Aug. 8, 1961 H. C. BRAUCHLA 2,995,247

APPARATUS FOR SEPARATING MATERIALS OF DIFFERENT SPECIFIC GRAVITIES

Filed March 9, 1960 2 Sheets-Sheet 1

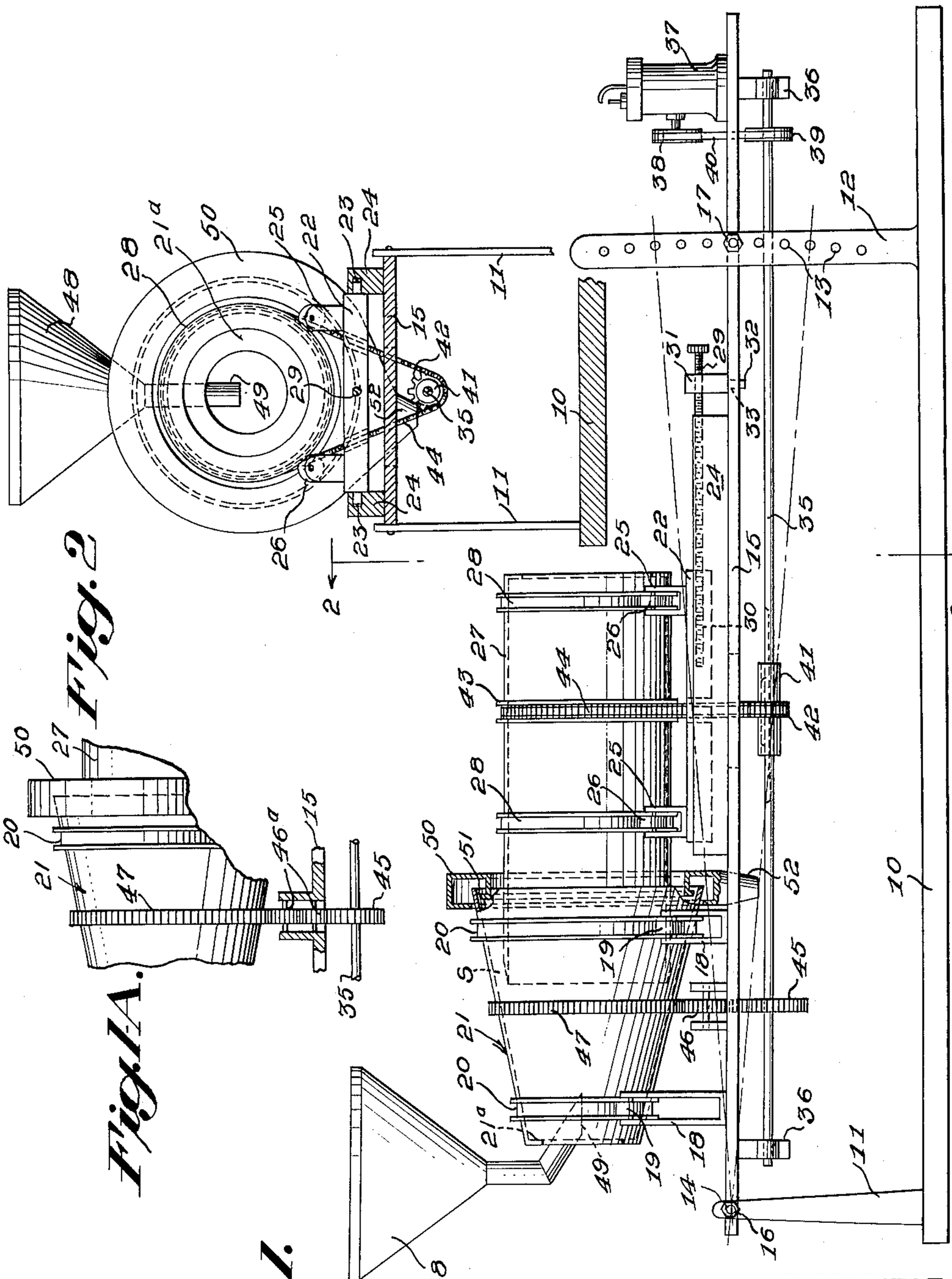

Fig. 1.

Fig. 1A.

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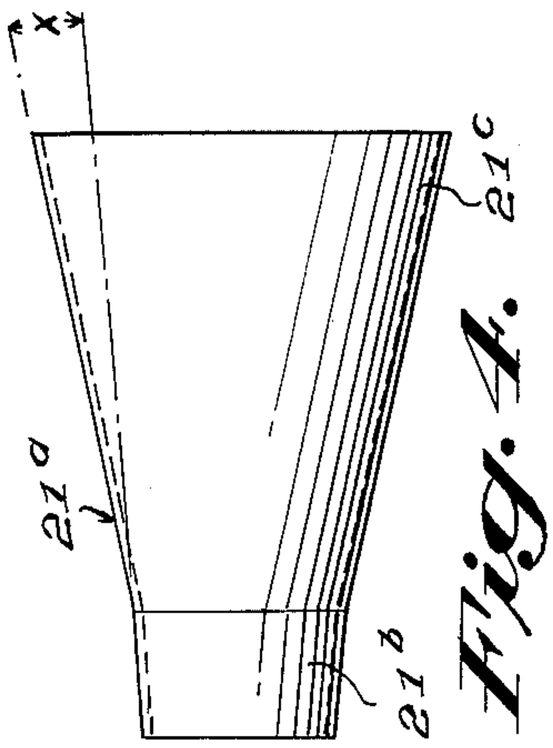

Fig. 4.

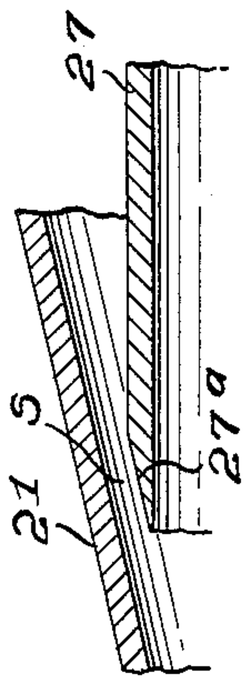

Fig. 5.

Fig. 3.

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APPARATUS FOR SEPARATING MATERIALS OF DIFFERENT SPECIFIC GRAVITIES

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This invention relates to apparatus for separating materials of different specific gravities.

A primary object of the invention is an improved apparatus for separating materials of different specific gravities in a conglomerate mass thereof, wherein the mass is confined to rotation thereof about an axis and wherein a portion of the material of a certain specific gravity is separated from the remaining material which is subjected to rotation about said axis and wherein the materials of different specific gravities are collected at separate stations.

A further object of the invention is the provision of means for separating materials of different specific gravities which embodies a pair of rotatable co-axial drums with an end of one thereof disposed within an adjacent end of the other and wherein said drums are rotatable about said axis with provision for feeding a heterogeneous mass of material into one end of one of the drums and with discharge of material of a given specific gravity from one of the drums and the remaining material discharging from the other drum.

A further object of the invention is a relatively simple structure for effective separation of materials of different specific gravities and which is highly efficient in operation as well as relatively simple in construction.

Other objects and advantages of the invention will become apparent in the course of the following detailed description, taken in connection with the accompanying drawings, wherein:

FIG. 1 is a side elevational view of the improved material separating apparatus.

FIG. 1–A is a fragmental side elevational view corresponding to a portion of FIG. 1, but disclosing a modified embodiment of the invention.

FIG. 2 is a broken transverse vertical sectional view as observed in the plane of line 2—2 on FIG. 1.

FIG. 3 is a more or less diagrammatic side elevational view showing material separating apparatus according to FIG. 1 as being arranged in tandem.

FIG. 4 is a side elevational view of a modified form of the advance separating member, shown in FIG. 1.

FIG. 5 is a fragmental sectional view of adjacent portions of the two cooperating members embodied in the separating apparatus.

Referring now in detail to the drawings, and first to FIGS. 1 and 2 thereof, the improved structure will be seen to comprise a frame including a base member **10** from one end of which a pair of laterally opposed posts **11** project vertically upwardly and adjacent the opposite end of the base member **10** are a pair of laterally opposed supports **12** which are provided with vertically spaced apertures **13** and, as is shown in FIG. 1, the apertures in each support have their centers in a curved line concentric with apertures **14** in the upper ends of the posts **11**.

Furthermore, the apertures **13** in the supports **12** are transversely aligned.

A platform **15** has one end thereof pivotally supported between the posts **11**, as by means of a pin **16** and the opposite end of the platform **15** is releasably engaged by pins **17** which are selectively receivable within the apertures **13** whereby the platform **15**, shown in horizontal position, is capable of being disposed in different degrees of angular relation to the base member **10**, as is indicated by dot-and-dash lines.

Disposed on the upper face of the platform **15** are brackets **18** arranged in longitudinally spaced pairs and in

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which are rotatably supported rollers **19** which are operatively disposed within channel tracks **20**, disposed adjacent opposite ends of a frusto-conical drum **21** and the cooperating rollers **19** and tracks **20** provide for rotation of the drum **21** about the axis thereof.

At this point, it is to be observed that the cooperating channel tracks **20** and the rollers **19** maintain the drum **21** against movement parallel with its axis and it is to be further observed that the drum **21** at the smaller or feed end thereof is provided with a relatively shallow circular flange **21a**.

A carriage **22** is provided with laterally opposed cam followers **23** which are disposed within tracks **24** on the platform **15**. The cam followers in cooperation with the tracks provide for relative lateral adjustment of the drums for accurate axial alignment thereof.

Projecting upwardly from the carriage **22** adjacent each end thereof are a pair of laterally spaced brackets **25** in each of which is rotatably supported a roller **26**.

A cylindrical drum **27** is provided with a pair of circumferential channel tracks **28** in substantially spaced relation axially of the drum in which the rollers **26** are disposed whereby the drum is capable of rotation about its axis which is normally co-incident with the axis of the frusto-conical drum **21**.

The forward end of the drum **27** is normally telescoped within the rear and larger end of the frusto-conical drum **21**, but same is capable of axial adjustment with a corresponding change in spacing of the inner end of the drum **27** and the inner wall of the drum **21** for a purpose later to appear.

In order to vary the distance of projection of the forward end of drum **27** within the drum **21**, the carriage **22** is capable of longitudinal adjustment and which is effected by means of an elongated screw **29** having one end thereof adjustably disposed within a threaded bore **30** in the rear end of the carriage **22** and the screw is threaded through a block **31** having a reduced square extension removably disposed in an aperture **33** in the platform **15**.

Thus, upon turning the screw **29**, the drum **27** may be axially adjusted for varying the space S between its inner end and the wall of the frusto-conical drum **21**.

Furthermore, the screw **29** may be threaded entirely out of bore **30** and same, together with block **31**, may be laid aside and the drum moved to a position wherein it is entirely clear of drum **21** for cleaning thereof.

Furthermore, the cam followers **23** provide for critical adjustment of the two drums **21** and **27**, for efficient operation thereof.

The drums **21** and **27** are rotatable about their common axis and according to FIG. 1, the drum **21** is rotatable at a higher rate of speed than drum **27** and in the same direction which is effected by drive means comprising an elongated shaft **35** whose opposite ends are rotatably supported in bearings **36** depending from the platform **15**. The shaft **35** is driven by a motor **37** through pulleys **38** and **39** and a belt **40**.

A cylindrical sleeve **41** surrounds shaft **35** and has a spline connection therewith and a sprocket wheel **42** surrounds and is fixed to the sleeve and the drum **27** is provided with a sprocket wheel **43** disposed intermediate tracks **28** and which is drivingly engaged with the sprocket wheel **42** by means of a sprocket chain **44**.

The purpose of the splined sleeve **41** is to provide for axial adjustment of the drum **27** and upon adjustment of the drum **27** to a cleaning position and in retracted relation to drum **21**, the chain **44** may be temporarily removed.

A relatively large gear **45** is secured to shaft **35** and rotatably supported on the platform **15** is a relatively small gear **46** in driving engagement with gear **45** and

which is also in driving engagement with a gear **47** surrounding the frusto-conical drum **21** intermediate tracks **20**. Accordingly, the drum **21** will rotate faster than and in the same direction as drum **27**.

According to FIG. 1–A the drum **21** is rotated faster than and in an opposite direction to drum **27** which is effected by a pair of meshing relatively small gears **46a** which are also in mesh with gears **45** and **47**.

A material receiving hopper **48** has a spout **49** leading into the smaller and feed end of the drum **21** and a circular housing **50** is provided for receiving higher specific gravity material which passes between the inner wall of drum **21** and the outer wall of the inner end of drum **27**, or through space S.

The housing **50** is fixed with adjacent ends of drums **21** and **27** rotating within it and such housing is of generally rectangular form in cross section with the larger end of drum **21** entering a circular opening **51** therein and the lowermost portion of the housing is of funnel-like formation as indicated at **52**, which is disposed to one side of shaft **35** for discharge of material without interruption of separating operations.

In FIG. 3 is shown in more or less diagrammatic fashion a tandem arrangement wherein material discharged from drum **27** enters a hopper **48¹** of a second unit having cooperating drums **21¹** and **27¹** whereby the valuable material is capable of more complete extraction from an original heterogeneous mass of material.

In FIG. 5 is shown a desirable formation of the inner end of drum **27** which is bevelled at **27a** to present a surface parallel with the inner wall of drum **21** for most effective adjustment of the space S which may be rendered zero.

As shown in FIG. 4, the drum **21a** may have a forward end portion **21b** whose wall is at a less angle to the axis of the drum than the major portion **21c** thereof. In this form of drum, the material from the hopper spout **49** would be deposited on the portion **21b**.

Having set forth the invention in accordance with certain specific structural embodiments thereof, what is

claimed and desired to be secured by U.S. Letters Patent is:

1. Apparatus for separating materials of different specific gravities, comprising a vertically adjustable platform, a frusto-conical drum supported on said platform for rotation about its axis, a material feed hopper extending into the smaller end of said frusto-conical drum, a cylindrical drum disposed about said platform in normally co-axial relation to said frusto-conical drum and having one end thereof normally disposed within said frusto-conical drum, means on said platform longitudinally adjustable relative thereto, means on said last means supporting said cylindrical drum for rotation about its axis, a power driven shaft disposed beneath said platform and means for individually imparting rotation to said drums from said power driven shaft.

2. The structure according to claim 1, wherein said frusto-conical drum is driven at a higher rate of speed than said cylindrical drum.

3. The structure according to claim 1, together with a housing communicating with the larger end of said frusto-conical drum and extending circumferentially thereof, said housing being adapted to receive material discharged from said frusto-conical drum and having a discharge funnel-like member at the lowermost portion thereof.

4. The structure according to claim 1, wherein said drums are rotated in opposite directions.

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