ROVER P6B AUTO TRANSMISSION SHIFT LEVER REPAIR FOR *PEA SOUP*

Introduction

Since the Rover 3500 has been in my ownership, the automatic transmission control lever (*Item 1, Figure 1*) has had a loose feel about it when shifting from 'Drive' to 'Park'. Recently, it has been very difficult to find the correct shift lever position that allows the engine to be started. Later, the lever became alarmingly 'wobbly' and had significant movement in the vertical plane. To me, this had become unacceptable, and therefore some investigation commenced. Having a rather limited understanding of just how the shift lever system was constructed and having a Repair Operations Manual that told not very much at all, an initial attempt at investigation was made.

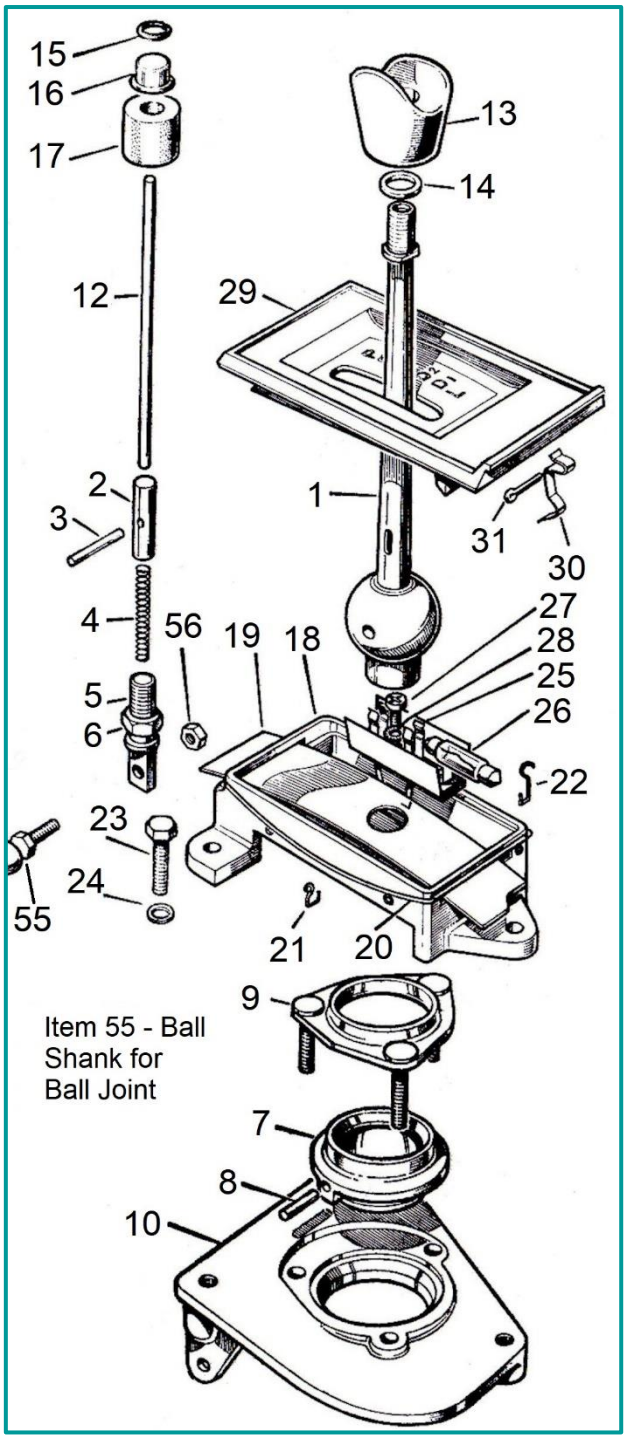

Figure 1. Illustration from the spare parts catalogue. Item Numbers are used in the following text. The descriptions are those of the author.

It should be noted that the motor car is equipped with an after-market air-conditioning system. To enable the shift lever to reach the '**Park**' position, the lever shaft and push-button rod assembly (*Items 1 and 12*) have been bent rearwards over a gradual curve. This curved lever, very likely, compounded the wear situation because of being pushed downwards and away from the driver as it is moved towards the '**Park**' position.

1st Concern Investigation

The lever's control knob (*Item 13*) was unscrewed and this action revealed a black gooey mess, probably in the past an attempt had been made, using a black sealant, to hold the knob assembly in the correct orientation. All of the silicone was cleaned up and a smear of carnauba wax used to free up the screw thread. Next, the lever's plastic finisher plate (*Item 29*, with **P**, **R**, **N**, **D**, **2** and **1** on it) was removed to find out what lay beneath.

An attempt was made at removing the centre console assembly. It is held in place by three ¼" UNF setscrews with their hexagon heads sliding into cages that are spot-welded onto the transmission tunnel. One setscrew at the front and two at the rear, all three revealed when the two ashtrays are removed. Ian Littler also advised that there should be a Phillips screw securing the console to the tunnel, just in front of the brush type draught excluder housing (*Item 20, Figure 1*). This screw does not pass through *Item 20*, it only secures the plastic console in the middle. Ian also advised that the handbrake boot had a flap in its front edge that could be lifted to reveal the screw. There was no such fitting on *Pea Soup*. There was, also, no screw – however there was a boss on the underside of the console, and a coinciding hole in the tunnel's top. This makes it possible that, originally, the self-tapping screw was fitted from beneath the car and tapped its own thread into the console's boss (*Figure 4*).

Being aware that a handbrake boot could be difficult to replace, it was decided to leave the console in place during this first investigation.

The Manual did show an illustration of the lever assembly, but it was not an 'exploded' view. It was very difficult to understand why there should be a spherical ball at the pivot. For a manual gearbox, this was easily understandable, but for an auto shift which only has a fore and aft movement, why the swivel ball? Some comments were sent to the RCCA's E-mail group and, quickly, some advice came to my Inbox. Ian Littler very kindly wrote up a procedure for getting at the mechanics of the task. Then, consideration was given to engineering a suitable fix to solve wobbly shift levers for all time.

Back to the black plastic finisher panel and it was soon discovered that it was secured with large dollops of, possibly, Silastic or similar. This probably worked well enough initially, in cooler conditions. With a recent spell of warm weather and the heat from the exhaust and transmission, the sealant soon became a sticky, semi-fluid mess that, as soon as the lever commenced being quite loose, the finisher panel moved in sympathy with the wayward lever; sort of floating on semi-liquid goo, not a comforting sight at all!

Once the mess had been cleaned up, it became obvious that the finisher needed to be more firmly secured in place on the centre console. The situation with regard to the ball-pivot was, to a large extent, not yet fully understood. The plastic finisher could, if possible, have

formed a suitable guide for the lever as it passed from '**Park**' through to '**1**' positions. there was still a leaf spring clip (*Item 30*) held to the rear of the finisher by a split pin. The clip was removed and tweaked rearwards to give it a small amount more pressure on the console. That did not really work, so it was decided to secure the finisher with three small self-tapping screws, which brought up the question of how to fasten it in its proper place.

There was a rather ineffective spigot across the front edge, to locate under the front edge of the console. Two small brass tabs were cut and secured with screws, to project forwards about ¼". Once these were in place, it was a simple matter to fix a third aluminium tab, this time under the rear edge of the console opening, projecting forwards to accept a small self-tapping screw with a No. 1 Phillips head. Thus the finisher could be fitted firmly and be removed using the simple action of just the one screw. Once in place, the finisher did act as a fore and aft guide, but not at all effective in controlling vertical and twisting play in the lever. Of course, the amount of play at the control knob is amplified by the lever's length.

The topic was then aired on the RCCA E-mail group and more useful responses came into my mailbox.

2nd Investigation And The Repair Task

There were two responses to my queries that sort of galvanised me into action. One, as mentioned previously from Ian, and another from Scott Richmond who advised that new Nylon shift lever bushings (*Item 7 in Figure 1*) were in stock at his shop in Oakleigh. Scott also sent an illustration from a spare parts catalogue which was most enlightening because it clearly illustrated what could be happening below the brush type draught excluder housing (*Item 20 in Figure 1*) and a decision was made to purchase a new bushing and, as a special treat for *Pea Soup*, a new handbrake lever boot which Scott also had in stock.

Remembering that Scott's store was just on the western side of the Pakenham rail line, it was decided to make use of the Myki card instead of driving over there. The trip to Oakleigh by train was really easy, the visit with Scott was also good and the advice that transmission shift levers had been known to fall through the transmission tunnel top and into the rotating propeller shaft with disastrous results, was the root of the decision to proceed with the repair immediately. The journey home was not good, with poor quality announcements at Oakleigh and Flinders Street that scheduled trains had been cancelled, extending the travel time by more than an hour. However, as has been said, every cloud has a silver lining, it was a pleasant surprise to note when 'touching-off' with the Myki card, my dollar value was still as it was at the start of the trip – free travel!

Using *Figure 1* as a guide and with *Pea Soup* parked over my pit, work commenced on replacing the bushing. For this job, some work is carried out from inside the car, and the rest from underneath. After disconnecting the universal joint at the front of the propeller shaft, all was revealed. The spherical ball of the lever could be seen working its way through into the universal joint cross. It had been caught in the nick of time!

The shift lever position light assembly (*Item 25*) was removed by unscrewing the single screw. Next the three setscrews (*Item 23*) were removed and, as the housing was lifted clear of the light assembly (through its port) and over the shift lever, the cast aluminium plate (*Item 10*) was heard to fall down onto the propeller shaft and hang there on the control lever's ball joint.

Back under the car, it was a simple matter to unscrew the control rod's ball shank from the bottom of the shift lever and lift the lever away. The pressed steel plate and studs assembly (*Item 9*) was then unbolted. The plate's removal revealed a sad mess that was the remains of the original bushing, refer to *Figure 2*. Comparison with the new bushing revealed that the 1977 Rover P6B featured two side locating pins (*Item 8*), whereas the new bushing was drilled for just one pin. Scott advised that the bushing should be drilled right through to accommodate the second pin. There was also advice that the pins should be installed without grease.

Figure 2. The new bushing is at left. Note that the new bushing has just one locating lug.

All components that had been removed were cleaned up and the ball on the lever was polished enthusiastically with Brasso to achieve a smooth surface and get rid of a felt/sealant mess that adhered to it. Once the cleaning was finished, the new bushing (*Item 7*) was drilled through and given a generous smear of Chemlube high temperature Silicone Grease and then the lever was pushed into the bushing. This went quite easily and it was a simple matter to grip the pins with a pair of self-locking pliers and push them home into the ball part of the lever. Once started, the bushing was swivelled until the rounded end of the pin entered the hole in the ball. Then the second pin was pushed into place. It should be noted that the pins are a tight fit in the bushing.

With the lever and bushing assembly pushed into the base plate (*Item 10*) and the steel securing plate (*Item 8*) tightened in place with three new Nyloc nuts, it quickly became apparent that the lever's action had been transformed. It was a really good feeling, but that feeling dipped, a little later on.

Next came the consideration of how one man could hold the base plate and lever assembly in place, while he installed the upper housing assembly. The solution was to have my wife, Sue, give some mechanical assistance. First, though, I cut the heads off two long $^{5}/_{16}$" UNC bolts and ground a radius on the shanks. Refer to *Figure 3.* The studs were threaded into the base plate and the assembly held in place from under the car. Then, with the assembly still held in place, Sue clamped a protruding stud shank with self-locking pliers (Vice-grips) so the assembly stayed in place.

Once back in the car, the pliers were used to guide the plate into position so that a short setscrew could be screwed into the rear hole in the plate and nipped up securely. The upper housing assembly (*Item 20*) was slid over the lever and the light assembly. Another long $^{5}/_{16}$" UNC bolt was screwed in place, instead of one of the studs. This allowed a degree of movement while the rear setscrew was removed and the second stud screwed in.

This procedure permitted the upper housing and light assembly to be slid accurately into its home position. Great care needs to be taken at this stage, to ensure that the plunger locking pin (*Item 3*) is centred in the lever assembly. When the housing was in place, the guide studs were removed and replaced with the original setscrews, one by one - with the whole assembly held rearwards as much as possible, in order to give the lever as much clearance at the air-conditioner console as possible. The shift control cable has enough adjustment to permit this, only a small amount, but it helps.

Figure 3. Bottom plate, showing the two guide studs.

When all the hardware was installed it was tightened home. As the lever was test moved fore and aft, it latched in all the correct places as described in the 3500 Owner's Manual. This was a good feeling.

Attention now turned to the control cable assembly. The Repair Operations Manual shows a pin and clevis type connector, but *Figure 1, Items 55 and 56*, shows a cut off ball joint and ball shank nut. On the car, the joint on the shift lever end of the cable was of the ball type with a plastic housing for the ball and, at the transmission end, there is a pin and clevis connector! The best of both options. This joint was located just above the exhaust, so it seems strange that plastic was employed there. The ball and housing were fairly well worn, so replacement was the only option. A rose-joint was tried, mainly because it was snug and featured an easy access lubrication point. As soon as it was installed, problems arose. The spot-welded cable mounting lug up in the tunnel was off-set to the centre line of the lug screwed into the bottom of the shift lever. An attempt was made to space the joint from the lug so that it was nearly aligned with the cable centre line resulted in the whole lever and cable assembly locking up after tightening home. It was then considered that extra spacing outwards of the rose-joint would impose a greater strain on the two pins (*Item 8*) which is not at all desirable. The hunt was then on for a new ball joint. Finally a suitable all metal ball-joint was located at Bearing Wholesalers at Bayswater (Part Number R107G, with ⅜" A/F ball stud hexagon and the same for the flats over the shank thread). The joint included a rubber seal to prevent dirt ingress, but its female ¼" UNF thread shank was ⅛" (0.125") shorter than the original(?) type. This was an appropriate ball joint to utilise, because there was sufficient thread engagement of the inner cable.

With the ball-joint concern resolved, the Repair Operations Manual was referred to, so that correct cable adjustment could be carried out. This, being (most likely) a British Leyland publication, was delightfully vague, with the statement:

'*Adjust cable as necessary.*' Oh?

After a few moments of thought, it was decided to place the shift lever latched into the '**P**' position, and then push the lever on the side of the transmission to locate snugly in its '**Park**' position. With the two levers in position, the ball-joint was set on the cable's thread so that the ball-shank would pass easily through the shift lever's lug (*Item 5*) and be fully tightened without placing any strain on the levers. It worked!

Fitting The Handbrake Boot

The original handbrake boot had split in a few places, that meant that the removal of the centre console was made easy by use of a sharp knife and cutting it away from the lever. This made removal of the centre console an easy task. Once the console was turned over, five steel pegs were revealed, these were employed to secure the boot to the console with speed-clips fitted from the underside. Personally, such clips have never been admired very much, that meant another holding method was required, The solution was to use a 3 mm die-nut (from Dormer, UK) to cut a thread on each stud. From there, 3 mm nuts and washers were used to fasten the boot to the console.

Figure 4. Console viewed from underneath showing the five 3 mm nuts and washers. The screw boss is arrowed.

Then, following Ian's suggestion, the handbrake cable adjustment was backed-off to allow the lever to be lifted to a near vertical position. This was quite difficult, probably due to *Pea Soup* having a large diameter exhaust pipe fitted. Finally with some deft spanner work, the cable was slackened enough to install the console easily. A generous smear of silicone grease was applied to the lever's hand grip so that the boot could slide over easily. The installation of the console was soon completed and attention was turned to the handbrake cable adjustment.

It was found that the new boot held the handle upwards two clicks on its ratchet quadrant. This condition meant that not very much adjustment was required at the cable adjuster. The ends of the cable were greased and the rubber cable boots pushed into place. The lever now sat slightly higher than in the past, but the brake still holds firmly as it should. The matter was settled later, again using Ian's advice, and some brutal pushing and ramming to make the stiff new boot submit to persuasion. It then settled in its new 'home' position, and thus the handbrake cable could be adjusted correctly.

As a result of this repair, the shift lever has a very new feel about how it operates, and that makes the driving experience so much more pleasurable.

Caution!

It should be noted that the foregoing is the result of scant published information describing how the job should be undertaken. The procedure could have been carried out differently and, probably, the second time around, the repair could be effected in a more streamlined manner.

It should also be noted that high temperature silicone grease was employed due to the proximity of the exhaust system and of the heat generated by the engine and transmission units. While the car is stationary, in traffic hold-ups, the transmission tunnel becomes quite hot.

Grateful thanks are given to all club members who freely provided assistance.

Mike Allfrey.

For the Rover Car Club of Australia Inc.