

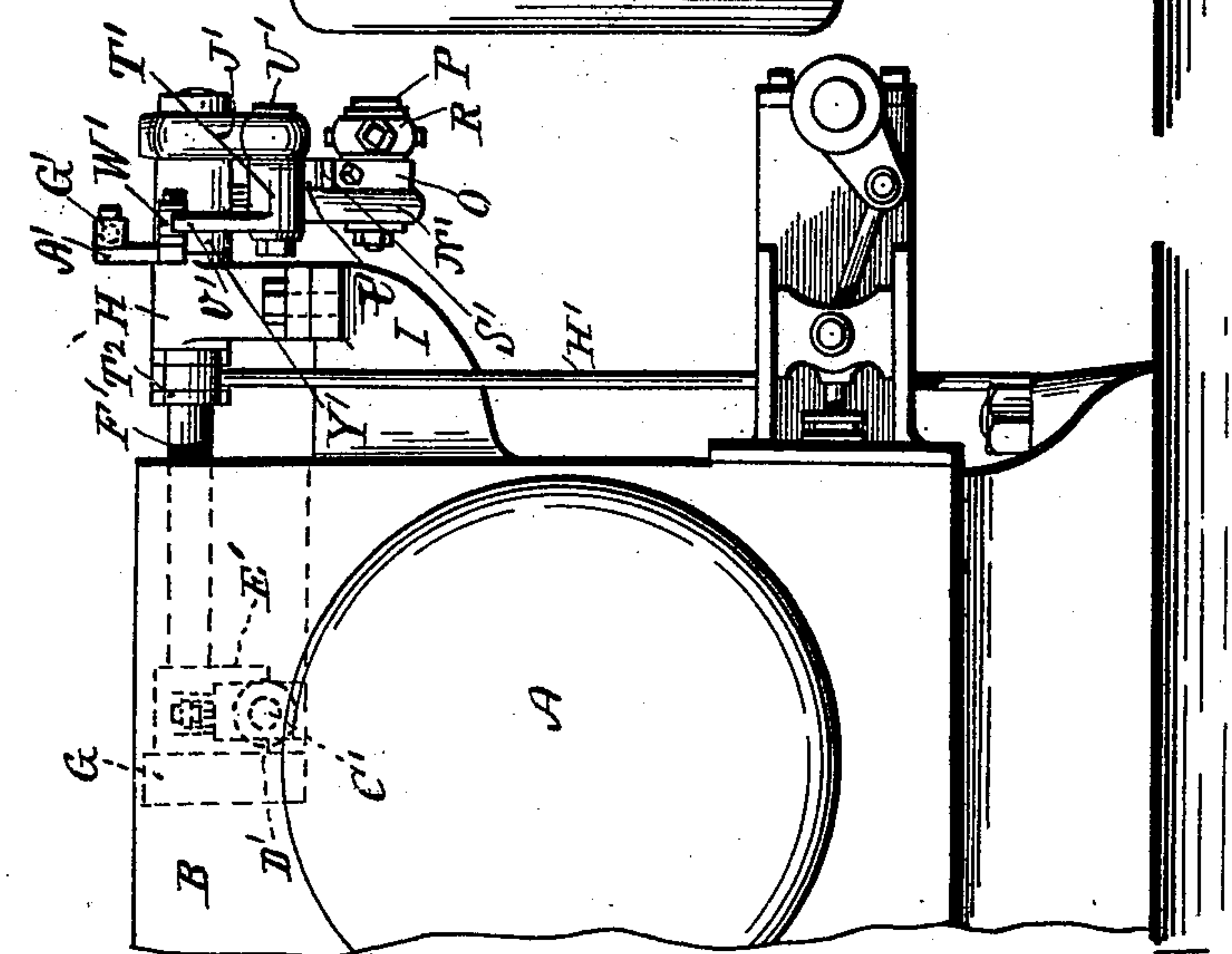
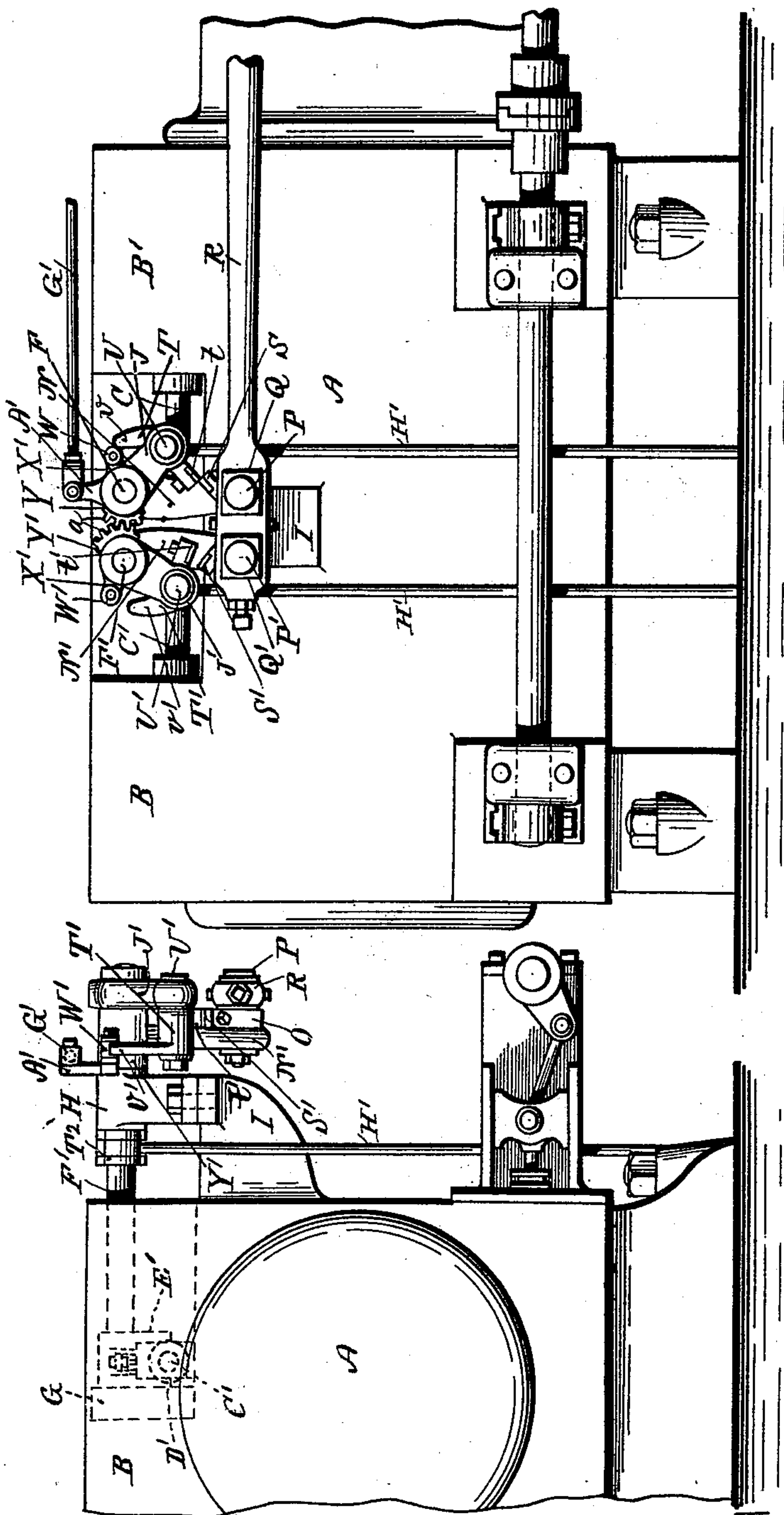
(No Model.)

3 Sheets—Sheet 1.

J. W. SARGENT.  
VALVE GEAR.

No. 516,634.

Patented Mar. 13, 1894.



Witnesses:

Inventor:

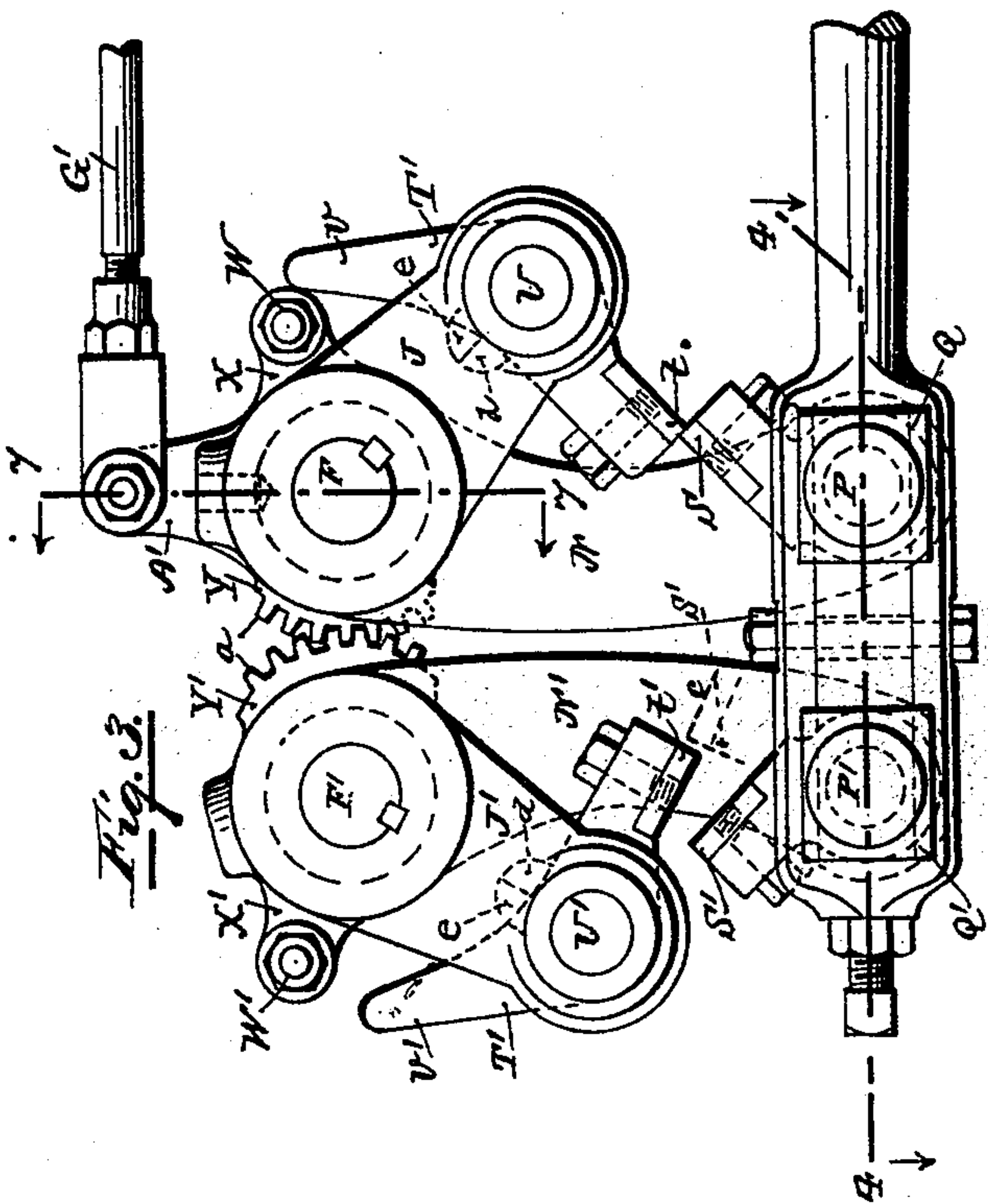
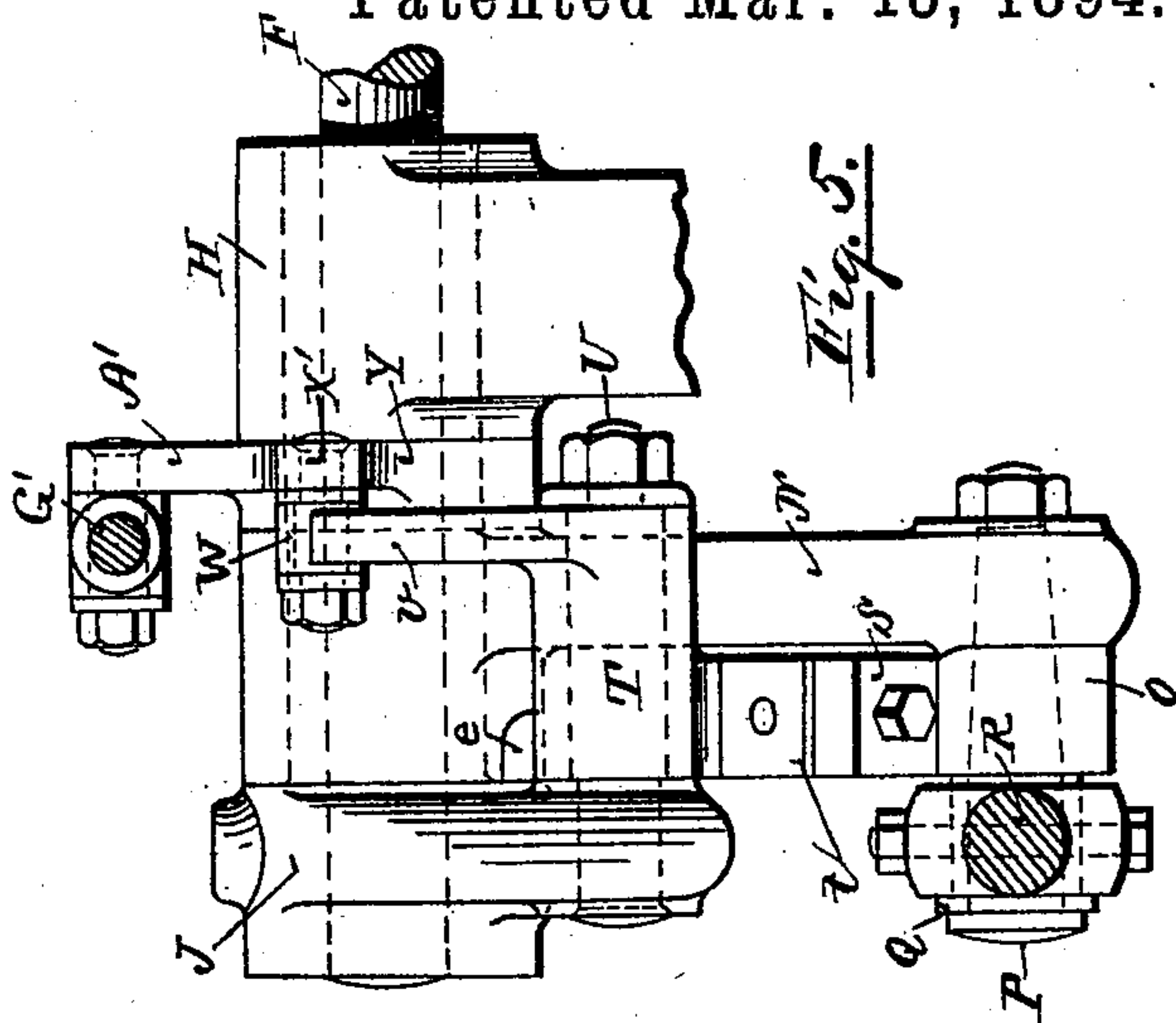
Charles Hannigan.  
John S. Lynch.

John W. Sargent  
By S. Schofield  
Atty.

3 Sheets—Sheet 2.

Patented Mar. 13, 1894.

No. 516,634.



Inventor:

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By S. Scholfield  
Atty.

(No Model.)

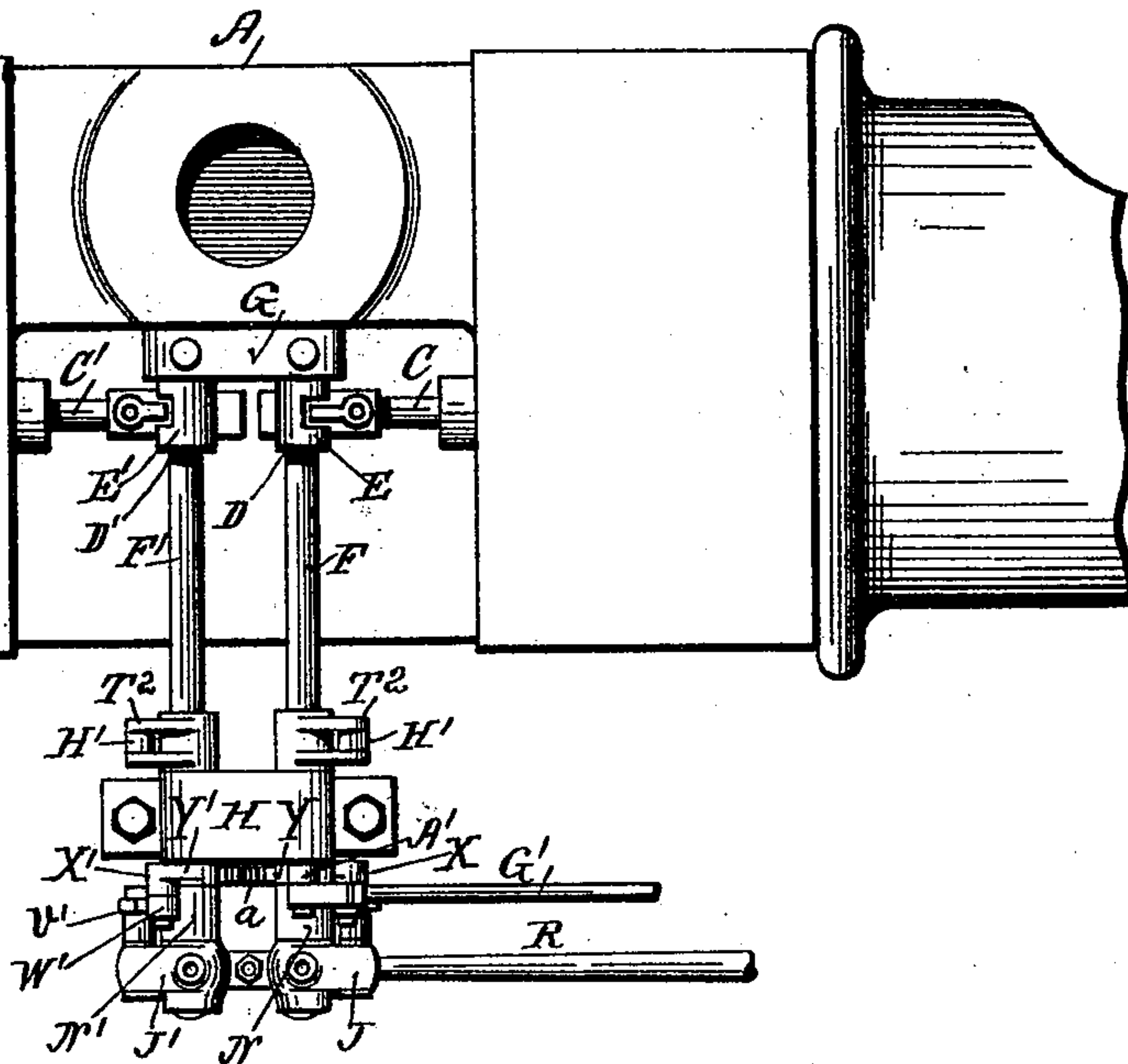
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Fig. 8.



Witnesses.

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John S Lynch

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Atty.



# UNITED STATES PATENT OFFICE.

JOHN W. SARGENT, OF PROVIDENCE, RHODE ISLAND.

## VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 516,634, dated March 13, 1894.

Application filed October 2, 1893. Serial No. 487,010. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN W. SARGENT, a citizen of the United States, residing at Providence, in the State of Rhode Island, have invented a new and useful Improvement in Valve-Gears for Steam-Engines, of which the following is a specification.

The object of my invention is to provide improved means for operating the inlet valves of a steam engine, whereby the steam will be cut off automatically by the action of a governor, and my invention consists in the improved construction and arrangement of the several parts; the device, as shown in the drawings, being applied to an engine of the "Greene" type, in which the inlet valves are flat gridiron slide valves.

Referring to the drawings: Figure 1, represents a side elevation of an engine cylinder provided with my improvement, for operating the valves. Fig. 2, represents a partial end elevation of the same. Fig. 3, represents an enlarged side elevation of the valve gear separate from the cylinder. Fig. 4, represents a horizontal section taken in the line 4, 4, of Fig. 3. Fig. 5, represents an enlarged end elevation of the valve gear. Fig. 6, represents a side view of the trip collar, which is operated by the governor, for controlling the closing movement of the valve. Fig. 7, represents a vertical section taken in the line 7, 7, of Fig. 3. Fig. 8, represents a top view of the engine cylinder and the valve gear.

In the accompanying drawings, A represents the cylinder of the engine, and B and B' the steam chests, containing flat gridiron valves, having valve stems C, C', projecting through suitable stuffing boxes, and connected by means of the pins D, D', with the lower ends of the rocker arms E, E', which latter are at their upper ends keyed to the rock-shafts F, F', respectively. The rock-shafts F, F', are carried at their inner ends by bearings in the pedestal G, and at their outer ends in the pedestal H, the said rock shafts being arranged horizontally, and parallel with each other, and at a comparatively short distance apart. The outer pedestal H, is supported by means of a table I, which is firmly bolted to the cylinder A, and to the outer end of each rock shaft is keyed a driving arm as J, J', which when in its middle position hangs at

about an angle of forty five degrees with a vertical line. The pedestal H is provided with the outwardly extending hubs or bushings, L, L', upon which are loosely held the rockers N, N', and the lower end of each rocker N, N', is provided with an outwardly extending boss O, and a pin P, and each of the pins P, P', of the rockers is held in one of the boxes Q, Q', carried in the forward end of the link R, connected with the eccentric.

The centers of the boxes Q, Q', and of the pins P, P', of the rockers, are arranged at the same horizontal distance apart as the centers of the rock shafts F, F', thus forming a parallel movement for the forward end of the link R. In front of the rockers N, N', and projecting upward and outward from the boss O are lugs S, S', for engaging with the toes t, t', of the latches T, T', which are pivoted to the studs U, U', extending inwardly from bosses at the outer ends of the driving arms J, J'. The latches T, T', are provided with long hubs extending inwardly upon the studs U, U', and with the upwardly extending trip arms v, v', which engage with the studs W, W', for liberating the cut-off. The studs W, W', are held by the arms X, X', of the trip-collars Y, Y', which latter are loosely fitted to the stationary hubs or bushings L, L', and are free to turn upon the same when actuated by the governor. The trip collars Y, Y', are geared together by the teeth a, so as to cause them to move simultaneously, and rotate in opposite directions, thus causing the trip studs W, W', to rise and fall together.

The trip collar Y is provided with an arm A', extending upward, the said arm being connected with the governor by means of the link G'.

The rotation of the main shaft of the engine, will impart by means of the eccentric and the link R, a continuous rocking movement to both of the rockers N, N', and as shown in Figs. 1 and 3, the backward movement of the link R, will cause the lug S of the rocker N, to engage with the toe t of the latch T, of the driving arm J, so that the said driving arm will at first be moved along with the rocker N, thereby turning the rock-shaft F, which by its connection with the valve stem C, will cause the opening of the valve to admit steam to the rear end of the



cylinder A. During the opening movement of the valve, and at a point depending upon the position of the stud W, which is controlled by the action of the governor, the stud W will be engaged by the trip arm *v* of the latch T, and as the end of the arm *v*, moves over the stud, the latch T will be turned upon its pivot stud U, thus raising the toe *t*, sufficiently, to cause the disengagement of the same from the lug S; the valve will then be suddenly closed by the steam pressure on the valve stem, and the weighted dash-pot (not shown in the drawings), which is connected to the rock shaft F, by means of the weight rod H', and the weight rocker T<sup>2</sup> which is keyed to the rock shaft. The dash-pot cushions and limits the closing movement of the valve, and the connected parts.

In Fig. 3, the forward driving arm J' and toe *t'* are shown at the extreme closed condition of the valve at the forward end of the cylinder; and the extreme backward position of the lug S', of the rocker N', is shown by the dotted line *c*, the toe *t'*, having in the meantime been raised by the inclined back of the lug, and then dropped in front of the same, like a ratchet pawl. The forward movement of the link R, will cause the engagement of the lug S' and toe *t'*, thus causing the movement of the driving arm J' and rock-shaft F' to open the forward valve of the cylinder, until the trip arm *v'* of the latch T', strikes the stud U' of the trip collar Y', and allows the valve to close in the same manner as the valve at the rear end of the cylinder, before described. Each of the driving toes *t, t'*, is limited in its downward movement, by

means of the lugs *d*, projecting from the inner sides of the driving arms J, J', and the lugs *e* which are raised up from the hubs of the latches T, T'.

I claim as my invention—

1. In an automatic cut-off valve gear, the combination with the link actuated by the eccentric, and provided with the duplicate boxes, the rock-shafts provided with the driving arms, and the swinging rockers arranged to form a parallel movement with the link and the rock-shafts, of the driving lugs upon the rockers, the latches provided with the trip arms and pivoted to the driving arms for engagement with the lugs of the rockers, and the independently held trip collars, geared to each other, and connected with the governor, substantially as described.

2. In an automatic cut-off valve gear, the combination with the pedestal provided with the outwardly projecting hubs, the rock shafts passing through the said hubs and provided with the driving arms, the link provided with the boxes arranged at a distance from each other corresponding with that of the rock shafts, the rockers held upon the hubs of the pedestal and provided with the driving lugs, the latches provided with the trip arms and pivoted to the driving arms, and the geared trip-collars arranged upon the hubs of the pedestal, and connected with the governor, substantially as described.

JOHN W. SARGENT.

Witnesses:

WM. B. WATERMAN,  
S. SCHOLFIELD.