6652X

R. WINANS.

Car Axle.

Patented July 20, 1831.

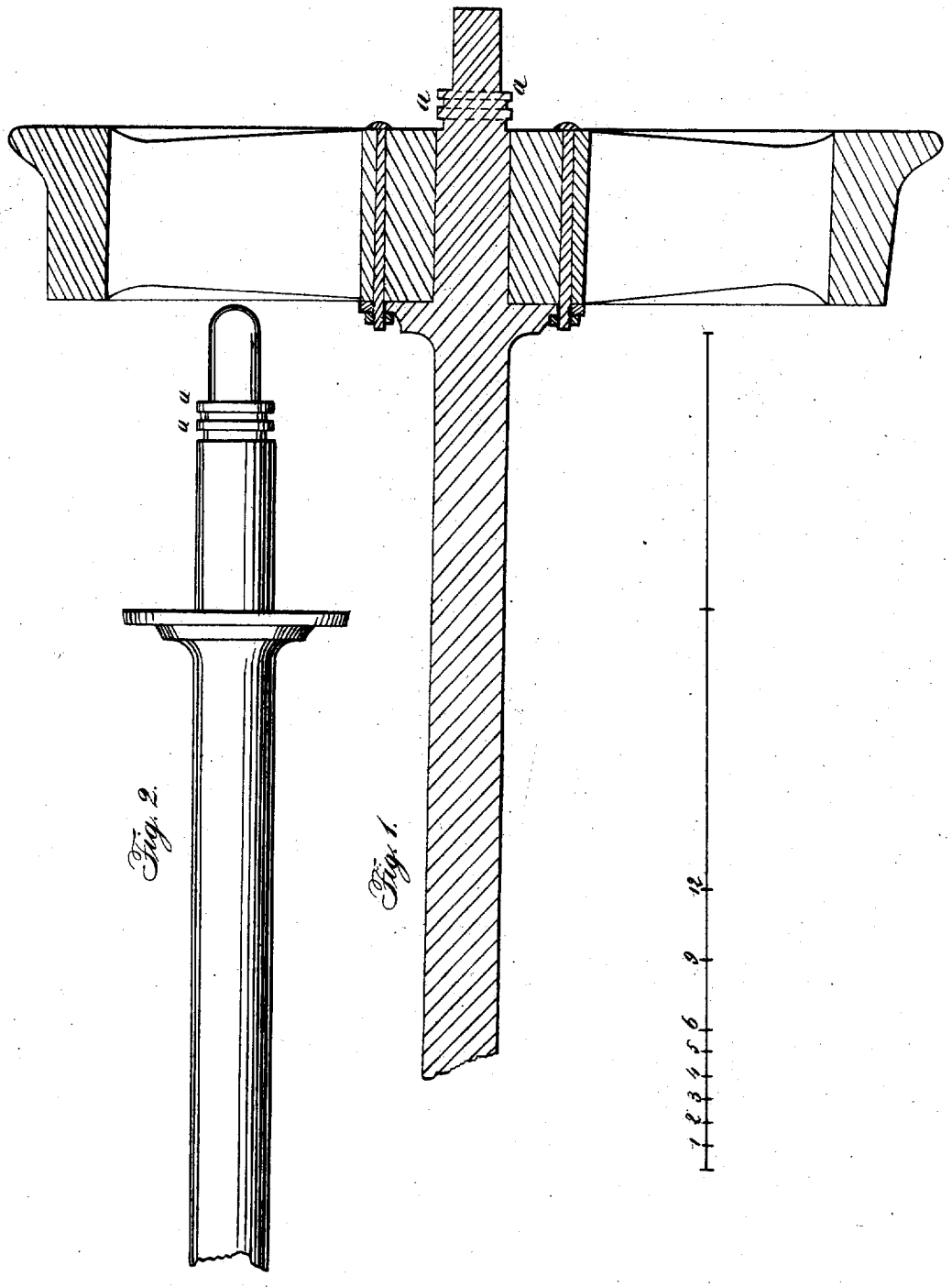


Fig. 2.

Fig. 1.

A.M. PHOTO-LITHO. CO. N.Y. (OSBORNE'S PROCESS.)

July 20. 1831

6652X

Royse Ebenezer
Letters Patent

The Schedule referred to in these Letters Patent and making part of the same containing a description in the words of the said Royse Ebenezer himself of his Improvement in the construction of the axles of Railway and other Carriages

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To all whom it may concern: Be it known that I Royse Ebenezer have invented an Improvement in the construction of the axles or bearings of Railway or other inclined carriages and that the following is a full and exact description thereof. The axle with my improved journals or bearings may be made straight and the inclined planes thereon in the usual way but instead of forming the bearings under the body of the Carriage and within the naves or hubs of the wheels these to sustain the weight of the load. I extend the axles out at each end projecting beyond the naves to such length as shall enable me to form thereon such gudgeons. The length and diameter of these gudgeons I regulate according to the load they are intended to sustain and other circumstances. In all cases however the value of my invention depends upon the gudgeons having their diameters and small as to give sufficient strength consistent with a due attention to the strength required in other parts. The enabling the axles to carry their bearings without the naves admits of their being made much smaller than usual the degree of diminution which I have found to answer well in practice will hereafter be stated. They should be formed of good wrought iron and case hardened or converted into the best steel and hardened which materially diminishes the expence of bearing surface necessary to enable them to carry and resist the pressure of the load and their tendency to wear they may therefore be short and are consequently strong in proportion to any small diameter. The tendency to lateral movement is checked or limited by forming the outer extremity of the axle or gudgeon so as to be rounded externally by the spherical superficies of the gudgeons of wrought lateral pressure ceases. By placing the bearing inclined to the perpendicular of the diameter of the wheels may be enlarged with some advantage thereby increasing the axle between the wheels may be made long in proportion to its strength so as to admit the improvement [illegible]

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of them by an enlargement of the wheels without affecting the size or strength of the bearing journals. By the foregoing means the leverage of the wheels for the mechanical advantage with which the moving power acts to overcome the resistance to motion is increased and consequently the friction or resistance to motion in Rail Road carriages diminished to a greater extent than before. This improvement in the axles & journals of railway carriages was devised and carried into operation in my experimental railway exhibited to various persons in the early part of the year 1829. And it was put into practical operation (under my direction) in the Baltimore & Ohio and on the Liverpool & Manchester Rail Roads in the early part of 1829. In connexion with another improvement for another diminution of friction by means of a revolving bearing or friction wheel for which other improvement a patent was granted to me on the 11th of October 1828. A combination for use on the tender of the before mentioned road of cast with axle and journals or gudgeons of various descriptions and dimensions. The gudgeons or immediate places of bearing for the load varied from 1½ to 3½ inches in diameter and from 3½ to 5 inches in length. Some of them were made of wrought iron and case hardened and some of iron over laid with steel and hardened. The axles between the wheels were mostly of wrought iron of from 2½ to 3 inches in diameter. Several cars were however constructed with hollow cylindrical cast iron axles secured to the wheels by keys or wedges on the ends of the axles which hold the gudgeons being separate pieces firmly fixed into the naves of the wheels. Iron may also be used for the axles but the wheels in their parallel relation to each other with the gudgeons as aforesaid to receive the bearings). The result of experience by the practical use of these cars for the conveyance of loads from 3 to 6 tons and under various circumstances is that (for the support of a given load) the gudgeons or bearing for the load might in the manner herein specified be safely made of from one third to one half less diameter than those in common use without increasing (but rather increasing) the strength and durability of the car; and the diameter of the wheels finding a sufficiently practical limit it is evident that a saving in the moving power to overcome the friction of the axles as a mechanical advantage proportionate to the amount

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take of the diameter of the wheel to that of the axle. These gudgeons are constantly in use applied in England before Notice and have been adopted there without any claiming any advantage therefrom as by the Laws of that country I could not secure the invention by patent - the having publicly exhibited it. The object of this invention and practical demonstration of its utility being known I do apply it to use and adaptation to the different rail road carriages, both on waggons locomotive engines &c and to the different bearing boxes that may be proposed for the different purposes (either centering or common) will be evident and easy to any person acquainted with the building of railway carriages. But to understand the same so the following general directions and proportions are given, which I think will be found to be a near approximation to what will be required in practice. When it is intended to convey loads of from 2½ to 3½ tons and to use wheels of from 3½ to 3 feet in diameter. The general diameter of the axle may be from 2¼ to 3 inches in Breadth standing through & beyond the naves of the wheels on each side far enough to go under and conveniently secure the side frame of the Coach bed and to have their ends turned or formed into gudgeons about 2½ to 3 inches in length and from 1½ to 2 inches in diameter. On the four gudgeons there is to be the carriage body rested by means of any hard metal bearings attached to the before mentioned side pieces which side pieces are to frame with the end pieces of the bogies to go on the outside of the wheels. Either over or under the gudgeons as convenience may require. The friction occasioned by the tendency to a lateral movement of the gudgeons is limited by causing the end cover of the bearing to meet the end of the gudgeon as near to the centre of rotation as possible. When my invention by it is intended to be used this end is attained by forming the end perfectly square, and when the contrary is used by forming the end of the gudgeon conical, the consequence of the inward or lateral pressure being counteracted by the bearing on the journal the bearing by the gudgeon against which the latter bears as above is the one of the most famous that can be used for that purpose as the oil or the lubrication of the gudgeon by the motion of the axle at its circumference may. But to guard against the oil running from the gudgeons on to the wheels

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it is advisable to diminish as much as may be consistent with strength the friction between the axle & the nave of the wheel which will thereby effect. I do not intend to be understood as claiming all wheels for carriages with bearings beyond or external to the wheels: the single wheel of Sargeant and of Palmer for railway carriages (or single railways) have for some time existed. And several kinds of railway carriages have been devised with four wheels each having separate axles with both inside and outside bearings with a view to turning curves with facility. A carriage was made at Liverpool in England at a Late date (viz 1829) upon the outside bearings of the usual size for the purpose of riding a board body conformably. and without any view to the object of this improvement, nor effecting the like purpose. My invention is sufficiently distinguished from all other known & used by the more useful effect produced in the manner specified. I therefore declare that the improvement or improvements above specified do not consist in diminishing the resistance & friction in whatever carriages to be used on rail ways, which I claim as my own invention, is the extending the axles each way outside of a pair or pairs of wheels far enough to form upon them bearings sufficient to receive the bearing boxes of the load body and thereby to support the same with a view to lessen the resistance of friction, as well as the situation with the use of the most convenient method for those with to put in practice the same conveniently in creasing the carriage of the wheels without impairing their effective strength or durability

Witness
Thos. B. Jones
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1652 hm

Ex.d
Cliff.

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