

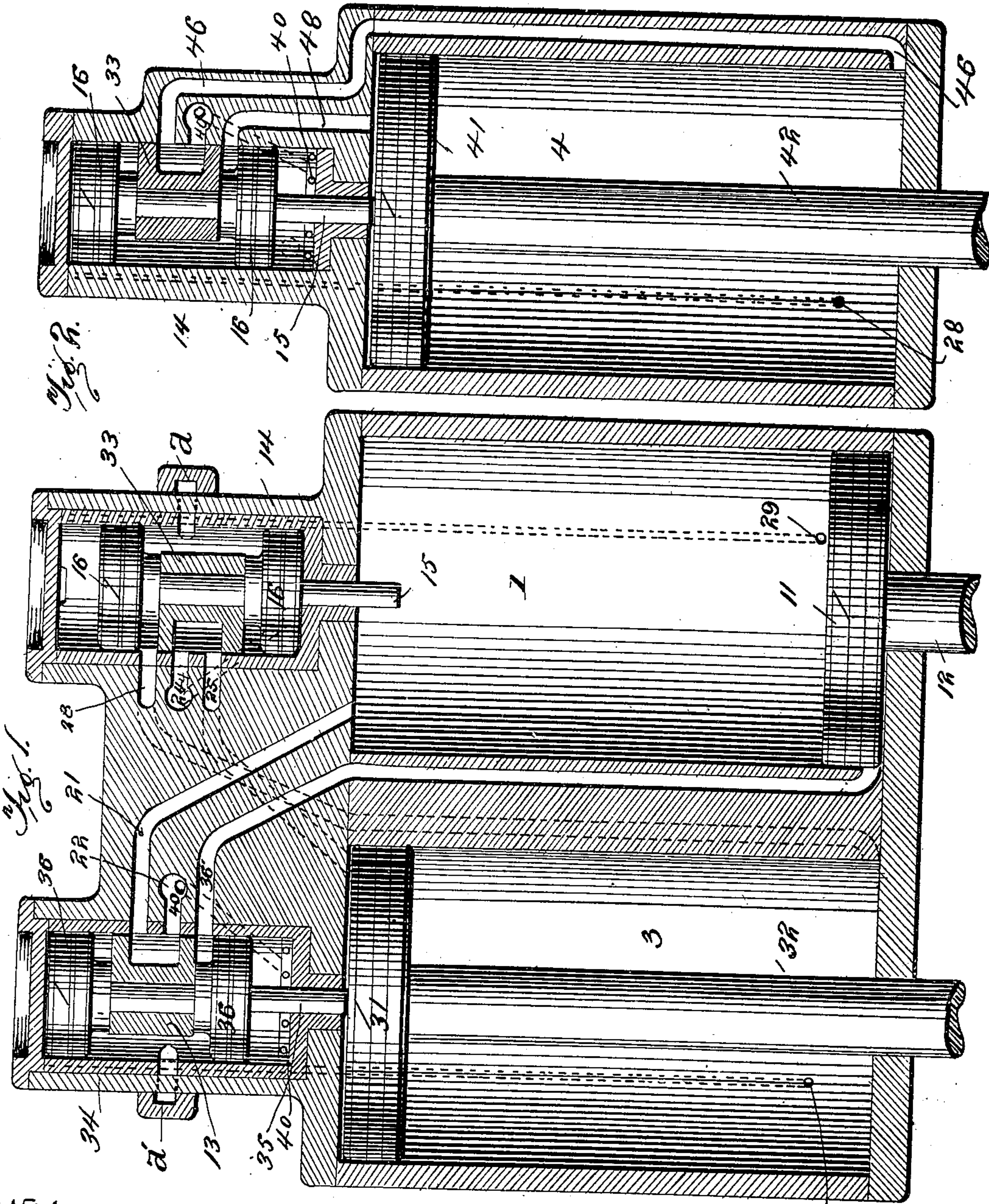
No. 666,374.

H. BREITENSTEIN.
STEAM PUMPING ENGINE.

Patented Jan. 22, 1901.

(Application filed Feb. 10, 1900.)

(No Model.)



Witnesses.

Charles H. Davies.

J R Simby

Inventor.

H. Breitenstein

By.

W A Bartlett

Attorney.

UNITED STATES PATENT OFFICE.

HENRY BREITENSTEIN, OF LARAMIE, WYOMING.

STEAM PUMPING-ENGINE.

SPECIFICATION forming part of Letters Patent No. 666,374, dated January 22, 1901.

Application filed February 10, 1900. Serial No. 4,787. (No model.)

To all whom it may concern:

Be it known that I, HENRY BREITENSTEIN, a citizen of the United States, residing at Laramie, in the county of Albany and State of Wyoming, have invented certain new and useful Improvements in Steam Pumping-Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to improvements in pumping - engines, especially such as are known as "duplex" pumping-engines.

The object of the invention is to produce an improved construction and combination of 15 parts and to simplify engines of this well-known character.

Figure 1 is a vertical central section through two steam-cylinders and valve-chests. Fig. 2 is a reverse view of one of the cylinders 20 modified as to construction.

The numeral 1 indicates one steam-cylinder of the engine, and 3 indicates the other steam-cylinder. The steam-piston 11 in cylinder 1 is connected to the pump in usual manner by piston-rod 12, and piston 31 is connected to its pump by piston-rod 32. The steam valve-chest 14, connected to cylinder 1, contains the slide-valve 33, which governs the ports of cylinder 3, and the steam-chest 30 34, connected to cylinder 3, contains the slide-valve 13, which controls the steam-ports of cylinder 1. The slide-valves are connected to tappet-rods 15 and 35, each projecting through the head of the adjacent cylinder and passing through suitable packing boxes or bushings in said cylinder-heads. The pistons 16 16, fixed on tappet-rod 15, and the corresponding pistons on tappet-rod 35 prevent the passage of steam, which may enter 40 between said steam-chest pistons, to the end of said steam-chests. These pistons 16 16 and 36 36 are of equal size and operate as moving pistons in the steam valve-chests. Except as the pressure is removed from one side or the other, as indicated, the valve-operating pistons are balanced by reason of their equal area; but as the pistons in the valve-chests are much smaller than the pistons in the steam-cylinders the operation of 45 the valves by the main pistons through the tappet-rods will be effected whether the pistons in the valve-chests be balanced or not.

Steam will be introduced to each of the steam-chests by suitable ports or passages, which may be indicated at *a a'*. 55

Now assuming the parts to be in the position shown in Fig. 1 and that steam be admitted at *a'*, by passage 36' this steam will enter under piston 11 and raise the same. As pistons 36 are of equal size, there will be 60 no tendency to move valve 13, except as herein stated. The entrance of steam by passage 36' will lift the piston 11. Any air or steam above piston 11 is free to escape by passage 21, and so to exhaust 22, such passages being 65 opened by the then position of valve 13. When piston 11 rises so far as to strike tappet 15, it thereby moves said tappet, the pistons 16, and slide-valve 33 in such manner as to close port 23 to the exhaust 24 and at the 70 same time open passage 25 to the cylinder 3, so that steam from chest 14 may enter said cylinder, the valve 33 having then assumed a position corresponding to that of valve 13. The steam through passage 25 thus enters 75 above piston 31 and drives said piston downward, exhaust-passages 23 24 being open for the escape of air or steam from below said piston 31. When piston 31 nearly reaches the end of its downward stroke, the by-passage 28 80 is opened to the entrance of steam from above said piston. The passage or pipe 28 leads into the steam-chest 34 above the upper piston 36, and as there is now nothing to prevent, the pistons 36, slide-valve 13, and tappet 35 are 85 moved downward by the pressure of steam through such passage 28. Such movement of valve 13 reverses the steam to cylinder 1 by opening the passage 21, leading above the piston 11, and opening the passage 36 22, 90 which now becomes the exhaust. When piston 11 has about completed its downward stroke, it uncovers passage 29, and steam then enters said passage and forces down the pistons 16, slide-valve 33, and tappet-rod 15, 95 which again opens the steam-passages to lift the piston in the cylinder 3, as before. As will be seen, the down position of slide 33 permits the exhaust of steam from above piston 36 by the passages 28, 25, and 24, so that there will 100 be no resistance to the lifting of the tappet at the next rise of the piston 31, and such action is reciprocal in the two cylinders.

A by-passage 40 is provided for any steam

which may leak around the tappet-rod, so that such a steam-leak may not affect the working of the valves, but such steam will act as a cushion to prevent "pounding" by the slides.

5 I am aware that the general sequence of piston movements is common in pumps of this character. Such is generally effected by moving the valves by slides or gearing, so that a more complex structure is required.

10 Fig. 2 indicates a modification in which the tappet and slide may be applied to a single-acting engine, the cylinder 4 having steam-passage 46 from the steam-chest to the lower side of piston 41 and by-passage 28. In other
15 respects the construction may be in general as indicated for the duplex engine.

What I claim is—

1. In a duplex pumping-engine, the combination of two steam-cylinders provided with
20 pistons as usual, a steam-chest at the end of each cylinder having ports leading to opposite ends of the more remote cylinder and a tappet-rod extending into the adjacent cylinder, pistons on said tappet-rods, and a by-passage
25 extending from near the remote end of each cylinder to the remote end of its own steam-chest, all combined substantially as described.

2. In a duplex pumping-engine, the steam-

cylinders, pistons and steam-chests arranged as described, the tappet-rods having pistons
30 within the steam-chests arranged to be actuated by steam in the chests, each tappet-rod connected to the slide-valve controlling the passages to the remote cylinder, the tappet-rods extending into the steam-cylinders as
35 described and steam-passages by which the steam enters from one cylinder to operate the slide-valve controlling the other cylinder, all combined substantially as described.

3. In a duplex pumping-engine, the cylinders, steam-chests, and pistons arranged as
40 described, tappet-rods extending into the cylinders, slide-valves in the steam-chests connected to said tappet-rods, and having operating-pistons connected thereto and working
45 in the steam-chests and a leak-exhaust connected to the slide-valve chamber to relieve the valve below the tappet-rod, all combined substantially as described.

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

HENRY BREITENSTEIN.

Witnesses:

DWIGHT P. SMITH,
HOWARD R. INGHAM.