(No Model.)

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C. J. DUDLEY.

HYDRAULIC ELEVATOR.

No. 518,491. Patented Apr. 17, 1894.

Fig. 2

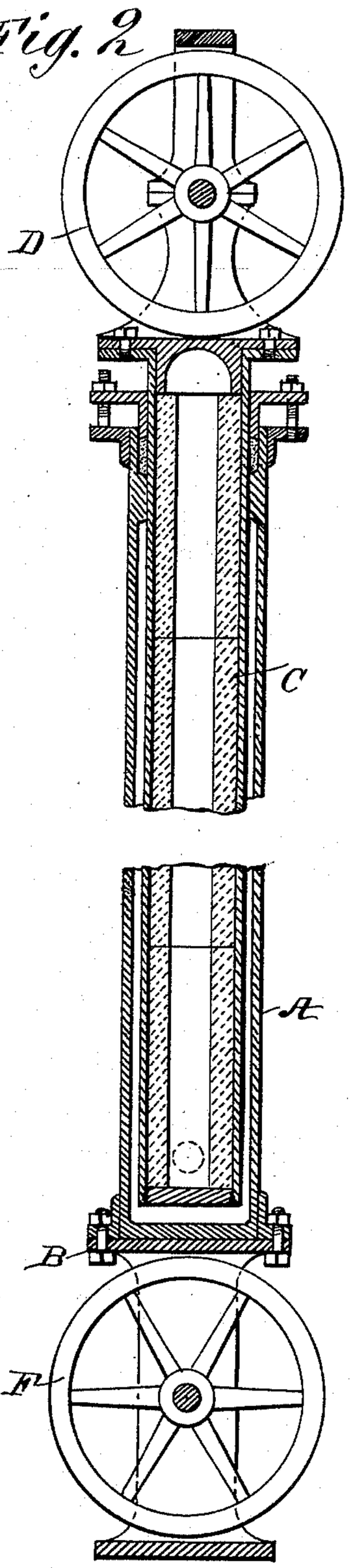
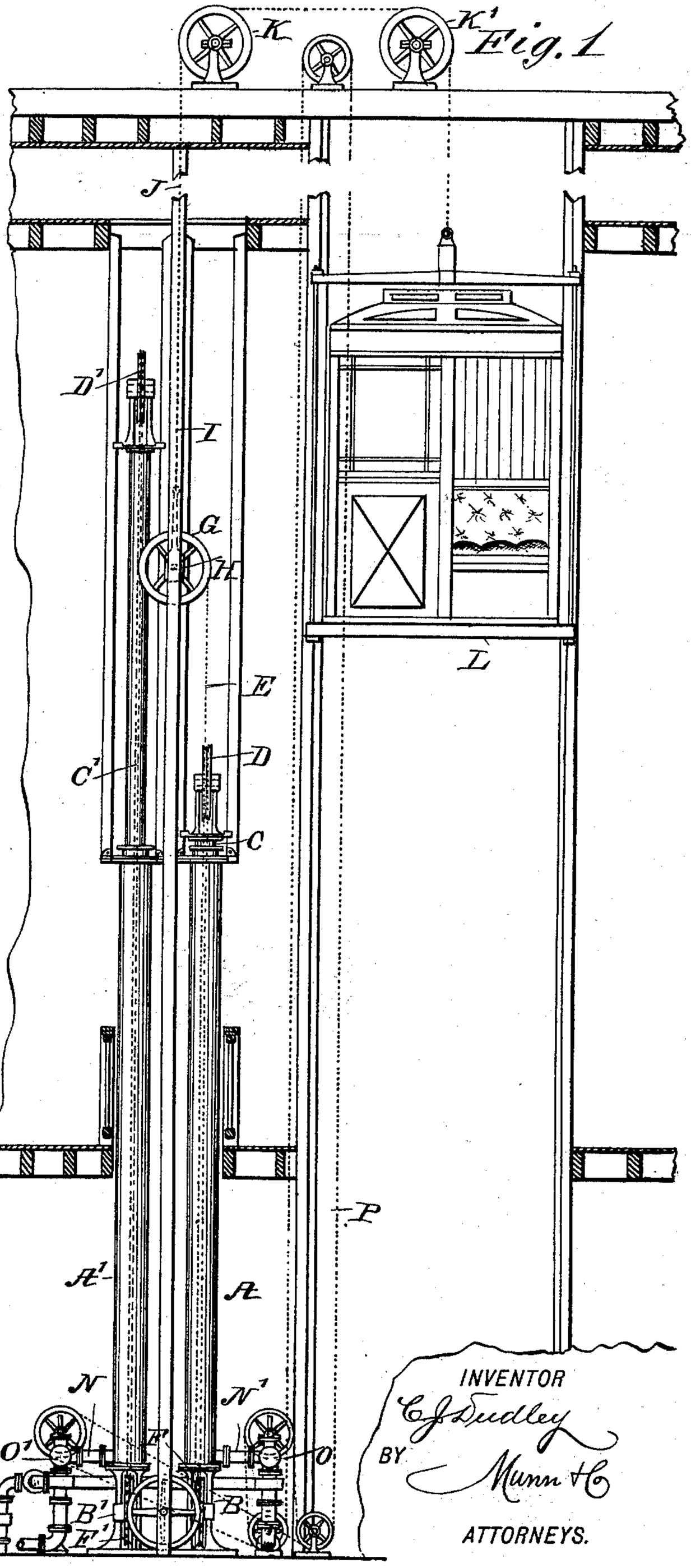


Fig. 1



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C. J. DUDLEY.

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Fig. 3

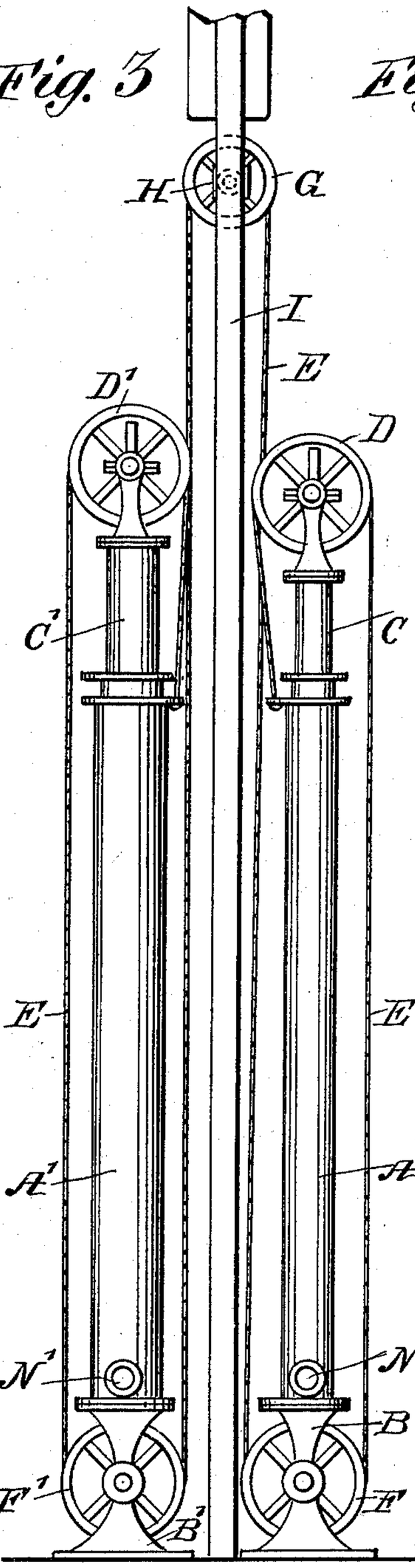


Fig. 4

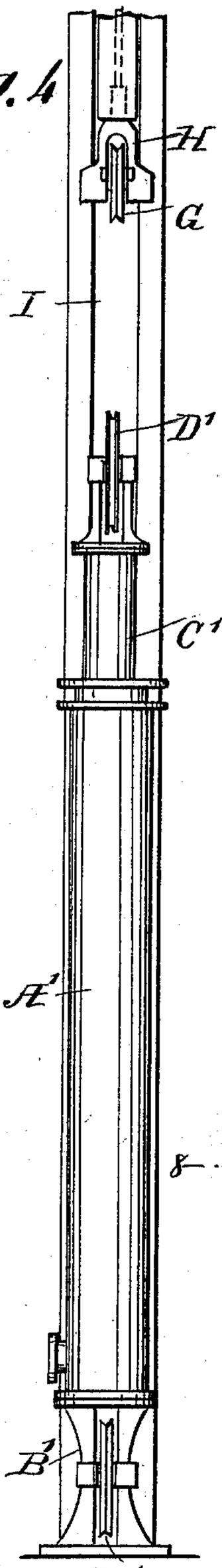


Fig. 5

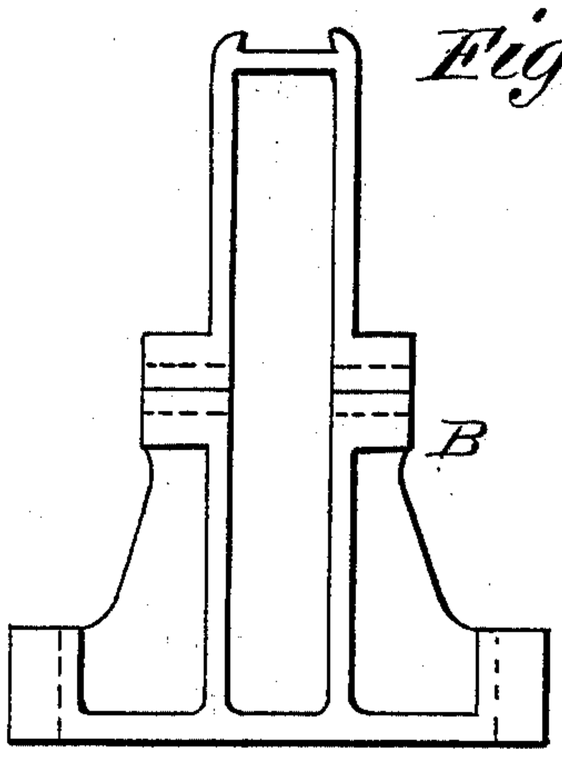


Fig. 6

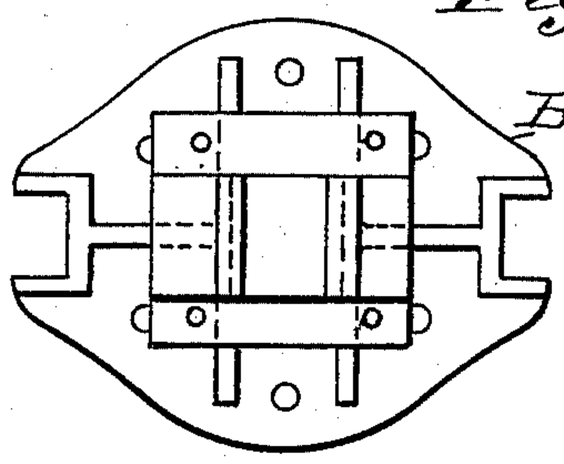


Fig. 7

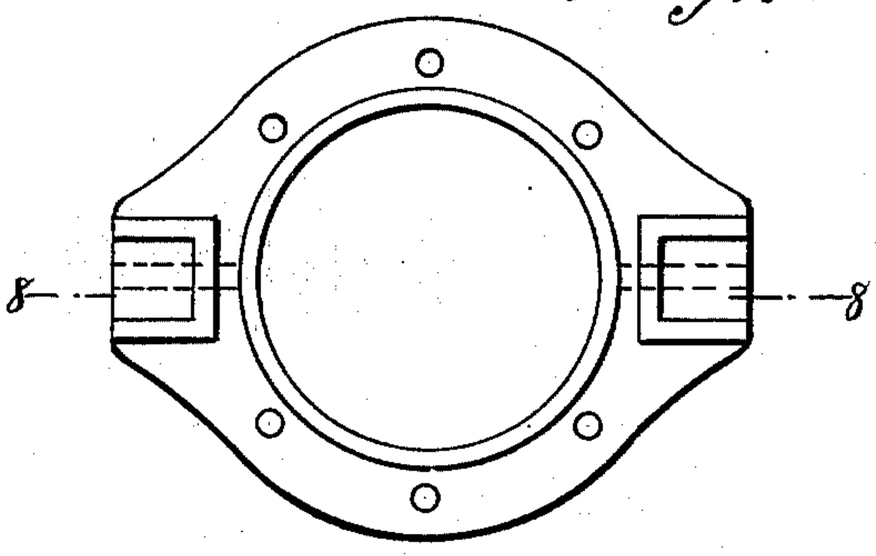
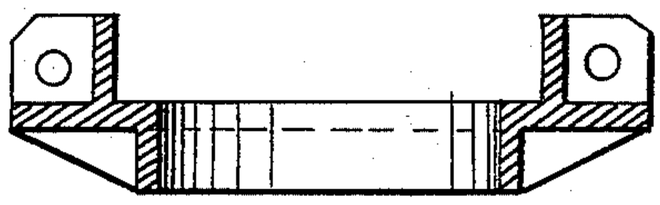


Fig. 8



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HYDRAULIC ELEVATOR.

No. 518,491. Patented Apr. 17, 1894.

Fig. 9

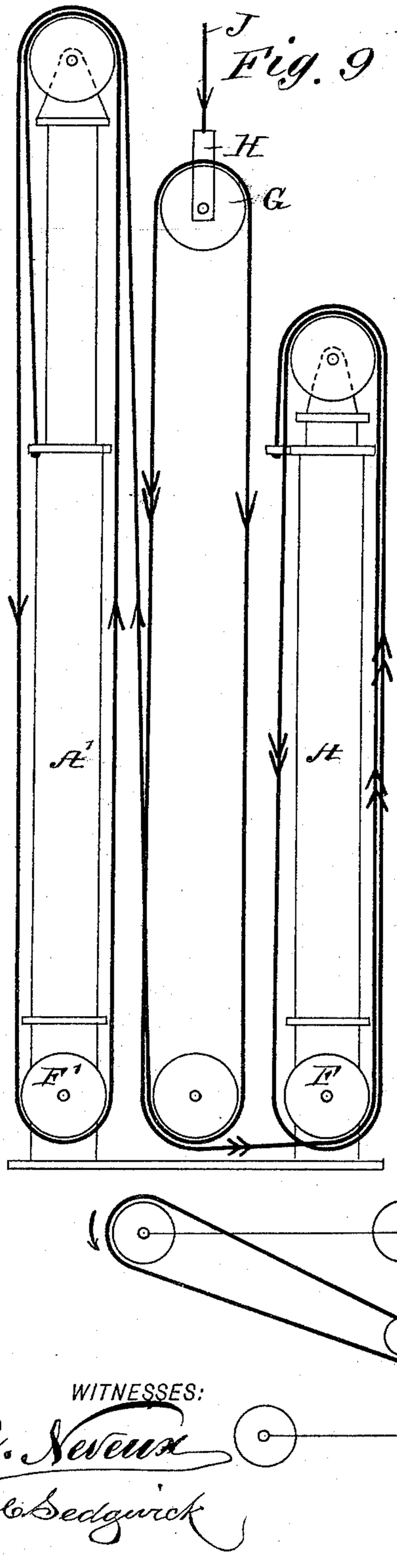

Fig. 10

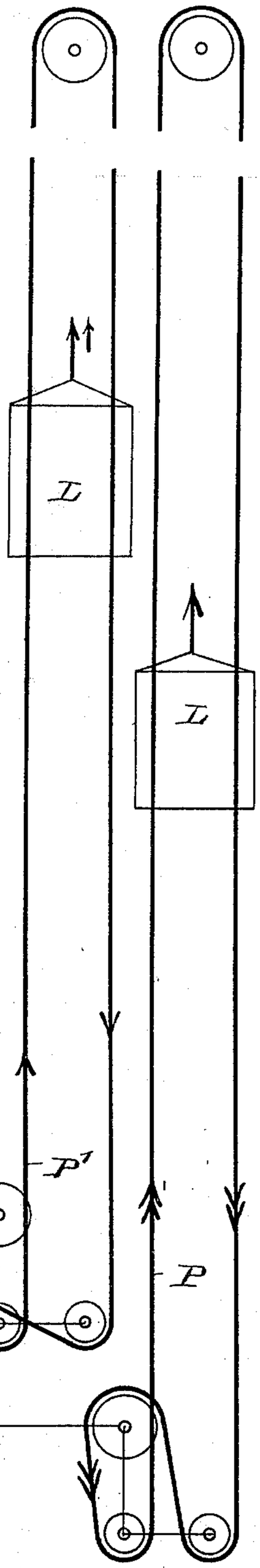

Fig. 11

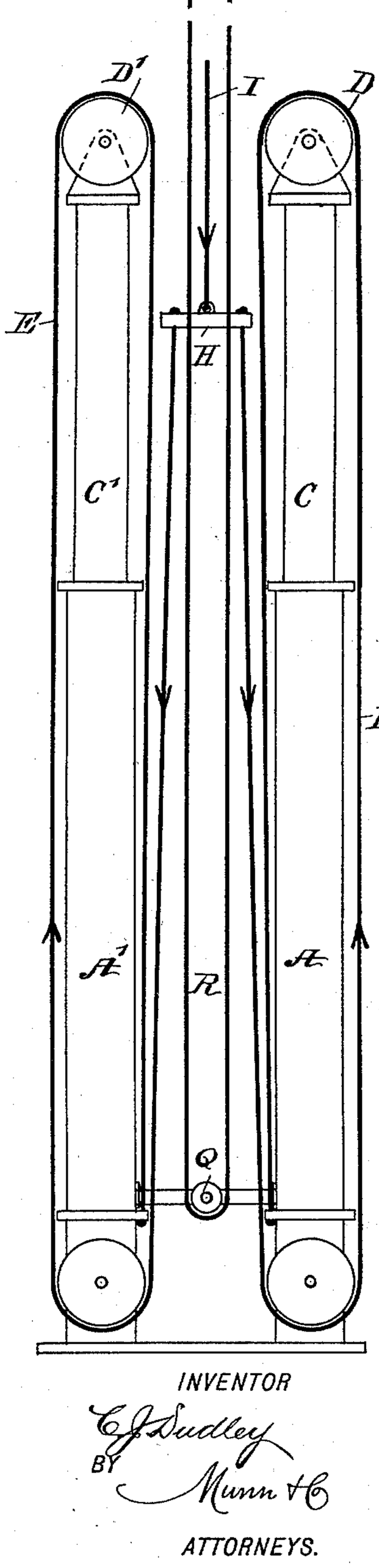

Fig. 12

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HYDRAULIC ELEVATOR.

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Fig. 13

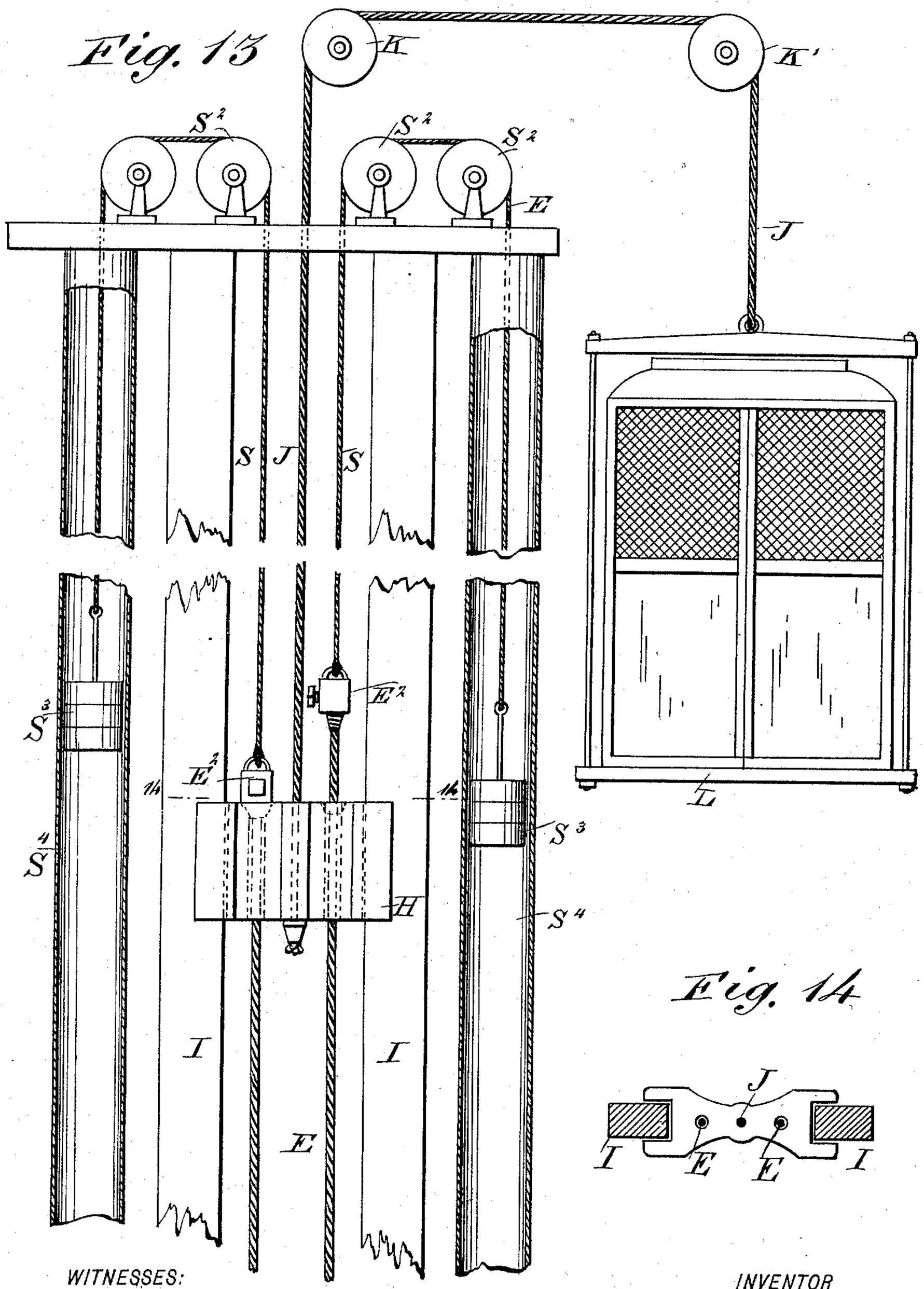

Fig. 14

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UNITED STATES PATENT OFFICE.

CHARLES J. DUDLEY, OF MOBILE, ALABAMA.

HYDRAULIC ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 518,491, dated April 17, 1894.

Application filed February 2, 1893. Serial No. 460,688. (No model.)

To all whom it may concern:

Be it known that I, CHARLES JOSEPH DUDLEY, of Mobile, in the county of Mobile and State of Alabama, have invented a new and Improved Hydraulic Elevator, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved hydraulic elevator, which is simple and durable in construction, and arranged to vary the lifting power of the elevator according to the load of the cage, the varying device being controlled by the operator in charge of the cage.

The invention consists of certain parts and details, and combinations of the same, as will be hereinafter described and then pointed out in the claims.

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 is a side elevation of the improvement with parts in section. Fig. 2 is an enlarged transverse section of one of the hydraulic cylinders. Fig. 3 is an enlarged side elevation of the improvement showing two differential cylinders. Fig. 4 is an edge view of the same. Fig. 5 is a side elevation of the frame for one of the cylinders. Fig. 6 is a plan view of the same. Fig. 7 is a plan view of one of the flanges for the hydraulic cylinder. Fig. 8 is a sectional side elevation of the same on the line 8—8 of Fig. 7. Fig. 9 is a diagrammatic view of the improvement. Figs. 10 and 11 are similar views of the valve actuating mechanism. Fig. 12 is a diagrammatic view of a modified form of the improvement. Fig. 13 is a sectional side elevation of another modified form of the improvement; and Fig. 14 is a sectional plan view of part of the same on the line 14—14 in Fig. 13.

The improved hydraulic elevator is provided with two or more cylinders A and A′ of like or different size, and supported at their lower ends on frames B and B′ respectively, attached to a suitable foundation. The pistons C and C′ in the cylinders A and A′ respectively, are preferably made hollow, as plainly shown in Fig. 2, and have their lower ends closed watertight and their upper ends also closed and sufficient space is left between the piston and the wall of the cylinder, as will be readily understood by reference to the said Fig. 2.

The upper closed ends of the pistons C and C′ support pulleys D and D′ respectively, over which passes a rope E having its ends attached to the cylinders A and A′, either at their upper ends, as shown in Fig. 3, or at the lower ends, as illustrated in Fig. 12. The rope E after passing over the pulleys D and D′, as shown in Fig. 3, extends downward and passes under the pulleys F and F′ journaled in the frames B and B′ respectively, for the respective cylinders A and A′. The rope then extends upward and passes over a pulley G journaled in a weighted cross head H mounted to slide vertically in suitable guideways I erected on the foundation between the two cylinders A and A′.

The cross head H is connected with one end of the lifting rope J, which extends upward and passes over the usual grooved wheels K and K′, to pass from the latter downward to support the lifting cage L of any approved construction and mounted to slide in the usual shaft of the elevator. The lower ends of the cylinders A and A′ are provided with the usual pipes N and N′ through which water is introduced in the cylinders to push the pistons C and C′ therein outward and which also serve to permit the escape of the water on the return movement or inward sliding of the said pistons.

The pipes N and N′ are provided with the usual controlling valves O and O′ respectively, actuated by the operator in charge of the cage L by means of ropes P and P′ passing through the elevator cage in the usual manner. If the two cylinders A and A′ are used simultaneously as shown in Fig. 12, then a single valve or tiller rope R passing through the cage L is employed the said valve rope then actuating a single valve Q controlling the inlet and outlet for the cylinders A and A′.

It is understood that when the water is in-

troduced into the cylinders under pressure, the pistons C and C′ slide outward and by the rope E exert a pull on the pulley G of the cross head H, so that a pull is exerted on the lifting rope J and the cage L ascends. When the position of the valves O and O′ is reversed, the cage L descends gradually, according to the graduated outflow of the water from the cylinders A and A′. When two valve or tiller ropes P and P′ are employed, then either of the cylinders A and A′ can be set in use without using the other; thus for instance, if the cylinder A is to be used only, on a light load in the cage L, then the other cylinder A′ remains out of action, and the cage L is raised by the power exerted in the cylinder A on the piston C therein. In case the load in the cage L is more than the power in the smaller cylinder A warrants, then the operator makes use of the other valve rope P′, so as to set the cylinder A′ in action, which owing to a larger diameter, has a greater lifting force. If the load is increased still more in the cage L then both cylinders A and A′ may be set in action simultaneously, so that the compound power of the two cylinders is utilized to raise the cage with its increased load. One cylinder may for instance, have the lifting capacity of one thouands pounds, and the other cylinder the lifting capacity of two thousand pounds, so that both together have the lifting capacity of three thousand pounds to an equal height, and as the majority of elevator loads are less than one thousand pounds for ordinary running, the cylinder having the lifting capacity of one thousand pounds will ordinarily be employed only, so that a saving of about fifty per cent. of water is obtained, as the other cylinder is only used on an increased load or both together for an extremely heavy load.

As illustrated in Fig. 13, the pulley G is omitted and the lifting rope J is directly connected with the plain crosshead H, mounted to slide vertically on the guide posts I as previously described.

The wire ropes E may be rigidly fastened to the crosshead as shown in Fig. 12, when the two or more cylinders are operated by one valve and one tiller rope R as previously explained. The wire ropes E may also pass loosely through the crosshead H, as illustrated in Fig. 13, and on the upper ends of the ropes are then secured the heads or stop dogs E^2, each connected with a rope S extending upwardly and passing over ceiling pulley S^2 to finally extend down and carry a weight S^3 fitted to slide in a suitable fixed tube or casing S^4. The weights are sufficiently heavy to take up the slack in the crosshead ropes or cables E to hold the said cable in position when its respective cylinder is not in use.

The valve of each cylinder is shut off automatically as soon as either single cylinder is started and cannot be actuated by the tiller rope without first coming back to the lower floor and one or both being actuated on the start. This is accomplished by the moving elevator cage or car L shutting off an independent valve on the cylinder not in operation automatically, and moving the tiller rope to start the elevator, it will move the device to shut off the independent valve clear of the car from that particular cylinder, and in case the load is too great for that cylinder, the other tiller rope is actuated so as to actuate the other cylinder, which then acts as an independent engine, and both cylinders carry the load. On return of the car to the lower floor the independent valve is automatically opened.

As illustrated in Fig. 2, the pistons or plungers C are each made of thin seamless tubing filled up with sections of turned off, well seasoned wood driven tight into the tube. The center of the wood is bored out as much as the diameter of the plunger will permit, to give the proper strength to the plunger. After the tube is filled up with wooden sections from end to end, both ends are capped up water tight. The wood sections can be made in suitable lengths to suit each plunger and by using cucumber or other tough wood of light weight, I provide for the necessary strength with considerably reduced weight for the plunger.

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

1. A hydraulic elevator comprising a lift or cage, cylinders and pistons, pulleys on the pistons, an auxiliary sliding cross-head between the cage and pistons, idler pulleys between the piston pulleys and the cross-head, and ropes passing over said pulleys and connected with the cross-head, substantially as described.

2. A hydraulic elevator comprising a cage, two or more hydraulic cylinders, pistons therein provided with pulleys, ropes passing over said pulleys, a sliding cross-head connected with said ropes, and with the lifting rope of the cage, idler pulleys between the piston pulleys and crosshead, over which idlers the ropes pass, independent valves for the cylinders, to regulate the inlet and outlet of water, and a valve rope passing through the lifting cage and serving to actuate the said valves, substantially as described.

3. A hydraulic elevator, provided with a plunger or piston comprising a thin metallic tube, wood sections fitted into the said tube to fill the same, and caps for closing the ends of the said tube, substantially as shown and described.

4. A hydraulic elevator, comprising a cage, duplicate cylinders and pistons therein counterbalanced independent cylinder ropes operated by the pistons, and a cage crosshead adapted to be engaged by either or both the said cylinder ropes, substantially as shown and described.

5. A hydraulic elevator, comprising a cage, cylinders, having pistons therein a crosshead connected with the elevator cage rope, cylinder ropes loosely passing through the said crosshead and each formed with a stop dog adapted to be seated on the crosshead, and ropes carrying counterbalancing weights, connected with the said stop dogs, substantially as shown and described.

CHARLES J. DUDLEY.

Witnesses:
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WM. D. SMITH, Jr.