Aug. 29, 1933. R. C. BURKET 1,924,636

CRACK FILLER

Filed March 31, 1932 4 Sheets-Sheet 1

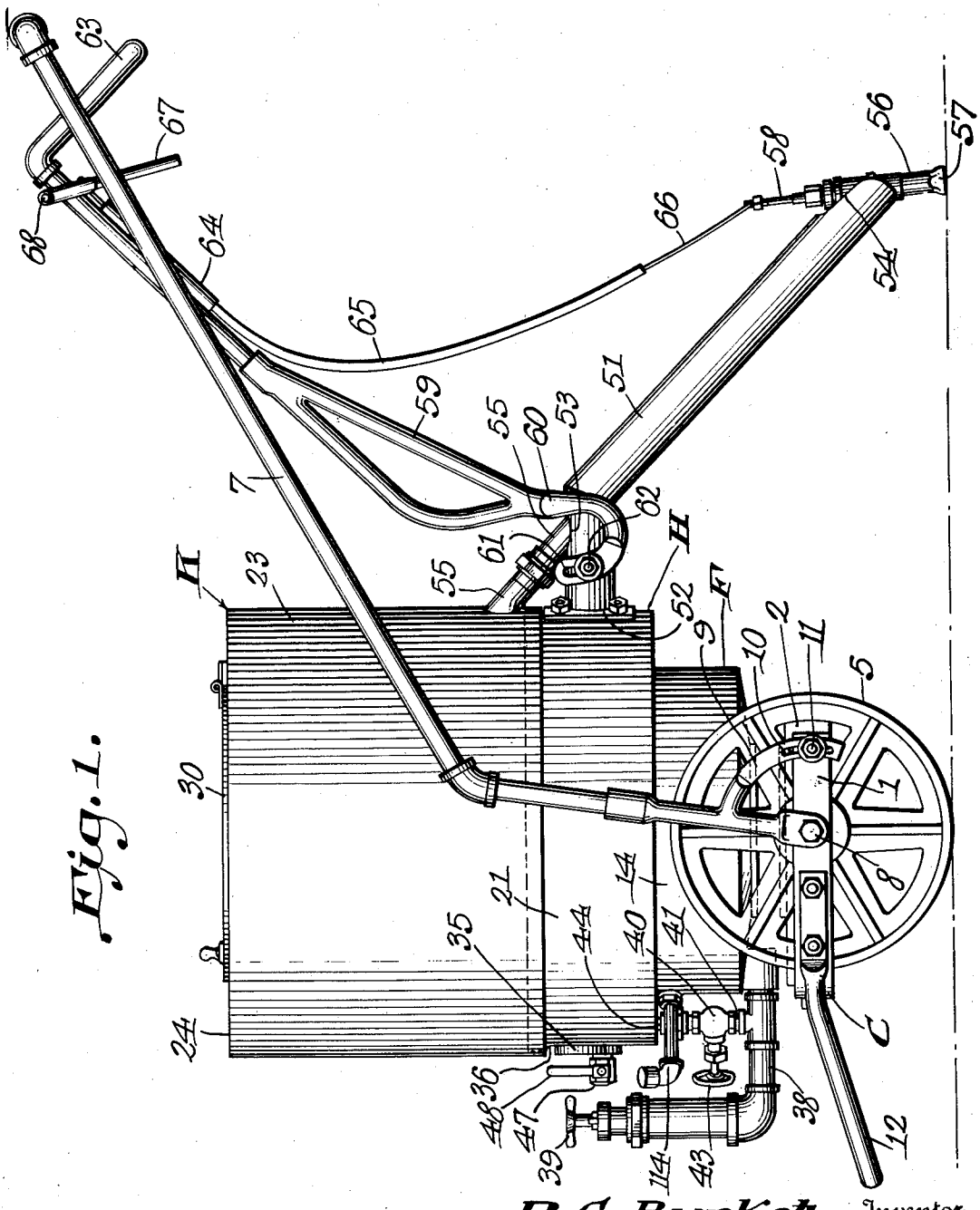

Fig. 1.

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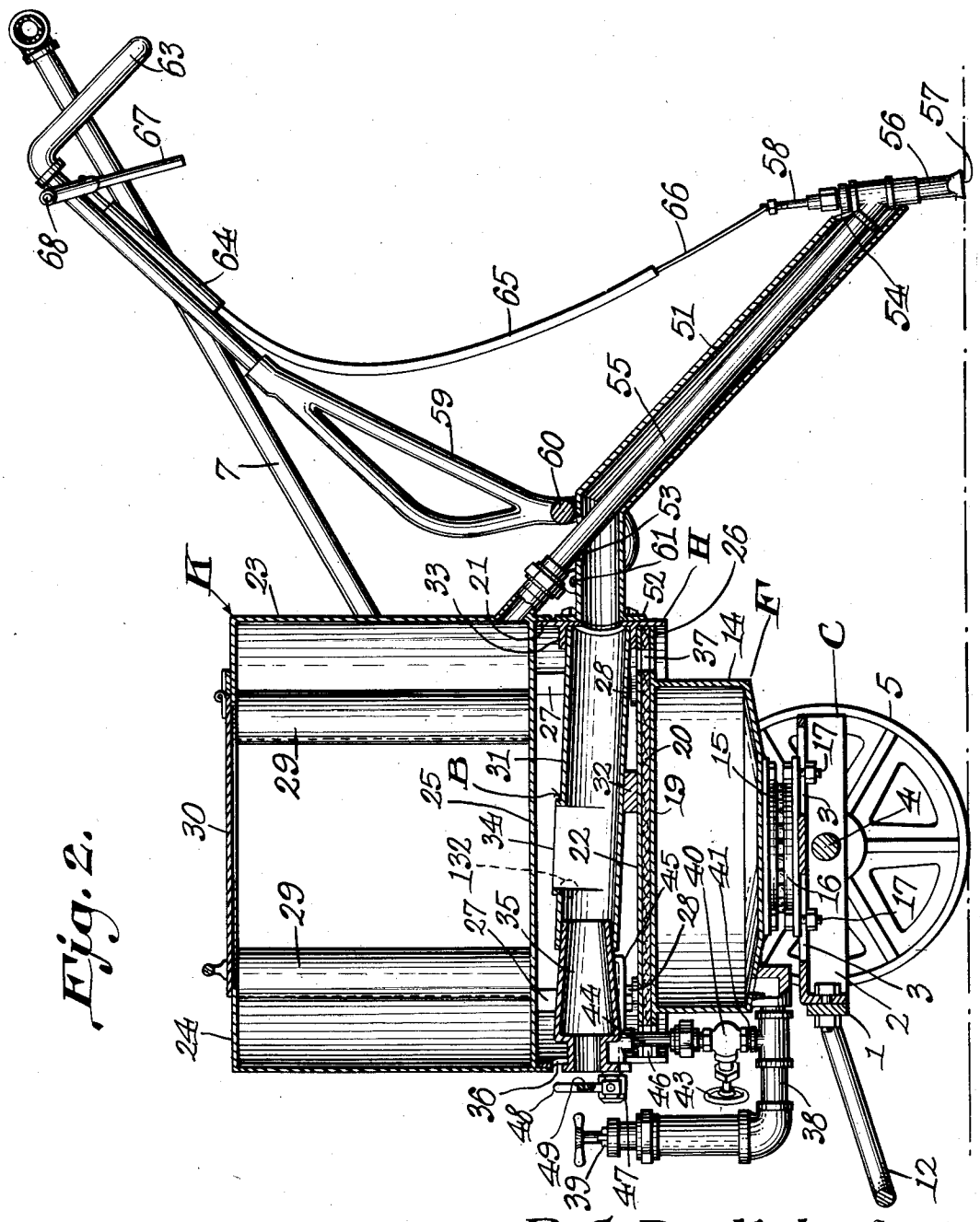

Fig. 2.

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Fig. 7.

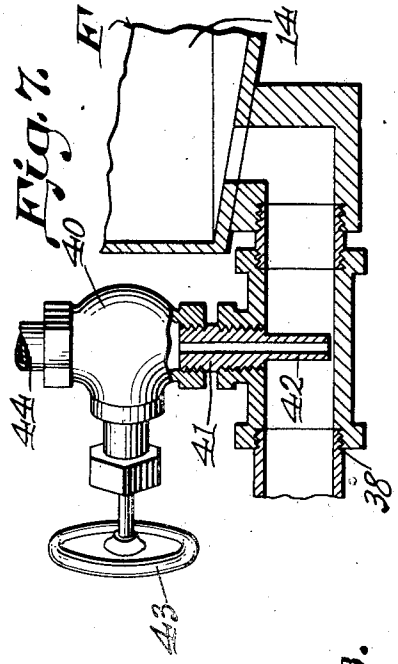


Fig. 3.

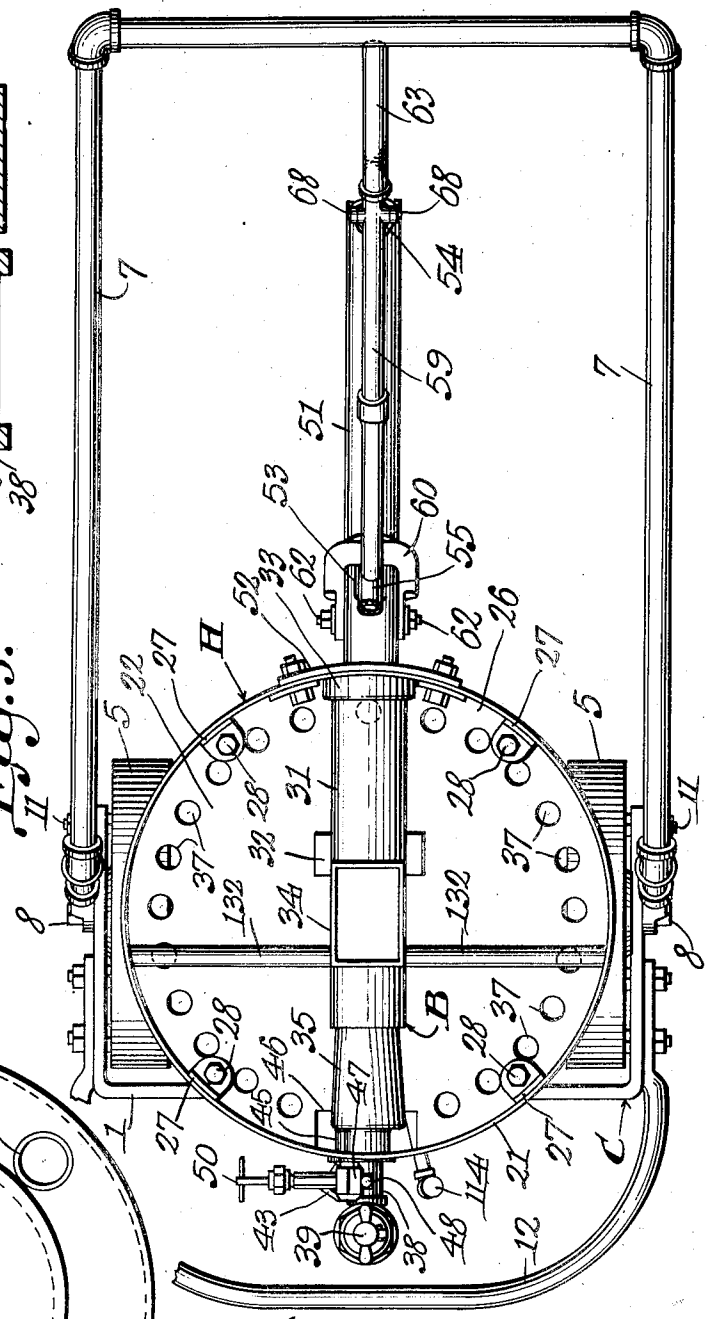
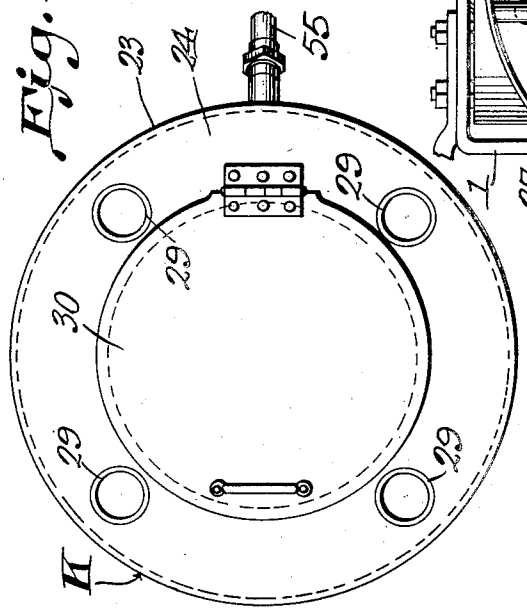


Fig. 4.



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CRACK FILLER

Filed March 31, 1932 4 Sheets-Sheet 4

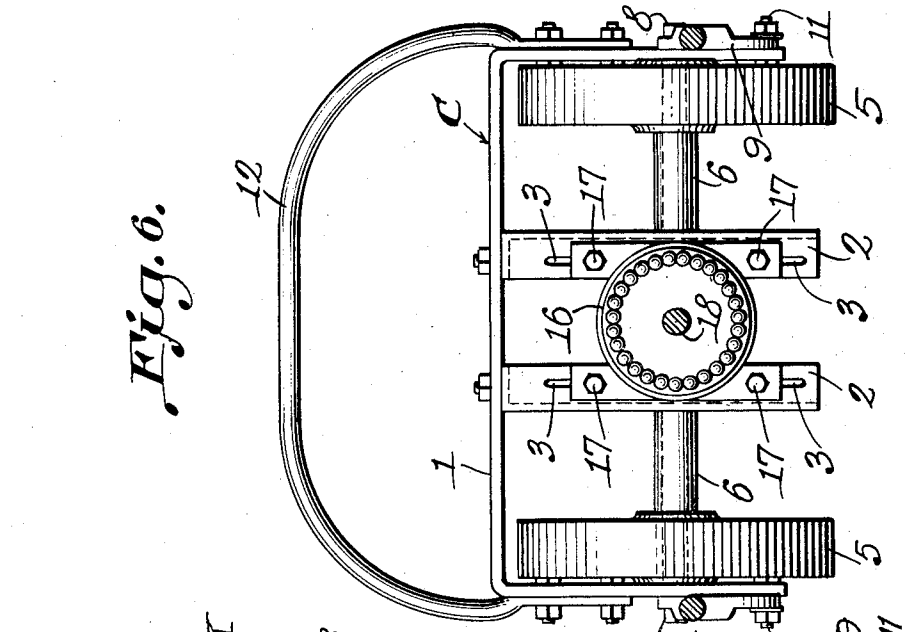

Fig. 6.

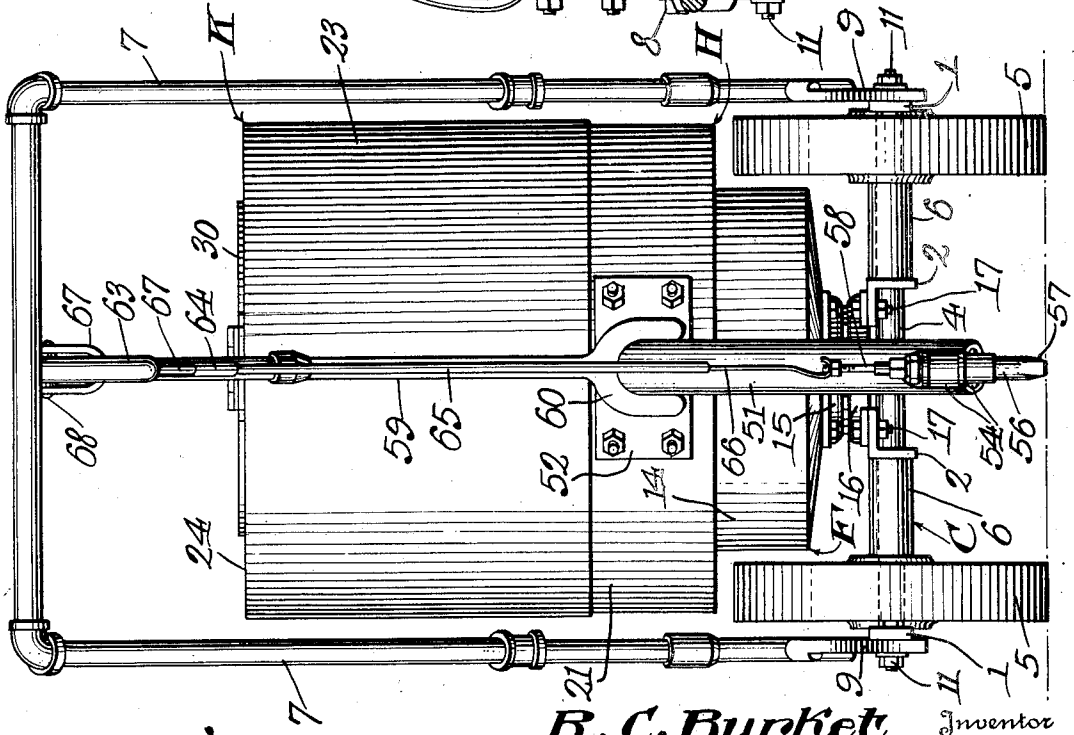

Fig. 5.

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Patented Aug. 29, 1933 1,924,636

UNITED STATES PATENT OFFICE

1,924,636

CRACK FILLER

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Application March 31, 1932. Serial No. 602,325

10 Claims. (Cl. 94—39)

The device forming the subject matter of this application is adapted to be used for filling cracks in roadways, with tar or a tar compound, and one object of the invention is so to mount the parts which carry the applying nozzle that the nozzle will follow the crack in the roadway, and discharge the filling material into the crack, regardless of whether the carriage which is rolled over the roadway follows the crack exactly, and regardless of whether the crack is irregular or straight.

Another object of the invention is to provide novel means for heating the filling material as it moves to the nozzle, so that the filling material will flow readily through the nozzle and through the discharge conduit which carries the filling material from the kettle to the nozzle.

A further object of the invention is to provide a combined machine for filling cracks or applying the filling material, the machine embodying novel means for heating the filling material by way of a burner, and for keeping pressure on the fuel, so that the fuel will flow to the burner, the aforesaid pressure causing a portion of the products of combustion to pass about the discharge conduit that leads to the nozzle, thereby heating the conduit and causing the filling material to flow freely through the nozzle, as aforesaid.

It is within the province of the disclosure to improve generally and to enhance the utility of devices of that type to which the invention appertains.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, may be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings:—

Fig. 1 shows, in side elevation, a crack filler constructed in accordance with the invention;

Fig. 2 is a vertical longitudinal section of the complete machine, wherein parts remain in elevation;

Fig. 3 is a top plan, parts being removed or broken away;

Fig. 4 is a top plan of the kettle;

Fig. 5 is a rear elevation of the machine, wherein remote parts are omitted;

Fig. 6 is a top plan of the carriage, parts being sectioned away;

Fig. 7 is a sectional view illustrating the combined pressure and fuel conduits, a portion of the fuel holder, and parts associated therewith.

In carrying out the invention, there is provided a wheel-mounted carriage C, which, as disclosed in Fig. 6, embodies a horizontally disposed, U-shaped frame 1. To the front portion of the frame 1 are secured rearwardly-extended intermediate bars 2, having longitudinal slots 3 which are shown in Figs. 6 and 2.

An axle 4 (Fig. 5) is mounted in the side portions of the U-shaped frame 1 and in the intermediate bars 2. Ground-wheels 5 are journaled on the axle 4, within the side arms of the frame 1. Tubular spacers 6 are mounted on the axle 4, between the intermediate bars 2 and the wheels 5.

The numeral 7 marks a wheeling handle, which is U-shaped in top plan, as disclosed in Fig. 3. Fig. 1 shows that the handle 7 extends upwardly, and then rearwardly, and pivot elements 8 connect the lower ends of the handle 7 with the side arms of the frame 1 and with the ends of the axle 4. Near to their lower ends, the side arms of the wheeling handle 7 are provided with curved, downwardly-extended fingers 9, having longitudinal slots 10, adapted to receive clamp bolts 11 mounted in the side arms of the frame 1. By loosening the clamp bolts 11, the handle 7 may be swung upwardly and downwardly, to make it adjustable for height, the handle swinging on the pivot elements 8, and, after the desired adjustment of the handle 7 has been attained, the clamp bolts 11 may be tightened up, to hold the handle in its adjusted position. A forwardly-extended, downwardly inclined, U-shaped prop 12 is secured to the forward portion of the frame 1 of the carriage C. When the machine is not in use, it can be tilted forwardly and downwardly on the ground-wheels 5, by means of the handle 7, can be supported on the ground-wheels 5 and on the prop 12.

The letter F has been used to designate, generally, a fuel holder including a tank 14 having a capped air vent 114. The upper member 15 (Fig. 2) of a ball bearing is secured to the bottom of the tank 14. The lower member of the ball bearing is marked by the numeral 16, and Fig. 6 shows that securing elements 17, such as bolts, received in the slots 3 of the intermediate bars 2 of the carriage, connect the lower member 16 of the ball bearing to the carriage, for adjustment forwardly and backwardly, at the will of an operator. The upper member 15 of the ball bearing is connected to the lower member 16 of the ball bearing, by means of a vertical shaft 18, shown

in Fig. 6, and the construction is such that the fuel holder F, and all parts about it can turn on a vertical axis, and also be adjusted forwardly and backwardly, owing to the provision of the bolts 17 that cooperate with the slots 3 of Fig. 6. The tank 14 of the fuel holder has a top 19 (Fig. 2) on which rests a sheet 20 of asbestos, or other heat insulating material.

The letter H designates a burner housing, made-up of a ring 21 and a bottom 22, the bottom resting on the sheet 20 of asbestos, and the ring 21 extending around the sheet 20 of asbestos and around the edge of the top 19 of the fuel tank 14.

The letter K directs attention to a kettle, including a drum 23, the lower end of which fits around the upper end of the ring 21 of the burner housing H. The drum 23 comprises a top 24, and a bottom 25, the bottom 25 forming, also, the top of the burner housing H. It can be seen in Fig. 2 that the top 19 of the fuel tank 14, the sheet 20 of asbestos, and the bottom 22 of the burner housing H extend outwardly beyond the vertical wall of the fuel tank 14, to form a rim 26. The ring 21 carries internal legs 27 (Fig. 3), connected by securing elements 28 with the rim 26, hereinbefore described, and shown in Fig. 2.

Any desired number of vertical flues 29 extend between the top 24 of the drum 23 and the bottom 25 thereof, and the flues open through the parts specified. The lower ends of the flues 29 communicate with the burner housing H. The top 24 of the drum 23 has a hingedly mounted lid 30, provided for the insertion of the filling material into the drum.

A burner B is located in the burner housing H, and may be variously constructed. Preferably, the burner B comprises a tube 31, supported intermediate its ends, as shown at 32, from the bottom 22 of the burner housing, the tube being supported, further, by a cross rod 132 (Fig. 3) connected at its outer ends to the ring 21 of the burner housing. One end of the tube 31 is secured at 33 to the ring 21, and opens through the ring. In its top, the tube 31 has a combustion mouth 34 (Fig. 3) located beneath the bottom 25 of the kettle K (Fig. 2).

A tapered air inlet member 35 is provided, and carries a warming chamber 45. The air inlet member 35, at its inner end, extends into the inner end of the burner tube 31, the outer end of the air inlet member extending through an opening 36 in the ring 21 and being supported on the ring. Air to support combustion at the mouth 34 of the burner is provided by means of holes 37 (Figs. 2 and 3) in the rim 26.

A pressure and fuel conduit 38 (Fig. 2) is provided and, at its inner end, this conduit communicates (Fig. 7) with the lower part of the tank 14 of the fuel holder F. On the outer end of the conduit 38, an air pump 39, under the control of an operator, is mounted. A valve casing 40 is joined to the fuel conduit 38, near to the tank 14, by a connection 41, having a reduced nipple 42 which extends downwardly to a point closely adjacent to the bottom of the fuel conduit 38. The valve 40 is manipulated by means of a hand wheel 43, or in any other desired way. From the top of the valve casing 40, a pipe 44 leads to the warming chamber 45 on the air inlet member 35, the warming chamber being located within the burner housing H. The pipe 44 extends through a hole 46 (Fig. 3) in the bottom 22 of the burner housing H. A coupling 47 is connected to the warming chamber 45 and extends outwardly through the ring 21. Outside of the ring 21, the coupling 47 carries a vertical burner tube 48 (Fig. 2) having a discharge orifice 49 disposed in alinement with the axis of the air inlet member 35. The flow through tube 48 and the orifice 49 is governed by a needle valve 50 (Fig. 3) carried by the coupling 47, and under the control of an operator.

Noting Fig. 2, it will be observed that the machine comprises a heating jacket 51, which is an angular pipe, and Fig. 5 shows that the inner end of the horizontal part of this jacket is connected by a foot plate 52 to the ring 21 of the burner housing H. In the horizontal part of the jacket 51 there is a hole 53, and there is an opening 54 at the lower end of the jacket. A discharge conduit 55 is connected to the drum 23 of the kettle K, near to the bottom of the kettle and extends downwardly through the hole 53 of the jacket 55 and longitudinally of the inclined part of the jacket, the horizontal part of the jacket being in communication with the burner tube 31, as seen in Fig. 2. On the lower end of the discharge conduit 55 there is a transverse nozzle 56, having a reduced or flattened end 57. The flow of the crack-filling material through the nozzle 56 is regulated by a valve 58, mounted in the upper end of the nozzle.

A rotating handle 59 is provided, this part being called a "rotating handle", not because it rotates, but because it is used to rotate the kettle K, the burner housing H, and the fuel holder F, when desired, about a vertical axis represented by the shaft 18 of Fig. 6, and with respect to the carriage C. The handle 59 is provided at its lower end with a fork 60, the intermediate portion of which rests on top of the horizontal part of the heating jacket 51 and acts as a fulcrum for the handle (Fig. 2).

The reader can see, in Fig. 1, that the side arms of the fork 60 are upwardly curved, and have slots 61, through which pass stud bolts 62, mounted on the sides of the horizontal part of the heating jacket 51. On the rear or upper end of the handle 59 there is a depending grip 63. The stud bolts 62 can be loosened, and the handle 59 can be swung up and down, with the intermediate part of the fork 60 (Fig. 2) as a fulcrum, and then the stud bolts 62 can be tightened, the height of the grip 63 being adjusted in this way. Fig. 3 shows that the grip 63 of the handle 59 lies within the handle 7, close to the rear cross bar of the handle 7. There is a bracket 64 (Fig. 1) on the handle 59, the bracket carrying a flexible guide 65, in which slides a flexible operating member 66, such as a wire, which is stiff enough, however, to operate the valve 58 of the nozzle 56, the lower end of the operating member being connected to the valve. The upper end of the operating member 66 is joined to a downwardly-extended forked lever 67, pivoted at 68 upon the handle 59, and located near enough to the grip 63 so that a person can take hold of the parts 63 and 67 at once, to work part 67 and actuate the valve 58 by way of the operating member 66.

The flow of the crack-filling material can be traced out best in Fig. 2. The crack-filling material moves from the drum 23 of the kettle K, through the discharge conduit 55 to the nozzle 56, where the material is discharged into the crack in concrete roadway, the flattened end 57 of the nozzle riding in the crack and discharging the material into the bottom of the crack, there being no danger that the material, which is hot, will bridge over the crack as the material cools, without completely filling the crack to the bottom, and there is practically no smearing of the material on the surface of the highway, with

corresponding waste. The flow through the nozzle 56 is regulated by the valve 58, and the valve is actuated by the operating member 66 and the lever 67.

The pump 39 is provided for two purposes. One function of the pump 39 is to put air pressure on the gasoline or other liquid fuel in the tank 14, by way of the conduit 38, the fuel flowing, under pressure, to the left in Figs. 7 and 2, up through the nipple 42, under the governance of the valve 40, through the pipe 44 and into the warming chamber 45. Here the fuel is heated, and it passes through the coupling 47 to the outlet tube 48, under the control of the needle valve 50 of Fig. 3. The fuel moves through the orifice 49 (Fig. 2) of the tube 48 and mingles with the air that is entering the mouth of the air inlet member 35. The mixture burns at the combustion mouth 34 of the burner tube 31, and the tar compound in the kettle K is heated, as the products of combustion pass along the bottom 25 of the kettle, and up through the flues 29, the products of combustion passing, for the most part, out of the upper ends (Fig. 4) of the flues.

Although the major part of the products of combustion pass through the flues 29, the products of combustion do not find an exclusive exit by that path. A portion of the products of combustion moves to the right in Fig. 2, past the combustion mouth 34, through the right hand end of tube 31, through the heating jacket 51, and out of the outlet 54 at the lower end of the jacket. Thus, the discharge conduit 55 is kept hot, throughout practically its entire length, the nozzle 56 is kept hot, and the crack-filling material will not solidify, but will always pass fluently through the nozzle 56.

The air pump 39 carries the fuel to the orifice 49 of the outlet tube 48 of Fig. 2, as has been explained, but the second and by no means negligible function of the pump 39 is to create enough of a forced draft or blast through the right hand end of the burner tube 31 in Fig. 2, so that a portion of the products of combustion will move downwardly through the jacket 51 and heat the crack-filling material as it flows through the discharge conduit 55. The jacket 51 has to be downwardly inclined, because the nozzle 56 must be so placed that it can ride in the crack to be filled, and the blast proceeding from the orifice 49 is highly desirable, since the products of combustion have no natural tendency to flow downwardly through the inclined heating jacket 51, especially when the mouth 34 of the burner tube 31 affords so ready an exit for them.

The device is a light one-man machine, and is trundled along by the handle 7, the wheels 5 rolling on the ground. The flattened end 57 of the nozzle 56 keeps its place in the crack automatically, even though the operator may not steer a course represented accurately and exactly by the crack, and the machine can be used to fill a crooked crack, quite as well as a straight one. As the machine moves over the roadway, the entire superstructure, comprising the fuel holder F, the burner housing H, and the kettle K, can rotate, as one piece, about a vertical axis represented by the shaft 18 of Fig. 6, and this lets the flattened end 57 of the nozzle 56 follow the crack, and stay in the crack, without any attention on the part of the operator. In order to shift the nozzle 56 sidewise, from crack to crack, or for any other purpose, the operator can turn the superstructure F—H—K on the carriage C, about a vertical axis represented by the part 18 of Fig. 6, through the instrumentality of the handle 59, that handle being connected to the burner housing 8, and not to the carriage C, the handle 7 being joined to the carriage.

Incidental and perhaps obvious features embrace the governing of the flow of fuel, at the will of an operator, by the valve mechanism 40—43 of Figs. 7 and 1, and the charging of the kettle K by way of the lid 30 of Figs. 4 and 2. The air vent 114 can be uncapped, the pump 39 taken off, and the fuel holder F filled with fuel through the conduit 38.

Since the machine is intended to be handled by one operator, the weight of the superstructure should be properly distributed from front to back, with respect to the axle 4, to the end that there may be no downward pressure on the handle 7, and also in order that when the device is tilted forward and supported on the prop 12, it will remain in that position and not tilt back of itself. In this connection, it is to be observed that the slots 3 and the bolts 17 of Fig. 6 have an important office. The sheet 20 of asbestos (Fig. 2) prevents the heat from the burner B from striking down and raising the temperature of the fuel in the fuel holder F.

What is claimed is:—

1. In a device for filling cracks in roads, a wheel-mounted carriage; a superstructure including a container for the crack-filling material, a conduit extended downwardly from the container, and a nozzle on the conduit and shaped to ride in the crack to be filled and to follow the crack automatically; and means for mounting the superstructure on the carriage for rotation, relative to said carriage, about a substantially vertical axis, to permit the nozzle to ride in and follow the crack to be filled.

2. In a device for filling cracks in roads, a wheel-mounted carriage, a fuel holder, means for mounting the fuel holder on the carriage for rotation, relative to said carriage, about a substantially vertical axis, a burner structure secured to the fuel holder, means for conducting fuel from the fuel holder to the burner, a kettle secured to the burner structure in such position as to be heated thereby, a downwardly extended conduit connected to the kettle, and a nozzle on the conduit and shaped to ride in and be guided automatically by the crack to be filled.

3. In a device for filling cracks in roads, a wheel-mounted carriage, a kettle, means for mounting the kettle on the carriage to rotate, relative to said carriage, on a substantially vertical axis, a conduit leading downwardly from the kettle, a nozzle on the lower end of the conduit, a rearwardly extended wheeling handle connected to the carriage, a handle for rotating the kettle on said axis, and means for connecting the rotating handle to the kettle, both handles being so located with respect to each other that they are accessible to a single operator.

4. A device for filling cracks in roads, constructed as set forth in claim 3, in combination with a valve controlling the flow through the nozzle, and means mounted on the rotating handle for operating the valve.

5. In a device for filling cracks in roads, a wheel-mounted carriage, a kettle for crack-filling material, means for mounting the kettle on the carriage for rotation about a substantially vertical axis, relative to the carriage, a conduit for crack-filling material connected to the kettle, an applying nozzle assembled with the conduit, a heat-conducting means cooperating with the

conduit and with the nozzle, a burner on the carriage and having a combustion orifice so located as to heat the kettle, the burner communicating with the heat-conducting means for the conduit and the nozzle, a fuel holder on the carriage, mechanism for conducting fuel from the fuel holder to the burner, and means for creating pressure in the fuel holder, to carry the fuel through said mechanism to the burner, and through the burner to the combustion orifice, and to carry a part of the products of combustion from the orifice into and through the heat conducting means for the conduit and the nozzle.

6. In a device for filling cracks in roads, a wheel-mounted carriage, a kettle for crack-filling material, means for mounting the kettle on the carriage for rotation about a substantially vertical axis, relative to said carriage, a conduit for crack-filling material connected to the kettle, an applying nozzle assembled with the conduit, a heat-conducting means cooperating with the conduit, a burner on the carriage and having a combustion orifice so located as to heat the kettle, the burner communicating with the heat-conducting means for the conduit and the nozzle, means for supplying fuel to the burner, and means for creating a blast in the burner, to carry the fuel to the combustion orifice, and to carry a part of the products of combustion from the orifice into and through the heat-conducting means for the conduit.

7. In a device for filling cracks in roads, a carriage including ground wheels, a superstructure including a container for the crack-filling material, a conduit extended downwardly from the container, and a nozzle on the conduit and shaped to ride in the crack to be filled and to follow the crack automatically; mechanism for mounting the superstructure on the carriage for shifting movement parallel to the line of advance of the carriage, thereby to shift the center of mass of the superstructure with respect to the axis of rotation of the ground wheels, and means for mounting the superstructure for rotation, relative to said carriage, about a substantially vertical axis, to permit the nozzle to ride in and follow the crack to be filled.

8. A crack filler comprising a wheel-mounted carriage, a container for crack filling material, a downwardly extended outlet conduit connected rigidly with the container, a nozzle on the lower end of the conduit and shaped to ride in the crack to be filled, and means for mounting the container on the carriage for free rotary movement about a substantially vertical axis, relative to said carriage, whereby the container will be rotated by the drag of the nozzle in the crack, and permit the nozzle to run in and follow the crack.

9. A crack filler constructed as set forth in claim 8, in combination with a tubular jacket about practically the entire length of the outlet conduit and extended downwardly to the nozzle, and means for applying heat, from a single source of heat supply, to the container, and past the container, to the jacket.

10. A crack filler constructed in accordance with claim 8, in combination with a heating means having two outlets, one of said outlets discharging upon the container, and the other of said outlets discharging downwardly along the outlet conduit throughout practically the entire length of the said conduit.

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