H. W. BRINCKERHOFF.

Elevator.

No. 165,472. Patented July 13, 1875.

Fig: 1.

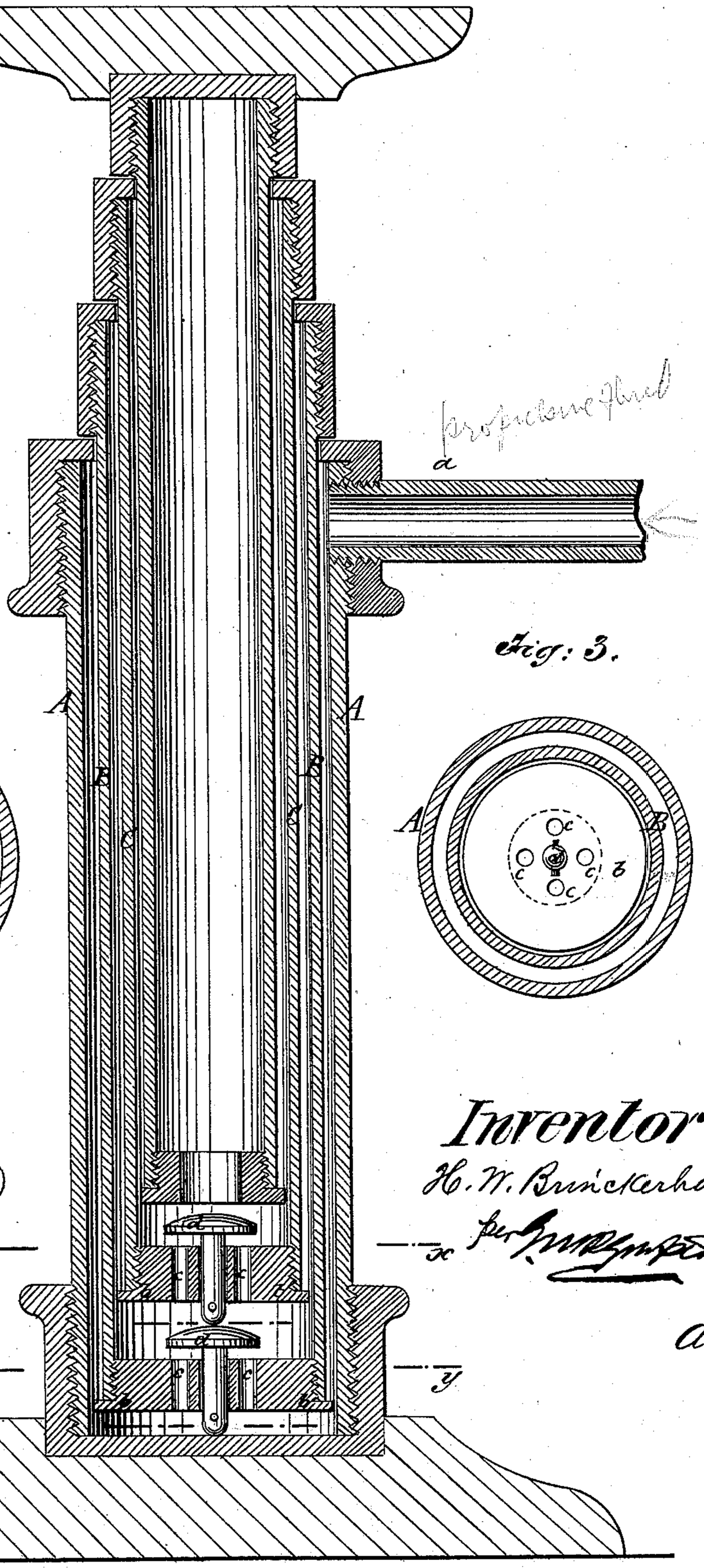

Fig: 2.

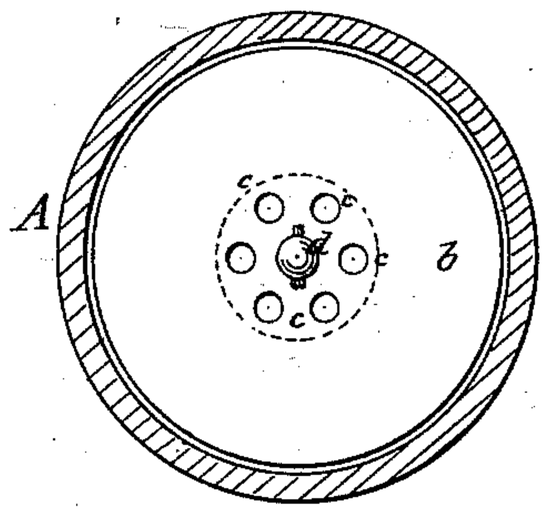

Fig: 3.

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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN ELEVATORS.

Specification forming part of Letters Patent No. **165,472**, dated Ju'y 13, 1875; application filed March 23, 1875.

To all whom it may concern:

Be it known that I, HENRY W. BRINCKERHOFF, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Elevators, and that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

This invention is an improvement in telescopic or other sectional elevators, actuated by the pressure of water or other fluid therein contained.

The invention consists in a diaphragm applied to the inner end of each of the moving sections, through which the propulsive fluid would otherwise flow during the operation of the elevator, and the combination with the said diaphragm of an orifice or orifices formed either in the said diaphragm or in the section to which it is attached. And the invention further consists in combining, when necessary, with such orifice or orifices, and diaphragm, an automatic check-valve.

The principal difficulties encountered in the operation of the telescopic elevator, as ordinarily constructed, are, first, the varying velocities of the car or platform, due to the necessary differences in the areas of the moving sections; second, the concussions or shocks caused by the engagements of adjacent sections with each other, both in ascent and descent, especially the latter. These shocks are more or less destructive to the mechanism, and disagreeable to those using it, and are aggravated by the increased speed of the smaller sections, as above mentioned; third, it has sometimes happened that through the parts being too tightly fitted, one of the larger sections would be held down and prevented from starting up in its usual order, the smaller section within it rising first, and when the larger section was finally released it would fly up with great violence, the smaller section falling within it at the same time, and the two coming together with a dangerous and startling concussion.

The present invention is designed to remove or relieve all these difficulties, as will more fully appear from the following description and accompanying drawings, wherein—

Figure 1 is a vertical central section of my improved elevator. Fig. 2 is a cross-section in the line *x x*, Fig. 1, and Fig. 3 is a cross-section in the line *y y*, Fig. 1.

Similar letters of reference indicate like parts in the several figures.

A represents the base tube or stationary section of a telescopic elevator, into which the propulsive fluid is forced through a pipe, *a*. The pressure thus generated raises the first, largest, and lowest moving section B with its superincumbent sections and platform, until its further progress is checked by the projecting edges of the diaphragm *b* coming in contact with the cap of the base tube. The fluid is then forced through the openings *c* in the diaphragm *b*, and actuates in a similar manner section C, with its superincumbent load, and so on until all the sections are forced out, or the required height is reached. The area of the orifice or orifices in each diaphragm is less than that of the supply-pipe, and successively diminishes in such proportion to the area of each superjacent section as to cause a proportionately reduced flow of water against such section, and thus impart a nearly or quite uniform velocity to the car.

The invention thus produces a uniform velocity of ascent and such alleviation of concussion as may be due to preventing the increased velocity of the smaller sections.

The check-valves *d* produce no effect in ascent, and if they are left out the descent will be as follows: The smaller inner and upper moving section immediately supporting the car will, by virtue of its greater proportionate weight, start to descend first, and were it not for the diaphragm, and suitable orifices, the subjacent section would not start until struck by it, when both would descend together, and so on. By the use of the diaphragm, however, the escape of the fluid contained between the upper and the immediately subjacent section is obstructed, and by the increased pressure caused by that obstruction on the upper side of the diaphragm attached to the said subjacent section, said subjacent section is forced down, so that when, by reason of the

escape of the intervening fluid through the before-mentioned orifices, the upper section comes in contact with the immediately subjacent one, the said subjacent section has already acquired a downward motion, so that the resulting concussion is very greatly diminished, if not almost entirely removed. A similar action takes place between each two adjacent sections, and if the areas of the orifices in the several diaphragms are properly proportioned to the lengths and the areas of the several sections, they will not come in contact with each other at all, till they all meet together at the bottom. The speed of descent will thus be absolutely uniform, without any concussion or jar whatever. Where several sliding sections are used, however, it is very difficult both to obtain and to maintain this nice adjustment of opening, much greater nicety of adjustment being required in this case than in ascending, where a mere approximate uniformity of speed is all-sufficient. In this case, therefore, I use the check-valve, as shown in the drawing, with the following result: Escape of the fluid contained between the several moving sections being absolutely prevented, they are obliged to descend together in a body, without motion on each other, until the lower section nearly reaches its lowest point of motion, when the check-valve in the diaphragm of the lower section is so arranged as to trip or open, thereby permitting the inclosed fluid to escape and the subjacent sections to continue their descent. This action is repeated by tripping each check-valve as the section carrying it nearly reaches its lowest point, until all the sections are down. It will be observed that in this method of descent all concussion between adjacent sections is absolutely avoided, and the process of descent being precisely the reverse of that of ascent, the same proportionate area of orifices in the diaphragms will secure a uniform speed to the platform in either case.

The check-valves also serve a further purpose of enabling the platform to be stopped and held at a given point while descending, as without them, if the escape of the fluid from the base tube were arrested while the sections were sliding upon each other, the platform would still be free to continue its descent for some distance, the displacement caused by such descent being compensated by the rising of the lighter subjacent sections, until checked by engaging with each other, they having been previously partially forced down, as before described. With the check-valves in use it will be obvious that no such rise of the subjacent sections can occur, and hence no descent of the platform.

The third difficulty, or rather accident, is evidently entirely prevented by this device, as no two adjacent sections can come together except by the displacement of the intervening fluid, and as by this arrangement of diaphragms and orifices this displacement is necessarily gradual, the approximation of the adjacent sections must in all cases be gradual, also, and hence without material or injurious concussion. In fact, when the check-valve is used, such accidental approximation of adjacent sections would be prevented altogether.

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

1. In a telescopic elevator, the sectional tubes thereof, partially closed, with diaphragms, as shown and described, for checking the free flow of the fluid through said sectional tubes.

2. In a telescopic elevator, a check-valve, combined with perforations in the diaphragms, covering the inner ends of the sections, and arranged to be opened by such sections successively, completing their descent substantially as specified.

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