R. S. JOHNSON.

SYSTEM FOR CLEANING AND PURIFYING OILS AND OTHER LIQUIDS.

APPLICATION FILED JULY 23, 1913.

1,115,827.

Patented Nov. 3, 1914.

2 SHEETS—SHEET 1.

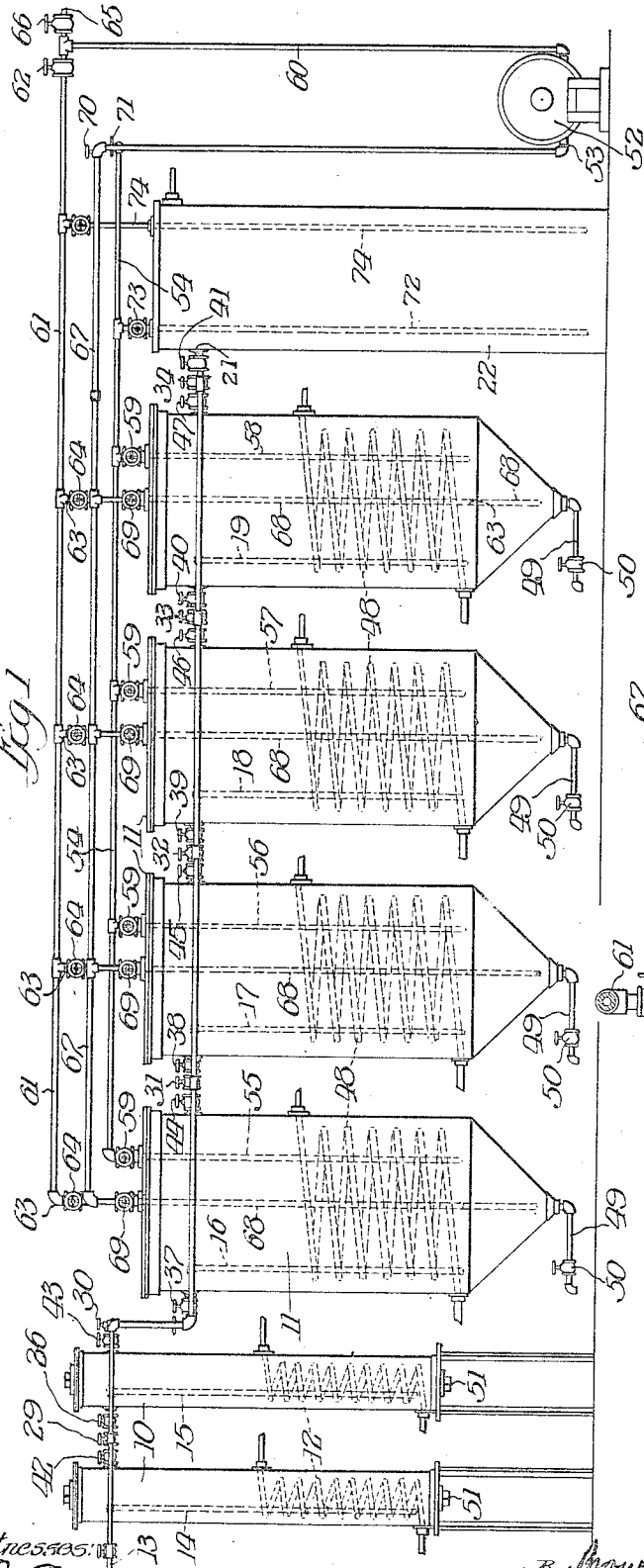


Fig 1

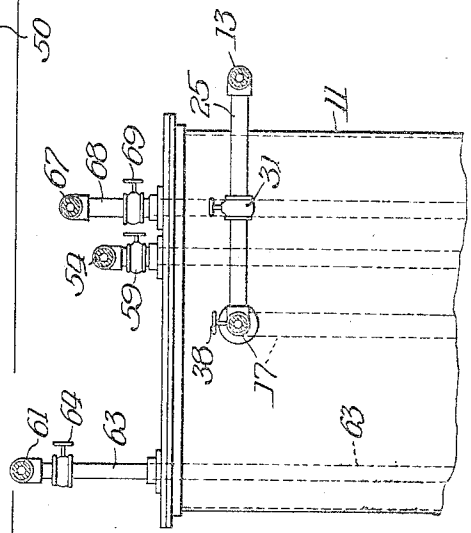


Fig 2

Witnesses:
Geo. E. Doing
R. Burkhardt.

Inventor:
Robert S. Johnson,
By Howson Hopkins Wilson & Sprackle
Attys.

R. S. JOHNSON.

SYSTEM FOR CLEANING AND PURIFYING OILS AND OTHER LIQUIDS.

APPLICATION FILED JULY 23, 1913.

1,115,827.

Patented Nov. 3, 1914.

2 SHEETS—SHEET 2.

Fig. 3.

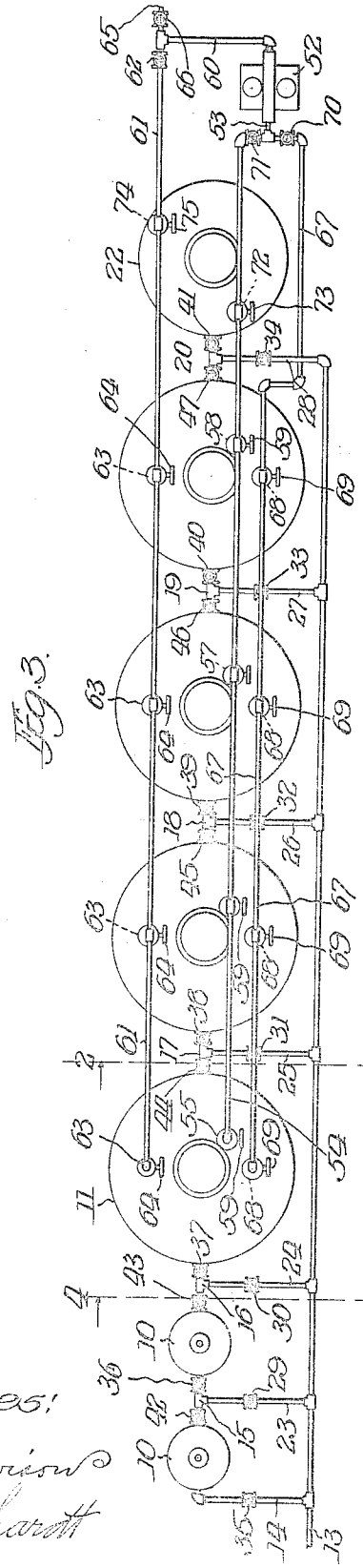


Fig. 4.

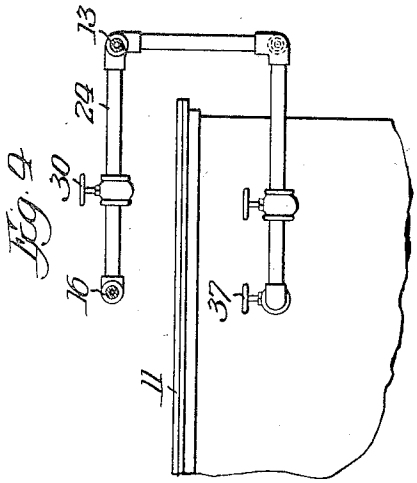
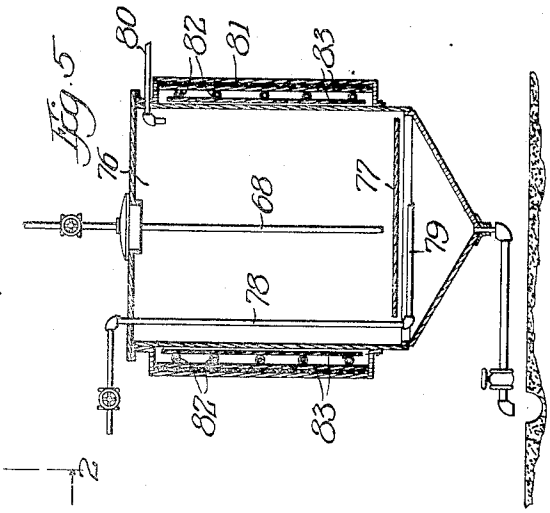


Fig. 5.



Witnesses:

Geo. C. Davison

R. Burkhardt

Inventor:

Robert S. Johnson,

By Brown Hopkins Kissel & Sprinkle

Attys.

UNITED STATES PATENT OFFICE.

ROBERT S. JOHNSON, OF CLEVELAND, OHIO, ASSIGNOR TO S. F. BOWSER & CO., INCORPORATED, OF FORT WAYNE, INDIANA, A CORPORATION OF INDIANA.

SYSTEM FOR CLEANING AND PURIFYING OILS AND OTHER LIQUIDS.

1,115,827. Specification of Letters Patent. Patented Nov. 3, 1914.

Application filed July 23, 1913. Serial No. 780,679.

To all whom it may concern:

Be it known that I, ROBERT S. JOHNSON, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Systems for Cleaning and Purifying Oils and other Liquids, of which the following is a specification.

This invention relates to improvements in systems for cleaning and purifying oils and other liquids and the primary object of the invention is to provide an improved, simple and efficient system of this character having means whereby oils collected from shops and the like may be cleansed and purified to be again used, thereby reducing to a minimum the loss of oils as well as the labor required, and with the further result that the oil after passing through this system will be in a healthy condition for the user.

To the attainment of these ends and the accomplishment of other new and useful objects, as will appear, the invention consists substantially in the features of novelty hereinafter more fully described and claimed and shown in the accompanying drawing exemplifying the invention, and in which—

Figure 1 is a side elevation of an apparatus by means of which the oil may be cleansed and purified in accordance with the principles of this invention. Fig. 2 is a sectional view on line 2—2, of Fig. 3. Fig. 3 is a top plan view, Fig. 1. Fig. 4 is a detail sectional view on line 4—4, Fig. 3. Fig. 5 is a sectional view of a modified form of tank.

Referring more particularly to the drawings, the apparatus therein illustrated consists primarily in the requisite number of what might be termed "settling" tanks 10, 11. The tanks 10, which are of some length, are preferably of a small diameter and arranged on end and these tanks are provided with any suitable means for heating the contents thereof, a simple and efficient heating means, as shown in the present exemplification of the invention, being heating coils 12 which latter may be arranged either on the inside or outside of the tanks, so that the temperature of the liquid will be raised as soon as it flows into the tanks. An inlet pipe 13 is provided which receives the oil or liquid and connects with the first one of the tanks by means of a connection 14 leading into the tank from a point adjacent the top thereof and this pipe extends in close proximity to the bottom of the tank so that the oil or liquid entering the tank will be discharged adjacent the bottom of the tank. An outlet 15 is provided for the first tank, which leads from the tank at a point adjacent the top thereof and this outlet pipe 15 extends into the second one of the tanks 10 to form an inlet for the tank, and the pipe 15 extends to a point adjacent the bottom of this tank. An outlet 16 similar to the outlet 15 leads from the second of the tanks 10 and communicates with the first of the settling tanks 11 by passing into the tank 11 at a point adjacent the bottom of the tank. Similar outlets 17, 18, 19 and 20 are provided for each of the tanks 11 and the outlet from the last of the series of tanks 11 has communication as at 21 with a storage tank 22.

The supply pipe 13 is preferably arranged to extend for the entire length of the series of tanks 10, 11 and connections 23, 24, 25, 26, 27 and 28 are provided, which lead from this pipe 13 to the respective outlets 15, 16, 17, 18, 19 and 20, whereby any one or more of the tanks may be cut out of the system for the purpose of cleaning the tanks. In order to accomplish this the connections 23 to 28 inclusive are provided respectively with valves 29 to 34 inclusive, while the connection 14 which leads from the pipe 13 to the first of the entry tanks 10 is provided with a similar valve 35. The outlet pipes 15 to 20 are provided respectively with valves 36 to 41 which are located between the points at which they enter the next adjacent tanks and the points of connection of the pipes 23 to 28 which lead from the supply pipe 13 and similar valves 42 to 47 inclusive are provided in the respective outlet pipes between the points of connections of the pipes 23 to 28 and the points at which they leave the respective tanks. Thus it will be seen that by opening or closing the proper valves in the outlet pipes as well as the valves in the pipes 14, and 23 to 28, any one or more of the tanks 10, 11 may be cut out of the system by preventing the liquid from flowing into the predetermined tanks.

Assuming that it is desired to cause the oil or liquid to flow from the first entry tank 10 and into the storage tank 22 through all

of the tanks of the entire system, the valves 29 to 34 inclusive must first be closed and both of the valves in each of the outlet pipes from the respective tanks opened. The liquid will then enter the pipe 13 and flow into the first entry tank 10 through the connection 14 to be discharged into the tank at the bottom thereof. From this tank it will flow out of the outlets 15 and into the second entry tank 10, from which it will flow through the outlet 16 into the first settling tank 11 to be discharged therein adjacent the bottom of the tank. The oil will pass successively from the settling tanks 11 in a similar manner and will be finally discharged into the storage tank 22.

The heating coils 12 are provided in the entry tanks 10 for the reason that the oil entering these tanks from the machines is very filthy and requires some distillation. A certain amount of steam or heating fluid is supplied to these coils 12 for the purpose of killing disease germs and other filthy matter which has collected through the machines in connection with which the oil has been in use. The temperature of these coils 12 should be quite high so that the oil as it enters the system through these entry tanks will pass through a more rapid system of precipitation from the high temperature of the heat than from the heat in any other tank in the series except the last tank of the series 11, in which tank a thoroughly high temperature is supplied for the purpose of assuring a sanitary condition of the oil before it flows into the storage tank 22.

The necessary heat may be supplied to each of the tanks 11 in any desired or suitable manner, a simple and efficient means, as shown in the present exemplification of the invention comprises the coils 48 and these together with the coils 12 may be supplied with the steam or heating fluid from any suitable source, preferably from a common source and it is obvious that the necessary valves may be provided for controlling the supply of heating fluid to the coils whereby the desired temperature may be obtained in the respective tanks.

The tanks 11 are preferably somewhat larger than the entry tanks 10 inasmuch as it is necessary that there should be a more rapid action of the heat on the liquid on its first entry into the system, and this rapid action of the heat causes a precipitation of the sediment so that it will drop from suspension as it is heated and the cleanest oil will always be found at the top so that this oil will be forced into the next tank to be treated in a similar manner. The tanks 11 are each preferably provided with a conical bottom leading from which is a discharge outlet 49 controlled by a valve 50 so that when desired the sediment may be drawn off from the bottom of the tank by opening the cock 50. Drain openings 51 may also be provided in the bottom of the entry tanks 10.

If the system is of considerable size a pump 52 may be provided to transfer the oil from one tank to another and this pump 52 is provided with an inlet 53 to which is connected a pipe 54. This latter pipe extends for the entire length of the series of tanks 11 and pipes 55, 56, 57, 58 lead therefrom into the respective tanks 11. A controlling valve 59 is provided in each of the pipes 55 to 58 so that they may be opened or closed to cut off or establish communication between the respective pipes and the pipe 54. An outlet 60 leads from the pumps 52 and has communication with a pipe 61 within which latter is provided a valve 62 to shut off communication between the outlet 60 and the pipe 61. Pipes 63 lead from the pipe 61 into each of the tanks 11 and a controlling valve 64 is arranged in each of the pipes 63 for establishing or cutting off communication with the pipe 61. An outlet 65 also leads from the pipe 60 and this outlet is controlled by a valve 66. Thus it will be seen that by adjusting the valves 59 to open or close the respective pipes in which they are located one or more of the tanks 11 may be cut out and when the pump 52 is operated the liquid will be drawn from the respective tanks through the pipe 54, to be discharged through the pump 52 into the pipe 60, the valve 66 being first closed and the valve 62 opened, and into the pipe 61, from which pipe the liquid may be discharged into the predetermined tanks 11, or thrown away if beyond further use. The pipes 55 to 58 terminate short of the bottoms of the respective tanks so as to remove the clean oil and the pipes 63 extend into the tanks to discharge the oil adjacent the bottom of the tanks. This pump 52 may be also employed for removing sediment from the tanks and for this purpose another pipe 67 has communication with the inlet 53 of the pump 52 and this pipe 67 extends the entire length of the series of the tanks 11 and has communication with each of the tanks by means of a pipe 68 leading therefrom and a controlling valve 69 is provided in each of the pipes 68 for opening and closing the latter. These pipes 68 extend into the tanks through the top thereof and terminate adjacent the bottom. When it is desired to remove the sediment, the valves 59, 62 and 64 are closed and the valves 69 and 65 opened as well as an additional valve 70 adjacent the pump. A valve 71 similar to the valve 70 is also provided in the pipe 54 adjacent the pump, which latter valve must be closed when it is desired to remove sediment. With the valves thus adjusted, the pump 52 will operate to draw the sediment from the

bottom of the tanks through the pipe 54 and will discharge the same through the pipe 60 and out of the pipe 65. Obviously the various valves may be adjusted in accordance with the operation or flow that it is desired to secure or impart to the liquid. The tank 22 is also provided with a pipe 72 leading from the pipe 54 for running the liquid from the tank and in which pipe 72 is a controlling valve 73. An additional pipe 74 is provided in the pipe 61 and this pipe 74 leads into the tank 22 and terminates adjacent the bottom thereof, and a controlling valve 75 is provided for controlling the passage of the liquid through the pipe 74.

In Fig. 5 there is shown a modified form of tank corresponding to the tanks 11 and is designated generally by the reference numeral 76. This tank 76 is provided with a baffle plate 77 adjacent its bottom and the inlet 78 is provided with a nozzle 79 extending under the baffle plate whereby the sediment is prevented from settling into the inlet pipe from the tank and also prevents the sediment from being drawn into the pipe 68. The outlet 80 leads from the top thereof. In this form of tank a jacket 81, constructed preferably of heat insulating material, is provided around the exterior thereof and the heating coils 82 surround the outside of the tank and are arranged within the jacket 81. Radiating plates 83 may also be provided within the jacket 81 and if desired, when the circumstances require it this form of tank 76 may be employed in place of the form shown in Fig. 1.

What is claimed as new is:

1. In a system of the class described, the combination of a series of individual settling tanks, intermediate pipes connecting said tanks in series and through which the liquid may flow from one tank to the other in series, valves in said intermediate pipes for shutting off the flow of liquid from one tank to the other, a pipe connected with the supply of liquid and common to all of said tanks, individual pipes connecting said intermediate pipes with said common pipe, and valves in said individual pipes whereby the liquid may be directed from one tank to any one or more tanks in the series.

2. In a system of the class described, the combination of a plurality of individual settling tanks arranged in a series, a source of liquid supply connected to one end of the series of tanks and an outlet at the other end of said series, intermediate pipes connecting one tank with the next tank in the series, controlling valves in said intermediate pipes and a common pipe having individual connections with each of said intermediate pipes, and valves in said individual connections for shunting the liquid from one of said tanks to any one or more tanks in the series and around any one or more tanks in the series.

3. In a system of the class described, the combination of a plurality of individual settling tanks arranged in a series, a source of liquid supply connected to one end of the series of tanks and an outlet at the other end of said series, intermediate pipes connecting one tank with the next tank in the series, controlling valves in said intermediate pipes and a common pipe having individual connections with each of said intermediate pipes, valves in said individual connections for shunting the liquid from one of said tanks to any one or more tanks in the series and around any one or more tanks in the series, a pump, and a common pipe for all of the tanks having individual connections and valves therein with each of the tanks for transferring the liquid from one tank to any other tank in the series.

4. In a system of the class described, the combination of a plurality of individual settling tanks arranged in a series, a source of liquid supply connected to one end of the series of tanks and an outlet at the other end of said series, intermediate pipes connecting one tank with the next tank in the series, controlling valves in said intermediate pipes and a common pipe having individual connections with each of said intermediate pipes, valves in said individual connections for shunting the liquid from one of said tanks to any one or more tanks in the series and around any one or more tanks in the series, a pump, a common pipe for all of the tanks having individual connections and valves therein with each of the tanks for transferring the liquid from one tank to any other tank in the series, and a third common pipe connected to said tank and having individual valve-controlled connections with said tanks for removing the sediment from said tanks.

5. In an oil cleaning and purifying system, the combination of a plurality of individual separated tanks arranged in a series, a source of dirty oil supply connected to one end of said series, a clean oil storage tank at the other end of said series, valve-controlled intermediate pipes connecting each tank in the series with the next tank in the series whereby the oil may flow through the series of tanks, a common pipe connected with said source of dirty oil supply and valve-controlled individual connecting pipes between said common pipe and said intermediate pipes whereby one or more of said tanks may be cut out of the series and the oil caused to flow through said end pipe and through one or more of the remaining tanks in the series, a pump, and a common pipe connected thereto and having valve-controlled individual connections with said tanks whereby

the oil may be transferred from one tank to any other or others in the series.

6. In an oil cleaning and purifying system, the combination of a plurality of individual separated tanks arranged in a series, a source of dirty oil supply connected to one end of said series, a clean oil storage tank at the other end of said series, valve-controlled intermediate pipes connecting each tank in the series with the next tank in the series whereby the oil may flow through the series of tanks, a common pipe connected with said source of dirty oil supply and valve-controlled individual connecting pipes between said common pipe and said intermediate pipes whereby one or more of said tanks may be cut out of the series and the oil caused to flow through said end pipe and through one or more of the remaining tanks in the series, a pump, a common pipe connected thereto and having valve-controlled individual connections with said tanks whereby the oil may be transferred from one tank to any other or others in the series, and means for heating said tank.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 12th day of July, A. D. 1913.

ROBERT S. JOHNSON.

Witnesses:
A. R. FRASER,
PAUL A. SIHLER.