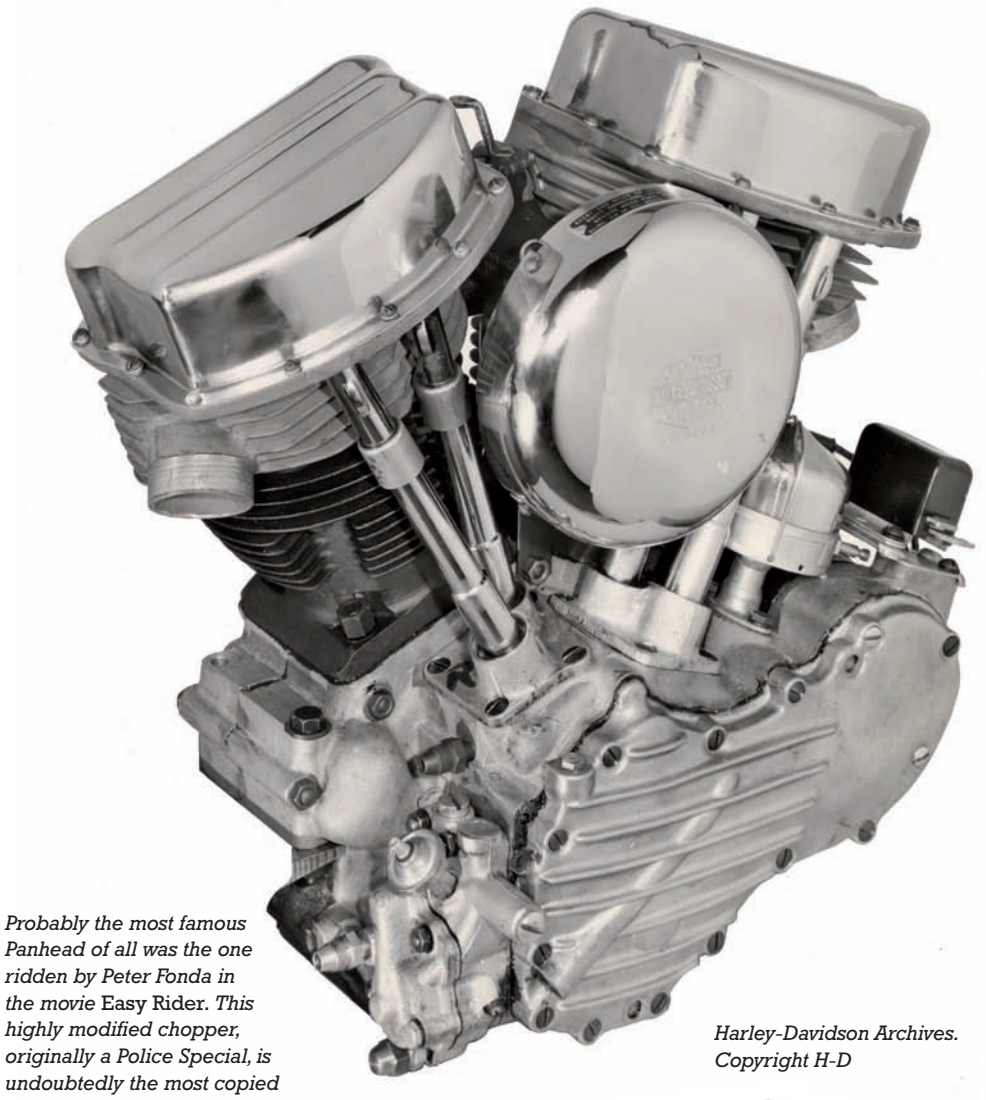
TECH FEATURE

THE PANHEAD ENGINE LIVES AGAIN

COMPILED BY RICHARD NICHOLLS AT REDGRAVE MOTORCYCLES



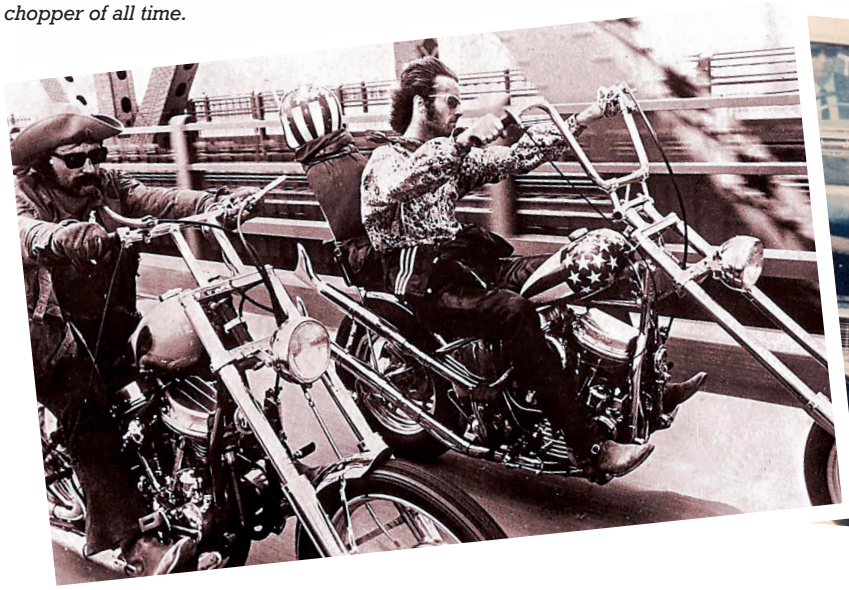
Probably the most famous Panhead of all was the one ridden by Peter Fonda in the movie Easy Rider. *This highly modified chopper, originally a Police Special, is undoubtedly the most copied chopper of all time.*

Harley-Davidson Archives. Copyright H-D

THE INCREDIBLY successful Panhead engine was introduced by Harley-Davidson in 1948, the same year they produced their last big twin side-valve engine. The new powerplant was an instant success and in continuous production for the next 17 years with approximately 120,000 Panhead motorcycles rolling off the production line between 1948 and 1964.

The most obvious difference between the new Panhead and the Knucklehead engines was the use of cast aluminium cylinder heads with integral bronze valve seats and re-designed cylinders for greater strength.

All Panheads were equipped with hydraulic tappets from day one, however, the initial setup incorporated the hydraulic unit into the pushrods. This was revised in 1953 with a new oiling system which included a serviceable filter screen and the removable hydraulic tappet positioned directly in the cam-follower. These lifters worked well but were often unnecessarily replaced with solid lifters, whereas poor



The Panhead Harley-Davidson found its way into history at the Assassination of John F. Kennedy.

diagnosis or incorrect adjustment was generally the problem. They remained in service on big twins until the end of Shovelheads in 1985.

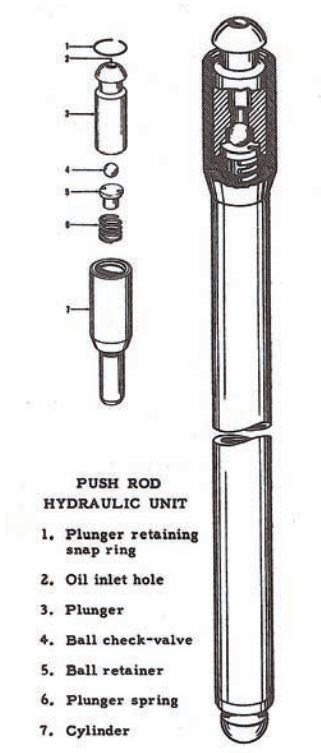
Up until the end of 1952, both the F series (74 cubic inch) and E series (61 cubic inch) versions of the Panhead engine were available. Commencing 1953, only the 74 cubic inch engines were available, and in 1955, an optional FLH version was introduced (H for High compression and slightly upgraded camshaft).

Initially the Panhead engine inherited its main bearing setup from the big twin side-valve and Knucklehead motors. Although a very robust engine to start with, Harley continued to beef up the bottom-end in conjunction with the on-going development of the engine. With the introduction of the FLH came the first Timken tapered bearings used for the drive-side mains. This brilliant arrangement remained with the big twins through to the 2003 Twin Cams.

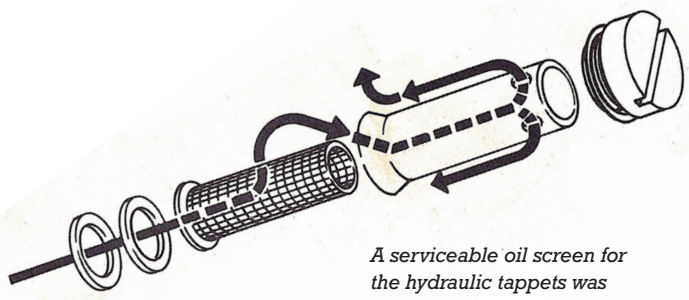
1955 was also the first year for the O-ring style inlet manifold. This replaced the old threaded manifold nuts and brass nipples that dated back to the very first Harleys. Superbly engineered but prone to leaking after years of abuse and incorrect tools, the classic big nuts made way for the O-ring setup which lead to the manifold seals being used today on Evolutions and Twin Cams.

1958 saw a move to three-piece oil-control-rings rather than the one-piece cast-iron-rings. The new-style oil-control ring produced less drag on the cylinder wall and was more efficient; this style of ring is an industry standard today.

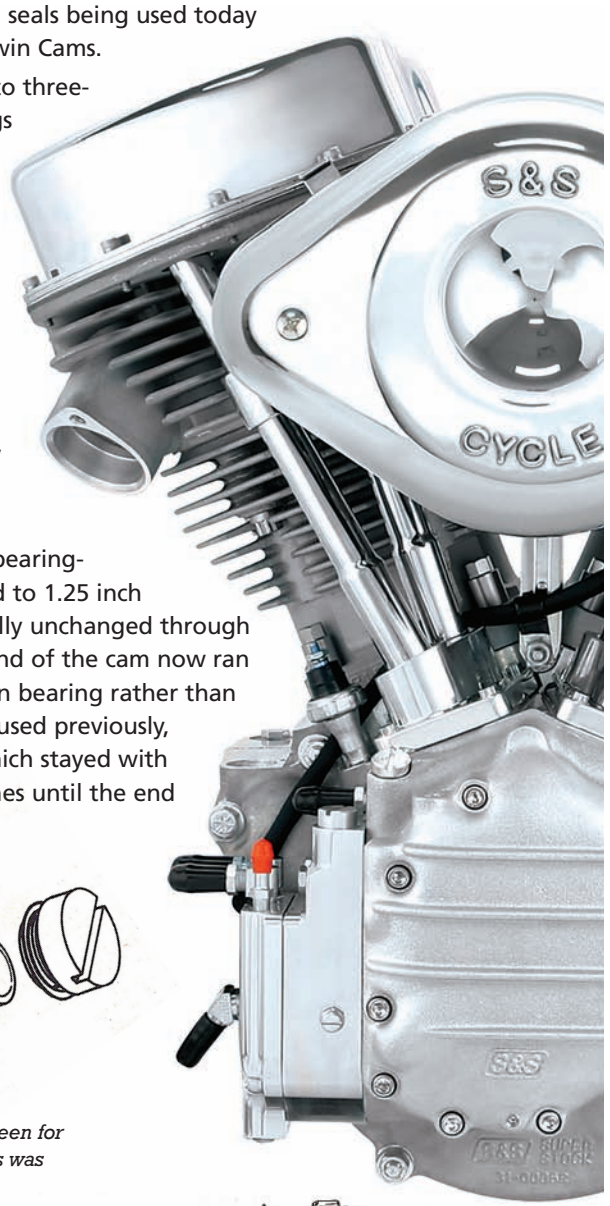
In the same year the right-side main-bearing-journal was enlarged to 1.25 inch and remained virtually unchanged through to 1999. The inner end of the cam now ran in a caged Torrington bearing rather than the bronze bushing used previously, another upgrade which stayed with the single cam engines until the end of production.

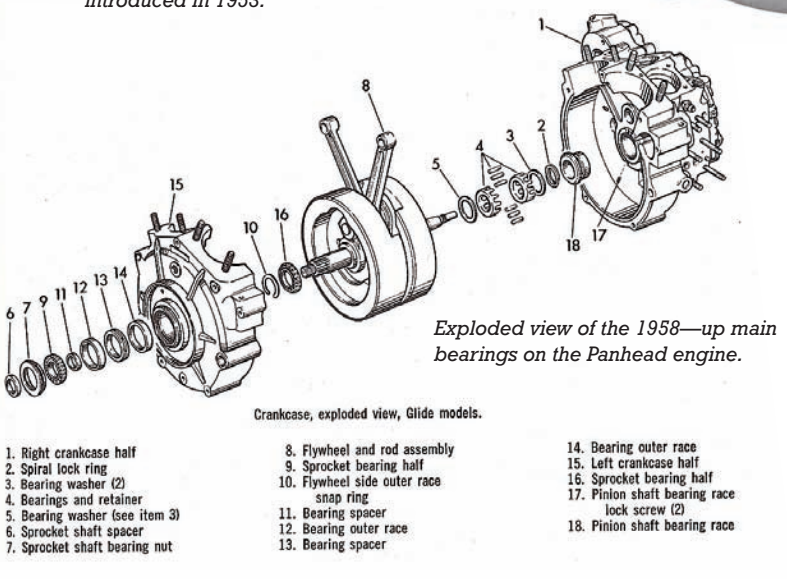


The 1948—1952 style pushrod incorporating the hydraulic unit.



A serviceable oil screen for the hydraulic tappets was introduced in 1953.





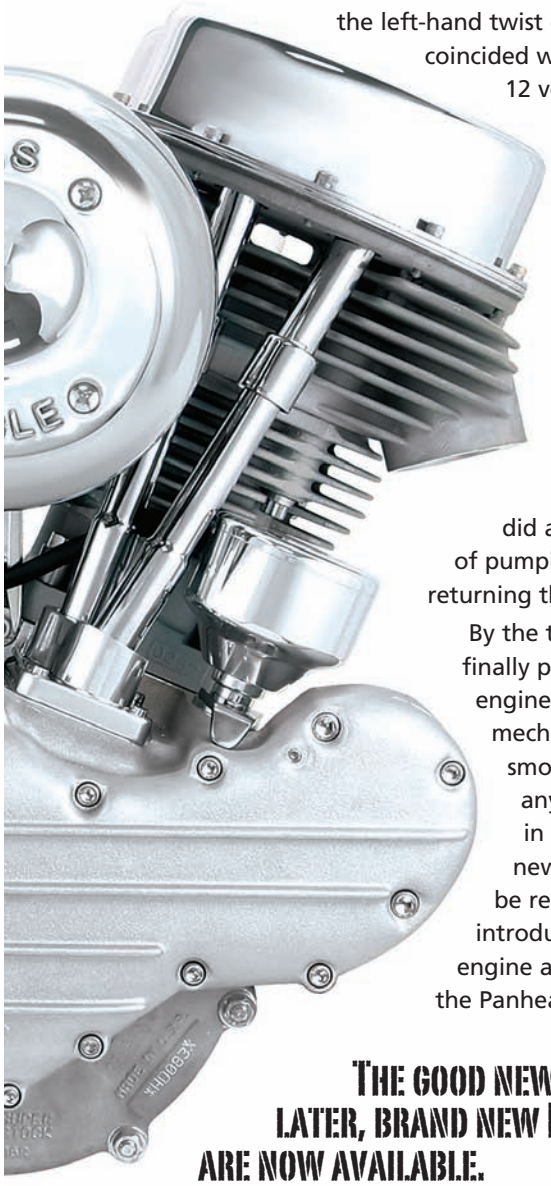
Exploded view of the 1958—up main bearings on the Panhead engine.

Crankcase, exploded view, Glide models.

1. Right crankcase half
2. Spiral lock ring
3. Bearing washer (2)
4. Bearings and retainer
5. Bearing washer (see item 3)
6. Sprocket shaft spacer
7. Sprocket shaft bearing nut
8. Flywheel and rod assembly
9. Sprocket bearing half
10. Flywheel side outer race snap ring
11. Bearing spacer
12. Bearing outer race
13. Bearing spacer
14. Bearing outer race
15. Left crankcase half
16. Sprocket bearing half
17. Pinion shaft bearing race lock screw (2)
18. Pinion shaft bearing race

The early style of inlet manifold was replaced by this O-ring version in 1955.

Ignitions slowly evolved with early versions using a manually advanced circuit breaker. The very last of the manually-operated ignition advance units, used from 1961 until 1964, are very rare items today. They had separate points, condensers and coils for each cylinder; the single lobe cam opens the breaker points, individually firing alternate cylinders every crankshaft revolution.



1965 saw the introduction of the automatic advance distributor which eliminated the control cable from the left-hand twist grip. This new distributor coincided with the introduction of 12 volt electrics and the first electric start.

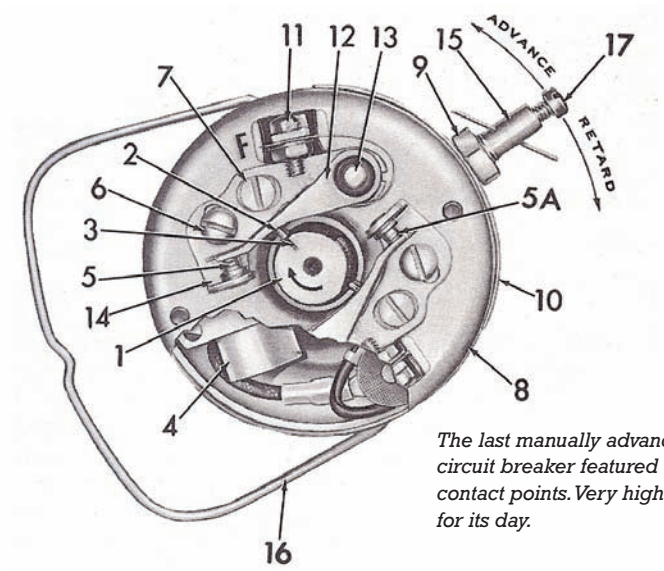
Further improvements included various changes to the oiling system and to the oil pump itself. Panhead engines did not rely on high oil pressure, just good circulation, and the cast iron oil pump in its final form did a particularly good job of pumping, regulating and returning the engine oil.

By the time Harley-Davidson finally phased out the Panhead engine, it was a highly refined, mechanically quiet and smooth running motor. For any appreciable increase in horsepower though, a new cylinder head would be required hence the introduction of the Shovelhead engine and the demise of the Panhead.

THE GOOD NEWS IS THAT, 43 YEARS LATER, BRAND NEW PANHEAD ENGINES ARE NOW AVAILABLE.

To celebrate its 50th anniversary, S&S Products has taken all the best features of the Harley engine and added a lot of its own. Currently available in two capacities—93 and 103 cubic inch—to keep them in line with the sizes of engines being offered in the large capacity motorcycle market.

S&S considered all possibilities and offer both early and late styles of the Panhead left-hand crankcase. Therefore engines can be ordered to accept the beautiful, pressed-tin, primary-chain covers used by Harley until 1964; or the cast-aluminium primary chaincase used by Harley to accommodate the first electric start (1965—1969); or the third version which allows the owner to



The last manually advanced circuit breaker featured dual contact points. Very high tech for its day.

install a '70—up alternator type charging system and a whole host of primary drives and covers, both open and closed.

S&S Panhead engines are equipped with state-of-the-art billet aluminium oil pumps delivering 33 percent more oil for these larger high-output engines.

One of the many attractive features of the Generator engines was the ignition timer tucked in under the front cylinder head. S&S has installed their Superstock ignition into a billet aluminium

The S&S billet aluminium oil pump delivers 33 percent more oil.

version of this timer and included the most up-to-date features available: data logging diagnostic capabilities and a kickstart mode for those who require it; single fire operation requires a special coil to deliver the individual spark.

S&S® 50TH ANNIVERSARY P-SERIES ENGINES FOR 1948-'99 CHASSIS (CARBURETED WITH SUPER STOCK® IGNITION)

Engine Name	Chassis Style	Engine Displacement	Crankcase Style	Part Number
P93	1948-'64*	93"	1954-'65 Generator	106-0819
P93	1965-'69	93"	1965-'69 Generator	106-0820
P93	1970-'99	93"	Alternator/Generator	106-0821
P93H	1948-'64*	93" HC	1954-'65 Generator	106-0822
P93H	1965-'69	93" HC	1965-'69 Generator	106-0823
P93H	1970-'99	93" HC	Alternator/Generator	106-0824
P103	1948-'64*	103" HC	1954-'65 Generator	106-0825
P103	1965-'69	103" HC	1965-'69 Generator	106-0826
P103	1970-'99	103" HC	Alternator/Generator	106-0827

Find your S&S Panhead engine fast.

The same high quality style of hydraulic tappets that S&S use in their Evolution and Twin Cam engines have been adapted to the beautiful billet aluminium lifter blocks. The hydraulic tappets feature a revised metering device which precisely controls oil delivery to the top end, ensuring rapid lifter pump-up, reducing the possibility of oil starvation to the bottom end.

S&S hydraulic tappets feature a revised metering device which ensures rapid lifter pump-up.

A sneak preview under the pan covers reveals roller rocker-arms and Evolution style rocker-arm shafts.

Locating good re-buildable Panhead engines these days is impossible so for anybody thinking about building a Panhead-powered bike these new engines will be a god send. Building engines from parts is now very expensive and there are lots of traps, making the cost of these S&S engines very realistic.

Redgrave Motorcycles, an Australian distributor of S&S Products for more than 30 years, is presently taking orders for the new Panhead engines. For any information give them a call; they will be happy to help answer your questions. Redgrave Motorcycles: 02-9484-9900.