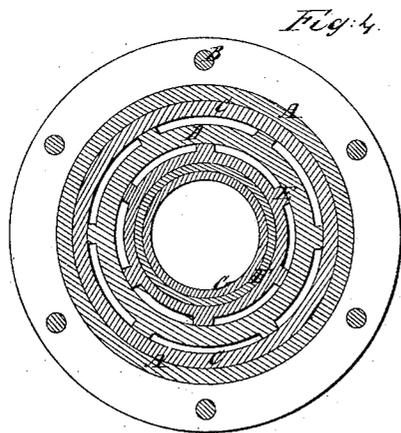
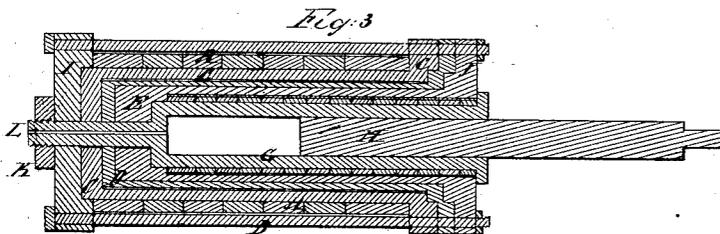
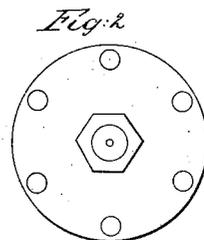
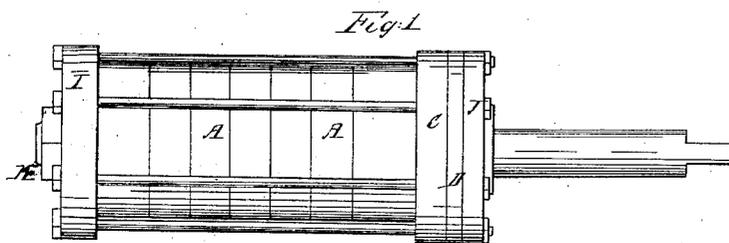


*D. Fitzgerald,
Hydraulic Engine.*

N^o 37,195.

Patented Dec. 16, 1862.



Witnesses

*Owen G. Warren
J. D. Hunt*

Inventor

Daniel Fitzgerald

UNITED STATES PATENT OFFICE.

DANIEL FITZGERALD, OF NEW YORK, ASSIGNOR TO HIMSELF AND CHAS. B. TATHAM, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN HYDRAULIC CYLINDERS.

Specification forming part of Letters Patent No. 37,195, dated December 16, 1862.

To all whom it may concern:

Be it known that I, DANIEL FITZGERALD, of the city, county, and State of New York, have invented a new and useful improvement in the mode of constructing hydraulic and other cylinders where great strength is required; and I hereby declare that the following is a full and exact description thereof.

To enable others skilled in the business to make and use my invention, I proceed to describe its construction and operation, reference being had to the drawings hereunto annexed and making part of this specification.

Figure 1 is a side elevation of cylinder; Fig. 2, an end elevation of the same; Fig. 3, a longitudinal section; Fig. 4, an enlarged section showing the concentric cylinders.

The same letters refer to the same things in all the figures.

A are outside hoops; B, the rods for longitudinal strength; C, the outside cylinder; D, a ribbed cylinder within C; E, a ribbed cylinder within D; F, the inner hoops; G, the inner cylinder; H, the piston; I, the breech-plate; J, the muzzle-plate; K, nut connecting the cylinders; L, vent or influx tube.

Where cylinders require great strength, as in hydraulic pumps for dry-docks, hydraulic presses for embossing cannon, cylinders for condensing gases, or for consolidation of substances, &c., it is difficult to accomplish the construction of them with one piece of metal on account of defects. It is also difficult to transport and place large masses.

By combining many metal cylinders in one, so that they shall be equalized and practically united, the object is attained. Great strength is had without the difficulty of making enormous forgings or castings, and the transportation in separate parts becomes easy. To this end I construct the interior part of the cylinder required sufficiently thick for stability, and having the proper vent or influx tube, as shown, Fig. 3, L. Over this inner cylinder or barrel I shrink hoops F, and then it would be best to turn the surface smooth.

There may be a narrow space left between the hoops. Over this I put on a cylinder, E, fitting it and shrinking it on, closing over the breech, and around the influx-tube, all the cylinders having flanges at the muzzle spreading to the full width of the finished cylinder. This cylinder E must have a few holes in it, and it may have longitudinal ribs from end to end. Over this I shrink on another cylinder, D, similar to E, and closing over the breech of the other, and with a broad flange at muzzle. This has ribs, and they break joints with those of the other E, and this has holes in it. Over this I shrink on the outside cylinder, C, closing it over the breech of the preceding, and with a wide flange at the muzzle. This is to be tight, except for an inlet and a valve. Over this outside cylinder I shrink thick hoops, and then put on the breech-plate I. Through this and the three muzzle-flanges, C, D, and J, I put many strong bolts, well secured, and it would be well to weld the nut and shrink the rods to draw the whole together. I now fill the interstices between the cylinders with water, and secure it in with safety-valve. If it be a gun I put in the water hot to make even expansion before loading, and to add to the strength of the metal. I can omit putting in the water, and yet have a strong and an elastic gun. I can fit the cylinders one into the other without shrinking them together, so that it may be taken to pieces, as the ribs are intended to touch the inner surface of the next outside cylinder.

What I claim as my invention, and desire to secure by Letters Patent, is—

Consolidating and combining the strength of concentric cylinders by means of water or other liquid, hot or cold, filling the interstices, in the manner substantially as above described.

DANIEL FITZGERALD.

Witnesses:

OWEN G. WARREN,
J. D. STURTEVANT.