Oct. 30, 1928. 1,689,284

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APPARATUS FOR TILTING AUTOMOBILES

Filed March 1, 1927 2 Sheets-Sheet 1

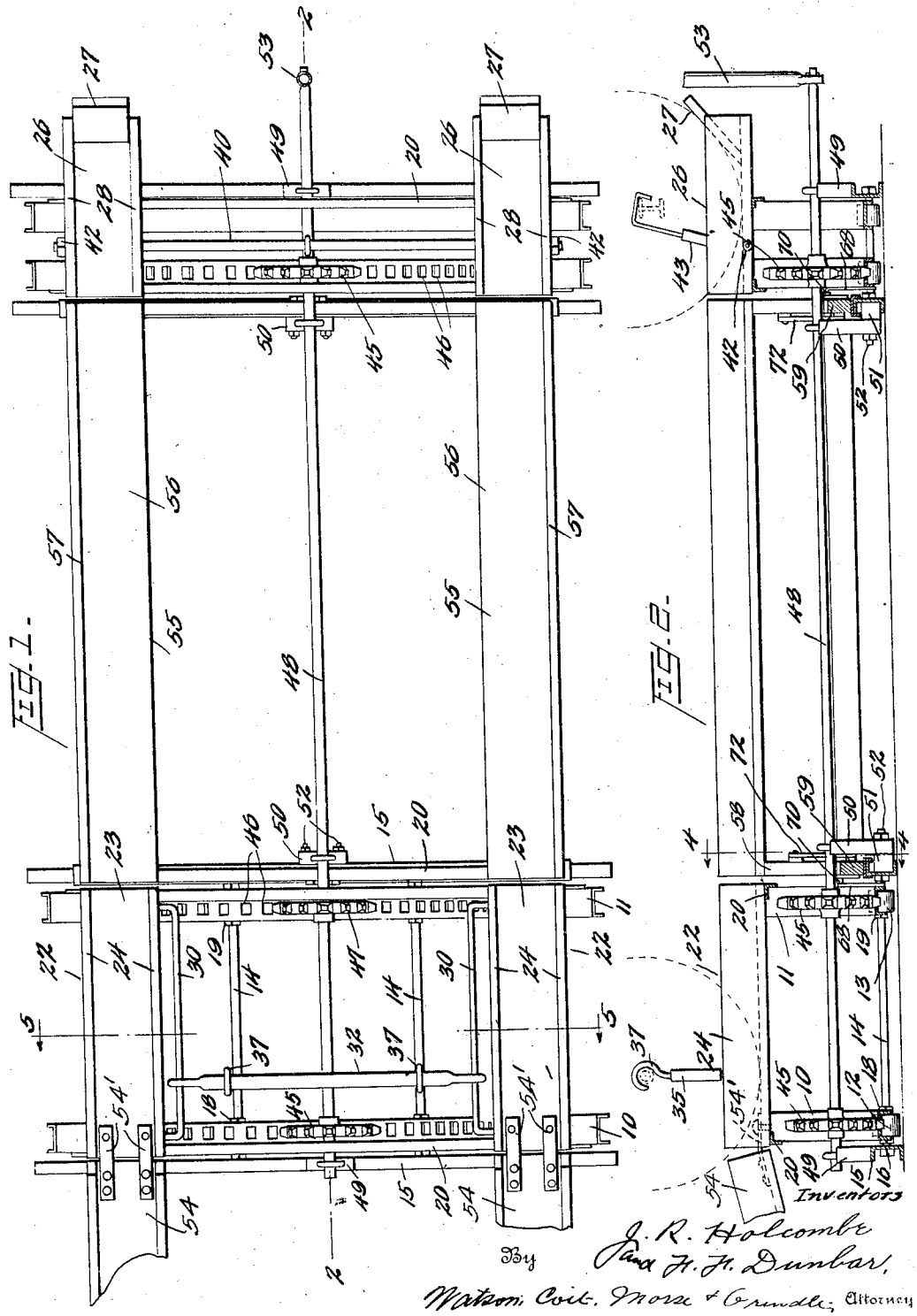


FIG. 1.

FIG. 2.

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FIG. 3.

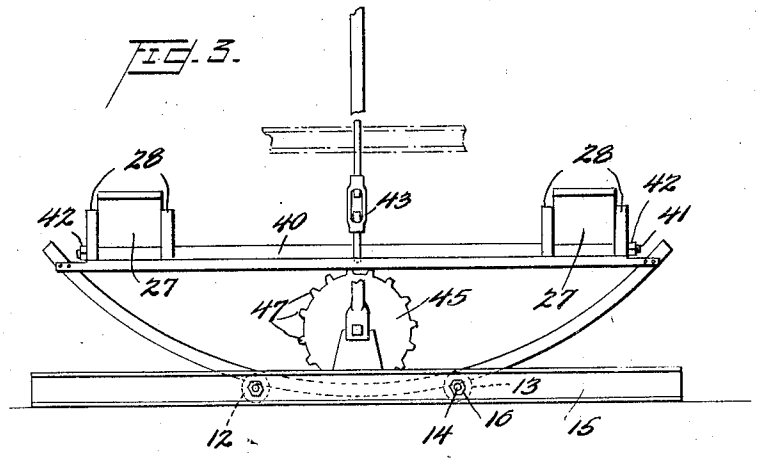


FIG. 4.

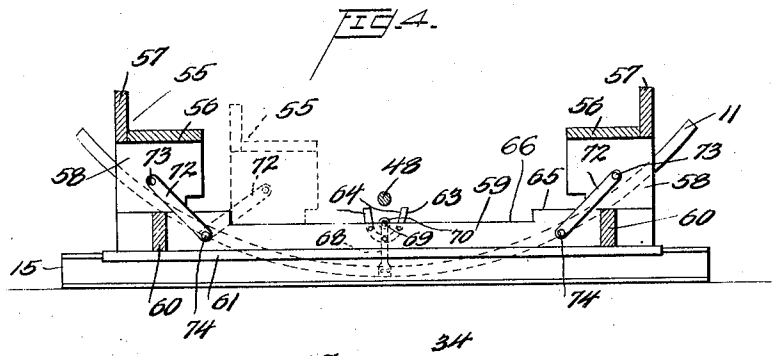
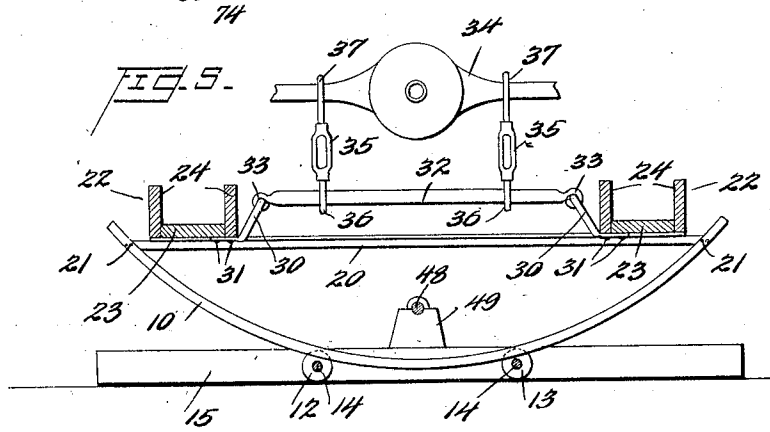


FIG. 5.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR TILTING AUTOMOBILES.

Application filed March 1, 1927. Serial No. 171,825.

This invention relates to apparatus for tilting automobiles.

It is a general object of the present invention to provide a novel and improved apparatus of the type described.

More particularly, it is an object of this invention to provide a device for tilting automobiles, comprising a pair of cradles each adapted to rock or tilt on suitable supports together with troughs carried by each cradle to support the vehicle wheels, there being connecting sections of track between the tilting troughs which are adapted to be automatically moved out of the way when the vehicle is titled on the cradles.

A further object of the present invention consists in the provision of novel means for moving inwardly the section of connecting track, between the movable troughs, on the side of the vehicle which tilts downwardly, so that it will not interfere with portions of the wheels and the running board during the tilting operation.

Other and further objects of the invention comprise the novel arrangement and construction of the various parts and will be more fully comprehended by those skilled in the art after a consideration of the accompanying drawings and following specification, wherein is disclosed a single exemplary embodiment of the invention, with the understanding, however, that various changes may be made therein such as fall within the scope of the appended claims without departing from the spirit of the invention.

In said drawings:

Figure 1 is a plan view of an apparatus constructed according to the present invention;

Figure 2 is a longitudinal central section on line 2—2 of Figure 1;

Figure 3 is an elevation of the right hand end of the machine as seen in Figure 1;

Figure 4 is a transverse vertical section on line 4—4 of Figure 2; and

Figure 5 is a transverse vertical section on line 5—5 of Figure 1.

A number of forms of tilting cradles have been suggested for use in repairing and greasing automobiles. The majority of these comprise a pair of parallel tracks to receive and retain the vehicle wheels and some means for causing one of the tracks to elevate or one to elevate and one to depress in order that ready access may be had to the under side of the vehicle. Such arrangements offer the difficulty of having the track extend between the wheels on the side which is lifted and to thus seriously interfere with movements of the workmen as well as to render access to certain parts of the vehicle difficult. The present invention contemplates separating the intermediate sections of the track from those sections which support the wheels and retaining them in their normal horizontal plane during tilting. In order that the intermediate track section on the depressed side of the vehicle may not interfere with the running board and portions of the wheels, arrangements are made for automatically moving this portion of the track out of the way during the tipping operation. The intermediate track section on the opposite or elevated side moves together with the portion on the lowered side and serves as a suitable seat or bench for workmen.

Referring to the drawing, there is disclosed at 10 and 11 a pair of rockers formed preferably of inverted steel channel sections curved to a true arc of suitable radius. Each rocker is adapted to roll on a pair of rollers 12, 13 spaced apart a suitable horizontal distance so as to prevent tipping of the rocker about one of the rollers as a pivot. The rollers are carried on a pair of axles 14 and adapted to rotate freely thereon. The axles 14 are shouldered at the ends and their reduced portions passed through the webs of spaced parallel channel sections 15 set on edge. Suitable nuts such as 16 secure the axles rigidly to the sections and serve to space these channel sections apart and to thus form a rigid frame. Suitable spacing nuts 18 and 19 position the channels and rollers. The side flanges of the rockers fit over the edges of the rollers and are thus prevented from moving longitudinally of the axles.

There are two complete sets of rockers and their supporting rollers and frames, spaced apart from center to center a distance equivalent to the average wheel base of the vehicles adapted to be accommodated. On the left hand end, the rockers are adapted to preferably support the rear wheels of the vehicle and are further spaced apart than those at the right hand end adapted to support the

front wheels. Otherwise the construction of the two sets of frames and rockers is identical.

Each rocker is provided with a chord in the form of an angle bar 20 subtending practically the full arc thereof and secured at its ends to the outer flange of the rocker as shown at 21. Extending transversely of the rockers and secured to and supported by the angle bars 20 are the wheel troughs 22 formed with the bottoms 23 and the sides 24. They may be of wood or metal as preferred. The wheel troughs 26 on the front end are provided with the inclined end stops 27 secured between their side members 28 to limit the extent of movement of the front vehicle wheels in these troughs.

In order that a vehicle may be securely attached to each cradle, comprising the two rockers and the corresponding set of wheel troughs, so that no relative movement thereof may result when the cradle is tilted, means are provided for securing the axles to the cradles. At the rear end, a bar 30 extends parallel to and slightly spaced from each inner trough side 24. Its ends are bent at right angles and are secured beneath the bottoms 23 of the wheel troughs as at 31. Referring to Figs. 1 and 5, it will be seen that a suitable bar or tube 32 extends between the rods 30 and has ring-like ends 33 surrounding these rods so that the bar 32 may be slid along the rods to be positioned directly beneath the rear axle 34 of the vehicle. A pair of turn-buckles 35 have their lower ends 36 of ring form to encircle the bar 32 and their upper ends 37 of suitable hook form so that these hooks can be placed over the axle housing on either side of the differential case and the turn-buckles tightened to draw the axle down and hold it rigid in respect to the cradle. At the forward end, it is contemplated stopping the front axle of the vehicle in substantially the same position irrespective of the wheel base of the vehicle by running the tires against the stops 27. To retain the axle a single transverse pipe 40 extends between the inner side members 28 of the wheel troughs and has a bolt 41 passing therethrough and through the bottoms of the wheel troughs, with nuts 42 applied on the ends thereof to retain the same in position. A turn-buckle 43, corresponding to one of those described in connection with the rear end cradle, serves to hook over the front axle and secure the same rigid in respect to the front end cradle.

The cradles are adapted to be rocked, to tilt the vehicle, by means of suitable gears such as 45, one engaging the inner rocker of the front cradle and one each rocker of the back cradle. For this purpose, the engaged rockers are provided with a series of spaced punched holes 46 adapted to mesh with the teeth 47 of the gears so that upon rotation of the gears suitable turning or rolling of the rockers will be effected. The three gears are non-rotatively mounted on a pipe or shaft 48 extending the full length of the apparatus. Suitable bearing blocks 49 for this shaft are bolted to the upper flanges of the outermost channel members of each cradle supporting frame. On the inner channel members of the cradle supporting frames, the bearings 50 of the shaft 48 are bolted to spacer members 51 fitting in the grooves of the channel members by means of the bolts 52. Preferably, at the forward end the handle bar 53 is non-rotatably attached to the shaft so that it can be used to rotate the shaft. The gear diameters are such that when the handle bar 53 is moved from the vertical position to one side until it touches the floor or ground, the vehicle is tipped as far as required in that direction and correspondingly in the opposite direction when the handle bar is moved to the opposite side. Intermediate positions are feasible, owing to the fact that the center of gravity of the vehicle practically remains at the same distance above the ground owing to the shape and contour of the rockers. With the center of gravity thus remaining practically stationary, it will be seen that but little effort will be necessary to tilt the vehicle because there is no actual lifting of the same. It is only necessary to overcome the friction of the gears, their shaft and of the rockers on their rollers. This friction is, however, sufficient to retain the vehicle in any desired position, although it may be desirable to provide some form of ratchet locking means (not shown) to retain the shaft 48 in any desired position. Since the rockers roll on their rollers and follow in continuations of their own arc, the center of the vehicle is shifted neither vertically nor transversely, and there is no tendency of the vehicle to fall over and no means need be applied to prevent the rockers from leaving their rollers.

In order to run the vehicle onto the wheel troughs, suitable detachable runways 54 may be provided to extend from the ground to the rear wheel troughs. They may have suitable hooks such as shown at 54′ to temporarily attach the parts together.

Some means must be provided for carrying the front wheels of the vehicle from the rear wheel troughs to the front wheel troughs, and these take the form of the intermediate runways 55, one between each front and rear wheel trough. Each comprises a bottom 56 and an outer side guide 57 attached thereto and forming a brace for the bottom. These intermediate runways are supported at their ends on the blocks 58, which are carried by the transverse stringers 59. The transverse stringers are connected together by longitudinal members 60, one at either end thereof thus forming a rigid rectangular framework. The

stringers are provided at their bottoms with the small channel members 61 attached thereto with their open sides down. The channels in these members 61 fit snugly over the flanges of the inner channels 15 of the cradle supporting frames and are slidable thereon laterally of the runways. The normal position of the runways is as shown in Fig. 1, but when the vehicle is tilted it is desirable that the runways be moved toward the side of the vehicle which is elevated, both to remove them from beneath the lowered portion of the vehicle and also to have them out of the way so that work can more conveniently be done on the vehicle. For this purpose, they slide on the channel members as just described.

Each stringer is provided on its outer face with a U-shaped member 63, the ends 64 of which project up substantially to the height of the top 65 of the stringer, although the intermediate portion of the stringer is cut away near the top as shown at 66. These ends form abutments spaced slightly from each other laterally. Secured to each of the rockers adjacent these stringers is an upwardly projecting arm 68 having a horizontally turned end 69 provided with a roller 70 rotatably mounted thereon and constituting a driving member. This roller is, (when the cradles are in their horizontal position), between the arms of the U 63, as best shown in Fig. 4. When the cradle is tilted the roller engages the inner surface of one of the arms by virtue of moving to the side, and carries the arm and with it the stringer and the runways to one side. It is not desirable to move the runways too far, and before any great movement of the same has occurred, the roller 70 elevates, by reason of following the arc of the rocker, and disengages itself from the U 63 with which it has been in contact, so that movement of the runways stops although movement of the rockers may continue. Upon returning, the roller 70 engages the opposite arm of the U when it has returned to a position slightly nearer to horizontal than that in which it disengaged the U, and returns the runways substantially to their central position automatically.

Some vehicles may have wheels so large and running boards so low that the runways on the side of the vehicle which is being lowered would interfere with these parts before they would be drawn sufficiently far inwardly by the mechanism just described, and for this purpose the blocks 58 are not rigidly attached to the stringers 59 but merely rest on the top surfaces thereof. A link 72 is pivoted at 73 to each block and at 75 to one of the stringers, and is normally inclined at the angle shown in Fig. 4. When it is desired to move a runway inwardly prior to tilting the vehicle, it is readily pushed and partially lifted in the direction desired to move the same and the whole runway pivots about the points 74 until the blocks 58 again rest on the stringer in the position shown in dotted lines at the left hand side of Fig. 4. Both runways are movable in this manner and it is sometimes convenient to move the one beneath the elevated side of the vehicle to more conveniently use the same as a seat or bench while working. When in their normal positions, the runways are rigid and since there are only outer sides on the same, any bumping of the tires against the same only serves to more securely set the blocks 58 on their stringers.

The whole device allows a vehicle to be quickly run into position, secured and tilted for greasing or repairs. Some of the water may be drained from the radiator if it is found necessary and the vents in the storage battery and gasoline tank may be plugged with stiff grease to prevent leakage at these points. Very little effort is required to tilt the vehicle either to its inclined position or back to a horizontal position. The front wheels of the vehicle are always run against the stops 27 and the rear ones position themselves along the rear wheel troughs in accordance with the wheel base of the vehicle. For this reason, the rear wheel troughs are made considerably longer than the front ones.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a device for tilting vehicles, in combination, a pair of spaced, tiltable cradles, wheel troughs on each cradle, intermediate runways between the wheel troughs of the two cradles when they are in a substantially horizontal position, and means to automatically move said runways laterally when said cradles are tilted.

2. In a device for tilting vehicles, in combination, a pair of spaced, tiltable cradles each having a pair of wheel troughs secured thereto, a runway arranged between each wheel trough on one cradle and the corresponding wheel trough on the other cradle to form communication therebetween when said cradles are in a substantially horizontal position and means on one of said cradles to move said runways laterally upon tilting the cradles.

3. In a device for tilting vehicles, in combination, a pair of spaced, tiltable cradles each having a pair of wheel troughs secured thereto, means to simultaneously tilt said cradles to lower one wheel trough on each and raise the other, a pair of connected runways to afford communication between the wheel troughs on the two cradles when the cradles are substantially horizontal, cooperating means on one of said cradles and on said runway assembly to move said runways laterally and toward the side of said cradles which are elevating, when said cradles art tilted.

4. In a device for tilting vehicles, in combination, a pair of spaced, tiltable cradles

each having a pair of wheel troughs secured thereto, means to simlutaneously tilt said cradles to lower one wheel trough on each and raise the other, a pair of connected runways flanges of the inner channels 15 of the cradle troughs on the two cradles when the cradles are substantially horizontal, cooperating means on one of said cradles and on said runway assembly to move said runways laterally and toward the side of said cradles which are elevating, when said cradles are tilted and means to allow independent movement of said runways.

5. In a device for tilting vehicles, in combination, a pair of spaced tiltable cradles each having a pair of wheel troughs secured thereto, a base supporting each cradle and each having a lateral member, a frame comprising a pair of lateral members and a pair of intermediate runways normally between said wheel troughs when the cradles are not tilted, means guiding said lateral frame members to slide on said lateral base members, means to tilt said cradles simultaneously and means to slide said frame laterally when said cradles are tilted.

6. In a device for tilting vehicles, in combination, a pair of spaced tiltable cradles each having a pair of wheel troughs secured thereto, a runway arranged between each wheel trough on one cradle and the corresponding wheel trough on the other cradle, means connecting said runways together, means to position said runways in register with said wheel troughs when said cradles are substantially horizontal, said means moving said runways laterally when said cradles are tilted.

7. In a device for tilting vehicles, in combination, a pair of spaced tiltable cradles each having a pair of wheel troughs secured thereto, a runway arranged between each wheel trough on one cradle and the corresponding wheel trough on the other cradle, means connecting said runways together, means to position said runways in register with said wheel troughs when said cradles are substantially horizontal, said means moving said runways laterally a fixed distance when said cradles are tilted.

8. In a device for tilting vehicles, in combination, a frame comprising spaced lateral support beams, axles connecting said beams together, rollers on said axles, rockers of inverted channel form, each rocker straddling a roller on each of two spaced axles, means connecting said rockers together comprising wheel troughs, spaced holes in the web of one of said rocker channels, a shaft journaled to said beams, a gear on said shaft and teeth on said gear fitting into said holes to tilt said rockers and wheel troughs.

9. In a device for tilting vehicles, in combination, a pair of spaced frames, a cradle rockable on each frame, a shaft extending over both frames and adapted to rock said cradles simultaneously, a pair of wheel troughs spaced laterally on each cradle, a framework supported slidably by and between said frames, a pair of runways carried by said framework and adapted to afford communication between the wheel troughs on the two cradles, a pair of abutments on said framework, a driving member on one of said cradles adapted to engage one of said abutments when said cradles are tilted to move the framework laterally and to engage the other abutment when the cradles are righted to return the framework to a central position.

10. In a device for tilting vehicles, in combination, a frame comprising spaced lateral support beams, axles connecting said beams together, rollers on said axles, rockers of inverted channel form, each rocker straddling a roller on each of two spaced axles, means connecting said rocker together comprising wheel troughs, means supported by said wheel troughs and adjustable laterally and longitudinally to secure the axle of a vehicle in position, spaced holes in the web of one of said rocker channels, a shaft journaled to said beams, a gear on said shaft, and teeth on said gear fitting into said holes to tilt said rockers and wheel troughs.

11. In a device for tilting vehicles, in combination, a pair of spaced frames, a cradle rockable on each frame, a shaft extending over both frames and adapted to rock said cradles simultaneously, a pair of wheel troughs spaced laterally on each cradle, a framework supported slidably by and between said frames, a pair of runways carried by said framework and adapted to afford communication between the wheel troughs on the two cradles, a pair of abutments on said framework, a driving member on one of said cradles adapted to engage one of said abutments when said cradles are tilted to move the framework laterally and to engage the other abutment when the cradles are righted to return the framework to a central position, and means whereby each runway may be individually moved in respect to said framework for the purpose described.

In testimony whereof we hereunto affix our signatures.

JOLLY ROY HOLCOMBE.
FRANCIS FICKLING DUNBAR.