No. 819,592. PATENTED MAY 1, 1906.

L. C. PHILLIPS.

LIFTING MECHANISM.

APPLICATION FILED OCT. 4, 1905.

4 SHEETS—SHEET 1.

Fig. 2.

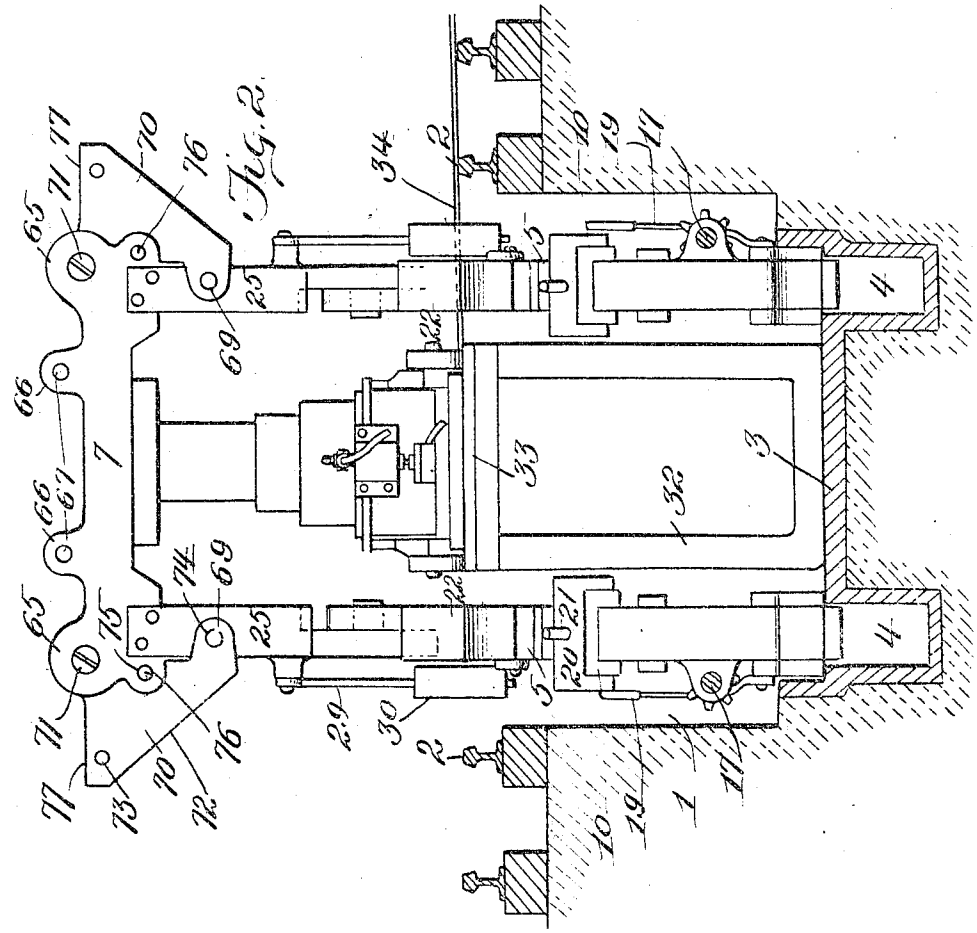
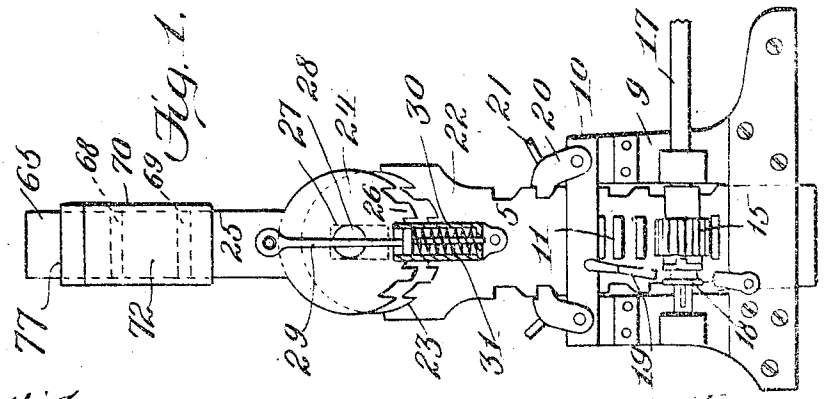


Fig. 1.



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4 SHEETS—SHEET 2

Fig. 3

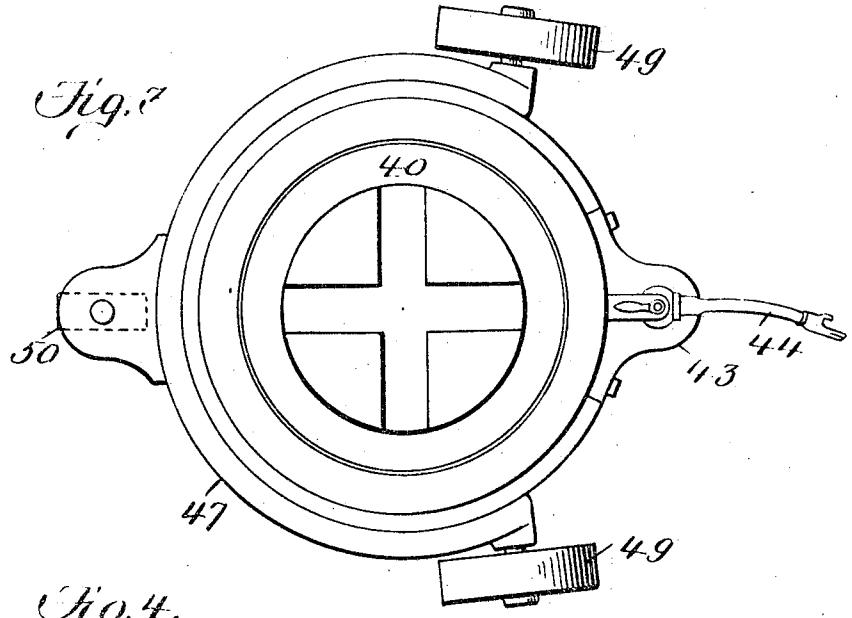


Fig. 4.

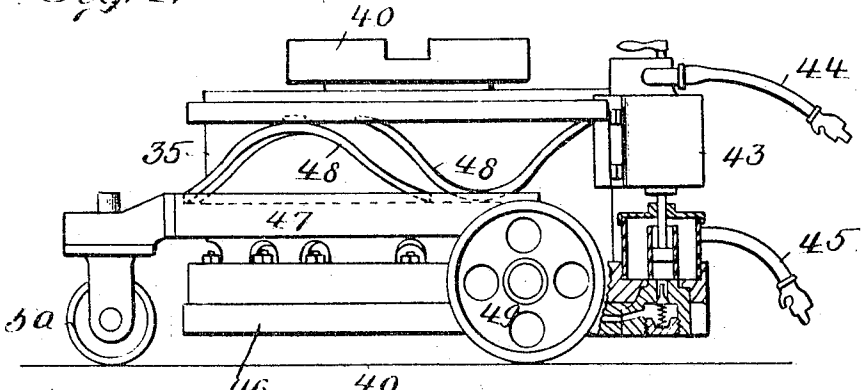
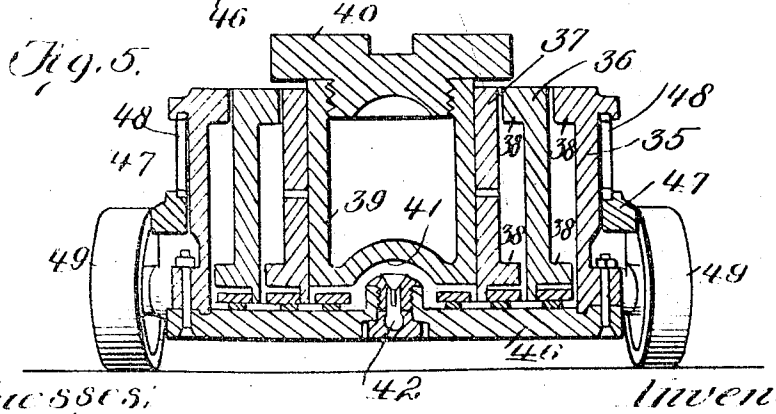


Fig. 5.



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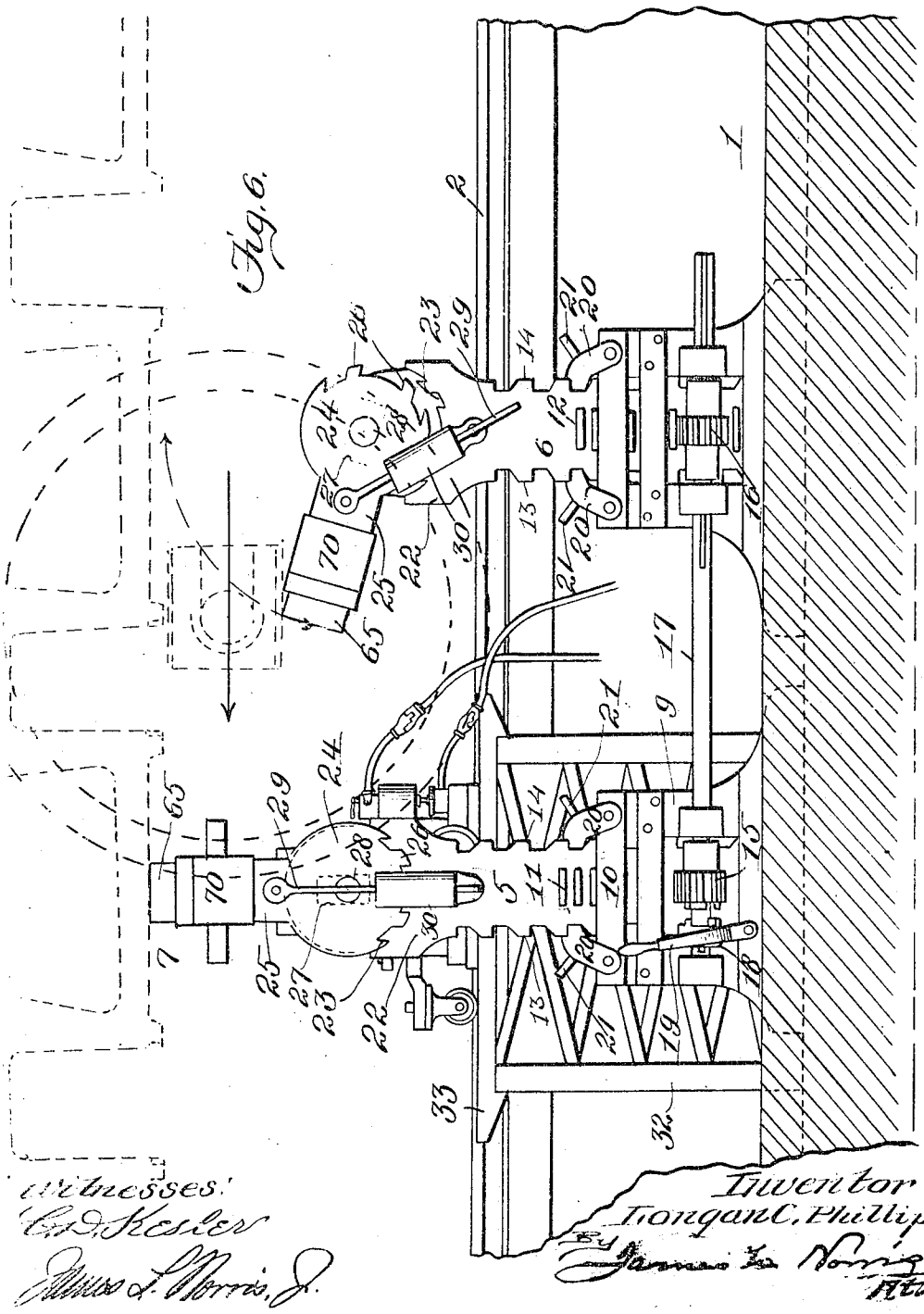
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LIFTING MECHANISM.

APPLICATION FILED OCT. 4, 1905.

4 SHEETS - SHEET 3.

Fig. 6.



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L. C. PHILLIPS.

LIFTING MECHANISM.

APPLICATION FILED OCT. 4, 1905.

4 SHEETS—SHEET 4.

Fig. 7.

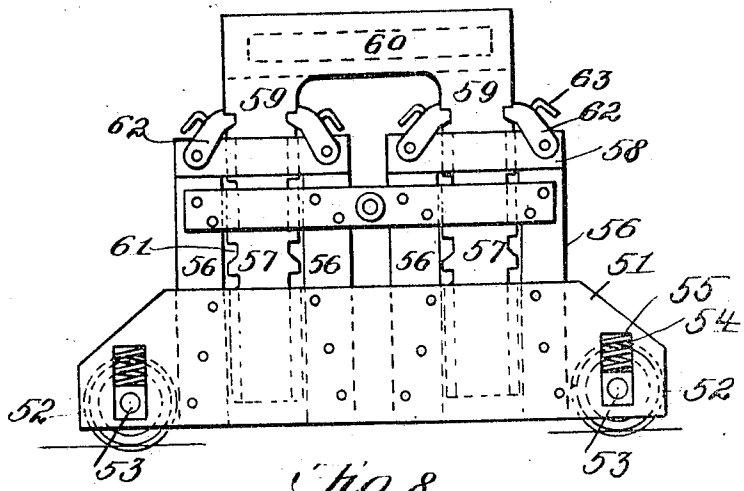
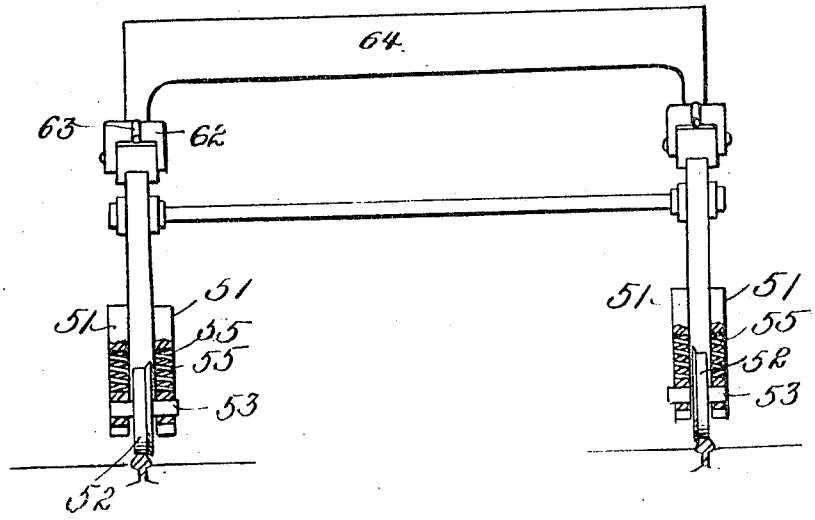


Fig. 8.



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UNITED STATES PATENT OFFICE.

LONGAN C. PHILLIPS, OF RICHMOND, VIRGINIA.

LIFTING MECHANISM.

No. 819,592. Specification of Letters Patent. Patented May 1, 1906.

Application filed October 4, 1905. Serial No. 281,320.

To all whom it may concern:

Be it known that I, LONGAN C. PHILLIPS, a citizen of the United States, residing at Richmond, in the county of Henrico and State of Virginia, have invented new and useful Improvements in Lifting Mechanism, of which the following is a specification.

This invention relates to mechanism for jacking up or supporting locomotive-engines and other analogous heavy structures when it is desired to detach the wheels or other under parts and to maintain the supported engine or other device in positive elevated position during the absence or prior to the replacement of the removed parts without resorting to the ordinary cumbersome method of utilizing blocks.

The invention consists in the construction and arrangement of the several parts which will be more fully hereinafter set forth.

In the accompanying drawings, Figure 1 is a side elevation, partially in section, of the improved pillar. Fig. 2 is a view in transverse section of a pit, showing a pillar located therein. Fig. 3 is a top plan view of a portable jack. Fig. 4 is a side elevation, partially in section, of the jack. Fig. 5 is a central transverse vertical section of the jack. Fig. 6 is a vertical longitudinal section of a pit with the pillars located therein and showing how an engine is elevated and supported to remove the wheels and boxes therefrom. Fig. 7 is a side elevation of the pilot-lifting mechanism, and Fig. 8 is an end elevation of the same.

Similar numerals of reference are employed to indicate corresponding parts in the several views.

The mechanism is used mainly in a pit 1 of suitable structure between track-rails 2 of the usual gage, and disposed in the bottom of the pit is a base-plate 3, with depending sockets or recesses 4 in the front and rear extremities thereof for the operation of front and rear pairs of pillars 5 and 6, respectively, having cross-heads 7 and 8 movably supported thereby and free to tilt in opposite directions, as will be more fully hereinafter explained. The pillars 5 and 6 are movable in suitable guides 9, provided with caps 10, through which the said pillars move. The pillars 5 and 6, respectively, have teeth 11 and 12 in their outer faces and edge teeth 13 and 14 at opposite sides. The teeth 11 and 12 are engaged by pinions 15 and 16, disposed on a shaft 17, this construction being duplicated at opposite sides of the mechanism. Each shaft 17 is operated by suitable means to raise and lower the pillars 5 and 6 and is adjustable with respect to the pinions to accommodate a separation or movement longitudinally of one set of pillars and connecting-head with respect to the other. The pinion 16 is caused to always rotate with the shaft through the medium of a suitable spline and groove in the respective parts. The pinion 15 is clutched to the shaft through the medium of a clutch-sleeve 18, operated by a clutch-lever 19 accessible at the outer side of the forward set of pillars, as shown. The pinion 15 is loose on the shaft when the clutch-sleeve is disengaged therefrom; but when said sleeve is shifted the motion of the shaft will be imparted to said pinion. The object of this arrangement is to lower the forward pillars and their connecting-head independently of the rear set of pillars and connecting-head. It will also be understood in this instance that the clutch-sleeve and operating device therefor will be similar on both sides of the forward pair of pillars. The edge teeth 13 and 14 of the pairs of pillars 5 and 6 are provided for engagement by pairs of dogs 20, operating with each pillar, each dog having an outwardly-projecting grip or handle 21 for releasing it or throwing it outwardly and inwardly with respect to its pillar.

The upper ends of the pillars 5 and 6 are enlarged, as at 22, and formed with toothed concavities or arcuate seats 23 in their outer faces, the inner portion of each pillar projecting above its seat 23. Fulcrumed locking-heads 24, forming portions of posts or legs 25, depending from the opposite extremities of the heads 7 and 8, engage the toothed concavities or seats 23 and are formed with teeth 26 to coöperate with the teeth of said recesses or seats. The posts or legs 25 are vertically movable with respect to the upper enlarged extremities or ends of the pillars through the medium of vertical slots 27, formed in the upper ends of the pillars above the concavities or recesses 23, and in which fulcrum-pins 28, extending through the center of the heads 24, engage. The posts or legs 25 have movement-controlling rods or members 29 pivoted thereto above the fulcrum-pins 28, said rods or members depending through movable spring-boxes 30 on the adjacent sides of the upper enlarged extremities 22 of the pillars 5 and 6. Suitable springs 31 are disposed in the spring-boxes

and operating with the rods or members 29 to normally hold the locking-heads 24 disengaged with respect to the concavities or seats 23. When the posts or legs 25 and the head 7 are tilted, the rods or members 29 and spring-boxes move accordingly, and when the said legs or posts and heads are free to return to normal position the springs 31 restore them to vertical alinement with respect to the pillars.

Between the pairs of pillars and resting on the bed-plate 3 in the bottom of the pit are intermediate supports 32, having table-tops 33 projecting forwardly and in rear of the pillars to sustain portable jacks, which will be more fully hereinafter specified, in elevated position and in operative relation to the centers of the heads 7 and 8. These table-tops 33 are rendered accessible from the track-rails 2 by means of bridge-plates 34, extending from the said rails to the table-tops and permitting the portable jacks to be easily disposed under or removed from beneath the heads 7 and 8 as the several operations of removing the car-wheels or other under parts of a locomotive-engine may demand. These portable jacks each comprises an outer cylindrical body 35, in which are arranged a series of concentric adjusting-cylinders 36 and 37, the upper extremity of the body 35 and both the upper and lower extremities of the cylinder 36 and the lower extremity of the cylinder 37 having flanges or circumferential abutments 38 for engagement with each other as the cylinders 36 and 37 are forced upwardly. Within the cylinder 37 is a plunger 39, carrying an upper head 40, the plunger 39 having a concavity 41 in its bottom over an inlet-valve mechanism 42 for controlling the admission of air or water into the body 35. Connected to the valve mechanism 42 is a pump 43, having a valved coupling-hose or analogous device 44 for attachment to the air-supply of a shop or to a water-main, as may be desired. The pump 43 also has an exhaust-pipe 45, similar in construction to the pipe 44. The pump and its connections, together with the valve mechanism, may be of any well-known form and of that class of such devices as are now commonly employed in connection with hydraulic or pneumatic apparatus.

The body 35 is secured to a bottom plate 46, and the lower ends of the cylinders 36 and 37 and the plunger 39 are normally held elevated above the said bottom, the valve mechanism 42 being suitably disposed in said bottom and the pump 43 in part secured to the body 35 and to the bottom. It will also be understood that suitable packings will be interposed between the cylinders, plunger, and the body, the body constituting, under normal conditions, the stand for the jack in which the cylinders and plunger are regularly adjustable to impart to the jack a greater range of motion without modifying the supporting means for the jack.

The jack, as set forth, is portable and has a yoke 47 attached thereto and partially surrounding the body, the latter being vertically movable within the yoke, and between the yoke and the upper portion of the body on the exterior springs 48 are interposed, which always tend to hold the said body elevated in the yoke. The yoke has its free terminals provided with rollers 49, and at the center thereof is a caster 50, by means of which the jack as a whole may be readily moved from one place to another. When weight strain is imposed upon the head 40, connected to the plunger 39, the body 35, together with the cylinders 36 and 37, are forced downwardly until the bottom 46 bears upon the support for the jack, which in the present instance will be one of the table-tops 33, thus relieving the rollers 49 and caster 50 of breaking strain.

At the front or pilot end of the locomotive a lifting mechanism somewhat similar to that embodying the pillars 5 and 6 and the heads 7 and 8 will be used, but will be without the jointed posts or legs 25. This pilot-lifting mechanism embodies a truck-frame 51, having front and rear pairs of track-wheels 52, carried by axles 53, movable in slots 54 and normally held depressed by springs 55. The track-wheels 52 are moved on a track of wider gage than the usual railway-track and located between the rails 2, so that this pilot-lifting mechanism may be readily placed in position under the front extremity of the engine and removed when desired. The movable attachment of the track-wheels 52 permits the truck-frame 51 to lower when the lifting mechanism is subjected to weight pressure, so that the truck-frame may rest upon the support therefor without imposing breaking strain on the track-wheels or their axles. Rising from opposite sides of the truck-frame 51 are pairs of guides 56, between which plungers 57 have vertical movement and carry caps 58, through which the legs 59 of a cross-head 60 extend, the legs 59 being movable through the caps and forming a continuation of the plungers 57. The opposite edges of the legs 59 or the extensions of the plungers have recesses 61 therein to receive the inner reduced ends of dogs 62, similar to the dogs 20, heretofore described, and having handles or grips 63 for a like purpose. The cross-heads 60 of the opposite pairs of plungers 57 are suitably connected by transverse members 64, and in some instances it may be found that only one cross-head will be necessary for certain kinds of work or that the plungers and cross-heads may be reduced one-half. This would be an obvious change without departing in the least from the scope of the invention. This pilot-lifting mechanism remains in one posi-

tion under the pilot or forward extremity of an engine during the removal of the wheels or other parts of the latter, but the jacks which are movably placed on the table-tops 33 may be shifted from one position to another as the nature of the work may require.

Each cross-head 7 and 8 is provided with means for engaging the engine-frames or to catch and hold the boiler and to accommodate the application of such means is provided with terminal fulcrum extensions 65 and upper apertured ears 66, having openings 67 therethrough. Below the fulcrum extensions 65 the ends of the head are also constructed with pin-openings 68, one in each, and the legs 25 are also provided with pin-openings 69 at a suitable distance below the pin-openings 68. Supporting-blocks 70 are movably connected to the extensions 65 by fulcrum-pins 71, and each block has an outer inclined edge 72 and upper, lower, and intermediate openings 73, 75, and 74 to respectively register with the openings 67, 68, and 69, suitable locking-pins 76 being inserted through the several openings when the position of the blocks is changed. Each block also has an engine-frame-supporting edge 77, which is in a true horizontal plane when the block is down, as shown by Fig. 2 in full lines. When each block is down, as just stated, the openings 68 and 75 and 69 and 74 coincide, and the block is secured in immovable position by insertion of the pins 76 through the coinciding opening. When the blocks are thrown over on each of the heads, the openings 73 coincide with the openings 67 and the inclined edges 72 are brought inwardly in reverse positions and provide a trough-like recess to catch and hold the boiler, the blocks when in the last-described position being held immovable by the insertion of one of the pins 76 through the coinciding openings 67 and 73. When the blocks are turned inwardly over the member 7, they will clear the engine-frames, and by lowering the jack engaging the member 7 the latter may be depressed sufficiently to engage the boiler. These attachments will be found exceptionally useful auxiliaries to the members 7.

When it is desired to use the improved mechanism for removing the wheels from a locomotive-engine, the latter is run over the pit 1 and the pillars 5 and 6 are operated through the medium of the shafts 17 to bring the heads 7 and 8 upwardly in contact with the side frames of the locomotive, the posts or legs 25 becoming locked with respect to the upper ends of the pillars, as heretofore explained. The jacks embodying the heads 40 are then disposed under the heads 7 and 8 and water or air admitted thereto to raise said heads 40 and also the heads 7 and 8 and the side frames of the engine. When the heads 7 and 8 are raised, they are locked against downward movement by the dogs 20 engaging the opposite sides, thus insuring a reliable support from a firm foundation, particularly when the jacks are removed, as will be presently set forth. When the heads 7 and 8 have been elevated sufficiently to clear the journals of the car-wheels from their bearings, the said wheels, with their journals, are moved from under the side frames, the pairs of car-wheels and their journals being successively detached. Previous to the movement of the car-wheels from under the side frames the jacks are individually removed from under the heads 7 and 8, and the support of the side frames and the weight of the locomotive above is then imposed upon the pillars 5 and 6 and the posts or legs 25 of the heads 7 and 8. While a pair of car wheels or drivers and their journals are moved to clear one pair of the posts or legs 25 the remaining pair of posts or legs and connecting-head therefor in operation with respect to the side frames of the locomotive have the jack still in engagement therewith. When the one pair of posts or legs and connecting-head are cleared, the car-wheels and journal are held against movement until the weight is brought to bear on the pair of posts or legs just cleared and the other pair of posts or legs released or permitted to move downwardly a slight distance, which can be accomplished by properly exhausting the jack and releasing the box 20. The remaining jack is then removed, and the car-wheels and the journal contact with the pairs of posts or legs in advance thereof and likewise throws said posts or legs over until a full clearance thereof ensues. By this means the drivers or car-wheels and their journals may be readily liberated from the side frames or replaced by a converse operation with expedition and convenience without the least injury to the frame of the engine or the parts supported by said frame. The posts or legs 25 are automatically returned to upright position as soon as they are cleared by the wheels and journals, and it will be understood that the said posts and legs and their connecting-heads are introduced between the wheels, so that the latter are not in the least obstructed in their rolling movement with respect to the rails engaged thereby. After the wheels and journals have been reset the jacks and supporting mechanism with which the jacks coöperate, as well as the pilot-jack, may be readily removed and lowered without in the least obstructing the propulsion of the locomotive.

Having thus described the invention, what is claimed as new is—

1. In a lifting mechanism of the class set forth, the combination of pairs of pillars having tilting devices supported thereby, and jack means coöperating with said tilting devices.

2. In a lifting mechanism of the class set

forth, the combination of vertically-movable pillars, tilting supporting means connected to said pillars, and jack means removably cooperating with said supporting means.

3. In a lifting mechanism of the class set forth, the combination of vertically-movable pillars, tilting supporting means connected to said pillars, and a portable jack coöperating with said supporting means.

4. In a lifting mechanism of the class set forth, the combination of vertically-movable pillars, means for locking the pillars in their adjusted position, and tilting supporting means having a slidable connection with the pillars.

5. In a lifting mechanism of the class set forth, the combination of vertically-movable pillars, and supporting means movably held by the pillars and having an automatic locking connection with the latter.

6. In a lifting mechanism of the class set forth, the combination of vertically-movable pillars, means for operating the said pillars, and supporting devices movably held by the upper extremities of the pillars and having resilient connecting means with respect to the latter.

7. In a lifting mechanism, the combination of vertically-movable pillars, and tilting supporting devices slidably connected to the upper extremities of the pillars and having resilient connections with respect to the latter.

8. In a lifting mechanism of the class set forth, the combination of vertically-movable pillars, and tilting supporting devices connected to the pillars and having a cross-head.

9. In a lifting mechanism of the class set forth, the combination of a pair of vertically-movable pillars, and supporting means having posts movably connected to the pillars and attached to each other by a cross-head.

10. In a lifting mechanism of the class set forth, front and rear pairs of coöperating vertically-movable pillars, tilting supporting means held by the said pillars, and portable jack devices to coöperate with the said supporting means.

11. In a lifting mechanism of the class set forth, the combination of front and rear pairs of vertically-movable pillars, shafts carrying pinions for operating said pillars, and tilting supporting means connected to the pillars.

12. In a lifting mechanism of the class set forth, the combination of vertically-movable pillars, shafts carrying pinions for operating said pillars, and tilting supporting means held by the pillars and provided with devices for automatically restoring them to vertical position.

13. In a lifting-mechanism of the class set forth, the combination of a pair of vertically-movable pillars, supporting means movably held by the pillars and having a tilting motion, and means for automatically restoring the supporting means to a vertical position.

14. In a lifting mechanism of the class set forth, the combination of vertically-movable pillars having toothed cavities at their upper extremities, and supporting means movably held by the pillars and provided with toothed heads to coöperate with the said toothed cavities of the pillars.

15. In a lifting mechanism of the class set forth, the combination of vertically-movable pillars, means for locking the pillars in their adjusted position, and tilting supporting means having a self-locking connection with the upper extremities of the pillars.

16. In a lifting mechanism of the class set forth, the combination of vertically-movable pillars, and tilting supporting means movably connected to the upper extremities of the pillars and having a self-locking connection with the latter.

17. In a lifting mechanism of the class set forth, the combination of vertically-movable pillars with opposite toothed edges, dogs removably coöperating with the said toothed edges of the pillars, and supporting means movably held by the upper extremities of the pillars.

18. In a lifting mechanism of the class set forth, the combination of vertically-movable pillars having opposite toothed edges, dogs removably coöperating with the toothed edges of the pillars, and tilting supporting means pivotally held by the upper extremities of the pillars and having locking means to engage the latter.

19. The combination with a locomotive-engine, of means for elevating the same having a tilting motion, and a jack removably operating with said elevating means.

20. In a lifting mechanism of the class set forth, the combination of a vertically-adjustable supporting member, and blocks movably attached to the opposite extremities of said member and adjustable outwardly and inwardly, said blocks having a straight edge which may be disposed horizontally to engage engine-frames, and inclined edges for holding a boiler, and means for locking the blocks in adjusted position.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

LONGAN C. PHILLIPS.

Witnesses:
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FRANK PHILLIPS.