July 14, 1936. L. S. WILBUR 2,047,449

APPARATUS FOR HANDLING AND RECLAIMING WASTE AND OIL FROM USED PACKING WASTE

Filed May 3, 1933 4 Sheets-Sheet 1

Fig. 1

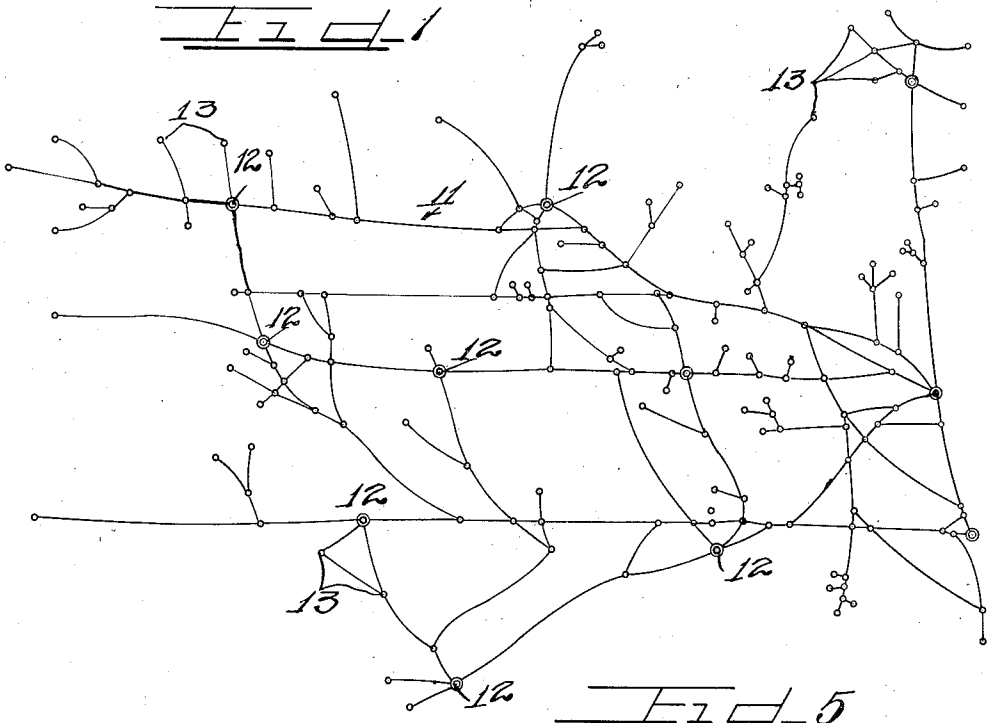
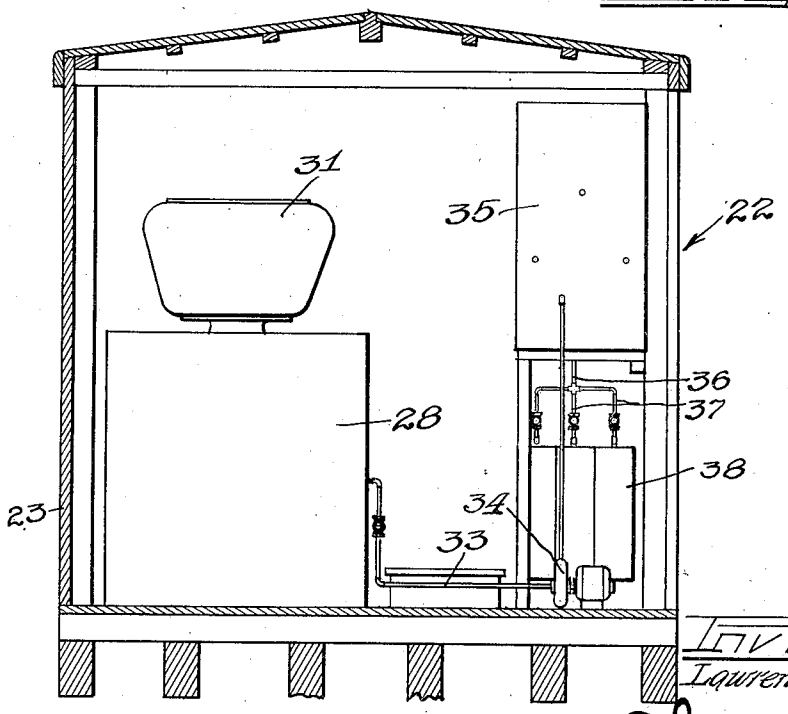


Fig. 5



Inventor
Lawrence S. Wilbur.

By

Atty.

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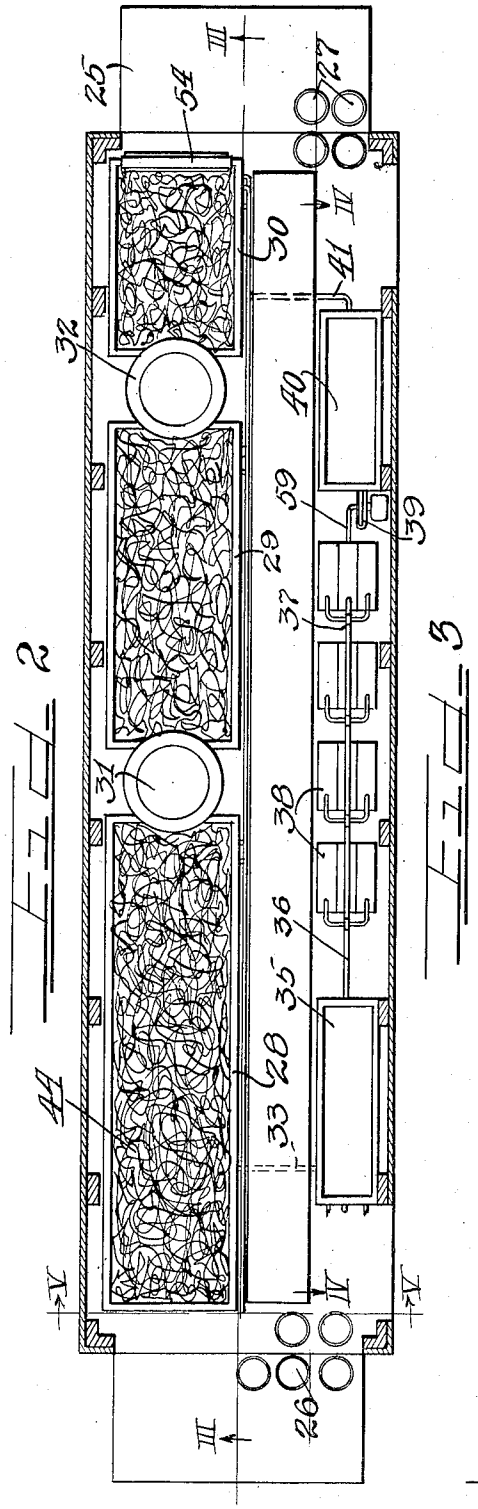


FIG. 2

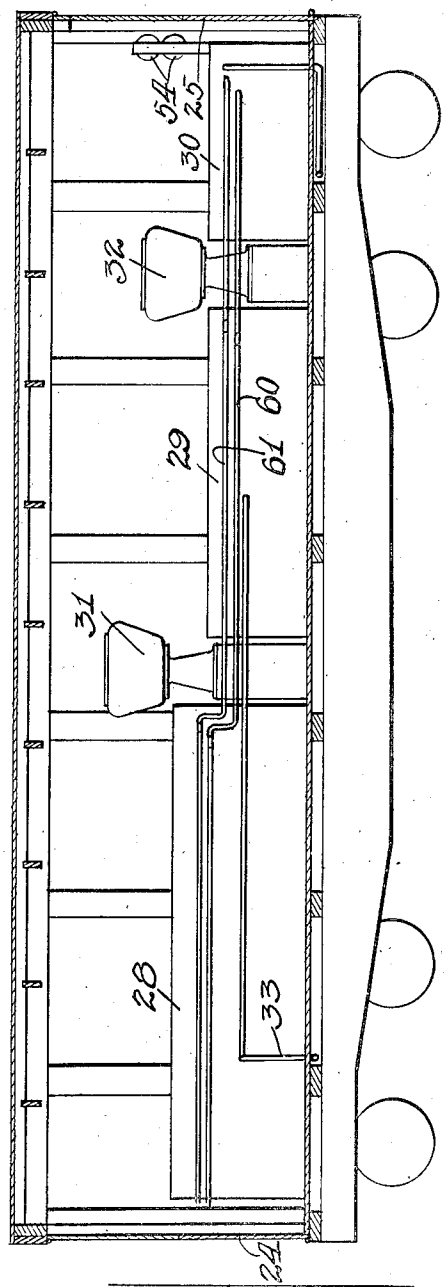


FIG. 3

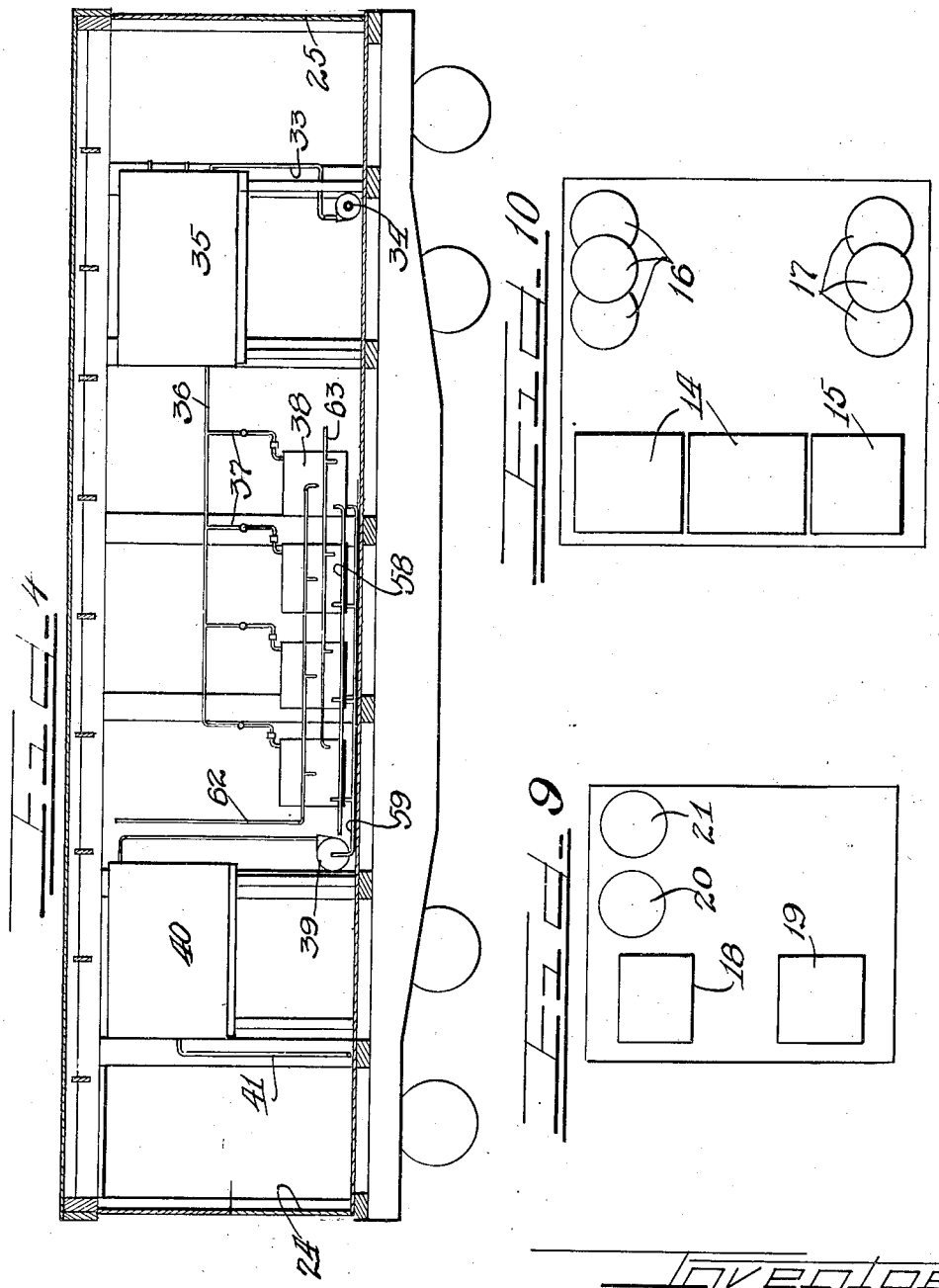
Inventor
Lawrence S. Wilbur.

By Attys

July 14, 1936. L. S. WILBUR 2,047,449

APPARATUS FOR HANDLING AND RECLAIMING WASTE AND OIL FROM USED PACKING WASTE

Filed May 3, 1933 4 Sheets-Sheet 3



Inventor
Lawrence S. Wilbur
Charles Gill
By
Atty.

July 14, 1936. L. S. WILBUR 2,047,449

APPARATUS FOR HANDLING AND RECLAIMING WASTE AND OIL FROM USED PACKING WASTE

Filed May 3, 1933 4 Sheets-Sheet 4

Fig. 6

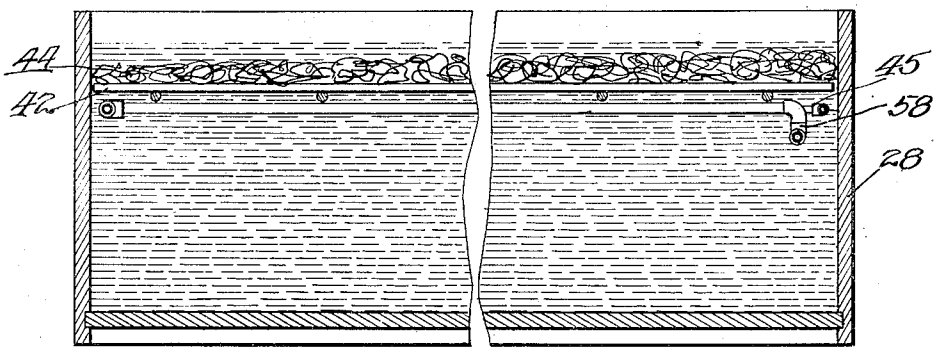


Fig. 7

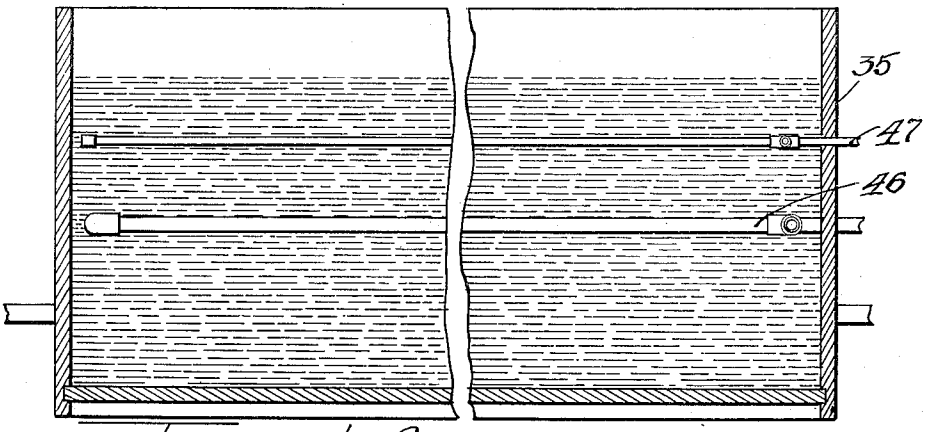
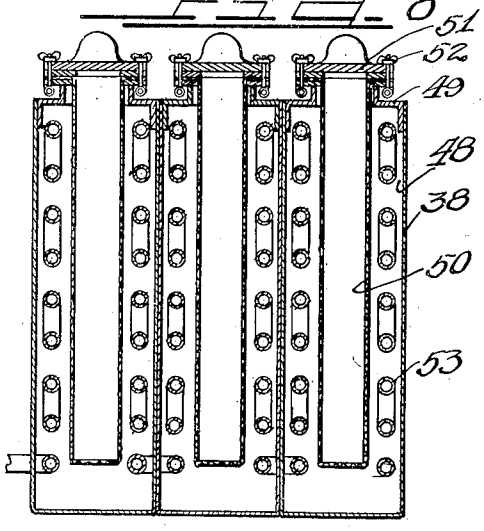


Fig. 8



Inventor

Lawrence S. Wilbur.

By Charles Orell

Atty.

Patented July 14, 1936

2,047,449

UNITED STATES PATENT OFFICE

2,047,449

APPARATUS FOR HANDLING AND RECLAIMING WASTE AND OIL FROM USED PACKING WASTE

Lawrence S. Wilbur, Evanston, Ill.

Application May 3, 1933, Serial No. 669,109

4 Claims. (Cl. 104—2)

This invention relates to an apparatus for handling and reclaiming waste and oil from used packing waste, such as is accumulated from the journal boxes of railroad rolling stock and the like.

As is well known, the cleaning or reclaiming of the waste and oil from dirty or used journal box packing from rolling stock represents a large and difficult task. The annual consumption of waste for the journal boxes of railway rolling stock in this country runs into many millions of pounds, of which total as much as twenty-five million pounds may be represented by a single large railroad system. Inasmuch as the business of reclaiming the waste and oil from the dirty or used packing waste is quite generally contracted for with private companies instead of being taken care of by the railroads themselves, this frequently means that the journal box packing waste must be trucked or shipped by freight to private companies located, in some cases, on competitive railroads, to be renovated and returned at considerable cost for shipping and often with damage to the equipment because of leakage of dirty oil from the containers onto the car floor. The cost and delay in handling dirty or used waste materially lessen the savings that can be effected by renovation of the waste and reuse of the reclaimed waste and oil. It is evident that the cost of shipping millions of pounds of packing waste, both to and from the renovating plant, is not only costly because of freight charges and delays, but results in other indirect losses through damage to the rolling stock of the railways because of leaky containers, careless shipments and the like.

According to my present invention, a great deal of the cost of shipping the packing waste to and from stationary renovating plants is eliminated. My invention provides a mobile equipment that is capable of renovating dirty or used waste and reclaiming both the waste and oil therefrom. This mobile renovating equipment lends itself to use with my system of handling and renovating used packing waste wherein stations for the collection and accumulation of dirty packing waste are established at strategic points of a railway system and the mobile renovating equipment is moved between such points. These main collecting points are so selected that large quantities of used packing waste will naturally accumulate at them, because of the existence of what are termed "rip" tracks at such points, at which various types of freight equipment is repaired. A comparatively large quantity of the used packing is accumulated at these points, but there are also other points on a railroad, such as the location of large roundhouses and car shops, where additional quantities of used packing material are accumulated. At still other points, smaller collections of used packing waste will gradually be accumulated from time to time.

According to my system, relatively large storage facilities for the handling of the accumulated used packing are established at the main points and smaller storage facilities are provided at points where smaller accumulations of the used packing will occur. The used packing from the secondary points will be shipped from time to time, as convenient, to the main points of storage and the mobile renovating equipment will simply move from one large concentration point to another, at each of which the accumulated used or dirty waste will be cleaned and renovated for reuse at such large storage points or for reshipment back to the smaller stations.

It is therefore an important object of this invention to provide a system for handling and renovating used or dirty waste packing from railroad rolling stock, whereby a considerable saving in the cost of renovation and reclaiming of materials may be effected.

It is another important object of this invention to provide a mobile equipment capable of handling and renovating dirty or used packing waste to reclaim efficiently the waste and oil therefrom.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

This invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 represents a railroad system with points thereon to indicate main and secondary stations for the accumulation of larger or smaller amounts of dirty or used packing waste, in accordance with my invention.

Figure 2 is a sectional view of a car equipped with my apparatus for renovating dirty or used packing waste and reclaiming the waste and oil.

Figure 3 is a sectional view taken substantially on the line III—III of Fig. 2.

Figure 4 is a sectional view taken substantially on the line IV—IV of Fig. 2.

Figure 5 is a sectional view taken substantially on the line V—V of Fig. 2.

Figure 6 is a broken, vertical sectional view of a washing tank.

Figure 7 is another broken vertical sectional view of an oil drying tank.

Figure 8 is a fragmentary sectional view of an arrangement of bag filters for filtering the dried oil.

Figure 9 is a diagrammatic view of a secondary point of storage or accumulation of dirty or used packing waste.

Figure 10 is a diagrammatic view of a main point of concentration of used packing waste.

As shown on the drawings:

The reference numeral 11 (Fig. 1) represents generally a system of railroad tracks which may be complete in itself or which may be a unit or part of a larger system. Main points 12 are strategically located on the system 11 to coincide with already existing rip tracks or other locations at which a major part of the repairs on the rolling stock is performed. At such points 12, large quantities of dirty or used packing waste will naturally accumulate and at these points, in accordance with my invention, correspondingly large storage and handling facilities are provided. At other points, 13, are provided smaller handling and storage facilities, at which the dirty or used packing waste is allowed to accumulate until a sufficient quantity has been collected to make it worthwhile to transport the material to a main center 12. The points 13 thus serve merely to feed the used packing waste to the nearest storage center.

At the main storage center 12, facilities are provided, as indicated in Fig. 10, for storing the dirty or used packing waste in bins, represented by the reference numeral 14, and fresh or renovated packing waste in bins 15. A plurality of barrels 16 are provided for dirty or contaminated oil and another set of barrels 17 are provided for the reclaimed, or clean oil.

At the points 13, storage facilities, illustrated in Fig. 9, may be set up, including a bin 18 for dirty packing waste and a bin 19 for fresh or renovated packing waste, a barrel, or barrels 20, for dirty or contaminated oil, and a barrel or barrels 21 for fresh or reclaimed oil. Obviously, Figs. 9 and 10 are merely diagrammatic and not intended to limit the number or size of the receptacles for the various materials.

My invention includes a mobile renovating and reclaiming plant or equipment, indicated generally by the reference numeral 22 (Figs. 2 to 5 inclusive) and comprising a box car or the like in which is mounted apparatus similar to that described and claimed in my copending application, Serial No. 655,451, filed February 6, 1933, and also in my copending application entitled Filter apparatus and process of filtering oils, Serial No. 668,393, filed April 28, 1933.

For purposes of illustration, the renovating plant 22 is shown as comprising a box car 23, which may be of standard construction, but which is preferably provided with end wall sections 24 and 25 (Figs. 2 and 3) which are adapted to be swung from vertical into horizontal position to afford additional floor or platform space for receiving barrels or other receptacles indicated at 26 and at 27, respectively.

The equipment within the car 23 comprises a tank 28 in which the dirty packing waste is washed with oil, a second wash tank 29 for carrying out a further washing step, a third tank 30 in which the renovated packing waste is mixed with fresh or reclaimed oil, and centrifuges 31 and 32 for wringing the oil impregnated waste between the first and second tank, and between the second and third tank, respectively. Dirty oil is drawn off from tanks 28 and 29, either periodically or continuously during the washing operation, through a pipe 33 by means of a pump 34, which discharges the dirty oil into an elevated tank 35 (Fig. 5). From the tank 35, the oil is drawn off through a pipe 36 and branch pipe 37 into a plurality of bag filter units 38, arranged in parallel. From the bag filters 38, the oil is drawn off through a main pipe line 59 and pumped by means of a pump 39 into a clean oil storage tank 40. From the storage tank 40, the oil is drawn off by gravity through a pipe 41 and run into the finishing tank 30.

The details of the construction of the various pieces of equipment are more fully described in my copending application above referred to. It is therefore deemed unnecessary to describe them other than very briefly here. The wash tank 28 comprises a comparatively deep receptacle having a horizontally extending rack or foraminous partition 42 near the top thereof, dividing the tank into a lower portion adapted to be filled with oil, and an upper washing compartment containing waste 44 partly or wholly submerged beneath the oil level. The contents of the tank 28 are adapted to be heated by means of one or more steam coils 58 from a main steam line 60 to keep the temperature of the oil preferably above the boiling point of water so as to drive off the water contained in the dirty oil derived from the used packing waste. One or more perforated air pipes 45 extend from a main air pipe 61 directly below the supporting grating 42 for the introduction of air into the tank. The air, in bubbling up through the oil and waste, serves both to keep the waste agitated and also aids in the carrying off of water and moisture from both the oil and waste.

The oil drying tank 35 (Fig. 7) is provided also with one or more steam coils 46 and perforated air pipes 47. The oil is kept at such a temperature as will permit the driving off of any contained water by the combined action of heat supplied through the steam coils 46 and air through the pipe 47.

The dried oil from the tank 35 then passes through a plurality of bag filters, the details of which are more clearly shown in Fig. 8. Each of said filters 38 comprises an outer receptacle 48 having a flanged top 49 from which is supported a bag 50 of suitable porous or foraminous structure. A removable cover 51 together with swinging bolts 52 serve to clamp the upper end of the bag 50 in place. A plurality of steam or other type of heating coils 53, connected between main steam inlet pipes 62 and outlet pipes 63, are positioned around the bag 50 and within the receptacle 48 to maintain the contents of the receptacle at a suitably high temperature to reduce the viscosity of the oil and facilitate more rapid filtration. The receptacles 38 may conveniently be arranged in sets of three or more, as shown. If desired, a vacuum can be drawn on the bag filters 38 by means of a suction line 58, so as to increase the pressure differential between the inside and outside of the bags and thus aid the filtration operation.

In practice, a mobile unit of the type described is assigned a certain territory to serve in the handling, renovating and reclaiming of materials

used in packing journal boxes of rolling stock. The mobile unit 22 is transported from one point 12 to another on the railroad lines within the assigned territory. At each point 12, a certain amount of dirty or used waste will have been accumulated, both from the operations local to that point and also by transportation from surrounding points 13. The mobile unit remains at each point or center 12 until the accumulation of dirty waste at that center has been renovated and the waste and oil reclaimed. The unit then moves on to the next center 12 and repeats the operation there.

At each center 12, the barrels 26 of used or dirty waste are loaded onto the platform 24 and the contents of these barrels are dumped into the tank 28 up to its capacity. The dirty waste 44 is supported on the racks or gratings 42 within the tank 28 and the tank filled to the desired level with fresh washing oil or with reclaimed oil. Steam is turned on the coils 58 and air on the pipes 45 to heat the oil to the desired temperature, usually above the boiling point of water and preferably considerably higher, and the water and moisture thereby driven off from the oil and packing waste by the combined action of the heat and the air passing through the mass. Dirt and other foreign material is liberated from the waste as a result of the washing action of the oil and the agitation caused by the bubbling of the air through the mass of waste.

The washed and dehydrated waste from tank 28 is passed into the centrifuge 31, where the major part of the oil is removed from the waste. The oil is allowed to flow back from the centrifuge 31 into tank 28 and the waste is removed from the centrifuge 31 and carried into the tank 29. In the tank 29, the waste is further washed with fresh or reclaimed oil, using both steam and air for heating and agitating the mass in the tank. The now thoroughly washed and dehydrated waste is passed into the centrifuge 32, where it is wrung comparatively free of oil. The oil from the centrifuge 32 passes into the tank 29 and the waste is carried on into the tank 30. As it leaves the centrifuge 32, the waste contains about equal parts of fibrous material and oil. Fresh or reclaimed oil is added to the waste in the tank 30 and the waste allowed to soak up as much oil as it will take.

From the tank 30, the renovated waste is passed between squeeze rolls 54 (Figs. 2 and 3) to remove the excess of oil. Ordinarily, about 2 to 4 parts of oil to 1 part of fibrous material are left in the waste that is ready for reuse.

The dirty wash oil from the tank 28 is drawn off through the pipe 33 and pump 34 into the oil drying tank 35. The oil in the tank 35 is heated by means of the heating coil 46 and air is bubbled through it from the perforated pipe 47 to carry off any moisture or free water that may be present in the oil. Sufficiently high temperatures, preferably above the boiling point of water, are used so that the dehydrating action is comparatively rapid. After the oil has been thoroughly dried, it is run into the bag filters 38, where all of the dirt and foreign matter is removed from the oil. A suitable pressure differential is maintained on the oil being filtered by means of the pump 39 and the oil is kept heated during the filtering operation to reduce its viscosity and allow it to filter more rapidly. Various filtering aids and various types of filtering devices, such as disclosed in my copending applications above referred to, may be employed. The filtered and dried oil is pumped into the reclaimed oil storage tank 40, from whence it is drawn into the tank 30 as required. Any surplus of reclaimed oil from the tank 40 is drawn off into barrels 27.

Other important advantages of my method of handling and renovating used packing waste to reclaim the waste and the oil for reuse are apparent. There is, first, a very considerable saving in the cost of transportation over the previous system of shipping the used waste from a great number of distant points to a central stationary renovating plant. Secondly, much of the damage or injury to rolling stock occasioned by the transport of dirty waste over long distances and much of the handling and rehandling of the dirty waste and renovated and reclaimed materials are eliminated.

My method of handling packing waste from rolling stock is applicable not only to steam railways but also to electric railways and the like. On these smaller railway systems, where the quantity of waste to be renovated would not justify the erection of a stationary plant, the use of my mobile unit makes possible the economical handling of the used waste from such system.

I am aware that many changes may be made and numerous details may be varied through a wide range without departing from the principles of this invention and I, therefore, do not purpose limiting the patent granted hereon otherwise than necessitated by the prior art.

I claim as my invention:

1. In a mobile unit for renovating packing waste and reclaiming waste and oil, a car having extensible end wall sections providing additional floor space in extended position for receiving waste and oil containers, a washing tank near one end of said car and a finishing tank for renovated and reclaimed waste and oil at the other end of said car and means intermediate said tanks for removing contaminated oil from packing waste coming from said first washing tank and supplying clean oil to the washed packing waste.

2. In a mobile unit for renovating packing waste and reclaiming waste and oil, the combination with a railroad car of a plurality of tanks positioned along one side thereof for receiving and washing dirty packing waste, centrifuges intermediate said tanks for removing oil from said waste, and a plurality of oil dehydrating and oil filtering means along the other side of said car and in oil flow communication with said tanks.

3. In a mobile unit for renovating packing waste and reclaiming waste and oil, the combination with a railroad car of a plurality of tanks positioned along one side thereof for receiving and washing dirty packing waste including a primary washing tank, a secondary washing tank and tank in which the renovated waste is impregnated with reclaimed oil, centrifuges intermediate said tanks for removing oil from said waste, and a plurality of oil dehydrating and oil filtering means along the other side of said car and in oil flow communication with said tanks for receiving dirty oil from said primary and secondary tanks and delivering reclaimed oil to said impregnating plant.

4. A mobile reclaiming plant for used oily waste from the journal boxes of rolling stock comprising, in combination, a railway car, a tank near one end of said car for receiving hot oil

therein to wash the waste, means for removing the oil from said waste after the waste is removed from said washing tank, a second washing tank adjacent said oil removing means for further washing the waste, a second oil removing means at the other end of said tank, a finishing tank adjacent said second oil removing means for impregnating the washed waste with clean oil, a filter apparatus for removing foreign materials from the oil in said washing tanks in piped communication with said tanks, and means for supplying said tank with cleaned oil.

LAWRENCE S. WILBUR.