Australian inventions for sustainable farming

What is the name of the invention or new knowledge ?

Avery's Econ Fodder Roller - a machine to roll up big hay bales

What did it look like ?

There is a drawing of the Hay Baling Apparatus at the USA Patents website at
http://www.google.com/patents/US3110145?printsec=abstract#v=onepage&q&f=false

There is a photo of it on p 107 of *Remarkable Australian Farm Machines,* by Graeme Ross Quick 2007, Dural: Rosenberg Publishing, - available on-line

When was it known ?

1961
(date the patent was appied for)

Who was the scientist?

Philip Avery
farmer and inventor
of Gabalong, Western Australia

For more details about the story of Phillip Avery on farm and devloping this concept see the above references.

What need was there for this?

As farms started getting bigger in the 1960s, big bales of fodder were needed to increase the number of stock that could be fed by one farmer.
Traditional cutting and stooking was far too slow, as was the common making of small bales.

Round bales kept well and self-thatched to protect the hay from the weather and keep lost hay to a minimum.

A machine was needed to create these big bales, that would be cheap, simple, able to be pulled by a tractor and needed only one farmer to do it.

For more information on the background to this invention see Philip Avery's documentation for the Hay Baling Apparatus at the USA Patents website at
http://www.google.com/patents/US3110145?printsec=abstract#v=onepage&q&f=false

What was the discovery that led to this invention?

The cut hay could be rolled up along the ground.

The hay could be taken continuously up for baling without the machine stopping for releasing the bale.

The bale could hold itself together. It did not have to have twine, but could have.

How does it work ?

The key points are:

- The baler has three arms which form a triangular shape while rolling over the hay
- The arms rotate as the bale size grows
- The bale is kept in contact with the ground at all times.
- The bale is released by the arms when it has full size, without the baler needing to stop.

For more information on the specific design of this invention see Philip Avery's documentation for the Hay Baling Apparatus at the USA Patents website at http://www.google.com/patents/US3110145?printsec=abstract#v=onepage&q&f=false

What shows its importance as an Australian discovery/invention ?

Business set up on it	Econ Fodder Roller made and sold in Australia until 1981
Where used on farm	in paddocks at hay making
Changes it made to farming	1 a big saving in the cost of hay making 2 gathered up hay which other hay makers couldn't, so that that hay was not wasted and left for pests to feed on. 3 round bales could be left in the paddock instead of gathered into a shed and then fed back out from the shed to the paddock
Contribution to sustainability	1 quicker haymaking- farmer could do more cheaper 2 better use of hay grown 3 storage in paddock made feeding out quicker too = ie made the farming enterprise more efficient

How quickly adopted	almost straight away
The places it spread to	across Australia then adopted in USA from Ohio in 1970's
Changes made to it for today	Farmers here tend to still use plastic string around their bales. Further south, in wetter areas, they may use plastic covers on their bales. Or more recently a net wrap to bind it for keeping.
Still in use today	yes
Current use in the Wimmera-Mallee	Large square bales are more common in the Wimmera, than the round bales. The round bales are more common in the wetter districts to the south of here.
Led to other knowledge or invention	In 1970 an American on a tour of farms in Australia, saw the Econ Fodder Roller in use. He took photos and a machine back to Ohio. In 1971, they started using it and researched their fodder storage and nutrition values for sheep and cattle stock under Ohio's winter conditions. The Americans then started making their own version.

Van Keuren, *History of the Development of the large round bale at Ohio Agricultural Research and Developmental Centre at* www.kb.osu.edu/dspace/bitstream/1811/24226/1/round_bales.pdf

Shape Sleuths Link –
An exercise for the 2013 Maths of Planet Earth

1 Draw the simple shapes that make up :

- *The round baler from Avery's design to the USA patent office,*
- *The round baler in the photo of it operating*
- *Different shape of bales that we now have available*

2 Name the shapes that are found in your drawings above.

3 If you have a chance to see a baler in reality,

- *makes some measurements of its dimensions*
- *makes some measurements of the size of the bale it makes*
- *and find out how many bales are eaten by 10 sheep or cattle per day.*
- *So you can calculate how many bales might be needed for a flock of 100 sheep or cattle over 6 months of hand feeding.*

For further information :

Books

Quick, Graeme Ross. *Remarkable Australian Farm Machines,* 2007 Dural: Rosenberg Publishing p 107. This book is also available on-line.

Websites

Philip John Avery, *Hay Baling Apparatus at USA Patents website*
http://www.google.com/patents/US3110145?printsec=abstract#v=onepage&q&f=false
Hagerstrom, R.C. *Farmer experiences with the Econ Fodder Roller in the Lower South East of South Austrlralia. 1969, Dept Ag, S. A. online at*
http://digital.library.adelaide.edu.au/dspace/bitstream/2440/10792/1/AgrRepNo7.pdf
Van Keuren, *History of the Development of the large round bale at Ohio Agricultural Research and Developmental Centre at*
*www.*kb.osu.edu/dspace/bitstream/1811/24226/1/round_bales.pdf

An education activity for the Mathematics of Planet Earth 2013 AUSTRALIA in the 2011-2020 United Nations Decade on Biodiversity