

One-Way Clutches—Nomenclature and Terminology— SAE J1087 JAN84

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ONE-WAY CLUTCHES—NOMENCLATURE AND TERMINOLOGY—SAE J1087 JAN84

SAE Information Report

Report of the Transmission and Drivetrain Committee, approved May 1974, last revised January 1984.

1. **Scope**—The definitions and illustrations in this report are intended to establish common nomenclature and terminology for automotive transmission one-way clutches.

1.1 **Definitions**—A mechanical device to transmit torque in one direction and permit free rotation in the opposite direction.

2. Most Commonly Used Types

2.1 **Roller Clutch**—A clutch having cylindrical elements which engage cam profiles on either the outer or inner elements.

2.2 **Sprag Clutch**—A clutch having cam-profiled locking elements which engage cylindrical outer and inner races.

3. Roller Clutch

3.1 Function Types

3.1.1 **SPRING ENERGIZED**—A clutch which has the roller held in contact with the cam and race by individual springs, or by means of a spring actuated cage.

3.1.2 **GRAVITY ENERGIZED**—A clutch which has no mechanical means for holding the roller in contact with the cam and race.

3.1.3 **CENTRIFUGALLY ENGAGING**—A clutch in which the rollers maintain contact with the race in over-running conditions.

3.1.4 **CENTRIFUGALLY DISENGAGING**—A clutch in which the rollers move out of contact with the race in over-running conditions.

3.2 Arrangements

3.2.1 **OUTER CAM CLUTCH**—A roller clutch which has the cam profile surfaces on the outer element. (See Figs. 1, 3, and 4.)

3.2.2 **INNER CAM CLUTCH**—A roller clutch which has the cam profile surfaces on the inner element. (See Fig. 2.)

3.2.3 **CAGED ROLLER CLUTCH**—A roller clutch which has the rollers and springs contained as a unit. (See Fig. 3.)

3.2.4 **LOOSE ROLLER CLUTCH**—A roller clutch which has the rollers individually placed between the cam and race, not located by a cage. (See Figs. 1, 2, and 4.)

3.3 Nomenclature

φ 3.3.1 **CAM**—That element of the clutch that contains the ramped profiles through which the rollers transmit torque.

3.3.1.1 **Leg Type**—A cam which has integral legs projecting into the space between the rollers to provide reaction for the springs and may provide radial location of the race relative to the cam. (See Fig. 4.)

3.3.1.2 **Hook Type**—A cam which has no legs, thereby forming "hooks" at the free wheeling end of the cam ramps. (See Figs. 1, 2, and 3.)

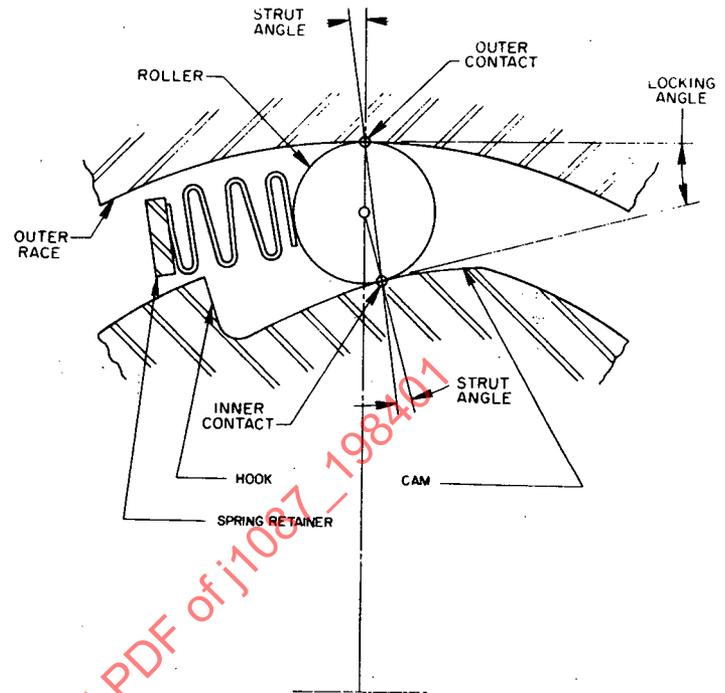


FIG. 2—INNER CAM TYPE ROLLER ONE-WAY CLUTCH DIAGRAM

φ 3.3.2 **RACE**—That element of the clutch providing the cylindrical surface through which the rollers transmit torque. (See Figs. 1–4.)

3.3.3 **ROLLER**—The cylindrical locking element of the clutch. Several are usually used in each clutch. (See Figs. 1–4.)

3.3.4 **ENERGIZING SPRING**—A spring used to actuate the roller into contact with the cam and race. (See Figs. 1–4.)

3.3.5 **CAGE**—An element primarily used to contain the springs and rollers. (See Fig. 3.)

3.3.6 **SPRING RETAINER**—That element which locates and provides reaction for the spring in loose roller clutches. (See Figs. 1 and 2.)

3.4 Roller Clutch Terminology

3.4.1 **CAM OR LOCKING ANGLE**—The angle between lines drawn tangent

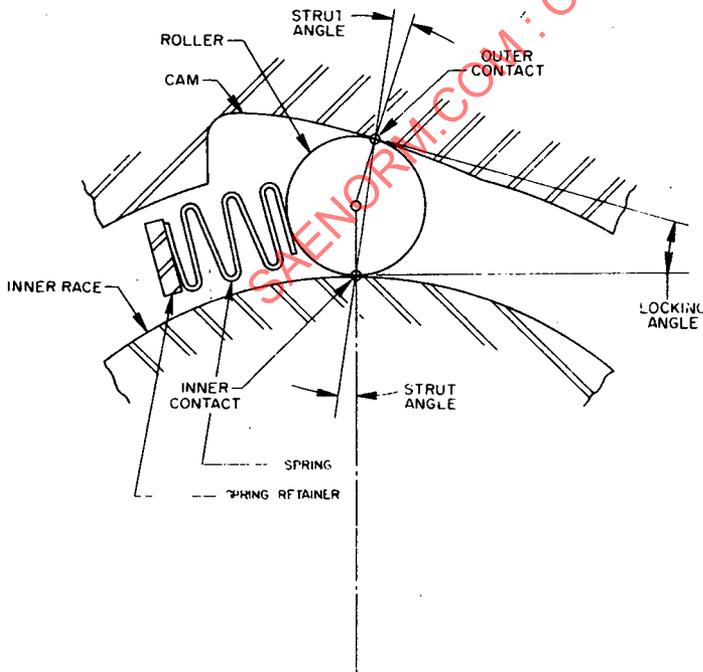
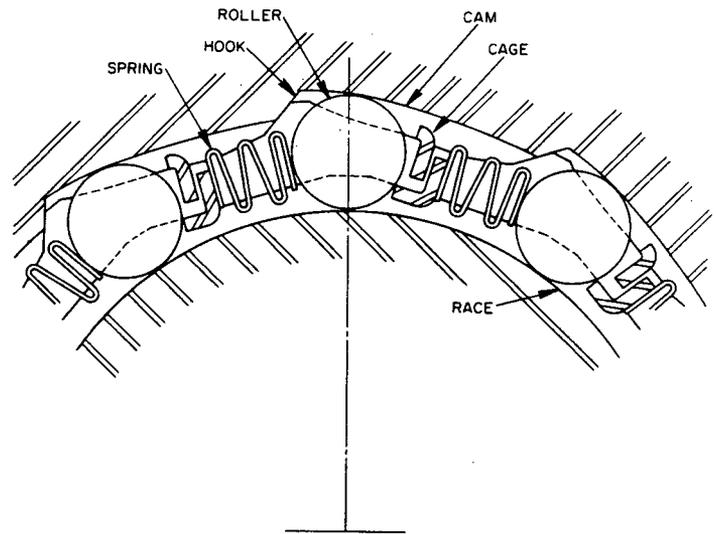


FIG. 1—OUTER CAM TYPE ROLLER ONE-WAY CLUTCH DIAGRAM



φ FIG. 3—CAGED ROLLER TYPE CLUTCH DIAGRAM (HOOK TYPE CAM)

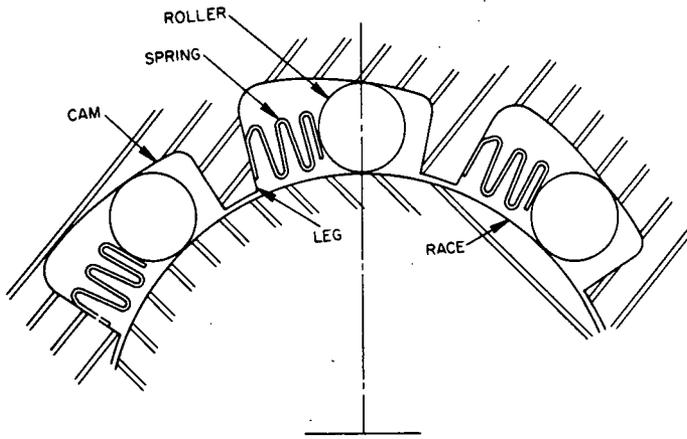


FIG. 4—LOOSE ROLLER TYPE CLUTCH DIAGRAM (LEG TYPE CAM)

to the cam and race at the contact points of the roller (equal to twice the strut angle). (See Figs. 1 and 2.)

3.4.2 **STRUT ANGLE**—The angle between a line connecting the contact points of the roller at the cam and race and a radial line from the roller center to either contact point. (See Figs. 1 and 2.)

4. **Sprag Clutch**

4.1 **Functional Types**

4.1.1 **CENTRIFUGALLY ENGAGING**—A clutch in which the sprags maintain contact with both races when acted upon by centrifugal force.

4.1.2 **CENTRIFUGALLY DISENGAGING**—A clutch in which the sprags move out of contact with the inner race when acted upon by centrifugal force.

4.2 **Arrangements**

4.2.1 **CAGED SPRAG CLUTCH**—A clutch that utilizes one or more cages to space or control the sprag elements (See Figs. 6 and 7.)

4.2.2 **FULL COMPLEMENT SPRAG CLUTCH**—A clutch in which the sprag configuration provides circumferential spacing. (See Fig. 8.)

4.3 **Nomenclature**

4.3.1 **OUTER RACE**—That element which provides the outer cylindrical surface through which the sprags transmit torque. (See Figs. 5–8.)

4.3.2 **INNER RACE**—That element which provides the inner cylindrical surface through which the sprags transmit torque. (See Fig. 5.)

4.3.3 **SPRAG**—The cam profiled locking element of the clutch. Several are usually used in each clutch. (See Figs. 5–8.)

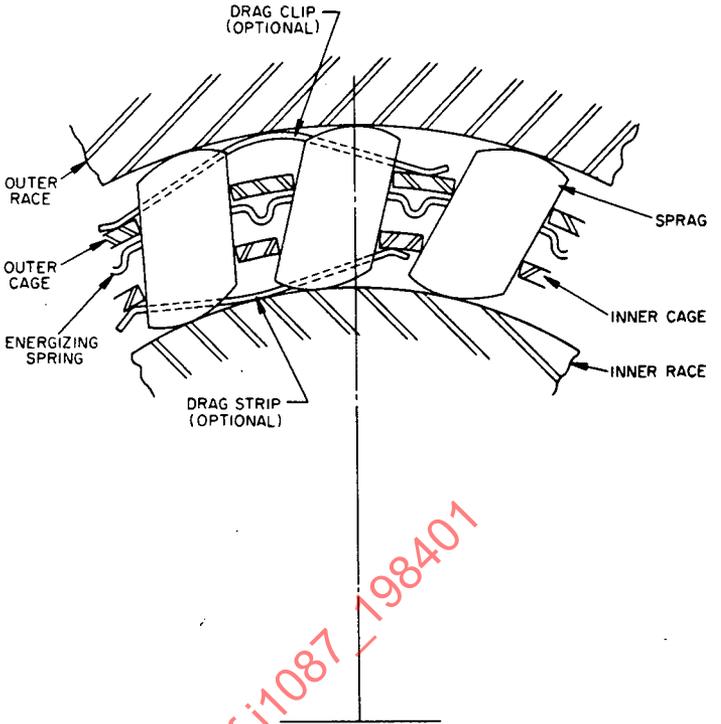


FIG. 6—TYPICAL DOUBLE-CAGE SPRAG ONE-WAY CLUTCH DIAGRAM

4.3.4 **ENERGIZING SPRING**—A spring used to actuate the sprags into contact with the inner and outer races. (See Figs. 6–8.)

4.3.5 **CAGE**—An element primarily used to contain and space the sprags. (See Figs. 6 and 7.)

4.3.6 **DRAG CLIP**—An element sometimes used to provide frictional drag between the outer cage and the outer race. (See Fig. 6.)

4.3.7 **DRAG STRIP**—An element sometimes used to provide frictional drag between the inner cage and the inner race. (See Fig. 6.)

4.4 **Sprag Clutch Terminology**

4.4.1 **SPRAG SPACE**—The radial distance between the inner and outer race cylindrical surfaces. (See Fig. 5.)

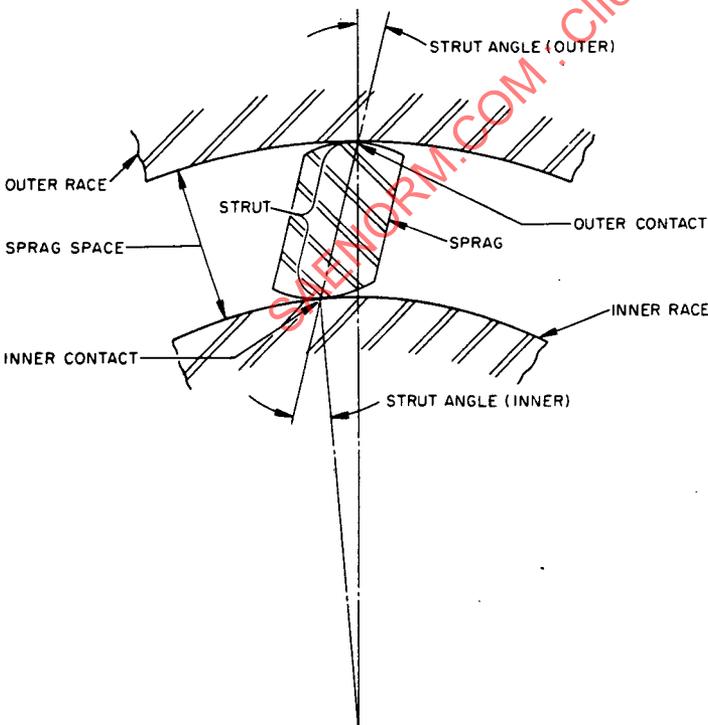


FIG. 5—SPRAG ONE-WAY CLUTCH DIAGRAM

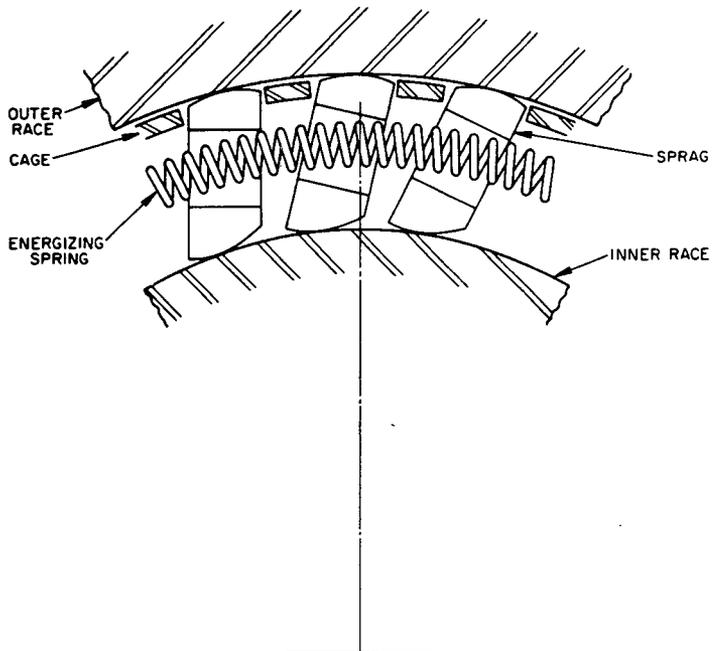


FIG. 7—TYPICAL SINGLE-CAGE ONE-WAY CLUTCH DIAGRAM