(No Model.)

A. FITTS.

TELESCOPING HYDRAULIC ELEVATOR.

No. 344,038. Patented June 22, 1886.

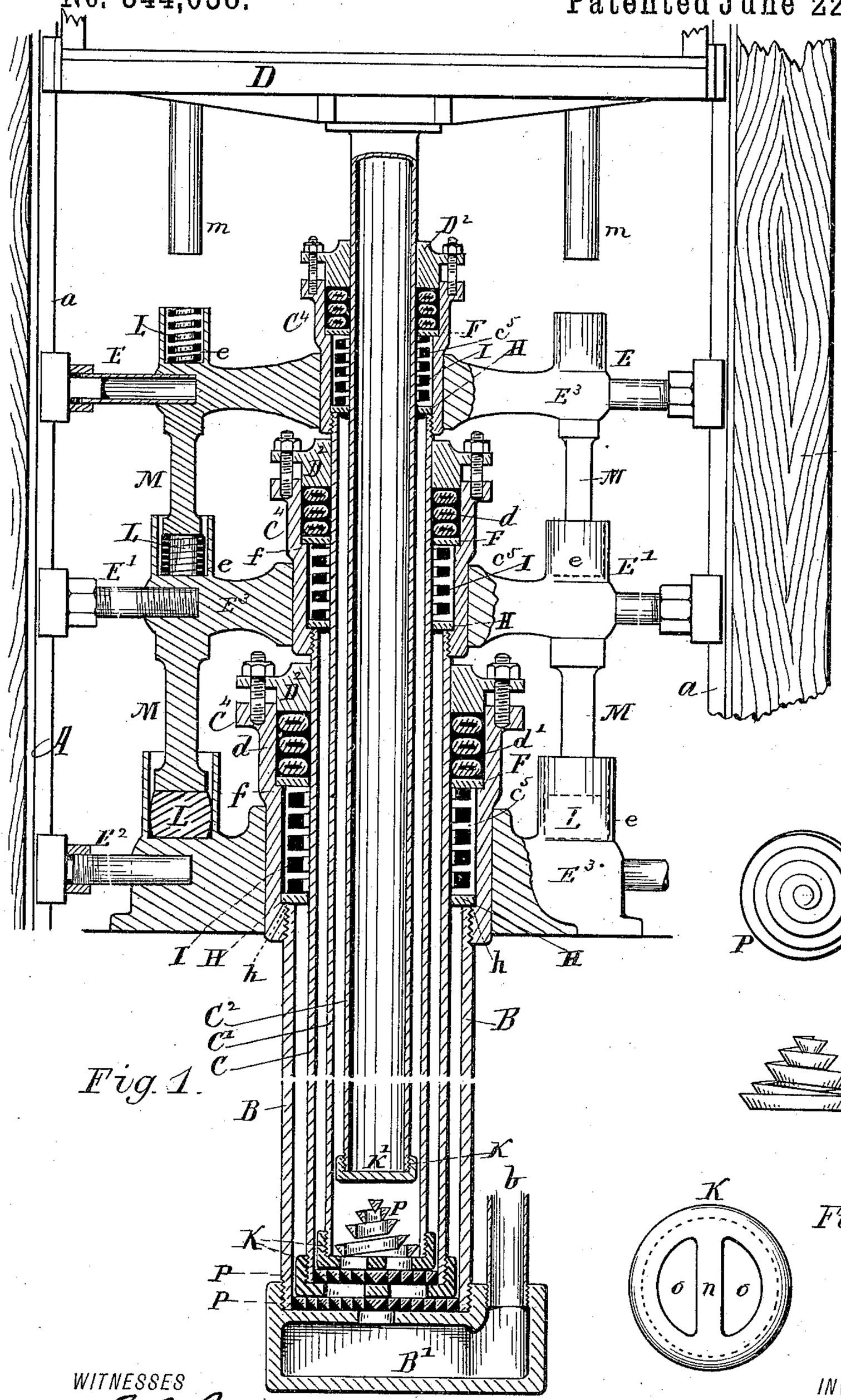

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

WITNESSES

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TELESCOPING HYDRAULIC ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 344,038, dated June 22, 1886.

Application filed February 25, 1886. Serial No. 193,180. (No model.)

To all whom it may concern:

Be it known that I, ABRAHAM FITTS, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Telescoping Hydraulic Elevators, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

This invention relates to that class of hydraulic elevators in which the car or platform is carried by a column which acts as a plunger within a cylinder for receiving the liquid-pressure, or by a series of tubular columnar sections adapted to telescope with each other and respectively serving as cylinders and plungers for each other in their order of arrangement and action.

The objects of my present invention are to provide means of an improved construction for preventing or relieving the jar, shock, or pounding action of the mechanism as the telescoping sections reach the end or limit of their movement when the column is extended or when the head of one section is brought into contact with that of another in the operation of the elevator; also, to provide springs or relieving mechanism in connection with the heads or guiding-arms, to relieve the same from shock when the arms are brought together by the closing in of the telescoping sections; also, to provide a spring for the foot of the telescoping tubular sections, which will act, in the manner described, as a cushion and a valve for gradually closing the water-space at the ends of said tubes as they reach their bottom limit of movement as the elevator descends, as hereinafter more fully explained. These objects I attain by the mechanism constructed and operating as explained in the following description, the particular subject-matter claimed being hereinafter definitely specified.

In the drawings, Figure 1 is a vertical sectional view of such parts of an elevator mechanism as will illustrate the nature of my invention. Fig. 2 is a plan view of the spring-valve for the foot of the telescoping sections. Fig. 3 is a side view of the same, and Fig. 4 is a bottom view of one of the foot-plate castings.

In referring to parts, A denotes the guide way or frame; *a*, the guiding-fillets; B, the main cylinder, having the foot-piece B′, to which the water-supply pipe *b* is connected.

C C′ C² denote the telescoping tubes or sections of the elevator-column, D the car or platform, and E E′ E² the guiding-arms for bracing the column laterally.

The general arrangement and operation of the telescoping hydraulic elevator being substantially well known and heretofore in use, it will not be necessary to herein minutely describe the same, except in the certain particulars appertaining to and illustrating my improvements.

One feature of my invention consists in the peculiar construction of the elastic relief mechanism, to obviate concussion or shock at the stopping of the sections in the upward action of the elevator. For this I form the cylinder and tube heads or stuffing-box castings C⁴ with an annular chamber, c^5, below the chamber *d′*, which contains the packing rings *d*, and preferably of somewhat less dimension than said packing-chamber, thus making a ledge, shoulder, or offset at *f*, and also an offset, shoulder, or ledge, as at *h*, at the bottom of said chamber c^5.

Surrounding the tube or section, and resting upon the respective shoulders at *f* and *h*, are arranged loose annular plates or flat rings F and H, which can move up within their respective chambers, but cannot drop below their supporting-ledges *f* and *h*.

Between the plates H and F there is arranged a stiff coiled spring, I, preferably formed from a bar of rectangular section, the coils of which spring extend around the tube or column within the chamber c^5. The packing-rings *d* rest upon the plate F, and are held in position by the ring or follower D², which is in turn held by bolts connected with the head or stuffing-box casting in ordinary manner.

In the operation of the elevator, when the telescoping section or column is forced up to its full extent the rim of the foot-plate K strikes the plate or ring H, and by lifting it, compresses the spring I, and thus cushions the mechanism or overcomes the upward momen-

tum of the moving part in an elastic manner, and the spring, when compressed by the lifting of plate H, tends to force up the plate F against the packing-rings *d*, causing them to tighten onto the surface of the column at the instant when the movement thereof stops and the reaction against the water-pressure is exerted, thus in a measure preventing strain and leakage, and admitting of the packings being worked less tightly than would be practical under ordinary circumstances with former constructions.

By making the spring I of a rectangular rod I obtain a stronger spring, and at the same time occupy less space for the chamber c^5 within the head-casting C^4 than would a round spring.

I am aware that a coiled spring has heretofore been employed in combination with an elevator-column for arresting its upward movement, and it will therefore be understood that I do not broadly claim the use of a spring for such purpose, or otherwise than in the construction and arrangement with adjacent parts, as illustrated and described.

Another feature of my invention is the devices for stopping and supporting the heads and guiding arms when the elevator descends to its lowest position. These devices I construct as follows: The ear castings or brackets E^3, which are fixed to the heads C^4 of the telescoping sections, are each provided with a cavity or sockets, *e*, within which is located a spring, L, and the upper brackets are furnished with dependent standards or projections M, that respectively correspond with the cavities on the next lower arm-bracket, and take support on the springs thereof before the rims of the section-heads C^4 strike against each other in their descendent movement. The car or platform D is also furnished with dependent standards *m* for similar purpose and acting in similar manner. The ears or brackets E^3 may be bolted or otherwise attached to the section-heads C^4, or, if preferred, may be formed integral therewith. The springs I may be of coiled metal rods or of rubber or other suitable material, as preferred.

Another feature of my invention is the arrangement at the foot of the telescoping sections of a pressure-spring, the coils of which act upon each other as a valve, for closing off the water from the respective sections as they reach their lowest position. For this the tubular sections, except the smallest one, are furnished each with a foot-plate, K, formed with cross-bar *n* and openings *o*, as indicated in Figs. 1 and 4, or in other equivalent manner, so as to permit free passage of water through and at the same time to act as a support for the peculiar spring-valve P. On the main or outer cylinder the base-casting B′ makes the foot-support, while the inner or smaller section is permanently closed by a solid foot-plate, K′. The several foot-plates K are in the present instance attached to their respective tubular sections by an annular rim or flange, into which the end of the tube is fitted and secured by screw-threads or other suitable fastenings.

Within the foot-plate beneath the movable columns, or for each of the tubular sections, is arranged the peculiar coiled spring, P, which is preferably made of a rod or bar having triangular sectional shape with two angles at top and one at the bottom. This spring P is made or coiled in the shape of a conical spiral or volute with a suitable center and rim so formed that when the spring is subjected to a sufficient pressure its volute coils will in regular order close together into the shape of a flat disk, the longer or peripheral spirals closing down first and the inner spirals in regular order thereafter as the pressure is continued. By this device the water-space in the bottom of the respective cylinders or sections is gradually shut off from the next in series as they reach their downward limit of action, and the water-pressure is thus relieved from the cylinders or sections in their regular order as they reach the bottom of the space, the closing being effected by a gradual action, thus avoiding concussion or sudden changes of pressure at the stopping of the movement. In similar manner the several telescoping sections are caused to start upward in successive order and by gradual action when the water-pressure is let onto the cylinder-base B.

I do not wish to confine myself to the triangular section of rod for the conical volute-spring valve P, although I consider that form preferable, as it effects the closing of the water-passage by a very efficient and desirable gradation of action; but it may, as a matter of cost or convenience of construction, be preferred in many instances to use square or round section rod for said spring, and I include such form of spring-valve as within the scope of my invention.

It will be understood that I do not herein broadly claim a spring at the foot of an elevator-column; nor do I claim, broadly, means for closing off the water-passage at such position, as mechanism for such purpose has been heretofore devised, but of a different nature from that herein shown.

I am also aware that a spiral spring, in connection with a perforated plate, has been heretofore patented for the purpose, and I do not therefore include such an arrangement as of my invention, since in my invention the passage is closed by the spring closing onto itself or by the coils forming a disk when the spring is flattened by pressure of the descending elevator-section.

The elevator may have any desired number of telescoping sections, the several devices of my invention hereinbefore described being similar for each of the several sections and all operating substantially in similar manner for each of the sections.

The valve for controlling the inlet and outlet of the water to and from the cylinder is not shown herein, as such valve may be con-

structed and operated in any well-known manner.

What I claim as of my invention, and desire to secure by Letters Patent, is—

1. The combination, in a hydraulic elevator with outer and inner telescoping tubes or column-sections, of the foot projection K, the head or stuffing-box casing C^4, having the chamber c^5 with offsets *f* and *h*, the movable annular plates F and H, respectively supported on said offsets, a spring of coiled rectangular metal disposed within the chamber c^5 and confined between said plates, and the packing-rings confined between the plate F and follower D^2, substantially as set forth.

2. The combination, with the hydraulic elevating mechanism or telescoping sections provided with guide arms or brackets E, of the springs L and standards M, substantially as set forth.

3. In combination with the cylinders or telescoping column-sections in a hydraulic elevator, the conically-coiled volute spring P, the adjacent coils in which are arranged to close together as a disk, one coil against another, in the manner described, whereby said spring is adapted to act as a valve for closing the water-passage, while it checks the momentum of the descending section, as hereinbefore set forth.

4. The combination, substantially as described, of the elevator-car, the telescoping tubular sections C C′ C^2, and the cylinder B, of the conically-coiled spring and valve device P, the foot-plates K, having projecting rims, the annular plates F and H, and the springs I, for the purposes set forth.

Witness my hand this 24th day of February, A. D. 1886.

ABRAHAM FITTS.

Witnesses:
CHAS. H. BURLEIGH,
S. R. BARTON.