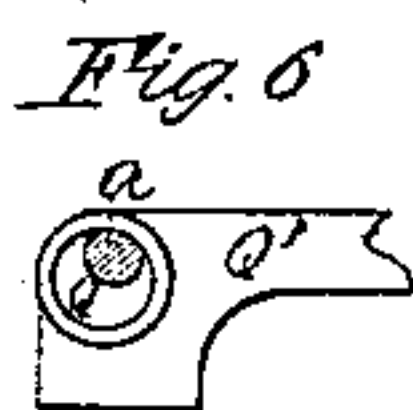
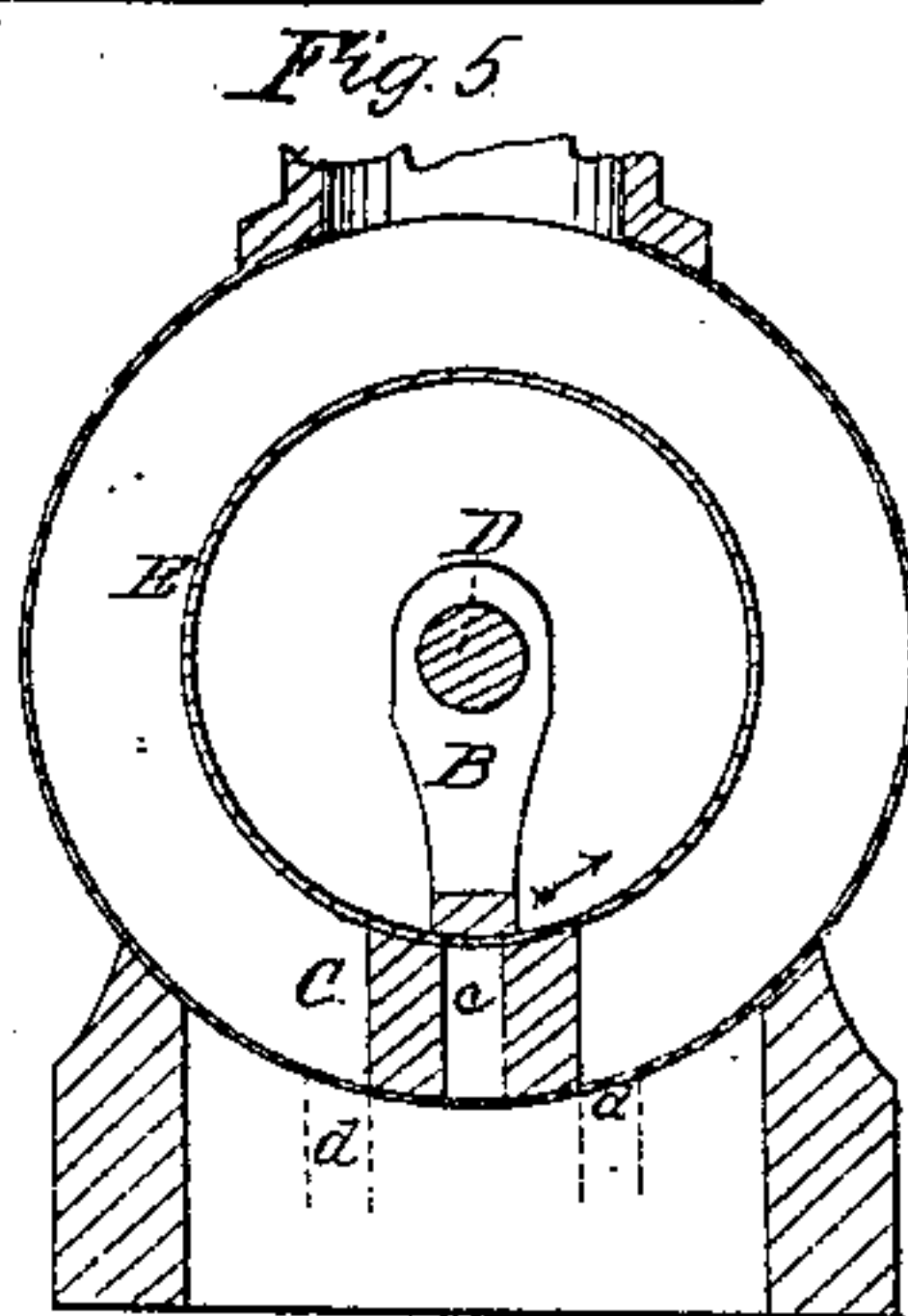
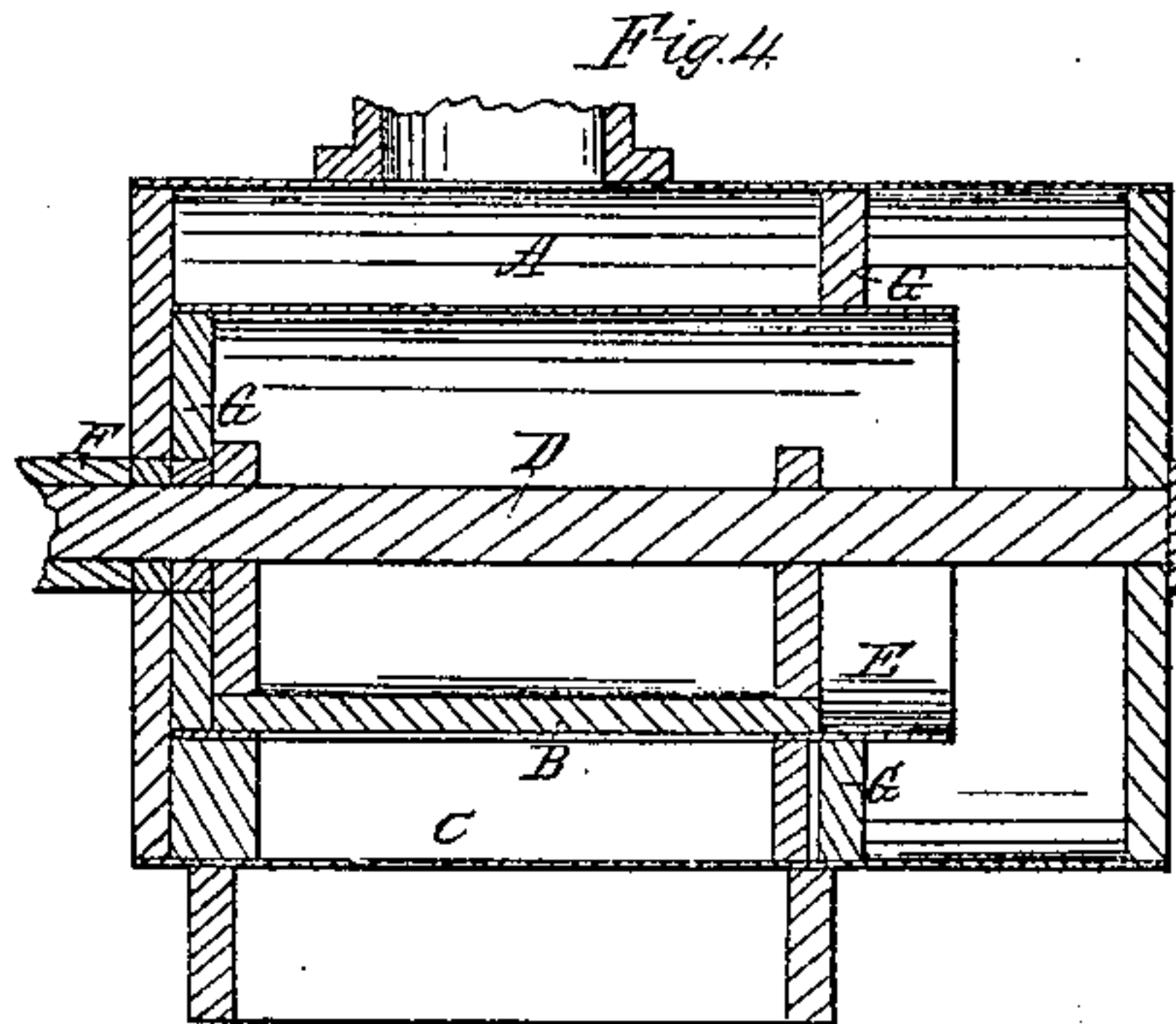
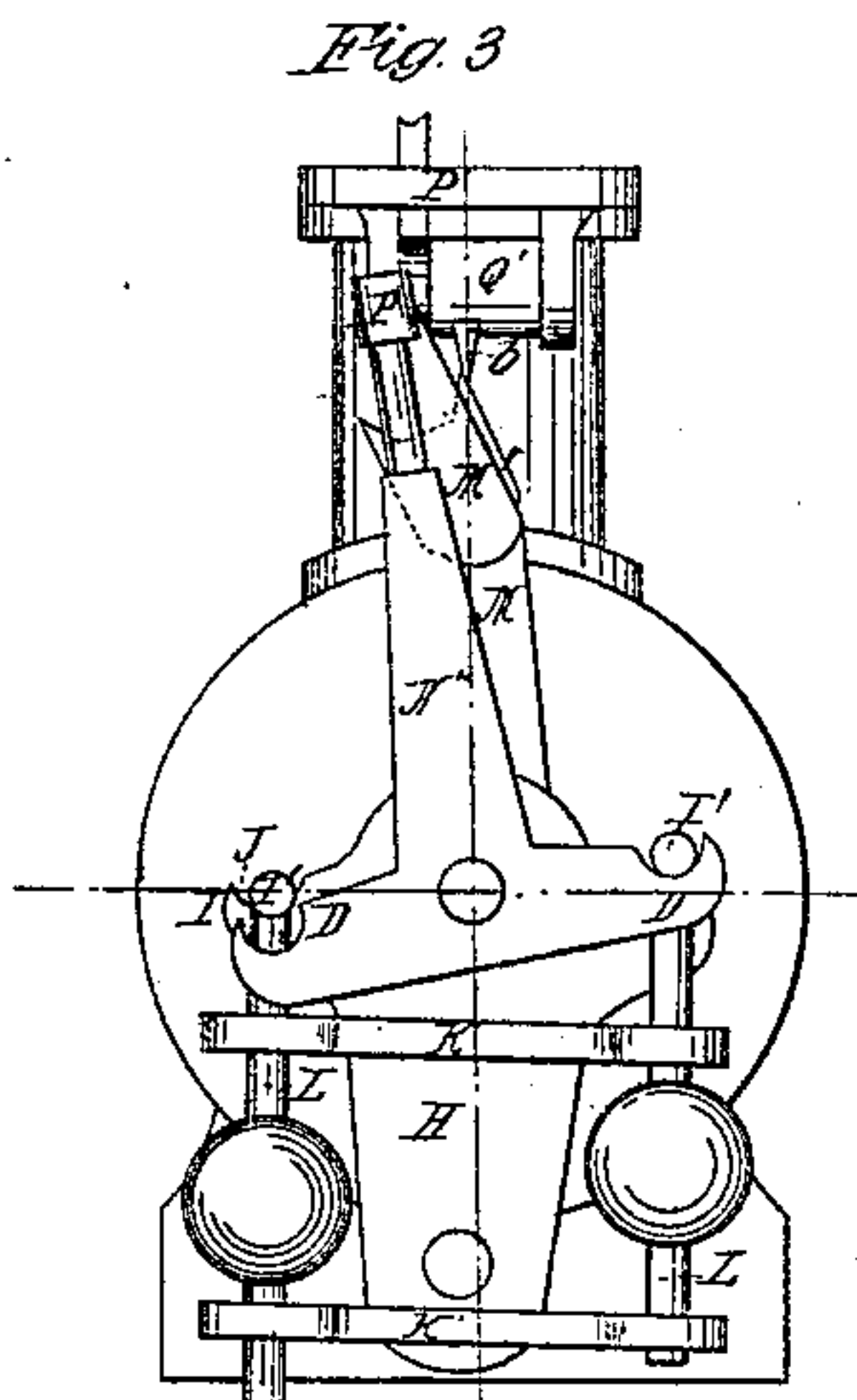
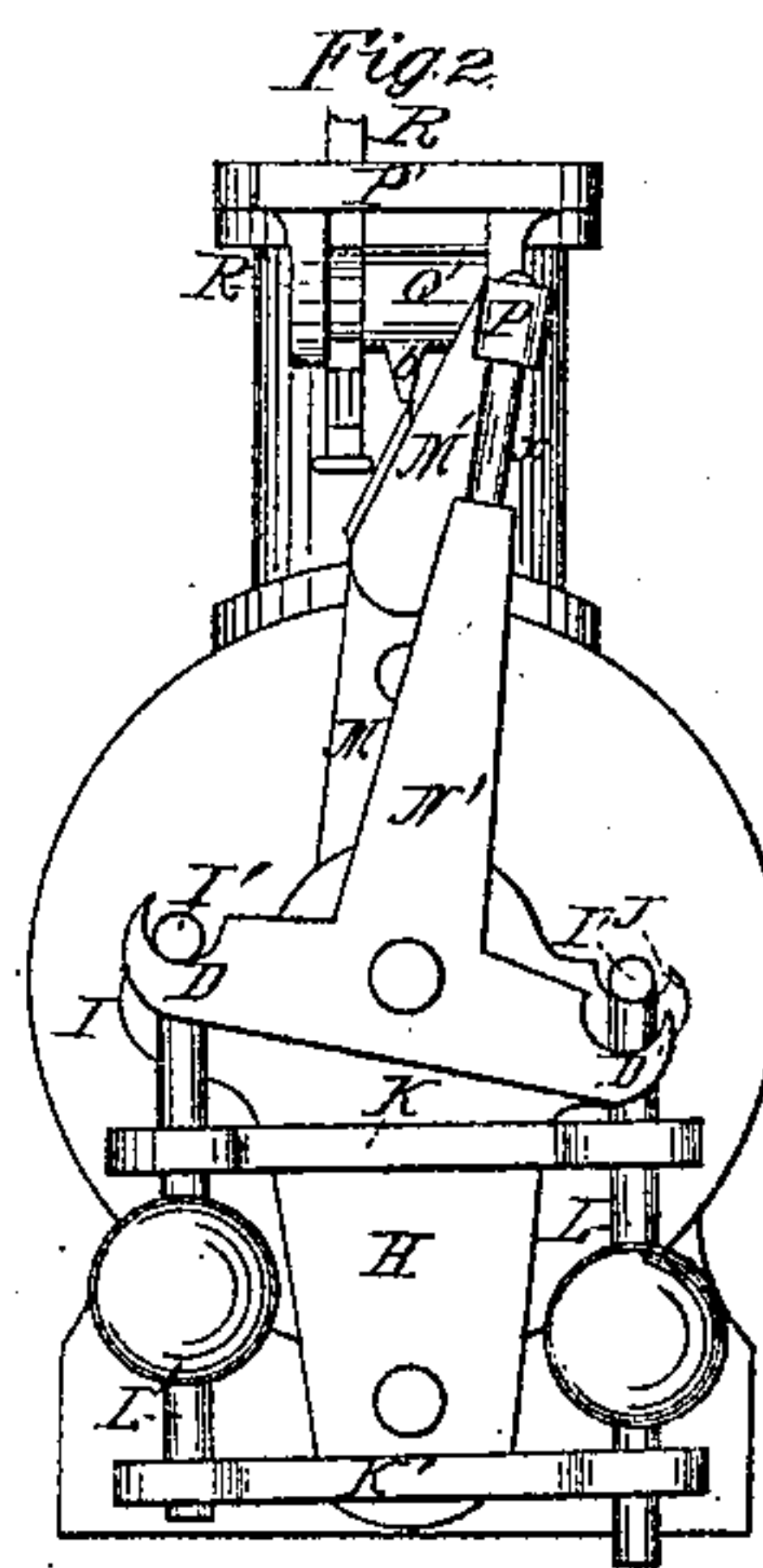
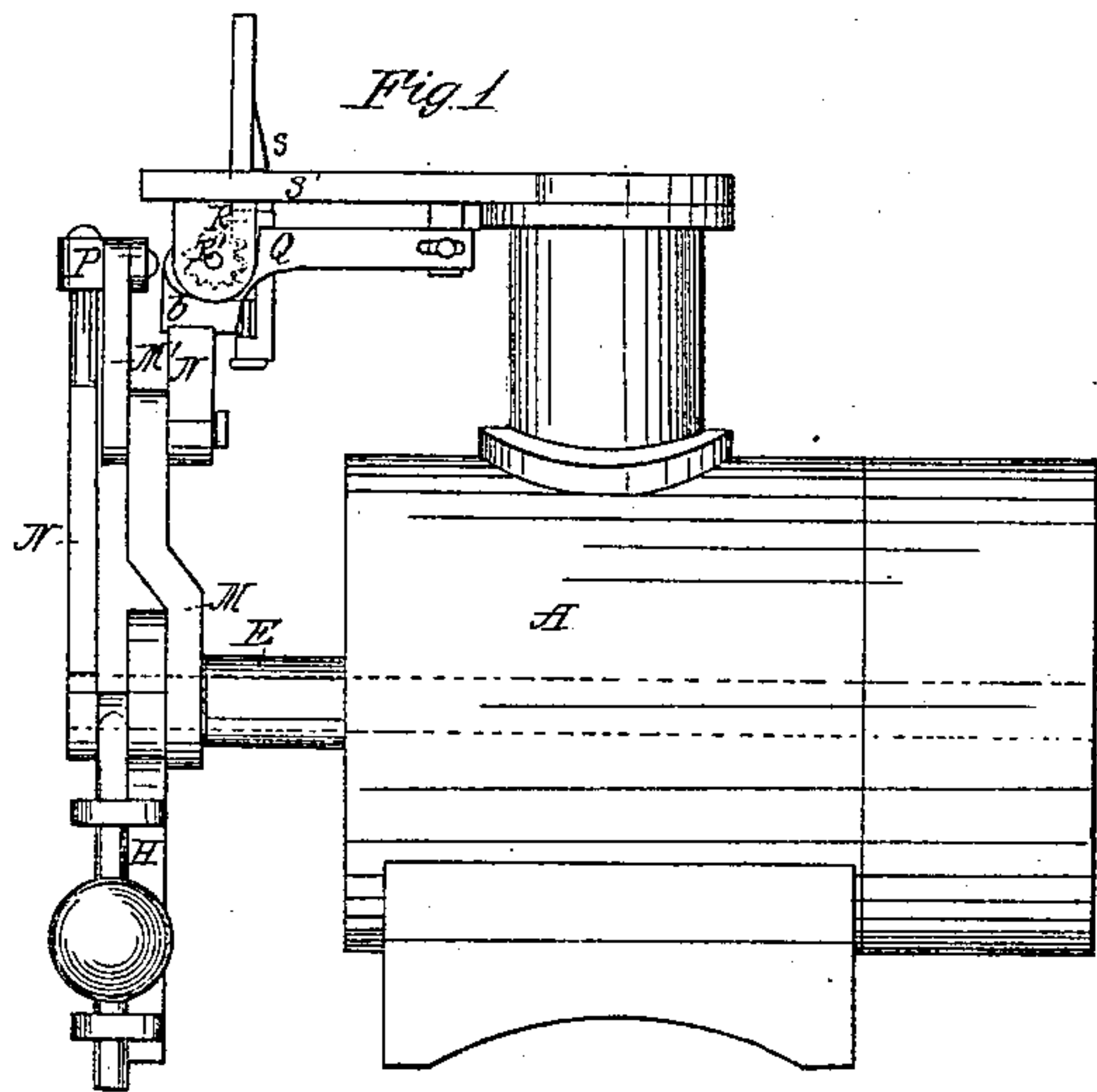


J. V. Weitz,
Steam-Engine Valve-Gear.
No 68,473. Patented Sep. 3, 1867.



Witnesses
J. H. Burdette
Frank S. Alden

Inventor
J. V. Weitz

United States Patent Office.

J. V. WEITZ. OF CLEVELAND, OHIO.

Letters Patent No. 68,473, dated September 3, 1867.

IMPROVEMENT IN LOW-WATER DETECTORS FOR STEAM-GENERATORS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, J. V. WEITZ, of Cleveland, in the county of Cuyahoga, and State of Ohio, have invented certain new and useful Improvements in Steam-Valves; and I do hereby declare that the following is a full and complete description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a side view of the apparatus.

Figure 2 is a front end view, with the right-hand port of the valve opened.

Figure 3, a front view, with the left port opened.

Figure 5, a transverse section.

Figure 6, a detached section.

Like letters of reference refer to like parts in the different views.

A, fig. 1, is the valve-chamber, in which are arranged the valves B C, fig. 4, of which B is connected to the shaft D, and C to the annular chamber E. The front end of this chamber is supported by and turns on the shaft D by means of a sleeve, F, attached to the head G of the chamber, and through which the shaft is seen to project, whereas the opposite end of the chamber passes through and is supported by a diaphragm, G', and in which it oscillates, as will hereafter be shown. To the projecting end of the sleeve F, referred to, is keyed a dependent arm, H, figs. 2 and 3, provided with lateral lugs I, in each of which is a rounded notch, J. To this arm are transversely fixed the stays K K', in which are supported and guided the weighted rods L L', which are hung in the notches of the lugs I by means of the cross-arms I', fig. 2, the purpose of which will hereafter be shown. To the sleeve is also keyed a vertical arm, M, fig. 1, to the upper end of which is pivoted a crank, M', and a cam, N, a side view of which is shown by the dotted lines in fig. 3. To the end of the shaft D, which is seen to project through the sleeve, and in which it works, is keyed a vertical lever, N', provided with horizontal arms D' D', in the ends of which a rounded notch is cut, in character and position the same as those in the lugs above referred to, and in which one of the cross-arms I is lodged, as shown in figs. 2 and 3. The upper end of the lever N' is rounded to a rod-like stem, and is connected to the crank N' by an eye, P, through which the stem slides, and is guided in its movements. Journalled in the checks of the stay P', fig. 3, is an eccentric, Q, fig. 5, in which figure a is the shaft. On this eccentric is placed and operated a cam, Q', of which fig. 6 is a detached section. By this arrangement it will be obvious that, as the eccentric is made to turn by the governor to which it is connected and operated, the dependent lug b of the cam will be more or less depressed, according to the radial throw of the eccentric.

Having thus indicated the several parts of the apparatus, the operation of the same is as follows:

When the lever N' and arm M are brought to a vertical position, as indicated by the red line, fig. 3, the valve B, to which the lever N' is attached by means of the shaft D, closes the port c, as shown in fig. 5, thereby shutting off the steam from the ports d d', one on each side of the valve C, as indicated by the dotted lines. Now, in order to induct steam into the cylinder through either of the ports d, it will be necessary to move the valve B from the port c, and at the same time to move the valve C so as to bring the port c in conjunction with the port d or d'. To accomplish this shifting of the valves, the arm H is connected to the eccentric of the engine, and by which it is made to oscillate, and thereby operate the valves. Thus when the arm H is drawn to the right, as shown in fig. 2, the valve C, fig. 5, will be moved to the right, and thus bring the port c in conjunction with port d, at the same time the arm is being drawn to the right and moving this valve. The cam N strikes against the lug b of the cam Q', thereby throwing the crank M' and the lever H, to which it is attached, in the direction shown in fig. 2. This lever being keyed to the shaft D, operates the valve B, and causes it to slide in the direction of the arrow, and thus opens the port c, through which the steam enters the port d, and from thence into the cylinder. At the moment the ear of the cam N slips from the lug b the weight on the rod L', which is now raised up and supported on the thus lifted arm of the lever, will cause the lever N' to approach a vertical line, and will thus throw the opposite ear of the cam against the lug b, as shown in fig. 3, and which, by the reverse action of the eccentric now exerted upon the arm H, carries the lever, crank, and cam to the position shown in fig. 3, which, it will be seen, is the reverse of that shown in fig. 2. This, as a consequence, produces a reverse movement of the valves, thus throwing the valve B toward x, and the valve C toward port

d' , until the ports c and d' are in conjunction, and so on alternately. As the arm H is oscillated from right to left, and from left to right, each time the arm H operating directly the valve C and the cam N , crank M' operating the valve B by means of the arm H , and the weights alternately bringing the ears of the cam against the lug b .

It will be obvious that the distance the ports are opened and the amount of steam admitted to the cylinder at once will depend upon the length of the throw of the valves; hence the greater the throw of the valves the wider the ports will be opened, and a larger amount of steam admitted into the cylinder, thereby increasing the action of the engine. In order to regulate the amount of steam in the cylinder, and give a constant and uniform supply, and thus obtain a regularity in the running of the engine, the governor is attached to the eccentric Q , to which the cam Q' is connected and operated as above described. Now, if the longer radius of the eccentric is downward, the lug b will descend and cause the cam N to be thrown more obliquely as it passes under the lug, the consequence of which will be to increase the length of the vibration of the lever N' , which will produce a corresponding increase in the throw of the valve B , thereby opening the port c , more or less, as the vibration given to the valve by the distance the lug may have been made to descend, and which, it will be evident, is gauged or controlled by the action of the governor. Thus the induction of the steam is easily and simply graduated to the demands of the engine. Should the eccentric be so turned as to bring its shortest radial line downward, the cam or lug of the cam would be thrown up so far that the ears of the cam N would not strike. In this condition the valve B would cease to operate, closing the port, and thus bring the engine to a stop. The valve B , and the above-described arrangement for operating the same, may be easily and cheaply applied to an old engine, not expressly constructed for its application, by taking the annular chamber E and valve B and placing it above the steam-chamber A or at any desirable point. In applying the valve to an old engine in this way the annular chamber answers as the steam-chest for the valve. In applying the cut-off valve in this way it will be necessary to operate it by attaching the eccentric rod to the arm M instead of to the arm H , as in this case, and still retaining the apparatus in all its essentials the same.

The manner of operating the cam Q' by the governor is by attaching the rod of the said governor to the upper end of the rack indicated by the dotted line R , fig. 1, which is seen to engage in the cog-wheel R' connected to the cam. As the rack is made to move upward and downward the cam will be turned more or less, and cause the lug b to descend or rise up, and thus effect the action of the cam N , for the purpose above said. Should the action of the governor be so great as to raise the rack so high as to cause the spring S to lodge upon the top of the reach S' , as shown in fig. 1, the lug b will be so far raised as to be no longer engaged by the cam N ; the consequence will be a full stopping of the engine, and thus avoid all danger that might result from an undue speed.

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

1. The arm H , stays K , weighted rods L L' , as arranged in combination with the sleeve F and valve C , for the purpose and in the manner set forth.
2. The vertical arm M , crank M' , and cam N , in combination with the valve C , as and for the purpose described.
3. The lever N' , when operated conjointly by the crank M' and weighted rods L , in combination with the valve B , as and for the purpose set forth.
4. The eccentric Q , cam Q' , and lug b , as arranged in combination with the cam N , for the purpose and in the manner substantially as described.

J. V. WEITZ.

Witnesses:

J. H. BURRIDGE,
E. E. WAITE.