

J. A. ANDERSON.
 APPARATUS FOR SEPARATING GARBAGE.
 APPLICATION FILED JAN. 29, 1916.

1,209,654.

Patented Dec. 26, 1916.
 3 SHEETS—SHEET 1.

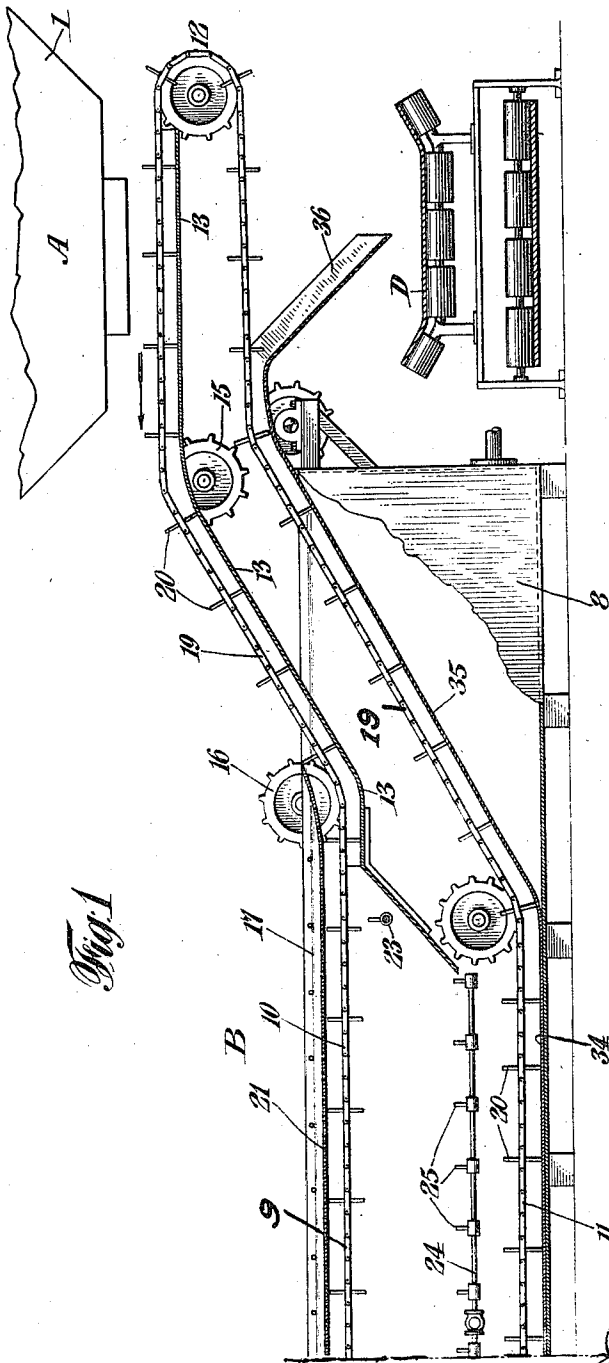


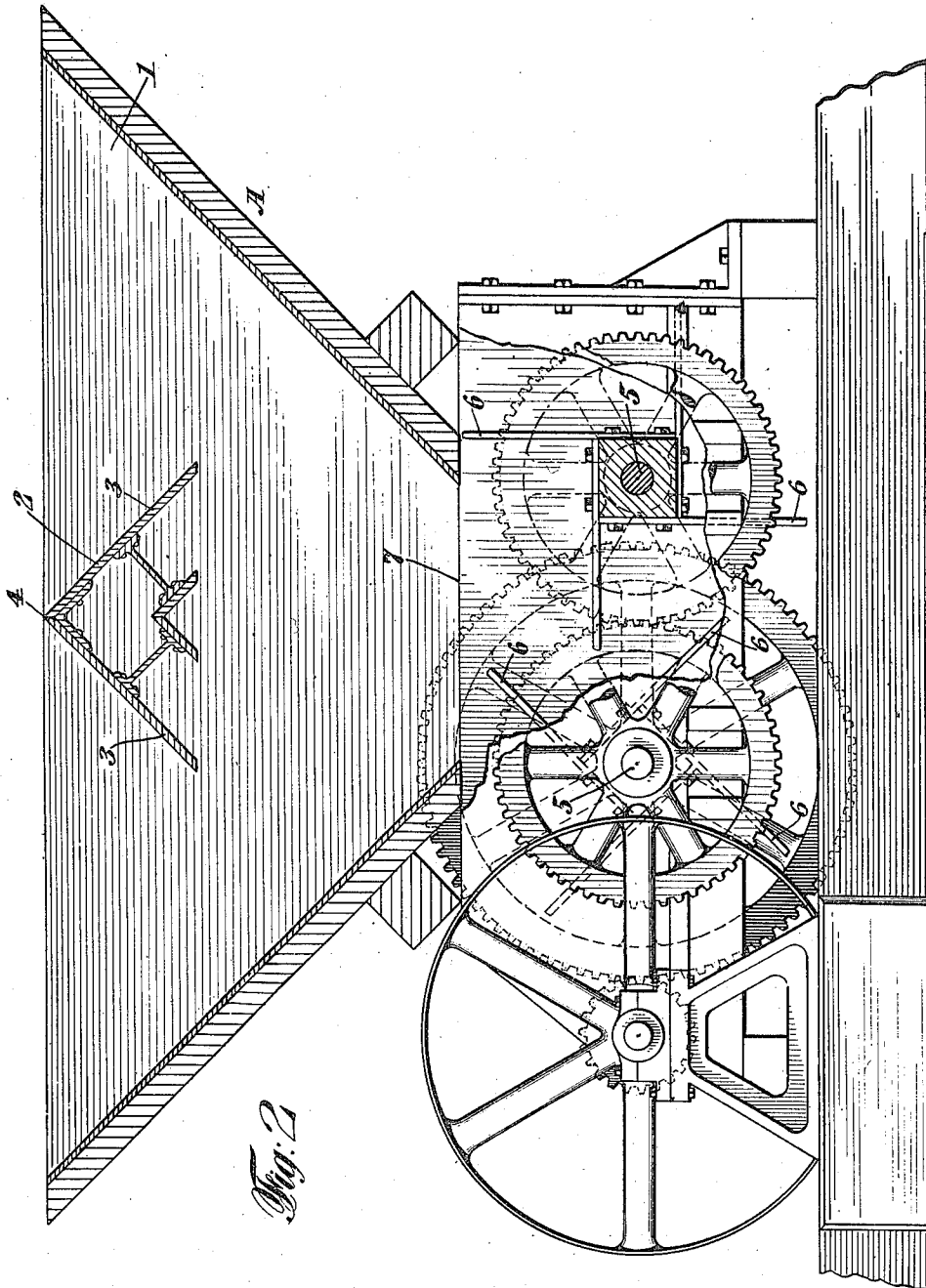
Fig. 1

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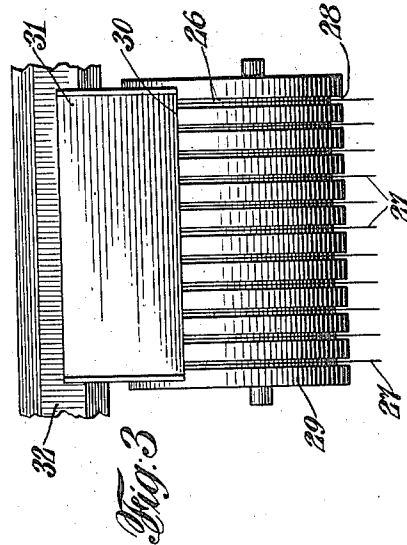
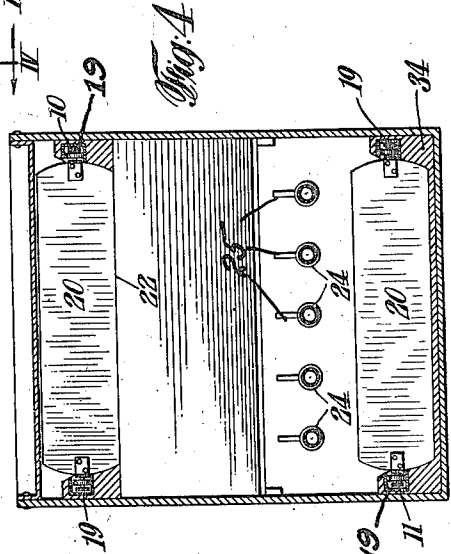
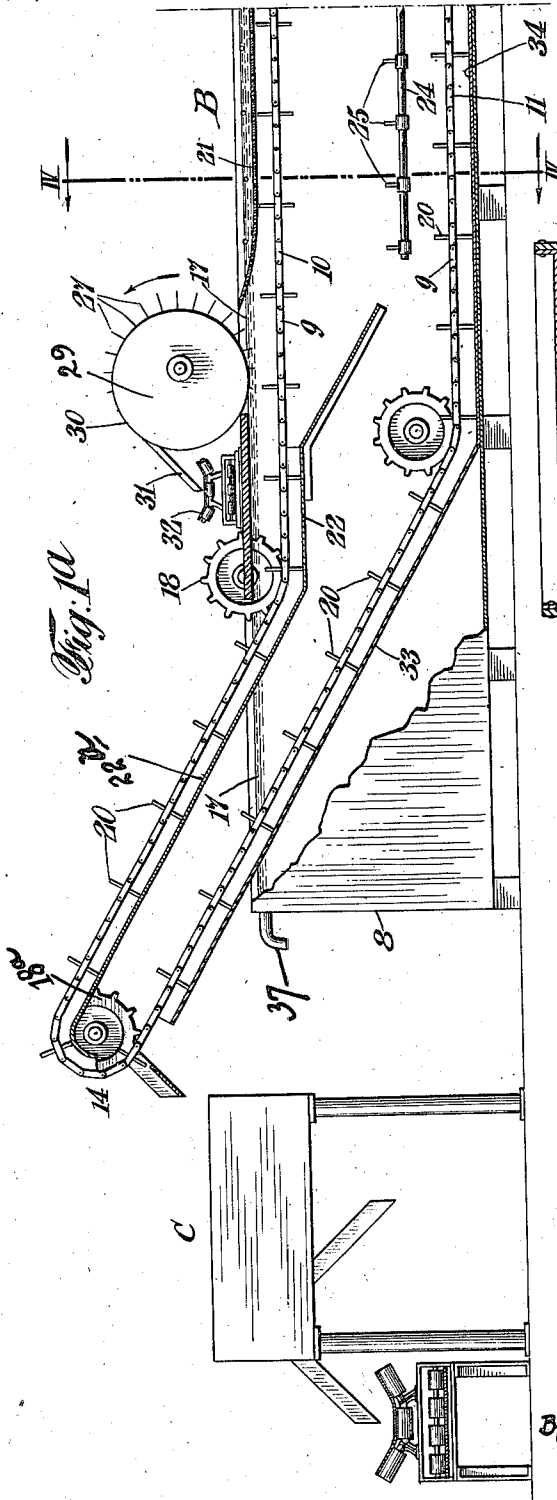
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UNITED STATES PATENT OFFICE.

JAMES A. ANDERSON, OF BARREN ISLAND, NEW YORK.

APPARATUS FOR SEPARATING GARBAGE.

1,209,654.

Specification of Letters Patent. Patented Dec. 26, 1916.

Application filed January 29, 1916. Serial No. 74,974.

To all whom it may concern:

Be it known that I, JAMES A. ANDERSON, a citizen of the United States, and a resident of Barren Island, county of Kings, city and State of New York, have invented certain new and useful Improvements in Apparatus for Separating Garbage, of which the following is a specification.

This invention relates to new and useful improvements in apparatus for separating the heavier or non-floatable portions of garbage from the lighter or floatable parts thereof.

One of the main objects of the invention is to provide an apparatus by means of which the garbage will be conveyed through a water tank in such manner that heavy material which does not constitute a part of the garbage proper will be permitted to drop to the bottom of the tank, while the lighter material will be maintained at or near the surface of the water and conveyed therealong and out of the tank to a suitable disintegrating and pressing apparatus.

Another object of the invention is to provide means whereby the light material such as paper, corn husks, rags and the like, will be picked up from the water before the garbage proper is removed from the tank. By means of this pick-up device all of these lighter non-grease-bearing materials will be prevented from passing to the disintegrating and crushing press.

Another object of the invention is to provide means whereby the heavy material such as bottles, broken crockery, metal parts, and the like will be picked up from the bottom of the tank and conveyed to a suitable point for distribution and sorting.

There are other objects and advantages of the invention which will appear hereinafter.

In the drawings, Figure 1 and Fig. 1^a constitute a complete longitudinal vertical sectional view of the apparatus, Fig. 1 being on Sheet 1 of the drawing and Fig. 1^a being on Sheet 2 thereof; Fig. 2 a vertical sectional view of the device for breaking up and distributing the garbage to the separating apparatus; Fig. 3 a detail plan view of the device for picking up rags and the like; and Fig. 4 a transverse vertical sectional view of the separating tank and the apparatus therein.

Referring to the various parts by reference characters, A designates the breaker and distributor through which the garbage is

passed to the separator; B designates the separator apparatus; C the crushing or disintegrating press and D the distributing and sorting conveyer.

The breaker and distributor consists of a large hopper 1, provided with a suitable, transversely extending, rigid primary breaker 2, said breaker consisting of two sharply inclined plates 3 which meet in a central, transversely extending, sharp ridge 4. The garbage is dumped from any suitable receptacle, or by any suitable means, into the said hopper, and is divided by means of this primary breaker. Below the bottom of the hopper two transverse shafts 5 are journaled, on each of which is mounted a series of breaker blades 6. These shafts are rotated in opposite directions and the said blades overlap at the center of the hopper, below the open end 7 thereof. Suitable gearing and driving means is provided for operating the breaker shafts. By means of this device the garbage is broken up and distributed to the conveyer belt below in a substantially uniform condition.

The separator apparatus consists of a long separating tank 8 through which travels a conveyer 9, one run of the conveyer moving longitudinally of the tank slightly below the surface of the water therein, as shown at 10, the other run thereof traveling on the bottom of the tank, as shown at 11. The receiving end 12 of the conveyer is above the tank, and the upper run thereof travels in a trough 13 directly below the discharge end of the disintegrator A. The upper run of the conveyer moves from the receiving end 12 to the discharge end 14. The trough 13, at its left-hand end, inclines downwardly into the tank 8 below the surface of the water therein, and the conveyer is forced to travel along said trough by means of pulleys 15 and 16, said conveyer traveling over pulley 15 and under pulley 16. The water level of the tank is indicated at 17, slightly above that portion of the upper run of the conveyer between the wheels 16 and 18, wheel 18 being near the discharge end of the tank. The conveyer consists of two endless chains 19 separated a suitable distance from each other and running along the sides of the tank, said chains being connected by double or balanced conveyer blades 20, said blades projecting above and below the chains, as shown. The trough 13 conforms substan-

tially to the shape of the blades, so that whatever material is dropped therein from the distributor A will be carried along through said trough by the blades 20. The conveyer has no bottom, except in so far as the troughs in which it runs form the bottom for it, so that when the material is carried out of the trough 13 into the tank 8 it is free to drop to the bottom of the tank, or to float, and be carried along by the conveyer, in accordance with the specific gravity of the material. When the upper run of the conveyer leaves the driving wheel 16 it passes under a perforated submerging plate 21, which extends through a substantial portion of the tank and insures the conveyer remaining under water. This submerging plate also insures the garbage being held under water for a considerable period of time. The purpose of this submerging plate is to hold empty tin cans, empty bottles and the like under water a sufficient length of time to permit them to be filled, or partly filled, to insure their sinking and dropping away from the floatable garbage. At the discharge end of the tank the upper run of the conveyer passes into a trough 22, and after passing around wheel 18 travels up the inclined part 22^a of said trough to the wheel 18^a. The floatable garbage is drawn into the trough 22 by the conveyer, and then carried into the trough up the inclined part 22^a thereof and delivered to the disintegrator or press C.

35 In the water tank close to the delivery end of the trough 13, is arranged a high-pressure water jet 23 from which upwardly projecting jets are forced for the purpose of breaking up and disintegrating the garbage as it comes from the trough 13, so that the heavier portions thereof will be detached from the lighter portions and may sink to the bottom of the tank without wastage of the lighter materials. Extending longitudinally and transversely of the tank, and a suitable distance below the water level, are a series of air pipes 24, provided with upwardly extending jets 25. Through these jets air, under a suitable pressure, is forced, said air jets maintaining the garbage at the top of the water and against the submerging plate, so that it will be conveyed along through the tank by the blades of the conveyer. It is manifest that these jets will not be sufficiently strong to maintain anything but the garbage proper near the surface of the water, all foreign matter such as stones, pieces of metal, crockery, glass, bottles and cans, falling to the bottom of the tank, stripped and cleaned of all light material. The air jets will tend to hold material such as paper, rags and the like, against the submerging plate, but the conveyer blades 20 bear at their upper edges against the under surface of said plate, and act as scrapers.

By this means all material is scraped from the plate and carried along by the conveyer to the discharge end of the tank. These blades also serve to keep the under side of the submerging plate clean, scraping therefrom all of the oil and soft oil-bearing material which may be driven against it by the air jets.

Near the delivery end of the submerging plate is arranged the device for picking up the light material such as paper, rags and corn husks, and the like. This device consists of a rotatable cylinder 26 carrying radial fingers 27, said fingers working in slots 28 in a stationary drum 29. The drum 26 is mounted eccentrically to the drum 29, so that the fingers will project beyond the surface of said drum as they enter the water, but will gradually pass into said drum as the fingers near the discharging point 30. In this manner the material on the pick-up fingers will be stripped therefrom by the stationary drum as the fingers pass into said drum, due to the eccentricity of the two drums. As the rags and other material is stripped from the fingers it passes down a chute 31 to a conveyer belt 32.

The lower run of the conveyer passes down the inclined trough 33 to the bottom of the tank, and thence along a trough 34 to the upwardly inclined trough 35. The upper end of this trough discharges into a chute 36 which delivers the material onto the conveyer D for distribution and sorting. The bottom of the tank forms the trough 34 as indicated clearly in Fig. 4, so that all the heavy material which drops therein will be carried by the conveyer up trough 35 and discharged through chute 36 onto the asorting and distributing belt.

By means of an apparatus of the character described herein the heavy materials, which really constitute foreign matter in the garbage, will be completely separated from the garbage proper so that they will not pass into the disintegrators and presses. Heretofore it has been a difficult and tedious operation to separate this foreign matter from the garbage, and the presses and disintegrators have been frequently injured by them. Heretofore it has been a very troublesome and tedious operation to separate rags and paper and corn husks from the other parts of the garbage. By means of the separator described herein this material is automatically picked up from the surface of the water and is prevented from passing to the disintegrator and press. The air jets will maintain practically all of the lighter or floatable portions of the garbage forced against the perforated submerging plate, and the conveyer will move the material along the plate to the discharge end of the tank. By perforating the submerging plate the air will not have a tendency to force the material toward the

ends thereof as might be the case if the plate were solid or unperforated.

As the garbage is moved up the chute 22 at the discharge end of the tank a considerable quantity of water will be carried with it. The free oil and grease will be carried along with this water. Necessarily a large quantity of the free oil and grease will be picked up by the garbage as it is drawn out of the water. It is especially desirable that this free oil and grease be carried along with the garbage to the disintegrator. The rate of flow of water into the tank is regulated in such manner as to avoid, if possible, any overflow, the inflowing water being merely sufficient to compensate for the amount of water taken out of the tank by the wet garbage. In order that there shall be no waste of the free oil and grease floating on the top of the water in the tank, an overflow pipe 37 at the discharge end of the tank is connected to suitable recovery tanks or vats.

It will, of course, be understood that the device for picking up rags, paper, etc., will not pick up any portion of the garbage proper, as that material is usually soft and of such character that it will not be readily picked up by the pins 27 or any other pick-up device suitable for operating on paper and rags.

Through the operation of the apparatus described herein, the by-products are greatly increased in value. All the metal contained in the garbage is separated from the garbage proper and delivered at a suitable point for proper separation and distribution. This not only increases the value of the garbage product and gives an added value to the properly separated metals, but prevents injury to the machinery and injury to the garbage products. Heretofore the presence of metal particles and broken and disintegrated glass and crockery has materially decreased the value of some of the garbage products, and particularly the tankage or fertilizer product. The presence of these foreign matters in the garbage as it is fed to the disintegrator, has resulted in enormous wear on the disintegrating machinery, and frequently results in the breakage of parts thereof. This is all avoided by my method of preliminarily separating the heavy foreign matters from the garbage proper.

What I claim is:

1. An apparatus for separating garbage comprising a water tank, an endless open horizontally movable conveyer arranged therein, and a water jet arranged in said tank near the intake end thereof and below the water level and directing a jet of water upwardly into the garbage to disintegrate the same and separate the heavier materials from the lighter portions of the garbage.

2. An apparatus for separating garbage comprising a water tank, an endless open

horizontally movable conveyer arranged therein, and a horizontal submerging plate in the tank to hold the conveyer and the garbage below the water level for a portion of its travel through the tank.

3. An apparatus for separating garbage comprising a water tank, a conveyer arranged therein, a perforated submerging plate in said tank adapted to hold the conveyer and the garbage below the water level, and a series of air jets below the water level and directing air upwardly to the conveyer through the perforated submerging plate.

4. An apparatus for separating garbage comprising a water tank, a conveyer arranged therein, a submerging plate in said tank adapted to hold the conveyer and the garbage below the water level, and a series of air jets below the water level and directing air upwardly to the submerging plate.

5. An apparatus for separating garbage comprising a water tank, an open horizontally movable endless conveyer therein with its upper run near the water level and its lower run at the bottom of the tank, a horizontal submerging plate near the water level and serving to submerge the upper run of the conveyer and the garbage, means for maintaining the lighter portions of the garbage near the surface of the water and against the under side of the submerging plate, whereby the said lighter portions will be carried through the tank by the upper run of the conveyer and the heavier portions will be conveyed out of the tank by the lower run thereof.

6. An apparatus for separating garbage comprising a water tank, an open horizontally movable endless conveyer therein with its upper run near the water level and its lower run at the bottom of the tank, a horizontal submerging plate near the water level and serving to submerge the upper run of the conveyer and the garbage for the greater part of its travel through the tank, and air jets in the tank below the water level to direct air upwardly through the upper run of the conveyer to maintain the lighter portions of the garbage in the conveyer near the surface of the water and against the under side of the submerging plate, whereby the said lighter portions will be carried through the tank by the upper run of the conveyer and the heavier portions will be conveyed out of the tank by the lower run thereof.

7. An apparatus for separating garbage comprising a water tank, an endless conveyer therein with its upper run near the water level and its lower run at the bottom of the tank, a perforated submerging plate near the water level and serving to submerge the upper run of the conveyer and the garbage, and air jets in the tank below the water level to direct air upwardly through the upper run of the conveyer to maintain

the lighter portions of the garbage in the conveyer near the surface of the water, whereby the said lighter portions will be carried through the tank by the upper run of the conveyer and the heavier portions will be conveyed out of the tank by the lower run thereof.

8. An apparatus for separating garbage comprising a water tank, an endless conveyer arranged therein and consisting of endless chain belts, transverse conveyer blades connected to said belts, a receiving trough at the receiving end of said tank, a discharge trough at the discharge end of said tank, means for supporting the upper run of the conveyer near the water level in the tank, means for supporting the lower run of the conveyer at the bottom of the tank, a submerging plate in the tank near the water level thereof to submerge the conveyer blades and the garbage held between them, a series of air jets below the water level and arranged to direct air upwardly and between the conveyer blades to maintain the garbage near the surface of the water and between said blades, and means for delivering garbage in the receiving trough between the conveyer blades.

9. An apparatus for separating garbage comprising a water tank, an endless conveyer arranged therein and consisting of endless chain belts, transverse conveyer blades connected to said belts, a receiving trough at the receiving end of said tank, a discharge trough at the discharge end of said tank, means for supporting the upper run of the conveyer near the water level in the tank, means for supporting the lower run of the conveyer at the bottom of the tank, a series of air jets below the water level and arranged to direct air upwardly and between the conveyer blades to maintain the garbage near the surface of the water and between said blades, and means for delivering garbage in the receiving trough between the conveyer blades.

10. An apparatus for separating garbage comprising a water tank, a receiving trough at one end thereof, a discharging trough at the other end thereof, an endless conveyer arranged in said tank with a portion there-

of extending into the receiving trough, and a portion extending into the discharging trough, means for supporting the upper run of said conveyer near the water level in the tank, means for supporting a portion of the lower run of said conveyer at the bottom of the tank, means for delivering substantially uniform quantities of garbage to the conveyer in the receiving trough, a submerging plate in the tank near the water level thereof and serving to submerge the upper run of the conveyer and the garbage carried thereby, means near the discharge end of the tank to automatically pick up light floating material, a series of upwardly projecting jets in the tank to agitate the garbage and maintain the floatable portions thereof near the surface of the water, whereby the lighter portions of the garbage will be carried near the surface of the water by the upper run of the conveyer and the heavy portions thereof will be carried along the bottom of the tank by the lower run of the conveyer.

11. An apparatus for separating garbage comprising a water tank, an endless conveyer arranged therein, means near the discharge end of the tank to automatically pick up light floating material, and means in the tank to agitate the garbage and maintain the floatable portions thereof near the surface of the water.

12. An apparatus for separating garbage comprising a water tank, an endless conveyer arranged therein and consisting of endless chain belts; transverse conveyer blades connected to said belts, means for supporting the upper run of the conveyer near the water level in the tank, means near the discharge end of the tank to automatically pick up and discharge light floating material, a series of upwardly projecting jets in the tank, whereby the lighter portions of the garbage will be carried near the surface of the water by the upper run of the conveyer and the heavy portions thereof will be carried along the bottom of the tank by the lower run of the conveyer.

In testimony whereof I hereunto affix my signature.

JAMES A. ANDERSON.