SEPARATOR DRIVING MECHANISM

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This invention relates to mechanism designed for driving or turning rotary shafts and has reference more particularly to means for transmitting motion from one to another shaft.

5 An object of the invention is to provide noiseless automatic transmission mechanism of such construction as to be adapted to operate without causing shocks due to sudden starting of one element by another.

10 Another object is to provide improved driving mechanism for cream-separators which shall be adapted to permit hand-power operation without endangering the operator, and which shall be efficient and not costly to manufacture.

Another object is to provide improved separator driving mechanism which shall be of such construction as to be adapted to be operated either by an engine or motor or by hand-power, and intermittently by either at will and which shall be adapted to be durable and economical in use.

With the above-mentioned and other objects in view, the invention consists in improved driving mechanism having silent clutching apparatus enabling one rotary element to smoothly start and rotate another rotary element in one direction and permitting it to be rotated in the same direction by another source of energy; and further, the invention consists in the parts and combinations and arrangements of parts as herein-after particularly described and further defined in the appended claims.

Referring to the accompanying drawings,—Figure 1 is an elevation, partially broken away, of a popular type of centrifugal separator having the improved driving mechanism incorporated therewith; Fig. 2 is a vertical sectional elevation approximately at right angles to the preceding figure; Fig. 3 is an enlarged sectional detail showing improved driving wheel construction and shaft connections whereby either one may be clutched to the other; Fig. 4 is an enlarged sectional detail showing improved mechanism whereby a shaft may be rotated in one direction by hand-power and permitted to be rotated in the same direction by motor-power; and Fig. 5 is a perspective view of a spring clutch device which preferably is incorporated in the invention.

Similar reference characters in the various figures of the drawings indicate corresponding elements or features of construction herein referred to in detail.

The improved driving mechanism is well suited for separator driving and is illustrated and described in connection therewith, and may be advantageously applied to various types of machines.

In the drawings the numeral 1 indicates generally the frame of a separator, and on the upper portion of the frame a pair of journal bearings or boxes 2 and 3 and a conventional separator vessel 4 having an actuating gear shaft or spindle 5, a crank shaft 6 being mounted in the bearings and having a hand-crank 7 fixed thereto. A large spur toothed gear wheel 8 is arranged on the crank shaft and for the purposes of the present invention is rigidly secured thereto to drive a gear shaft or countershaft 9 rotatably mounted in suitable journal bearings 10 and 11 below the other bearings above-mentioned, the shaft 9 having a gear wheel 12 thereon of large diameter which conventionally rotates the shaft 5 at relatively higher speed than that of the shaft 9, the latter shaft being sufficiently long to extend through and beyond its supporting bearings.

The improved mechanism includes a spur toothed pinion 13 which is rotatively mounted on the shaft 9 and in mesh with the wheel 8, and it has a side hub portion 14 to which a hollow cylindrical clutch member 15 is fixed, preferably integrally therewith, the member 15 having a true bore 16 therein and also a counterbore 17. A collar 18 is rigidly secured to the shaft 9 and has a hollow cylindrical portion 19 that is received in the counterbore, the internal diameter of the portion 19 being approximately equal to the diameter of the bore 16 to receive a frictional spring clutch, the portion 19 being suitably bored for the required purpose and having a pocket 20 in the bottom of the bore. A coiled spring clutch 21 is arranged in the bore 16 and extends into the portion 19, being provided with
What is claimed is:

1. A separator driving mechanism including two identical coil spring friction clutches spaced apart in tandem arrangement, a horizontal gear shaft loosely arranged in the clutches and rotatably supported, two collars rigidly secured to the shaft at corresponding ends of the clutches respectively and connected thereto, a rotary crank shaft and a toothed gear wheel rigidly secured thereto, a toothed pinion rotatively supported on the shaft gear in mesh with the gear wheel and provided with a hub portion having a bore receiving the major portion of one of the clutches to fractionally engage the clutch upon rotation in one direction, and a pulley rotatably supported also on the shaft and provided with a hub portion having a bore receiving the major portion of the remaining one of the clutches to fractionally engage the clutch upon rotation in one direction.

2. In a separator driving mechanism, the combination with a high speed rotary gear shaft, of a drive wheel rotatably guided on the shaft and provided with an annular smooth face friction clutch member, a collar rigidly secured to the shaft and having a bore therein diametrically larger than the shaft and a pocket at the bottom of the bore, and a coil spring friction clutch device partially arranged in said bore and having a lug extending into said pocket, the device being guided by the clutch member and automatically engaging its smooth face upon rotation of the drive wheel in one direction.

3. In a separator driving mechanism, the combination of a rotary gear shaft having two separate annular collars separately secured rigidly thereto, a toothed pinion and a pulley rotatably guided on the shaft in proximity to the collars respectively and having each a smooth-bore friction clutch portion, a driving gear wheel in constant mesh with the pinion and two coil spring friction clutch device secured to the collars respectively and guided in said smooth-bore portions respectively to automatically and silently engage said portions alternatively upon rotation of the pinion or the pulley.

4. In a separator, the combination, with a separator frame having two upper journal bearings spaced apart and two lower journal bearings spaced apart below the upper bearings respectively, of a gear shaft rotatably mounted horizontally in the lower bearings and extending therethrough, a worm gear fixed to said shaft between its bearings, a spur tooth pinion rotatably mounted on the gear shaft adjacent to the outer side of one of its supporting bearings, the pinion having an annular side hub portion extending outwardly, the outer end of the hub portion having a counterbore, a collar rigidly secured to the gear shaft and having a hollow cylindrical portion arranged to turn in said counterbore,
a clutch device inclosed in said cylindrical collar portion and said annular side hub portion and co-operating therewith, a crank shaft rotatably mounted in said upper bearings and extending therethrough, a spur tooth gear wheel secured to the crank shaft at the outer end of one of its supporting bearings and meshing with said pinion, and a crank arm secured to the crank shaft at the outer side of the opposite one of its supporting bearings.

5. In a separator driving mechanism, the combination, with a separator frame and a gear shaft rotatably supported thereby, of a collar rigidly secured to the shaft and having a hollow cylindrical portion provided with a guiding shoulder, a pulley having a hub rotatably supported at one end on the shaft, the remaining portion of the hub having a relatively large bore and also a counterbore receiving and guided by the cylindrical portion of the collar, said counterbore having a groove therein adjacent to said shoulder, a retaining ring arranged in said groove in contact with said shoulder, and a silent friction clutch device inclosed in said cylindrical collar portion and in said hub bore and co-operating therewith to rotate the shaft.

6. In a separator, the combination of an upright frame and a bowl thereon with a vertical spindle having support in the frame, a countershaft rotatively supported in the frame, a worm gear fixed to the countershaft and meshing with the spindle, a toothed pinion rotatable on the countershaft adjacent to one end thereof, a crank shaft supported by the upper portion of the frame, a drive gear secured to the crank shaft and meshing with the pinion, a noiseless friction clutch on the countershaft operable to connect the countershaft to the pinion, a belt drive pulley arranged on the countershaft adjacent to the opposite end thereof, a noiseless friction clutch on the countershaft operable to connect the countershaft to the pulley, and a casing secured to the frame and inclosing the drive gear and the pinion and also the pinion clutch.

In testimony whereof, we affix our signatures on the 22nd day of May, 1928.

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