Two basic principles are used in cutting unit adjustment, these being:

- **Reel adjusted down on to the bottom blade** – This is the system generally used in Europe and is the method used on all Ransomes cutting units except trailed gang mowers. Ransomes trailed gang mower design is based on the original Worthington Patents (USA) and the original method of adjustment has been retained.

- **Bottom blade adjusted up to the reel** – This is the system used generally in North America and no doubt is based on the original Worthington Patents, the method being extended from its initial trailed gang unit application to all other types of cutting unit.

### Trailing Gang Unit Requirement

In trailed gang units the cutting reel is driven through a system of gears from the ground engaging the wheels of the unit. In such a drive system it is of course essential to maintain a constant centre distance between the intermediate gear and reel pinion and this constraint makes it desirable to have a fixed position for the reel.

An alternative would be possible by providing a reel bearing housing which pivots about the centre of the intermediate gear, but this would lead to a more complex design and would make the ‘quick removal’ of a cutting reel from the frame more difficult to achieve.

There is good reason, therefore, on a trailed gang unit to position the reel in a fixed position within the cutting unit frame and to adjust the bottom block up to the reel.

### The European Method of reel and bottom blade adjustment

This is used by all major UK and European manufacturers of commercial grass cutting machinery and provides several benefits.

- **Cutting Unit Frame Design**: This usually takes the form of two side plates which are connected either by tubular cross members or pressed steel top plates or tie bars and the frame may either be a welded or bolted fabrication.

![Diagram](image)

The stiffest part of any cutting unit, however, is the bottom block and if this can be rigidly connected to the side plates it contributes greatly to the overall rigidity of the frame assembly.

- **Cutting Unit Adjustment**: With any reel mower it is necessary to maintain correct adjustment between the reel and bottom blade as the cutting surfaces wear. This wear will be greater on the bottom blade than the reel due to the fact that wear on the reel is 'shared' between a multiplicity of blades. Even so, there may well be a difference in reel diameter of up to 3/4" between a new reel and one which has reached the end of its life. By adjusting the reel down on the blade, this wear has no influence on the ability to retain the original minimum cutting height.

![Diagram](image)

- **Reel and Bottom Blade Alignment**: Even on newly built cutting units there are likely to be slight degrees of misalignment between the reel and bottom blade due to manufacturing tolerances. Efficient grass cutting can only be achieved with quite precise adjustment between the reel and bottom blade and this adjustment needs to be achieved across the whole width of the reel and bottom blade.

Any slight misalignment which may exist can be compensated for by making more or less adjustment on one end of the unit or the other, thus ensuring correct setting across the whole width of the unit.

Misalignment is likely to increase during the life of the cutting unit due to unequal wear of the reel blades and bottom blade and possible inaccuracies in re-grinding. By adjusting the reel top the bottom blade, the normal internal clearances of the reel bearings or the use of self-align-
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The above is obviously biased toward the European tradition of adjusting the cutting reel down onto the bottom blade. However, I have attempted to take an unbiased stand but find it hard to reveal any any valid technical reason which favours a change to this long accepted method.

Benefits of Adjusting Reel to Bottom Blade

- Bottom block is used as structural member of cutting unit frame contributing significantly to frame strength and rigidity.
- A consistent minimum cutting height is retained during the total life of reel and bottom blade.
- Any misalignment between reel and bottom blade can easily be compensated for by 'unequal' adjustment of reel without inducing twisting forces into any component. Backlapping is then unnecessary for correcting misalignment. (Backlapping only required to maintain keen cutting edges).
- The angle between bottom blade and turf is constant and can therefore be designed for an optimum position to minimise drag on the turf and to present a small area of surface contact with the turf to ensure that the unit will cut down into the thatch or matt, rather than riding over it.
- Reducing need for grooved front rollers, although these still are an advantage. They should not, however, be used indiscriminately. Scuffing of fine turf when turning is more likely with a grooved front roller.

Conclusions