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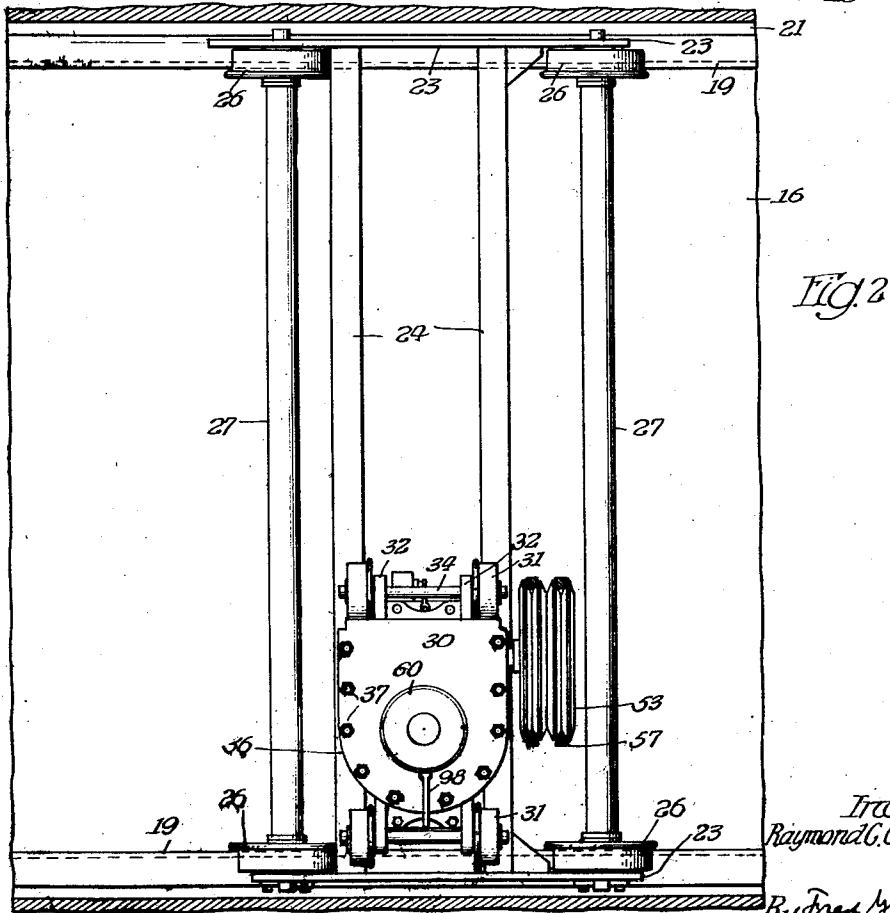
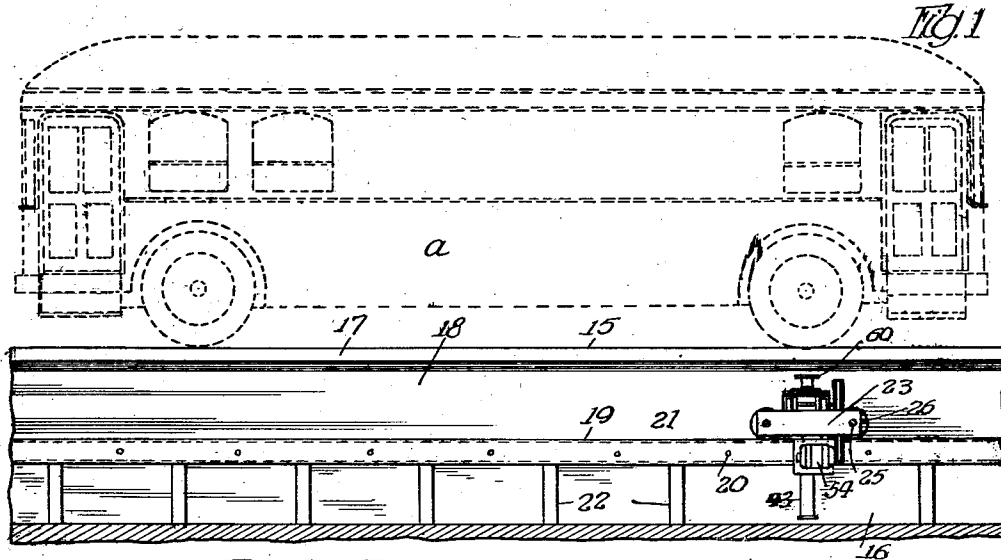
R. C. ORTGIES

2,327,446

DROP PIT APPARATUS

Filed April 3, 1943

4 Sheets-Sheet 1



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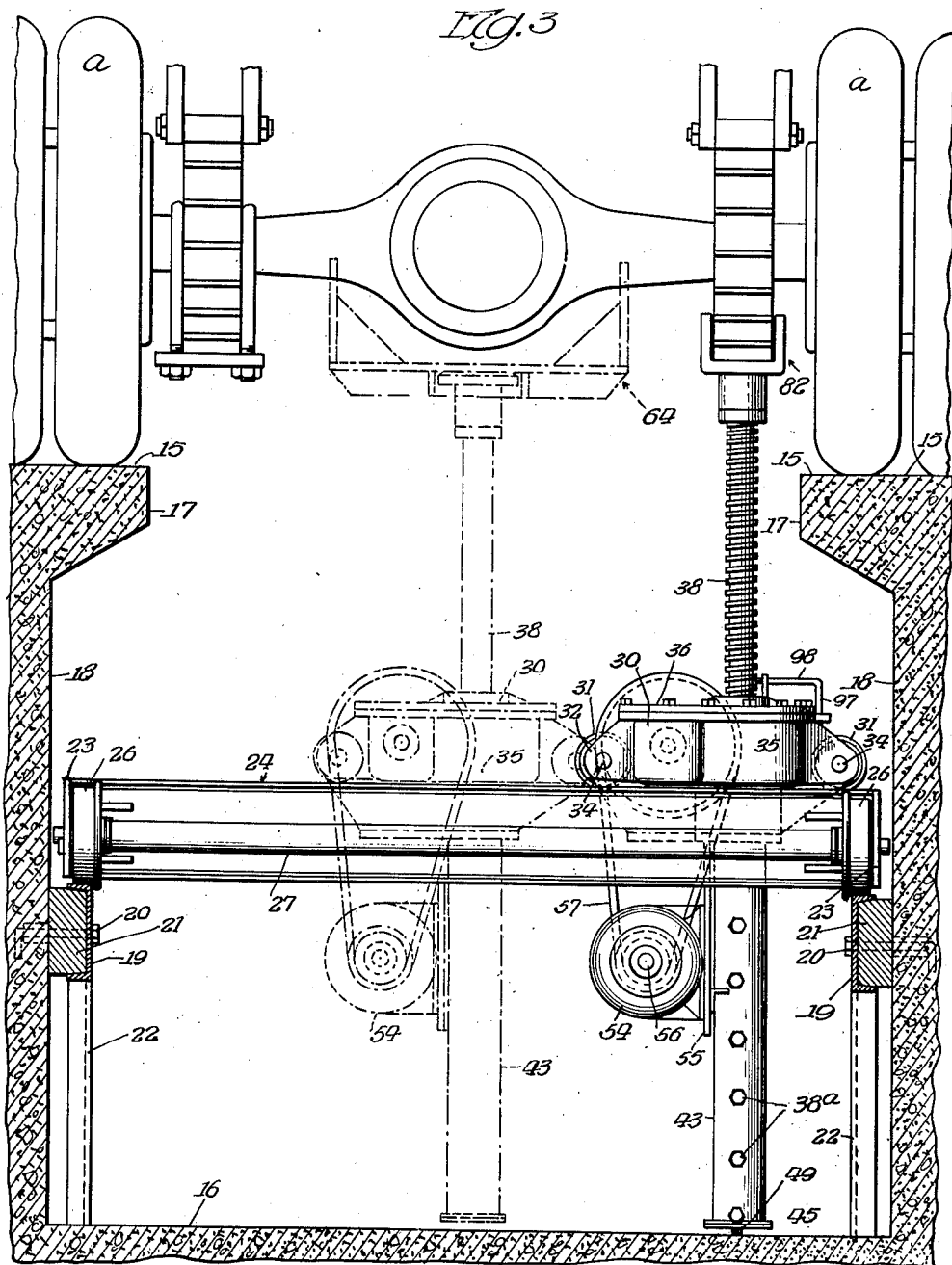
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4 Sheets-Sheet 2



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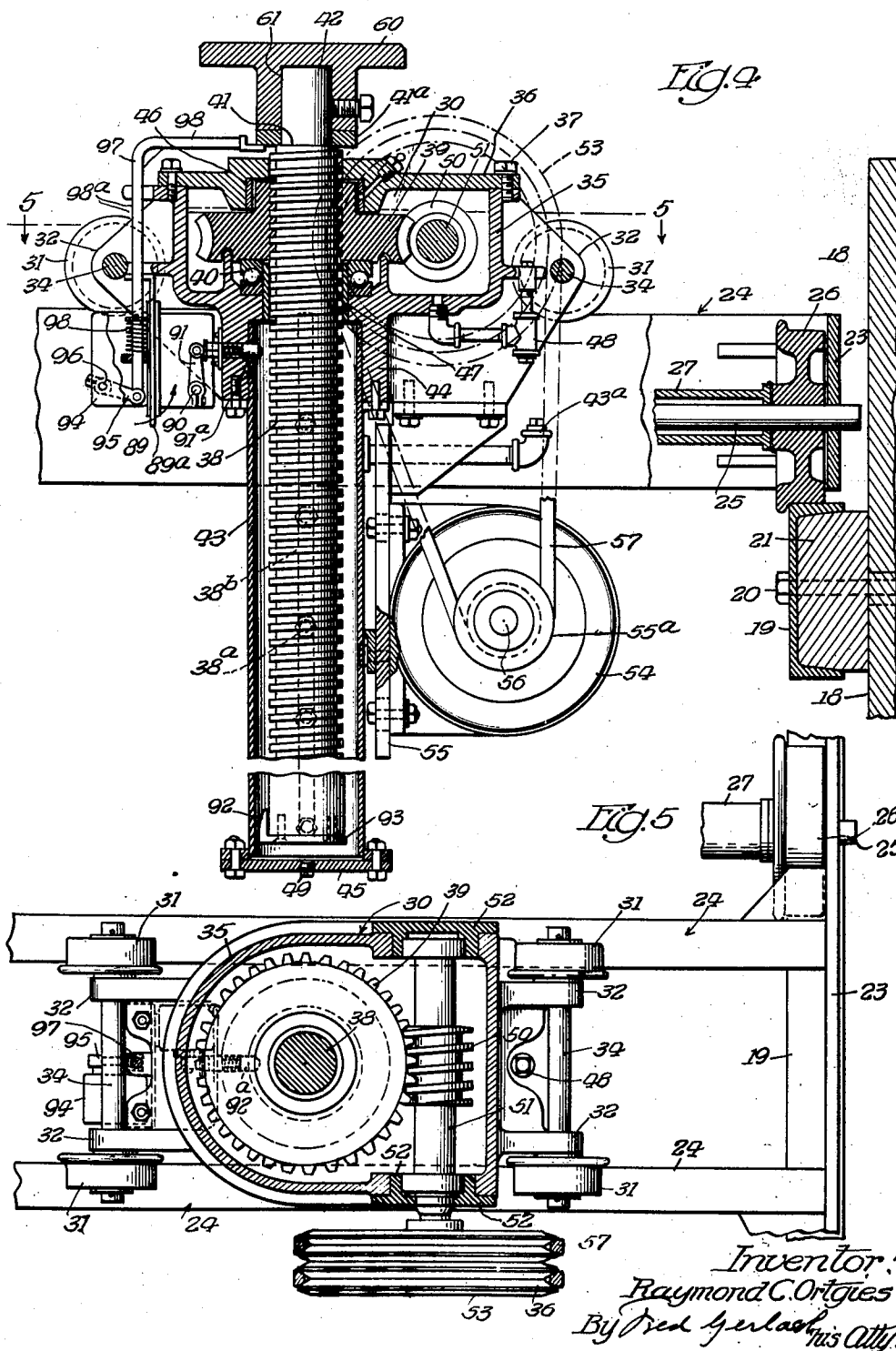
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DROP FIT APPARATUS

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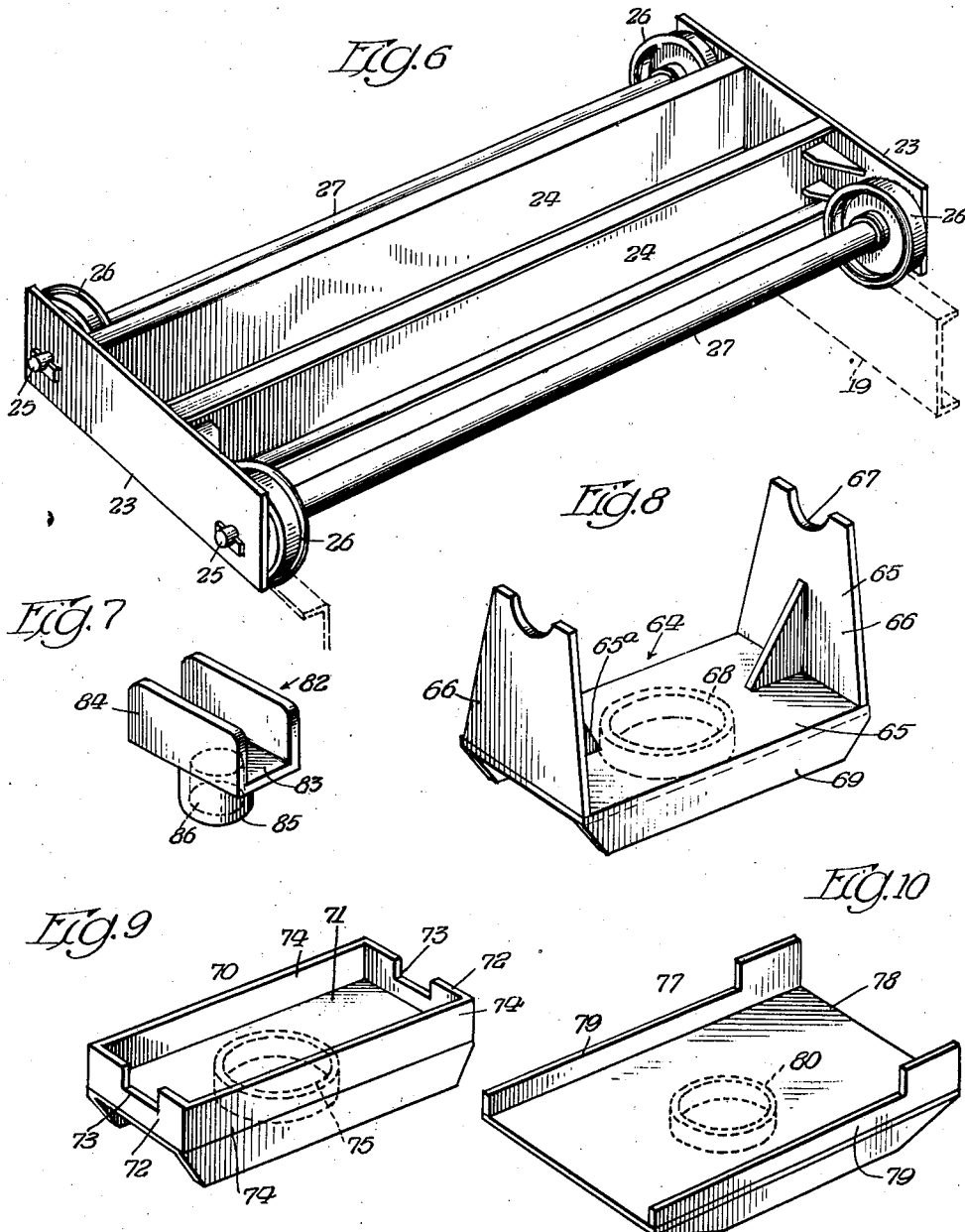
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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,327,446

DROP-PIT APPARATUS

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Application April 3, 1943, Serial No. 481,675

16 Claims. (Cl. 104—32)

The invention relates to drop-pit apparatus.

In servicing and repairing the under-equipment of vehicles, such as automotive buses, trackless trolley cars, street cars and trucks, it is necessary to lift body springs, under floor motors, differential housings, transmissions or other parts.

One object of the invention is to provide drop-pit apparatus which includes a lifting screw which is adapted to be transported longitudinally and laterally in the pit to center the screw for lifting under parts in different locations on the vehicle, so that a single jack may be used for lifting under-equipment located on different portions of the vehicle.

Another object of the invention is to provide drop-pit apparatus which is adapted for general lifting purposes in connection with the servicing and repair of parts of the under-equipment of the vehicle and includes interchangeable fixtures on the lifting mechanism for engaging the parts of different character so that a single jack will be usable for lifting any of the parts.

A still further object of the invention is to provide drop-pit mechanism which is useful generally for lifting any of the under-equipment of the vehicle, is simple in construction, and facilitates the work of inspection, repair or removal and replacement.

Other objects of the invention will appear from the detailed description.

The invention consists in the several novel features which are hereinafter set forth and more particularly defined by claims at the conclusion hereof.

In the drawings:

Fig. 1 is a longitudinal section of drop-pit apparatus embodying the invention.

Fig. 2 is a plan of the carriage which is adapted to travel longitudinally of the pit and the lifting jack which is adapted to travel on the carriage transversely of the pit, the sides of the pit being shown in section.

Fig. 3 is a transverse section illustrating in full lines the jack-screw in position for lifting one of the body supporting springs of the vehicle and in dotted lines the jack-screw and the fixture for engaging the differential housing on the vehicle.

Fig. 4 is a transverse section through the lifting mechanism.

Fig. 5 is a section taken on line 5—5 of Fig. 4.

Fig. 6 is a perspective of the longitudinally movable wheeled carriage.

Fig. 7 is a perspective of the fixture used for engaging and lifting a leaf spring on the vehicle.

Fig. 8 is a perspective of the fixture used for engaging a differential housing on the vehicle.

Fig. 9 is a perspective of the fixture used for engaging the front axle of a truck.

Fig. 10 is a perspective of the fixture used for engaging an under-floor motor or a transmission on a vehicle.

The invention is exemplified with a floor 15 beneath which is built a drop-pit 16, over which the vehicle *a* is adapted to travel and which is of sufficient length for access to substantially all portions of the under-equipment of the vehicle.

The floor is provided with inwardly extending ledges or portions 17 which define the opening at the top and overhang the inner faces of the side walls 18 of the pit. These overhanging ledges make the pit wider than the top opening through which the lifting mechanism is movable to engage the under-equipment on the vehicle. The spaces under the ledges 17 provide areas at the sides of the pit for sufficient transverse travel of the lifting mechanism for engaging any of the equipment on the vehicle overlying said opening. Channel girders 19 extend longitudinally the full length of the pit and are secured to the pit walls 18, which are usually of concrete, by suitable anchors 20. Wood beams 21 fit in the channel girders 19 and space said girders from the side walls of the pit, and channel standards 22 additionally support the girders 19 from the bottom of the pit. The top flanges of girders 19 serve as rails which form a track extending longitudinally the full length of the pit and are disposed under the ledges 17.

The drop-pit apparatus comprises a wheeled truck or carriage which is adapted to travel longitudinally on the girders 19 and lifting mechanism on a wheeled carriage which is adapted to travel transversely on the longitudinally movable carriage, so that the lifting mechanism may be moved longitudinally and crosswise of the pit into a position to engage the equipment on any part of the vehicle over the top of the pit.

The longitudinally movable carriage comprises side-plates 23 which are rigidly cross-connected by a pair of channel girders 24, axles 25 mounted in the end portions of the plates 23, and wheels 26 are journaled on said axles. The wheels at each end of the side-plates 23 are rigidly cross-connected by sleeves 27. The wheels 26 are flanged and are adapted to travel on the longitudinal girders 19 so that this carriage can be moved longitudinally to any portion

of the pit 16. The top flanges of channel girders 24 serve as a pair of transverse rails which are spaced apart to form a transverse track.

The apparatus comprises a transversely movable carriage which is adapted to travel crosswise of the pit on the cross girders 24 of the longitudinally movable carriage. This carriage comprises a casing 30 which serves as a transversely movable carriage frame. The casing 30 comprises a body section 35 which forms a gear housing and a cover section 36 removably secured by screws 37 to said body section. The body section 35 has a pair of spaced integral bracket members 32 at each of its ends. An axle 34 is journaled in each pair of bracket members 32 and a pair of flanged wheels 31 is secured to each axle. Wheels 31 are adapted to travel on the top flanges of the girders 24 of the longitudinally movable carriage. The lower portion of casing 30 is adapted to travel between the cross girders 24. A jack-screw 33 extends vertically through the casing 30, is vertically shiftable by a worm gear 39 which is journaled on a thrust-bearing 40, and confined against vertical movement in the casing 30. The hub of gear 39 has screw-threaded engagement with the jack-screw 33 so that rotation of said gear in one direction will raise the screw, and rotation in the opposite direction will lower the screw. The upper end of screw 33 is provided with a thrust-shoulder 41 and a ring 41^a on said shoulder, and a stud-extension 42 above the shoulder for interchangeably interfitting with lifting fixtures as hereinafter described. The screw 33 extends below the casing 30 and is there housed by a tube 43. The upper end of tube 43 extends into and is fixed to a depending tubular extension 44 on the bottom of the body 35 of the gear casing. The lower end of tube 43 is closed by a cap 45. The tube 43 is adapted to contain oil for lubricating the jack-screw 33 and has connected thereto a filler pipe 43^a through which the tube may be filled up to the line of the pipe. The screw 33 is slidably held against rotation by studs 33^a which are secured in the tube 43 and extend into a vertical groove 33^b in said screw. A drain-plug 49 is provided in the cap 45 on the end of tube 43. The casing 30 is adapted to retain oil for lubricating the gearing therein and a pipe 48 is connected thereto for introducing oil into the casing.

Worm-gear 39 in the casing 30, is provided with an upwardly extending hub which is journaled in a bushing 46 held in the cover section 36 of the casing 30. The screw 33 is guided in a bushing 47 which is fixed in the body-section 35 of casing 30. Worm-gear 39 is engaged by a worm 50 on the shaft 51 which is journaled in heads 52 in the sides of the body-section 35 of casing 30. One end of shaft 51 extends through one of the caps 52 and a belt-pulley 53 with V-grooves is fixed to said shaft for driving the gearing to raise and lower the screw 33. A reversible electric motor 54 is mounted on a depending bracket 55 which is secured to the body-section 35 of gear casing 30. A belt pulley 55^a with V-grooves is fixed to the shaft 56 of motor 54 and drives V-belts 57 which extend into and around V-grooves and drive the pulley 53.

A head 60 for supporting work-engaging fixtures is removably secured to the stud 42 on the upper end of screw 33 and is provided with a socket 61 for receiving the upper end 42 of

said shaft. The depending hub on head 60 is adapted to rest on the thrust ring 41^a on the screw 33. A fitting 64 for engaging a differential housing on the vehicle fits on the lifting head 60 and comprises a base plate 65, upwardly extending end members 66 provided with semi-circular notches 67 for receiving the tubular extension on the sides of the differential housing, reinforcing ribs 65^a, and a ring 68 on the under side of base 65 for receiving the head 60 and confining the fixture 64 against lateral movement on the head. The several parts of fixture 64 are formed of plate metal and are welded together. The base plate has reinforcing downwardly extending flanges 69. This exemplifies removable fixtures engageable by the head 60 on the jack-screw for engaging a differential housing.

A fixture 70 is provided for engaging the front axle of a truck for lifting it for removal, inspection or repair of the king-pins of the dirigible wheels. The fixture 70 comprises a base 71, end members 72 provided with notches 73 for receiving the axle, side flanges 74 and a ring 75 on the under side of base 71 which is adapted to removably receive, and fit around, the head 60 on the screw 33. These parts are formed of plate metal welded together. This exemplifies a fixture for engaging a non-rotatable truck axle.

A fixture 77 is provided for engaging an under-floor motor or a transmission housing on the vehicle. This fixture comprises a base plate 78, side flanges 79 and a ring 80 on the under side of plate 78 for receiving the head 60 on the jack-screw, all welded together. This exemplifies a fixture for engaging a motor or transmission housing on the vehicle.

A fixture or saddle 82 is provided for engaging a body spring on the vehicle, and comprises a base 83, side flanges 84 and a hub 85 which is provided with a socket 86 which is adapted to receive the upper end 42 of the jack-screw when the head 60 is removed. This exemplifies a fixture for engaging the body spring of a vehicle.

A switch 89 is included in the circuit of the motor 54 when the worm 50 is driven to raise the jack-screw 33. The enclosing box of said switch 89 is secured to a plate 89^a which is supported from the body-section 35 of the casing 30. Switch 89 is adapted to be opened to interrupt said circuit by a rock shaft 90 to which is secured an arm 91. A spring-pressed stud 91^a is slidably mounted in the depending portion 44 of the body-section 35 of the casing 30 and is shiftable by a cam 92 on a plate 93 which is fixed to a plate secured to the lower end of the screw 33. When screw 33 is raised to its high limit, cam 92 will push the stud 91^a outwardly to rock arm 91 and shaft 90 and open the switch 89. This device is mounted on the transversely movable carriage and automatically limits the upward movement of the screw 33 by the operation of the motor 54. A switch 94 is secured to the plate 89^a on the casing section 35 and is included in the circuit for operating the motor 54 to drive worm 50 in the direction in which it will lower the screw 33. This switch 94 comprises a rock shaft 96 which has affixed thereto an arm 95. A rod 97 is mounted for vertical sliding movement in a lug on the body-section 35 and is normally pressed upwardly by a spring 98. The lower end of rod 97 is adapted to engage the arm 95 to open the switch 94. A rigid arm 99 on the upper end of rod 97 is extended to be engaged by the ring 41^a or the fix-

ture on the upper end of screw 38 when the latter reaches its predetermined low limit. This exemplifies means mounted on the transversely movable carriage for automatically controlling the lowering movement of the screw 38.

The operation of the apparatus will be as follows: The vehicle will be positioned over the opening in the floor at the top of the pit as illustrated in Fig. 3. The longitudinally movable carriage can be wheeled to any desired position longitudinally of the pit to the point where an element on the vehicle is to be raised. The transversely movable carriage can be wheeled transversely to the point desired according to the transverse location of the part on the vehicle to be lifted. If the differential housing is to be lifted, the fixture 64 is placed on top of the head 60. The motor 54 will then be operated to drive the worm 51 and rotate gear 39 for raising the screw 38 to the extent desired to support the housing in its raised position for the performance of any work thereon. The motor 54 can also be operated in reverse direction to lower the screw 38 and the engaged differential housing. When a front axle with dirigible wheels is to be lifted, the ring 75 of fixture 70 will be placed around the lifting head 60 and the screw 38 may be raised and lowered as before described.

When an under-floor motor or transmission casing is to be lifted, the ring 80 on fixture 77 will be placed around the lifting head 60 and the motor 54 may be raised and lowered as before described.

When a body spring is to be lifted, the lifting head 60 is removed from the upper end 42 of the jack-screw and the fixture 82 is placed on the upper end of said shaft with the fixture in abutting engagement with the thrust-ring 41^a. The motor can then be operated to raise and lower the screw 38 as before described. During any of these operations the screw 38 will be stopped at the predetermined high and low limits. When the cam 92 strikes the stud 91^a, arm 91 will be shifted to rock shaft 90 and open the switch 89 for the circuit in which the motor 54 is included. During the lowering operation, the thrust-ring 41^a or the hub 85 on fixture 82 will depress arm 98 and rod 97 to shift the arm 95 and rock shaft 96 to open the switch 94 and the circuit for the motor 54 during the lowering operation of the jack-screw.

The invention exemplifies drop-pit apparatus in which the jack-screw is mounted on a transversely movable carriage which in turn is mounted on a longitudinally movable carriage so that the jack-screw may be brought into operative position under a part to be raised, which is located transversely or longitudinally on any part of the vehicle over the pit. It also exemplifies apparatus of this type which includes interchangeable fixtures for engaging different parts of the under-equipment of the vehicle, such as differential housings, front axles, under-floor motors, transmissions and springs. The apparatus is simple in construction and efficient in operation.

The invention is not to be understood as restricted to the details set forth since these may be modified within the scope of the appended claims without departing from the spirit and scope of the invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent is:

1. Apparatus for raising and lowering parts of the equipment on a vehicle disposed over a pit extending longitudinally beneath the vehicle,

comprising longitudinal rails fixed along the sides and elevated above the bottom of the pit, a wheeled carriage mounted on and to travel longitudinally of the pit on said longitudinal rails, transverse rails on the longitudinally movable carriage, extending substantially across the pit, a wheeled carriage mounted to travel on the transverse rails for movement across the pit, a vertically extending jack-screw mounted for vertical movement in the transversely movable carriage and having its upper end extended for lifting, and mechanism for raising and lowering the screw, mounted on and to travel with the transversely movable carriage, the screw and said mechanism being movable to different transverse and longitudinal positions in the pit by transverse and longitudinal movements of the carriages, respectively.

2. Apparatus for raising and lowering parts of the equipment on a vehicle disposed over a pit extending longitudinally beneath the vehicle, comprising longitudinal rails fixed along the sides and elevated above the bottom of the pit, a wheeled carriage mounted on and to travel longitudinally of the pit on said longitudinal rails, rails on the longitudinally movable carriage extending transversely substantially across the pit, a wheeled carriage mounted to travel on the transverse rails for movement across the pit, a single vertically extending jack-screw mounted for vertical movement in the transversely movable carriage, a part-engaging element on the upper end of the screw, and mechanism for raising and lowering the screw, mounted on and to travel with the transversely movable carriage, the screw and said mechanism being movable to different transverse and longitudinal positions in the pit by transverse and longitudinal movements of the carriages, respectively.

3. Apparatus for raising and lowering parts of the equipment on a vehicle disposed over a pit extending longitudinally beneath the vehicle and provided at the floor with inwardly overhanging ledges, comprising longitudinal rails fixed along the sides, elevated above the bottom of the pit and underlying the ledges, a wheeled carriage mounted on and to travel longitudinally of the pit on said longitudinal rails, transverse rails on the longitudinally movable carriage extending substantially across the pit, a wheeled carriage mounted to travel on the transverse rails for movement across the pit, a vertically extending jack-screw mounted for vertical movement in the transversely movable carriage and having its upper end extended for lifting, and mechanism for raising and lowering the screw mounted on and to travel with the transversely movable carriage, the screw and said mechanism being movable to different transverse and longitudinal positions in the pit by transverse and longitudinal movements of the carriage, respectively.

4. Apparatus for raising and lowering parts of the equipment on a vehicle disposed over a pit extending longitudinally beneath the vehicle, comprising longitudinal rails fixed along the sides and elevated above the bottom of the pit, a wheeled carriage mounted on and to travel longitudinally of the pit on said longitudinal rails, rails on the longitudinally movable carriage extending transversely substantially across the pit, a wheeled carriage mounted to travel on the transverse rails for movement across the pit, a single vertically extending jack-screw mounted between the rails on the longitudinally movable

carriage, and having its upper end extended for lifting, and mechanism for raising and lowering the screw mounted on and to travel with the transversely movable carriage, the screw and said mechanism being movable to different transverse and longitudinal positions in the pit by transverse and longitudinal movements of the carriages, respectively.

5. Apparatus for raising and lowering parts of the equipment on a vehicle disposed over a pit extending longitudinally beneath the vehicle, comprising longitudinal rails fixed along the sides and elevated above the bottom of the pit, a wheeled carriage mounted on and to travel longitudinally of the pit on the longitudinal rails and comprising longitudinally extending end plates and transverse girders between the end plates and extending substantially across the pit, and provided with rail forming upper surfaces, a carriage provided with wheels on the transverse girders for movement across the pit, a vertically extending jack-screw mounted for vertical movement in the casing between the transverse girders and having its upper end extended for lifting, and mechanism for raising and lowering the screw and mounted to travel with the casing, the screw and said mechanism being movable to different transverse and longitudinal positions in the pit by transverse and longitudinal movement of the carriages, respectively.

6. Apparatus for raising and lowering parts of the equipment on a vehicle disposed over a pit extending longitudinally beneath the vehicle, comprising longitudinal rails fixed along the sides and elevated above the bottom of the pit, a wheeled carriage mounted on and to travel longitudinally of the pit on the longitudinal rails and comprising longitudinally extending end plates and transverse girders between the end plates, extending substantially across the pit and provided with rail-forming surfaces, a carriage provided with wheels on the transverse girders for movement across the pit, said transversely movable carriage comprising a casing, a vertically extending jack-screw mounted for vertical movement in the casing between the transverse girders and having its upper end extended for lifting, and mechanism comprising gearing in the casing, for raising and lowering the screw and mounted to travel with the casing, the screw and said mechanism being movable to different transverse and longitudinal positions in the pit by transverse and longitudinal movement of the carriages respectively.

7. Apparatus for raising and lowering parts of the equipment on a vehicle disposed over a pit extending longitudinally beneath the vehicle, comprising longitudinal rails fixed along the sides and elevated above the bottom of the pit, a wheeled carriage mounted on and to travel longitudinally of the pit on the longitudinal rails, transverse rails on the longitudinally movable carriage, extending substantially across the pit, a wheeled carriage mounted to travel on the transverse rails for movement across the pit, said transversely movable carriage comprising a casing, a vertically extending jack-screw mounted for vertical movement in the casing between the transverse rails and having its upper end extended for lifting, gearing in the casing for raising and lowering the screw, an electric motor for driving said gearing, mounted on the casing, the screw, gearing and motor being movable to different transverse and longitudinal positions in

the pit by transverse and longitudinal movement of the carriages, respectively.

8. Apparatus for raising and lowering parts of the equipment on a vehicle disposed over a pit extending longitudinally beneath the vehicle, comprising longitudinal rails fixed along the sides and elevated above the bottom of the pit, a wheeled carriage mounted on and to travel longitudinally of the pit on the longitudinal rails and provided with rails extending substantially across the pit, a carriage comprising a gear-casing provided with extensions and wheels on said extensions, mounted to travel on the transverse rails for movement across the pit, a vertically extending jack-screw mounted for vertical movement in the casing between the transverse rails and having its upper end extended for lifting, and mechanism comprising gearing in the casing for raising and lowering the screw and mounted on and to travel with the casing, the screw and said mechanism being movable to different transverse and longitudinal positions in the pit by transverse and longitudinal movement of the carriages, respectively.

9. Apparatus for raising and lowering parts of the equipment on a vehicle disposed over a pit extending longitudinally beneath the vehicle, comprising longitudinal rails fixed along the sides and elevated above the bottom of the pit, a wheeled carriage mounted on and to travel longitudinally of the pit on the longitudinal rails, transverse rails on the longitudinally movable carriage extending substantially across the pit, a wheeled carriage mounted to travel on the transverse rails, a single jack-screw mounted for vertical movement in the transversely movable carriage, a lifting head on the upper end of the screw, mechanism carried by the transversely movable carriage for raising and lowering the screw, and fixtures for engaging different parts of the equipment on a vehicle interchangeably and removably mounted on the head.

10. Apparatus for raising and lowering parts of the equipment on a vehicle disposed over a pit extending longitudinally beneath the vehicle, comprising longitudinal rails fixed along the sides and elevated above the bottom of the pit, a wheeled carriage mounted on and to travel longitudinally of the pit on the longitudinal rails, transverse rails on the longitudinally movable carriage extending substantially across the pit, a wheeled carriage mounted to travel on the transverse rails, a single jack-screw mounted for vertical movement in the transversely movable carriage, and having its upper end extended for lifting, mechanism carried by the transversely movable carriage for raising and lowering the screw, and fixtures for engaging different parts of the equipment on a vehicle interchangeably and removably mounted on the upper end of the screw.

11. Apparatus for raising and lowering parts of the equipment on a vehicle disposed over a pit extending longitudinally beneath the vehicle, comprising longitudinal rails fixed along the sides and elevated above the bottom of the pit, a wheeled carriage mounted on and to travel longitudinally of the pit on the longitudinal rails, transverse rails on the longitudinally movable carriage extending substantially across the pit, a wheeled carriage mounted to travel on the transverse rails, a single jack-screw mounted for vertical movement in the transversely movable carriage, and having its upper end extended for lifting, mechanism carried by the transverse-

ly movable carriage for raising and lowering the screw, and forked fixtures for engaging different parts of the equipment on a vehicle interchangeably and removably mounted on the upper end of the screw.

12. Apparatus for raising and lowering parts of the equipment on a vehicle disposed over a pit extending longitudinally beneath the vehicle, comprising longitudinal rails fixed along the sides and elevated above the bottom of the pit, a wheeled carriage mounted on and to travel longitudinally of the pit on the longitudinal rails, transverse rails on the longitudinally movable carriage extending substantially across the pit, a wheeled carriage mounted to travel on the transverse rails, a single jack-screw mounted for vertical movement in the transversely movable carriage, a lifting head on the upper end of the screw, mechanism carried by the transversely movable carriage for raising and lowering the screw, and a fixture for engaging a part of the equipment on a vehicle, provided with a socket for removably receiving the head.

13. Apparatus for raising and lowering parts of the equipment on a vehicle disposed over a pit extending longitudinally beneath the vehicle, comprising longitudinal rails fixed along the sides and elevated above the bottom of the pit, a wheeled carriage mounted on and to travel longitudinally of the pit on the longitudinal rails, said longitudinally movable carriage comprising rails extending substantially across the pit, a wheeled carriage mounted to travel on the transverse rails for movement across the pit, said transversely movable carriage comprising a casing, a vertically extending jack-screw mounted for vertical movement in the casing between the transverse tracks and having its upper end extended for lifting, a tubular housing for the jack-screw on the casing and extending substantially to the bottom of the pit, means on the housing for holding the screw against rotation, and gearing in the casing for raising and lowering the screw, the screw and said housing being movable to different transverse and longitudinal positions in the pit by transverse and longitudinal movement of the carriages, respectively.

14. Apparatus for raising and lowering parts of the equipment on a vehicle disposed over a pit extending longitudinally beneath the vehicle, comprising longitudinal rails fixed along the sides and elevated above the bottom of the pit, a wheeled carriage mounted on and to travel longitudinally of the pit on the longitudinal rails, said longitudinally movable carriage comprising rails extending transversely of and substantially across the pit, a wheeled carriage mounted to travel on the transversely extending rails for movement across the pit, said transversely movable carriage comprising a casing, a vertically extending jack-screw mounted for vertical movement in the casing between the transversely extending rails and having its upper end extended for lifting, a tubular housing for the jack-

screw on the casing and extending substantially to the bottom of the pit, means on the housing for holding the screw against rotation, gearing in the casing for raising and lowering the screw, and a motor for driving the gearing, mounted on the housing, the screw, motor and said housing being movable to different transverse and longitudinal positions in the pit by transverse and longitudinal movement of the carriages, respectively.

15. Apparatus for raising and lowering parts of the equipment on a vehicle disposed over a pit extending longitudinally beneath the vehicle, comprising longitudinal rails fixed along the sides and elevated above the bottom of the pit, a wheeled carriage mounted on and to travel longitudinally of the pit on the longitudinal rails, said longitudinally movable carriage comprising rails extending transversely of and substantially across the pit, a wheeled carriage mounted to travel on the transversely extending rails for movement across the pit, said transversely movable carriage comprising a casing, a vertically extending jack-screw mounted for vertical movement in the casing between the transversely extending rails and having its upper end extended for lifting, gearing in the casing for raising and lowering the screw, an electric motor for driving the gearing, limit-switches for the motor, mounted on the casing, and means controlled by the upper and lower ends of the screw for shifting the limit-switches, the screw and said housing being movable to different transverse and longitudinal positions in the pit by transverse and longitudinal movement of the carriages, respectively.

16. Apparatus for raising and lowering parts of the equipment on a vehicle disposed over a pit extending longitudinally beneath the vehicle, comprising longitudinal rails fixed along the sides and elevated above the bottom of the pit, a wheeled carriage mounted on and to travel longitudinally of the pit on the longitudinal rails, said longitudinally movable carriage comprising rails extending transversely of and substantially across the pit, a wheeled carriage mounted to travel on the transversely extending rails for movement across the pit, said transversely movable carriage comprising a casing, a vertically extending jack-screw mounted for vertical movement in the casing between the transversely extending rails and having its upper end extended for lifting, gearing in the casing for raising and lowering the screw, an electric motor for driving the gearing, limit-switches for the motor, mounted on the casing, a member controlled by the upper end of the screw and mounted on the casing for shifting one of the limit-switches and a member on the lower end of the screw and in said housing, for shifting the other limit-switch, the screw and housing being movable to different transverse and longitudinal positions in the pit by transverse and longitudinal movement of the carriages, respectively.

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