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LIQUID ELEVATING APPARATUS.

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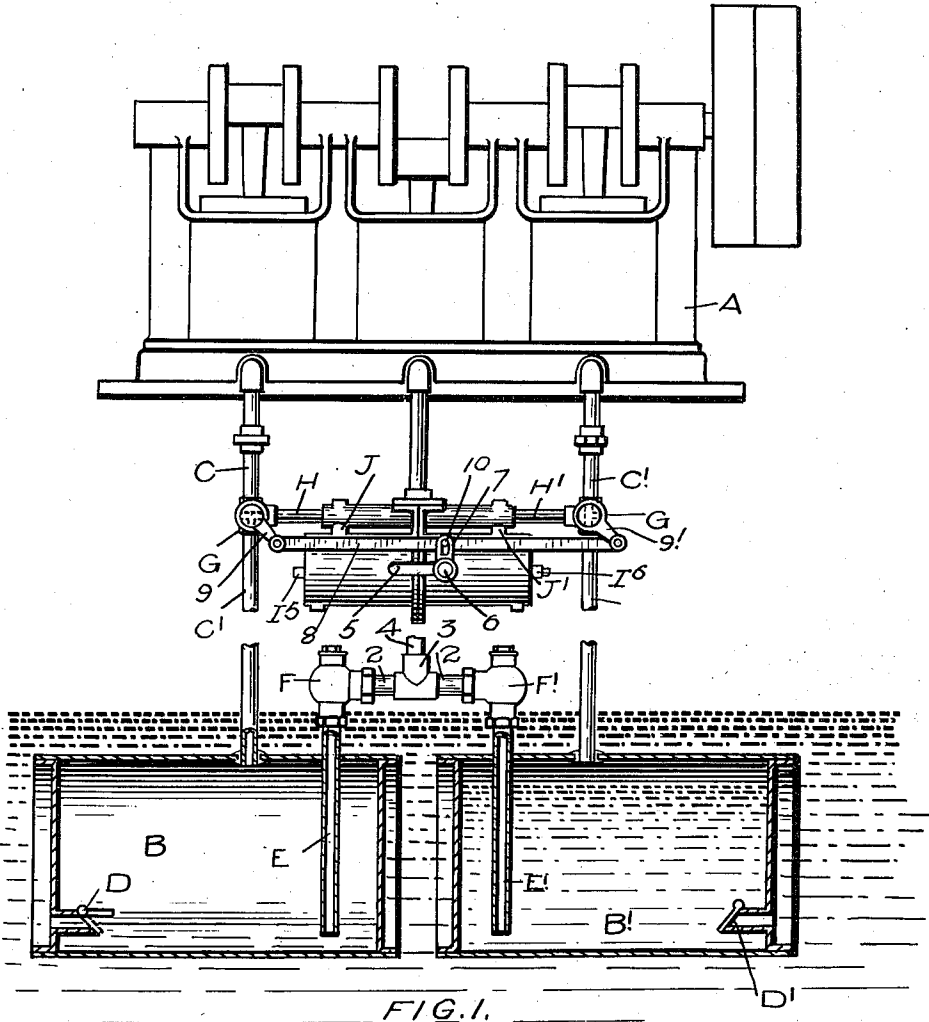


FIG. 1.

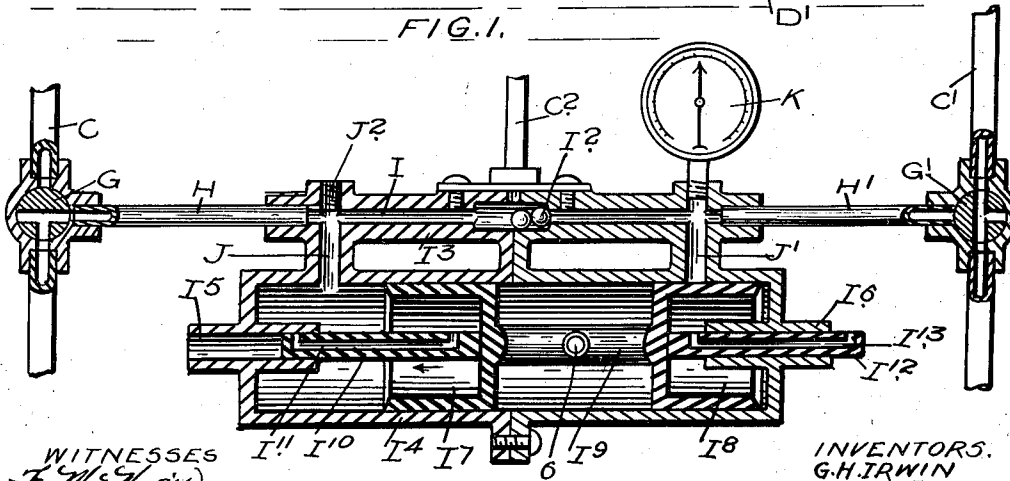


FIG. 2.

WITNESSES
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LIQUID-ELEVATING APPARATUS.

979,957.

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To all whom it may concern:

Be it known that we, GEORGE HARTFORD IRWIN, JOHN PERCIVAL CULLON, and FREDERICK KNOWLSON, all of the town of Lindsay, in the county of Victoria, in the Province of Ontario, Canada, have jointly invented certain new and useful Improvements in Liquid-Elevating Apparatus, of which the following is the specification.

Our invention relates to improvements in a liquid elevating apparatus, and the object of the invention is to devise an apparatus of this class by which liquid may be elevated or forced up to any desired practical height, in fact to an extraordinary height with a minimum amount of power as compared with direct pumping.

Our invention consists of a triplex air pump or compressor, pipes extending from the outer pumps to submerged tanks in the well or the like, a double piston controlling valve, a central pipe extending from the center pump to the valve, branch pipes connected to the outer pipe and extending to the valve, suitable three-way faucets located at the juncture of the branch pipes with the side pipes, a cross rod connecting the operating arms of the faucets and secured intermediate of its length to the double piston of the controlling valve and a suitable discharge from the submerged tanks, the parts being otherwise constructed and arranged as hereinafter more particularly explained.

Figure 1, is an elevation partially broken away and in a section to exhibit the parts involved in our invention. Fig. 2 is an enlarged detail of the valve.

In the drawings like letters of reference indicate corresponding parts in each figure.

A is a triplex air pump or compressor having intercommunicating channels between the cylinders, such air pump or compressor being of any desired form. B and B' are compression tanks located two in a well, stream or body of water. The compressor A may be placed at any desired height above the body of water in which the compression tanks are located.

C and C' are pipes leading from the intercommunicating channels in the compressor A to the tanks B and B' respectively.

D and D' are flap valves in the tanks B and B' respectively, such valves being located near the bottom of the tank and being designed to be closed by pressure in the

one tank and opened by suction or gravitation in the companion tank.

E and E' are discharge pipes which extend down to the bottom of the tanks B and B' respectively and F and F' are check valves at the upper end of the discharge pipes at the point of juncture between them and the branch pipes 2 2, which lead to the tee 3 from which extends the ultimate discharge pipe 4. Such discharge pipe may lead to any desired point. The check valves open alternately by the pressure and close by the suction as each tank is being filled or discharged.

G and G' are three-way faucets located at the point of juncture between the pipes C and C' with the branch pipes H and H' respectively leading to the inlet passageways I of the controlling valve.

C² is a pipe leading from the enlarged central portion I' of the passage-way I to the pump A.

I² are ball valves located in the enlargement I' for a purpose, which will hereinafter appear.

J and J' are passage-ways extending vertically downward from the passage-way I.

K is the ordinary pressure and vacuum gage, which is located at the upper end of the vertical passage-way J'. At the top of the passage-way J' is a relief valve J². The passage-way I is in the upper extension I³ of the divided cylinder I⁴. The cylinder I⁴ is provided with tubular end bosses I⁵ and I⁶ respectively. I⁷ and I⁸ are double pistons reversely set and connected together by a bar I⁹. The piston I⁷ is provided with a spindle I¹⁰ through which extends a passage-way I¹¹. The piston I⁸ is provided with a central outwardly extending spindle I¹² provided with a passage-way I¹³ for a purpose, which will hereinafter appear. The cylinder I⁴ is provided with a slot 5 extending crosswise of the connecting flanges thereof and through this slot 5 extends a pin 6 into the bar I⁹. The pin 6 has a slotted arm 7 secured thereto. 8 is a cross bar, which is connected at the end to the arms 9 and 9' of the faucets G and G'. The cross bar 8 has a pin 10 extending into the slot in the arm 7.

Having now described the principal parts involved in our invention we shall briefly describe its operation and utility. In the position in which our apparatus is shown in the drawings the air compressor is pumping

air into the tank B' and at the same time is causing a suction through the pipes C and H, thereby causing a vacuum in the tank B and causing the water to be drawn into the tank B which when filled causes a vacuum in the pipe C' which vacuum draws the piston I' in the direction indicated by arrow, when the pressure from the tank B' forces the piston I' to the limit of its stroke. Such piston carries along the pin 6 and with it the cross bar, thereby closing the valve G' and opening the valve G to the compressor. When the piston I' reaches the limit of its stroke the vacuum is relieved therein by the passageway I¹⁰ so that it is ready to move in the opposite direction. This movement continually takes place, so that there is a constant supply of water under pressure in either one or the other of the tanks for the ultimate discharge pipe 4, which may lead to any desired point.

Although we have described in detail the construction of our invention it will of course, be understood that many changes may be made therein without departing from the spirit of our invention.

What we claim as our invention is.

1. The combination with an air compressor and two compression tanks arranged to be submerged in a body of water, of pipes connecting each tank with the air compressor, a flap valve at the bottom of each tank, a discharge pipe leading from each tank, a three-way faucet located on each pipe connecting the tanks with the compressor provided with suitable operating arms and designed to be one reversely set to the other, an independent pipe leading from the compressor, a controlling valve communicating with this pipe comprising a cylinder provided with an upward extension having a longi-

tudinal passage-way with a central enlargement opposite the independent pipe and ball valve therein, and vertically disposed end passage-ways and double piston provided with a connecting rod, and spindles having passage-ways leading therethrough, tubular bosses formed on the ends of the cylinders into which the spindles extend, a pin extending from the connecting bar of the piston through a slot in the cylinder, an arm connected to the pin and a cross bar connecting the arms of the faucets to the arm on the pin and branch pipes leading from the cylindrical passage-way in the upper extension of the cylinder to the faucets as and for the purpose specified.

2. In a device of the class described, a controlling valve comprising a cylinder provided with an upward extension having a longitudinal passage-way with a central enlargement opposite the independent pipe and ball valve therein, and vertically disposed end passage-ways, a double piston provided with a connecting rod and spindle having passage-ways leading therethrough, tubular bosses formed on the ends of the cylinders into which the spindles extend, a pin extending from the connecting bar of the pistons through a slot in the cylinder, an arm connected to the pin and a cross bar connecting the arms of the faucets to the arm and branch pipes leading from the rearward passage-way in the upper extension of the cylinder to the faucets as and for the purpose specified.

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Witnesses:

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