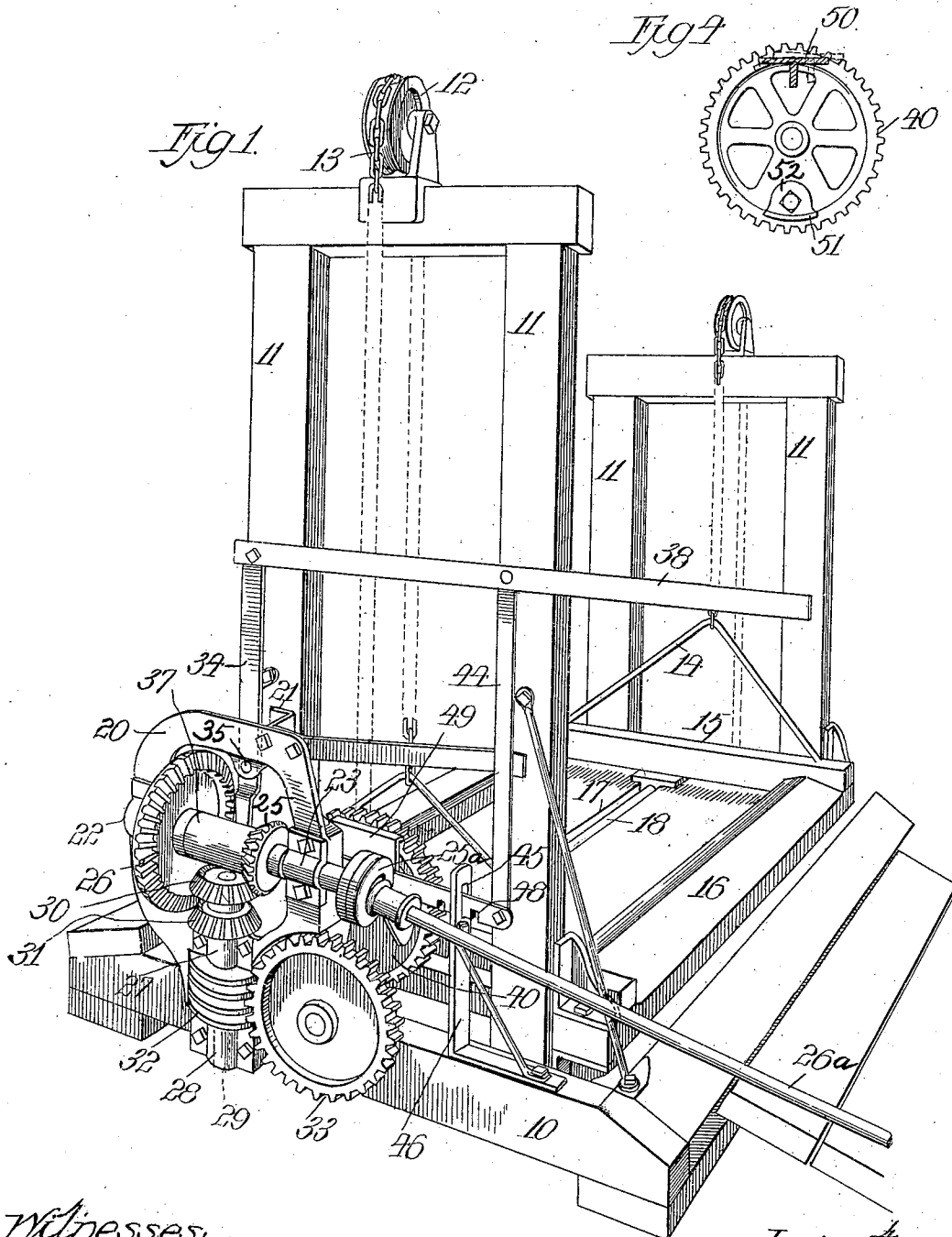


J. H. GILMAN.  
LIFTING APPARATUS.  
APPLICATION FILED SEPT. 6, 1904.

938,755.

Patented Nov. 2, 1909.  
2 SHEETS—SHEET 1.



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938,755.

2 SHEETS—SHEET 2.



*Inventor:*

by <sup>53</sup> John Howard (McElroy Attys)

# UNITED STATES PATENT OFFICE.

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## LIFTING APPARATUS.

938,755.

Specification of Letters Patent.

Patented Nov. 2, 1909.

Application filed September 6, 1904. Serial No. 223,489.

*To all whom it may concern:*

Be it known that I, JOHN H. GILMAN, a citizen of the United States, residing at Ottawa, Lasalle county, Illinois, have invented certain new and useful Improvements in Lifting Apparatus, of which the following is a specification.

My invention is concerned with a novel mechanism for lifting objects, and is designed especially for lifting the front wheels of a wagon, so that its contents may be dumped out of its rear end by the action of gravity, but it will be apparent that it might be used in other similar lifting mechanisms.

In the following specification, I will describe in detail a preferred form in which my invention is embodied, and I will, in the claims, specifically point out the combination of elements considered by me as novel.

To illustrate my invention, I annex hereto two sheets of drawings in which the same reference characters are used to designate identical parts in the figures, of which—

Figure 1 is a perspective view of the apparatus; Fig. 2 is a view of the gearing from the inside of the apparatus, with the framework omitted or broken out, and with the gearing set as it is when the platform is being lowered. Fig. 3 is a similar view, but with the shifting gear wheel omitted, and with the gearing automatically shifted to the position in which it appears just after the downward movement is completed; and Fig. 4 is a view of the other side of the shifting gear wheel.

In carrying out my invention for wagon-lifts, I provide a base 10, which is substantially constructed of wood, and upon which the front wheels of a loaded wagon are adapted to be driven in the customary manner. At the ends of the base are the supports 11, extending vertically upward, which may, however, be slightly inclined or curved, and of any desired construction. At their tops are supported the sheaves 12 over which pass the chains 13, the inner ends of the chains being secured to bails 14, which in turn are secured to the cross-pieces 15 of the rectangular platform 16, the center of which is open, so that when the wagon wheels are driven upon the base and platform, and the platform is raised, the wheels fitting into the open center of the platform will be held from any possible rolling movement.

Extending transversely of the base, and

preferably in the channel 17, so as to be protected from the wagon wheels, is the shaft 18, which is journaled in suitable bearings in the ends of the base. Just outside the cross-pieces 15 of the platform 16 are the small drum sleeves or cylinders 19 rigidly secured on the shaft, and to which the other ends of the chains 13 are secured, so that as the shaft 18 is rotated in one direction the chains will be wound thereon and the platform 16 raised, while when it is rotated in the other direction the chains will be unwound therefrom and the platform lowered.

To rotate the shaft 18 in either direction, I employ the novel mechanical movement which I will now describe: At one end of the base is the yoke-shaped casting 20, which is suitably secured at its lower end to the base and at its upper end to the adjacent support 11, as by means of the bracket 21. This casing 20 has formed thereon the bearings 22 and 23 for the shaft 24, one end of which is secured by the universal joint connection 25<sup>a</sup> with the tumbling rod 26<sup>a</sup> which extends to the power, and by which the mechanism is driven. Splined or otherwise secured on the shaft 24 so as to rotate therewith but so as to be free to reciprocate thereon, are the beveled wheels 25 and 26, which are preferably connected by being secured to a common sleeve which can reciprocate back and forth on the shaft 24, but which must rotate therewith. If the platform is to be moved at the same speed in both directions, then the wheels 25 and 26 are of the same size. But I preferably make them of different diameters, the wheel 26 being twice the diameter of the wheel 25, so that the platform will be lowered twice as rapidly as it is raised. As a wagon-lift is ordinarily used, the front end of the wagon is raised slowly, with the rear end opened so that its contents will slide slowly out of the back end of the wagon, and into a conveyer which carries its contents to any desired point. While it is necessary to elevate the front end slowly, it will be apparent that by lowering it rapidly a saving of time is effected in the use of the apparatus.

Journaled in suitable vertical bearings 27 and 28 in the casting 20 is the shaft 29, which has secured rigidly upon its upper end the pair of bevel gears 30 and 31 which are suitably located and shaped so as to

mesh with the bevel gears 25 and 26, respectively, depending upon whether the wheels 25 and 26 are shifted to their extreme right or left positions. If they are left in an intermediate position, as illustrated in Fig. 3, neither of the bevel gears will be engaged, and the rotation of the shaft 24 does not affect the apparatus. If the wheels 25 and 26 are of the same size, it will be obvious that but one of the gears 30 and 31 will be necessary. On the central portion of the shaft 29 is secured the worm 32, which, rotating therewith and meshing with the worm gear 33, rigidly secured on the end of the shaft 18, serves to rotate the shaft slowly, and thus apply the necessary power to lift the platform 16 and the end of the wagon resting thereon by the rotation of the tumbling rod 26<sup>a</sup>.

As a means of manually controlling the engagement or disengagement of the gears, so that the apparatus may be raised, lowered, or held at rest, as desired, I provide a lever 34, which is pivoted to the yoke-shaped casting 20 at 35, and has its lower end resting in a recess 36 having square edges and formed in a sleeve 37 concentrically mounted between the wheels 25 and 26, and preferably held from rotation with said wheels. A horizontal bar at 38 is preferably connected to the upper end of the lever 34 and extended out so as to be adjacent the rear of the wagon being lifted, so that the driver in the wagon can control the movement thereof.

While the apparatus thus far illustrated is entirely under the control of the operator, I preferably provide mechanism for automatically stopping the movement of the apparatus at either or both extreme positions, so that the operator need not give it his careful attention to prevent the possibility of any breakage when the extreme limit of movement is reached. For this purpose, I journal upon a suitable bearing stud 39 projecting inward from the frame 20, a gear shifting wheel 40, which is driven from the shaft 18 through the gear pinion 41 on said shaft, and an idle pinion 42 meshing with its toothed periphery. This wheel is preferably made of such size that substantially a complete revolution is required to raise the customary wagon-bed high enough to discharge its contents, while the rotation in the other direction serves to lower it back to its normal position. Pivoted on the sleeve 37 adjacent the recess 36 is the end of the automatic shifting bar 43, the other end of which is preferably connected to the bar 38 by the link 44, so that a sort of parallel motion is produced. This shifting bar 43 extends through a vertical recess 45 in a standard 46 projecting upward from the base 10. This recess 45 is slightly longer than the width of the bar 43, so that the same is free to re-

ciprocate back and forth in the recess, and also to permit it to descend in the standard and become locked thereto by reason of one of the notches 47 or 48 therein coming into register with the standard and permitting the bar 43 to drop, so as to lock it from any accidental movement.

From a consideration of the positions shown in the different views, it will be apparent that if the notch 47 be in engagement with the standard 46, the large wheel 26 will drive the shaft 29, and the platform will be lowered. If the notch 48, however, be in engagement with the standard 46, the small wheel 25 will drive the shaft 29 at a lower rate of speed and raise the platform. If the bar 43 is in the intermediate position shown in Fig. 1, neither of the wheels 25 and 26 will be in engagement, and the platform will be at rest. Secured upon the bar 43 adjacent the gear shifting wheel 40, is the bracket 49 which has on its inner face the T-shaped flange 50 which extends into the plane of the flange 51 formed on the outer edge of the lug 52 which is adjustably secured on the inner face of the gear shifting wheel 40 by means of the bolt 53 passing through the slot 54 formed in said wheel. When the platform is being raised, the gear wheel 40, rotating in one direction at the limit of its upward movement, brings the flange 51 into engagement with the under surface of the adjacent horizontal portion of the flange 50, and first lifts that flange so as to raise the bar 43 and disengage the notch from the standard 46. When the bar has been lifted far enough to disengage the notch, the continued movement of the flange 51 causes its end to engage with the vertical portion of the flange 50 and shift the bar 43 in the proper direction to bring it into position where the standard is half-way between the notches 47 and 48, and the gears 25 and 26 are both disengaged, and thus the apparatus is automatically stopped. When it is started again by manually shifting the bar 43 on to engage the other notch with the standard 46, the shifting gear wheel 40 is then rotated in the opposite direction until its flange 51 comes around and engages the other side of the horizontal portion of the flange 50 to disengage the bar 43 from the standard, and thereafter shift it back to the central position. It will be perceived that by this simple mechanism I automatically control the operation of the apparatus to throw it out of engagement at the end of its movement in either or both directions.

While I have shown my invention as embodied in the form which I at present consider best adapted to carry out its purposes, it will be understood that it is capable of modifications, and that I do not desire to be limited in the interpretation of the follow-

ing claims, except as may be necessitated by the state of the prior art.

What I claim as new and desire to secure by Letters-Patent of the United States is:

1. In a wagon dump, the combination with a frame, of a support vertically movable therein to raise the front end of a wagon box, a driving shaft, lifting means for the support, gearing between said shaft and lifting means, said gearing comprising a sleeve splined on said shaft and having two opposed bevel gear wheels of different sizes secured thereon, a second shaft provided with two bevel gears adapted to cooperate alternately with the opposed gears, and means for engaging one or the other of said bevel gears on the driving shaft with the cooperating bevel gear on said second shaft.

2. In a wagon dump, the combination with a frame, of a support vertically movable therein to raise the front end of a wagon box, a driving shaft, lifting means for the support, gearing between the shaft and lifting means for moving the support in either direction or holding it from movement, and locking mechanism for holding the gearing positively in engagement until the limit of movement in one direction is reached, and then unlocking the gears and disengaging them to stop the movement.

3. In a device of the class described, the combination with the supports, of a platform vertically movable between said supports, a driving shaft, lifting means for the platform, gearing between said shaft and lifting means, said gearing including a sleeve splined on said shaft and having opposed bevel gears thereon, a second shaft provided with gearing to cooperate with the opposed gears, and means for engaging one or the other of said bevel gears with the gearing on said second shaft.

4. In a device of the class described, the combination with the supports, of a platform vertically movable between said supports, a driving shaft, lifting means for the platform, gearing between said shaft and lifting means, said gearing including a sleeve splined on said shaft and having opposed bevel gears thereon, a second shaft provided with gearing to cooperate with the opposed gears, and means for shifting said sleeve to engage one or the other of said bevel gears with the gearing on said second shaft.

5. In a device of the class described, the combination with the supports, of a platform vertically movable between said supports, a driving shaft, lifting means for the platform, gearing between said shaft and lifting means, said gearing including a sleeve splined on said shaft and having opposed bevel gears thereon, a second shaft provided with gearing to cooperate with the opposed gears, and means for automatically

shifting said sleeve at the end of the movement of the platform in one direction to automatically disengage the bevel gear wheels from the gearing on said second shaft.

6. In a device of the class described, the combination with the supports, of a platform vertically movable between said supports, a driving shaft, lifting means for the platform, gearing between said shaft and lifting means, said gearing including a sleeve splined on said shaft and having opposed bevel gears thereon, a second shaft provided with gearing to cooperate with the opposed gears, and means for automatically shifting said sleeve at the end of the movement of the platform in either direction to automatically disengage the bevel gear wheels from the gearing on said second shaft.

7. In a device of the class described, the combination with the supports, of a platform vertically movable between said supports, a driving shaft, lifting means for the platform, gearing between said shaft and lifting means, said gearing comprising a sleeve splined on said shaft and having two opposed bevel gear wheels of different sizes secured thereon, a second shaft provided with two bevel gears adapted to cooperate alternately with the opposed gears, and means for engaging one or the other of said bevel gears on the driving shaft with the cooperating bevel gear on said second shaft.

8. In a device of the class described, the combination with the supports, of a platform vertically movable between said supports, a driving shaft, lifting means for the platform, gearing between the shaft and lifting means for moving the platform in either direction or holding it from movement, and locking mechanism for holding the gearing positively in engagement until the limit of movement in one direction is reached, and then unlocking the gears and disengaging them to stop the movement.

9. In a device of the class described, the combination with the supports, of a platform vertically movable between said supports, a driving shaft, lifting means for the platform, gearing between the shaft and lifting means for moving the platform in either direction or holding it from movement, and locking mechanism for holding the gearing positively in engagement until the limit of movement in either direction is reached, and then unlocking the gears and disengaging them to stop the mechanism.

10. In a device of the class described, the combination with the supports, of a platform vertically movable between said supports, a driving shaft, lifting means for the platform, gearing between the shaft and lifting means for moving the platform in either direction or holding it from movement, and locking mechanism for holding

the gearing in engagement until the limit of movement in one direction is reached, said locking mechanism comprising a shifting bar having a shouldered notch therein, a stationary support with which said notch is adapted to engage to lock the bar from movement, and means to automatically raise the bar to unlock it, and then to move it to shift the gearing.

11. In a device of the class described, the combination with the supports of a platform vertically movable between said supports, a driving shaft, lifting means for the platform, gearing between the shaft and lifting means for moving the platform in either direction or holding it from movement, gear shifting mechanism for controlling the direction of movement, a shifting bar connected to the gear shifting mechanism and having two shouldered notches therein, a stationary support adapted to engage either of said notches to lock the bar from movement, and means to automatically raise the bar to unlock it at the end of the movement in either direction, and to then move it to a position between the notches to shift and disengage the gearing.

12. In a device of the class described, the combination with the supports, of a platform vertically movable between said supports, a driving shaft, lifting means for the platform, gearing between the shaft and lifting means for moving the platform in either direction or holding it from movement, gear shifting mechanism included therein, a shifting bar attached to said shifting mechanism and having a shouldered notch therein, a stationary support adapted to engage the notch and lock the bar from movement, a gear shifting wheel rotated by the gearing and carrying a lug, and a horizontal and vertical flange on said shifting bar, the lug on the gear shifting wheel being adapted to first engage the horizontal flange at the limit of movement to lift the bar from engagement with the support, and then to engage the vertical flange to move the bar horizontally to disengage the gearing and stop the movement.

13. In a device of the class described, the combination with the supports, of a platform vertically movable between said supports, a driving shaft, lifting means for the platform, gearing between the shaft and lifting means for moving the platform in either direction or holding from movement, gear-shifting mechanism to control the direction of movement of the platform, a shifting bar attached to said gear shifting mechanism and having two shouldered notches therein, a stationary support adapted to engage with one or the other of said notches to lock the bar from movement, a T-shaped flange on said bar, a gear shifting wheel rotated by the gearing, and a lug on said gear

shifting wheel adapted to engage the T-shaped flange to lift the bar and then shift it horizontally, substantially as and for the purpose described.

14. In a device of the class described, the combination with the supports, of a platform vertically movable between said supports, a driving shaft, lifting means for the platform, gearing between the shaft and lifting means for moving the platform in either direction or holding it from movement, gear-shifting mechanism to control the direction of movement of the platform, a shifting bar attached to said gear shifting mechanism and having two shouldered notches therein, a stationary support adapted to engage with one or the other of said notches to lock the bar from movement, a T-shaped flange on said bar, a gear shifting wheel rotated by the gearing, and an adjustable lug on said gear shifting wheel adapted to engage the T-shaped flange to lift the bar and then shift it horizontally, substantially as and for the purpose described.

15. In a device of the class described, the combination with the supports, of a platform vertically movable between said supports, a driving shaft, lifting means for the platform, gearing between the shaft and lifting means for moving the platform in either direction or holding it from movement, a gear shifting sleeve, a lever engaging the sleeve, the shifting bar, the horizontal bar 38, and the connecting link 44, substantially as and for the purpose described.

16. In a hoisting device, the combination with the supports, of the platform vertically movable between said supports, a driving shaft, and connections between said shaft and platform for positively raising and lowering the latter, said connections including two beveled gears mounted on said shaft to rotate therewith and capable of being shifted longitudinally thereof simultaneously, a vertical shaft having beveled gearing adapted to be alternately engaged by the gears on the driving shaft, and means for automatically shifting the beveled gears.

17. In a hoisting device, the combination with the supports, of the platform vertically movable between said supports, a driving shaft, and connections between said shaft and platform for positively raising and lowering the latter, said connections including two beveled gears mounted on said driving shaft to rotate therewith and capable of being shifted longitudinally thereof simultaneously, a vertical shaft having beveled gearing adapted to be alternately engaged by the gears on the driving shaft, a worm on said vertical shaft, a worm gear engaged thereby, and a winding shaft on which the worm gear is secured.

18. In a hoisting device, the combination with the supports, of the platform vertically

movable between said supports, a driving shaft, and connections between said shaft and platform for positively raising and lowering the latter, said connections including two beveled gears mounted on the driving shaft to rotate therewith and to be shifted longitudinally thereof simultaneously, a vertical shaft having beveled gearing adapted to be alternately engaged by the gears on the driving shaft, a shifting member to move the beveled gears on the driving shaft having a flange thereon, a gear-shifting wheel geared to the vertical shaft, and a lug on the gear-shifting wheel to engage the flange on the shifting member and shift the same to automatically disengage the gearing.

19. In a hoisting device, the combination with the supports, of the platform vertically movable between said supports, a driving shaft, and connections between said shaft and platform for positively raising and lowering the latter, said connections including two beveled gears mounted on the driving shaft to rotate therewith and to be shifted longitudinally thereof simultaneously, a vertical shaft having beveled gearing adapted to be alternately engaged by the beveled gears on the driving shaft, a shifting bar to move the gears on the driving shaft, a flange on the shifting bar, a gear-shifting wheel geared to the vertical shaft, and a lug on the gear-shifting wheel adapted to engage the flange on the bar on either side to disengage the gears at the limit of their movement in either direction.

20. In a hoisting device, the combination with the supports, of the platform vertically movable between said supports, a driving shaft, and connections between said shaft and platform for positively raising and lowering the latter, said connections including two beveled gears mounted on the driving shaft to rotate therewith and to be shifted longitudinally thereof simultaneously, the vertical shaft having beveled gearing adapted to be alternately engaged by the gears on the driving shaft, a shifting bar to move the gears on the driving shaft, a notch in said bar, a stationary support adapted to engage the notch and lock the bar from movement, a flange on said bar having a horizontal and a vertical surface, a gear-shifting wheel geared to the vertical shaft, and a lug on the gear-shifting wheel adapted to first engage the horizontal portion of the flange to lift and unlock the bar, and then to engage the vertical portion and shift it to uncouple the gearing.

21. In a hoisting device, the combination with the supports, of the platform vertically movable between said supports, a driving shaft, and connections between said shaft and platform for positively raising and lowering the latter, said connections including two beveled gears mounted on the driving

shaft to rotate therewith and to be shifted longitudinally thereof simultaneously, the vertical shaft having beveled gearing adapted to be alternately engaged by the gears on the driving shaft, a shifting bar to move the gears on the driving shaft, a pair of shouldered notches on said bar, a stationary support with which either of said notches is adapted to engage to lock the bar from movement, a T-shaped flange on said bar, a gear-shifting wheel geared to the vertical shaft, and a lug on the gear-shifting wheel adapted to engage the horizontal portion of the T-shaped flange toward the limit of the movement of the apparatus in either direction to lift the bar to unlock it, and then to engage the vertical portion of the flange to shift the bar to uncouple the gearing.

22. In a hoisting device, the combination with the supports, of the platform vertically movable between said supports, a driving shaft, and connections between said shaft and platform for positively raising and lowering the latter, said connections including two different sized beveled gears mounted on said driving shaft to rotate therewith and to be shifted longitudinally thereof simultaneously, the vertical shaft having two beveled gears thereon adapted to be alternately engaged by the beveled gears on the driving shaft, and means for moving the beveled gears on the driving shaft longitudinally thereof, substantially as and for the purpose described.

23. In a wagon dump, the combination with a frame, of a support vertically movable therein to raise the front end of a wagon box, a driving shaft, lifting means for the support, gearing between the shaft and lifting means for moving the support in either direction or holding it from movement, and locking mechanism for holding the gearing positively in engagement until the limit of movement in either direction is reached, and then unlocking the gears and disengaging them to stop the movement.

24. In a wagon dump, the combination with a frame, of a support vertically movable therein to raise the front end of a wagon box, a driving shaft, lifting means for the support, gearing between the shaft and lifting means for moving the support in either direction and holding it from movement, a gear-shifting sleeve, a lever engaging the sleeve, a shifting bar, the horizontal bar 38, and the connecting link 44, substantially as and for the purpose described.

25. In a wagon dump, the combination with a frame, of a support vertically movable therein to raise the front end of a wagon box, a driving shaft, and connections between said shaft and support for positively raising and lowering the latter, said connections including two bevel gears

mounted on the driving shaft to rotate therewith and to be shifted longitudinally thereof simultaneously, a vertical shaft having bevel gearing adapted to be alternately engaged by the gears on the driving shaft, a shifting member to move the bevel gears on the driving shaft having a flange thereon, a gear-shifting wheel geared to the vertical shaft, and a lug on the gear-shifting wheel to engage the flange on the shifting member and shift the same to automatically disengage the gearing.

26. In a wagon dump, the combination with a frame, of a support vertically movable therein to raise the front end of a wagon box, a driving shaft, and connections between said shaft and support for posi-

tively raising and lowering the latter, said connections including two different sized bevel gears mounted on said driving shaft to rotate therewith and to be shifted longitudinally thereof simultaneously, the vertical shaft having two bevel gears thereon adapted to be alternately engaged by the bevel gears on the driving shaft, and means for moving the bevel gears on the driving shaft longitudinally thereof, substantially as described.

In witness whereof, I have hereunto set my hand this 29th day of August, 1904.

JOHN H. GILMAN.

Witnesses:

WILL A. HENDERS,  
GEO. P. HILLS.