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The strange story of the Freyler Two-Speed hub gear adapter

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1927-1936-1948: The Freyler two wheel evolution

This is the tale of a rare two-speed adapter, retrofitted by one of the authors to his F&S Komet coaster hub on an old Dutch bike. The adapter was developed in the late 30's initially as a chainwheel device and then adapted postwar for coaster hubs. The inventor was a Hungarian Citizen named Adalbert Freyler living in Vienna.

In 1927 Freyler invents a sleeve valve motorcycle engine (British patent GB291344). By 1929 Freyler's company was bankrupt due to problems with his invention. The motorcycle assets are bought by a company in Lambach, a year later they drop the engine as too unreliable

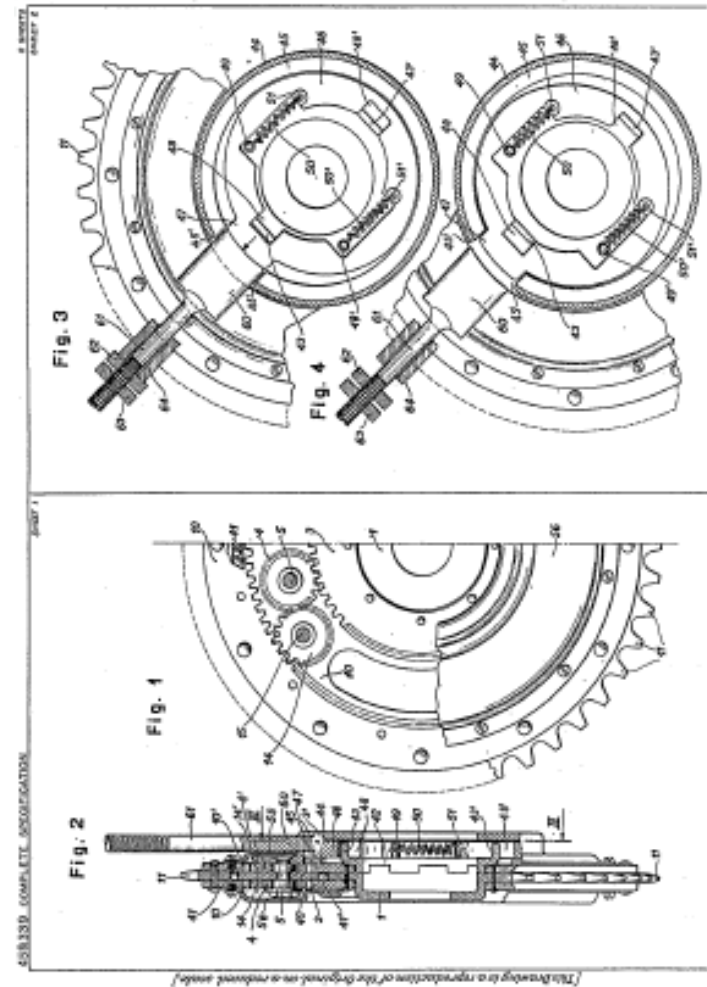


1936: the bicycle adventure begins

Working with a small company called Otto Koppitsch & Co. in Vienna, Adalbert Freyler, now an Austrian Citizen, develops a prototype two-speed epicyclic adapter for a bicycle chainwheel. It is complicated and difficult to manufacture. He gets another British patent (GB 459339 1937). He is probably unaware that chainwheel two-speeds were tried in the 1903-1912 era and eventually dropped, due to the high torques at the chainwheel epicyclic compared to at the hub.

We have found no evidence that Adalbert & Otto ever got beyond the prototype stage with this two-speed chainwheel adapter

It has a lot of design problems, starting with its extreme low ratio, double overlarge sun gears sandwiched around the chainwheel and intertwined (!) tiny planet gears.

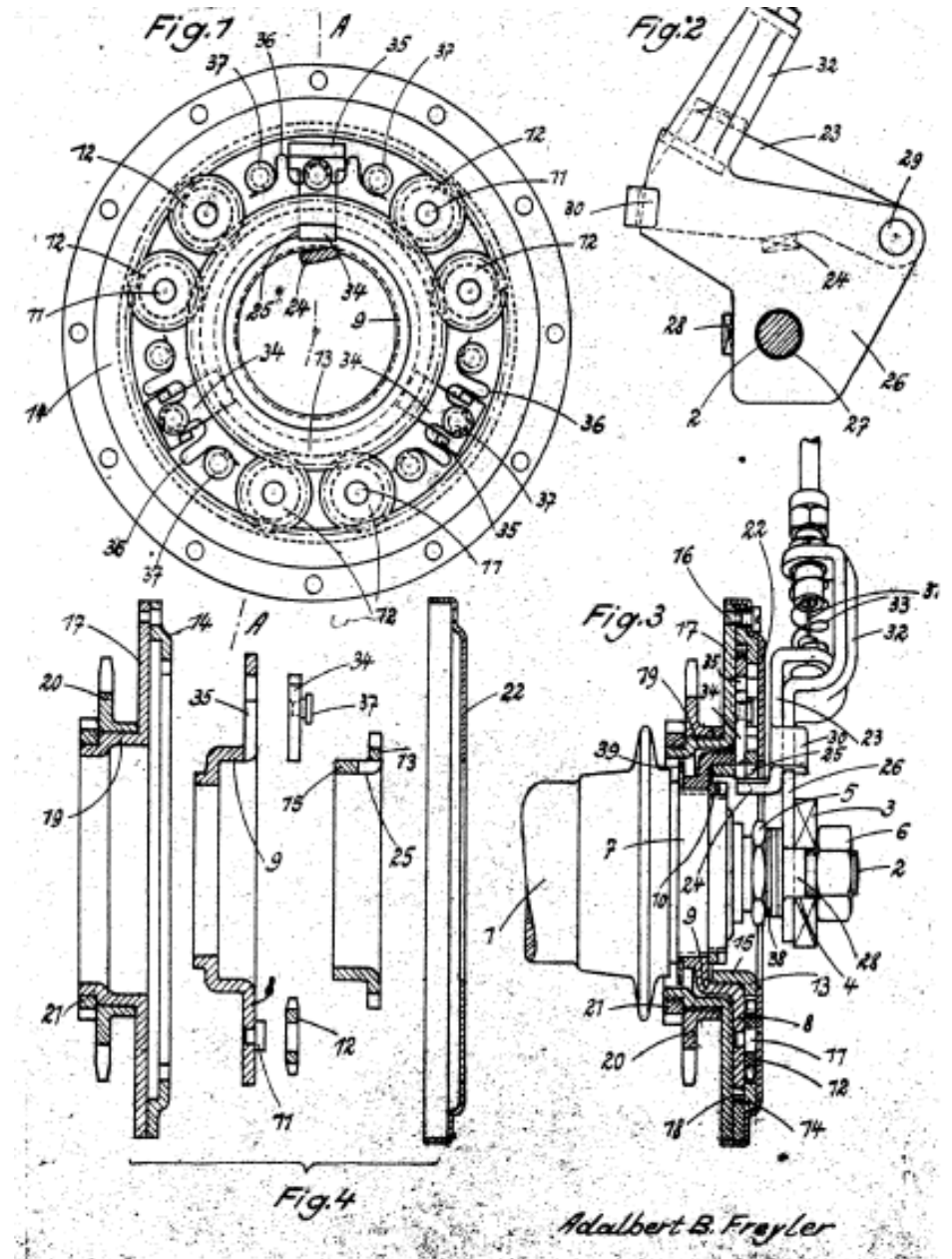


1948-50: Production at last

After a wartime career in Dusseldorf, working for Rheinmetall Borsig, Freyler moves to Wuppertal and becomes a West German Citizen.

In 1948 he applies for a German patent for his latest two-speed design (DE1602795 1950). It is now Hub-Mounted (to a standard Fichtel & Sachs Komet coaster hub) but retains many of the strange features of the 1936 Chainwheel design.

This time a limited number were manufactured, likely in the 1948-50 period when European cycling was booming - to get to work (not for leisure..).



Inside the Freyler two-speed Hub Adapter

The sample we have, fitted to an old Dutch Gazelle by Gerd, has seen very little wear (using the chain sprocket teeth as a guide).

This is the planet carrier. Instead of the normal 3 (or 4) equi-positioned planets, Freyler went for double planets at each position, in a vain attempt to reduce the noise and wear. Note the three tangs that serve to lock the gear in direct.

Notice there are only 10 teeth on each planet. That is a real problem, the smaller the planet the higher the wear. Adalbert was forced into this by choosing an extreme low gear of 0.60 (requiring large sun gears and even larger ring gears)..

The 1936 Sturmey Archer AW hub uses 20 teeth planets, the Torpedo ZweiGang of the time used 22 teeth. Both had a reasonable low gear of 0.75/0.76.



The sun and ring gears

The 43 teeth (!) sun gear is shown on the right. Note the large cut-out on the rim to lock the gear stationary for Low. The cut-out is close to the edge, where it could cause fatigue problems from the shock loads of shifting down.

Teeth are very shallow for the high epicyclic loads in Low gear. They also don't mesh properly; by the time the epicyclic train reaches the ring gear from the sun, it is three teeth short.

The enormous ring gear (66 teeth) is shown opposite. Also note the 'thrust' bearing created from loose ball bearings in a groove on the planet carrier rim.



Shifting..

This is not a pleasant business. To select Low, the handlebar Bowden cable lever is pushed forward. At the rear hub, a bracket with two tangs then rotates. One tang pushes the engaged planet carrier tang out of its recess, unlocking the planet from the sun. It also holds back the other two unused planet carrier tangs from dropping in the recess.

The second tang on the bracket jams the sun gear, using that cutout near the rim, and stops it rotating. Low gear is now 'available'.



How did the Team find the Shifting?

Typical feedback:

***Bad, Noisy, Hard to pedal in Low,
Clunky shift.***

You get the idea. And this was for a near-new Freyler..

By comparison, Gerd's old 1925 F&S Torpedo ZweiGang was smooth and silent in use (1937 model opposite).



Design details

By every measurement, the 1948 Freyler comes out as inferior. This is comparing it to two other hub gears in production at the time, both from 1936 originally. The two are the Fichtel & Sachs Torpedo ZweiGang two-speed and the Sturmer Archer AW three-speed (considering just the low gear aspect). Two other (American) two-speeds were also in production at the time (New Departure and Bendix) that were equally good.

- Size: the bulky large diameter ring gear and planet had little rigidity, compared to the compact hubs of the others. This would lead to premature epicyclic gear wear and noise.
- Weight: 29% heavier complete than the Torpedo two-speed.
- Lubrication: just a smear of grease and a dustcover, compared to an oilbath on the others.
- Bearings: (the F&S Komet has 2 caged ball bearings already) Just loose ball-bearings for thrust only, the rest are plain steel on steel. The F&S Torpedo two-speed had 4 caged ball bearings.
- Destructive shifting loads leading to damage eventually.
- Tiny planet gears causing rapid wear and noise in Low.



Freyler decorated cover with sun gear shifting hole at 4 o'clock



Sturdy and compact Sturmey Archer planet, sun and ring gear to compare

In Summary - Rare for a Reason..

Unlikely that the Freyler was in production for more than a couple of years ~1948-50. Hence the “rarity”.

Could not compete for longevity and quietness with regular two speeds from the existing manufacturers. This is regardless of price.

Would have had a short life during the rainy season in the Ruhr, where it was briefly made.



Brought to you by the Town Musicians of Bremen



And a Donkey..

Thank you all!