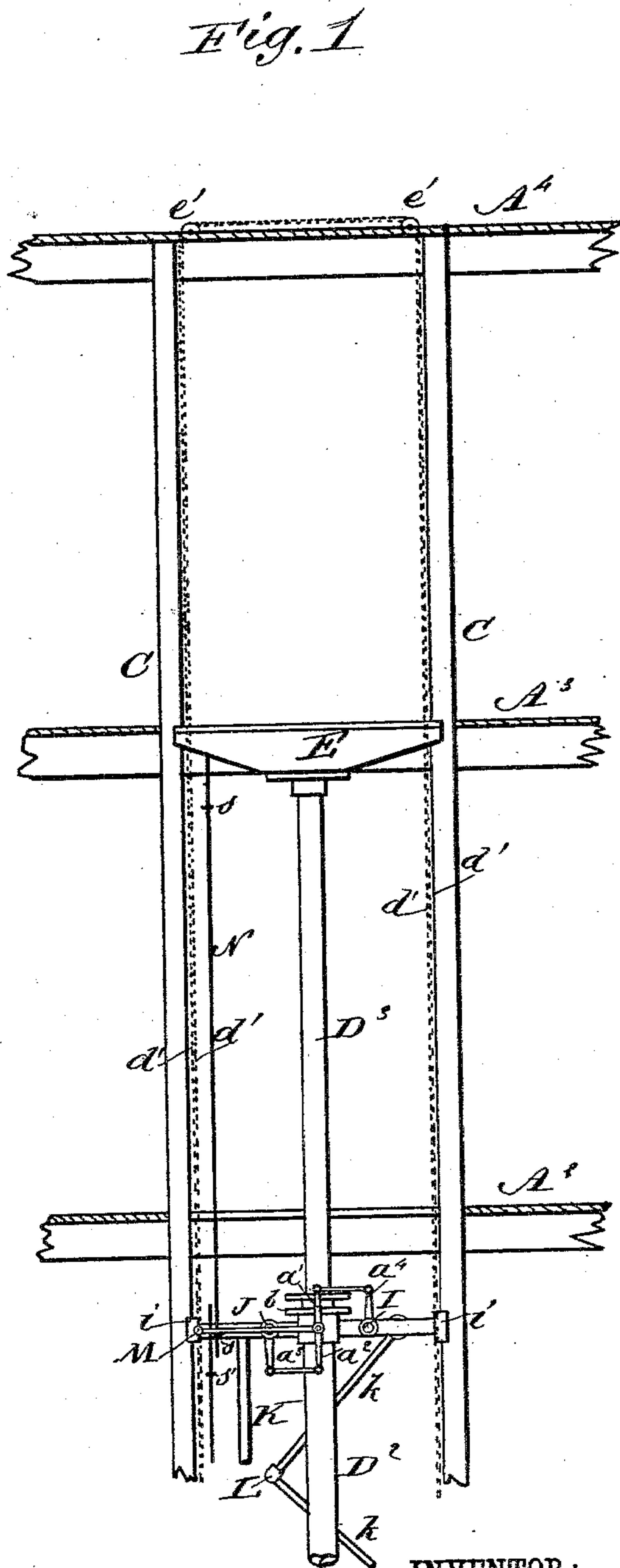


2 Sheets—Sheet 1.

No. 286,451.

Patented Oct. 9, 1883.



WITNESSES:

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(No Model.)

J. A. LESOURD & J. LOTAN.
HYDRAULIC ELEVATOR.

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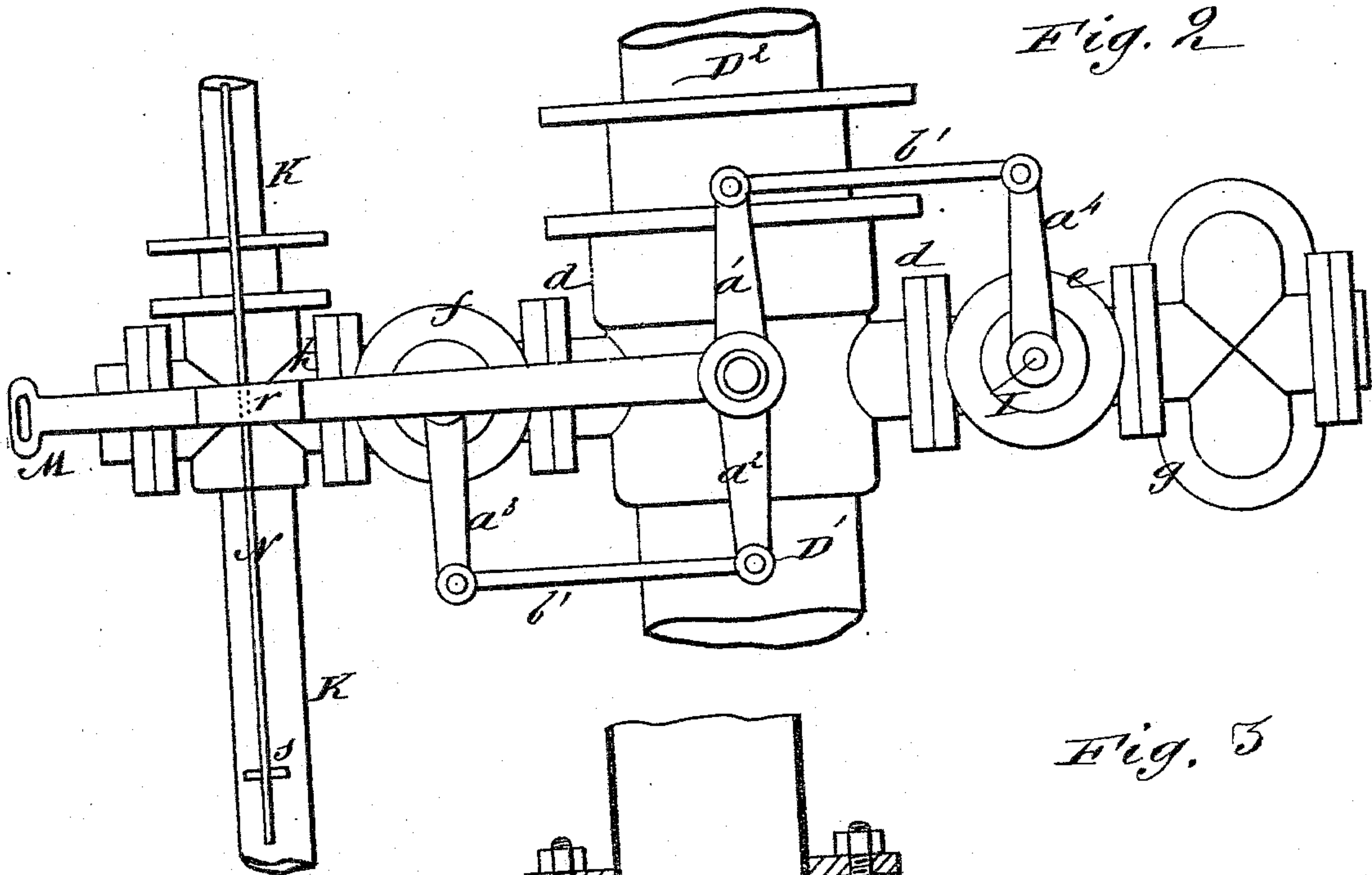


Fig. 2

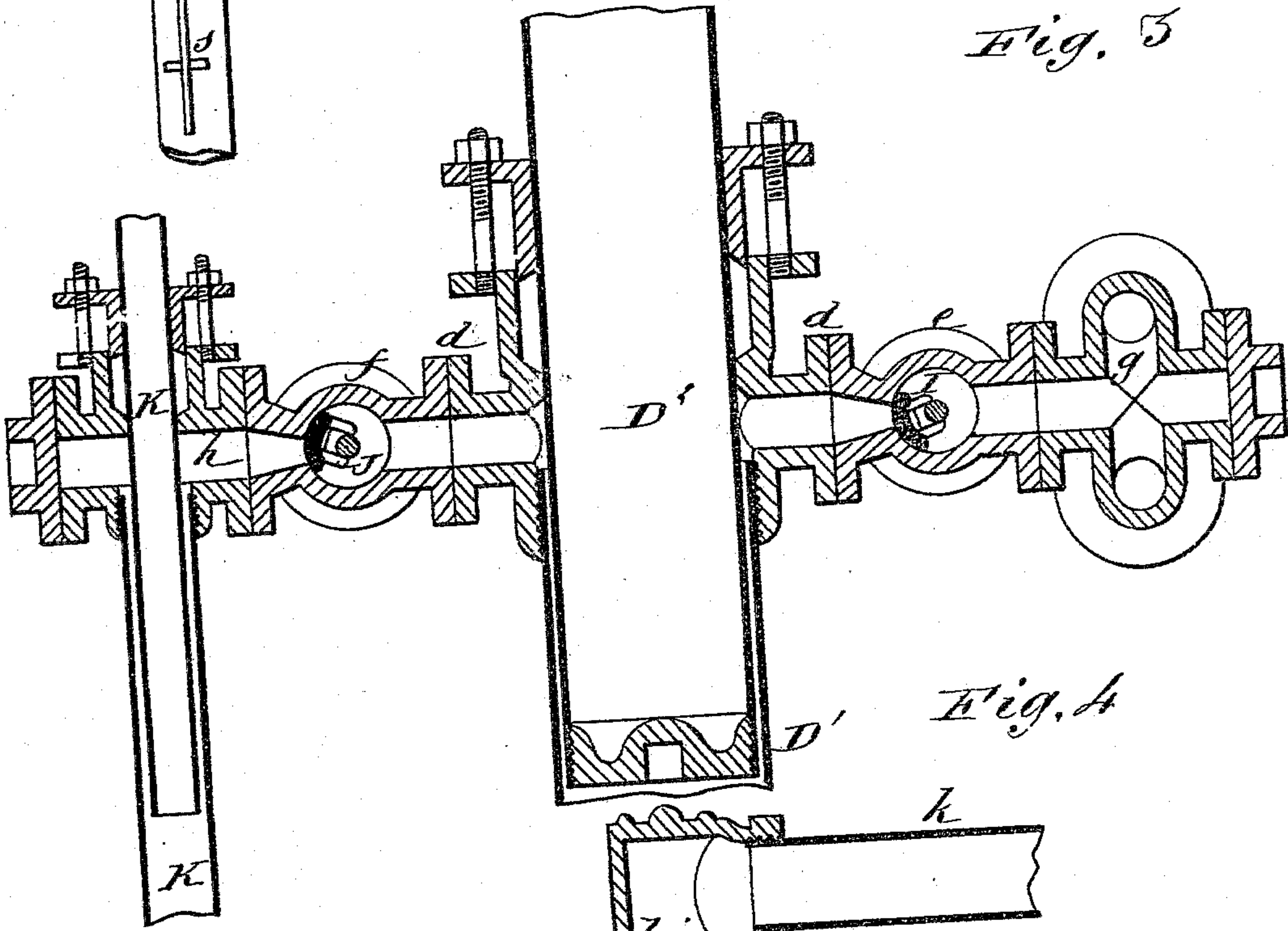


Fig. 3

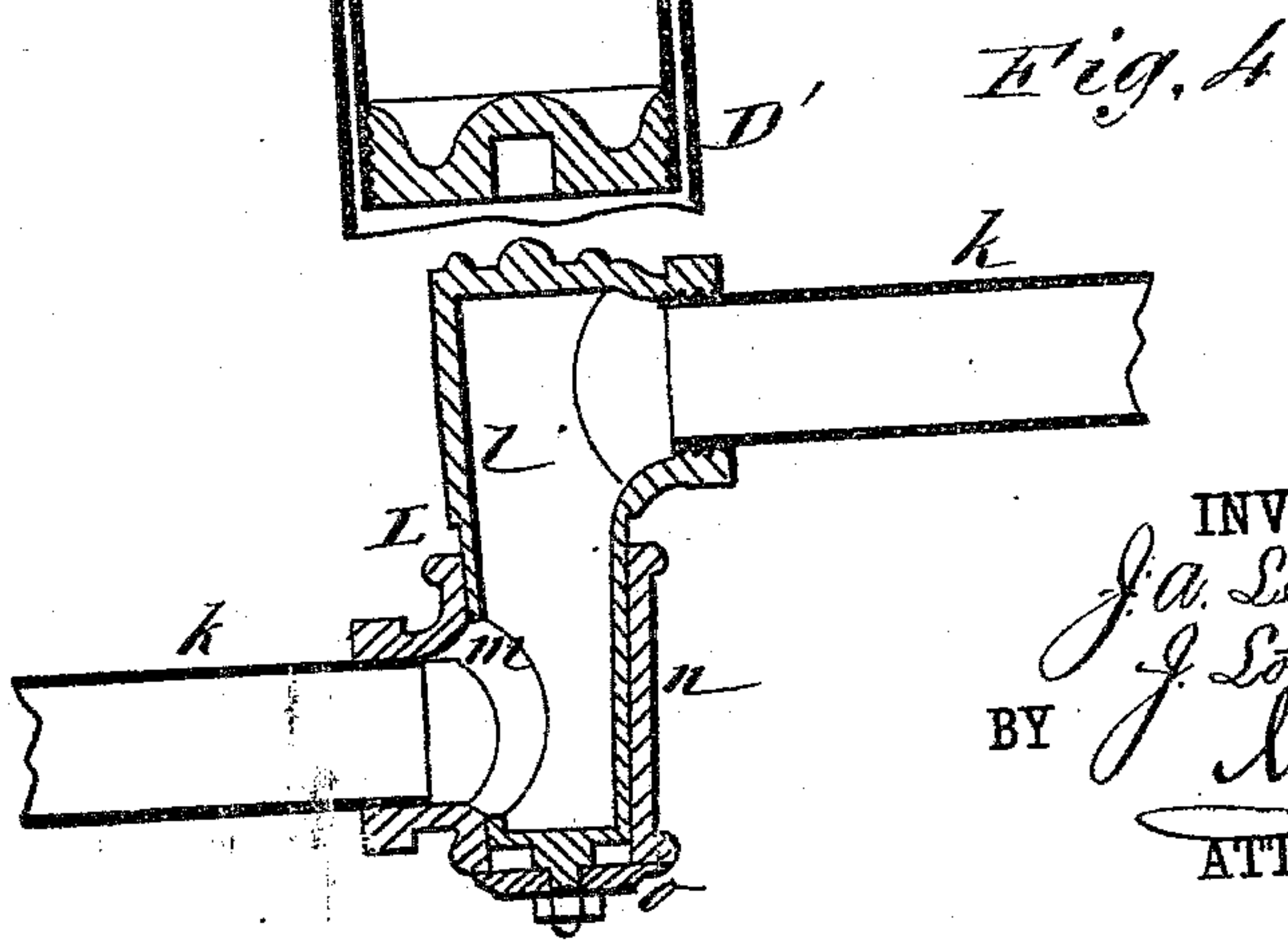


Fig. 4

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UNITED STATES PATENT OFFICE.

JOHN A. LESOURD AND JAMES LOTAN, OF PORTLAND, OREGON.

HYDRAULIC ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 286,451, dated October 9, 1883.

Application filed February 24, 1883. (No model.)

all whom it may concern:

Be it known that we, JOHN A. LESOURD, of Portland, county of Multnomah, and State of Oregon, and JAMES LOTAN, of Portland, county

Multnomah, and State of Oregon, have invented certain new and useful Improvements in Hydraulic Elevators, of which the following is a full, clear, and exact description.

This invention relates to telescopic elevators in which a fluid under pressure, or which is supplied from a higher head or level than that to which it is necessary to raise the cage or platform of the elevator, is made to act upon a series of rams or tubes arranged to work one within the other. Our invention, however, differs from other telescopic hydraulic elevators in its mode of action, valve-gear, and mechanism, whereby we produce what we term a "multiple hydraulic elevator," in which each telescoping section is controlled by independent valves, and may be raised or lowered independently of the other sections, thus making each section a complete elevating device within itself, and so that the working-fluid may be introduced to either telescopic section to operate the cage or platform of the elevator given distance, or two or more or all of the telescopic sections may be simultaneously operated, as desired.

The invention also includes a series of sectionally constructed and flexibly connected or jointed pipes for transmitting the working-fluid from a general supply-pipe to the different elevator-sections, substantially as hereinbefore described. Furthermore, the invention comprises a special automatic stop mechanism for closing the valves of the telescoping sections whenever said sections reach the limit of their stroke.

The object of our invention is to provide an elevator the operations of which are at all times under perfect control, and which is exempt from liability to accident to which wheels, ropes, and lowering cables, and other conveniences apt to break or give way, are exposed. The multiple action obtained by a separate set of valves for each ram or elevator-section, making each ram an independently-operating device, but admitting of all the rams operating in concert when required, will be found a great convenience and advantage.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 represents a broken or interrupted elevation of a hydraulic elevator embodying our invention, and as arranged to operate within or through the several floors of a building, (shown in section,) the upper part of the elevator being represented at the right hand of said figure. Fig. 2 is a side elevation, in part, upon a larger scale, in illustration of the valves, valve mechanism, and automatic stop devices applied to each telescoping section; and Fig. 3, a vertical section in a parallel plane with Fig. 2 of like devices. Fig. 4 is a sectional view, also upon a larger scale, of one of the flexible joints of the connecting supply-pipe sections between the several elevator-sections.

The elevator, as represented in the drawings, has three working-rams; but of course there may be two, four, or more.

A indicates the cellar-floor of a building; B, a pit below said floor, and A', A'', A''', and A'', first, second, third, and fourth floors, respectively, of the building.

C C are the fixed uprights or guides of the elevator-shaft, arranged to pass through the several floors below the top one, and serving to direct the cage or platform and working-rams of the elevator.

The elevator is mainly composed of a series of telescoping pipes, D D' D'' D''', of such areas or diameters as the work to be done may require, or according to the available pressure in the hydraulic main from or by which the elevator is worked, the lower one of these pipes being the largest and the others being of decreasing diameter in regular order. Said pipes have their lower ends closed, so that they form rams and ram-cylinders, the lower one, D, of which is stationary, and the uppermost one, instead of being a pipe, might be a solid ram. Each of said pipes or rams, excepting the top one, which carries the cage or platform E, is provided at its upper end with a stuffing-box and gland, b, to form a water-tight joint for the pipe or ram working up or down within it. The several rams and ram-cylinders constitute the telescoping sections of

the elevator, and, with the exception of the top one, each is provided with suitable inlets and outlets for the working fluid or water, and with valves and valve mechanism for controlling the ingress and egress of the fluid.

G represents the general inlet or supply pipe for the water used to work the elevator, and H the general outlet or escape pipe. The inlet-pipe G serves to supply the water direct to the lower ram-cylinder, D, and each succeeding ram is indirectly supplied from said pipe. Thus each ram, excepting the upper one, has flanged projections *d* on opposite sides of its stuffing-box, to which are secured, respectively, an inlet-valve box, *e*, and an outlet-valve box, *f*, containing inlet-valves I and outlet-valves J. Secured to the outer flanges of these lateral projections from the stuffing-boxes of the rams are further lateral extensions or couplings, *g* and *h*, the ones, *g*, of which are supply-water couplings, and the others, *h*, exhaust-water couplings. These latter couplings, *h*, are fitted with stuffing-boxes, and serve to carry a series of telescoping pipes, K, for the exhaust-water; also, to these couplings and the couplings *g* of the working-rams are secured the cross heads or slides *i*, which work up and down the uprights C C, to guide said rams. The supply-water couplings *g* have flexibly jointed to them a series of connecting supply-pipes, each of which is built up of a series of sections, *k*, flexibly jointed to each other, as at L, and arranged to open and close in a folding and unfolding manner relatively to each other, to conform to the motion of the rams. The flexible joint L, by which the sections *k* are united with each other, is shown in Fig. 4, the same consisting of a shell, *l*, having a side opening, *m*, and an outer shell, *n*, fitted to turn freely on or around the shell *l*, and secured at its exposed end by a nut and washer, *o*, whereby the joint may be tightened.

The inlet and outlet valves I J of the several elevator-sections are connected, respectively—that is, the two valves of each ram-section—by a combination of reverse cranks, *a' a'' a''' a''''*, with connections *b' b'*, and said cranks are operated to control the movement of the valves by a lever, M, for each ram or elevator section, said lever turning on a stud on the side of the stuffing-box of the ram. The levers M are slotted at *r* to allow of the passage through them of rods N, having stops *s s'* to automatically control the closing of the valves in the ascent or descent of the elevator-sections. Each ram-section has one of these rods N connected at its upper end to it. The outer ends of the levers M, which span the width of the cage, so as to be out of the way, have attached to them small hand-ropes *d'*, each lever having its own rope. These ropes are arranged to run through the side of the cage or platform, and to and over or around sheaves *e' e''*, at the top and bottom of the elevator frame or shaft.

To start the elevator from its lowermost position, the hydraulic main having been pre-

viously opened, the lower valve-lever M depressed by its manipulating-rope *d'* to open the inlet-valve I of the lower ram-section. This will cause the elevator to ascend to the next story above or other given position, as the ram thus raised reaches, or nearly reaches its topmost position, the bottom stop, *s*, of the rod N of the elevator-ram section, coming in contact with said lever, raises it and closes the inlet-valve it controls, thus automatically arresting the motion of the ram. The action of the valves I and J, as described, will be readily understood by reference to Figs. 2 and 3, both valves being closed when the lever M is in a horizontal position, and the two valves being set with reverse laps, so that only the inlet-valve I is opened when the lever M is depressed from its horizontal position, and closed without opening the outlet-valve J when returning said lever to its horizontal position, and the outlet-valve J is opened without opening the inlet-valve on lifting the lever M above its horizontal position. To continue the upward movement of the elevator, the next valve-lever M is similarly manipulated by its rope *d'* to elevate the next ram, when a like action takes place, and so on for the several rams, the bottom stops, *s*, of the rods *d'*, pertaining to the rising rams, always closing at the proper time the inlet-valves I belonging to said rams. If it be required to similarly lower the elevator by moving each ram in succession, it is only necessary to reverse the manipulation, successively, of the several ropes *d'*, so as to open the outlet-valves respectively controlled by them, while closing or keeping closed the inlet-valves, when the water, passing off by the telescopic exhaust-pipes K and outlet J, will cause the rams to be successively lowered as required, the upper stops, *s'*, of the rods automatically operating on the valve-levers to shift the valves and stop the downward motion of the rams at their appointed time, as in the case of the upward action of the elevator. If it is desired, however, to at once move the elevator to its extreme upward position, instead of by stages, as effected by the successive manipulation of the valves controlling the several rams, all the inlet-valves can be opened at once, causing the several rams to move together, and the operation may be reversed to come down.

Having thus fully described our invention we claim as new and desire to secure by Letters Patent—

1. In a telescoping hydraulic elevator, the combination of a series of rams or ram-cylinders arranged to work one within the other, independent inlet and outlet valves separately applied to each ram or elevator-section, and supply and exhaust pipes for the operating fluid capable of moving up and down with the several ram-sections and connecting them, essentially as described.

2. The combination, with the several ram-sections of the elevator, of a series of connecting fluid-supply pipes constructed in section

flexibly jointed to each other and to the ram-sections, substantially as specified.

3. The connecting fluid-supply pipes between the ram-sections of a hydraulic elevator, constructed of a series of pipe-sections, *k*, flexibly jointed with each other by turning joints or joint-pieces *L*, and arranged to open and close in a folding and unfolding manner relatively to each other, essentially as described.

10 4. In a telescoping hydraulic elevator, the combination, with the several rams or elevating-sections of the elevator, and with independent valves and valve mechanism arranged to separately control said sections, of a series of
15 stops connected with the ram-sections, and arranged to automatically control said valves at or near the extremity of the movement of the rams in either direction, substantially as specified.

5. The combination of the independent manipulating ropes or connections *d'* with the 20 valve-levers *M*, the inlet and outlet valves *I J*, and mechanism connecting said valves with said levers, the independent ram-sections *D D' D'' D'''* of a hydraulic elevator, and fluid supply and exhaust pipes to and from the several 25 ram-sections, each of which is provided with independent valves *I J*, essentially as and for the purposes herein set forth.

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Witnesses:

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FRED. U. HOLMAN.