

No. 644,610.

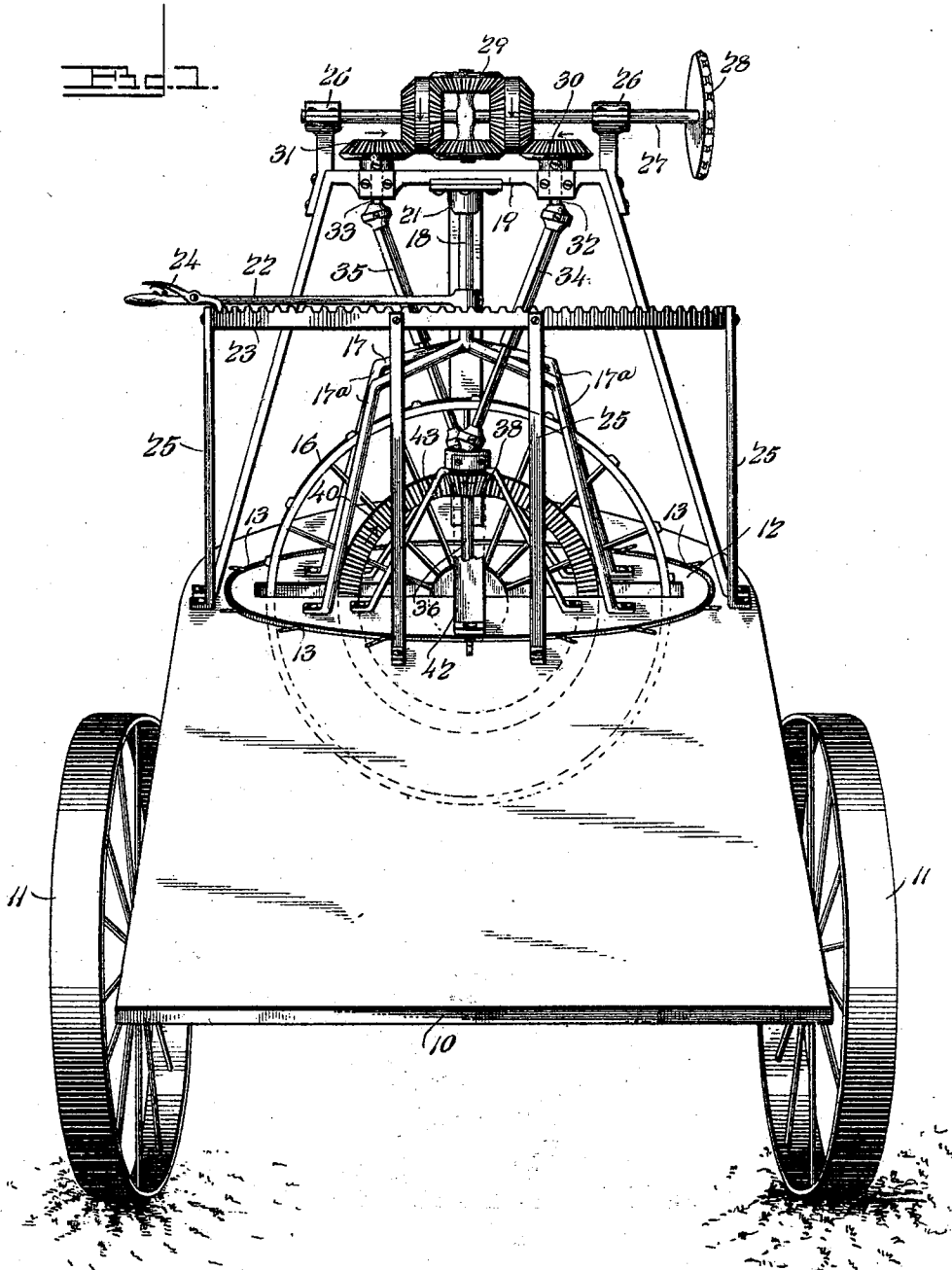
Patented Mar. 6, 1900.

R. & I. W. KNIGHT.
TRACTION ENGINE.

(Application filed Apr. 8, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses
E. F. Stewart
[Signature]

Riley Knight Inventors
By their Attorneys, *Ira W. Knight*

CA Snow & Co.

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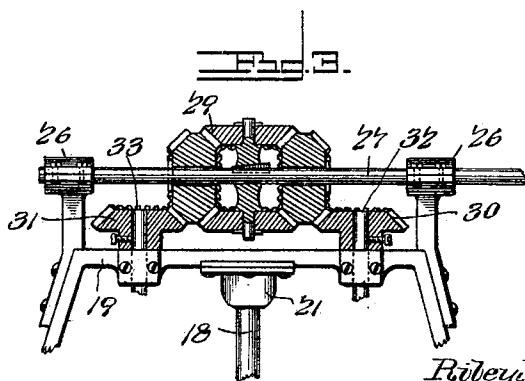
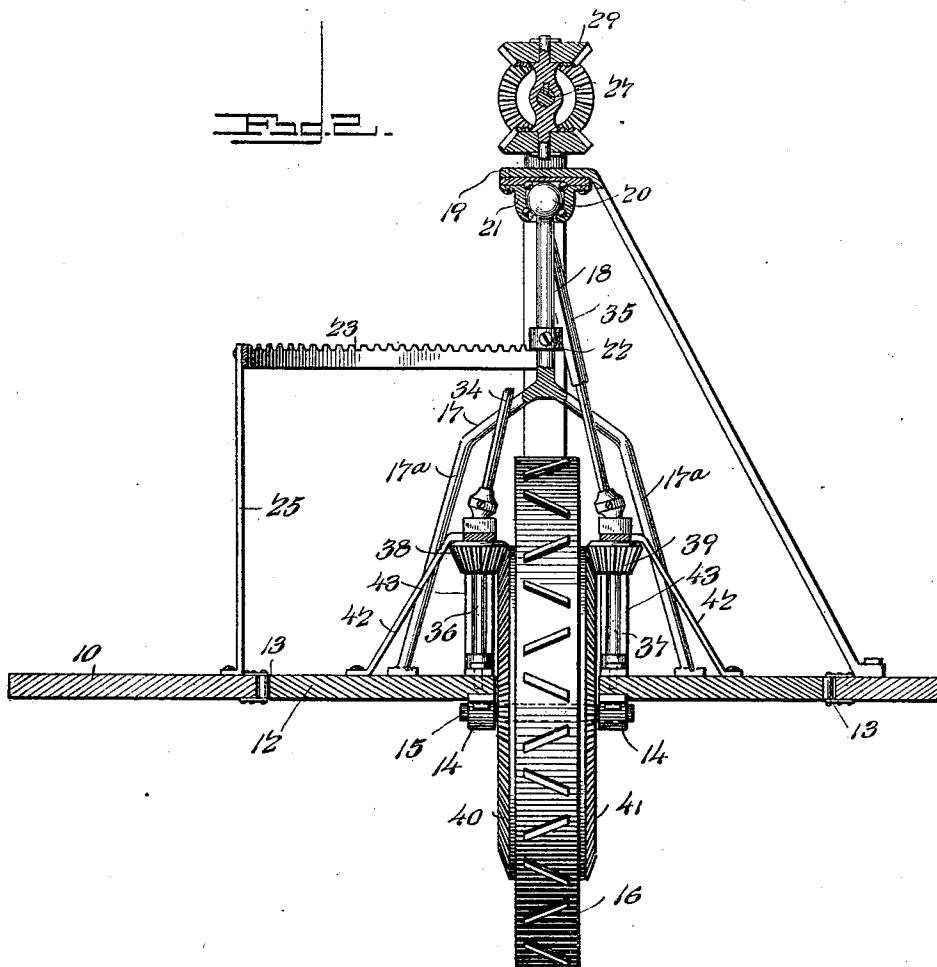
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2 Sheets—Sheet 2.



Witnesses
E. J. Stewart
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By their Attorneys,

Riley Knight Inventors
Ernest W. Knight

C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

RILEY KNIGHT AND IRA WELLS KNIGHT, OF MOSCOW, IDAHO.

TRACTION-ENGINE.

SPECIFICATION forming part of Letters Patent No. 644,610, dated March 6, 1900.

Application filed April 8, 1899. Serial No. 712,308. (No model.)

To all whom it may concern:

Be it known that we, RILEY KNIGHT and IRA WELLS KNIGHT, citizens of the United States, residing at Moscow, in the county of Latah and State of Idaho, have invented a new and useful Traction-Engine, of which the following is a specification.

Our invention relates to traction-engines, and particularly to a steering mechanism for traction-engines and similar vehicles; and the object in view is to provide a steering mechanism wherein the steering-wheel may be turned to occupy any desired position with relation to the previous direction of movement of the vehicle, whereby short turns may be made, and, furthermore, to provide means for facilitating the manual positioning of the steering-wheel.

A further object of our invention is to provide a steering mechanism wherein the steering-wheel may be utilized, either solely or in connection with other means, as the traction-wheel.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a perspective view of a steering mechanism constructed in accordance with our invention applied in the operative position to a vehicle of a construction commonly employed for traction purposes. Fig. 2 is a vertical sectional view of the same. Fig. 3 is a detail transverse section taken through the gearing at the top of the machine.

Similar reference characters indicate corresponding parts in all the figures of the drawings.

In the construction illustrated the vehicle is provided with a frame, including a platform or bed 10, and supporting-wheels 11, mounted upon the spindle portions of a fixed axle and adapted either for traction purposes, when so desired, or simply for supporting a portion of the weight of the frame. Mounted upon this frame for revoluble movement is a turn-table 12, arranged in an opening of the platform and provided with suitable antifriction-bearing devices, such as rollers 13. This turn-table is provided with bearings 14, in which

is mounted the spindle or shaft 15 of the steering-wheel 16, said steering-wheel being arranged in a diametrical slot or opening of the turn-table. The above-mentioned antifriction-bearing devices are interposed in the construction illustrated between the periphery of the turn-table and the adjacent portions of the frame; but the front of the frame is supported by the front or steering wheel through said turn-table, the weight of the adjacent portion of the frame being transferred to the turn-table through a spider 17, having a plurality of legs 17^a, which straddle the steering-wheel, two being shown arranged on each side thereof, and are bolted or otherwise securely fastened to the turn-table. These legs are united at their upper ends to a central stem 18, which is arranged directly over the steering-wheel and which has at the upper end an antifriction-bearing in a yoke 19, rising from the front portion of the vehicle-frame, as from the platform 10. In the construction illustrated this yoke is of looped shape, with a horizontal cross-bar at its top and downwardly-extending legs, which are bolted to the platform, and preferably the bearing at the upper end of the stem is of ball-and-socket construction, suitable antifriction devices being employed to reduce to the minimum the effort necessary upon the part of the operator to vary any position of the steering-wheel. Thus in the construction illustrated the stem 18 is provided at its extremity with a ball 20, fitting in a socket 21, which depends from the cross-bar of the yoke, and fixed to the stem at an intermediate point and at a height convenient to the operator is a steering or controlling lever 22, which traverses a rack or segment 23 and is provided with a hand-latch 24, designed for engagement with the teeth of the rack to secure the lever at the desired adjustment, and hence with the steering-wheel in the desired position with relation to the planes of the rear supporting-wheels. Thus it will be seen that the yoke 19, which is arched to extend over the steering-wheel, carries the bearing in which the spindle of the turn-table is mounted, and pressure is communicated through this bearing to the spindle and the turn-table. Oscillatory movement of the turn-table is pre-

vented by the antifriction-bearing devices interposed between the same and the adjacent portions of the supporting-frame, and we have found in practice that by reason of this single bearing for the turn-table the steering-wheel may be adjusted manually with comparatively little effort upon the part of the operator and that owing to the scope of movement of the steering or controlling lever a machine provided with a steering device embodying our invention may be caused to make abrupt turns as effectively as when drawn by horses.

The rack or segment 23 is supported by standards 25, rising from the platform or supporting-frame of the vehicle; but it will be understood that any other suitable means may be employed for this purpose.

When, as in connection with traction-engines for agricultural purposes, it is desirable to utilize the steering-wheel as a traction-wheel either solely or as an auxiliary to the main or driving wheels, we provide the yoke 19 with transversely-aligned bearings 26, in which is mounted a line or drive shaft 27, having a sprocket or other gear wheel 28, by which motion may be communicated to the shaft from the traction-engine or other source of energy. From this shaft motion is communicated through differential gearing 29 to pinions 30 and 31, carried, respectively, by driving-spindles 32 and 33, mounted, preferably, in a vertical position upon the yoke 19, and said driving-spindles are connected by tumbling-rods 34 and 35 with the spindles 36 and 37 of driven pinions 38 and 39, which mesh, respectively, with annular gears 40 and 41, fixed to the shaft of the steering-wheel. Said gears may be fixed to the sides, respectively, of said wheel. The driven spindles 36 and 37 are mounted in suitable structures carried by the turn-table and in the construction illustrated comprising a standard 42 and a stirrup 43, and the tumbling-rods are provided with terminal knuckle-joint connections, respectively, with the driving and driven spindles, whereby motion may be communicated to the driven spindles in any position of the steering-wheel. Said tumbling-rods are of extensible construction and preferably comprise telescoping outer and inner members fitted together for relative longitudinal movement and held from independent revoluble movement.

The above-described driving mechanism adds to the facility with which a vehicle provided with the improved steering mechanism may be turned or diverted from a straight path of movement, and, furthermore, the connections between the driving and driven elements of the operating mechanism are such as to allow the adjustment of the turn-table without overcoming an excessive amount of resistance.

It will be understood that in practice various changes in the form, proportion, size, and

minor details of construction within the scope of the appended claims may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention. 70

Having described our invention, what we claim is—

1. The combination with a vehicle having a supporting-frame, of a fixed yoke or support mounted on said frame, a turn-table mounted for revoluble movement in an opening in said frame, a steering-wheel carried by the turn-table, a spider fixed to the turn-table and having a central spindle stepped at its upper end in a bearing on said yoke or support, said spindle being arranged directly over the steering-wheel, and means for actuating the turn-table to vary the position of the steering-wheel, substantially as specified. 75

2. The combination with a vehicle-wheel having a supporting-frame, of a fixed yoke or support mounted on said frame, a turn-table mounted for revoluble movement in an opening in said frame, antifriction-bearings arranged between the turn-table and the frame, a steering-wheel carried by the turn-table, a spider fixed to the turn-table and having a central spindle, a ball-and-socket connection between the upper end of the spindle and the yoke or support, and means for communicating rotary motion to the turn-table, substantially as specified. 85

3. The combination with a vehicle having a frame and supporting-wheels, of a fixed yoke supported by said frame, a turn-table mounted for revoluble movement in an opening in said frame, a spider fixed to the turn-table and having a central spindle stepped at its upper end in a bearing on said yoke, a steering-wheel mounted upon the turn-table, a steering-lever fixed to the spindle of said yoke, and a rack traversed by the steering-lever, said lever having a hand-latch, substantially as specified. 90

4. The combination with a vehicle having a frame and supporting-wheels, of a turn-table, a steering-wheel mounted upon the turn-table, means for actuating the turn-table to angularly vary the position of the steering-wheel with relation to the length of the vehicle, driving mechanism mounted upon the frame, and flexible connections between the driving mechanism and the steering-wheel for communicating revoluble movement to the latter, substantially as specified. 100

5. The combination with a vehicle having a frame and supporting-wheels, of a turn-table, a steering-wheel mounted upon the turn-table, means for actuating the turn-table to angularly vary the position of the steering-wheel with relation to the length of the vehicle, driving mechanism mounted upon the frame, and flexible connections, including tumbling-rods, between the driving mechanism and said steering-wheel, for communicating rotary motion to the latter, substantially as specified. 105

6. The combination with a vehicle having a frame and supporting-wheels, of a turn-table, a steering-wheel mounted upon the turn-table and having side gears, means for angularly varying the position of the turn-table with relation to the length of the vehicle, driving mechanism including driving-spindles arranged at opposite sides of the axis of movement of the turn-table, driven pinions mounted upon the turn-table and meshing with said side gears of the steering-wheel, and tumbling-rods connecting said driving-spindles with the driven pinions, substantially as specified.

7. The combination with a vehicle having a frame and supporting-wheels, of a turn-table, a steering-wheel mounted upon the turn-table and having side gears, means for angularly varying the position of the turn-table with relation to the length of the vehicle, driving mechanism including driving-spindles arranged at opposite sides of the axis of movement of the turn-table, driven pinions mounted upon the turn-table and meshing with said side gears of the steering-wheel, and extensible tumbling-rods connecting said

driving-spindles with the driven pinions, substantially as specified.

8. The combination with a vehicle having a frame and supporting-wheels, of a turn-table, a steering-wheel mounted upon the turn-table and having side gears, means for angularly varying the position of the turn-table with relation to the length of the vehicle, driving mechanism, consisting of a driving-shaft, driving-spindles, and differential gearing for communicating motion from the driving-shaft to the driving-spindles, driven pinions mounted upon the turn-table and meshing with said side gears on the steering-wheel, and flexible connections between the driving-spindles and the driven pinions, substantially as specified.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

RILEY KNIGHT.
IRA WELLS KNIGHT.

Witnesses:

W. L. PAYNE,
B. L. JENKINS.