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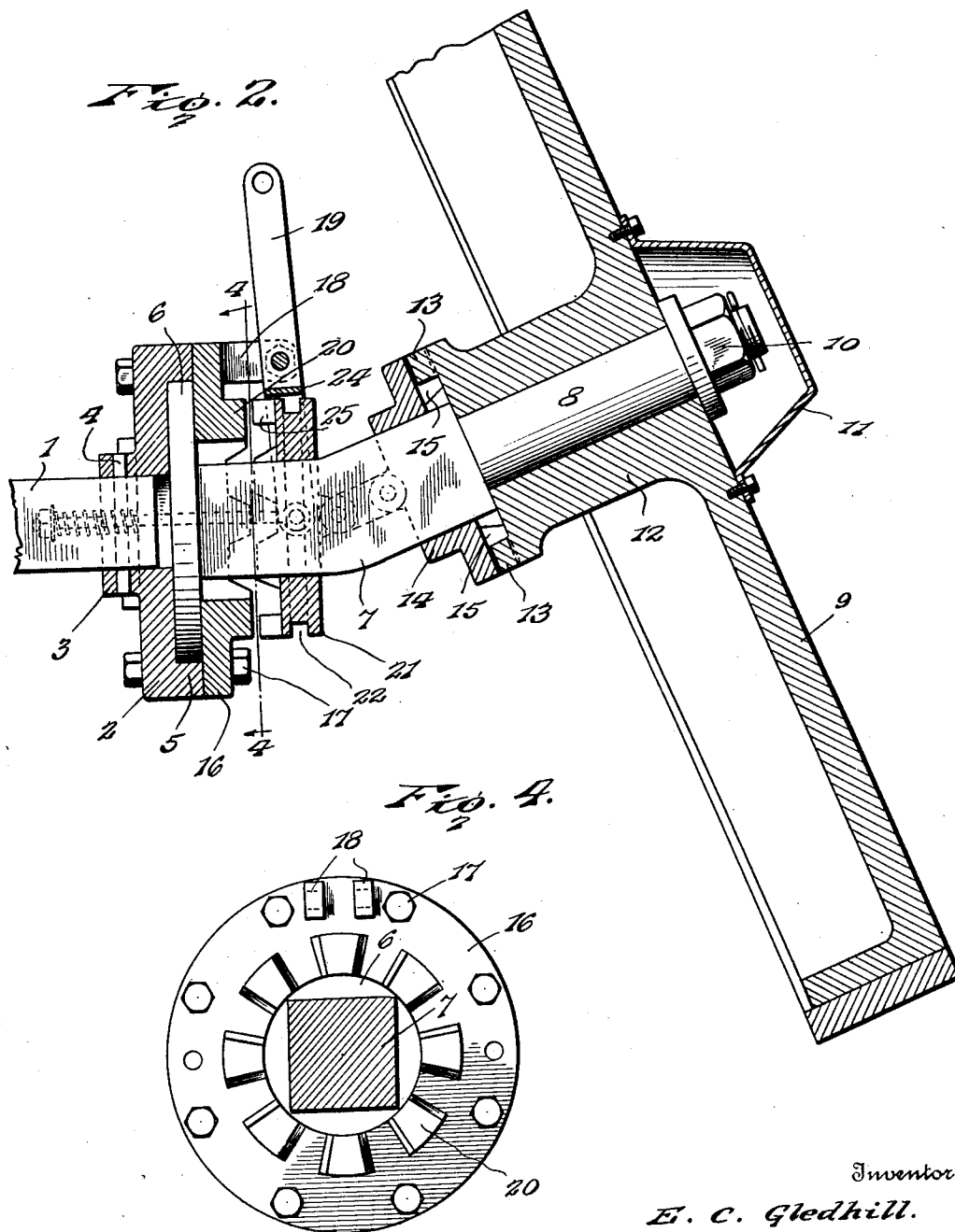
E. C. GLEDHILL

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LEANING WHEEL

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UNITED STATES PATENT OFFICE

EDWARD C. GLEDHILL, OF GALION, OHIO

LEANING WHEEL

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In the use of road graders or scrapers, it is now the general practice to provide the ground wheels with mounts which will permit them to be tilted so that the top of the wheel will lean toward the direction in which the material is being moved by the blade of the scraper or grader, this arrangement serving to resist the thrust of the load and to hold the grader to its work more effectually than would be the case if the wheel was set strictly vertical and parallel with the side of the machine. The object of the present invention is to provide efficient means whereby the wheel may be tilted both vertically and horizontally and caused to assume a position at any desired angle to a vertical plane or any desired angle to a horizontal plane or set in any intermediate position. This object is accomplished by the use of mechanism such as is illustrated in the accompanying drawings, and the invention resides in certain novel features which will be hereinafter first fully described and then more particularly defined in the appended claims.

In the drawings:

Figure 1 is an elevation of a wheel mounted in accordance with the present invention.

Fig. 2 is a section taken on the central longitudinal vertical plane of the parts shown in Fig. 1.

Fig. 3 is a transverse section on the line 3—3 of Fig. 1, and

Fig. 4 is a detail transverse section on the line 4—4 of Fig. 2.

In the drawings, the reference numeral 1 indicates the end of an axle of a road grader or other machine which is employed for moving road material for the purpose of grading the same or otherwise shifting a portion of the earth surface. In carrying out the present invention, I secure to the end of the axle 1 a head 2 which has a central boss 3, the bore of which is preferably angular in cross section so as to conform to the angular cross section of the axle. This head 2 is rigidly secured to the axle by a pin 4 inserted diametrically through the boss and through the axle, as shown in Fig. 2, or by other means as may be preferred. The head is provided on its outer face with an annular rim 5 whereby a central circular seat or recess is produced to receive an annular flange 6 on the inner end of a bent spindle 7. The spindle 7 is of polygonal cross section through a portion of its length immediately adjacent the flange 6 and at its outer end is reduced in diameter and given a circular cross section, as shown at 8, whereby it will rotatably support the ground wheel 9. The ground wheel is secured upon the circular portion 8 of the spindle by a nut 10 thereon and a hub cap 11 is secured upon the outer side of the wheel over the nut 10 so as to protect the same and the end of the spindle from an accumulation of dirt and other matter which would tend to clog the operation of the device and to create excessive wear upon the parts. The inner end of the hub 12 of the wheel is provided with spaced lugs or teeth 13 and slidably mounted upon the spindle is a collar 14 formed with mating lugs 15 adapted to engage between the lugs or teeth 13 of the hub, as shown in Figs. 1 and 2 and as will be understood. The bore of the collar 14 is polygonal or non-circular to conform to the cross sectional contour of the bent portion of the spindle and the collar, therefore, may slide along the spindle but will be constrained to rotate therewith. Fitting over the margin of the annular flange 6 is a cap plate 16 which is secured to the head 2 by bolts 17 inserted through the plate and the head at intervals around the margins thereof and at the top of this cap plate are lugs 18 to and between which is fulcrumed a lever 19. Extending around the central opening of the cap plate 16 on the outer face of the plate are spaced lugs or teeth 20, as shown. Slidably fitted upon the spindle 7 adjacent the cap plate 16 is a collar 21 having an annular groove 22 in its periphery within which are engaged studs 23 mounted in the ends of a fork 24 which is formed on the lower end of the lever 19 whereby the collar 21 may be shifted along the spindle in an obvious manner and said collar is provided with lugs or teeth 25 on its inner face which are adapted to mate with and engage between the lugs or teeth 20 upon the cap plate in an obvious manner. Links 26 are pivoted to lugs 27 on the outer face of the collar 21 at one end and

at the opposite end are pivoted to corresponding lugs 28 on the collar 14, the two collars being thus connected so that they will move in unison whenever the lever 19 is rocked.

5 It is thought the operation of the device will be readily understood from the foregoing description, taken in connection with the accompanying drawings. It is obvious that the head 2 cannot revolve inasmuch as it
10 is fixed to the stationary axle 1 and the cap plate 16 being bolted to the head will, of course, be held stationary. Consequently, if the collar 21 be shifted into engagement with the cap plate 16, the spindle 7 will be held
15 against rotation and the wheel will be locked in the position in which it may be set. The wheel may rotate freely upon the end portion 8 of the spindle and normally the collar 21 will be locked to the cap plate 16 and the
20 collar 14 will be released from the hub of the wheel. If it be desired to change the inclination of the wheel so that its top will be tilted outwardly from the machine or to set the wheel so that, while its top and bottom will
25 be in the same vertical plane, the wheel will be disposed at an angle to the line of travel, the hand lever is shifted so that the collar 21 will be released from the cap plate 16 and the collar 14 simultaneously engaged with
30 the end of the hub, whereupon the rotation of the wheel due to the travel of the machine will cause the wheel to rotate and this rotation will be transmitted to the spindle through the collar 14 in an obvious manner.
35 Inasmuch as the spindle is bent and the wheel is mounted upon the outer portion which is in angular relation to the inner portion of the spindle and the axle, the hub of the wheel will be caused to travel in an orbital path
40 about the central line of the axle and this shifting of the position of the outer end of the bent spindle will, of course, change the angular disposition of the wheel. When the wheel has assumed the desired position, the
45 hand lever 19 is rocked so that the collar 21 will be again engaged with the cap plate 16 and the collar 14 released from the hub of the wheel so that the spindle will be locked in the position in which it has been set and
50 the wheel will be thereupon maintained in the desired position of angularity. It will thus be seen that with the present device the wheel is shifted automatically to a desired position by the travel of the machine upon which it is mounted and the desired
55 result is consequently attained with minimum effort upon the part of the operator, whereas heretofore, so far as I am aware, it was necessary to manually manipulate various
60 devices so that the operation of changing the set of a wheel was laborious and time-consuming.

It will be understood that, while I have shown only mounting for a single wheel and
65 have referred in my description to a wheel,

the invention may be applied to all the wheels of a machine and they may be so arranged that all the wheels may be changed at one time or only one of them changed or two or more of them changed and it will be possible to so arrange the devices that the wheels may be tilted in different directions or set in different degrees of inclination.

Having thus described the invention, I claim:

1. In a tilting wheel mechanism, a bent spindle, means for mounting said spindle upon the end of an axle for independent rotation about the axis of the axle, and means for locking the spindle against rotation.

2. In a tilting wheel structure, a bent spindle, a wheel freely rotatable upon an extremity of said spindle, means for mounting the spindle rotatably upon the end of an axle, means for causing the spindle to rotate with the wheel, and means for locking the spindle against rotation.

3. In a tilting wheel mechanism, a bent spindle, means for rotatably mounting the spindle at one end upon the end of an axle, a wheel rotatably mounted upon the outer end of the spindle, means for locking the wheel to the spindle, and means for locking the spindle against rotation and simultaneously releasing the wheel to rotate about the spindle or vice versa whereby the angular disposition of the spindle may be automatically shifted as the wheel travels over the ground.

4. In a tilting wheel structure, a head, means for securing said head upon the end of an axle, a bent spindle having an annular flange rotatably seated in said head, means for retaining said flange in the head and permitting rotation of the spindle, a wheel rotatably mounted upon the outer end of the spindle, means for locking the wheel to the spindle, means for locking the spindle against rotation, and means whereby when the spindle is locked against rotation the wheel will be released to rotate freely.

5. In a tilting wheel structure, the combination of a bent spindle, means for rotatably mounting the spindle at its inner end upon the end of an axle, a wheel rotatably mounted upon the outer end of the spindle, a collar slidably mounted on the spindle and constrained to rotate therewith and constructed to engage the wheel to lock the wheel to the spindle, a second collar slidably mounted on the spindle and constrained to rotate therewith and constructed to engage the means for mounting the spindle whereby to hold the spindle against rotation, and connections between said collars whereby when the spindle is locked against rotation the wheel will be released to rotate freely.

6. In a tilting wheel structure, the combination of a head, means for securing said head to the end of an axle, a bent spindle, an

annular flange on the inner end of the spindle freely seated in the outer face of the head, a cap plate secured to the head and extending over said flange whereby to retain the spindle upon the head, said cap plate being
5 provided around its center with a series of spaced lugs, a collar slidably mounted upon the spindle but constrained to rotate therewith and provided on its inner side with a series of spaced lugs arranged to mate with
10 the lugs on the cap plate, a lever for shifting said collar, a wheel rotatably mounted upon the outer end of the spindle, a series of spaced lugs on the inner end of the wheel
15 hub, a collar slidably mounted on the spindle and constrained to rotate therewith and provided upon its outer face with a series of spaced lugs arranged to mate with the lugs on the wheel hub, and links pivoted to
20 and connecting the said collars.

In testimony whereof I affix my signature.

EDWARD C. GLEDHILL. [L. s.]

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