E. ANDERSON.

YIELDABLE GEARING.

APPLICATION FILED AUG. 13, 1912.

1,165,381. Patented Dec. 28, 1915.

Fig. 1.

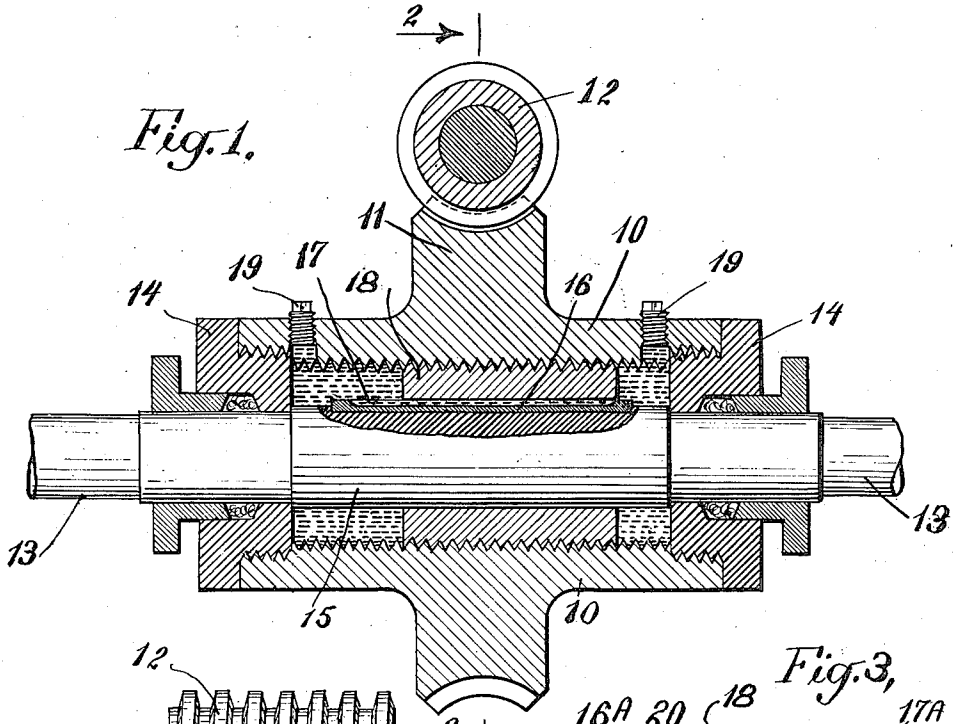


Fig. 2.

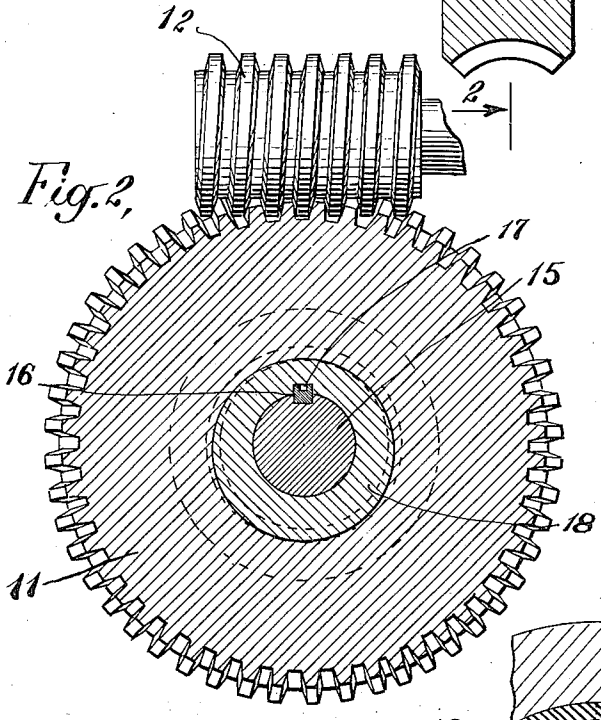


Fig. 3.

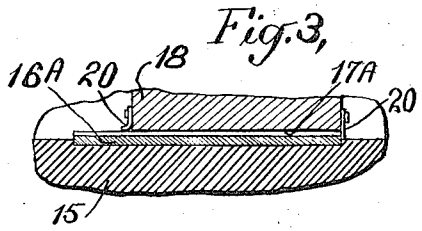


Fig. 4.

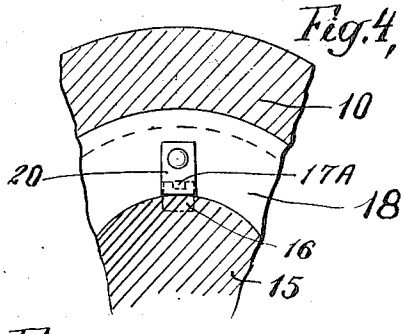
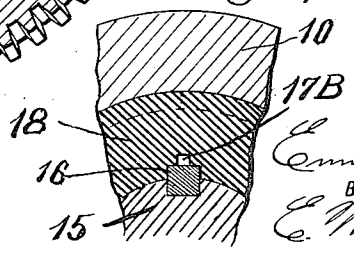


Fig. 5.



WITNESSES

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YIELDABLE GEARING.

1,165,381. Specification of Letters Patent. Patented Dec. 28, 1915.

Application filed August 13, 1912. Serial No. 714,909.

To all whom it may concern:

Be it known that I, EMIL ANDERSON, a citizen of the United States of America, and a resident of New York, county and State of New York, have invented certain new and useful Improvements in Yieldable Gearing, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to yieldable gearing and its object is to provide a transmission device between a driving and a driven member by means of which when the driving member is started, its motion will be imparted gradually to the driven member, and to provide a simple, self-contained and automatically actuated yieldable gearing for this purpose.

To these ends I have invented the device shown in the accompanying drawings, which I will describe in the following specification, and the novel features of which I will set forth in appended claims.

Referring to the drawings: Figure 1 is a sectional side elevation of a yieldable gearing embodying my invention. Fig. 2 is a sectional end elevation of the same device, the section being taken on the line 2—2 of Fig. 1. Fig. 3 is a sectional side elevation of portions of the device shown in Figs. 1 and 2 showing a modified form of construction. Fig. 4 is a sectional end elevation of the parts which are shown in Fig. 3. In Fig. 5 a construction somewhat like that illustrated in Figs. 3 and 4 is shown but in this case a still further modification is illustrated.

Like characters of reference designate corresponding parts in all of the figures.

10 designates a driving member which in this case is in the form of a hollow cylindrical housing, the central portion of which is enlarged to form a worm gear 11 which may be driven by a worm 12. This housing surrounds a driven shaft 13 and is provided with heads 14—14 which fit this shaft and are provided with stuffing boxes to insure a tight fit.

The central portion 15 of the shaft 13 is enlarged as shown and in it is a key 16. Throughout the greater portion of the length of this key is a longitudinal groove 17 but this groove does not extend through to the ends of the key.

That portion of the housing which is between the heads 14, 14, forms a chamber which is divided into two compartments by a cylindrical member 18, the external surface of which is threaded and fits into similar threads provided on the inner surface of the housing 10. This member 18 is provided with a key-way which fits over the key 17 and it also fits closely about the enlarged portion 15 of the shaft. The chamber within the housing is to be filled with oil or other suitable fluid which may be done through the holes which are shown closed by the screw plugs 19.

Before specifically describing the modifications which are shown in Figs. 3, 4 and 5 of the drawings I will point out the operation of this device. When the cylindrical member 18 is in an intermediate position there is a small by-pass formed between the two compartments of the oil chamber through the longitudinal cut 17 in the key. Now when rotation is imparted to the driving member 10 this will have a tendency to move the driving shaft 13, or if the latter does not move, to impart a longitudinal movement to the cylindrical member 18. If the latter is in its central position when the apparatus is started, its longitudinal movement will decrease the size of the compartment on one end of the apparatus and increase the size of the other compartment. The pressure thus imposed upon the fluid when the compartment is decreasing in size may be transferred slowly through the by-pass into the other compartment. Let us assume that the rotation of the driving member 10 is in such a direction as to cause the cylindrical member 18 to move to the right. This movement will continue until the shaft 13 starts to rotate or until the cylindrical member 18 reaches the end of the groove 17 and thereby shuts off the by-pass for the fluid. The parts are shown in such relative positions in Fig. 1 as to cause the by-pass to be closed. It is evident that then the driven shaft 13 must then rotate with the driving member 10. It is obvious that this device is reversible and that rotation imparted in either direction to the driving member 10 will, after a fixed amount of lost motion, be transmitted to the driven shaft 13 in the same direction.

In Figs. 3 and 4 the key 16^A is provided with a longitudinal groove 17^A which in this case extends throughout the length of the key. The cylindrical member 18 is provided in this case with two flap valves 20,

one on either end thereof immediately above the key 16^A which are adapted to ride upon the upper surface of the key when the cylindrical member is in intermediate positions. This allows the by-pass formed by the groove 17^A to remain open. But when the cylindrical member moves into such a position as to bring one of its ends into alinement with the end of the key, the flap valve on this end of the member will fall down over and close the end of the groove 17^A, thus shutting off the by-pass. It is not necessary in this case to have the groove cut in the key, but if desired it may be cut longitudinally through the cylindrical member 18 directly above the key as is shown at 17^B in Fig. 5.

I have illustrated and described several modified forms of my invention to show that it is not limited to any specific construction or arrangement of parts. The driving member 10 may be the engine shaft or it may itself be driven by any suitable motive power. By the use of this invention an engine to which it is applied may be started with little or no load upon it. The load will gradually be put upon the engine without any undue strains as it will increase as the pressure upon the fluid within the housing increases until the by-pass is shut off, after which the driven member will be connected positively with the driving member.

What I claim is:

1. A shaft, a hollow housing rotatably mounted thereon and arranged to form a closed chamber surrounding the shaft, and a member keyed to the shaft within said housing dividing said chamber into two compartments and arranged to move longitudinally therein, one of the parts being constructed to form a bypass between said compartments, said member being arranged to close said bypass after a predetermined longitudinal movement.

2. A shaft, an internally threaded housing rotatably mounted thereon and arranged to form a closed chamber surrounding the shaft, and a cylindrical member screwed into the housing and keyed to the shaft dividing said chamber into two compartments and arranged to move longitudinally therein, one of the parts being constructed to form a bypass between said compartments, said member being arranged to close said bypass after a predetermined longitudinal movement.

3. A shaft, a key therein, said key being provided with a longitudinal groove throughout the intermediate portion of its length, an internally threaded housing rotatably mounted on the shaft and arranged to form a closed chamber surrounding the shaft, a cylindrical member screwed into the housing, said member being provided with a key-way fitting the key in the shaft, said member dividing the chamber into two compartments connected by the longitudinal groove in the key when the member is in certain positions and said member being arranged to close the groove as the member approaches the end of the key.

4. A hollow rotary gear member arranged to form a chamber for fluid, an axially movable member forming one end of said chamber arranged by its movement to change the size of said chamber, and a passage for allowing some fluid to flow into or out of said chamber during a portion of the movement of said axially movable member, the movable member being arranged to close said passage when it has moved to a predetermined position.

5. A hollow rotary gear member arranged to form a chamber for fluid, an axially movable member therein arranged to divide said chamber into two compartments and by its movement to simultaneously increase the size of one of said compartments and to decrease the size of the other compartment, and a passage for allowing fluid to flow from one of said compartments to the other during a portion of the movement of said axially movable member, said axially movable member being arranged to close said passage after a predetermined movement in either direction.

In testimony whereof, I have hereunto set my hand this 1st day of August, 1912, in the presence of two witnesses.

EMIL ANDERSON.

Witnesses:
R. J. DEARBORN,
ERNEST W. MARSHALL.