No. 742,588. PATENTED OCT. 27, 1903.

A. W. CASE.

WATER PUMPING ENGINE.

APPLICATION FILED FEB. 19, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

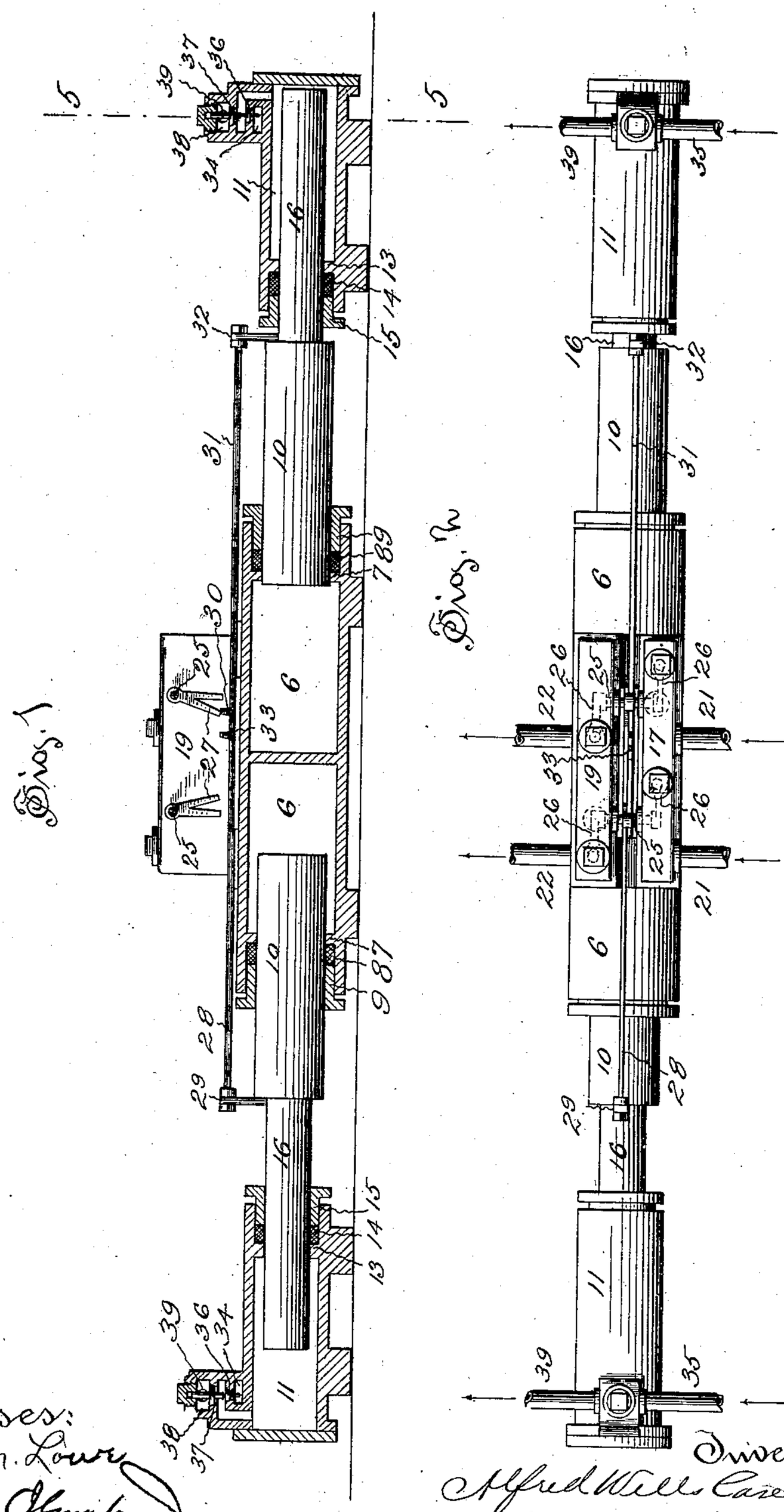


Fig. 1.

Fig. 2.

Witnesses:
Ethel M. Lowe
Ella M. Olmsbee

Inventor,
Alfred Wells Case, by
Harry P. Williams,
Atty

No. 742,588. PATENTED OCT. 27, 1903.

A. W. CASE.

WATER PUMPING ENGINE.

APPLICATION FILED FEB. 19, 1903.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3

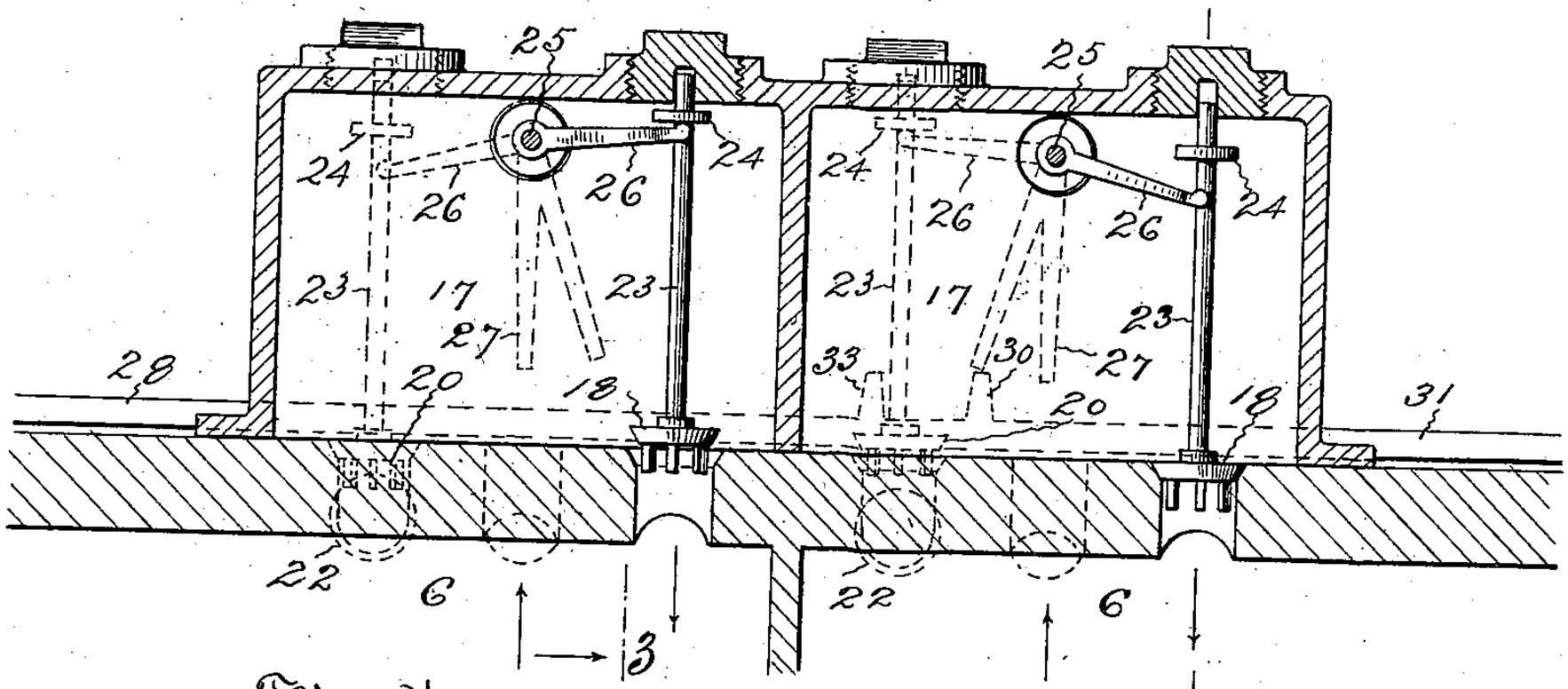


Fig. 4

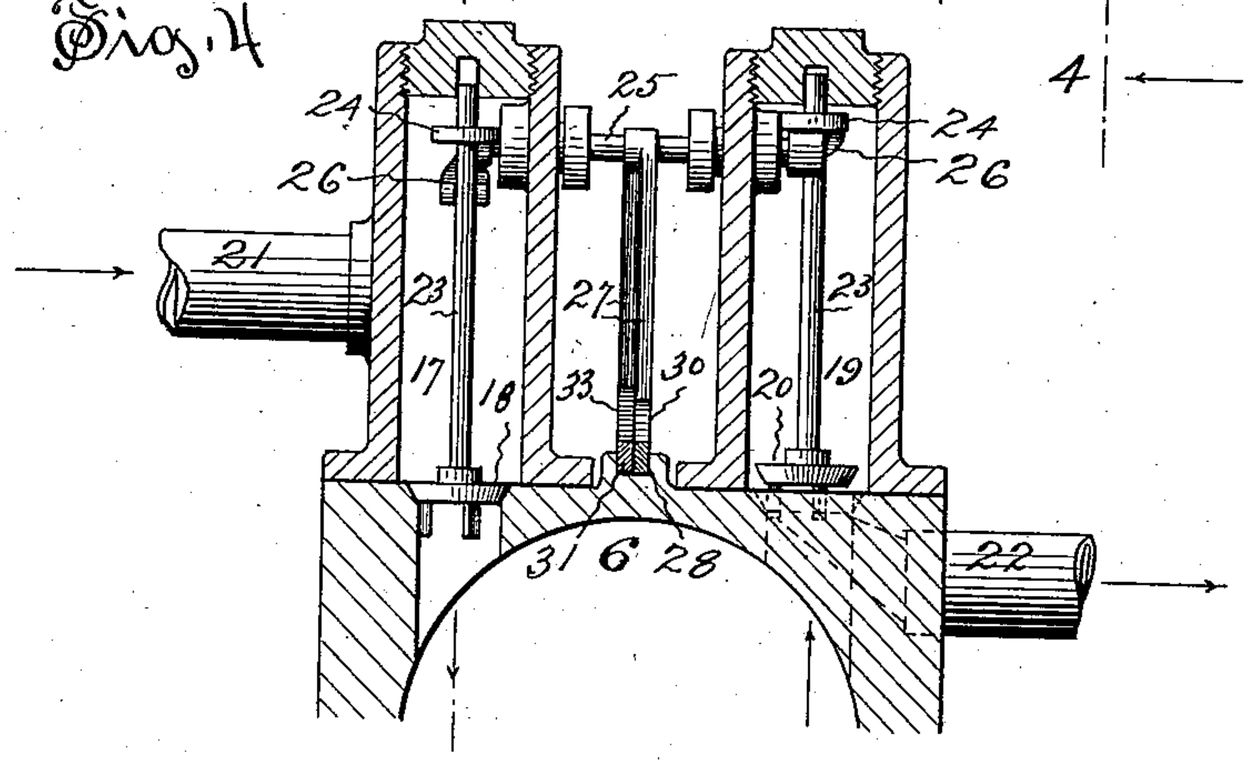
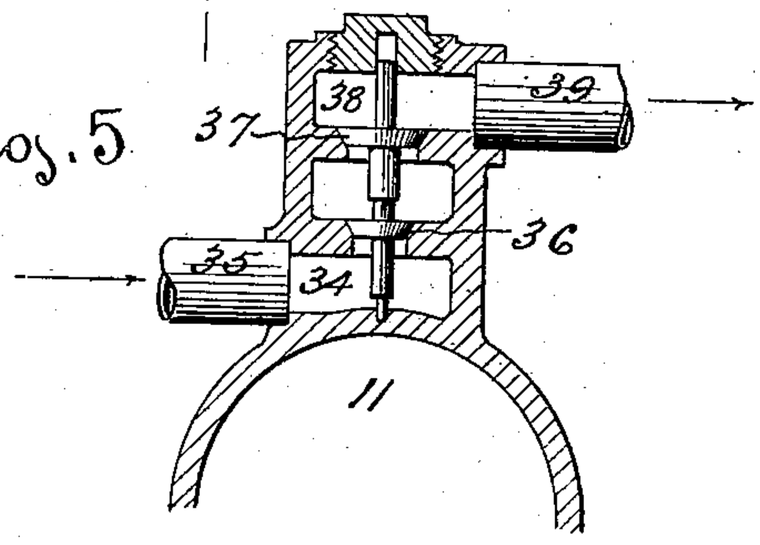


Fig. 5



Witnesses:
Ethel M. Lowe.
Ellen M. Olmsted

Inventor:
Alfred Wells Case by
Harry T. Williams
atty.

No. 742,588. Patented October 27, 1903.

UNITED STATES PATENT OFFICE.

ALFRED WELLS CASE, OF HIGHLAND PARK, CONNECTICUT.

WATER-PUMPING ENGINE.

SPECIFICATION forming part of Letters Patent No. 742,588, dated October 27, 1903.

Application filed February 19, 1903. Serial No. 144,092. (No model.)

To all whom it may concern:

Be it known that I, ALFRED WELLS CASE, a citizen of the United States, residing at Highland Park, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Water-Pumping Engines, of which the following is a specification.

This invention relates to a pumping-engine constructed to utilize a fall of water for raising a part of the same or other water to a greater height.

The object of the invention is to provide a simple, durable, and powerful self-acting pumping-engine of this nature which is particularly adapted for raising to a considerable height spring-water having some fall by brook-water having a greater fall than the spring-water.

The embodiment of the invention illustrated has two connected cylinders with two oppositely-working plungers of large diameter and two independent cylinders with plungers of smaller diameter, the larger cylinders having valves operated by the movements of the plungers for admitting and exhausting the brook-water and the smaller cylinders having self-operating valves which allow the inflow and discharge of spring-water.

Figure 1 of the accompanying drawings shows a vertical central section of a pumping-engine that embodies the invention. Fig. 2 shows a plan of the same. Fig. 3 shows a vertical longitudinal section, on larger scale, taken on the plane indicated by the dotted line 3 3 of Fig. 4. Fig. 4 shows a vertical transverse section taken on the plane indicated by the dotted line 4 4 of Fig. 3. Fig. 5 shows a vertical transverse section taken on the plane indicated by the dotted line 5 5 of Fig. 1.

The two large cylinders 6 are cast integral. In the interior near the outer end of each large cylinder is a flange 7, outside of which is a packing 8, that is held in place by a gland 9. Movable in and out of each large cylinder is a plunger 10. Each of the two small independent cylinders 11, that are located opposite the outer ends of the large cylinders, has an interior flange 13, outside of which is a packing 14, that is held in place by a gland 15. Movable in and out of each small cylinder is a plunger 16, each small plunger being attached to a large plunger. The areas of the respective cylinders and plungers are proportional to the relative amount of pressure developed from the fall of the brook-water and the pressure required to raise the spring-water to the desired height. On top of each large cylinder is an admission-chamber 17, containing an admission-valve 18, and an exhaust-chamber 19, containing an exhaust-valve 20. Brook-water is conducted to the admission-chambers by the inlet-pipes 21 and escapes from the exhaust-chambers by the outlet-pipes 22. Each admission and exhaust valve that is shown is suitably guided and has a spindle 23 with a collar 24. A shaft 25 extends transversely through the inner side walls of the opposite admission and exhaust chambers and has at each end an arm 26, that projects beneath a collar on a valve-spindle. The oscillations of the shafts cause these arms to lift and open the admission and exhaust valves and drop and allow the admission and exhaust valves to close alternately. On each shaft between the valve-chambers is a pair of rocker-arms 27, and on a bar 28, that is connected with a post 29, attached to the outer end of a large plunger, is a lug 30, adapted to engage the arms on one shaft, and on a bar 31, that is connected with a post 32, attached to the other large plunger, is a lug 33, adapted to engage the arms on the other shaft. The connections are so made that the admission and exhaust valves of one large cylinder are opened and allowed to close by the movements of the plunger in the opposite large cylinder—that is, the movements of one plunger effect the reversal of the valves of the cylinder containing the other plunger—and the operations are so timed that the admission and exhaust valves are opened and closed alternately with each other and oppositely with those of the other cylinder, the closing always occurring a little in advance of the opening. The valve mechanism shown is arranged in such manner that the outward movement of one plunger effects the closing of the admission-valve and opening of the exhaust-valve of the cylinder containing the other plunger, and the inward movement of the former plunger opens the admission-valve and allows the closing of the exhaust-valve of the cylinder containing

the latter plunger, while the same movements of the latter plunger effect the actuation of the valves of the cylinder containing the former plunger reversely.

Opening into the inlet-chamber 34 on top of each forcing-cylinder is an inlet-pipe 35, leading from the spring or reservoir containing the water which is to be lifted. An inlet-valve 36 is provided for each of these chambers, and a discharge-valve 37 is provided for each outlet-chamber 38, from which the pipes 39 lead to the level to which the water is to be raised.

This engine is particularly adapted for raising spring-water by means of brook-water, although of course it can be used for raising the same water that is used to operate the engine. Brook-water under considerable head is admitted into and exhausted from the large cylinders alternately, so as to force outwardly one plunger and then the other plunger. The head of the spring-water or other water to be lifted forces the plungers back to their initial positions, when at the end of each outward stroke a plunger is relieved of the pressure on its large end by the reversal of its valves due to the action of the opposite plunger and is only subject to the pressure of the water on the smaller end.

I claim as my invention—

1. A pumping-engine having a pair of oppositely-facing cylinders, a head separating the cylinders, a flange, packing and gland at the outer end of each cylinder, a plunger extending through the flange, packing and gland of each cylinder, a smaller cylinder opposite each large cylinder, a flange, packing and gland at the outer end of each small cylinder, a small plunger extending through the flange, packing and gland of each small cylinder and connected with a large plunger, an admission and an exhaust valve for each large cylinder, mechanism for actuating the admission and exhaust valves alternately and oppositely, and inlet and discharge valves for each small cylinder, substantially as specified.

2. A pumping-engine having a pair of oppositely-facing cylinders, a head separating the cylinders, a flange, packing and gland at the outer end of each cylinder, a plunger extending through the flange, packing and gland of each cylinder, a smaller cylinder opposite each large cylinder, a flange, packing and gland at the outer end of each small cylinder, a small plunger extending through the flange, packing and gland of each small cylinder and connected with a large plunger, an admission and an exhaust valve for each large cylinder, mechanism for raising and lowering the admission and exhaust valves alternately and oppositely, and inlet and discharge valves for each small cylinder, substantially as specified.

3. A pumping-engine having a pair of oppositely-facing cylinders, a head separating the cylinders, a flange, packing and gland at the outer end of each cylinder, a plunger extending through the flange, packing and gland of each cylinder, a smaller cylinder opposite each large cylinder, a flange, packing and gland at the outer end of each small cylinder, a small plunger extending through the flange, packing and gland of each small cylinder and connected with a large plunger, an admission and an exhaust valve for each large cylinder, mechanism for actuating the admission and exhaust valves alternately and oppositely, and connections between the actuating mechanism of the valves of each large cylinder and the plunger of the opposite large cylinder, and inlet and discharge valves for each small cylinder, substantially as specified.

4. A pumping-engine having a pair of oppositely-facing cylinders, a head separating the cylinders, a flange, packing and gland at the outer end of each cylinder, a plunger extending through the flange, packing and gland of each cylinder, a smaller cylinder opposite each large cylinder, a flange, packing and gland at the outer end of each small cylinder, a small plunger extending through the flange, packing and gland of each small cylinder and connected with a large plunger, an admission and an exhaust valve for each large cylinder, connections between the admission and exhaust valve of each large cylinder and a plunger of the opposite cylinder, and inlet and discharge valves for each independent cylinder, substantially as specified.

ALFRED WELLS CASE.

Witnesses:
ETHEL M. LOWE,
H. R. WILLIAMS.