E. H. McCLOUD.

POWER TRANSMISSION MECHANISM.

APPLICATION FILED DEC. 12, 1913.

1,270,964.

Patented July 2, 1918.

3 SHEETS—SHEET 1.

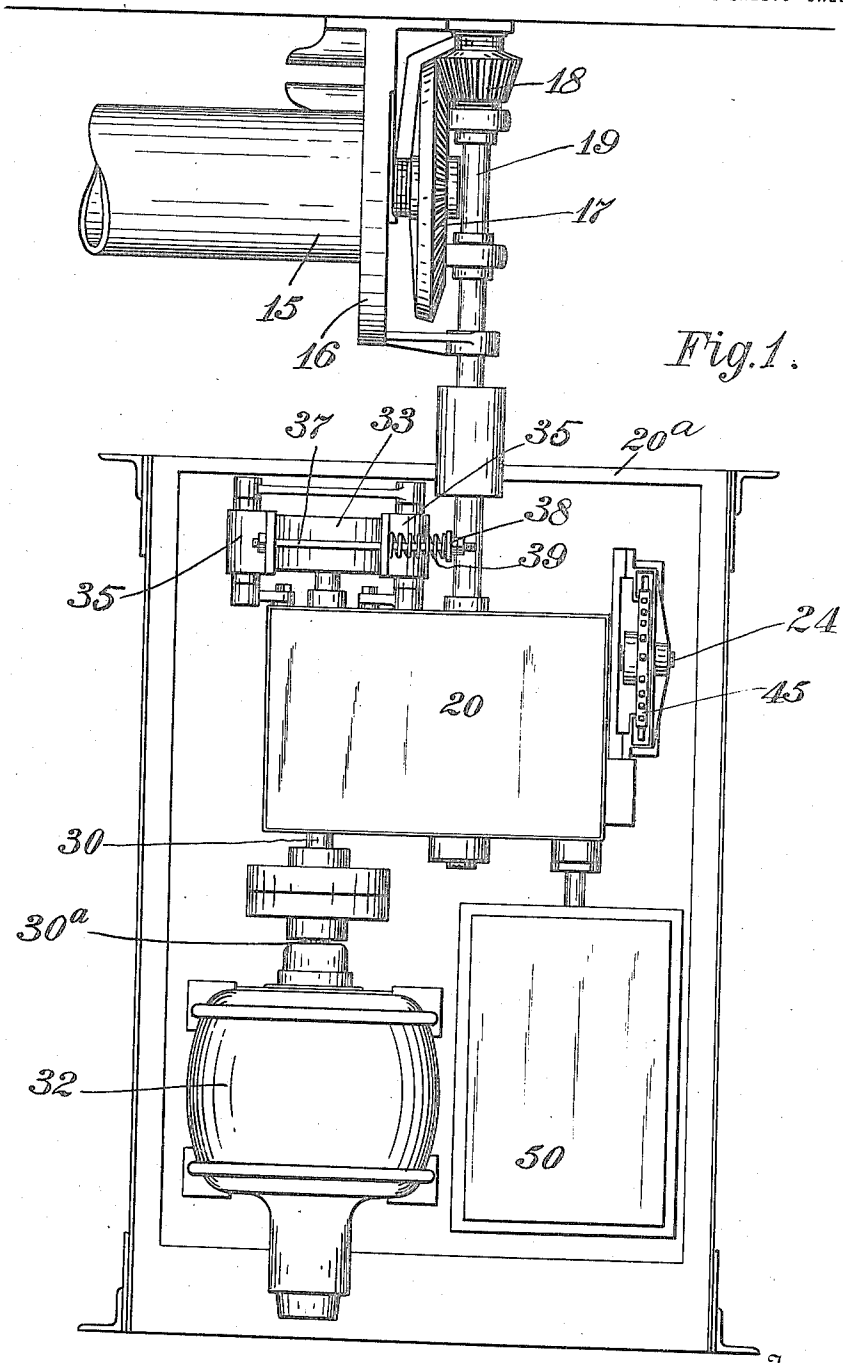


Fig. 1.

Witnesses

Benj. Finckel

W. E. Ricketts

Inventor

Edward H. McCloud

by Finckel & Finckel

his Attorneys

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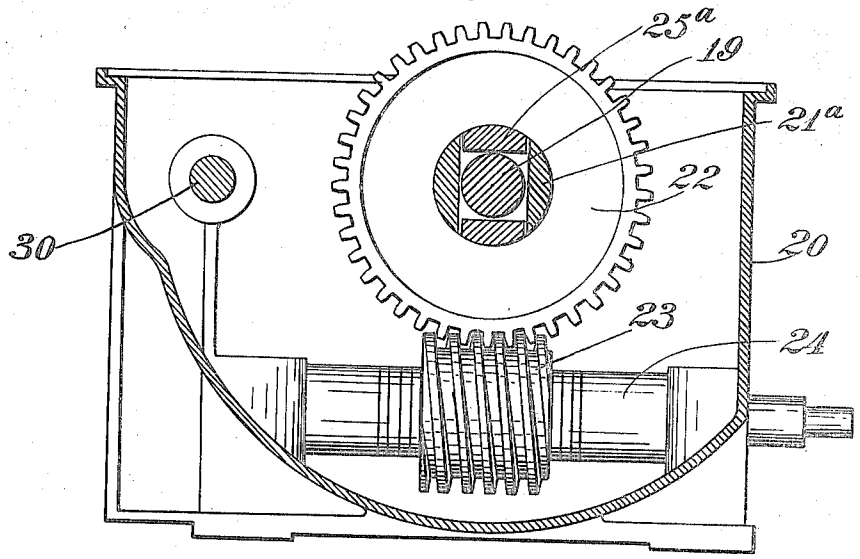
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3 SHEETS—SHEET 2.

Fig. 2.



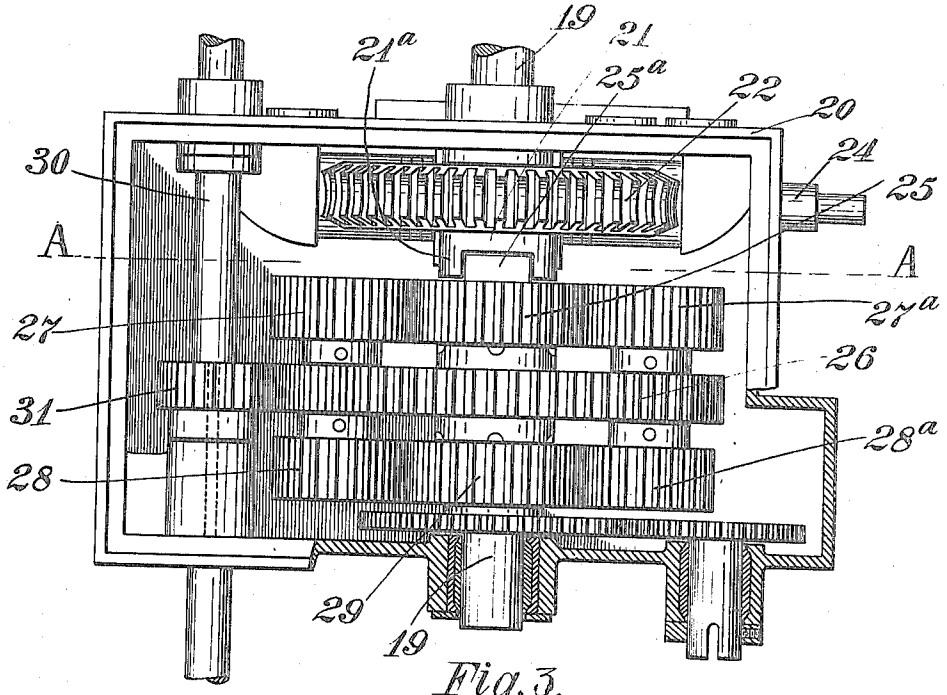


Fig. 3.

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Benj. Finkel

W. E. Ricketts

Inventor

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by Finnel & Finnel

his Attorneys

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3 SHEETS—SHEET 3.

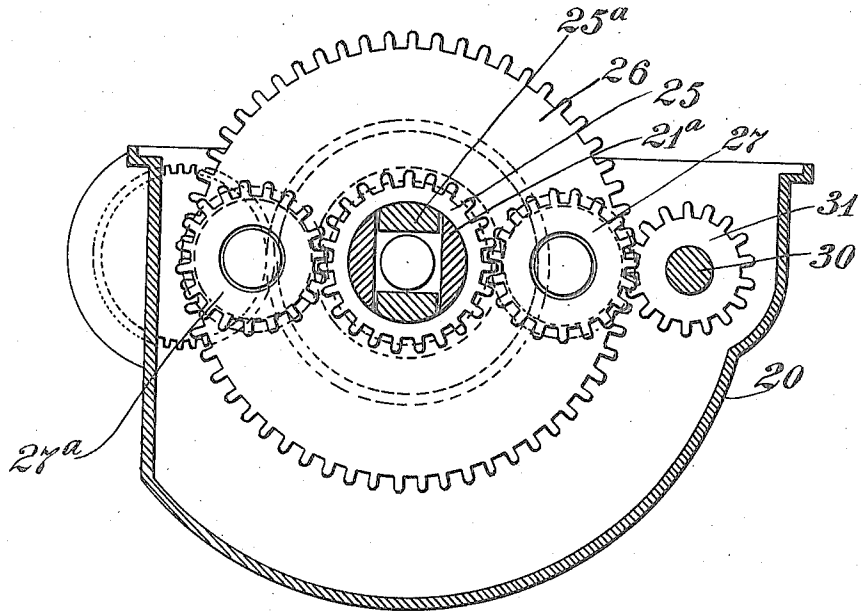


Fig. 4.

Witnesses

Benj. Finckel

M. A. Ricketts

Inventor

Edward H. McCloud

By Finnell & Finnell

his Attorneys

UNITED STATES PATENT OFFICE.

EDWARD H. McCLOUD, OF COLUMBUS, OHIO, ASSIGNOR TO THE KINNEAR MANUFACTURING COMPANY, OF COLUMBUS, OHIO, A CORPORATION OF WEST VIRGINIA.

POWER-TRANSMISSION MECHANISM.

1,270,964. Specification of Letters Patent. Patented July 2, 1918.

Application filed December 12, 1913. Serial No. 806,318.

To all whom it may concern:

Be it known that I, EDWARD H. McCLOUD, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented a certain new and useful Improvement in Power-Transmission Mechanism, of which the following is a specification.

This invention relating generally to power transmission mechanism has for its particular object to provide improved means of the kind especially useful for the manual and power operation of a rolling fire door or shutter whereby clutches and auxiliary mechanism for shifting them are dispensed with. Clutches have some disadvantages among which are first—the difficulty of shifting them into engagement, there being no available means, so far as I am aware, for positively registering them; and second the difficulty of disengaging them because of the binding of their contacting surfaces when under pressure.

Other objects of the invention can be gathered from the detailed description herein.

The invention is embodied in the examples of constructions and combinations of parts herein set forth and pointed out in the claims.

In the accompanying drawings forming part hereof—

Figure 1 is a plan view of the invention.

Fig. 2 is a section on the line A—A Fig. 3 looking up.

Fig. 3 is a plan view on a larger scale than appears in Fig. 1 of the transmission gear.

Fig. 4 is a section of the line A—A, Fig. 3 looking down.

In the views 15 designates one end of the ordinary barrel or winding drum of a flexible rolling fire curtain and 16 one of the supporting brackets for the shaft or roller barrel. The shaft of the barrel where it extends through the bracket has fixed to it a bevel gear 17 engaged by a pinion 18 fixed on a shaft 19 so that rotation of the pinion shall cause rotation of the barrel and the winding or unwinding of the curtain according to the direction the shaft 19 and said pinion are turned.

The shaft 19 extends through a cast iron box 20 mounted in a suitable casing 20^a. Within the box 20, loose on the shaft 19, is a sleeve or collar 21 having fixed thereto a worm gear 22 engaged by a worm 23 on a shaft 24 journaled in the box and having a stud projecting at one end therefrom (see Figs. 2 and 3). The angulation of the threads on the worm gear 22 and worm 23 is such as to prevent the driving of the worm by the worm gear. In other words the worm gear is locked from motion unless the worm is turned. Such a construction is known as an irreversible worm. Loose on the shaft 19 beyond the worm gear is a spur gear 25 and loose on the shaft 19 beyond said gear 25 is another larger spur gear 26 having journaled in its web two shafts carrying on the opposite sides of the web pairs of smaller spur gears 27 and 27^a and 28 and 28^a. The spur gears 27 and 27^a are larger than the spur gears 28 and 28^a and engage the spur gear 25 while the spur gears 28 and 28^a engage a spur gear 29 that is fixed to the shaft 19. The worm gear 22 is operably coupled to the spur gear 25 by means of jaws 21^a on the hub or collar of the worm gear engaging lugs 25^a at the hub of the spur gear 25, so that if the worm gear be rotated motion will be imparted to the shaft 19 by reason of the difference between the peripheral motions of the smaller gears 27, 27^a and 28, 28^a. A similar motion can also be imparted to the shaft 19 by revolving the small or planetary gears 27, 27^a and 28, 28^a about the gears 25 and 29. Hence there is journaled in the box 20 parallel to the shaft 19 a driving shaft 30 upon which is secured a pinion 31 engaging the large spur gear 26. One of the gears 27, 27^a and one of the gears 28, 28^a could be dispensed with but the use of pairs secures better balance in the bearings and operation.

The shaft 30 is shown as having coupled to it at one end the armature shaft 30^a of an ordinary electric motor 32 for driving the shaft 30, and its pinion 31. Keyed to the other end of said shaft 30 where the latter protrudes beyond the box 20 is a brake disk 33 engaged by ordinary shoes bearing on the rim of the brake disk and carried on levers 35, 35 fulcrumed on a suitable bracket provided on the box for that purpose. The upper arms of the levers 35, 35, are connected by a rod 37 (see Fig. 1) passing loosely through eyes in said arms, said rod having screw threaded ends with suitable loose stops backed by adjustable nuts on the rod, but on one end of said rod beyond the adjacent lever

arm and between said arm and the loose stop or collar 38 is a coil spring 39 tending normally to draw both arms toward each other and the brake shoes upon the brake disk. The pressure of the brake shoes can be appropriately regulated by turning one of the nuts to increase or diminish the pressure of the spring 39. The worm gear and shaft 19 can be turned by the application of manual power to the worm shaft 24. To the protruding stud of this shaft 24 is secured a sprocket wheel 45 which can be engaged by an endless sprocket chain the lower loop of which extends to within easy reach of an operator on the floor or ground.

In practice the shaft 19 may be rotated either by the application of power to the worm 23 or to the shaft 30. When power is applied to the worm 23 the worm gear 22 is turned thus rotating the loose spur gear 25 and the planetary gears 27, 27^a and 28, 28^a. In this operation the carrier gear 26 is held stationary and the gear 29 and shaft 19 rotated by the action of the planetary gears. When the shaft 30 is used to operate the shaft 19 the brake of the shaft 30 is released and when said shaft is rotated the pinion 31 turns the carrier gear 26 and because the gear 25 is held from rotation by the worm 23 the planetary gears 27 and 27^a and 28 and 28^a respectively are rotated thus imparting to the gear 29 and shaft 19 a motion due to the difference between the circumferences of the said planetary gears.

What I claim is:

1. A power transmission mechanism including, in combination, a driven shaft, a spur gear fixed thereto, and a spur gear loose with reference thereto, a carrier wheel, planetary pinions carried by said carrier wheel, said pinions engaging said spur gears, a driver for the carrier wheel, a driver for the second mentioned spur gear and means whereby the last named driver may be locked from operation.

2. A power transmission mechanism including, in combination, a driven shaft, a spur gear fixed thereto, and a spur gear loose with reference thereto, a carrier wheel, differential planetary pinions carried by said carrier wheel, said pinions engaging said spur gears, a driver for the carrier wheel, a driver for the second mentioned spur gear and means whereby the last named driver may be locked from operation.

3. A power transmission mechanism including, in combination, a driven shaft, a loose spur gear, a second spur gear of different diameter fixed to said shaft, a rotary member carrying a shaft having pinions thereon to engage the two first mentioned spur gears, and means whereby the first mentioned spur gear is held and the rotary member rotated to drive the driven shaft, said holding means adapted to be driven to drive the driven shaft when the rotary member is held.

4. A power transmission mechanism including, in combination, a shaft, a spur gear loose on said shaft, a second spur gear of different diameter fixed on said shaft, an intermediate spur gear loose on said shaft, said spur gear carrying a shaft having pinions to engage the two first mentioned spur gears, an irreversible worm driven wheel coupled with the first mentioned spur gear to drive the shaft, a pinion engaging the said intermediate spur gear and means for driving and means for holding the same.

5. A power transmission mechanism including, in combination, a shaft, a spur gear loose on said shaft, a second spur gear fixed on said shaft, a rotary member carrying a shaft having pinions to engage the two first mentioned spur gears, means for holding and driving the first mentioned spur gear and separate means for holding and driving the rotary member.

EDWARD H. McCLOUD.

Witnesses:
ANNA TERESA KING,
ALBERT RUSH.