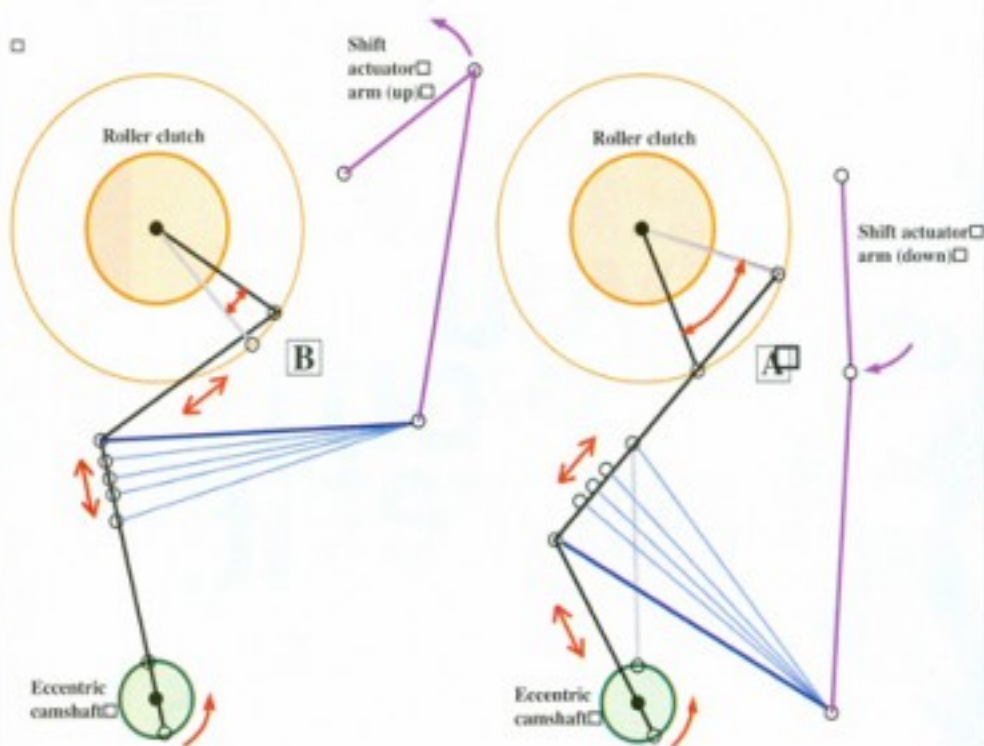


# Honda's Gearbox



## LOW GEAR

## HIGH GEAR

**Shifting links:** A line drawing of the Honda linkage shows how the gear ratio changes as the shift actuator is moved from the top position to the bottom position. The small circle represents the eccentric cam, and the larger circle represents the roller clutches on the final driveshaft. The roller clutches move the driveshaft three times farther (A) in high gear than they do in the low gear (B).

tion, the one-way-drive clutches spread their torque loads over the entire circumference of the driveshaft.

### CAN TEAM MECHANICS CHANGE THE GEARING TO MATCH DIFFERENT RACE COURSES?

Honda's transmission ratios cover the same range as a single-chaining derailleur setup with an 11x32-tooth cogset. This is a far wider spread than most pro downhillers run, so it is unlikely that there will be a call to change the Honda's gearing. If the need does arise, switching the number of teeth of either of the RN01's final drive sprockets is all that a racer will need to do to tune for different tracks.

### IS THE HONDA TRANSMISSION LIGHTER THAN A DERAILLEUR SYSTEM?

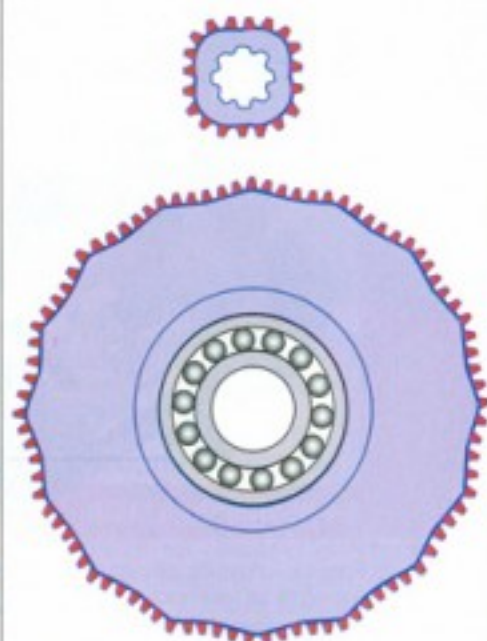
Honda has not published the actual weight of its transmission, but it is highly unlikely that the prototype gearbox comes close to the bare-bones derailleur system that downhillers use. Don't count Honda out, though. The first RN01 used an

aluminum gearbox housing, the '04 version now has a carbon fiber housing molded inside a machined-aluminum space frame. Once Honda has a year of racing development on the system, we anticipate huge improvements, like forged-aluminum linkage arms and hard-chromed or ceramic-coated alloy gears.

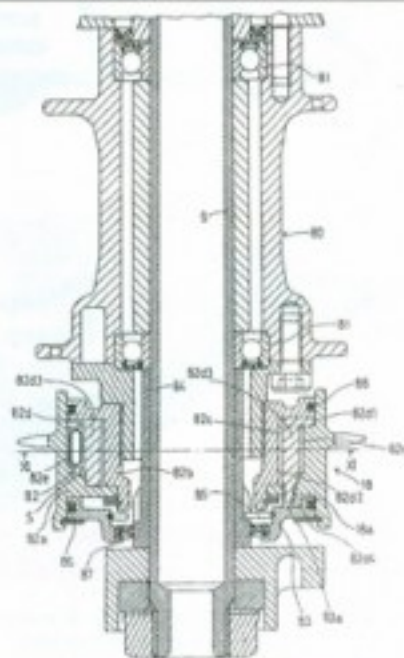
Honda doesn't need to invent new technology to improve its downhill gearbox—everything the RN01 team needs can be borrowed from their spectacularly successful motorsports racing development programs. The RN01 transmission may never approach the weight figure of a derailleur system, but if the feat can be accomplished, Honda will be the one to succeed.

### SO, WILL HONDA'S RECIPROCATING GEARBOX ELIMINATE THE DERAILLEUR FOREVER?

No. Together, the crusty old chain, cables, cogs, pulleys and plates that have served the mountain bike since its inception are a lightweight, inexpensive, relatively reliable and embarrassingly efficient



**Wiggly gears:** Only Honda could figure out how to grind wavy gears that run efficiently enough for human power. The unusual profile erases the pulsing of the drive clutches.



**Two-way freehub:** Rolling the RN01 backwards would destroy the transmission, so Honda designed a hub that freewheels in both directions—but engages under power.

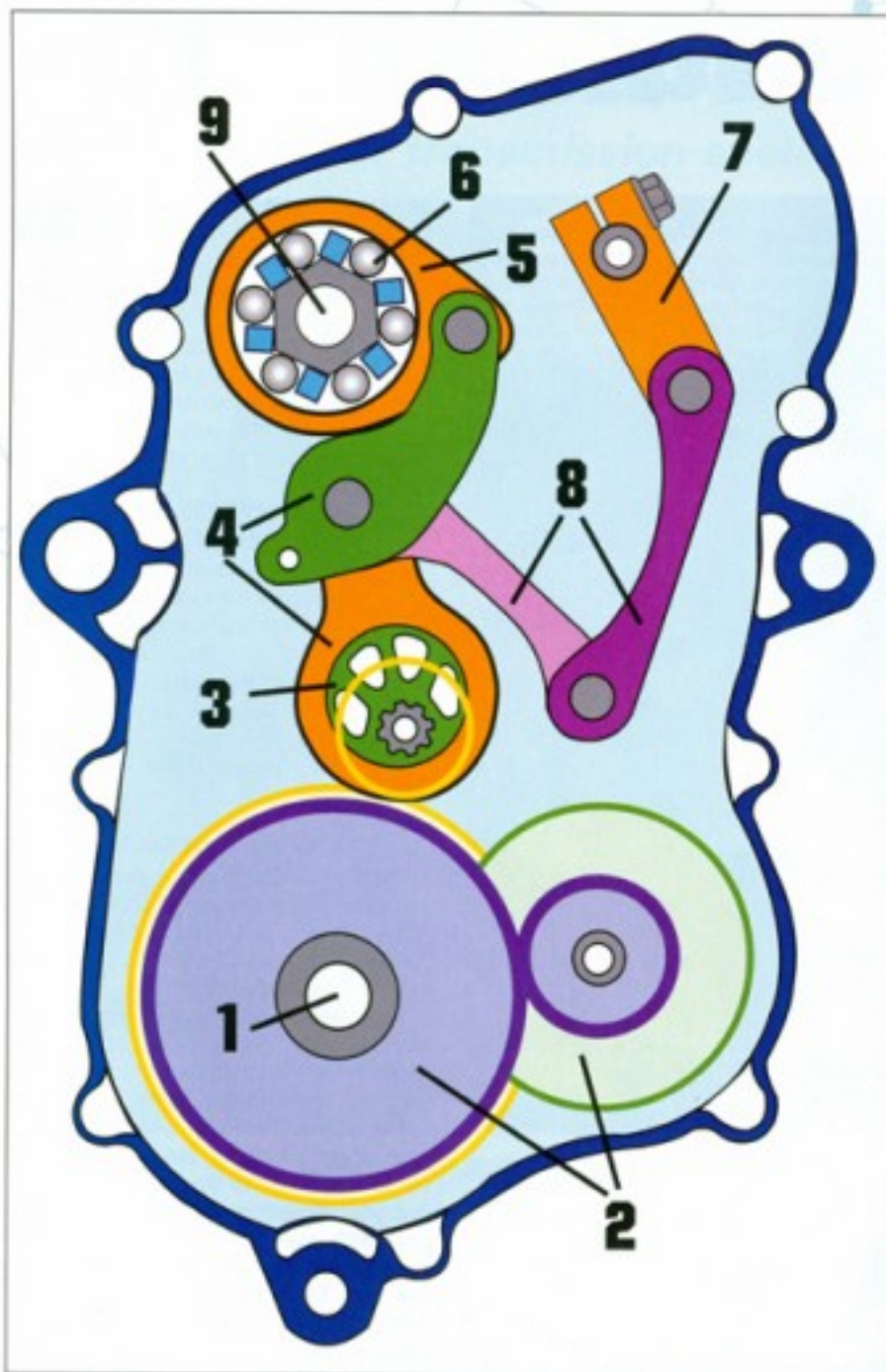
method of transmitting pedaling power to the dirt. For downhill racing, however, where throwing a chain or a missed shift can cost a racer the World Championship, the Honda transmission could be a powerful weapon. Greg Minnaar must agree, because he is staking his career on the concept. □

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# Honda's Gearbox



Revised shifter: Earlier Honda gearboxes used an external rotary shift device. The '04 version's cable enters the housing in a cleaner fashion.

## CAN THE RNO1 USE A TRIGGER SHIFTER?

Yes. As long as the shift lever pulls enough cable to operate the internal selector lever through its complete range, a trigger system will work fine. The twist shift, however, offers an unlimited choice of ratios.

## WILL THE HONDA TRANSMISSION BE EFFICIENT?

Not as efficient as a derailleur system, because a roller chain is nearly 100-percent efficient—especially in the high-torque/low-rpm realm of the mountain bike drivetrain. The Honda transmissions should easily outperform the planetary gear drives that hub-type transmission use, because it uses fewer cogs and its linkages and cams all rotate on needle bearings.

The attraction of Honda's novel roller-clutch drive is that the link pivots don't move more than a fraction of a revolution, which reduces friction, and the system is well suited for high loads at relatively low rpm. The entire mechanism is sealed inside a lightweight housing and runs in lubricating oil.

## IS HONDA'S RECIPROCATING LINKAGE AS STRONG AS A GEARSHIFT OR DERAILLEUR TRANSMISSION?

Theoretically, the Honda transmission is stronger. A gear or derailleur transmission is most vulnerable while it is being shifted. A rider must ease up slightly and reduce the torque load to allow a gear-type or derailleur system to shift smoothly and effectively. As the shift occurs, all of the rider's leg power is concentrated upon a small, highly stressed shift point (cog teeth or engagement pawls). This is not the case with Honda's reciprocating-lever drive, because the beefy linkage arms are far stronger than a single cog tooth, engagement pawl or chain link, and the levers are always engaged. In addi-

## WHAT'S INSIDE THE RNO1 TRANSMISSION

- 1) Crank arms drive the main shaft.
- 2) Four-stage overdrive gears rotate the camshaft 11 revolutions for each turn of the cranks.
- 3) Four eccentric cams turn rotary motion into reciprocating action.
- 4) Two linkage arms act as pushrods.
- 5) Pushrods rock roller clutches on the driveshaft to convert reciprocal motion back into rotary motion.
- 6) Rollers lock in one direction and spin freely in the opposite.
- 7) When you twist the handlebar grip, the cable swings the shift actuating lever up and down.
- 8) Two links between the pushrods and the shift actuator change the pushrod geometry. Full down is high gear, full up is low gear.
- 9) Drive shaft (turns countershaft sprocket).