

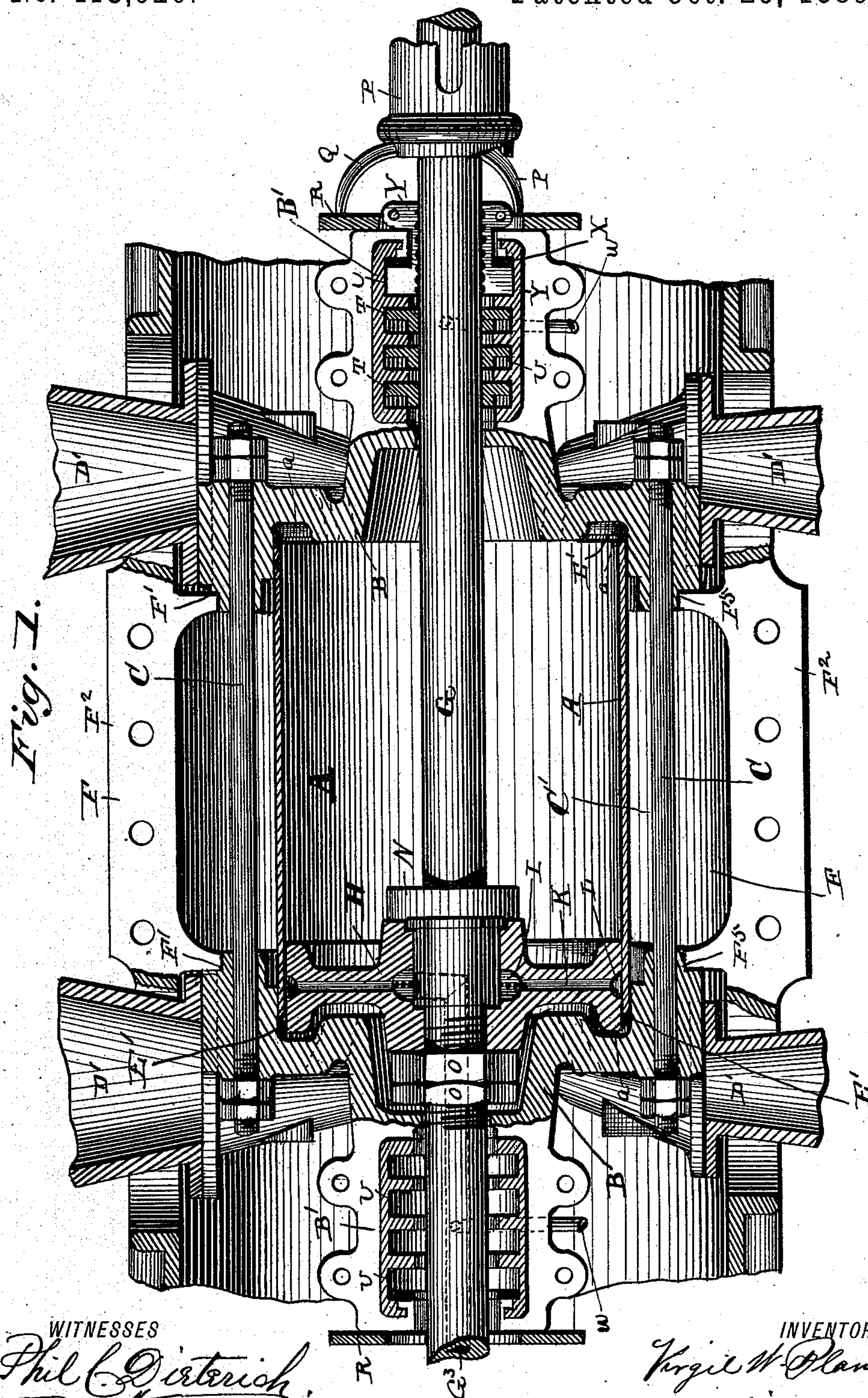
(No Model.)

2 Sheets—Sheet 1.

V. W. BLANCHARD.
STEAM ENGINE CYLINDER.

No. 413,920.

Patented Oct. 29, 1889.



WITNESSES
Phil C. Dieterich
A. E. Dowell

INVENTOR
Virgil W. Blanchard
By *his Attorney*
W. Alexander

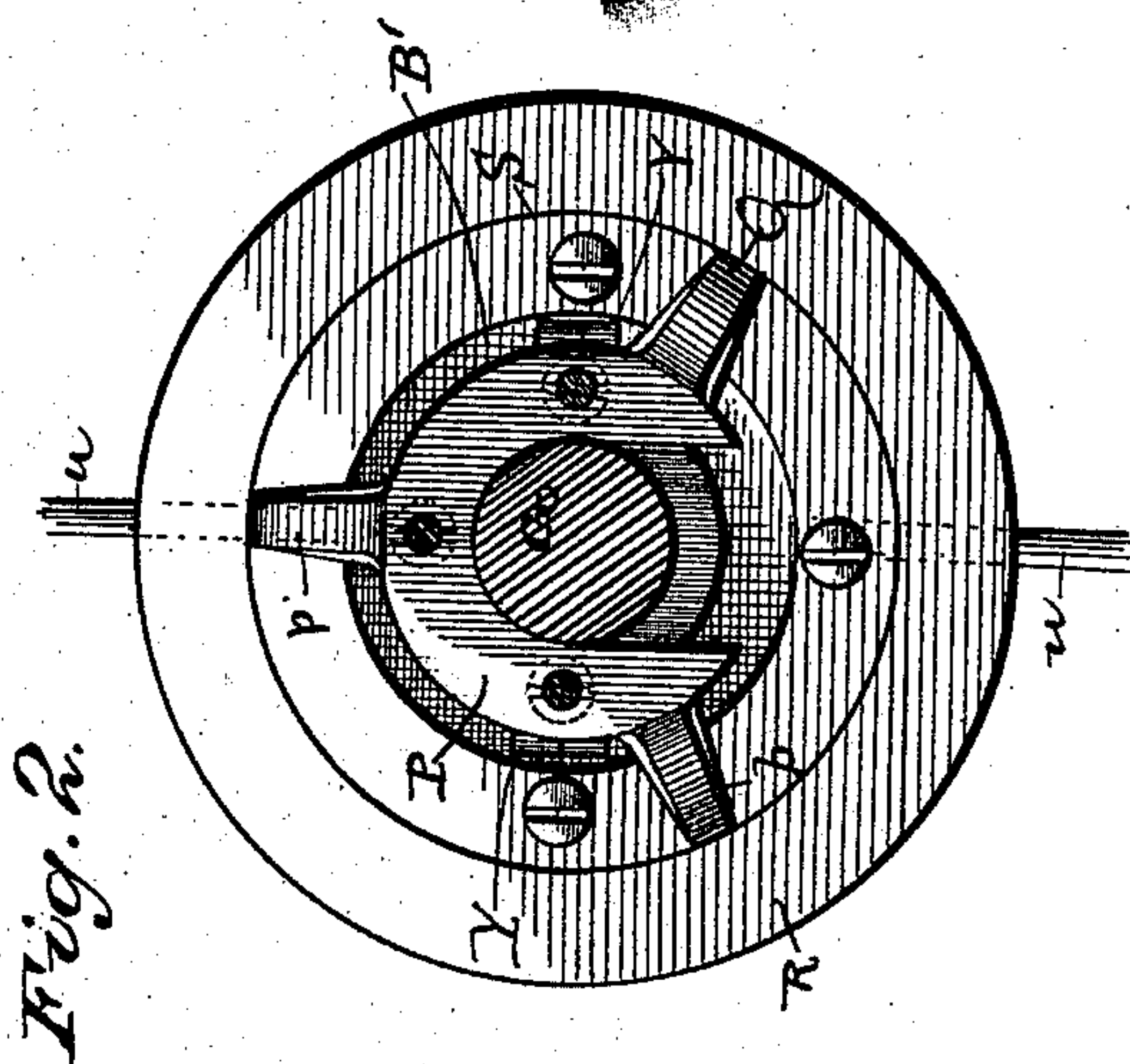
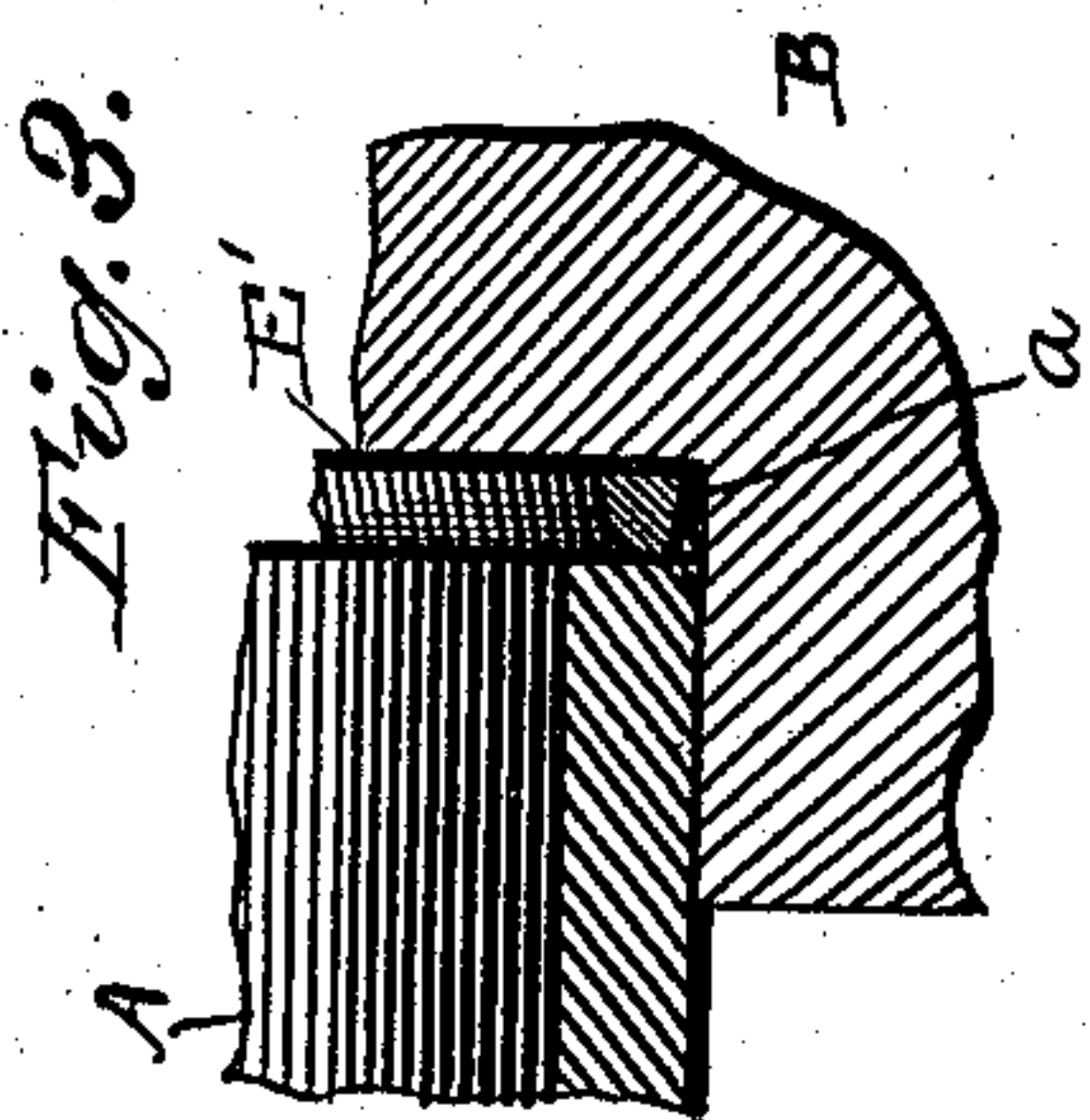
(No Model.)

2 Sheets—Sheet 2.

V. W. BLANCHARD.
STEAM ENGINE CYLINDER.

No. 413,920.

Patented Oct. 29, 1889.



WITNESSES

Phil. Dietrich.
a. e. Dowell

INVENTOR

Virgil W. Blanchard
By *his Attorney*
W. Alexander

UNITED STATES PATENT OFFICE.

VIRGIL W. BLANCHARD, OF NEW YORK, N. Y., ASSIGNOR TO JOSEPH A. DAVIS, OF SAME PLACE.

STEAM-ENGINE CYLINDER.

SPECIFICATION forming part of Letters Patent No. 413,920, dated October 29, 1889.

Application filed April 13, 1889. Serial No. 307,155. (No model.)

To all whom it may concern:

Be it known that I, VIRGIL W. BLANCHARD, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Steam-Cylinders; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification, in which—

Figure 1 is a central horizontal sectional view through my improved steam-engine cylinder and piston and stuffing-boxes thereof, parts of the engine being broken away. Fig. 2 is an end view of one of the registering devices for centering the piston-rod; and Fig. 3 is a sectional detail, enlarged, showing the manner of using soft-metal packing-rings between the cylinder-heads and ends of the cylinder.

This invention is an improvement in steam-engines, and it has especial reference to the construction of the cylinders of steam and other engines; and my objects are to so construct the various parts that they are easily and quickly detachable from each other and are of such form and weight as to make their handling easy in case of needed repairs or in the process of transportation; second, to make them of such form and proportion that the requisite strength and durability are secured with the least possible expenditure of material and to have each piece sustain such relations to its neighbors that its fitting up from the rough is accomplished with an adaptation for perfect joints, without costly special tools, quickly, and with ordinarily-skilled labor; third, to adapt ductile metals of the greatest strength where the strain is most severe, and thus insure safety from fracture and largely diminish the weight of the parts entering into its construction. All these objects are attained by the means illustrated in the drawings, and hereinafter particularly and clearly described and claimed.

Referring by letter to the drawings, A designates the tubular wall of the cylinder, which is composed of steel, bronze, or other suitable material of sufficient strength to resist a high steam-pressure. This wall is merely a cylinder of metal and is comparatively light, so

that it can be handled with ease and bored with the greatest accuracy and facility. The ends of this tube A are closed by heads B B, which have an annular groove in their inner faces, in which is seated a ring or annulus E', of soft metal or other heat-resisting material. (Shown more clearly in Fig. 3.) The heads B B are of larger diameter than tube A, and are united by bolts C C, as shown in Fig. 1, securely nipped at their extremities, thus embracing the tube A firmly between the heads. The cylinder-heads are bored out at *a a*, leaving annular shoulders or abutments for the packing-rings E', so that when compressed they will not interfere with the piston H at the termini of its strokes. The heads B B are provided with the port-apertures D' D', and these heads are formed of cast metal, preferably of steel or bronze.

F designates the semi-cylindrical shell or supporting-frame for the steam-cylinder, in which the cylinder is accurately fitted after its heads B B are secured by bolts C in their proper places, the heads being braced against longitudinal strain or movement on the shell by accurately-fitting shoulders F' F', which abut against annular ribs or flanges F^s in the shell F, as indicated in Fig. 1.

F² F² designate flanges springing laterally from the semi-cylindrical shell F, to which a semi-cylindrical cover (not shown in the drawings) is bolted, which cover should form close joints with the heads B B and shell F, similarly to the joints between the flanges F^s and said heads, thereby leaving an annular space C' between tube A and the shell and cover, which form an exterior to casing to tube A or the cylinder proper.

By filling the space C surrounding tube A with asbestos fiber or any other suitable non-conducting refractory material exterior radiation of heat from the tube A is effectually prevented and said wall in a measure re-enforced.

G designates the piston-rod, playing through the cylinder and through stuffing-boxes in heads B B, as hereinafter described.

H designates the piston, secured on said rod between an annular shoulder N thereon and locking and jam nuts O O, as shown, or in other suitable manner. One end of said pis-

ton-rod is bored, as indicated at G^3 , and this bore extends into the cylinder and to the piston H, where it connects by a lateral opening G^4 (indicated in dotted lines) with an annular channel I in the hub of the piston H. This channel I communicates with a peripheral annular groove L of the piston by radial openings K, as shown, and if water is supplied to the piston-rod it can find its way to the periphery of the piston, as is evident.

Q designates a piston-centering spider formed of a saddle P (fitting the rod G outside the cylinder) and curved prongs p , as shown in Fig. 1; and R is a registering-plate fixed to the end of the stuffing-box B' and having a circular registering-line S marked on its face, as shown in Fig. 2, by means of which the engineer can determine accurately the position of the piston in the cylinder with respect to the longitudinal axis thereof, and correct it in case of error by adjusting the slideways carrying the piston-rod, which ways are not shown.

B' B' designate stuffing-boxes on the exterior faces of heads B B, provided with semi-annular cavities U U U for the reception of the metallic piston-rod packing-rings T T, and also for the exterior or terminal packing-annulus Y. (Shown in Fig. 1.)

It will be observed by reference to Fig. 1 that one extremity B' represents the metal piston-rod packing-rings in position, while the other represents the semi-annular cavities formed in annulus Y, the rings being removed. The annulus Y is made in two halves, each alike, and which are placed one upon the other to complete each packing-box. The rings are formed in two parts halved and connected by a joint and screws, as indicated, and they are also perforated, as at $v v$.

It will be observed by reference to Fig. 1 that when rings T are in place on rod G or around said rod there is not only a space between them, but that they are a little less in diameter than the cavities which they occupy. The stuffing-boxes may be connected by suit-

able pipes ww with a water-supply, by which the spaces between and around the rings are supplied with water to make a water-packing and steam-tight joints, and also obviate all friction and wear. The loosely-fitting rings also permit the adjustment of the piston-rod for centering the piston in the cylinder, as described.

X indicates a rubber gasket, by which a water-tight joint may be formed between the exterior or terminal packing Y and the extremity of the stuffing-box B'.

I do not herein claim the stuffing-box packings nor the means for lubricating the piston. The former is embraced in my application for Letters Patent filed April 17, 1889, Serial No. 307,613, for piston-rod packings, and the latter will form the subject of another application.

Having thus described my invention, what I claim as new is—

1. The combination, with the annularly-recessed heads and the thin tube confined between the same, of the semi-cylindrical flanged supporting-shell sustaining the heads, substantially as specified.

2. The combination of the tube, the annularly shouldered and recessed heads having inlet and outlet steam passages fitted on the ends of said tube, and the confining-bolts therefor, with the supporting semi-cylindrical shell for said heads and the non-conducting filling between the casing and tube surrounding the latter, all substantially as set forth.

3. The combination, with the tube A and the annular casing thereof, of the heads B B, having boxes B' B', and the piston and piston-rod, all substantially as and for the purpose described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

VIRGIL W. BLANCHARD.

Witnesses:

W. R. KEYWORTH,
F. O. MCCLEARY.