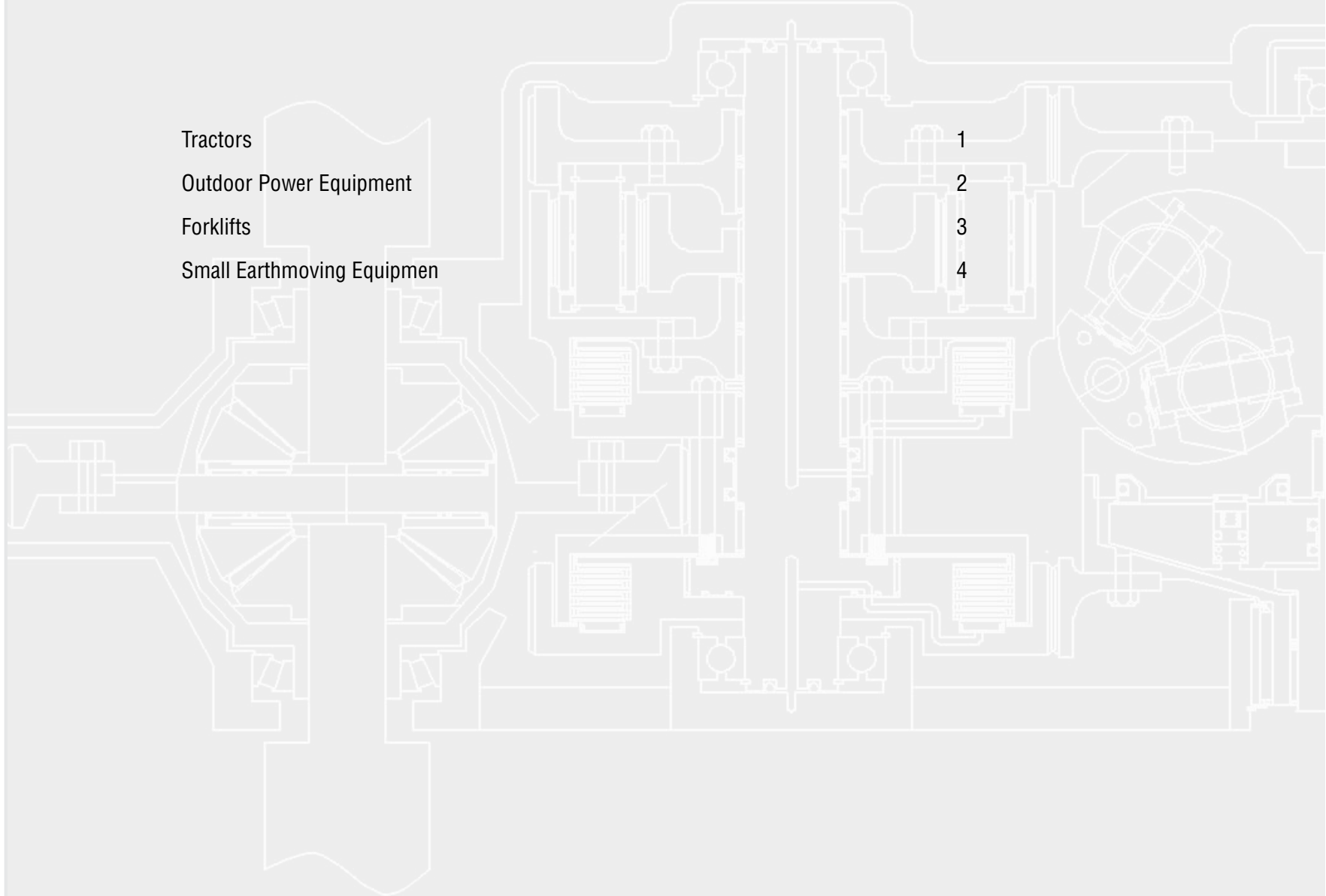


Mobile Equipment

Tractors
Outdoor Power Equipment
Forklifts
Small Earthmoving Equipmen

1
2
3
4



CVT based IVT has secured a very large market acceptance predominantly using a hydrodynamic based CVT in large HP tractor applications.



The small and medium tractor transmission market has for some years failed to offer an efficient IVT at an affordable price, as most existing versions feature complex mechanical configurations and electronics. This makes them not only financially unviable for smaller vehicles, but also unsuitable for installation in low complexity products sold in emerging markets.

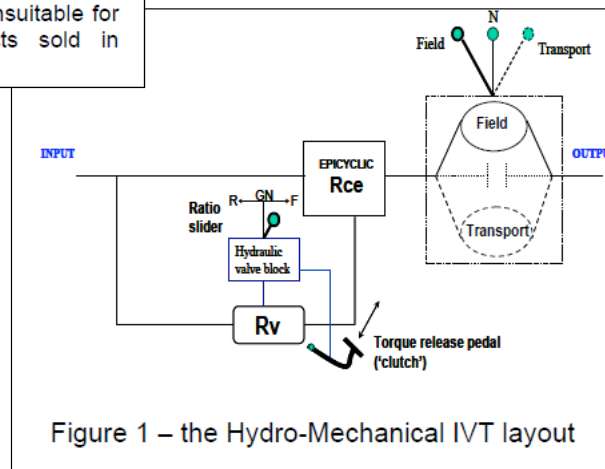
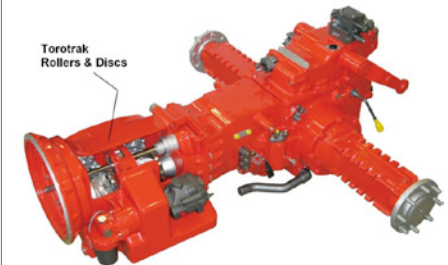


Figure 1 – the Hydro-Mechanical IVT layout

The Torotrak SFTV has had some impact on smaller tractors and OPE.



This transmission is now being used by Carraro for its medium powered tractors

View its output on YouTube http://www.youtube.com/watch?v=iDX5q-Kdw_0

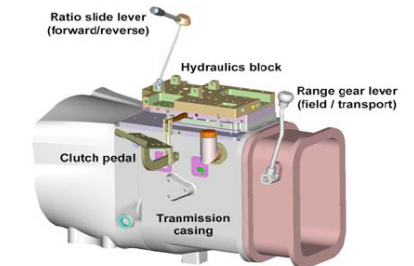


Figure 2 – the Hydro-Mechanical IVT concept

Based on the Torotrak concept outlined some years ago.

The system uses a two (or three) regime IVT using a simple control strategy

The operation of a hydrostatic IVT can be viewed on YouTube at:

<http://www.youtube.com/watch?v=dgtIKMAjvFI>
(how a hydrostatic IVT works)

http://www.youtube.com/watch?v=sWu_HQnEQs0
(how a John Deere hydrostatic IVT works)

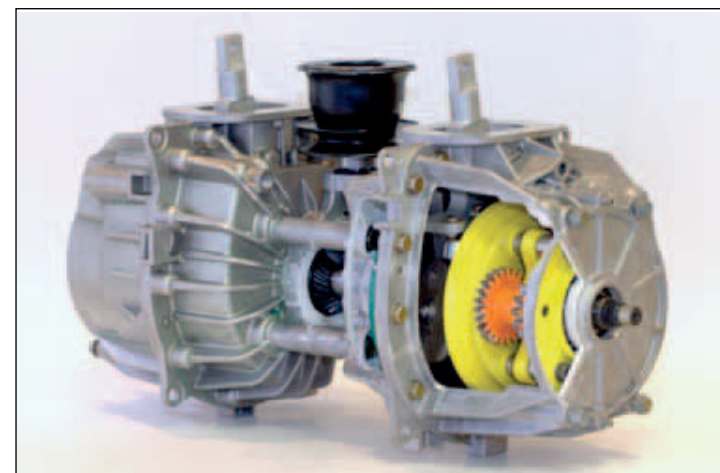
<http://www.youtube.com/watch?v=szncrHCfsws&feature=related>
(how a Fendt IVT performs)

Outdoor Power Equipment

There are quite broad applications for the application of traction based CVT's to the outdoor Power Equipment market. In particular the use of a CVT based IVT gives seamless transition from forward to revers

A double cavity SFTV – IVT system was introduced by Torotrak in JV with MTD Holdings a branch called Infinitrak

The first Infinitrak transmissions utilized a dual transmission that output an independent IVT output to each side of the ride-on mower. This allowed the mower to execute a Zero turn maneuver in which one wheel drove in one direction and one in the other.



Another Infinitrak System is being released that uses a single cavity balanced against a traction roller based IVT similar to that used by Perbury. It uses a conventional differential for steering.

It appears that the cost of the double IVT and the gear noise associated with the fast moving spur gear planet system have made the original Infinitrak unworkable.



View operation on YouTube

<http://www.youtube.com/watch?v=Uj4BB7gfRlw>

t <http://www.youtube.com/watch?v=gkqcWNB-B7c>

<http://www.youtube.com/watch?v=h5bR0Z9EaEw>

Forklifts continually move from forward to reverse during normal operation and a CVT based IVT has been proposed by a number of CVT manufacturers. As far as Ultimate Transmissions is aware this transmission has not yet been implemented.



Small Earthmoving Equipment

Small earth moving loaders like bobcats can readily utilize a CVT based IVT provide that the control system is setup to protect the driveline from the over torque produced in very low gear ratios. The use of a torque controlled clutch can do this as effectively as with hydrostatic drive transmissions.



