somewhat, their narrow surfaces being together at the tread of the tire, and their wide ones at the beaded edge. The anchorage of the cord to the beaded edge is obtained by steel pins passing through the loops of the cord and into the canvas beads (fig. 13). The cords, tread and beads being all vulcanized together, the tire is practically impervious to moisture, and has there­fore less tendency to rot than a canvas tire. Fur­ther, the threads, by the process of manufacture, are insulated each from the others by a layer of rubber, and there is thus less tendency for them to fray or saw each other as the tire yields dur­ing continuous running. These features of con­struction tend to greater durability.

*Strains on Fabric of Pneumatic Tire.—*As each portion of the tread comes in contact with the ground it is flattened, while the rest of the transverse section has its radius of curvature slightly decreased (fig. 3). Thus the transverse section is repeatedly undergoing flexure through a range extending from flatness (radius of curva­ture infinity) to a radius of curvature slightly less than that of the normal section. On the longitudinal section the range of flexure is from flat to a radius of curvature equal to that of the normal section. The latter range is therefore much less than the former. The necessary thickness of the fabric and rubber to resist the air pressure and punctures involves a certain amount of stiffness; consequently the energy expended in the flexure of the tire is much greater than in a thin cycle tire. This energy appears as heat; the temperature of the cover rises until the heat carried away by the air is equal to that generated by flexure. At very high speeds this heating becomes so great as to have 'an injurious action on the rubber and fabric. Unfortunately, the solid rubber tire is worse off in this respect, its elastic hysteresis, and there­fore the heating effect, being greater than that of a pneumatic tire. It is evident that increase of the diameter of the tire-section lessens the heating action, while reduction of diameter of the wheel has no effect, so long as the range of longitudinal flexure is less than the transverse. Nearly all tire fabrics are equally stiff longitudinally and transversely; but probably greater durability would be obtained from a fabric more flexible transversely, even if somewhat stiffer longitudinally.

*Pneumatic Tires for Heavy Loads.—*From the formula for load supported, *yN ≈τyp-<lDd,* for a given air pressure *p* and vertical flattening *y,* the load supported is proportional to the square root of the product of the longitudinal and transverse diameters; thus a tire 36"×4" is equivalent to one 24''×6". But the latter can be subjected to a much greater vertical flattening *y* than the former, with a less range of flexure of the cover, probably twice the amount. In this event, with the same air pressures, the 24\*×6\* tire could carry a load twice that of the 36"×4" tire. Or, if both tires carried the same load, the air pressure in the former might be half that in the latter, and, its vertical flattening under normal load being twice as great, its value as a spring in absorbing vertical unevenness of the road would be double. Since the first use of pneumatic tires for motor cars, they have been steadily reduced in diameter, and probably they can be made still smaller with advantage, if the transverse section be proportionately increased.

The following table gives the maximum loads and minimum air pressures for a few sizes of tires, as recommended by the Dunlop Pneumatic Tire Company. The corresponding vertical flattening has been calculated from the formula given above.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | Diameter. | Section. | Maximum Load per Wheel. | Minimum Air Pressure. | Vertical  Flattening. |
| Light |  | In. | In. | lb | Ib . per sq. in. | In. |
|  | 28 | 2Ì | 360 | 70 | ■19 |
| Car -∣ |  | 28 | 3, | 400 | 75 | •19 |
| Tires | L | 28 | 3⅛ | 700 | 80 | •25 |
| Heavy | r | 32 | 3½ | 900 | 80 | ·33 |
| Car |  | 32 | 4 | 1000 | 85 | ·33 |
| Tires |  | 32 | 5 | 1300 | 95 | ·34 |

*Fastenings of Motor Tires to Rims.—*The “ beaded edge ” type of fastening is most largely used, supplemented by security bolts

(fig. 14). Fig. 13 shows a flange fastening as used for the Palmer cord tire, the two flanges being secured by a number of bolts passing through the rim of the wheel.

*Solid Rubber Tires for Heavy Vehicles.—*Fig. 15 shows a section of a solid rubber tire and rim, the rubber being forced under pressure on the beaded rim. For very heavy loads, as in motor omnibuses, a twin tire gives the best results. The two tires are fastened on the same rim, at a sufficient dis­tance apart to allow each to bulge laterally as it rolls on the ground.

*Non-Skid Devices.—*As a pneumatic tire flattens where it is in contact with the road, under certain conditions of road surface a semi-liquid film of mud gets interposed, and frictional contact is reduced to a minimum. The vehicle has then no lateral constraint, and side-slipping or skidding may occur. On a bicycle this means a dismount, probably a severe fall; on a three or four-wheeled vehicle the steering control is temporarily lost. Cycle tires are usually provided with longitudinal ridges at the tread (figs. 8, 9, 11); the narrow surfaces of the ridges penetrate the mud and get a better grip on the solid road surface. Motor car tires are sometimes left with a smooth tread (fig. 14); fig. 13 shows a non-slipping tread with longitudinal ridges. The Dunlop non-slipping tread is formed by a series of lateral grooves about 2 in. apart all round the tread. Fig. 16 shows a tire fitted with a non-skid leather band, to which hard steel studs are fastened. This type of non-skid band can be either vulcanized to the tire or independently fastened to the rim at the beaded edges. The Parsons “ non-skid ” device consists of chains crossing the tire at right angles and fitting loosely over its surface; they are fastened at intervals to two chain rings one on each side of the wheel, and can be easily adapted to any tire. (A. Sp.)

TIREH (anc. *Teira),* a town of Asia Minor, situated in the valley of the Küchük Menderes (*Caystrus)* at the foot of Mt Messogis. It was the capital of the amirate of Aidin in the 14th century, and is described by Ibn Batuta as a fine city with streams and gardens. Pop. over 14,000, the larger half Moslems. It is connected with Smyrna by a branch of the Aidin railway, and has a trade in raisins, wheat, rice, tobacco and cotton.

TÎRGOVISHTEA (Rumanian *Tirgovistea,* or *Târgovistea,* sometimes incorrectly written *Tergovista* or *Tirgovist),* the capital of the department of Dimbovitza, Rumania; situated at the foot of the Carpathians, on the right bank of the river Jalomitza, 48 m. N.N.W. of Bucharest. Pop. (1900), 9398. A branch line connects Tîrgovishtea with the main Walachian system, and is prolonged northwards into the hills, where there are rich deposits of petroleum, salt and lignite. Coal is also found but not worked. Apart from the scanty ruins of a 14th-century palace, the most interesting building in the town is the Metropolitan church, still one of the finest in the country, with its nine towers and monuments of the princely house of Cantacuzino. It was founded in 1515 by Neagoe Basarab, builder of the famous cathedral of Curtea de Argesh. Tîrgo­vishtea is a garrison town, with a cavalry training school and an artillery depot and repairing arsenal.