

No. 866,877.

PATENTED SEPT. 24, 1907.

J. MUIRHEAD.
LADDER HOIST.

APPLICATION FILED MAR. 11, 1907.

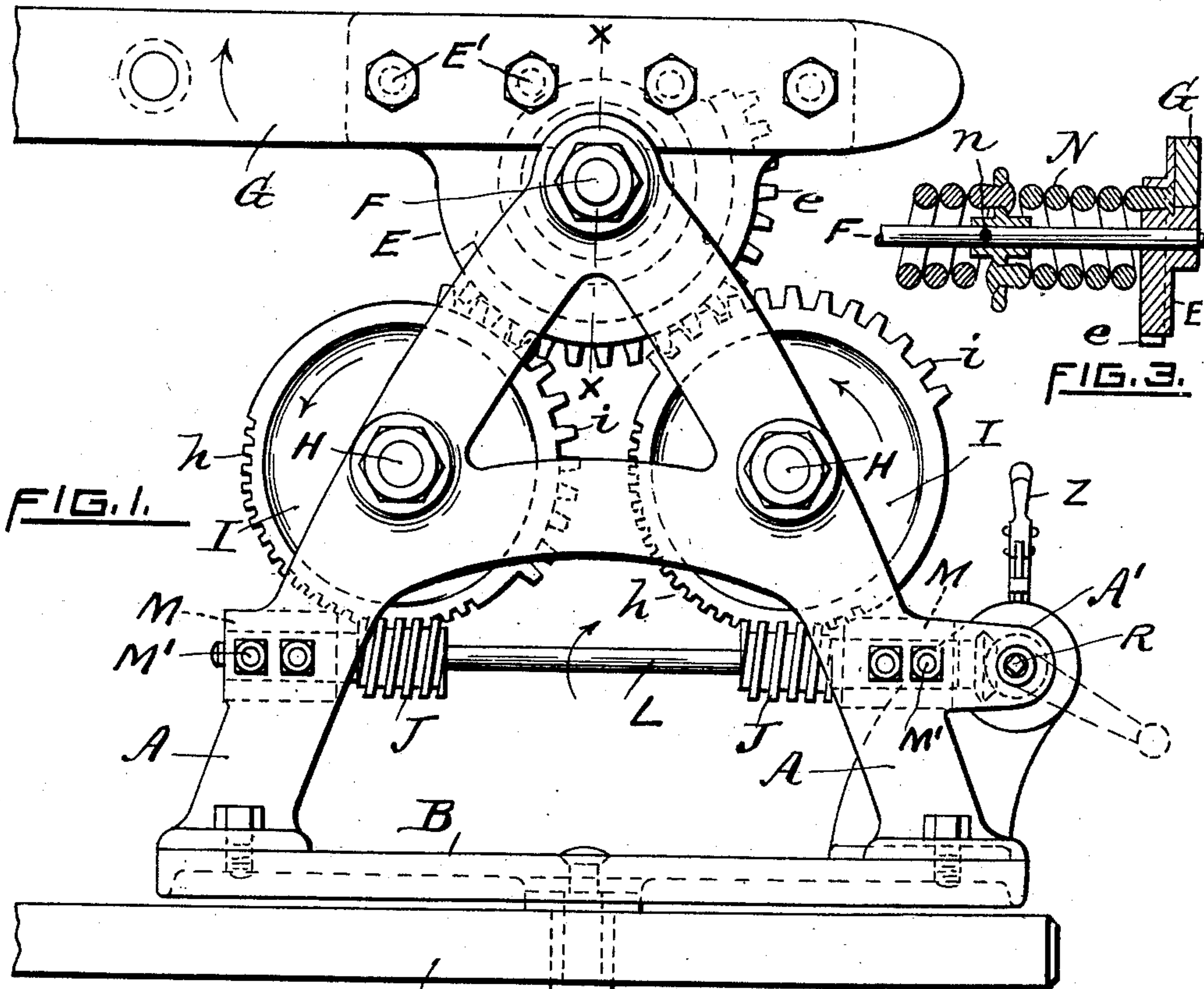


FIG. 1.

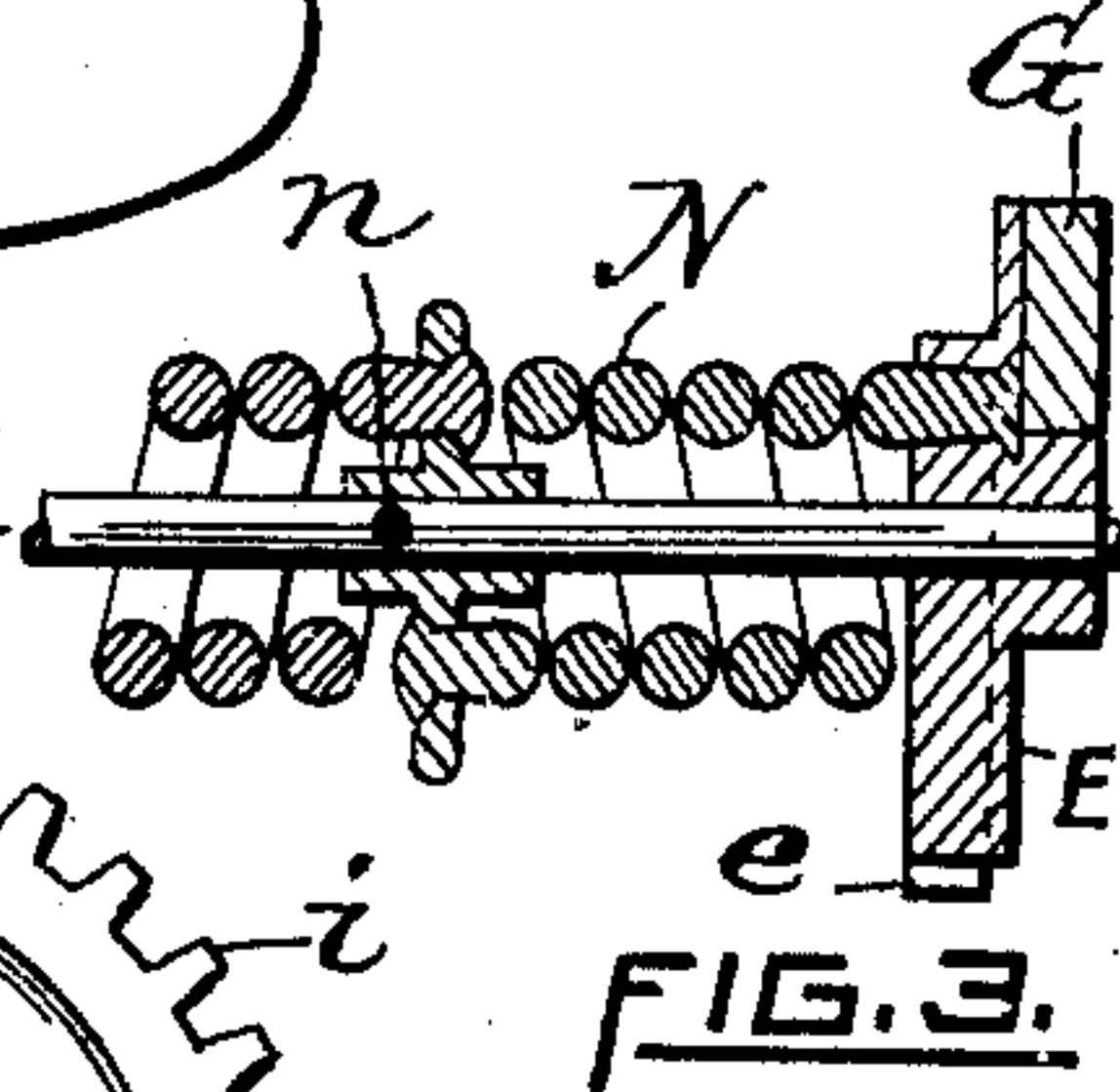


FIG. 3.

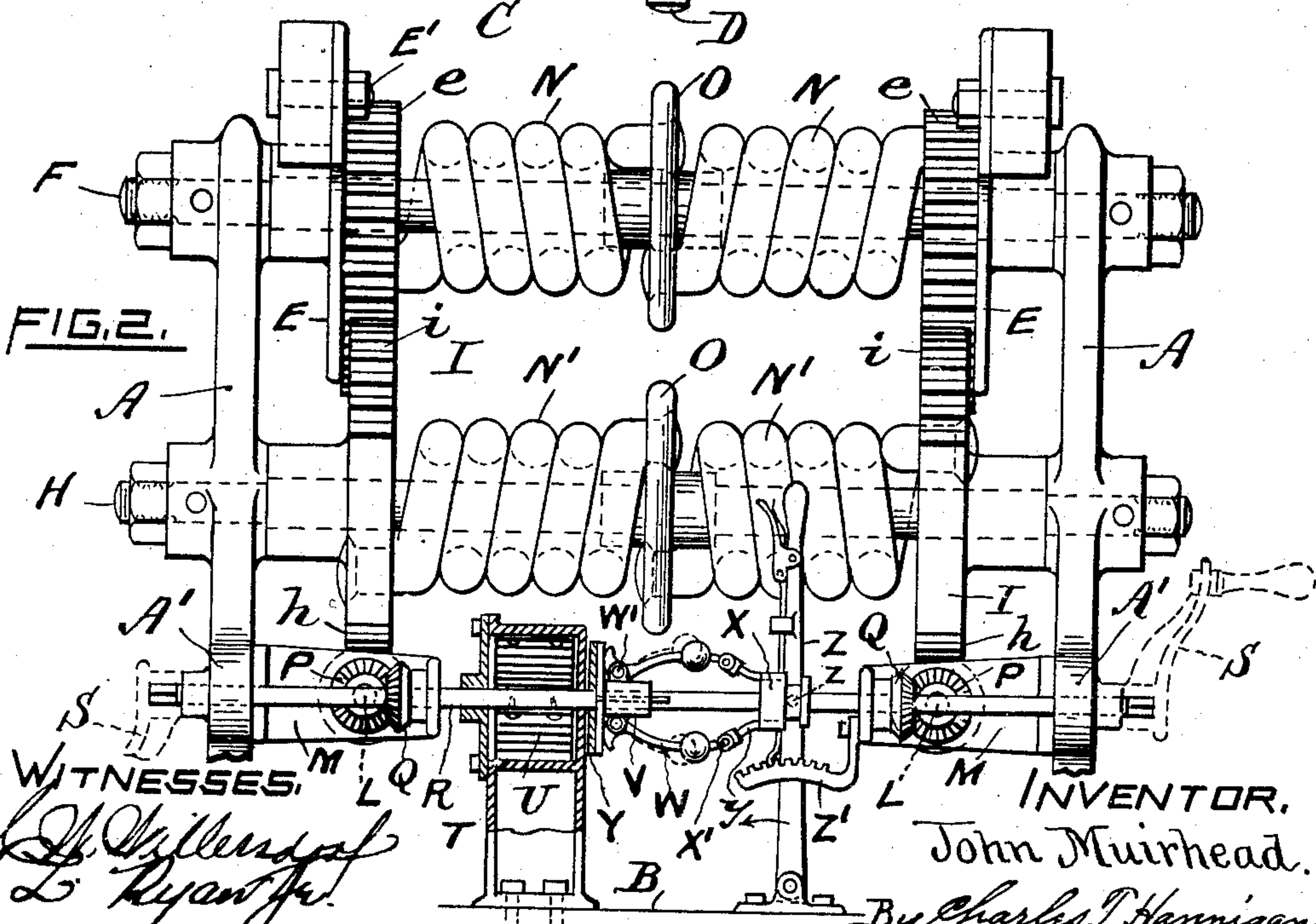


FIG. 2.

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LADDER-HOIST.

No. 866,877.

Specification of Letters Patent.

Patented Sept. 24, 1907.

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To all whom it may concern:

Be it known that I, JOHN MUIRHEAD, a subject of Great Britain, residing at the city and county of Providence, in the State of Rhode Island, have invented certain new and useful Improvements in Ladder-Hoists, of which the following is a specification.

This invention relates to certain new and useful improvements in ladder hoist, and the primary object of the invention is to provide means to raise the ladder of a fire-truck from its normal or horizontal position on the wagon body, to the desired angular position.

A further object of the invention, more specifically stated, is to provide means to raise the ladder of a fire truck from its normal or horizontal position on the wagon body, to the desired angular position, in conjunction with means for automatically operating the ladder lifting mechanism.

A still further object of my invention is to provide means, preferably in the nature of a spring motor, for automatically operating the ladder lifting mechanism to elevate the ladder from its normal position to the desired angular position, and to provide means whereby, as the ladder is returned to its normal position, the spring of the motor employed for automatically elevating the ladder, will be rewound, so as to be ready for again operating the ladder when desired.

The invention resides in the novel construction, combination, and arrangement of parts, as will be hereinafter more fully set forth and then particularly pointed out in the claims.

In describing the invention in detail, reference will be had to the accompanying drawings forming a part of this application, and illustrating a practical embodiment of the invention, though I desire it to be understood that the device as illustrated is susceptible to various structural changes without departing from the spirit of the invention.

In describing the invention in detail, like letters of reference will be employed for indicating like parts throughout the different views of the embodiment of the invention shown, in which:

Figure 1 is a side elevation of an embodiment of ladder-lifting mechanism constructed in accordance with my invention, showing the same mounted upon the pivotal base plate of a wagon body, the said wagon body not being shown. Fig. 2 is a front end view of the embodiment of the invention illustrated in Fig. 1, and Fig. 3 is a detailed sectional view taken on the line $x-x$ of Fig. 1.

In the embodiment of the invention illustrated, A, A designates a pair of uprights or standards suitably shaped at their lower ends so that they may be securely fixed to a base plate B, preferably circular, though not necessarily, and which base plate B is pivoted to the wa-

gon body C, by a king-bolt D as shown in Fig. 1 or in any other suitable manner.

Mounted in the standards or uprights A, A, approximately at the upper ends thereof, is a fixed shaft or rod F, on which is loosely mounted a pair of plates E, E each of which plates has an integral horizontal portion, the ends of which portions are indicated by dotted lines in Fig. 1, and which horizontal portions are firmly fixed by means of bolts E' to the end portions of the ladder G. The lower portions or parts of said plates E are substantially sector-shaped and provided with spur-gear teeth, for a purpose as will presently appear.

Mounted in the uprights or standards A, A are two fixed shafts or rods H, H, and loosely mounted on these shafts or rods H, H are disks I, I, a pair of disks being mounted on each rod or shaft, and each disk having toothed portions i meshing with the teeth e of the plates E, E. The disks I, I are also provided on a portion of their periphery with a worm-toothed portion h meshing with worms J, J carried by worm shafts L, L. The said worm shafts L, L are rotatably mounted in supports M, M, suitably secured, as by bolts M', M', to the uprights or standards A, A.

On the fixed shaft or rod F is mounted a pair of coiled springs N, and on each of the fixed shafts or rods H, H are similarly mounted a pair of coiled springs N', N', which springs N and N' are arranged to expand in tilting or elevating the ladder.

The springs N on the fixed shaft or rod F have their outer ends secured in the spur-gear plates E, and their inner ends secured in a disk O, the hub of which is made fast to the fixed shaft or rod F in any suitable manner, as by a pin n as shown in Fig. 3.

The springs N' are secured in the same manner as the springs N, that is, with their inner ends fixed in a disk O, and their outer ends fixed in the disks I, the tension of said springs N', however, being the reverse of the springs N, in order that each and all of the springs may act to expand in lifting the ladder.

The uprights or standards A, A are formed at the front side with extensions A', and in these extensions is mounted a shaft R which carries beveled gears Q meshing with beveled gears P fixed on the forward ends of the worm shafts L. The said shaft R has its ends extended beyond the extensions A', and suitably shaped to receive cranks S, to permit the manual operation of the device for carrying the ladder back to its normal horizontal position on the wagon body.

The ladder is automatically lifted by means of the expanding springs N, N' on the fixed shafts or rods F and H, H, through the agency of a motor T, preferably of the ordinary spring type, the casing of which is firmly secured to the base plate B. The flat band coiled spring U of said motor has one end secured to the

casing of the motor and its opposite end secured to the motor shaft R. On said motor shaft R is slidably mounted, as by the employment of a spline, a flanged-sleeve V. Two ball-weighted cam-levers W are pivotally mounted on the sleeve V as at W'.

X indicates a loose collar mounted on the motor shaft R and carrying two fixed connections y, the ends of which are bifurcated to receive the ends of the cam-lever W, as at X'.

Y designates a leather disk interposed between the flange of the sleeve V and the outer surface of the motor casing, and constituting a brake.

Z designates an operating lever, having a pin z to engage in a circular recess formed therefor in the collar X, said lever being provided with a spring pressed rod connection of the usual type, to enter in the notches of a fixed segment Z'.

The device being constructed and arranged as above stated, the operation thereof may be briefly described as follows: Should the cranks S be in position on the ends of shaft R, they are first removed, and the operating lever Z is swung to the right, in order to release disk Y from frictional engagement with the motor casing, thereby releasing the brake, and permitting the spring U to act in rotating the motor shaft R, this motor shaft R transmitting the motion throughout the worm-shafts L, and worms J, to disks I, and from said disks I to the plates E, E, causing the ladder to be lifted. When the ladder is moved to the desired angular position, the operating lever Z is moved to the left as indicated by the arrow in Fig. 2, thus moving the disk Y into engagement with the motor casing with sufficient friction to stop the motor, and the spring pressed rod connection of said lever being engaged with one of the notches in the segment Z', the mechanism of the device is held in a fixed condition, and the ladder held at the position

to which it has been brought. When it is desired to return the ladder to the horizontal or normal position shown in Fig. 1, the operating lever Z is moved to the right so as to release the disk Y from frictional engagement with the motor casing, the cranks S are attached to the ends of the motor shaft P and the mechanism operated to lower the ladder which, as it descends, causes the spring U of the motor to be again wound for another tension to be exerted upon the ladder lifting mechanism, placing the parts in position for another automatic operation.

Having fully described my invention what I claim as new and desire to secure by Letters Patent is:—

1. In an apparatus of the type described, a pivotally mounted base plate, uprights fixed to said base plate, a fixed shaft in said uprights, plates mounted on said shaft and having spur-teeth, a ladder secured to said plates, a pair of fixed shafts in the uprights, disks mounted on said pair of shafts having teeth for engagement with the teeth of said plates, and having worm-teeth, worm shafts carried by the uprights and having worms for engagement with the worm teeth of said disks and having beveled gears on their ends, a spring motor having the shaft thereof provided with beveled gears meshing with the beveled gears of said worm shafts, and a brake mechanism for said spring motor.

2. In an apparatus of the type described, the combination of a pivotally mounted base plate, uprights supported on said base plate, a ladder supported from said uprights, a spring motor mounted on the base plate, brake mechanism normally holding the spring of said motor against action, means including tension springs intermediate the ladder and the motor adapted, when the motor is released, to aid in lifting said ladder.

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

JOHN MUIRHEAD.

Witnesses:

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C. W. WILLERSDORF.