Jan. 10, 1950 C. W. OSMOND 2,494,260

IMMERSION HEATER FOR BITUMINOUS MATERIALS AND THE LIKE

Filed April 22, 1948 2 Sheets-Sheet 1

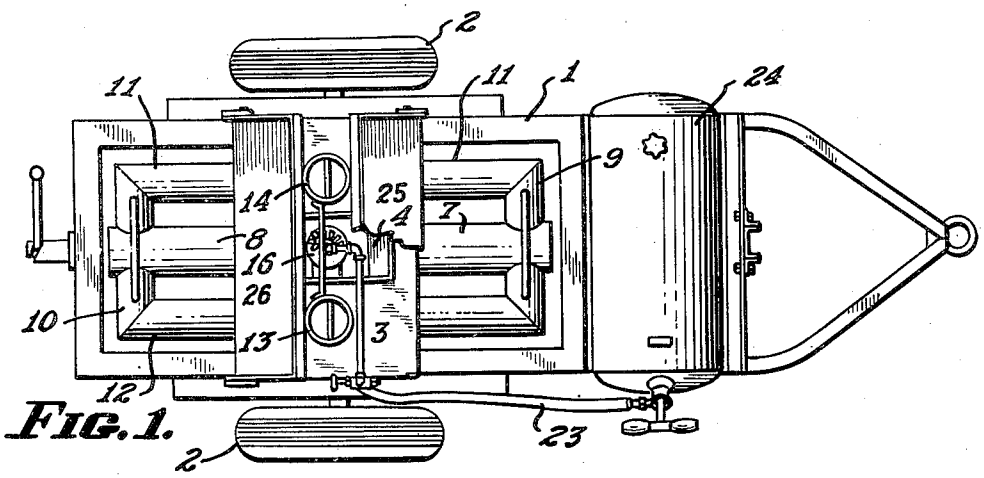


FIG. 1.

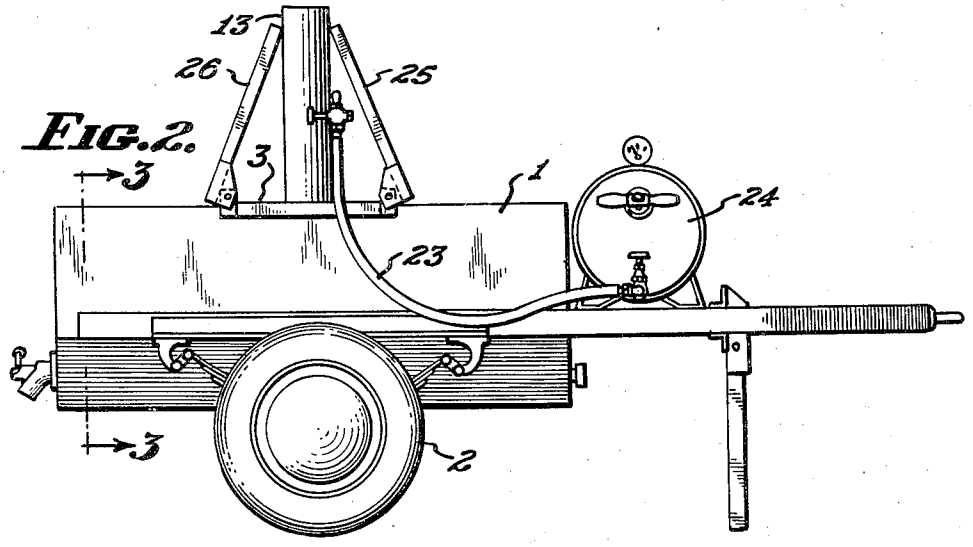


FIG. 2.

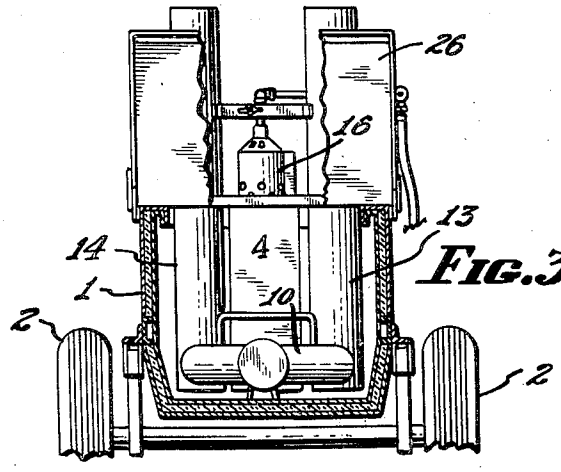


FIG. 3.

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IMMERSION HEATER FOR BITUMINOUS MATERIALS AND THE LIKE

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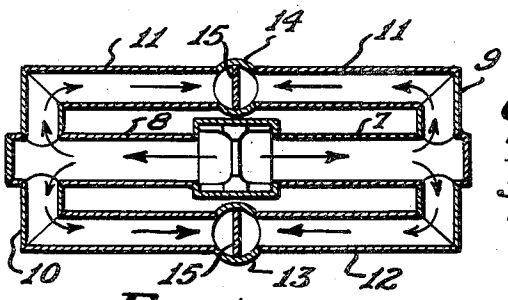


FIG. 7.

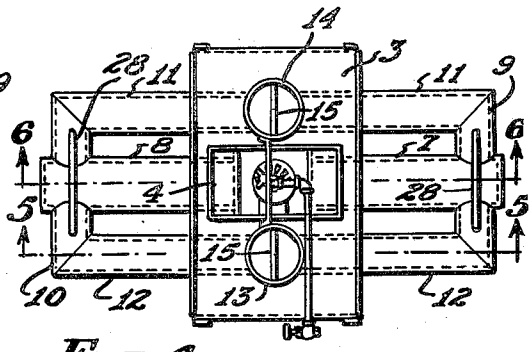


FIG. 4.

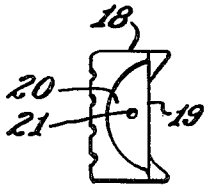


FIG. 10.

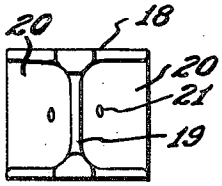


FIG. 9.

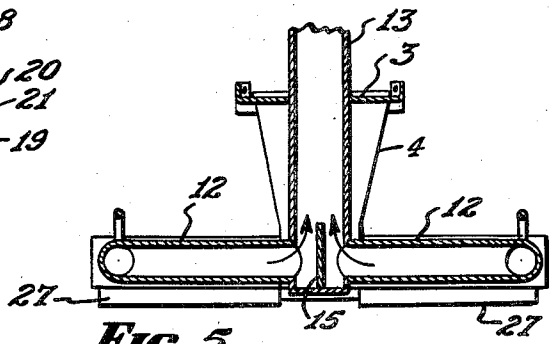


FIG. 5.

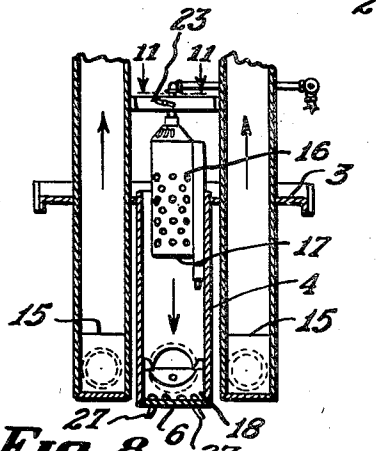


FIG. 8.

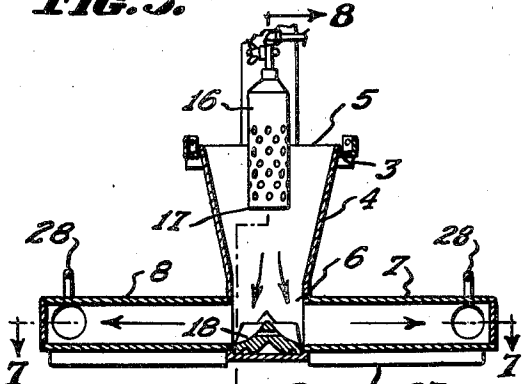


FIG. 6.

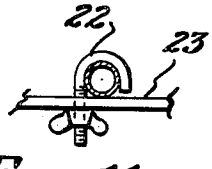


FIG. 11.

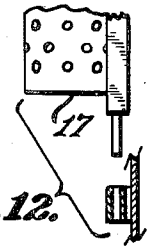


FIG. 12.

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UNITED STATES PATENT OFFICE

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IMMERSION HEATER FOR BITUMINOUS MATERIALS AND THE LIKE

Charles W. Osmond, Cincinnati, Ohio, assignor to Littleford Bros. Inc., Cincinnati, Ohio, a corporation of Ohio

Application April 22, 1948, Serial No. 22,554

12 Claims. (Cl. 126—360)

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My invention relates to an immersion heater for heating bituminous materials and the like in an open top material receiving receptacle.

My invention broadly consists of a system of flues connected to a burner receiving housing and exhausting through upstanding stacks which are formed as a unit and which may be easily and bodily removed as a unit from the material receptacle and the like.

There are a number of immersion heaters made up of flues and a burner box which may be removed from the material receptacle. However, they have certain disadvantages. As an example, it has been found that the hollow relatively light flues with the burner housing at one end of the receptacle tend to heat the material in the receptacle closer to the burner to a higher degree than the material remote from the burner. The burner is probably the heaviest part of these immersion heaters and when it and its housing is placed at one end of a rectangular receptacle, the other end of the heater made up of the relatively light hollow flues has a decided tendency to float unless held down by some means.

It is an object of my invention to provide an immersion heater where the housing or box carrying the heater is centrally located in the receptacle so that the heat throughout the receptacle will be substantially uniform.

It is a further object of my invention to provide an immersion heater wherein the burner box or housing is so configured and proportioned that sufficient air enters the housing and permits the burner to be ignited in position in the housing.

It is a further object of my invention to so arrange the flues and the housing that the overall weight of the unit will be centrally located and prevent any portion of the unit from floating and at the same time to permit the use of hinged covers at both ends of the receptacle, thus greatly facilitating the loading of the receptacle, particularly when in use.

These and other objects of my invention which will be set forth hereinafter or will be apparent to one skilled in the art upon reading these specifications, I accomplish by that certain construction and arrangement of parts of which I shall now describe an exemplary embodiment. Reference is now made to the drawings which form a part hereof and in which:

Figure 1 is a plan view of my novel immersion heater in place in a material receptacle.

Figure 2 is a side elevation of the device illustrated in Figure 1.

Figure 3 is a cross section of the device illustrated in Figure 2 taken on the section line 3—3 of Figure 2.

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Figure 4 is a plan view of my novel immersion heater itself.

Figure 5 is a cross section of the immersion heater shown in Figure 4 taken on the section line 5—5 of Figure 4.

Figure 6 is another sectional view taken on the section line 6—6 of Figure 4.

Figure 7 is a horizontal cross section of my novel immersion heater taken on the section line 7—7 of Figure 6.

Figure 8 is a sectional view of my heater as shown in Figure 6 taken on the section line 8—8.

Figure 9 is a plan view of my novel flame divider and deflector.

Figure 10 is a side elevation of the flame divider and deflector shown in Figure 9.

Figure 11 is a detailed view of the clamp for holding the burner taken on the section 11—11 of Figure 8.

Figure 12 is a detail view of the burner holder for use with my device.

Briefly, in the practice of my invention, I provide a burner housing having an open top which is attached to a centrally located cover resting on the open top of the material receptacle. The burner itself is positioned in the housing with its flame directed towards the bottom thereof.

A longitudinal flue attached to the housing projects from each side thereof and terminates in cross flues, which in turn are joined together by parallel longitudinal flues. These longitudinal flues carry upstanding stacks which contain a draft dividing baffle across the flue portion and are preferably located adjacent the burner housing.

I also provide a flame divider and deflector in the bottom of the housing preferably formed of a heavy casting which besides protecting the bottom of the housing, divides the downwardly projecting flame and deflects one-half through each of the adjacent flue portions. The heat flows outwardly from the burner housing in two directions through the cross flues and back through the longitudinal flues to the draft dividing baffle which prevents opposition of draft flow and insures the gases exhausting up through the upright stacks.

The flame divider and deflector is of appreciable weight and together with the weight of the burner and its centrally located position holds the whole heater system down in the container and prevents floating.

Referring to the drawings, I place my novel

immersion heater in the usual type of material tank 1 which may be mounted on wheels 2 to form a cart, or may be placed on an immovable stand.

The immersion heater itself is shown in Figure 4 and consists of the top plate 3 adapted to rest on the open top of the container 1 as shown in Figure 1. Attached to the top plate 3, I provide a burner housing 4 the top 5 of which is open and of greater area than the bottom portion 6. Projecting from opposite sides of the housing 4 adjacent the bottom 6, I provide longitudinal flues 7 and 8 which terminate in cross flues 9 and 10. Joining the ends of the cross flue 9 with the ends of the cross flue 10, I provide parallel flues 11 and 12. Adjacent the burner housing 4 and projecting upwardly from the parallel flues 11 and 12, I provide exhaust stacks 13 and 14. In the bottom of the exhaust stacks 13 and 14 transverse the flues 11 and 12, I provide baffles 15.

The burner 16 is of a type well-known in the art and is mounted in the burner housing 4 with the flame projecting end 17 pointed downwardly as in Figures 6 and 8. On the bottom 6 of the housing 4, I place a flame divider and deflector 18 which is shown in Figures 9 and 10. The flame divider is formed of relatively heavy heat resistant material and has an upward projecting portion 19 which divides the flame from the burner 16. There are also curved surfaces 20 on the deflector 18 which deflects the divided flame and directs one-half into the flue 7, and the other half into the flue 8. The divider and deflector 18 merely rests on the bottom 6 of the housing 4 and may be easily removed by placing a piece of baling wire through the hole 21, lifting it out through the top 5.

If desirable, the position of the burner 16, may be maintained by clamping the inlet pipe by a clamp 22 to a cross piece 23 positioned between the stacks 13 and 14; or fastening it in any other convenient way.

The burner 16 is connected by means of a hose 23 to the usual pressure tank 24 and in operation the flame projected downwardly from the nozzle portion 17 of the burner 16 is divided and deflected into flues 7 and 8 and the hot gases split up and go through the cross flues 9 and 10, return through portions of the parallel flues 11 and 12 and out the stacks 13 and 14. The baffle 15 in the stacks prevents the gases in the two different portions of the device from bucking each other and insure a smooth even flow out through the stacks 13 and 14.

Hinged to the central plate 3, I provide covers 25 and 26 which are of such size that when they are in closed position they completely cover the remaining portion of the open top of the receptacle 1. This permits the loading of the receptacle 1 from either end through hinged cover 25 or 26.

The weight of the flame divider and deflector 18 together with the weight of the burner 16 and the housing 4 is sufficient to hold the whole immersion heater down in the receptacle 1, thus preventing its floating and there is no necessity of clamping the plate 3 to the top of the receptacle 1.

I preferably provide fins 27 along the flues 7 and 8 to assist in dissipating the heat through the material and to support my structure on the bottom of the receptacle 1. I also preferably provide handles 28 to assist in lifting the immersion heater out of the receptacle 1 for cleaning.

From the above, it is apparent that I have divided my heat evenly throughout the flues of my

immersion heater by placing the burner and its housing in a central location and splitting the hot gases. The center of gravity of the immersion heater is substantially in the center and the weight is sufficient to prevent the device from floating. The whole heater may be easily and quickly removed from the receptacle 1 for cleaning and easily replaced. Due to the configuration of the burner housing, sufficient air is admitted to permit the igniting of the burner 16 without removing it from the housing 4. It is merely necessary to toss a rag soaked in inflammable material into the housing 4 and turn on the heater. Hot spots and cold spots are avoided by my construction as is excessive caking and the total contents of the receptacle is evenly and uniformly heated.

It is to be understood that modifications may be made in my invention without departing from the spirit thereof, and I do not intend to limit myself otherwise than as pointed out in the claims which follow. Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A melting kettle for bituminous material and the like including an open top material receiving receptacle and a removable immersion heating unit comprising a central cover portion adapted to be positioned on top of the receptacle a distance from each end thereof, an open topped tapered housing attached to the cover, a longitudinal flue attached to and projecting from opposite sides of said housing adjacent the bottom thereof, cross flues attached to the ends of said longitudinal flues and parallel longitudinal flues joining the ends of the opposite cross flues, said last mentioned flues each having an upstanding exhaust stack adjacent said housing and a draft dividing baffle positioned transverse the bottom of said stacks and at least across the interior of said last mentioned flues, a burner positioned in said housing with its flame projecting toward the bottom thereof and a flame divider in the bottom of said housing whereby the burner flame is divided and directed into said flues oppositely attached to said housing so that heat will flow through all of said flues and exhaust through said stacks.

2. A melting kettle for bituminous material and the like including an open top material receiving receptacle and a removable immersion heating unit comprising a central cover portion adapted to be positioned on top of the receptacle a distance from each end thereof, an open topped tapered housing attached to the cover, a longitudinal flue attached to and projecting from opposite sides of said housing adjacent the bottom thereof, cross flues attached to the ends of said longitudinal flues and parallel longitudinal flues joining the ends of the opposite cross flues, said last mentioned flues each having an upstanding exhaust stack adjacent said housing and a draft dividing baffle positioned transverse the bottom of said stacks and at least across the interior of said last mentioned flues, a burner positioned in said housing with its flame projecting toward the bottom thereof and a flame divider in the bottom of said housing whereby the burner flame is divided and directed with said flues oppositely attached to said housing so that heat will flow through all of said flues and exhaust through said stacks, said flame divider being relatively heavy and having curved flame deflecting surfaces having a horizontal and vertical component capable of dividing a vertical flame and

deflecting it with two opposite horizontal components.

3. A melting kettle for bituminous material and the like including an open top material receiving receptacle and a removable immersion heating unit comprising a central cover portion adapted to be positioned on top of the receptacle an equal distance from each end thereof, an open topped tapered housing depending from the cover, a longitudinal flue attached to and projecting from opposite sides of said housing adjacent the bottom thereof, cross flues attached to the ends of said longitudinal flues and parallel longitudinal flues joining the ends of the opposite cross flues, said last mentioned flues each having an upstanding exhaust stack adjacent said housing and a draft dividing baffle positioned transverse the bottom of said stacks and at least across the interior of said last mentioned flues, a burner positioned in said housing with its flame projecting toward the bottom thereof and a flame divider in the bottom of said housing whereby the burner flame is divided and directed with said flues oppositely attached to said housing so that heat will flow through all of said flues and exhaust through said stacks, said flame divider being relatively heavy and having curved flame deflecting surfaces having a horizontal and vertical component capable of dividing a vertical flame and deflecting it with two opposite horizontal components, and being bodily removable from the bottom of said housing.

4. A melting kettle for bituminous material and the like including an open top material receiving receptacle and a removable immersion heating unit comprising a central cover portion adapted to be positioned on top of the receptacle an equal distance from each end thereof, an open topped tapered housing depending from the cover, a longitudinal flue attached to and projecting from opposite sides of said housing adjacent the bottom thereof, cross flues attached to the ends of said longitudinal flues and parallel longitudinal flues joining the ends of the opposite cross flues, said last mentioned flues each having an upstanding exhaust stack adjacent said housing and a draft dividing baffle positioned transverse the bottom of said stacks and at least across the interior of said last mentioned flues, a burner positioned in said housing with its flame projecting toward the bottom thereof and a flame divider in the bottom of said housing whereby the burner flame is divided and directed with said flues oppositely attached to said housing so that heat will flow through all of said flues and exhaust through said stacks, and supplemental covers hinged to the central cover portion covering the remaining portion of the open top of the material receiving receptacle.

5. A removable immersion heating unit for an open topped material receiving receptacle comprising a horizontal flue system configured in the form of a symmetrical figure, and a second flue system bisecting the symmetrical figure and having its ends connected into said first mentioned flue system, an open top burner housing within said second flue system midway between its ends, vertical exhaust stacks connected into said first mentioned flue system alone and adjacent said burner housing, a burner positioned in said burner housing with the flame projected towards the bottom thereof onto a flame divider positioned at the bottom of said burner housing which divides and directs the flame into both halves of said second mentioned flue system, so that heat will travel

therefrom into the first mentioned flue system out through said exhaust stacks.

6. A removable immersion heating unit for an open topped material receiving receptacle comprising a horizontal flue system configured in the form of a symmetrical figure, and a second flue system bisecting the symmetrical figure and having its ends connected into said first mentioned flue system, an open top burner housing within said second flue system midway between its ends, vertical exhaust stacks connected into said first mentioned flue system alone and adjacent said burner housing, a burner positioned in said burner housing with the flame projected towards the bottom thereof onto a flame divider positioned at the bottom of said burner housing which divides and directs the flame into both halves of said second mentioned flue system, so that heat will travel therefrom into the first mentioned flue system out through said exhaust stacks, said burner housing having a greater area at its open top than at its bottom.

7. A removable immersion heating unit for an open topped material receiving receptacle comprising a horizontal flue system configured in the form of a symmetrical figure, and a second flue system bisecting the symmetrical figure and having its ends connected into said first mentioned flue system, an open top burner housing within said second flue system midway between its ends, vertical exhaust stacks connected into said first mentioned flue system alone and adjacent said burner housing, a burner positioned in said burner housing with the flame projected towards the bottom thereof onto a flame divider positioned at the bottom of said burner housing which divides and directs the flame into both halves of said second mentioned flue system, so that heat will travel therefrom into the first mentioned flue system out through said exhaust stacks, said flame divider being removable from said burner housing.

8. A removable immersion heating unit for an open topped material receiving receptacle comprising a horizontal flue system configured in the form of a symmetrical figure, and a second flue system bisecting the symmetrical figure and having its ends connected into said first mentioned flue system, an open top burner housing within said second flue system midway between its ends, vertical exhaust stacks connected into said first mentioned flue system alone and adjacent said burner housing, a burner positioned in said burner housing with the flame projected towards the bottom thereof onto a flame divider positioned at the bottom of said burner housing which divides and directs the flame into both halves of said second mentioned flue system, so that heat will travel therefrom into the first mentioned flue system out through said exhaust stacks, said burner housing attached to a cover plate adapted to be positioned over the material receiving receptacle at a distance from both ends thereof.

9. A removable immersion heating unit for an open topped material receiving receptacle comprising a horizontal flue system configured in the form of a symmetrical figure, and a second flue system bisecting the symmetrical figure and having its ends connected into said first mentioned flue system, an open top burner housing within said second flue system midway between its ends, vertical exhaust stacks connected into said first mentioned flue system alone and adjacent said burner housing, a burner positioned in said burner housing with the flame projected towards the

bottom thereof onto a flame divider positioned at the bottom of said burner housing which divides and directs the flame into both halves of said second mentioned flue system, so that heat will travel therefrom into the first mentioned flue system out through said exhaust stacks, said burner housing attached to a cover plate adapted to be positioned over the material receiving receptacle at a distance from both ends thereof, and two covers hinged to said covering plate and covering the remainder of the open top of the material receiving receptacle.

10. A melting kettle for bituminous material and the like including an open top material receiving receptacle and a removable immersion heating unit comprising a central cover portion adapted to be positioned on the top of the receptacle a distance from each end thereof, an open-topped housing attached to the cover, a longitudinal flue attached to and projecting from opposite sides of said housing adjacent the bottom thereof, cross flues attached to the ends of said longitudinal flues, parallel longitudinal flues extending from the ends of said cross flues toward said housing, and exhaust flue means connected with said parallel longitudinal flues adjacent said housing and extending upwardly in parallelism with said housing and through said cover.

11. A melting kettle for bituminous material and the like including an open top material receiving receptacle and a removable immersion heating unit comprising a central cover portion adapted to be positioned on the top of the receptacle a distance from each end thereof, an open-topped housing attached to the cover, a longitudinal flue attached to and projecting from opposite sides of said housing adjacent the bottom thereof, cross flues attached to the ends of said longitudinal flues, parallel longitudinal flues extending from the ends of said cross flues toward said housing, and exhaust flue means connected with said parallel longitudinal flues adjacent said housing and extending upwardly in parallelism with said housing and through said cover, a burner positioned in said housing with its flame projecting towards the bottom thereof and a flame divider in the bottom of said housing whereby the burner flame is divided and directed into said flues oppositely attached to said housing so that heat will flow through all of the said flues and exhaust through said exhaust flue means.

12. A melting kettle for bituminous material and the like including an open top material receiving receptacle and a removable immersion heating unit comprising a central cover portion adapted to be positioned on the top of the receptacle a distance from each end thereof, an open-topped housing attached to the cover, a longitudinal flue attached to and projecting from opposite sides of said housing adjacent the bottom thereof, cross flues attached to the ends of said longitudinal flues, parallel longitudinal flues extending from the ends of said cross flues toward said housing, and exhaust flue means connected with said parallel longitudinal flues adjacent said housing and extending upwardly in parallelism with said housing and through said cover, a burner positioned in said housing with its flame projecting towards the bottom thereof and a flame divider in the bottom of said housing whereby the burner flame is divided and directed into said flues oppositely attached to said housing so that heat will flow through all of the said flues and exhaust through said exhaust flue means, said housing having a greater area at its open top than at its bottom.

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