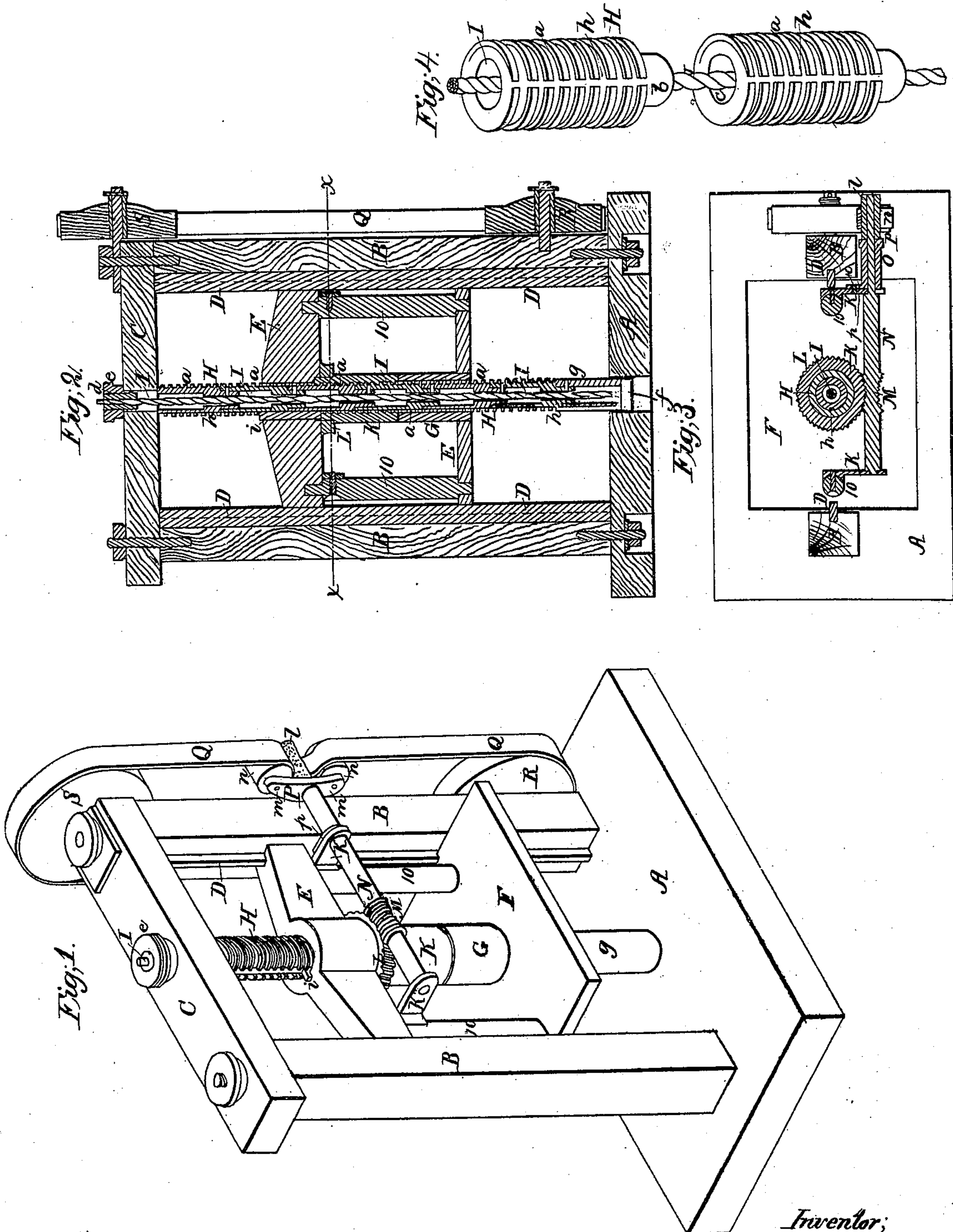


D. H. Chamberlain.

Elevator.

N^o 87,143.

Patented Feb. 23, 1869.



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Letters Patent No. 87,143, dated February 23, 1869.

IMPROVEMENT IN HOISTING-APPARATUS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, DEXTER H. CHAMBERLAIN, of West Roxbury, in the county of Norfolk, and State of Massachusetts, have invented certain Improvements in Elevators, or Hoisting-Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a perspective view of my improved elevator as applied to a building.

Figure 2 is a vertical longitudinal section through the same.

Figure 3 is a horizontal section on the line xx of fig. 2.

Figure 4 is a perspective view, representing the construction of my sectional screw-shaft.

Elevators, or hoisting-apparatus, provided with a revolving screw-shaft, are objectionable for various reasons, some of which will be here enumerated.

Owing to the great length of the screw-shaft, it is found necessary to make it in sections, and steady it by a series of open bearings formed within braces projecting from the sides of the walls, and placed at suitable intervals between the extreme upper and lower fixed bearings, by which construction it is impossible to employ a shaft with a continuous screw-thread for driving the screw-nut attached to the carriage of the elevator, and it is therefore only a small number, or a limited portion of the threads, which simultaneously engage with or mesh into each other, which fact, together with that of the resistance or weight being removed so far from the power, subjects the screw-shaft to a very considerable torsion, which is unfavorable to the regular and uniform transmission of the power, to overcome which difficulty the shaft must be made of large diameter, which is not only unwieldy, but very expensive.

When a shaft so constructed is revolving rapidly, the amount of vibration produced is so great as to shake and endanger the safety of the building in which it is placed.

It therefore becomes necessary to give the threads of the screw-shaft a "steep pitch," and revolve it slowly, but on account of the expense and difficulty of making an accurate steep pitch, and the rapidity with which it wears away, by its threads becoming thin and beat out, it is also exceedingly objectionable.

The torsion above referred to also deranges the position of the threads of the screw-shaft relatively with those of the screw-nut on the carriage, so that they will not readily engage therein, and are frequently upset and rendered worthless.

To obviate the above-mentioned difficulties is the object of my invention, which consists in a non-revolving screw-shaft, loosely suspended or supported in movable bearings, in contradistinction to a screw-shaft revolving in fixed bearings, the shaft being provided with a vertical longitudinal groove, for the reception of a

spline in the cross-head or in the platform of the carriage, for preventing the revolution of the shaft, while a nut, directly or indirectly in contact with the cross-head or platform, is revolved by worm-gear, or otherwise, to raise and lower the carriage and its load, as required, the shaft being always free to adjust itself to its proper position for insuring the smooth and uninterrupted action of the nut thereon.

My invention also consists in a continuous screw-shaft formed in sections, fitting into and securely united together, the union or connection being formed between the homogeneous ends of the respective sections, by which means I am enabled to avoid the use of sleeves and intervention of bushes incident to the construction of other sectional screw-shafts for elevators.

My invention also consists in certain other improvements, of minor importance, to be referred to hereafter.

To enable others skilled in the art to understand and use my invention, I will proceed to describe the manner in which I have carried it out.

In the said drawings—

A is the base, or foundation in the basement of the building, to which the elevator is to be applied.

Within this foundation are secured the lower ends of two vertical posts or beams, B B, which extend up the sides of the "well" or area to be occupied by the elevator, and are united at their tops by a horizontal beam, C.

D D are guides, or ways, upon which the cross-head E and platform F of the elevator-carriage slide.

The platform and cross-head are securely connected together by means of two vertical posts or stanchions, 10, 10.

G is a circular tube, projecting up from the centre of the platform, through which, and the centre of the cross-head, are formed circular openings, for the passage of an upright screw-shaft, H, which is composed of a series of hollow sections, a , the lower end, b , of one section being tenoned or turned down, so as to accurately and snugly fit into the top, c , of the circular recess in the other section. (See figs. 2 and 4.)

I is a wire rope, which passes through the centre of each of these sections, and thence loosely through an aperture in the horizontal beam C, the top of the wire rope being provided with a screw-plug, d , over which turns a screw-nut, e .

The lower end of the wire rope, I, terminates in a circular projection or foot-piece, f , upon which rests a hollow cylindrical section, g , of the same diameter as the section of the screw-shaft above it, by which construction it will be seen that the entire hollow screw-shaft is hung upon the wire rope, which is loosely suspended from the beam C, while the bottom of the screw-shaft is free to move slightly in a lateral direction, for a purpose presently to be explained.

The several sectional screws are each provided with a longitudinal groove, h , which, when the sections are

fitted together, form a long vertical groove, extending the whole length of the screw-portion of the shaft.

Within this groove fits a spline, *i*, secured to the cross-head, and projecting into the circular aperture made therein for the reception of the screw-shaft, the object of the spline being to prevent it from revolving, and thus avoid the vibration and torsion incident to screw-shafts which are made to revolve.

The carriage of the elevator is caused to ascend and descend upon the non-revolving screw-shaft by means of the revolution of a circular screw-nut, *K*, which surrounds and turns thereon, this feature being in contradistinction to a revolving screw-shaft engaging into a screw-nut attached to the carriage.

To the top of the screw-nut *K* is secured a worm-wheel, *L*, directly upon which the cross-head rests.

This worm-wheel *L*, (and consequently the nut with it,) is driven by a worm-screw, *M*, on a horizontal shaft, *N*, which has its bearings in lugs or braces, *k*, projecting from the opposite ends of the cross-head, this shaft *N* passing through a cylindrical sleeve, *O*, and terminating at its outer end in a serrated or notched "whorl," *l*.

The sleeve *O* is provided, at its outer end, with an arm, *P*, at right angles thereto, from the extremities of which proceed studs, *m m*, which serve as stationary axes upon which the sheaves *n n* are made to revolve, by means of power transmitted through a belt, *Q*, which is led over a drum, *R*, on the driving-shaft around the sheaves *m m* and "whorl" *l*, and thence up over a drum, *S*, the sleeve *O* being prevented from revolving by means of a pin, *o*, passing through a flat projection, *p*, into one of the braces *k*, from which construction it will be seen that the worm-shaft *N*, with the sheaves *m m*, rises and falls in common with the elevator.

As the screw-nut turns up or down, (carrying with it the carriage,) the non-revolving screw-shaft *H*, being suspended loosely by the wire rope *I*, is free to be adjusted by the movable nut *K* into a vertical position, without being cramped thereby, the threads of the

shaft and nut being made of the required fineness and pitch to enable the nut to be driven smoothly, and at a uniformly high rate of speed, without causing any vibration, and almost an imperceptible, if any, torsion, the torsion, should any be produced, being in the wake of the nut.

Instead of a wire rope passing loosely through the sectional screw-shaft, a rod, or rope of other material may be employed for suspending the shaft, and the rod or rope may be soldered, or otherwise secured to the sectional shaft, if desired.

The rod or rope may also be dispensed with, and the shaft be suspended by a link, or other connection, at its top, or it may be supported in a movable bearing at or near its bottom; and furthermore, a non-revolving sectional screw-shaft may pass through each side of the elevator, instead of through its centre, and the screw-nut *K* may be placed under the platform, and where the elevator is only required to ascend a short distance, the screw-shaft may be made in one piece, instead of in sections, if preferred, without departing from the spirit of my invention.

What I claim as my invention, and desire to secure by Letters Patent, as an improvement in elevators or hoisting-apparatus, is—

The non-revolving screw-shaft, suspended substantially as and for the purpose set forth.

I also claim a continuous sectional screw-shaft, as and for the purpose set forth.

I also claim two or more sections of a continuous screw-shaft, united together by homogeneous tenons at their ends, substantially as and for the purpose described.

I also claim the arrangement of the revolving screw-nut *K*, and a non-revolving screw-shaft, *H*, provided with a groove, *h*, the steadying-spline *i*, either in the cross-heads *E* or platform *F*, for the purpose specified.

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