No. 841,198. PATENTED JAN. 15, 1907.

G. L. TREDO.

HOISTING MACHINE.

APPLICATION FILED MAY 24, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

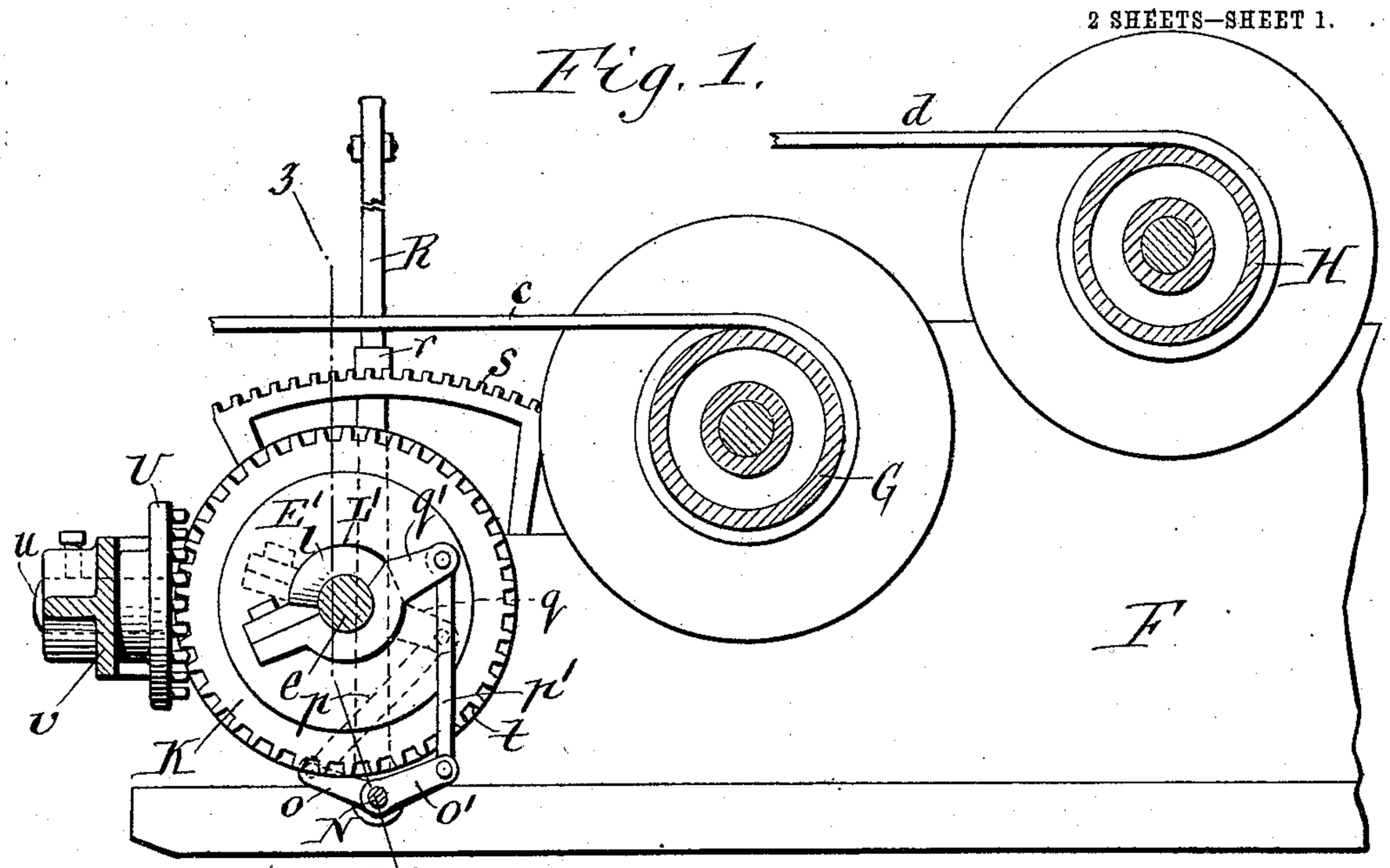

Fig. 2.

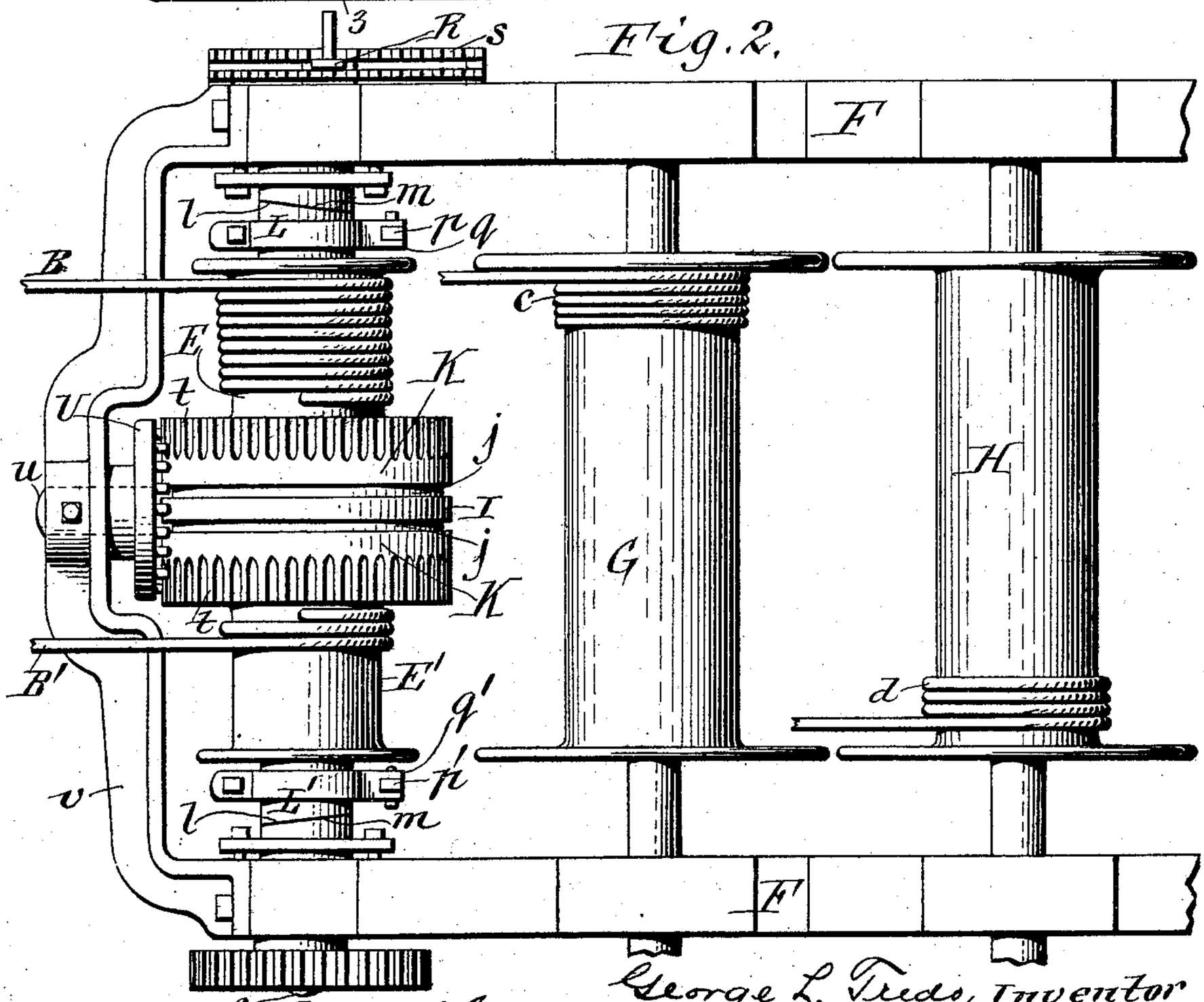

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Fig. 3.

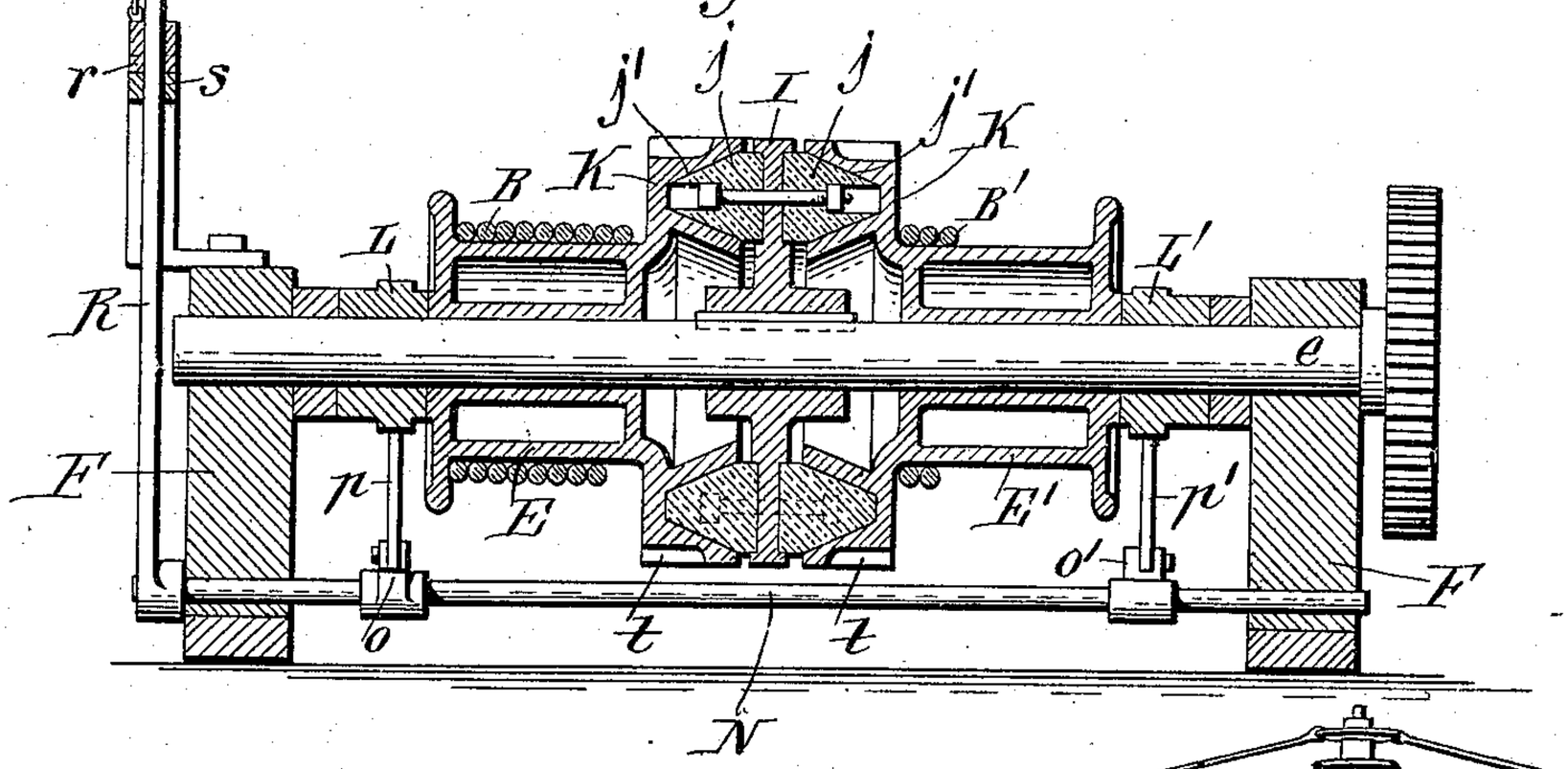
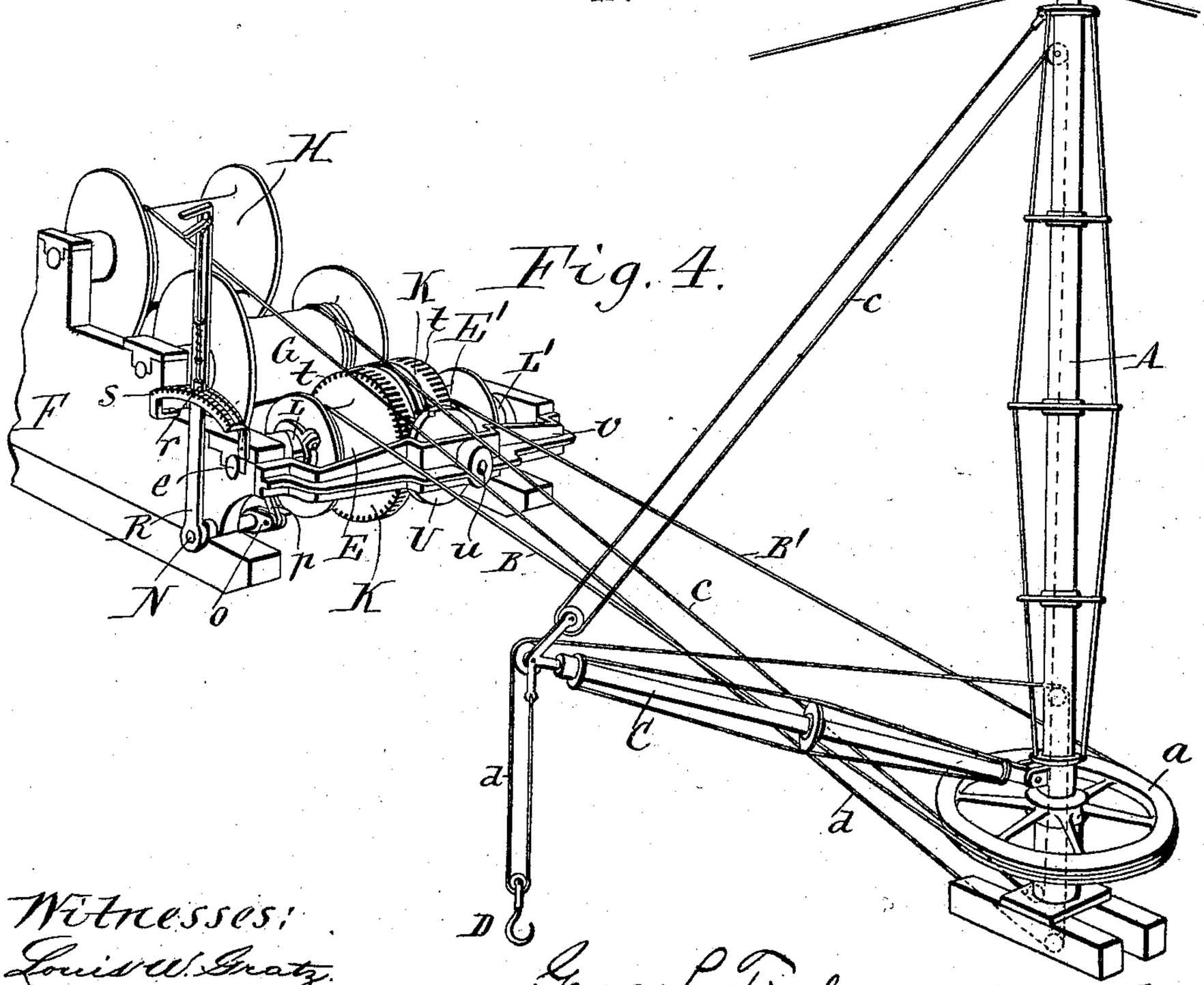


Fig. 4.



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UNITED STATES PATENT OFFICE.

GEORGE L. TREDO, OF BUFFALO, NEW YORK, ASSIGNOR TO THE CONTRACTORS' PLANT MANUFACTURING COMPANY, OF BUFFALO, NEW YORK.

HOISTING-MACHINE.

No. 841,198. Specification of Letters Patent. Patented Jan. 15, 1907.

Application filed May 24, 1906. Serial No. 318,443.

To all whom it may concern:

Be it known that I, GEORGE L. TREDO, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Hoisting-Machines, of which the following is a specification.

This invention relates to that class of hoisting-machines which are used in connection with derricks and which are provided with devices for rotating or swinging the derrick horizontally, raising and lowering the boom, and raising and lowering the grapple or tackle hook which carries the load.

So far as I know, heretofore swinging of the derrick has been effected by means of a turning cable or line passing with its intermediate or central part around the turning or bull wheel secured to the mast and with its opposite ends around derrick-swinging drums, either of which could be connected with a driving-shaft, while the other was free on said shaft. As the tight swing-drum rotated with the driving-shaft the corresponding end of the swinging or turning cable was wound upon the same, while the opposite end of this cable was unwound from the other or loose swinging or turning drum. No means were provided for controlling the movement of the loose swinging drum, and as a result the same was liable to pay out the cable faster than the same was taken up by its companion tight drum, which produced a slack in the trailing end of the swing-cable, which necessitated the employment of take-up rollers and other devices for keeping the cable taut. This was objectionable not only on the account of the undue wear upon the swing-cable owing to the employment of the take-up devices, but also on account of the loss of control of the derrick on the slack side of the cable, inasmuch as there were no reliable means for preventing the boom from swinging in the direction which it was being pulled by the tight swing-drum beyond where it was wanted.

The object of this invention is to provide simple, efficient, and durable means for maintaining an operative connection between the two swinging drums, whereby the same are always retained in a definite relation to each other and the same are compelled to rotate in opposite directions at the same rate, whereby one end of the swing-cable is wound up on one of the swinging drums, while the other end of the swing-cable is paid out in the same measure, thereby preventing undue slack in the same and avoiding the necessity of employing special take-up devices and also maintaining full control of the derrick during all parts of its swinging movement.

In the accompanying drawings, consisting of two sheets, Figure 1 is a fragmentary vertical longitudinal section of a hoisting-machine having its swinging drums equipped with my improvements. Fig. 2 is a top plan view of the same. Fig. 3 is a vertical transverse section in line 3 3, Fig. 1. Fig. 4 is a fragmentary perspective view of the derrick and hoisting-machine, showing the application of my invention.

Similar letters of reference indicate the corresponding parts throughout the several views.

The derrick which is operated by my improved hoisting-machine may be of any usual and well-known construction, that shown in the drawings consisting of an upright mast A, which is capable of horizontal rotation or turning by means of a swing line or cable B B′, passing with its central or intermediate part around a turning or bull wheel *a* at the lower end of the mast, a laterally-projecting boom C, pivoted at its inner end to the lower part of the mast and adapted to be raised and lowered by means of a boom line or cable *c*, operatively connected with the outer end of the boom, and a tackle-hook or grapple D for attachment to the load depending from the outer end of the boom and operatively connected with the main line or cable *d*.

The main parts of the hoisting-machine (shown in the drawings for illustrating the application of my invention) consist of two derrick swinging or turning drums E E′, mounted side by side on a driving-shaft *e*, which is journaled transversely at the front end of the main frame F, a boom-drum G, mounted on the main frame in rear of the swinging drums, and a main drum H, mounted on the frame in rear of the boom-drum. The opposite ends of the swinging cable are wound on the two swinging drums, respectively, both of these cables being wound around these drums in the same direction. The hauling end of the boom-cable is wound around the boom-drum, and the corresponding end of the main cable, which operates the

tackle-hook, is wound around the main drum.

Between the two swinging drums a driving-wheel I is arranged, which is keyed or otherwise secured to the driving-shaft, so as to be compelled to rotate therewith in the same direction. The swinging drums are capable of being coupled with or uncoupled from this driving-wheel by two friction-couplings, each of which consists of a coupling rim or flange *j*, of wood, secured to one side of the driving-wheel and having its V-shaped or tapering outer edge engaging with a correspondingly-shaped annular groove *j'* in the inner side of a wheel K on the adjacent inner end of one of the swinging drums. Upon moving either of the swinging drums axially on the driving-shaft toward the driving-wheel its wheel K will grip the coupling-flange of the driving-wheel and cause the respective swinging drum to rotate with the driving-shaft. Upon moving the swinging drum axially away from the driving-wheel sufficiently to loosen the grip of the coupling-flange on the wheel of the respective drum the latter will be uncoupled from the driving-shaft.

The means shown in the drawings for moving the swinging drums axially inward and coupling the same with the driving-shaft consists of two rotary shifting collars or sleeves L L', mounted loosely on the driving-shaft and each bearing with its plain inner end against the outer end of one of the swinging drums, while its outer end is provided with a cam or inclined face *l*, which engages with a corresponding cam or inclined face *m*, secured to the adjacent stationary part of the main frame. Upon rotating the shifting sleeve forwardly the operation of its cam against the companion cam on the main frame causes the adjacent swinging drum to be moved toward the driving-wheel for coupling the same therewith, while upon moving said shifting sleeve backwardly the respective swinging drum is permitted to free itself from the driving-wheel. These shifting sleeves are operated by means of a horizontal rock-shaft N, journaled transversely on the main frame below the swinging drums, a forwardly-projecting rock-arm *o* on the rock-shaft, connected by a link *p* with a rearwardly-projecting arm *q* on one of the shifting sleeves, and a rearwardly-projecting rock-arm *o'* on the rock-shaft, connected by a link *p'* with a rearwardly-projecting arm *q'* on the other shifting sleeve. These parts are so constructed that when the rock-shaft N is in its central position both of the shifting sleeves will be in an inoperative position and either of the swinging drums will be coupled with the driving-wheel; but upon turning the rock-shaft toward one side of its central position one of the shifting sleeves will be turned forwardly or in the direction which causes its companion swinging drum to be moved into operative engagement with the driving-wheel, while upon moving the rock-shaft toward the other side of its center the swinging drum which has just been coupled will now be uncoupled from the driving-wheel and the other swinging drum will be coupled with the driving-wheel by the cam action of the other shifting sleeve.

The shifting of the rock-shaft is effected by a hand-lever R, connected with one end thereof, and the same is locked in different adjusted positions by means of a catch *r*, mounted on the hand-lever and adapted to engage with a tooth-segment *s*.

Whenever one of the swinging drums is coupled with the driving-wheel the respective end of the swinging cable or line is wound upon the same, while the other end of this cable is unwound from the other swinging drum, which turns in the opposite direction, thereby turning the bull-wheel, around which the central part of the swinging cable passes, and also swinging the derrick, the mast of which carries the bull-wheel.

The parts thus far described are well known and are shown merely to illustrate the application of my invention.

The means for causing the turning or swinging drums to turn in unison, so that the turning-cable unwinds from one drum in the same measure as it winds up on the other, is preferably constructed as follows: *t* represents a toothed or gear rim arranged on the periphery of the wheel K of each swinging drum, so that the same also forms a gear-wheel. U represents an intermediate or controlling gear-pinion arranged across the front of both gear-wheels K and having its pivot *u* arranged at right angles or radially relatively to the axis of the driving-shaft and swinging drums. This pivot is supported on the center of a horizontal cross-piece *v*, which is arranged in front of the pinion and gear-wheels and connects the front ends of the side pieces of the main frame. The intermediate gear-pinion meshes on opposite sides of its center with the gear-wheels of both swinging drums, whereby these gear-wheels and drums are compelled to turn in opposite directions.

It follows from this construction that when one end of the turning or swinging cable is wound up by the forward turning movement of one swinging drum the other end of the swinging cable will be unwound at the same rate by the backward movement of the other swinging drum. By this means both ends of the swinging cable are maintained taut at all times without the necessity of employing take-up devices for this purpose. Furthermore, the wear on the cables incident to the use of such take-up devices is avoided and an absolute control of the swinging movement of the derrick is ob-

tained, which is not the case when the paying-out swinging drum is uncontrolled.

The intermediate gear-pinion shown in the drawings consists of a disk having a radial row of pins arranged on one side for engagement with teeth of the gear-wheels K; but it is obvious that other forms of gearing for transmitting the movement from one swinging drum to the other are within the scope of my invention.

I claim as my invention—

1. A hoisting-machine having two drums around which opposite ends of a derrick-turning line are adapted to be wound and a gearing interposed between said drums and operating to turn one drum forwardly while the other drum turns backwardly, substantially as set forth.

2. A hoisting-machine having two axially-alined drums around which opposite ends of a derrick-turning line are adapted to be wound, and a gearing interposed between said drums and operating to turn said drums in opposite directions, substantially as set forth.

3. A hoisting-machine having two axially-alined drums around which opposite ends of a derrick-turning line are adapted to be wound, gear-wheels arranged on said drums, and an intermediate gear-pinion meshing on opposite sides with said gear-wheels, substantially as set forth.

4. A hoisting-machine having two axially-alined drums around which opposite ends of a derrick-turning line are adapted to be wound, gear-wheels arranged on the inner ends of said drums, and an intermediate gear-pinion journaled radially relatively to said drums and meshing on opposite sides of its center with said gear-wheels, substantially as set forth.

5. A hoisting-machine having two axially-alined drums around which opposite ends of a derrick-turning line are adapted to be wound, gear-wheels arranged on the inner ends of said drums, an intermediate gear-pinion journaled radially relatively to said drums and meshing on opposite sides of its center with said gear-wheels, and a cross-piece supporting the pivot of said pinion, substantially as set forth.

6. A hoisting-machine having a driving-shaft, two drums which are mounted on said shaft and around which opposite ends of a derrick-turning line are adapted to be wound, a driving-wheel arranged between said drums and secured to said shaft, means for coupling and uncoupling said drums and driving-shaft, gear-wheels arranged on the inner ends of said drums, an intermediate gear-pinion arranged at right angles to the axis of said shaft, drums and gear-wheels and having its teeth meshing on opposite sides of its center with the front side of said gear-wheels, and a cross-piece arranged in front of said pinion and supporting the pivot thereof, substantially as set forth.

Witness my hand this 8th day of May, 1906.

GEORGE L. TREDO.

Witnesses:
GEO. M. MISNER,
THEO. L. POPP.