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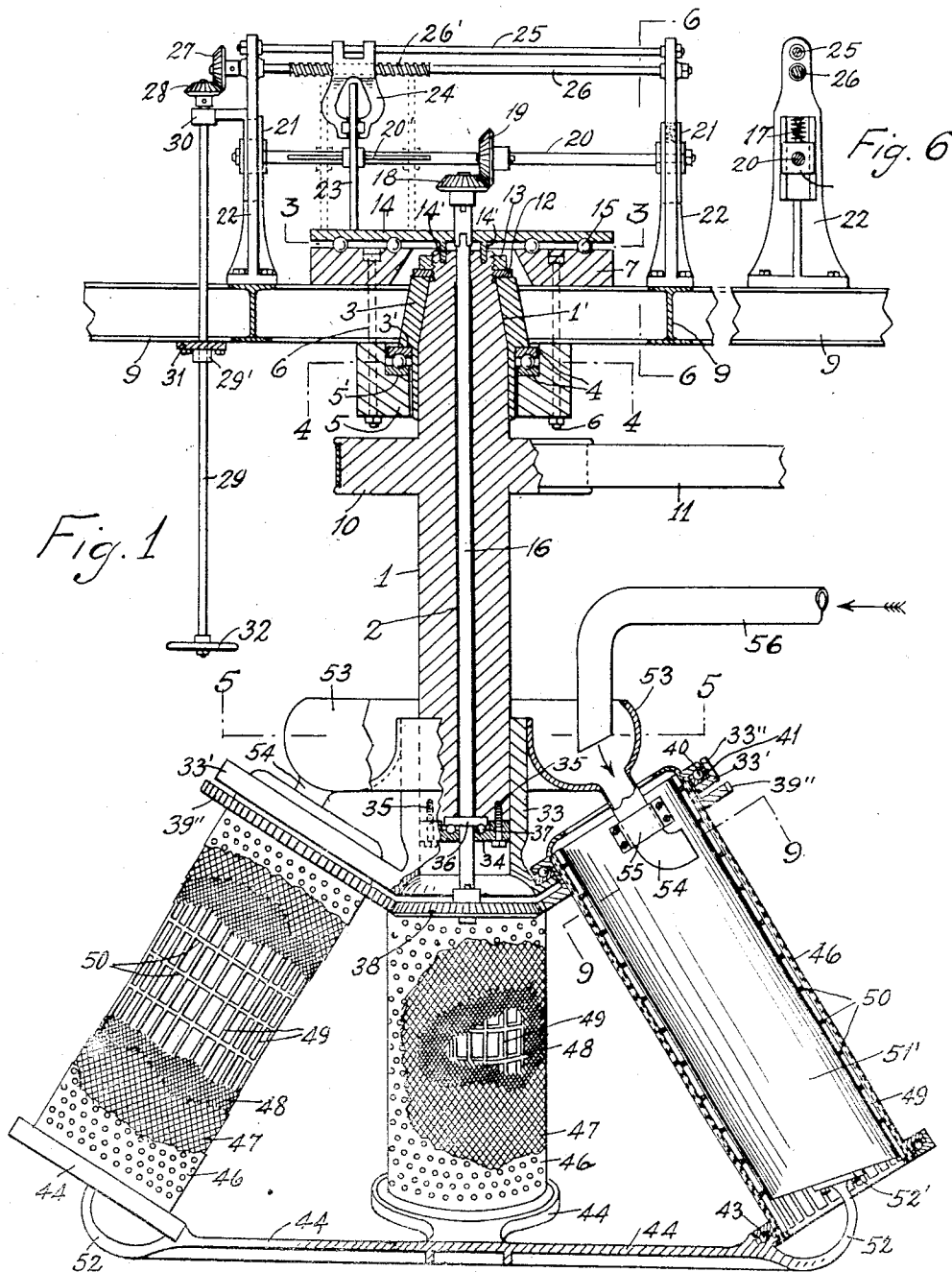
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M. L. SANSARICQ

CENTRIFUGAL MACHINE

Filed May 29, 1926

4 Sheets-Sheet 1



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INVENTOR

By

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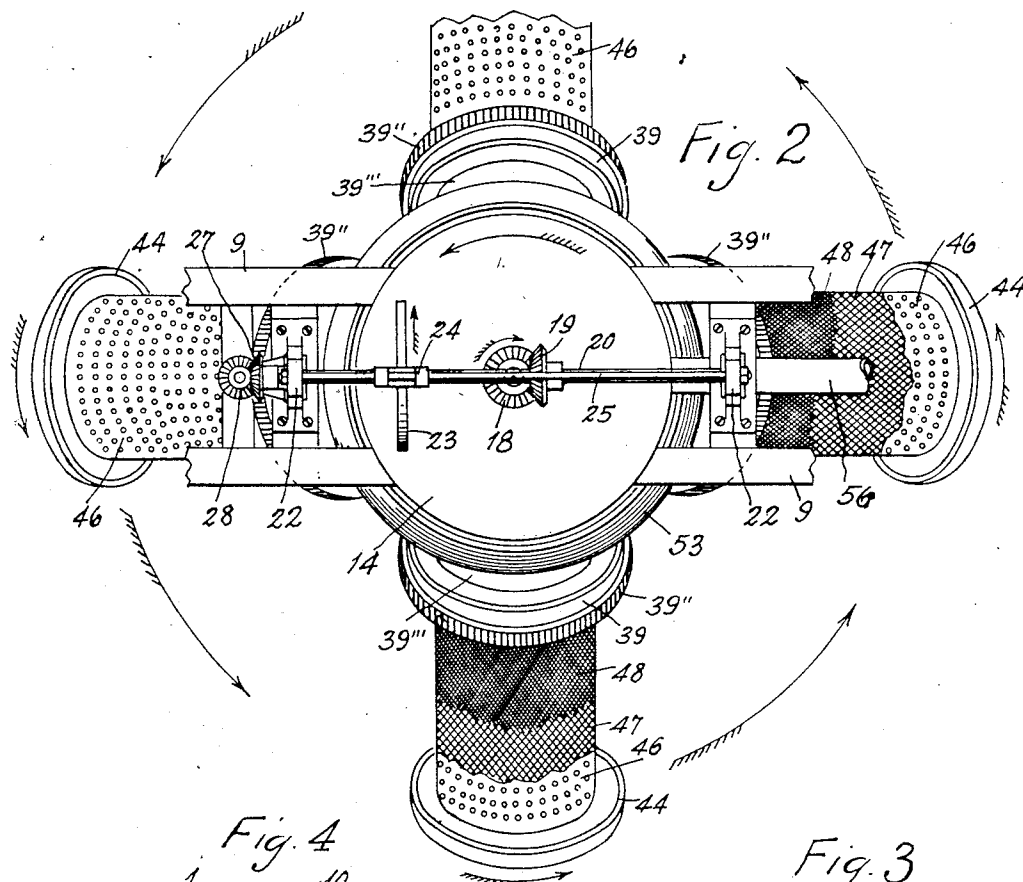
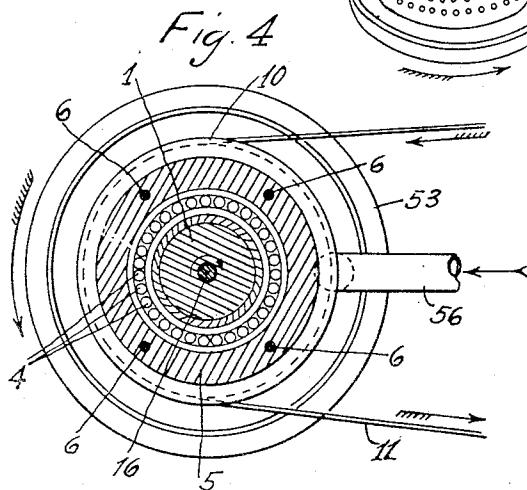
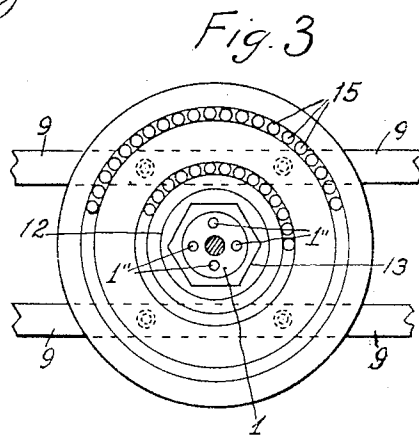
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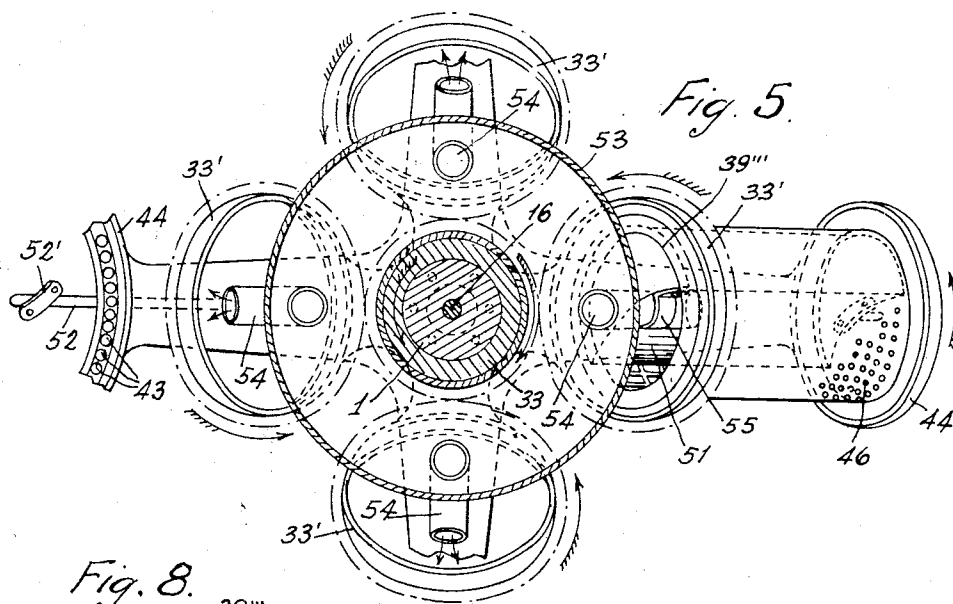
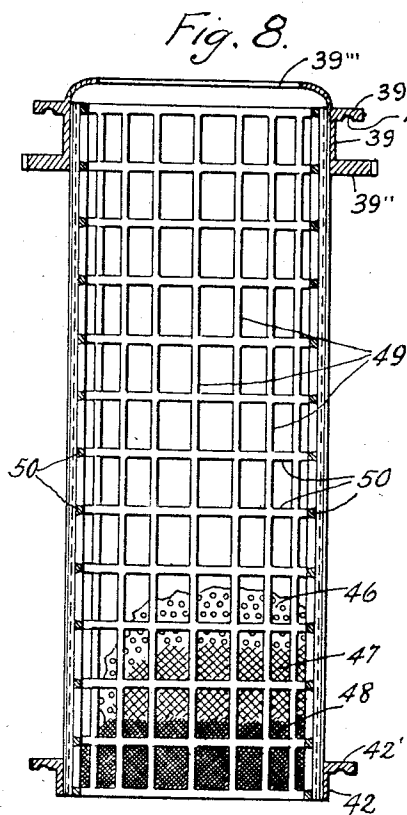
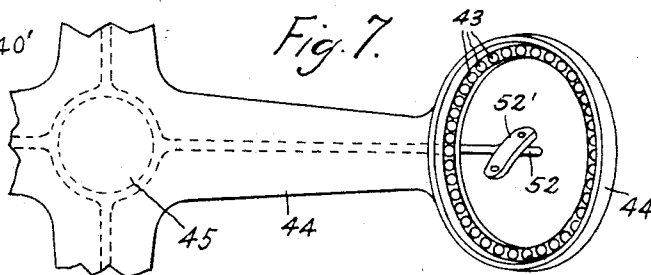
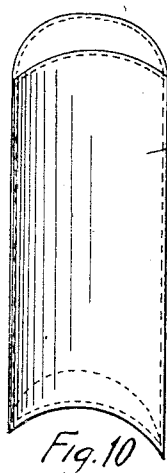
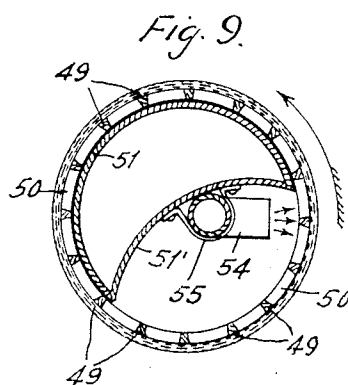
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4 Sheets-Sheet 3



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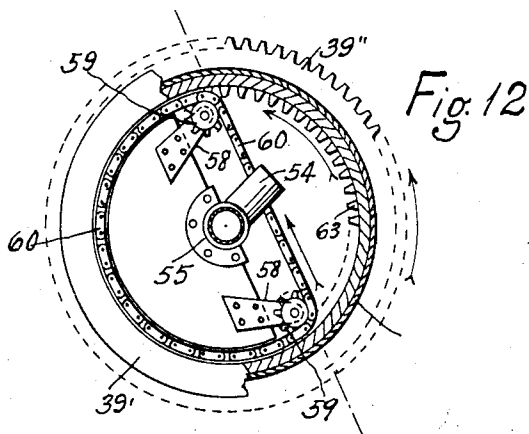
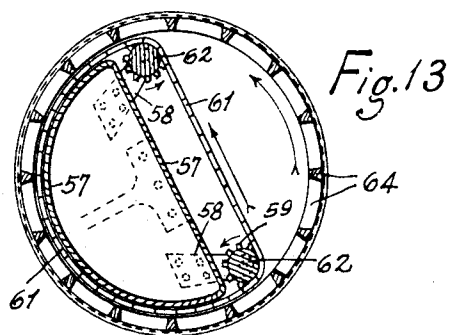
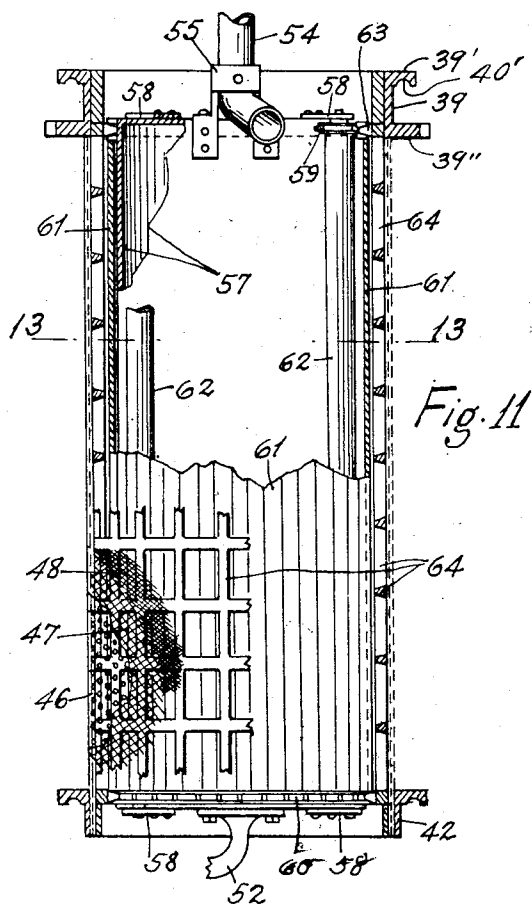
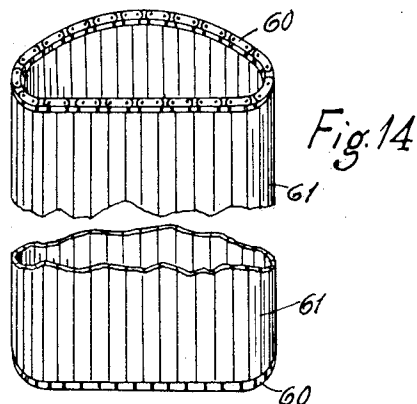
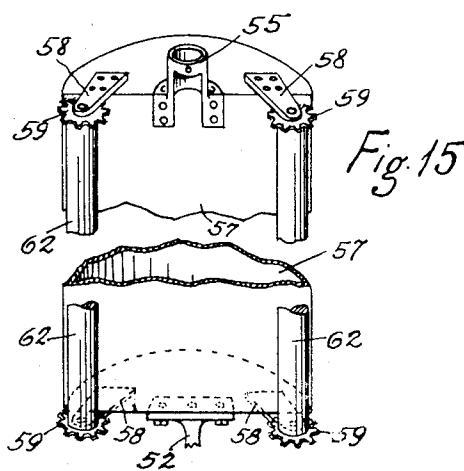
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CENTRIFUGAL MACHINE

Filed May 29, 1926

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE.

MARCOS LARRALDE SANSARICQ, OF HABANA, CUBA.

CENTRIFUGAL MACHINE.

Application filed May 29, 1926, Serial No. 112,633, and in Cuba April 29, 1926.

This invention refers to centrifugal machines, for instance, to the type used in the sugar manufacturing industry, to separate molasses from the sugar. It is to be understood, however, that it may be used for any other purpose to which its construction is suited, being applicable in cases which require the separation of a solid from a liquid.

An important object of this invention is to provide a centrifugal machine which operates continuously and with a greater efficiency than present similar machines.

The invention may be said to consist of a plurality of drums or nets hung from a central standard; and revolving thereabout, and each net or drum having in turn a gyratory movement on its own shaft, with the object of producing a constant agitation of the materials to be treated.

Another object of this invention is to provide means, in each drum or net which causes the gradual settling and under centrifugation of the solid material treated, from the feeding inlet to the discharging outlet of the net or drum.

Other objects and advantages of this invention will be understood in the course of this specification, especially by those who are experts in the art to which the invention refers.

The invention is clearly illustrated in the accompanying drawings, in which:—

Figure 1, is a side elevation, partly in section, of the improved centrifugal machine.

Figure 2, is a top plan view thereof.

Figure 3, is a horizontal section taken on line 3—3 of Figure 1.

Figure 4, is a horizontal section taken on line 4—4 of Fig. 1.

Fig. 5, is another horizontal section taken on line 5—5 of Fig. 1.

Figure 6, is a fragmentary vertical section taken on line 6—6 of Fig. 1.

Fig. 7, is a top plan view of one of the brackets of the drum or net of the centrifugal machine.

Figure 8, is a vertical sectional detail of one of the drums or nets of the centrifugal machine.

Figure 9, is a horizontal section on an enlarged scale taken on line 9—9 of Figure 1.

Figure 10, is a perspective detail of one of the component elements of the drum or net shown in Figure 8.

Figure 11, is a fragmentary sectional detail of a modified form of the net or drum.

Figure 12, is a top plan view, partly in section of the construction shown in Figure 11.

Figure 13, is a horizontal section taken on line 13—13 of Figure 11.

Figures 14 and 15 are perspective views of different component parts of the net or drum.

Similar characters of reference are employed in all of the above described views to indicate corresponding parts.

Referring to Figures 1 to 10 inclusive, there is provided a main shaft 1 having a bore 2 and a tapered upper end 1'; around which is fitted a sleeve 3 which has a recess 3' for receiving two ball bearing plates 4 which bear upon a seat 5' formed in the upper part of an annular block 5. This block 5 is fastened by suitable means such as bolts 6 to another annular block 7, said bolts also serving to fasten the blocks 5 and 7 to the beams 9, the said arrangement constituting a frame which supports the shaft 1, in a hanging and gyratorial manner as may be easily seen in Fig. 1 of the drawings. The shaft is rotated by suitable means, such as a pulley wheel 10 carried thereby and over which a belt 11 operates for transmitting rotary movement from a suitable source of power (not shown).

The upper end of the shaft is fitted with a washer 12 and is threaded to adjustably receive a nut 13 which acts to hold the sleeve 3 in proper position. The upper end of the shaft is also provided with sockets 13 in which are engaged pins 14' which project from the under surface of a plate 14 bearing upon the upper surface of the block 7 by means of ball bearings 15.

Through the bore 2 of the shaft 1 is mounted an inner shaft 16 on the upper end of which is coupled a beveled pinion 18 which pinion meshes with another pinion 19 fastened in turn to a shaft 20 arranged horizontally and at right angles to the shaft 16. The shaft 20 rotates in bearings 21 arranged in the standards 22 fastened in turn upon the beams 9 of the supporting frame. These bearings are slidable, and are supported by springs 17 (see Fig. 6), so that the shaft 20 may yield under an upward pressure, and thereby facilitate the frictional movement of a wheel 23. This wheel 23 is mounted on the key 20' of the shaft 20 and is slidable on the same, through the action of a guiding device 24 hung from a horizontal rod 25 fastened in turn between the standards 22. Said device gears with a worm 26' provided

on the shaft 26 journaled in said standards 22 and arranged so as to permit the changing of the position of the frictional wheel upon the plate 14 as may be seen by dotted line in Fig. 1, the purpose being to increase or decrease at will the gyratory velocity of the shaft 16. This action is accomplished by means of a gearing comprising a pinion 27 fastened to the end of the horizontal shaft 26 which projects out from one of the standards 22 and which meshes at a right angle with another beveled pinion 28 secured to the upper end of a vertical shaft 29, and supported in turn by a bracket 30 fastened to the corresponding standard 22, as by a plate 31 secured under the beams 9 and a collar 29' integral with the shaft 29. A handle 32 facilitates the operation of the shaft 29.

The movement of the shaft 16 can be reversed by reversing the operation of the pinion 19 as is easily understood.

To the lower end of the shaft 1 is fitted a sleeve 33 from which project in opposite directions and upwardly four annular plates 33' which terminate in flanges 33''. The lower end of the shaft 16 is journaled through a plate 34, which is secured by bolts 35 to the lower end of the main shaft and between which and a collar 36 integral with the shaft 16 is a ball bearing casing 37. To the lower end of the axle 16 is secured a bevel gear 38 which serves to transmit movement to four centrifugal cylindrical drums or baskets, which now will be described in detail, it being evident that the number of same may be varied simply by making a slight change in the means of transmission.

In Figures 8 and 9 is detailed in section, one of said drums or nets which consists of an upper header 39 presenting a peripheral flange 39' and a peripheral crown 39'' which meshes with the gear 38 and projecting thence inwardly, presents a large slot 39''' which serves as a charge inlet or admission to the drum. A ball bearing plate 40' is provided on the flange 39' and coacts with a bearing plate 41 received in turn on the annular plate 34 for accommodating the ball bearings 40.

The lower header of the four drums or nets comprises a metallic ring 42 encircling the outlet or discharge mouth of the drum or net and which header presents an annular flange 42' the upper surface of which forms the upper half of a ball bearing casing 43 and the lower half of which casing is formed in each one of four bracket arms 44 which project radially from a central bracket 45.

The body of each of said drums comprises a metallic bored plate 46, close to which is a second body 47 made of a wide wire netting and then a third body 48, made of a fine wire gauze or filter cloth. Close to and in contact with the body 48 is arranged another body in the form of a cage compris-

ing vertical members or bars 49 and spaced rings 50. Inside of each drum and in close contact with the cage described is installed a stationary drum closed at both ends, and which as detailed in Fig. 10 is crescent shaped in cross section and presents towards the inner part of the adjacent drum its concaved wall 51' while its convex wall 51 corresponds to and coacts with the inner curve of the cage 49 and 50.

Each drum is supported at its lower end by arms 52 which project radially from the standard 45 and which are bolted to the bottom of the drum by means of an attaching plate 52'.

Arranged around and fastened to the sleeve 33 is a circular trough 53 from which projects four discharge pipes 54 and these pipes respectively extend into each one of the drums or nets being secured to the outer surface and adjacent the upper end of the wall 51' of each drum by brackets 55. The material to be treated which may be in the form of a boiled mass may be fed to said channel by the feed pipe 56.

The operation of the machine may be reviewed as follows:

Upon the turning of the shaft 1 by means of the pulley 10 keyed to same and the belt 11 which transmits the power from the power source, the plate 14 on the said shaft will turn while the set of drums or nets of the centrifugal will also be moved by reason of the connection with the brackets 33' which unite them with the sleeve 33 fitted to the end of the shaft 1.

At the same time the plate 14 transmits, by friction, movement to the wheel 23 which rotates the shaft 20 whereon is keyed the pinion 19 which meshing with the pinion 18 causes the turning of the shaft 16 mounted through the shaft 1, and therefore through the meshing of the pinion 38 secured at the lower end of the shaft 16 with the crowns 39'' in the upper part of the drums or nets is caused the movement of each one of the drums independent of the general movement which is received by means of the shaft 1 and which movement may be in the same or in an opposite direction, by means of an adequate change of transmission (not shown).

When the materials to be treated are fed through the pipe 56 to the trough 53 and discharged through the pipes 54 into each one of the drums or nets, the solid material will be maintained in the upper part of the grating or cage 49—50 in front of the discharge outlet of the corresponding tube 54, and due to the continuous rotary movement of the drum, will be carried behind the drum, that is over the convex wall 51 of the same retaining the solid material between said wall and the cage, and preventing the settling of the same until it has finished its

course behind the drum, and returns to the free space in front of the concave wall 51' of same, descending by virtue of the centrifugal force to a lower level in the cage 49—50 to pass again behind the drum and being retained until it is again in the free space, within the centrifugal drum and so continuing until it is discharged, thoroughly treated, through the lower end of the centrifugal drum or net.

In the meantime a fresh supply is fed to the machine treated in the same manner, following approximately a spiral movement, so that the operation of the machine is continuous.

The liquids, in the meantime will be discharged through the filtering materials of which the body of the centrifugal drum or net is composed in a manner usual in this class of machines.

The speed of rotation of the drums may be controlled by the action of the handle or wheel 32, so that by the transmission of gears 27—28 and by the worm 26' with the guiding piece 24 the position of the wheel 23 may be varied approaching or moving the same further from the center of the plate 14, by which the speed of rotation of the shaft 16 may be increased or diminished.

In the modified form of drum shown in Figures 11 to 15 of the drawings the drum body 57 is of a semi-cylindrical form and in its upper and lower header there is fastened two brackets 58 which support loose pinions 59, which serve as a guide to the chains 60, the latter engaging the upper and lower edges of an endless belt made of slats 61, which latter travels around the drum, being guided over vertical rollers 62 held between the arms 58. The chain 60 is geared in turn to a crown 63 secured to the upper part of the cage and designated by the numeral 64 which permits of the movement of the endless belt 61 around the drum 57, and the changing of the surface of contact of the endless belt with the cage 64.

It is believed in view of the foregoing description that a further detailed description is entirely unnecessary. Likewise it is believed that the advantages of the invention will be readily apparent.

Having thus fully described the invention what is claimed and desired to be secured by Letters Patent is:—

1. In centrifugal machines, a supporting frame, a plurality of drums thereon and each including a plurality of filtering bodies the inner of which is in the shape of a cage, means for feeding material to each drum, means for imparting a general gyratory movement to all of the drums, means for imparting an independent gyratory movement to each of the drums in the same or in the opposite direction of the general movement, an element in the shape of a drum

installed within each centrifugal drum and occupying approximately one-half of the same, and destined to maintain the material to be treated against the cage while it passes behind said element.

2. In centrifugal machines, a supporting frame, a hollow shaft hung upon said frame, bearings between the frame and the shaft, means for imparting a gyratory movement to said shaft, a bracket secured to the lower end of the shaft, a plurality of centrifugal drums rotatably supported on the bracket and each drum including a plurality of filtering bodies the inner of which is in the form of a cage, a secondary shaft mounted through the hollow shaft, a gear carried by the secondary shaft, a gear secured to the upper part of each drum and meshing with the gear on the secondary shaft, means for imparting a controllable gyratory movement reversible to that of the secondary shaft, means for feeding the material to be treated to the upper part of each of the drums, an element in the form of a scaled drum arranged within each centrifugal drum and occupying approximately one-half of the capacity of each drum, and destined to maintain the material to be treated between the inner cage shaped body of each drum and its wall causing a gradual advance under centrifugal action of materials towards the outlet of the drum and the continuous centrifugal action of the same.

3. In centrifugal machines, a supporting frame, a main hollow shaft supported by said frame, bearings interposed between the shaft and the frame, transmission means between the shaft and a suitable source of power, a secondary shaft mounted through the hollow shaft having its respective ends projecting above and below said hollow shaft, a gear fitted to one end of the secondary shaft, centrifugal drums arranged around the gear, a bracket carried by the hollow shaft for supporting the drums, gears carried by the drums and meshing with the gear on the secondary shaft, each drum including an outer body in the form of a perforated plate, a second body made of wide metallic netting, a third body made of filtering material and a fourth body in the form of a cage, means for imparting controllable rotatable movement to the shaft which bears the gear for the drum, means for feeding the material to be treated to each drum, and a drum-like element crescent shaped in cross-section having closed ends arranged stationary in each drum and occupying approximately one-half of the capacity of the same and having its outer curved portion arranged in proximity to the cage and destined to maintain the solid material in the cage during the advance of the latter behind the outer curved wall of the element and

causing the material to descend progressively through the centrifugal action towards the outlet of the drum.

4. In centrifugal machines, a supporting
5 frame, a hollow main shaft hung from said
frame, ball bearings between the shaft and
the frame, transmission means between the
shaft and a suitable source of power, a sec-
10 ondary shaft mounted through the hollow
shaft and projecting above and below the
ends of the shaft, a sleeve secured to the
lower end of the hollow shaft, a bracket in
the form of cross-like annular plates, a plu-
15 rality of centrifugal drums arranged about
the lower part of the main shaft and sup-
ported by brackets, ball bearings interposed
between the brackets and drums, a gear
carried by the secondary shaft, other gears
20 carried by the upper ends of the drums and
meshing with the gear on the secondary
shaft, each drum comprising an outer per-
forated metallic body, a second body of
metallic netting, a third body of filtering
25 material and a fourth body in the form of
a cage, a trough surrounding the upper part
of the sleeve, means for feeding the material
to be treated to said trough, pipes for dis-
charging the material to the upper part of
each drum, a hollow element of crescent
30 shape in cross-section having the respective
ends enclosed and arranged within each
drum with its convex wall arranged adja-
cent the cylindrical wall of the drum and
adapted to retain the material to be treated

against the inner cage as it passes between 35
the cylindrical walls, so as to cause the ma-
terial to descend gradually under centrifu-
gal action towards the outlet of the drum
and permitting continuous feeding to the
same of the material to be centrifugated, a 40
disc-like plate mounted above the upper end
of the main hollow shaft provided with an
opening through which the secondary shaft
projects, bearings for supporting the plate,
a wheel in frictional contact with the upper 45
surface of the plate, standards supported on
the frame, a horizontal shaft journaled in
the standards for supporting the friction
wheel so that the latter may be slid thereon,
a gear transmission between the horizontal 50
shaft and the secondary shaft, and a device
for controlling the movement of the friction
wheel toward and away from the center of
the plate thereby causing an increase or de-
crease of speed of the secondary shaft, sub- 55
stantially as and for the purposes set forth.

5. A centrifugal machine as claimed in
claim 1, wherein brackets are fixed to the
upper and lower parts of each of the ele-
ments in the drums, gears loosely mounted 60
on said brackets, endless chains operating
about the gears and the elements, slots car-
ried by said chains and in operable connec-
tion between said gears and said drums.

In testimony whereof I affix my signa- 65
ture.

MARCOS LARRALDE SANSARICO.