

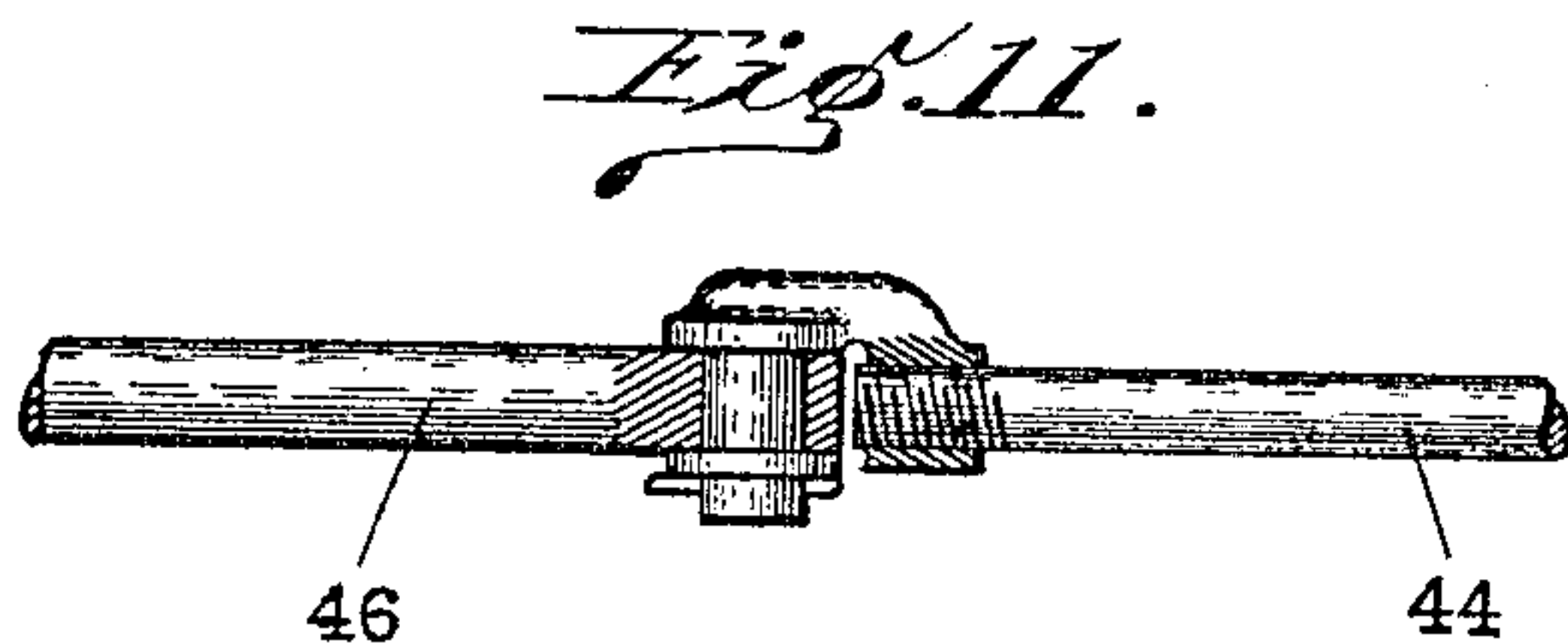
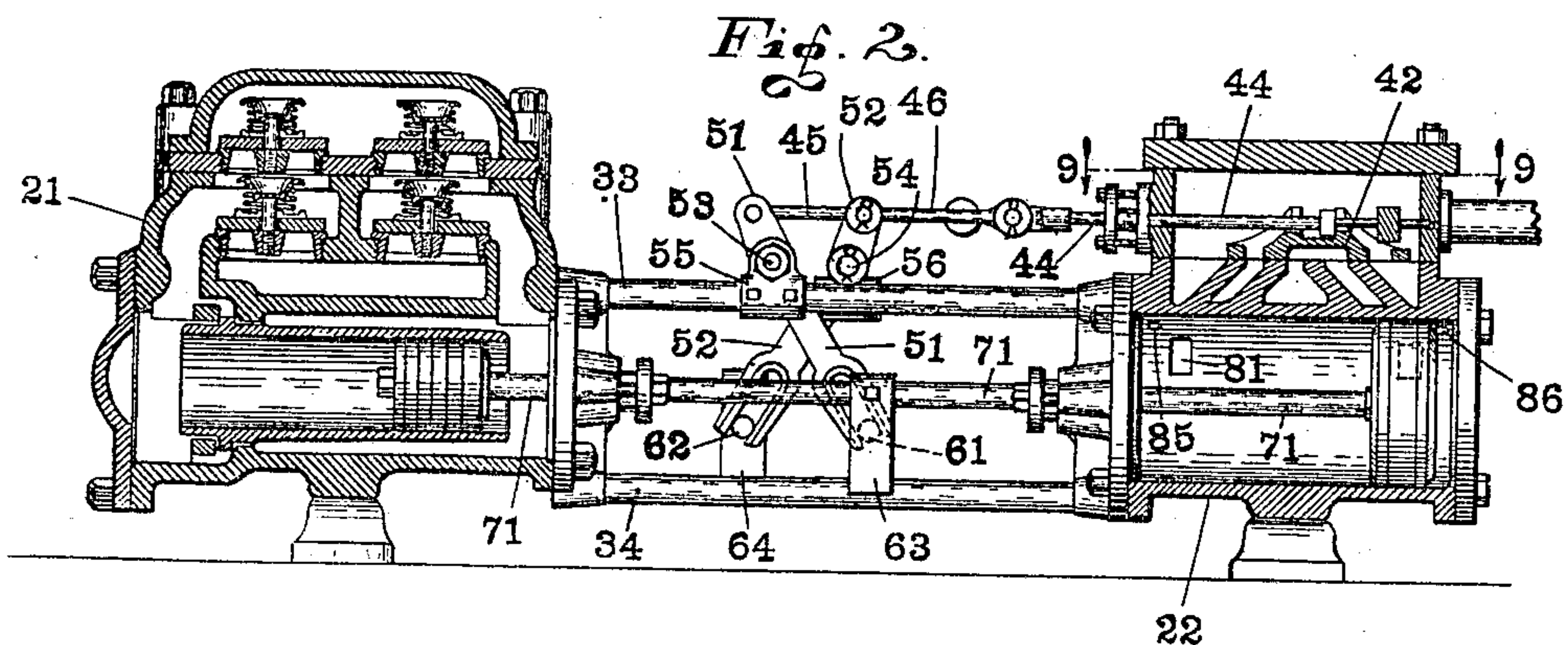
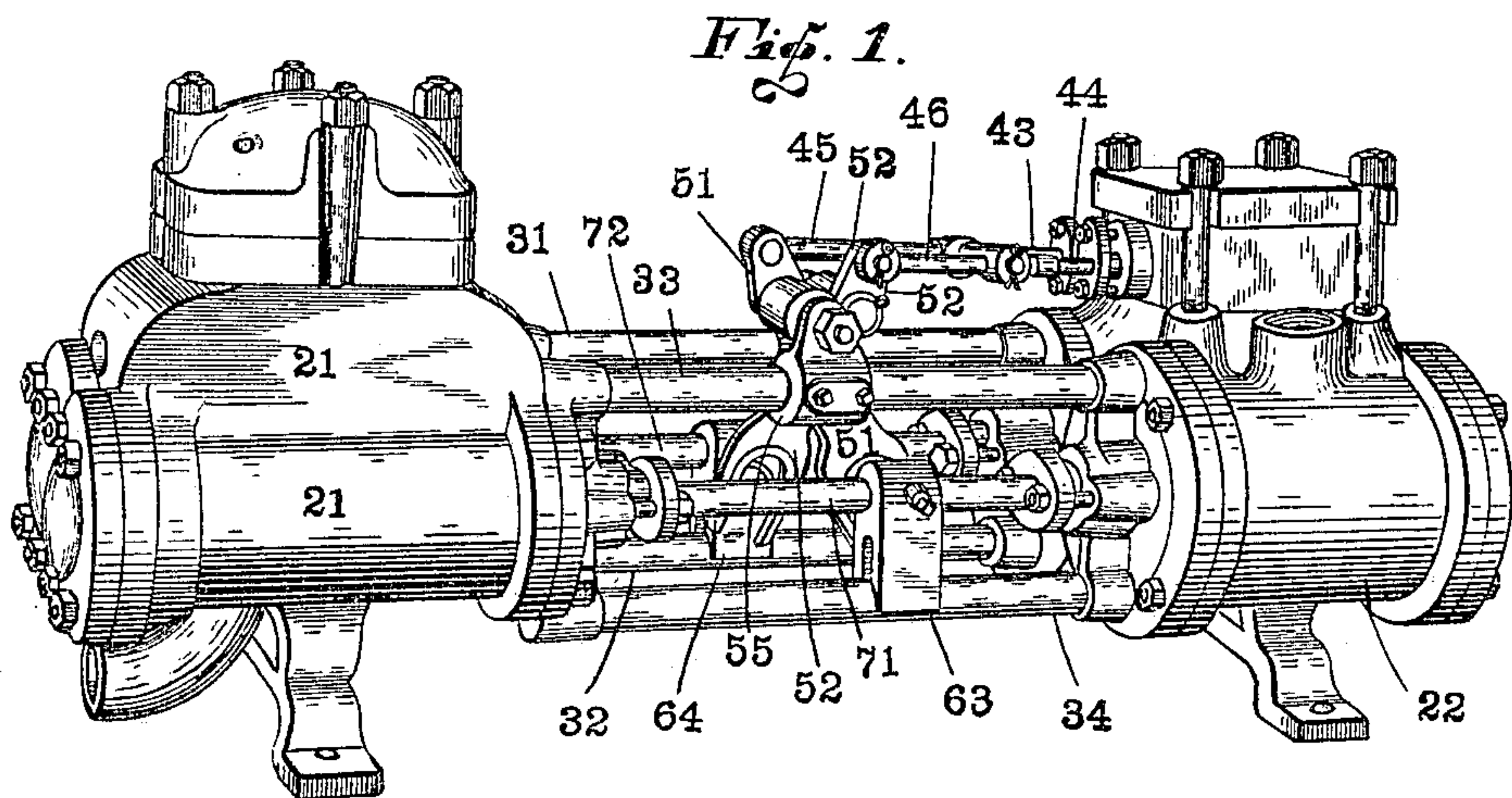
No. 819,864.

PATENTED MAY 8, 1906.

J. C. DEAN.
STEAM PUMP.

APPLICATION FILED JUNE 3, 1905.

3 SHEETS—SHEET 1.



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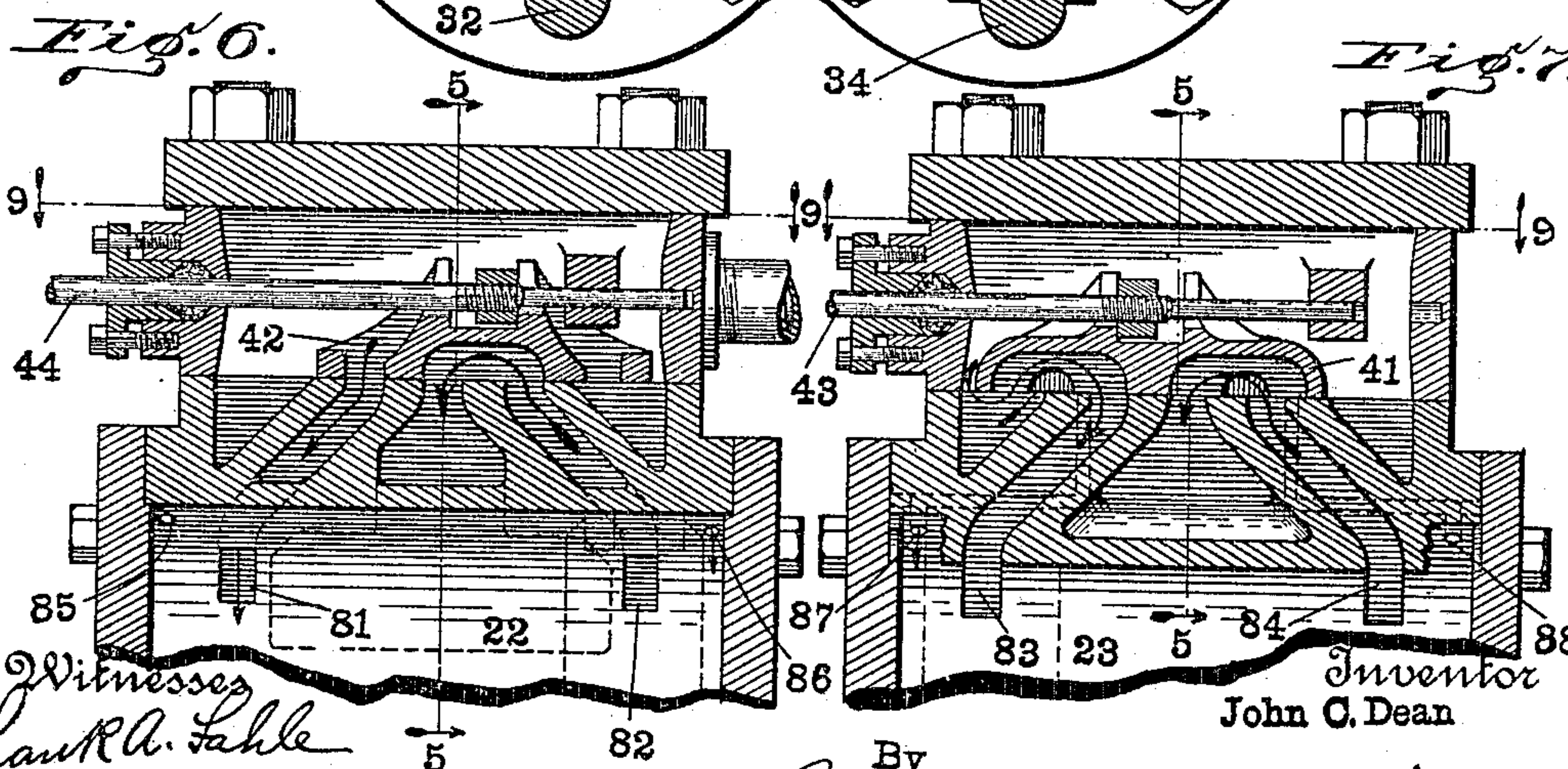
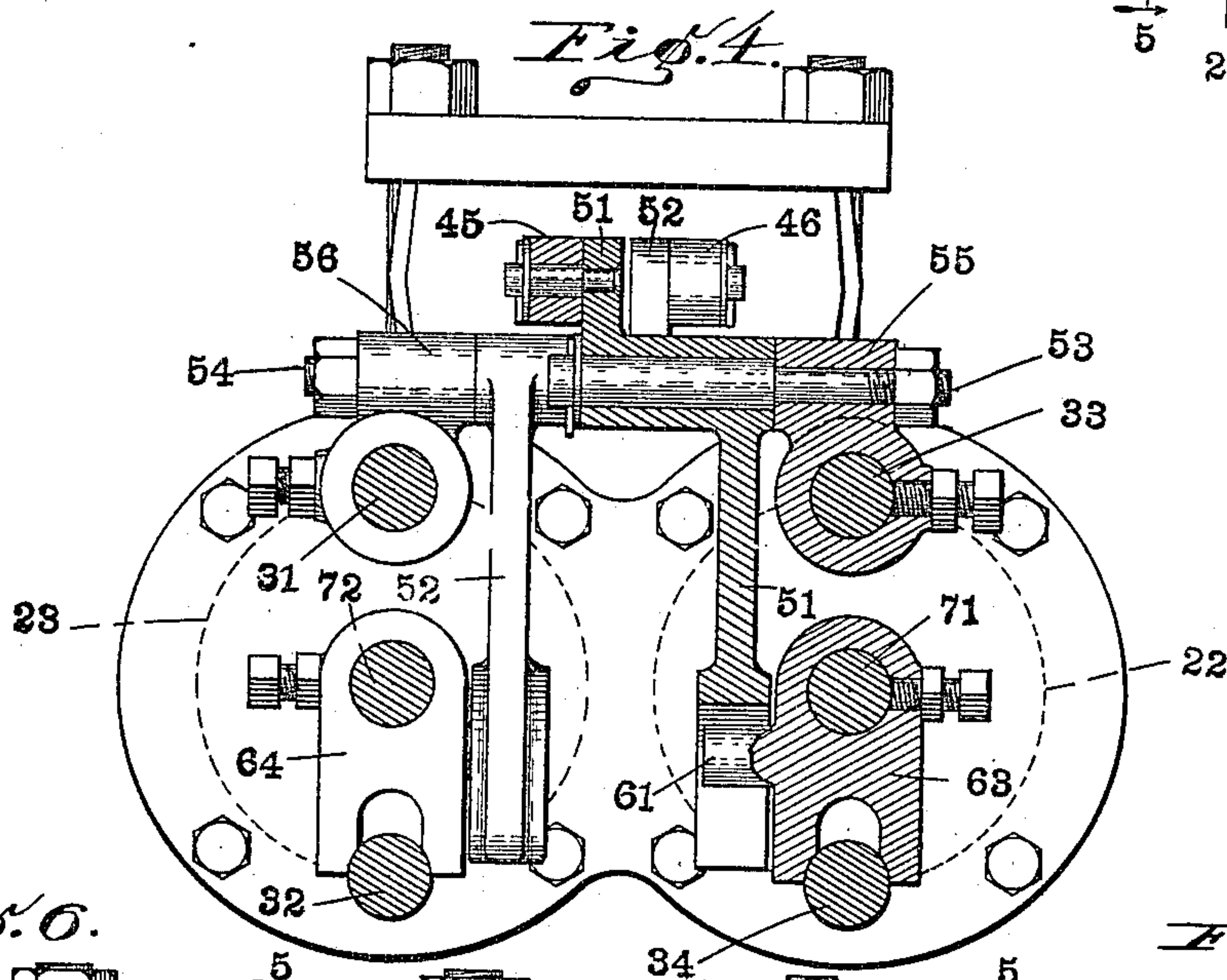
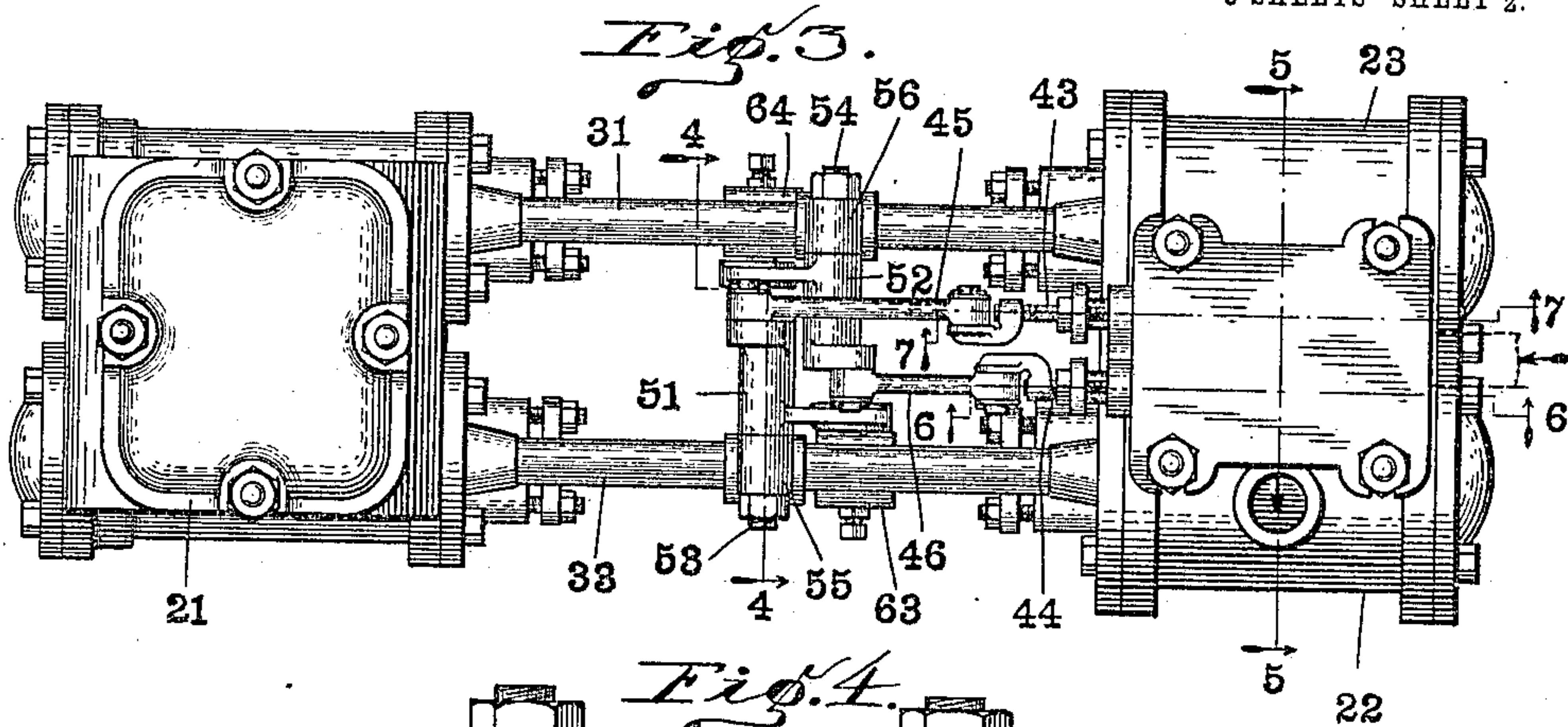
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 5.

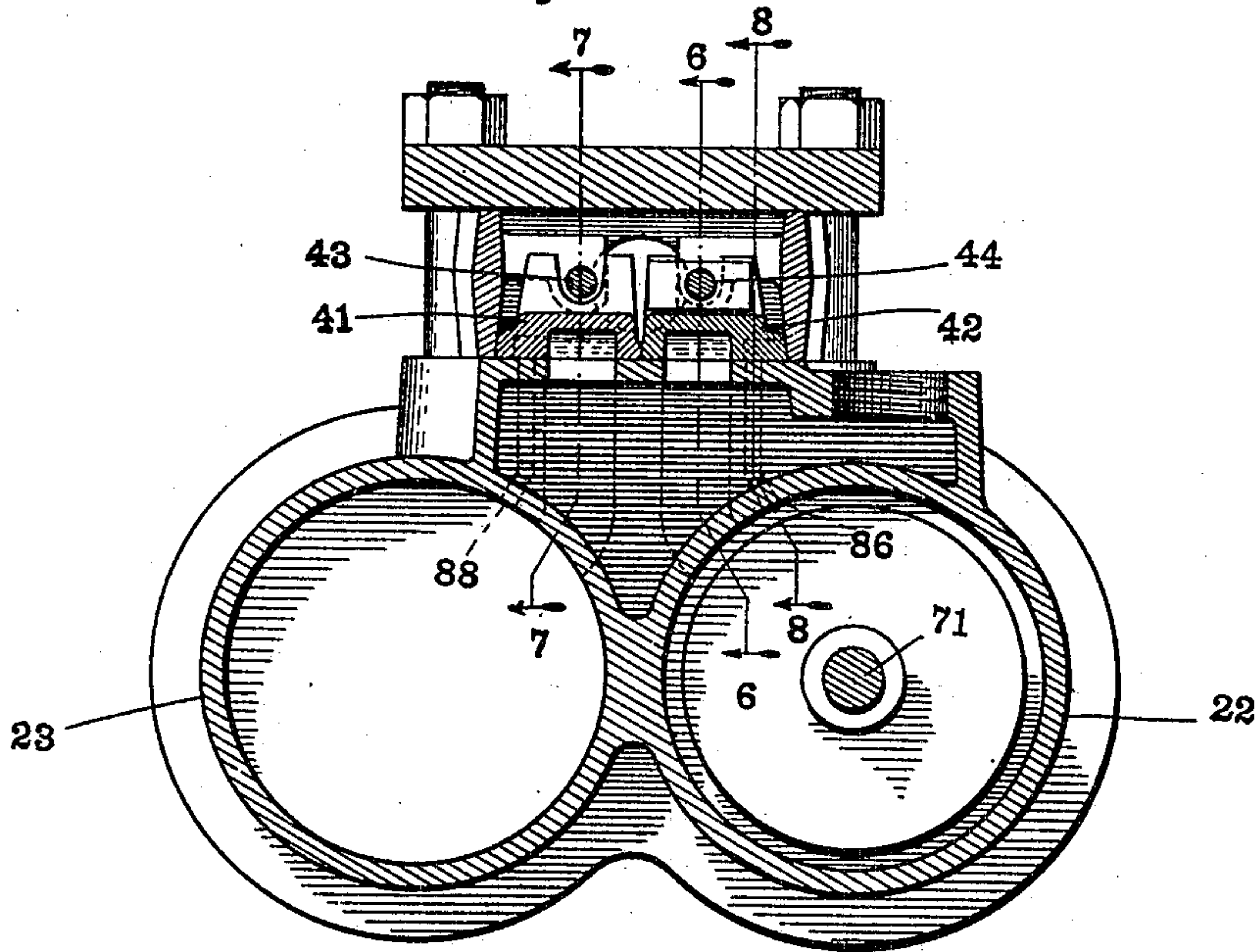


Fig. 8.

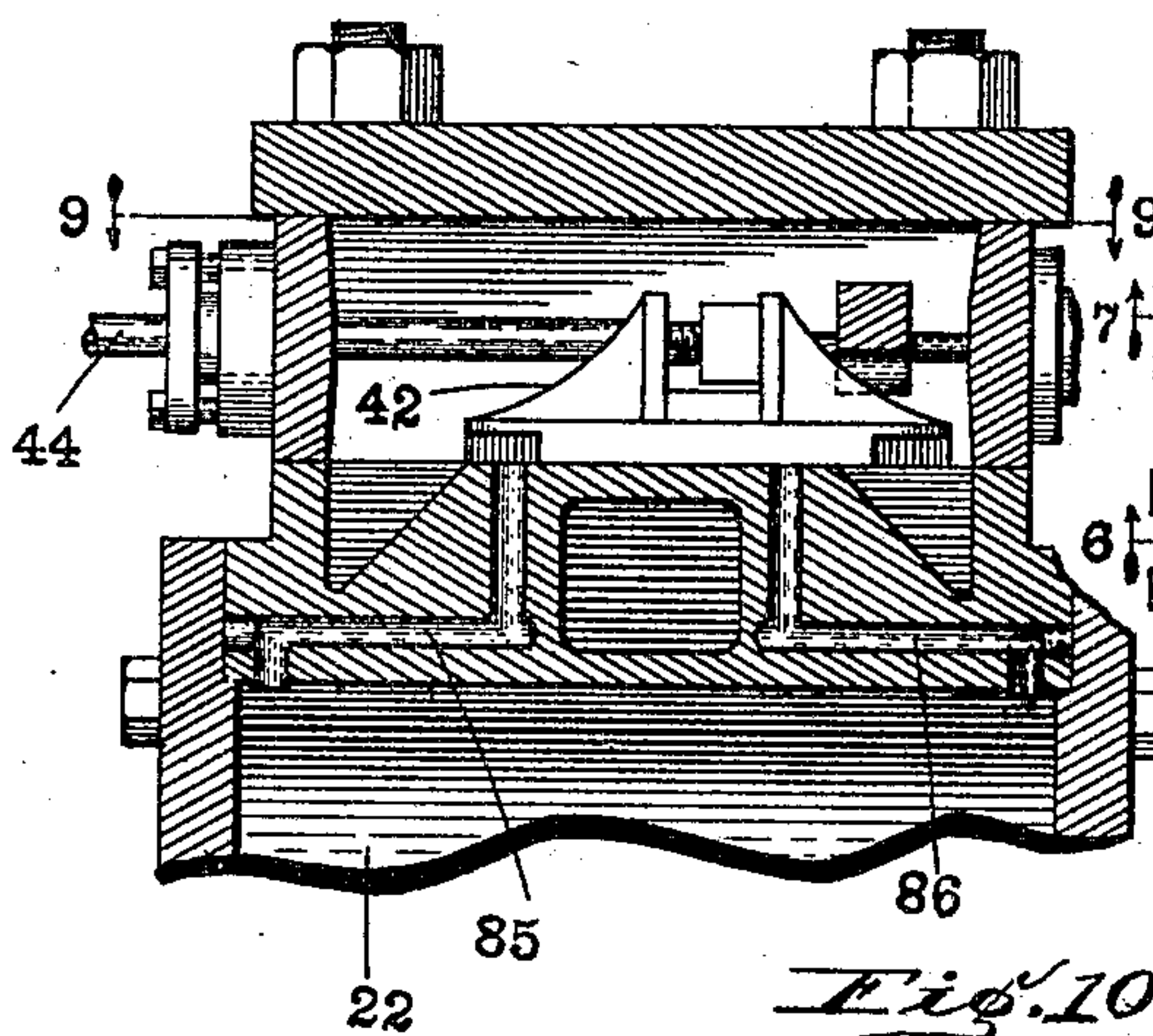


Fig. 9.

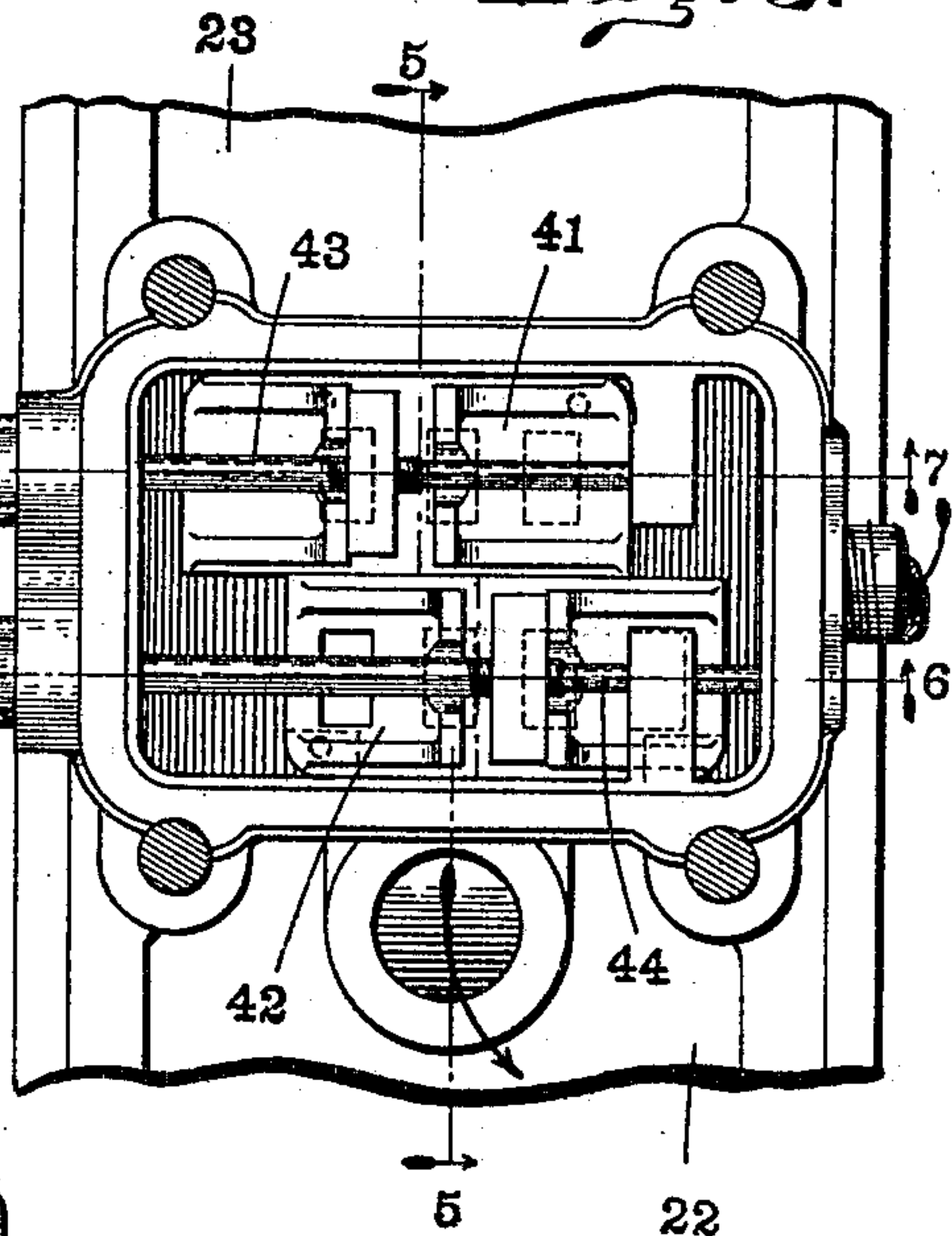
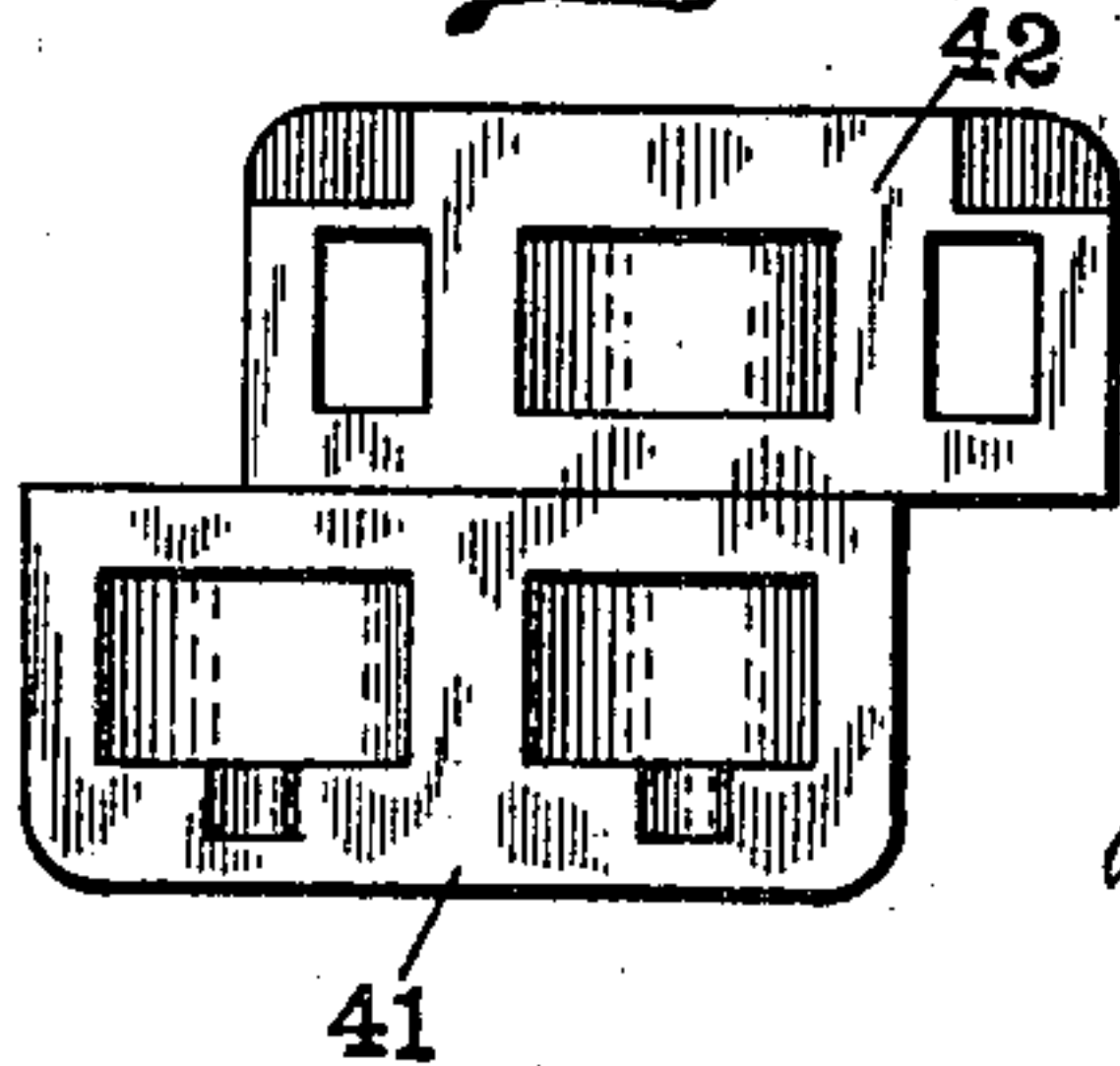


Fig. 10.



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UNITED STATES PATENT OFFICE.

JOHN C. DEAN, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO DEAN BROTHERS STEAM PUMP WORKS, OF INDIANAPOLIS, INDIANA, A CORPORATION OF INDIANA.

STEAM-PUMP.

No. 819,864.

Specification of Letters Patent.

Patented May 8, 1906.

Application filed June 3, 1905. Serial No. 263,642.

To all whom it may concern:

Be it known that I, JOHN C. DEAN, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Steam-Pumps, of which the following is a specification.

My present invention relates especially to that variety of pumping-engines commonly called "duplex" steam-pumps, although its principal features are also applicable to single pumps.

The principal objects of my said invention are to reduce the expense of construction, improve efficiency, provide for a more simple and compact arrangement of the valve-operating mechanism, and increase the facility with which the structure may be taken apart or put together both in building originally and in cases where it is necessary for purposes of repair.

The accompanying drawings illustrate a duplex steam-pump embodying my said invention.

Figure 1 is a perspective view of such a pump; Fig. 2, a view in which the valve-operating mechanism is shown in side elevation and one of the pumps, the corresponding steam-cylinder, and its steam-valve in central longitudinal vertical section; Fig. 3, a top or plan view; Fig. 4, a transverse vertical sectional view, on an enlarged scale, at the point indicated by the dotted line 4 4 in Fig. 3; Fig. 5, a transverse vertical sectional view at the point indicated by the dotted line 5 5 in Figs. 3, 6, 7, and 9; Figs. 6, 7, and 8, detail longitudinal vertical sectional views as seen when looking in the directions indicated by the arrows from the dotted lines 6 6, 7 7, and 8 8, respectively, in Figs. 5 and 3; Fig. 9, a top or plan view of the steam-chest and the valves contained therein when the cap is removed; Fig. 10, an under side plan view of the valves separately in the same position as shown in Fig. 9, and Fig. 11 a detail horizontal sectional view illustrating the form of coupling which I have adopted for connecting the valve-stems and the links by means of which said stems are connected to the valve-operating levers.

The pump structures 21 are or may be of any appropriate construction desired. As

they are not peculiar to my present invention, they will not be further described herein, except incidentally in describing said invention. The steam-cylinders 22 and 23 are for the most part also of a usual form. There are, however, some peculiarities about the steam-ports to these cylinders, which will be described in connection with the description of the steam-valves.

The pump structures and the engine structures or cylinders are connected by means of four rods 31, 32, 33, and 34, the ends of said rods entering suitable sockets on the heads of said pump and engine structures. This construction is both better and less expensive than the cast frames extending between said structures heretofore used. The upper ones of said rods also support or embody the studs on which the valve-operating levers are mounted. The lower rods also furnish superior and easily-adaptable guideways for the stud-blocks attached to the piston-rods which carry or embody the studs with which the forks on said valve-operating levers engage.

Of the two valves, one, 41, is of a form known as a "B-valve," and the other, 42, is of a form known as a "D-valve." These are respectively most clearly illustrated in Figs. 7 and 6. The valve-stems 43 and 44 extend out and are connected to links 45 and 46, and these in turn are connected to the upper ends of the valve-operating levers 51 and 52. As the piston-rods and valve-stems of this pump are in different vertical planes, said valve-operating levers 51 and 52 are offset correspondingly—that is, the lever-arms are likewise in different vertical planes and are united by horizontal members which form hubs and which fit onto the studs or pivots, presently further described. These levers 51 and 52 are duplicates in construction, the distance between the fulcrums and attaching points in both being the same and being merely reversed in position when assembled, as is best shown in Fig. 4. Said valve-operating levers are mounted, respectively, on studs 53 and 54, carried by or forming part of the stud-blocks 55 and 56, which, as before stated, are carried by the frame-rods 33 and 31, respectively. The upper ends of said valve-operating levers extend across each

other, so that the lever 51 operates the valve 41 through the valve-stem 43 and link 45, while the lever 52 operates the valve 42 through the valve-stem 44 and link 46. This arrangement permits the levers to be shorter, so that they do not project above the adjacent structures, and also brings them within the space between the frame-rods, so that they are well protected. The lower ends of the said valve-operating levers 51 and 52 are bifurcated and engage, respectively, with the studs 61 and 62, carried by or forming part of the stud-blocks 63 and 64, attached to the piston-rods 71 and 72, said stud-blocks being also supported and guided by the frame-rods 34 and 32, which also form ways or guides, as before stated.

As will be noticed, the several stud-blocks 55 and 56 and 64 and 63 are adjustable upon the frame-rods, by which they are carried, and may thus easily be positioned accurately to produce the desired results and can readily be adjusted from time to time for the purpose of taking up wear or otherwise as may be desired.

As before stated, the ports to the steam-cylinders are somewhat peculiar in their arrangement. In a duplex steam-pump the valve to one cylinder is operated from the piston-rod of the other cylinder, and in order to produce the best results in a machine of this character the valve to be operated is not moved so as to admit steam until the piston from which it is operated has substantially half completed its stroke. This provides for the short pause at the end of each stroke which is found in the best classes of steam-pumps and which enables the water-valves to properly seat themselves as each stroke is completed. When the piston is at the end of its stroke, it covers the main port, and as the valve also at that time covers the small auxiliary port (presently to be described) a small amount of steam is imprisoned at the end of each stroke, thus "cushioning" the piston, as it is called. The main ports 81, 82, 83, and 84 are best shown in the sectional views Figs. 6 and 7. One set of the auxiliary ports 85 and 86 is best shown in Fig. 8. The other set of auxiliary ports 87 and 88 is indicated especially in Fig. 7, where parts are broken away to show their inner ends. The positions of all the various ports are shown wherever possible by means of dotted lines and otherwise.

By the use of one **B**-valve and one **D**-valve in connection with the duplicate valve-operating levers having the same length and stroke I am enabled to secure a uniformity of ports and of valve stroke and to produce the results indicated, while maintaining simplicity of construction and efficiency of operation, as well as low cost.

Having thus fully described my said inven-

tion, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in a steam-pump, of the pump structure, the engine structure, each being of the duplex type, two pairs of rods connecting said two structures, pistons in the steam-cylinders of said structures, steam-valves to the two steam-cylinders, the piston-rods to said pistons, the valve-stems to said valves, stud-blocks mounted upon the rods connecting the structures, valve-operating levers carried thereby, and connections between said levers and the valve-stems at one end and between said levers and the piston-rods at the other end, said levers extending across each other, whereby the piston-rod of one engine operates the valve of the other.

2. The combination, in a duplex steam-pump, of the pump structure, the engine structure, four rods connecting said two structures arranged in pairs and each pair being in the same vertical plane as the corresponding piston-rod, the pistons, the steam-valves, duplex reversely-positioned valve-operating levers, two stud-blocks carried by the upper rods of the pairs and serving as bearings for the levers, a connection between each of said levers and the corresponding piston-rod, and a connection between each of said levers and the opposite steam-valve.

3. The combination, in a duplex steam-pump, of the pump structure, the engine structure, the pistons and piston-rods, two pairs of rods connecting said engine structure and said pump structure, the rods of each pair being arranged in the same vertical plane as one of the piston-rods, stud-blocks on the upper rods of the pairs carrying fulcrums for the levers, the steam-chest, the valves therein, and levers mounted on the fulcrums of the stud-blocks and engaging with the piston-rod of one side of the machine and with the valve-stem of the other side of the machine.

4. The combination, in a duplex steam-pump, of the pump structure, the engine structure, four rods connecting said two structures arranged in pairs, duplex reversely-positioned valve-operating levers, stud-blocks carrying the fulcrums for said levers mounted on the upper rods of the pairs, and other stud-blocks with which the lower ends of said levers engage mounted on the pistons and engaging with and guided by the lower rods of the pairs.

In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 29th day of May, A. D. 1905.

JOHN C. DEAN. [L. S.]

Witnesses:

CHESTER BRADFORD,
JAMES A. WALSH.