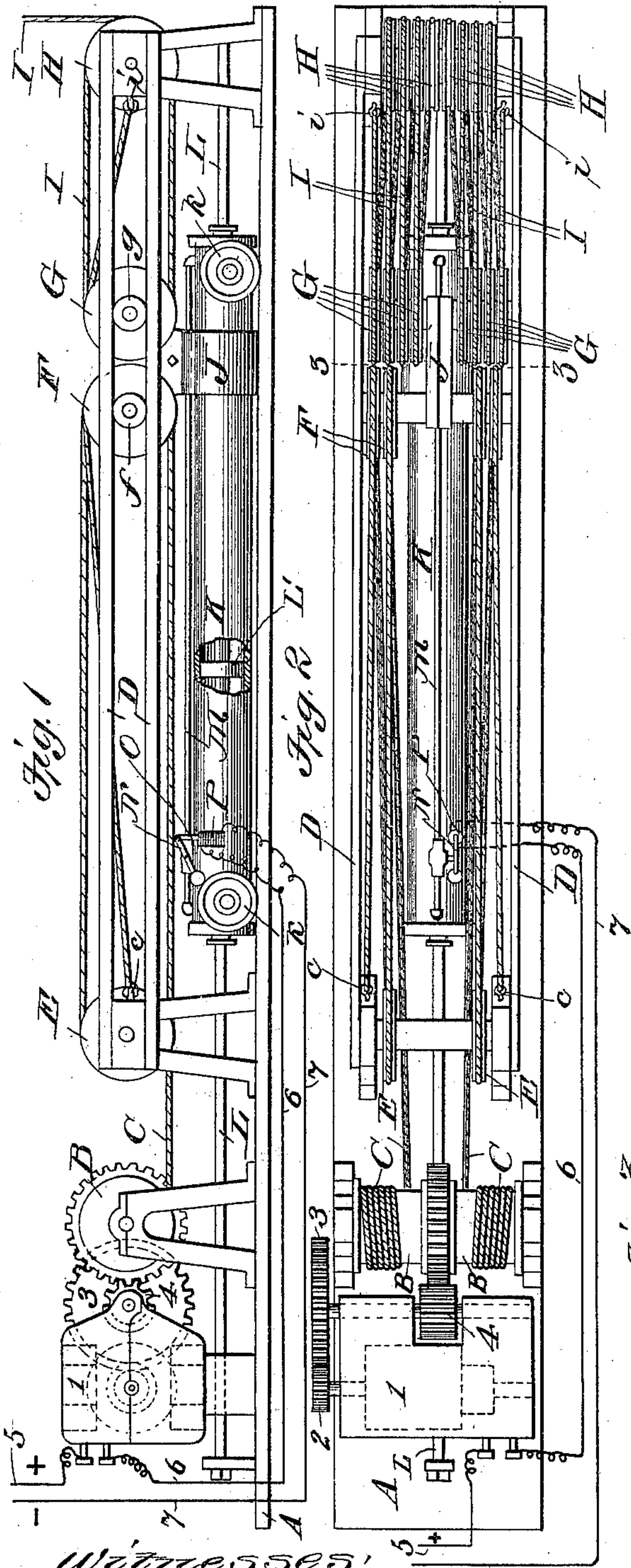


(No Model.)

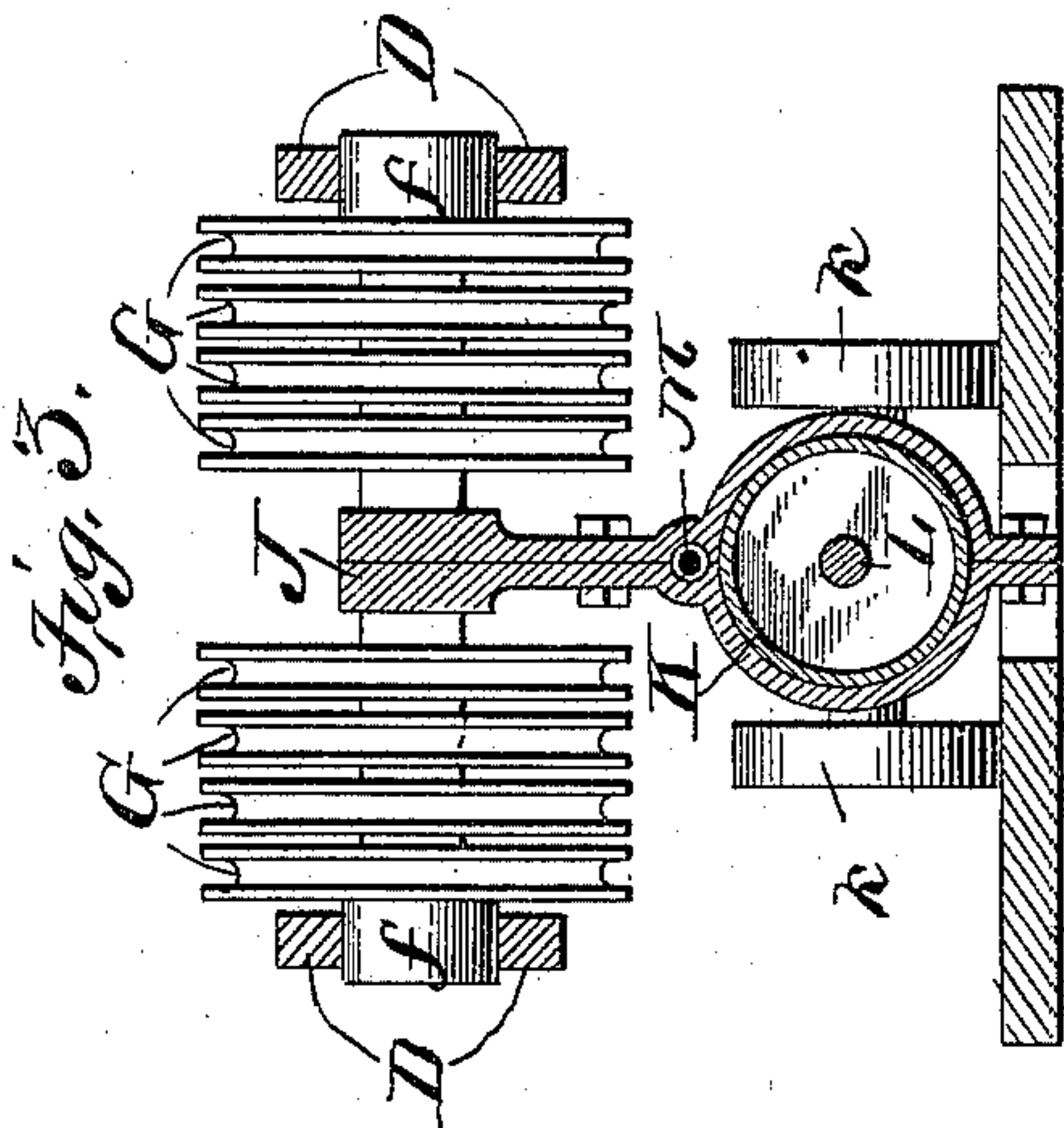
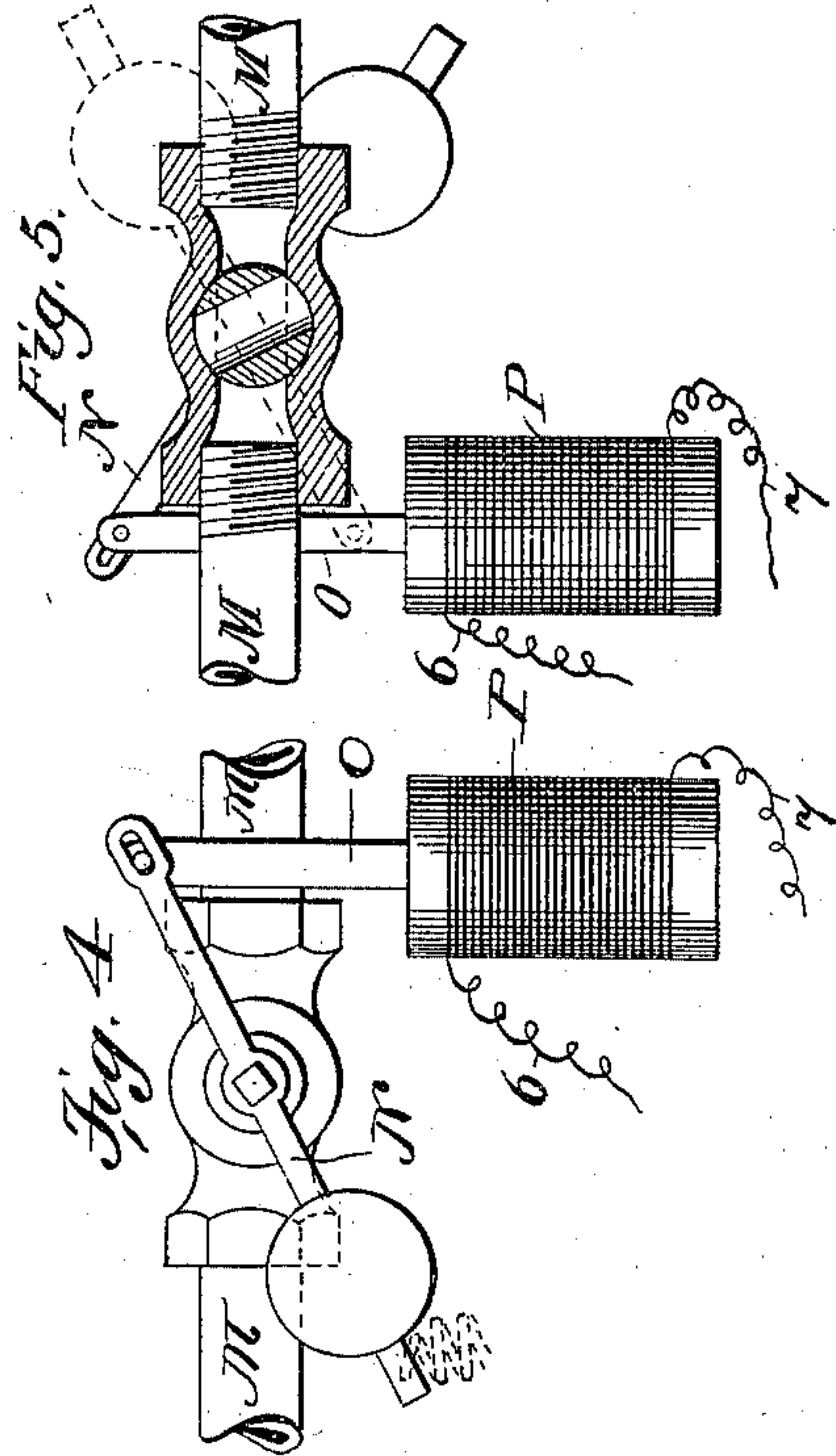
W. C. FLETCHER.
HOISTING APPARATUS FOR ELEVATORS.

No. 598,415.

Patented Feb. 1, 1898.



Witnesses:
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Inventor
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UNITED STATES PATENT OFFICE.

WENDELL C. FLETCHER, OF ST. LOUIS, MISSOURI.

HOISTING APPARATUS FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 598,415, dated February 1, 1898.

Application filed April 29, 1897. Serial No. 634,374. (No model.)

To all whom it may concern:

Be it known that I, WENDELL C. FLETCHER, a citizen of the United States, residing at the city of St. Louis, State of Missouri, have invented a certain new and useful Improvement in Hoisting Apparatus for Elevators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a side elevational view of my improved hoisting apparatus. Fig. 2 is a top plan view of the same. Fig. 3 is a cross-sectional view on line 3 3, Fig. 2. Fig. 4 is a detailed view of the controlling-valve for the regulating-cylinder. Fig. 5 is a sectional view through the valve as seen from the other side, showing its closed position in full lines and its open position in dotted lines.

This invention relates to a new and useful improvement in hoisting apparatus, and is especially adapted for use in connection with elevators, although it will be obvious that there are other uses to which my invention can be advantageously put.

The object of this present invention is to utilize the multiple-sheave arrangement to the best possible advantage and in providing a controlling device in connection with the multiple sheaves, which controlling device in the event that power fails to operate said sheaves will operate as a brake for the movable sheaves and prevent said sheaves from moving and thereby save the elevator from falling by gravity.

It is well known that where the hauling-rope leads directly to a power-driven winding-drum said rope will not lead properly, and but one rope can be used without serious danger of accident. Where the shaft is deep, a large quantity of rope must necessarily be wound on the drum, and when this is done the rope is liable to "pile" and break.

My present invention contemplates the use of a moderate-speed power-driven drum using a short length of rope and imparting a high speed to the hauling-ropes of the elevator, of which there may be any number.

In the drawings I have shown two power-driven drums coöperating with two sets of multiple sheaves, which I will call the "power-driven" sheaves, said power-driven sheaves

operating two sets of multiple sheaves for two hauling-ropes, there being one brake-cylinder for the whole apparatus. It is obvious that more than one brake-cylinder may be used in connection with the apparatus, if desired. It is also obvious that but one set of power-driven multiple sheaves may be used in conjunction with three or more sets of multiple sheaves for three or more hauling-ropes, if desired.

The special features of my present invention reside in the utilization of a power-driven drum and multiple-sheave arrangement to cooperate with a comparatively short power-rope, in combination with multiple-sheave arrangements for the hauling-rope and a brake-cylinder for the driving and driven movable sheaves of the respective multiple sheaves.

Other features of the invention reside in the construction, arrangement, and combination of the several parts, all as will hereinafter be described, and afterward pointed out in the claims.

In the drawings, A indicates a suitable base, upon which is mounted a power-driven drum B, around which are arranged the power-ropes C. A steam-engine or electric motor can be employed to drive these drums. I have shown a common form of the latter in the drawings.

D indicates guides supported by standards on base A. Fixedly mounted in the front ends of these guides are bearings for pulleys E, while pulleys F, having rollers *f* on the ends of their shafts, are mounted so as to move in the guides D. When power is applied to drums B to wind the ropes C thereon, said ropes passing under and around pulleys F, then under and around pulleys E, and again under and around pulleys F, the ends of said ropes being then fixed to suitable eyes *c*, will draw the pulleys F toward the pulleys E, the number of pulleys E and F around which the ropes C pass determining the speed of the movable pulleys F with relation to the winding speed of the drums B.

G indicates pulleys having rollers *g* on the ends of their shafts, said rollers running in the guides D.

H indicates pulleys the bearings of which are fixedly mounted in the rear ends of the guides D.

I indicates the hauling-ropes wound around

the pulleys G and H, said hauling-ropes passing up over sheaves at the top of the shaft (not shown) and suspending the elevator, as is well known. Ropes I are fixed to eyes *i*,
 5 whence they pass over and around pulleys G, under and around pulleys H, &c., and over the sheaves at the top of the elevator-shaft, as before described. In order to increase the speed of ropes I, pulleys G and H may be multiplied indefinitely, as is well understood.

10 The shafts of pulleys F and G are connected together by a suitable yoke J, as shown.

When ropes C are wound on drums B, pulleys F move toward pulleys E, causing pulleys G to move away from pulleys H, and in
 15 this way cause the elevator to be lifted. When it is desired that the elevator shall descend, the engine or motor geared to drums B is reversed and run at such speed that the ropes
 20 C on drums B will be played out to permit the pulleys F and G to move toward the pulleys H and away from pulleys E and allow the elevator to descend by gravity.

K indicates a brake-cylinder using an incompressible fluid, said cylinder being mounted
 25 in the lower end of yoke J, the ends of said cylinder being supported on suitable rollers *k*.

L indicates a rod fastened at its ends to suitable standards extending from base A, said rod being the piston-rod of cylinder K and passing through both ends thereof, carrying a piston-head L' in the cylinder, as is
 30 well understood. The object of extending this rod out each end of the cylinder is to equalize the areas on each side of the piston-head.

M indicates a by-pass pipe opening into the ends of cylinder K. When cylinder K is
 40 moved with the pulleys F and G, a suitable incompressible fluid is forced through pipe M from one end of the cylinder to the other, the size of the opening through which this fluid passes controlling the speed of the cylinder and its attached pulleys F and G. In
 45 order to completely close the passage through this pipe M and in that way brake the pulleys F and G, I arrange a suitable plug-valve in pipe M, which valve carries a lever N, which
 50 lever is provided with a weight or spring *n* on one end, as shown more clearly in Figs. 4 and 5. The other end of lever N is slotted and carries an armature O, operating in a suitable solenoid P, to the windings of which
 55 lead suitable wires from the motor, which imparts power to the drums B. While the motor is running, current passes through the solenoid and attracts the armature O, thereby opening pipe M, as shown in dotted lines in
 60 Fig. 5. As soon as current is cut off from the motor the solenoid is deenergized and the weight or spring on the end of lever N will cause the valve controlled by said lever to close the passage through pipe M, as shown
 65 in full lines in Fig. 5. In the event that a shunt-field motor is used this solenoid is in the armature-circuit. Where the armature and

field are in series, the solenoid may be in the circuit, as shown in the drawings, wherein 1
 is the motor; 2, pinion on armature-shaft; 3,
 70 gear on counter-shaft meshing with armature-pinion; 4, pinion on armature-shaft for driving drum B; 5, wire for supplying current to motor; 6, wire running from motor to solenoid, and 7 return-wire from solenoid.

75 From the above description it will be seen that the cylinder controls the speed of the movable sheaves in the multiple-sheave arrangement of the power and hauling ropes and that said cylinder is in turn controlled
 80 by the power which drives the motor for the multiple sheaves. This cylinder therefore acts practically as a safety-brake for both the power and hauling ropes of the apparatus.

I am aware that many minor changes in the
 85 construction, arrangement, and combination of the several parts of my device can be made and substituted for those herein shown and described without in the least departing from the nature and principle of the invention.

90 Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a hoisting apparatus, the combination with a power-driven drum, of a power-rope,
 95 multiple sheaves about which said rope is passed, a hauling-rope, and multiple sheaves about which said hauling-rope is passed, the movable sheaves in both sets of multiple sheaves being connected; substantially as described.

2. In a hoisting apparatus, the combination with a power-driven drum, of a power-rope,
 105 multiple sheaves about which said rope is passed, a hauling-rope, multiple sheaves about which said hauling-rope is passed, and means for controlling the movement of the movable sheaves in said multiple-sheave devices; substantially as described.

3. In a hoisting apparatus, the combination
 110 with a power-driven drum, of a power-rope, multiple sheaves about which said rope is passed, a hauling-rope, multiple sheaves about which said hauling-rope is passed, the movable sheaves in both sets of multiple sheaves
 115 being connected, a liquid-containing cylinder connected with said movable sheaves, a stationary piston operating in said cylinder, and a by-pass connecting the ends of said cylinder; substantially as described.

4. In a hoisting apparatus, the combination with a power-driven drum, of a power-rope,
 120 multiple sheaves about which said rope is passed, a hauling-rope, multiple sheaves about which said hauling-rope is passed, a liquid-containing cylinder for controlling the movement of the movable sheaves in said multiple-sheave devices, said cylinder having a piston,
 125 a by-pass pipe opening into each end of the cylinder, a valve in said by-pass pipe, and means for operating said valve; substantially as described.

5. The combination with a hoisting apparatus, of a cylinder connected with and adapt-

ed to control the same, said cylinder being provided with a by-pass pipe leading into its ends, a valve in said pipe, means controlled by the motive fluid which drives the hoisting apparatus, for throwing said valve open when said motive fluid is operative, and mechanism for closing said valve when said motive fluid is inoperative; substantially as described.

10 6. The combination with a hoisting apparatus, of a cylinder mounted on rollers, a fixed piston cooperating with said cylinder, a by-pass pipe leading into the ends of said cylinder, a valve for controlling said pipe, means for
15 normally closing said valve, and a connection between the power for driving the hoisting apparatus, and the valve, for opening said valve when said power is effective; substantially as described.

20 7. In a hoisting apparatus, the combination with a suitable base, of power-driven drums,

guides on said base, sheaves mounted in bearings fixed in the ends of said guides, movable sheaves mounted in said guides, power-ropes and hauling-ropes for passing about said
25 fixed and movable sheaves, a yoke conjoined to the movable sheaves, a cylinder mounted in said yoke, a by-pass pipe leading into the ends of the cylinder, a valve in said pipe, means for normally closing said valve, a so-
30 lenoid cooperating with the other end of said valve, for opening the same, said solenoid being in the circuit which runs the motor imparting power to the hoisting apparatus; substantially as described.

35 In testimony whereof I hereunto affix my signature, in presence of two witnesses, this 9th day of April, 1897.

WENDELL C. FLETCHER.

Witnesses:

F. R. CORNWALL,
HUGH K. WAGNER.