

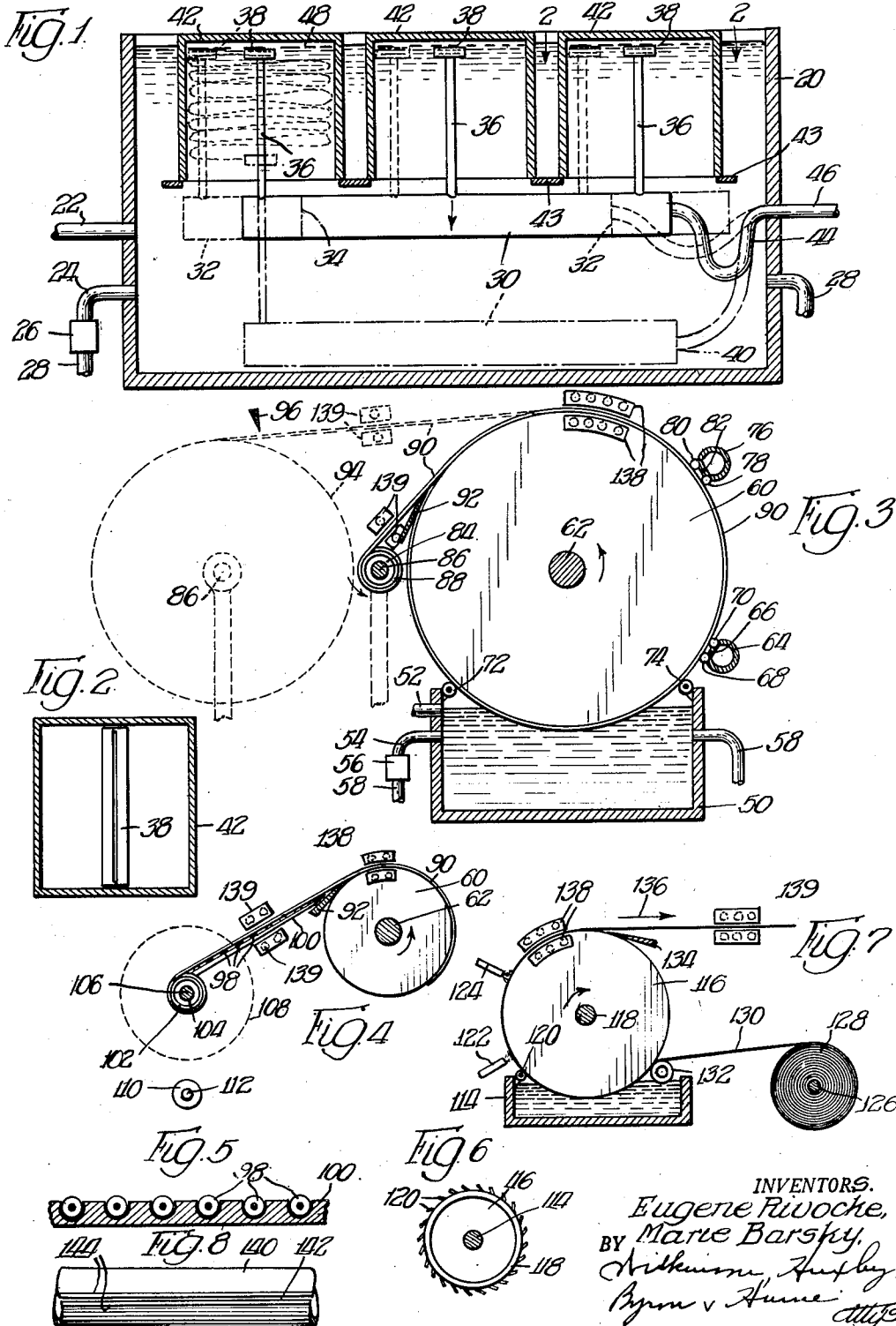
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APPARATUS FOR FORMING SOLID FUELS INTO FILMS OR BANDS

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APPARATUS FOR FORMING SOLID FUELS
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This invention pertains to apparatus for producing congealed fuels as in ribbons, films or bands for convenient or tight packing.

Various methods are known for transforming liquid fuels, and more particularly gasoline or alcohols, into solid or congealed masses, which are used as such for the purpose of preventing numerous inconveniences. In many cases, as particularly during transportation and storage, liquid fuels are inconvenient and dangerous as they are volatile, have a low firing point so are explosive and are subject to vapor loss, and there is great difficulty in preventing losses through leakages and the formation of explosive mixtures by the gases evolved by them. Moreover, with the processes known and used up to the present, liquid fuels, after having been transformed into the solid state, can no longer be brought back again to their former liquid state and quality.

The first or gelatinizing stage of the process consists in mixing cold and with strong agitation the liquid fuel with one or more gelatinizing substances such as keratine, gluten, algin, pectine and the like, during a period of 15-20 minutes, thus obtaining a product having a gelatinous consistency.

This emulsion is then brought into contact by the apparatus and methods hereinafter described, with a bath of suitable metallic salts rich in oxygen, which may be peroxides, sulphates, persulphates, chromates, bichromates, borates, perborates, manganates, permanganates, and the like, or tannin, oxymethylene, calcium chlorate, sodium chlorate, etc., in a liquid state.

In recent years, much progress has been made in technique of producing congealed, solid gasoline and hydro-carbons generally, and processes are known in which presentation of fluid fuels in such sufficient solid form to keep them in shape without special packing and susceptibility to transportation to storage. These are essentially processes using basic raw products for solidification of alginates, algin and other similar products on which the action of metallic salts is used to provoke the jellification of the algin solutions. Most of these products are presented in ball or globule forms and sizes. However, even with the present processes there are still many difficulties to overcome.

First

The stabilization of the congealed product and the establishment of a stable equilibrium is characterized with a contracting action and rejection of supplemental or surplus water. This is a long process as much time is required for the stabiliza-

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tion of the product and the elimination of the moisture content of the particles proportionate to the diameter or thickness of the particles formed.

Second

A standard content of moisture in the individual particles is difficult to obtain by drying in conventional tray or conveyor systems, as the particles do not have the same moisture content. In such systems, they fail to acquire a homogeneous drying of each particle but there occurs a general loss of a certain percentage of moisture from the whole mass of dried particles without the guarantee that each individual particle will have the same elimination of moisture.

Third

In the presentation or production of the particles in spherical formation, like balls or globules, an inevitable loss of volume of substantially 25% average will occur, and the formation of the balls or globules of congealed fluid by projecting or dropping the fuel emulsion into the congealing bath causes a substantial evaporation loss.

It is therefore an object of this invention to provide apparatus for congealing fuel, such as a petroleum product liquid, into a band, film, ribbon or the like.

Another object of the invention is to congeal a petroleum product fuel into a ribbon, or the like in such a manner that there is substantially no evaporation loss.

Another object of the invention is to transform a liquid fuel of low firing point into a congealed mass of high firing point.

Another object of the invention is to congeal liquid combustible fuel into a ribbon or the like of a predetermined thickness and moisture content to permit easy and safe handling and storage.

Another object of the invention is to provide mechanism for forming laminations of congealed fuel which may be wound on rolls or a desired thickness or arranged in blocks of selected size.

Another object of the invention is to form fuel into a ribbon, or the like, which may be backed to give strength thereto or for separation or storage purposes.

Another object of the invention is to provide mechanism for congealing a petroleum product to a state where it is readily molded.

With these and various other objects in view, the invention consists of certain novel features of construction and operation as will be more

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fully described and particularly pointed out in the specification, drawings and claims appended hereto.

In the drawings, which illustrate embodiments of the device and wherein like reference characters are used to designate like parts—

Figure 1 is a longitudinal sectional elevation of one form of apparatus embodying the invention, the same showing a device wherein the film of congealed fuel is lapped upon itself in a receptacle;

Figure 2 is a fragmentary sectional top plan view of a portion of the apparatus and a storage receptacle illustrated in Figure 1, the same being taken substantially in the plane as indicated by the line 2—2 of Figure 1;

Figure 3 is a transverse sectional elevation through a modified form of apparatus embodying the invention, the same showing a device wherein the film of congealed fuel is wound in roller form;

Figure 4 is a fragmentary, transverse sectional elevation through another modified form of apparatus for rolling the congealed fuel into roller form, the winding being done at a distance remote from the forming roll;

Figure 5 is an enlarged fragmentary sectional elevation through a form of conveyor adapted to be used with the apparatus illustrated in Figure 4;

Figure 6 is a transverse sectional elevation showing a form of cylinder on which the film of congealed fuel is adapted to be wound, the same being adapted to be utilized in the forms of device illustrated in Figures 3, 4 or 7;

Figure 7 is a fragmentary transverse sectional elevation through still another form of apparatus embodying the invention, wherein the congealed fuel is applied to a backing or reinforcing strip; and

Figure 8 is a fragmentary plan view of a form of spray device adapted for use with the herein disclosed apparatus.

Referring first of all, more particularly, to the form of construction illustrated in Figures 1 and 2, a receptacle such as the tank 20 is provided with an inlet 22 through which the liquid comprising the solidification salt bath is supplied to said tank, said salts being suitable metallic salts rich in oxygen, such as are enumerated above.

The tank is provided with re-circulating means such as pipe 24 connected to said tank and through pump 26 to pipe 28, which is in turn connected to said tank whereby the emulsion can be kept in motion by operation of the pump, it being understood that a suitable level of the bath is maintained at all times.

A manifold 30 is disposed in said tank below the liquid level, said manifold being adapted to be oscillated from its midposition, shown in full lines, to the left and toward the right as viewed in Figure 1, to the dotted line positions 32 and 34. Said manifold is provided with upwardly extending conduits 36 of any selected number, shown three, said conduits being provided adjacent the upper ends thereof with a slotted nozzle 38. The manifold 30 is also adapted to move from its top-most position as shown in dotted lines in Figure 1 to its lower-most position as shown at 40. Any suitable mechanism for causing the reciprocatory motion toward the right and left and the downward motion may be utilized, such as pneumatic, electric or manual means operated through suitable cranks and levers or through rollers and tracks of the

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proper shape. It is noted that the manifold may be made to move only in a vertical direction in which case the nozzles are moved from side to side; or the manifold may be made to move only from side to side and the nozzles move vertically; or the nozzles may be made to move from side to side and vertically and the manifold may retain stationary.

Storage receptacles 42 are adapted to be supported as at 43 with respect to the nozzle 38 so that the nozzle may be moved from side to side of said receptacle as it is moving from the closed to the open end of said receptacle. The nozzle is of substantial T-shape and in its long dimension substantially fits the shape of the receptacle as illustrated in Figure 2.

The manifold 30 is connected through a suitable flexible connection 44 and pipe 46 to a suitable source of emulsion supply from which the emulsion is supplied to the manifold and nozzles under pressure, any suitable valve or other control means being provided. The fuel emulsion is such as described in applications of Jean Pathus Labour, Serial No. 12,153 and 12,154, filed February 28, 1948, or in the French patent of De Granville, Patent No. 802,727, published September 14, 1936, and as noted above. In the upper-most position of the manifold 30 nozzles 38 are preferably below the top level of the bath and the nozzles are adapted to be lowered to a position such that the film formed in the receptacles 42 and disposed in layers therein substantially fills said receptacles. It will be seen that the emulsion supplied under pressure is supplied to the inside of the receptacles 42 which are completely filled with congealed emulsion in a ribbon-like form, as upon contact with the bath solution the emulsion is immediately congealed into a film or ribbon-like shape, and the side to side and lowering movement of the nozzles causes a continuous film to be formed wherein the layers overlap one another as illustrated by the dotted lines 48 as shown in Figure 1. The receptacles are substantially filled when the manifold 30 reaches its lower dotted line position as shown at 40 in Figure 1, at which time the supply of emulsified fuel is shut off so that no further fuel is supplied to the manifold 30. The receptacles can then be removed and new receptacles substituted therefor, and the manifold 30 returned to its raised position, whereby the process may then be repeated.

Referring now to the modification illustrated in Figure 3, a receptacle or tank 50 is shown for the reception of a suitable amount of solidification or congealing bath, such as above described, the tank 50 being provided with an inlet 52 for supplying the metallic salts bath to the tank 50. Recirculation means may be provided in the form of pipe 54 connected at one end to said tank and the other end of pump 56, the pump in turn being connected to pipe 58, the other end of which is connected to the tank 50. Forming cylinder or roll 60 is suitably mounted on its axis 62 and so disposed that a portion of the cylinder is immersed in the bath. Cylinder 60 is made of metal, porous stone or the like, that is, of a material which can be kept damp without being wet, in other words the material is such that the surface moisture on the cylinder can be readily controlled. In the embodiment shown, the cylinder 60 is adapted to rotate in a counter-clockwise direction and a spray of fuel emulsion to be congealed is provided by means of the adjustable nozzle 64 disposed adjacent the exit of

the surface of cylinder 60 from the tank. The nozzle 64 is provided with the nozzle surface 66 which preferably conforms to the contour of the cylinder 60 and the nozzle 64 may be provided with rollers 68 and 70 on each side of the surface 66, said rollers being for the purpose of preventing too much emulsion from adhering to the cylinder (that is to regulate film thickness), and in addition serve to iron out the film formed after spraying from said nozzle, and to mask the nozzle to prevent the escape of fuel vapor. The rollers may be of such character as to serve as vapor condensing means, and they, with the nozzle, may be adjustable toward and away from the forming cylinder. Tank 50 is likewise provided with adjustable rollers 72 and 74 at opposite sides of said tank, roller 74 being adapted to control the quantity of moisture retained on the cylinder 60 after immersion in the bath in tank 50 and prior to its being sprayed from nozzle 64. Spaced from nozzle 64 there is a similar nozzle 76 which may also be provided with the spaced rollers 78 and 80 which additionally iron the film and regulate thickness, said nozzle being adapted to spray through a nozzle member on a nozzle surface 82 liquid of the same material as that of the solidification bath. This spray is likewise adjustably disposed with respect to the cylinder 60.

A small rotatable cylinder 84 is rotatably positioned on shaft 86 disposed adjacent the cylinder 60 and cylinder 84 is adapted to be provided with the removable cylindrical pipe or sleeve 88. The film 90 formed on the cylinder 60 rotates with said cylinder until it reaches the stripper blade 92 at which time it is peeled off the cylinder 60 and is adapted to be rolled on the sleeve 88 forming a roll 94 of such material. As the film is being wound on the sleeve 88 the speed of the shaft 86 is adjusted so that the film 90 will be fed in layers in a regular manner and for this purpose any desired mechanism is provided for regulating the relative speeds of rotation between shafts 86 and 62, and as the roll 94 is built up shaft 86 moves away from the roll 60 as illustrated in Figure 3. Speed regulators for this purpose may be as used in motion picture projectors for the unwind and rewind mechanism, or as used in steel mills or paper mills. After a desired size roll 94 of the material is attained, the film may be cut by suitable cutting blade 96 whereupon the roll of material and the sleeve 88 upon which it is wound may be removed from the cylinder 84 for storage and another sleeve 88 may be applied to the cylinder 84 for a repetition of the process, shaft 86 being moved to its initial position adjacent the roll 60 for starting the new applying process.

It is of course understood that instead of providing a cylinder 84 with its shaft 86 and the sleeve 88, the film 90 may be stripped from the cylinder 60 and disposed in layers in suitable containers, being fed thereto by gravity or other means.

In Figure 4 a modification is shown wherein forming cylinder 60 mounted on shaft 62 rotates in a counterclockwise direction and has the film 90 formed thereon in the same manner as described with respect to Figure 3. In Figure 4 the tank 50 and the nozzles 64 and 76 have been omitted. As the film 90 reaches the blade 92, it is stripped and passes over the rollers 98 of the conveyor 100. As shown, the conveyor 100 is of the so-called iceberg type wherein the axis of the rollers is below the upper surface of the

stationary roller supporting member whereby only a portion of the arcuate surface of the rollers 98 is exposed.

The film 90 passes downwardly and is adapted to be wound on sleeve 102 similar to sleeve 88, being removably supported on the cylinder 104 which is adapted to be rotated by means of shaft 106. The film 90 is wrapped on the sleeve 102 to form a roll 108 of desired diameter, it being understood that shaft 106 is rotated in such a manner with respect to shaft 62 that the film is properly applied to the sleeve to form the roll, in other words is regulated similarly to shaft 86.

As the roll is being formed the conveyor 100 is adapted to move in such a way that the film is properly fed, that is, substantially tangentially to the film already wound. After the desired size roll is formed the film is cut and shaft 106 is moved out of the way to a desired position where the roll 108 and sleeve 102 may be stripped from the cylinder 104. As it is moved to stripping position a new roll 110 with its shaft 112 is moved to the initial position of shaft 106 and the conveyor 100 is moved to its initial position whereupon film 90 may be fed to new roll 110. This is repeated with a plurality of shafts and rolls moving in succession so that substantially a continuous uninterrupted process is attained.

In Figure 6 a modified form of roll construction to take the place of rolls 110, 88 or 102 is illustrated. In this modification shaft 114, corresponding to shafts 112, 106 or 86, is provided with the cylinder 116 rotatable therewith and sleeve 118 is removably disposed on said cylinder 116 for the reception of the film, the sleeve being provided with a plurality of film receiving elements or fingers 120 preferably diagonally disposed with respect to a plane through the axis of shaft 114 to insure gripping of the film.

In Figure 7 there is shown an apparatus for producing a film or band mounted upon a reinforcing strip which is preferably continuous in the same manner as the film is continuous. This reinforcement may be in the form of buckram, netting, woven cord or other suitable material, a desirable quality of the netting being that it is not chemically affected by the congealed fuel, nor will it chemically react with said fuel and is so arranged that the congealed fuel may be readily gasified or reliquified without interference by the reinforcing means. In this construction the tank 114 is provided similar to the tank 50 and is adapted to be fed from a suitable inlet, not shown, with the above referred to metallic salts which are maintained at a suitable level in said tank. Recirculation means, not shown, may also be provided. In this case, the forming roll or cylinder 116 similar to cylinder 60 is rotatably mounted on shaft 118 and so disposed with respect to tank 114 that a portion of cylinder 116 is adapted to dip into the solution. Adjustable roller 120 is arranged to regulate the amount of moisture adhering to the cylinder 116, in this case cylinder 116 rotating in a clockwise direction. As before, a spray 122 of the fuel emulsion is disposed adjacent the surface of cylinder 116 and the emulsion sprayed thereon, suitable rollers as rollers 68 and 70 being provided, if desired.

A second spray 124 (which may be similar to nozzle 76) is disposed in spaced relation to spray 122 and is adapted to spray the metallic salt solution on the film formed on the surface of cylinder 116. In order that the film so formed may be reinforced, shaft 126 is rotatably disposed adjacent the tank 114 and is provided with the

roll 128 of reinforcing material 130. A strip of the reinforcing material 130 is passed around rotatable roller 132 into the bath in tank 114 and around roller 116, the moisture content thereof being regulated by the roller 120. The material 130 is fed from roll 128 in a regulated manner, shaft 126 being properly synchronized with shaft 118. The fuel emulsion is sprayed at 122 and the bath spray sprayed from nozzle 124 on said reinforcing means, and thereafter the reinforcing means and the film formed thereon may be stripped by the stripper member 134 and fed in the direction of arrow 136 to form a suitable roll similar to those formed on sleeves 88, 102 or the film may be stored in layers in suitable containers.

Drying means such as the banks of infra-red lights 138 are provided, the intensity of said lights being controlled by a suitable switching means. The infra-red lights may be disposed adjacent the surface of the cylinder as shown in Figure 7, or may be disposed at any selected place along the path of the film to its storing means as at 139. This, of course, is true with respect to any of the modifications illustrated herein, the lights also being shown at 133 and 139, though it has been found that if a thin enough film is formed the drying means is not needed as the film is stabilized by the congealing salts as it is formed.

With respect to sprays 38, 64, 76, 122 and 124, these of course may be separate nozzles so arranged as to spray the material onto adjacent cylinders in a homogeneous manner, or may be in the form of a sleeve 140 such as shown in Figure 8 having a continuous slit 142 extending for the length of the forming cylinder such as cylinder 60, the opening of the slit being controlled by suitable slides or shutters 144 which may be adjusted toward and away from each other, sleeve 140 being so mounted as to be moved to a selected position with respect to the cylinder to be sprayed, such as cylinder 60.

While the baths which were described above were described as the salts, and the fuel emulsion described as being sprayed, it is of course understood that the reverse may take place, it being necessary that the cylinder be first sprayed with bath fluid prior to immersion in the fuel emulsion and thereafter sprayed with bath fluid.

It is to be understood that this application is not to be limited by the exact embodiments of the device shown, which are merely by way of illustration and not limitation as various and other forms of the device will, of course, be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the claims.

We claim:

1. In a device of the character described, the combination of a tank having a bath of fuel congealing material therein, a rotatable roller mounted adjacent said tank and disposed so that a portion of the periphery of said roller dips into said tank, a fuel emulsion spray adjacent said roller for spraying emulsion on the liquid coated roller causing a film of congealed fuel to be formed on said roller, means for stripping the congealed fuel film formed on said roller from said roller, said stripping means being positioned at a point intermediate said spray and the point at which said roller dips into said bath, and means for storing said film as a continuous member.

2. In a device of the character described, the combination of a tank, an inlet for supplying

and maintaining a bath of fuel congealing material in said tank, a rotatable roller mounted adjacent said tank and disposed so that a portion of the periphery of said roller dips into said bath, means in the path of movement of said roller for controlling the amount of liquid carried by said roller from the bath, a fuel emulsion spray adjacent said roller for spraying emulsion on the liquid coated roller causing a film of congealed fuel to be formed on said roller, a spray for spraying fuel congealing material on the film on the coated roller, means for stripping the congealed fuel film formed on said roller from said roller, and means for receiving and storing said film.

3. In a device of the character described, the combination of a tank, an inlet for supplying and maintaining a bath of fuel congealing material in said tank, a rotatable roller mounted adjacent said tank and disposed so that a portion of the periphery of said roller dips into said bath, means in the path of movement of said roller for controlling the amount of liquid carried by said roller from the bath, a fuel emulsion spray adjacent said roller for spraying emulsion on the liquid coated roller causing a film of congealed fuel to be formed on said roller, a spray for spraying fuel congealing material on the film on the coated roller, means for stripping the congealed fuel film formed on said roller from said roller and means for receiving and storing said film, said last named means including a rotatable roller, a removable member on said last named roller on which said film is adapted to be wound, said last named roller moving away from said first named roller as the film is wound thereon whereby the wound film is always spaced from said first named roller.

4. In a device of the character described, the combination of a tank, an inlet for supplying and maintaining a bath of fuel congealing material in said tank, a rotatable roller mounted adjacent said tank and disposed so that a portion of the periphery of said roller dips into said bath, means in the path of movement of said roller for controlling the amount of liquid carried by said roller from the bath, a fuel emulsion spray adjacent said roller for spraying emulsion on the liquid coated roller causing a film of congealed fuel to be formed on said roller, a spray for spraying fuel congealing material on the film on the coated roller, rollers carried by said sprays, said sprays being movable to move said rollers toward and away from said first named roller, means for stripping the congealed fuel film formed on said roller from said roller, and means for receiving and storing said film.

5. In a device of the character described, the combination of a tank, an inlet for supplying and maintaining a bath of fuel congealing material in said tank, a rotatable roller mounted adjacent said tank and disposed so that a portion of the periphery of said roller dips into said bath, means in the path of movement of said roller for controlling the amount of liquid carried by said roller from the bath, a fuel emulsion spray adjacent said roller for spraying emulsion on the liquid coated roller causing a film of congealed fuel to be formed on said roller, a spray for spraying fuel congealing material on the film on the coated roller, rollers carried by said sprays, said sprays being movable to move said rollers toward and away from said first named roller, means for stripping the congealed fuel film formed on said roller from said roller, and means for receiving

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and storing said film, said last named means including a rotatable roller, a removable member on said last named roller on which said film is adapted to be wound, said last named roller moving away from said first named roller as the film is wound thereon whereby the wound film is always spaced from said first named roller.

6. In a device of the character described, the combination of a tank, an inlet for supplying and maintaining a bath of fuel congealing material in said tank, a rotatable roller mounted adjacent said tank and disposed so that a portion of the periphery of said roller dips into said bath, means in the path of movement of said roller for controlling the amount of liquid carried by said roller from the bath, a fuel emulsion spray adjacent said roller for spraying emulsion on the liquid coated roller causing a film of congealed fuel to be formed on said roller, a spray for spraying fuel congealing material on the film on the coated roller, means for stripping the congealed fuel film formed on said roller from said roller, storing means for receiving and storing said film, and conveying means for conveying the film to said last named means.

7. In a device of the character described, the combination of a tank, an inlet for supplying and maintaining a bath of fuel congealing material in said tank, a rotatable roller mounted adjacent said tank and disposed so that a portion of the periphery of said roller dips into said bath, means in the path of movement of said roller for controlling the amount of liquid carried by said roller from the bath, a fuel emulsion spray adjacent said roller for spraying emulsion on the liquid coated roller causing a film of congealed fuel to be formed on said roller, a spray for spraying fuel congealing material on the film on the coated roller, means for stripping the congealed fuel film formed on said roller from said roller, storing means for receiving and storing said film, and conveying means for conveying the film to said last named means, said conveying means being movable as the film is supplied to the storing means to feed the film to said storing means in a predetermined manner.

8. In a device of the character described, the combination of a tank, an inlet for supplying and maintaining a bath of fuel congealing material in said tank, a rotatable roller mounted adjacent said tank and disposed so that a portion of the periphery of said roller dips into said bath, means in the path of movement of said roller for controlling the amount of liquid carried by said roller from the bath, a fuel emulsion spray adjacent said roller for spraying emulsion on the liquid coated roller causing a film of congealed fuel to be formed on said roller, a spray for spraying fuel congealing material on the film on the coated roller, means for stripping the congealed fuel film formed on said roller from said roller, storing means for receiving and storing said film, and conveying means for conveying the film to said last named means, said storing means including a rotatable roller, a removable sleeve thereon on which the film is adapted to be wound, said conveying means being movable as the film is supplied to the storing means to feed the film in a substantially tangential manner to the wound film.

9. In a device of the character described, the combination of a tank, an inlet for supplying and maintaining a bath of fuel congealing material in said tank, a rotatable roller mounted adjacent said tank and disposed so that a portion

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of the periphery of said roller dips into said bath, means in the path of movement of said roller for controlling the amount of liquid carried by said roller from the bath, a fuel emulsion spray adjacent said roller for spraying emulsion on the liquid coated roller causing a film of congealed fuel to be formed on said roller, a spray for spraying fuel congealing material on the film on the coated roller, means for stripping the congealed fuel film formed on said roller from said roller, storing means for receiving and storing said film, and conveying means for conveying the film to said last named means, said storing means including a rotatable roller, a removable sleeve thereon on which the film is adapted to be wound, said conveying means being movable as the film is supplied to the storing means to feed the film in a substantially tangential manner to the wound film, the rotatable roller being movable to inoperative position after the film is wound thereon, and another rotatable roller having a film receiving removable sleeve being movable to receive said film.

10. In a device of the character described, the combination of a tank, an inlet for supplying and maintaining a bath of fuel congealing material in said tank, a rotatable roller mounted adjacent said tank and disposed so that a portion of the periphery of said roller dips into said bath, means for supplying a flexible backing to said roller at a point prior to dipping into said bath in such a manner that said backing is disposed in close proximity with said roller, means in the path of movement of said roller and backing after they have left said bath to control the amount of liquid carried by said roller and backing from said bath, a fuel emulsion spray adjacent said first named roller for spraying emulsion on said bath coated backing causing a film of congealed fuel to be formed on said backing, a spray for spraying fuel congealing material on the film on the backing, means for stripping the film and backing from said first named roller, and means for receiving and storing said backed film.

11. In a device of the character described, the combination of a tank, an inlet for supplying and maintaining a bath of fuel congealing material in said tank, a rotatable roller mounted adjacent said tank and disposed so that a portion of the periphery of said roller dips into said bath, means for supplying a flexible backing to said roller at a point prior to dipping into said bath in such a manner that said backing is disposed in close proximity with said roller, means in the path of movement of said roller and backing after they have left said bath to control the amount of liquid carried by said roller and backing from said bath, a fuel emulsion spray adjacent said first named roller for spraying emulsion on said bath coated backing causing a film of congealed fuel to be formed on said backing, a spray for spraying fuel congealing material on the film on the backing, means for stripping the film and backing from said first named roller, and means for receiving and storing said backed film, said last named means including a rotatable roller, a removable member on said last named roller on which said film is adapted to be wound, said last named roller moving away from said first named roller as the film is wound thereon whereby the wound film is always spaced from said first named roller.

12. In a device of the character described, the combination of a tank, an inlet for supplying

and maintaining a bath of fuel congealing material in said tank, a rotatable roller mounted adjacent said tank and disposed so that a portion of the periphery of said roller dips into said bath, means for supplying a flexible backing to said roller at a point prior to dipping into said bath in such a manner that said backing is disposed in close proximity with said roller, means in the path of movement of said roller and backing after they have left said bath to control the amount of liquid carried by said roller and backing from said bath, a fuel emulsion spray adjacent said first named roller for spraying emulsion on said bath coated backing causing a film of congealed fuel to be formed on said backing, a spray for spraying fuel congealing material on the film on the backing, rollers carried by said sprays, said sprays being movable to move said rollers toward and away from said first named roller, means for stripping the film and backing from said first named roller, and means for receiving and storing said backed films.

13. In a device of the character described, the combination of a tank, an inlet for supplying and maintaining a bath of fuel congealing material in said tank, a rotatable roller mounted adjacent said tank and disposed so that a portion of the periphery of said roller dips into said bath, means for supplying a flexible backing to said roller at a point prior to dipping into said bath in such a manner that said backing is disposed in close proximity with said roller, means in the path of movement of said roller and backing after they have left said bath to control the amount of liquid carried by said roller and backing from said bath, a fuel emulsion spray adjacent said first named roller for spraying emulsion on said bath coated backing causing a film of congealed fuel to be formed on said backing, a spray for spraying fuel congealing material on the film on the backing, rollers carried by said sprays, said sprays being movable to move said rollers toward and away from said first named roller, storing means for receiving and storing said backed film, and conveying means for conveying the backed film to the storing means.

14. In a device of the character described, the combination of a tank, an inlet for supplying and maintaining a bath of fuel congealing material in said tank, a rotatable roller mounted adjacent said tank and disposed so that a portion of the periphery of said roller dips into said bath, means for supplying a flexible backing to said roller at a point prior to dipping into said bath in such a manner that said backing is disposed in close proximity with said roller, means in the path of movement of said roller and backing after they have left said bath to control the amount of liquid carried by said roller and backing from said bath, a fuel emulsion spray adjacent said first named roller for spraying emulsion on said bath coated backing causing a film of congealed fuel to be formed on said backing, a spray for spraying fuel congealing material on the film on the backing, rollers carried by said sprays, said sprays being movable to move said rollers toward and away from said first named roller, storing means for receiving and storing said backed film, conveying means for conveying the backed film to the storing means, said storing means including a rotatable roller, a removable sleeve thereon on which the backed film is adapted to be wound, said conveying means being movable as the backed film is sprayed to the storing means to feed the backed film in a sub-

stantially tangential manner to the wound backed film.

15. In a device of the character described, the combination of a tank, an inlet for supplying and maintaining a bath of fuel congealing material in said tank, a rotatable roller mounted adjacent said tank and disposed so that a portion of the periphery of said roller dips into said bath, means in the path of movement of said roller for controlling the amount of liquid carried by said roller from the bath, a fuel emulsion spray adjacent said roller for spraying emulsion on the liquid coated roller causing a film of congealed fuel to be formed on said roller, a spray for spraying fuel congealing material on the film on the coated roller, means for stripping the congealed fuel film formed on said roller from said roller, storing means for receiving and storing said film, and conveying means for conveying the film to said last named means, said conveying means being movable as the film is supplied to the storing means to feed the film to said storing means in a predetermined manner, said conveying means comprising a fixed member having spaced rollers thereon, the axes of said rollers being below the surface of said fixed member.

16. In a device of the character described, the combination of a tank, an inlet for supplying and maintaining a bath of fuel congealing material in said tank, a rotatable roller mounted adjacent said tank and disposed so that a portion of the periphery of said roller dips into said bath, means in the path of movement of said roller for controlling the amount of liquid carried by said roller from the bath, a fuel emulsion spray adjacent said roller for spraying emulsion on the liquid coated roller causing a film of congealed fuel to be formed on said roller, a spray for spraying fuel congealing material on the film on the coated roller, means for stripping the congealed fuel film formed on said roller from said roller and means for receiving and storing said film, said sprays comprising a fluid conducting member having an elongated outlet therein for spraying the fluid on said first named roller, and adjustable shutter means for varying the size of said opening.

17. In a device of the character described, the combination of a tank, an inlet for supplying and maintaining a bath of fuel congealing material in said tank, a rotatable roller mounted adjacent said tank and disposed so that a portion of the periphery of said roller dips into said bath, means in the path of movement of said roller for controlling the amount of liquid carried by said roller from the bath, a fuel emulsion spray adjacent said roller for spraying emulsion on the liquid coated roller causing a film of congealed fuel to be formed on said roller, a spray for spraying fuel congealing material on the film on the coated roller, means for stripping the congealed fuel film formed on said roller from said roller and means for receiving and storing said film, and drying means adjacent the path of said film.

18. In a device of the character described, the combination of a tank, an inlet for supplying and maintaining a bath of fuel congealing material in said tank, a rotatable roller mounted adjacent said tank and disposed so that a portion of the periphery of said roller dips into said bath, means in the path of movement of said roller for controlling the amount of liquid carried by said roller from the bath, a fuel emulsion spray adjacent said roller for spraying emulsion on the liquid coated roller causing a film of congealed fuel to be formed on said roller, a spray for spraying fuel congealing

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material on the film on the coated roller, means for stripping the congealed fuel film formed on said roller from said roller, storing means for receiving and storing said film, conveying means for conveying the film to said last named means, and drying means adjacent the path of said film.

19. In a device of the character described, the combination of a tank, an inlet for supplying and maintaining a bath of fuel congealing material in said tank, a rotatable roller mounted adjacent said tank and disposed so that a portion of the periphery of said roller dips into said bath, means for supplying a flexible backing to said roller at a point prior to dipping into said bath in such a manner that said backing is disposed in close proximity with said roller, means in the path of movement of said roller and backing after they have left said bath to control the amount of liquid carried by said roller and backing from said bath, a fuel emulsion spray adjacent said first named roller for spraying emulsion on said bath coated backing causing a film of congealed fuel

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to be formed on said backing, a spray for spraying fuel congealing material on the film on the backing, means for stripping the film and backing from said first named roller, means for receiving and storing said backed film, and drying means adjacent the path of said film.

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