Aug. 29, 1939. G. E. SWARTZ 2,171,458

DRIVE-LOCK MEANS

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Fig. 1.

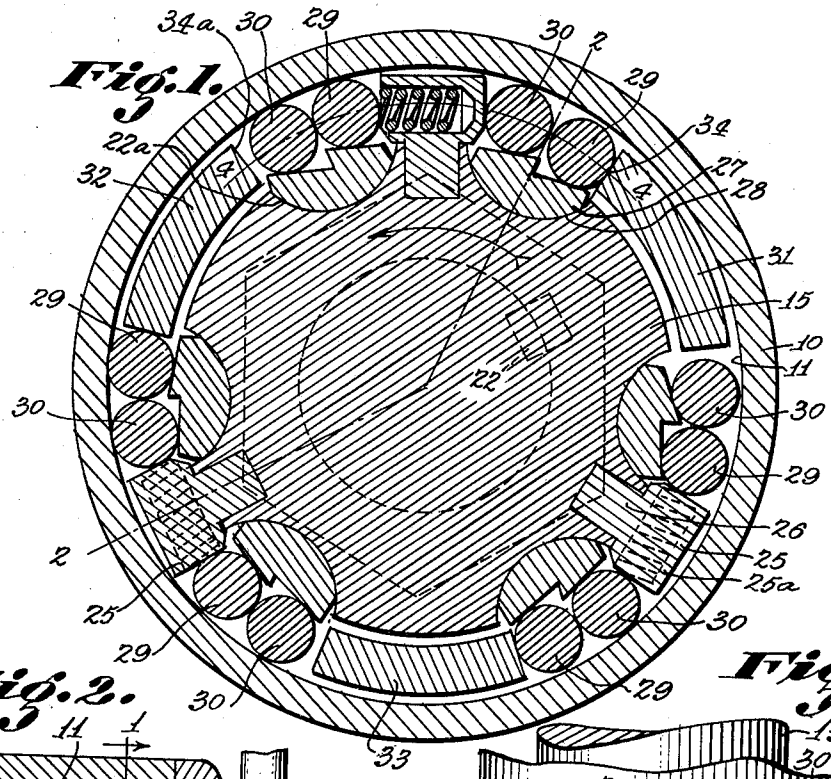


Fig. 2.

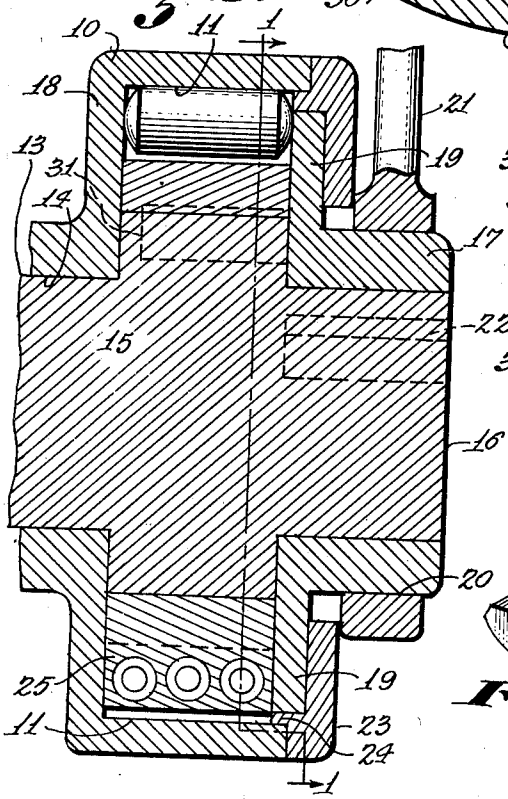
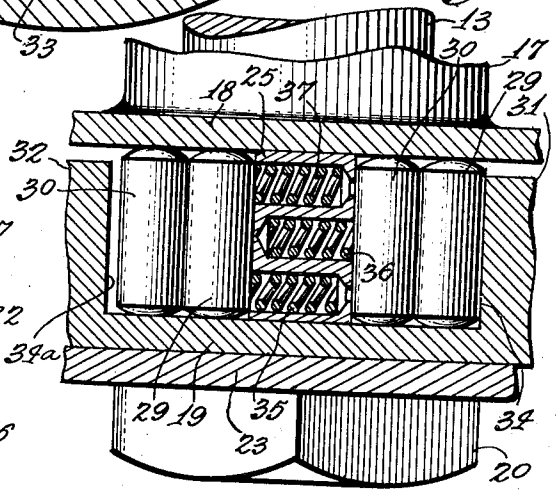


Fig. 4.



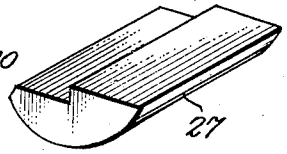


Fig. 3.

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DRIVE-LOCK MEANS

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10 Claims. (Cl. 192—8)

The present invention relates to driving a mechanism and frictionally locking the mechanism against reversing.

Objects of the present invention are—

To provide a means wherein a member operates a mechanism and is frictionally held against self-reversing at the end of an operation of the mechanism by a large member of contact points.

To provide a means wherein a plurality of drive-lock members are mounted on a member that can rock or swivel individually.

To provide a means whereby a movable mechanism is operated and is driven by the means through individually movable members mounted on a shoe that can rock or swivel individually and each of the movable members is forced into frictionally locking contact at the end of an operation of the movable mechanism.

To provide an inexpensive, not necessarily accurately machined means whereby a mechanism is driven and the means is frictionally locked against self-reversing at the end of movement of the mechanism.

Other objects will be pointed out during the description of the apparatus shown in the accompanying drawing, or will become apparent, or obvious, or will suggest themselves upon inspection of the drawing and this specification.

The accompanying drawing shows one type of device, for illustration purposes but not for limitation purposes, embodying the present invention. In the drawing—

Fig. 1 is a transverse section taken on line 1—1 of Fig. 2 and shows the general arrangement of this type of device.

Fig. 2 is a longitudinal section taken on line 2—2 of Fig. 1 showing further relations of elements of the device shown in Fig. 1.

Fig. 3 is a perspective view showing the rocking or swivelling shoe used in the device here shown.

Fig. 4 is a transverse section taken on line 4—4 of Fig. 1 showing more clearly the relations of the shoes and driving plugs and driving prongs and the casing and casing cover.

Similar reference characters refer to similar parts throughout the views.

Referring now to the accompanying drawing:

The casing 10, preferably non-rotatable and integral with or mounted on a device that has a mechanism which is to be moved, has the bore 11 therein which is, preferably, ground with a smooth surface.

The shaft 13 has the part 14 journaled in the casing 10, the diametrically enlarged part 15 and the journal part 16.

The flange 17 is journaled on the part 16 and the flange part thereof abuts the part 15 and keeps the part 15 in endwise abutment on the wall 18 of the casing 10 and on the flange 19 with a slight clearance so that the part 15 can rotate relative to the bottom of the bore 11 in the casing 10 and also permits the below described shoes and drivers and rolls to move freely therebetween. The outer end of the flange 17 is polygonal, here shown hexagonal at 20, to receive the operating handle 21 in six different angular relations to the shaft 13 so that the handle can be adjusted to different positions for convenience or necessity of operation of the device. The key 22 is interposed between the shaft part 16 and the hub part of the flange 17 so that rotation of the flange 17 by the handle 21 rotates the shaft 13 also.

The cover 23 has the annular flange 24 fitting to the bore 11 in the casing 10, is secured to the casing 10 by suitable means and abuts freely movably the flange part 19. This cover 23 serves to cover the openings between the movable members in the casing and holds the shaft part 15 against endwise movement within the clearance allowed between the casing 10 and the part 15.

The three drive-lock mechanisms here shown are duplicates so the description of one will answer for all. The three mechanisms here shown have been found to be satisfactory although less than or more than three such mechanisms may be used by duplication of the mechanism here shown.

Each driving member 25 has the end 26 closely fitting into the part 15 of the shaft 13, preferably driven in and the head 25 of each abuts the periphery of the shaft part 15.

Each shoe 27 rests or is seated movably on the curved bottom 28 of a socket in the shaft part 15 and has two surfaces on the top thereof for the below described rolls to move on.

The rolls 29 and 30 are interposed between the corresponding surfaces on the shoe and the bore 11 in the casing 10.

The prongs 31, 32 and 33 extend inwardly from the flange 19 and each end of each is adapted to contact the end roll of each row of rolls on each shoe 27.

The shoes 27 and the rolls 29 and 30 and the driving members 25 extend all the way across the shaft part 15 so that providing the grooves in the part 15 of the shaft are easily made and

the parts for the grooves are also easily formed and are merely cut off a little shorter than the width of the shaft part 15.

Operation of the handle 21 in either direction rotatively moves the flange 17 and the prongs 31 and, the flange being keyed onto the shaft part 16, rotatively moves the shaft 13 also and the mechanism that is to be operated by the shaft 13 is thereby moved also. The prongs move with the shaft 13 and, when moved in the direction of the arrow thereon, the flat side 34 of the prong 31 contacts the end one 29 of the rolls on one of the shoes 27 and moves this end roll 29 into contact with the roll 30 at the other end of the row of rolls and moves the roll 30 into contact with the driving plug 25. The driving plug then moves into contact with the roll 29 of the next shoe 27 and moves the roll 29 thereon into contact with the roll 30 adjacent thereto but not into contact with the side 34a of the prong 32. While the rolls are so moving and moving the driving plug, the rolls on each shoe are not wedged against the bore 11 and the drive-lock mechanism allows the shaft 13 to rotate freely in the hollow casing 10 until the shaft meets with resistance to movement thereof as when the mechanism driven by the shaft 13 comes to an end of a movement thereof and tends to stop rotation of the shaft 13. At this stage of the operation, the shaft 13 tends to stop rotating and further movement of the handle 21 takes up all lost motion and spring in the material and lets the prongs move a little further and thereby move the rolls on the shoes 27 up on the inclined surfaces thereon and thereby wedges the rolls on this shoe between the corresponding flat surface of the shoe and the bore 11 and also contacts the rolls on each other and thereby frictionally locks the drive-lock means against self reversing until a reverse movement of the handle 21 releases the locking.

The operation of the means just described also applies to the three mechanism here shown as well as to any other numbers of such means that may be added above the three shown or less than three.

Reverse movement of the handle 21 reverses the operation of the drive-lock mechanism and, at the end of a reversing movement, also frictionally locks the mechanism against self-reversing.

Each driving member 25 has three springs 35, 36 and 37 mounted therein. The springs 35 and 37 find abutment on the roll 29 at one side of the driving plug and the spring 36 finds abutment on the roll 30 on the other side of the same driving plug. The springs 35 and 37 exert more pressure against the roll 29 on one side of the plug while the spring 36 exerts less pressure against the roll 30 at the other side of the driving plug. The springs 35 and 37 tend to keep the rolls on one side of the driving plug in frictional contact with the shoe at one side of the driving plug with a certain pressure while the spring 36 tends to keep the roll of the other side of the same driving plug with less pressure overpowered by the springs 35 and 37 and keep the rolls 29 and 30 in contact with the corresponding surface on their shoe while the spring 36 tends to keep the rolls 29 and 30 free of frictional contact with the surfaces of the shoe as is shown in the drawing. The drive-lock mechanism is thereby locked against self reversing when the members are in position so shown.

When the operating handle is reversed, the rolls 30 and 29 are moved to ride upwardly on the shoe and thereby tend to put these rolls 30 and 29 into frictional contact on their shoe and against the bore 11 and against each other and thereby provide a multipoint contact and, aided by the spring 36 keeps the rolls 30 and 29 frictionally locked to prevent reversing of the shaft 13 and mechanism thereon. While the handle 21 so reverses the shaft, the prongs reverse also in the same direction so that the side 34 of each prong recedes from the row of rolls and permits the rolls to move individually while the side 34a of each prong is moved into contact on the roll 30 at the other side of the driving plug and moves the rolls 30 and 29 and releases the same from frictional contact and permits individual movement thereof.

This structure and method of operation thereof locks the mechanism more tightly at one end of the operation of a mechanism that is being driven than at the other end. When it is desired that the other end be locked more tightly, then the driving plugs are reversed so that the springs 35 and 37 act on the rolls on the opposite side of the driving plug.

In either case of directional operation of the drive-lock means, the rolls can compensatingly move into and out of contact on their companion or co-operating members by the shoes mounted on arcuate seats and the rolls mounted on the shoes in rows of rolls so that the shoes can rock on their seats until the rolls thereon each contacts its co-operating member.

The drive-lock means shown and described is simple of structure, requires no close machining or wearing in of parts and thereby eliminating cost of present productions; the friction contact points are materially increased above present similar devices; the drive-lock members are arranged in rows and each row is mounted on a shoe that can rock or swivel so that the rolls can compensatingly arrange themselves into contact onto a companion roll and onto the shoe and onto a raceway and thereby provide at least three friction contact points for each locking member and this aids materially in locking the drive-lock means against reversing. The device is easily and conveniently operated by one stroke of the handle operating the driving member and locking the drive-lock mechanism against reversing; the device is conveniently reversible by merely reversing one part thereof to convert the device to either one that locks more tightly when the handle is moved in one direction or one that locks more tightly when the handle is moved in the opposite direction.

I am aware that the present invention can be embodied in structures other than what is herein described within the spirit and intent of the present invention and the appended claims. Therefore

I claim—

1. A drive-lock means including, a member for driving a mechanism, a driving means for said member including a plurality of individually movable compensatingly mounted members comprising shoes and rolls thereon brought into co-operative relations for driving said member and frictionally locking said member against reversing at the end of an operation thereof.

2. A drive-lock means including, a driven member, a plurality of individually, movable and self relating members, shoes mounted to rock relative to said driven member, and means for applying force on one of said movable members

and thereby driving said driven member and relating said movable members for locking said driven member against reversing at an end of a movement thereof.

3. A drive-lock means for a rotatable member including, an element carried by the rotatable member and comprising a plurality of relatively compensatingly movable shoes and a row of rolls on each, and means for applying force against the end of one of each of said rows and thereby driving said rotatable member and frictionally locking the same against self reversing at the end of a rotative movement of said rotatable member.

4. A drive-lock means for a movable member including, a rotatable shaft, a shoe mounted to rock relative to said shaft, a row of individually movable members on said shoe, and means for applying force against an end one of said row of members on said shoe and thereby driving said movable member and locking the same against self reversing at an end of a movement thereof.

5. A drive-lock means for a rotatable member including, a hollow stationary casing, a shaft journaled in said casing, a plurality of shoes carried by said shaft each to rock relative thereto, a row of rolls individually movably mounted on each of said shoes to contact the inner wall of said hollow casing, and a means for applying force against the end one of each of said rows for driving said rotatable member and moving said rolls on each of said shoes into frictional locking contact between said shoes and the bore of said casing when said rotatable member meets with resistance to rotation thereof.

6. A drive-lock means including, a casing, a shaft journaled in said casing, a driving plug projecting radially of said shaft within said casing, a rockable shoe mounted on said shaft circularly adjacent to each side of said driving plug, a plurality of rolls individually movably mounted on each of said shoes, and movable driving prongs extending into said casing and one adapted to contact with one of said plurality of rolls and the other with the other of said plurality of rolls.

7. A drive-lock means including, a hollow casing, a shaft journaled in said casing, a plurality of driving plugs projecting radially from said shaft within said casing, a rockable shoe mounted on said shaft at each side of the corresponding driving plug and each shoe having a plurality of surfaces inclined relative to the wall of said casing, an individually movable member on each of said surfaces, and prongs entering said casing and each adapted to engage one end of the row of individually movable members by one side thereof and the opposite end of the row of individual members by the other side thereof.

8. A drive-lock means including, a casing, a shaft journaled in said casing, rows of individually movable rolls mounted on said shaft, a driving plug fixed to said shaft intermediate said rows of rolls, springs in said driving plug to exert more pressure against one of said rows of rolls than against the other row of rolls, and driving prongs entering said casing and one being adapted to engage one of the rows of rolls and the other adapted to engage the other row of rolls.

9. A drive-lock means including, a driving locking mechanism within a casing and including compensatingly mounted individually relatively movable rolls and shoes adapted to rock individually, and a driving means on the outside of the casing and adapted to operate said mechanism in said casing for first moving the driving locking mechanism positively and then lock the driving mechanism against reversing when the same encounters a resistance to movement thereof.

10. A drive-lock means including a casing, a driving locking mechanism within said casing and including compensatingly mounted individually relatively movable members, and a driving means on the outside of said casing and adapted to operate said mechanism within said casing in opposite directions and lock said mechanism within said casing with more force at the end of one directional movement than at the end of the other directional movement.

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