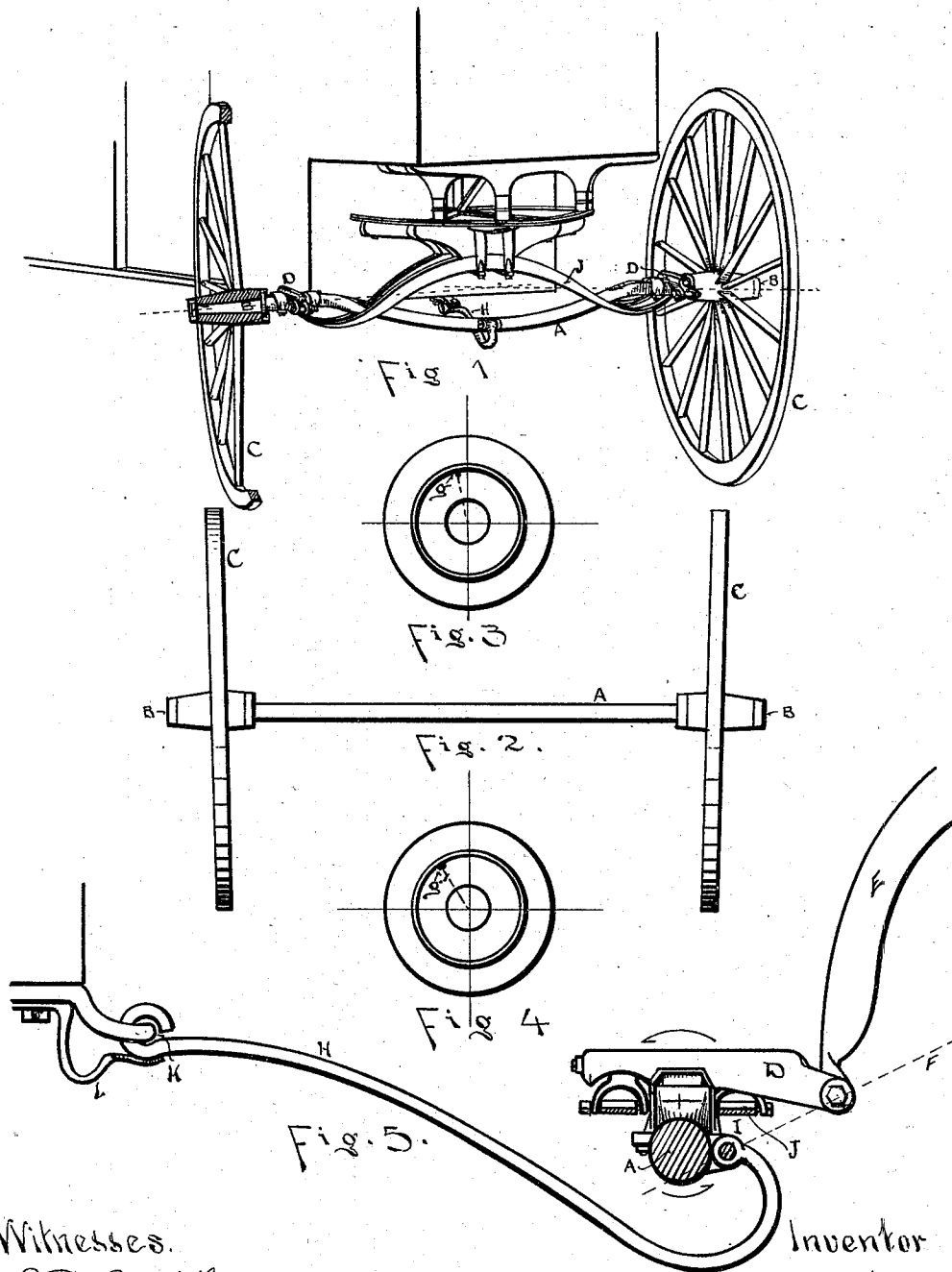


(No Model.)

W. B. STOVER.
WAGON.

No. 562,434.

Patented June 23, 1896.



Witnesses.

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WAGON.

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To all whom it may concern:

Be it known that I, WILLIAM B. STOVER, of South Bend, in St. Joseph county, in the State of Indiana, have invented new and useful Improvements in Wagons; and I declare that the following is a full and accurate description of the same, reference being had to the accompanying drawings, wherein—

Figure 1 is a perspective view of a wagon possessing my invention. Fig. 2 is a plan of axle and wheels. Figs. 3 and 4 are elevations of the hub, illustrating the set of the skein. Fig. 5 is a longitudinal elevation, with axle in section, showing the tension-rod.

It is well known that a wagon-axle skein has a conical figure, and that the axis of said cone is not parallel with the ground nor perpendicular to the line of progression. Every wagon-wheel is somewhat dishing, and the skein has imparted to it a certain "set," as the wagon-makers term it, that is to say, the skeins are so placed on the axle that the axis of each skein will incline downward and a little forward at the outer end. The effects of this are, first, the supporting-spokes of the wheel stand upright or vertical, under the hub; second, the tops of the wheels incline outwardly, so that the tops of the wheels are considerably farther apart than their treads or bottoms; third, the slight forward inclination of their axes causes the wheels to "gather," that is to say, tend to run toward each other. This forward inclination or set of the skein is a matter of importance and delicacy. If it is too great, the wheels gather too much, and run too hard against the collars. If it is not great enough, the wheel tends to "wobble" back and forth between the nut and the collar, and therefore runs unsteadily, or it runs against the nut. When the set is just right, the wheel simply tends to run against the collar, and therefore to run steadily, but without undue friction.

The skein being set down and forward at its outer end, it will be perceived that a small rotary motion of the skein will either exaggerate or extinguish the gather of the wheels, according to its direction. The wheel will run too hard against the collar or will cease to gather and will either wobble or run against the nut. Usually, when the draft is applied

to the axle this rotation is in a direction which exaggerates the forward set. The object of my invention is to prevent this rotary movement of the axle, and therefore preserve the wheel in its proper position.

This invention applies more particularly to those wagon-gears which have the draft force applied to the front axle, though the principle involved has a wider application, which will be readily perceived by reference to this description.

For convenience I will confine my particular description to a low-down wagon, such as is adapted to delivery of milk, &c. In all wagons of this class the draft strain is applied to the axle through the medium of thills or a tongue to which horses are attached. The line of draft will be a direct line from the point of thill attachment to the horse's shoulder, which latter is invariably considerably above the level of the axle. Consequently the draft is forward and upward from the point of connection, and as said point of connection is forward of the axle there is a consequent lift which tends to rotate the axle and exaggerate the gather of the wheels.

In counteracting the lifting effect of a draft on an upward line there are several points to be considered, and the controlling condition is, the draft strain ought to be transmitted direct to the body or gear of the wagon through but irrespective of the axle, and the second condition is, the active devices must be so arranged that any rotary movement of the axle will disturb the line of draft and be immediately resisted by the draft.

I am aware that in many heavy platform-gears the draft strains act upon the platforms, which are rigid, and that, in those cases, the front axles are pushed forward by the wagon and gear, instead of drawing the wagon and gear after the axle. In such cases the tendency to rotate the axle will extinguish the gather, and the wheels will run against the nuts.

I am also aware that in common farm-wagons the tongue is attached to the front ends of the hounds, which project forward from the axle; but in that case the point of tongue attachment is so far in front of the axle and so high in respect thereto that there

is but little tendency to rotate the axle, and this little is effectually counteracted by the rearward extension of the hounds and their sliding connection with the reach; but I am not aware that any wagon has heretofore been constructed with provision for preventing rotary motion of the front axle on the principle of my provision, which I will now particularly describe.

A is the front axle, and B B are the skeins. Their downward set is shown in elevation in Fig. 1, and their forward set is shown in plan in Fig. 2. The forward set shown in Fig. 2 is greatly exaggerated, because in a drawing so much smaller than full size the true set would not be perceptible. The set in both directions is illustrated in Fig. 3, where the point *g* shows the position of the axis of the axle, exaggerated as to forward set. C C are the wheels. D D are the clips for attachment of the thills or tongue E. The line of draft F extends in a straight line from the clip D to the harness of the draft-animal, and it exerts a lifting strain upon the front axle, tending to cause a rotation thereof in the direction of the arrows. This will tend to transfer the point *g* toward *g'*, Fig. 4, and impart too much forward set and cause the wheels to run too hard against the collars. To support the axle against the direct pull of the draft, and transmit the draft to the rear axle, a reach of some kind is employed. In the low-down wagon the bottom of the wagon-body constitutes the main part of the reach, and the tension-rod H constitutes the remainder of the same; but the location of the joint which connects the axle and rod H is an essential part of the invention to obtain the best results. In ordinary wagons, where a reach is employed, the front end of the reach is not usually connected to the front axle, but to a bolster or head-block, and in low-down wagons, where a bolster and fifth-wheel have been employed, a rod has been employed in place of H. The front end of said rod has been connected to the king-bolt below the axle and capable of motion up and down therewith, or thereon, when the body moves up or down. All these are different from my device and are incapable of producing the same effect.

The proper location of the joint I at the front end of the rod H has been a matter of experiment, and I have discovered that said joint must be in the inclined plane of the line of draft projected through the axes of the clips D D toward the rear, as shown. That is to say, the best results are attained when so arranged. The draft strains are then transmitted directly to the rod H and to the wagon-body without any tendency to rotate the axle. If the joint I were below said plane, there would be a tendency to lift the clips D, and rotate the axle, but such tendency would be resisted by the rod H in proportion to the distance of said joint I below the said plane.

When the joint I is in the plane F exactly,

no rotation of the axle can take place without elongation of the rod H, because any rotation of the axle must carry the joint I in the arc of a circle about the axis of the wheels C in the direction of the arrows, Fig. 5. This resistance of the rod H is augmented if the joint I is placed below the line F because the radius of its orbit around the axis of wheel C will be increased. This statement is the result of elaborate experiments, and the wagons built in accordance with it have demonstrated the correctness of the principles discovered.

In the case depicted in the drawings the clips D have considerable projection in order to reach over the half-spring J, which is attached to the same iron, and the downward bend in the axle locates the joint I in the line of draft.

I locate the joint I on the front side of the axle A, not from any necessity in the matter of rotation of the axle which has been discussed above, but for another reason entirely.

The distance between the axle and the wagon-body is short, being only about sixteen inches. As the wagon-body rises and falls, due either to varying load or to momentum caused by the passage of the wheels over obstacles in their path, the rear end of said rod tends to move in the arc of a circle about the joint I as a center; but such movement is disturbed by the momentum of the body and its other connections, which cause it to move in a straight line. At the same time the displacement of the joint I by a thrust of the rod H is resisted by the axle A and its connections. If the rod H were straight, the resistance of the axle would be forcibly overcome, and that result is not desirable. I therefore make said rod with a gooseneck bend, and therefore capable of yielding sufficiently to permit the body to descend without pushing the axle out of place. The necessity of this flexibility will appear from a consideration of the following facts: It is evident that so far as any rotation of the axle is concerned the axis of such rotation must be the axis of the wheels in which said axle is supported, because were it elsewhere any rotation of the axle would necessarily result in raising the wheels off the ground, or in depressing them into the ground, neither of which is possible.

If the wagon-body descends in a straight line, said line is either a chord or a tangent of a curve about the joint I as a center. If the rod H were inflexible, then the descent of the body in a straight line would cause the joint I to be displaced along an arc of which the axis of the wheel is the center; but the arc through which the rod H would cause the body to descend has a radius of about eighteen inches, while the arc along which the joint I may be displaced by a thrust of said rod has a radius of about three inches, and it is evident that whereas the wagon-body may descend in a straight line it is impossible for the joint I to be displaced along any straight line, and that a sufficient displace-

ment in arc may be impossible, so that, without reference to other considerations, the mere relation of the parts would compel a flexibility of the rod H. Its ready flexibility is secured by its curved form.

The rearend of the rod H is provided with a simple free joint K and a supporting saucer-shaped spring L, which prevents rattling in said joint.

10 In the particular wagon depicted in the drawings, the weight of the wagon-body rests upon the half-spring J in front of the axle and any rotation of the axle under thrust of the rod H would cause the front end of the body to be raised up, which would be a result quite impossible.

15 Having described my invention, I claim—

20 1. In a wagon-gear, the clip I and tension-rod H, connected to the axle in the plane of the line of draft extended to the rear through the draft-clips D, D, for the purpose set forth.

2. In a wagon, a front axle provided with

forwardly-projecting clips to receive the draft strains, combined with a tension-rod connected at its rear end to the wagon body or reach, and at its front end jointed to the axle at a point below and in rear of said clips, whereby rotation of the axle is prevented by substitution of the tension-rod joint for the axis of the axle as a center of rotation.

3. In a low-down wagon, the front axle A provided with the projecting draft-clips D, D, the slightly-elastic tension-rod H, jointed at its rear end to the wagon-body and at its front end to the axle A, as and for the purpose set forth.

4. In a wagon, the front axle A, combined with a slightly-extensible tension-rod H and a spring-plate L for the purpose set forth.

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Witnesses:

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