

C. J. MONTGOMERY.
ENGINE OF SELF PROPELLED VEHICLES OR BOATS.
APPLICATION FILED JULY 11, 1911.

1,006,973.

Patented Oct. 24, 1911.

3 SHEETS—SHEET 1.

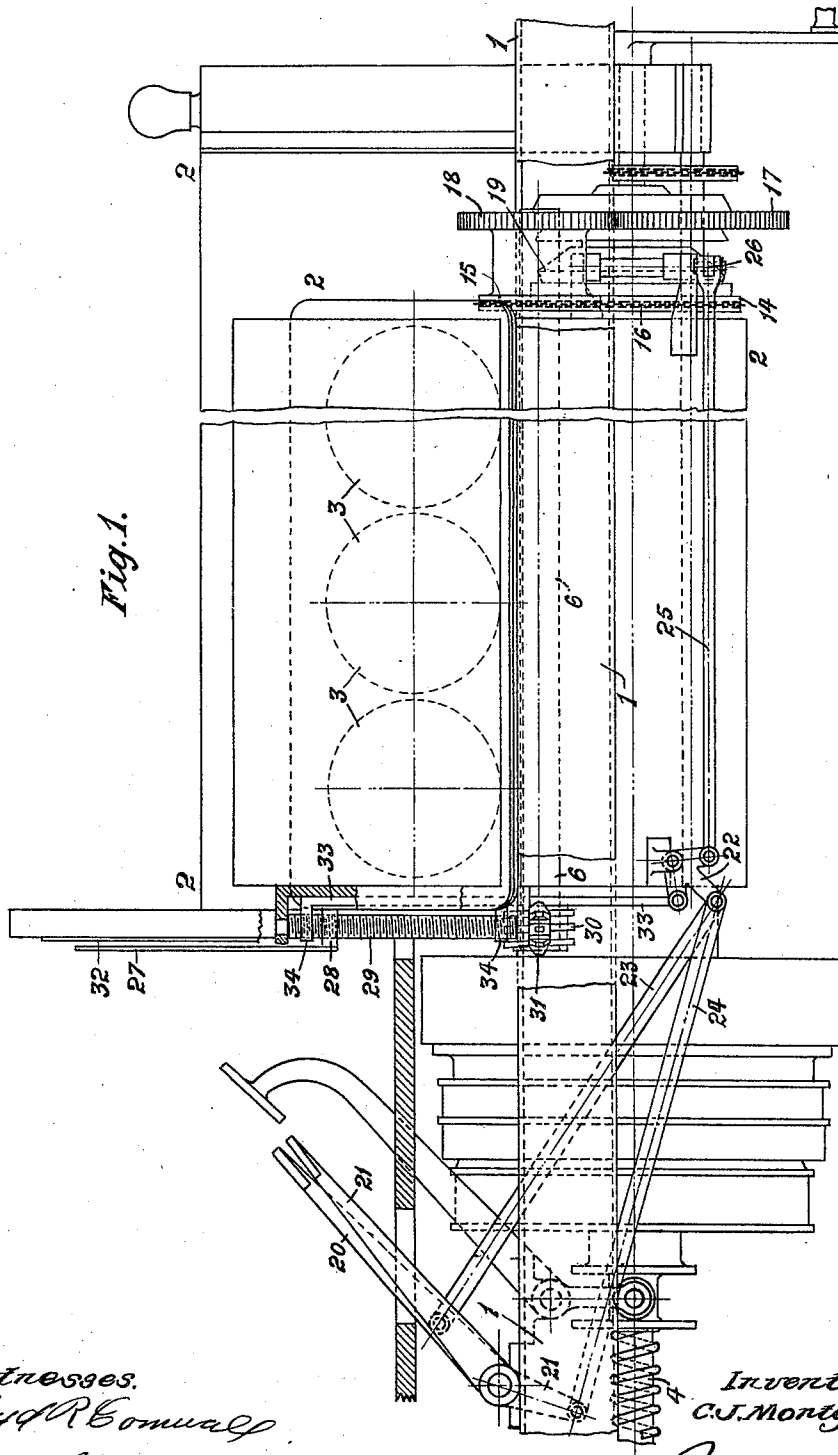


Fig. 1.

Witnesses.
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E. H. Hughes

Inventor
C. J. Montgomery

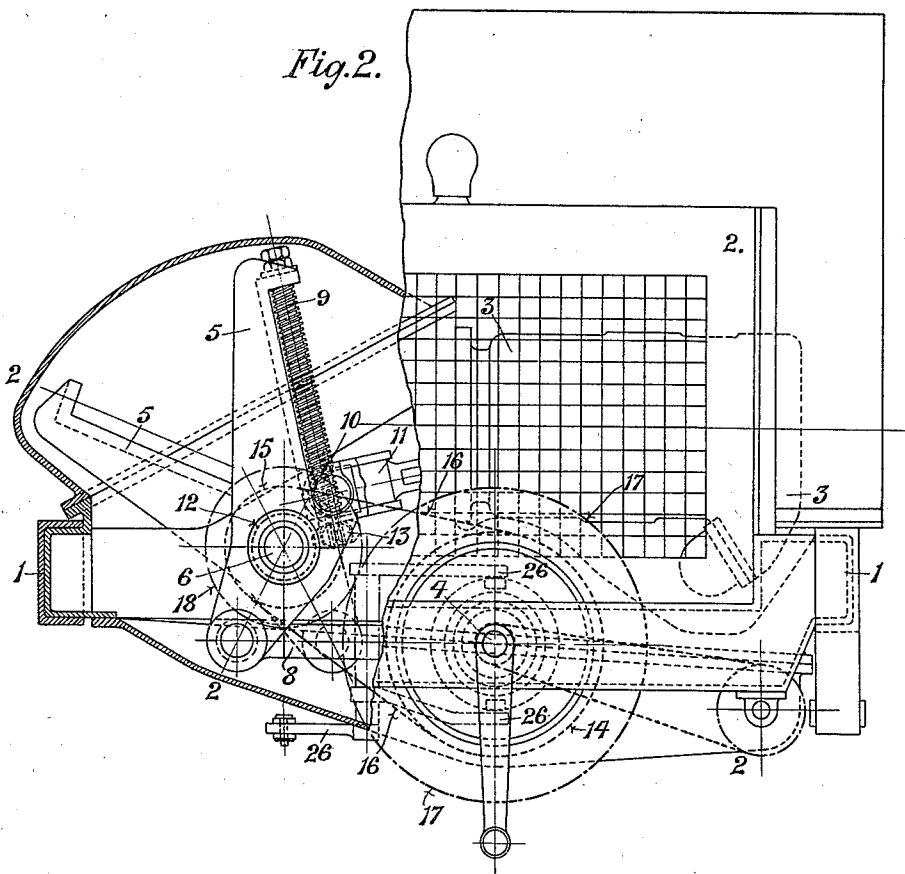
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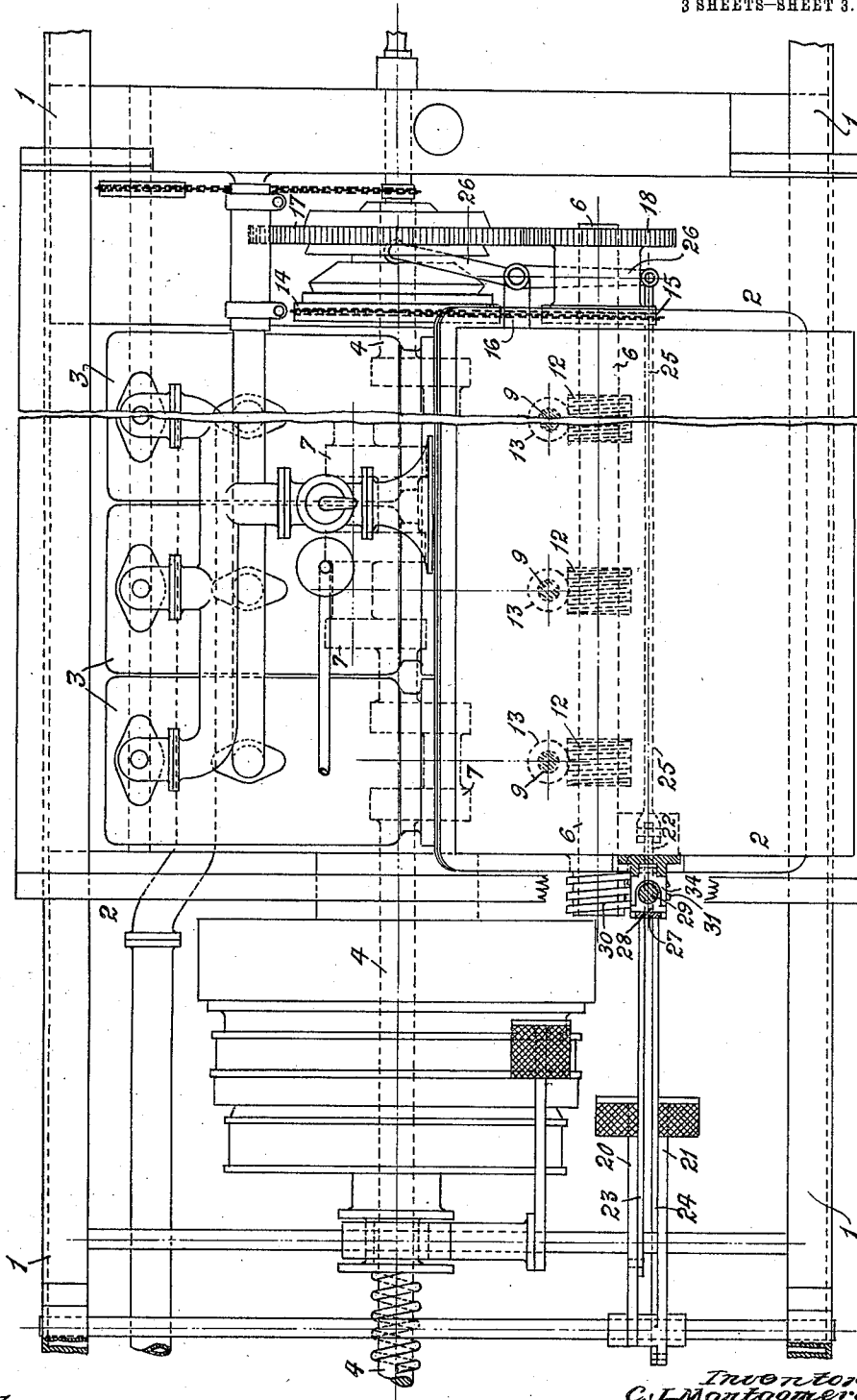
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3 SHEETS—SHEET 3.

Fig. 3.



Witnesses.
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UNITED STATES PATENT OFFICE.

CHRISTOPHER JOHN MONTGOMERY, OF ROCK FERRY, ENGLAND.

ENGINE OF SELF-PROPELLED VEHICLES OR BOATS.

1,006,973.

Specification of Letters Patent.

Patented Oct. 24, 1911.

Application filed July 11, 1911. Serial No. 637,993.

To all whom it may concern:

Be it known that I, CHRISTOPHER JOHN MONTGOMERY, a subject of the King of England, residing at Rock Ferry, in the county of Chester, England, have invented certain new and useful Improvements in or Connected with Engines of Self-Propelled Vehicles or Boats, of which the following is a specification.

This invention has reference primarily to the engines or power machinery employed for propelling vehicles on ordinary roads or streets, and to that type of such engine having a variable stroke of piston, the variations of which are effected through toothed or wormed gearing, arranged in connection with a vibrating arm, operated by itself, and controlled from outside the engine by hand or power driven mechanism.

The main object of the invention is the provision of simple and effective means for controlling the variation in the piston stroke, and for indicating the stroke condition, the indicating mechanism automatically cutting out the operator-control at predetermined points.

In the following description of propelling machinery, the improvements hereunder are comprised.

The engine may be assumed to be of multicylinder type, say with a plurality of parallel cylinders horizontally disposed; and the pistons of these cylinders work on power levers through connecting rods, the outer ends of which are adjustable or varied by worm or screw gearing on said levers; and the power transmitted to said levers is transferred to the driving crank shaft—which may be below the cylinders—by other arms and connecting rods. The ends of the connecting rods are connected to blocks which work up and down on worms or screws connected with the vibrating power levers referred to; and these screws are rotated by worm gearing carried on a spindle or shaft on which the said levers or arms are supported.

Motion is transmitted to the worm or screw gear referred to from the engines, so that the variable gear is worked from the engine; and power from the engine is adapted to be applied to the said gear as and when desired; so that the radius at which the pistons act upon the power levers or arms can be automatically effected at any time in either direction, making the stroke longer

or shorter, while the engine is in motion automatically. Between the engine driven shaft and the said gear shaft, there is an engaging and disengaging device, such as a clutch, which is adapted to be thrown in and out of action by a foot or hand operated mechanism from the seat of the driver, or other convenient part.

An indicator is used in connection with the gear so as to show what position the connecting rods are acting on the power levers or arms; and this indicator, in one form, may consist of a nut adapted to travel up and down on a worm, operated from the power arm or lever supporting shaft or gearing thereon; and this indicator device is also in some cases connected up with the clutch operating mechanism, so that when the indicator or nut or part has reached either end of its stroke, it will act through suitable connections upon said clutch gear, and throw it out of action when it is in action. Thus the attendant or driver cannot over-run the variable gear.

The invention will be further described in connection with the accompanying drawings, which illustrate it.

In these drawings Figure 1 is a side elevation of the front part of a vehicle showing the motor mechanism; Fig. 2 is an end view, partly in section; and Fig. 3 is a plan.

Referring to the drawings 1 are the main longitudinal members of the vehicle frame; 2 is the engine casing, which is carried from the frame members 1; 3 are the engine cylinders; and 4 is the crank shaft.

5 are the rocking or vibrating arms or levers, which the pistons of the motors are connected to, and which they directly actuate; and 6 is the shaft on which they are loosely mounted; the shorter arms below the shaft 6 being connected with the cranks 7, by connecting rods 8. The vibrating arms 5 carry the threaded rods 9, which pass through, and mesh with, blocks 10, to which the ends of the connecting rods 11 of the motor pistons are connected, and which bear and work on the face of the levers 5, which receive the propulsive effort of the pistons, and these threaded rods 9 are revolved as and when required by worms 12 fixed on the shaft 6, gearing with worm wheels 13 on the inner ends of the rods 9, in the known way of engines of this type.

The shaft 6, and therefore the worms 12,

and worm wheel 13 and rods 9, are worked from the engine crank shaft 4 in one or other direction, at will; and this is effected in the case shown, by the use of two sets of gearing, one consisting of sprocket wheels 14, 15 on the shafts 4, and 6, respectively, and a sprocket chain 16; and the other consisting of two spur wheels 17, and 18, on the shafts 4, and 6, respectively. Both the wheels 14 and 17 are loosely mounted on the shaft 4, and they are connected up, or disconnected from the shaft 4, by a clutch 19, on the shaft 4, and operating in connection with one or other wheel, alternatively, or placed out of gear with both, when moved to the mid position; the clutch 19 itself being operated from the foot board or seat of the driver, by treadle levers 20, 21, connected respectively with the arm or bell crank 22, by rods 23, 24, and by a rod 25, connecting the bell crank 22, with the clutch lever 26. Thus, by the means described, the shaft 6, can be revolved in the one direction or the other by the engine itself, though the sprocket or spur gears 14, 15, 17, 18; and the blocks 10, so moved farther from, or nearer to the shaft 6, so allowing, at will, the radius at which the pistons act on the arms or levers 5, and thereby varying the stroke of the pistons, and the power given out by them, and the mechanical advantage obtained.

The position of the blocks 10, on the rods 9, is made known to the driver by an indicator, which in the case shown consists of a bar or rod 27 carried on a nut 28, on a threaded rod 29, which is revolved from the shaft 6, by a worm 30 on it and a worm wheel 31 on the lower end of the rod 29; so that when this rod 29 is revolved in one or other direction, the nut 28 is moved up or down the rod 29, and the level of the rod 27, which moves with the nut, shows the position of the block 10. The rod will work in connection with stationary points, or a scale such as a plate 32. Movement of the blocks 10 too far, in either direction, is prevented by providing in connection with a part geared up with the shaft 6, a part which is moved by it when it has been revolved a certain extent in one or other direction, and is connected to the clutch actuating mechanism. These provisions in the arrangement shown,

consist of a rod 33 connected with the bell crank 22, and having two jaw projections 34 on it, one near the outer end, and the other near the other end of the rod 29, whereby, when the blocks 10 reach points near the end of these rods 9, and correspondingly when the nut 28 reaches a point near the limits of its travel, it—the nut—comes in contact with one or other of the jaws 34, it moves the rod 33, and through the rod 25, and the clutch lever 26, throws the clutch out of action with either the wheel 14 or 17, and so stops the rotation of the screws 9.

I claim:—

1. A variable stroke piston mechanism for engines, including an adjusting shaft, a lever loosely mounted thereon, a connection between said lever and the engine crank shaft, an adjusting element carried by the lever, an operative connection between said element and the piston rod, means carried by the adjusting shaft for actuating said element, driving members mounted on the engine crank shaft, driving members fixed on the adjusting shaft and operatively connected to the respective members on the crank shaft, clutch mechanism for operatively connecting either of the crank shaft driving members to said shaft, operator-actuated means for controlling the clutch mechanism, an indicator to note the position of the piston rod connection on the adjusting element, and means actuated by the indicator mechanism to automatically operate the clutch mechanism at predetermined points.

2. An engine of the type described, means to adjust the piston stroke, operator-controlled means for actuating said adjusting means, an indicator for said adjusting means, and mechanism automatically controlled by the indicator to relieve the adjusting means from the power of the actuating means therefor at predetermined limits of the indicator.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHRISTOPHER JOHN MONTGOMERY.

Witnesses:

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