J. PETERSON.

MECHANISM FOR CONVERTING MOTION.

APPLICATION FILED FEB. 11, 1916.

1,241,015.

Patented Sept. 25, 1917.

4 SHEETS—SHEET 1.

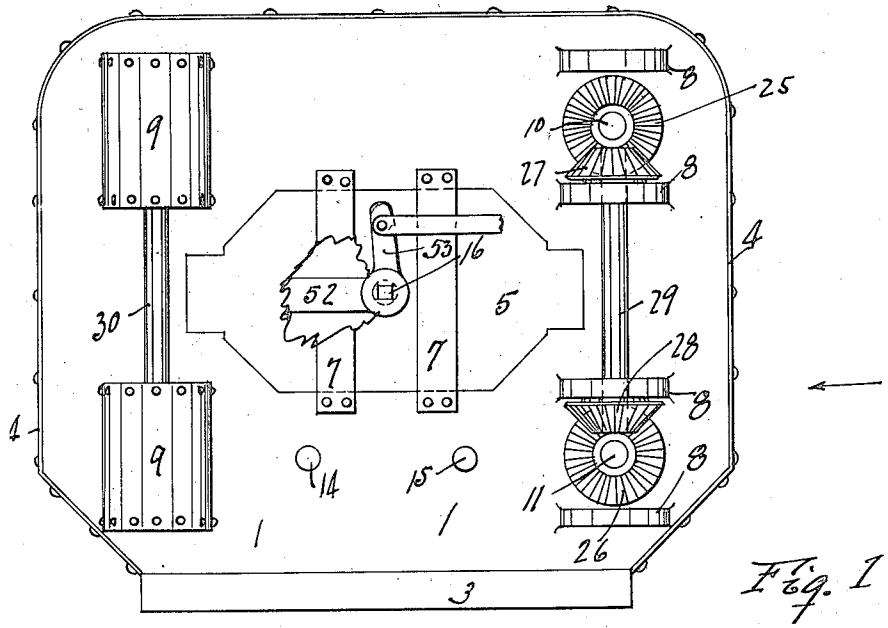


Fig. 1

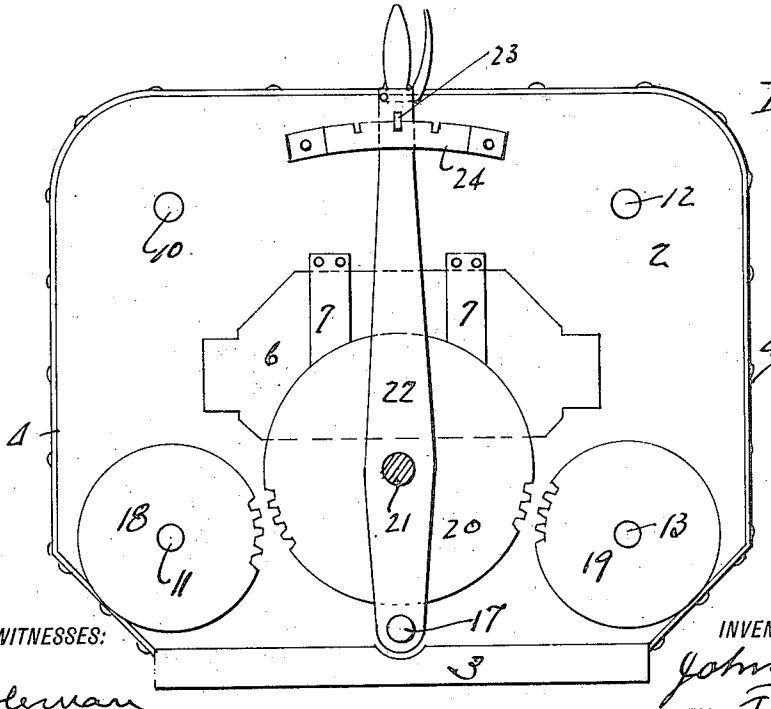


Fig. 2.

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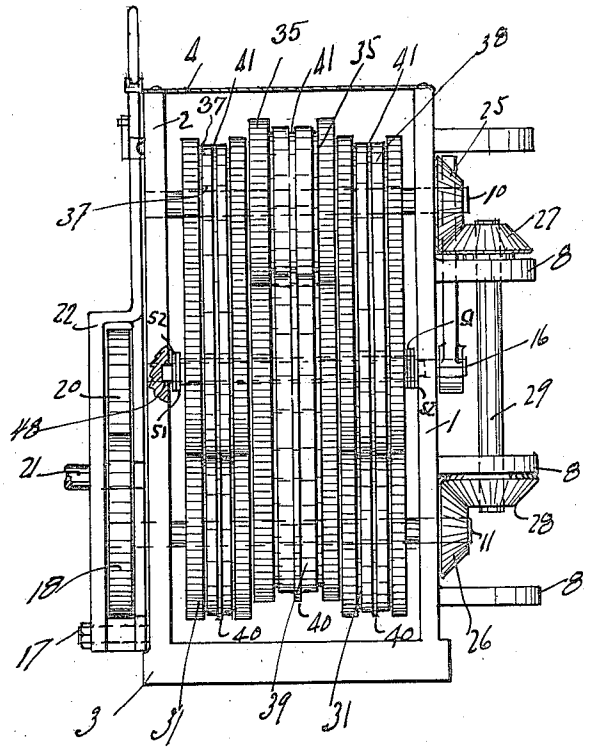


Fig. 3.

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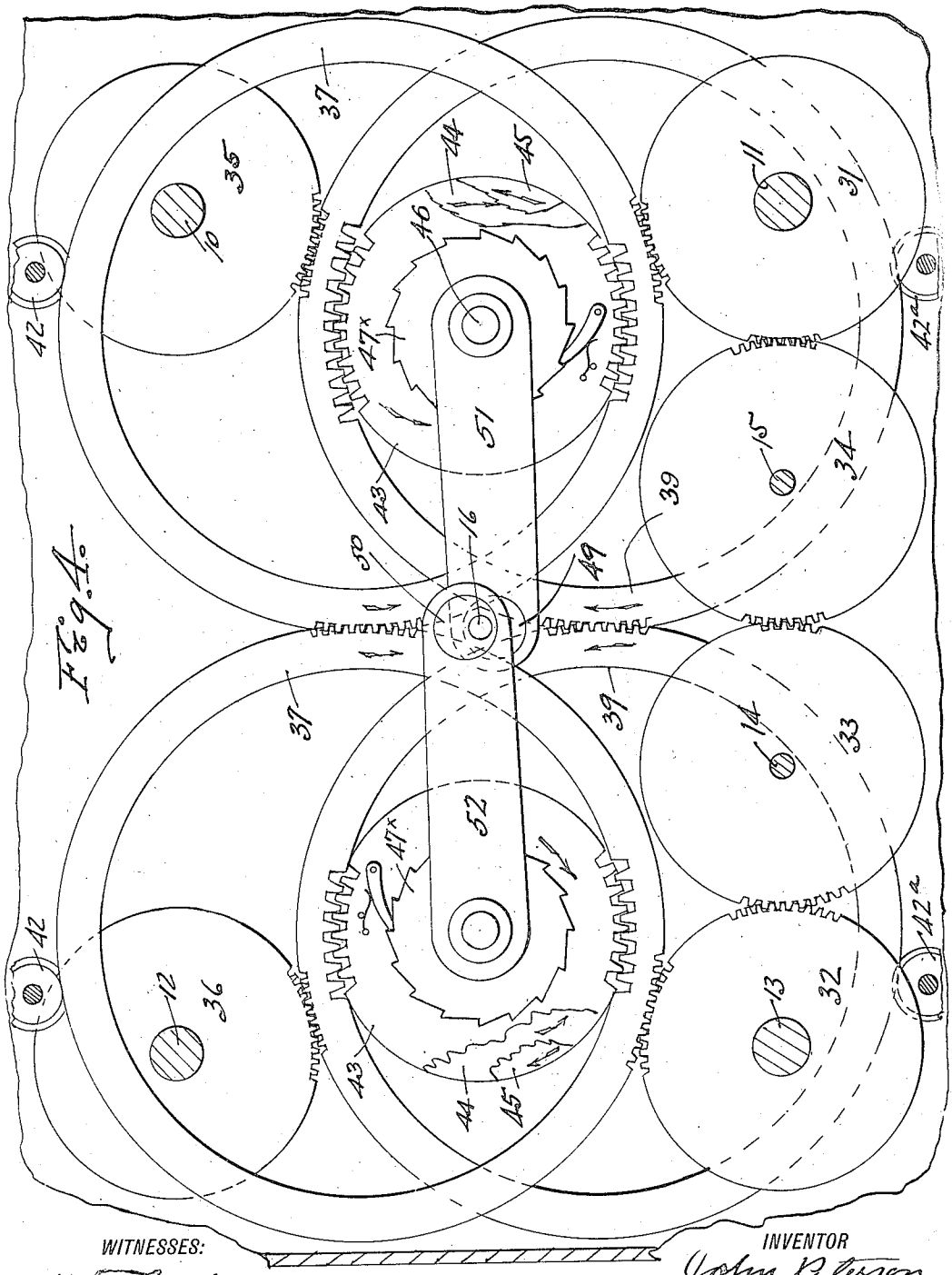
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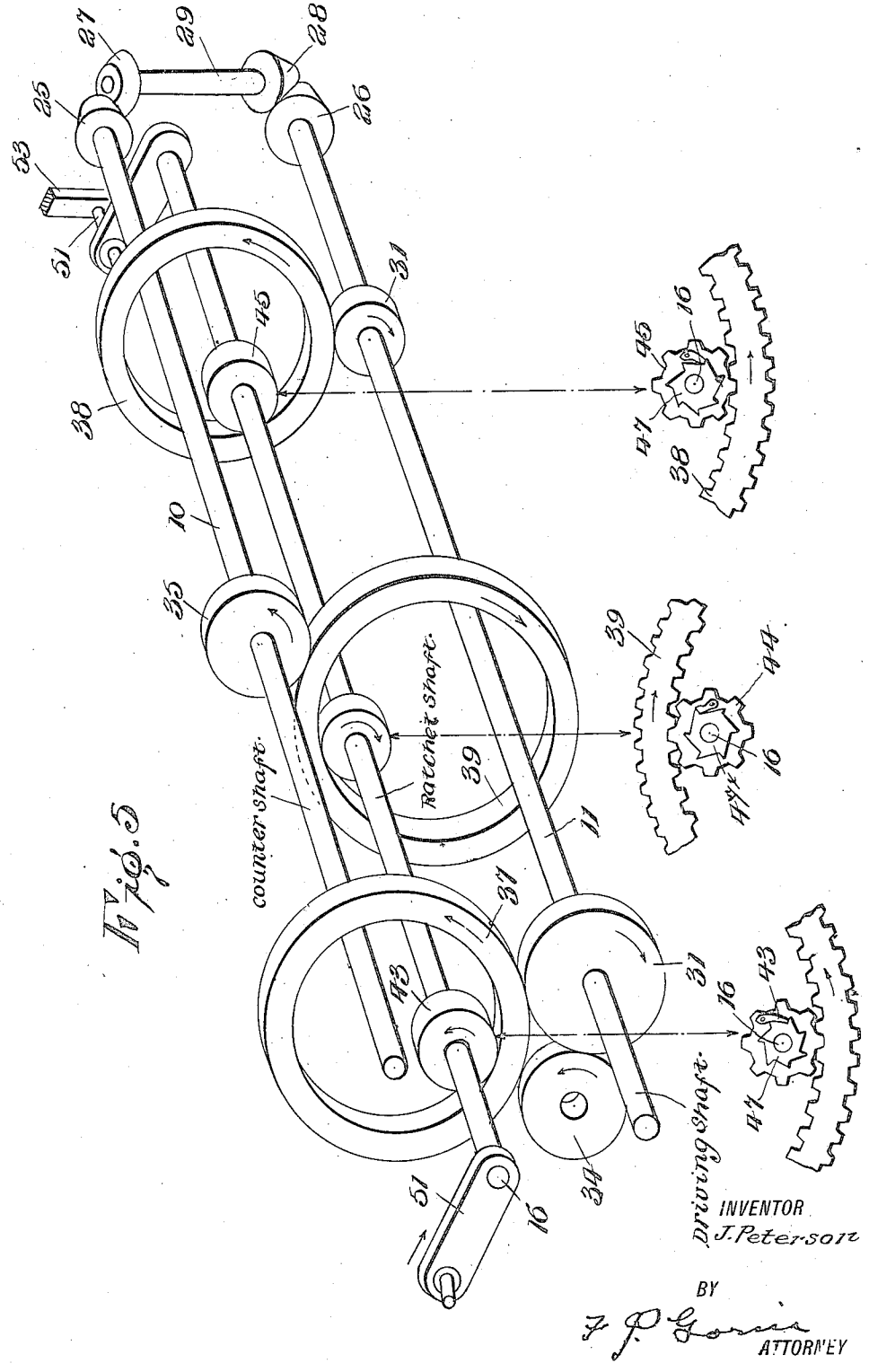


Fig. 5

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UNITED STATES PATENT OFFICE.

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MECHANISM FOR CONVERTING MOTION.

1,241,015. Specification of Letters Patent. Patented Sept. 25, 1917.

Application filed February 11, 1916. Serial No. 77,623.

To all whom it may concern:

Be it known that I, JOHN PETERSON, a citizen of the United States, and a resident of Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Mechanism for Converting Motion, of which the following is a full, true, and exact specification.

My invention relates to means for converting motion of the type which converts reciprocating motion into rotary motion and has for its principal objects; to provide a device of the above described character in which a minimum of power is lost through journal friction; to provide a novel form of construction embodying hubless floating gears. In a device of this general character, it is desirable to eliminate all possible friction and for this reason I employ ball bearings on all revolving bearings. The novelty of gears without center hubs and bearings transmitting power is one of my features which eliminates journal friction.

Other objects will appear as my invention is more fully explained in the following specification, illustrated in the accompanying drawings and pointed out in the appended claims.

In the drawings, Figure 1 is a front elevation of my device. Fig. 2 is a similar rear elevation. Fig. 3 is an end elevation with parts omitted. Fig. 4 is an enlarged sectional front elevation with parts broken away. Fig. 5 is a diagrammatic perspective view of the gearing on one side of the apparatus, the respective ratchet connections 43, 44 and 45, with respective floating gears 37, 38 and 39 being indicated in detail in side elevation below the view.

Referring more particularly to the drawings, numerals 1 and 2 indicate front and rear frames of a casing. The front and rear frames are joined together by a base 3. The front and rear frames are similar in outline and have rounded top corners and beveled base corners. An outer casing 4 covers all of the mechanism contained between the frames 1 and 2 to which it is secured. Frames 1 and 2 are each provided with a removable door 5 and 6 respectively which are held in place by straps 7. Brackets 8 project from the face of frame 1 for the purpose of providing bearings for shafts and for supporting gear housings 9. Both front and rear frames are provided with similarly located antifriction bearings for shafts 10, 11, 12, 13, 14, 15 and 16. Frame 2 has an additional bearing for a lever rock shaft 17. Similar pinions 18 and 19 are mounted on shafts 11 and 13 respectively on the outside of rear frame 2. A gear wheel 20 is secured to a shaft 21 which is mounted on a shaft lever 22 and which may be connected by an additional shaft and universal joint (not shown) to apparatus to be driven. Shift lever 22 is pivoted to shaft 17 at its lower end and at its upper end is provided with latch bar 23 which coöperates with a notched quadrant 24 which is secured to the face of rear frame 2. By means of the shift lever, the gear 20 may be thrown into mesh with either pinion 18 or 19 as desired and as the said pinions revolve in opposite directions, as will be explained later, it is apparent that the direction of rotation of gear 20 will be reversed when shifted from one pinion to the other. Bevel pinions 25 and 26 are secured to shafts 10 and 11 respectively and mesh with pinions 27 and 28 respectively, both of which are secured to a shaft 29 which takes bearing in brackets 8. The pinions 25 and 26 are external to frame 1. Shafts 12 and 13 are equipped similarly to shafts 10 and 11 with pinions which mesh with other pinions similar to 27 and 28 which in turn are mounted on a shaft 30 which is parallel and similar to shaft 29. It is thus seen that shafts 10 and 11 and 12 and 13 are positively geared together in pairs. Secured to each of shafts 11, 13, 14 and 15 are pairs of spur gears 31, 32, 33 and 34 respectively which mesh together and form a pair of continuous trains along the inner face of frames 1 and 2. Spur pinions 35 and 36 of similar diameter as pinions 31 and 32 are secured to shafts 10 and 12 respectively and are located centrally between frames 1 and 2. Pairs of similarly located spur gears 37 and 38 mesh together at the vertical center plane of the machine, one of each pair with pinions 31 and the other with pinions 32. The gears 37 and 38 are provided with teeth both externally and internally, the contacts just mentioned being external. A pair of similar floating gears 39 also mesh in the central vertical plane of the machine. One with each of pinions 35 and 36. Floating gears 39 are internally and externally toothed and are of the same diameter. All of the floating gears lie in parallel vertical planes, with the axes of gears 37 and 38, in the sme horizontal plane and the axes of the

gears 39 in a similar and parallel plane. The above mentioned horizontal planes are separated by a distance less than the length of the internal radius of either of the floating gears. It will be apparent that the floating gears 37 and 38 lap past floating gears 39 a distance somewhat less than a semicircumference. Gears 37, 38 and 39 are held in line laterally by means of circumferential cooperating flanges 40 and grooves 41 in the said gears and in pinions 31, 32, 35 and 36 and in idler rollers 42 and 42a, the former of which coöperate with gears 37 and 38 and the latter with gears 39. Pinions 31, 32, 35 and 36 and idlers 42 and 42a and 43 are all located so that their axes of rotation lie outwardly of the vertical axes planes of gears 37, 38 and 39, so that the said gears are prevented from getting out of mesh with each other and with the pinions 31, 32, 35 and 36. Shaft 16 has its axis at the intersection of straight lines which pass through the axes of rotation of both floating gears 37 and 39 or in other words, lies in the space between the coöperating faces of the pairs of gears 37, 38 and 39. One each of propelling pinions 43, 44 and 45 are loosely mounted on ratchet shafts 46 and 47. The propelling pinions are each freely rotatable in only one direction as indicated by arrows in Fig. 4 and are retained from rotation in the opposite direction by any approved ratchet and pawl 47x or automatic clutch means. The propelling pinions 44 coöperate with the inside teeth on floating gears 39, the pinions 43 coöperate with the inside teeth of gears 37, and the pinions 45 coöperate with the inside teeth of gears 38. It will be noted that the axes of rotation of shafts 46, 47 and 16 lie in the same horizontal plane. The ends of the shafts 46 and 47 are slidable horizontally in ways 48 in frames 1 and 2. Shaft 16 has two pairs of eccentrics 49 and 50 which are oppositely disposed and which work in one end of each of strap 51 and 52 respectively. The other ends of straps 51 and 52 engage shafts 46 and 47 respectively. When shaft 16 is partially rotated by a lever 53 the eccentrics 49 and 50 draw the shafts 46 and 47 respectively either toward each other or push them farther apart as the case may be depending on the direction in which the lever 53 is thrown. The axes of rotation of the floating gears and the propeller pinions on each side lie in the same vertical plane when the pinions are in mid or normal position. The pinions 43 and 44 and 45 have a limited horizontal movement due to their long teeth and loose fit with the three floating gears. The operation of my device embodies the alternate right and left movement of lever 53 with the resultant similar movement of the ratchet shafts carrying the propelling pinions which ride idly within the floating gears in one direction as previously pointed out and on the return stroke cause a rotation of their coöperating floating gears in the directions indicated by arrows in Fig. 4. A rapid and continuous operation of the propelling pinions will keep the floating gears revolving continuously in one direction with the resultant continuous operation of all of the other gears and pinions of the device. The speed and constancy of velocity of the moving parts of course, will depend largely upon the frequency of operation of the reciprocating members of the machine as will also the amount of power transmitted.

Claims:

1. In means for converting lateral motion into rotary motion, the combination with a ratchet shaft, a plurality of pinions loosely mounted on the ratchet shaft, a ratchet connection between each pinion and the ratchet shaft, a plurality of floating gears having external and internal teeth, the pinions meshing with the internal teeth on the floating gears, a counter shaft, a pinion secured thereto which meshes with the external teeth on one of the floating gears, a driven shaft, pinions secured thereto which mesh with the other floating gears, gearing between the counter shaft and the driven shaft, and means for laterally reciprocating the ratchet shaft to cause the pinions thereon to impart rotary motion to the floating gears in one direction of reciprocation.

2. In means for converting lateral motion into rotary motion, the combination of a ratchet shaft, means for laterally reciprocating the ratchet shaft, a pinion loosely mounted on the ratchet shaft, a ratchet connection between the pinion and the ratchet shaft, a floating gear having external and internal teeth, the pinion on the ratchet shaft meshing with the internal teeth on the floating gear, a driven shaft, a pinion secured on the driven shaft which meshes with the external teeth on the floating gear, and means engaging the periphery of the floating gear for maintaining said floating gear in mesh with said pinions.

3. In means for converting lateral motion into rotary motion, the combination of a pair of parallel ratchet shafts, a plurality of pinions loosely mounted on each ratchet shaft, a ratchet connection between each pinion and its ratchet shaft the ratchets on the respective ratchet shafts being arranged to permit opposite rotation of the two sets of pinions, a pair of meshing floating gear wheels, each provided with internal and external teeth, the internal teeth of said floating gears meshing with certain of the pinions on the parallel ratchet shafts, a pair of parallel counter shafts, a pinion secured to each counter shaft, said latter pinions meshing with the external teeth on the pair of floating gears, a pair of parallel driven shafts located in vertical planes with the

counter shafts, a pinion secured to each of the driven shafts, a second pair of meshing floating gears each provided with internal and external teeth, the internal teeth on the second mentioned floating gears meshing with certain of the pinions on the ratchet shaft and the external teeth of said second mentioned floating gears meshing with the pinions on the driven shafts, gears interposed between the counter shaft and driven shaft in one vertical plane, gears interposed between the other counter shaft and driven shaft in the other vertical plane, gearing between the two driven shafts, means for conveying motion from either driven shaft, and means for laterally reciprocating the ratchet shafts toward and from each other to cause the pinions thereon to impart rotary motion to the floating gears.

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