

May 30, 1933.

E. S. PEARCE

1,911,527

WASTE RENOVATING APPARATUS

Filed Feb. 14, 1930

5 Sheets-Sheet 1

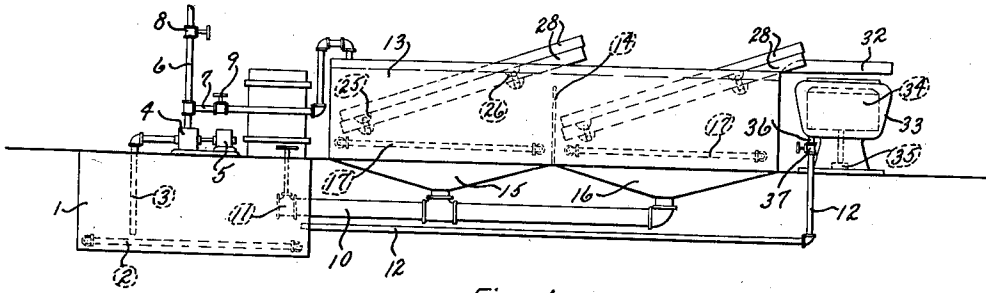


Fig. 1

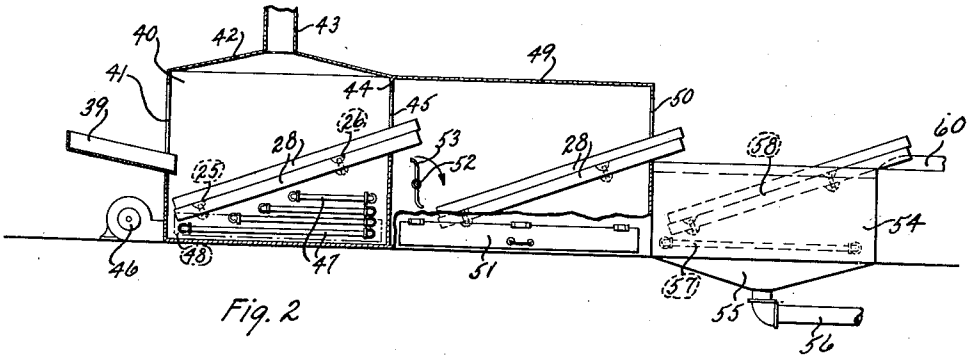


Fig. 2

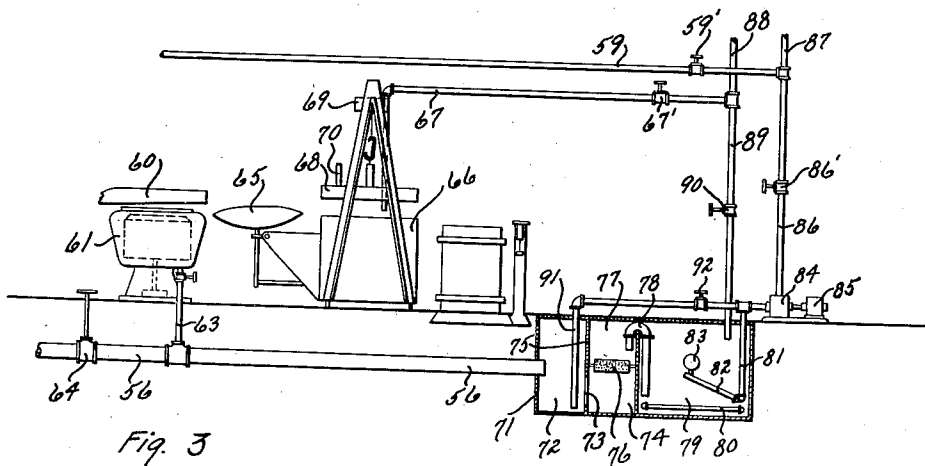


Fig. 3

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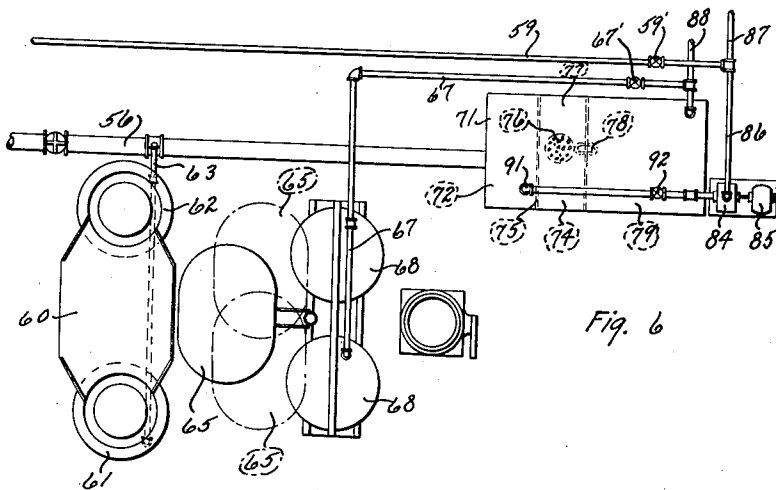
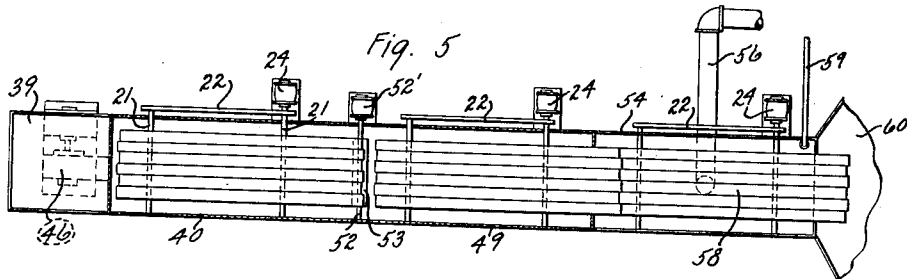
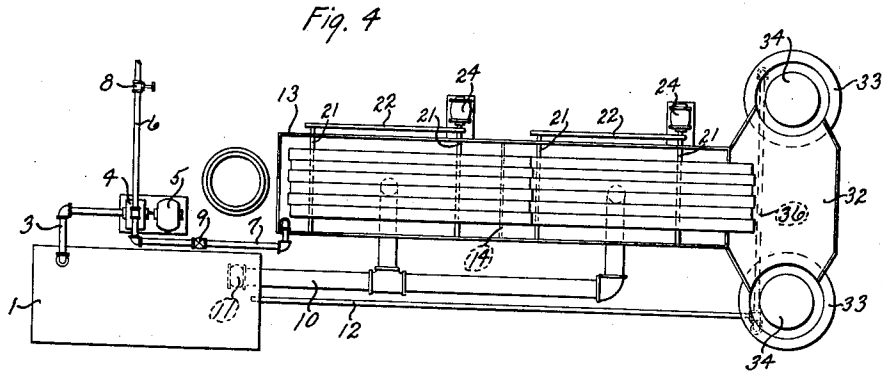
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5 Sheets-Sheet 3

Fig. 7

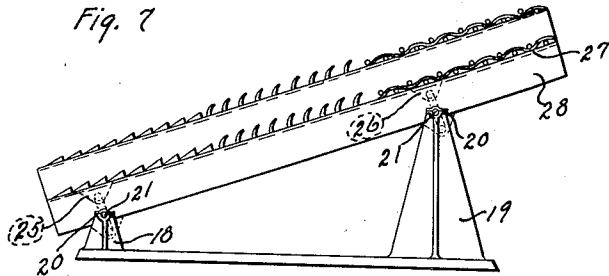


Fig. 8

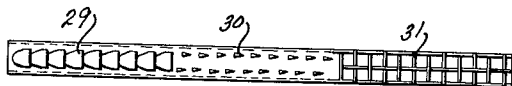
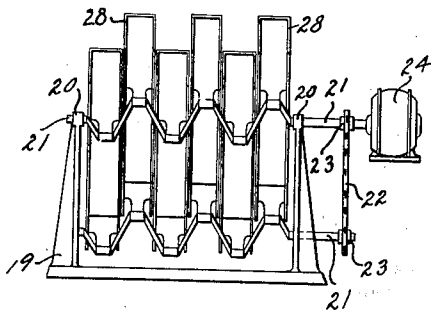


Fig. 9

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5 Sheets-Sheet 4

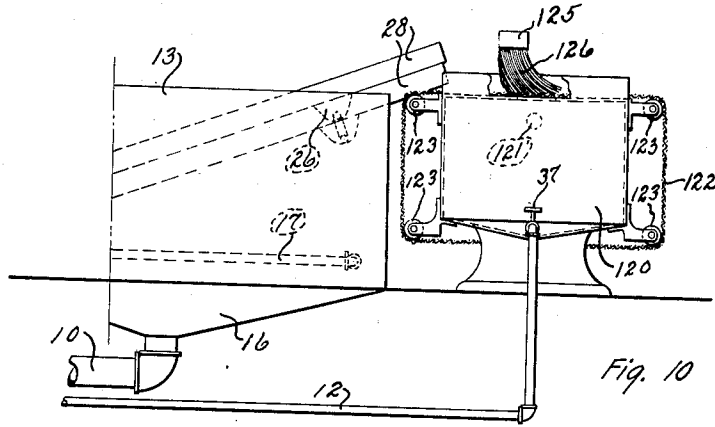


Fig. 10

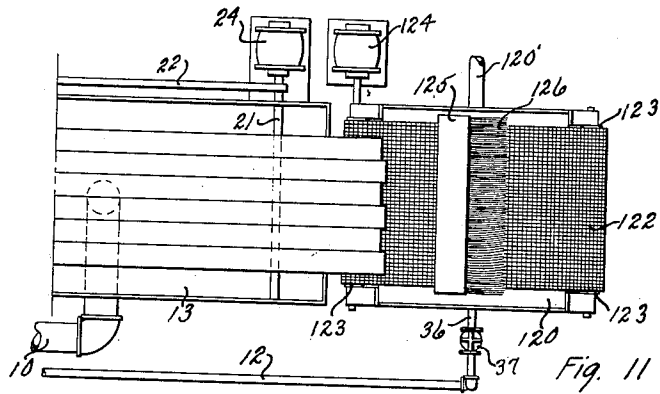


Fig. 11

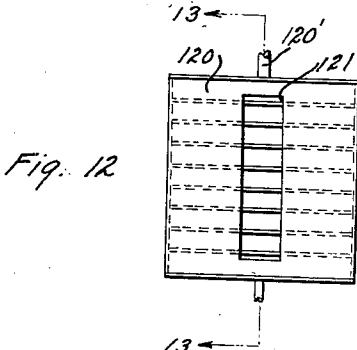


Fig. 12

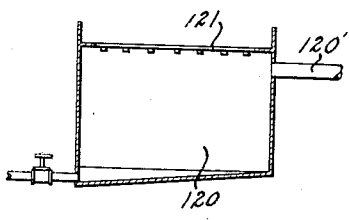


Fig. 13

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Filed Feb. 14, 1930

5 Sheets-Sheet 5

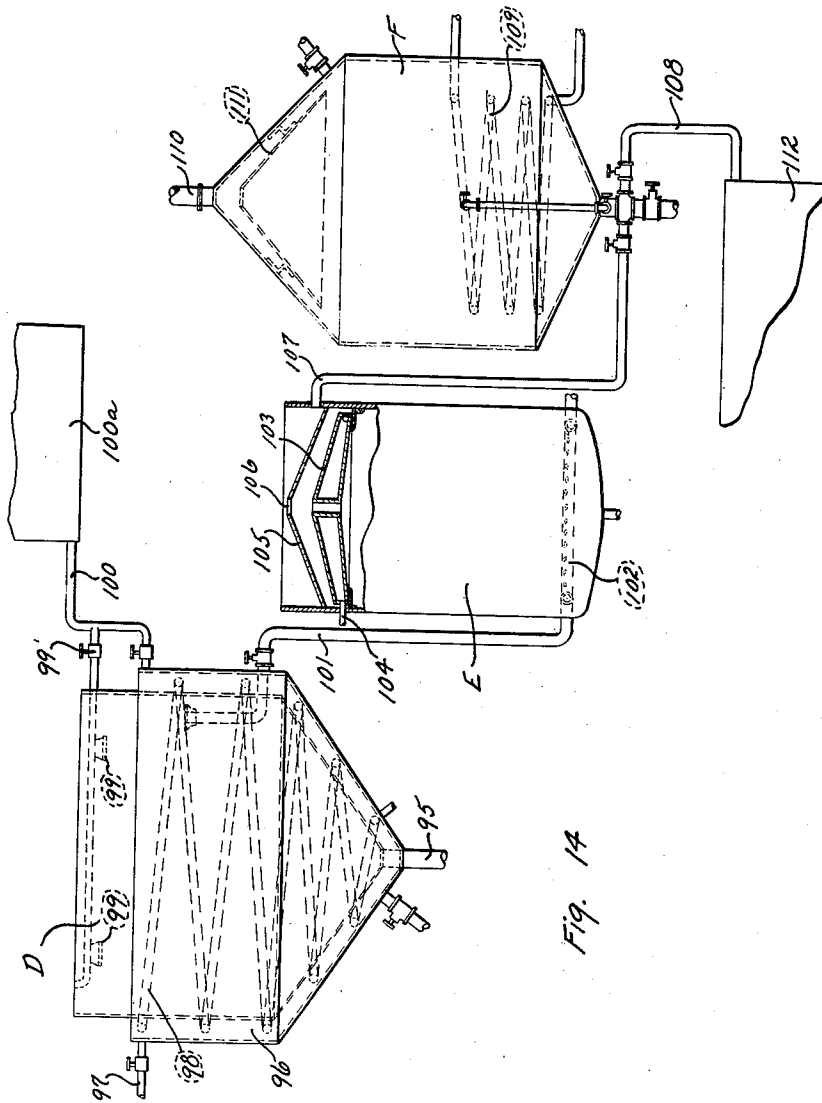


Fig. 14

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UNITED STATES PATENT OFFICE

EDWIN S. PEARCE, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO THE RAILWAY SERVICE & SUPPLY CORPORATION, OF INDIANAPOLIS, INDIANA, A CORPORATION OF INDIANA

WASTE RENOVATING APPARATUS

Application filed February 14, 1930. Serial No. 428,388.

The invention disclosed in this application is for apparatus for renovating journal box packing.

Heretofore, journal box packing has been renovated by using apparatus of the type disclosed in the patent to McCarthy No. 1,483,361, issued February 12, 1924, and the present invention is intended to carry forward the method disclosed in that patent by employing apparatus which will render the McCarthy method more pliable, more effective and substantially continuous in operation by the use of a combined agitator and conveyor in a number of the different steps of the process, to wit, in the soaking, drying, cleaning, and washing steps.

Another object of the invention is to arrange these agitator and conveyor units in tanks or casings provided with other suitable mechanism so that they may be utilized in the soaking step, the drying and cleaning steps, and the washing step, as stated, and provide the other machines necessary, such as oil removing devices or extractors, impregnators, oil sumps, a complete oil renovating apparatus for cleaning the wash oil and the dirty soaking oil.

The invention will be readily appreciated and understood from the following description, drawings and claims.

In the drawings, Figs. 1, 2 and 3 are being shown as separate views, by reason of the limitation as to size of the drawings, but they are virtually one view, the right hand end of Fig. 1 being closely adjacent the left hand end of Fig. 2, and the right hand end of Fig. 2 being closely adjacent the left hand end of Fig. 3. Fig. 1 shows the soaking tank, dirty oil sump and extractor arrangement; Fig. 2 shows the dryer, cleaner and washing mechanism; and Fig. 3 shows the extractors for the wash, the scales, the impregnator, and the wash oil cleaner or renovator; Figs. 4, 5, and 6, like Figs. 1, 2 and 3, are top plan views of the apparatus shown in Figs. 1, 2 and 3, divided as in those figures; Fig. 4 being a top plan view of the dirty oil sump, the soaking tank, arrangement, the extractor; Fig. 5 is a top plan view of the dryer, cleaner and wash

apparatus; and Fig. 6 shows the wash extractors, the impregnator, and the wash oil cleaner or renovator; Fig. 7 is a detailed side elevation of a combined agitator and conveyor unit utilized in the soaking tank, the dryer, the cleaner, and the wash; Fig. 8 is an end elevation; Fig. 9 is a top plan view of one of the blades or sections of the unit; Fig. 10 is a side elevation of another form of extractor; Figs. 11 and 12 are top plan views of said other form; Fig. 13 is a section on the line 13—13 of Fig. 12; and Fig. 14 is a view partly in elevation and section showing the oil renovating and processing apparatus.

In the apparatus shown in the drawings, 1 represents a suitable dirty oil sump conveniently arranged at a low level and provided with a heating coil 2 connected to any suitable steam supply and, preferably, arranged in the bottom of the tank to maintain the dirty oil, contained therein, in a heated condition. The heat of the oil in this tank is, preferably, at substantially 200°. In any event it should be maintained at a temperature below the fractional distillation of any of the useful oil ingredients. This tank is connected by a pipe 3, extending to a point near the bottom and above the coil 2, with a suitable oil pump 4 driven by a motor 5. This pump is connected to two pipe branches, 6 leading to any suitable oil cleaner or renovator, and 7 leading to the soaking tank to be described. These two pipes 6 and 7 are provided respectively with valves 8 and 9. The sump is further provided with a relatively large inlet pipe 10 having a valve 11 controlling the discharge of dirty oil from the soaking tank. The sump tank is still further provided with another pipe 12 leading to it from the extracting device or devices to be described.

At a higher level than the dirty oil sump is a soaking tank 13 preferably divided into two sections by a transverse vertical partition 14, and the bottom of the tank on each side of the partition 14 is hopper shaped, providing two hopper bottoms 15 and 16, both connected by suitable connections with the large pipe 10, so that practically all the

material from the two portions of this soaking tank may be discharged into the dirty oil sump 1. The pipe 7 from the pump 4 leads into the soaking tank in the portion to the left side of the partition 14 or, what might be termed, the primary portion. As the oil accumulates in this primary portion it over-flows the partition 14 and supplies the hot dirty soaking oil to the secondary side of the partition 14. The oil level in both of these portions is preferably the height of the partition 14. Each of the primary and secondary portions of the soaking tank is provided with a separate heating coil 17, supplied with steam or other heating medium from any suitable source, and arranged to heat the oil in its soaking tank portion. Both of these heating coils are arranged near the bottom of their respective tank portions, and above the hopper bottoms 15 and 16, as shown.

These tanks may be utilized, as described, and the inbound dirty packing is charged into them in sequence, first into the primary and then into the secondary portion.

I prefer, however, to provide a combined agitator and conveyor for not only assisting the soaking and heating of the inbound dirty packing but also for agitating it and conveying it from the primary portion to the secondary portion and from the latter to the next piece of apparatus. These agitator and conveyor units not only facilitate and expedite the heating of the inbound dirty packing but also serve to shake out some of the undesirable material, such as sand, cinders, babbitt, and any other material capable of being shaken out at this stage. They further serve to completely mingle the dirty sump oil and the oil carried by the packing and remove some of the undesirable lint elements present in the waste, such as short ends, relatively long lint and the finer lint which remains in suspension in the oil. The finer lint particles, however, have no great tendency to settle, especially in the process of the agitation in the soaking tank, but are more or less uniformly distributed and in suspension throughout the oil part. It is quite obvious that more undesirable materials would be discharged into the oil bath in the primary stage than in the secondary stage.

This agitator and conveyor unit is very clearly shown in Figs. 7, 8, and 9, and it comprises a suitable pair of supports 18 and a pair 19, the former being shorter than the latter. At the upper ends of each pair of supports are suitable bearings 20 which receive a crank shaft 21, having a plurality of crank parts. These two crank shafts are inter-connected by a chain 22 engaging sprockets 23 arranged on the two shafts, one of these shafts may be driven by a suitable motor 24. Both of the shafts 21 have the

same number of cranks and all cranks, preferably, are indexed in the same relative position and have the same throw. The two aligning cranks comprising one crank of the lower shaft and the aligning cranks of the upper shaft have bearings in brackets 25 and 26, Fig. 7, secured to the top inner portion 27 of a U-shaped channel bar having side portions 28, extending down along the sides of the brackets 25 and 26. There is one of these bars for each of the pairs of lower and upper cranks, as shown. The top portion of each channel bar is punched out or otherwise equipped to provide next to its lower end a group of saw teeth 29 while the intermediate portion is provided with upwardly and forwardly curved teeth 30 arranged in two longitudinal groups with the teeth of the groups staggered, while the last third portion may be provided with wire mesh 31. One of these agitator and conveyor units is arranged in each of the primary and secondary portions or compartments of the soaking tank, as shown, and the arrangement is such that when the inbound dirty packing is charged into the primary portion it is received by the unit, agitated in the bath of oil, shredded, picked, pulled, and loosened up by these agitators and at the same time conveyed through the dirty oil to a point above the partition 14, where it is discharged into the secondary portion or compartment onto the lower end of the unit in that portion or compartment. Here the packing is again agitated, fluffed, etc., in the bath of oil in this compartment and conveyed from this soaking tank portion to the next piece of apparatus.

The apparatus following the soaking tank is in the form of a centrally disposed table 32 arranged between two extractors. Each extractor comprises a curb 33, a basket 34, any suitable driving means 35 and a discharge pipe 36 connected to a valve 37, also connected to pipe 12. As shown, there are two of these extractors arranged in opposite ends of the table, and the hot oil soaked waste delivered from the soaking tank operation is charged onto this table ready for the operatives to pack it in the extractor. When the waste is packed in one of the extractors, the basket is set in motion and the oil, which has not drained out through the drain board effect of the last agitator and conveyor unit, is extracted and delivered to the curb from whence it finds its way to the dirty oil sump. The extracting operation is carried to the point of uniformly removing the oil from the waste part and leaving such waste part in a stage of fiber saturation only with all bodies of oil removed from the interstices among the fibres.

In place of the centrifugal extractors shown in Fig. 1, for example, a suitable vacuum extracting device shown in Figs. 10 to

13, may be provided, and it comprises a vacuum box 120 connected to any suitable source of vacuum through pipe 120' and provided with a slot 121 at its top the width of the mass of material delivered from the upper end of the secondary agitator and conveyor unit above the top of the vacuum box and traveling across it and of a width greater than the slot is one stretch of a reticulated conveyor 122, mounted on rollers 123 at the top and bottom. These rollers may be driven by any suitable mechanism such as motor means 124. Above the conveyor is a brush comprising a backing 125 supported in any suitable manner and carrying a mass of long bristles 126 adapted to bear upon the mat of the waste part upon the conveyor and press it down onto the slot or inlet of the vacuum box. In this way the oil part is removed from the waste part by a vacuum in a manner similar to the extracting operation and without the disadvantage of the intermittent effect, resulting from the use of extracting.

The packing up to this stage in its course through the apparatus has been separated into its oil part and its waste part, the former, with whatever undesirables it may have removed, being in the two compartments of the soaking tank and in the sump, while the latter, the waste part, is fiber saturated only with all of the oil uniformly removed from all of the interstices of the fibrous mass and ready for the next treatment.

Closely adjacent the table 32, and preferably in alignment with it, is a waste part cleaning and washing apparatus comprising a chute 39 leading to a cleaner housing 40 having an opening 41 at its front for the entrance of the waste part as it is discharged from the extractor baskets and placed in the chute 39. The cleaner housing 40 is provided with a dome shaped top 42 leading to a suitable stack or pipe 43 for carrying away any water or other vapors discharged from the waste part by heat. This housing is provided with a rear partition 44 having an upper opening 45 therein, leading to a dry dirt removing apparatus, to be described. Connected to the bottom of the housing is a suitable air blower 46 adapted to project a stream of air onto suitable heating coils 47 arranged in the bottom of the housing. This housing may be provided with a suitable clean out door 48. The coils 47 are arranged in an upwardly inclined bank to permit of the use of one of the combined agitator and conveyor units above described in connection with the soaking tank. This unit is identical with those used in the soaking tank and, therefore, needs no detailed description at this point, it being sufficient to say that it is arranged to receive the waste part as it is delivered through the cleaner housing 40 from the chute 39 and agitated

and conveyed through a heated current of air out of this housing into the next washing apparatus. The action of this agitator and conveyor in this cleaner housing is such that it loosens upon the balls of waste, shakes dirt therefrom, and gradually elevates it to the point of discharging it from this cleaner housing. In its passage through this cleaner much of the entrained moisture and other like elements are vaporized and discharged through the stack 43 so that the waste part emerges more or less de-hydrated, still in a state of oil fiber saturation, and free to some extent of much of its undesirables, such as undesirable fibers, lint not entrained with the oil, short ends, sand, cinders, dirt of all kinds and bits of metal, etc.

Adjacent to and preferably forming a part of this cleaner housing 40 is a dry dirt removing housing 49 communicating with the cleaner housing 40 by the opening 45 and provided with a similar discharge opening 50 at relatively the same level as the opening 45. This housing has a clean out door 51 and is provided with one of the combined agitator and conveyor units used in the cleaner housing 40 and in the soaking tank. Its arrangement is such that it is upwardly inclined from the receiving end and gradually slopes upward to the delivering opening 50. The lower end receives the discharge of the waste part from the upper end of the combined agitator and conveying unit in the cleaner housing 40. Indeed, the agitator and conveyor unit of the housing 40 projects into this housing 49 while the corresponding unit in this housing projects through the opening 50, as shown in Fig. 2. If necessary, this dry dirt remover may be provided with a transfer paddle comprising a shaft 52 driven by any suitable motor means 52' and carrying suitable paddle arms 53 for hitting the back of the mass of waste as it is discharged from one unit to the other.

In this dry dirt remover the waste part is again agitated while still hot from the preceding steps including the cleaner and soaking tank and additional foreign matter and undesirable material is removed from the waste while it is being further fluffed and uniformly torn apart. This dry dirt removing apparatus just described is followed by a washing apparatus and it comprises a tank 54 similar in all respects to a single stage of the soaking tank already described. It comprises a hopper bottom 55 connected to a discharge pipe 56, a heating coil 57, and a combined agitator and conveyor unit 58, similar in all respects to those already used and described. This washing tank receives clean oil through a supply pipe 59 leading to an oil cleaner, as will appear. The clean oil supplied to this washing tank 54 is hot, say at a temperature of approxi-

mately 200°, and as the waste is agitated and moved through this bath of oil it collects some of the dirt and other foreign matter not heretofore removed, and in addition thereto washes out and collects undesirable loose fibers and lint not heretofore removed. It further exchanges the oil film which constitutes the fiber saturation of the waste part heretofore referred to, to the point of providing a new clean oil film in its stead thereby removing additional dirt and other foreign matter and leaving the fibers in substantially their original clean condition. Indeed, where colored waste strands appear in the waste these colors are restored by the exchange of the dirty oil film in this stage. This stage is very important and differs in some respects from the oil treating stage in the soaking tank, for example, because here the waste part treated is substantially dry or dehydrated, on the one hand, and has a better opportunity to be oil washed because of its having been fluffed and loosened by the cleaner. The agitation in the soaking tank is important and does remove considerable undesirables, etc., but it must be borne in mind that the waste is balled and matted in the soaking tank and is in the process of being heated and while it ultimately comes to approximately 200° in this soaking stage it is so bound to its dirt, so to speak, and there is not the opportunity in that stage for washing away the undesirables and clean the fibers as there is in this washing stage after the previous treatments and agitations. Furthermore, in the first extractors, following the soaking tank, while the oil races through the fibers and carries away some undesirables, including substantially all of the lint in suspension, the weight of the mass of oil soaked waste in these extractors produces such a packing action on the waste part that an insufficient amount of undesirables are removed.

Following the washing tank 54 there is a second extractor table 60 preferably arranged between two extractors 61 and 62 similar in all respects to those already described, and having a suitable oil drain 63 connected to their curbs and leading to the drain pipe 56 of the clean oil wash tank 54. A valve 64 is provided in this drain pipe 56 between the pipe 63 and the wash tank, so that the desired level of oil may be retained in the washing tank.

In this second extracting stage following the wash the action is one of separating the washing oil from the waste part leaving it in a condition of fiber saturation only with the distinction that the oil film, in this case, is one of clean oil, whereas in the former extracting operation the film was of dirty oil. As before stated, this wash step is very important for further cleansing of the waste part and for leaving such waste

part with the uniform fiber saturation of clean oil and without any deposits of oil in the interstices of the waste. Following this operation the waste is removed from the baskets of the extractors, placed upon the table, and laid in suitable scales, generally indicated at 65, in proper quantities for charging into an impregnator.

The impregnator may be of any suitable form but is very conveniently of the type set forth in my prior Patent No. 1,723,747, granted August 6th, 1929, and generally speaking, comprises a cylindrical tank 66 closed at the bottom and opened at the top and adapted to receive in the bottom a quantity of renovated oil or new oil through a pipe 67. This pipe 59 is also connected to the pipe 6 for supplying such renovated or new oil, as may be needed in the early stage of the apparatus. This oil is hot and is measured off in suitable quantities in the bottom of the tank 66. Fitting the tank is a weighted cover 68 manipulated by a suitable hoisting device 69 and adapted to bear down upon the waste which has been charged from the weighing device 65 on top of the oil in the tank 66. A suitable vacuum producing means is connected through a flexible tube indicated at 70 to this weighted cover 68 for removing the air from below the cover and within the chamber of the tank. The rate of lowering of the cover is that of the speed of immersion of the waste in the oil, which speed should be at the proper point commensurate with the uniform upward movement of the oil through all parts of the waste body. Finally the waste is entirely immersed and the oil is uniformly distributed through the waste part, resulting in the production of a journal box packing possessing maximum lubricating qualities and lacking in fine and coarse lint and also lacking in other undesirables. Such a packing effectively lubricates journal boxes and reduces the hot boxes per car mile, over packing not so treated or produced. Indeed, such a packing, in some respects, is better than a new packing made up of new waste and new oil in that there has been a prolonged undisturbed association of oil and waste with an accompanying bond between the oil and waste fiber. It might be well to note here that such a bond can only be produced by a prolonged association of waste and oil and results only from treatment which removes moisture and permits a thorough contact of the oil with every part of each fiber.

The washing oil is treated in a suitable oil cleaner or renovator and such a renovator comprises a tank 71 mounted at low level and having a receiving compartment 72 connected to the pipe 56 leading from the wash tank 54 and the extractors 61 and 62.

This compartment communicates by an opening 73 with what is termed a subsidence compartment 74 having an upper wall 75 lower than the top of a tank and carrying a filtering unit 76 of waste or other porous material. Above this filtering unit is a collecting chamber or compartment 77 connected by a siphon 78 to a third compartment or clean oil reservoir 79. This reservoir is provided with a heating coil 80 for maintaining this oil at the working temperature which is substantially 200°. Extending through the bottom of this reservoir 79 is a discharge pipe 81 connected to a skimmer pipe 82 provided with a float 83. This pipe 81 leads to a suitable pump 84 driven by a motor 85 connected to a discharge pipe 86 which branches into the pipe 59 on the one hand and a pipe 87 leading to the oil processing plant. A return processed oil pipe 88 branches off into the pipe 67 and also in a pipe 89 provided with a valve 90 and an extension leading to the top of the reservoir 79, so that should the wash oil need replenishing in this reservoir 79 this may be accomplished through the use of the pipe 89 and the valve 90. Periodically, the receiving compartment may be drained through a pipe 91 provided with a valve at about 92 and leading to the pump 84 and in this way the foul condition of this receiving compartment may be disposed of by pumping its dirty oil together with whatever undesirables which have collected in the bottom of it, out through the pump 84 and to the oil processing apparatus through the pipe 87. In this case, of course, the valve 59' in the pipe 59 is closed and the valve 86' is open. From the foregoing it will be seen that the washing oil, for the most part, is renovated or cleaned by the apparatus just described, which is in a sense a filter. Such a filter may be used at this point for several reasons. In the first place, the waste part in first extracting stage, has been relieved of the fine lint which goes into suspension in the oil and which will pass any practical filter. Secondly, the filtering means disclosed is one which permits subsidence of the oil in the receiving and subsidence compartments so that the oil in a more or less quiescent state moving upwardly through the filtering element 76 and into the collecting tank above it from which it passes periodically into the reservoir 79. This filtering pad collects also any moisture which may not have been removed and which is present in the oil.

The renovation or processing of the oil from the sump tank 1 as well as like treatment from time to time of the washing oil in connection with the washing stage, may be accomplished by any suitable oil renovating or processing apparatus or method. Such an apparatus is disclosed in the appli-

cation of Leonard D. Grisbaum, Serial No. 74,949, filed December 12, 1925, to which reference may be had for a more complete description of the same.

Briefly described, and as shown in the drawings, this oil renovating plant includes features as follows:

The oil from the sump is forced through the pipe 6 by the pump 4 to the line 59 leading to the pipe 87, also connected to the pump 84 which draws the oil from the receiving compartment 72 of the washing oil filtering apparatus and conveys it to the oil renovating and processing plant. The latter includes three tanks D, E and F, respectively.

Tank D has a cylindrical body and conical base to the bottom of which the pipe 95 is connected. It is provided with a jacket 96 to which water may be supplied by the pipe 97 and in which jacket is a steam heating coil 98. At the top of the tank are one or more spray nozzles 99 communicating with a hot water pipe 100 from tank 100a. This pipe 100 also communicates with the jacket 96 to supply hot water thereto. In the tank D is placed a charge of a solution of a suitable alkali, such as caustic soda. Water is supplied to the jacket and steam is passed through the heating coils 98 to raise the temperature even to a point above boiling, the water supply pipes being shut off to hold the water under pressure. The oil to be cleaned is then admitted to the bottom of the tank and bubbles up through the alkali solution, producing a sufficient agitation for the treatment. When a sufficient quantity of oil has been admitted the tank is allowed to stand for an appreciable time, say five hours, at this higher temperature, and the heating under pressure stimulates the mixing action. Finally, the valve 99' in the water supply, which comes from the open tank 100a, is opened, relieving the pressure in the jacket and permitting the temperature to drop to approximately boiling, in which condition the tank is maintained for another period of about five hours. The cover is now removed from the tank and hot water is sprayed onto the surface of the oil through the nozzles 99. This spraying is continued to thoroughly wash the oil. All soluble matter goes into solution and stays with the water, and the solid matter, including dirt particles, which may have been suspended in the oil, is carried down and settles with the sludge. The oil has the lower specific gravity and floats on the top of the water, while the sludge collects at the bottom. There are now three layers in tank D—first, at the top there is clean oil containing traces of chemicals and water, second, the water, and third, the sludge.

The continued heating in tank D prior to the spraying or washing with water breaks

down or destroys part of the lint, such as the woolen or animal fibers, and precipitates the remainder, such as cotton or vegetable fibers. It also produces chemical reactions with
 5 chemical impurities, such as soaps, grease and the like, and makes them either soluble or precipitates them. As a consequence, when the water washing step has been performed the oil in the top layer is free of lint
 10 and mechanical impurities and contains but a small portion of chemical impurities with the moisture or water in it.

The oil in the upper layer is now drawn off through the pipe 101 and supplied there-
 15 by to a perforated pipe 102 at the bottom of tank E, which is filled with hot water. In said tank the oil rises in a greatly broken up condition and accumulates above the water level and below a hollow plate 103
 20 heated by steam circulated through it by the pipe 104. Said plate is of bell form with a center opening or mouth and is preferably kept heated at about 250° F. As the rising oil strikes it any water entrained in it is
 25 vaporized and escapes. Above the hollow plate 103 is a cone 105 with a center opening 106. As the oil accumulates it finally flows out through the center opening 106 and
 30 down the sides of the cone 105 to a pipe 107 by which it is supplied to the tank F. The oil may be tested to determine its chemical content and if some chemicals still remain some clean hot water may be mixed with the oil in tank F for further washing and
 35 then drawn off through the pipe 108. In any event, the oil is supplied to tank F and permitted to collect therein by settling with the oil on top and the water at the bottom. Finally the water is drawn off and the tank
 40 F is then heated by the steam coil 109 so as to vaporize and drive off any water by way of the pipe 110 beneath which is a baffle 111 to prevent oil loss by spattering or otherwise. This treatment dehydrates the oil and
 45 drives off all water, leaving a clear, clean usable oil free of chemicals and mechanical impurities, such as lint, dirt and the like. The recovered oil may be drawn off to a tank 112 from which it is delivered to any place
 50 for use, such as to the pipe 87 by which oil is supplied to the various parts of the apparatus requiring renovated or processed oil.

From the foregoing it will be seen that the inbound dirty packing is first charged
 55 into a bath of heated dirty sump oil where it is heated, agitated and delivered to a second hot soaking bath where it is again heated, agitated and delivered to the oil extracting stage. In the oil extracting stage the
 60 waste part is separated from the oil part so that the former is reduced in oil content to the point of fiber saturation only without any bodies of oil remaining in the interstices of the waste or between the fibers. The oil
 65 part at this point is charged with substan-

tially all of the finely divided lint which remains in suspension in the oil and passes down with it to the soaking tank, to be treated in the later oil renovating and processing plant or apparatus. The waste part,
 70 fiber saturated as above, is delivered to the cleaner. The cleaner apparatus comprises a heating and dehydrating part wherein the waste is agitated and conveyed to the dry dirt remover. Here the waste part is again
 75 agitated in an atmosphere of air to shake out additional undesirables and conveyed therefrom to the washing stage wherein the waste part, fluffed and loosened by the cleaner, is subjected to a washing operation in clean
 80 or washing oil. Here the oil film is exchanged for a clean oil film and additional dirt and lint are removed. This stage is particularly advantageous in that it not only improves the appearance of the waste part
 85 but takes out longer fibers incapable of being suspended in the oil and undesirable in the packing. In this washing stage the waste part is agitated in and conveyed through the oil and delivered to another oil extracting
 90 device which reduces the oil content of the waste part to a known minimum fiber saturation without bodies of oil in the spaces between the fibers. From this extracting stage the waste is weighed out and delivered to an
 95 impregnator where it meets some of the renovated oil and results in the production of a renovated journal box packing.

The oil of the washing stage in the meantime is being filtered and cleaned and relieved of its undesirable long and short fibers which are removed by the peculiar characteristics of the filtering means employed.

While the waste has been moving through its various treatments, the oil from the dirty
 105 oil sump as well as the dirty oil from the washing oil filter is removed in quantities from time to time and treated and stored in the tank 112 ready to be returned to the apparatus for use in the treatment.
 110

It will be seen from the foregoing that the plant treats the waste part and the oil part without undue accumulation of oil and with the return, at the end, of the waste
 115 part and the oil part in a journal box packing ready for use. The only additional oil and waste supplied being that which is necessary to make up for losses, etc.

The U-shaped channel bars of the agitator and conveyor unit are open at the bottom,
 120 and the top is also open through the screen portion 31 through openings left when producing the projections 30 as well as the louvers or teeth 29. As these channel bars are moved up and down into and out of the
 125 oil bath they move the waste body up and down and at the same time oil is projected through the openings in these channel bars in the form of streams which pass in and
 130 through the waste body and cleanse it. It

is obvious that as the body of waste is fluffed and torn apart the projected streams of oil will have ample opportunity to penetrate it.

Each of the channel bars may be equipped with the different upper surface arrangements shown in Fig. 9, or the groups of bars in any of the different stages may be equipped with any one of these surface arrangements, as for example the louvers 29.

What I claim is:

1. Renovating apparatus for journal box packing made up of a fibrous waste part and an oil part, comprising an oil soaking tank unit; an oil removing unit located adjacent said soaking tank unit, a cleaning unit for the waste part of the packing located adjacent said oil removing unit; an oil washing unit for said waste part located adjacent said cleaning unit; means in said soaking tank unit for simultaneously agitating said packing, opening up the waste part thereof, and conveying said packing through said soaking tank unit and delivering the same to a point adjacent said oil removing unit; means in said cleaning unit for simultaneously agitating the waste part of said packing and for conveying the same through said cleaning unit and delivering the same into said oil washing unit; and means in said washing unit for simultaneously agitating and opening up the waste part of said packing and for moving said waste part through said unit.

2. Renovating apparatus for journal box packing made up of a fibrous waste part and an oil part, comprising an oil soaking tank unit having a packing receiving end and a packing delivering end; oil removing unit adjacent the delivery end of said soaking tank unit; a cleaning means for the waste part of said packing and having a waste receiving end adjacent said oil removing means; means in said soaking tank unit for simultaneously agitating the packing and for conveying said packing therethrough and delivering the same to a point adjacent said oil removing means; means in said cleaning unit for subjecting the waste part of said packing to an atmosphere of air and heat; and means in said cleaning unit for simultaneously agitating and opening up said waste part and for conveying the same through said unit.

3. Renovating apparatus for journal box packing made up of a fibrous waste part and an oil part, comprising an oil soaking tank unit having a packing receiving end and a packing delivering end; oil removing means adjacent the delivery end of said soaking tank unit; a cleaning unit for the waste part of said packing and having a waste receiving end adjacent said oil removing means; means in said soaking tank unit for simultaneously agitating the packing therein and for conveying said packing therethrough

and delivering the same to a point adjacent said oil removing means; means in said cleaning unit for subjecting the waste part of the packing therein to an atmosphere of air and heat, means in said cleaning unit for simultaneously agitating and opening up said waste part and for conveying the same through said unit; an oil washing unit having its waste receiving end adjacent the waste delivery end of said cleaning unit; and means in said washing unit for simultaneously agitating said waste part in the oil therein and for conveying said waste part through said unit.

4. Renovating apparatus for journal box packing made up of a fibrous waste part and an oil part, comprising an oil soaking tank unit having a packing receiving end and a packing delivering end; oil removing means adjacent the delivery end of said soaking tank unit; a cleaning unit for the waste part of said packing and having a waste receiving end adjacent said oil removing means; means in said soaking tank unit for simultaneously agitating the packing therein and for conveying said packing therethrough and delivering the same to a point adjacent said oil removing means; means in said cleaning unit for subjecting the waste part of the packing therein to an atmosphere of air and heat; means in said cleaning unit for simultaneously agitating and opening up said waste part and for conveying the same through said unit; an oil washing unit for said waste part having its waste receiving end adjacent the waste delivery end of said cleaning unit; means in said oil washing unit for simultaneously agitating said waste part in the oil therein and for conveying said waste part through said unit; and oil removing means adjacent the waste delivery end of said oil washing unit.

5. Renovating apparatus for journal box packing made up of a fibrous waste part and an oil part, comprising a cleaning unit for the waste part of said packing; said cleaning unit having a casing provided with a waste inlet opening and a waste outlet opening, a partition dividing said casing into a front chamber and a rear chamber and having an opening therethrough, said front chamber communicating with said inlet opening and said rear chamber communicating with said outlet opening, and means in each of said chambers for agitating the waste part therein and for moving said waste part therethrough; one of said means extending through said partition opening for conveying said waste part from one of said chambers to the other of said chambers, and means for subjecting the waste in one of said chambers to a heated air effect.

In testimony whereof I hereby affix my signature.

EDWIN S. PEARCE.

CERTIFICATE OF CORRECTION.

Patent No. 1,911,527.

May 30, 1933.

EDWIN S. PEARCE.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, line 70, for "upon" read "up"; page 7, line 38, claim 2, for "unit" read "means", and line 40, for "means" read "unit"; same page, line 119, claim 5, strike out the word "and"; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 22nd day of August, A. D. 1933.

(Seal)

M. J. Moore.
Acting Commissioner of Patents.