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# STEERING SYSTEM



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The system, governing the angular movement of front wheels of a tractor is called *steering system*.

*This system steering wheel minimizes the efforts of the operator in turning the front wheel with the application of leverages*



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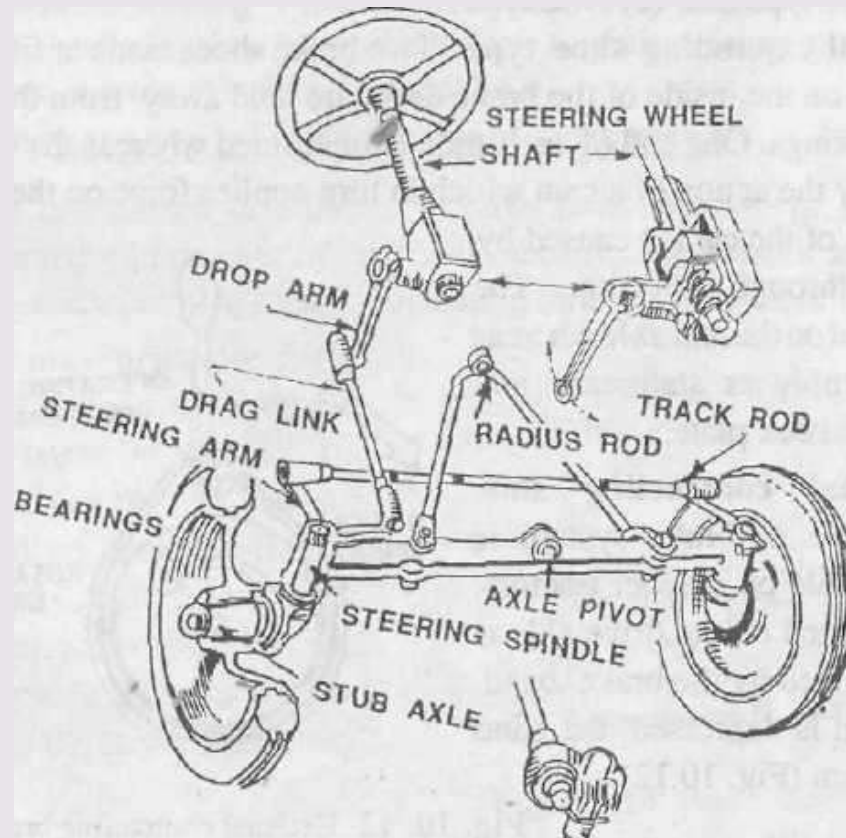
The different components of the system are:

- (i) steering wheel
- (ii) steering shaft
- (iii) steering gear
- (iv) pitman arm (drop arm)
- (v) drag link
- (vi) steering arm
- (vii) tie rod and
- (viii) king pin.



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When the operator turns the steering wheel, the motion is transmitted through the steering shaft to the angular motion of the pitman arm, through a set of gears.

The angular movement of the pitman arm is further transmitted to the steering arm through the drag link and tie rods.



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Steering arms are keyed to the respective king pins which are integral part of the stub axle on which wheels are mounted.

The movement of the steering arm affects the angular movement of the front wheel.

In another design, instead of one pitman arm and drag link, two pitman arms and drag links are used and the use of tie rod is avoided to connect both steering arms.



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# Steering principle

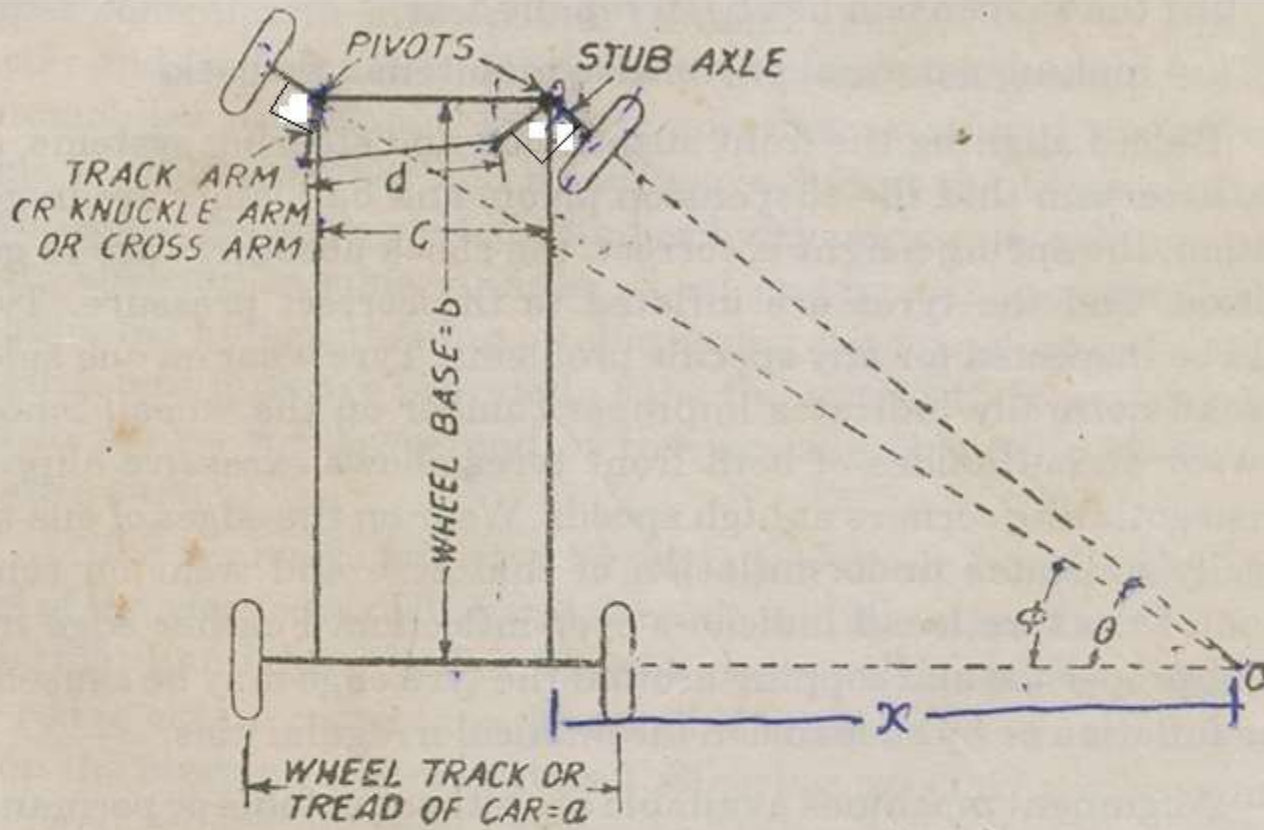
## True rolling

**Whenever a vehicle a turn, the front wheels must turn in definite manner both in relation to each other and in relation to the axis of rear wheels so that lateral slip may be avoided and true rolling for all the wheels is obtained.**

**For this the fundamental condition is that**

**” ALL THE WHEELS MUST ALWAYS ROTATE ABOUT A COMMON CENTRE TERMED AS INSTANTANEOUS CENTRE”**

**Since the rear wheel axle is fixed it is quite obvious that the common centre would lie somewhere on its extension**



where

$O$  = is the instantaneous centre.

$\theta$  = angle of inside 'lock'.

$\phi$  = angle of outside 'lock'.

$c$  = distance between the pivot centres.

$b$  = wheel base of the vehicle.

$a$  = wheel track, also known as tread of car.

$d$  = length of track rod