G. P. KAHLER.

MECHANICAL MOVEMENT.

APPLICATION FILED APR. 19, 1912.

**1,187,629.**

Patented June 20, 1916.

3 SHEETS—SHEET 1.

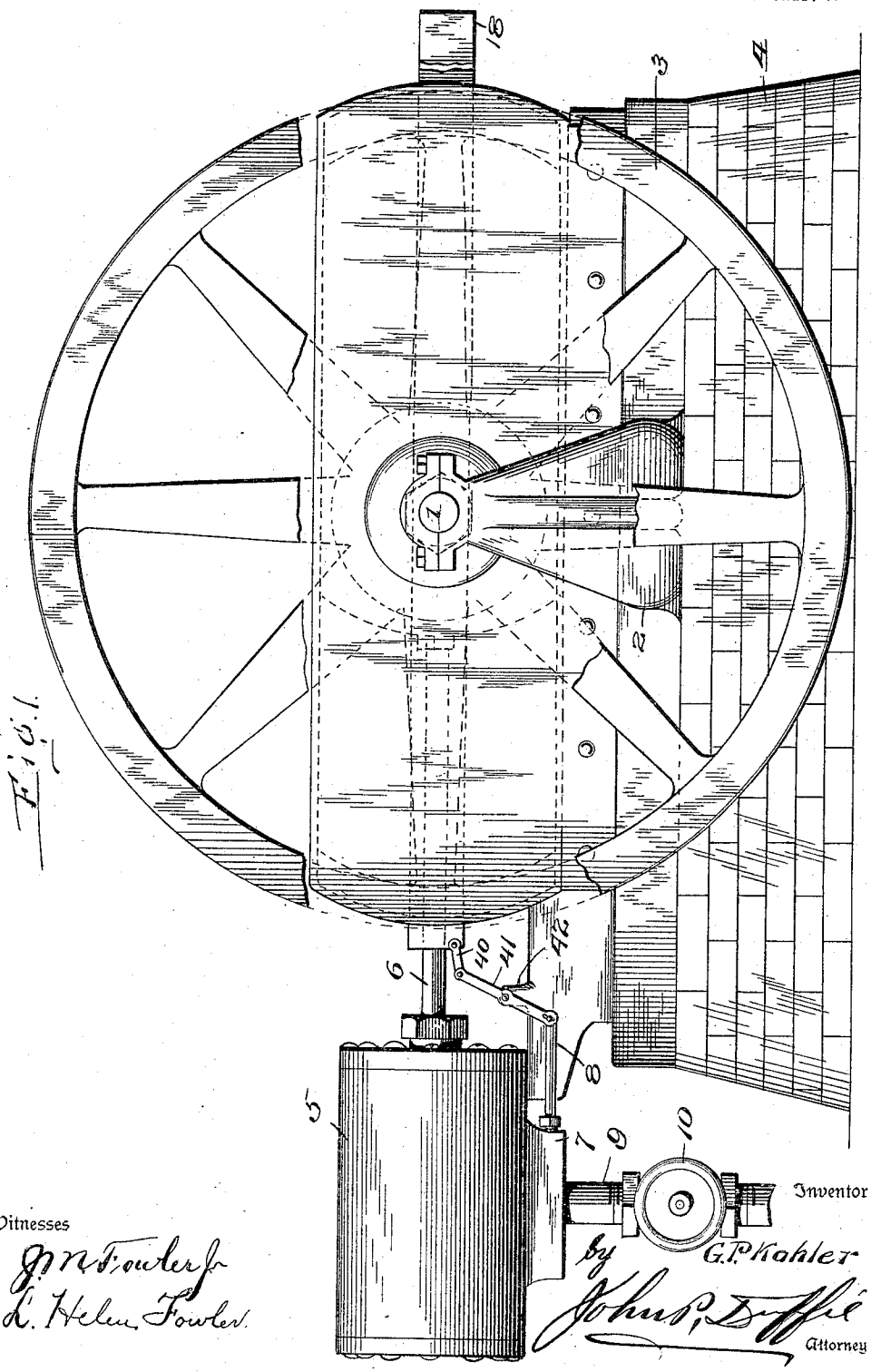



Fig. 1.

Witnesses

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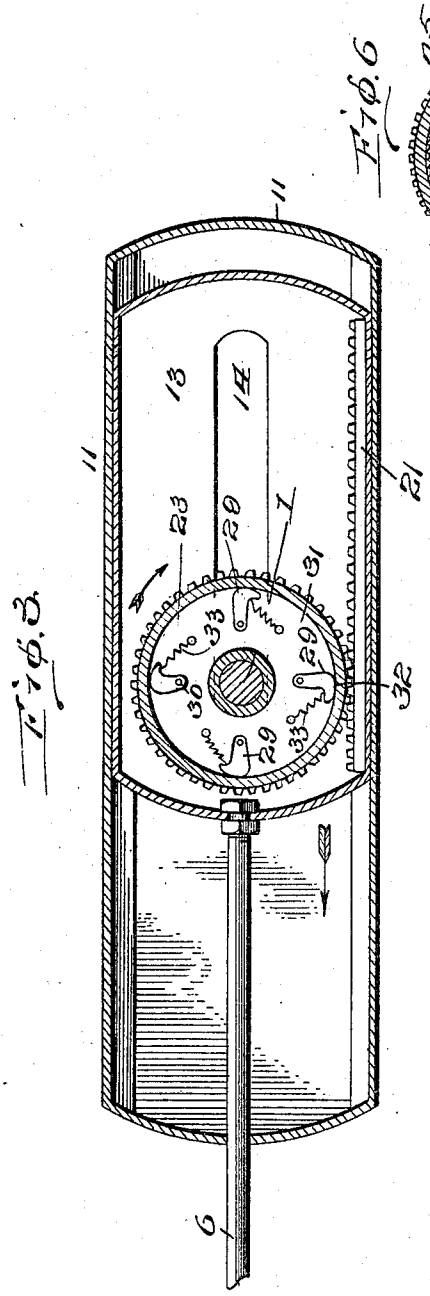


Fig. 3.

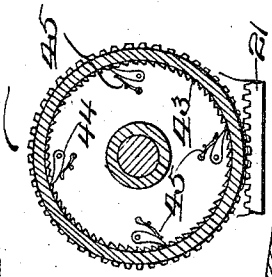


Fig. 6.

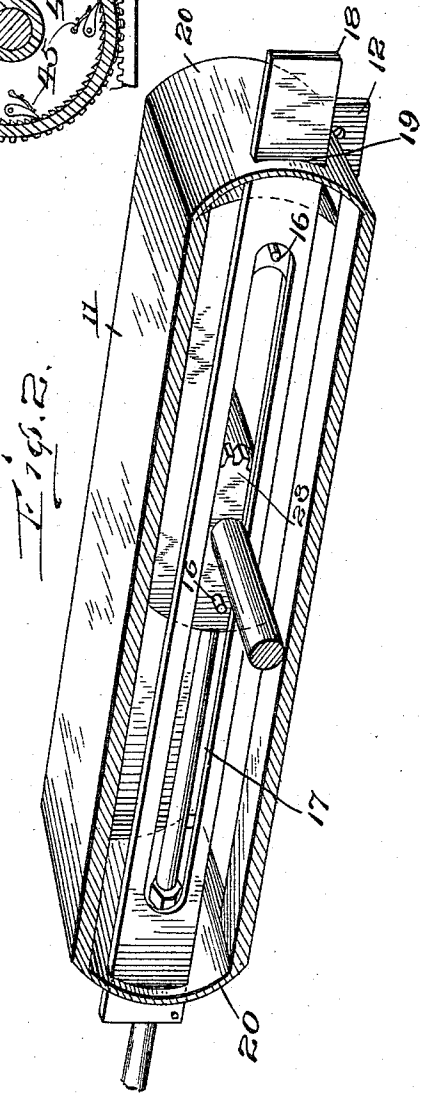


Fig. 2.

Witnesses

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3 SHEETS—SHEET 3.

Fig. 4.

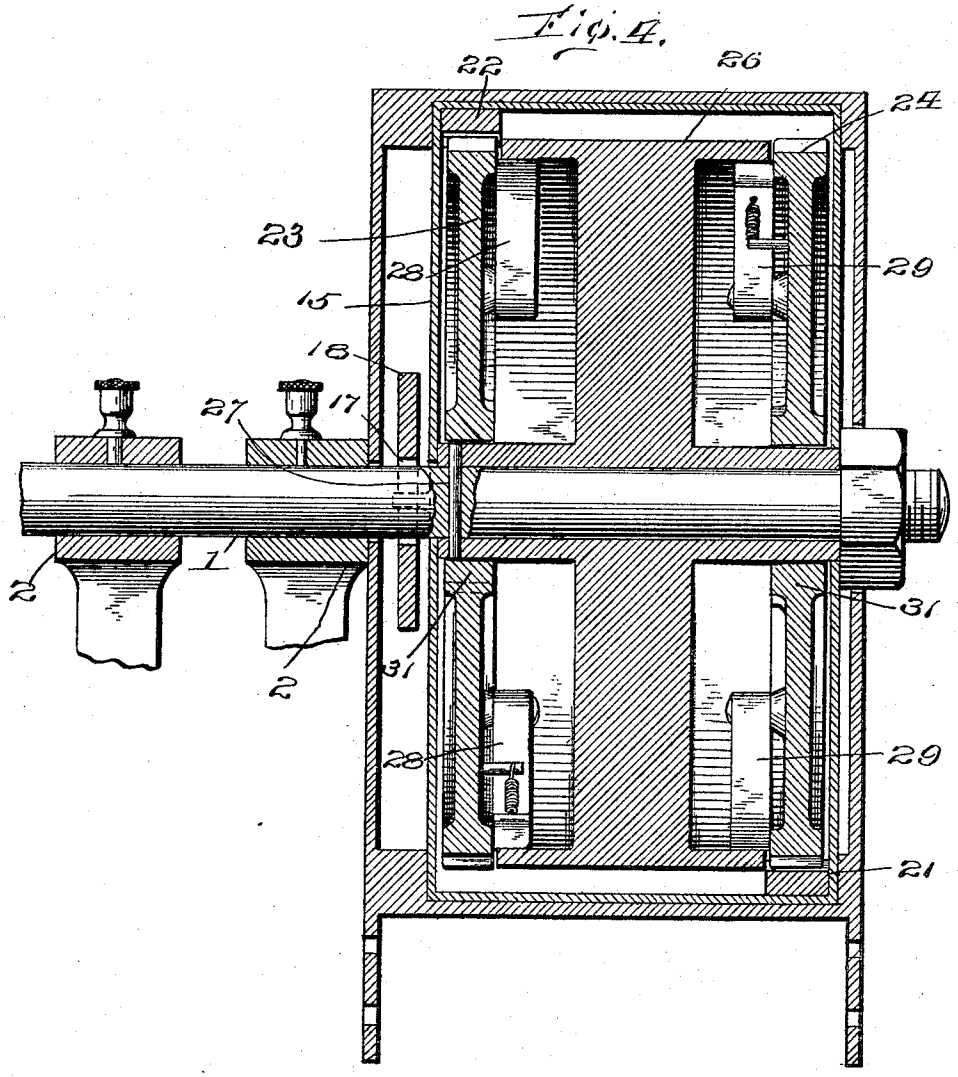
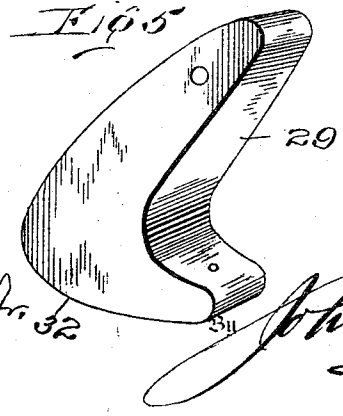



Fig. 5.




Witnesses

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# UNITED STATES PATENT OFFICE.

GOTTLEIB P. KAHLER, OF ALVO, NEBRASKA.

## MECHANICAL MOVEMENT.

1,187,629. Specification of Letters Patent. Patented June 20, 1916.

Application filed April 19, 1912. Serial No. 691,862.

*To all whom it may concern:*

Be it known that I, GOTTLEIB P. KAHLER, a citizen of the United States, residing at Alvo, in the county of Cass and State of Nebraska, have invented certain new and useful Improvements in Mechanical Movements, of which the following is a specification.

This invention relates to new and useful improvements in engines.

The primary objects of my invention are, first, to make certain improvements in engines which will overcome "dead centers", so that no matter where the stroke stops, the piston can always complete the stroke, its leverage being equal at all points; second, to provide improvements of such a character that the engine is much easier to control and operate, and third, to provide means whereby the power or speed of the engine, as desired, may be varied without changing the stroke of the piston, or vice-versa.

With the foregoing and other objects in view that will appear as the nature of the invention is better understood, the invention consists in the novel features of construction, combination and arrangement of parts illustrated in the drawings and more particularly pointed out in the appended claim.

In the accompanying drawings: Figure 1 is a side elevation of an engine of the stationary type embodying my improvements. Fig. 2 is a sectional perspective view of the outer casing, the inner slidably mounted casing and associated parts. Fig. 3 is a longitudinal section of Fig. 2. Fig. 4 is a transverse section taken through the line or power shaft the drum and associated parts. Fig. 5 is a detail perspective view on an enlarged scale over one of the friction grips, and Fig. 6 is a detail sectional view of a modification.

In the embodiment illustrated, 1 indicates the line or power shaft, 2 the standards for said shaft, 3 the fly or band wheel on one end of the shaft 1, 4 the base, 5 the piston cylinder, 6 the piston rod, 7 the steam chest, 8 the stem of the slide valve, 9 the steam pipe communicating with the steam chest and 10 the hand valve on the steam pipe 9.

It is to be understood that the parts above referred to are of any ordinary or approved construction, and for this reason a more detailed description thereof is not deemed necessary.

The improvements comprise a rectangular oblong outer metal frame or casing 11, which is mounted on the bed frame 4, being disposed longitudinally of the piston rod and cylinder, and having a base flange 12 by means of which it is bolted or otherwise secured in place. An inner casing 13 is mounted to slide longitudinally within the outer stationary casing or frame 11, and is provided in opposite side members with longitudinal slots 14 to receive the line or power shaft 1. The side wall 15 of the inner casing 13 is provided near opposite ends with a pair of outwardly extending lugs or pins 16, which are disposed in longitudinal alinement and work in a longitudinal slot 17 formed in the slide bar 18 which works through and is guided in its movement by corresponding slots 19 in the end walls 20 of the outer stationary casing. The inner casing 13 is provided at its bottom and top with longitudinal racks 21 and 22, respectively, which are disposed at diagonally opposite corners or opposite sides of the inner casing, and which mesh with the teeth of pinions 23 and 24 loosely mounted on opposite ends of the hub 25 of the drum 26 keyed to the power shaft by the pin 27. An annular series of friction grips 28 and 29 are pivoted at their inner ends, as at 30, to the rims of the pinions, and are provided at their outer ends with the cam-shaped bearing portions 32, held in frictional contact with the rim of the drum 26 by the coil springs 33. Each series of friction grips alternately operate to grip the rim of the drum and in this way transmit power to the line shaft, when the piston is moving in one direction, and to permit the pinion by which said series are carried to revolve or turn loosely on the hub of the drum without turning the latter when the piston is moving in the opposite direction. The two series of friction grips are oppositely arranged, that is, one series acts to grip the rim of the drum and in this way transmit power to the line shaft when the piston is moving in one direction, and the other series operating to grip the rim and turn the shaft in the same direction of rotation on the opposite or return stroke of the piston, each series successively gripping and releasing the rim of the drum, whereby a constant uniform force is exert-

ed to rotate the power shaft always in the same direction.

It will be observed that owing to the arrangement of the racks and pinions shown, that the greatest amount of leverage is provided in transmitting the power of the piston to the power shaft, and for this reason it is claimed that by employing my improvements greater power in engines may be obtained with a given pressure on the piston. Attention is also invited to the fact that by increasing the size of the pinions greater power may be had with a proportionate decrease in the speed, and conversely, by using pinions of a smaller size greater speed may be attained with a proportionate decrease in the power. It will also be observed that results may be obtained by varying the length of the stroke of the piston without changing any of the parts.

In practice, when the piston is on the return stroke the inner casing 13 is moved bodily within the outer casing or frame 11, in the direction indicated by the arrows, under which conditions the rack 21 rotates the pinion 24 in the direction indicated by the arrow in Fig. 3 and said pinion through the medium of the friction grips 28 held in contact with the rim of the drum 26 by the coil springs 33 rotates the drum in the same direction which in turn rotates the power shaft, the drum being keyed to the shaft by the pin 27. On the forward or opposite stroke of the piston the other series of friction grips carried by the pinion 23 are brought into play during which period the pinion 24 turns loosely on the hub of the drum in an opposite direction. This is made possible owing to the particular construction of the friction grips. When the casing 13 is moved in the direction indicated by the arrow in Fig. 3 and is almost at the end of its stroke, the pin 16 at the inner end of the casing engages the inner end of the slot in the slide bar 18 which moves the bar a sufficient extent to operate the slide valve, the inner end of the slide bar 18 being connected by the link 40 with the upper end of the connecting link 41 pivoted on the bearing stud 42 and connected at its lower end with the stem 8 of the slide valve.

The construction and operation of the steam chest and slide valve does not need further explanation, as this is well understood by those versed in the art.

As shown in the modification illustrated in Fig. 6, the rim of the drum may be provided at opposite faces with ratchet teeth 43 and the pinions with pawls 44 held in contact therewith by the springs 45. This arrangement will give the same results in turning the line or power shaft by the rotation of the drum as the friction grips heretofore described.

From the foregoing description taken in connection with the drawings, it is thought that the construction, operation and many advantages of my improvements will be clearly understood without requiring a further explanation.

Various changes in the form, proportions and minor details of construction may be resorted to without departing from the principles or sacrificing any of the advantages of this invention as defined in the appended claim.

Having described my invention what I claim as new is:

A mechanical movement including a reciprocating element a rotary shaft, and a means for converting the reciprocating movement of the reciprocating element into rotary movement of said shaft, comprising an oblong outer stationary casing having a depending base attaching flange, an inner hollow rectangular oblong casing slidably mounted in the outer casing and connected with said reciprocating element, a drum keyed to the power shaft within said inner casing, longitudinal racks arranged at the top and bottom of the inner casing at diagonally opposite corners thereof, pinions loosely mounted on opposite ends of the hub of said drum and intermeshing with said racks, a series of friction grips pivoted to each pinion and provided at their outer ends with enlarged off-set bearing portions engaging the rim of the drum and coil springs for holding said friction grips in operative or drum-engaging position, the two series of friction grips being oppositely arranged and each series successively gripping and releasing the hub of the drum whereby a continuous rotary motion is imparted to the rotary shaft in the same direction.

In testimony whereof I affix my signature in presence of two witnesses.

GOTTLEIB P. KAHLER.

Witnesses:
Ross B. Smith,
Claude M. Brobst.

**Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."**