

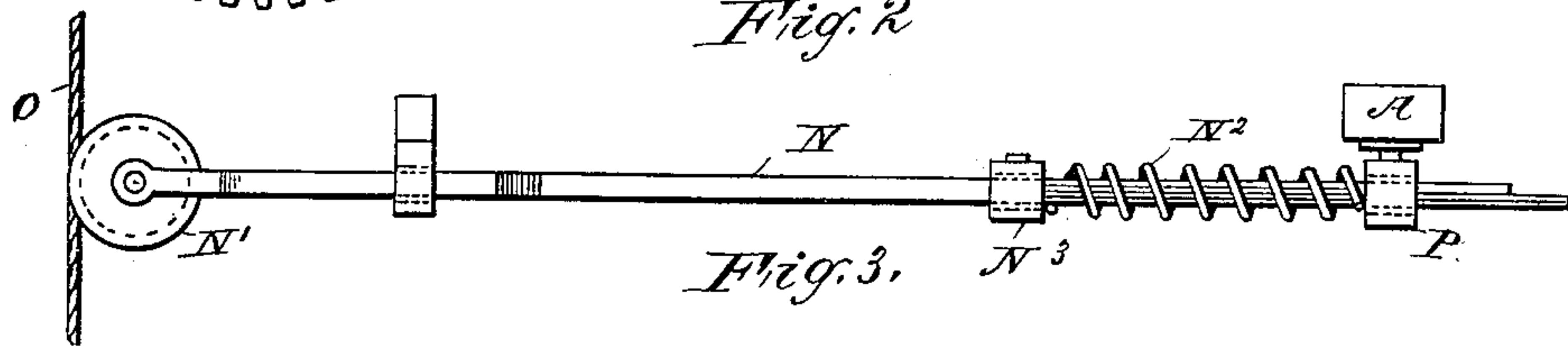
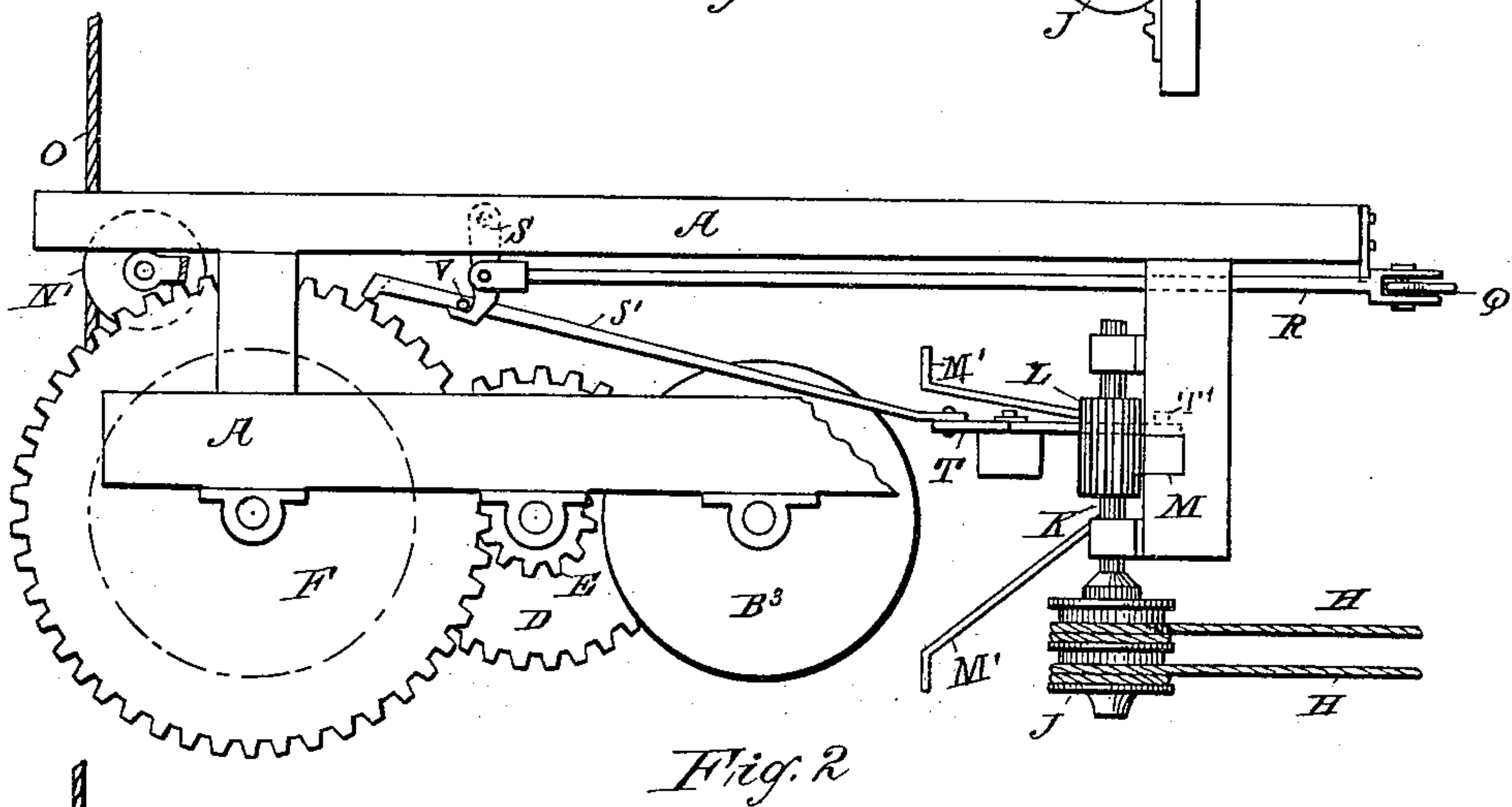
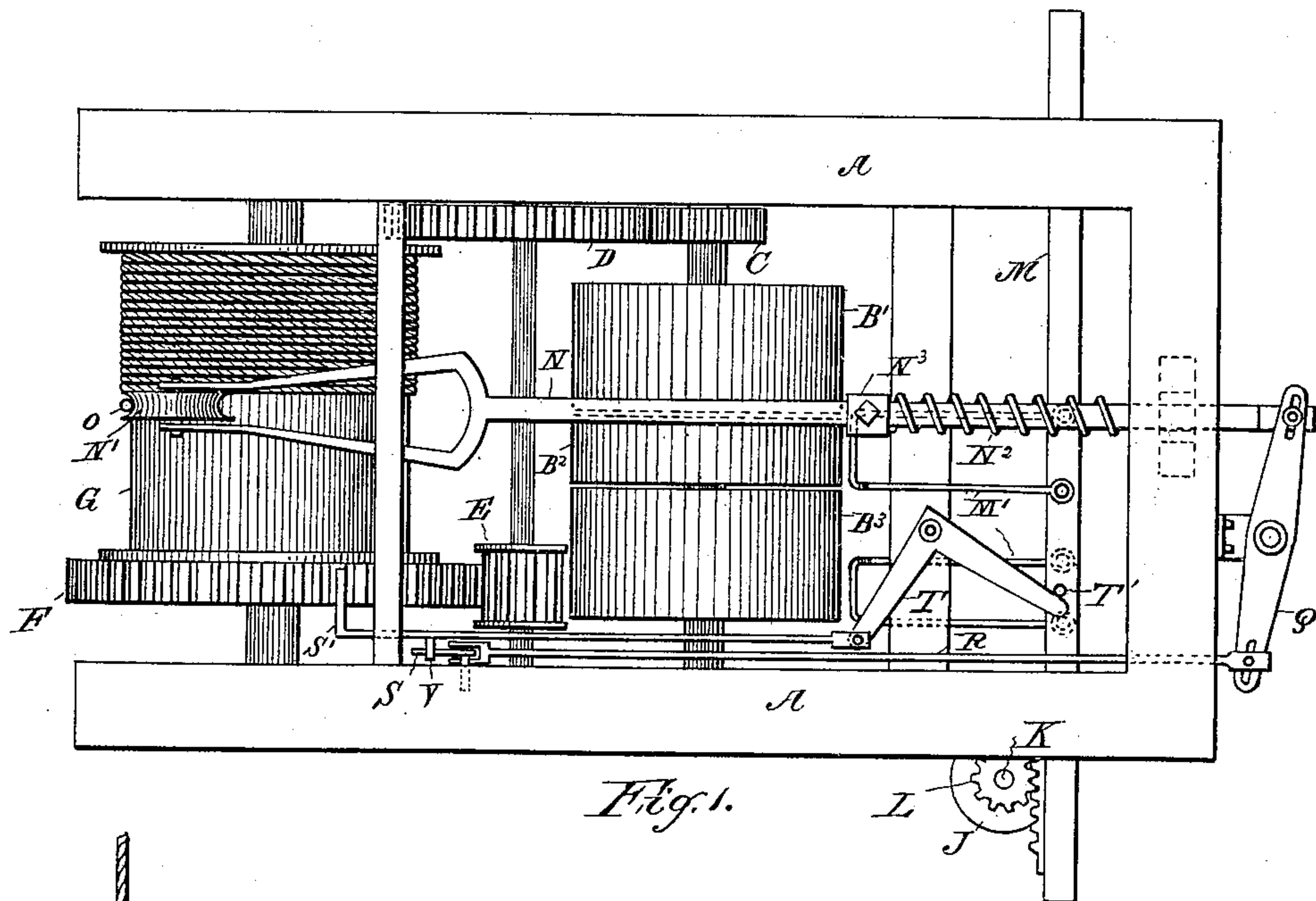
(No Model.)

N. B. CUSHING.

UNWINDING SAFETY DEVICE FOR HOISTING MACHINERY.

No. 377,017.

Patented Jan. 31, 1888.



WITNESSES:

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UNWINDING SAFETY DEVICE FOR HOISTING MACHINERY.

SPECIFICATION forming part of Letters Patent No. 377,017, dated January 31, 1888.

Application filed October 12, 1887. Serial No. 252,190. (No model.)

To all whom it may concern:

Be it known that I, NICHOLS B. CUSHING, a citizen of the United States, and a resident of Jersey City, in the county of Hudson, and State of New Jersey, have invented a certain new and useful Unwinding Safety Device for Hoisting-Machines, of which the following is a specification.

My invention relates to machines used to raise and lower merchandise and freight as well as passengers in elevators. For the most part, in such machines the operator stands at any convenient place at some distance from the machine, or upon the car or platform which carries the freight or passengers to be raised or lowered, and controls the machine by means of hand-ropes which are led from the machine to where he stands, or led up through the elevator-shaft within which the car or platform travels, in which case the hand-ropes pass close to or through the car or platform within reach of the operator. It therefore becomes important to provide the machine itself with devices which, in case of accident to or derangement of any of its parts, will act automatically to stop it. One source of danger in such machines arises from the weight car or platform being accidentally obstructed or hung up in its ways while descending. In such case it becomes important to stop the machine at once and prevent the winding-drum from acting to pay out any of the hoist-rope, as, if this is not done and the drum continues to unwind, the slack of the hoist-rope would accumulate, and if the obstruction should be overcome the weight car or platform would fall unchecked by the hoist-rope and acquire such momentum as to break the hoist-rope when the end of the slack would be reached, and serious damage might ensue.

The object of my invention is to provide such winding and hoisting machines with mechanism that in such a condition would act automatically and stop the machine at once, thus keeping the hoist-rope taut and supporting the weight or platform. It is also intended to stop the machine if, from any derangement whatever, the hoist-rope should break or become slack while lowering a weight. I attain this object by means of the device shown in the accompanying drawings, wherein—

Figure 1 is a top view of a simple winding and hoisting machine containing my invention. Fig. 2 is a side view of the same with

part of the frame of the machine broken away to show a portion of my device. Fig. 3 is a side view of my sheave-rod and its connections separated from the machine.

Similar letters refer to similar parts in the several views.

A is the frame of the machine. B', B², and B³ are the belt-pulleys, over which the belts from an engine or other source of power are run. The outer belt-pulleys, B' and B³, are idle-pulleys, the middle one, B², being the one which actuates the winding-drum. A belt runs upon each of the idle-pulleys, one of them being crossed to obtain motion in an opposite direction to that obtained by the other one. According as one or the other belt is shifted to the actuating-pulley B², the hoist-rope O is wound or unwound upon the winding-drum G and the weight car or platform is raised or lowered. When the belts run upon their respective idle-pulleys, no motion is conveyed to the winding-drum and the machine is stopped. From the shaft which carries the belt-pulleys motion is conveyed to the winding-drum G by the gears and pinions C, D, E, and F, and upon the winding-drum G the hoist-rope O is wound or unwound at the desire of the operator. The belts are shifted from the idle-pulleys B' and B³ to the actuating-pulley B² by means of the belt-shifters M', which are rods bearing against the edges of the belts, and are attached to the belt-shifting bar M, which is constructed to move transversely to and fro in the direction of its length within the frame of the machine.

The machine is operated by hand-ropes H, which are led directly or over appropriate sheaves into the elevator-shaft, or to such other place as it may be desirable to place the operator. The hand-ropes H are attached to the hand rope wheel J, mounted upon a shaft, K, having bearings attached to the frame of the machine. The shaft K is provided with a pinion, L, gearing into a rack upon the belt-shifting bar M, and when the shaft K is rotated by means of the hand-ropes H, acting upon the hand rope wheel J, the pinion L is rotated with it, giving motion to the belt-shifting bar M and shifting the belts by means of the belt-shifters M' to such of the belt-pulleys as may be desired by the operator. These are all well-known and commonly-used parts of winding and hoisting machines of the class shown in my drawings.

In my invention I provide a sheave-rod, N, passing horizontally through the machine and forked at one end, carrying between the forks a sheave, N', arranged to abut against the hoist-rope O as it is wound upon or unwound from the winding-drum G. The other end of the sheave-rod N passes loosely through a bearing or box, P, which is pivoted upon the frame of the machine, and which allows the sheave-rod N to have longitudinal motion or end-play and to swing laterally upon the pivot of the bearing-box P, to allow the sheave N', which it carries, to move laterally to and fro and follow the hoist-rope O as it is wound upon or unwound from the winding-drum G.

I place upon the sheave-rod N a spiral spring, N², which bears at one end against the box P or other suitable place, and at the other end it bears upon an adjustable collar, N³, upon the sheave-rod N. By the action of the spiral spring N² the sheave-rod N is thrust in the direction of its length, and holds the sheave N' pressed firmly upon the hoist-rope O. If from any cause the hoist-rope becomes slack or breaks, the sheave-rod N is thrust forward by the action of the spring N², the hoist-rope being no longer in a state of tension sufficient to hold the sheave-rod N against the action of the spring N². In practice I prefer to use the spiral spring N² to obtain this pressure; but another form of spring or a weight may be used in place of the spiral spring.

A cross-beam, Q, is pivoted by its center to a bracket upon the frame of the machine, and to one end of the cross-beam Q the sheave-rod J, after passing through the bearing or box P, is pivoted. To the other end of the cross-beam Q is pivoted the end of a rod, R, which passes through the machine, the other end being pivoted to a latch, S, which is hung by a pin to the frame of the machine, permitting it to swing to and fro by an endlong motion of the rod R.

I provide a pawl-rod, S', one end of which carries a protection or pawl constructed and arranged to engage in the teeth of the gear-wheel F and to be withdrawn from such engagement. The other end of the pawl-rod S' is pivoted to a bell-crank, T, which turns upon a stud attached to a cross-bar upon the frame of the machine, the stud passing through the angle of the bell-crank T. The belt-shifting bar M carries a pin or stud, T', so adjusted and arranged with reference to the free arm of the bell-crank T that when the bell-crank T is actuated, as hereinafter explained, it will bear against the pin T' and move the belt-shifting bar M in the direction necessary to shift the belts to the idle-pulleys and cause the machine to stop.

For the ordinary operations of the machine the pawl-rod S' is provided with a pin, V, which engages with the hooked end of the latch S, and by means of which the pawl-rod S' is held out of contact with the gear-wheel F, so that it does not engage with the teeth thereof. By retracting the latch S through

the operation of the rod R, the pawl-rod S' is left free to fall, and when its pawl falls between the teeth of the gear-wheel F it will acquire motion in the direction of its length, according to the direction of rotation of the gear-wheel F at the time the pawl-rod S' engages with it.

The mode of operation of my device is as follows: In case the hoist-rope should break or become slack from any cause while the machine is in operation, the spiral spring N² being relieved of the tension caused by the hoist-rope O pressing upon the sheave N', the sheave-rod N would be thrust forward, carrying the end of the cross-beam Q, which would then operate the rod R to withdraw the latch S from its engagement with the pin V on the pawl-rod S', when the pawl-rod will fall, and its end engaging in the teeth of the gear-wheel F, it will be thrust in the direction of its length and operate the bell-crank T. The free arm of the bell-crank T will then engage with the pin or stud T' on the belt-shifting bar M and actuate it to shift the belts to the idle-pulleys, and the machine will be stopped.

I do not limit myself to the specific construction of the details of my invention as shown in my drawings; but the shape and conformation thereof can be modified to perform the functions which I have explained—as, for example, the hook S may be connected directly with the sheave-rod N, so that the pawl-rod can be dropped into contact with the gear-wheel F without the intervention of the rod R or the cross-beam Q. As, however, my invention can be applied to any existing form of winding or hoisting machines, I have shown the mechanism which I prefer to apply in fitting my invention to machines already constructed, the main feature of my invention being the pawl-rod connected with mechanism for actuating the belt-shifting bar and means for dropping the pawl-rod into engagement with the gear-wheel on the winding-drum in the contingency of the hoist-rope breaking or becoming slack.

I am aware that the device for conveying motion to brake mechanism by means of the sheave-rod N or its equivalent is an old and well-known device, and I therefore do not claim it, except in combination with mechanism for shifting the belts of the machine; but

What I do claim, and desire to secure by Letters Patent, is—

In a winding and hoisting machine, a pawl-rod, S', in combination with the bell-crank T, pin T', belt-shifting bar M, latch S, rod R, cross-beam Q, sheave-rod N, sheave N', and spring N², for the purpose specified.

Signed at the city of New York, in the county of New York and State of New York, this 28th day of September, A. D. 1887.

NICHOLS B. CUSHING.

Witnesses:

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D. DOTY BROWN.