it properly to be positioned without the need for lifting them.

Attached to the back of the plate 3, by means of a suitable channel piece 9 is an elevator cylinder 11. This is shown more particularly in Figs. 4-6. This cylinder has a bottom head 13 having a restricted inlet member 15 for connection with an upwardly extending air pipe 17. The air pipe 17 passes up to a fitting 19 clamped on cylinder 11. An inlet nipple 21 on the fitting communicates with the pipe 17. The fitting accepts an air coupler 23 which may be manually applied and removed. The coupler 23 is on the end of a flexible air hose 25 leading from an air supply line 27. This supply line 27 may be carried upon the wall behind a row of containers, a hose 25 being provided for each required coupler. By applying the coupler 23 to the nipple 21, air may be introduced into the bottom of the cylinder 11. This operation is exemplified in Figs. 2 and 3. As will be shown below, this operation is elective.

When the coupler 23 is removed from the nipple 21, air more or less slowly may escape from the cylinder 11 through the restricted outlet 15, pipe 17 and nipple 21.

Telescoping the cylinder 11 is a sliding cylinder 29, which is closed at the top by means of a head 31. Within the cylinder 29 and extending from its lower end is a piston rod 33 having a shouldered extension 25. The shoulder is shown at 37. Attached to the upper end of the extension 35 is a control knob 39 between which and the head 31 is located a compression spring 41. A sleeve 43 maintains the spring 41 straight. The spring 41 normally biases the piston rod 33 upward to a point where the shoulder 37 engages the head 31.

At its lower end, the rod 33 extends from the telescoping cylinder 29 into the cylinder 11, where it is provided with a round latch trigger 45. Below the trigger 45 is an integral piston 47 fitting the cylinder 11. Broadly, the trigger 45 is in the shape of a spool having a downwardly beveled head 49 and a lower flange 50. The outside diameters of the head 49 and flange 50 are only slightly smaller than the inside diameter of the cylinder 11. Thus in effect the trigger is grooved between head 49 and flange 50.

The fitting 19 is clamped around the cylinder 11 a distance from the upper end of the latter. As above described, it provides outside of the cylinder 11 a passage between pipe 17 and inlet nipple 21. It also includes a boss 51 in which is a sleeve liner 53 held in place by means of a cross pin 55. The bore of the liner 53 is in line with a counterbored opening 59 through the wall of the cylinder 11. Within the sleeve 53 is a hollow latch in the form of a lug 57. This is slidable in the liner 53 and through the opening 59. This lug 57 is provided exteriorly with an operating handle 61, the entire piece being slotted as shown at 63 to accommodate the pin 55. A compression spring 65, reacting between the pin 55 and the interior of the lug 57, biases the lug inward with respect to the cylinder 11. Inside, the lug 57 is provided with a notch 67, the upper side of which is flat as shown at 69, and the lower side of which is upwardly beveled as shown at 71. The notch 67 accommodates the head 49, the flat 69 being engageable with the flat top thereof. The bevel 71 is engaged by the lower bevel 73 of the head when the latter is pushed down, as will be described.

From the above it is clear that if the sliding cylinder 29 is down, or partially down as shown in Fig. 6, the latch 57 must be back in the liner 53. If the assembly of the cylinder 29, trigger 45 and piston 47 is raised, the parts will pass through the position shown in Fig. 5. The upward motion is limited when the head 49 engages the flat 69, the latch at this time being biased in by the spring 65. To permit this biasing-in motion is the purpose of the notch 67. The above places the bottom of the cylinder 29 above the latch 57, as shown in Fig. 4, so that the parts associated with the cylinder 29 are held up as illustrated in Fig. 2. To release the cylinder 29 to let it drop, an operator may either withdraw the latch 57 by pulling out on its handle 61, or he may instead push down on the button 39. In the latter case, a downward motion of the piston rod 33 relative to the cylinder 29 causes the bevel 73 on the trigger 45 to engage the bevel 71 on the latch 57. Thus the latch is pushed back clear of the bottom end of the cylinder 29 to release the latter for descent. Fig. 5 illustrates the condition of parts after release and at the beginning of a

descent. Thus it will be seen that the elevated cylinder 29 may be released for descent either by a pull on the handle 61 or a push on the button 39. In either event, the latch 57 is caused to retract.

It will be observed that by employing telescoping cylinders 11 and 29, as distinguished from a mere piston rod and cylinder telescoping construction a higher degree of rigidity is obtained for the telescoping system to withstand the overhanging weight later to be described. The piston rod 33 is relieved of stiffening duties and serves only to assume compressive thrust from the piston 47 and to operate the trigger 45. Thus no outside crosshead and guide structure is needed. It will be clear that when the assembly of piston 47, rod 33 and cylinder 29 is released, it will be buffed by a cushion of air under the piston. If this air is slowly released through the restriction, the assembly will settle gradually.

Supported on the head 31 is a bracket 75 formed as two angular arms or handles 77 which curve down and fasten at 79 to a lid 81. It will be understood that the ordinary commercial lid of the container 1 has been removed when the container is put into service. The lid 81 supports a generally semi-circular shielding apron 83 which serves as a dress and protection for the container 1 when the parts are down as shown in Fig. 1. The lid also supports the air engine part 85 of the lance type of pump above mentioned. The cylinder of this pump is shown at 87. The engine part 85 is attached to the lid 81. The lance pump cylinder extends down from the air engine part 85 through a suitable opening in the lid 81. At its bottom end it has a suction inlet 89. The lubricant outlet of the pump is shown at 91, to which is coupled a flexible lubricant line 93 leading to a supply line 95. The supply line 95, like the air line 21, may be attached to the wall in front of which the containers are set. Air may be supplied to the pump when it is down with its suction inlet 89 in the container 1. This may be done by attaching air coupler 23 to the nipple 97 of the pump. This operates the pump to withdraw lubricant from the bottom of the container through the suction valve 89, through the pump cylinder 87 and out to the outlet connection 91. Said patents make clear how lance pumps operate in these particulars.

In order to center the lid 81 when it is down with the apron 83 covering the front of the container (as shown in Fig. 1), a camming notch 99 is provided in the front edge of the upper end of cylinder 11. A pin 101, fastened in the sliding cylinder 29, is guided when down by the notch 99 to provide the desired centering.

It will be observed that the circular form of the trigger 45, including its head 49, allows the trigger to operate upon the latch 57 regardless of any lateral rotation of the assembly 47, 45, 33, 29 in the cylinder 11.

Complete operation will be clear from the above. Assuming the container 1 to be centered in the base V, the lid 81 is normally directly above its upper opening, with the apron 83 shielding the outside front of the container as shown in Fig. 1. This protects the container and makes a dressy appearance, particularly when several containers incorporating the invention are arranged in a row against the backing wall. The apron also prevents the container, which may be greasy, from smudging the clothes of passersby. By at-

taching coupler 23 to the nipple 97, the pump is operated and lubricant withdrawn from the container and dispensed over line 95. To replace an empty container, the coupler 23 is detached. The operator may then pull up on the handle 77, thus raising the sliding cylinder 29 until it is latched up by the latch 57. Or, the operator may choose to apply the coupler 23 to the nipple 21, so as to introduce air into the bottom of the stationary cylinder 11. This has a similar raising and latching effect. It will be observed also that the restriction 15 controls the in-rush of air into the cylinder 11 upon the pneumatic raising operation, so that there is not a violent upward movement.

After either of the above procedures, the operator may laterally swing the assembly of the lid, apron and pump, as illustrated in Figs. 2 and 3. The result is easy access into the container 1 for inspection to determine whether it is really empty before making an exchange. Or it may be removed and replaced by another filled container.

To return the device to operating position, the lid 81 is again swung forward until the pump barrel 87 is more or less central over the opening of the container. Then either the handle 61 is pulled out, or the button 39 is pushed down. In either event, the latch 57 is caused to release the cylinder 29, which descends by gravity. At this time the coupler 23 must have been removed from the nipple 21 to allow air to escape through the pipe 17 and nipple 21. The descent is cushioned and controlled because of the throttling action upon the air escaping from the cylinder 11 by means of the restriction 15.

As the lid approaches the end of its downward movement, the pin 101 is guided by the notch 99 so as exactly to center the lid over the opening of the container 1, the parts being then again as shown in Fig. 1.

It should be observed that while the use of the container guide V on the floor is preferable as a support for the telescoping elements, it might be placed on a wall, and also a non-centering base may be used. If it is desired to support the device on a wall instead of on the floor, the base V can be modified to become a wall bracket for supporting the telescoping parts. Such a construction is shown in Fig. 7, wherein the modified bracket is indexed M. In this case the former side plates 5 are lettered 6 and the former back plate 3 is lettered 4. The side plates are carried rearward and angled as shown at 8, for attachment to a wall W. The fastening means are shown at 10. In this modification the former channel piece 9 is extended and indexed 12. The relationship of the parts to the stationary cylinder 11 of the telescoping arrangement is shown. By means of this construction, the device may be supported entirely upon the wall while the lubricant container rests upon the floor. As above suggested in either the case of the floor type or the wall type mounting the centering guide plates 5 or 6 may be eliminated but this is not preferred.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. An elevating lubricant-pump construction for vertical movement of application of lance type pumps to and from interchangeable containers, comprising vertically arranged telescoping assemblies, one of which is stationary and the other being vertically movable and rotary relative to the other, an overhanging support for a pump mounted upon the upper end of the movable telescoping assembly, said support including a container cover, a latching mechanism having one element thereof near the upper end of the stationary assembly and a cooperating element thereof near the bottom end of the movable assembly adapted automatically to engage when the movable member is lifted to a topmost position so as to hold said movable assembly in said topmost position, said latching mechanism comprising a movable detaining member on one of the telescoping assemblies and a part on the other telescoping assembly for engagement by said movable detaining member in order to latch, said part permitting rotary movement of the movable telescoping assembly when latched up so that the cover may be raised from a container and swung laterally, manual means for disengaging the latch, and a piston in the stationary telescoping assembly and carried on the movable telescoping assembly near its lower end, said stationary telescoping assembly including a restricted air supply and exhaust port near its lower end for controlling rising and falling movements of the movable assembly.

2. An elevating lubricant-pump construction for vertical movement of application of lance type pumps to and from interchangeable containers, comprising, vertically arranged telescoping inner and outer cylinders, the outer one of which is stationary and fixed, the inner cylinder being vertically movable and rotary, an overhanging support for the pump attached to the upper end of the inner cylinder and constituting a cover for a container, a latching mechanism having one element thereof near the upper end of the stationary cylinder and a cooperating element thereof near the bottom end of the movable cylinder and rotary therewith adapted automatically to engage when the movable cylinder is lifted to a topmost position so as to hold said movable cylinder for rotation in said topmost position, said latching mechanism comprising a movable detaining member on one of the telescoping cylinders and a member rotary with the other cylinder for engagement by said movable detaining member in order to latch, a piston in the stationary cylinder but located below the movable cylinder, a piston rod extending from the piston to a point outside the movable cylinder, one of said latch elements being carried near the lower end of said rod, and an outside latch control member on the outer end of said rod.

3. An elevating lift for a lubricant-pump construction comprising a trough-shaped base adapted to receive and guide a lubricant container into a predetermined position, a single stationary vertical air cylinder, an assembly of elongated parts which telescope in said cylinder and including a piston in the cylinder, said cylinder being attached at one end to the base for support, a pump support cantilevered outwardly from the upper end of the telescoping assembly, a latch operative with said telescoping assembly adapted automatically to hold said telescoping assembly in an elevated position upon raising the assembly, and means for releasing said latch

at will, said cylinder having a throttled air release below said piston for cushioning the descent of the assembly.

4. An elevating lubricant-pump construction comprising a vertical trough-shaped base adapted to receive and guide a lubricant container into a predetermined position, a single stationary vertical air cylinder fixed behind said base, an assembly of parts which telescope said cylinder and including a piston in the cylinder, the assembly being adapted to be moved upward and turned, said assembly including an overhanging lid for the container and a supporting member therefor positioned outwardly from the top of said assembly, a latch adapted automatically to hold said telescoping assembly in an elevated position without interfering with its turning movement, and means for releasing said latch at will, said cylinder having a throttled air release below said piston for cushioning the descent of the assembly.

5. An elevating lubricant-pump construction for use in connection with a container and comprising a base adjacent which the container may be located, a stationary vertical air cylinder near said base, a rotary and telescoping assembly including a piston in said cylinder adapted to be raised and turned, said assembly supporting an overhanging lid for the container, a latch adapted automatically to hold said telescoping assembly in a raised position without interfering with its turning, means for releasing said latch at will, and a guiding device for automatically turning the assembly to a predetermined position upon descent from its raised position.

6. An elevating lubricant-pump construction comprising a vertical trough-shaped base adapted to receive a lubricant container and guide it into a predetermined position without lifting, a stationary vertical air cylinder extending up from behind said base, a rotary and telescoping assembly including a piston in said cylinder adapted to be raised and turned, said assembly supporting an overhanging lid for a container in guided position in the base, a latch adapted automatically to hold said telescoping assembly in a raised position without interfering with its turning, means for releasing said latch at will, and a guiding device for automatically turning the assembly to a predetermined position upon descent from its raised position, said air cylinder having a throttled air port below the piston for cushioning said descent.

7. An elevating lubricant-pump construction comprising a vertical trough-shaped base adapted to receive and guide a lubricant container into a predetermined position, a stationary vertical air cylinder behind said base, a telescoping assembly in said cylinder adapted to be moved upward and swung sideward, said assembly including the lid for a container in guided position in the base, means attached to the upper end of said assembly supporting said lid, a latch adapted automatically to hold said telescoping assembly in an elevated position without interfering with its lateral movement, means for releasing said latch at will, and a piston forming part of said telescoping assembly and fitting said cylinder, said cylinder having a throttling air port whereby descent of the telescoping assembly is controlled when the latch is released.

8. Lubricating apparatus comprising a lower guide for centering a lubricant container relative to a pump, vertically sliding telescoping mem-

bers, one of which is fixed adjacent the guide, the other of which is vertically movable and laterally swingable, an overhanging support extending from the movable telescoping member for a lubricant pump insertable in the container and comprising a lifting handle and a cover for a container, the lifting handle and container cover being carried by the overhanging support outwardly from the top of movable telescoping member, and a latch for holding said movable telescoping member in an elevated position with the pump both laterally and vertically clear of the container.

9. Lubricating apparatus comprising a lower guide for centering a lubricant container relative to a pump, a single pair of vertically sliding telescoping cylinders, one of which is fixed adjacent the guide, the other of which is vertically movable and rotary, an overhanging pump support extending from the movable cylinder, a container lid carried by the overhanging support outwardly from the movable cylinder, the lid being cooperative with the top of a centered container and the pump being insertable into the container upon lowering the movable cylinder, and a latch for holding said movable cylinder in an elevated position with the lid open and the pump laterally clear of the container, said latch being arranged to allow the necessary rotary swinging of the supported lid and pump.

10. Lubricating apparatus comprising a lower guide for centering a lubricant container relative to a pump, vertically sliding telescoping members, one of which is fixed adjacent the guide, the other of which is vertically movable and rotary, an overhanging pump support extending from the movable telescoping member, a container lid and apron assembly carried by the pump support and cooperative with the container upon lowering, and a latch for holding said movable telescoping member in an elevated position with the lid, pump and apron clear of the container, said latch being arranged to allow the necessary rotary swinging of the supported lid and pump.

11. Lubricating apparatus comprising a lower guide for centering a lubricant container relative to a pump, vertically sliding telescoping members one of which is stationary adjacent the guide, the other of which is vertically movable and laterally swingable, an overhanging support extending from the movable telescoping member for support for a lance type lubricant pump, a container lid carried by the overhanging support outwardly from the vertical movable telescoping member, the pump and lid being cooperative with the container, a latch for holding up said movable telescoping member with the pump clear of the container and the lid open, and a partial apron for the container depending from said lid adapted to cover a side of the container when down but to expose the container when up and swung aside to permit convenient inspection and removal of the container.

12. In an elevator for lubricant pumps and the like, a stationary vertical cylinder having a throttled air port adjacent its lower end, a sliding telescoping cylinder in said stationary cylinder and extending from its upper end, a latch operable through the wall of the stationary cylinder adapted automatically to hold up the telescoping cylinder when raised, a relatively axially movable piston rod in the telescoping cylinder, an outside control for said rod accessible from the top of said telescoping cylinder, a piston on said rod beneath the telescoping cylinder and

having sliding engagement with the stationary cylinder, and a release trigger on the rod for the latch operable by relative axial movement between the rod and the telescoping cylinder, whereby the telescoping cylinder is automatically latched up upon movement from the stationary cylinder and released by outside control of the latch, downward movement of said piston being controlled by the throttling of air forced through said port by the piston.

13. In an elevator for lubricant pumps and the like, a stationary vertical cylinder having a throttled air port adjacent its lower end, a sliding and rotary telescoping cylinder in said stationary cylinder and extending from its upper end, a latch operable through the wall of the stationary cylinder adapted automatically to hold up the bottom of the telescoping cylinder when raised while permitting its rotation, a relatively axially movable piston rod in the telescoping cylinder, an outside control for said rod accessible from the top of said telescoping cylinder, a piston on said rod beneath the telescoping cylinder and movably engaging in the stationary cylinder in both a rotary and axial manner, a latch release trigger on the rod operable by relative axial movement between the rod and the telescoping cylinder to release the latch but accommodating relative rotary movement between the trigger and latch, whereby the telescoping cylinder is automatically latched up for rotary movement upon retraction from the stationary cylinder and releasable by said outside control from the latch for downward movement controlled by the throttling of air forced from said port by the piston.

14. An elevator for lubricant pumps and the like comprising a stationary vertical cylinder, a sliding telescoping cylinder in said stationary cylinder, a latch operable through the wall of the stationary cylinder adapted automatically to hold up the telescoping cylinder when raised, a relatively axially movable piston rod in the telescoping cylinder, an outside axial control for said rod accessible from the top of said telescoping cylinder, a piston on said rod beneath the telescoping cylinder and engaging the stationary cylinder, and a trigger on the rod operable by relative movement between the rod and the telescoping cylinder to release the latch, the trigger being of circular form allowing operative engagement with the latch in any rotary position of the telescoping cylinder, and the trigger.

15. An elevating lubricant-pump construction providing for vertical movements of application of downwardly extending lance type pumps to and from adjacently located interchangeable containers, comprising vertically arranged telescoping assemblies, one of which is fixed, the other telescoping assembly being vertically movable on said fixed assembly, an overhanging pump support mounted at the upper end of the movable telescoping assembly, said pump support carrying a container cover positioned above the pump lance and below which cover the lance extends downward, and a latch mechanism which is automatically operative upon movement of the movable telescopic assembly to an elevated position to hold said movable assembly in said elevated position, said movable assembly being rotary on the stationary assembly when latched, so as substantially both vertically and laterally to clear the cover and pump lance for movement with respect to an adjacent container.

16. An elevating lance type lubricant pump

construction for vertical movement of application of lance type pumps to adjacently located containers, comprising vertically arranged telescoping assemblies one of which is stationary and fixed, the other telescoping assembly being vertically movable in said fixed assembly, an overhanging pump support mounted on the upper end of the movable telescoping assembly, a horizontal circular cover on said pump support below which the pump lance extends downward, handle means extending up from the cover, a depending semi-circular shielding apron attached to said circular container cover, and an automatic latch mechanism operative upon movement of the movable assembly to an uppermost position wherein the pump is clear of the container to hold said movable assembly in said position, said movable assembly being rotary on the stationary assembly when latched up.

17. An elevator for a lance type lubricant pump, comprising inner and outer telescoping cylinders, means on the outer cylinder for supporting it in a vertical position, the inner cylinder being rotary in the outer cylinder and being reciprocative between an extended latched position and a retracted position wherein the upper end of the inner cylinder projects from the upper end of the outer cylinder, a bracket extending outwardly and downwardly from the upper end of the inner cylinder, a circular plate mounted on said bracket transversely of and alongside the cylinders, the plate being positioned below the upper end of the outer cylinder when the inner cylinder is retracted, said plate being apertured to receive the lance of a pump with other parts of the pump supported on top the plate, and a latch for locking the inner cylinder in its extended position, said latch comprising a lug carried by one of the cylinders biased towards the other cylinder and cooperating with a recess formed in said other cylinder, said recess extending at least partially around said other cylinder to permit its rotation with respect to the lug when the inner cylinder is raised to the latched position.

18. An elevator as set forth in claim 17, wherein said bracket has a pair of arms curved down and fastened to the circular plate on opposite sides of the lance-receiving aperture in the plate.

19. An elevator as set forth in claim 17 wherein the outer cylinder is formed with a notch in its upper end and wherein the inner cylinder has a lug adjacent its upper end cooperable with said notch to position the inner cylinder in a rotary direction when the inner cylinder is in its retracted position.

20. An elevator as set forth in claim 19 further including an apron extending from the margin of the circular plate.

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