I. HANSEN.

MULTICYLINDER SUCTION AND FORCE PUMP.

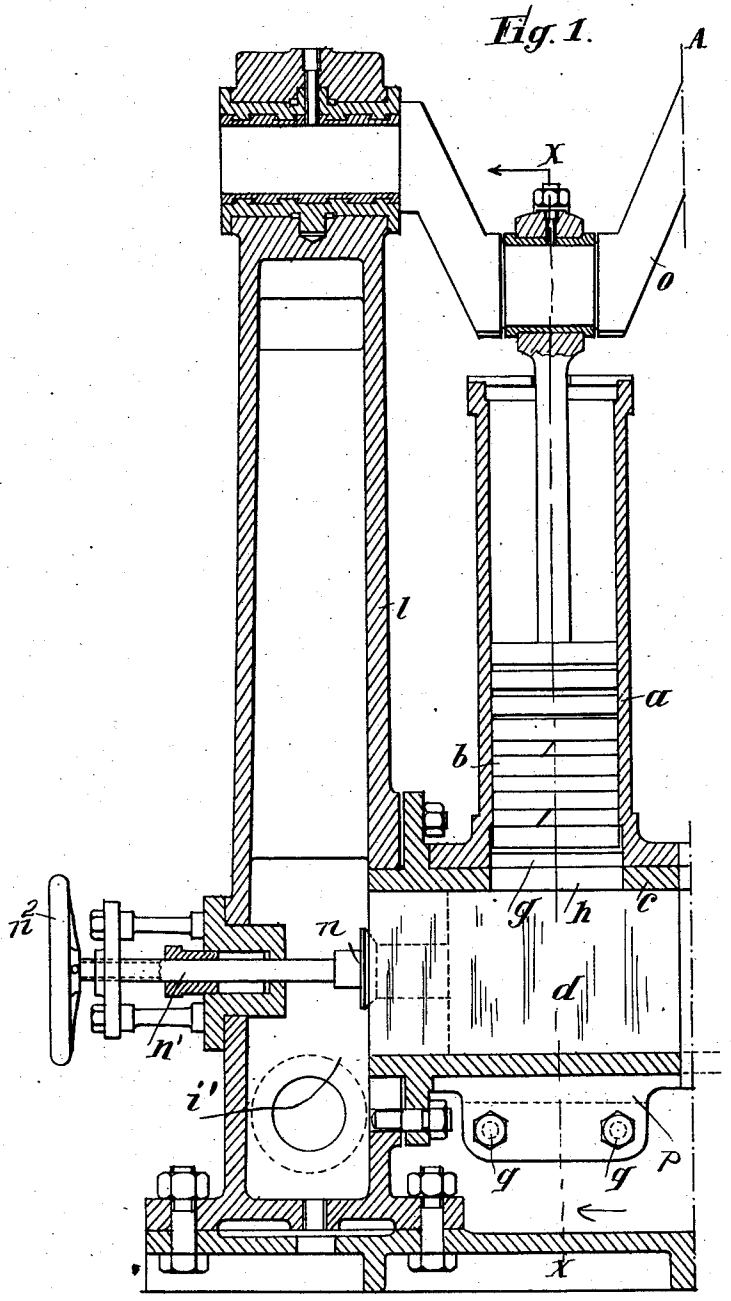
APPLICATION FILED SEPT. 28, 1910.

1,010,902.

Patented Dec. 5, 1911.

3 SHEETS—SHEET 1.

Fig. 1.



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Inventor:
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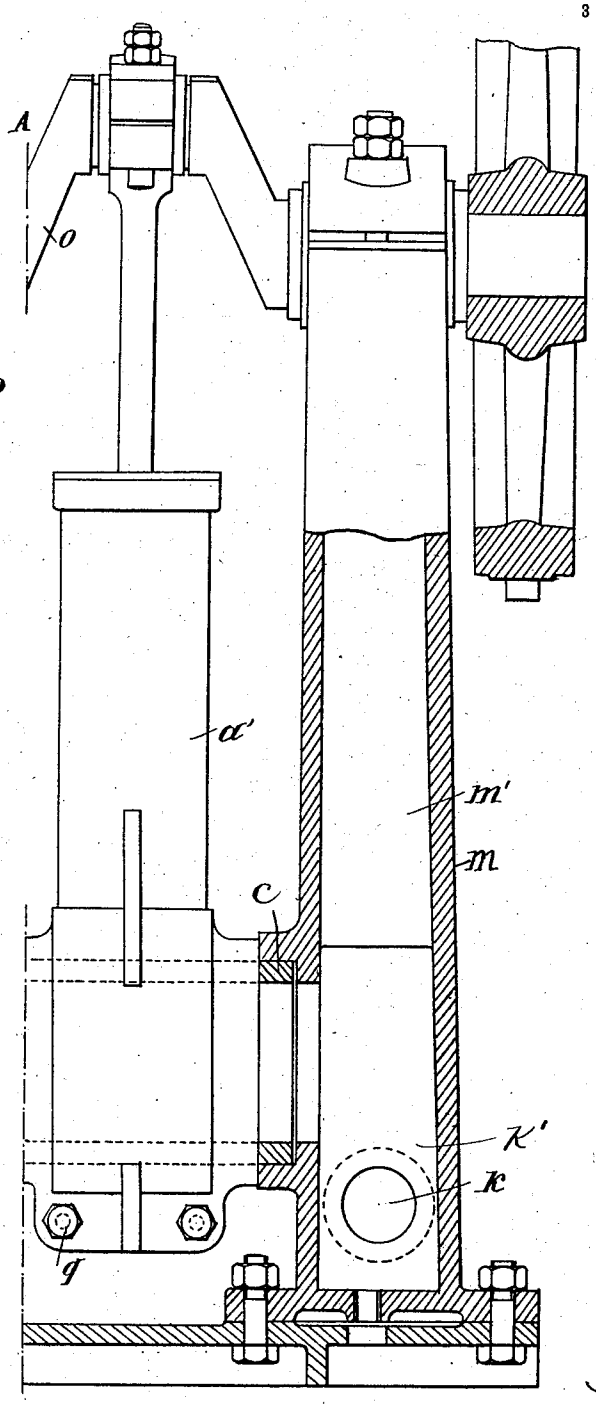
3 SHEETS—SHEET 2.

Fig. 2



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3 SHEETS—SHEET 3.

Fig. 3.

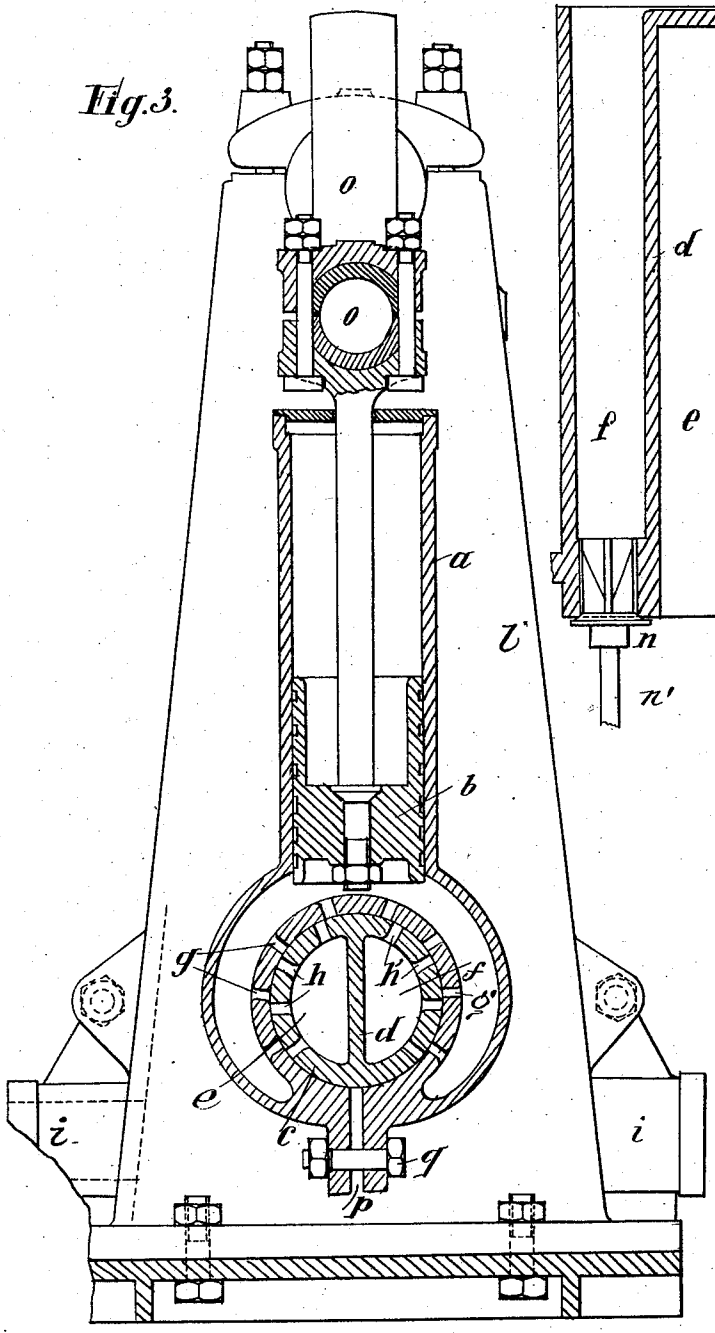

Fig. 4.

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UNITED STATES PATENT OFFICE.

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MULTICYLINDER SUCTION AND FORCE PUMP.

1,010,902. Specification of Letters Patent. Patented Dec. 5, 1911.

Application filed September 28, 1910. Serial No. 584,341.

To all whom it may concern:

Be it known that I, IWER HANSEN, a subject of the German Emperor, and resident of Flensburg, Germany, have invented certain new and useful Improvements in Multicylinder Suction and Force Pumps.

This invention relates to improvements in multicylinder suction and force pumps.

The object of the invention is to provide a simple and economical construction whereby a continuous flow of water is obtained, and to also provide simple means for controlling the volume of water passing from the pump.

The invention also relates to the specific details of construction of the cylinders and the means employed for taking up wear.

In the accompanying drawings: Figure 1 is a vertical section of one side of the pump. Fig. 2 is a side elevation, partially in section of the other side of said pump. Fig. 3 is a transverse vertical section of the pump on the line x—x, Fig. 1, looking in the direction of the arrow. Fig. 4 is a horizontal section of the hollow trunnion.

The pump comprises two cylinders a, a', mounted on a trunnion c formed with ports h and h', and seated in end standards l and m'. The trunnion c, is hollow and is divided by a vertical partition d, into two parallel chambers e and f. The chamber e, forms a suction passage, while the chamber f, forms a delivery passage, both said passages being common to both cylinders. Above the cylinders is mounted a driving shaft o, having cranks angularly positioned at 180°, so that for instance the piston b of the cylinder a, occupies its lowermost position, when the piston of the cylinder a' assumes its uppermost position. The lower end of each cylinder is formed with a horizontal cylindrical piston formed with ports g and g' respectively, which correspond to the ports h, h', of the hollow trunnion c. When the cylinders oscillate these ports register in such a manner that either the suction passage e, or the delivery passage f, is in communication with a respective cylinder. The horizontal cylindrical portion of each vertical cylinder, is cast with the latter, and at its bottom it is split at p, and each side the split are depending perforated ears which receive clamping bolts g. By this arrangement, the connection between the cylinders and the hollow trunnion may be readily and conveniently adjusted to take up wear, and also permits of quick assembling of the parts.

One end of the suction passage e, is permanently closed while the opposite end is open and at all times communicates with a delivery chamber i', formed in a standard b. One end of the delivery passage f, is at all times open and communicates with a supply chamber m', formed in a standard m, while the opposite end of the delivery passage is provided with a wall formed with an opening, in which fits a manually operable valve n. The valve n is provided with a stem n' which extends across the chamber i' and through the wall of the standard l, and on its outer end is a hand wheel n^2.

Assuming the cylinders a—a' to be disposed vertically in alinement with the center of the hollow trunnion c, and the crank shaft starts to revolve; this will cause the cylinder to oscillate. The cylinder a will first move toward the left, and then again toward the right, until the crank pin o, reaches the upper dead center, in which position the cylinder again assumes a vertical position, and consequently elevates the piston b. During this oscillating motion the ports g, of the cylinder a register with the ports h in the suction passage e, and the water is sucked into the chamber a by the rising piston b. Obviously, by reference to the drawing, when the piston b has reached its uppermost position, the period of suction is finished, and the ports g and h are out of register. During the following descending motion of the crank, the cylinder a is oscillated around the hollow trunnion first toward the right and then again toward the left, until the crank pin o, has reached the lower dead center position, and the cylinder a again assumes its vertical position. This oscillating motion lowers the piston b, and in a part of the interval the ports g' register with the ports h' of the delivery passage f, and the water previously sucked into the cylinder is forced through said delivery passage e, into the delivery chamber k, from which it escapes through pipe k'. During this operation of the cylinder a the cylinder a' performs the same motion, except that while the cylinder a, is performing the sucking operation, the cylinder a' is performing its delivery operation, and vice versa. When it is desired to vary the volume of water delivered from the pump, the valve n, is operated. When this valve

is opened communication between the delivery passage *f* and the suction chamber *i'* in the standard *l* is established, thereby causing part of the water forced into the delivery chamber to flow again into the suction passage, thus controlling the flow of the water. When the valve *n* is closed the maximum volume of water pumped by the pistons will be directed through the outlet pipe *k*. The standards *l* and *m* are hollow and form air cushion chambers for the water entering the opening *i*, and the water forced through the delivery passage *f*, of the hollow trunnion *c*.

What I claim is:

1. In a pump of the character described, the combination of a pair of cylinders, the lower end of each cylinder being enlarged and having cast with the same an inner transverse cylinder formed with a plurality of ports, each side a medial line, the transverse cylinder being spaced from the enlarged portion of one of the first mentioned cylinders to form a passageway, the lower portion of the enlarged portion and the transverse cylinder being split, means for drawing the split portions of the cylinder together, a stationary hollow trunnion mounted in and extending through both transverse cylinders, said hollow trunnion having a transverse partition to form inlet and outlet passages and formed each side the partition with ports adapted to alternately register with the openings in the transverse cylinder, a valve in the delivery passage in the hollow trunnion for controlling the volume of water pumped, a crank shaft, piston rods, pistons mounted in the pair of cylinders and connected to the piston rods, and hollow standards in which the hollow trunnion is mounted, the delivery passage communicating with one of the hollow standards and the suction passage communicating with the other hollow standard.

2. In a pump of the character described, the combination of two hollow standards forming suction and delivery chambers, a hollow trunnion connecting the two hollow standards, said hollow trunnion having inlet and outlet ports each side a medial line and divided centrally by a vertical partition to provide suction and delivery passages with which the suction and outlet ports respectively communicate, the suction passage being open at one end and communicating with the suction chamber in the hollow standard and closed at its opposite end, the delivery passage being open at one end and communicating with the delivery chamber formed in the other hollow standard and having a wall at its opposite end, said wall being formed with an opening adapted to communicate with the suction chamber, a manually operated valve in said opening, a stem extending from said valve and across the suction chamber and through the wall thereof to the outside of the standard, a pair of vertical cylinders mounted on the hollow trunnion, the lower end of each cylinder being enlarged and having cast with the same an inner transverse cylindrical portion which fits on the hollow trunnion, each inner transverse cylindrical portion being spaced from the walls of the enlarged lower end of the vertical cylinder and provided with a plurality of inlet and outlet ports each side a medial line, said ports adapted to alternately register with the inlet and outlet ports in the hollow trunnion when the cylinders are oscillated, a crank shaft, piston rods pivotally mounted on the crank shaft, and pistons mounted in the vertical cylinders and connected to the piston rods.

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

IWER HANSEN.

Witnesses:
MARL HOFFMANN,
H. FASBUNDER.