

No. 721,303.

PATENTED FEB. 24, 1903.

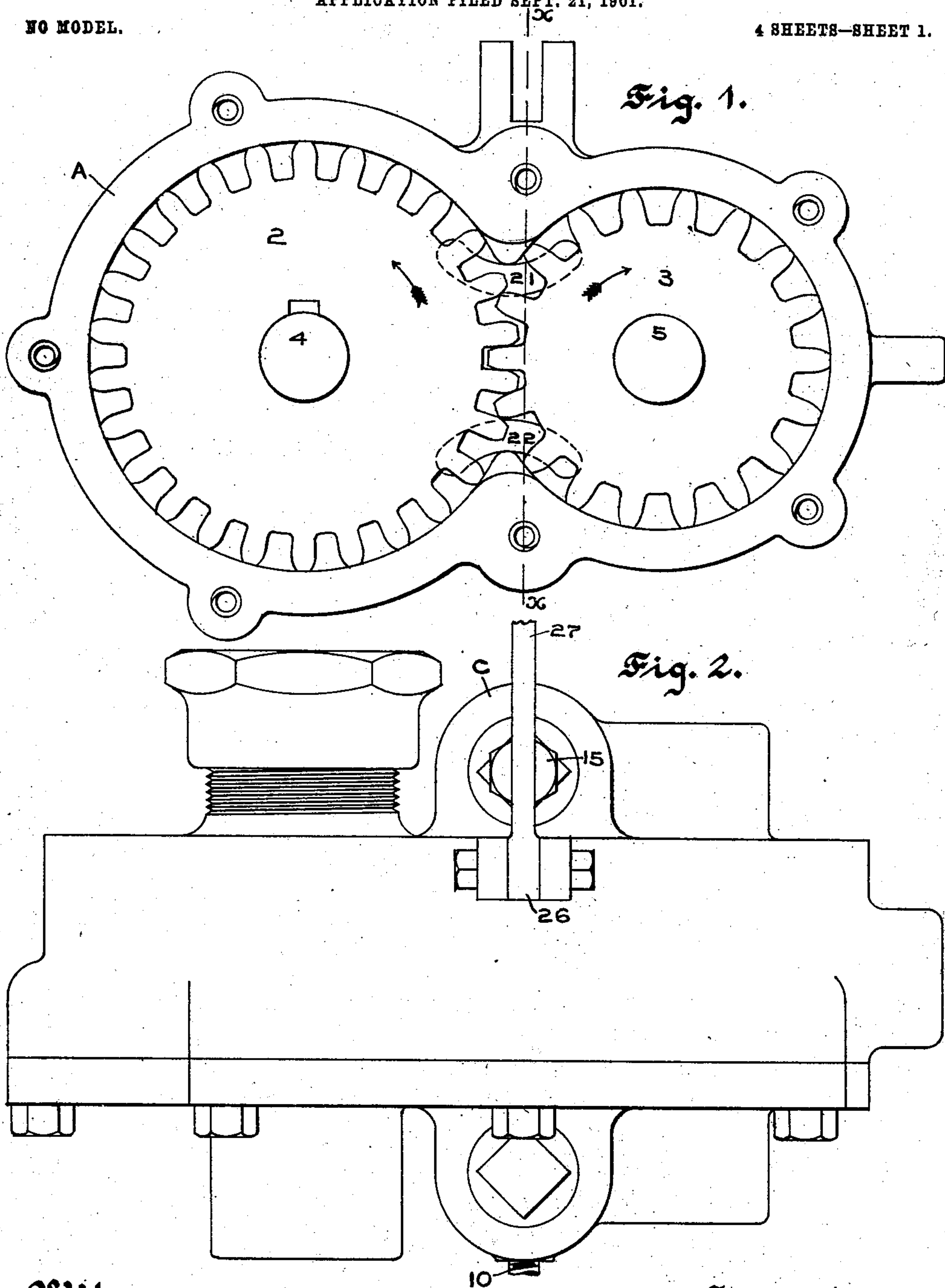
C. HOFF.

FLUID ACTUATED ELEVATOR BRAKE AND GOVERNOR.

APPLICATION FILED SEPT. 21, 1901.

NO MODEL.

4 SHEETS—SHEET 1.



Witnesses,
W. H. Palmer.
Emily Eastman

Inventor,
Christopher Hoff.
By J. H. Johnson
his Attorneys.

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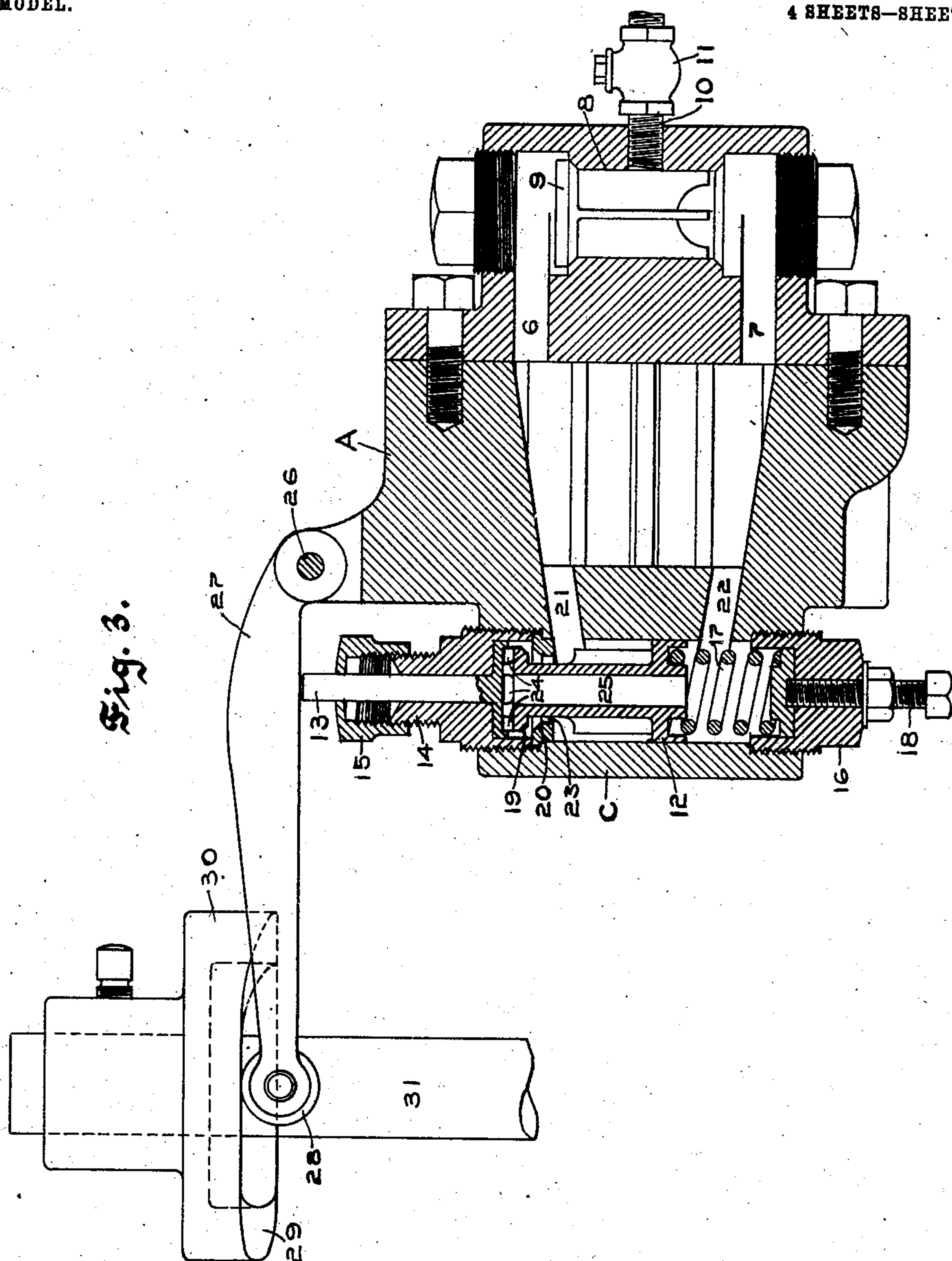
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4 SHEETS—SHEET 2.



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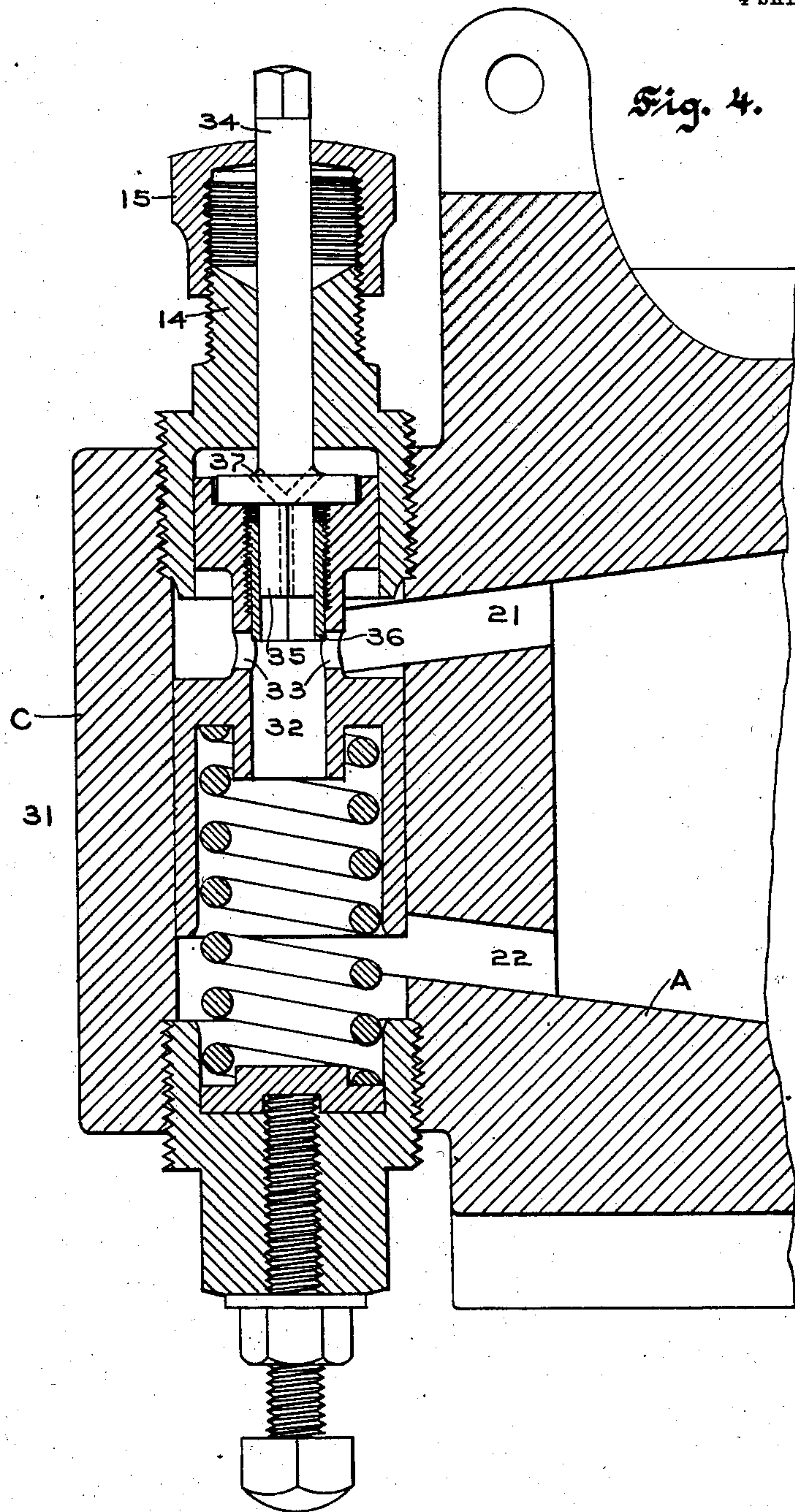
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4 SHEETS—SHEET 3.



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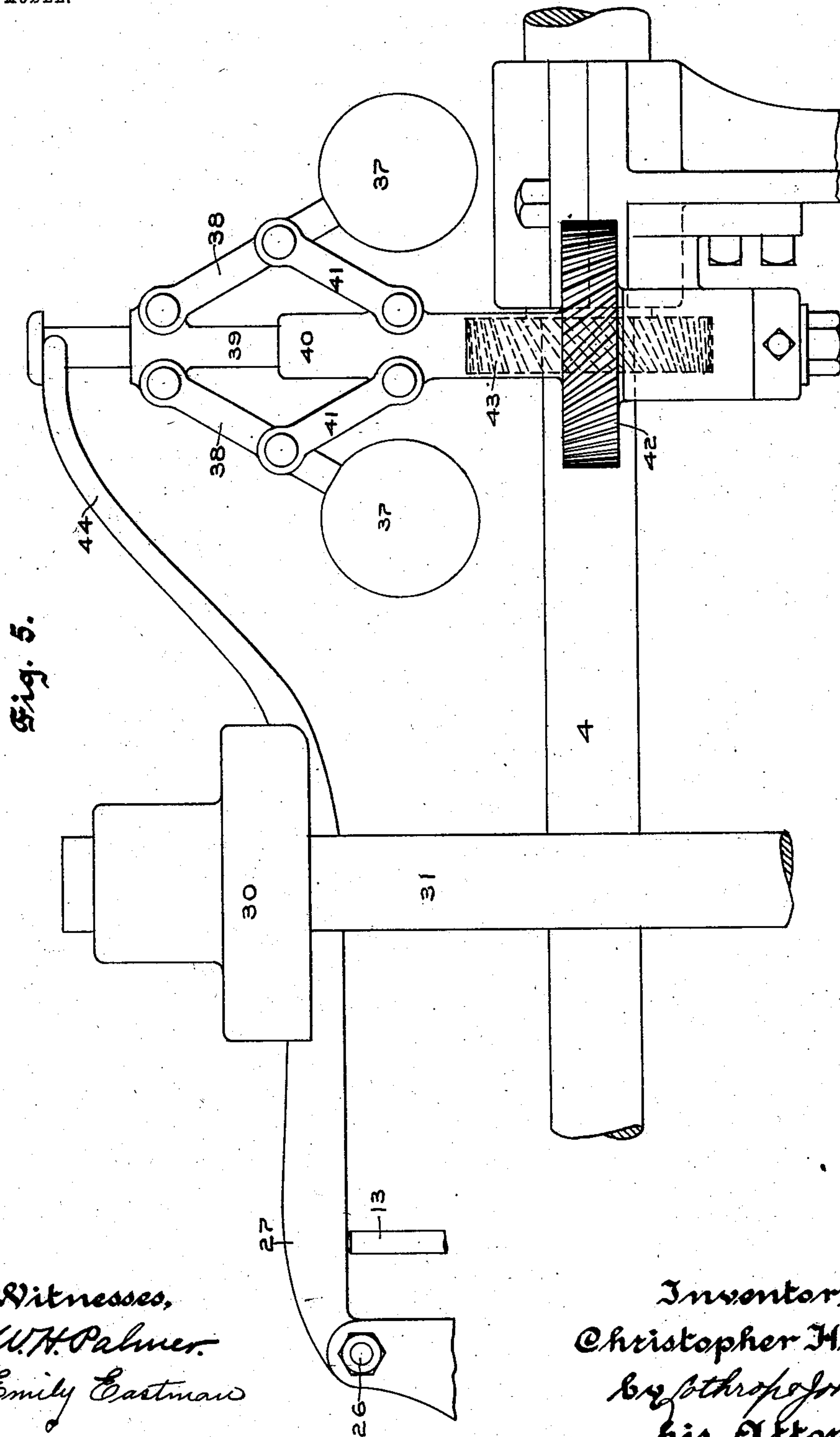
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APPLICATION FILED SEPT. 21, 1901.

NO MODEL.

4 SHEETS—SHEET 4.



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W. H. Palmer.
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UNITED STATES PATENT OFFICE.

CHRISTOPHER HOFF, OF ST. PAUL, MINNESOTA.

FLUID-ACTUATED ELEVATOR BRAKE AND GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 721,303, dated February 24, 1903.

Application filed September 21, 1901. Serial No. 76,042. (No model.)

To all whom it may concern:

Be it known that I, CHRISTOPHER HOFF, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Fluid-Actuated Elevator Brakes and Governors, of which the following is a specification.

My invention is a fluid-actuated elevator brake and governor, and has for its object to provide means for controlling the speed of the elevator when descending and for braking the same and for holding the elevator from dropping back after being reversed to ascend until sufficient power shall have been communicated to the raising mechanism to lift the load.

In the accompanying drawings, forming part of this specification, Figure 1 is a side elevation of my improved governor and brake with the cover removed. Fig. 2 is a top plan view. Fig. 3 is a section on line *x x* of Fig. 1 with the connected controlling-lever. Fig. 4 is a view taken on the same line, showing a modified construction of controlling-valve; and Fig. 5 shows a ball-governor applied to my invention.

In the drawings, A represents the casing, within which is closely fitted the intermeshing cog-wheels 2 and 3, the wheel 2 being secured upon a shaft 4, which forms part of the elevator-actuating mechanism, and the wheel 3 being mounted upon an auxiliary shaft 5. Leading into the space between the wheels 2 and 3 at the upper end of the casing is a conduit or port 6, and at the bottom of the casing is a similar port 7. Seated in the opening 8 between the outer ends of the ports 6 and 7 is the check-valve 9. The main inlet-pipe 10 opens into the space alongside the valve 9, said inlet-pipe being provided with a suitable check-valve 11. Supported upon the opposite side of the casing A is the valve-casing C. Within the valve-casing C is fitted the sliding valve 12, having at one end a stem 13, extending through the plug 14, threaded in one end of the valve-casing C, the plug being provided with a suitable threaded cap 15. In the opposite end of the valve-casing C is a plug 16. Between the plug 16 and the lower end of the valve 12 is interposed a coil-spring 17, adjustable by means of a screw 18,

threaded through the plug 16. The upper end of the valve 12 is formed with a disk 19, cooperating with a seat 20, carried by the valve-casing C. Leading from the upper end of the cog-wheel chamber B to the space surrounding the valve 12 is a port 21, and leading from the lower end of said chamber to the space below the valve is a port 22. As shown in Fig. 3, an opening 23 is left between the valve-seat 20 and the valve 12, by means of which the port 21 is connected with the openings 24 in the upper end of the valve leading into the central passage 25 of the valve, which in turn opens into the space below the valve and through the port 22 into the bottom of the gear-chamber.

Having fulcrum-support 26 upon the top of the casing A is a lever 27, which bears against the end of the valve-stem 13 and is provided upon its free end with an antifric-tion-roller 28, which bears against the curved surface 29 of the cam 30. The cam 30 is secured on a vertical shaft 31, actuated by a lever or other suitable means in the elevator. (Not shown.)

The operation of the above-described mechanism is as follows: Oil is admitted to the cog-wheel chamber B and the connected conduits and valve-chambers by means of the inlet-port 10. When the elevator is ascending, the shaft 31 is actuated to depress the lever 27 and close the valve 12. The travel of the cog-wheels, as indicated by the arrows, will then cause the oil to travel from the inlet-port 6 around the outside of the wheels 2 and 3 to the lower port 7 and upward through the valve-opening 8, lifting the valve 9. Thus while the elevator is ascending the mechanism operates freely without being retarded by the oil or other fluid. When the elevator is descending, the cog-wheels will operate in the opposite direction. The oil will then press upon the top of the valve 9 and hold the same seated. The lever 27 being allowed to rise, the spring 17 will open the valve 12. The oil will then pass from the top of the cog-wheel chamber through the port 21, the openings 24, the passage 25 of the valve, and port 22 into the bottom of the cog-wheel chamber, being carried by the teeth of the wheels around the outside of the chamber back to the upper port 21. It will be evident that by

partially closing the valve 12 the flow of the oil will be retarded, acting as a brake upon the wheels, and by entirely closing said valves the wheels will be stopped. By adjusting the screw 18 the speed may be regulated. The valve 12 being larger at its lower end will allow the pressure of the oil to force said valve downward against the spring 17, thus moving the valve automatically downward and upward as the load increases or diminishes.

In Fig. 4 is shown a modified construction of regulating-valve. In this form the valve 31 is provided with a central opening 32 and with the registering ports or openings 33 in its sides. The valve-stem 34 is formed upon its lower end with an extension 35, fitted in a bushing 36, centrally threaded in the valve 31, as shown. By turning the stem 34 the end of the bushing 36 is carried past the opening 33, partially closing the same, as shown in Fig. 4. To equalize the pressure above and below the valve, I form an opening 37 through the valve-stem, as shown in dotted lines in Fig. 4. Except as above described the valve is constructed and is actuated the same as the valve shown in the other figures of the drawings. While I preferably use oil with my invention, air or other fluid may be used.

In Fig. 5 I show a safety-governor, which may, if desired, be used in connection with the controlling-valve. This consists of the balls 37, mounted upon the ends of arms 38, connected with a rod 39, slidable in a standard 40. Toggle-arms 41 connect the arms 38 with the standard. The standard 40 is supported upon a gear 42, which intermeshes with a gear 43, carried by the shaft 4. An extension 44 of the lever-arm 27 engages with the outer end of the governor-rod 39, as shown in Fig. 5. Thus as the balls of the governor are thrown outward the lever-arm 27 will be depressed.

I claim—

1. The combination with the actuating mechanism of an elevator, of intermeshing cog-wheels connected therewith, said wheels being closely fitted within the inclosing casing, ports leading into one side of said casing above and below the intermeshing points of said wheels, a one-way valve interposed between said ports, ports leading from the opposite side of said casing above and below the intermeshing points of said wheels, a valve ar-

anged intermediate of said ports, and means for actuating the same. 55

2. The combination with the actuating mechanism of an elevator, of intermeshing cog-wheels connected therewith, said wheels being closely fitted within the inclosing casing, ports leading into one side of said casing above and below the intermeshing points of said wheels, a one-way valve interposed between said ports, ports leading from the opposite side of said casing above and below the intermeshing points of said wheels, a regulating-valve arranged between the outer ends of said ports, and means for adjusting the same. 65

3. The combination with the actuating mechanism of an elevator, of intermeshing cog-wheels connected therewith, said wheels being closely fitted within the inclosing casing, ports leading into one side of said casing above and below the intermeshing points of said wheels, a one-way valve interposed between said ports, ports leading from the opposite side of said casing above and below the intermeshing points of said wheels, a slidable valve arranged between the outer ends of said ports, spring means normally holding said valve open, and means for closing the same against the tension of said spring. 75

4. The combination with the actuating mechanism of an elevator, of intermeshing cog-wheels connected therewith, said wheels being closely fitted within the inclosing casing, ports leading into one side of said casing above and below the intermeshing points of said wheels, a one-way valve interposed between said ports, ports leading from the opposite side of said casing above and below the intermeshing points of said wheels, a hollow slidable valve interposed between the outer ends of said ports, spring means for holding the same in raised or open position, a connected valve-stem, a lever fulcrumed adjacent to said valve-stem, and means for actuating said lever to lower said valve and close said ports. 85 90 95

In testimony whereof I affix my signature in presence of two witnesses. 100

CHRISTOPHER HOFF.

Witnesses:

H. S. JOHNSON,
EMILY EASTMAN.