L. H. MINER.

PROCESS AND APPARATUS FOR HEATING ASPHALT.

APPLICATION FILED OCT. 9, 1911.

1,066,515.

Patented July 8, 1913.

3 SHEETS—SHEET 1.

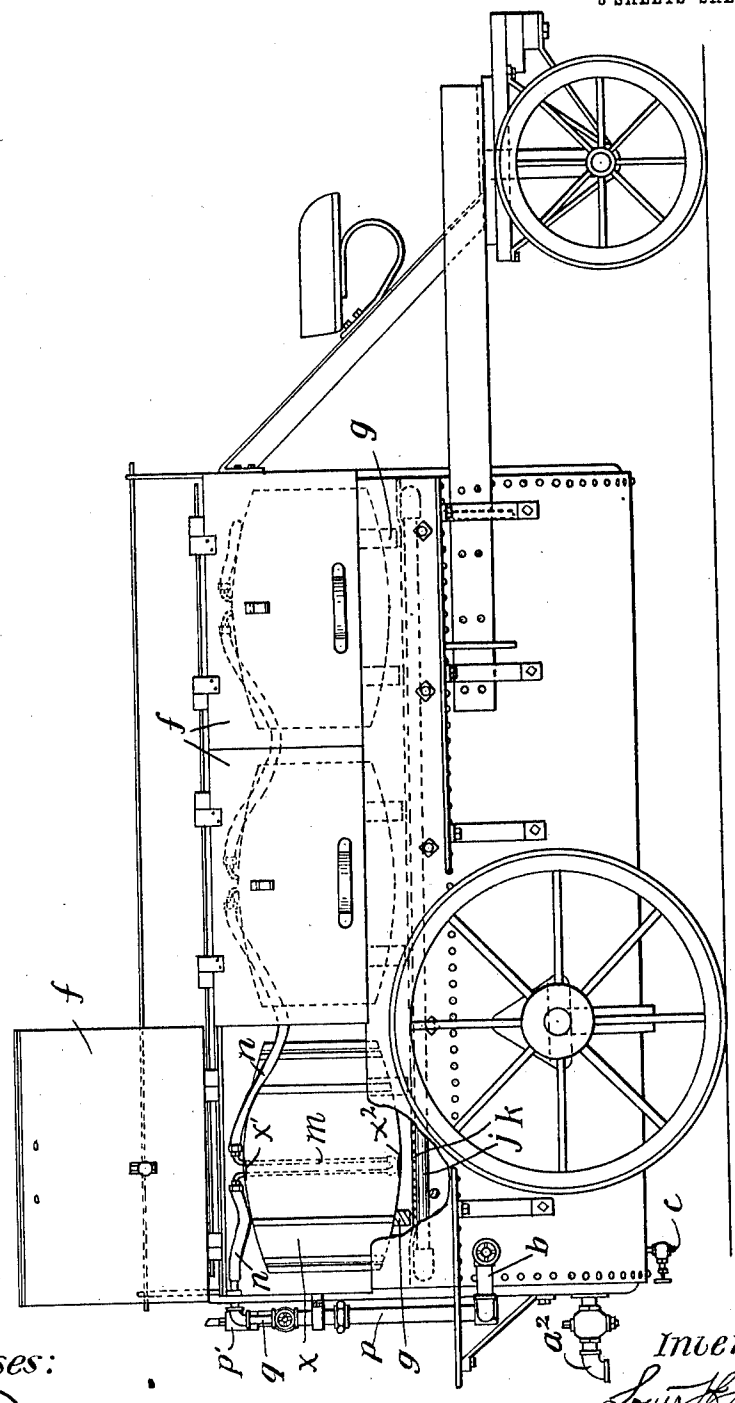

Fig. 1

Witnesses:

H. B. Davis.

J. L. O'Neill

Inventor:

Louis H. Miner

by Boyd & Harrison

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COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

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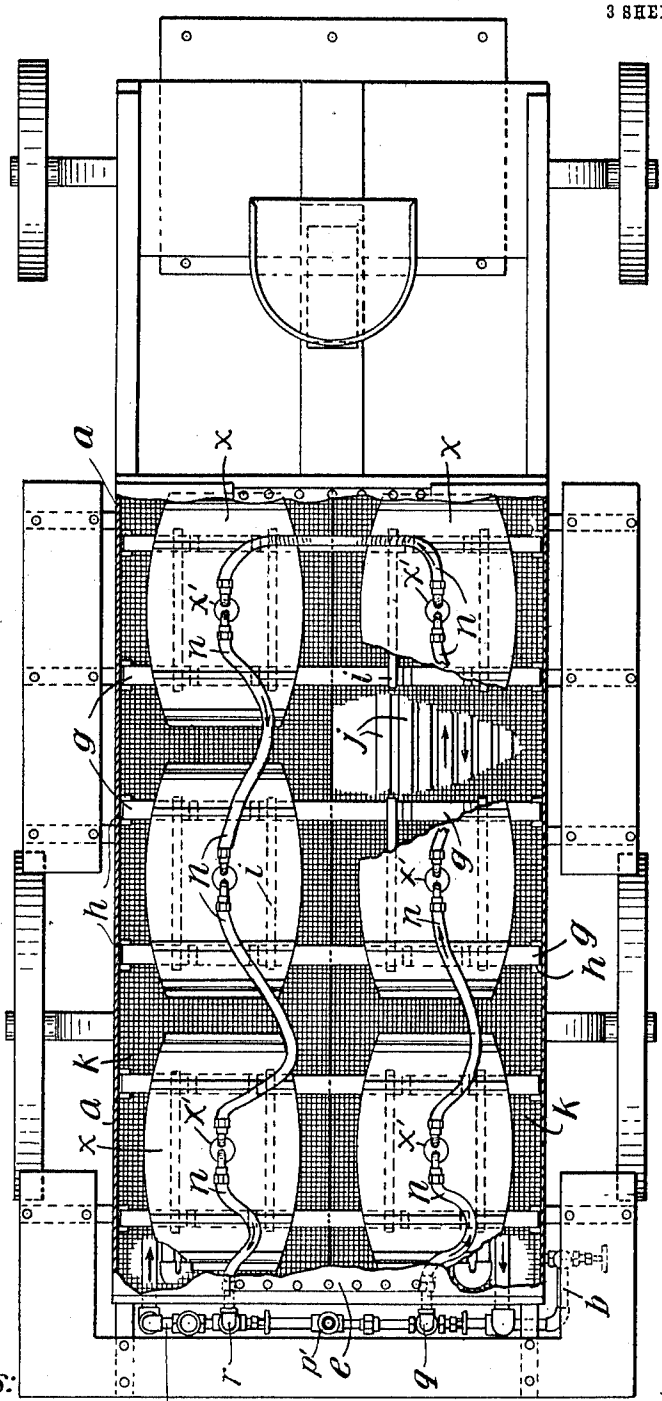

Fig.2

Witnesses:

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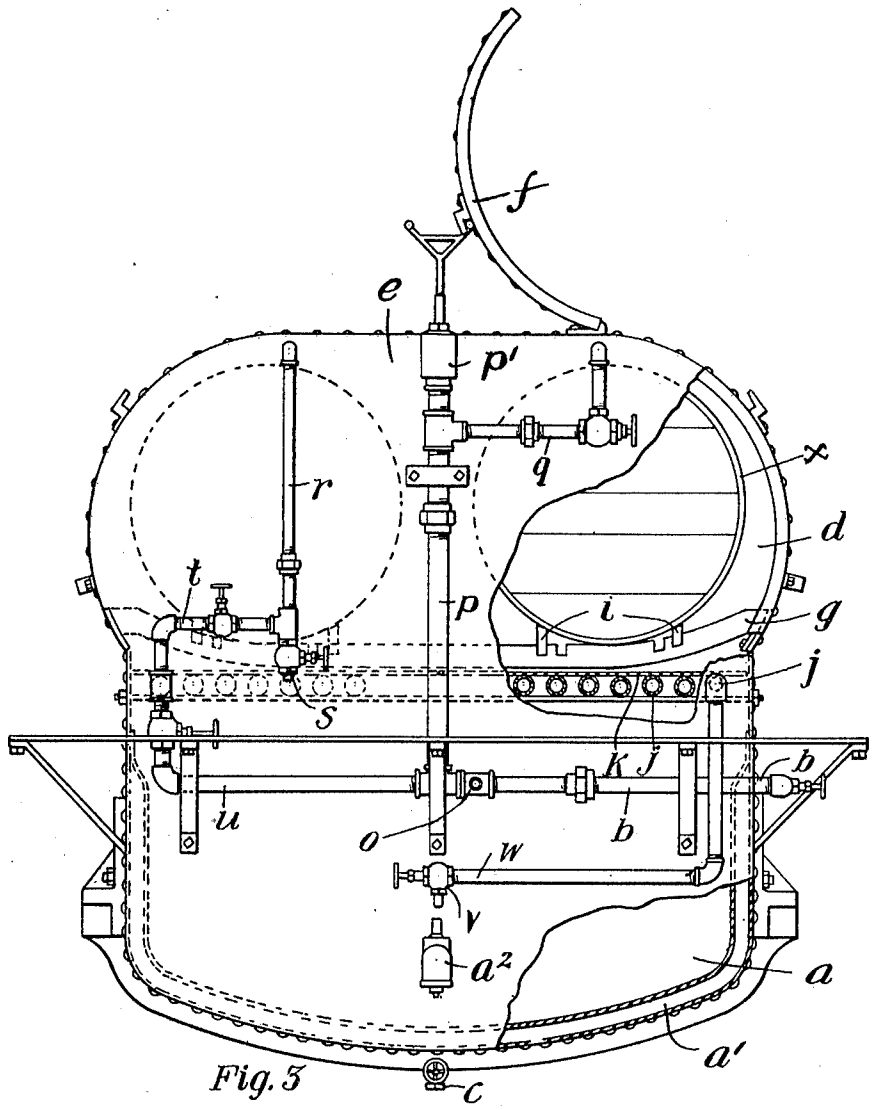

Fig. 3

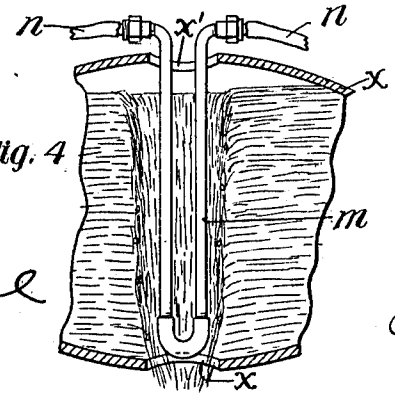

Fig. 4

Witnesses:

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UNITED STATES PATENT OFFICE.

LOUIS H. MINER, OF HAVERHILL, MASSACHUSETTS.

PROCESS AND APPARATUS FOR HEATING ASPHALT.

1,066,515. Specification of Letters Patent. Patented July 8, 1913.

Application filed October 9, 1911. Serial No. 653,519.

To all whom it may concern:

Be it known that I, LOUIS H. MINER, a citizen of the United States, residing at Haverhill, in the county of Essex and State of Massachusetts, have invented an Improvement in Processes and Apparatus for Heating Asphalt, of which the following is a specification.

Commercial asphalt is a solid at ordinary temperatures, but becomes sluggishly liquid when heated to about 150° F., and freely liquid when heated to about 300° F., to which latter temperature it is usually heated when it is to be applied as a binder to the surface of a street, by means of a sprinkling or other distributing apparatus. This material is usually shipped in strong barrels and much difficulty has been encountered in removing it therefrom, as it has generally been considered necessary to destroy the barrel in order to remove its contents. Even when this is done, it is extremely difficult to remove the asphalt completely, so that there has been much waste in the handling of this material.

This invention relates to a method of, and means for removing asphalt, or like material, from receptacles, and an apparatus for heating the same, and has for its object to provide a method and apparatus by the employment of which congealed asphalt may be quickly and completely removed from a closed receptacle, as a barrel, without removing the sides or head, or otherwise injuring the same, so that it may be used again for a similar purpose, and further to provide means for heating the asphalt, as it is removed from the barrel, to the temperature necessary to enable it to be used in an ordinary distributing apparatus, and which is so arranged that a practically continuous supply of heated material may be provided. I accomplish these objects by the means shown in the accompanying drawing, in which,

Figure 1 is a side elevation of an asphalt-heating apparatus made according to my invention. Fig. 2 is a plan view thereof, partly broken away to show the different parts. Fig. 3 is an end view partly in cross-section. Fig. 4 is a detail view showing the operation of the heating device.

According to my invention I provide a tank *a*, which, for convenience in transportation, is mounted on wheels, as shown, said tank *a* being formed of sheet metal, or other suitable material, and having a steam chamber *a'* formed in the walls thereof which extends about its bottom and sides, said chamber having a steam-pipe *b* leading thereto and a drip-pipe *c* at its under side, so that steam may be forced into said chamber to heat the contents of the tank. A discharge spout a^2 is provided at the rear end of the tank, for filling the distributing apparatus.

A chamber *d* is provided directly above the tank which is inclosed by a casing *e* at the ends, and extending over the middle portion of the tank. A series of covers *f* are hinged to the opposite edges of said middle portion of the casing, and arranged to swing upward and be supported in upright position. In the present instance three of said covers are shown as pivoted to one edge of the casing *e* and three to the other, so that both sides of the chamber *d* may be entirely opened, the length of each cover being preferably slightly greater than the length of an ordinary barrel. A series of cross-bars *g* are removably mounted in sockets *p* formed on the inner sides of the walls of tank *a* adjacent the upper edges thereof, said bars being adapted to support a series of barrels in chamber *d* at each side of the middle thereof, the apparatus shown being designed to receive three barrels, end to end, at each side, although it will be obvious that the number of barrels which the apparatus may be designed to accommodate may be varied, as desired. The bars *g* are provided with notches to receive trig-bars *i* which are adapted to prevent the barrels from rolling beyond the desired point after they have been placed in position.

A series of steam coils *j* are arranged at a short distance beneath the bars *g*, and a series of screen-plates *k* are supported on said coils between the same and said bars.

Radiators for heating each barrel internally are provided, each of which comprises a pair of parallel metal pipes *m* connected by a return bend, and thereby forming a U-shaped coil. The ends of said pipes *m* are provided with couplings to which hose-pipes *n* are connected, and said radiators are con-

nected in series, so that a heating fluid, as steam, may be circulated therethrough successively.

An inlet-pipe *o*, for superheated steam, is connected to the branch pipe *b* to supply steam to the steam chamber *a'*, and to a pipe *p*, preferably having a safety valve *p'* thereon, which is, in turn, connected by a branch pipe *q* to the first flexible hose *n* of the series of radiators *m*. The last radiator *m*, of the series, is connected to a pipe *r*, which is provided with a drip-valve *s*, and said pipe *r* may also be connected, by a pipe *t*, to the inlet to the coils *j*. The inlet to said coils *j* is also connected to the supply-pipe *o*, by means of a branch pipe *u*, said pipes being controlled by suitable valves. The discharge end of the coils *j* is connected to drip-valve *v*, by means of a pipe *w*.

The method of using my device is as follows:—The barrels *x* are provided with oppositely disposed apertures *x'*, *x²*, in the middle of their sides, similar to an ordinary bunghole, and, as the material in the barrel is solid at ordinary temperatures, it will not escape from these apertures unless heated to approximately 150° F. The barrels are then placed in the chamber *d*, so that one of the apertures is at the highest point and the other at the lowest, as shown, and then they are trigged in place by the bars *i*. The several barrels, which the apparatus is designed to contain, are placed in position, as above described, and then the steam is passed through the radiators *m*, so that they will be heated to a much higher degree than the melting point of the material. A radiator is then inserted through the upper opening *x* of each barrel and pressed against the asphalt therein, and, as this material quickly becomes liquid on the application of heat, each radiator will immediately melt the asphalt with which it is placed in contact, so that it may be quickly pressed down through the material until its end is closely adjacent the lower aperture *x²*, or actually protrudes therefrom, as shown in Fig. 4. This not only causes an immediate heating of the asphalt which is actually touched by the radiator, so that it becomes liquid, but also a heating of the material adjacent thereto by radiation and conduction. The material thus becomes liquefied adjacent the lower opening *x²*, so that the material adjacent the radiator will immediately flow through said lower opening, and as soon as the material in contact with, or adjacent the radiator, flows from the barrel, a vent is formed through the upper opening *x'*, so that, as the adjacent material is liquefied, it will flow from the barrel without obstruction, in like manner, as indicated in Fig. 4. As the material flows from the barrel, it passes through the screens *k* and between the pipes of coils *j* into the tank *a*, where it will be heated to the temperature desired by the steam in the steam-jacket *a'*. As soon as all the coils *m* have been inserted in the barrels, all of the covers *f* will be lowered, so that the space containing the barrels will be closed and the heat from the steam coil *j* will be retained and applied to the outer sides of the barrel, which will be heated both internally and externally, causing the material next the sides to be liquefied. The whole operation of emptying the barrels is thus greatly facilitated, and furthermore practically the entire contents thereof will be discharged. The operation of emptying the barrels will thus be rapidly accomplished, as the material will be discharged almost as rapidly as it is liquefied, and, as the material will be partly heated before it is discharged into the tank beneath, in which the principal heating is accomplished, and, as the transfer of the material from the barrels to the tank is not only accomplished without loss of heat, but the temperature of the material is increased in transit, the heating of the whole mass to the desired temperature will be rapidly accomplished. The screens not only act to strain out solid matter which would later clog the spraying or distributing apparatus, but act to distribute the material over the coils *j*, so that it is heated to a considerable extent as it passes thereover. Also, the material passes from the barrels in lumps, these lumps will lodge on the screen, in which position they will soon be liquefied by the heat from the coils *j* on which the screens are supported. The material is thus liquefied and heated to such an extent, before it passes into the tank *a*, that the heating thereof in the tank is greatly facilitated. The barrels may be removed as soon as they are empty, and others placed therein without in any way interfering with the heating operation in the tank, which when once started may be continued indefinitely. It will be observed that the barrel is in no way injured when this method of emptying it is employed, so that it may be again used for the same purpose.

I claim:—

1. The method of removing a mass of congealed asphalt, or similar material from a receptacle which consists in first liquefying a relatively small portion of the material by passing an elongated heat radiator through the mass into proximity to a discharge-opening in the bottom of the receptacle, so that said liquefied portion extends from the point where the radiator is inserted to said opening, then permitting said liquefied portion to flow from the discharge-opening and continuing the operation by liquefying the adjacent material by heat from the radiator,

so that the material is discharged as it is liquefied.

2. The method of removing congealed asphalt, or similar material, from a barrel, or like closed receptacle, which consists in first liquefying a relatively small portion of the material adjacent a radiator which is extended from a vent opening in the upper wall of the receptacle into proximity to a discharge-opening in the lower wall thereof, then permitting said melted portion to be discharged through said discharge opening, and then melting the adjacent material to cause the same to flow, as it is liquefied, through the passageway thus formed through the material, and from the discharge-opening, while air is admitted through the vent opening.

3. The method of removing congealed asphalt, or similar material, from a barrel, or like closed receptacle, which consists in first liquefying a relatively small portion of the material adjacent a radiator which is extended from a vent opening in the upper wall of the receptacle into proximity to a discharge-opening in a lower wall thereof, permitting said portion to be discharged and continuing the liquefication of the adjacent material, by heating it internally from the radiator and externally by other means, to cause it to flow, as it is liquefied, through the discharge-opening while air is admitted through the vent opening.

4. The method of removing congealed asphalt, or similar material, from a barrel, or like closed receptacle, which consists in passing an elongated heat radiator through a vent opening in the upper wall of the receptacle, and causing it to melt its way through the material into proximity to a discharge-opening in the lower wall thereof and melt the adjacent portion of the material, permitting such portion to flow through the discharge-opening, and continuing the operation by melting the adjacent material and permitting the same to flow, as it is liquefied through the passageway thus formed in the material, and from the discharge opening, while air is admitted through the vent opening.

5. The method of removing congealed asphalt, or similar material, from a barrel, or like closed receptacle, which consists in first passing an elongated heat radiator through a vent opening in the upper wall of the receptacle, and causing it to melt its way through the material to a discharge-opening in the lower wall thereof and continuing the operation of melting the material by heat from the radiator, and by the application of heat to the receptacle externally, permitting the same to flow, as it is liquefied through the passageway thus formed in the material, and from the discharge-opening, while air is admitted through the vent opening.

6. In combination with a barrel or like closed receptacle having an upper and a lower opening, an elongated radiator adapted to be loosely inserted through the upper opening and to extend therefrom to the lower opening, and means for heating said radiator while in the receptacle to liquefy the contents thereof from the radiator outwardly and drain the same through the lower opening as it is liquefied, substantially as described.

7. In combination with a barrel or like closed receptacle having diametrically opposite openings in the middle of its sides, means for holding the barrel so that one opening is directly over the other, an elongated radiator construction to be freely inserted through the upper opening and to extend therefrom to the lower opening, and means for circulating a heating fluid through said radiator, substantially as described.

8. An apparatus for heating and for removing congealed asphalt and the like from receptacles, comprising a casing having a heating tank in its lower portion and a chamber in its upper portion, said chamber having a perforated receptacle support therein, and having a side opening to permit introduction and removal of the receptacle, means for closing said opening, and means for heating said chamber to heat externally a receptacle therein to liquefy the contents thereof and cause it to drain through said support into said heating tank, substantially as described.

9. An apparatus for the purpose described comprising a casing having a heating tank in its lower portion and a closed chamber in its upper portion, a support in the lower portion of said chamber constructed to permit a receptacle supported thereon to drain into said tank, means to heat said chamber to heat a receptacle externally while held on said support, means to heat such receptacle internally, substantially as described.

10. An apparatus for the purpose described comprising a casing having a tank in its lower portion and a chamber in its upper portion, means to support a receptacle in said chamber, means to heat said chamber thereby to heat a receptacle therein, externally, a radiator constructed to be inserted in the receptacle to heat the same internally, and means to permit the receptacle to drain into said tank, substantially as described.

11. An apparatus for the purpose described comprising a casing having a tank in its lower portion and a closed chamber in its upper portion, a support in the lower

portion of said chamber for sustaining a receptacle therein and constructed to permit the receptacle to drain into said tank, a heating coil disposed beneath and adjacent said support, and a screen disposed between said coil and said support, substantially as described.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

LOUIS H. MINER.

Witnesses:
L. H. HARRIMAN,
H. B. DAVIS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."