

PRACTICAL TALKS TO THRESHERMEN Talk No. LXXXV.

Conducted by PROFESSOR P. S. ROSE

Note.—The term "gas engine" in these lessons will be used indiscriminately in speaking about all internal combustion engines.

Tractor Drive Wheels look pretty much alike until you examine them closely. Then many differences appear. In fact, there are about as many different kinds of tractor wheels as there are tractors. The differences are not necessarily very startling, but they are there just the same. There are differences in the spokes, differences in the rims, differences in the lugs and different ways for transmitting motion to the wheels. Every designer has a different idea and tractor wheels are far from being standardized. And yet there is no part about a traction engine that has received more careful attention than the drive wheels. Not only are there a great many modifications in the ordinary round wheel but a number of different kinds of wheels have been invented, some of which will be described presently.

A good tractor wheel must be so designed that it will carry the weight of the machine, stay in line under the severest kind of work and not get out of shape. It must be strong and yet not carry any more weight than is essential for the work it has to do. Moreover, it must be so fashioned that it will not slip on any kind of soil or tear up a good roadbed. Altogether these are difficult requirements.

Perhaps the easiest way for the reader to get an idea of the different wheels is to describe a number of the leading styles and point out the differences of construction. Figure 195 represents one form of wheel used by the Hart-Parr Company. The rim is made of heavy sheet steel and the hub of cast iron. The spokes are round steel rods riveted into the rim and held to the hub by nuts which put the spokes all in tension. The bull gear, which is of

cast steel, is provided with a number of projections by which it may be bolted to the rim. With this construction none of the driving force is transmitted through the spokes. The gear is what is known as an internal spur gear,

external spur gear. It is bolted to the hub and is supported by the rim through a number of braces which are riveted to brackets on the wheel and to the rim of the large wheel.

Another feature of this wheel

in diameter this is quite a serious objection, as they represent in such cases, no inconsiderable amount of the entire weight of the tractor. They should be made as light as possible consistent with proper strength and good wearing qualities. Another disadvantage of cast wheels is that sometimes a piece gets broken out of the rims whereas the same blow would do no more than bend a steel wheel and it would be an easy matter to hammer it back into shape. A cast wheel, on the other hand cannot be mended.

A number of companies have built what are known as open rim wheels. Instead of having a solid piece of steel for the rim they build it up of narrow strips with open spaces between. The object of such a wheel is to allow it to settle down into soft ground until it finds a proper footing. The soft earth squeezes up through these open spaces and falls out when the wheel turns around. A wheel of this kind is expensive to make and unless it is very well made it cannot have quite the rigidity of a solid rim wheel.

Since the good roads movement started there has been a disposition on the part of many road officials to restrict tractors of all kinds to the unimproved roads. The reason given is, of course, that the sharp cleats of the tractors tear up the roads and entail a great deal of expense to put them in good order again. There

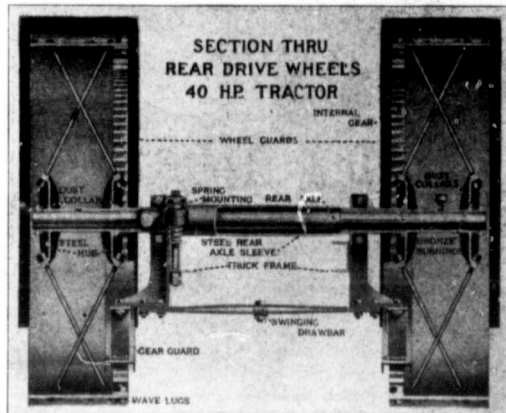


Fig. 195. Drive Wheels of Hart-Parr Tractor.

that is, the teeth are cut on the inside of the rim instead of on the outside, as in most gears. Both drive wheels are made exactly the same and each is provided with a bull gear which allows driving from both sides. Nearly all of the heavy tractors are built in that way at the present time. If the drive were all from one side the frame would be subjected to severe twisting stresses, which in time might throw the various parts out of line. The action of the driving pinion is to lift the front end of the machine. Sometimes this lifting effort amounts to two or three thousand pounds. If it were applied all to one side of the machine it would cause a severe twisting of the frame, consequently it has become customary to design tractors to drive from both sides.

Figure 196 shows a different style of wheel. The rim is made of heavy sheet steel riveted together and reinforced on each edge with a narrow strip of steel. This wheel has to carry a very heavy load and if it were not reinforced on the edges the designer was afraid it might be bent if it happened to strike a rock. The spokes are of flat steel, upset on the outside end so that they can be riveted to the rim. On the inside end they are riveted to the heavy cast iron hub. In this wheel, it will be observed, the spokes are in compression. The bull gear is what is known as an

is the lugs or grouters, as they are sometimes called. These consist of two rows of wedge shaped pieces of cast iron, placed diagonally across the rim and riveted thereto.

An entirely different kind of wheel is shown in figure 197. Here we find only a single row of spokes which are set into a suitable socket at the hub and held to the rim by means of a special clamp or foot which is bolted to the rim. This type of wheel is used on a steam traction engine and so far as known is not used on gas tractors. It is introduced here merely to show one of the various ways in which the wheel problem has been solved. In this wheel, the driving forces are transmitted entirely through the spokes to the rim. The differential and bull gear are attached to the rear axle and the driving wheel is keyed also to the axle. The twisting force of the gears is therefore applied to the axle instead of to the wheel as in the former example.

In some tractors the rims are cast. Wheels made in that way give satisfactory service and in some kinds of soil they wear better than steel wheels. If the roads are sandy and the sand is sharp it cuts a steel rim much more rapidly than it does one that is cast. The objection to the cast wheel is chiefly that it is heavy. Where wheels are made anywhere from six to eight feet



Fig. 197. Wheel used on Clegg Steam Traction Engine.



Fig. 196. Wheel used on Rumely Oil Pull Tractors.

tractor  
leges  
be run  
rims o  
In Fra  
work  
wheel  
in figu  
damag  
dam o  
is gen  
wheel.  
that o



Fig. 198

where  
mileag  
Othe  
this d  
tracto  
spikes  
a few  
smoot  
a wh  
tracti  
munic  
one w  
shoul  
pectiv

is no doubt but that in many cases the road officials are right in their contention, and yet, some of the ablest highway engineers contend that the tractor does not do enough damage to make a fuss about. They recognize that even though it be an evil it is a necessary evil. Others even go so far as to advocate laws prohibiting tractors from the use of all improved highways. There is one thing certain, and that is, if the