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General References

- MG Factory Workshop Manual
Note in particular page M12 Section "Replacement of the Wheel Cylinder".
- Horst Schach, MG TD Restoration Book
- Parts blowups from MG TD Parts List
- MG TD-TF Internet Bulletin Board

Miscellaneous Notes

- Threads on bleeder and pipe fitting are 3/8" x 20 BSF.
- Grease fitting can be fabricated from a 10 mm grease fitting, rethreaded for 3/8" x 20 BSF.

Disassembly

During disassembly it was discovered that the front left brake drum had a chip in the outer lip. This was likely from a wheel puller with arms having been used on the drum at some time in the past. In tracking down a replacement brake drum it was found that the size of the front drums was larger than the rear drums by approximately 1 inch. The front drums are apparently from an MGA 1500. The other components that appear to be MGA running gear include the round backing plate and the shoes.

Front drums had the following numbers cast in them:

MOWOG

BC ATB 4165

These should be approximately 11 3/4" diameter drums.

A replacement MGA drum was purchased from British Wire Wheels to replace the chipped one.

An article in the TSO (Feb 1976, page 22) suggests other differences, too. In an MGA, the banjo fittings and brake pipes are Unified thread. Further, the brake pipe connecting the two banjo fittings is longer to span the greater distance associated with the larger drums. The brake hoses have Unified fittings instead of Whitworth and the hose length may be different. (The TSO article also described modifications to the tie rod ends that will need to be made so that toe-in may be set properly for the TD. This will all need to be sorted out to figure out what parts are required to rebuild the brakes.)

The brake pipe set I purchased was designed for TD/TF. This must mean the front brake cylinders are TD/TF cylinders, as the thread size was correct. These pipes fit fine. There was an obvious homemade plate to adapt what I believe to be TD/TF front brake cylinders to the MGA backing plate. I conclude that the only MGA parts are the front drums, shoes, and backing plate.

Rear drums are MG TD/TF

These are approximately 10 3/4" diameter

I believe these should carry the number: ATB 4126

They are actually stamped with the somewhat hard to read numbers: A2394 and 12

Wheel Disassembly/Reassembly

- Remove knock-off (one only)
- Loosen castellated nut
 - Castellated nuts (only) on axle stub must be removed, in order to remove the brake drum. Remove the cotter pin, which may be extracted through the hole in splined sleeve of the brake drum. Stainless steel cotter pins were used during reassembly. A breaker bar was used with the socket driver to *loosen* the nut. (This was an approximately three foot black iron pipe from a pipe clamp.)
 - The castellated nuts will be removed completely after the wire wheels are removed.
 - Castellated nuts are threaded as follows:
Left front: Left-hand thread, 1 1/4" SAE
Right front: Right-hand thread, 1 1/4" SAE
Left rear: Right-hand thread, 1 1/8" SAE
Right rear: Right-hand thread, 1 1/8" SAE
- Put on knock-off.
- Repeat above for all four wheels.
- Put car on jack stands
- Remove four knock-offs
- Remove four road wheels.
- Remove four castellated nuts
 - The large washer behind castellated nut has beveled edge out.
- Brake Drums
 - *Back off fully the brake adjusters before removing wheel.* These are accessed through a hole in the drum. There is one adjuster on each rear wheel and two adjusters on each front wheel. During reassembly the rear brake adjusters may be replaced with adjusters that have a shim welded on the bottom to take up some of the gap.
 - Note: The castellated axle nut must be removed before doing this step. On some wheels the brake drum easily slid off the axle stub. If the brake drum is not easily removed a wheel puller will be required. It is best not to use the kind of wheel puller that has three or four arms which go around the outside of the brake drum. The drum is made of cast iron and the wheel puller arm can break off a piece of the drum. An alternative wheel puller was made by drilling a hole in the center of an old knock-off. A large nut was welded on the inside of the knock-off. A matching 5" bolt with hex head will be used with this wheel puller. (Note that two modified knock-offs are required, one for the wheels on the left side of the car and one for the wheels on the right side, as the threads are opposite). Spin the knock-off puller fully on. Tighten the bolt through the knock-off until it contacts the axle. Tighten the bolt with a socket wrench and the drum will slide off the axle.
 - Locking tabs on the brake drum nuts do not need to be removed.
 - After removing drum and cleaning the end of the axle, a line was scribed on the axle end to show the alignment of the cotter pin. This will make it easier to determine how far to tighten the castellated nut on reassembly.
- Remove shoes by prying apart one shoe from the other, then moving one shoe outboard so it can be passed by the inboard shoe. For front wheels it is too difficult to separate the shoes by hand. Use two pieces of 2x3 approximately 2 1/2' long and one piece of 2x3 approximately 6" long. These form a "scissors" that can be used to pry apart the brake shoes or align them for reassembly
- Brake Cylinders
 - Remove the brake cylinders
 - It may be difficult to remove the piston from the brake cylinder. This can be done easily by screwing a 3/8 x 20 Whitworth grease fitting into the brake cylinder,

then pumping grease into the cylinder. Hydraulic pressure will squeeze the piston out of the brake cylinder.

Cleaning

Metal parts were placed in an ultrasonic cleaner filled with Simple Green. Any remaining paint or hardened grease was removed with a toothbrush and Simple Green. Finally, parts were soaked for several hours in Metal Ready to prepare them for eventual painting or reinstallation without further treatment. Metal Ready should provide some level of rust prevention for these parts. Brass (banjo fittings, etc.) and parts that had machined surfaces that fit together to make a leak-free seal were not placed in Metal Ready.

Cylinders

- Rear brake cylinders (two) replaced with reproduction brake cylinders (Moss).
- Front brake cylinders (four) resleeved in stainless steel by Mark Frappier.
- Master cylinder resleeved in stainless steel by Mark Frappier.
- Split steel washers used to attach cylinders to the car were replaced with split stainless steel washers.

Mark Frappier

82 Mountainview Street

Agawam, MA 01001

Resleeve wheel cylinder in stainless steel: \$45 per cylinder

Resleeve master cylinder in stainless steel: \$65

Return shipping and insurance: \$10.36

C.H.Topping & Co.

520 Esther Street

Long Beach, CA 90813

<http://www.chtopping.com/>

(562) 432-0901

Reline four brake shoes (two pair): \$30 for four shoes

Return shipping: \$12.80

Reassembly

Use Silicone Dot 5 brake fluid

Silicone grease (same as silicone dielectric grease) was used during different points in the reassembly. When rebuild kits were installed in cylinders, a very thin smear of silicone grease was used to lubricate all internal rubber parts.

Master Cylinder

Disassembly

Brake master cylinder could not be opened. After circlip was removed thick steel washer could not be withdrawn. This end of the master cylinder was placed in Simple Green in an ultrasonic cleaner to no effect. A microtorch was used to heat the washer and a very thin stainless steel lab spatula was slid under the washer and the washer carefully pried up. Disassembly followed.

Rebuild

- Use silicone grease (thin smear) to aid assembly
- Silicone grease helps to pull the donut cup over the internal piston. Make sure this cup is fully seated.
- When inserting tiny rubber cup, press rubber cup sides, which bulge through the metal cup holes, back into the interior using a blunt tool.
- To insert last cup into the master cylinder use a tiny curved spatula to work around the sides and gently press cup into the master cylinder at the same time.
- Gasoila was used on some pipe fittings,

Installation

Rubber boot small opening goes over wide shoulder on most rearward nut. Silicone assembly grease aids what is a very difficult job. Push opening over blind side by pressing on boot from the rear of the car. Then hold boot in the correct position by holding with fingers from the front. Next, work one's way around the boot from the rear, pushing it over the nut and onto the shoulder.

Brake Cylinder (Rear)

- Moss repro rear brake cylinder needed to be filed at one end so that cylinder would fit through cutout in cylinder backing plate. Round edges after filing so rubber boot doesn't tear on cylinder. To insert, cylinder piston needs to be removed during cylinder fitting through backing plate, then reinserted after cylinder is in place.
- Rubber boot is a very snug fit over cylinder. To install the boot over the pipe fitting at the top, turn the boot inside out at this top portion, then push the opening in the boot over the pipe fitting, finally allowing the boot to spring into its correct position. Plastic caps were left in place over the pipe openings in the cylinders, so dirt or dust would not get into the cylinders.

Flex Lines

- Screw front flex lines to brake cylinders first, then to bracket on chassis.
- Screw rear flex line to three-way fitting first, then to bracket on chassis.
- Make sure flex lines are not twisted during installation. There are reference lines on the flex lines that can be sighted to make sure twisting has not occurred.

Other Parts

- Replace all rubber parts, including using rebuild kits for wheel and master cylinders and new rubber boots.
- Replace all copper washers. I sanded the washers using very fine grit sandpaper on a glass plate to insure flatness. Even new copper washers should be annealed. Heat all copper washers to red hot, then allow to cool to room temperature before installing.

- Some people use Gasoila to prevent leaks at banjo and pipe fittings. I used Gasoila on pipe fittings, specifically in the master cylinder, but did not use Gasoila on banjo fittings.

During reassembly castellated nuts were torqued to the minimum values, then turned further to align the scribed line on the axle stub with slot in the castellated nut.

Torque Specifications

Front castellated nuts: 40-70 foot pounds.

Rear castellated nuts: 70-200 foot pounds.

Torque (Actual)

Actual torque values were as follows:

Left front: 70 foot pounds

Right front: 40 foot pounds

Left rear: 80 foot pounds

Right rear: 105 foot pounds

If it is not possible to obtain the described torque values, washers may be swapped from one side of the car to the other to see if this allows the nuts to be tightened to the desired torque values. If the correct torque value range still cannot be obtained, the washer may be filed down to remove some thickness. This can be done by moving the washer back and forth by hand over a steel file.

The left front washer was filed down from 0.127" to 0.123" and the right front washer was filed down from 0.128" to 0.123".

Bleeding

- Try very hard not to create bubbles when transferring silicon fluid (pour and transfer slowly).
- Fill each cylinder with fluid before installing. I did not have much success doing this.
- Master cylinder should never go empty during bleeding
- Order for bleeding: RR then LR then RF then LF (farthest from master cylinder to nearest)
- Operate brake pedal slowly to avoid bubbles in brake fluid. Do this many times to bleed.
- Have one person operate the brake pedal while the other person operates the bleeder valve at the wheel. Sequence of steps:
 - Open bleeder
 - Press brake pedal slowly.
 - Close bleeder
 - Release brake pedal slowly
 - Repeat
- Rebleed the next day to remove any remaining air.

Brake switch arc suppression device

Parts

1. Two 0.22 microfarad capacitors (Radio Shack) (or one 0.47 microfarad capacitor)
2. Polaroid camera picture coat brush tube (plastic), cut down
3. Slice from rubber stopper, with two small holes for wires, to be inserted in tube
4. Silicone caulk

Assembly/Installation

1. Solder capacitors, wired in parallel, then put wires through rubber slice
2. Fill tube with silicone caulk, then press in capacitors and rubber slice
3. Wire capacitors in parallel with brake switch. Make sure wires not stressed and that wires can't short against chassis. Use heat shrink tubing as necessary.

(see article about Brake Light Relay by Dave DuBois or contact Dave for more suggestions).

Rubber fume excluder over pedals in cockpit

1. Check that holes in rubber boot line up with holes in metal top plate, through which screws will go. If not, punch new holes.
2. Remove horizontal pedal extension (if installed)
3. Put electrical tape over sharp top edges of vertical pedal posts
4. Smear silicone grease inside boot and on vertical pedal posts
5. Carefully stretch rubber boot over posts
6. Secure metal plate with screws on top of boot
7. I repositioned pedal extender on one pedal and did not install extender on another pedal to give my feet more room to work the pedals

Wheels and Tires

- Five new Vredestein steel belted radial tires (165SR15, \$68.99 each), also radial inner tubes (\$8.07 each), from Tires Unlimited (www.tiresunlimited.com).
- Tire pressure of 30 pounds appears optimal.
- Tires were mounted by House of Wheels/Wheel Repair Service, Auburn, MA (www.house-of-wheels.com/)
- Wire wheels were tuned and balanced. See invoice for details about each wheel.
- Each wheel marked with a punch.

<u>Punches</u>	<u>Placement</u>
1	Spare
2	Left front
3	Right front
4	Right rear
5	Left rear