

SUPER SIZE FORD REARS

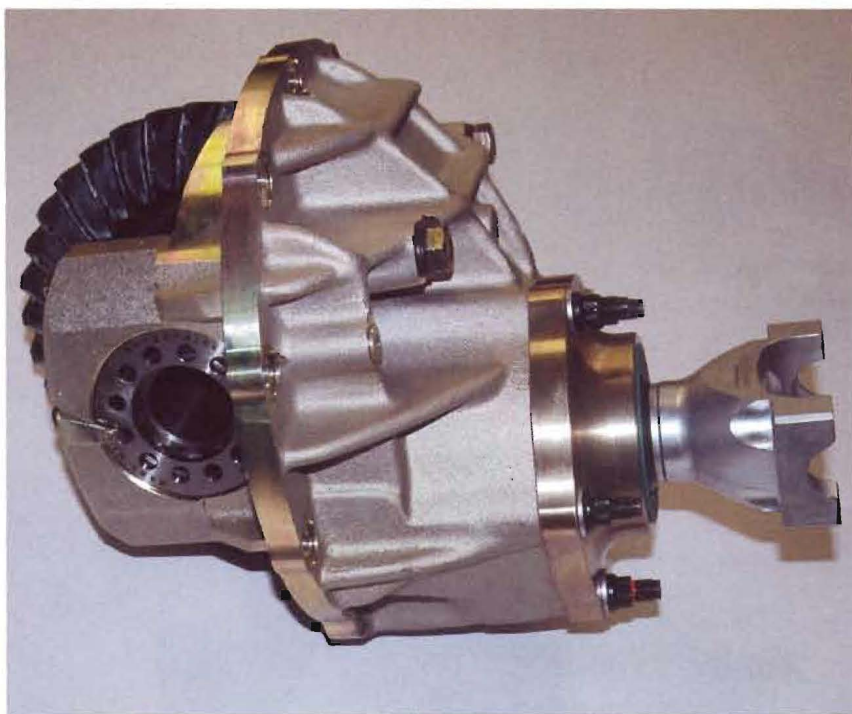
INSIDE THE TOUGHEST FORD 9-INCH CENTER SECTIONS

BY WAYNE SCRABA / PHOTOGRAPHY BY WAYNE SCRABA

IF YOU BOUGHT A NEW HIGH-PERFORMANCE PASSENGER CAR FROM FORD THREE TO FOUR DECADES AGO, IT DEFINITELY CAME WITH ONE REAREND: A 9-INCH. AND IF WAS A BONA-FIDE GROUND-POUNGING MUSCLECAR, THAT 9-INCH WAS FILLED WITH 31-SPLINE CARRIER AND AXLES.

Most ultimate power Fords came equipped with a nodular iron center section (most are marked with a big "N" cast directly over the pinion). Nodular iron is a type of cast iron that first saw the light of day in 1943. While most varieties of cast iron prove brittle, nodular iron is much more ductile, because of its "nodular graphite" inclusions. But we digress: Typically, nodular iron center section, 31-spline axle combination rears were used behind 427, 428 Cobra Jet and various 429 CJ and SCJ cars (some can even be found in certain FE-powered 4X4 pickups).

Ford center sections are manufactured with a separate bolt-in support for the pinion. Cars with nodular center sections were regularly equipped with "Daytona" pinion supports. These supports make use of the same size outer bearing as the more pedestrian supports, however the inner bearing is much larger, and the inner webbing is much beefier. Typically, the majority of nodular iron, 31-spline muscle-Fords came equipped with Ford's clutch pack-equipped Traction Lok differential (a limited slip arrangement). During the 1970 model year, a positive locking



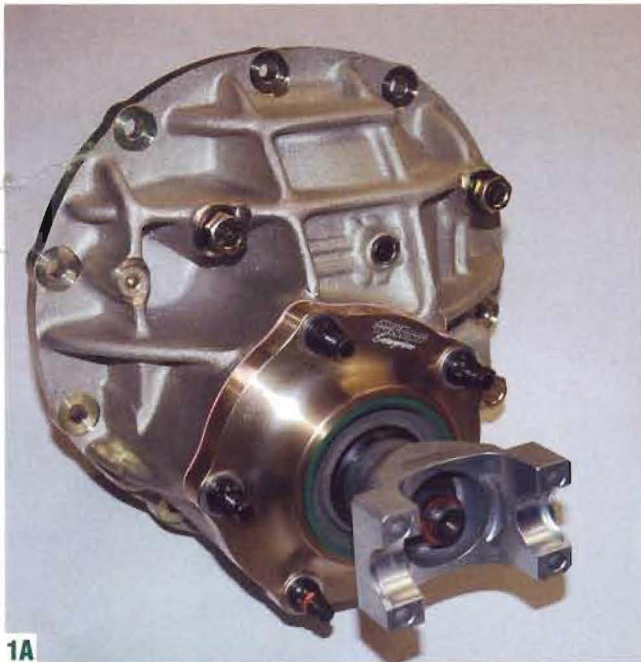
(gear driven) differential manufactured by a company called Detroit Automotive Products Corporation was made available in high-horsepower cars with 4.30:1 axle ratios. These are the fabled "Detroit Lockers."

So far so good. With careful shopping, one can track down most of the stock hardware to piece together a factory-style nodular iron, 31-spline 9-inch, complete with a Daytona pinion support and even a Detroit locker. But in many cases today, what you'll find is old, used up hardware. Prepare to spend serious money to get the stuff into shape. That's the bad news. There are, however, plenty of good alternatives available today, particularly if matching

numbers don't enter the equation.

What are those alternatives? For example, several companies manufacture and sell nodular iron cases. Mark Williams has a reinforced nodular iron case that is stronger than stock, but is comparable in weight to a stock Ford assembly. These cases come complete with billet steel rearend caps that have been precision alignment bored. They also include special billet steel adjusters and studs to secure the pinion assembly. They're available with 3.062-inch or 3.250-inch bore sizes (the larger the bore, the larger the axle diameter/spline you can use — the larger the axle diameter and spline, the stronger the axle).

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1A



1B



2A



2B

1A & 1B TUFF STUFF: If you need the ultimate in 9-inch Ford center-sections for your musclecar, this is pretty much it. It's a Mark Williams through-bolt configuration aluminum center section, complete with a pinion support, billet carrier adjusters, 1350 universal

joint yoke, 35-spline Detroit locker and in this case, a 3.89:1 ring and pinion.

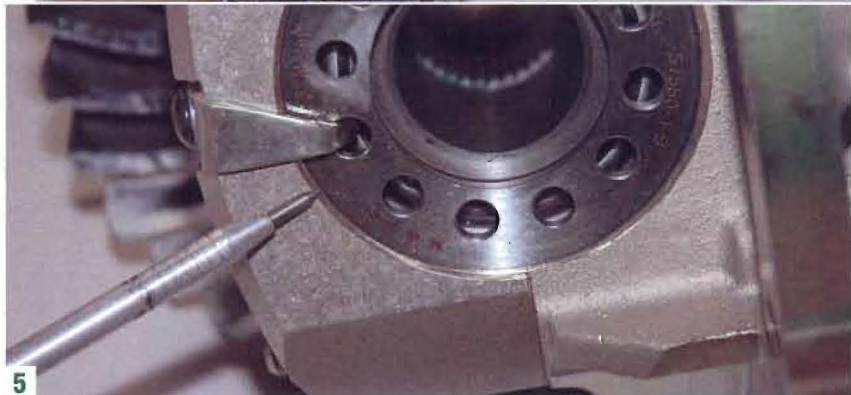
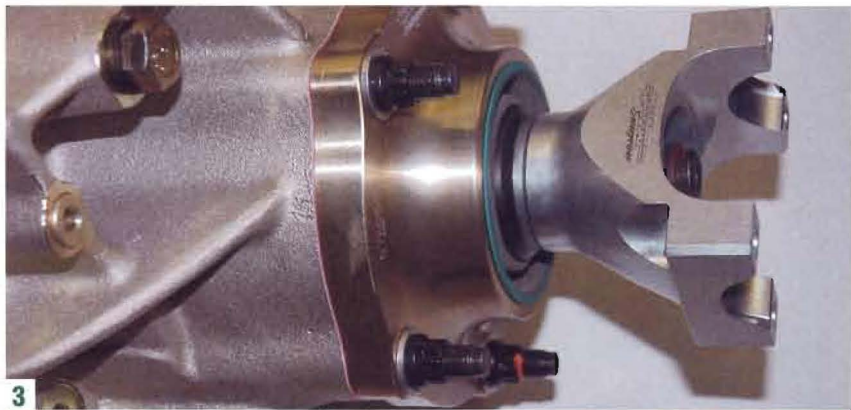
2A & 2B THROUGH BOLT: When we discussed the "through bolt" design, this is what we referred to: Instead of a bolt (for the main caps) threading into

the body of the center section, a high-strength Grade 9 bolt goes completely through the center section. That means there are no threads engaged in the center section, and no chance of stripped fasteners. It also means the strength is increased many fold.

Another option is the aluminum "Thru Bolt" case manufactured by Mark Williams. Isn't aluminum weaker than nodular iron? Not in this form. This is a highly refined, extreme-duty component that has become the standard in virtually all NHRA

Pro Stock cars. It's also used with regularity in slower class drag race cars, "pro street" cars and any number of seriously quick street machines (the center section you see here is going into a big-block powered, small-tire muscle machine). It weighs 11 pounds

less than Williams' comparable nodular iron carrier or a stock Ford Carrier. Cast from an ultra strong aircraft alloy (30 percent stronger than 6061T6), the case is engineered with special "thru bolts" that go completely through the center section to secure the main caps.



3 PINION SUPPORT: Here's a close-up look at the pinion support. For a street car, a tapered-bearing pinion support such as this is what you need. This particular piece is engineered to work with OEM style 1.313-inch diameter, 28-spline pinion gears. The aftermarket also offers Ford 9-inch pinion gears in 35-spline derivatives (1.875-inch diameter). Don't confuse the pinion spline with the axle spline! Large pinion gear sets are only available in 9310 alloys, which are specifically designed for the shock loads drag racing places upon them.

4 LOK AND LOAD: This center section is based around "standard" or "street" gears (in this case, a 3.89:1 ratio from Richmond Gear). The material used is 8620 steel. It works well in oval track and street applications. Additionally,

the material has heat-treating that provides excellent wear and service life. This particular center section includes a Detroit Locker with a fully machined billet steel case (designed for huge 35-spline axles).

5 PRE-LOAD: In the Ford rear, once the pattern and backlash have been established, you have to set the pre-load on the differential bearings. This is accomplished by way of these adjusters. In practice, the adjusters are first snugged by hand only (both sides). Typically, each adjuster must be moved anywhere from 0.004-0.006-inches, depending on the bearings used. The holes in the adjusters are a guide. Rotating the adjuster from one hole to the next provides changes in pre-load. A spanner wrench is used to set the adjuster, and then it's locked in place.

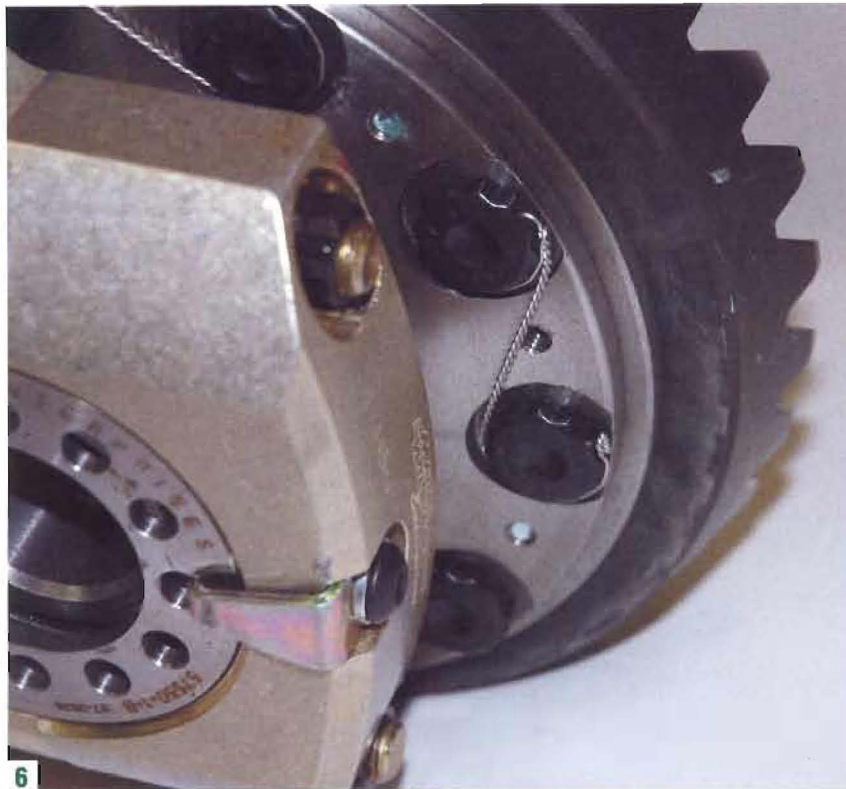
The actual main caps are machined from 7075 aluminum and include billet steel carrier adjusters.

The pinion pilot-bearing bore incorporates an extra length bearing that is completely captive and retained by fasteners. Meanwhile, the pinion support is held in place by way of large diameter $7/16$ -inch studs. The case is manufactured in three different bore sizes (3.062-inch, 3.250-inch and 3.812-inch, although for anything short of an all-out drag car, the 3.812-inch piece isn't necessary). All thru bolt case configurations have clearance for $9\frac{1}{2}$ -inch gears ($9\frac{1}{4}$ -inch actual diameters). Fluid passage ports for external lubrication systems are pre-drilled.

Mark Williams also manufactures 9-inch Ford pinion support assemblies for a number of applications (including fast street musclecars). Assemblies are available for standard 28-spline pinions and 35-spline large pinion pro gears. The support housings are CNC-machined from aircraft-quality aluminum and use either oversized tapered roller bearings or low friction angular contact ball bearings. All pinion supports come pre-assembled. The bearing pre-load is set through the use of a solid hardened pre-load spacer rather than a crush sleeve or stack of thin shims. The spacer is factory machined to the required pre-load for each assembly. Pinion seals are included.

Housings are drilled to accommodate the $7/16$ -inch studs used in all MW cases. That doesn't preclude the use of these custom pinion supports in a stock Ford case. By using special reducer bushings from Williams (part number 57606) and accompanying studs (part number 57609) the housing can also be used with stock style 9-inch Ford cases equipped with $3/8$ -inch threads. All MW 9-inch yokes and couplers are designed to work perfectly with MW pinion supports. If you use the support with a stock Ford yoke, it must be shortened for proper thread engagement.

What about the fabled Detroit Locker? The aftermarket has you covered too. Detroit Automotive Products Corporation is no longer in business, but OEM heavyweight Eaton now owns the rights to the locker. As Eaton points out, the Detroit Locker is the most durable and dependable locking differential available. The Detroit Locker maximizes traction by delivering 100 percent of the torque to both drive wheels. It is engineered

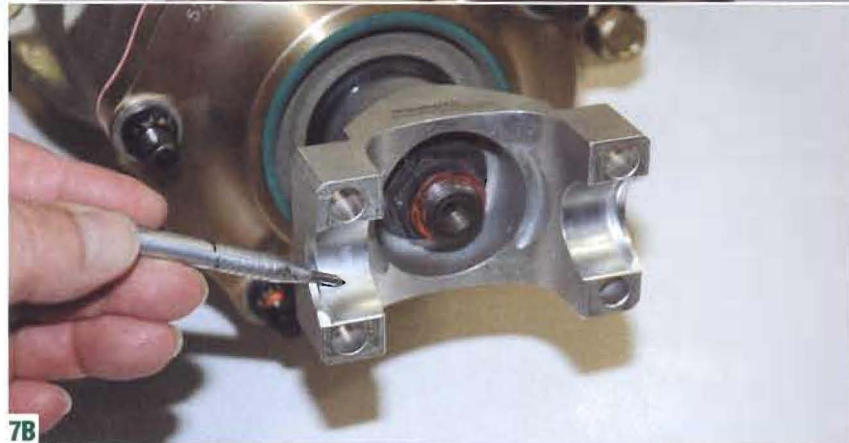


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6 SAFETY MINDED: With these center section assemblies, attention to detail is pretty stout. Case-in-point: The ring gear fasteners (top of the line ARP models) are safety wired.

to keep both wheels in a constant drive mode, and has the ability to automatically allow wheel speed differentiation when required. That means when you turn a corner, the Detroit Locker allows the wheel with the larger turning radius to overrun and unlock from the other wheel. Williams offers Lockers in several different versions: 28-spline, 31-spline and 35-spline. The 35-spline piece (as shown in the accompanying photos) is sufficiently strong, it can be used regularly in drag racing. Williams also offers a special extreme-strength billet case 35-spline Detroit Locker (in place of the regular iron case model).

So what does all of this mean? Simple. Today, you can assemble a brand new 9-inch without searching for used parts at the wrecking yard (or that online auction site). Better still, you can pick and choose components that prove to be significantly stronger than the originals, but simultaneously, the hardware can be installed in your stock Ford housing (there are exceptions when you get into the extreme sized axles, but that's usually out of musclecar territory). Super size your Ford? You bet.

**7A****7B**

7A & 7B YOKE: On the nose, a special billet yoke machined from 4340 steel is included in the Mark Williams Pro Street center section (in this case, "pro" doesn't necessarily mean fat back tires). They use special tooling to ensure that the yoke is machined concentric to the pinion spline (not always the case with pinion yokes). These yokes are engineered to accept a huge Spicer-style 1350 universal joint. And yes, like all of the other components, they offer these special yokes for production-line Ford center sections as well. ■

SOURCES

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