Planetary drive, straight axles and keyed straight axles.

This article is about the several ways that rear drive wheels can be mounted and impelled on a farm tractor.

The first and obvious way is to simply bolt the wheels to a straight axle that runs to the differential. That is how many wheels are mounted on cars and trucks.

The first McCormick Deering (Standard) tractors were designed that way also.

In a planetary design, the drive shaft from the differential ends with a small diameter gear. That small gear is in constant contact with the perimeter of a large diameter gear. Apparently, that physical arrangement, a small gear which might appear to revolve around a large gear, reminded someone of planets revolving about the sun.

In any case, picture a small gear actually driving a much larger gear.

The tractor ground wheel is affixed to the larger gear.

This mechanical construct accomplishes several things.

It reduces the high-speed rotation from the gear box to a much lower speed for the wheel. That also increases the torque of the ground wheel dramatically.

Because in practice, the small gear is mounted on the top side of the large gear, another effect is to raise the body of the tractor. That provides improved ground and crop clearance.

A speed reduction can be accomplished in a variety of ways. What is critical in the farm tractor application is the added clearance.

IH used a planetary drive on the first Farmall and in some succeeding models. They used planetary drive on the Regular, The F-30 and the F-20.

When IH produced the F-12 in 1932, they tried a new variation of the straight drive axle. The F-12 axle was keyed and clamped to allow the rear wheels to be moved in or out on the axle. This had the great advantage of width adjustment.

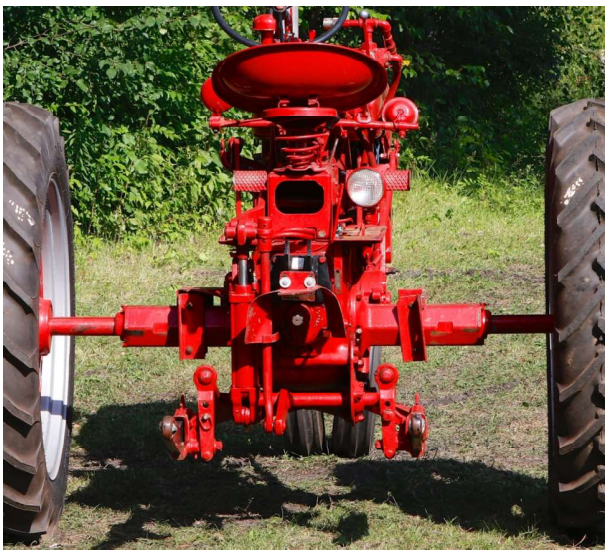
ABOVE: This is rear view of a 330 Utility tractor. The axles are part of a common differential assembly. It functions basically like the rear axle of a rear-wheel-drive automobile. These wheels are mounted securely to the axles and are not adjustable for width.

ABOVE: This is the rear view of an F-20 Farmall. The axle is high to provide crop clearance. The Planetary drive mechanism at each wheel, transfers the force from the high axle to the much lower wheel. The wheels are bolted directly to the hubs and are not adjustable for width.

Changing wheel spacing allowed farmers to use tractors for different crop row spacing.

The F-12 used larger diameter rear wheels instead of a planetary drive to achieve high crop clearance.

IH learned from the F series tractors. In the Letter Series tractors, introduced in 1939, IH switched the rear axle forms.



ABOVE: This is the rear of a Farmall 200. A descendant of the F-12, F-14, and C. It has straight, keyed, axles that allow excellent wheel-width adjustment..

ABOVE: This is the rear of a 1947 Farmall Cub. The Cub is a Culti-Vision tractor like the A. As such it is offset with a long axle on the right and a short axle on the left. All Cubs use the planetary drive. Wheel width can only be changed by flipping rims.

The larger tractors, the C, the H and the M, employed the straight, keyed axles of the F-12 and F-14.

The smaller models, the A, the B, and the Cub used planetary drives.

ABOVE: This is the rear of a F-14 Farmall, a descendant of the C and F-12. It has straight, keyed, adjustable, axles.

ABOVE: This photo shows the F-12's keyed axle. This wheel can be moved in or out, to change wheel spacing. That is done by jacking up the tractor, loosening a clamp on the inner side of the wheel and sliding the wheel on the axle. That works pretty good if it is done at least yearly. If it has been decades since the wheel was adjusted, it will take more effort.