

Importance of Road Maintenance

THERE is no phase of the road problem more important than that of maintenance. The general impression that there are certain types of roads that are permanent is erroneous. No permanent road has ever been constructed or ever will be, according to the road specialists of the U. S. Department of Agriculture. The only things about a road that may be considered permanent are the grading, culverts and bridges. Roads constructed by the most skillful highway engineers will soon be destroyed by the traffic, frost, rain and wind, unless they are properly maintained. But the life of these roads may be prolonged by systematic maintenance. A poor road will not only be improved by proper maintenance but may become better in time than a good road without it.

The first and last commandment in earth road maintenance is to keep the surface well drained. To insure good drainage the ditches should be kept open, all obstructions removed and a smooth crown maintained. Except for very stony soil the road machine or scraper may be used very effectively for this work. The machine should be used once or twice a year and the work should be done when the soil is damp so that it will pack and bake into a hard crust. Wide and shallow side ditches should be maintained with sufficient fall and capacity to dispose of surface water. These ditches can in most places be constructed and repaired with a road machine.

All vegetable matter such as sods and weeds should be kept out of the road as they make a spongy surface which retains moisture. Clods are also objectionable for they soon turn to dust or mud and for that reason roads should never be worked when dry or hard. Boulders or loose stones are equally objectionable if a smooth surface is to be secured.

A split-log drag or some similar device is very useful in maintaining the surface after suitable ditches and cross

sections have one been secured. This drag can also be used to advantage on a gravel road as well as on an earth road. The principle involved in dragging is that clays and most heavy soils will puddle when wet and set very hard when dry. The little attention that the earth road needs must be given promptly and at the proper time if the best results are to be obtained.

In dragging roads only a small amount of earth is moved, just enough to fill the ruts and depressions with a thin layer of plastic clay or earth which packs very hard so that the next rain, instead of finding ruts, depressions and clods in which to collect, runs off, leaving the surface but little affected.

The drag should be light and should be drawn over the road at an angle of about 45 degrees. The driver should ride on the drag and should not drive faster than a walk. One round trip, each trip straddling a wheel track, is usually sufficient to fill the ruts and smooth the surface. If necessary the road should be dragged after every bad spell of weather, when the soil is in proper condition to puddle well and still not adhere to the drag. If the road is very bad it may be dragged when very wet and again when it begins to dry out. A few trips over the road will give the operator an idea as to the best time to drag. Drag at all seasons, but do not drag a dry road.

The slope or crown of an earth road should be about one inch to the foot. If the crown becomes too high it may be reduced by dragging toward the ditch instead of from it. If the drag cuts too much, shorten the hitch and change your position on the drag. If it is necessary to protect the face of the drag with a strip of iron, it should be placed flush with the edge of the drag and not projecting. A cutting edge should be avoided, as the main object in dragging is to smear the damp soil into position.

GOOD ROADS YEAR BOOK.

FUNDS available in all of the states for the improvement of roads during the year 1914 are shown in the Official Good Roads Year Book issued by the American Highway Association, which is ready for distribution. This is one of the new features of the book which will make it invaluable to every state, county and municipal highway official.

The year book discloses for the first time that appropriations by the state legislatures for road improvement in the various states are available to the sum of \$62,201,016. The year book lists all of the patents relative to roads and bridges, all road expenditures in recent years, all associations' work for road improvement, describes all the different methods of road construction and different road materials, giving a directory of all road bulletins, circulars, and documents of interest to persons working for better highways and for all officials engaged in supervising work on roads. Sections of the year book are devoted to work in different states and the progress of road improvement. One of the interesting features, for instance, is the description of dust preventives, while one chapter is devoted to convict labor and another to the financial phase of road improvement. A summary of the road laws in the various states is of particular interest to motorists, while descriptions of specifications for highways in the various states will be of interest to engineers. There also is a chapter devoted to important events in the road movement in 1913, and another section devoted to road systems in foreign countries. The year book is issued annually by the American Highway Association as part of its campaign to give the United States an adequate system of improved highways. Price, \$1, postpaid.

A NOVEL HORN.

A NEW device for protecting automobiles against robbers has been invented, and it promises to put a stop to the activities of the thieves who have been stealing so many cars. The new contrivance has a powerful horn attachment with a weird and un-

usual tone. As soon as the automobile stops the alarm is set automatically, and if anybody jumps into the machine and tries to steal it the horn will set up a fearful noise the moment the wheels begin to turn, and will not stop until the car comes to a standstill. No thief would be daring enough to jump into a car that would make itself so conspicuous.

The new invention is proof against carelessness on the part of the chauffeur, because the moment he gets out of the car or stops it the alarm gets into position and will give forth its noisy blast unless the combination is readjusted.

This device will be a boon to owners of cars whose chauffeurs are in the habit of going out joy riding. A chauffeur on a joy ride is liable to drink too much and become very careless, but with the horn alarm on his machine there can be no chance for a thief to slip away with it.

ROAD DRAINAGE.

THE first and prime essential of any good road is drainage—surface, sub-surface and side drainage. When finished, the road must shed water. To do this the road must be crowned from $\frac{1}{4}$ to $\frac{1}{2}$ of an inch to the foot, depending on the wearing surface, and must have an impervious or waterproof covering. There must be an unimpeded slope from the crown to the gutter or to the side ditch. The gutters or side ditches have at least 4-10 of a foot fall per 100 feet, and, if they are earthen ditches, they should have $\frac{1}{2}$ foot per 100 feet, and free drainage at frequent intervals into natural creeks, channels, or, in the case of a city with a sewerage system, into the sewers.

In order to drain away the sub-surface water and prevent it from softening the foundations, it is well to lay two lines of tiles.

The second essential, which is an essential of any structure, is a good foundation, and this is especially required for roads where the loads are concentrated on such small areas.

Because macadam roads are more expensive than gravel roads in first cost, they should be built very carefully. The materials in the order of their excel-

lence—trap rock, tough granite, chert, tough limestone, ordinary lime, tough sandstone.

HE HARNESS HIS AUTO.

J. FRANK TREES, a farmer of Brackenridge, Pa., makes a good use of his high-power automobile, when he is not out joy riding. He uses it to put hay into his mow. Formerly the hay was raised by means of a block and tackle and horsepower, but it was hard work and the horses had to be rested often. Now he fastens the touring car to the block and tackle by means of a "harness" he has devised, and can stow the hay away twice as fast as formerly.



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