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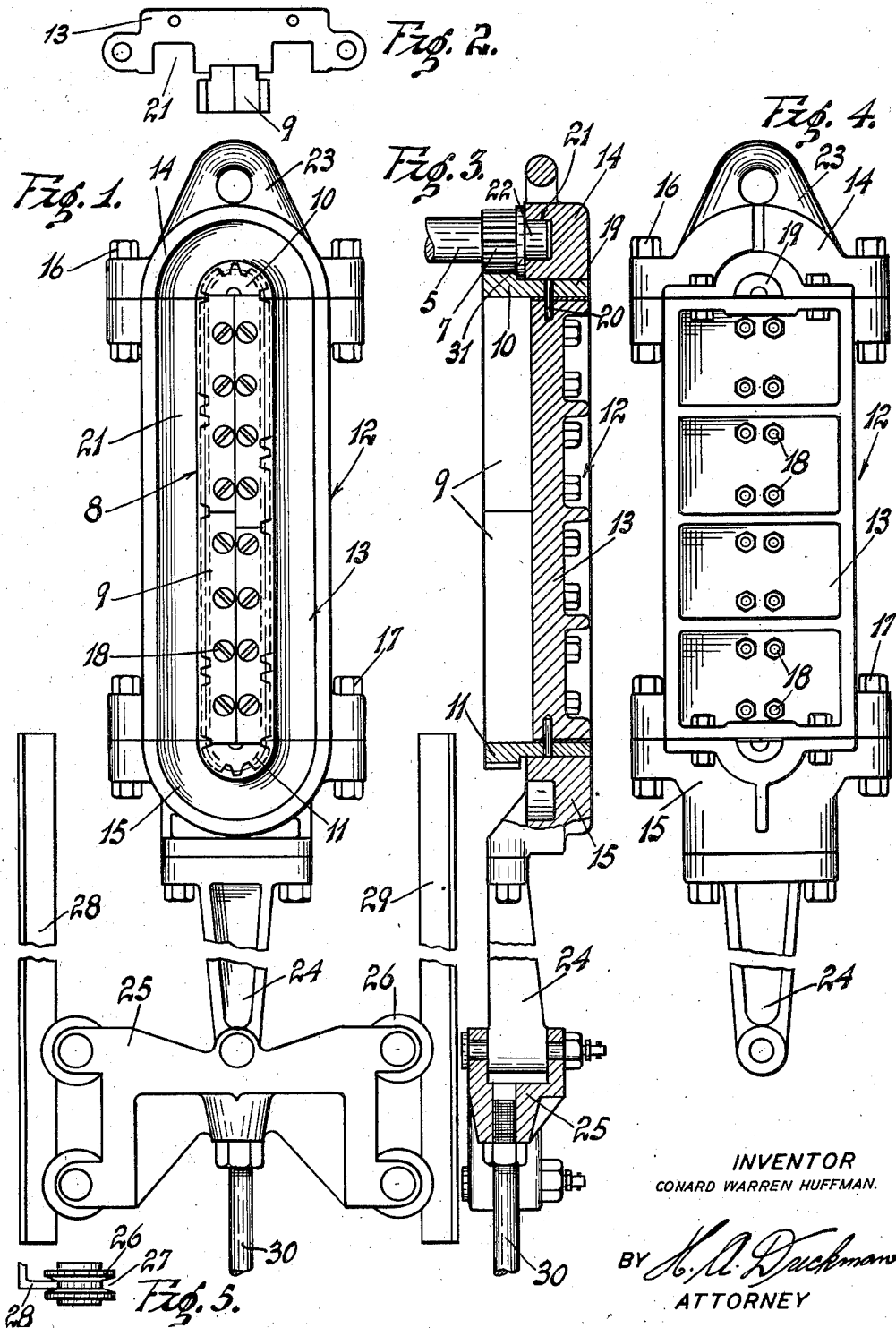
C. W. HUFFMAN

2,079,171

RECIPROCATING GEAR MECHANISM

Original Filed June 9, 1934

2 Sheets-Sheet 1



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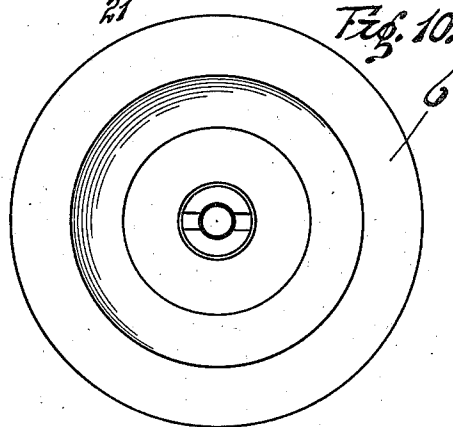
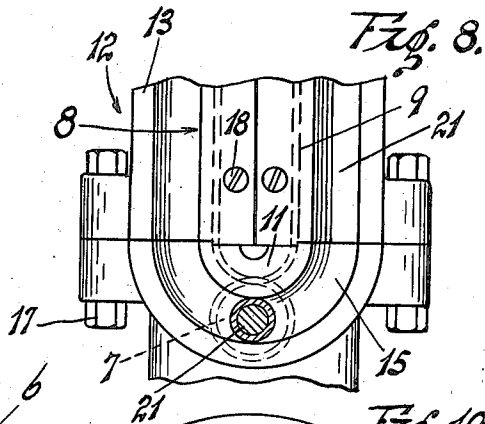
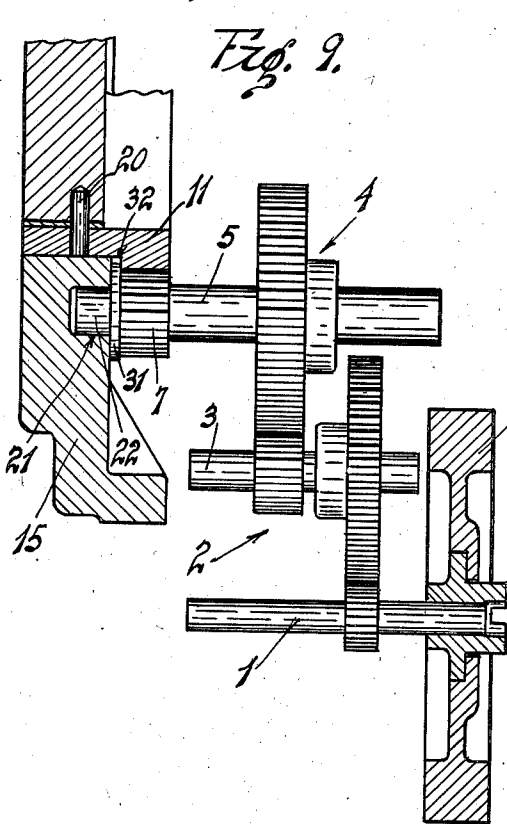
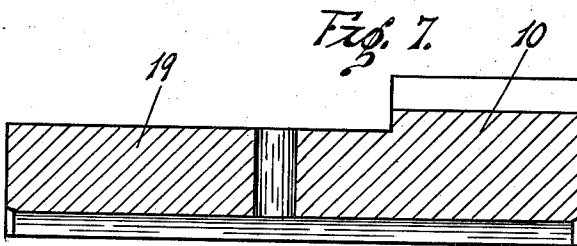
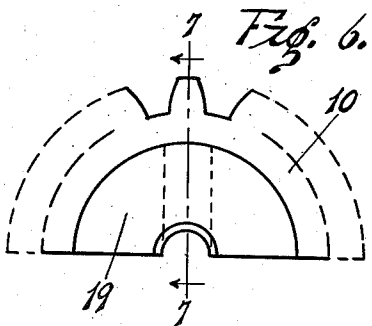
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RECIPROCATING GEAR MECHANISM

Original Filed June 9, 1934

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,079,171

RECIPROCATING GEAR MECHANISM

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9 Claims. (Cl. 74—30)

This invention relates to a reciprocating gear mechanism whereby a reciprocating movement is imparted to any device such as a pump, from a continuously rotating source of power.

5 An object of my invention is to provide a novel reciprocating gear mechanism which is simple to construct and to assemble, and which is effective in operation.

Another object is to provide a device of the character stated, in which the excessive jerk is eliminated, due to the movement of the reciprocating elongated gear from one side thereof to the other.

Another object is to provide a novel means of eliminating excessive strain on the elongated gear and pinion due to the tendency of the elongated gear to tilt relative to the pinion.

Novel features of my invention reside in the methods of assembling the elongated gear, the housing and box cam, and the like.

Other objects, advantages and features of invention may appear from the accompanying drawings, the subjoined detailed description, and the appended claims.

25 In the drawings

Figure 1 is a front elevation of my gear mechanism with the pinion removed.

Figure 2 is a diagrammatic top plan view of the elongated gear and housing.

30 Figure 3 is a longitudinal sectional view of my gear mechanism.

Figure 4 is a rear elevation of the same.

Figure 5 is a plan view of one of the cross head rollers.

35 Figure 6 is an end view of one of the cross over gears.

Figure 7 is a sectional view taken on line 7—7 of Fig. 6.

40 Fig. 8 is an enlarged fragmentary front elevation of the gear mechanism.

Figure 9 is a diagrammatic partially section view of the gear train and a fragment of the housing.

Figure 10 is an end view of the fly wheel.

45 Referring more particularly to the drawings, the numeral 1 indicates a drive shaft which is rotated from any suitable source of power (not shown). A gear train 2 transmits the rotary movement of the shaft 1 to the jack shaft 3. A gear train 4 then transmits the movement of the jack shaft 3 to the pinion shaft 5. A fly wheel 6 is mounted on the drive shaft 1 so as to steady the rotation of this shaft and to prevent the driving motor from raising, due to the varying

stresses which are applied to the reciprocating gear mechanism.

A pinion gear 7 is secured to the shaft 5, and meshes with an externally cut elongated gear 8. The elongated gear is preferably formed by a plurality of rack sections 9 and two semi-circular transfer gears 10 and 11. The racks and transfer gears are fitted together, as shown in Figs. 1, 3 and 8, so as to provide a continuous elongated external gear. The elongated gear 8 is detachably secured to a gear frame 12. The gear frame 12 is preferably made in three or more parts, including a central plate 13 which includes one or more sections, and arcuate ends 14, 15. The ends 14, 15 are bolted onto the top and bottom respectively, of the central plate 13 by means of a plurality of studs or bolts 16, 17, respectively.

The rack sections 9 are bolted, or otherwise suitably detachably secured to the plate 13 by means of a plurality of bolts 18. The transfer gears 10 and 11 are preferably formed as follows: a continuous gear is first cut and is then sawed in half along the center line and these halves are then fitted at the top and bottom, respectively, of the rack sections 9. The transfer gears are so cut that the teeth will properly mesh with the rack sections, and the pinion 7 will then follow continuously around the elongated gear. The transfer gears are each formed with an elongated hub 19 which is semi-circular in cross section. This hub fits into a semi-circular bore in the ends 14 or 15. The flat part of the hub rests against the end of the center plate 13. A dowel pin 20 extends thru the hub 19 and into the end of the plate 13, thus holding the transfer gear in proper position. The flat part of the hub 19 will hold the gear against tilting. A recess or box cam 21 is formed in the plate 13 and the ends 14, 15, thus forming a continuous track which accurately conforms to the shape of the elongated gear 8.

A trunnion 22 projects from the pinion gear 7 into the box cam 21. This trunnion serves to hold the pinion in proper spaced relation relative to the elongated gear 8. That is, the pinion is so held that the teeth thereof will properly mesh with the teeth in the elongated gear. A sleeve may be mounted on the trunnion 22 to reduce friction in the box cam.

45 An eye 23 is integrally formed on the end 14 so that a cable or the like, can be attached thereto, this cable extending to a counterweight (not shown).

A rod 24 depends from the end 15 and is pivotally secured to a cross head 25. A plurality

of rollers 26 are mounted on the cross head 25 and each roller is grooved, as shown at 27, and fits on vertical guides 28, 29. This cross head, cooperating with the guides 28, 29, will hold the reciprocating gear mechanism from twisting around a vertical axis. Thus, the box cam, pinion, and elongated gear are relieved of a great deal of strain, and the life of the gears is materially increased.

10 A rod 30 depends from the cross head 25 and extends to a device to be operated, such as a pump.

In order to hold the gear 7 against outward movement, I provide a flange 31 on the gear, which fits into a groove 32 in the elongated gear. Inward movement of the pinion is, of course, prevented by the flange engaging the face of the gear frame.

In operation, the stresses on the reciprocating gear mechanism will vary but the speed of the shaft 1 is held substantially constant because of the fly wheel 6. This fly wheel 6 prevents backlash in all of the gears and tends to make a mechanism which will operate more quietly.

25 Having described my invention, I claim:

1. A reciprocating gear mechanism comprising a pinion, drive means for said pinion, an externally cut elongated gear, said pinion meshing with said gear, a gear frame, means detachably securing the elongated gear to the gear frame, said gear frame having an elongated box trackway formed therein, a trunnion projecting from the pinion into the trackway whereby the pinion is held in constant mesh with the elongated gear, and guide means whereby the gear frame is held against twisting movement.

2. A reciprocating gear mechanism comprising a pinion, drive means for said pinion, an externally cut elongated gear, said pinion meshing with said gear, a gear frame in which the elongated gear is detachably mounted, said gear housing comprising a center plate, a pair of ends, means detachably securing the ends to the center plate, said gear housing having a box trackway formed therein, and a trunnion projecting from the pinion into the trackway whereby the pinion is held in constant mesh with the elongated gear.

3. A reciprocating gear mechanism comprising a pinion, drive means for said pinion, an externally cut elongated gear, said pinion meshing with said gear, a gear frame in which the elongated gear is detachably mounted, said gear housing comprising a center plate, a pair of ends, means detachably securing the ends to the center plate, said gear housing having a box trackway formed therein, a trunnion projecting from the pinion into the trackway whereby the pinion is held in constant mesh with the elongated gear, and a cross head secured to the gear housing, and guides in which the cross head moves whereby the gear frame is held against twisting movement.

4. A reciprocating gear mechanism comprising a pinion, drive means for said pinion, an externally cut elongated gear, said pinion meshing with said gear, a gear frame in which the elongated gear is detachably mounted, said gear housing comprising a center plate, a pair of ends, means detachably securing the ends to the center plate, said gear housing having a box trackway formed therein, a trunnion projecting from the pinion into the trackway whereby the pinion is held in constant mesh with the elongated gear, said elongated gear comprising a

plurality of rack sections, means detachably securing the rack sections to the gear frame, a pair of arcuate transfer gears, one at each end of the rack sections, and means removably securing the transfer gears in the end sections of the gear frame.

5. A reciprocating gear mechanism comprising a pinion, drive means for said pinion, an externally cut elongated gear, said pinion meshing with said gear, a gear frame in which the elongated gear is detachably mounted, said gear housing comprising a center plate, a pair of ends, means detachably securing the ends to the center plate, said gear housing having a box trackway formed therein, a trunnion projecting from the pinion into the trackway whereby the pinion is held in constant mesh with the elongated gear, said elongated gear comprising a plurality of rack sections, means detachably securing the rack sections to the gear frame, a pair of arcuate transfer gears, one at each end of the rack sections, a hub on each transfer gear, said hub being arcuate in cross section, the gear frame ends having an arcuate bore therein to receive the hub whereby the transfer gears are held against movement in the frame ends.

6. A reciprocating gear mechanism comprising a pinion, drive means for said pinion, an externally cut elongated gear, said pinion meshing with said gear, a gear frame, means detachably securing the elongated gear to the gear frame, said gear frame having an elongated box trackway formed therein, a trunnion projecting from the pinion into the trackway whereby the pinion is held in constant mesh with the elongated gear, and a fly wheel on the drive means for said pinion.

7. A reciprocating gear mechanism comprising a pinion, drive means for said pinion, an externally cut elongated gear, said pinion meshing with said gear, a gear frame in which the elongated gear is detachably mounted, said gear housing comprising a center plate, a pair of ends, means detachably securing the ends to the center plate, said gear housing having a box trackway formed therein, a trunnion projecting from the pinion into the trackway whereby the pinion is held in constant mesh with the elongated gear, said elongated gear comprising a plurality of rack sections, means detachably securing the rack sections to the gear frame, a pair of arcuate transfer gears, one at each end of the rack sections, means removably securing the transfer gears in the end sections of the gear frame, a cross head secured to the gear frame, guides engaged by the cross head whereby twisting movement is prevented in the gear frame.

8. A reciprocating gear mechanism comprising a pinion, drive means for said pinion, an externally cut elongated gear, said pinion meshing with said gear, a gear frame, said gear frame having an elongated box trackway formed therein, a trunnion projecting from the pinion into the trackway whereby the pinion is held in constant mesh with the elongated gear, a fly wheel on the drive means for said pinion, and a cross head secured to the gear frame, guides engaged by the cross head whereby twisting movement is prevented in the gear frame.

9. A reciprocating gear mechanism comprising a pinion, drive means for said pinion, an externally cut elongated gear, said pinion meshing with said gear, a gear frame in which the elongated gear is detachably mounted, said gear housing comprising a center plate, a pair of ends,

means detachably securing the ends to the center plate, said gear housing having a box trackway formed therein, a trunnion projecting from the pinion into the trackway whereby the pinion is
5 held in constant mesh with the elongated gear, said elongated gear comprising a plurality of rack sections, means detachably securing the rack sec-

tions to the gear frame, a pair of arcuate transfer gears, one at each end of the rack sections, means removably securing the transfer gears in the end sections of the gear frame, and a flywheel on the drive means for said pinion.

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