WOOD PAVING IN PARIS.

The paving of the streets of Paris with rectangular wood blocks was begun about fifteen years ago, and, since then, more than twenty-five million francs' worth of work has been done, to say nothing of the sum expended for maintenance and reconstruction. At first, the contracts for such work were allotted to various companies, which, in addition to furnishing the material and putting it in place, were required to keep it

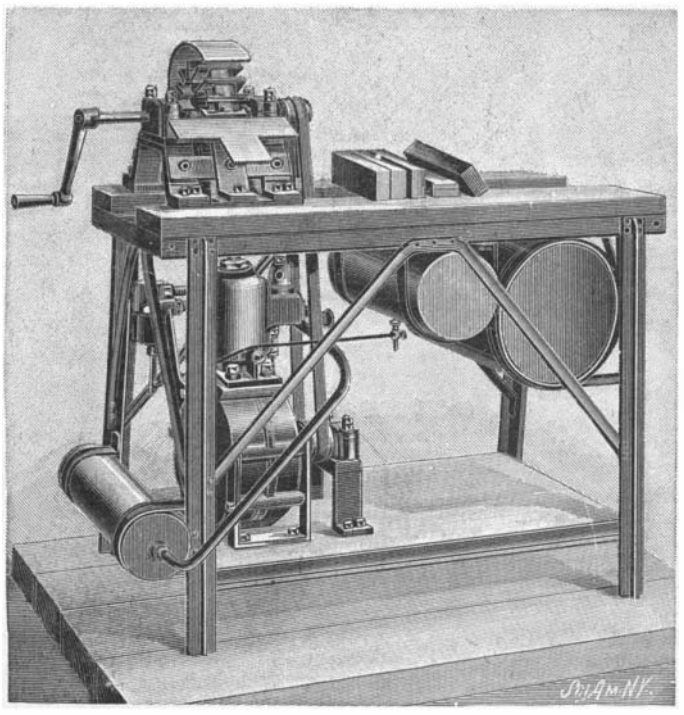

Fig. 1.—GASOLINE TRIMMING MACHINE FOR WOODEN PAVING BLOCKS.

in good order and to give the city an entirely new road at the expiration of the concession. All such privileges will terminate three years hence, and after that the work will be carried on exclusively by the Commission of Public Ways, which has already laid and kept in repair a large number of square feet of wooden pavement.

Now that considerable experience has been had with this kind of pavement, it is possible to estimate accurately its advantages and drawbacks. In a few words, its advantages are smoothness of surface, comfort to pedestrians, and saving in work for horses, while its drawbacks reside principally in the cost of maintenance. A wooden pavement lasts but about eight years. At the end of this time it may be considered as having been entirely reconstructed by the repairs to which it has been continuously subjected.

The city of Paris now owns a large establishment, which is devoted to this industry, and which is in charge of M. Josse, superintendent of the public works. The wood is here cut into blocks by machines actuated by powerful dynamos, and the blocks are afterward injected with creosote before being carried to the places where they are to be laid. The wood employed is of very variable quality. More than fifty varieties, derived from various countries, are used. These may be divided into two principal kinds: First, hard woods, such as Karri (*Eucalyptus diversicolor*), French oak, and Javanese teak; and, second, soft woods, such as the maritime pine of Landes (which furnishes three-quarters of the paving blocks of Paris), northern spruce (which has the inconvenience of being costly), Florida pitch pine, etc. The reliance that can be placed upon soft woods is well known, since they were the first that were employed for the Paris pavements. As for the others, however, they have been used for only a few years past, and it is not as yet known whether they will exhibit an increase in endurance commensurate with their higher cost.

One of the most interesting questions connected with a wooden pavement is its maintenance. This involves the following three operations, which are performed according to requirements: (1) renewal of portions of small extent that are very badly worn; (2) the turning of an entire section of the pavement upside down; and (3) the entire reconstruction of the work. After a paving block has been used for a certain length of time, the extremity of the fibers running toward the surface has been submitted to a crushing due to the passage of vehicles, so that the block can no longer be used in the position in which it is placed. Since, however, the body of the wood is intact, it may readily be seen that the block can be employed again if it be turned upside down. But, inasmuch as the fraying produced by the crushing of the fibers would prevent the blocks from being placed together so as to constitute a homogeneous surface, it is necessary to have recourse to a process of trimming in order to straighten the damaged edges.

Formerly, when but a small number of pieces had to be manipulated, this operation was performed by hand; but, as soon as it became a question of a more extensive repair, the blocks were caried to the factory, where they were trimmed mechanically. Hand trimming is slow, costly, and, as a general thing, badly done. On the other hand, trimming done at the factory always involves a great expense, since the cost of transporting to and from the latter must be taken into consideration; and so it is often difficult to know which of the two systems is the more economical, and the better adapted for certain particular cases.

M. Josse has just devised an arrangement that surmounts all difficulties, as by its use the trimming can be done mechanically upon the spot. For this purpose he has constructed a compact trimmer to be used at the place where the work is in progress. By means of this the blocks are trimmed *in situ* with very great rapidity and with considerable saving in expense, so that wood pavement has entered upon a new era of usefulness since the cost of keeping in repair—its great drawback—is thus very largely reduced.

The trimmer, which has been in use for a few months past at Paris, consists of two parts, a cutter and a motor (Fig. 2). The former consists of a wide notched wheel upon which are fixed 16 movable blades, one in each notch. Each of these blades is rectangular, and is adjusted to the body of the wheel by means of two screws, so that after it has become blunt, it can be very easily dismounted and sharpened mechanically, according to the amount of wear that it shows. These blades are very cheap, since they are made simply of steel plate cut to the dimensions required, and do not have to undergo any special shaping.

The cutter is mounted upon a table that serves as a bench for the workman, who places the block to be trimmed in front of the blades. The trimmer is driven by a small electric motor direct connected to the axle of the tool, and controlled by a starting rheostat. The expense of operating that is quite small, since the electric power employed is only 880 watts, 8 amperes, at 110 volts—corresponding to a little more than one horse power.

The difficulty is to find the electric wires and to tap them for the current. At Paris this is not everywhere of the same nature, so that it is often necessary to interpose resistance in order not to exceed the proper density of current for which the motor is constructed.

On the other hand, it is sometimes very troublesome to connect the apparatus with the conductors from which it is desired to obtain the supply of electricity. All these circumstances have led to the installation of an arrangement that seems to be very practical, and which, moreover, has given excellent results. Instead of the use of electricity as a motive power, recourse is had to a small De Dion-Bouton gasoline motor placed under the work-table of the apparatus and inclosed in a case with hinged panels. The iron plate of which this is made is perforated, so as to permit of a circulation of air and thus prevent a rise of temperature (see Fig. 1, in which the case is supposed to be removed).

The transmission is effected by a belt, so that there is no danger of any violent shocks being transmitted to the motor when some hard substance on the block happens to hit the cutting blades.

The carbureter, which is of the usual type, receives the gasoline from a three-gallon tank, which contains sufficient to run the motor about eight hours. The apparatus requires supervision, however, since the cooling of the cylinder and explosion chamber is done by cold water contained in a ten-gallon tank that must be refilled every three hours.

A later development of this machine is shown in Fig. 3. The apparatus is extremely simple, consisting of a De Dion motor of three horse power with its gasoline receiver and water cooling tank, driving a rotary cutter which is mounted directly on the shaft. The motor is brought up to speed by the crank and chain-wheel seen in front. The cutter has sixteen blades of steel 0.32 inch thick, very hard and specially tempered. It can trim about 400 blocks an hour upon one face. It is driven at 2,000 revolutions per minute. The blades have to be changed every two days. Before the cutter is a metal shelf or support which presents the block to the cutter, and its position is calculated so that the faces when cut will be always perpendicular. An automatic oiler with a constant feed assures a perfect lubrication without requiring any care from the operator; this fact is quite important on these high-speed motors. The motor is water-cooled in this case, and the large water tank with the pipes are seen on the left. Near it is the gasoline reservoir. The city of Paris has ordered a number of these outfits, because of their superiority over others. For portions of the above article we are indebted to La Nature.

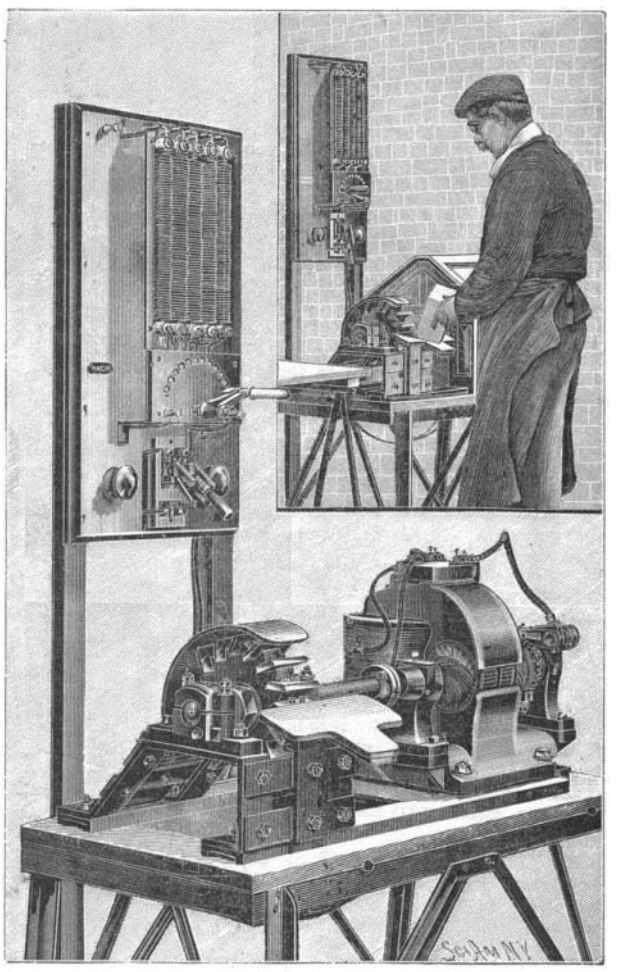

Fig. 2.—ELECTRIC TRIMMING MACHINE.

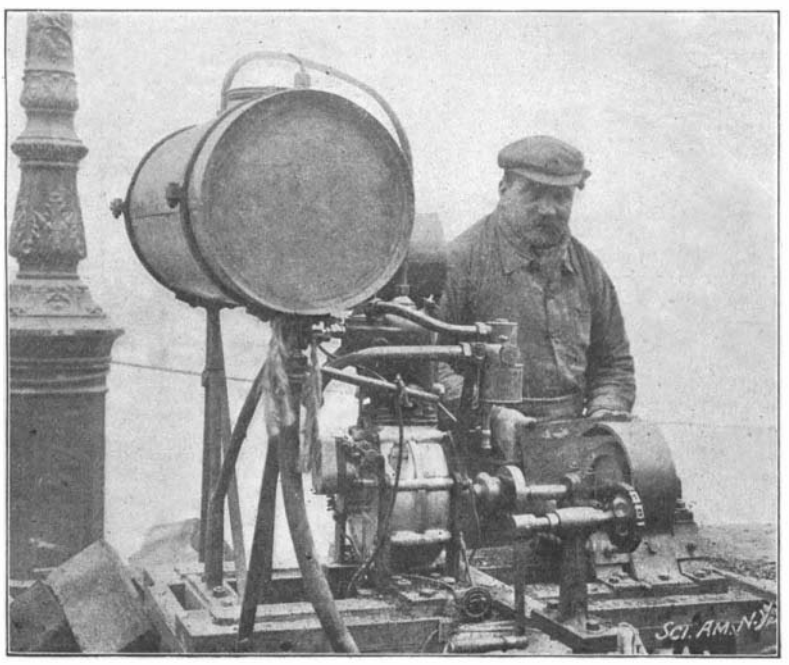

Fig. 3.—MACHINE FOR TRIMMING PAVING BLOCKS.

Annual Meeting of the American Association for the Advancement of Science.

The Fifty-second Annual Meeting of the American Association for the Advancement of Science, and the first of the "Convocation Week" meetings, will be in session by the time this issue is in the hands of our readers. The meetings will be held in Washington, D. C., December 27, 1902, to January 3, 1903; the meeting of the Executive Committee of the Council on Saturday, December 27, and the opening session of the association on Monday, December 29, in Lafayette Theater. The Arlington Hotel has been selected as "Headquarters."

Owing to the rapidly increasing dimensions of vessels, it has become imperative for the River Clyde to be straightened, deepened, and widened in the vicinity of the various shipbuilding yards, in order to facilitate the launching of large vessels. The project has been contemplated for some time past, but it will have to be undertaken immediately, as the two new Cunard liners, which are to be the largest vessels afloat, are to be built upon the Clyde, if possible. Construction in the Clyde yards, however, can only be carried out by improving the river, to obtain the necessary launching accommodation.