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MEANS FOR RECLAIMING USED JOURNAL BOX WASTE

Filed May 4, 1929

3 Sheets-Sheet 1

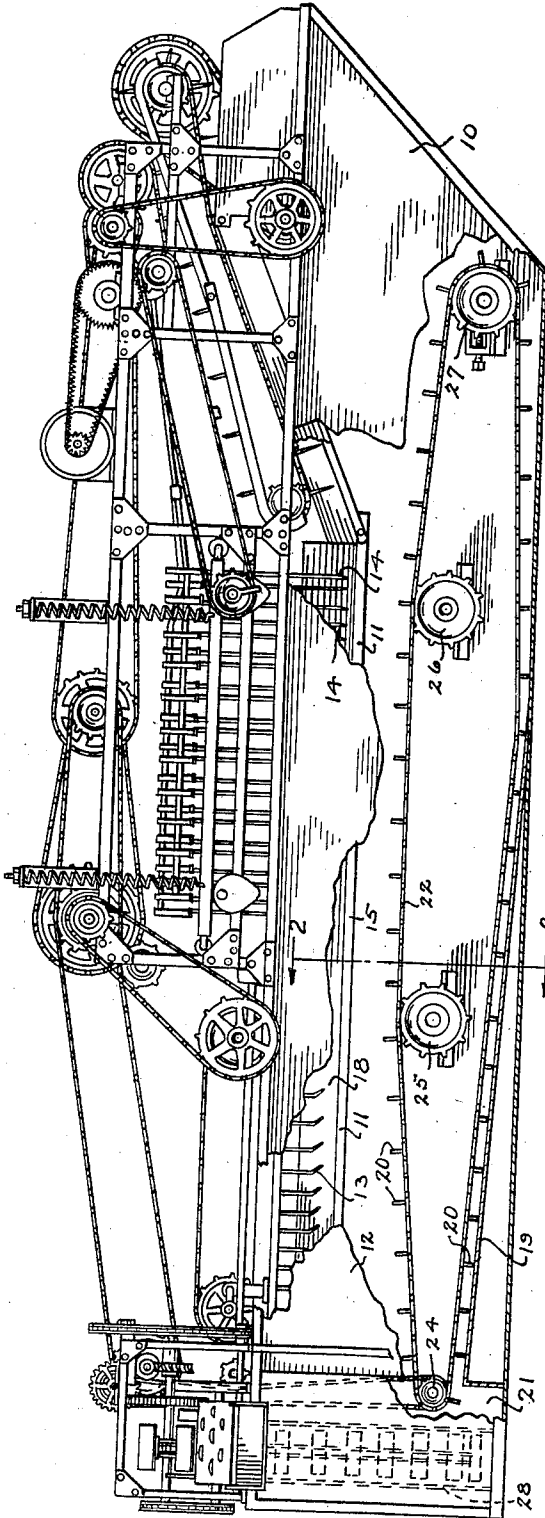


Fig. 1.

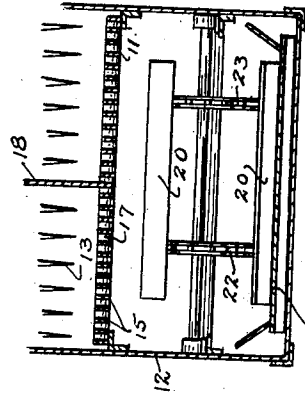


Fig. 2.

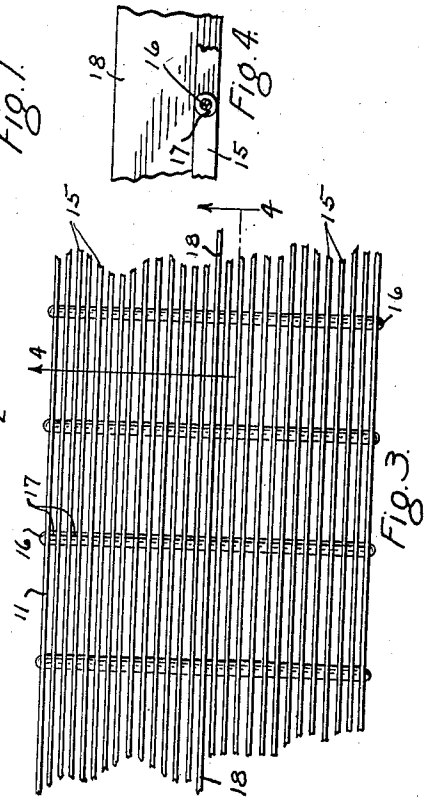


Fig. 3.

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3 Sheets-Sheet 2

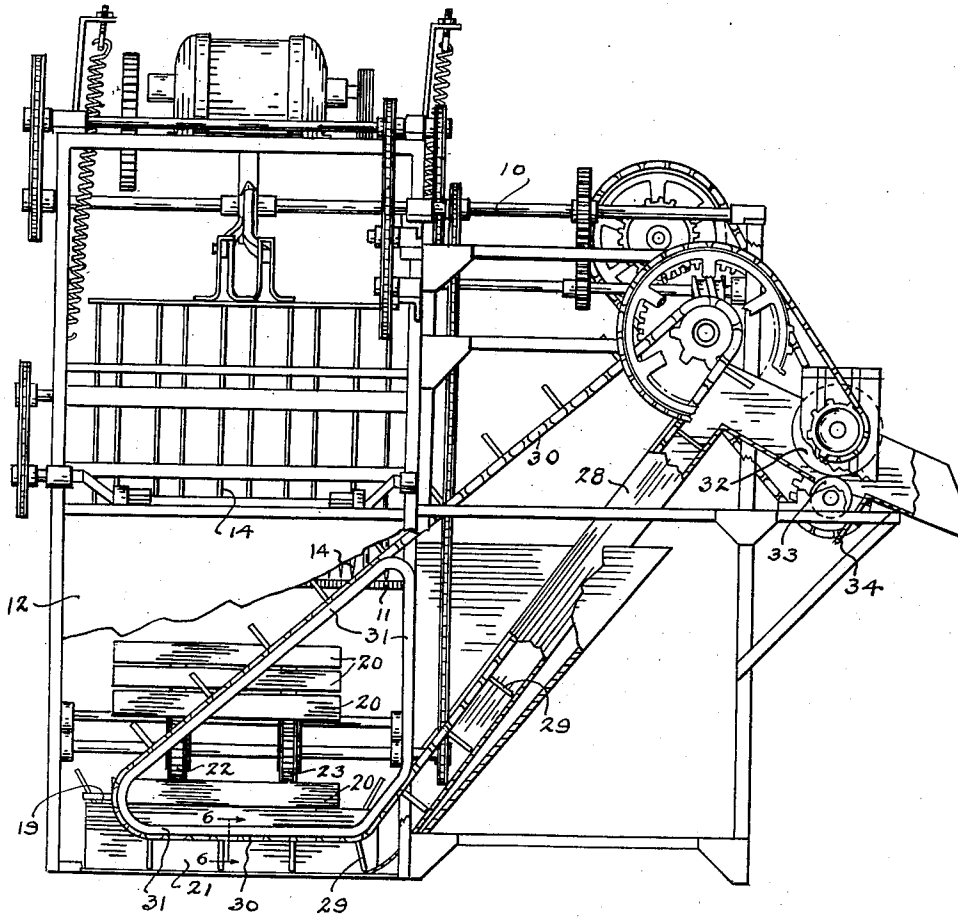


Fig. 5.

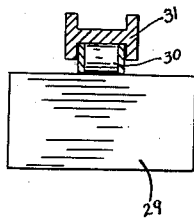


Fig. 6.

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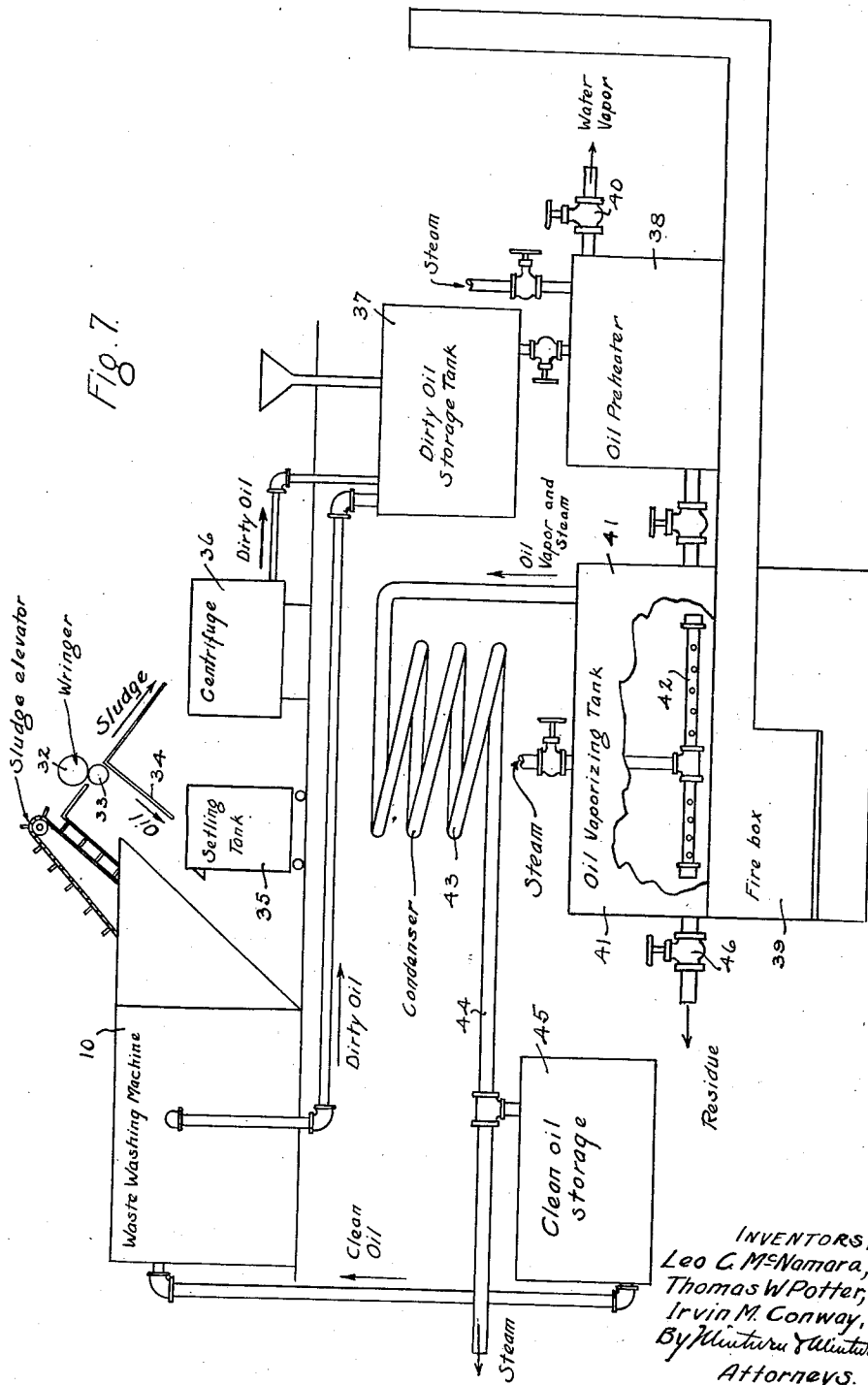
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MEANS FOR RECLAIMING USED JOURNAL BOX WASTE

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# UNITED STATES PATENT OFFICE

2,000,291

## MEANS FOR RECLAIMING USED JOURNAL-BOX WASTE

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Application May 4, 1929, Serial No. 360,544

9 Claims. (Cl. 141—2)

This invention relates generally to the art of renovating used journal-box waste and in particular to the method and means for reclaiming used oil from the waste, removing sludge from the wash oil, and in cleaning the wash oil.

The principal objects of the invention reside in employing a method and a structure that will provide substantially a continuous operation of the waste renovating process, in removing sludge from the wash oil in the wash tank as it is formed, and in restoring a mixture of the wash oil and reclaimed oil to a completely desirable lubricating oil suitable for re-impregnating the renovated waste for employment in journal-boxes.

Other minor objects will become readily apparent in the following description of one form of the invention as illustrated by the accompanying drawings, in which—

Fig. 1 is a fragmentary side elevation of a waste washing machine;

Fig. 2, a transverse vertical section on the line 2—2 in Fig. 1;

Fig. 3, a fragmentary top plan view of the screen in the waste washing machine;

Fig. 4, a longitudinal vertical section on the line 4—4 in Fig. 3;

Fig. 5, a fragmentary end elevation of the waste washing machine;

Fig. 6, a section on the line 6—6 in Fig. 5; and

Fig. 7, a diagram of the complete method of handling the oil.

Like characters of reference indicate like parts throughout the several views.

Referring first to the waste washing machine generally designated by the numeral 10, in Figs. 1-5, we mount a screen or grid 11 horizontally within a tank 12 to extend over a considerable length of the tank. By suitable means, such as by a plurality of picker teeth 13 and rods 14 raising, lowering, and moving ahead, the used journal-box waste (not shown) fed onto the screen 11 from the left hand end of the machine, Fig. 1, is pulled apart and carried along over the screens in the presence of heated wash oil with which the tank 12 is filled to above the screen 11. The oil is preferably at a temperature of 175 degrees Fahrenheit or slightly above. The exact construction and method of actuating the picker teeth 13 and rods 14 are not here shown, being the subject matter of an independent invention as shown in the U. S. Patent to Conway, et al., No. 1,783,407, issued December 2, 1930, and the details of which do not enter into the present invention.

Waste to be usable must exert a wick-like action to convey oil to the journal, and the entire pur-

pose of reclaiming the used waste is to restore it to a wick-like condition. By reason of the peculiar action of the picker teeth and rods in conjunction with the grid-like screen below described, the waste is gently combed fore and aft in a direction parallel with the grid bars. The picker rods 14 in conjunction with the grid bars particularly exert this combing action since they rock in pairs one faster than the other to gently stir the waste fore and aft and at the same time exert a slight pulling action also fore and aft, with the screen or grid bars tending further to align and maintain the fibers in fore and aft parallel arrangement. By bringing the fibers closer together in parallel alignment rather than causing the waste to mat and droll up in balls, the waste is better arranged to serve its wick purpose since fibers in somewhat parallel arrangement form more, continuous capillary tubes than do fibers entirely in a criss-cross arrangement. Further, by combing the waste to cause it to approach the parallel arrangement, the short ends and foreign matter are more readily passed from between the fibers through the screen. Also, observation of the waste as it passes through the machine over the screen shows that after the waste has been opened up and the fibers arranged in parallel alignment, when the picker rods are lifted at the front end of the waste and the waste picked up by the teeth on the outgoing conveyor, the waste is looped in "hanks" about the teeth to cause the fibers to be drawn more closely together into a wick-like condition.

In moving the waste along over the screen 11, it has been found that with a common type of reticulated screen, the waste would ball or roll up rather than be pulled apart and the fibers be separated one from the other, which action is necessary in order to secure a thorough washing out from the waste of Babbitt metal, cinders, coal dust, and the like, as well as the complete washing out of the old and congealed oil in the waste, and particular attention is directed to the screen 11 here shown, which has solved the problem or maintaining the waste in an opened-up, freely moving mass under the action of the picker teeth and rods thereabove.

The screen 11 is formed by assembling a plurality of bars 15 turned on edge, longitudinally positioned of the tank 12, and threaded on transverse rods 16, the bars 15 being separated one from the other by spacing washers 17 therebetween slidingly carried on the rods 16.

These washers 17 are round, and their outer surfaces are just tangent or a trifle below the

top edges of the bars 15 so that they do not impede the sliding of the waste along over the bars 15. The space between the bars 15 largely determines the amount of short fibers passing between the bars down into the oil and becoming lost from the main body of the waste. The elimination of short fibers may thus be controlled by the spacing apart of the bars. In place of a central bar, is placed a partition 18 extending longitudinally of the screen 11 as a further aid in preventing the rolling up of the waste, the partition 18, in effect, producing two narrow lanes over the screen bars 15 along and over which the waste is moved and pulled apart.

Since the waste is generally loaded with foreign matter as well as heavy congealed used oil, a large body of wash oil is kept within the tank 12, so that an appreciable length of time may elapse before the wash oil becomes too dirty for effective work. The main body of this wash oil is below the screen 11 and hence is not continually being agitated by the moving waste thereabove. The dirt and foreign matter washed out of the waste drops between the bars 15 and tends in part to settle at the bottom of the tank. Some of the very fine lint separated from the waste does not precipitate but remains in suspension within the oil and defies complete separation therefrom by any of the heretofore well known filtering or centrifugal means.

To prevent accumulation of this matter which will hereinafter be termed sludge, at the bottom of the tank 12, which accumulation would soon reduce the volume of oil capable of being carried by the tank and which would become mixed with fresh clean wash oil introduced into the tank, a false, inclined floor 19 is placed on the bottom of the tank, and a plurality of transverse blades 20 are slowly pulled along up over the floor 19 to drag the sludge to the waste receiving end of the tank, where the sludge is dropped into a sump 21 at the end of the floor 19. These blades 20 are secured on the two chains 22 and 23 (Fig. 5), the chains being endless and carried around over the driving sprocket 24 (Fig. 1) and idler sprockets 25, 26, and 27. The sprocket 24 comparatively small in diameter is revolved in the neighborhood of two revolutions per minute so that the blades 20, while always moving, travel very slowly and do not agitate the oil sufficiently to cause the precipitated sludge to be stirred up and carried in suspension in the oil.

From the sump 21, the sludge is dragged up the chute 28 (Fig. 5) by means of the vanes 29 carried on the single endless chain 30. In order to prevent interference due to strings and fibers present in the oil, shafts and sprockets are eliminated at the lower end of the chain 30, and the chain is slidably guided over, down and around, under a track 31 to direct the vanes 29 across the bottom of the sump 21. As the sludge is being pulled up the chute 28, much of the oil drains from the sludge and flows back down into the tank 12. However, the sludge remains saturated with oil and to save such oil, the sludge is discharged from the upper end of the chute 28 down and through between the wringer rolls 32 and 33.

In passing through between these wringer rolls much of this remaining oil is pressed from the sludge and drains downwardly from the rolls onto the apron 34 from which it may be conveyed to any suitable tank, such as the settling tank 35 diagrammatically indicated in Fig. 7, where the oil may accumulate to permit what foreign

matter will precipitate to settle therein. The sludge coming from the wringer rolls still contains some oil and is deposited within a centrifuge of any of the suitable types well known to those versed in the art, designated in Fig. 7 by the numeral 36. The sludge by this time has become a more or less fluffy mass with only a trace of oil remaining therein and may be used as kindling in starting fires under boilers, or the like.

Referring now principally to the diagram comprising Fig. 7, the wash oil in the machine 10 is changed by withdrawing the dirty oil and discharging it preferably to a storage tank 37. The oil accumulating in the settling tank 35 is taken to the storage tank 37, as is also the oil extracted by the centrifuge 36. From the storage tank 37, the dirty oil is conducted to some preheating means here shown as a tank 38 mounted over the stack leading from a fire-box 39. The temperature of the oil within the preheater tank 38 is brought up to approximately 300 degrees Fahrenheit or in any event to above the boiling point of water for the purpose of vaporizing all of the water that may be carried by the dirty oil. In the form here shown, the water vapor may escape into the atmosphere through the valve 40, after which said valve is closed and steam under pressure is admitted to the tank 38 to force the oil into the vaporizing tank 41.

It is immaterial as to how the dirty oil is preheated and a coil of pipes (not shown) may be carried directly in the fire-box 39 in place of the tank 38 so that oil may flow continuously from the storage tank 37 through such a preheating system directly into the vaporizing tank, the principal purpose of the preheating being to transform the water into vapor or steam so that no water will be present as such upon entering the vaporizing tank 41, and to conserve heat.

The dirty oil in the vaporizing tank 41 is heated to approximately 650 degrees Fahrenheit, and the pressure in the tank is at no time permitted to rise above five pounds, so that there is no cracking of the oil. In order to prevent coking on that part of the tank 41 over the fire-box 39, the oil within the tank 41 is stirred or agitated by discharging steam from a manifold 42 near the bottom of the tank. The steam so discharged is for no other purpose than to agitate the oil, unless it be to create a draft through an outlet from the tank 41 to aid in withdrawing vaporized oil therefrom. Any other inert gas or mechanical means would serve equally as well in agitating the oil. Atmospheric air may not be employed since the oil would tend to be oxidized.

The vaporized oil in the tank 41 discharges therefrom and passes through a condenser 43, the temperature of which is maintained such that the vaporized oil may condense but that the steam coming therethrough may not condense. From the condenser, the condensed oil flows through the pipe 44 to drop into a storage tank 45, and the steam may pass on out into the atmosphere. The lint and foreign matter is left within the vaporizing tank 41 and may be withdrawn from time to time in the form of a viscous mass through the valve 46. Regarding the foregoing described method of separating the lint from the oil, reference is made to the U. S. Patent No. 1,709,230, issued April 16, 1929.

This mass serves admirably as a road oil, a gear compound, or as a waterproofing paint on steel or iron work. Clean oil from the storage tank 45 is transferred as required to the machine 12 to replace the dirty oil removed.

Enough dirty oil is preferably allowed to accumulate within the dirty oil storage tank 37 to require at least a day's run through the vaporizing tank 41 as a matter of economy of labor and plant operation, and by suitably regulating the flow of dirty oil from the tank 37 through the preheating means, dirty oil may be continuously admitted to the tank 41 as rapidly as the oil may be vaporized therefrom.

By the foregoing described method, the heavy dirty oil in the used waste is removed from the waste, mixed with the lighter wash oil, the vexatious problem of removing the unprecipitable and filter-clogging fine lint from the oil mixture is accomplished, and the used oil is reclaimed by distillation to form again a highly desirable lubricating oil, the wash oil serving only as a conveying medium and being used over and over again in the tank 12.

By constantly removing the sludge from the wash tank 12 as it appears on the floor 19, the oil is not only kept cleaner for washing purposes, but the lint content of the tank oil when removed for distillation or renovation is maintained at a comparatively low amount, so that the dirty oil storage tank and its inlet and discharge pipes do not become clogged with the sludge. When the dirty oil in the tank 12 is removed, as above indicated, clean oil from the clean oil storage tank 45 is returned to the wash tank 12.

We claim:

1. In a machine for reclaiming oil from used journal-box waste, a screen for waste formed of a plurality of longitudinal bars of comparatively narrow width, rods passed transversely through said bars, and spacer washers carried on said rods spacing apart said bars one from the other.

2. In a machine for reclaiming oil from used journal-box waste, a screen for waste formed of a plurality of longitudinal bars of comparatively narrow width, rods passed transversely through said bars, and spacer washers carried on said rods spacing apart said bars one from the other, and a central, longitudinal vertically extending partition plate having its lower edge supported by said rods.

3. In a machine for reclaiming used journal-box waste, a screen for the waste formed of a plurality of longitudinal bars spaced laterally one from the other, and a plurality of fingers to agitate and move the waste longitudinally of the screen, and partition means for dividing the screen into relatively narrow longitudinal lanes, the movement of the waste being in the same direction in each lane.

4. For reclaiming used journal-box waste, a tank adapted to contain wash oil, a screen horizontally disposed in the tank at a distance below the normal level of the oil in the tank, means for agitating and moving the waste along over the screen, a plurality of scraper blades carried in said tank below said screen, means for moving said blades during the operation of said waste agitating and moving means whereby said blades may be moved slowly across the bottom of the

tank to drag sludge therealong without stirring it back into the oil, a sump at one end of the tank to receive said sludge, means for elevating the sludge from said sump, said elevating means comprising an inclined trough, a chain carrying a plurality of blades along said trough, and a track around which said chain is returned to carry said blades across the sump and into said trough.

5. In a machine for reclaiming used journal box waste, a tank adapted to contain wash oil, a screen in the tank normally submerged in the oil and supporting the waste, said screen comprising a plurality of spaced apart parallel bars, and a plurality of picker members above the screen adapted to comb the waste over said screen longitudinally of the bars whereby the fibers of the waste are arranged in parallel alignment while in said oil, said members being directed toward the screen and engaging in the waste.

6. In a machine for reclaiming waste, a tank adapted to hold oil, means in the tank for combining waste in the presence of the oil to arrange the fibers of the waste in parallel alignment including shiftable members engaging in the waste, and screen means below the shiftable members, said screen means having members cooperating with the shiftable members for aiding in aligning the waste fibers parallel to the direction of movement of the shiftable members.

7. In a method for reclaiming used journal box waste, that step which consists of arranging the fibers of the waste in the presence of oil in substantial parallel alignment.

8. In a method for reclaiming used journal box waste, the combination comprising the step of arranging the fibers of the waste in the presence of oil in substantial parallel alignment, and the step of looping the aligned fibers to bring the fibers closer together as they are withdrawn from the oil.

9. Apparatus for reclaiming used journal-box waste, comprising in combination a tank adapted to contain wash oil, a screen horizontally disposed in the tank at a distance below the normal level of the oil in the tank, means for pulling apart and moving the waste along on the screen, said screen having aligning members over which the waste is moved to cause the fibers of the waste to be brought into approximate parallel alignment with the direction of movement of the waste on the screen under the action of said pulling apart means, the combined action of said pulling apart means and said screen members causing the waste to be opened up and realigned permitting foreign matter and short ends to fall through said screen into the bath oil thereunder, means for conveying said foreign matter and short ends to a sump, and elevating means lifting the matter and short ends from the sump out of the oil.

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