



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution

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DEPARTMENT OF AGRICULTURE ENGINEERING

19AGB301-FARM TRACTORS

III YEAR V SEM

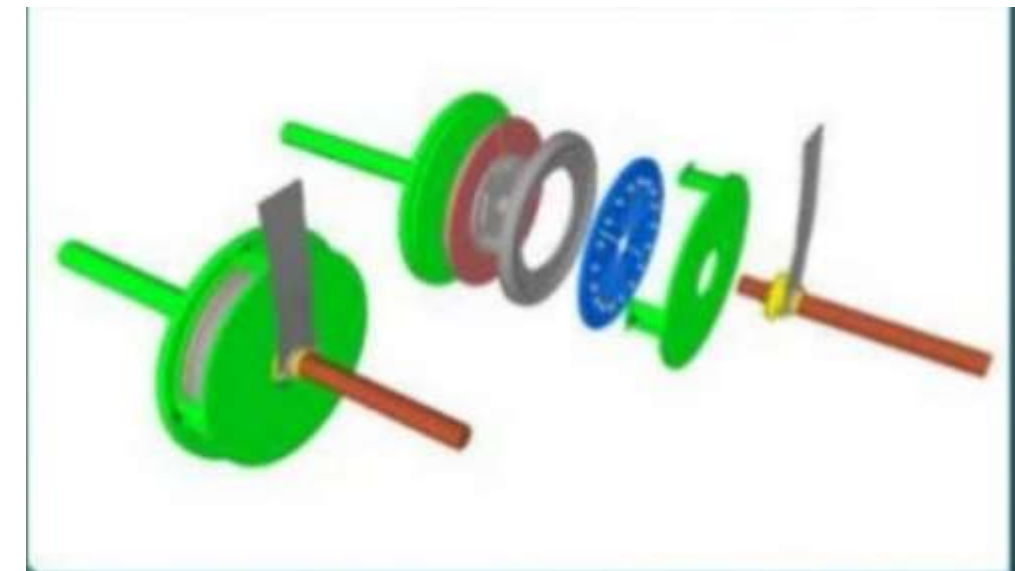
UNIT 2 –TRACTOR ENGINE SYSTEM

TOPIC –Transmission system -CLUTCHES



INTRODUCTION

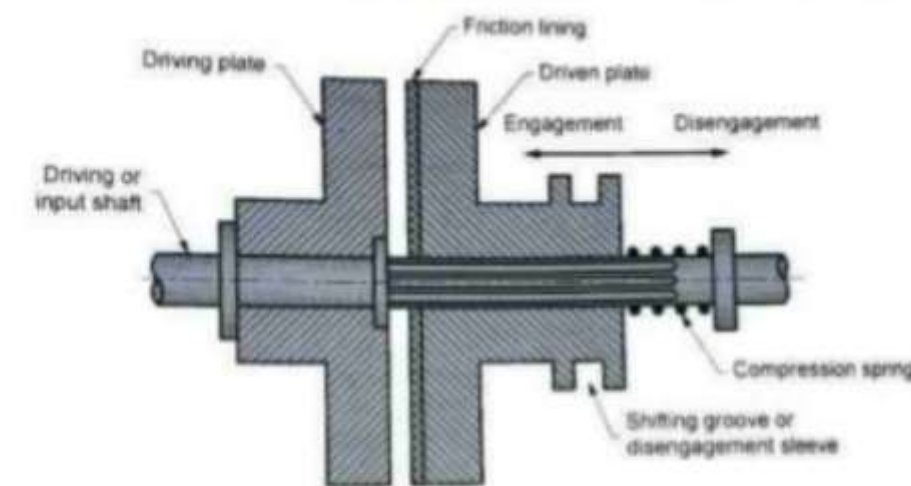
The vast majority of clutches ultimately rely on frictional forces for their operation. The purpose of friction clutches is to connect a moving member to another that is moving at a different speed or stationary, often to synchronize the speeds, and/or to transmit power. Usually, as little slippage (difference in speeds) as possible between the two members is desired.





CONSTRUCTION

Friction plate is held between the flywheel & pressure plate. There are spring arranged circumferentially, which provide axial force to keep the clutch in engaged position. The friction plate is mounted on a hub which is splined from inside & is thus free to slide over the gearbox shaft. Friction facing is attached to the friction plate on both sides to provide two angular friction surfaces for the transmission of power. A pedal is provided to pull the pressure plate against the spring force whenever it is required to be disengaged.



Friction clutch



WORKING

The engine flywheel is the master of the clutch, the driven plate with the friction plate and the driven hub are connected by the sliding spline to the driven shaft (ie, the drive shaft). The compression spring presses the driven plate against the flywheel end face.

The engine torque is transmitted to the driven disc by the friction between the flywheel and the contact surface of the driven plate, which is then passed to the drive wheels via a series of components in the driven shaft and the drive train. The greater the compressive force of the compression spring, the greater the torque that the clutch can deliver.



As the tractor in the process of running, often need to maintain power transmission, and interrupt the drive is only a temporary need, so the active part of the clutch and the clutch part IS often in the state of engagement. The friction pair is a spring fastening device in order to meet this requirement When the clutch is desired to be disengaged, the pedal in the ring groove of the driven hub is pushed as long as the pedal in the clutch operating mechanism is depressed to push the driven plate against the pressure of the compression spring to the release direction, Separation, friction disappeared, thus interrupting the transmission of power.

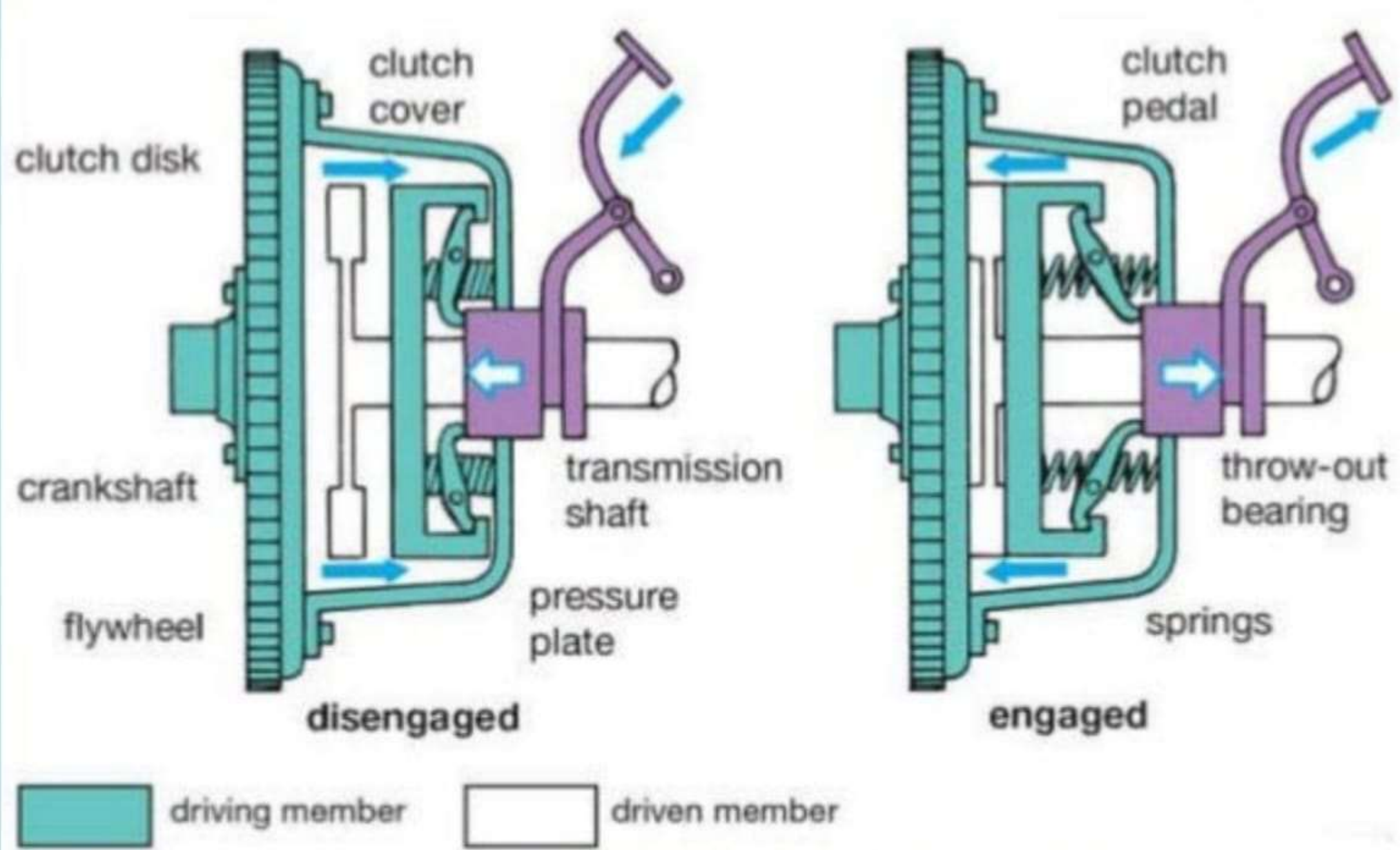


Fig. 10.2: Principle of friction clutch

(Source: <http://media.web.britannica.com/eb-media/41/104141-004-5B075D35.gif>)




MATERIALS

Various materials have been used for the disc-friction facings, including asbestos in the past. Modern clutches typically use a compound organic resin with copper wire facing or a ceramic material, Ceramic materials are typically used in heavy applications such as racing or heavy-duty hauling, though the harder ceramic materials increase flywheel and pressure plate wear,

In the case of "wet" clutches, composite paper materials are very common. Since these "wet" clutches typically use an oil bath or flow-through cooling method for keeping the disc pack lubricated and cooled, very little wear is seen when using composite paper materials.



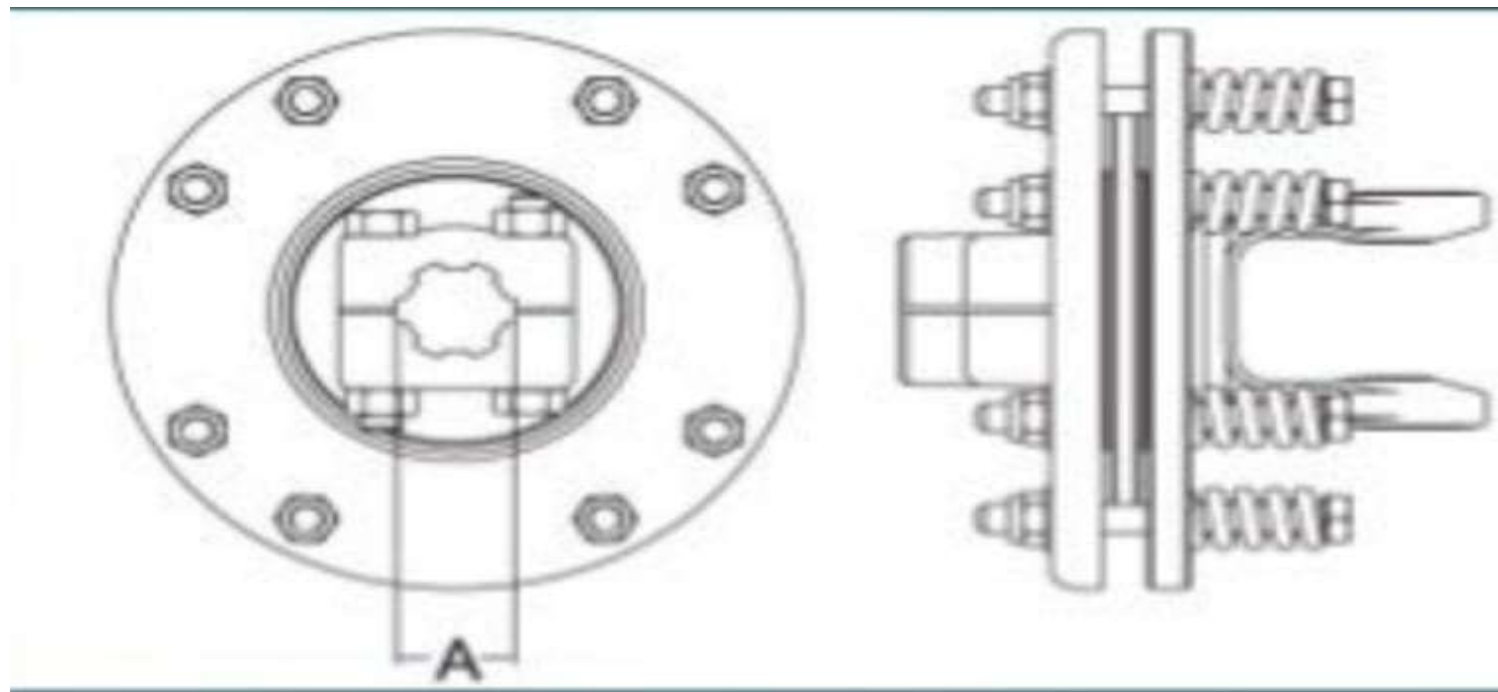
CLUTCHES & BRAKES SELECTION CHART—BY MOTION TYPE

Motion Type	Type	Model/Sizes	Max Torque lb-in (Nm)	Bore Range	Max RPM	Actuation Method	Page
Starting  <i>Motion icons are shown at the top of each product page to make selecting easier.</i>	Friction Clutch	CS-11, 15, 17, 22, 26, 30 CSC-11, 15, 17, 22, 26, 30	125 (14.2)	English: 1/4 - 1" Metric: 8 - 35 mm	5000	DC	12
	Friction Clutch	CF-11, 15, 17, 22, 26, 30 CFC-11, 15, 17, 22, 26, 30	125 (14.2)	English: 1/4 - 5/8" Metric: 8 - 16 mm	5000	DC	12
	Friction Clutch	TC-19, TCR-19 TCP-19	250 (28.2) 50 (5.6)	English: 3/8 - 1/2"	5000	DC	47
	Friction Clutch	MCS	Custom Engineered Product - Consult Factory				49
	Friction Clutch	MDC	Custom Engineered Product - Consult Factory				53



CLASSIFICATION

Friction-disc clutches generally are classified as push type or pull type depending on the location of the pressure plate fulcrum points. In a pull-type clutch, the action of pressing the pedal pulls the release bearing, pulling on the diaphragm spring and disengaging the vehicle drive. The opposite is true with a push type, the release bearing is pushed into the clutch disengaging the vehicle drive. In this instance, the release bearing can be known as a thrust bearing .





MANUFACTURING

Modern clutch development focuses its attention on the simplification of the overall assembly and/or manufacturing method. For example, drive straps are now commonly employed to transfer torque as well as lift the pressure plate upon disengagement of vehicle drive. With regard to the manufacture of diaphragm springs, heat treatment is crucial. Laser welding is becoming more common as a method of attaching the drive plate to the disc ring with the laser typically being between 2-3KW and a feed rate 1m/minute.



ADVANTAGE AND DISADVANTAGE

Advantages:

- i) Gear changing is easier than core clutch
- ii) It is more reliable

Disadvantages:

- i) The spring have to more stiff hence greater force required by the driver for disengaged.



APPLICATION

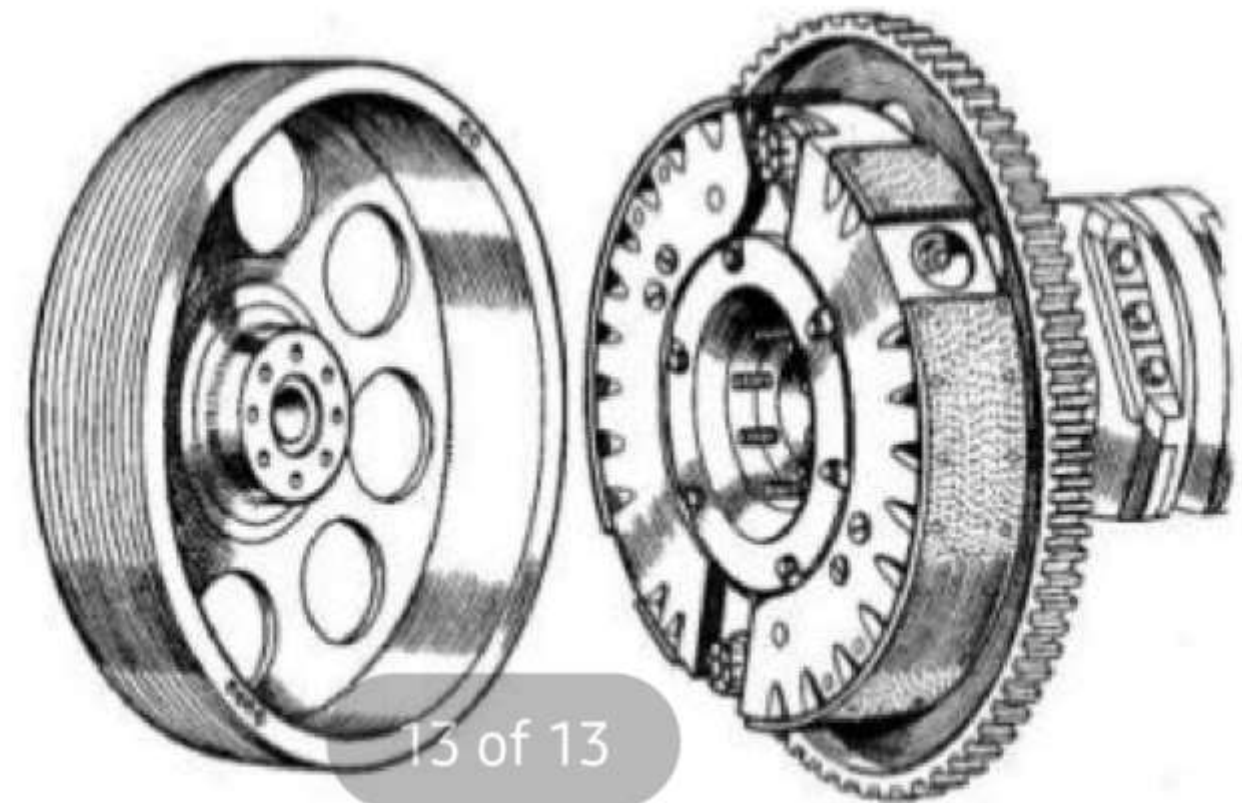
It is used , where radial space is more like in trucks and buses and tractors.



OTHER CLUTCH USED IN TRACTOR

Centrifugal clutch:

It is used in garden tractors, With the increase of revolutions per minute the flyweights — beating spring force — are pressed against the inner wall of the drum transmitting the torque of the engine.





YOUTUBE LINK



https://youtu.be/HY_PjmHRxuE



Thank You