

wheels

One of the most common troubles encountered with the wheels of WWI was the result of side loads while landing; it could tear the tire from the rim, bend spokes and rim, and could tip the aircraft into structural damage. The most effective counter to these dangers came in the form of the Palmer Cord Aero Tyre of the Palmer Tyre Co. The spokes of the Palmer tire extended in radial fashion to the rim (D) and there were more of spokes than contemporary tires. The 700x100 and 750x125 had 64 spokes in comparison with the 40 which were usual. The tire of the Palmer carried its bead under a lip in the rim. The tire and rim were capable of withstanding side loads up to 25 cwt. As will be seen in A, B and C, the tires were not necessarily centered on the rim. The 700x100 tire with a hub of 178mm could have a track line of 132/46 or 185mm length with 135/50 as in (A). The case of (B) would be a hub of 178mm with the track line 132/46. The centrally located rim (C) would have a hub length of 150 or 185mm.

The wheel that presents the most trouble to modeler and replica builder alike is the 40 spoke found in French and German machines. We present an explanation of the spoking to aid your understanding. To ease your following of what is to be said, imagine that you are about to string the spokes on a wheel.

The rim has 40 holes which we will number counter-clockwise from 1 to 40. The two flanges of the hub have 20 holes each and are numbered counterclockwise with odd numbers on the near rim and even numbers on the far one. When assembled on the axle - and if imagined to be transparent - looking at the flanges would show 40 holes; the near odd number interstices filled by the far even numbered holes.

Insert the first spoke into hole #1 so that the spoke lies on the outside of the flange, then insert it into hole #5 of the rim. The second spoke goes into hole #3 of the flange, but this time the spoke in on the inside of the flange. This spoke inserts in hole #7. Alternate the spokes and insert as follows:

NEAR FLANGE	RIM	FAR FLANGE	RIM
1.....5		2.....38	
3.....7		4.....40	
5.....9		6.....2	
and so on		and so on	
33.....37		34.....30	
35.....39		36.....32	
37.....1		38.....34	
39.....3		40.....36	

The wheel covers were fabric or metal. Some were a disc of fabric doped between the tire and the rim after having been

slipped over the axle. The Palmer wheel cover was interesting in that small spring hooks were sewn under the edge binding tape of the cover. These were inserted into holes drilled for their placement in the rim. The tool used resembled an ordinary button hook. (See sketch.)

The hub (E) is from a Nieuport and was typical French practice. The hub (F) is similar to that found on aircraft of both sides, this one from an Albatross. The welded flange is typical of model practice. All that needs to be added would be the holes for the spokes which would be difficult to drill without some form of indexing gear. We will publish an indexing jig in the next issue of this journal. Drawing (G) is the system used on the Palmer wheel. Each drawing shows the bronze bushing which provided the surface on which the landing gear axle bears.

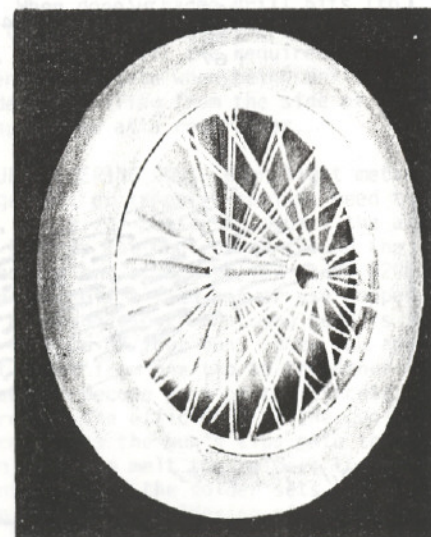
The hole found in wheel covers served one of two purposes - and sometimes both: access to the stem of the air filling valve of the inner tube or access to the oil tube for the axle bearing.

Some aircraft employed spun aluminum wheel discs, the manufacture of which for model purposes we will cover in a later issue. When these wheel covers were aluminum discs, the method of attachment was very much different than that used for fabric, as one would expect: they were bolted in place. The device used on the Albatross D.Va in the NASM in Washington, DC, USA, was an ingeniously located wooden block that was braced against the rim and spokes. Provision for bolting of the cover was through a threaded rod. We will publish drawings and details of this in a future issue.

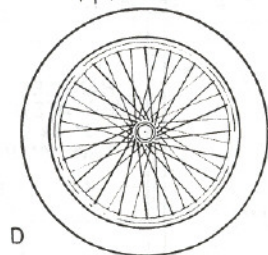
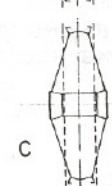
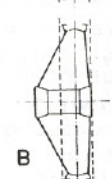
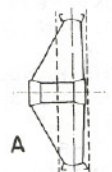


Sketch above shows the wire hook of the Palmer Cord Aero Tyre noted in the text.

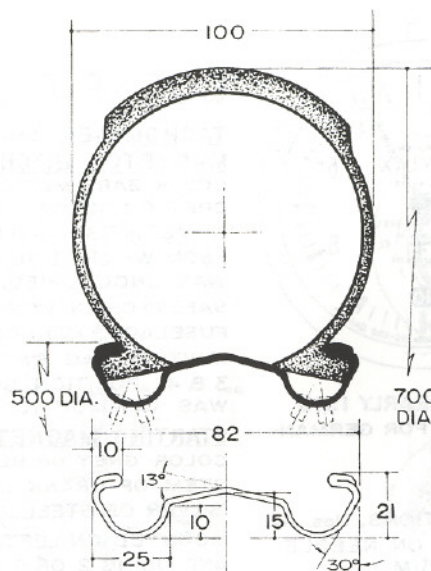
The wheel at the right is a 1:4 prototype for the same Palmer wheels. It is worth noting that the rubber of most tires was a grey rather than black



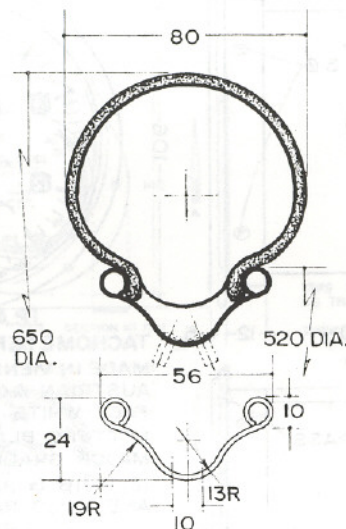
WHEELS



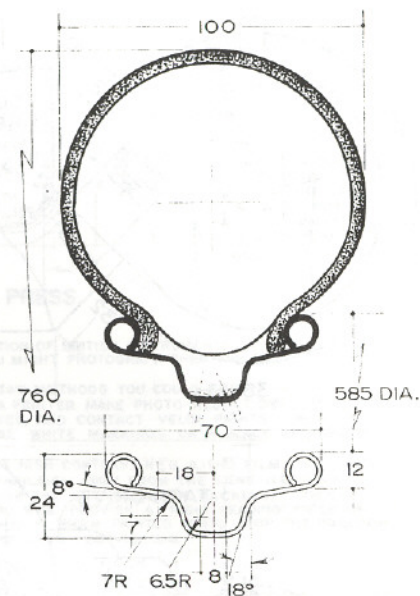
SPOKE
PATTERN
SEE TEXT



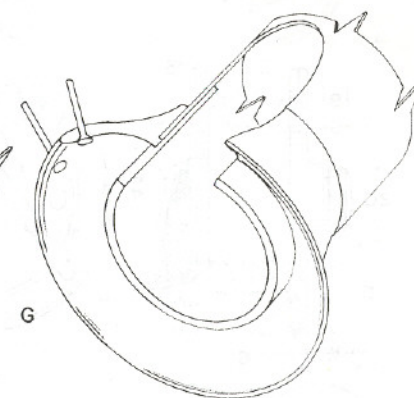
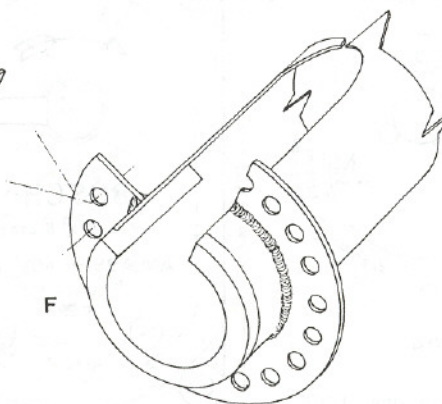
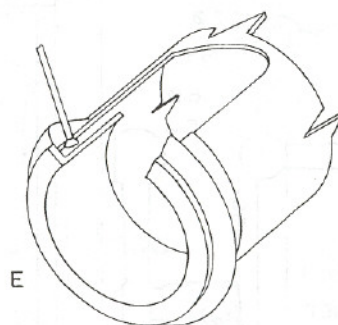
64 SPOKES
BRITISH



40 SPOKES
FRENCH



40 SPOKES
GERMAN



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