Mr. R. MALLET, M. Inst. C.E., exhibited and described a model of an axle-box, with self-oiling apparatus, designed by him for railway carriages and locomotive engines.

He stated, that all axle-boxes, or oil-boxes, however variously constructed, might be divided into two classes; first, those in which the unguent was applied in a solid form, and secondly those in which it was applied and used as a liquid. The defect of the former class was, that a certain amount of heating by friction must take place, in order to liquify a part of the solid grease, before it could be of any service; thus, both the axle and its bearing were, to some extent, injured, before the remedy could come into operation. The great impediment to the use of those of the second class, wherein liquid unguents were used, had been the difficulty of keeping them constantly and uniformly applied, as well as in preventing any loss by leakage, from the effects of gravitation, and the centrifugal action of the axle-neck upon the film of oil covering it. Another evil, common to both classes, was the final loss of the unguent, and its constant contamination, by solid particles of grit and dust, which, lodging on the surface of the brass, or other metallic bearing, gradually ground away the neck of the axle.

These objections, and difficulties in the requisite facility of replenishing the unguent, had hitherto caused nearly all the rolling stock, on British railways, to be lubricated by the frequent application of solid grease. For the locomotive engines and tenders, oil had been extensively used, but the waste was so great, that the cost of oil alone frequently amounted to £40 per annum, for each engine and tender. It was by attention to all these small sources of loss, and by their constant removal, that the profits of railways might be most effectually enhanced.

The axle-box, Figs. 1, 2, 3, and 4, had been designed to remedy these defects, and to enable fluid unguents to be used in all cases. The cast-iron shell of the axle-box, *a a*, was so contrived that it should inclose the neck of the axle *b*, and secure it from the access of dust and grit; within this box, and on the under side of the axle-neck, *b*, a vessel of oil, *d*, was placed, and floating in it there were two, or more spheres, or short cylinders, *f, f*, made either of light wood, or of hollow metal, or glass. The diameter of these spheres, and the quantity of unguent in the oil vessel, were such as to retain the spheres in contact with the lower side of the axle-neck, so that when the axle revolved, these floating spheres also revolved, and constantly applied the oil to the surface of the axle-neck, any superfluity being swept off by the bearing, and dropping back into the oil vessel.

The bearing, *c*, usually made of brass, might be made, in the present case, of a white metal alloy, of tin, zinc, and lead, (such as Babbitt's metal); for it was well ascertained, that these alloys answered perfectly when a liquid unguent was used, but with solid grease the initial friction necessary to melt a solid unguent continually abraded the surface of the bearings, until they were eventually completely destroyed.

The oil vessel, *d*, could be filled either at the lip in front, by sliding up the sheet-iron door, *h*, or at the hollow space, *a, a*, above the axle-box, where the grease was usually applied; the latter method was not recommended, as it exposed the oil to some dust. The oil vessel was secured and kept steady by the cross-key, *e*, which was slightly curved upwards, to give the requisite elasticity.

In order to close the bottom of the axle-box hermetically against dust, there was a pan, *g*, resting upon the returned edges of the lower part of the axle-box, and retained in place by the sliding plate, *h*. This pan, being larger horizontally than the oil vessel, was also useful, for catching any oil that might escape from the bearing, or the oil vessel.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Mr. Mallet conceived, that the axle-box, he had described, was peculiarly suitable for the rolling stock of railways generally, and more especially for locomotive engines and tenders, as by its application, fluid unguents could be used without waste; and whatever impurities, or solid matters might be contained in the oil, or be introduced into it, by the abrasion of the rubbing surfaces, would fall to the bottom of the oil vessel, whilst the oil applied to the floating spheres would always be taken from the top, and hence be perfectly free from impurities. The ingress of dust, or dirt, was entirely prevented, and yet the construction was so simple as to admit of easy and direct inspection of the axle-bearing: and with properly-cast white metal bearings, a new bearing might be inserted, without removing the axle from the carriage.

Sir JOHN RENNIE, *President*, addressed the meeting on the importance of transmitting, during the recess, or at an early period of the ensuing session, the Communications intended to be brought before the Institution, in order to afford time for preparing them for the meetings.