

Upgrading a Babetta into a Classic Sports 50cc Motorcycle

or the one they should have built!!

The project started with a Mustang or type 555 engine bought off Gibby "Enterprises" at the 50th Anniversary National Rally back in 2004. The engine had been rebuilt but was missing the JIKOV 2917 carb, but had the neck, and also any of the various gear shift lever mechanisms that JAWA 50cc bikes used with these engines. The engine was shipped home along with the usual Grot Bike Award and sat in the garage for another day.

Timbo and myself did speculate a "what if we" type idea of whether or not the little engine would fit into my son's JAWA type 210 Economy 1 speeder that we had given to him by Mark DeHora the year before. This bike went reasonably but was still slow.

Onto August 2004 and at the Netley Marsh Motorcycle Autojumble, which is always a good place to find all kinds of JAWAs and CZs including Enduros and Classic, I spotted a type 225 with cosmetic damage. Fifteen notes were exchanged and I became the owner of a type 225 2 speeder. It joined the haul of JAWAs and a CZ250 twin that the "mob" acquired that day. It's amazing that John Ambroses' Renault Traffic made it out of the field without sinking, what with 5 people, a Raleigh RM (1!!) and numerous JAWAs and CZs. It was also bloody cramped inside as well. Luckily nobody farted to add to the suffering!!

Back at Timbo's we nicked the spare gas tank I had bought for the type 210 and then fired the type 225 up. Having a kick start was an improvement on the type 210's LPA method of starting. Soon we were performing speed trials of one against the other down the 1/2 mile private road at Trickett's Cross and as could be expected, the type 225 2 speeder peed all over the 1 speeder type 210. An added bonus that when some teenage twat on a Peugeot Speed Fight Sc**ter thing with a "performance" exhaust challenged me to a race down the lane, the little JAWA also peed over that as well, though when the automatic gear box changed up via neutral and disengaged the drive for a second, I dropped back and thought that that was as quick as the little JAWA would go, but when second gear kicked it I just rocketed on past the sc**ter and into the distance!!

Back into the garage and modify the baffle / restrictor and back out again on the lane with John Ambrose matching speed on the CZ250 which clocked me at 42 MPH eventually. Bearing in mind that CZ twin speedos are notorious for reading less than actual speed by more than 2 or 3 MPH (or 8 MPH in the case of a speeding ticket I received from a motorcycle cop back in 1984!! 38 MPH actually, 30 MPH on the clock!!) Anyhow, quite good going for such a little engine. The automatic gear change is a novelty in itself and everyone had a play on it.

Now that I had a possible bike to convert I decided to go for it and armed with angle grinders and expensive welders, hammers and hacksaws, etc. the 225 engine was removed and stuck into the type 210 for obvious reasons and the Mustang engine bracketed and fitted in place.

This involved having to turn the frame upside down

and make two across slash cuts and one length ways into the frame tube belly to allow the pipe to be hammered flat so that it didn't foul the Mustang engine's top mounted gear actuator mechanism. This was TIGed shut and filled in with stick welder. The original front engine mounts were ground away and removed.

When this was done, still with the frame upside down, suitable engine front mounts were sourced from the front mount plate of a dead JAWA type 638 frame, being of suitable quality proper metal which welded on nicely after they were bolted into place on the fitted upside down Mustang engine. Now with the engine bolted into place on the frame it was turned back onto its wheels and sat on to see how it felt and if the frame could be flexed as the engine is a stressed member on the ZVL type mopeds!! NO it couldn't but it was discovered that the rear bottom of the mudguard hit the spark plug when the forks were compressed all the way (6 cm.). So the mudguard was removed and luckily the wheel was well clear of the engine.

OK, so now we had a moped with a decent engine that still looked like a type 225 Babetta with a bigger engine. Still far cooler than any sc**ter for a 16er to ride but still lacking style.

Anyone who read the Letters Page in Bike magazine back in May 2005 will have spotted my star letter that they titled "Strike Him Out Of The Will!!" on the horrors of a biker finding that his teenage offspring want to turn to the dark wimpy side of "motorcycles" and ride sc**ters!! My son kept stating that he didn't want a bike with gears and Timbo did point out that maybe the dark side was luring him. Obviously time to act and fast, before he starts to use foul language such as Lam****a and V****a amongst biking company!! I still reckon that all sc**ter magazines should be kept on the top shelf away from young impressionables!!

So we have a Babetta with a Mustang engine and it has Gremica wheels to boot!! Still doesn't look the part though until I dig up a knackered CZ 125 Cezeta frame the following week and haul it over to Tibo's place where we cut off the cross bar and seat rails in one piece. The rear seat rail spacer was just right to be welded onto the rear main frame spar where it starts to turn downwards. The front I cut short and used some more old JAWA 350 engine mount plates to marry it up, with heavy welding, to the rear of the headstock sides. Now it was looking more like a bike!!

Using a CZ cross bar also came with the ignition coil hanger and strengthened the frame even more. It also allowed for the fitting of a CZ gas tank which would give a Mustang engined bike 350.064 miles per full tank it was worked out. So no late night, "Dad, I'm out of gas" phone calls or a good excuse to reply, "Well push it!!".

However a CZ saddle didn't look right on the bike at the tail end, being too long and also the tail end lights needed somewhere to live. A CZ Custom Mk.II. saddle was also far too long.

The months went by and the project was mothballed usually due to the weather but mainly due to other bikes to work on. In September this year I had Timbo flat bed combi the thing over and I started to wire the thing up and sort out the brakes and gear shift problems.

The saddle and tail lights plus rear end styling problem was solved by bolting a JAWA TS 350 rear end plastics and mudguard unit straight onto the saddle frame rails. It fitted like a glove, almost as if it was made for it. This solved the tail lights as well. I'd curtailed the original mudguard up to the rear most of its mounting lugs so it continued in use but was not visible from the rear and matched the radius of the plastic JAWA item over it.

Next the saddle was cut back at the front of the pan a few inches shorter than one would think obvious so that the saddle foam snugly mates up to the rear of the CZ gastank. The saddle pan is to be bolted to the frame rails once all the wiring is finished.

The wiring was kept to the Mustang wiring colours as much as possible because I was using a brand new Mustang headlamp bought from George Arnold's bike shop and I had the diagram available from jawamoped.com. However, being a wizard when it come to automotive wiring, I made a few modern improvements as the generator puts out next to bugger all power and I needed to milk it for all it could give and no waste.

OK from the alternator red and green wires the power flows into a bridge rectifier (Maplins catalogue very bottom of the list 4 Ampere item!!) bolted to right hand CZ part of the frame trimming mount lug (another bonus of the CZ frame!!) it is important that the minus out spade connector is not used, as the alternator earths through the frame and the power output drops to 4 Volts if one does!! The plus output then feeds into a Yamaha T80 Townmate 6 Volt transistorised regulator bolted to the other trimming lug on the left of the frame. From here the power splits up to feed the lights and indicators as usual on a Babetta or Mustang but also it feeds through a fuse into a sealed Gel Pack 6 Volt 10 Amp/Hour battery mounted in a large plastic project box fixed to the Babetta under saddle rear frame tube trimming lugs by bolts and washers.

On testing the system it operated the lights happily either without the battery in line, just on the alternator or just with the battery in line and the engine stopped. The lights are bright with no battery and just over tickover revs and stay the same through to peak revs so I think it works good enough. The bike is running 1 x 25 Watt headlamp and 2 x 4 Watt tail lamps so apparently I've improved on the Mustang's 30 watts and the Babetta's 25 Watts somewhat.

All the wiring was done with soldered crimp connectors using automotive wire. The switch gear on the CZ handlebars is Cezeta and I used the CZ plug to hook into the loom I'd built.

The ignition was wired up with the coil also having its power fed through the handbar kill switch just to be on the safe side. A good kick on the starter had a literally cracking spark at the plug. I was unable to measure the spark's strength using the HOTTAS (Hold On To This A Second!!) test method as my son had assisted on another bike spark test with this method before. With the HOTTAS method of magneto / coil testing one has to gauge the strength of the spark power from the reaction and language of the assistant. There is of course, no immediate hazard or risk to the tester when using the HOTTAS method, only the assistant, so it is safe to use.

Not having the correct JIKOV 2917 carb I used a AMAL 18mm item bought complete from the 2005 Netley Marsh Bike Autojumble for 15 quid. I alluminium soldered the neck manifold piece to an aluminium plate and drilled and filed a hole through it to mate up with the bolts and tunneling to the JAWA neck piece. I then fitted everything back onto the engine and the bike started up on the first instance of the push start. (No kick start lever foot piece on the kickstart!!).

The AMAL runs a 68 main jet and the manual states that the Mustang carb also runs a 68 main jet. Luck or what? As a plus the AMAL has a push down and twist to lock choke and a tickler. Since fabricating the foot part for the kickstart lever from a Lucas indicator and steel sleeving tube, the little engine even starts on one kick from cold at sub zero temperatures!!

Anyway, back to the carb. The AMAL Tiger Cub 18mm carb has a cotton mesh air cleaner which might have been OK but for the fact that it faces forwards within a few inches of the front tyre. Luckily the carb mouth is a wide 3 inch by 2 inch oval with screw fittings for the filter unit. I removed this and used a black project box screwed to the rear of the carb with a larger hole to feed the air into it. This box is the new plenum chamber in addition to the normal Babetta frame tube Plenum chamber and air filter above it. Anyway a piece of packing foam sprayed with WD40 is glue gunned across the upper quarter of the box so that the Plenum area is the other three quarters below it, giving the engine a suitable reservoir of air and blow back area for negative back pressure from the exhaust system (flat spot revs to the layman). From the rear top of the box a piece of red washing machine hose feeds up into the normal Babetta frame mounted air "filter" system. If anyone has seen what passes as an air filter element in a Babetta, they will understand why I put "filter" with quote marks. Basically ants could easily crawl through it.

From then on the air flow and intake is as for the stock Babetta except that I cut the intake silencer back a bit by 4 inches to improve the tickover and throttle response. Connecting up the air system allowed the engine to settle into a nice smooth tickover once warmed up.

Onto the exhaust system. This is a brand new item, bought for a fiver, at the Shepton Mallet Bike Auction and Show in 2004. It is a racing expansion for the now defunct Aprilia AF50 sports 50cc motorcycle. I had intended to use only JAWA, CZ and ZVL parts on this bike but as Aprilia started off in 1969 building CZ type 476 150cc versions of the CZ 125 and also CZ 250 and CZ 350 twins, there is a historical link between CZ and Aprilia in the past and through the 1970s. I own an 79,000 mile Aprilia CZ 350 and bloody fast it was too with its ASSO Werk 14.5:1 compression pistons, non-Czech mains and other differences to Czech built machines!! I must return it to the road someday.

The pipe had the neck cut back, eliminating the kill joy restrictor washer as a bonus, and had a concentric mounting oval, stick welded on from a salvaged sc**ter exhaust system and this was bolted onto the engine. The rest of the exhaust (and the sc**ter!!) were thrown away. The midway exhaust bracket lug is bolted to a chrome mudguard brace from a crash damaged type

634 mudguard and this is in turn bolted to the normal Babetta exhaust hanger. The silencer is a 50cc aftermarket trailbike item and is an aluminium oval street legal can featuring a flat plate area inside that feeds through two perforated tubes and into a space and exits through a 10 degree angled hole. Being a left hand can on a right hand location, the exhaust gases usefully spray out directly behind the number plate area. By some stroke of luck the pipe doesn't foul the centre stand and fits as good as a proper JAWA factory made system.

For the brake pedal a JAWA 350 brake cross shaft was used inserted through the swinging arm pivot but from right to left. The left hand brake switch and side car brake piece is now on the right. Onto this I welded a CZ type 476/477/471/472 brake pedal with the hole part cut off. This was positioned so that it cleared the underside of the right hand foot rest and the expansion pipe. A spacer tube was fitted onto the shaft to position the pedal clear of everything.

A 1970's CZ rear brake rod was fitted to the back brake drum and attached to the brake pedal. Pushing down on the pedal revealed that it didn't foul the bike anywhere and now the back brake ability is about 10 times better than when it was on the handlebars. This location now occupied by the clutch lever of course.

On the left hand side I discovered that a JAWA / CZ machined tube from somewhere in a twin engine, happened to fit snugly over the cross shaft and turns freely. Also that a JAWA / CZ gear lever interference fits nicely onto this shaft. A rummage in George Arnold motorcycles, old JAWA / CZ stores stockpile revealed a load of J shaped stamped brackets for God knows what model JAWA / CZ in the past and a brand new JAWA 90 primary chain, which I bought (in case Mally or someone wants it!!) and type 555 clutch pushrods, amongst other things.

These J shaped brackets looked just the job and I welded one onto the steel sleeve and hooked it up to the gear shift mechanism on top of the engine. I positioned the gear lever for best effect and ergonomics and then welded it into position. So now I had a bike that changed gear and stopped with a brake pedal. OK, so the Mustang has a pre-select type gear box which is a pain if one is used to modern auto-return boxes but as both Timbo and John Ambrose have pointed out, my son doesn't know anything better so it won't be a hassle for him to learn.

The clutch proved to be gummed up and from the efforts of John Ambrose and myself to put the microscopic but strong clutch springs back into the clutch and also fit the circlips utilising a claw hammer and pin nosed pliers instead of the factory, crowbar like, spring compression tool, we surmised that the designer must have been a sadist or something close. After over an hour of swearing, hunting for shot off parts, etc. it was all back together again.

It was then that I noticed that clutch pushrod adjuster on the right in the right hand engine case wasn't locking when set up. This meant that the bloody clutch unadjusts itself within 10 seconds of being used. The end of the screw had been split and broken off sometime during its history and the lock nut wouldn't screw onto the thread again. Also the seal leaks in the case and so I'll have to take it apart and machine up

the broken part. The engine is so torquey that I can just paddle forwards with the engine running in neutral and it will smoothly engage first gear or second and pull away. When the clutch is working for 10 seconds it is possible to pull away in second gear without slipping the clutch and with a bit of throttle. The engine runs smoothly throughout the rev range and has a noticeable powerband kick in the last thousand RPM before changing up is required. It goes quite well or "Bloody Good" as John Ambrose put it and he does own a couple of FS1Es to compare it with. He rates the performance as well above FS1E but not as high as a Puch Grand Prix, which he also owns.

The bike is nice to ride and John Ambrose just loves the little thing, stopping him test riding it around the drive takes running out of gas, etc. So he reckons that I should style the type 210 the same way but leave the 2 Speed engine in it just the same.

Next is fettling the bike up for an MOT test, obtaining a new registration because the DVLA doesn't keep records of VIN numbers and what plates go with them, which is another expensive money making racket they've dreamt up at DVLA towers. I thought that the bike just hadn't ever been registered until we tried to obtain a logbook for another bike that is known to have been registered locally and lost its number plate in the past. Nope that one needed re-registering as well and so 19 quid become 53 quid in one fell swoop. Be warned about buying bikes with lost number plates!! And always write the number somewhere on the frame as you could be somebody's hero in the future.

On the type 210 Jazz I plan to fit a pedal rear brake as it works better and fit a CZ cross bar, gas tank, JAWA TS 350 saddle and tail piece plus electrics but that's it. Oh, and fit a decent electrical system that runs a battery too.

The overall plan is that the bike will convey my son at a pace that'll keep up with the Grot Combo to the 2006 National Rally. As the Little Babetta only weighs 100 Pounds I can probably carry it on the Combo hung off the back. Timbo has proposed a suspended towing rig arrangement on the Combo. We'll see how it runs on longer road tests first.

If he does ride it there will there be an award for furthest distance travelled without having to refuel, as the 2.89 gallon tank will take the Babetta 350.064 miles in theory. I've worked out that the JAWA Jazz type 210 with a 2 speeder engine will do 450 miles or more on 2.89 gallons, so with a JAWA TS 350 4 gallon tank could the club go for the Lands End to John O'Groats without refueling unclaimed record?

Anyone interested in converting their unexciting Jazz or Babetta into a facimile of the classic 1970's sports moped like our Babetta, feel free to ask for advice. It wasn't that difficult to build and it seemed to solve itself when problems arose, unlike the DVLA.

I've received good Construction and Use guidance and tips on the legal minefields and loopholes from George Arnold Motorcycles who is an MOT station and both builds and tests constructed and modified motorcycles from time to time.

And that's how I did it with and bit of help and inspiration from friends.

Andy Reid. **Dorset.**