

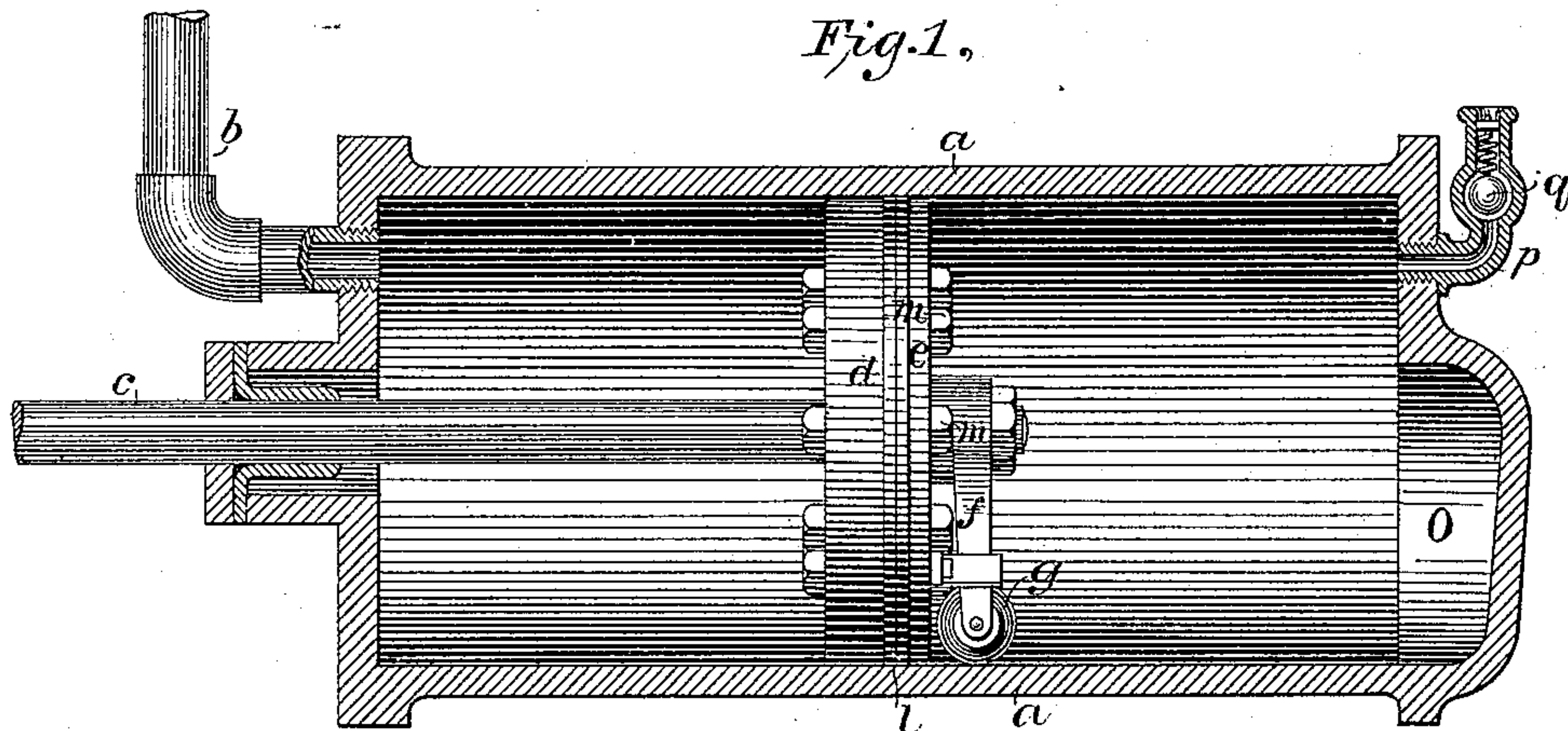
(No Model.)

M. N. HUTCHINSON.

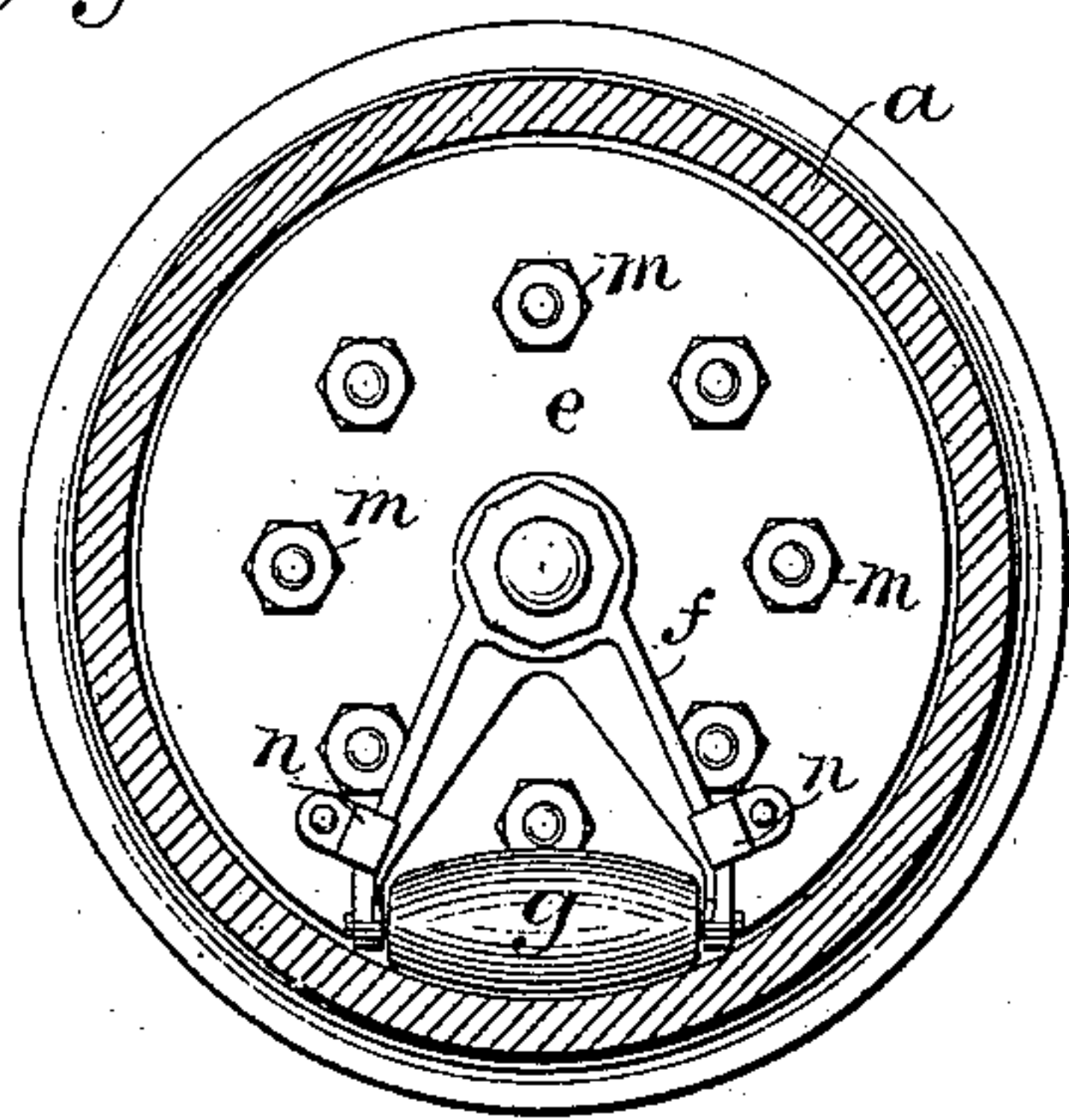
ELEVATOR.

No. 333,468.

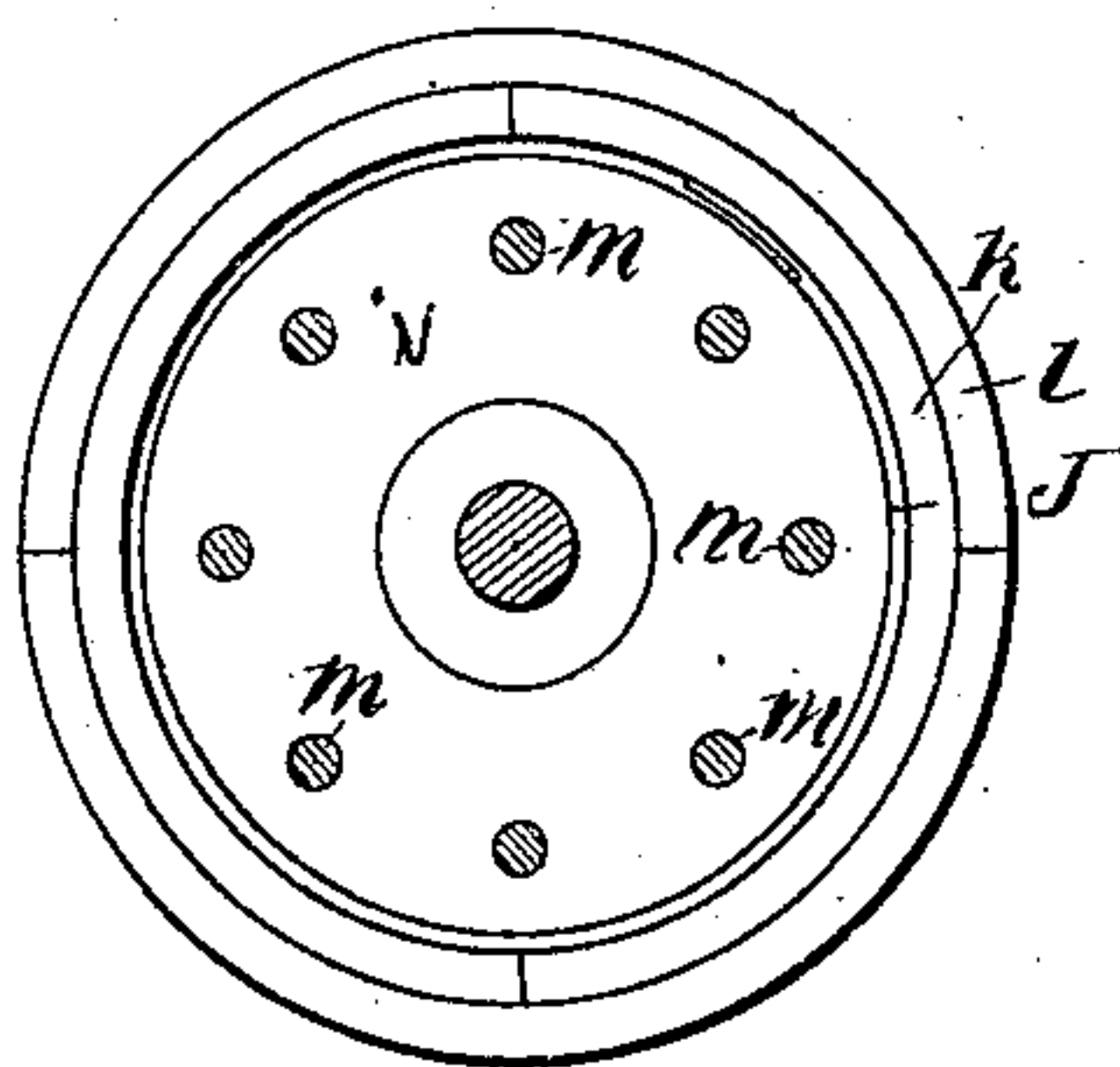
Patented Dec. 29, 1885.



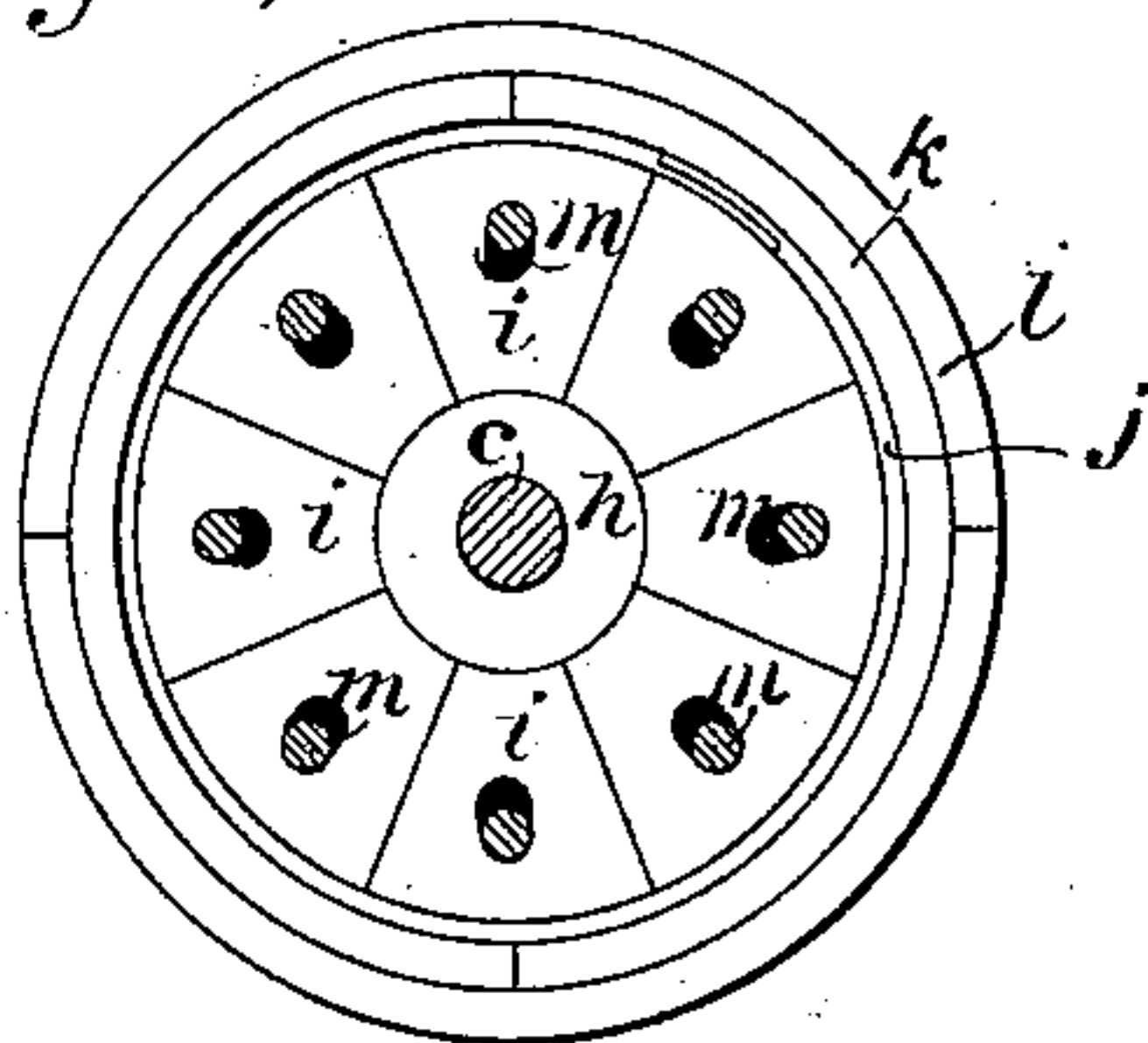
*Fig. 2.*



*Fig. 4.*



*Fig. 3.*



WITNESSES

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# UNITED STATES PATENT OFFICE.

MERRILL N. HUTCHINSON, OF NEW YORK, N. Y.

## ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 333,468, dated December 29, 1885.

Application filed November 5, 1883. Serial No. 110,827. (No model.)

*To all whom it may concern:*

Be it known that I, MERRILL N. HUTCHINSON, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Elevators, of which the following is a specification, reference being had therein to the accompanying drawings.

My present invention is designed especially to be applicable to hydraulic cylinders used in connection with the hoisting apparatus of elevators.

The first part of my invention consists in a novel construction of the piston-head, whereby the wear of the packing is largely taken up by the elasticity of the head, and when this elasticity has been exhausted the construction admits of readily taking up the wear without disturbing the exterior rim of the head.

The second part of my invention is especially applicable to use in connection with horizontal cylinders; and it consists in the application to the piston-head of a sustaining-roller, which bears upon the interior of the cylinder and thereby removes the pressure due to the weight of the piston-head from the packing of the piston, and by thus decreasing the friction prevents wear.

The third part of my invention is applicable to cylinders in which water is admitted only on one side of the piston; and it consists in the combination with such cylinder of a valve opening, exteriorly and placed upon the cylinder opposite the side of the piston where water is introduced, said valve being held open by a suitably-adjusted spring or other contrivance, so that air may be admitted to follow the stroke of the piston at ordinary velocities thereof; but in case of any sudden or accelerated movement of the piston the valve will be closed by external pressure of the atmosphere, and the further movement of the piston retarded by the formation of a vacuum behind it.

In the drawings, Figure 1 represents the interior construction of a hydraulic cylinder and the arrangement of the piston therein. Fig. 2 represents a transverse section of the cylinder looking toward the bottom of the piston-head. Fig. 3 represents the arrange-

ment of the different parts of the piston-head and the face-plate thereof removed. Fig. 4 shows a modification.

*a* is the cylinder. *b* is the pipe through which water flows into the cylinder. *c* is the piston-rod. *d* is a metallic plate secured to the piston-rod, and upon the face of which is placed the construction which embodies the first part of my invention, and which is held in place between said disk *d* and the face-plate or disk *e*. The piston-rod extends through the disk *d* and the face-plate *e*, and projects sufficiently to receive upon its end the carriage *f* of the roller *g*, and a nut to secure the same in place.

The following is the manner in which I prefer to construct the portion of the piston-head between the disk *d* and the face-plate *e*: Around the piston-rod *c* is placed an annular collar of metal or elastic material, *h*. Next to this collar *h* is placed a series of sectors, *i*, of some yielding material. The combined outer edges of these sectors constitute a continuous cylindrical surface, which is encircled by a band or hoop, *j*, of flexible metal or other suitable material, having its ends preferably overlapping each other, as shown, to provide for expansion. Outside of the band *j* are placed two collars, *k* and *l*, of leather or suitable packing material, which are preferably arranged, as shown, so as to break joints. Through each sector *i* and the plates or disks *d* and *e*, adjacent thereto, are placed the bolts *m*, which are provided with set-nuts suitable for varying the distance between the plates *d* and *e*. If the collars *h* and *j* are made of metal, their width outward from the face of the plate *d* should be less than the width of the compressible material, so that when the piston-head is new the plate *e* will not be screwed up sufficiently to come in contact with the metallic portions between it and the plate *d*, but will rest against the compressible portions, as the sectors *i* and the collars *k* and *l*. As in use the collar *l* becomes worn and the diameter of the piston-head reduced, this wear may be taken up by simply tightening the nuts upon the bolts *m*, which, by causing the compression of the sectors *i* between the plates *d* and *e*, forces the exterior surfaces of those sectors radially outward, and thereby expands the band *j*, which



distributes this expansive force, and in turn expands the collars *k* and *l*, and thereby takes up whatever wear has occurred. The mere tightening of the nuts on the screws *m* will thus be sufficient to take up the wear produced by a long period of use, and, when this means has been exhausted, the further wear can be taken up without disturbing the exterior surface of the packing by removing the face-plate *e* and substituting in place of the collar *h* a collar of slightly larger exterior diameter, so as to force the sectors *i* bodily outward, and thereby expand the exterior surface of the packing.

The part lettered *i*, I have illustrated as being made up of sections in the form of sectors, and I prefer this arrangement; but other forms of sections might be employed, or it may be continuous, as shown in Fig. 4.

In Fig. 1 I have illustrated the collar *l* as being made up of two thicknesses of leather or packing material side by side, and it is desirable to have more than one thickness for the purpose of breaking joints and avoiding too great rigidity; but this is not indispensable. It may also be remarked that the layers of packing material—such as *k* and *l*—may be multiplied, if desired.

The object of the construction which I have just described is to provide a piston-head which is expansible, but comparatively solid and very slightly yielding.

The carriage *f*, upon which the roller *g* is mounted, is preferably pivoted to the center of the face of the piston-head, and projects downward in two branches. Upon the extremities of these branches are placed the bearings of the roller *g*, and the carriage *f* is held in position by the clips *n*, which are so adjusted as to allow the carriage a very slight play around its pivot. The roller *g* is preferably curved longitudinally, so that its surface is coincident with the interior surface of the cylinder *a*, and said roller is preferably made as long as is permitted by the presence of the bearings upon its ends. I have shown the roller as situated on the side of the piston-head opposite the piston-rod, and I consider it more convenient and preferable to locate it in this position. At the end of the cylinder the cylinder-head is made so as to create a recess, *o*, which admits of the entrance of the carriage *f* and roller *g* when the piston-head is at the end of its stroke, and thereby avoids shortening the length of stroke of the piston.

*p* is a pipe for the admission of air into the cylinder as the piston-head recedes, and within this pipe is located a valve which is so bal-

anced or regulated by a spring or other suitable contrivance that it will not obstruct the entrance of air into the cylinder so long as the piston-head continues to move at normal speed; but in the event that the speed of the piston-head is accelerated, as would be the case if by some accident the water or power driving the piston should escape from the cylinder too rapidly, then the said valve will be closed by the external pressure of the atmosphere, and the further progress of the piston will be retarded by the formation of a vacuum behind it. A form of valve which is suitable for this purpose is represented at *q* in the drawings, and is a ball-valve controlled by a spring, the tension of which is sufficient to keep the valve open against the pressure of the entering air under ordinary circumstances.

I am aware of Letters Patent of the United States No. 153,709, dated August 4, 1874, and granted to Arthur Granville, and make no claim to anything therein described. At the opposite end of the piston-rod from the piston-head a bearing-roller or shoe should be provided, so as to bear the weight of the rod at that end. Thus the whole weight of the piston-rod and piston-head will rest substantially on that roller and the roller *g* described.

I claim—

1. In combination with the piston-head and the cylinder, the pipe or passage *p*, leading from said cylinder to the open air, and a double-acting valve located in said pipe or passage and normally held from both its seats, substantially as described, whereby said passage will be open when the speed of the piston is normal, but closed whenever its speed is abnormally accelerated in either direction.

2. In combination with the cylinder *a* and its piston, the pipe *b*, for admitting water or other fluid for driving said piston, and the pipe or passage *p*, a double-acting valve, *q*, located therein and normally held clear of both its seats, substantially as described, whereby the passage is kept open under ordinary conditions, but closed when the speed of the piston is abnormally accelerated, as set forth.

3. In combination with the piston-head, the carriage *f* and the lugs *n*, for retaining the same in position, and the roller *g*, substantially as described.

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

MERRILL N. HUTCHINSON.

Witnesses:

W. F. HAPGOOD,  
D. H. DRISCOLL.