

object of this side ditches. is sufficient, the rise should gravel roads, and be at least the metal above will the metal ended for the heavy horse should be smooth and the metal sur-

and repairing and that it subjected to, the roads the well together al used will, re econom from a dis canic rocks rocks make tones with tendency to

should be pass freely as a stand- ilar rocks, ilar stones, and similar ve to be. eight, and at hard and soft rocks. broken as n will pass a 1½ inch l hard rock and make g material.

ROAD SURFACES.

Road surfaces outside of pavements may be considered under the heads of Telford, Macadam and Gravel Roads.

Telford Roads. The modern system of making Telford roads differs considerably from that laid down by the inventor, and is practically as follows: On the well-rolled earth foundation, stones about 4 inches wide, 6 inches thick and 8 to 12 inches long are set by hand on their flattest sides, the longest side laid across the road, and in straight rows, the stones to break joint. In the space between the larger stones smaller stones and chippings are firmly wedged, any irregular upper edges of the large stones are sledged off. When finished it presents a slightly roughened surface; this surface should also be well rolled. After the completion of this sub-pavement, at least two separate layers of broken stone are put on. The stones used in the next layer may be from 1 to 3 inches in diameter. This layer should be about 4 inches thick, and should be spread evenly to conform to the finished surface. A small quantity of coarse sand should be spread on this course, sufficient to fill the interstices and act as a binder, and then it should be well and thoroughly rolled after first being sprinkled with water. The top or finished course should be of smaller stone, not over 1½ inches diameter, such as would pass through a 2 inch ring. Great care should be exercised in selecting this layer, as in the quality of the stone depends the life of the road surface. All the stones should be of a uniform size. This course should be at least 3 inches thick, and after being lightly rolled, should be sprinkled with coarse sand or stone screenings from the quarry, watered, and constantly rolled with a heavy roller until it is pressed into a smooth compact mass, so that no more sand or screenings can be pressed into the spaces. In rolling always roll the outside first parallel with the road, working towards the centre. Fig. 7 shows a cross section of Telford roadway for an eight foot surface.



Fig. 7. Section Telford Road Service.

Macadam Roads. In this, as in the former case, modern road builders have departed from the rules laid down by the inventor. Macadam roads are undoubtedly inferior to Telford roads for locomotion where heavy traffic is to be provided for; but, when made care-