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26" x 1 3/8", 26" x 1 1/2", 28" x 1 1/2", black only.

COVER **3'9** TUBE 1/6





FIFTY YEARS of PNEUMATIC TYRES

By
A. C. DAVISON

Our Contributor, Who Has Cycled Throughout the Half Century Since J. B. Dunlop Invented the Pneumatic Tyre in 1888, Recalls Some Personal Experiences

FIFTY years are a long way to look forward, but not nearly so far to look back on, and but for the calendar I could hardly believe that it is such a time since I heard shouts of joy and gusts of laughter as the lads of the village viewed the Dunlop "pudding tyres" on a solitary machine exhibited at the Stanley Show at the Agricultural Hall, Islington. In point of fact, it is not quite so long, for although the Dunlop tyre was invented in Ireland in 1888 it took some time to cross the sea, and this would be at the Show of 1890.



A reproduction of the first Dunlop tyre. It was made from thin sheet rubber, blown up with a football pump and attached to a wooden disc with a strip of linen.

I did not join in this jeering, partly because I had a fair experience of what it felt like to sit on a piece of pig-skin-covered iron plate and propel $\frac{3}{4}$ -in. solid tyres over granite sets, and also I had heard of the success of William Hume, who was winning races all round on them in Ireland and was also the first to exploit the pneumatic in this country at the Liverpool Police Sports held in July, 1889.

Comfort was the object aimed at in the original tyre, and the "pudding" certainly promised that, so it was not long before I had a pair of "Dunlops," on a high bicycle, however. They cost about 3 guineas, but were worth it for comfort, although for speed they did not score so much as on the geared-up machine, the reason being that, when struggling uphill at a slow pace, vibration was not the most important factor, while downhill the limit was set by the speed at which one could pedal, and there was no gain in tyres that would run faster if you could not follow the pedals round.

The pneumatic, however, did not have a "walk-over." Experienced riders like S. F. Edge expressed the opinion that they would slip on grease to such an extent as to be dangerous, and that great authority on

cycling matters G. Lacy Hillier took a lot of converting to the new idea. "Cushion" tyres, which were virtually large solids about $1\frac{1}{4}$ ins. diameter with a hole through the middle, sprang up in opposition, and a

JOHN BOYD DUNLOP

Born February 5, 1840
First tyre Experiments, 1887
Secret night ride by Johnny Dunlop on pneumatic-shod tricycle, February 28, 1888
Patent applied for July 23, 1888
First raced (by Wm. Hume) May 18, 1889
Dunlop died October 23, 1921

fierce controversy raged between the supporters of each. These "cushions" were distinctly faster on bad surfaces by providing more comfort than the "bootlace" solids used by the lightweight fanatics of the day, but they were never in it with the pneumatic.

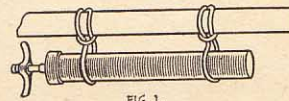


FIG. 1.

Early pump and method of carrying.

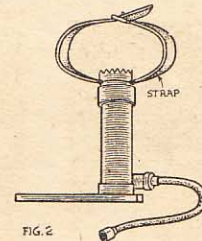


FIG. 2.

Mr. Davison's patent foot pump.

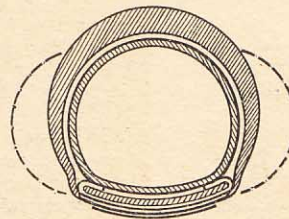


FIG. 3.

Section of first Dunlop cycle tyre showing easy bending of cover.

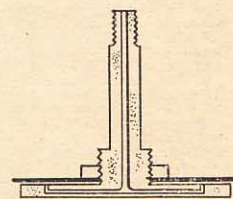


FIG. 4.

The Welch valve.

I believe that most of the adverse comment was due to the fact that the early experimenters thought in terms of comfort and rode the tyres far too soft. I have some recollection of S. F. Edge writing how a pair of tyres had spread out on the grease and slithered into the gutter with him, and I have negative evidence of the

(Continued on page 184.)

Fifty Years of Pneumatic Tyres (continued from page 181)

correctness of this view in the fact that I never had any trouble at all from side-slip. For this I was indebted to a friend, R. H. Kendall, of the North Road Club, who had got a little bit ahead of me with a pair of pneumatics on a safety. He was a rare enthusiast who quickly gained experience, and his advice was: "Blow them as hard as a brick." Without getting quite to this stage, I did blow them to over 30 lb. per sq. in., and although the covers were quite smooth and 2 ins. diameter I had no trouble from slipping.

These early "rag-shop" tyres were terrible things to repair (Kendall claimed to be able to mend one in 10 minutes, but I never saw him do it) and if standardized in their original form would have been limited to use by the enthusiasts. Dunlop's luck seems to have been in at the time, however, and, just as in seeking comfort he lighted upon speed, so in making the cover in the way he did he made, I believe (from both practice and theory), the fastest form ever devised. The sketch shows the original arrangement. The tube was enclosed in an endless woven canvas bag which took the pressure. The cover had a wide strip of canvas on each edge, one of which was turned over and solutioned to the outside of the rim, slots being cut for the spokes; the other edge was turned over and stuck down over the first and, finally, a strip of canvas was solutioned down along the centre of the rim, making all neat. The dotted line (see sketch) shows how easily the cover could bend away from the rim, much more easily than any that is fastened inside the rim and has to take a reverse curve, and it is on the flexibility of this that the speed possibilities of any pneumatic depend.

It was unfortunate for the first Dunlop Tyre Co. formed that the interest aroused brought to light an anticipation of the pneumatic principle by one Thompson in 1846, and this spoiled their hope of a "master patent" and left them with only their own not too satisfactory way of applying it. As a result, a host of pneumatics with all sorts of fastenings sprang up, the most formidable competitor being the beaded-edge type of the North British Rubber Co. However, in 1890 they lighted on and purchased C. K. Welch's patent for the detachable wired-edge cover which is now almost universal, and in 1892 they introduced this as the "Dunlop-Welch."

Since that time there has been really very little change. The most important events have been the introduction of the diagonal fabric, in which the threads run somewhat in the manner of tangent spokes and reduces the drag or gin between the rim applying the power and the road which resists it, making the tyre

more rigid and less wasteful of power. The other is the embedding of the threads of the fabric in india-rubber, preventing the chafing of the threads against one another.

Valves.—The first Dunlop valve was a very primitive affair, consisting of a short length of rubber tube with a wooden plug at its inner end, and the pump was an ordinary football inflator with a conical nozzle to push into the end of the tube. In 1892 the Woods valve, which was substantially as it is to-day, was adopted, but there was an experimental period when the "Welch" valve was tried. This, on paper (see sketch), is very attractive. It is simple; the air passes down the stem right and left through the long head inside the tube and the small holes are sealed by the tube itself. It failed from the fact that rubber has a way of sticking itself hard to metal, and when this happened there was no way of getting at it. A number of tyres were sent out, but had to be recalled and the valves changed.

There was another valve on the market at one time made by Lucas (inventor unknown), which was, in my opinion, the best ever. Much easier to blow through, quite sound when screwed down, and rarely requiring attention. I have one now 38 years old which has never had anything done to it and is still quite fit for work.

Pumps.—The first pump which was given in with the tyres was a stumpy little affair about 7 ins. long by 1 in. diameter. It was carried either in the pocket or with a couple of india-rubber bands round the top tube, as shown in sketch, a somewhat primitive, but satisfactory, way. Owing to its large diameter, it worked better than one would expect and development took the form of lengthening it out, 18-in. by 1-in. pumps being made. For real work these are quite good, but rather cumbersome to carry about, and a telescopic one consisting of three barrels which closed to about 6 ins. was for a time on the market.

My early tyres being 51 ins. by 2 ins., were very laborious to fill and I made a "foot-pump" (see sketch). The barrel was 5 ins. by 1½ ins., a light foot-plate fastened with a couple of turns to the base, and the top of the plunger had a roughend foot-piece and an adjustable strap. The foot-piece was held down by one foot and the pumping done by the other. It was rather an acrobatic business, but quite possible with the bicycle as a support, and, the area of the barrel being only about 1 sq. in., a person of 10 stones-odd could easily put 140 lb. to the sq. in. in with it. It was quite easily carried in the pocket or tool-bag and would inflate a 28-in. by 1½-in. tyre to 40 lb. in 35 secs.

The First Touring Club (continued from page 182)

road maps was entered into. Thousands of danger and caution boards were erected on hill-tops. Reductions in cycle rates were obtained from the railway companies. Continued demands were made for improved roads, culminating in the formation of the Roads Improvement Association. And, greatest triumph of all, the recognition of cycles as carriages by the Act of 1888 was secured.

Meanwhile cycling interest was growing on the Continent, and not only was the Club seeking to secure special Customs facilities for British tourists—the first concessions of this kind were granted in 1890—but there was an obvious desire on the part of foreign cyclists to set up similar organizations to the C.T.C. in their own lands. When the Touring Club de France was in contemplation it was at first suggested that it should be a branch of the C.T.C., and although that idea was ultimately rejected the Club can

justly claim to be the parent of all the great touring clubs on the Continent, which imitated it even to the extent of adopting the English words "touring club" in their titles.

These clubs have now all become motoring organizations—or, rather, by deciding to admit tourists of all kinds, have long been dominated by the motoring element.

It is impossible to do more in the available space than touch upon the other activities and achievements of the Club in the 60 years of its existence. Chief of these have been the freeing of toll-bridges (or the reduction of tolls), the promotion of legislation beneficial to cyclists and, in more recent years, the opposition to proposed legislation that might have been injurious to cyclists, the great extension to foreign travel facilities, and the introduction, 13 years ago, of free third-party insurance for members.

The C.T.C. has enjoyed the honour of Royal patronage since 1910, three successive monarchs having been Patrons.

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