

(No Model.)

2 Sheets—Sheet 1.

O. KRELL.
HYDRAULIC ELEVATOR.

No. 454,872.

Patented June 30, 1891.

Fig. 1.

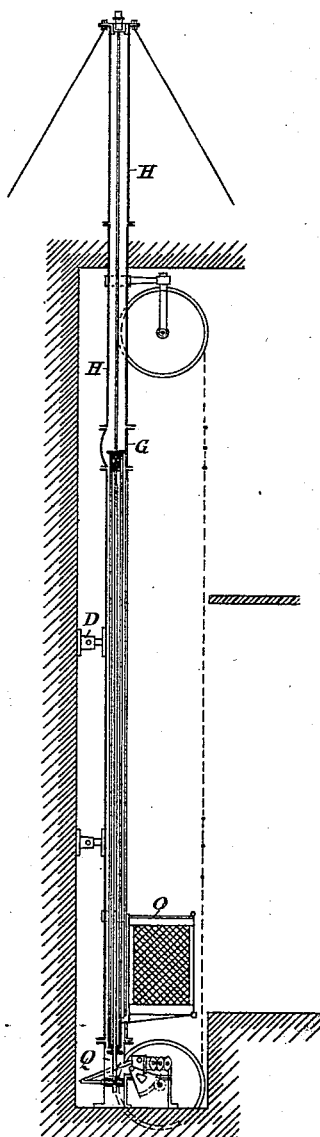


Fig. 2.

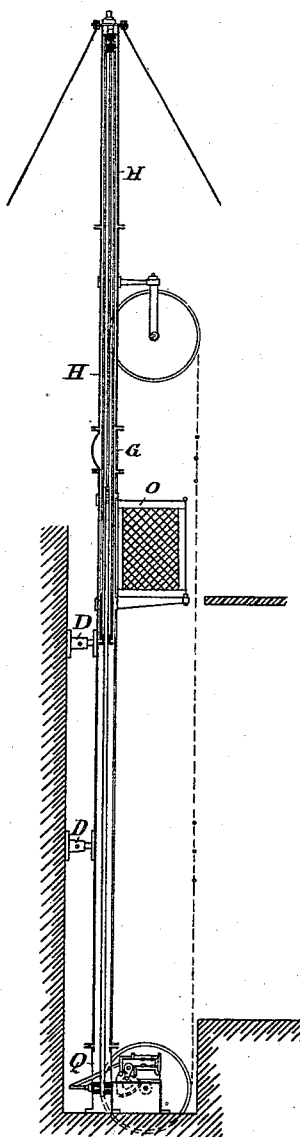
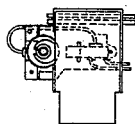


Fig. 3.



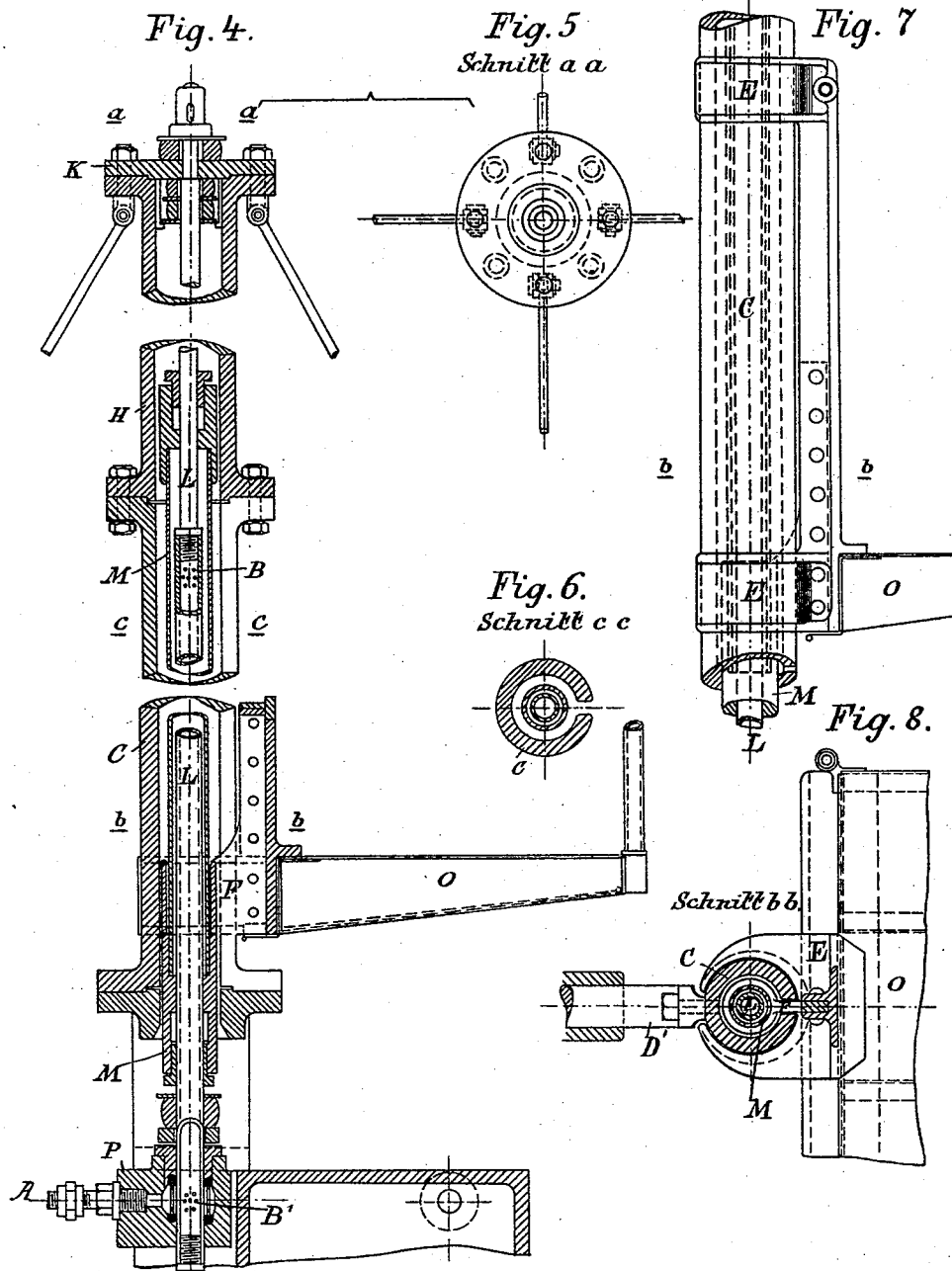
Witnesses
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UNITED STATES PATENT OFFICE.

OTTO KRELL, OF ST. PETERSBURG, RUSSIA.

HYDRAULIC ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 454,872, dated June 30, 1891.

Application filed April 1, 1891. Serial No. 387,262. (No model.) Patented in Germany May 30, 1890, No. 55,607, and in England June 9, 1890, No. 8,904.

To all whom it may concern:

Be it known that I, OTTO KRELL, managing director, a subject of the Duke of Saxe-Meiningen, residing at St. Petersburg, in the Empire of Russia, have invented certain new and useful Improvements in Hydraulic Elevators, (for which I have obtained patents in England, No. 8,904, dated June 9, 1890, and in Germany, No. 55,607, dated May 30, 1890;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The construction of hydraulic lifts adapted to be operated by direct action and to be raised to considerable heights has hitherto required a stationary cylinder to be sunk in the ground, which involved considerable expense, besides being attended by great technical difficulties. The plunger-rod, for instance, owing to its very great length compared with its thickness, has to withstand a powerful breaking or bending strain, the consequence being that in order to render it capable of sufficient resistance it is necessary to proportion its size in a manner inconsistent with what is required, in regard to diameter, for obtaining the most advantageous liquid-pressure. In the directly-acting hydraulic lift or elevator constructed according to the present invention these drawbacks are obviated by the employment of a differential plunger permanently suspended by its upper end and yet adapted to force the water required for exercising the hydraulic pressure upwardly.

A lift or elevator embodying these improvements is represented in the accompanying drawings, in which—

Figures 1 and 2 are diagrammatic views of different positions of the cage, while Fig. 3 is a plan of the whole arrangement, and Figs. 4 to 8 are detail views.

The plunger of the motor or elevating-cylinder is a differential plunger or piston, Figs. 4, 7, and 8, which is made smaller at the upper portion than at the lower part and is permanently suspended by its upper end from the support K, Figs. 1, 2, and 4. Upon this plunger slides the elevating or motor cylinder M, Figs. 4, 7, and 8, provided with a stuff-

ing-box at either end and supporting the cage O. The lower or thicker portion of the piston-rod L assumes the shape of a tube, and it is through this portion that the liquid employed to create hydraulic pressure is admitted from below, at A, Fig. 4, into the hollow piston-rod, whence through openings provided in the upper end of the thicker portion, at B, Fig. 4, it passes into the motor-cylinder. Owing to such an arrangement, the plunger is only submitted to a tensile strain, so that nothing prevents its diameter being such as is consistent with the most advantageous utilization of the liquid-pressure available, nor is it necessary to sink the piston-rod underground.

In the example illustrated in the drawings a special method of guiding the rod and of adjusting its point of suspension is represented; but any suitable means may be adopted for these purposes, if desired.

The cage may be guided, in the form of elevator shown, by means of a slotted tube C, Figs. 4, 7, and 8, concentrically surrounding the elevator-cylinder and secured to the wall of the building by means of stays D', Fig. 8. The cage is provided on diametrically-opposite points of its guiding-column C with slotted sliding cheeks E, Figs. 7 and 8. The neck F, Figs. 4 and 8, is rigidly secured to the cage. It passes through the slot in the tube C and surrounds the cylinder, and by contact with the edges of the slot in the guiding column or tube C it prevents the cage from turning. At the upper end of the slotted guiding-tube an open attachment or extension of the tube G, Figs. 1 and 2, is provided, through which access may be had to the upper stuffing-box of the cylinder. Upon this piece G are erected the required number of tubes H, Figs. 1 and 2, carrying at their upper ends the support K, Figs. 1, 2, and 4, from which the plunger-rod is suspended.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a hydraulic elevator, the combination, with the stationary slotted tube, of the extension-tubes secured to the said tube and pro-

vided with a support at the top, the piston
suspended from the said support, the cylinder
sliding on the said piston, a neck secured to
the said cylinder and projecting through the
5 said slotted tube, and a cage secured to the
said neck, substantially as and for the pur-
pose set forth.

2. In a hydraulic elevator, the combination,
with a stationary suspended piston, of a slid-
10 ing cylinder, a stationary slotted tube sur-
rounding the cylinder, a neck guided by the
said tube and secured to the cylinder, the cage

secured to the said neck, and the slotted slid-
ing cheeks secured to the said cage and par-
tially encircling the said tube, substantially 15
as set forth.

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

OTTO KRELL.

Witnesses:

JAS. DE FRESHVILLE,
C. N. MANAPNELZ,
S. M. MALAPHEIFF.