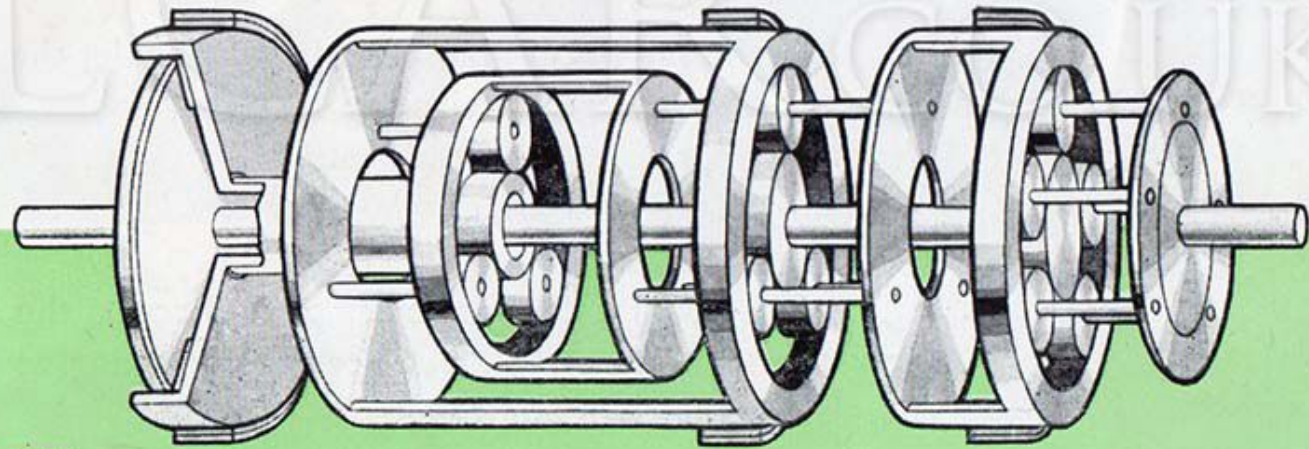


# A SIMPLE EXPLANATION

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RAILCAR BOOK



*of the*  
**WILSON  
EPICYCLIC GEARBOX**

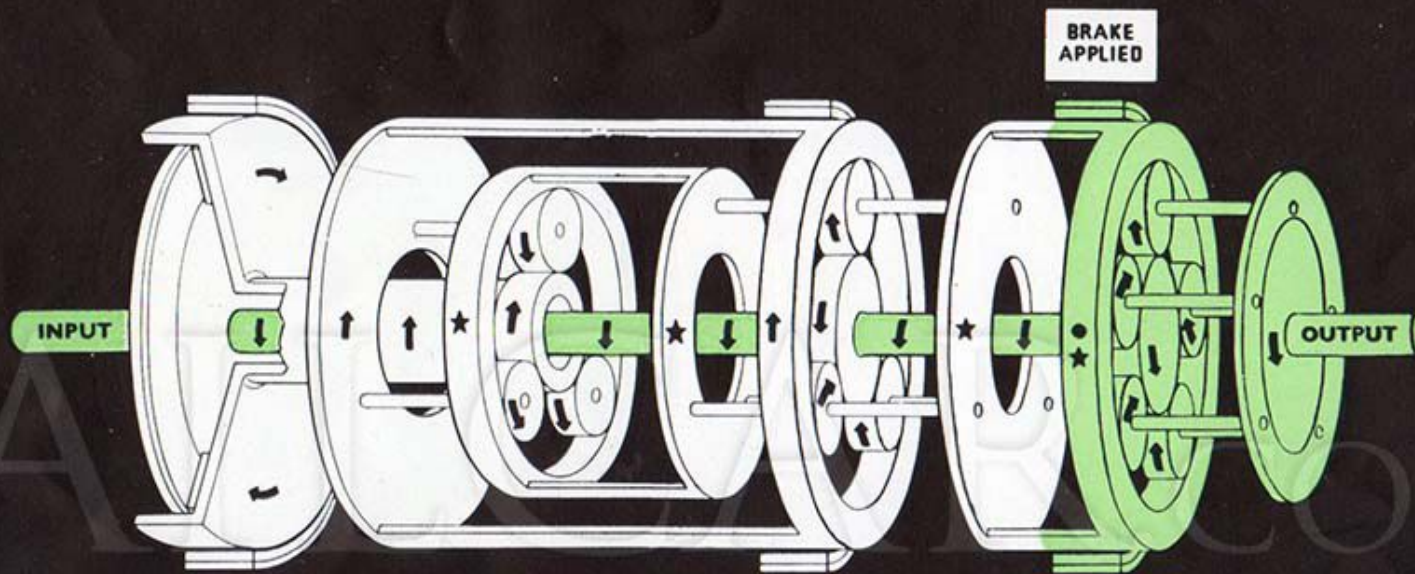
## PREFACE

This little booklet has been produced to meet an ever growing demand by railwaymen throughout the world for information in excess of normal requirements; namely what happens within the gear trains themselves as the various speeds are engaged.

In the various diagrams within this booklet the direction of rotation of the gear trains can be clearly followed, and we feel the diagrams give a satisfactory indication of the compounding of the gear trains when in operation.

The booklet does not attempt to describe the complete actuation of the gearbox but literature relating to this will be gladly sent on request.





INPUT

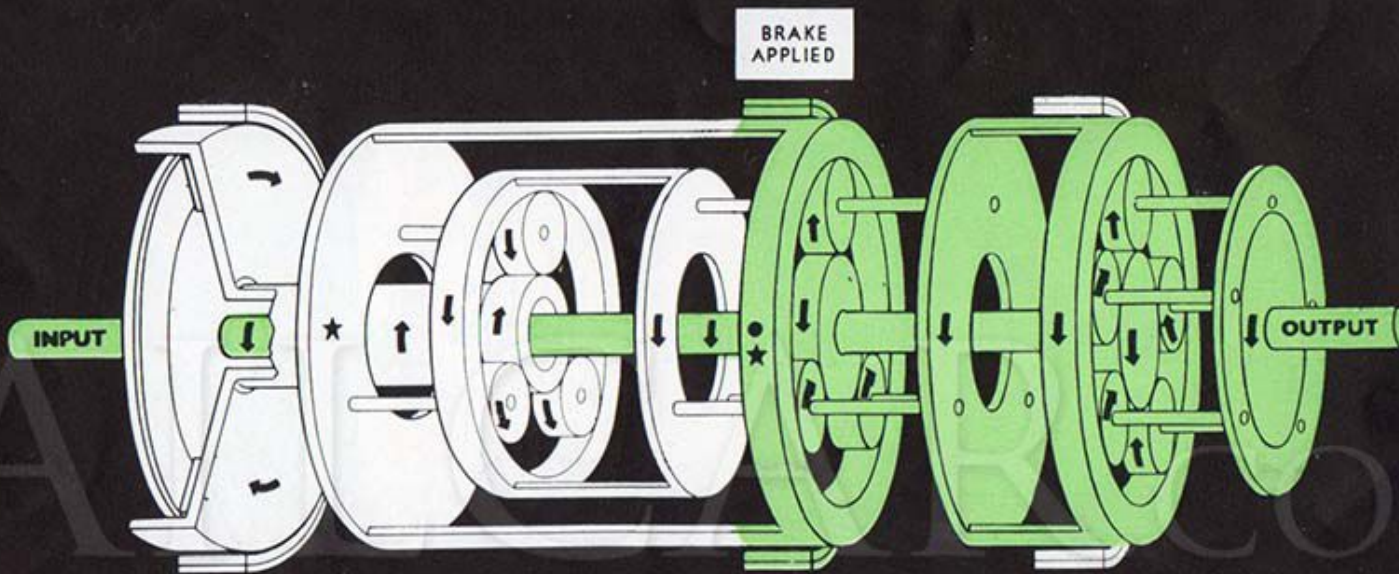
BRAKE APPLIED

OUTPUT

- ★ NO ROTATION
- ITEMS TRANSMITTING TORQUE
- REACTION MEMBER

1st SPEED

SELF CHANGING GEARS LTD. LYTHALLS LANE COVENTRY

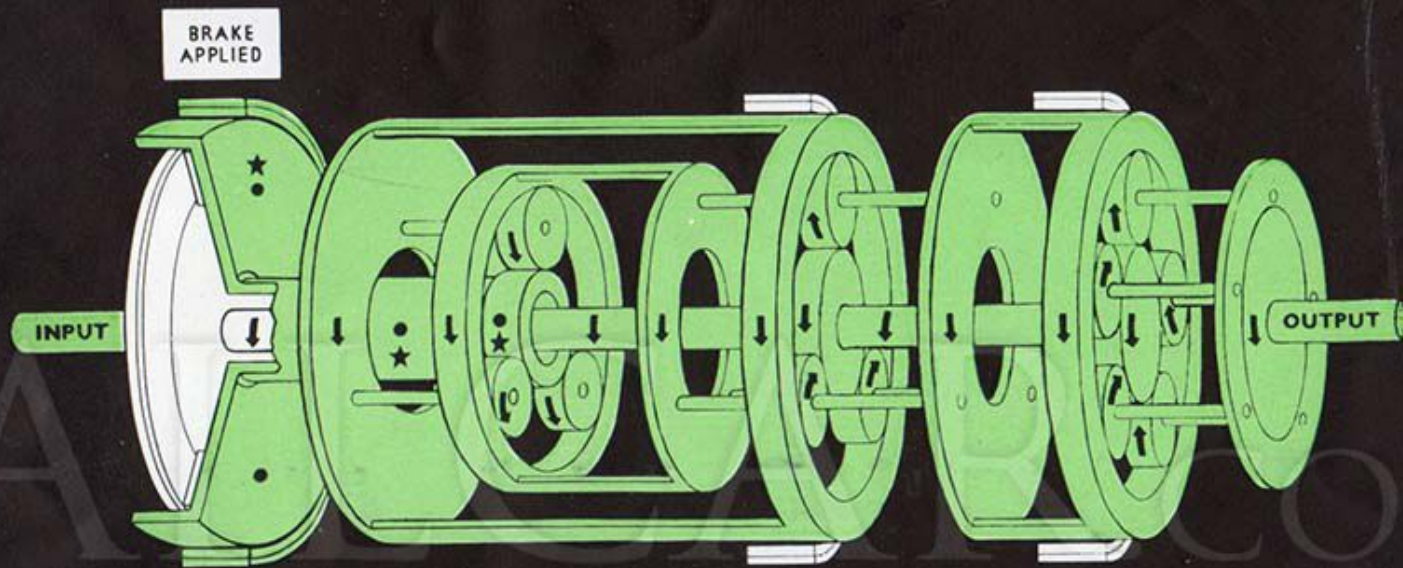


- ★ NO ROTATION
- ITEMS TRANSMITTING TORQUE
- REACTION MEMBER

2<sup>ND</sup> SPEED

SELF CHANGING GEARS LTD. LYTHALLS LANE COVENTRY

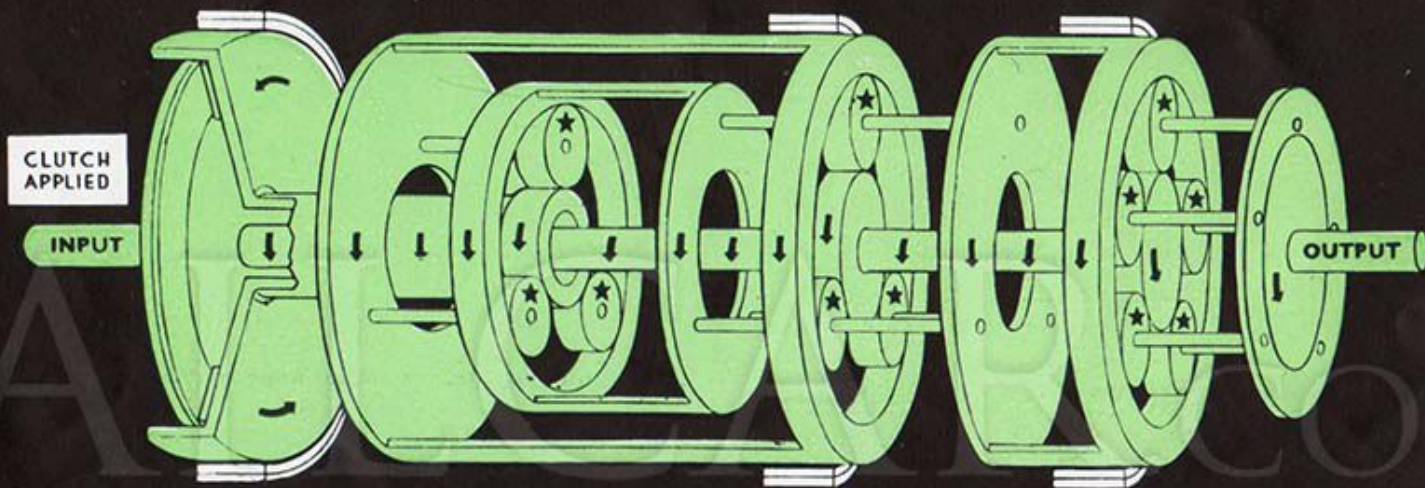




- ★ NO ROTATION
- ITEMS TRANSMITTING TORQUE
- REACTION MEMBER

3<sup>RD</sup> SPEED

SELF CHANGING GEARS LTD. LYTHALLS LANE COVENTRY



- ★ NO ROTATION
- ITEMS TRANSMITTING TORQUE
- REACTION MEMBER

4<sup>TH</sup> SPEED

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## THE GEARING

The gearing consists of a number of gear "trains", each "train" comprising three elements which revolve about a common centre. These three elements are known as the sunwheel, the carrier and the annulus (an internally toothed gear) indicated by the letters S, C and A respectively in Fig. 1. Meshing between the internal teeth of the annulus and the teeth of the sunwheel, and mounted on the carrier are the idler gears, usually termed planet gears and indicated by letter P in Fig. 1. Reference to this diagram shows clearly how all the gears in any one "train" are in constant engagement.

The number of planet gears here shown is three. This is the usual number employed, but other combinations may be found. By connecting one or more of the elements of one "train" with those of similar "trains", various gear ratios are obtained, this being the principle employed in the Self-Changing gearbox.

## THE BAND BRAKE

Now let us consider the method of making the gear trains transmit the drive from the engine to the final drive. How this is achieved is shown in Fig. 2. Here the simple gear depicted in Fig. 1 has the drive from the engine connected to the shaft S1, which is in one with the sunwheel S. The mechanism being driven is connected to the shaft S2, which

is integral with the carrier C and finally the annulus A is held stationary by a band brake B. The drive from the engine will now cause the sunwheel S to turn and, since the planet wheels P are engaged with the sunwheel S, they too, will turn. However since the planet wheels are also engaged with the annulus which is held stationary, as they turn, they roll around the inside of the annulus, taking with them the planet carrier C which is integral with shaft S2. In this way the drive from the engine is imparted to the driven mechanism. The arrows in the diagram indicate the rotation and direction of the various parts.

It should now be clear that, if a number of gear trains are connected together and a band brake is provided for each train, then each time a brake is applied a gear change is made with the gears always in mesh. In this way gear changing with the Self-Changing gearbox is made simple, quick and certain.

The exception to this rule in this type of gearbox is that when a change into Top gear is made, none of the band brakes are applied, but instead, a simple clutch is engaged which gives a direct drive from the engine to whatever mechanism is connected to output end of the gearbox.

For the sake of simplicity, no mention has been made of a clutch between engine and gearbox. In practice a clutch—usually of the fluid type for increased smoothness of drive—is used.

Fig. 1. A simple epicyclic gear train.

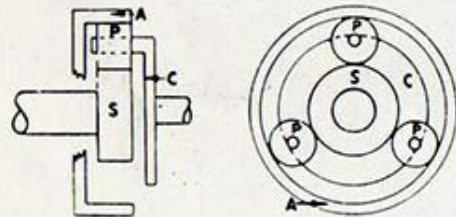


Fig. 2. The purpose of the band brake.

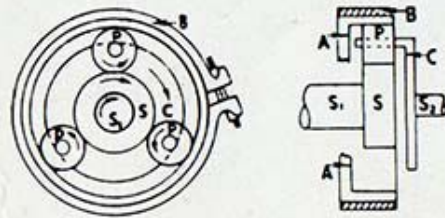
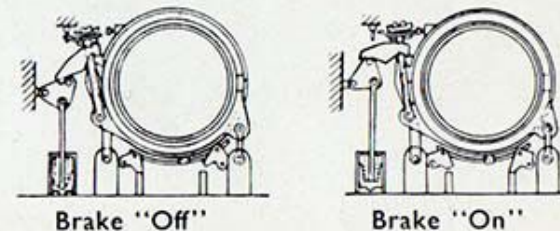


Fig. 3. Air operated brake mechanism.







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