

(No Model.)

2 Sheets—Sheet 1.

S. P. CRAFTS.

APPARATUS FOR VAPORIZING FUEL OIL.

No. 412,238.

Patented Oct. 8, 1889.

Fig. 1

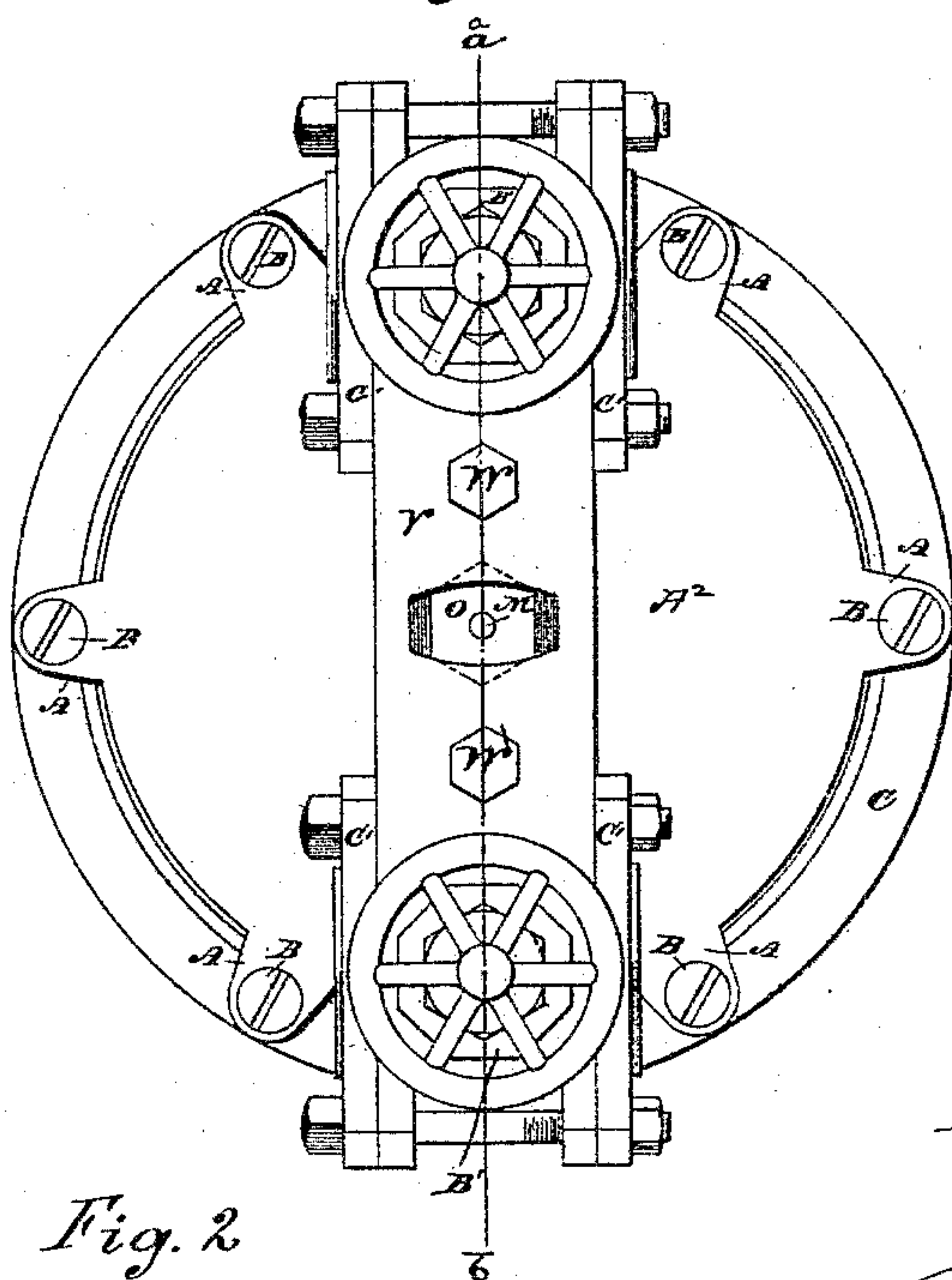


Fig. 2

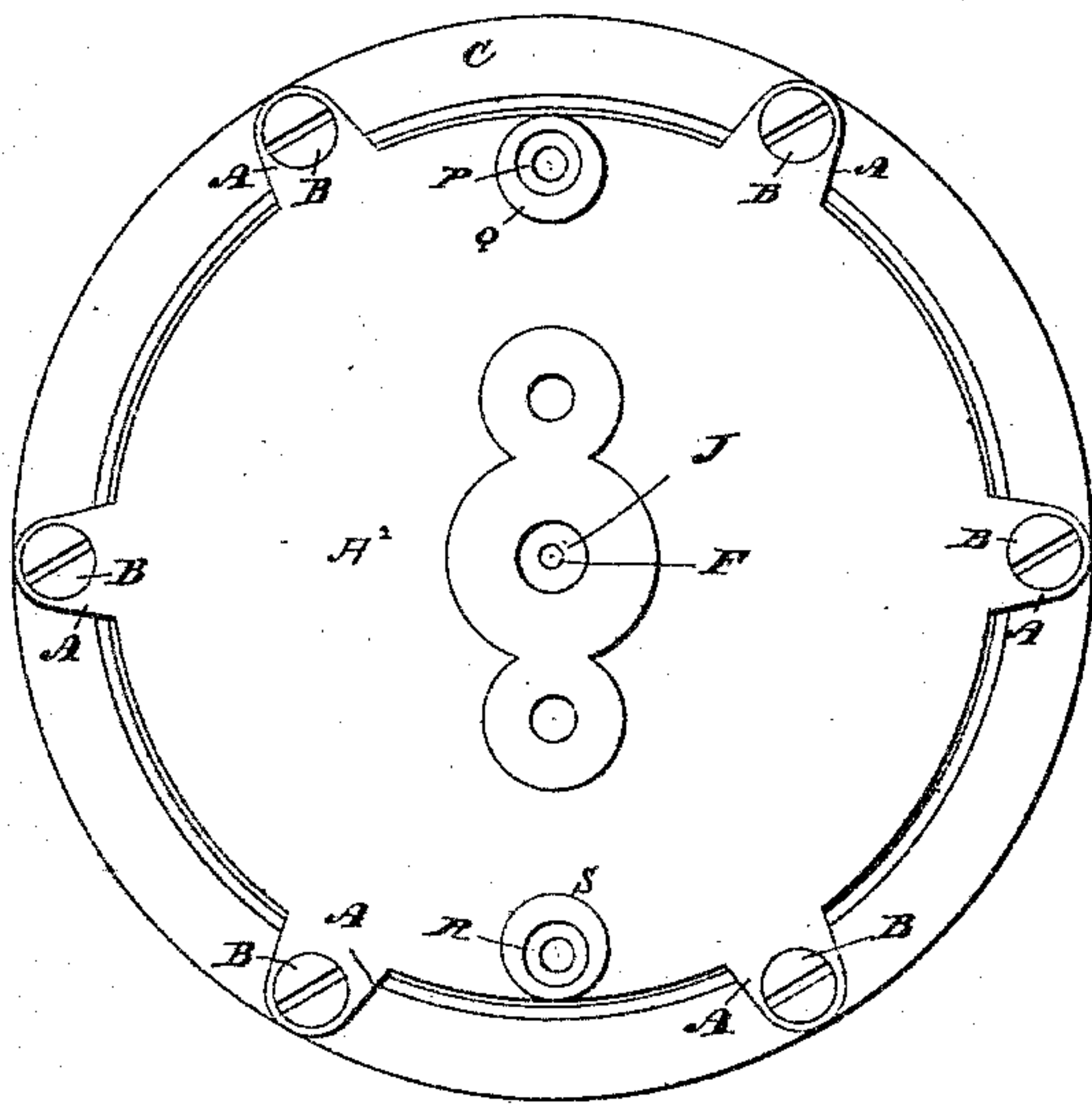
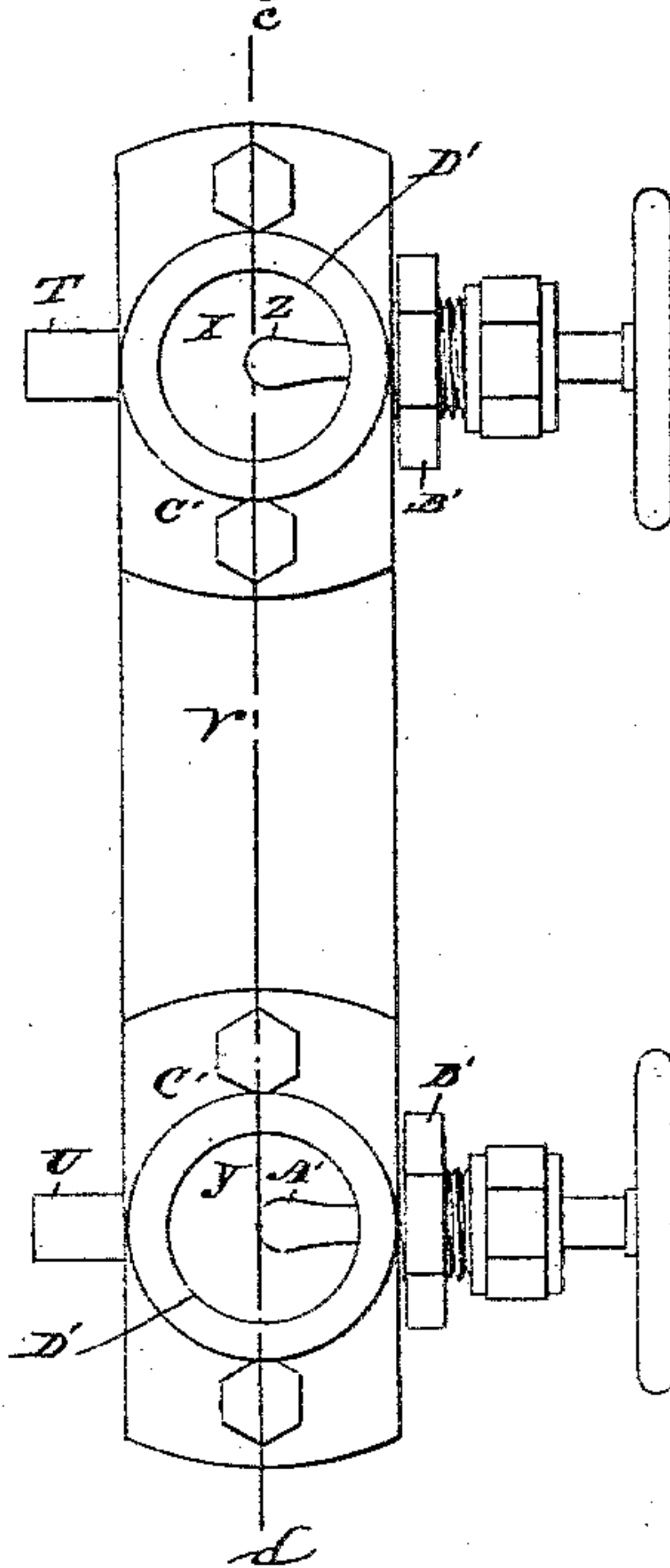


Fig. 3



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Fig. 4

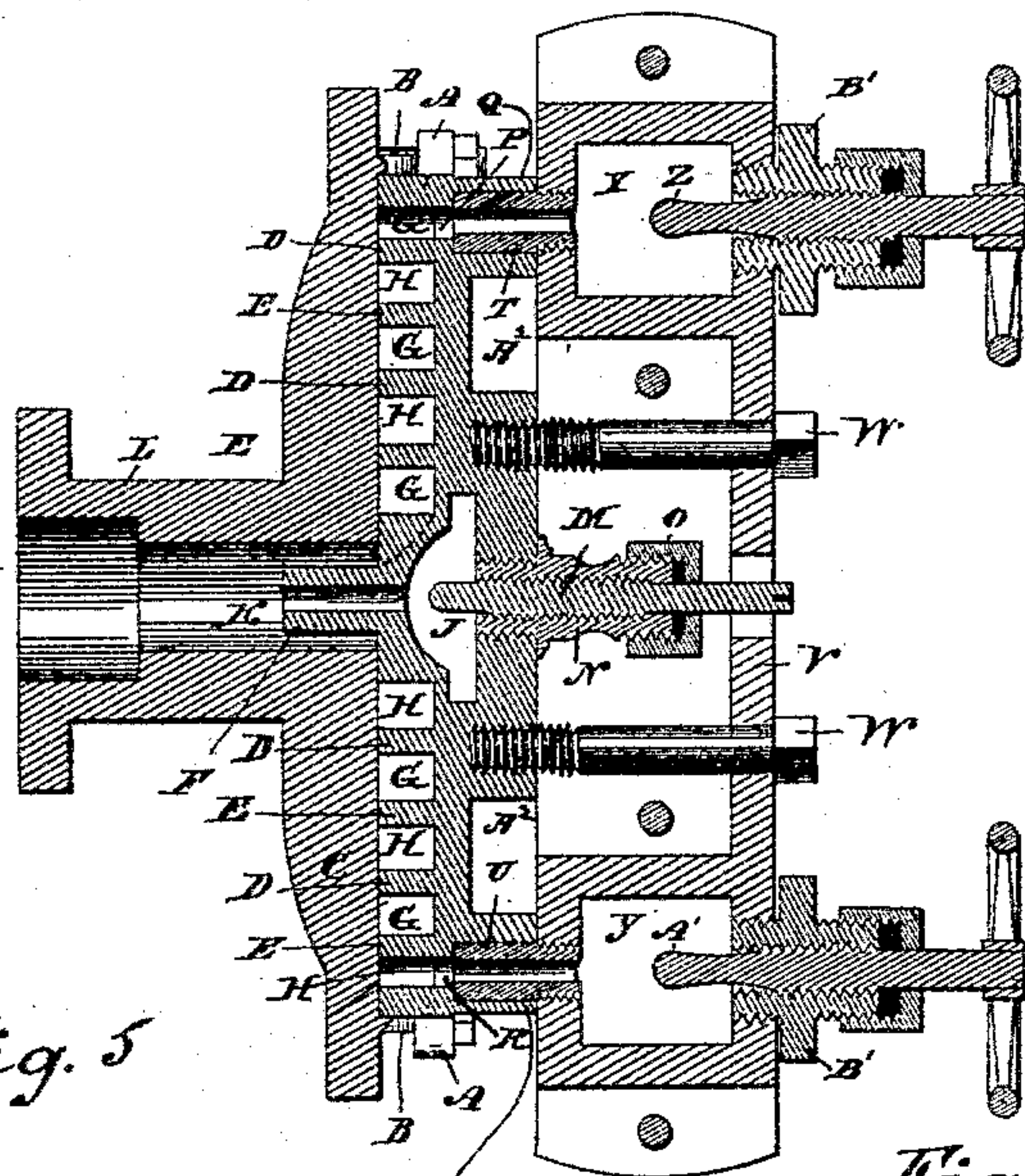


Fig. 5

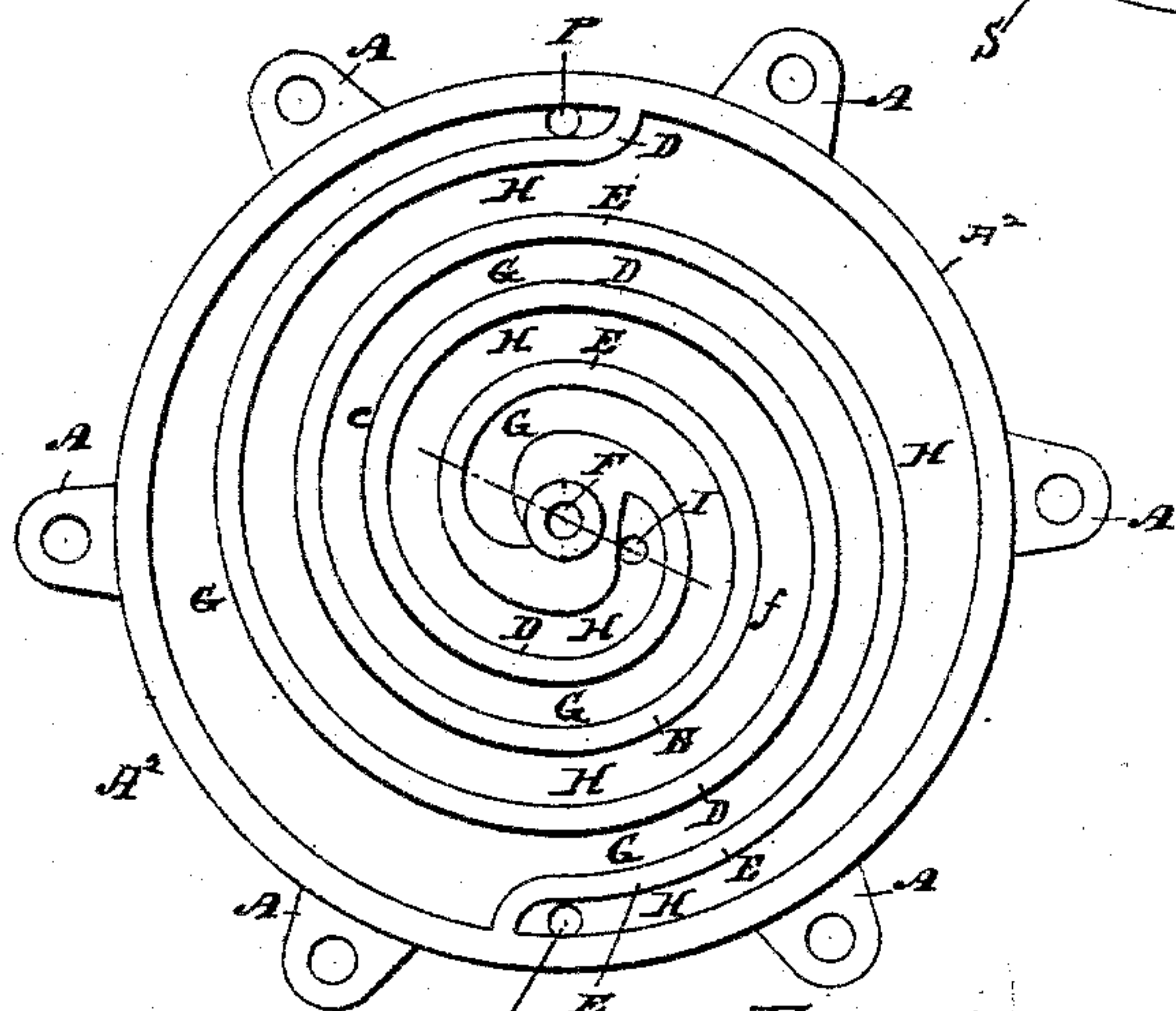


Fig. 6

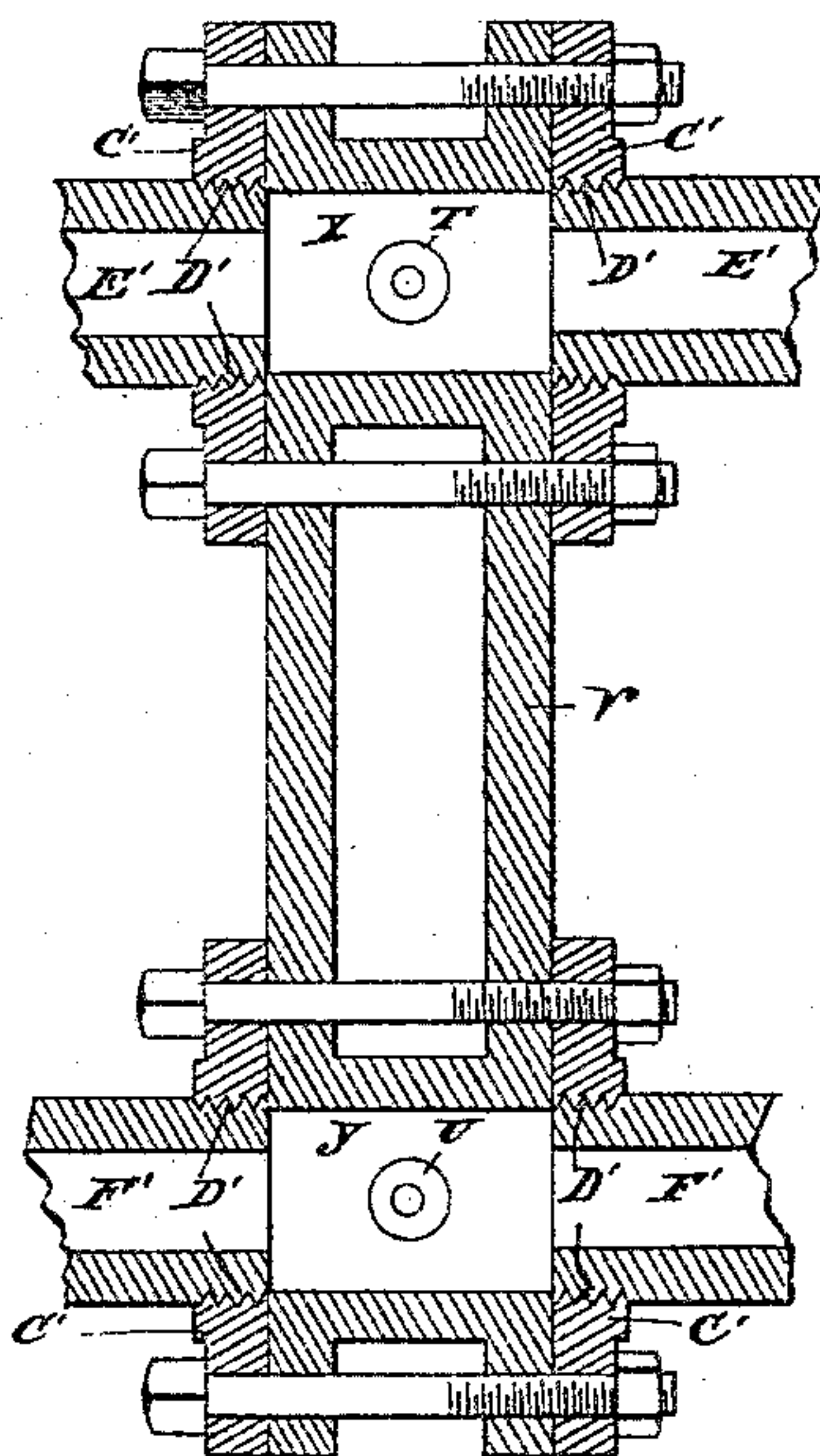
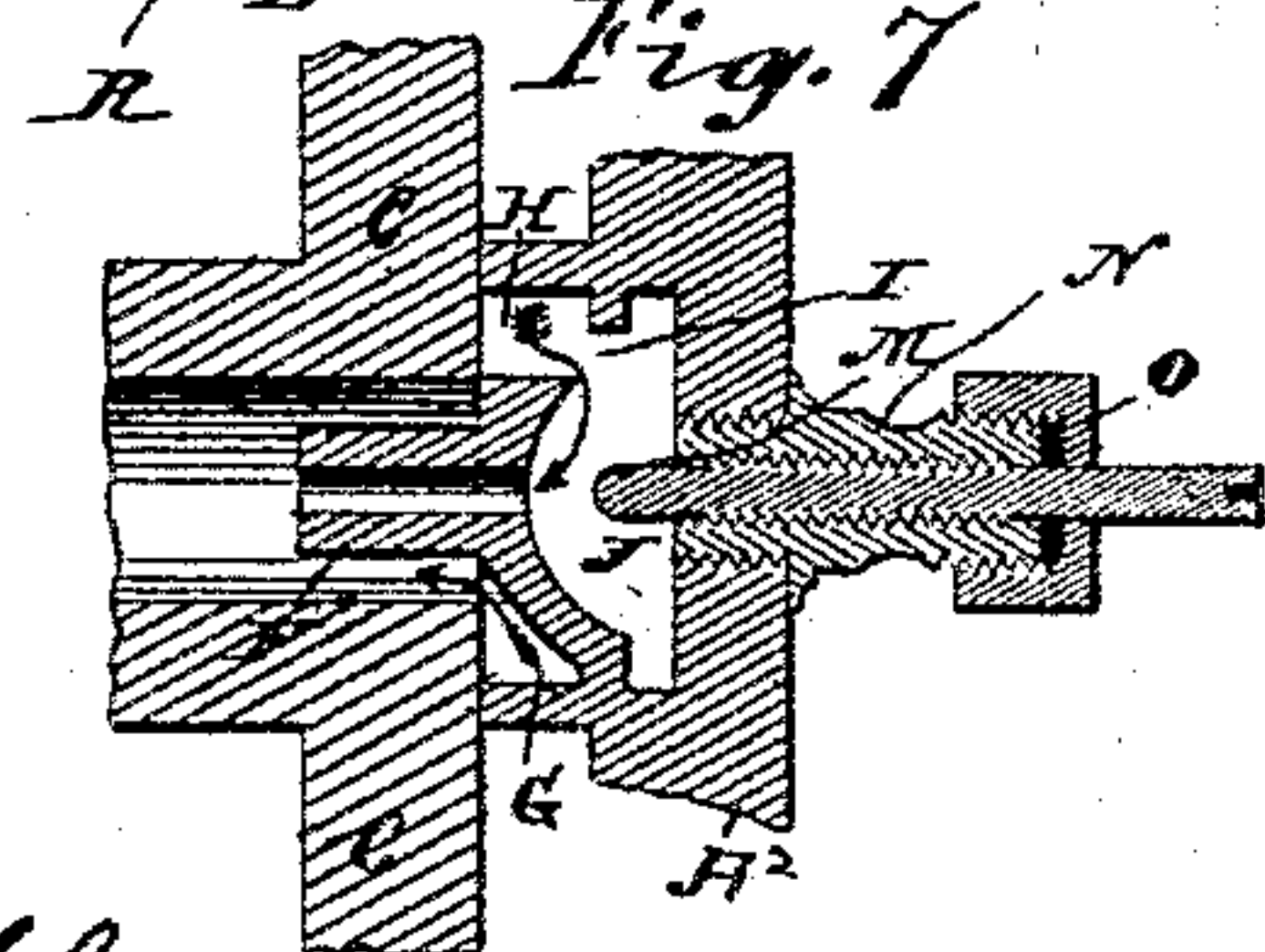


Fig. 7



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UNITED STATES PATENT OFFICE.

SAMUEL P. CRAFTS, OF HAMDEN, CONNECTICUT.

APPARATUS FOR VAPORIZING FUEL-OIL.

SPECIFICATION forming part of Letters Patent No. 412,238, dated October 8, 1889.

Application filed February 20, 1889. Serial No. 300,578. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL P. CRAFTS, residing at Hamden, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Apparatus for Vaporizers for Fuel-Oil; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to an improved atomizer or vaporizer for fuel or hydrocarbon oil, the object being to provide a simple, compact, efficient, and economic apparatus for this purpose.

With these ends in view my invention consists in certain details of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in front elevation of my improved device. Fig. 2 is a similar view with the valve and pipe-frame removed. Fig. 3 is a detached view in side elevation of the said frame. Fig. 4 is a view in vertical central section through the apparatus on the line *a b* of Fig. 1. Fig. 5 is a detached view in inside elevation of the atomizing-chest or vaporizing-chamber. Fig. 6 is a detached sectional view on the line *c d* of Fig. 3 of the valve and pipe-frame; and Fig. 7 is a broken sectional view showing the passage leading from the inner end of the spiral oil-passage into the vapor-chamber of the atomizing-chest and the outlet of the inner end of the spiral steam-passage into the chest-cap, the direction of the section being indicated by the line *e f* of Fig. 5.

As herein shown, the atomizing-chest or vaporizing-chamber *A*² is circular in form and provided with perforated lugs *A*, which project from its periphery and receive screws *B*, which secure the circular cap *C* to its inner face. Two ribs *D* and *E*, respectively, starting at opposite points on the said face of the chest, coiling one within the other in volute form and terminating at a longitudinally-chambered nipple *F*, divide the chest into a spiral steam-passage *G* and a spiral oil-passage *H*, such passages being concentric and having no communication with each other when the cap is on the chest except through

a passage *I*, (see Fig. 7,) leading from the extreme inner end of the oil-passage *H* into a vapor-chamber *J*, opening into the inner end of the longitudinally-chambered nipple aforesaid, which projects from the center of the inner face of the chest, and is surrounded by a chamber *K*, communicating with the inner end of the spiral steam-passage *G*, (see Fig. 7,) and formed partly in the chest-cap *C* and partly in a flanged hub *L*, projecting outward from the center thereof and constituting the attachment for the distributing-connections, whatever they may be, of the atomizer.

The size of the opening leading from the vapor-chamber into the inner end of the nipple *F* is regulated by means of an adjustable valve *M*, mounted in a box *N*, having a packing-ring *O* and projecting centrally outward from the outer face of the chest.

A steam-port *P* leads from the outer end of the spiral steam-passage *G* into a chambered hub *Q*, formed in the outer face of the chest at one edge thereof. A similar oil-port *R* leads out of the outer end of the oil-passage into a chambered hub *S*, corresponding to the hub *Q*, and located directly opposite the same on the outer face of the chest. These chambered hubs *Q* and *S*, respectively, receive short pipes *T* and *U*, fitting them closely and projecting from the inner face of a removable valve and pipe-frame *V*, secured to the outer face of the chest by means of threaded bolts *W W*, respectively located on opposite sides of the regulating-valve *M*, before mentioned. The inner ends of the said pipes *T* and *U* respectively lead into a steam-supply chamber *X* and an oil-supply chamber *Y*, formed in the frame *V*, and are countersunk to form valve-seats for the steam-inlet valve *Z* and the oil-inlet valve *A'*, the said valves being mounted in boxes *B' B'*, located in the outer face of the said frame *V*. Plates *C'*, bolted to the sides of the frame *V* and provided with threaded openings *D'*, located in alignment with the said steam-supply and the oil-supply chambers, are provided for the attachment of steam-supply pipes *E'* and oil-supply pipes *F'*. This frame *V* is only employed when a number of the atomizers are connected together in a series having common connections with supplies of steam and oil. Its inlet-valves will then be oper-

ated to control the volumes of steam and oil supplied to each atomizer. If the atomizers are to be used independently, the frame may be dispensed with and the steam and oil conducted directly to the ports located at the outer ends of the spiral steam and oil passages of the atomizing-chest.

Having now fully described my invention in detail, I will proceed to describe the mode of its operation. Steam and oil under pressure are admitted into the outer ends of the concentric spiral steam and oil passages and flow side by side through the same. The steam, being separated from the oil only by the thickness of the ribs on the inside of the chest, heats it intensely and so favors its atomization, which results from its friction with the constantly-contracting walls of its passage, the curves of which grow more abrupt as they approach the center of the chest. By the time, therefore, the oil has reached the inner end of the spiral oil-passage it is broken up into very fine spray or vapor, which passes through the passage at the inner end of such spiral and into the vapor-chamber behind the chambered nipple, through which the vapor then escapes to be mingled at the outer end thereof with the steam, which circles around such nipple in a spiral motion, which is imparted to it by the shape of the spiral steam-passage. The mingled steam and atomized or vaporized oil are now burned, the proportions in which they are combined being regulated by the steam-inlet and oil-inlet valves. The chief function of the steam is, however, to heat the oil and act as a vehicle for carrying it when atomized to the point where it is to be burned.

If desired, steam may be replaced by compressed air, and I would have it understood that I hold my invention as covering the use of air as well as steam. Portions of the oil may be actually vaporized by the heat; but it is not necessary so far as the presentation of this invention is concerned to consider whether actual vaporization or only atomization occurs. In either case the oil is prepared for burning as a fuel.

Having fully described my invention, what

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

1. An apparatus for vaporizing fuel-oil and commingling it with steam or air, consisting of a vaporizing-chamber provided with two spiral or volute ribs forming two spiral passages lying side by side and terminating near the center of the chamber, where each passage has an outlet-port, a port for steam or air leading into the outer end of one passage, an oil-port leading into the outer end of the other passage, and means for commingling the steam or air and vapor as they issue from the inner ends of the said passages, substantially as set forth.

2. An apparatus for vaporizing hydrocarbon oil and commingling it with steam or air, consisting of a vaporizing-chamber provided with two spiral or volute passages terminating near its center, a chambered nipple projecting from the center of the vaporizing-chamber, a vapor-chamber located behind the said nipple, a passage leading from the inner end of the oil-passage into the said chamber, and ports entering the outer ends of the said passages, substantially as set forth.

3. In an apparatus for vaporizing hydrocarbon oil and commingling it with steam or air, the combination, with a vaporizing-chamber provided with two spiral or volute passages concentric throughout their length, of a chambered nipple located in the center of the chamber, communication between the inner end of one passage and the inner end of the nipple, ports leading into the respective passages, and a cover secured to the chamber over the said passages and forming around the nipple an annular chamber, which communicates with the inner end of the other passage, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

SAMUEL P. CRAFTS.

Witnesses:

CHAS. B. SHUMWAY,
WM. J. DE MAURIAC.