

(No Model.)

3 Sheets—Sheet 1.

I. E. STOREY.
FLUID PUMP.

No. 439,792.

Patented Nov. 4, 1890.

Fig. 1.

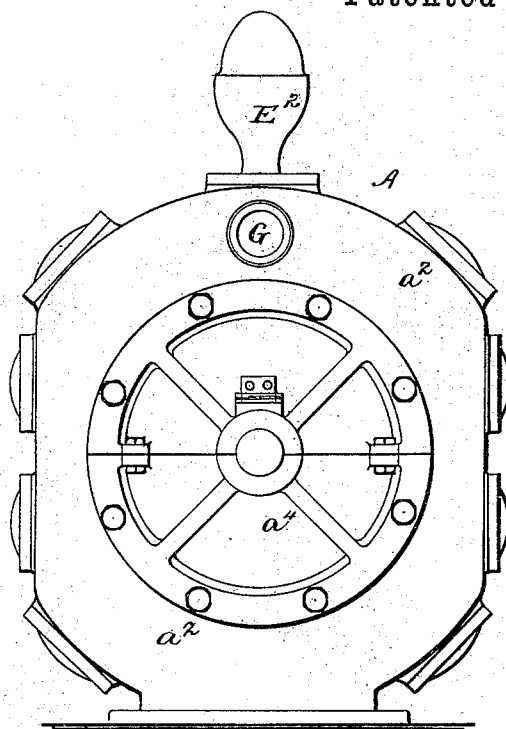
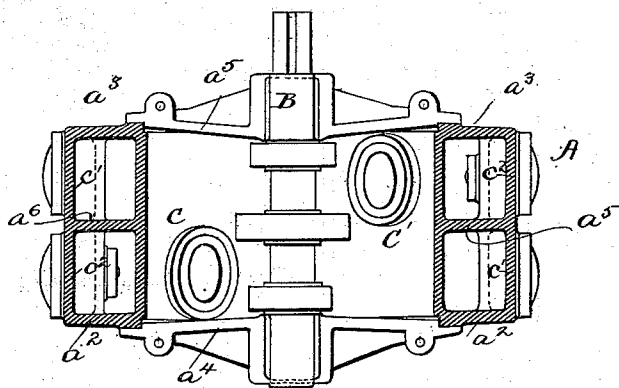


Fig. 2.



WITNESSES:

Frank A. Ober
Thos. H. Trenchard

INVENTOR

Imle E. Storey

BY

W. B. Johnston
ATTORNEY.

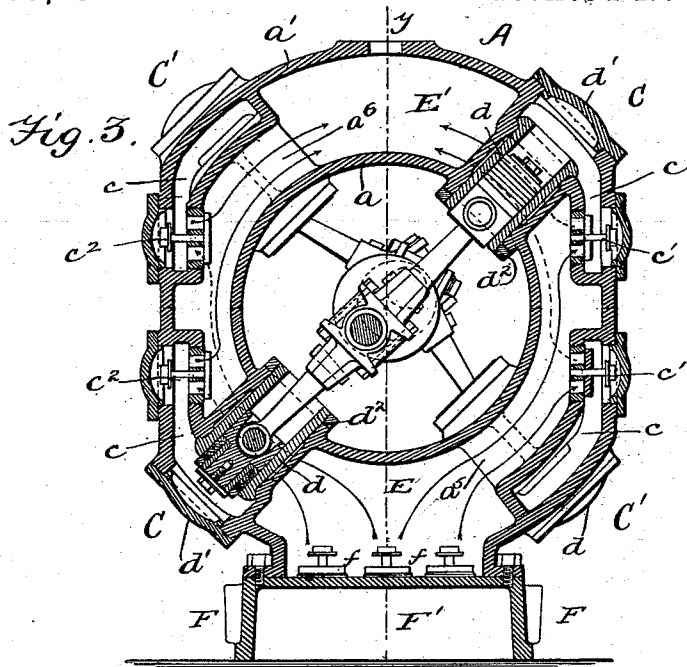
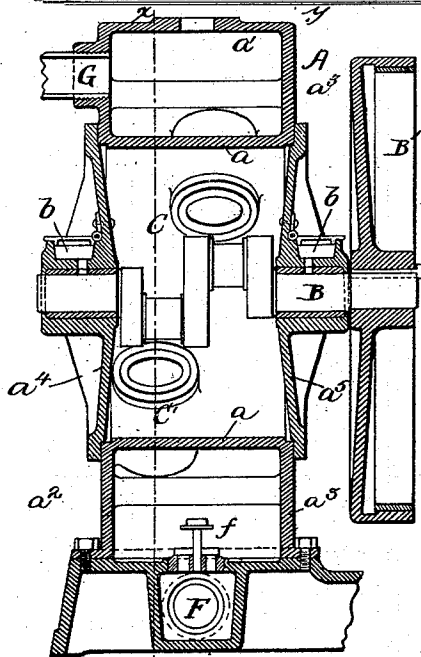
(No Model.)

3 Sheets—Sheet 2.

I. E. STOREY.
FLUID PUMP.

No. 439,792.

Patented Nov. 4, 1890.



WITNESSES:

Frank S. Ober
Thomas H. Trenchard

INVENTOR

I. E. Storey

BY

W. J. Johnston
ATTORNEY..

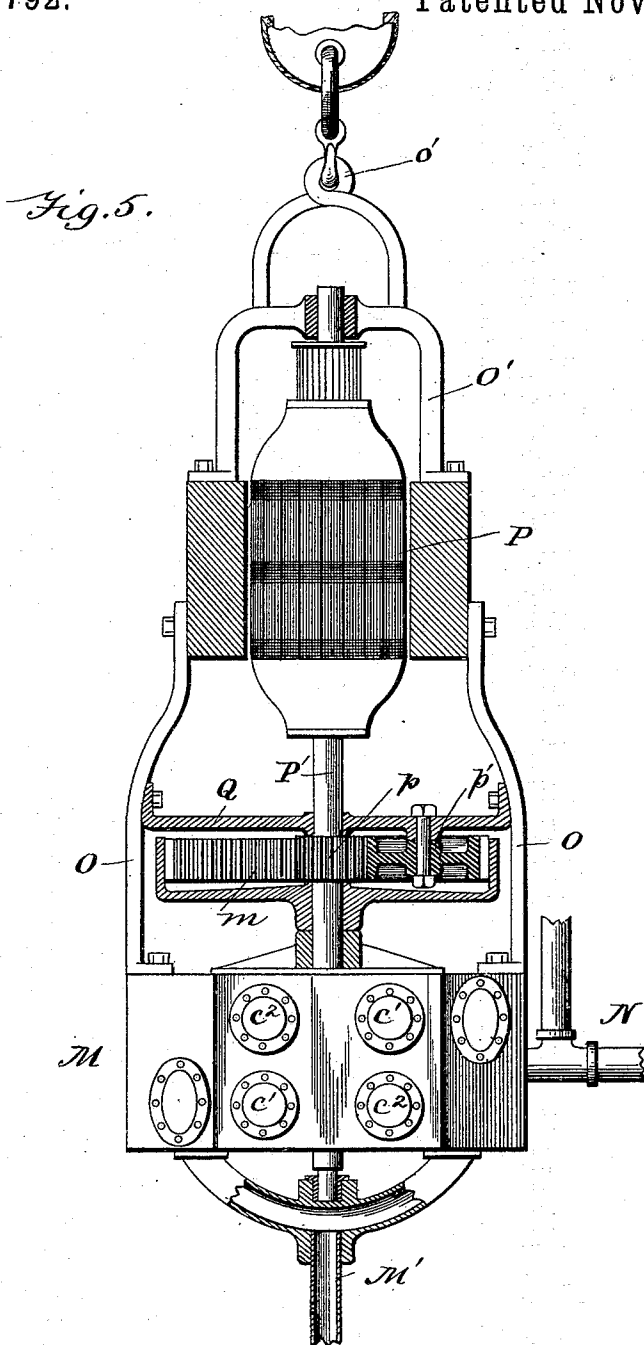
(No Model.)

3 Sheets—Sheet 3.

I. E. STOREY.
FLUID PUMP.

No. 439,792.

Patented Nov. 4, 1890.



WITNESSES:

Wm. A. Ober
Thomas K. Treuchard.

INVENTOR

Imle E. Storey

BY

W. D. Johnston
ATTORNEY.

UNITED STATES PATENT OFFICE.

IMLE E. STOREY, OF BROOKLYN, NEW YORK.

FLUID-PUMP.

SPECIFICATION forming part of Letters Patent No. 439,792, dated November 4, 1890.

Application filed January 16, 1890. Serial No. 337,079. (No model.)

To all whom it may concern:

Be it known that I, IMLE E. STOREY, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Fluid-Pumps, of which the following is a specification.

This invention relates to fluid-pumps. It belongs to the class of multi-cylinder pumps in which the pistons are driven by a single central crank-shaft.

The objects of the invention are to provide a pump of a variable capacity which shall be cheap of construction, occupy a small space, be efficient in operation, and well adapted for use in mines.

The invention consists of the details of construction, which will now be described with reference to the accompanying drawings, in which—

Figure 1 represents a side elevation of the pump; Fig. 2, a horizontal section of same; Fig. 3, a vertical section taken on line xx of Fig. 4; Fig. 4, a similar section taken on line yy of Fig. 3, and Fig. 5 a side elevation with parts in section of a sinking pump and motor for use in mines.

Referring to the drawings by letter, A represents the frame of the pump. It consists of a single casting having two concentric walls a and a' , the former of which is cylindrical and the latter made of cylindrical and plane portions. The space between these walls is inclosed by two plane heads a^2 and a^3 , and the cylindrical space in the center is covered by two heads a^4 and a^5 , which are slightly concaved to bring the bearings which they contain inside as far as possible, thereby permitting of elongated bearings without occupying an unnecessary amount of space. In these bearings is mounted the shaft B of the pump, which extends out at one side, where it carries a gear-wheel B', which may be driven by an electric or other motor. Between its bearings the shaft has formed upon it two cranks, standing diametrically opposite each other. The shaft-bearings are supplied with oil from oil and waste boxes b b . The oil is carried along the journals and into the cylindrical chamber, where it is thrown about and thoroughly lubricates the parts.

In the main casting are formed four cylin-

ders C C and C' C'. The cylinders C C are arranged nearly in the same plane, while the cylinders C' C' are in a different but parallel plane. The cylinders are spaced around the frame ninety degrees apart. The space between the walls a , a' , a^2 , and a^3 constitutes the water chambers and passages. On each side between the pair of cylinders vertical central diaphragms a^6 a' are formed or cast. These divide the sides of the pump each into two water spaces or channels. Above and below the space between the cylinders is all open, the space below (represented by E) serves as a receiving and distributing chamber for the inflowing water, while the space above (represented by E') serves as a receiving-chamber for the outgoing water. An air-chamber E² may be connected with chamber E' for the usual purpose.

Referring to Fig. 3, the side channels for the water lead from chamber E to the right and to the left. The passage to the right is located this side of the diaphragm a' , and is terminated by the upper right-hand cylinder C. The passage to the left is located back of the diaphragm a^6 , and is terminated by the upper left-hand cylinder C'. Likewise there are passages leading to outlet-chamber E', the one on the right being back of diaphragm a^5 , its inner limit being the lower left-hand cylinder C. Connected with each cylinder is a water-chamber c c , &c. These chambers extend across the pump and communicate with the chambers on each side of the diaphragm through valves c' c' and c^2 c^2 , there being two valves for each cylinder, one opening inward to admit water to chambers c and the other opening outward to allow water to escape from said chambers.

In each of the cylinders is placed a removable lining d of brass or brass alloy. This is inserted in place through opening in the main casting covered by cap d' , and is held in place by the nut d^2 . The pistons in the cylinders standing opposite each other are connected by piston-rods with the same crank. It is obvious that the brass cylinders and the pistons may be substituted by others of different diameters, thus varying the capacity of the pump.

Water is drawn into the pump through passages F F, which lead to chamber E', thence

through inwardly-opening valves *f* to the distribution-chamber *E*. Thence the water divides, a part going to the right over cylinder *C'* and the remainder to the left under cylinder *C*. Then when the pistons are drawn out of the cylinders or toward the center of the pump the water forces its way through valves *c'* into chambers *c*, and when the piston returns the pressure upon the water thereby closes valves *c'* and opens valves *c*, which allows the water to escape into the passages communicating with receiving-chamber *E'*, and thence through the outlet-passage *G*.

The compactness of this pump renders it particularly adaptable for use in mines either as a stationary pump or a sinking pump. As a sinking pump, I have shown it connected with an electric motor and in a suitable frame. The pump itself is represented by *M*. In this instance it is turned on its side. The pipe *M'* leads down into the mine and the outlet-pipe is connected at *N*. The main shaft of the pump is stepped in a socket in the pipe *M'*. It extends through the pump and carries on its upper end the gear-wheel *m*, having internal teeth. To the upper side of the pump-frame is bolted or otherwise secured the frame *O*, which supports at considerable distance above the pump the electric motor *P*, the armature-shaft *P'* of which is placed in line with the pump-shaft. The lower end of this armature-shaft carries a pinion *p*, which engages with a gear *p'*, and the latter with the internal gear *m*. Above this internal gear is placed a disk or diaphragm *Q*, properly secured to the frame *O*, and in which the armature-shaft *P'* has a bearing. The gear *p'* runs on a stud, also secured to this diaphragm. The other bearing of the arma-

ture-shaft is formed in an extension of the frame *O'*. This extension is also provided with an eye *o'*, with which a block and tackle may be engaged for the purpose of raising and lowering the pump in the mining-shaft.

Having thus described my invention, I claim—

1. In a multi-cylinder pump, a casing having an annular interior space a part of which constitutes a chamber on one side for the incoming fluid and another part a chamber on the opposite side for the outgoing fluid, the spaces on each side between the two chambers being divided into two channels by central diaphragms, one of the channels on each side communicating with the chamber for the incoming fluid and the other channel on each side communicating with the chamber for the outgoing fluid, and a cylinder on each side of the two diaphragms and two valves for each cylinder, one located on each side of the diaphragms and affording communication between the cylinder and the respective channels on each side of the diaphragm, substantially as set forth.

2. The combination, with a pump and its central shaft, of an electric motor having its armature-shaft in line with the pump-shaft and geared to said shaft, and a frame connecting the pump and motor together, said frame having an extension whereby the pump and motor may be suspended.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

IMLE E. STOREY.

Witnesses:

THOMAS K. TRENCHARD,
FRANK S. OBERT.