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Labelled part of a tractor

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Differential Unit and Final Drive 4. Steering gear and brake steering system 5. Hydraulic control system 6. Towing and control board tractor 7. Power-off unit (Pto) 8. Belt snail 9. The control board or dashboard board of Tractor 10. Tractor tyre and front axle.Fig. 10.2 shows the important components of the tractor. All tractors are C with an engine. Now one day almost all tractordiesel tractors.Component #1. Clutch: A clutch is a device that connects and disconnects the tractor engine from transmissions and drive wheels. The clutch transmits performance by friction between the driver and the driven members. Tractor axle coupling constraint: Tractor clutch essential for reasons: 1. The engine must be rotated by any appropriate means. For easy rotation, the motor is Clutch. After starting the engine, the clutch is switched on to transmit energy from the engine to the gearbox.2. To change the gears, the gearbox must be kept free of engine power, otherwise the gears will be damaged and the gear switch-on will not be perfect. This work is carried out by a clutch.3. When the tractor's belt disc is operating in the field, it must be stopped without stopping the engine. This is done by a clutch. Basic features of a good clutch:1. She must be able to conceive without pulling or chattering.2. You must have more capacity to transfer maximum power without slipping.3. The friction surface is strongly resistant to heat.4. The manual or pedal control lever must be simple. Type clutch: Clutches are primarily of three types: 1. Friction clutch2. Dog clutch3. Liquid switch Friction clutch is the most popular four-wheel tractors. Liquid clutches are also used on some tractors these days. The dog clutch is mostly used by electricians.1. Friction clutch: The friction clutch causes a grip by applying friction force between two surfaces. These surfaces are compressed to radiate energy. When the engine is started, the clutch pedal is in your favour. After starting the engine, the clutch pedal is slowly released to increase the pressure gradually on the friction surfaces until there is a slip. Thus, the driven plate adheres to the guide plate. The transmission of power depends on what material is used for frictional members and the intensity of the force, pushing them together. The friction clutch is divided into three classes: (i) Single disc clutch or single disc clutch (ii) (i) Single disc clutch: This can be called- Single disc clutch. It consists of: a. Pressure plate. Clutch plate. Springs and... Let go of your fingers. There is only one clutch plate in this type. The clutch plate is pressed to the imitated wheel by means of a spring-loaded pressure plate. When the clutch pedal is pressed down, the pressure plate is pushed back by the release fingers. This dissolves the pressure on the clutch plate. Then the clutch plate stops rotating, but the flywheel continues to rotate. When the clutch pedal is released, the pressure plate is pressed against the flywheel so that the clutch plate and flywheel are connected as one unit as one unit. Thus, the power of the engine goes from the gearbox to the gearbox on the rear wheels. (ii) Multi-disc clutch: This can be called multiple disc shafts. There is a set of thin metal plates, arranged alternately to work as a driving and driven members. One set is attached to the flywheel and the other is connected to the axis. If the discs are the clutch means that it is switched on and the power supply is the engine to drive the gearbox to the rear wheels. This pressure is won by a series of heavy springs, which are mounted in the house. The continuous of this type of clutch is very smooth due to larger friction surfaces.2. Dog Clutch: This is a simple clutch with angular jaws, which are used to drive the shaft in both directions. It's mostly used in light bulb stars.3. Liquid coupling: The liquid connector consists of a drive member and a driven member. The whole unit is positioned in a suitable casing. A switch shall be fitted to the crankshaft of the engine with a suitable oil of 3/4. A spring sealing ring is available to keep the driven shaft oil tight. When the crankshave rotates, the oil is thrown out by centrifugal force from the centre of the impeller to the outer edge, increasing the speed and energy of the oil. It then enters the running blades on the outer part and flows towards the center, causing rotation of the running unit. As long as the impeller and runner rotate at different speeds, the oil will continue to circulate evenly, but when the impeller and runner start running at the same speed, the circulation of the oil stops. The connector does not increase the torque used, but only transmits the torque evenly. The main features of fluid interconnection: i. Absorption of impact and vibration.ii. Smooth beginner and.iii. Simple OperationComponent #2. Transmission gearboxes and torque shifters: The tractor engine is moving at high speed, but the rear wheel of the tractor requires energy at low speed and high torque. Therefore, it is essential to reduce the engine speed and increase the torque available on the rear wheels of the tractor, since T is the torque at newton-m (N.m)n = speed rpm If the engine power is constant, it is obvious that the higher torque on the wheels requires low speed and vice versa. Thus, the gearbox is mounted between the engine and the rear wheel for variable torque and speed. This is done by properly designing the gear and axles. The speed varies depending on the field requirements, so there are a number of gear ratios available according to different conditions. Gears are usually made of alloy steel. Since the tractor always has to radiate high torque, the highest quality lubricants free of sediment, delicacies, alkali and moisture are used for lubrication. There are two types of common gears used on tractors: 1. Selective sliding type2. Permanent net type1. Selective sliding type:The gearbox consists of: (i) Gearbox, (ii) The crankshaft is directly connected to the clutch and transports gears. Gears tend to shifts with the shifting lever and the fork. The gears are scythed along the axis, to which they are splined to engage another gear as and whenever necessary to connect the powertrain. Gears are different in diameter, they have different number of teeth. The speed decreases in proportion to the number of teeth on the gears.2. Permanent mesh type: These gears are always in a net. In general, the gears are spiral in shape. The powertrain is dilated by switching on gear switches that slide on the counting axis and the output axis of the gearbox. Torque converter: This is also called hydrokinetic transmission. This is a device used on tractors to transmit power and multiply the torque of the engine. It works like a torque multiplier. Torque converter consists of: (i) Impeller.ii. Turbine.iii. Stares Andiv. Positioning In this system, the engine flywheel is attached to a impeller with blades and is located in a housing with adequate oil. When the alendwheel is rotating, it rotates the impeller, which collides with the oil in the tank (Fig. 10.9). The driven oil hits the turbine blades and forces it to rotate, resulting in high input torque. The swirling oil bounces off the turbine hammers against the stator. The flow of oil against the standing area creates a rear force. It's a reaction torque, and it's added to the input torque. The swirling oil bounces off the stator and redirects it back to the rotating impeller blade. Thus, the circulating oil is propelled around and around, bouncing impeller from the turbine, to the stator of the impeller, helping itself to multiply the torque. The turbine is connected to the output axis of the torque converter. Its twisting force (torque) can be transferred to the rear wheels of the tractor. The torque converter takes low torque at high speeds and converts it to high torque at low speeds.Component #3. Differential unit and final drive:The differential unit: The differential unit is a special arrangement of gears which allows one rear wheel of the tractor to rotate slower or faster than the other. When turning the tractor on a curved track, the inner wheel must travel a distance less than the outer wheel. The inner wheel requires less power than the outer wheel; this condition is met by the differential unit, which allows one rear wheel of the tractor to move faster than the other at the tipping point. The output shaft from the gearbox is equipped with an oblique gear angle at the end of the axle. The slanted-toothed mesh with a large oblique wheel, known as the Crown wheel. The main functions of the crown wheel assembly are as follows: 1. Transmission of power through a right-angle drive corresponding to the wheels of the tractor.2. To reduce the rotational speed. A consists of: 1. Differential housing2. Differential gear angle3. Crown wheel4. Half axis and 5. Slanted gearWheel the casing is rigidly attached to the crown wheel and moves like a unit. Inside the differential housing there are two gears, which are carried around by the crown wheel, but they can also rotate freely on their own axle or sedentary. There are two or more oblique gears in the net with differential gears. An oblique gear is at the end of each half axle, which goes to the tractor's rear wheel. Thus, instead of locking the crown wheel directly to the solid axle between the wheels of the tractor, the drive must be returned from the indirect route through the differential housing, the differential tooth and the half-axle of the tractor. When the tractor moves in a straight line, the differential tooth does not rotate on the axis of the stump, but is solid at the differential housing. The two oblique gears are driven at the same speed and in the same direction as the hull and crown wheel. [Figures 10.11 and 10.12] Figure 10.11 shows that when the vehicle is driving straight, the sun and its star teeth do not rotate on their axles, but run as a unit. Figure 10.12 shows that when the vehicle turns, the star and solar gears move on their own axis, apart from moving the gear carrier. Each differential tooth tooth can move in two planes at once. When the casing is carried around, it drives the half-axis in the same direction, but when rotated on its own axis, it drives them in the opposite direction, i.e. the rotation of the differential gear puller gives movement to one axle and extracts movement from the other axis. Differential lock: A differential lock is a device which fixes both half-axes of the tractor so that, even if one wheel is in less resistance, the tractor comes out of the sludge, etc., as both wheels move at the same speed and apply equal adhesion. Final Drive: Final drive is a speed reduction unit for differentiation of the drive between wheels in powertrain units. The last drive eventually transmits power to the rear axle and wheels. The rear wheels of the tractor are not directly attached to the half-axes, but the drive must be transferred through a pair of spur gears. Each half shaft ends with a small piece of equipment, which nets a large outfit called Bull Gear. The Bull gear is mounted on the axle with the rear wheel of the tractor. The equipment is for final speed reduction, suitable for tractor rear wheels known as Final drive mechanism.Component #4. Steering control and braking steering system: The system for regulating the angular movement of the front wheels of the tractor is called a steering control. This system minimizes the operator's efforts to turn the front wheel using leverage. Various components of the system - (i) steering wheel, (ii) steering shaft, (iii) steering gear, (iv) Pitman arm (drop lever), (v) Pull mechanism, (vi) Steering lever, (vii) Tie rod and (viii) King pin. When the operator turns the steering wheel, the through the steering shaft into the angular movement, will be used. a pitman arm with a set of gears. The angular movement of the pitman arm continues to spread through the steering arm through the pull and tie rods. The steering levers shall be connected to the specific driver's cranks, which shall form an integral part of the stub shaft on which the wheels are mounted. The movement of the steering lever affects the angular movement of the front wheel. Another design, instead of a pitman arm and pull link, two pitman arms and pull links are used, and the use of tie rods should be avoided to connect both steering arms. Brake: The brake is used to stop or slow down the movement of the tractor. It is mounted on the driven axle and is operated by two independent pedals. Each pedal can be operated independently to assist in turning the tractor during field work or locked with a lock. Operating principle: The brake operates on the principle of friction. When a moving element comes into contact with a stationary element, the movement of the moving element is affected. This is due to the frictional force, which in opposite directions of movement and converts kinetic energy into thermal energy. Classification of the brake:The brake may be classified as follows: 1. Mechanical brake and 2. Hydraulic brake1. Mechanical brake: The mechanical brake can be of two types: (a) Inner expanding shoe type (b) External contracting shoe type and (c) Disc type (a) Inner expanding shoe type: Two brake shoes made of friction material mounted on the inside of the brake drum are kept away from the drum by springs. At one end each shoe is fulcrummed while the other is free to move around the action of the camera, which in turn applies force to the shoe. The cam movement is caused by the brake pedal through the joint. The drum is mounted on the rear axle, while the shoe unit is stationary and mounted on the back. (b) External contracting shoe type: This type of braking system is generally also available on tracked tractors. The drum mounted on the driven axle is surrounded directly by the brake band. When the pedal is pressed, the band pulls the drum, c Disc brake:Two actuating discs drill holes on each disc in which steel balls are placed. When the brake pedal is pressed, the connections help to move the two dials in the opposite direction. This puts the steel balls inslightest part of the holes drilled on the plate. As a result, the two discs expand and the brake discs are pushed between the discs and the standing housing. The brake discs are mounted directly on the differential axis.2. Hydraulic brake: The hydraulic braking system is based on the law of Pascal. The brake fluid, which is usually a mixture of glycerin and alcohol, is filled into the master cylinder. When the pedal is pressed, the piston horn of the master cylinder is inserted into the cylinder and the whole system a pressure system. The wheel cylinder plug change immediately slides outwards, which moves the brake pads to stop the rotating drum. When the pedal is released, the return spring of the main cylinder puts the plug back in its original position, causing a sudden pressure fall in the line. The retraction springs on the brake face bring them back to their original position. Thus, the wheel cylinder plug returns.Component #5. Hydraulic control system: A mechanism in the tractor which lifts, holds or lowers equipment equipped or semi-equipped by hydraulic means. All tractors are equipped with a hydraulic control system to operate the tractor's three-point tug. Principle of operation:The principle of operation of the hydraulic system is based on Pascal's law. This law states that pressure on closed fluids spreads equally in all directions. Low force action in small areas can bring greater force on the surface of a larger area.wt the small cylinder (W1) / area small cylinder (A1) = wt larger cylinder (W2) / area larger cylinder (A2)W2 higher, in the same proportion as the ratio of the areas between the two sections. A simple hydraulic system consists of a pump that pumps oil into a hydraulic ram. This pump can be driven from the tractor's transmission or mounted on its engine. This system consists of a cylinder with a tight-fitting piston, like an engine cylinder. Since the oil is pumped into the closed end of the cylinder, the piston forces it with it. The movement of the piston is transmitted to the lower links by means of a crossshaft and lifting rods. The control valve controls the flow of oil and directs it back to the tank. This allows the oil in the cylinder to flow out again when the links need to be reduced. It also traps the oil in the cylinder when the links need to be kept at any height. Precautions hydraulic system: a. Use oil of sufficient quality.b. The hydraulic oil tank must be oil-c. All screws, nuts and pipes must be tightened well.d. The filter shall be checked at regular intervals. Component #6. Tractor string and control plate: Couplings must be properly inserted for the efficient and safe operation of the tractor. Implementations may include: 1. Towed2. Half-mounted and3. Mounted Tools can be hitched in two ways: 1. Sring hitch and2. Three-point connection1. The Drawbar Tractor Force: The drawbar is a device by which the traction of the tractor is transferred to the locking device. It is a cross-line with matching holes, connected to the bottom hitch links. It is mounted at the rear of the tractor. Three-point link: This is a combination of three links, one for the top chain and two bottom links for links articulated to the tractor and work equipment at the end in order to connect the work equipment to the tractor. The three-point lead Easy control of work equipment. Quickly set up implements. Automatic hydraulic control of machinery, such as position control, control drafts, etc. Good balancing of attached devices. Finally Control: The tractor is connected to the machine with a built-in lifting system through a certain type of mechanical connection, known as a three-point connection, and the system is called an mounted system. The machine is connected to the tractor's hydraulic system on two lower chains and one upper chain. Both lower connectors are connected to two levers through the lifts. The levers are mounted directly on a rock axis, which is further connected to the piston rod. All movements of the plug are transferred to the bottom links. The upper connection is used to connect the third connection point of the machine and can be adjusted to maintain the level of the work equipment and the suction angle. Load sensor in the draft check can also be done with the top link, which is spring-loaded. Some tractors have lower connections with spring loaded draft detection. Depending on the condition of the ground and the type of operation, the mounted machine can be controlled by the Position Control or sketch control. Weight transmission: The rear of the tractor is heavier than the front part to gain greater traction efficiency. On the front axle, however, sufficient weight is needed to facilitate easy steering and compensate for the impact of weight transfer. When the load is tightened, the trend of the front axle is that with a certain weight loss it becomes light, and the same increases the rear axle. The higher the drag, the higher the weight transfer. Mathematically, it can be represented-Where, the line drag is always assumed to be parallel to the ground.Component #7. Power take-off unit (Pto): This is part of the tractor's transmission system. It consists of an axis, a shield and a lid. The shaft is externally low-powered to transmit torsional energy to another machine. The rigid guard mounted on the tractor covers the exit axle as a safety device. This guard is called an energy-aided shield. Agricultural machinery is attached to the axle at the rear of the tractor. Since per ASAE standard pto speed is 540 ± 10 rpm if it works under load. In order to operate 1000 rpm pto drive machine, a new standard has been improved.Component #8. Belt Pulley: Each tractor is equipped with belt pulley. The task of the snails is to transfer energy from the tractor to stationary machinery using a safety belt. It is used to operate a trimmer, centrifugal pumps, silo cutters and a number of other machines. The snails are located on the left, right or rear side of the tractor. The drive of the slings shall be switched on or off from the engine by means of a clutch. The pulley is usually made of cast iron or cast steel.Component #9. Control plate or dashboard of the tractor: Control panel of the tractor consists of: 1. Power switch:When the power switch is on, the current flows in the electrical circuit.2. Throttle lever: This lever is capable of increasing or reducing the speed of the engine.3. Decompression lever:This lever emits compression pressure from the engine combustion chamber and helps to start the engine.4. Clock meter: This meter is used for the engine clock as well as engine speed /min.5. Light switch: The light switch is only for light points.6. Horn Hutton: This tractor horn.7. Battery charge indicator: This indicates that the battery is charging and discharged.8. Oil pressure indicator:This indicates lubricating oil pressure in the system 9. Water temperature meter: This indicates the temperature of water in the cooling system.Component #10. Tractor tyre and front axle:Tyre: Tyres are available in many sizes, with a plywood value of 4, 6 or 8. The plywood assessment of tyres indicates the comparative strength of the tyres. The higher the rating, the stronger the tyres. The inflating pressure on the rear wheels of the tractor varies from 0.8 to 1.5 kg/cm2. The front wheel inflator pressure varies from 1.5 to 2.5 kg/cm2. Pneumatic tyres can have a useful life of approximately 6000 man-hours in normal operation for draw rod work. Front axle: The front axle is the unit on which the front wheel is mounted. This wheel is an idler wheel that steers the tractor in different directions. The shaft is a rigid tubular or I-section steel structure turned away from the center. Different front wheel settings: 1. Toe-in2. Caster angle and3. Inclination1. Toe-in:This is the difference between the centre lines of the rear and front ends of the front wheels of the tractor. Toe-in adjustment of front wheels: The distance at the front of the wheels is slightly smaller than the rear of the wheels. The difference between the two measurements is called Toe-in. If the steering wheel vibrates too much or if the tractor tends to shut up while moving, check the toe of the front wheels. If the toe-in is less than or greater than the specified limits, it shall be adjusted as follows: (i) Loosen the fastening mother to the end.ii.i. Use the toe-in gauge to determine the toe-in value in mm and adjust the turning buckle to reach the desired limit.iii. Now secure the rotating clamp by tightening the lock nut.2. Roler angle:The angle between the centre line of the tractor king pin and the vertical line.3. Inclination: This is the angle between the center line of the tyre and the vertical line. Line.

