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## Engineers—And

very small drill, approximately one-twenty-fourth of an inch in diameter. This year, however, we have been able to get better results by the use of punches. The orifice is made by punching the pipe nearly through in the City Shops with a broad punch before being brought out on to the boulevards. The pipes are then connected up in the ordinary way, resting in a groove in the turf made just wide enough to hold the pipe; and after pipe for the length of a block has been connected up and the pressure turned on, a man is sent over the line with a sharp punch and the orifices are punched through. With the exercise of proper care the orifices can be made in such a way as to obtain a uniform spray from each one. This system seems to be better than the old method of drilling. The connections are made at intervals sufficient to allow each of the orifices to discharge under a proper pressure: usually one connection every three hundred feet is sufficient.

Where the boulevards are flat the pipe is laid along the middle of the strip. Where the sidewalk is elevated to any extent above the curb there is of course a sloping boulevard, and the pipe may be placed close to the edge of the walk, allowing such portion of the lawn as is not reached by the spray itself to be watered by the trickling of the water which has already fallen on the grass nearer to the sprinkling pipe. Under such conditions, having the pipe near the edge of the walk, the lawn is more easily kept cut and in good condition than where the pipe extends along the centre of the boulevard strip. Special orifices are made where necessary in order to water the trees along the line. The sod at the base of each tree is cut away so that a small pool may gather.

The apertures in the pipes should be drilled or punched as small as possible, so as to obtain the greatest possible spray effect. While the punch idea works out to be much the better, it is always a difficult matter to punch galvanized pipe, and in some cases a pipe length may be spoiled on account of the distortion caused by blows. With practice, however, the damage from punching is almost negligible.

In many cases considerable pipe fitting is necessary in order to pass the short cross walks over the boulevards with the piping. These crossings are usually of concrete and in the case of private walks the pipe is laid over the concrete slab, but at the street intersections it is carried out to the curb and rests in the gutter until beyond the cross walk, and is then returned to the boulevard. The early system of laying pipe over the top of these concrete cross walks has been entirely abandoned and the new arrangement is much more satisfactory. In the sidewalks which we are building this year, where the boulevard sprinkling pipe should pass the cross walk a groove is being left in the walk just sufficient to carry the pipe across. This will eliminate the necessity of so many turns at the corners which are always a source of great expense and inconvenience.

Since the water required for the irrigation of the boulevards is considerable, and since the demand is greatest at times when there is a large drain on our water supply, and since also the pumping of the water is done against a head of four hundred feet, it is necessary to be as economical as possible in the use of