Oct. 1, 1929. A. C. BAMFORD 1,729,758

CENTRIFUGAL SEPARATOR OR THE LIKE

Filed Dec. 2, 1925 2 Sheets-Sheet 1

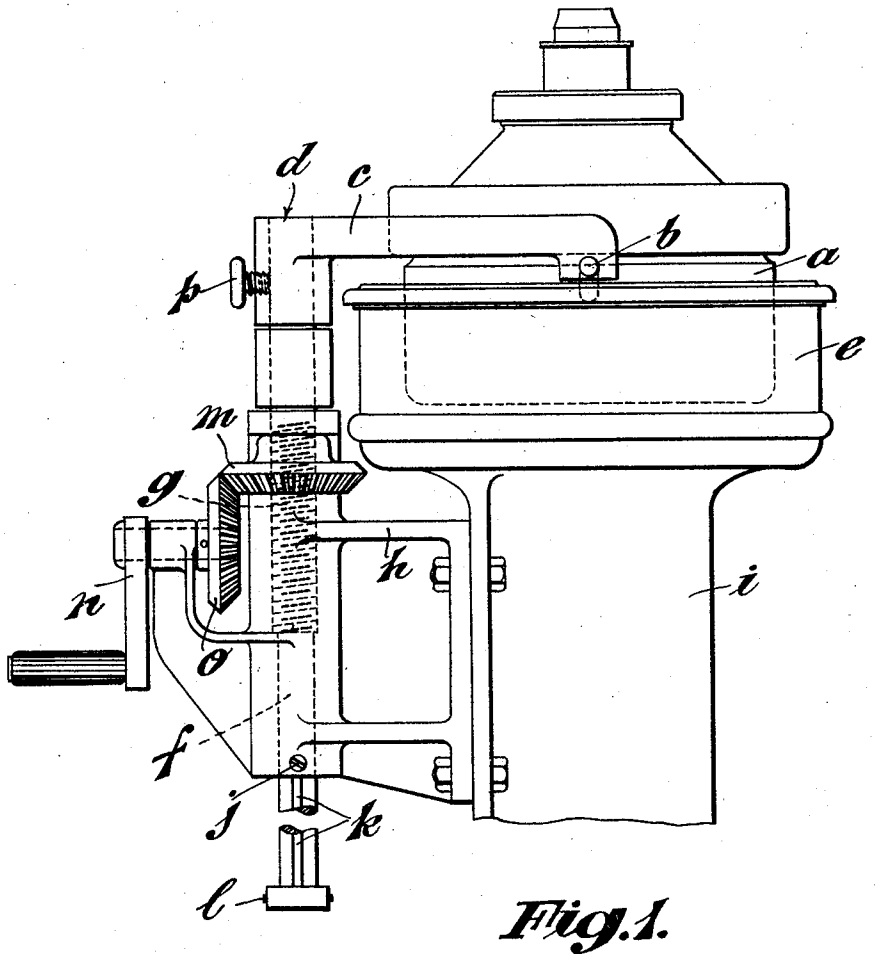


Fig. 1.

INVENTOR

Alfred Chadburn Bamford

BY

Busser and Harding

ATTORNEYS.

Oct. 1, 1929. A. C. BAMFORD 1,729,758

CENTRIFUGAL SEPARATOR OR THE LIKE

Filed Dec. 2, 1925 2 Sheets-Sheet 2

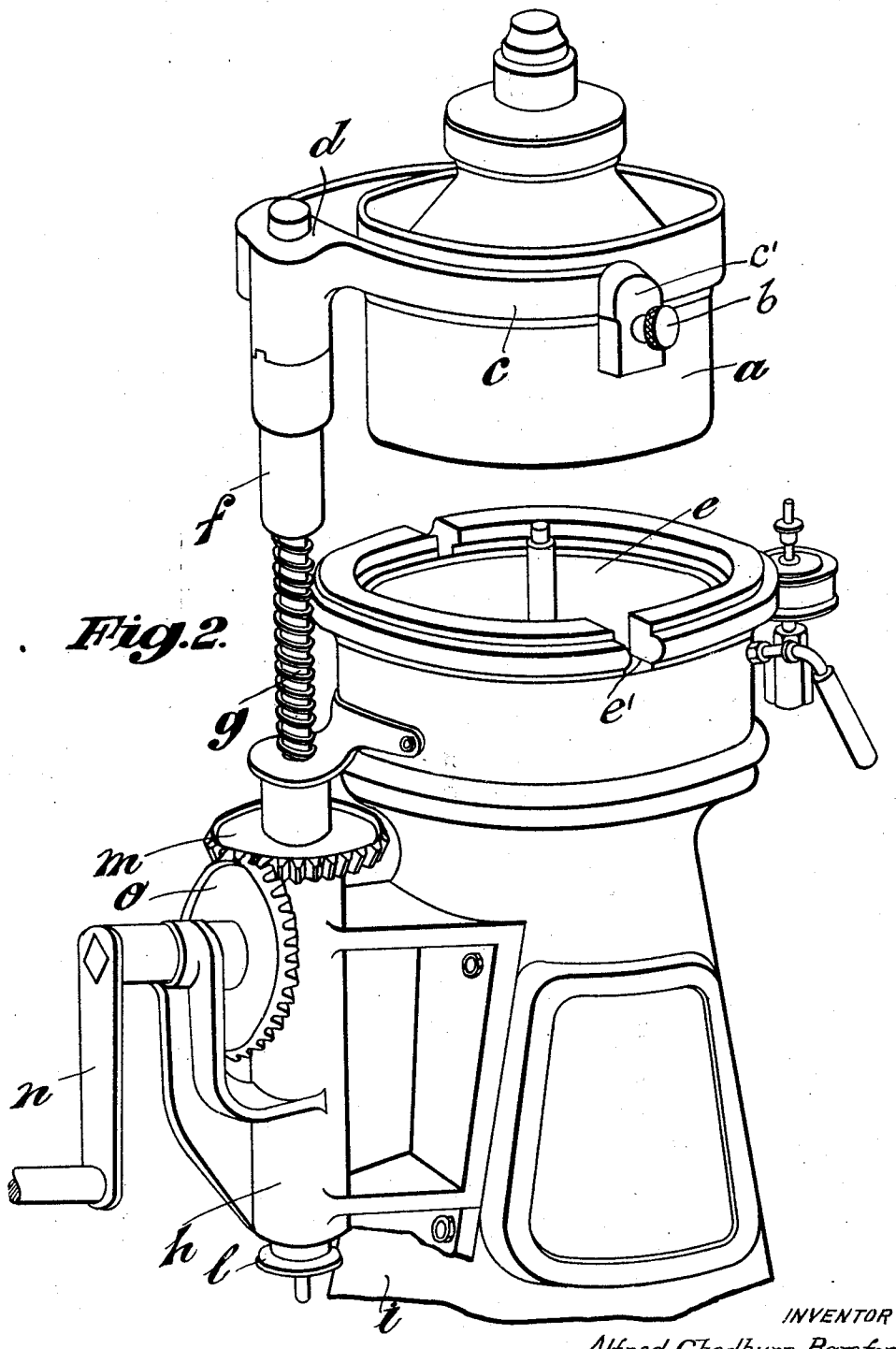


Fig. 2.

INVENTOR
Alfred Chadburn Bamford
BY
Bussar and Harding
ATTORNEYS.

Patented Oct. 1, 1929 1,729,758

UNITED STATES PATENT OFFICE

ALFRED CHADBURN BAMFORD, OF NEW BRIGHTON, ENGLAND, ASSIGNOR TO THE DE LAVAL SEPARATOR COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY

CENTRIFUGAL SEPARATOR OR THE LIKE

Application filed December 2, 1925, Serial No. 72,655, and in Great Britain December 10, 1924.

This invention relates to centrifugal separators or the like for separating solids from fluids or fluids from fluids of different specific gravities.

The object of the present invention is to provide improvements in such machines by which the removal of the bowl and the discharge from it of the separated matters and the necessary cleaning operations can be quickly and easily effected.

This quick and easy manipulation of the bowl is especially important in connection with centrifuges used for the separation of impurities from oil used for the lubrication systems of engines or machinery where the lubricating oil which is in continuous circulation is passed through one or more centrifugal oil purifiers for the purpose of keeping the oil constantly clean and pure. In such cases and with the conventional form of centrifugal purifier the removal of each bowl for cleaning and its replacement after cleaning entails a considerable amount of time and labour as besides being heavy the bowls are frequently too hot to handle with the bare hands.

The present invention consists broadly in providing centrifugal separators with mechanical means for lifting their bowls out of and into the normal position.

According to one embodiment of the invention the bowl is pivotally mounted between the arms of a yoke the arrangement being such that the mechanical lifting means operate to raise bodily both the yoke and the supported bowl, and when in the elevated position the bowl and the yoke together are free to be swung about a horizontal plane whilst the bowl is free to be turned independently about its pivotal mountings to facilitate the cleaning operation.

In order that the invention may be clearly understood such an embodiment will now be described by aid of the accompanying drawing in which Fig. 1 is a fragmentary elevation of a centrifugal separator with one form of lifting gear for the bowl applied thereto.

Fig. 2 is a perspective view of the same.

In the arrangement illustrated the bowl *a* of the separator is pivotally mounted as at *b* between the extremities *c* of the arms of a yoke *d* in such a manner that the bowl, when lifted out of the supporting vessel or cup *e* is free to be swung about such pivots to an inverted position so as to empty it of the collected separated solids or impurities. The pivots *b* about which the bowl may be swung to an inverted position are screws *b*, which, by their knurled heads, as shown in Fig. 2, may be turned to screw them into the sockets in the bowl when it is desired to raise the bowl, or may be turned in the opposite direction to screw them out of the bowl sockets to permit rotation of the bowl when in the operative position.

The lifting mechanism in the present example comprises a spindle *f* which is threaded as at *g* and upon the upper end of which is mounted the yoke *d*. This spindle *f* is slidably fitted in a bracket *h* which is bolted to the frame *i* of the separator and such spindle is prevented from rotating by the engagement between a stud *j* or its equivalent and a longitudinal groove *k* in the lower end of the spindle. The upward movement of the spindle is limited by a stop in the form of a collar *l* on the spindle.

The means illustrated for moving the spindle comprise a nut in the form of a bevel pinion *m* engaging the threaded portion of the spindle, said nut being rotated by means of a handle *n* through the medium of a further bevel pinion *o* which meshes with the bevel pinion *m*.

It will thus be seen that by rotating the handle *n* the nut *m* is rotated to cause the spindle to be raised or lowered and with it the yoke *d* and bowl *a*. Normally the yoke *d* may be fixedly secured to the spindle *f* by means of a clamping screw *p* but when the bowl is raised clear of its supporting vessel or cup *e* the clamping screw may be slackened off so as to permit the yoke with the bowl to be swung round in a horizontal plane when the bowl is free to be inverted for cleaning.

It is to be understood that the present invention is not limited to the particular means illustrated for lifting the bowl as any other suitable means for this purpose may be employed. For example the bowl may be lifted

by means of a lever or steam, air, or hydraulic rams in lieu of the bevel gear illustrated and the term "mechanical means" employed in the claims is to be construed as including such devices.

Further any convenient system of counter-balancing the weight of the bowl may be used such for example as counter-balancing wheels, springs or weights.

In practice the yoke and the lifting gear may be enclosed by a hood or cover.

To enable the ring of the bowl to be undone with its spanner it is usual to lock the bowl in position by means of two bolts. The design illustrated lends itself to the provision of alternative and more satisfactory means for this purpose. These means are illustrated in Fig. 2 and comprise extensions c^1 on the yoke arms below the pivots b which when the bowl is lowered are adapted to fit in slots e^1 in the neck of the bowl receptacle or cup e.

What I claim and desire to secure by Letters Patent is:—

1. In a centrifugal separator, the combination, with the bowl, of a supporting receptacle, diametrically opposite recesses in the neck of the receptacle, vertically movable arms by and between which the bowl is supported, and extensions on said arms adapted to fit in said recesses.

2. In a centrifugal separator, the combination with the bowl, of two bowl supports, one adapted to support the bowl in operative position, the other comprising a yoke, means supporting the central part of the yoke and on which the yoke is swingable laterally and which is movable vertically to lift the yoke bodily to raise the bowl away from the first support, the bowl being mounted on a horizontal axis between the ends of the yoke arms to permit it to be inverted after the bowl is lifted.

3. In a centrifugal separator, the combination, with the centrifugal bowl, of two bowl supports, one adapted to support the bowl during operation and the other being vertically and laterally movable, and means to prevent lateral movement of the second support during its vertical movement so that the bowl may be moved vertically with its axis maintained in line with the axis of the first support, said means being releasable to permit lateral movement of the support to enable the bowl to be swung laterally after it is raised.

4. In a centrifugal separator, the combination, with the centrifugal bowl, of two bowl supports, one adapted to support the bowl during operation and the other being vertically and laterally movable, means to prevent lateral movement of the second support during its vertical movement so that the bowl may be moved vertically with its axis maintained in line with the axis of the first support, said means being releasable to permit lateral movement of the support to enable the bowl to be swung laterally after it is raised, and means to lock the second support after it and the bowl have been swung laterally to bring the bowl out of vertical alignment with the first support.

5. In a centrifugal separator, the combination, with the centrifugal bowl, of two bowl supports, one adapted to support the bowl during operation and the other being vertically and laterally movable, and means to prevent lateral movement of the second support during its vertical movement so that the bowl may be moved vertically with its axis maintained in line with the axis of the first support, said means being releasable to permit lateral movement of the support to enable the bowl to be swung laterally after it is raised, the second support comprising trunnions engaging the bowl at the opposite ends of one of its diameters.

6. In a centrifugal separator, the combination, with the centrifugal bowl, of two bowl supports, one adapted to support the bowl during operation and the other being vertically and laterally movable, means to prevent lateral movement of the second support during its vertical movement so that the bowl may be moved vertically with its axis maintained in line with the axis of the first support, said means being releasable to permit lateral movement of the support to enable the bowl to be swung laterally after it is raised, the second support comprising trunnions engaging the bowl at the opposite ends of one of its diameters, and means to lock the second support after it and the bowl have been swung laterally to move the bowl out of vertical alignment with the first support.

7. In a centrifugal separator, the combination, with the bowl, of means to move the bowl both vertically and horizontally, and means to rigidly restrain the bowl against horizontal movement during its vertical movement, said means being releasable to permit said horizontal movement.

8. In a centrifugal separator, the combination, with the bowl, of a bowl supporting yoke, turnable about a vertical axis so as to position the bowl either in vertical alignment with its operating position or in position for cleaning, manually releasable means to lock the yoke in each position, and means to move the yoke vertically while it is locked in the first specified position.

In witness whereof I affix my signature at Liverpool, England, on Nov. 17th, 1925.

ALFRED CHADBURN BAMFORD.