

APPLICATION FILED SEPT. 26, 1908.

Patented June 7, 1910.

2 SHEETS—SHEET 1.



Oliver H. Holmes  
E. B. McBath.

*J. C. Fleming*

Attorney

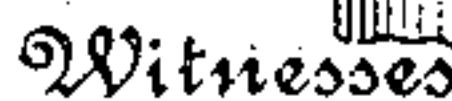
# REFINING MACHINE.

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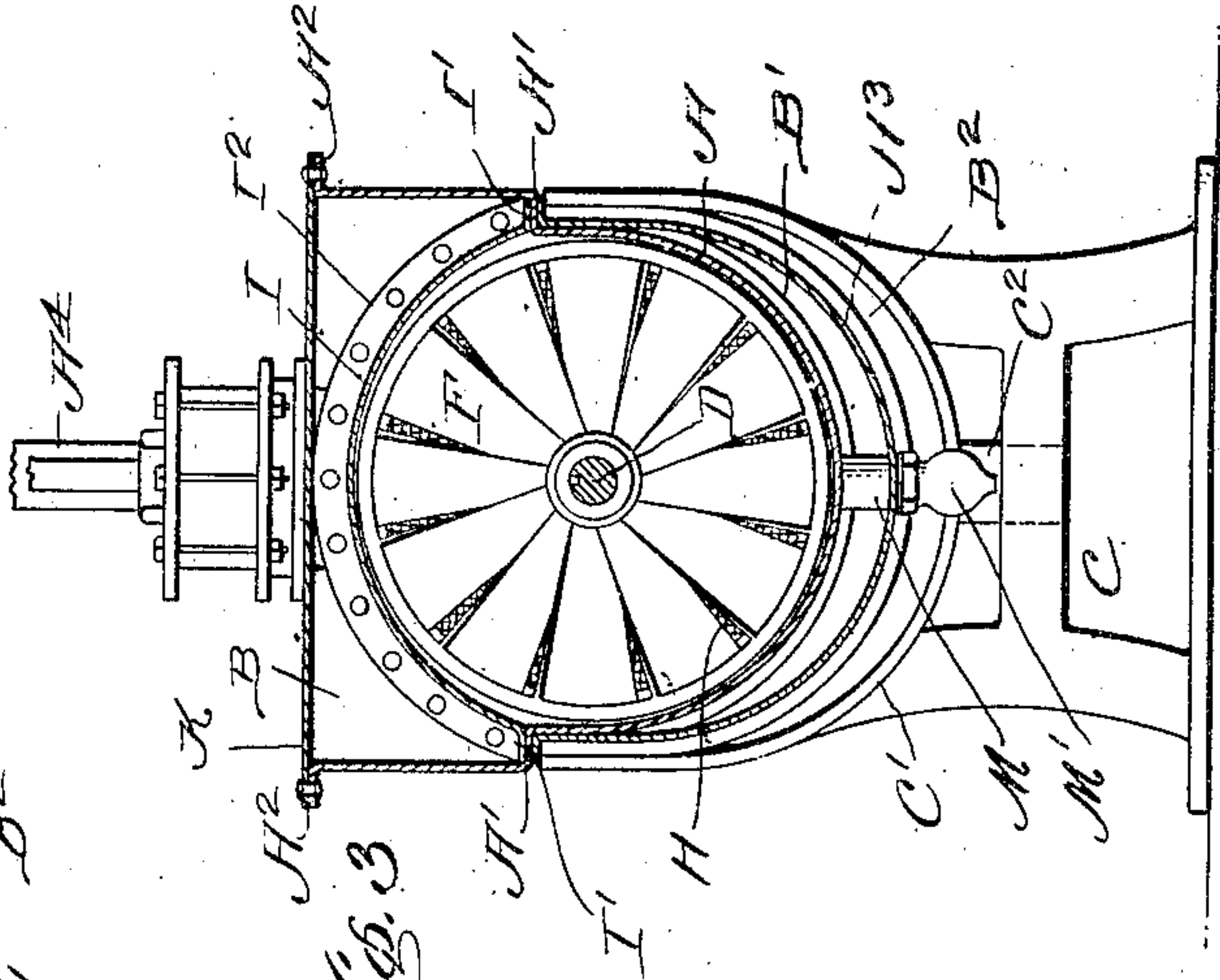
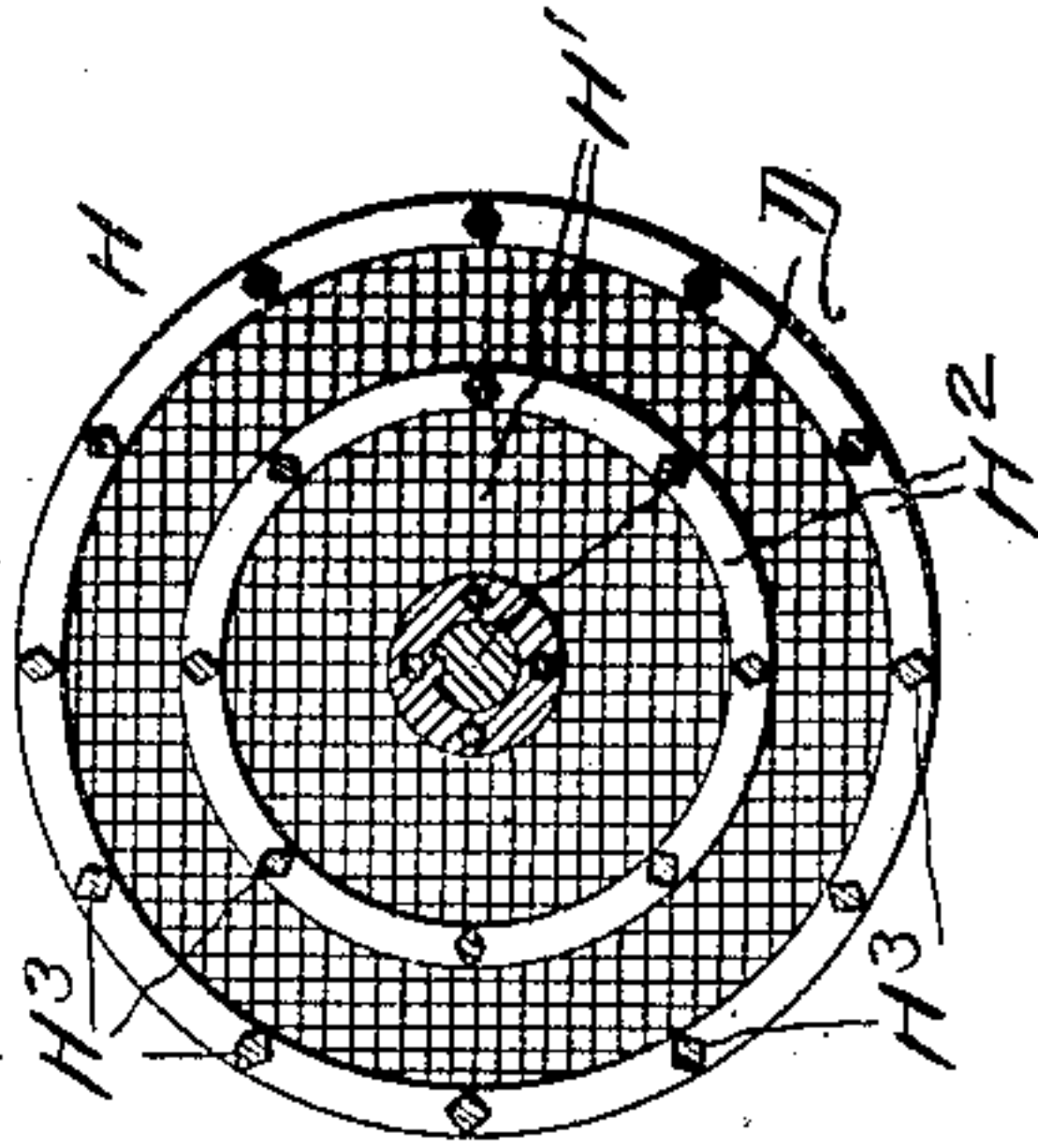
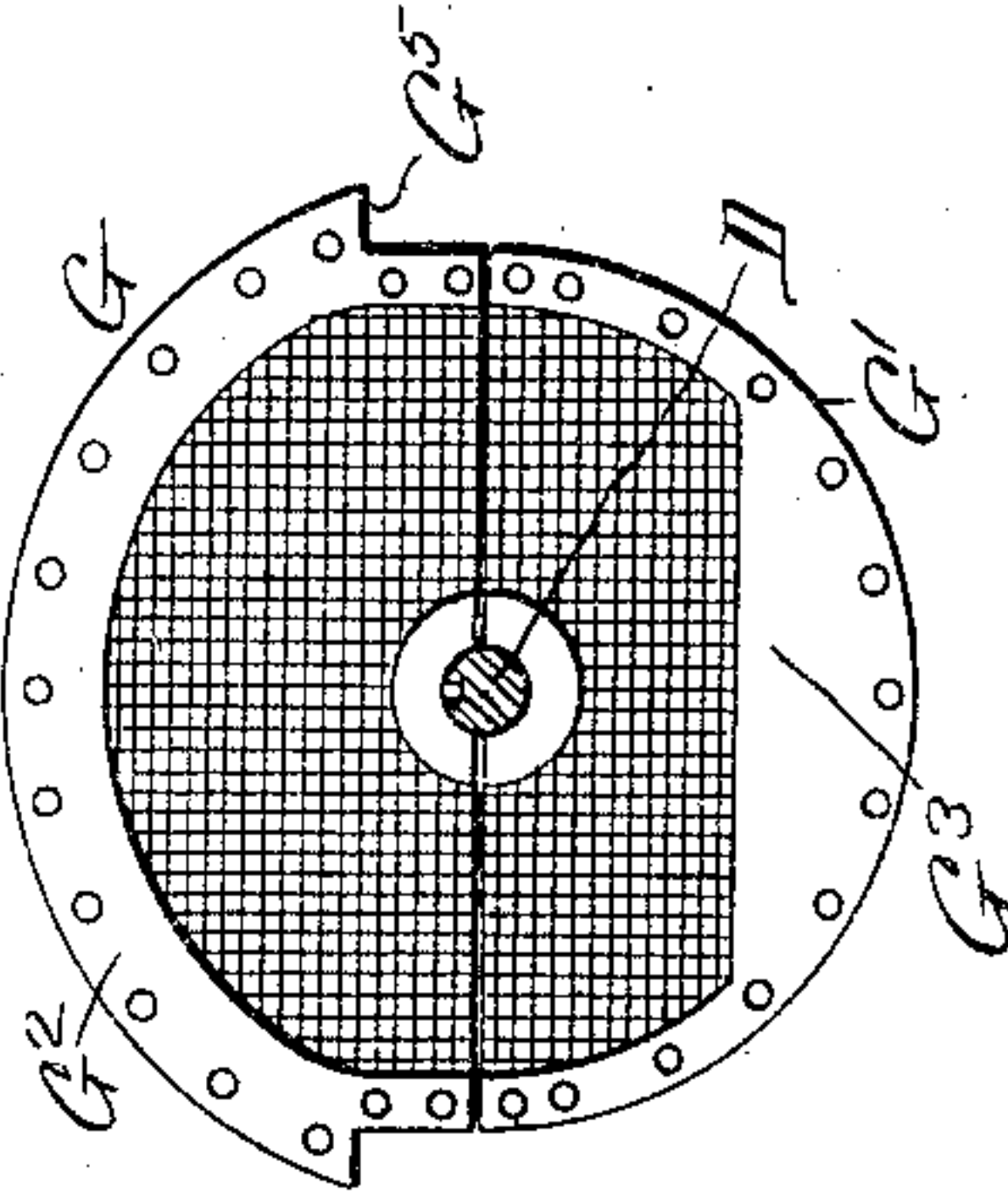
**960,529.**

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Oliver W. Holmes  
E. B. McCall Bath



Inventor

*J. C. Fleming*

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Oliver Brock

Attorney



# UNITED STATES PATENT OFFICE.

JOHN C. FLEMING, OF WASHINGTON, DISTRICT OF COLUMBIA.

REFINING-MACHINE.

960,529.

Specification of Letters Patent.

Patented June 7, 1910.

Application filed September 26, 1908. Serial No. 454,899.

*To all whom it may concern:*

Be it known that I, JOHN C. FLEMING, a citizen of the United States, at present residing in Washington, in the District of Columbia, have invented a new and useful Improvement in Refining-Machines, of which the following is a specification.

This invention relates generally to a mixing machine and more particularly to a machine employed for mixing, purifying and refining oils and other products and is an improvement upon the machine shown and described in my application for patent filed July 2, 1908, and bearing Serial Number 441,729.

The machine is also specially adapted for the mixing of both liquid and gaseous purifying ingredients with oils or other materials and the machine is also particularly fitted for the separation of the butter-fats from milk or cream.

Another object of the invention is to produce a machine whereby sugar and sugar-syrups can be purified and bleached in the absence of charcoal, and the machine can also be used for the refining of mineral oils without danger to the operator.

The above objects are obtained by constructing a machine in which by means of the mechanism hereinafter described a liquid of any kind will be thoroughly broken up, and where a second liquid or other form of purifying agent is added, the same will be thoroughly mixed and incorporated with the liquid intended to be purified or refined.

With these various objects in view, my invention consists essentially in the employment of a receptacle within which is arranged a series of rotary dashers for causing the material to be rapidly forced from one end of the machine to the other, arranging a stationary screen adjacent each rotary dasher and through which the material is forced, and thereby separated into small particles, a rotary screen being arranged adjacent and behind each stationary screen, said rotary screens being double and adapted to not only carry on the separation and breaking up of the particles but also aiding materially in carrying around the ingredients and delivering them in a finely divided state to the next rotary dasher, which operating in the same manner as the first mentioned dasher performs its function upon the

finely divided material and passes it on to the next set of screens and dashers to the end of the machine.

The invention also consists in arranging a rotary dasher at the extreme end of the machine, the blades thereof being inclined reverse to the blades of the other dashers whereby the movement of the material is arrested at the end of the machine, thereby permitting its discharge in a free and easy manner.

The invention consists also in providing a novel form of support together with the novel means of covering the receptacle and at the same time securing the stationary screens in place.

The invention consists also in various novel features of construction and also in the combination or arrangement of these various parts, all of which will be fully described hereinafter and pointed out in the claims.

In the drawings forming a part of this specification:—Figure 1 is a vertical longitudinal sectional view of the machine, the dashers being shown in elevation. Fig. 2 is a horizontal sectional view, the dashers being shown in elevation. Fig. 3 is a transverse sectional view on the line 3—3 of Fig. 1. Fig. 4 is a sectional elevation of one of the rotary screens, and Fig. 5 is a side elevation of one of the stationary screens.

In the practical embodiment of my invention I employ an essentially U-shaped trough, or receptacle consisting of the curved sheet metal plate A having offsets as shown at A' and flanged along the upper edges as shown at A<sup>2</sup>. The ends B are U-shaped of course, and are riveted to curved angled bars B' and B<sup>2</sup>, and the bottom of the receptacle A is also riveted to the angled iron B', and the jacket A<sup>3</sup> is riveted to the angled iron B<sup>2</sup>, and all of these parts connected as described rest in the curved angled iron support C' constituting a portion of the end support C, this end support being preferably made of cast-iron, and providing the legs for supporting the machine at each end. A bracket arm C<sup>2</sup> extends upwardly from the central portion of the end-support and carries a bearing block C<sup>3</sup> in which is journaled the projecting end of the shaft D, it being understood that there is a bearing at each end, and that the shaft passes centrally



through the receptacle, and is supported at each end in the bearings C<sup>3</sup>, and at one end is provided with a power-pulley D' and at the opposite end with a balance-wheel D<sup>2</sup>.

From the foregoing description it will be noted that I provide a U-shaped receptacle closed at each end and also supported at each end, and furthermore it will be noted that the receptacle is jacketed upon the bottom and that the ends of the jacket and receptacle are securely connected in an exceedingly strong and durable manner.

As before stated the horizontal shaft D passes longitudinally through the receptacle, said receptacle being intended to receive the oil or other material to be purified and refined, and for the purpose of quickly and thoroughly breaking up the material into fine particles or atoms and at the same time thoroughly commingling any liquids or gases which may be added for purifying and refining purposes, I arrange upon the rotary shaft a series of rotary dashers, for the purpose of causing the material to be rapidly forced from one end of the machine to the other, and in connection with each rotary dasher I employ a stationary screen and also a rotary screen, said screens being so constructed and arranged as will more fully appear, that the material in being forced from one end to the other will be thoroughly separated, broken up, atomized and commingled. The material is fed through an opening A<sup>4</sup> and adjacent the end of the machine I arrange a rotary dasher E which immediately throws the material to the rotary dasher F, which is the first rotary dasher of the entire series which extends throughout the machine, and in the present instance I employ eight such dashers in the series. Adjacent each rotary dasher F and behind the same is a stationary screen G, and adjacent each stationary screen and behind the same is a rotary screen H, the dashers and rotary screens being keyed upon the shaft, said shaft being grooved longitudinally, and in practice I prefer to arrange spacing collars between all the dashers and screens so that by tightening up the end nuts D<sup>3</sup>, all of the movable parts can be securely locked upon the shaft, and it will be understood that the dashers and rotary screens are arranged upon the shaft before the end plates of the receptacle are fastened on. The material is discharged through an opening A<sup>5</sup> and it will be noted that the last rotary screen is adjacent one side of this discharge opening, and adjacent the opposite side of said discharge opening and mounted upon the rotary shaft is a rotary dasher E', similar in all respects to the rotary dasher E, except that its blades are inclined reverse to the inclination of the blades of the dasher E, and the function of this end dasher E' is to throw back the material from the extreme end of the machine,

thereby arresting the movement of the material directly over the opening A<sup>5</sup>, and consequently materially aiding in the free and easy discharge of the material from the machine. A discharge chute A<sup>6</sup> leads from the opening A<sup>5</sup> and a feed chute A<sup>4</sup> of any suitable construction leads into the feed end of the machine.

In practice I prefer to construct the stationary screens G in two sections, the lower section G' and the upper section G<sup>2</sup>, and the lower portion of the metal frame which surrounds the sides of the lower section extends upwardly a considerable distance from the bottom, as shown at G<sup>3</sup>, for the purpose of preventing any possible escape of the material along the bottom of the receptacle, without being first subjected to the actions of the rotary dashers and screens, and for the purpose of holding the lower sections of the stationary screens in place, I employ curved angled irons G<sup>4</sup> which are secured at regular intervals to the bottom of the receptacle and extend upwardly as far as the offsets A'. The upper sections G<sup>2</sup> of the rotary screen consist of wire gauze held between the metal frame-work, and it will be noted that this metal frame work is shouldered as shown at G<sup>5</sup>, and the shoulders rest upon the offsets or shoulders A', and at the center of each rotary screen it is provided with a half-collar which embraces the rotary shaft.

For the purpose of providing a curved upper side to the receptacle, and at the same time securing the upper section of the rotary screens in place, I employ a series of curved plates I, each plate being of a length and curved in such a manner as to extend from side to side of the machine, and just leave clearance enough for the rotation of the rotary dashers and screens, and each curved plate I has a horizontal flange or foot-piece I', which rests upon the offset or shoulder A', and furthermore, each plate is constructed with a vertical flange I<sup>2</sup>, and when these plates are arranged from end to end, each upper section of the rotary screen will be between the flanges of two adjacent plate-sections, and by means of rivets, all of the sections and screens can be securely fastened together. A flat top plate K extends over the entire machine, and is riveted or bolted to the side flanges and end flanges of the receptacle. It will of course be understood that openings are produced in this top-plate for the feed-tubes previously referred to.

The jacket is provided with an inlet pipe L and a discharge pipe L' by means of which any suitable heating or cooling medium may be introduced into and circulated through the jacket for the purpose of heating or cooling the contents of the receptacle, and the manner of connecting the jacket to the sides and ends of the receptacle renders it steam-



tight so that steam may be employed as a heating medium whenever desired. A plurality of drain-pipes M extend from the bottom of the receptacle through the jacket and each is provided with a cock M', and it will be noted that these drain-pipes are arranged between each pair of angled irons against which the stationary screens bear, and by means of these drain-pipes I am enabled to quickly and thoroughly remove any and all sediment or material which might remain in the bottom of the receptacle.

Each rotary screen H as heretofore described is arranged adjacent to and to the rear of, the stationary screen, and the material is rapidly forced through the stationary screen and is partially separated, broken up or atomized by its passage through this stationary screen, but by having a rotary screen immediately behind the stationary screen and rotating in unison with the rotary dasher, the separated material as it comes through the stationary screen is quickly caught up and whirled around through the rotary screen and separated and broken up into much finer particles, and by continuing the operation a sufficient number of times the contents are thoroughly atomized and commingled, so that the refining and purifying operation can be quickly and easily accomplished within the machine, and in practice I prefer to make each rotary screen a double screen, as shown, there being two disks of wire gauze H' connected to two concentric circular rings H<sup>2</sup> and between the said wire gauze disk and concentric rings are the lozenge-shaped spacing blocks H<sup>3</sup>, and it will be noted that the outer series of blocks are arranged with their angular edges coincident with the end of the screen, and this outer series of blocks just clear the bottom of the receptacle, so as to take up by a scraping action the material in the bottom of the receptacle, and by having the rotary screens double, and also by utilizing the peculiar shaped spacing blocks, the operation of separation or atomizing is much more easily accomplished.

In operation the material to be refined or purified is introduced into the machine through the feed-tube and with it any desired form of purifying or refining agent, either in the solid or liquid form, and the moment the material enters the machine the first rotary dasher E will immediately start it toward the opposite end of the machine and here it comes into contact with the first of the series of rotary dashers F, and the rotary dasher rapidly whirls it around and forces it through the first stationary screen, and after passing through the stationary screen it is caught up and carried around and passed through the first rotary screen, and is then passed on to the next rotary dasher and all of these operations are again

repeated as often as desired, and in the meantime any suitable gaseous re-agent can be introduced through the gas supply pipe, if desired.

The material by being continually subjected to the churning and screening operations is broken up into the finest particles and every particle of the material to be purified is brought into intimate contact with every particle of the purifying and refining agents, and in this manner, the complete operation is carried on so that when the material emerges from the machine the purified and refined product can be immediately collected. For the purpose of removing the pressure from the rear end of the machine I have provided a supplemental dasher which checks the motion of the material at the end, and facilitates its free and easy discharge through the discharge tube or chute. By having these rotary dashers at the opposite ends of the machine I am able to do away with stuffing boxes and consequently only employ split sleeves for surrounding the shaft at each end between the ends of the receptacle and the bearings for the shaft.

The advantages of the special features of construction having been fully pointed out during the detailed description of the various parts, it is not necessary to further enumerate them.

It will thus be seen that I provide an exceedingly cheap, simple and highly efficient machine for refining oils, and similar materials, and capable of carrying out all of the objects of the invention hereinbefore referred to.

If desired strips of wire screen may be employed between the two rotary screens in place of the bars, and at times both the bars and strips of screens may be employed.

One decided advantage of this machine is that the milk passed therethrough will evaporate at a low temperature preserving its food-value.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a machine of the kind described, the combination with a receptacle, of a rotary dasher, a stationary screen adjacent the said dasher, and a rotary screen adjacent the stationary screen.

2. In a machine of the kind described, the combination with a receptacle, of a rotary dasher, a fixed screen adjacent thereto, and a rotary screen adjacent the fixed screen, said fixed screen being made in two sections.

3. In a machine of the kind described, the combination with a receptacle, of a rotary dasher arranged therein, a fixed screen adjacent said dasher, and a rotary screen arranged adjacent the fixed screen, said rotary screen being double.



4. In a machine of the kind described, the combination with a receptacle, of a rotary shaft extending through the same, said receptacle having a feed opening near one end, 5 and a discharge opening near the opposite end, a pair of rotary dashers upon opposite sides of said openings, the dasher upon the rear side of the discharge end being inclined reverse to the direction of the other 10 dasher, and a series of dashers and screens arranged between the said dashers at the front and rear, as set forth.

5. In a machine of the kind described, the combination with a receptacle, of a rotary 15 shaft extending therethrough, rotary dashers and screens mounted upon said shaft and a stationary screen arranged between each rotary screen and dasher, and means for securing the said stationary screen, substantially 20 as described.

6. In a machine of the kind described, the combination with a receptacle, of a rotary shaft passing therethrough, rotary dashers 25 mounted therein, stationary screens arranged adjacent said dashers, and flanged plates arranged within said receptacle, and

between which the stationary screens are secured, substantially as described.

7. In a machine of the kind described, the combination with a receptacle shaped as de- 30 scribed, of a rotary shaft extending there-through, rotary dashers arranged on said shaft, rotary screens also on said shaft, stationary screens arranged between each pair of rotary screens and dashers, angled irons 35 secured to the receptacle against which the stationary screens bear, and curved angled plates arranged in the receptacle, the upper portions of the stationary screens being held 40 between the flanges of said plates, as set forth.

8. In a machine of the kind described, the combination with a rotary dasher, of a stationary screen arranged adjacent to said rotary dasher, and a rotary screen arranged 45 adjacent to said stationary screen and adapted to rotate in unison with the rotary dasher, substantially as described.

JOHN C. FLEMING.

Witnesses:

CHAS. E. BROCK,  
E. B. MCBATH.