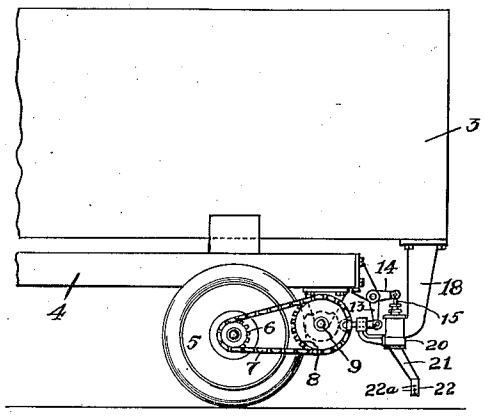
Oct. 6, 1936. H. E. CUMMINGS 2,056,258

METHOD OF APPLYING PROTECTIVE MATERIAL TO ROAD SURFACES

Filed Sept. 7, 1933

Fig. 4



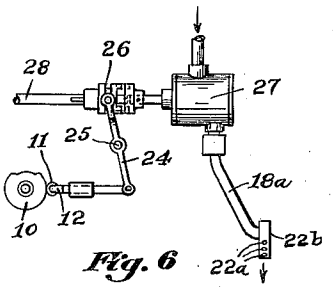


Fig. 6

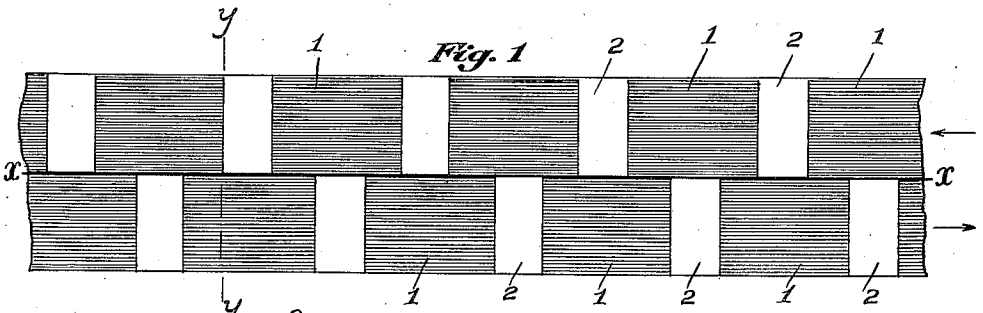


Fig. 1

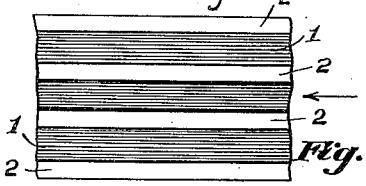


Fig. 3

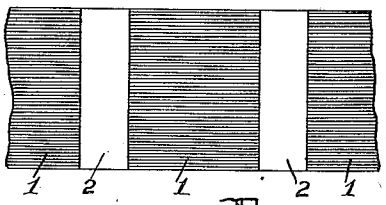


Fig. 2

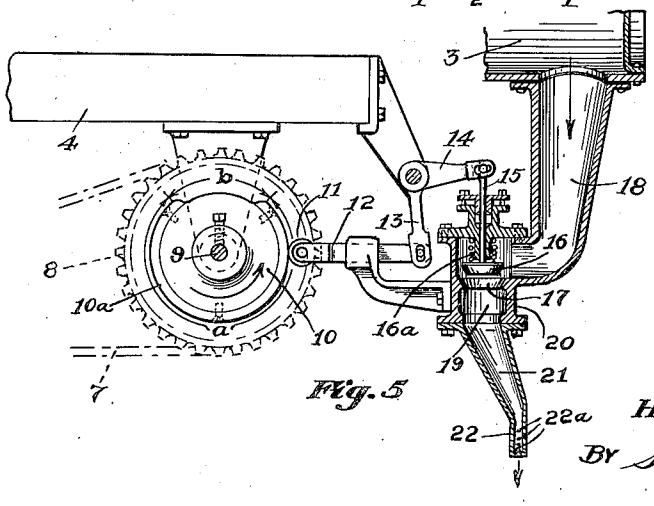


Fig. 5

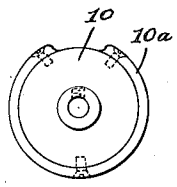


Fig. 7

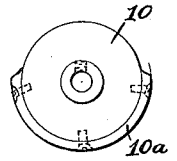


Fig. 8

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UNITED STATES PATENT OFFICE

2,056,258

METHOD OF APPLYING PROTECTIVE MATERIAL TO ROAD SURFACES

Harry E. Cummings, Portland, Maine

Application September 7, 1933, Serial No. 688,533

6 Claims. (Cl. 94—23)

This invention deals, in general terms, with highway construction, having particular reference to their maintenance and preservation.

Specifically, it involves a method of operation related directly to oiling or otherwise treating the surface of highways which, from their nature or character, are susceptible of such treatment. The invention varies from present-day practice in the matter of application of the protective material to the road surface.

My method is particularly well adapted for use in that type of road construction in which gravel forms a major portion of the roadbed section, or in other types, such as concrete, over which it is desired to spread a thin coating of the oily material or tar products to make it impervious to water.

In the foregoing classes of roads it is common practice, at stated periods, to cover the surface with a low grade of oil and to immediately thereafter spread a thin layer of fine sand over the oil which, eventually, is taken up and absorbed by the sand.

In certain instances a drag or levelling device is drawn over the oil and sand-treated surface, but in any event the usual traffic over the road finally rolls the material into a more or less compact protective covering which greatly assists in preventing erosion and guttering by rain storms and dissipation of much of the road surface to the sides of the road, during dry weather, by each passing vehicle raising the dust and wafting it to either side. These difficulties are bound to occur even when a road is well built but does not receive proper care thereafter; and it is the primary object of the present invention to improve on the present method of protecting its surface once the road has been properly constructed.

While my present conception contemplates the use of oil and sand as the protective materials generally employed for this purpose, it is in the manner or method of applying them that the novelty of the invention mainly consists.

The primary object sought in my invention is to reduce the yearly expenditure of funds required to satisfactorily protect a road surface after once being properly built. It is due to the high cost of oiling a road that many municipalities are unable, from lack of ample funds, to properly care for them. And anything which will alleviate the situation is worthwhile.

With this end in view I have conceived a plan embodying a method calculated to reduce the cost of material used for protecting the road surface by a considerable amount, the method consisting in applying the oil in stretches alternating with bare portions of the road surface.

It is a well known fact that motor vehicle tires rolling over freshly oiled and sanded roads pick up and carry forward considerable amounts of these materials. Thus when the tires pass off the oiled and sanded stretches a portion of this material is carried along on to the bare stretches, and in the course of a short period of time it will be found that there is sufficient protective material distributed over the originally bare surface to satisfactorily cover it for protection purposes. Ample evidence that traffic distributes this oil-sand mixture is found by observation of two intersecting roads, one only of which is oil treated. For some distance on the untreated road the oil will be found, carried there by traffic passing thereonto from the oil treated one.

The alternating, oiled and bare, stretches may be arranged in various ways, a preferred arrangement being to divide the road into two longitudinal lanes, operating first on one and then on the other, the oiled stretches being staggered with respect to the two lanes.

In carrying out my invention in practice it is possible to use the present tank truck oil control equipment to manually operate the opening and closing of the oil distributing valve, but I prefer, for reasons of procuring greater accuracy and uniformity in distribution of the oil, to equip the truck with a simple mechanism, acting wholly automatically, with provision to vary the period of time during which the oil is discharging so as to obtain various proportionate lengths of oiled and bare stretches, respectively.

Such a device, illustrative in character, is depicted in the accompanying drawing in which also is shown various arrangements of protective coverings respecting their allocation on the road surface.

In the drawing, in which similar reference characters are employed to identify like parts in the various views thereof,—

Fig. 1 represents a two-lane highway, the oiled surfaces thereon being shown in shaded portions and separated by bare spaces;

Fig. 2 shows a single lane road with respect to the oiled surface, the oiled stretches being arranged across the full width of the highway;

Fig. 3 illustrates an alternative method of depositing the oil; in this instance it is laid in narrow longitudinal strips with bare spaces intervening;

Fig. 4 shows, fragmentarily, an oil distributing truck with apparatus installed thereon for auto-

matically feeding the oil on to the road surface in a manner disclosed in this invention;

Fig. 5 is a view of the oil distributing and control mechanism shown in Fig. 4, but on an enlarged scale;

Fig. 6 is a representation of a power-driven oil pump controlled to feed the oil intermittently, and

Figs. 7 and 8 show, respectively, different forms of cams for varying the proportionate lengths of the oiled and bare surfaces in the roadway.

Fig. 1 of the drawing represents a plan view of a roadbed divided, with respect to the oiling thereof, into two lanes, the oiling operation being conducted first on one side of the center line *x*—*x*, and then on the other.

On each lane there are stretches of oiled surfaces **1** alternating with somewhat shorter stretches of bare surfaces **2**. It will be observed that the oiled surfaces on one lane are staggered with respect to those on the other lane. This brings the bare spaces **2**, taking the two lanes together, into somewhat closer relation, relatively, than if the oil was distributed in a manner depicted in Fig. 2, by reason of the fact that vehicles cutting out of line or operated in a more or less promiscuous manner—zig-zagging, as it were—will cause the oil to be more quickly and completely spread over these bare portions.

Allocating the oiled stretches in the manner shown in Fig. 2 will give very satisfactory results particularly where the road is narrow and well cambered and the oil sprinkling apparatus is of broad gauge.

In Figs. 4 and 5 I disclose structure, wholly illustrative in character, embodying an automatically operating mechanism which may be installed on an oil tank truck for accurately laying the protective material in separated stretches over the road surface, as illustrated in Figs. 1 and 2.

An oil tank **3** is mounted on a truck frame **4**, and the axle **5** of the running gear carries a sprocket wheel **6**. Through the agency of the chain **7** the sprocket wheel **8** is driven, the latter being fixed on the transversely disposed shaft **9**. Secured to the shaft **9** is a cam **10** engaging which is a roll **11** mounted on the reciprocable plunger **12**. The opposite end of the plunger is connected to one arm **13** of a bell crank lever and the other arm **14** of the lever actuates the valve rod **15**, on the lower end of which is a valve **16**. Raising the valve from its seat **17** permits oil to flow from the oil-conducting tube **18** into a chamber **19** located within the long, transversely extending box **20**. From this box depend a plurality of nozzles **21** on the lower ends of which are sprinkler heads **22** which deliver the oil to the road surface through small apertures **22***a*. The oil tube **18** is directly connected to the tank **3**.

In the foregoing description of the oil-control mechanism a gravity feed arrangement is contemplated. A forced ejection of the oil may be, and more than likely would be employed. Apparatus of this character is shown in abbreviated form in Fig. 6 of the drawing.

In this forced-feed method of delivering the oil the cam **10**, through the intermediary elements, including the lever **24** pivoted at **25**, operates a clutch **26** which when engaged with its mating part transmits power to the pump **27**, the power being derived from the shaft **28** which has connection with either the main power plant of the truck or an independent power unit used for oil pumping purposes. When the clutch is disengaged the pump is idle. The forced feed pumping unit is equipped with oil tubes **18***a* and nozzles **22***b*.

Referring to Fig. 5 it will be observed that there are shown two index arcuate lines indicating and identifying the "dwells" on the cam **10**, the dwell *a* being the longer and serving with the connecting parts to open the valve **16**. When the roll **11** passes off the dwell *a* on to the dwell *b* the valve is closed through the agency of the spring **16***a*.

The arcs *a* and *b* represent, relatively, the open and close times of the valves **16**, but they also represent the proportional lengths of the oiled and bare surfaces of the roadbed after the oil has been laid thereover.

Different proportionate lengths of oiled and bare stretches may be obtained by changing the rim **10***a* of the cam **10**. Examples of this can be seen by reference to Figs. 7 and 8. While I have shown a simple method of driving the cam **10**, namely, by sprockets and chain, it is of course quite obvious that a system of interchangeable gearing might be employed. After it is first determined what lengths of oiled and bare stretches are desirable, the proper reduction in gearing to open and close the oil discharge valve at the proper times is easily found.

It might be thought that the same objects could be attained by applying the oil in a thinner coating but over the entire surface of the roadbed. This would not, however, be feasible since it is absolutely essential that the oil be laid in a sufficiently thick layer or coating to enable the sand to be completely impregnated with it. Furthermore, should there not be enough oil to thoroughly saturate the sand, the outer or dry portion would be dissipated by passing traffic and be blown off the highway. In other words, wherever the oil is deposited it should be in such quantities as to form a proper binder for the sand, and a too thin application will not serve the purpose.

The condition of the roadbed surface will largely determine the proportionate lengths of the respective stretches of treated and bare surfaces. The looser the bare stretches the shorter they will be, and the firmer or more compact these portions are, the longer they may be.

As has previously been stated, the primary object of my invention is to conserve material used for road preservation and dust-laying purposes, and I have elected to illustrate and describe it in connection with the use of oil and sand as the protective mediums solely for the purpose of comprehensively disclosing it.

I do not, therefore, wish it understood that I limit or restrict myself to the use of these substances as I am not concerned with the material itself but only with the method or manner of applying it to road surfaces.

For instance, certain kinds of tar products, if heated, could be distributed over the road surface in the manner hereinbefore set forth for oil; and a saving in material could easily be effected.

Then, too, if the object be simply to lay the dust on the roadbed, certain chemical products, such as calcium chloride, might be employed to carry out my invention, the only requirement being to provide a proper apparatus which, as in the case with the oil, could lay the material in separated stretches. And as the chemical mentioned has a strong affinity for moisture it would readily lend itself for the purpose required and most effectively

be carried on vehicle tires from the treated portions on to the bare sections of the roadbed.

What I claim is:

1. A method of applying protective material to road surfaces consisting of depositing oil and sand upon the surface in separated areas, the bare, intervening spaces being of such length as will insure being covered by the oil and sand mixture incident to and through the agency of vehicular traffic over the highway.

2. A method of treating already constructed roads which consists in applying to the road surface an unctuous material laid in longitudinally separated areas extending substantially the full width of the roadbed, and immediately thereafter spreading a thin layer of sand over the unctuous material, the sand, together with the unctuous material being carried from the respective treated areas on to the bare, intervening areas by the wheels of vehicles passing over the highway in both directions, to the end that the protective covering laid in segregated portions may subsequently merge into a continuous covering of the road surface.

3. A method of treating roads consisting in applying to the road surface an oily substance, flowed thereonto and left in longitudinally spaced areas extending for a predetermined portion of the width of the roadbed, and then spreading over the treated areas a granular substance adapted to absorb the oily substance and be carried by vehicular traffic on to the intervening bare spaces lying between the oil-treated portions of the road surface, whereby the bare areas may subsequently be covered by the protective covering, comprising the oily and granular substances.

4. A method of protecting roads having a loose top surface consisting in depositing on said surface over areas longitudinally and predeterminately spaced, an unctuous material, and immediately following this operation, spreading a layer of a granular substance adapted to absorb the unctuous material and to be carried by vehicular traffic on to and cover the bare intervening spaces, whereby the whole length of the highway, originally intermittently covered by protective material, may become covered by a continuous stretch of the said covering material through the agency of vehicular traffic over said highway.

5. A method of applying protective material to road surfaces consisting in depositing thereon a coating of oily material and subsequently covering the oily material with a thin layer of sand, the oily material being laid over the full width of the road surface in stretches longitudinally alternating with bare spaces the lengths of which are uniform and determined by the capacity of vehicular traffic to pick up and carry thereonto portions of the oily material and sand first deposited, whereby eventually the entire surface of the road will receive protective covering.

6. A method of protecting road surfaces consisting in depositing thereon a coating of oily material at short distances apart along the highway, and then covering the oily material with a thin layer of sand, the intervening bare stretches being predeterminate in length but no longer than will insure being subsequently covered by a portion of the originally deposited oil and sand carried on to the bare spaces by vehicular traffic in both directions, the proportionate lengths of the oil-and-sand covered and bare spaces depending on the condition of the road surface and varying from five to one, respectively.

HARRY E. CUMMINGS.