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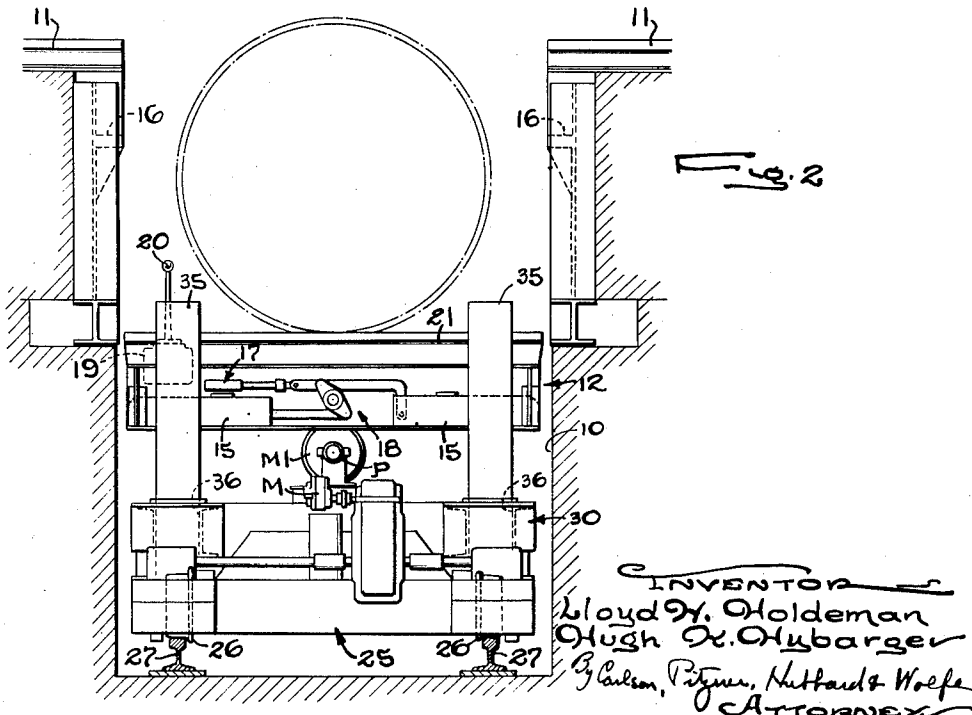
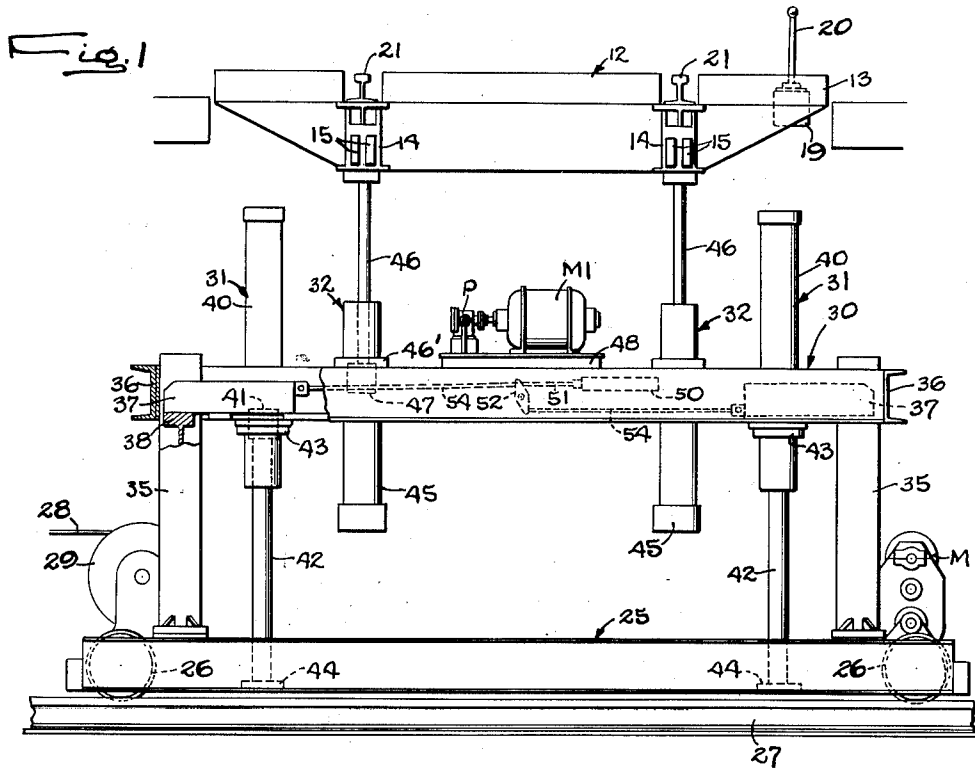
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2,655,115

DROP PIT APPARATUS

Filed Aug. 24, 1950

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Fig. 3

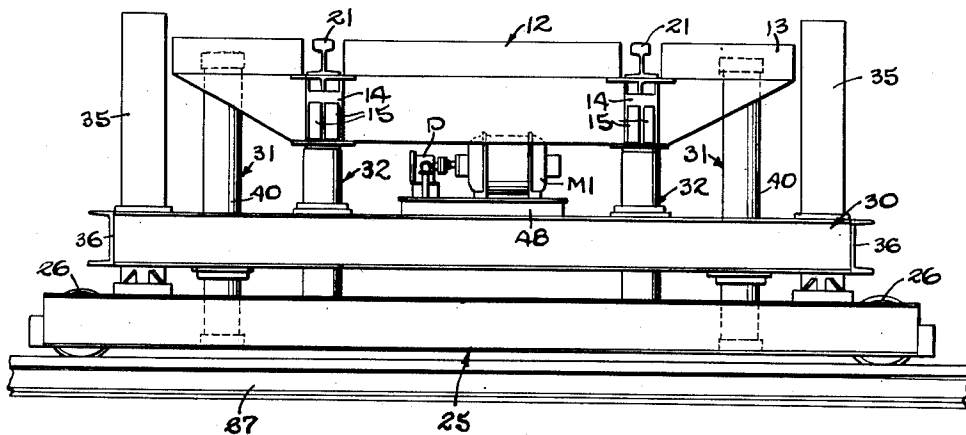
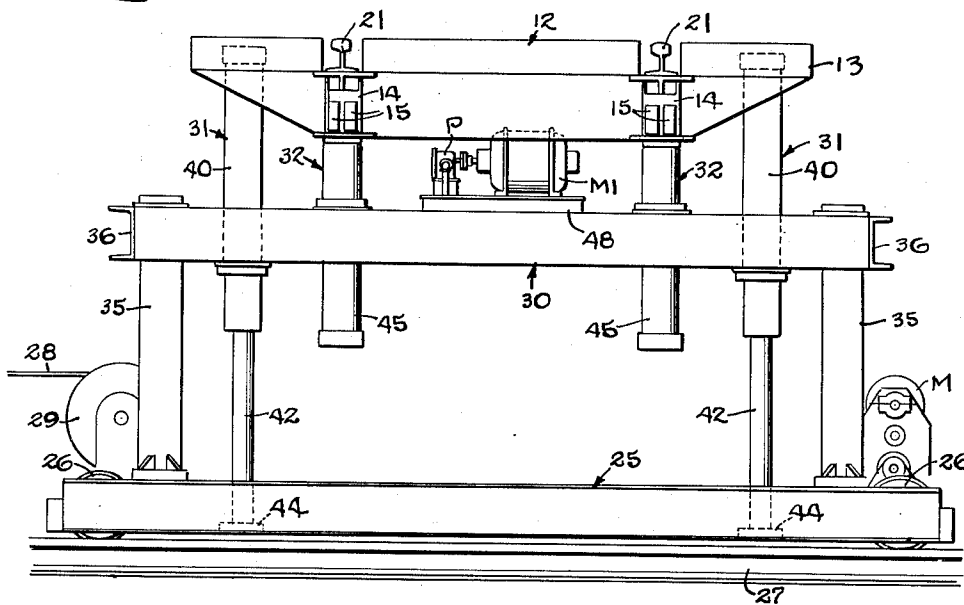


Fig. 4

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DROP PIT APPARATUS

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5 Claims. (Cl. 104—32)

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The invention relates to drop pit apparatus of the type used in railroad shops for removing, replacing and repairing the trucks or wheels of locomotives and other vehicles and for transferring the trucks and wheels between the various service tracks of the shop.

One object of the invention is to provide improved elevator mechanism for drop pit apparatus of the above general character which is simple in construction, efficient in operation, inexpensive to maintain, and which is capable of being operated and controlled with a high degree of accuracy.

Another object is to provide a dual elevator mechanism for drop pit apparatus which provides optimum lifting capacities and raising and lowering speeds for the different operating ranges of the apparatus.

It is also an object of the invention to provide drop pit elevator construction which is particularly well adapted to the use of hydraulic lifting mechanisms and to take advantage of the smooth action and easy and accurate control afforded by such mechanisms. In this connection it may be noted that drop pit apparatus utilizing hydraulic elevator mechanism is disclosed and claimed in the copending applications of Schramm and Holdeman, Serial No. 678,348, now Patent No. 2,520,968, and Holdeman, Serial No. 678,349, now Patent No. 2,520,969, both filed June 21, 1946, and in the Holdeman and Hybarger application, Serial No. 181,264, filed August 24, 1950. The present invention represents further developments and improvements in apparatus of the type disclosed and claimed in the above applications.

Other objects and advantages of the invention will become apparent from the following detailed description of the preferred embodiment illustrated in the accompanying drawings, in which:

Fig. 1 is a side elevational view of drop pit apparatus embodying the features of the invention, the apparatus being shown with the elevator and drop tables raised to their upper limit positions.

Fig. 2 is an end view of the apparatus showing the elevator and drop tables lowered to transport position.

Fig. 3 is a side view of the apparatus with the drop table lowered and the elevator table in its upper limit position.

Fig. 4 is a side elevational view of the apparatus showing both the elevator and drop tables lowered to transport position.

While the invention is susceptible of various modifications and alternative constructions, we have shown in the drawings and will herein describe in detail the preferred embodiment, but it

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is to be understood that we do not thereby intend to limit the invention to the specific form disclosed, but intend to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

For purposes of illustration, the invention has been shown as incorporated in apparatus adapted to operate in a pit 10 which intersects and extends beneath a series of service tracks 11 such as are commonly provided in railroad repair shops. To permit locomotives or other vehicles to be run over the pit on a service track and their wheels or trucks positioned for lowering within the pit, a drop table 12 is provided for bridging the gaps in the service tracks at the various pit intersections.

The drop table 12 may be of any preferred type such, for example, as shown in the applications above referred to. The pit table illustrated comprises a generally rectangular frame having a floor portion 13 supported on heavy structural members 14 disposed transversely of the pit 10. For supporting the table in pit bridging position, latch bars 15 are slidably mounted on the table so that they may be projected to rest on ledges 16 provided in the pit walls. When the table is to be lowered the latch bars are withdrawn to the retracted position in which they are shown in Fig. 2.

Any preferred type of actuating mechanism may be utilized for projecting and retracting the latch bars 15. In the exemplary apparatus the latch bar actuating mechanism is of the hydraulically operated type comprising a double acting piston and cylinder actuator 17 operatively connected with the latch bars by a linkage 18. Pressure fluid is supplied to the actuator 17 in this instance by a hand pump 19 through a suitable direction valve (not shown) which determines the direction of movement of the latch bars. The pump 19 is conveniently mounted on the drop table and is provided with an upright operating lever or handle 20 which may be removed after the table is locked in place.

For the accommodation of vehicles to be serviced, the table 12 is provided on its upper face with rails 21 spaced apart to align with the rails of the service track 11. Thus, when the drop table 12 is bridged across the pit the rails 21 extend the service tracks across the pit so that the vehicle to be serviced may be run over the pit.

Drop pit apparatus of the type with which the present invention is concerned is usually provided with elevator means for raising and lowering the drop table 12 and also with means for transport-

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ing the table along the pit 10 for association with any selected one of the service tracks of the shop. For this purpose the elevator means is mounted on a carriage 25 equipped with flanged wheels 26 adapted to run on rails 27 forming a track at the bottom of the pit 10. Power actuated means such as motor M may be provided for driving the carriage on the pit track. As herein shown, current for operating the motor is supplied by way of a cable 28 running over a spring actuated take-up reel 29 mounted on the carriage.

The advantages of equipping drop pit apparatus with dual elevator mechanisms for light duty high speed operation and heavy duty slow speed operation are explained in detail in the applications hereinbefore referred to and various organization including such mechanisms are disclosed and claimed therein. Among those advantages are the substantial structural simplification with attendant reduction in initial costs. Moreover, each elevator mechanism may be constructed to function most efficiently under the load it is required to handle. In accordance with the present invention, the utility of such dual elevator mechanisms is further extended by associating them with the other elements of the apparatus in a novel and advantageous manner. More particularly, the pit carriage 25 is provided with a vertically movable structure 30, conveniently called an elevator table, which is arranged to carry both a light duty elevator mechanism 31, a heavy duty elevator mechanism 32 and power means for operating both mechanisms.

In the preferred form of the apparatus illustrated, the light duty mechanism 31 is constructed to provide an operating range such that the elevator table may be raised and lowered between the upper limit position in which it is shown in Figs. 1 and 3 and the lower limit or transport position in which it is shown in Figs. 2 and 4. In the latter position the elevator table is adapted to rest on the carriage 25 and the elevator mechanism is relieved of its load.

The heavy duty elevator mechanism 32, on the other hand, is arranged for raising and lowering the drop table 12 relative to the elevator table. To facilitate the disconnection and reconnection of vehicle trucks and wheels, the elevator mechanism 32 is constructed to provide an operating range such that it can lift the drop table 12 substantially above the level of the service track, as shown in Fig. 1. It will be understood, of course, that such lifting of the drop table takes place only when the elevator table 30 is in its upper limit position. In the lower limit position of the elevator mechanism the drop table is supported directly on the elevator table and the elevator mechanism is relieved of its load.

The elevator table 30 as shown comprises a rigid generally rectangular frame somewhat shorter and narrower than the carriage 25. To relieve the elevator mechanism 31 of unnecessary strains, guiding means is provided for confining the movements of the table to a vertical plane. Such guiding means preferably comprises a plurality of upright columns 35 mounted on the carriage 25 and coacting with suitable guideways 36 provided on the table 30. In the particular apparatus illustrated, four of the columns 35 are provided, one adjacent each of the four corners of the carriage 25 for cooperation with the similarly located guideways 36 on the table.

Provision is made for relieving the elevator mechanism 31 of strain when the elevator mech-

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anism 32 is engaged in lifting a heavy load, as for example when raising the drop table above track level preparatory to releasing a set of wheels from a vehicle. For this purpose the table 30 is releasably latched to the columns 35 so that the load on the table 30 is transferred by the columns to the carriage 25 independently of the elevator mechanism 31. The latching means as herein shown comprises a series of latch bars 37 slidably supported on the table 30 so that they may be projected into engagement with ledges 38 provided on the columns 35. When the elevator table is to be lowered to transport position the latches 37 are retracted clear of the ledges, thus transferring the table load back to the elevator mechanism 31.

The elevator mechanisms 31 and 32 are preferably of the hydraulically operated type. Thus, as shown, the mechanism 31 comprises a plurality of hydraulic actuators, four in the present instance, each including a cylinder 40 with a working piston 41 having its piston rod 42 projecting from the lower end of the cylinder. Each cylinder is provided with a flange 43 for convenient attachment to a cross member forming a part of the table 30 and the piston rod 42 is adapted to bear at its lower end on a cross member 44 provided on the carriage 25. Accordingly, when pressure fluid is admitted to the upper end of the cylinder 40, the cylinder and table 30 are moved upwardly. The table may be lowered by gravity by opening the upper end of the cylinder and allowing fluid to drain therefrom. Alternatively, pressure fluid may be introduced into the lower end of the cylinder to effect a positive downward movement of the table.

The elevator mechanism 32 likewise comprises a series of hydraulic actuators each comprising a cylinder 45 secured to the table 30 in an upright position as by a flange 46 on the cylinder. Each cylinder has a working piston 47 with its piston rod 48 projecting from the upper end of the cylinder. In the present instance four such cylinders are mounted on the table so as to engage directly with the lower flanges of the beams 14 of the drop table 12. When fluid under pressure is admitted to the lower ends of the cylinders 45, the pistons and their rods are shifted upwardly, thus imparting upward movement to the drop table 12. Upon exhaust of fluid from the lower ends of the cylinders the drop table is lowered. Such lowering may be effected either by gravity or by introduction of pressure fluid into the upper ends of the cylinders 45.

Pressure fluid for operating the elevator mechanisms is supplied in the present instance by a pump P driven by an electric motor M1. The motor and pump are preferably mounted on a base 48 carried on and movable with the elevator table 30. The base 48 may conveniently constitute a reservoir for the fluid used in the system.

Preferably pressure fluid operated means is also provided for projecting and retracting the latch bars 37. Such means may conveniently comprise a cylinder 50 having its working piston connected by a piston rod 51 on a crank arm 52 fast on a rockshaft 53 journaled on the table 30. Other crank arms on the rockshaft are connected by links 54 with the latch bars 37 so as to move all the bars in or out simultaneously when the shaft is rocked in one direction or the other.

Suitable controls are provided for initiating and interrupting the operation of the various ac-

tuators as required. Controls especially well suited for that purpose are disclosed in our co-pending application Serial No. 181,264, filed August 24, 1950. By reference to that application it will be seen that the controls for the dual elevator mechanisms are interlocked and coordinated with each other and with the control for the latch bar actuator so that the proper operating sequence is insured at all times.

It will be apparent from the foregoing that the invention provides drop pit apparatus of novel and advantageous construction particularly well adapted for the use of hydraulically actuated dual elevator mechanisms. By mounting the elevator mechanisms and their power drive means on the elevator table, simplicity of construction is attained and maintenance is greatly simplified. The operations of the elevator and associated mechanisms may be readily coordinated to insure efficient and safe operation at all times. Through the provision for transferring the support of the elevator table directly to the carriage the light duty elevator mechanism is effectively protected from excessive strains when the heavy duty mechanism is used for lifting heavy loads.

We claim as our invention:

1. Apparatus for use in a pit intersecting and extending beneath a service track comprising, in combination, a drop table dimensioned to span the pit and bridge the gap in the service track, means for releasably latching said drop table in pit bridging position, a carriage movable in said pit below said drop table, an elevator table mounted on said carriage for vertical movement, elevator mechanism mounted on said elevator table for raising and lowering the table relative to said carriage, means carried by said elevator table and cooperating with means on said carriage when the table is in a raised position for supporting the table independently of said elevator mechanism, and other elevator mechanism mounted on said elevator table operative to raise and lower said drop table.

2. Apparatus for use in a pit intersecting and extending beneath a service track comprising, in combination, a drop table dimensioned to span the pit and bridge the gap in the service track, means for releasably latching said drop table in pit bridging position, a carriage movable in said pit below said drop table, a plurality of cylinder and piston mechanisms interposed between said elevator table and said carriage for raising and lowering the table relative to the carriage, other cylinder and piston mechanisms mounted on said carriage operative to raise and lower said drop table, and means for supporting said elevator table in a raised position independently of said first mentioned cylinder and piston mechanisms while said other cylinder and piston mechanisms are in operation.

3. In a drop pit apparatus, in combination, a carriage adapted to travel in a pit intersecting a service track, a drop table dimensioned to bridge the gap in the service track, means on said carriage for raising and lowering said drop table between a pit bridging position and a transport position, said raising and lowering means comprising an elevator table adapted to rest on said carriage in its lower limit position, a plurality of upright columns mounted on said carriage and

coacting with said elevator table to guide the same for vertical movement, hydraulically actuated mechanism mounted on said elevator table operative to raise and lower that table between an upper limit position and said lower limit position, other hydraulically actuated mechanism mounted on said elevator table operative to raise and lower said drop table, and latch means on said elevator table engageable with said columns for supporting that table adjacent said upper limit position.

4. In a drop pit apparatus, in combination, a carriage adapted to travel in a pit intersecting a service track, a drop table dimensioned to bridge the gap in the service track, means on said carriage for raising and lowering said drop table between a pit bridging position and a transport position, said raising and lowering means comprising an elevator table adapted to rest on said carriage in its lower limit position, a plurality of upright columns mounted on said carriage and coacting with said elevator table to guide the same for vertical movement, hydraulically actuated mechanism mounted on said elevator table operative to raise and lower that table between an upper limit position and said lower limit position, other hydraulically actuated mechanism mounted on said elevator table operative to raise and lower said drop table, a plurality of movable latch bars mounted on said elevator table, said latch bars when projected acting to support the elevator table on said columns and being retractable to release the elevator table for movement by said first mentioned hydraulic mechanism, and power operated means for projecting and retracting said latch bars.

5. In a drop pit apparatus, in combination, a carriage adapted to travel in a pit intersecting a service track, a drop table dimensioned to bridge the gap in the service track, means on said carriage for raising and lowering said drop table between a pit bridging position and a transport position, said raising and lowering means comprising an elevator table adapted to rest on said carriage in its lower limit position, a plurality of upright columns mounted on said carriage and coacting with said elevator table to guide the same for vertical movement, hydraulically actuated mechanism mounted on said elevator table operative to raise and lower that table between an upper limit position and said lower limit position, other hydraulically actuated mechanism mounted on said elevator table operative to raise and lower said drop table, a plurality of movable latch bars mounted on said elevator table, said latch bars when projected acting to support the elevator table on said columns and being retractable to release the elevator table for movement by said first mentioned hydraulic mechanism, a hydraulic actuator for projecting and retracting said latch bars, and a common source of pressure fluid carried by said table for supplying said table raising and lowering mechanisms and said latch bar actuator.

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