Dec. 20, 1938. D. KOMLOS 2,140,634

METHOD OF PRODUCING PATHS, ROAD SURFACES, FLOORINGS, AND THE LIKE

Filed March 2, 1935 2 Sheets-Sheet 1

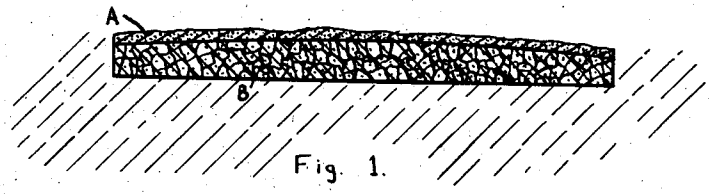


Fig. 1.

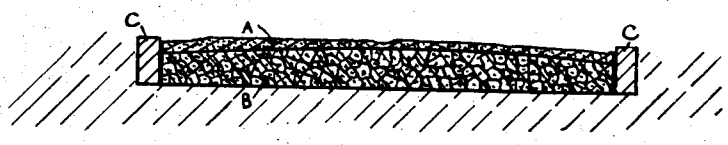


Fig 2

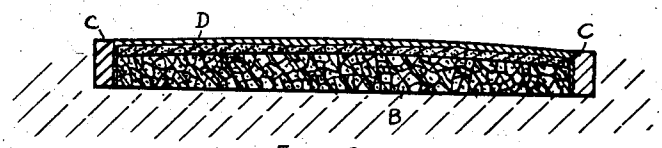


Fig 3

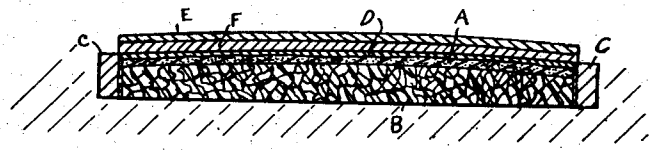


Fig 4

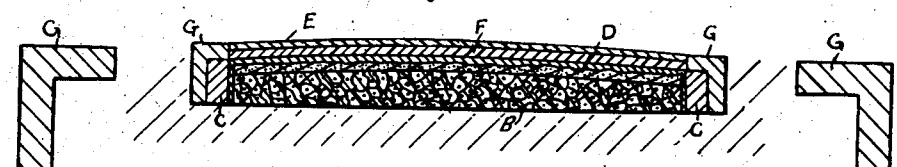


Fig 5

Fig 6

Fig 6

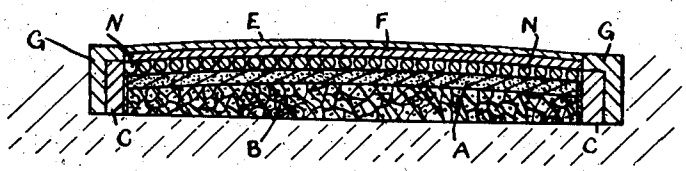


Fig 7

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METHOD OF PRODUCING PATHS, ROAD SURFACES, FLOORINGS, AND THE LIKE

Filed March 2, 1935 2 Sheets-Sheet 2

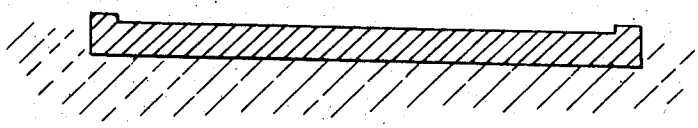


Fig. 8.

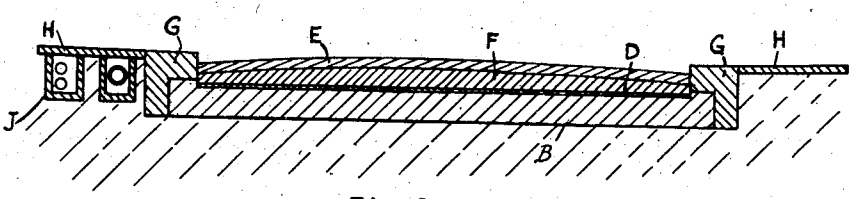


Fig. 9.

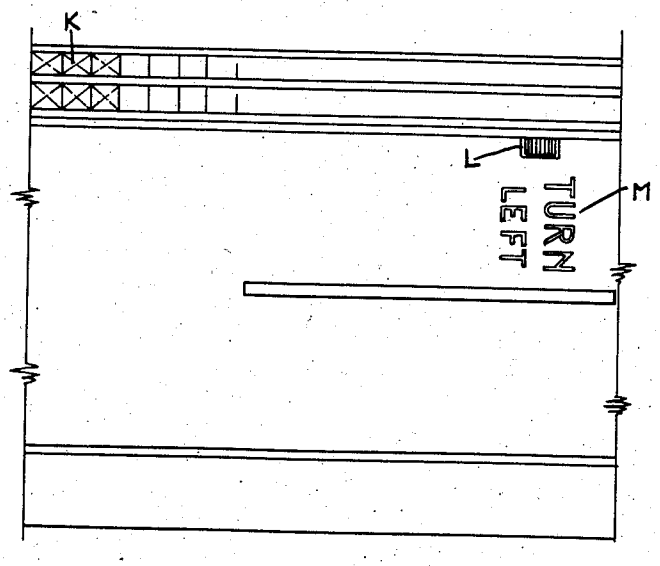


Fig. 10.

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Patented Dec. 20, 1938 2,140,634

UNITED STATES PATENT OFFICE

2,140,634

METHOD OF PRODUCING PATHS, ROAD SURFACES, FLOORINGS, AND THE LIKE

Dezso Komlos, Golders Green, London, England

Application March 2, 1935, Serial No. 9,055
In Great Britain March 6, 1934

3 Claims. (Cl. 94—22)

The present invention relates to the production of road surfaces, side walks, floorings, borderings, tennis courts, road and the like structures, and solid bodies, e. g. tiles and bricks. The object of this invention is to obtain a surface or structure of a durable yet somewhat of a cushioning or shock or load absorbing nature, and which will not get tacky or soft when subjected to the influence of heat in hot weather. A further object of this invention is to enable seamless surfaces to be obtained which will not crack or become distorted under changes in temperature and also which will readily adjust themselves in longitudinal, transverse and vertical directions.

A number of oils have the property of drying when exposed to the air and of forming an initially viscous and subsequently more or less hard substance. The use of such oils in the preparation of cementing materials and in the manufacture of artificial stones is of quite ancient origin. Various mineral oils have been used as stamping oils in the production of artificial stones and other materials.

Vegetable oils have been used as binding agents in conjunction with various plastic earths, chalk, lime, sand, graphite, manganese ore, and with water-soluble mineral colouring agents to prepare various cements and to produce toy bricks for children.

These cements and bricks are quite hard and remain hard if plastic water-soluble minerals have been used for their manufacture, and provided they do not come into contact with cold or warm water. In water these earthy, limy or chalky compounds become entirely soft so that they are useless for the purposes of road construction, even if their properties were otherwise suitable.

Now the inventor has found that all metals in a fibrous or granulated condition and all minerals and ores in a similar condition provided they do not comprise water-soluble components such as earthy mineral pigments, earth, chalk, lime, graphite, a soft substance such as asbestos or the like, but only what I term as hard minerals, for instance, volcanic or metamorphous rocks or sand, gravel, flint, quartz or the like in their pure and natural state can be utilized individually or in any convenient mixture thereof as the predominating constituent of a water-insoluble, non-rusting material which is as hard as steel and capable of being pressed and used for all purposes of road construction, by the addition to the selection substance of a relatively small proportion, which may be as little as 3–5% of specially prepared linseed oil with an admixture of a relatively small proportion of a dryer and in a somewhat inspissated form. The quantity of drier need only be 1% by weight of the oil.

The resultant mixture is pressed "in situ" and an essential part of this invention is that the pressed mixture is converted by a chemical exothermic reaction into a high class road-making material this chemical reaction being assisted by coating the pressed material with a protective covering of suitable material, e. g. sand which will retain the heat generated by the chemical action for a protracted period. The resultant material possesses the first-class qualities of a synthetic material which after drying can be sawn, cut, drilled, turned, planed or nailed like for example ebonite, steel, iron, copper, brass or wood. This broadly constitutes the present invention and the outstanding feature is the remarkably small quantity of dryer required to bring about this reaction.

Useful metallic admixtures for the linseed oil as a drier are the well-known metal oxides or hydroxides, such as lead, manganese, zinc and cobalt compounds, and the selected oxide or hydroxide is boiled in the oil to form a solution.

The commercial forms of linseed oil products which contain concentrated fatty acids and resinates dissolved in volatile solvents and admixed to the linseed oil are unsuitable for the above stated purpose as the employment of the said compounds robs the siccative oils of their required caoutchouc-like properties which it is desired to achieve by the present invention, and as a consequence the road making materials prepared from them are liable to become brittle. The caoutchouc-like consistency of the binding agents can be varied in degree at will. The longer these oils are subject to a process of thickening at temperatures not exceeding 260° to 300° C. the more caoutchouc-like is the final product obtained.

The chemical exothermic reaction to which these caoutchouc-like substances are subjected comprises two distinct simultaneous reactions. On the one hand, there is an oxidation, in other words oxygen is absorbed from the atmosphere in quantities which can be determined by weighing, and, on the other hand, there is a process of polymerization, that is to say, an agglomeration of molecules which occurs in the chemical structure of the substance.

In view of the fact that the length of time required for the completion of the "chemical-exothermic reaction", after the material has been pressed, greatly depends upon the season, the

process can be separately treated as a "summer process" and a "winter process".

The essentials of the summer process are as follows:— Metal or mineral non-water-soluble material or materials is or are fed to a mixing machine. In the mixing machine the materials are mixed with the aforementioned binding agents. The mixing process must be continued until every grain of the metal or mineral substance is embedded in the caoutchouc-like binding agents. This requires 5 to 6 minutes.

In order to ensure that the requisite ratio of binding agents is obtained a well-known type of automatic pump feeding device can be built on to the mixing machine. The mixed materials are then delivered directly on to the road where the road surface is made by compression in a few seconds with the help of a continuously and progressively working pressing and scraping machine.

Five to six hours after pressing, the chemical exothermic process begins which automatically generates heat in the pressed caoutchouc-like road surface until a temperature of 120 to 150° C. is reached. The longer the temperature generated in the pressed road surface can be maintained at the stated level and particularly also if protection is afforded against rain and premature cooling the more resistant will be the final product and the more rapid will the process be completed. It is, therefore, a decided advantage to cover the entire road surface after heat has begun to be generated with a layer of sand which has been preheated to a similar temperature and to have this layer on the road surface for a period of at least 48 hours.

The reaction is completed during the stated period of 48 hours and the road surface produced. The sand can be removed or used again, and after the surface has become perfectly cool and dry it is ready for traffic.

However, the chemical exothermic reaction is also set up if the described safeguarding measures are not carried out but in such case the completion of the process requires at least fourteen days.

In winter the process is very similar, but it is necessary in winter to preheat the road to a temperature approaching the reaction temperature of approximately 150° C. Otherwise the process is similar, excepting that in cold weather the reaction takes appreciably longer and that the layer of sand must be left on the road for at least 4 to 5 days. When using a reliable and well tested oven preheater 5 to 6 kilometers of a road can be maintained at the reaction temperature every day and seeing that the operating of preheating one yard hardly costs one penny to twopence per day it is advisable to employ the preheating apparatus both in summer and in winter. The attached two sheets of drawings diagrammatically show two examplary ways of carrying out the process, and wherein:—

Fig. 1 to Fig. 5 show varies sections of road structures.

Fig. 6 shows in sectional end elevation a pair of road borderings.

Fig. 7 is a section through an alternative construction of road surface.

Fig. 8 shows a suitable substructure with borderings integral therewith, and

Fig. 9 and Fig. 10 are sectional elevation and plan views respectively of a road assembly.

Referring to the drawings Fig 1 shows in sectional elevation a road surface A with the substructure B in a condition requiring repairs.

Fig. 2 again shows in sectional elevation a road surface A with its substructure B requiring repairs, with two safety walls C along the sides of the road and made "in situ" of the caoutchouc-like sand material and pressed into the substructure. The road surface contains an impregnated layer of sand of approximately 10 to 15 mm. thickness between the walls C and the substructure B. The purpose of the walls C is to hold in position the layer of sand or the balls subsequently described with reference to Fig. 7.

Fig. 3 shows a loose layer of sand D 20 mm. thick on the road substructure B and between the lateral walls C.

Fig. 4 shows the road surface A requiring repairs with a thick loose 20 mm. layer of sand on the road substructure D between the lateral walls C and a freshly made seamless caoutchouc-like road surface F and E pressed in one piece without lateral bordering G, Figure 6.

The construction of the new road surface is usually carried out in two layers, namely of a finer caoutchouc-like layer of sand F of a thickness of 4 to 5 centimetres and of a rougher caoutchouc-like layer of flint or fibrous steel E of a thickness of 3 centimetres and these two layers form a one-piece seamless surface which after compression is 7 to 8 centimetres thick. Owing to the effect of the chemical reaction the resultant coefficient of expansion of the materials is uniform.

Fig. 5 shows a road surface freshly constructed superimposed upon the loose layer of sand D between the two lateral walls C, the road surface F and E and the substructure B complete with the borderings G, these borderings being shown in larger scale in Fig. 6.

Fig. 6 shows a special type of road bordering pressed from the same material.

Fig. 7 again shows a freshly constructed road surface borne by hard balls N, and each of a diameter of about 20 to 30 mm., arranged between the lateral walls C, the surface F and E and the substructure B, complete with the bordering G. Fig. 8 shows a substructure such as may be necessary in reconstructing a road, with two integral lateral walls, pressed "in situ" in one piece and consisting of the same cheap caoutchouc-like sand predominating material. Fig. 9 shows a road surface E and F made of the same material, a road substructure B with a sidewalk H on either side and a drainage system and ducts J pressed from the same material.

Fig. 10 is the plan of a freshly constructed caoutchouc-like road surface. The covering plates of the drainage ducts J are at K. L is a drain pressed into the road surface. M is a coloured road warning sign which is also pressed into the road surface. The said balls N can be used to prevent the upper road surface from adhering to the road substructure and the lateral walls.

By using the safety walls C, the lateral borderings G, Fig. 6 (which can be pressed into any desired shapes) and lastly by using the layer of sand D which permits expansion to take place or alternatively of the hard porcelain balls N the washing away of the sand by rain is rendered impossible. On the other hand, the above mentioned safety devices permit the construction of reliable road surfaces, sidewalks, drainage ducts and the like which can expand laterally, lengthwise and in an upward and downward direction

and which are suspended like a link-chain suspension bridge and can move as if borne on a ball bearing.

In hilly districts it is desirable to add 1% of cheap mineral oil to the sand before use to hold it in position in the road.

When erecting buildings the substructure of the buildings can also be pressed in one piece "in situ" in the same material, lateral walls such as previously described being employed for such purpose.

When adopting the hereinbefore described methods of supporting a road surface the road surface can be constructed of other materials such as concrete, asphalt, tar and other bituminous materials.

I claim:—

1. The herein described method of forming road coverings, tennis courts and analogous hard durable surfaces and products, consisting in mixing intimately a granulated non-powdery hard non-water-soluble mineral and about 3 to 5% thereof of a siccative oil and a dryer as a relatively smaller proportion of the oil with substantially total absence of water, pressing such mixture in situ, and entirely covering the mixture after it has been pressed in situ with a layer of heat retaining material, heating such covering material to approximately 120° to 150° C. and maintaining it over the mixture for a period of at least forty-eight hours for the purpose of converting the pressed mixture by chemical exothermic reaction into a hard mass.

2. Method of laying a road covering, tennis court or the like comprising mixing with a substantially water free granulated non-powdery hard non-water-soluble mineral about 3 to 5% thereof of a linseed oil and a considerably smaller proportion of a dryer, spreading the said mixture soon after it has been mixed upon the road or equivalent foundation, compressing the spreaded composition to the desired shape of road or like surface, and after an interval of from five to six hours covering the compressed surface for a period of at least forty-eight hours with a layer of sand heated to approximately 120° to 150° C.

3. Method of laying a road covering, tennis court or the like comprising mixing with a substantially water free granulated non-powdery hard non-water-soluble mineral about 3 to 5% thereof of a linseed oil and a considerably smaller proportion of a dryer, spreading a layer of sand on the site, spreading the said mixture upon said layer of sand, compressing the spreaded composition to the desired shape of road or like surface and after an interval of from five to six hours covering the compressed surface for a period of at least forty-eight hours with a layer of sand heated to approximately 120° to 150° C.

DEZSO KOMLOS.