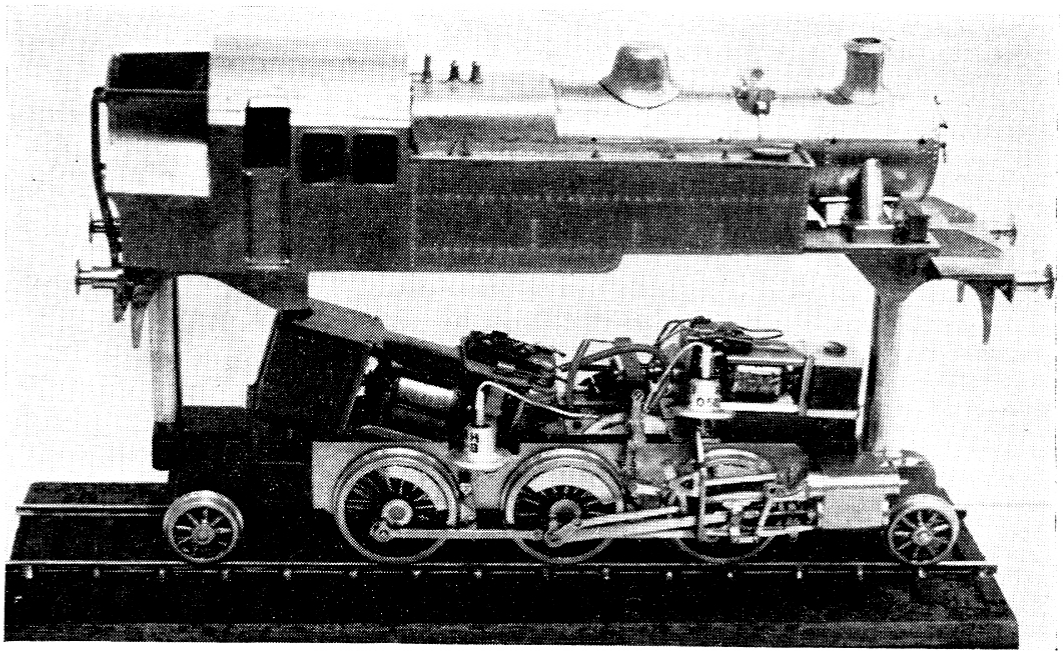

The Pittman 5-pole, heavy duty, DC-71B motor has enough clearance in the cab of this $\frac{7}{16}$ in. scale class 3 tank, despite the oversized Alnico 6 magnate. Sitting on the steam chest, and extending back over the frames, is the 5-pole "Terrier" by Romford. It is this motor that operates the lifting arms of the valve gear. The sector plates can be easily seen; the housing containing the spring loaded carbon brush protrudes on the near side, and the split in the sector plate is obvious on the far side. The extended "Terrier" armature shaft passes through the Tufnol crosshead bridging the top of the two wiper arms. A 10 B.A. thread screw operates on the bush mounted on the back of this crosshead. *Photo: B. Monaghan.*

JOHN NOBLE

This article was previously published in "The 'S' Gauge Gazette," and is reproduced here with permission of the Editor, E. A. Manning.

REVERSING GEAR FOR AN IVATT TANK

THE idea started as a joke to amuse members of the S gauge Society a couple of years ago, but has proved to be quite reliable. Basically, the idea is something like this: If the reversing gear is set for the correct direction of travel the loco starts and stops normally. If the reversing gear is the wrong way, current to the main motor is blocked by a rectifier, and passes instead to a second small motor. This motor proceeds to shift the valve-gear to the opposite setting, then switches itself off and transfers power to the main motor.

This business of rectifiers needs a little basic explanation for our non-electrical readers. As is well-known, it is usual to arrange a dead section at the end of a siding, so that the loco does not charge the buffet stops. The switch can be a simple toggle but is better spring loaded to the "off" position, so that nobody can leave it on by mistake, Fig. 1. Better still is to use a simple rectifier, Fig. 2. This gives the same protection by blocking motor current, but allows the loco to be driven away again without fiddling with any switches. Also, of course, it cannot be switched on by mistake. (The rectifier must be pointing the right way round, but since there are only two ways, this is easily found by trial and error !)

The system of motor control in my 2-6-2T uses this same principle, but I needed four of these rectifiers for full interlocking, together with a special two-pole switch which I designed as part of the valve lifting gear and shown in Fig. 3. This is called a "ladder diagram" and, in fact, the double lines at each side represent the running rails. The two arrows in the centre of the diagram represent the lifting arms of the valve-gear, and contact brushes wipe over the sector plates to act as a double-pole switch. The lifting arms are, of course, mechanically connected to the auxiliary motor and move up or down in unison.

In the position shown the main motor cannot turn because current is blocked by one of the two rectifiers A and B for either direction of current flow. The valve-gear is in roughly the mid position, and current *can* flow to the auxiliary motor by a direct path through the two wiper arms on the

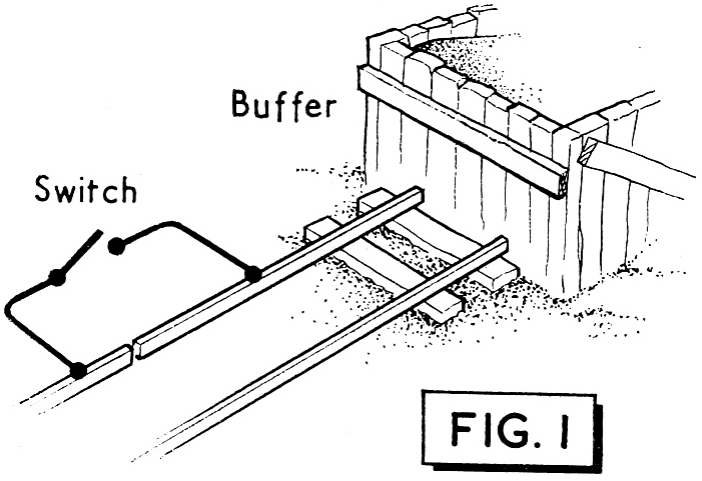

FIG. 1

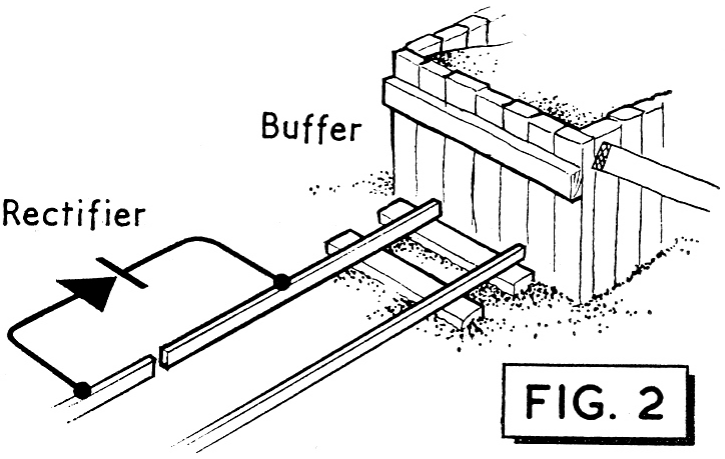

FIG. 2

long segments of the switch. Now suppose the auxiliary motor rotates in such a way that the wiper arms travel downwards — when the right-hand wiper arm leaves the long segment the motor stops; this is just like the engine entering the dead end of the siding. If the current is reversed, the auxiliary motor obtains power through the rectifier "D" and the left-hand wiper arm (which is still on the long segment of the switch), and the auxiliary motor can thus raise the wiper arms until the left-hand one leaves the long segment and the motor again stops.

Then, similarly, another reversal of current will give a feed to the auxiliary motor through rectifier "C" and the right-hand wiper arm for downward travel.

All the above concerns the auxiliary motor, but consider now the main motor which drives the wheels of the loco. As stated before, when the wiper arms are in a central position, current is blocked. However, when the wiper arms reach the bottom position, the right-hand wiper feeds current to the short section of the switch, and the main motor now has a feed via rectifier "A"; the loco will now travel forward. Conversely, with the arms in the top position, there is current flow to the main motor through the left-hand wiper arm and rectifier "B."

The advantage of insulated frames and split-axle construction of locomotives is now apparent. Since opposite sides of the chassis are electrically separate, our ladder diagram now becomes a diagram ot the actual loco; the double lines at each side represent the side frames of the chassis, and each is the mounting-plate for two rectifiers and one wiper arm. The side frames are joined by the usual Tufnol spacer block, and this forms a mounting platform for the two pairs of sector plates, which are thus insulated from the frames. A Tufnol bar connects the two ends of the wiper arms to form a cross-head; this latter is fitted with a threaded bush across its centre and is operated by a 10 BA screw mounted on the auxiliary motor shaft.

It was found worthwhile to fit small carbon brushes in the wiper arms, lightly spring-loaded to reduce friction. The rectifiers used are from A.E.I. Ltd., and are marked "SJ 052-B." From memory, these have a rating of one amp, and none have so far failed in service. They look something like the sketch.

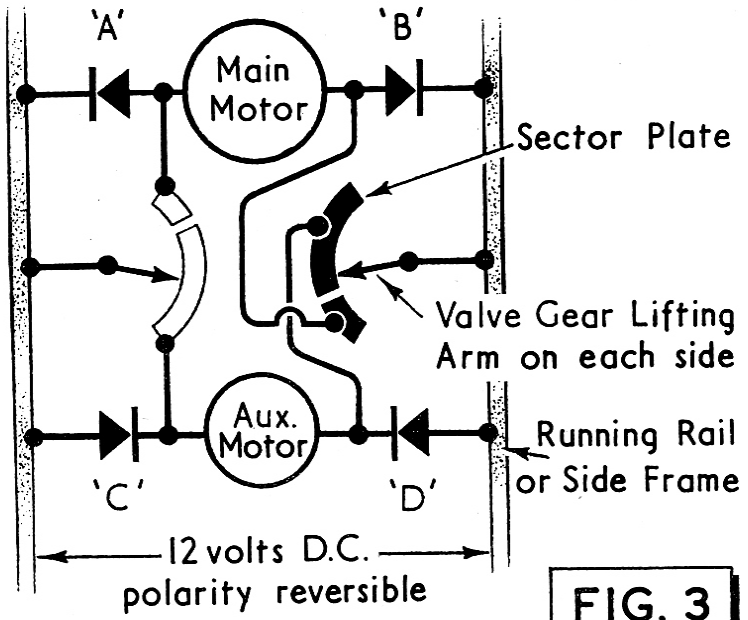

FIG. 3

It should be borne in mind that there is progress in miniaturisation each year and even smaller types may now be available. Figures 4 and 5 give more detail of the mechanical construction, and are self-explanatory.

A lot of head scratching was needed before space was found for all the equipment, and this scheme is perhaps only practicable in a tank loco. It is obvious that all the visible parts of the model Walschaerts gear must work in the same way as the prototype, particularly the radius rod, which has a pivot pin free to slide up and down in the grooves of the expansion link.

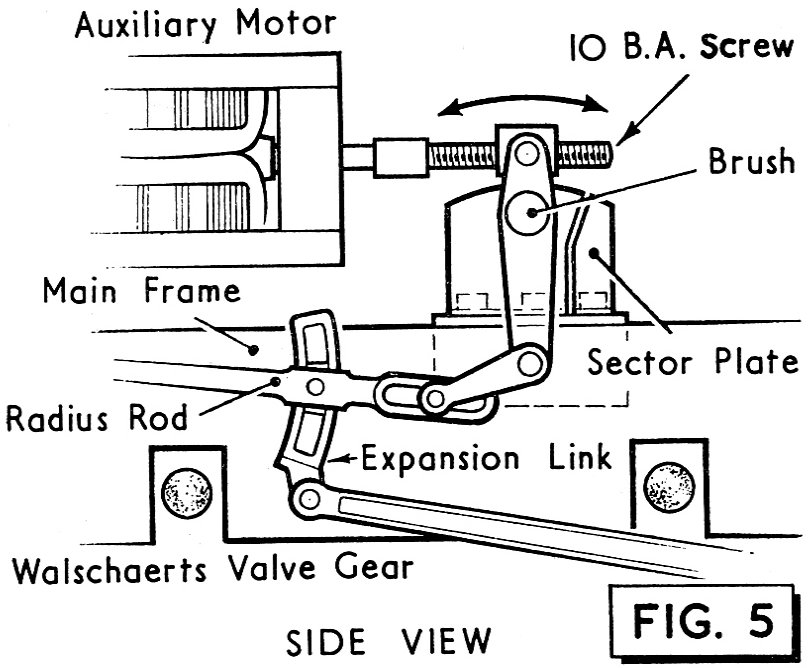

FIG. 5

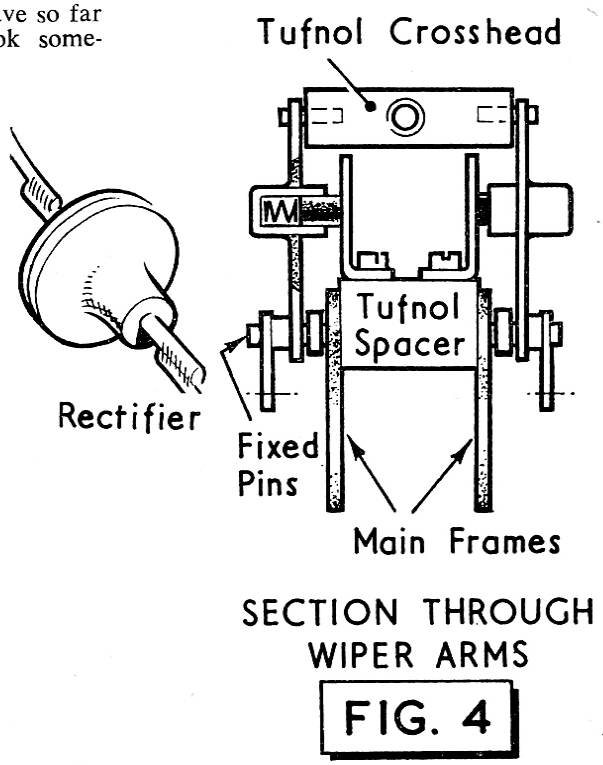

FIG. 4