No. 887,276. PATENTED MAY 12, 1908.

E. J. SELLEY.

TRANSMISSION GEAR.

APPLICATION FILED MAY 24, 1907.

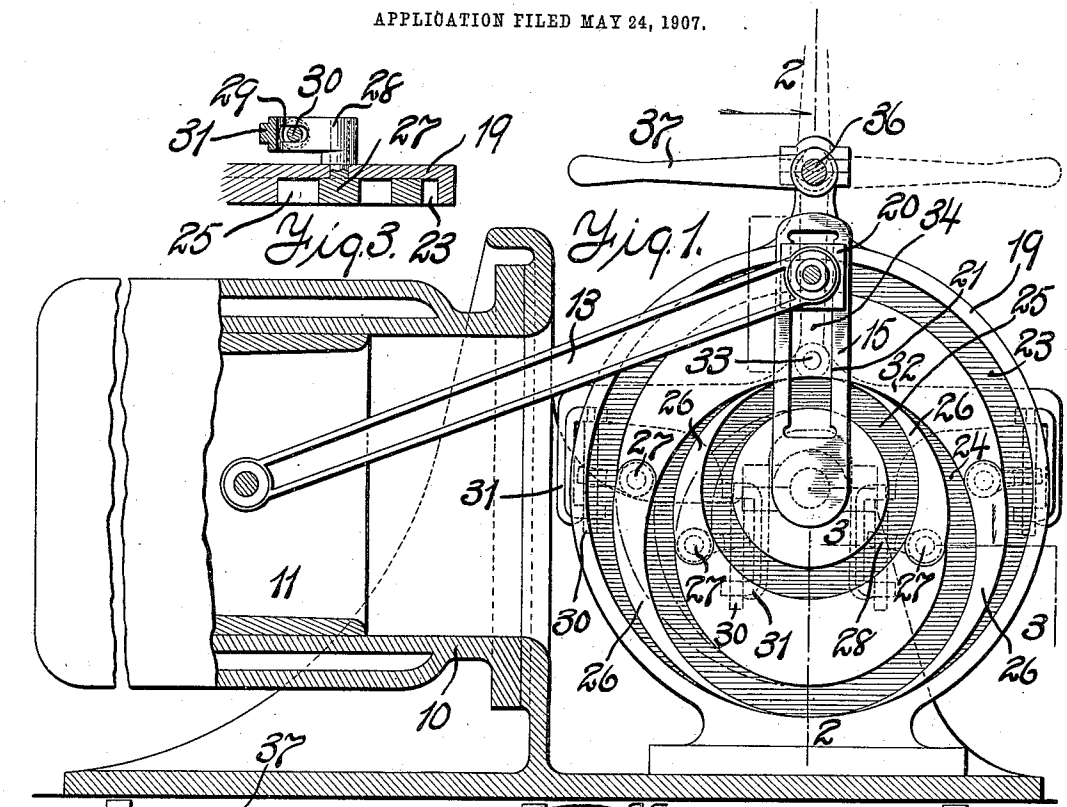

Fig. 1.

Fig. 3.

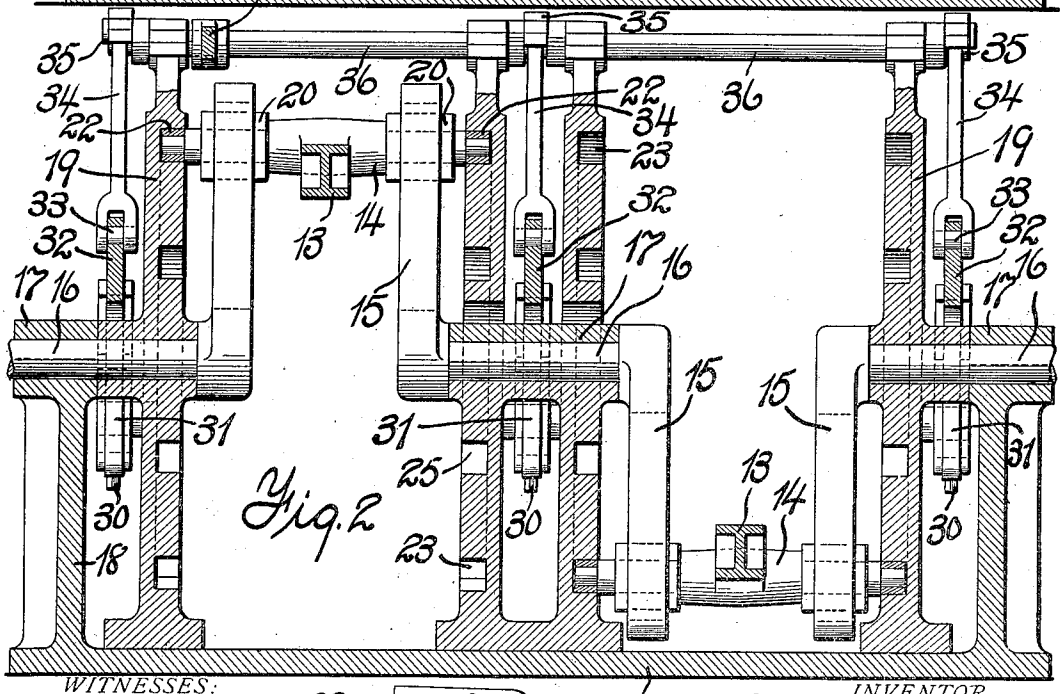

Fig. 2.

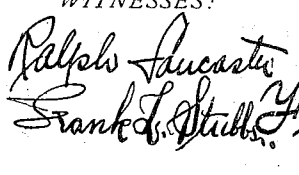

Fig. 4.

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TRANSMISSION-GEAR.

No. 887,276. Specification of Letters Patent. Patented May 12, 1908.

Application filed May 24, 1907. Serial No. 375,441.

To all whom it may concern:

Be it known that I, EDWIN J. SELLEY, of the city, county, and State of New York, have invented a new and useful Improvement in Transmission-Gears, of which the following is a full, clear, and exact description.

My invention relates to improvements in transmission gears, and the object of my invention is to produce an exceedingly simple gear which can be easily changed from high to low speed, or an intermediate speed, and especially to produce a gear of this character which is very reliable, and has not the usual dangers of stripping or breaking.

Another object of my invention is to avoid the use of gear teeth and friction devices, as these are unreliable and likely to break or slip.

My invention is further intended to produce a transmission gear which is not expensive and which can be applied to a great variety of things.

With these ends in view, my invention consists of certain features of construction and combinations of parts which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawing forming a part of this specification, in which similar reference characters indicate corresponding parts in all the views.

Figure 1 is a sectional elevation of the apparatus embodying my invention, showing the same in connection with a gas engine. Fig. 2 is a vertical section on the line 2—2 of Fig. 1. Fig. 3 is a detail section on the line 3—3 of Fig. 1, and Fig. 4 is a detail sectional plan showing the connection between the main yoke and one of the shifting tongues or switches.

In carrying out my invention it can be applied to any sort of power generator or motor, and I have shown it in connection with a simple form of gas engine 10, having the customary piston 11, this being mounted in a suitable base 12, which also serves to support the rest of the apparatus, but the means of support and the character of motor is not at all essential. The piston 11 connects by a pitman 13 with a crank pin 14, which is mounted in the crank arms 15, and I have shown two pitmen 13, and two pairs of arms, but obviously any usual number of cranks and pistons can be used without affecting the principle of the invention. The crank arms 15 are secured to the crank shaft 16, which is journaled in suitable bearings 17 on the pedestals 18 and in guide plates 19, and power can be taken from the crank shaft in any usual way. I have shown each crank pin 14 provided with slide blocks 20, and these move in the ways 21 of the crank arms 15, as the drawings show. The ends of the crank pins 14 are preferably provided with rollers 22, or with some easy running part which moves in the grooves 23, 24 and 25 of the guide plates 19.

The guide plates are arranged in pairs, as shown best in Fig. 2, and the grooves just referred to are essentially concentric and are similar on the several guide plates. There can be any necessary number of them, and three are sufficient for most purposes. It will be seen that these grooves merge one into the other, and the entrances from one to the other are controlled by switches or tongues 26, which at their free ends are very thin, and which taper gradually from the studs 27 to which they are secured. These studs 27 are journaled in the guide plates 19, and each stud has a crank arm 28, shown clearly in Figs. 3 and 4, and the crank arm is preferably slotted as shown at 29, to receive the guide pin 30, although any suitable connection can be made between the parts. Each guide pin is held in a stirrup 31, of a general U shape, which is formed in the main yoke 32. Each crank arm 28 is pressed on opposite sides by balancing springs 32^a (see Fig. 4) which permits the arms 28 to move against the spring pressure when the tongue 26 is moved by the pressure of the crank pin 14. When there are two pairs of crank arms as illustrated, there are two pairs of guide plates, and one of the yokes 32 is arranged between the inner pair of guide plates and a corresponding yoke at the end of the apparatus. Each yoke 32 is pivoted near the center as shown at 33, to the pinion 34, which connects with a crank 35 on the supplemental crank shaft 36, which is journaled as shown on the tops of the guide plates 19, but which obviously can be supported in any convenient way. This shaft 36 is provided with a handle lever 37 for turning it, but any operative connection can be made with the shaft for turning it manually.

Referring to the drawings, it will be seen that in Fig. 1 the crank pins 14 are in the outer groove 23, so as to impart the most

power to the crank shaft 16. As the cranks 15 turn, however, the crank pin will enter the groove 24, slipping past the first switch or tongue 26, and being guided by the next one into the intermediate groove 24, and as it continues, the third tongue 26 will turn into the position shown by dotted lines in Fig. 1, and leave the crank pin running in the inner groove 25. To regulate and confine the crank pin to any particular groove, is the function of the shaft 36 and its connections. For instance, by turning the handle 37 to the vertical position shown by dotted lines in Fig. 1, the yokes 32 will be carried down, and the outer tongues moved inward to the position shown at the left and in dotted lines in Fig. 1, thus confining the travel of the pin to the intermediate groove, and by putting the handle 37 over to the position shown at the right, and by dotted lines in Fig. 1, the yokes 32 will be carried still further down, thus swinging the inner switch tongues 26 to the position shown in Fig. 1, and confining the travel of the crank pin to the inner groove. It will be seen that the position of the tongues 26 can thus be readily controlled, and the travel of the crank pin confined to any desired groove, so that the speed and power of the crank shaft can be controlled at will. It will further be seen that this can be done without the use of any teeth or friction devices, and so the apparatus is durable and reliable.

While I claim the means for controlling the switch tongues, still the essential thing is the guide groove, the crank connection with the groove, and the means for shifting the crank pin from one groove to the other, so as to regulate the speed, and obviously many operative things might be used for regulating the switch tongues, without departing from the principle of the invention. It will also be seen that by properly controlling the switch tongues, the crank pins can be made to travel in an eccentric path, if desired, thus giving increased speed or increased power at a particular point, and this is desirable in some cases and for some classes of work.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent:—

1. An apparatus of the kind described, comprising a crank shaft with cranks thereon, guide plates near the shaft, said plates having guide grooves arranged one within the other, a driving connection for the crank shaft, and means for directing the driving connection into any of the aforesaid guide grooves.

2. A transmission gear, comprising a crank shaft with cranks thereon, guide plates near the shaft, said plates having guide grooves therein, a crank pin radially slidable in the cranks of the shaft, and means for directing the crank pin into the desired guide groove.

3. A transmission gear, comprising a crank shaft with cranks thereon, a crank pin radially slidable in the cranks of the shaft, guide plates having grooves arranged one within the other, said grooves being adapted to receive the ends of the crank pin, and switching devices to guide the crank pin from one groove to the other.

4. A transmission gear, comprising a crank shaft with cranks thereon, a crank pin slidable in and out on the crank of the shaft, guide plates having grooves arranged one within the other, said grooves being adapted to receive the ends of the crank pin, and switch tongues pivoted on the guide plate and constructed to guide the crank pin with reference to the several grooves.

5. A transmission gear, comprising a crank shaft with cranks thereon, a crank pin radially movable in the crank of the shaft, a guide plate having grooves one within the other to receive the crank pin, switch tongues to direct the pin from one groove to another, and a lever mechanism to control the movement of the switch tongues.

6. In a transmission gear, the combination with the crank shaft with cranks thereon, the radially movable crank pin in the shaft crank, and the grooved guide plate, of the switch tongues controlling the grooves of the guide plate, the yokes connected to the several tongues to move them, and a lever mechanism for operating the yokes.

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