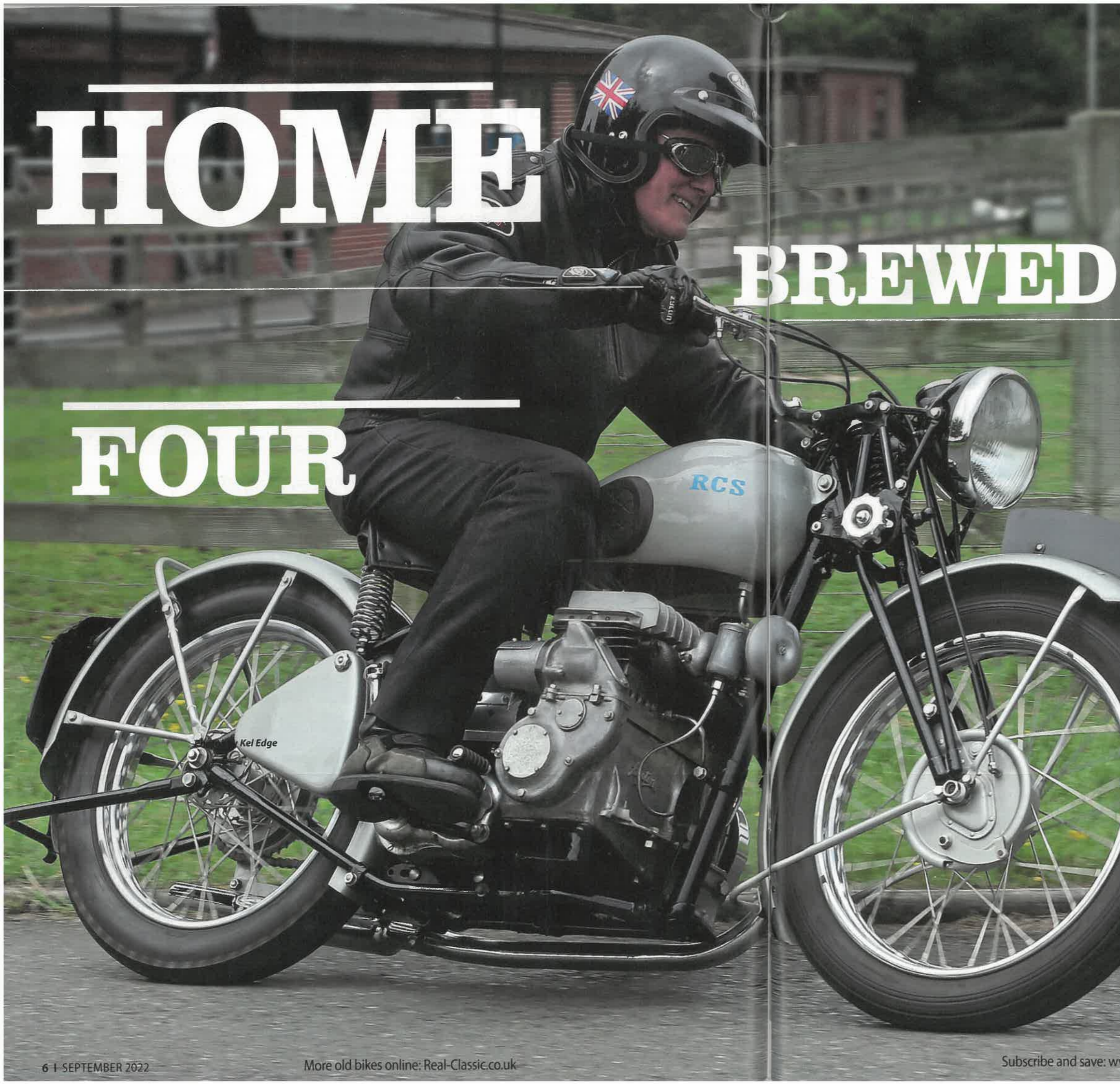


HOMIE

BREWED

FOUR



There have been several car-engined specials, but few of them were converted to air cooling. Alan Cathcart tells a special tale...

This year sees the Centenary celebrations of the creation of the Austin Seven motor car – nicknamed the ‘Baby Austin’. It was unveiled in November 1922 at the London Motor Show in Olympia, then produced from 1923 until 1939 in the UK, during which time no less than 290,000 examples were built. It was the best-selling car produced for the British market and sold well abroad, too, and its effect in Britain was similar to that of the Model T Ford in the US, since it allowed customers who might otherwise have been unable to afford a motor car to enjoy the benefits of owning one.

It was also licensed and/or copied by companies all over the world. The first BMW motor car, the Dixi, was a licensed Austin Seven, while in France they were made and sold as Rosengarts, and in the USA were built by the American Austin Car Company. In Japan, Nissan also used the Seven design as the basis for their first cars, although not under licence, just copied – although this later led to a 1952 agreement for Nissan to build and sell cars in Japan under the Austin name.

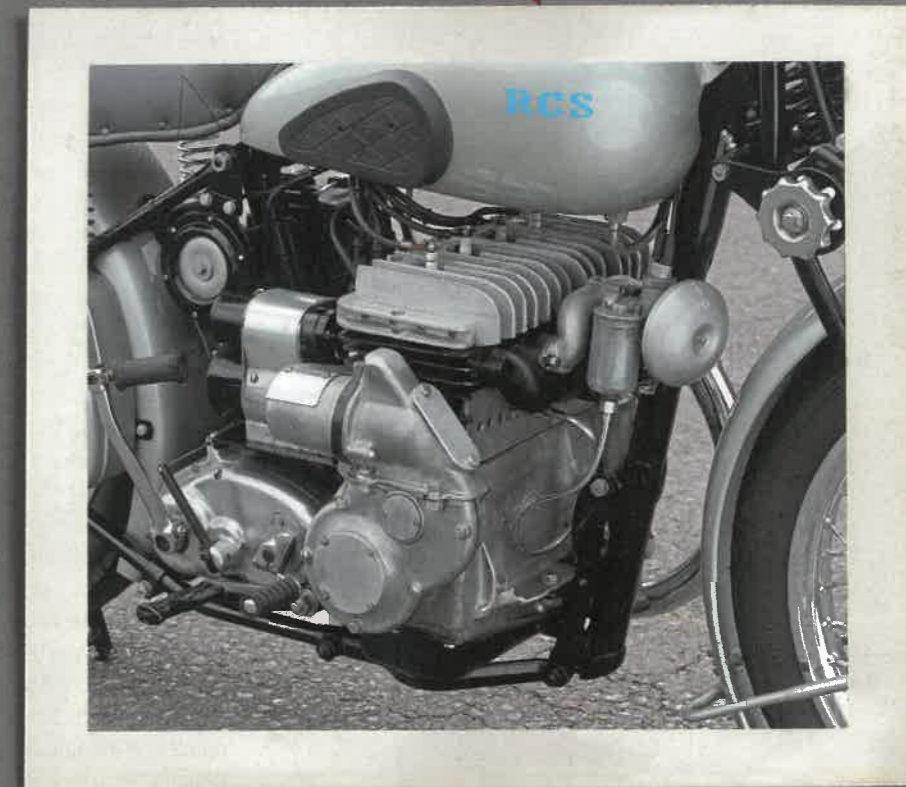
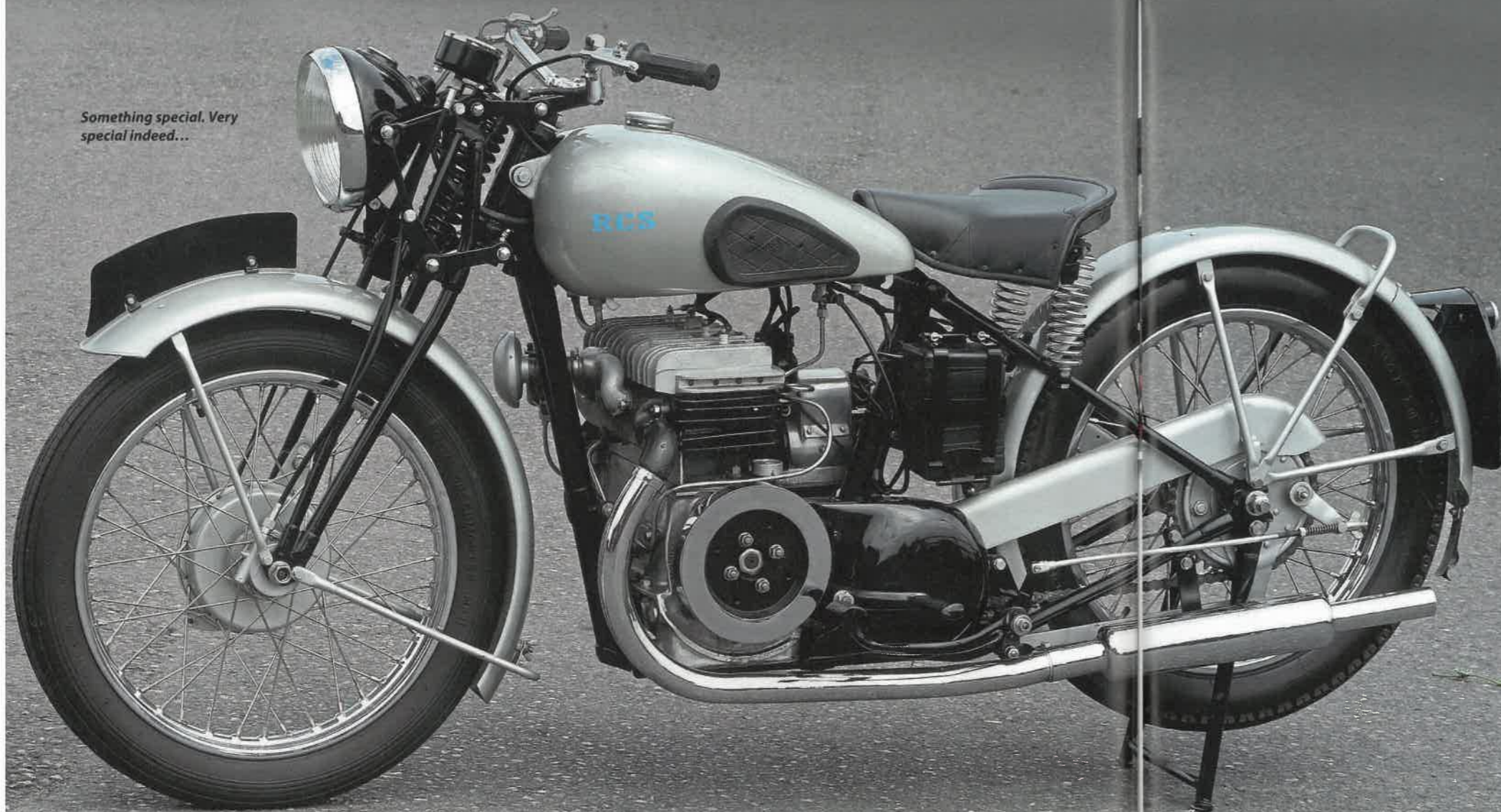
Many Austin Sevens were transformed into Specials after WW2, including the first racing car built in NZ by Bruce McLaren, and Colin Chapman’s first Lotus, the Mark I. On two wheels, several Special builders used the four-cylinder Austin engine as the basis for their own creations – and none more so than Birmingham bike engineer Bob Collier, who built six such devices over a 20 year period.

Britain has always had a tradition of building Bitzas, aka Specials. This was especially popular post-war, when availability of new bikes for UK owners essentially ceased, leaving the creation of ever more ingenious ways of concocting basic transportation, while using less of the scarce petrol ration to get you about, to become common practice. So special-building really took off, thanks to the ready availability of ex-WD / War Department equipment, ranging from spare parts to complete motorcycles which could be bought for next to nothing as war surplus hardware, often however in pretty poor condition.

Since the 1940s export drive dictated that precious resources of metal and plastics had to be directed towards earning money overseas – mainly from America – to rebuild the UK’s finances laid low in helping rid Europe of Hitler, this meant scarce new machines sold in the home market commanded a price premium, leading several people to pursue building ever more esoteric creations as a cost effective way of getting around.

However, few special builders were as adept at conceiving and then fabricating what became known collectively as a JABS – Just Another Bloody Special! – as Bob Collier. As already remarked, he built one after another over a 30-year period, and in the process of doing so displayed an uncanny ability to predict future trends, as well as to conceive innovative solutions verging on the avant garde to resolve technical conundrums that had major manufacturers puzzled. Nobody today can appreciate this better than trials and road racing legend Sammy Miller, whose eponymous Museum in England’s New Forest is home today to several of Bob Collier’s creations. ➤

Something special. Very special indeed...



A remarkably modified engine which started life in a car

even on low octane pool petrol, that nothing else emanating from Norton's Bracebridge Street factory would deliver before the firm moved south and created the Commando. Sammy Miller is pretty scathing about that, though: 'Collier showed Norton how to do it, and as usual they completely ignored him,' he says!

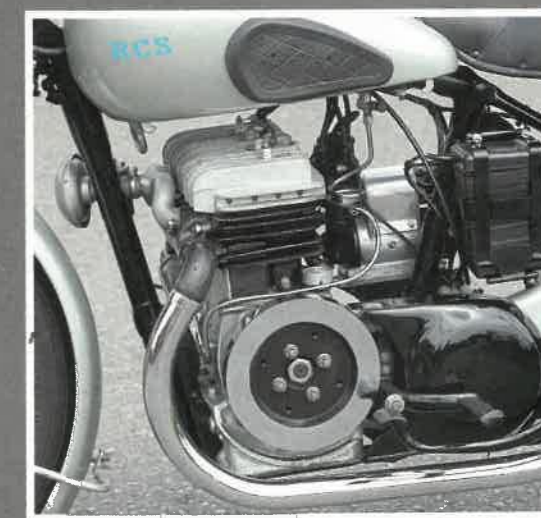
Later on, after the war ended, Bob Collier joined Feridax, a Birmingham-based producer of motorcycle accessories and clothing, for whom he worked as the development engineer. Then in 1949 he moved to work at Norton's Experimental Department under Bert Hopwood, where he collaborated with Cyril Smith in producing the low-built sidecar outfit with which Smith won the 1952 Sidecar GP World Championship.

That same year Collier produced another even more avant garde road racer under his own aegis, called the RGC (his initials). This was a 350cc GP single consisting of a 1949 AJS 7R engine canted over at 45° to produce an ultra-low wind-cheating device in those pre-streamlining days, with a radical design of trailing-link front suspension, similar to that later found on the mid-1970s French-built HO 500 and BUT 250 GP racers.

Collier also produced several bonded-rubber suspension systems, including a sprung hub design fitted to an A7 BSA which apparently worked even better than Triumph's similar effort on the Speed Twin. As well as this, he produced a variable length handlebar to permit a sidecar outfit to pass through a narrow gap, and a fully-sprung, banking sidecar outfit which did not roll in corners, on which the passenger used a steering wheel to control the lean of the sidecar where appropriate, and thus also optimise

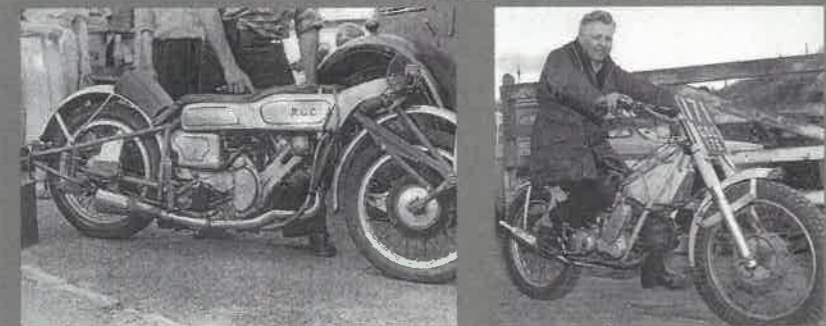
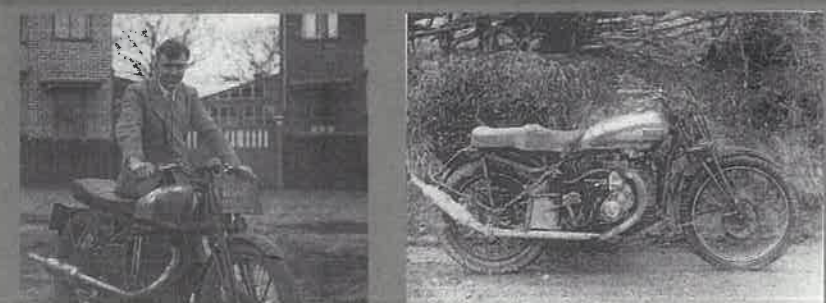
suspension response! But it was for a series of four-cylinder motorcycles powered by the Austin Seven car engine that Bob Collier was best known, since in doing so he showed the way ahead that Honda would take two decades later in creating the CB750. One of these was conceived for his chosen sport of Sidecar Trials, at which he excelled.

'Bob was a natural sidecar rider who was both skilled and brave,' says Sammy Miller. 'Several manufacturers would willingly have given him support, but he wanted to ride a bike he'd built himself, with an Austin Seven engine. We have two of them here, one of which his grandsons Matt and Mike Collier donated to the Museum Trust in 2012, together with Bob's Norton twin and a lightweight trials chassis. We already had an earlier example of Bob's four-cylinder trials

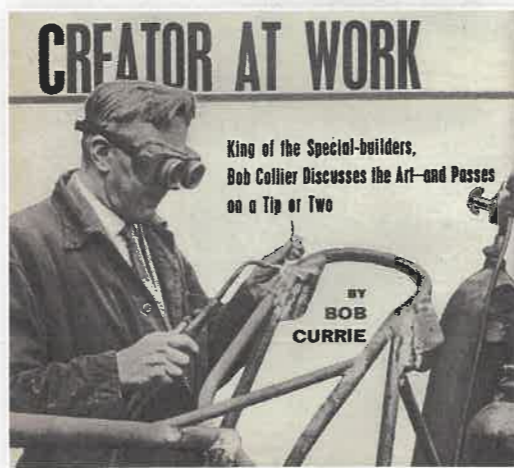


Front-facing carb and cunningly side-exit exhaust

OTHER COLLIER SPECIALS



Clockwise from top left:
 Bob Collier's 1943 1056cc Norton twin in its Matchless Silver Hawk frame
 RCS Austin four at the 1947 DK Mansell Trial
 AJS 7R-engined machine, seen at the Belgian GP, Spa, 1953
 Bob Collier at the 1967 Scottish Six Days with his trials special
 The man himself. Bob Collier in 1962



'I knew Bob quite well when I was at Ariel in the '50s, and he was just round the corner at Norton,' says Sammy. 'I had the greatest respect for him, both for his constant ability to come up with something new that nobody else had thought of, and the fact that he did all of the work in building these bikes himself, often on a shoestring. He'd combine parts from often unlikely sources to create something new and different, but he rolled up his sleeves and did most of the work on building each bike himself. I really admired him for that – and especially for one special he made that really interested me. 'It was a trials Norton where he'd canted the engine

over by about 60 degrees, and then put the gearbox beneath the cylinder, instead of behind the crankcase. At a stroke it lowered the cee of gee and shortened the wheelbase – it was a very clever bike.'

Born in 1913, Bob Collier worked for four years as a draughtsman at the Fort Dunlop tyre factory, before jettisoning his pencil and drawing board in favour of a hacksaw and file by joining the Dunlop experimental department, where he worked throughout WW2 in what was a protected occupation, meaning he wasn't allowed to enlist in the armed forces. Instead, he joined the Home Guard as an after-hours despatch rider aboard a venerable 1920s 500cc Model 18 Norton, which made hard work of keeping up with the Triumph twins and cammy Velocettes of his comrades.

Hence Bob's decision to build a large capacity parallel-twin OHV Norton five years before his future boss Bert Hopwood created the Dominator in 1948 that duly led to the Commando. Bob Collier did this by essentially combining two 1930s Model 18 single engines, mounted side-by-side in a 1930 Matchless V4 Silver Hawk frame, and overbored to accept Levis pistons to create a 1056cc wartime Norton Superbike capable of over 100mph. When he completed it in 1943 this device had an all-round level of performance,



Sammy Miller with Bob Collier's grandsons Matt (sitting) and Mike when the unrestored bike was delivered to the Museum in 2012

bikes in the Museum, so we've made a Bob Collier Area in honour of this great innovator.

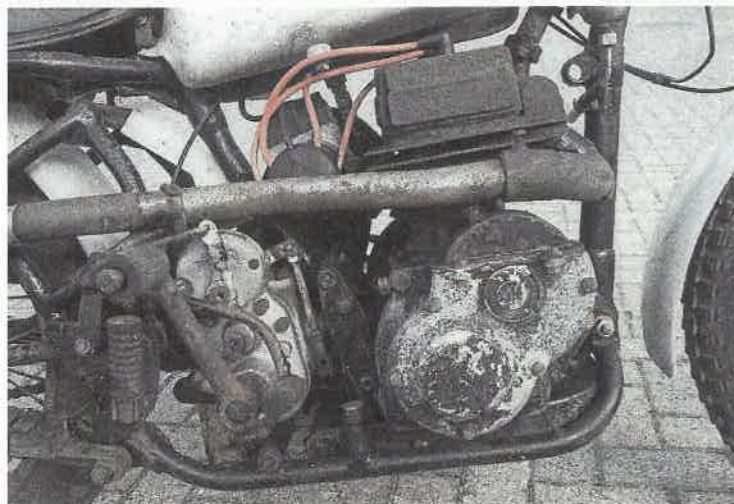
Collier briefly owned one of the ten examples of the Brough Superior Four, also powered by a lengthways-mounted Austin Seven engine, which had been introduced in 1932 essentially for sidecar use, with its twin rear wheels. This was because George Brough chose to use the standard Austin three-speed car gearbox, complete with reverse, driving a prop shaft to a crown wheel and pinion mounted in a specially cast housing between the rear wheels. The intrepid Collier was apparently pretty unimpressed by the performance of this unwieldy and heavy yet costly device, and reckoned he could do a lot better himself, working in his garden shed as opposed to the well-equipped Brough factory!

And so it turned out, although according to a piece Bob penned for *The Motor Cycle* (he wrote several articles of both a philosophical and practical nature recounting the creation of many of his home-brewed devices), it wasn't until 1945, just as the war was ending, that Collier built his first four-cylinder bike, which he obtained by shoe-horning a 1920s sidevalve Austin Seven motor into a chassis formerly housing a 1932 550cc New Hudson sidevalve single.

This was far from being the first such special built with a car engine, but whereas other Bitza-builders had positioned the motor lengthways in the frame, like in the Brough, with the attendant problem of a lengthy wheelbase, as well as switching the drive through 90° to turn the rear wheel if the car gearbox was retained, or else combining this with a motorcycle transmission, Collier instead mounted the engine transversely, just as he perhaps had seen Gilera do on its supercharged 500cc GP racer which won the final European Championship before the outbreak of hostilities. Was this the first road bike of the modern era with the engine format adopted two decades later by Honda? It very well could be...

However, Collier never completed this first of the six four-cylinder bikes he created in the post-war era because, as he recounted to readers of *The Motor Cycle*, he was selling a 600cc Sunbeam to raise funds for the special, and someone who came to look at that bike instead insisted on buying the nearly-completed RGC Four, as it was called!

This gave Bob the funds to start work on a second, improved version incorporating the lessons he'd learnt on the first such bike, with the Austin engine still water-cooled, as original, and slotted as before into another New Hudson frame. This went well, but the



The earlier 1948 RGC Trials Special with its air-cooled Austin Seven motor, as it was delivered and as it is now



Two RGC Fours as they are today



rigid frame was unsatisfactory to Collier, who was an eager exponent of rear suspension, hence his experiments with bonded rubber rear ends. So for his third four-cylinder road bike he this time slotted the Austin engine into – wait for it! – a 1935 HRD-Vincent V-twin frame, complete with cantilever rear suspension as standard, which he used satisfactorily on the road. Later on in the late 1940s, he built another RGC Four road bike, this time with alternative front suspension in the form of the actual OEC duplex front end off Joe Wright's purported Land Speed Record-breaker – but before that he'd previously built his fifth such Austin-engined bike in 1946.

This four-cylinder Bitza – in his writings Collier always endowed the word with a capital letter – was created to use in trials, invariably with a sidecar attached, and it's this bike which is the older of the two Collier fours in the Miller Museum. To build it Bob used a rigid WD Norton frame sourced from Government Surplus for a princely five pounds sterling, with a few tubes re-bent to give the necessary ground clearance, a Webb girder fork with a New Hudson front wheel (later replaced by Norton teles), and a Norton gearbox and rear wheel.

The long-stroke 747cc Austin Seven engine he bought for two pounds measured 56x76mm as a pre-1929 unit using a magneto – replaced by coil ignition from 1930 onwards. One of the 290,000 such cars and vans built in Austin's Longbridge factory in Birmingham (ten miles from the Norton factory where Collier would later work) between 1922 and 1939, it had an aluminium crankcase (steel was used after 1935, to reduce cost at

the expense of added weight), a two-bearing crankshaft and splash lubrication, with the three-speed gearbox cut off by Collier, and replaced by a four-speed Norton transmission, again ex-WD. Originally, Bob retained water cooling, using the original Austin radiator (he'd used a Scott rad on the original road bike) whose header tank was modified to blend in with the sawn-off Panther fuel tank located behind it.

Collier began riding this Bitza on the road as a solo to sort out any problems, but then began competing on it in Sidecar Trials to good effect, winning the gruelling D.K. Mansell Trial on it. But the problem was that the water radiator kept getting clogged up with mud on dirt sections in the long distance trials at which Bob was so adept, resulting in the engine overheating, especially on long bottom-gear sections, and either blowing a gasket or, on one occasion, seizing solid.

Reasoning that most of the heat was generated in the cast iron cylinder head, Collier removed the water jacket and brazed on an array of 3/8-inch sheet steel fins in its place. The radiator was discarded and a half-gallon oil tank fitted, with an old lorry pump driven off the existing dynamo drive on the engine to circulate the oil. This left him with an air-cooled head and an oil-cooled block, with the absence of a radiator not only saving weight but hopefully eliminating overheating.

Apparently the cooling proved successful in several trials, but to improve it further Collier removed the water jacket from the cast iron cylinder block, and fabricated a further array of 50 differently-shaped fins to braze onto the block to further dispel heat.

'The whole thing was a great success,' he wrote in an article describing the development. 'There was a still greater saving in weight, and I had a unique Austin-engined Bitza as a result. And the job only weighs 387lb.'

Yes, but one with an engine producing a pretty measly 17bhp at 3800rpm in its Austin automotive application, with just a single Amal ▶

carb with remote float positioned in front of the engine feeding all four cylinders. Maybe a freer-flowing motorcycle installation might have added a little extra performance?

Since the removal of the radiator left lots of space up front, Collier reduced the wheelbase by taking four inches out of the Norton frame's upper tube, shortening the bottom support rails and making new front engine plates. This resulted in a wheelbase of 53", in turn making the bike quicker steering and more responsive in tighter sections off-road. Collier also installed a bonded rubber rear end, with the cantilever swinging arm's lower horizontal member bearing on an array of rubber blocks of differing density, and thus variable malleability.

A key factor in Bob's success in trials, where if there had been a British championship for such events he would most probably have been crowned champion in two or three successive years on his four-cylinder creation, was the smooth torque and power delivery of the engine, and the excellent power to weight ratio of the Collier Bitza.

'The Austin Seven engine is immensely popular with Bitza builders,' he wrote in 1948, 'and I have found them almost ideal. These engines are



BSA fork and wheel handle the front end



Left: A transverse four is always going to be wider than a sidevalve single, but it needn't be gross



RCS AUSTIN FOUR

THE MILLER MUSEUM



The Sammy Miller Museum in New Milton, Hampshire, UK is crammed full of interesting machines – including one of the biggest collections of exotic racing bikes in the world, and all are runners! These include the V8 Moto Guzzi, AJS Porcupine, Mondial 250 with dustbin fairing, Nortons, Ducatis, Suzukis, Hondas, Velocettes and many more! The Road Bike Hall includes a huge collection of factory prototypes and exotic designs from all over the world, and of course there are plenty of dirtbikes and trial icons, too – over 400 bikes in total.

The Museum is open to visitors daily from 10am every day at New Milton, Hampshire B25 5SZ. 01425 620777 / www.sammyiller.co.uk

compact, light and accessible. The performance is not to be sneezed at, since it's as good as many a 500cc OHV engine, added to which is the fact that they are both quiet and docile. The unit is comparatively small when compared with, say, a 350cc Levis or 500cc BSA. A visit to a public weighing machine proved to be most surprising, with the Levis engine scaling 87lb, the BSA 105lb, one of the original 500cc Ariel Square Four engines 115lb, and the Austin just 110lb. When comparing these weights, do not forget that the Austin is half as big again in capacity as the biggest of the others. This fact may come as a shock to those who vow that a car-engined Bitza machine must necessarily be heavy!

Bob Collier produced a sixth and final Austin-engined road bike in the 1950s, using a 1933 aluminium crankcase and coil ignition motor that he again modified for air cooling, to which he added a very professional-looking and quite heavily finned cast aluminium cylinder head that he made himself from scratch. He modified the inlet tract manifold for the sidevalve engine to be horizontal, with the Amal carb angled to clear the front chassis downtube, and the long single exhaust pipe running neatly away down the left

side of the bike to a slim silencer beneath the rigid rear end's wheel spindle. The Lucas dynamo and distributor were moved inboard to the right of the engine, with an auxiliary drive to give good accessibility.

Bob fitted this Austin motor into another ex-WD frame, this time from a BSA M20, retaining the BSA girder fork and four-speed gearbox. This is the bike donated to the Miller Museum Trust by the Collier family in a poor but nearly complete state, having sat in a shed unused for the past fifty years, which Sammy and his now retired colleague Bob Stanley then restored to better condition than when Collier rode it!

My chance to sample Bob Collier's engineering skills first hand came on his final self-built Bitza, since rechristened as an RCS (Robert Collier Special) by Sammy – well, that's what it says on the fuel tank! – rather than the RGC (his initials) Bob's creations always carried Back Then. But – hey, what's in a name: it's the quality and effectiveness of Bob Collier's handiwork that matters, and by any standards this is absolutely superlative.

Thanks to the low compression the four-cylinder sidevalve car engine is easy to start

on the sturdy kickstart lever, and it purrs into life with an extremely sophisticated sense of refinement that's frankly at odds with its home-built history. If you didn't already know that a single clever individual had built all this himself in his home garage you'd never guess that to be the case. Apart from the vintage-era girder fork, which was well passé by the mid-'50s when Collier concocted this final Four, you'd be complimenting the engineers of the far-sighted manufacturer who had created this luxurious mile-eater more than a decade before Honda followed suit in launching the world's first modern-era four-cylinder Superbike.

This final RCS Austin Four is far from being a performance package, but it wafts along quietly at a smart pace, and is extremely flexible with a wide spread of torque, so is very relaxing to ride. It's a pity there's no rev-counter fitted, just a Smiths speedo and an ammeter in the back of the headlight shell, as I'd have liked to see how few revs the Austin engine required in pulling away smoothly from rest, because you need hardly slip the clutch at all, and you're on your way. That clutch lever action is light and positive, while the right-foot one-down four-speed gearshift is

crisp and short in travel, although you don't need to use it much because the engine is so flexible.

Although there's no rear suspension – strange, since Bob Collier was so eager to experiment with this on his other bikes – the ride quality is pretty good, thanks to the well-sprung and spacious saddle, and the girder front end handled OK over the few bumps to be found on the long private driveway where I tested the bike, which hadn't yet been registered for the public highway after restoration. Sammy is hoping to be able to retrieve the GOC 175 Birmingham number the bike carried when it was new.

If and when that happens, I'm hoping to persuade Sammy to let me take this last of the line of Collier Fours away for a morning spin through the gorgeous New Forest lanes around his Museum. I reckon it'd be me that would come back purring – with pleasure, after doing so! What remarkable testimony it is to the creative talents of a gifted self-taught engineer who by rights should have been working

much sooner than he did for one of the major manufacturers.

Even when he did join Norton, it was to refine other people's creations, instead of spending his spare time showing them how to move British motorcycle engineering forward with his succession of specials. I hate to say it, but if Bob Collier had been Italian he'd have been scooped up by one such company after building his second or third such bike, and we'd nowadays be talking about him in the same respectful terms as Carcano of Guzzi or Ducati's Tagliani. Imagine if he'd been given the resources that such men enjoyed, and allowed his inventive imagination to run wild, in the interests of his employers and their customers. Thanks to Sammy Miller and his grandsons, Bob Collier's gifted talents are now being recognised – but what a pity he didn't gain this level of appreciation while he was still alive. Still, better late than never, I suppose! Rc