UNITED STATES PATENT OFFICE.

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LIQUID BITUMINOUS COMPOUND AND PROCESS OF MAKING THE SAME.

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To all whom it may concern:

Be it known that we, HENRY R. KASSON and SAMUEL S. SAXTON, who are citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Liquid Bituminous Compound and Process of Making the Same, of which the following is a specification.

Our invention or discovery relates to a liquid bituminous compound and a process for converting bitumens or asphalts into a liquid condition and combining the same with a vehicle for applying the same for various uses. Before this discovery or invention, bitumens and asphalts were liquefied by the application of heat, and they remained liquid only so long as they were retained at a sufficiently high temperature.

This discovery or invention provides a liquid bitumen or asphalt compound which retains its liquid condition at ordinary temperatures without the necessity of artificial heat.

The liquid bitumen or asphalt compound described in this specification may be diluted with water so that the resulting mixture is of any desirable or preferred consistency and is especially serviceable for many uses. In its less diluted form it may be used for preparing pavements for roadways, walks, etc., roofs of buildings and floors for the same. It may also be used as a paint and in a diluted form it may be readily sprayed over surfaces by painting machines and different forms of sprinkling or spraying machines. This latter mentioned use of our liquid bitumen or asphalt compound renders it specially applicable for use on railroad roadbeds, as it can be sprayed or sprinkled from a moving car and not only serves to cover and bind the material of the roadway, but also covers the ties and metal work of the roadbed, thereby preventing dust and preserving the wood and metal from the deleterious effects of moisture and the atmosphere.

We have discovered the fact that bitumens, or asphalts, when treated in a certain way and with certain materials, become liquid, and while in this liquid condition and either hot or cold, they can be diluted with water *ad libitum*.

While in this specification we describe the specific method for reducing bitumens and asphalts to a liquid condition which is the best method of which we have any knowledge, and which method is the one which we at present prefer, we wish it distinctly understood that we do not intend by such specific description to restrict our invention or the claims appended hereto, to the precise method herein described, nor to a liquid bitumen or asphalt which is the product solely of the process herein described, but we intend that said claims shall cover any equivalent process or a liquid bitumen or asphalt produced by any equivalent process.

Having thus generally described our discovery or invention, we will now proceed to set forth specifically and in detail the best method or process known to us at present for reducing bitumens and asphalts to a liquid condition, which liquid condition they will retain for some considerable time at ordinary temperatures, and in which condition they may be freely diluted with either hot or cold water *ad libitum*.

In employing our process, we take for instance, 70 pounds of bitumen or asphalt, and preferably, a bitumen or asphalt which melts at about 300 degrees F. and which may be either a natural product as it comes from the deposit, or may be a mixture of several bitumens from various sources, and melt it by the application of heat in the usual way, and after it is thoroughly melted we add a mixture composed of two oils, viz: 20 pounds of paraffin petroleum residuum, and 10 pounds of red oil (commercial oleic acid). We prefer to use the product which consists of the heavier or higher boiling portions of any paraffin petroleum. It should have a specific gravity of between 20 degrees and 22 degrees Baumé (.936 to .924 specific gravity). The mixture of oils having been raised to about the temperature of 212 degrees F. added to the melted bitumen, and the mixture thus formed thoroughly stirred or agitated and allowed to cool to about the temperature of 212 degrees F., an alkaline solution is then added to the mixture with the amount of water necessary to produce the fluidity required in the resultant liquid. For ordinary pavement work on streets and walks we find that by adding about 100 pounds of water to 100 pounds of the mixture of the bitumen or asphalt and the two oils, gives the fluidity desirable. This water which is added is raised to the temperature of 212 degrees F. and to this water, before it is added to the

bitumen or asphalt mixture, is added a solution of ammonia or ammonia water, the ordinary 17 per cent. solution of ammonia being employed, and one part of this ammonia water is used to ten parts of the water which is to be added to the mixture.

The resulting bitumen or asphalt mixture will be in a liquid condition, and in this condition it will remain at ordinary temperatures. The expression "at ordinary temperatures" is intended to mean those climatic temperatures which are experienced in the northern part of the United States during the summer and the latter part of the spring and the early part of the fall when the temperature is above the freezing point. While held in bulk in barrels or other air tight receptacles, this liquid bitumen or asphalt will remain liquid for practically an indefinite period; but when spread out on surfaces or mixed with crushed stone, sand and stone dust, as in making ordinary bituminous roadways, it will solidify within a comparatively short period owing to the comparatively rapid evaporation of its water constituent. Other alkalies as lime water, for example, can be used in place of the ammonia, but we find that ammonia is the most convenient form of alkali to use, and we find that the liquid bitumen or asphalt produced by its use is superior to that produced otherwise. The proportions of the several ingredients which we have mentioned are not to be considered as arbitrary and not capable of variation, as these proportions can be varied, and sometimes it will be found desirable to do so on account of weather conditions, or some other factor.

This liquid bitumen or asphalt mixture, is specially serviceable as a paint, a dust preventive, and a material for constructing bituminous roadways, floors, roofs, etc., as it will adhere tenaciously to cold stone, sand, metals and wood, and it is particularly useful owing to the fact that it may be transported for long distances in its liquid form and used without being first heated.

Having thus fully and completely described our discovery and invention, what we claim is:

1. The process of producing a bitumen or asphalt in liquid form at ordinary temperatures which consists in first melting the bitumen or asphalt, mixing residuum oil of petroleum and red oil, heating this mixture of oils to the temperature of about 212° F. then adding this mixture of oils so heated to the melted asphalt or bitumen, agitating thoroughly the mixture thus formed by the oils and the bitumen or asphalt, cooling this mixture to about the temperature of 212° F., raising a mass of water substantially equal in weight to the weight of the mixture thus formed to the temperature of about 212° F., adding ammonia water to the water with its temperature thus raised, and then mixing the water thus provided with ammonia to the mixture of the asphalt or bitumen and the two oils while the temperatures are maintained at substantially 212° F.

2. As a new composition of matter, a bitumen or asphalt compound in a liquid form and capable of maintaining its liquid form at ordinary temperatures composed of bitumen or asphalt, residuum oil of petroleum, red oil (commercial oleic acid), an alkali and water, substantially as specified.

In witness whereof we hereto affix our signatures in presence of two witnesses.

HENRY R. KASSON.
SAMUEL S. SAXTON.

Witnesses:
CHAS. L. GOSS,
FRANK E. DENNETT.