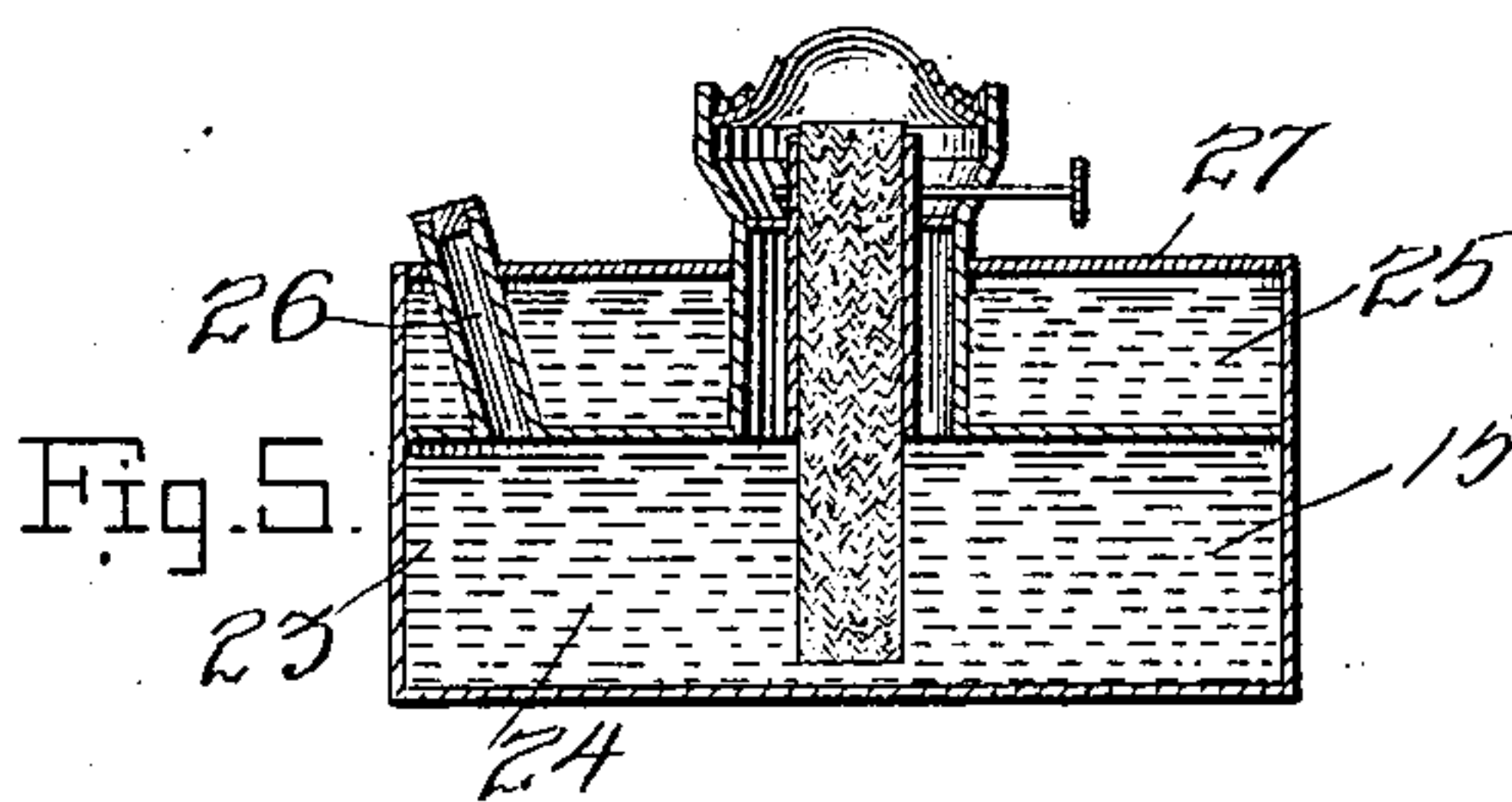
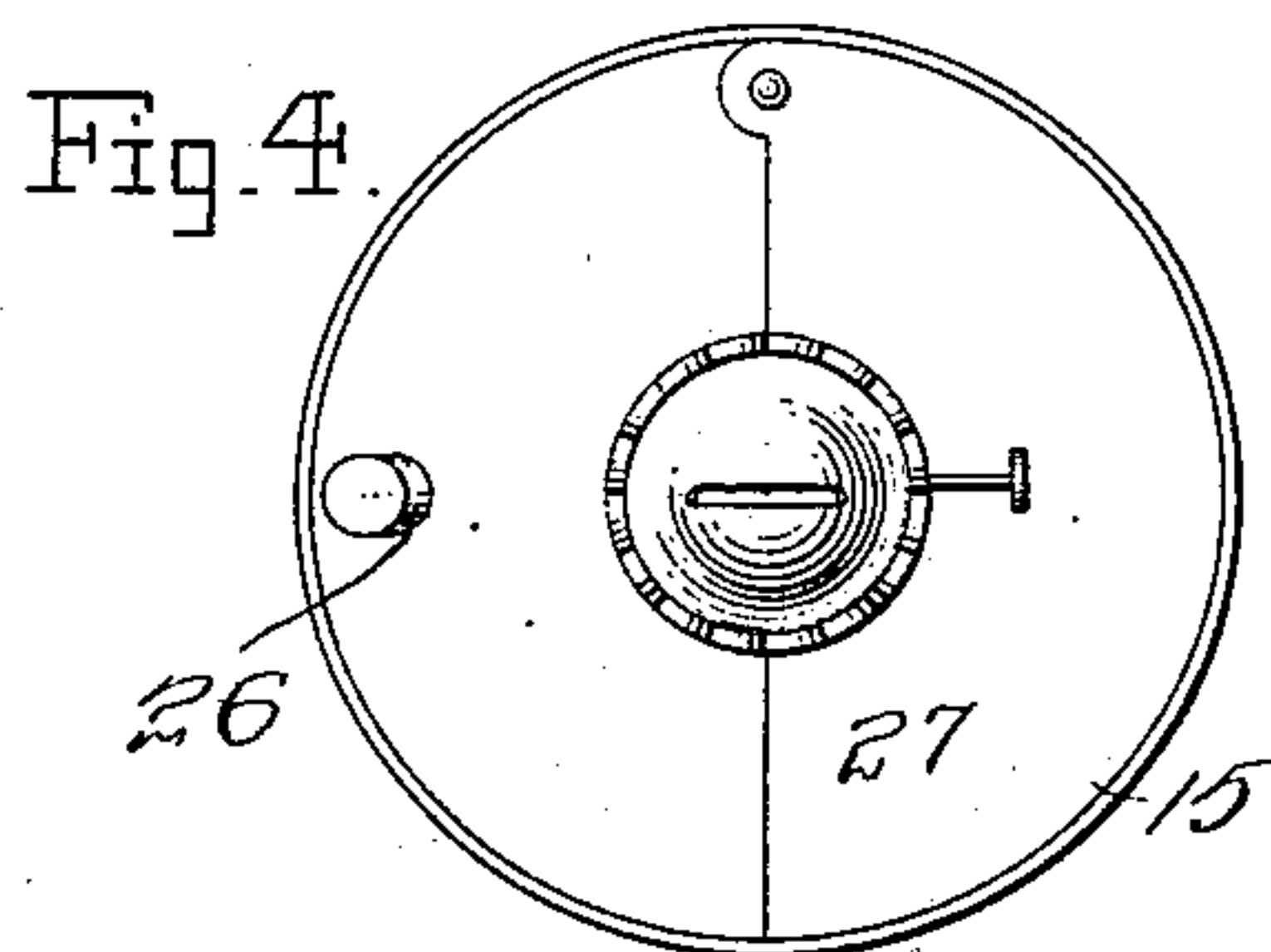
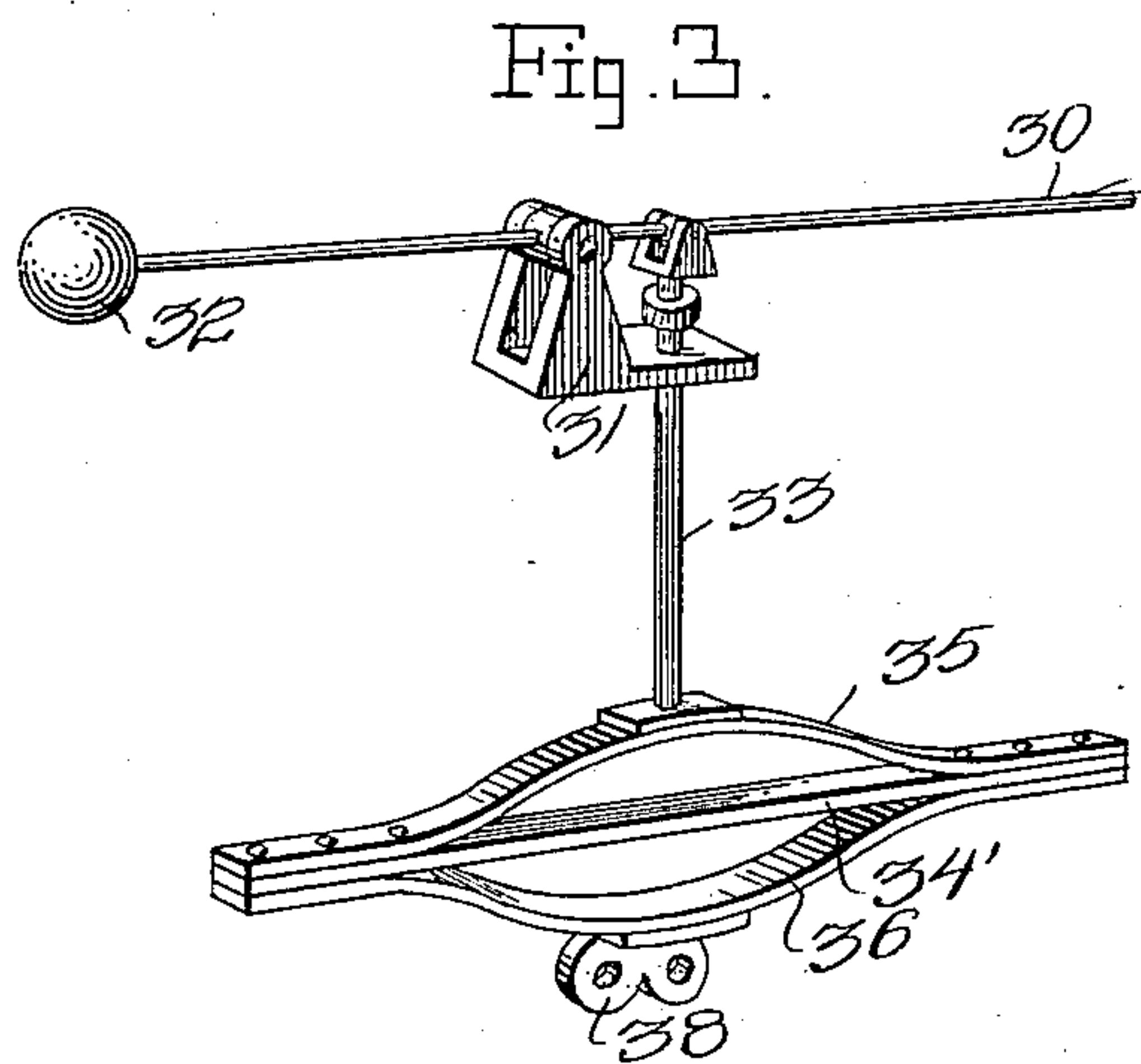
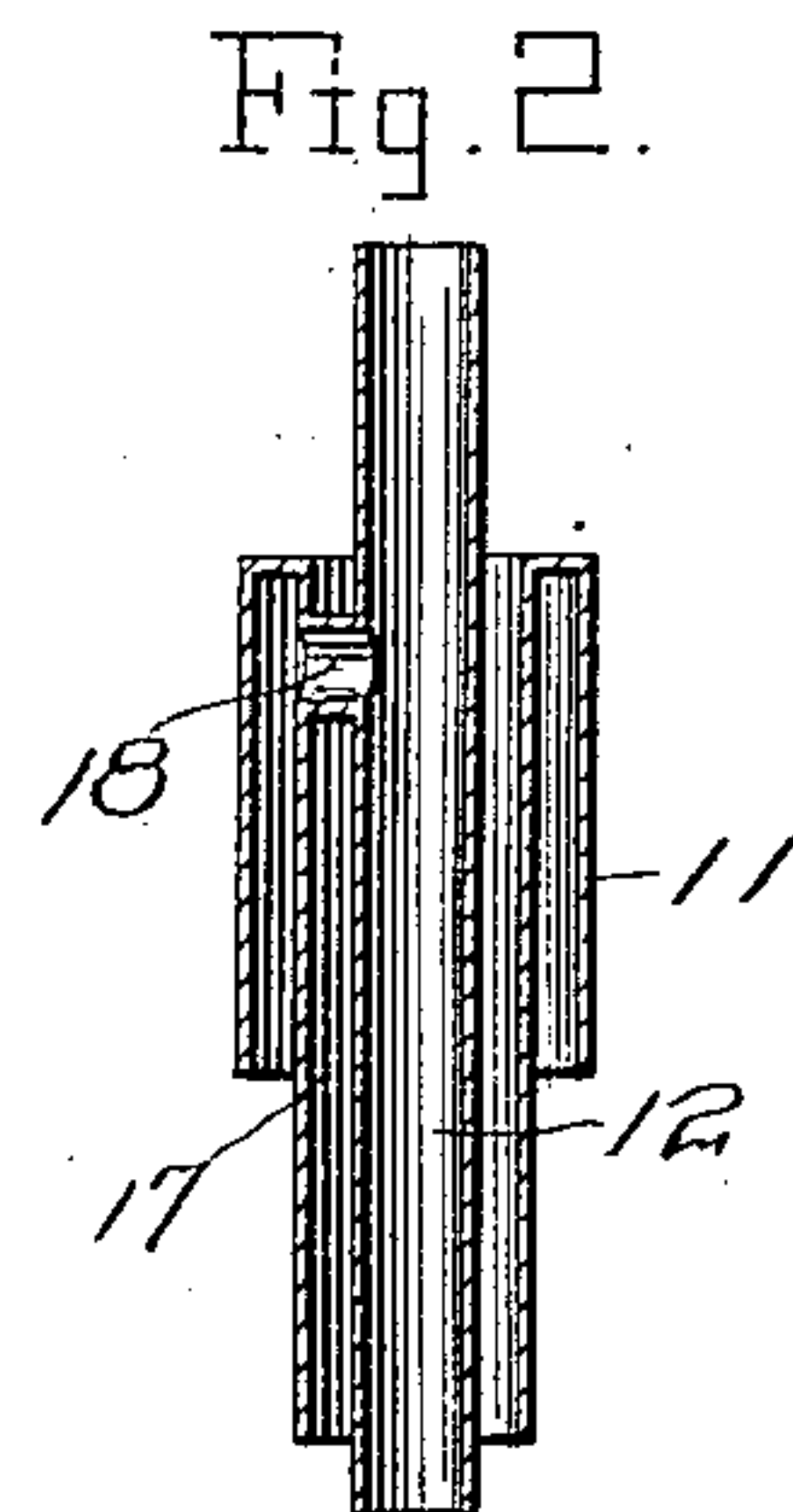
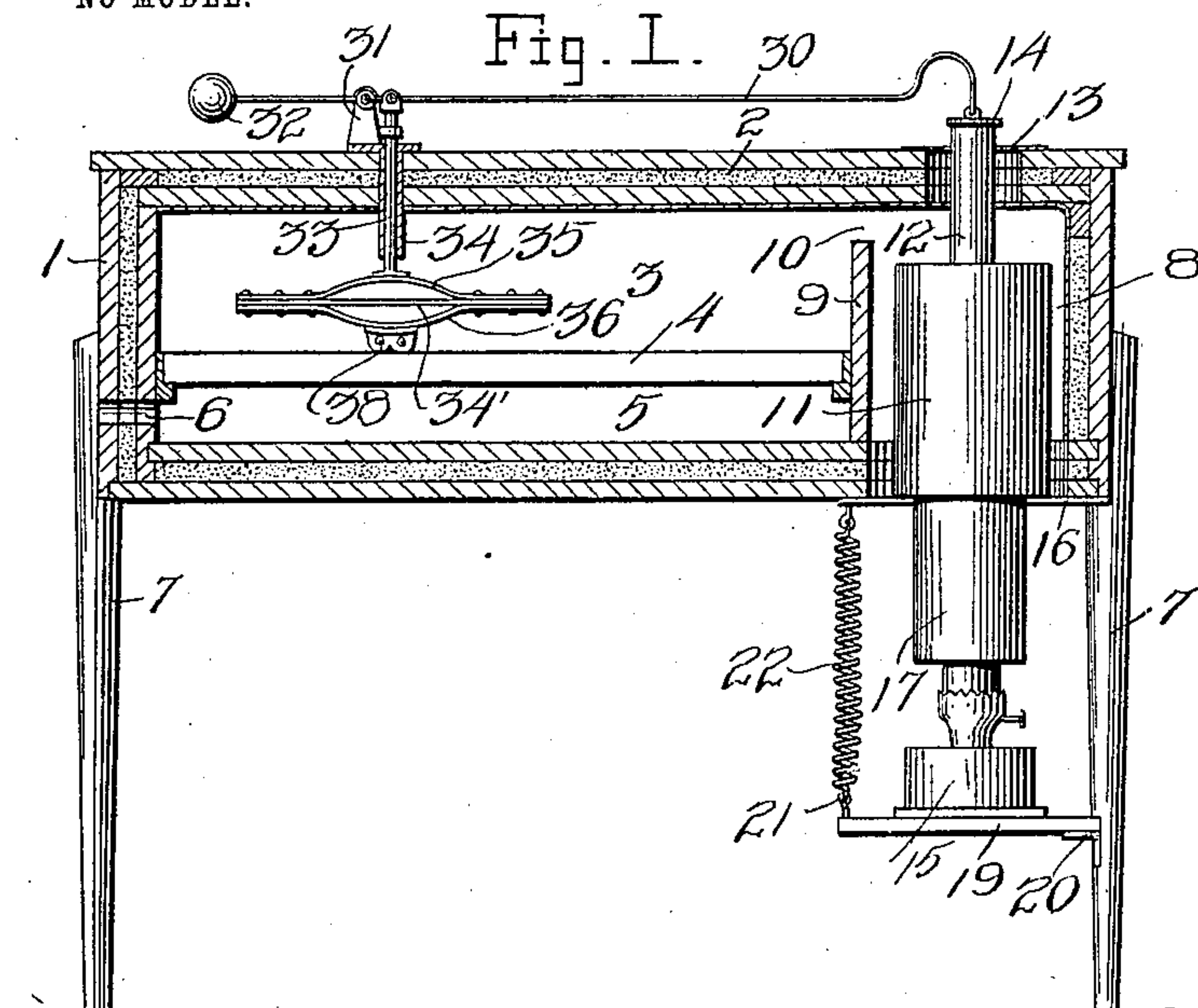


O. H. GROSLAND.
INCUBATOR.

APPLICATION FILED MAR. 16, 1903.

NO MODEL.



Witnesses
Carl Reichenbach.

J. Reichenbach

Inventor
Ole H. Grosland.

A. B. Wilson

Attorney.

UNITED STATES PATENT OFFICE.

OLE H. GROSLAND, OF KENSETT, IOWA, ASSIGNOR OF ONE-HALF TO
OLE A. NUBSON, OF KENSETT, IOWA.

INCUBATOR.

SPECIFICATION forming part of Letters Patent No. 730,639, dated June 9, 1903.

Application filed March 16, 1903. Serial No. 148,039. (No model.)

To all whom it may concern:

Be it known that I, OLE H. GROSLAND, a citizen of the United States, residing at Kensett, in the county of Worth and State of Iowa, have invented certain new and useful Improvements in Incubators; and I do 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.

This invention relates to incubators, and has for its object to provide improved means for supplying heat to the egg-chamber and maintaining the same at a desired temperature.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section of an incubator embodying my invention. Fig. 2 is a vertical section of the drum and flues removed from the casing. Fig. 3 is a detail view of the thermostat and connections, and Figs. 4 and 5 are a top plan and a sectional view of the lamp.

Referring now more particularly to the drawings, the numeral 1 represents the incubator-casing, which is composed, as usual, of the inner and outer spaced walls between which is a non-conducting packing 2. Within the casing is an egg-chamber 3, in which are suitably supported one or more egg-trays 4, below which is a nursery space or chamber 5 in connection with one or more outlet-openings 6, through which the vitiated air exhausts to the atmosphere. The incubator-casing is supported upon the legs 7.

At one end of the incubator-chamber is a heating-chamber 8, spaced apart from the egg-chamber by the vertical partition 9 and in connection with said egg-chamber through a port or passage 10 above the said partition. Disposed within the chamber 8 is a drum 11, through which projects a flue 12, whose upper end projects to the exterior through an opening in a ring-shaped plate 13 upon the top of the casing and is adapted to be closed or opened to the desired extent by means of a damper 14. The lower end of this flue fits over or extends immediately above the burner of a lamp 15 and is adapted to receive the hot air and products of combustion rising

therefrom. The drum 11 is disposed concentric with the flue 12 and rests at its lower end upon a ring-plate 16, closing the bottom of the chamber 8. An intermediate tube 17 is disposed within the drum 11 and encircles the flue 12 and is open at its upper end to communicate with the upper end of the chamber 8 and supply hot air therefrom through the port or passage 10 to the egg-chamber 3. The drum 11 is not in communication with the tube 17, but is in communication with the central flue 12 through a tubular passage or connection 18.

The lamp 15 is supported by a bracket 19, hinged at 20 to one of the legs 7 and provided at its free end with an eye 21 for engagement with a hook on the lower end of a spring 22, secured to the ring-plate 16, the said spring serving to support the lamp in position for operation. When the hooked end of the spring is detached from the lamp-supporting bracket 19 the latter may be folded down parallel with the leg 7, to which it is attached for convenience in transportation. The bowl 23 of the lamp is divided by a central horizontal partition to form an oil-chamber 24 and a superposed water-chamber 25, through which latter extends an oil-spout 26, whereby oil may be supplied to the chamber 24. The top of the water-chamber 25 is provided with a hinged section 27, which may be entirely closed to prevent water from escaping from said chamber or may be opened to allow moisture to pass upward with the heated air into the egg-chamber. The damper 14 is carried by an arm 30, fulcrumed to a bracket 31 on the top of the casing 1 and provided with a weighted end 32, adapted to normally hold the damper 14 above the flue 12 to allow the products of combustion from the lamp to freely pass out into the atmosphere. On the opposite side of the bracket 31 from the weighted end 32 the arm 30 is connected to a rod 33, extending through a sleeve or tubular guide 34 into the egg-chamber 3 and attached at its lower end to a thermostat consisting of a central steel strip 34' and upper and lower aluminium strips 35 and 36, the said aluminium strips being embossed at the center for respective connection with the rod and with a bracket 38, connecting the same to one

of the walls of the casing. In practice it will be readily understood that as the aluminium strips will expand more readily than the steel strips the thermostat is adapted to bow freely in the usual way to move the rod up or down, according to the temperature in the chamber 3, and thus transmit motion to the rod 30 to regulate the position of the damper 14, thus completely cutting off the exhaust of the products of combustion from the lamp to the atmosphere through the top of the flue 12 or partially cutting off the same or allowing the products to escape freely to the atmosphere, according to the degree of temperature of the chamber 3.

The products of combustion from the lamp pass upwardly from the flue 12, and if the damper 14 is partially or wholly open exhaust through the top of said flue to the atmosphere. Air at the same time enters upwardly through the tube 17 and is heated on its upward passage and finally discharges through the port 10 into the chamber 3, thus heating the latter, the heated air passing downward through the tray or trays 4 and finally exhausting to the atmosphere through the opening or openings 6. If from any cause the draft through the flue 12 is completely arrested, as when the damper 14 is closed, the products of combustion will pass laterally and downwardly through the tube 18 and into the drum 11 and exhaust at the base of said drum to the atmosphere.

From the foregoing description, taken in connection with the accompanying drawings, the construction and mode of operation of the invention will be readily understood, and it will be seen that simple and effective means for heating and regulating the temperature of the egg-chamber is provided and that by the described construction and arrangement of the drum and flues the necessity of arranging the radiator upon the exterior of the casing is avoided and loss of heat by direct radiation to the atmosphere is prevented, as all the heat from the drum is radiated into the chamber 8 and thence passes to the egg-chamber 3.

Various changes in the form, proportion,

and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of the invention.

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

1. In an incubator, the combination with a casing and a heater, of a central flue receiving the products of combustion from the heater, a drum inclosing said flue and open at its lower end to the atmosphere, and an intermediate hot-air flue inclosing the central flue and inclosed itself by the drum, said flue being open at its lower end to receive air and at its upper end to supply heated air to the casing, and a connection between the inner tube through the intermediate tube to the drum for the downward flow of the products of combustion when the upper end of the central flue is closed, substantially as described.

2. In an incubator, the combination of a casing provided with a heating-chamber and an egg-chamber in communication through a passage, a drum supported within the heating-chamber and open at its lower end to the atmosphere, a flue extending vertically through the drum and projecting through the casing at its upper end and downwardly through the casing at its lower end and adapted to receive the products of combustion from a lamp or other heater, said flue being in direct communication with the drum, and an intermediate hot-air flue inclosed by the drum and inclosing the inner flue and open at its lower end for the reception of air and at its upper end for delivery of air into the top of the heating-chamber, whence the heated air passes to the egg-chamber, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

OLE H. GROSLAND.

Witnesses:

B. A. RINGHAM,
OLE A. NUBSON.