

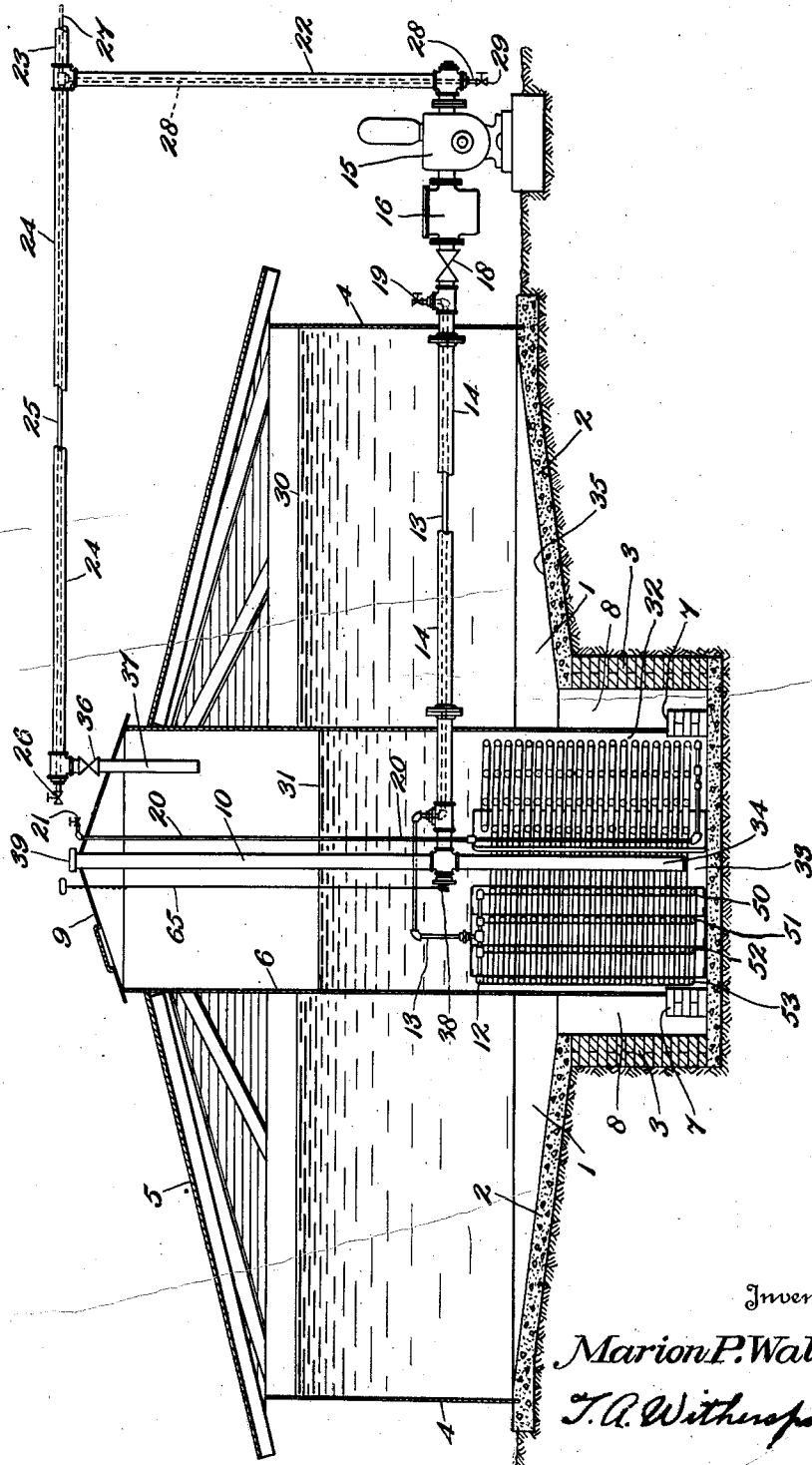
M. P. WALL.
METHOD AND APPARATUS FOR HANDLING ASPHALT.
APPLICATION FILED JUNE 7, 1920.

1,378,637.

Patented May 17, 1921.

2 SHEETS—SHEET 1.

Fig. 1.



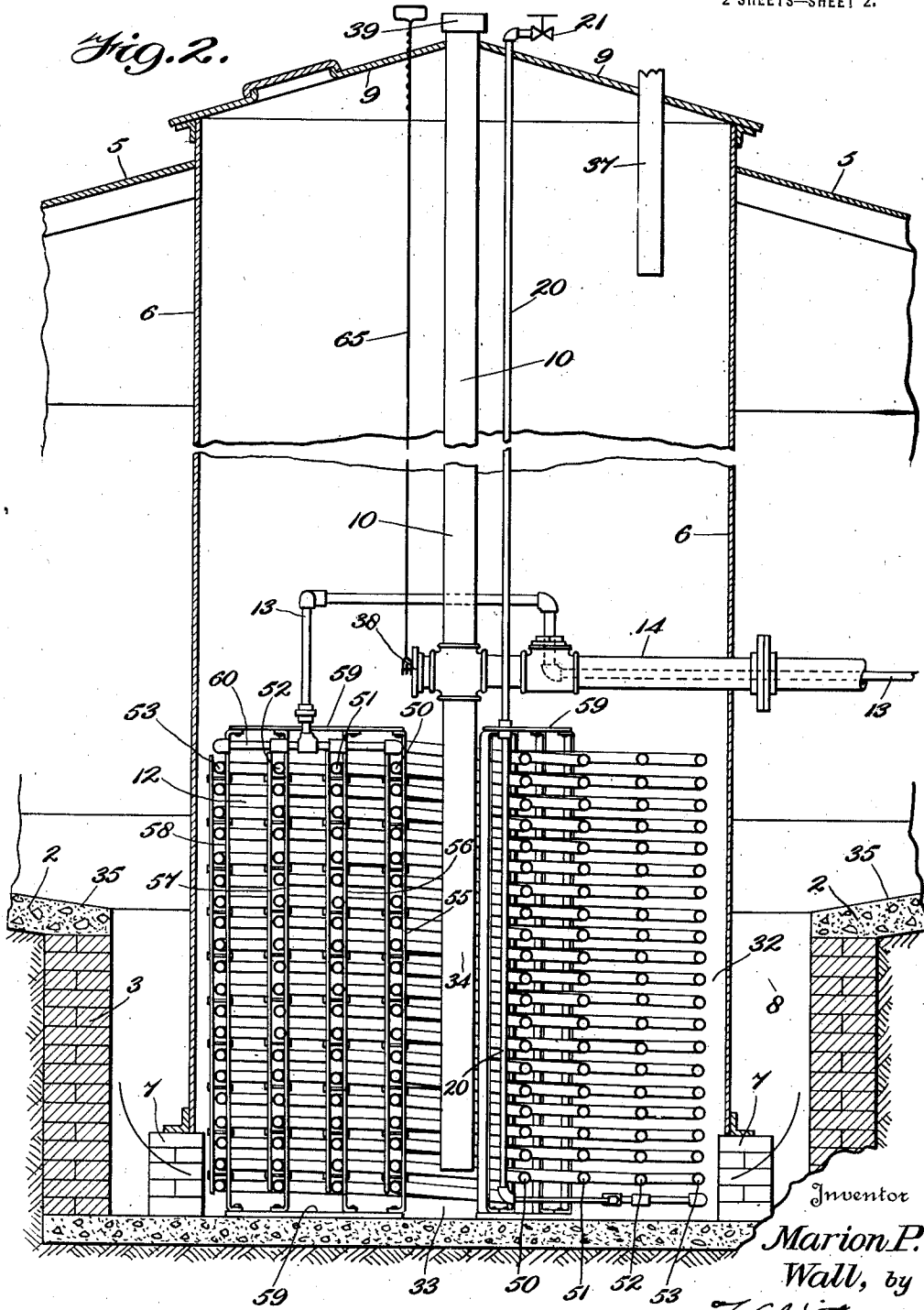
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UNITED STATES PATENT OFFICE.

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METHOD AND APPARATUS FOR HANDLING ASPHALT.

1,378,637.

Specification of Letters Patent.

Patented May 17, 1921.

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To all whom it may concern:

Be it known that I, MARION P. WALL, a citizen of the United States, residing at Chattanooga, in the county of Hamilton and State of Tennessee, have invented certain new and useful Improvements in Methods and Apparatus for Handling Asphalt; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a method of and an apparatus for handling asphalt, and has for its object to provide a means and a procedure which will be comparatively inexpensive to construct and more efficient in use than those which have been heretofore proposed.

With these and other objects in view, the invention consists in the novel steps and combinations of steps constituting the process, and the novel parts and combinations of parts constituting the apparatus, all as will be more fully hereinafter disclosed and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification, in which like numerals designate like parts in all the views;

Figure 1, is a sectional view of one form of apparatus made in accordance with this invention; and

Fig. 2 is an enlarged sectional view of a portion of the parts shown in Fig. 1.

1 indicates any suitable excavation or storage space preferably lined with a concrete, or cementitious material 2, and with brickwork 3 as indicated, 4 represents any suitable metal or other walls constituting a portion of the outer storage tank above ground, 5 suitable roofing over the walls 4, and 6 a vertically disposed metal tank located inside the walls 4 and preferably resting upon the brick piers or foundation 7 located at the bottom of the well 8 as illustrated. The said inner tank 6 is provided with a cover 9 to protect it against the weather, and it is further provided on its interior with a vertical pipe 10, whose lower portion 34 reaches almost to the bottom of the tank 6 as shown.

Located inside the lower portion of the tank 6 are the pipe coils 12 which may be of any suitable disposition and construc-

tion, but preferably of the form best illustrated in Fig. 2. That is to say, said coils are preferably formed of a plurality of sections indicated at 50, 51, 52, and 53, which sections are supported respectively by the frame works 55, 56, 57, and 58, and which frame works are rigidly joined or held together by the metal members 59 as shown. By this means, I am enabled to employ coils of standard make, and to support them in place by material readily bought in the open market. The sections of coils are joined in parallel by the pipe 60 to which is connected the live steam pipe 13. Leading from the pipe 10 is the larger pipe 14 connecting with the suction side of the pump 15 provided with the strainer 16 and controlled by the valve 18 as illustrated. Said steam pipe 13 is preferably located inside the pipe 14 as shown and is provided outside of the walls 4 with the valve 19 to control the supply of steam to the coils 12. Said coils 12 are provided with the exhaust steam pipe 20 leading up through the top 9 of the tank 6, and said pipe 20 is provided with the controlling valve 21 as illustrated in the drawings. The delivery side of the pump 15 is provided with the discharge pipe 22 having the branch 23 leading to the place of use of the asphalt, and also having the branch pipe 24 leading back into the top of the tank 6 through the discharge 37 as will be clear from the drawings. Inside the pipe 24 is a steam pipe 25 provided with the cock 26, and branching from said pipe 25 is the pipe 27 located inside the pipe 23, and also the pipe 28 located inside the pipe 22 and provided with the control valve 29 as shown.

30 represents a level of the asphalt inside the tank 4, and 31 represents a level of the asphalt inside the tank 6. It should be remembered that the brick foundations 7 are in the form of posts or piers, so that asphalt which has become melted and finds itself in the well 8, may readily flow past said pier 7 down into the interior 32 of the tank 6 and especially to the point 33 of said space 32 located immediately below the lower end 34 of the pipe 10, which end also constitutes the suction end of the pipe 14.

Of course, the shells 4 and 6 as well as the roof 5 are made in easily handled sections or plates of standard sizes joined to-

gether as usual, and the capacity of the said inner heating tank 6 is preferably such as to contain only sufficient asphalt for a few hours' use.

5 In operation, live steam is admitted through the cock 19, at a pressure to produce in the coils a temperature of say about 300° F., and it passes along the pipe 13 inside the pipe 14 through the coils 12 and out
10 the discharge pipe 20 past the cock 21. The asphalt inside the tank 6 and in contact with the coils 12 will then be gradually melted at a rate depending upon the pressure of the steam, and will flow down to the
15 point or sump 33, whence the pump being started, said asphalt will be sucked up through the suction pipe 34, the pipe 14 on the outside of the steam pipe 13, past the valve 18, through the strainer 16 into said
20 pump 15, and will be forced out of the pump through the pipe 22 and through the pipe 23 to the point of use. As the steam continues to heat the asphalt in the tank 6, more and more of it will become liquefied,
25 and heat from this liquefied asphalt will pass through the metal walls of the tank 6 and gradually melt the asphalt on the outside of said tank 6, so that the material in the tank 4 will begin to flow down the
30 inclined walls 35 of the storage receptacle, into the well 8, and thus supply the interior of the tank 6. As the heating continues, more and more of the asphalt in the outer tank 4 will thus become melted, and more
35 and more of the same will find its way into the interior of said tank 6, so that there will always be a supply of molten asphalt at the point 33 so long as steam is supplied to the coils 12.

40 It is an important feature of this invention that the disposition of the parts is such that only a relatively small part of the asphalt is heated at a time, and that small part to a temperature only sufficient to melt
45 the material, for by so doing the outer asphalt never becomes injuriously hot and therefore its qualities are better preserved than has been heretofore possible.

As the asphalt from the tank 6 is used periodically, the molten material delivered through the pipe 23 may be suitably stopped off at the place of use by a valve in said pipe, (not shown).

The valve 36 controlling the return pipe
55 37 is always partially open during the operation of the apparatus, the amount of its opening being so adjusted however, that there will always be sufficient back pressure in the pipe 23 to cause a flow of the melted
60 asphalt through the said pipe 23 when its controlling valve is opened.

In other words, the return pipe 37 is so restricted by means of the valve 36 that whenever the valve controlling the pipe 23
65 is opened, the said pipe 23 will offer so

much less resistance to the flow of the material that substantially all of it coming up through the pipe 22 will pass through pipe 23, and only a negligible portion will return to the tank 6 by way of pipes 24 and 37. 70 On the other hand, when the valve controlling the pipe 23 is closed the entire amount of asphalt passing through the pipe 22 from the pump 15 will be returned to the tank 6 through the pipes 24 and 37, thereby providing a continuous circulation of the melted material. 75

This arrangement of parts constitutes an important feature of the invention for it provides a continuous operation of the pump 15 which is decided advantage when dealing with a material of the viscous nature of asphalt; and it further provides for keeping up a constant forced circulation in the tank 6, which avoids sedimentation, and
80 local overheating during such periods as the material is not being withdrawn for use. 85

It sometimes happens that the suction pipe 34 becomes clogged or stopped up, at a time when it is not convenient to shut down
90 the plant for cleaning, and in such case it is only necessary to open the valve 38 by means of the rod 65, whereupon the molten material will be sucked into the pipe 14 through the said valve 38 and delivery through the
95 pipe 23 will not be interfered with.

The valve 38 thus constitutes an auxiliary suction or intake for the pipe 14.

As soon as it is possible to close down the plant, the obstruction in the pipe 34 may be
100 readily removed by taking off the cap 39 of the pipe 10 and passing a cleaning rod down through the pipes 10 and 34, after which the valve 38 may be closed, cap 39 replaced, the pump started, and operations resumed
105 in the original manner.

In practice it is found quite easy to keep the proper temperature in the tank 6 without raising the temperature of the outer material more than is sufficient to cause a
110 proper flow under the lower edges of and into the bottom of said inner tank 6.

This constitutes another important feature of this invention for it is well known that in handling asphalt it is very easy to
115 overheat the same and thereby injure its quality. That is to say, it is well known that in the prior methods of handling asphalt heretofore in general use, it has been the custom to apply fire underneath a portion of the asphalt or to otherwise heat a portion of the same to such a high degree that a large proportion of the asphalt actually heated would be found to have been injuriously overheated. The necessity for
120 this overheating in the prior methods is plain. Asphalt is such a poor conductor of heat and it is so difficult by the prior methods to create the necessary temperatures throughout its mass, that it has been
130

thought, prior to this invention, necessary to so highly heat a relatively small portion of the material as would through conduction melt other and larger portions thereof. No means was provided for limiting the amount melted, to substantially the amount to be used, and it resulted that a large proportion of the melted and overheated asphalt would not be used at first, but would be allowed to cool and to be reheated one or more times before it would be finally used. Therefore, it followed in the prior procedures that these overheatings, as well as these successive heatings, injured the quality of the asphalt. By only heating to a predetermined low temperature the relatively small proportion of the asphalt in the tank 6, in accordance with this invention, on the other hand, and by substantially using up this portion of asphalt before the larger portion of asphalt in the tank 4 has been melted to a material extent, I am enabled to avoid the above disadvantages and to not only conserve heat units in the operation of the process, but also to conserve the quality of the asphalt. Stated in other words, it is only necessary to heat asphalt to a harmless temperature of about say 300 degrees F., in order to pump it to the place of use, and this I accomplish in the manner above disclosed without having to overheat at much higher temperatures relatively large proportions of asphalt which must later be allowed to cool and which have to be later reheated one or more times.

It will now be clear that by following the procedure above outlined, and by providing the apparatus disclosed, I am enabled to readily convey asphalt from the storage tank to the point of use, to use the same intermittently, and to only melt substantially no larger a body of the material than it is desired to use, so that I avoid the injurious overheatings and repeated re-heatings of the material which have been heretofore found necessary in the handling of asphalt.

It will further be clear that by providing the central tank 6 surrounded by the larger body of asphalt, I effectually prevent all loss of heat units and thus conserve, in the asphalt to be heated, substantially all the heat that is taken from the steam. It will still further be clear, that by intermittently circulating the asphalt in the tank 6 in the manner above described, I thoroughly circulate the asphalt during use, and thus avoid the injurious effects of sedimentation.

It will likewise be clear that these tanks can be made as small as desired, so that they can be readily put up, at or near the point of use, and when it is desired to do so, they may be readily dismantled, shipped to another place, and used over again.

All of the parts including the tank walls, piping, pump, etc., are of standard commer-

cial sizes and shapes, and, therefore the material for the tanks is readily bought in open market at a minimum cost and with a minimum of delay.

It is obvious that those skilled in the art may vary the steps of the procedure as well as the construction and arrangement of parts, without departing from the spirit of the invention, and therefore I do not wish to be limited to the above disclosure, except as may be required by the claims.

What I claim is:—

1. The process of handling asphalt which consists in storing a mass of the same; heating to a molten state a portion of said mass on the interior of the same; pumping said portion to the point of use; and maintaining the molten temperature from the suction side of the pump to the point of delivery; substantially as described.

2. The process of handling asphalt which consists in storing a mass of the same; heating to a molten state a portion of said mass on the interior of the same; pumping a part of said portion to the point of use; pumping another part of said portion back into the molten mass; and maintaining the molten temperature from the suction side of the pump to the point of delivery; substantially as described.

3. The process of handling asphalt which consists in storing a mass of the same; continuously heating by steam to a molten state a portion of said mass located on the interior of the same; continuously pumping the molten material to the outside of said mass; intermittently delivering a portion of the pumped material to the point of use; and delivering another portion of said pumped material back into said molten portion; substantially as described.

4. In an apparatus for handling asphalt, the combination of an outer tank adapted to contain asphalt in a solid state; an inner tank adapted to hold asphalt in a molten state; a connection between said tanks; a steam coil in said inner tank; means to supply steam to said coil; a pump for withdrawing the molten asphalt from said inner tank; means to deliver a portion of said molten asphalt to the point of use; and means for delivering another portion of said molten asphalt back into said inner tank, substantially as described.

5. In an apparatus for handling asphalt, the combination of an outer tank adapted to contain asphalt in a solid state; an inner tank adapted to hold asphalt in a molten state; a connection between said tanks; a steam coil in said inner tank; means to supply steam to said coil; a pump provided with a suction pipe surrounding said steam supplying means for withdrawing the molten asphalt from said inner tank; means to deliver a portion of said molten asphalt to

the point of use; a steam pipe for maintaining the asphalt in its molten condition while being conveyed by said last named means; and means for delivering another portion of said molten asphalt back into said inner tank, substantially as described.

6. In an apparatus for handling asphalt, the combination of an outer tank adapted to contain asphalt in a solid state; an inner tank adapted to hold asphalt in a molten state; a connection between said tanks; a steam coil in said inner tank; means to supply steam to said coil; a pump for withdrawing the molten asphalt from said inner tank; means to deliver a portion of said molten asphalt to the point of use; steam pipes inside the suction and delivery pipes of said pump to maintain the asphalt in its molten condition; means for readily cleaning out a portion of the suction pipes of said pump; and means for delivering another portion of said molten asphalt back into said inner tank, substantially as described.

7. In an apparatus for handling asphalt, the combination of an outer tank adapted to contain asphalt in a solid state; an inner tank adapted to hold asphalt in a molten state; a connection between said tanks; a steam coil made up of a plurality of sections joined together in said inner tank; a frame-work for supporting said coil sections; means to supply steam to said coil; a pump for withdrawing the molten asphalt from said inner tank; means to deliver a portion of said molten asphalt to the point of use; and means for delivering another

portion of said molten asphalt back into said inner tank, substantially as described.

8. In an apparatus for handling asphalt, the combination of an outer tank adapted to contain asphalt in a solid state; an inner tank adapted to hold asphalt in a molten state; a connection between said tanks; a steam coil in said inner tank; means to supply steam to said coil; a pump for withdrawing the molten asphalt from said inner tank; a straight pipe extending from end to end of said inner tank and whose lower portion constitutes the suction end of the suction pipe of said pump; a valve in said straight pipe; means to deliver a portion of said molten asphalt to the point of use; and means for delivering another portion of said molten asphalt back into said inner tank, substantially as described.

9. In an apparatus for handling asphalt, the combination of an outer tank of sheet metal adapted to contain asphalt in a solid state; an inner tank of sheet metal adapted to hold asphalt in a molten state; a connection between said tanks; a steam coil composed of sections in said inner tank; means to supply steam to said coil; a pump for withdrawing the molten asphalt from said inner tank; a strainer between said inner tank and said pump; means to deliver a portion of said molten asphalt to the point of use; and means to maintain said asphalt molten until it reaches said point of use, substantially as described.

In testimony whereof I affix my signature.

MARION P. WALL.