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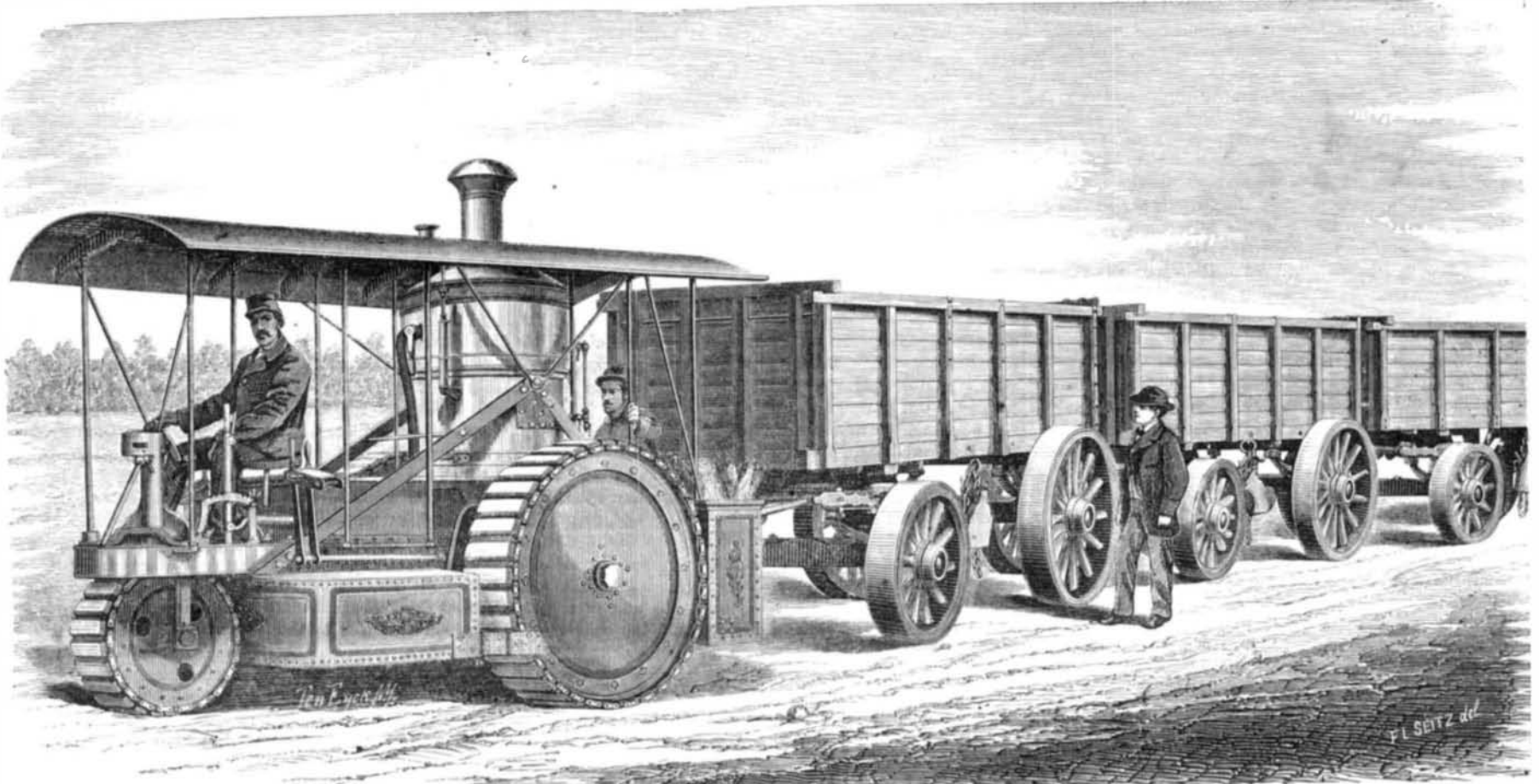
## Improvement in Road Steamers.

This remarkable traction engine has, during the past two years, attracted more notice among scientific men than any of the numerous road locomotives which have ever preceded it. The use of steam on common roads has long excited the great interest of all engineers as well as of those who would benefit by its practical introduction. Without discussing the special reasons of the failure of the Boydell system, with its cumbersome self-carrying tramway, or the Bray engine with its projecting and receding claws operating through the periphery of its driving wheels, it may be briefly stated that no road

which series of plates is the portion of the wheel which comes in contact with the rough road. This reticulated chain is connected by what might be properly styled steel vertebrae, at each side of the wheel. The rubber tire and this ring of steel plates, have no rigid connection, but are at perfect liberty to move round independently of each other, or even without the concurrence of the inner ring of the wheel which they both inclose. This is a remarkable combination and contributes to the great success of the wheel as a whole. Holes are made in the inner iron rim of the wheel to admit air under the rubber tire. This enables the rubber to slowly

for quick speed, and a double gear for heavy loads. The engines are double cylinders with a reversing gear. Either of the driving wheels can be thrown in or out of gear, so that in turning sharp corners the inner wheel is out of gear, slipping freely while the outer wheel drives the machine around.

When attached to a loaded train of four wagons by a simple triangle coupling the whole can be turned in any road of ordinary width, each wagon following in the exact wake of the steamer. The loads drawn by the two sizes now made are from twelve to twenty tons, up inclines of one in twelve, and twenty to thirty tons on an ordinary level road. The



THOMSON'S PATENT ROAD STEAMER.

engine has ever satisfied the demand for driving heavy trains of wagons on common roads, until the advent of Mr. Thomson's ingenious invention, which is illustrated on this page.

Adhesion, without too great weight; traction, without destroying the roads; gearing, which would not break when jolting over rough pavements, and steering which would enable the engine to be easily turned, were some of the absolute requirements of a practical road locomotive. The enormous weight of the traction engines, with rigid tires, now used in connection with steam plowing in England, proves its necessity for the purpose of gaining sufficient adhesion. Their provision for inserting teeth in the face of the wheels tells the story of their destruction of roads when drawing heavy loads. Their inability to use springs causes a wear and tear of gearing and working parts, which any mechanic will understand, and the time consumed in turning corners quite unfit them for high speed.

Many ingenious traction engines have been made in this country, but as they were not constructed for drawing heavy loads, there was no occasion for them to surmount the difficulties stated above.

In the elastic tire invented by R. W. Thomson, C. E., of Edinburgh, all these fatal objections have been overcome and new powers developed. The idea of using vulcanized rubber for gaining adhesion, traction, and simplicity of gearing, was as novel as valuable. Even this useful and important discovery might have never been given to the world had not Mr. Thomson been a gentleman of large means as well as a thoroughly educated engineer. He was thus enabled to continue his experiments and perfect his invention before it was brought before the public, and it is probably for this reason that it at once attracted the notice of the most eminent engineers of the Old and the New World.

A brief description of the "Road Steamer" is all that is necessary in connection with the accompanying engraving. The driving wheels are about five feet in diameter with a broad iron tire having narrow flanges, upon which is placed a ring of soft vulcanized rubber twelve inches in width and five inches in thickness, which surrounds the iron tire, and is kept in place by the flanges. Over the rubber there is placed an endless chain of steel plates, three and a half inches wide,

creep round the wheel, so that in going a mile with a heavy load in tow, the rubber tire will be found to have crept once around the iron tire. To this ingenious device is due the indestructible nature of the tire. An enormously sudden and heavy strain upon the soft tire might tear it, but the slight slip saves it. Nearly the whole weight of the engine is upon the drivers, the third wheel in front being only for steering. The steering apparatus is therefore exceedingly simple, and the rapidity and ease with which it guides the steamer must be seen to be properly realized. It will instantly spin around with its inner driving wheel, describing a circle of less than six feet in diameter. The weight upon the rubber tires causes them to collapse and conform to all the irregularities of the road for a space of twenty inches each, and thus is insured adhesion and traction, which cannot be obtained in the slight line of contact with smooth rigid tires. To this fact is due the ability of the road steamer to draw enormous loads and to ascend steep hills.

Perhaps one of its most important features, as concerns its use in this country, is its ability to run over soft ground or muddy roads. The rigid-tired traction engines in England are able to slowly grind over their hard and magnificently macadamized roads, but upon our common dirt roads they would be utterly useless. In this respect the road steamer has been not inaptly compared to the elephant and camel, whose elastic cushioned feet enable them to cross the soft yielding sands of the desert. It is this same elastic cushion which prevents injury to the roads, and which, acting as springs or buffers between the rough road and the gearing saves the machinery from damage. The work done by the wheel in depressing the rubber in front, is again performed by the rubber at the rear in urging the wheel forward, so that the one exactly balances the other, hence there is no loss.

The boiler used is of the vertical tubular type made entirely of steel and constructed with special regard to simplicity and great strength. All the gearing and working parts are either of steel or malleable iron, and are entirely hidden from sight. An ingenious device in connection with the exhaust steam almost completely suppresses the noise caused by its escape. The coal bunkers hold a day's supply, and the water tanks hold a third of a day's supply. There is a single gear

speed varies from two and a half to six miles per hour for freight steamers, and ten miles per hour if constructed specially for passenger service. The consumption of coal averages about half a ton per day. About three times as much wood by weight is required to furnish the same steam power.

All the road steamers can be fitted with a fly wheel and governor, so as to run as stationary engines for driving any description of machinery.

The British Government appointed a commission of military men to examine these road steamers with the view of adopting them in the War Department. The examination was most severe and the report so favorable that a number have been ordered; among others one to carry stores up the Rock of Gibraltar, the inclines being one in six. Various other European governments have, after careful examination, ordered them for drawing heavy artillery and for other purposes. Over seventy road steamers are now in order at the works in Great Britain for India, Australia, and other countries.

With our vast country so much of which must be for many years without railroads they will be of great use for mines, transportation companies, feeders to railroads, for general carrying purposes, and for towing on canals. One steamer can draw six boats at double the speed of horses. And lastly, in plowing the grain fields of the Great West, as also the sugar and cotton plantations of the South, they will find a wide field of usefulness, and prove of great value. Harnessed to one of Williamson's gang plows they turn seven furrows of eight inches depth and twelve inches width with perfect ease, as we can testify, having personally witnessed the performance of one of them, not long since, in plowing obstinate soil.

Mr. D. D. Williamson, of 32 Broadway, New York, is the exclusive manufacturer under Mr. Thomson's American patents. No better assurance can be given that the American engines will be fully equal if not superior to the British, than the fact that the Grant Locomotive Works, of Paterson, whose locomotive at the great Paris Exhibition took the prize over all others, have contracted to build them for Mr. Williamson, and are now constructing a number for the American market.