

FOR AND (RATHER MORE) AGAINST Banking Sidecars

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THE idea of a banking sidecar outfit, so constructed that it can be leaned in or out on a corner to permit higher speeds without passenger acrobatics, has always had an attraction for at least a section of the men who pilot three-wheeled devices. A recent reference in "Everybody's Business" to the Vincent H.R.D. built for the cancelled 1933 Sidecar T.T. (in the construction of which I was personally involved) calls to mind this model and several others, few of which managed to live up to the promise they apparently held.

The most famous example, to English readers, would be Freddie Dixon's Douglas outfit, which won the 1923 Sidecar T.T. on its first appearance and put up fastest laps in the two succeeding years.

Around the Dixon period, a device called the "Flxi" (the maker's spelling, not mine) was used extensively for racing in the U.S.A. on oval mile and half-mile dirt tracks, where only one-way banking was required. A. H. Alexander, tried out a similar thing in the 1924 T.T. practice, but reverted to a conventional Hughes chassis for the race, although he was reported as saying the flexible model would have been faster if he had had enough time to get used to it, as it was, he retired, but he was certainly used to the T.T. course, having ridden in 15 solo events since his first appearance, in 1910, on a Rex.

In more recent times, George Brough experimented with a chassis of the Dixon type on a road-going model, and Kim Collett tested a racing version of it at Donington, without much joy.

In the scheme used by Dixon, the chassis and body were of substantially normal construction, except that the wheel-spindle was attached to an arm, seven inches long, which was fixed to, and trailed behind, a cross-shaft housed in the chassis. Two long levers, one on each side of the body, were also attached to the shaft, and by operating these in the appropriate directions the sidecar wheel could be dropped or raised, thereby tilting the whole outfit while keeping the wheels parallel.

So that the passenger should not have to act as a permanent human spring, a plunger and slot were provided to lock the mechanism in the normal position on straight going and a counterbalance spring was added which would almost maintain the outfit on an even keel, even with the plunger disengaged.

The Vincent system was similar in principle, but instead of levers the passenger operated a wheel (which effectively prevented

him entering or leaving unless it was first detached). The wheel was connected to an ex-Morris Cowley, ex-wrecker's steering-gear box mounted in the body nose, whence motion was transmitted to the wheel-carrier arm by two sprockets and a chain.

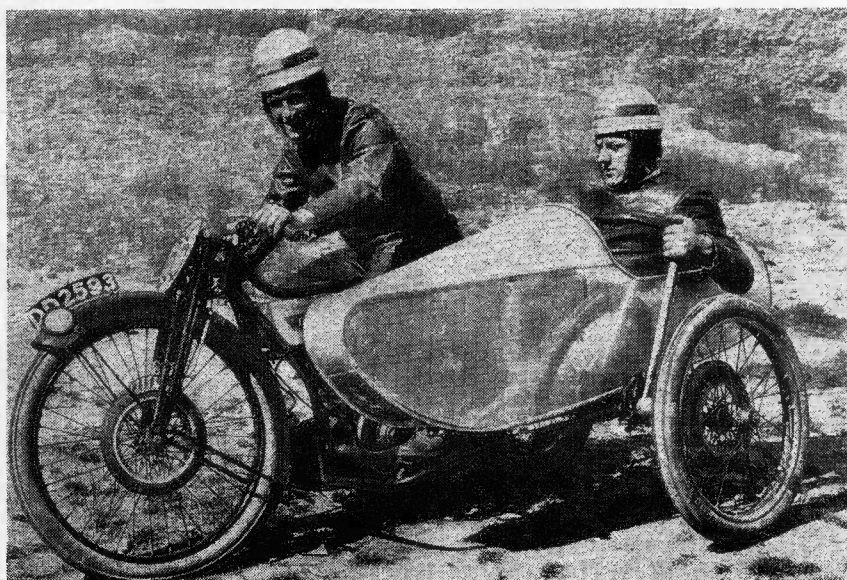
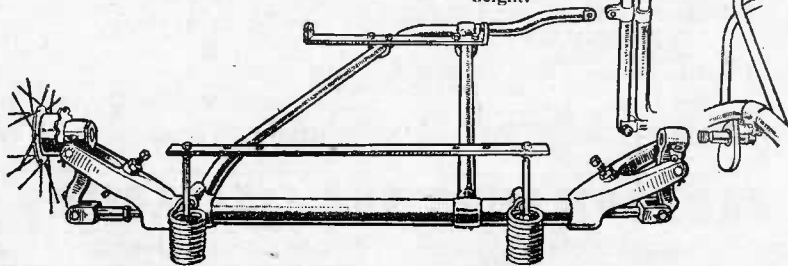
As the steering box was of the irreversible type, the sidecar wheel would stay where it was put and the passenger was protected from road-shocks; but the whole arrangement was probably heavier than Dixon's and not quite so quick to operate. On the other hand, a measure of sidecar wheel steering was provided by inclining the axis of the carrier-arm 5° downwards, so that when the sidecar was dropped for a left-hand corner the wheel turned slightly in the same direction, and vice versa on right-handers. This action obviated some of the scrubbing which

is bound to occur when the third wheel is located forward of the rear wheel in order to bring it closer to the centre of gravity of the whole outfit.

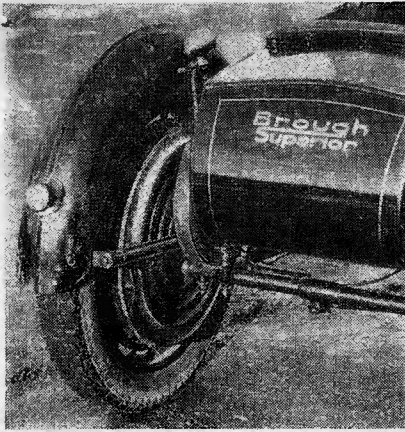
At first glance one might think that the general scheme of the "banker" is a good one, but in practice it does not work out that way. Apart from the necessity for extremely accurate co-ordination between passenger and driver to avoid doing the wrong thing at the right time, the total amount of bank obtainable to the left is insufficient to be of much use.

So far as stability is concerned, left-handed banking has the effect of moving the centre of gravity of the whole outfit inwards and downwards by an amount which is limited by the normal ground clearance below the outer chassis member and also by the method of controlling the height of the wheel. Since 6 in. is about the maximum variation which can be obtained without making the whole sidecar unduly high, and 28 in. is about the minimum distance between chassis-member and main-frame centre-line to provide enough working space for the crew, the maximum inner banking angle is in the region of

A. H. Alexander's "flexible" chassis of 1924 had rod linkage to maintain the sidecar wheel at the same angle of inclination as the machine, without much alteration of height.



Freddie Dixon and the famous Douglas "banker" of 1923; the passenger is 'bringing the chair up.' Note the Research Association brakes on sidecar and machine wheels.



This one-off Brough sidecar of 1933 had a peg-and-scroll one-way banking mechanism, foot-operated by the driver.

12°—which, though helpful, is not much compared with the 45° to which a solo can be cranked over.

It must also be remembered that moving the wheel does not *force* the sidecar down. If the passenger's reactions are a little too slow, as they may well be in some sudden emergency, and the "chair" wheel is on the point of lifting off the ground before the banking operation is instituted, the only result will be to lift the wheel still further, and the stability will be decreased, not increased. Meanwhile, as the passenger has to remain seated at the controls, he is automatically debarred from assisting

in the usual manner by leaning out, and only extreme skill on the driver's part will avert a catastrophe.

Neither is the position much better on right-hand corners, because the sidecar's mass is raised—or, more accurately, the outfit's centre of gravity is moved upwards as well as inwards—and the net result is little, if any, gain in stability, although the inward inclination of all the wheels does help to make the vehicle self-correcting and so reduces steering-effort.

The crux of the matter is that one is up against conflicting requirements. If the "chair" is made high and narrow for good banking to the left, it is of no advantage when banking to the right.

From contemporary reports, admittedly, it seems that Dixon could corner faster than his rivals, but other factors may have contributed to this—superb chairmanship, the low build of the Douglas and the fact that rival rigid outfits were about as bad as they could be in inhibiting effective action by the passenger. Despite the "bankers'" initial victory, the official Douglas entries the next year were fitted with a rigid chassis, on which the body was pivoted along a horizontal axis so that the passenger could roll it towards, or away from, the machine as occasion demanded.

The American Flxi device worked on an entirely different principle. The chassis was hinged to the frame at two points only, and the third-wheel axle was carried by a bracket mounted on a horizontal spindle and connected by a radius-rod to the main frame, so that when the machine was banked over the sidecar wheel banked as well. Alexander's

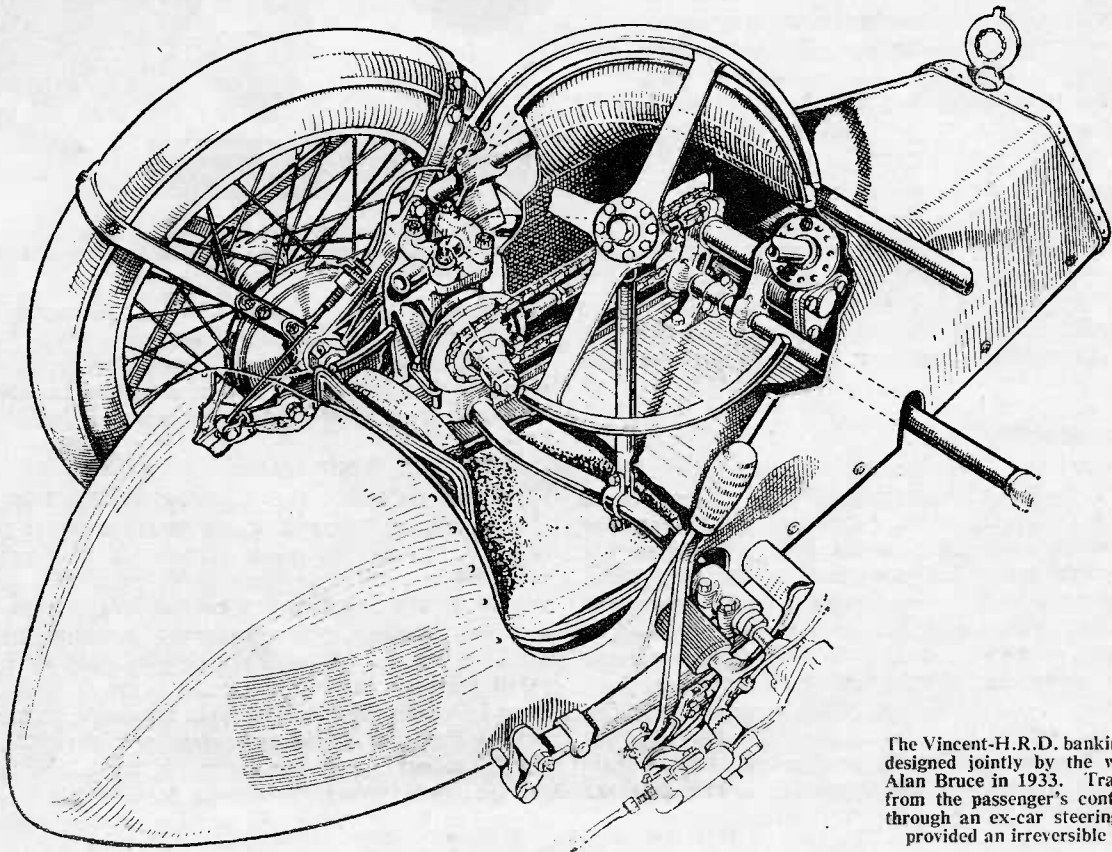
chassis had a similar sort of linkage, but whereas his was arranged to lean both ways, the American machine could be leant only *away from* the sidecar (to the left in their usage).

In practice, the rider braced a muscular leg against the chassis and forcibly held the monster on full bank as he hurtled round the long, sweeping bends, which must have made quite an awe-inspiring sight. Nevertheless, the speeds in the low seventies recorded on the U.S. mile tracks compare poorly with the over-90 m.p.h. laps regularly achieved today on Australian mile circuits by rigid outfits with "staggered" sidecar wheels and so much lean-out that they almost fall over when the crew step off!

One trouble with the fully flexible outfit for road use is simply the difficulty of finding enough room to lean all the wheels over far enough in both directions without resorting to an excessively wide track. This can be partially met by leaving the third wheel fixed, but then it has to slide laterally in order to allow the machine to lean over.

Then again, what happens when, while rounding a corner on full bank, a swift course alteration becomes necessary to avoid an unexpected obstacle? Even with a solo this is not always easy, but it might well be impossible with the much greater weight and lower responsiveness of the three-wheeler.

No—all in all, the verdict goes in favour of the rigid model, both for touring and racing—although it is odd that no one has thoroughly explored a layout with the sidecar wheel fully sprung and coupled to the rear wheel by a torsion-bar to minimize roll, rather than the lines of the celebrated Model H Matchless:



The Vincent-H.R.D. banking sidecar designed jointly by the writer and Alan Bruce in 1933. Transmission from the passenger's control wheel through an ex-car steering gearbox provided an irreversible control.