

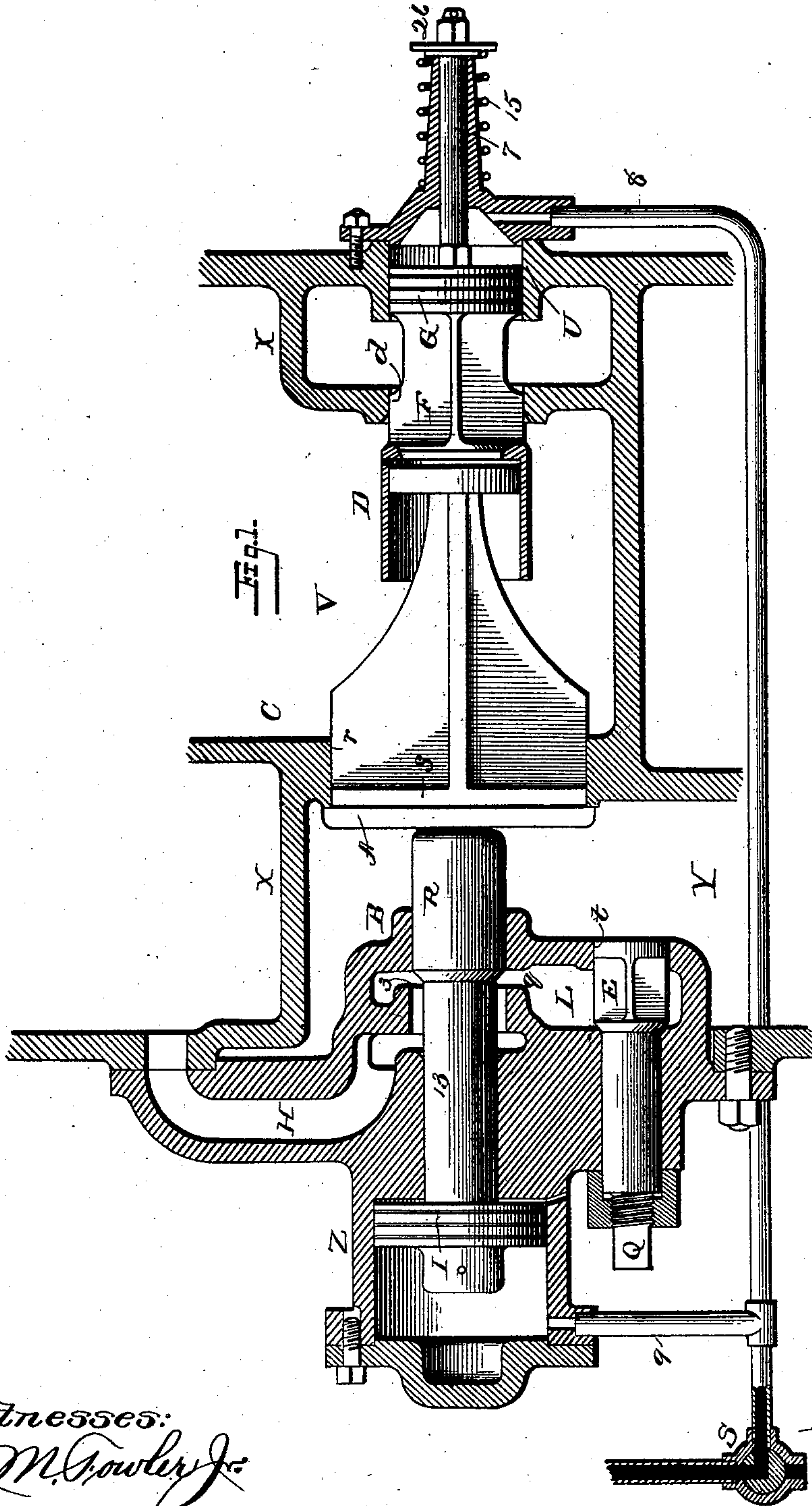
(No Model.)

2 Sheets—Sheet 1.

E. F. C. DAVIS.
COMPOUND ENGINE VALVE DEVICE.

No. 603,441.

Patented May 3, 1898.



Witnesses:

J. M. Gowley Jr.
Amos A. Dobson

Inventor.
E. F. C. Davis

By *Inter & Freeman*
Attys.

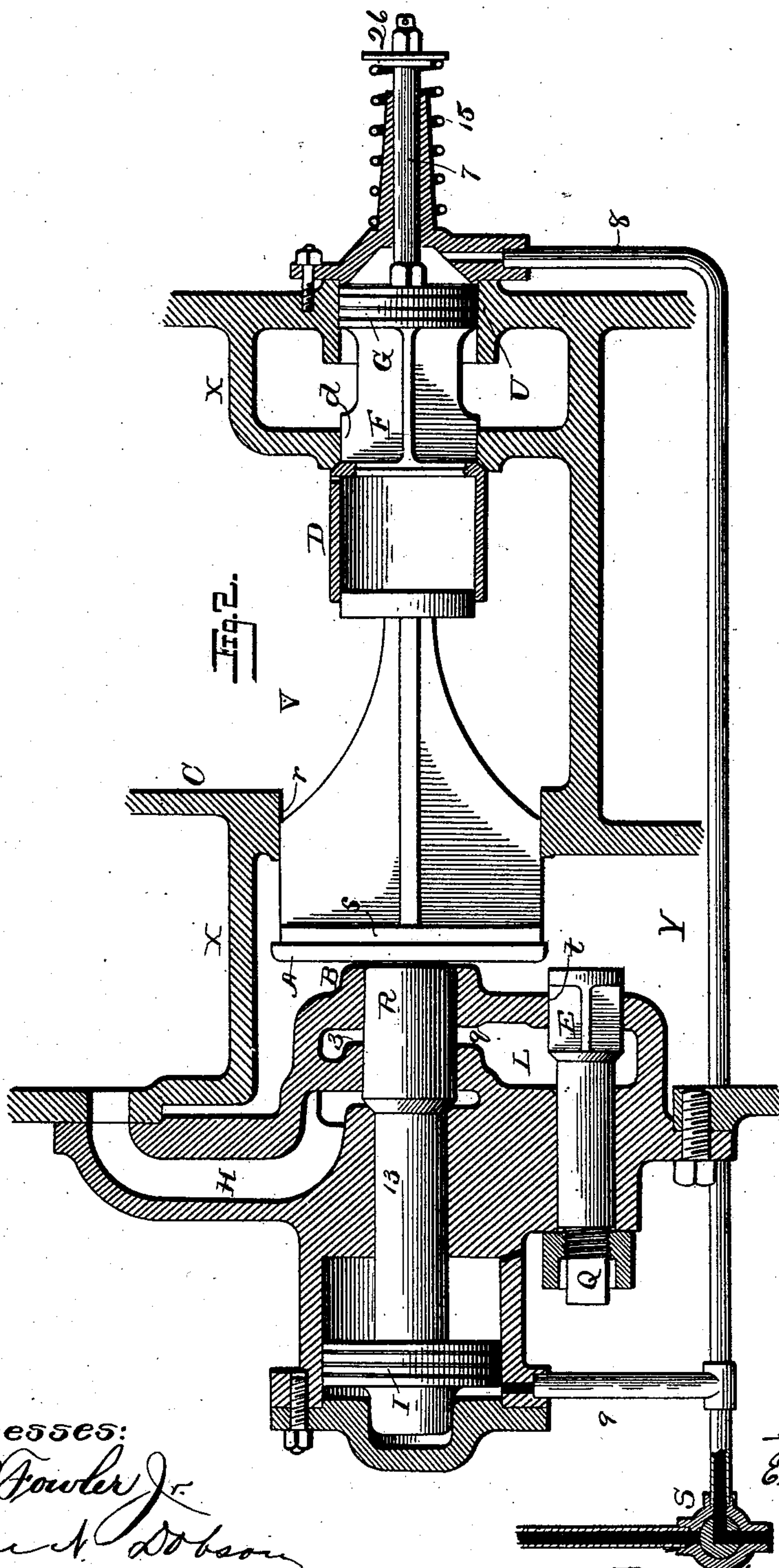
(No Model.)

2 Sheets—Sheet 2.

E. F. C. DAVIS.
COMPOUND ENGINE VALVE DEVICE.

No. 603,441.

Patented May 3, 1898.



Witnesses:

J. M. Fowler Jr.
Acme & Dobson

Inventor:

E. F. C. Davis

By Foster & Freeman
Attys.

UNITED STATES PATENT OFFICE.

EZEKIEL F. C. DAVIS, OF RICHMOND, VIRGINIA, ASSIGNOR TO THE RICHMOND LOCOMOTIVE AND MACHINE WORKS, OF SAME PLACE.

COMPOUND-ENGINE VALVE DEVICE.

SPECIFICATION forming part of Letters Patent No. 603,441, dated May 3, 1898.

Application filed April 14, 1894. Renewed October 7, 1897. Serial No. 654,353. (No model.)

To all whom it may concern:

Be it known that I, EZEKIEL F. C. DAVIS, a citizen of the United States, residing at Richmond, Henrico county, State of Virginia, have
5 invented certain new and useful Improvements in Compound-Engine Valve Devices, of which the following is a specification.

My invention relates to that class of valve devices used in connection with compound
10 engines; and my invention consists in combining with the intercepting-valve an independent reducing-valve, an independent motor, and also an emergency-valve, and, further, in constructing the reduction-valve to
15 constitute both a reduction and an admission valve, as fully set forth hereinafter, and illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section of my improved valve device, showing the position of the valves when the locomotive is run with a high-pressure cylinder only on account of
20 accident to the low-pressure steam chest or cylinder or for other reasons. Fig. 2 is a similar view showing the parts in the position they occupy when the engine is running compound.

The casing of the valve device X is suitably constructed and arranged, and the intercepting-valve A closes a port *r* in the partition C between the two sections V Y of the receiver.

Opposite the intercepting-valve A is a cylinder B, to which is fitted a piston R, having
35 a stem 13, which extends into a cylinder Z, where it may have an enlarged head or piston I.

The cylinder B communicates at one end with a passage H, to which live steam is supplied from the boiler and which when it acts upon the head or shoulder 3 of the piston R forces the latter to the right and carries the end of the piston against the head of the valve A and uncovers a port *q*, communicating with a chamber L. The piston R therefore acts as a motor to close the intercepting-valve whenever live steam is admitted by opening the throttle to the passage H. It is further necessary, however, to control the
50 flow of live steam to the section Y of the receiver that communicates with the low-pres-

sure engine, and for this purpose I make use of a valve E, closing a port *t* between the chamber L and section Y of the receiver, and this valve E constitutes both an admission-
55 valve and a reducing-valve, thereby dispensing with the use of separate and independent admission and reduction valves. When, therefore, the live steam is admitted to the passage H, it moves the motor-piston R to
60 bring it against and close the intercepting-valve and opens the port *q*, and it also moves the valve E to open the port *t* to permit live steam to pass to the low-pressure engine; but owing to the different areas of the faces
65 of the valve E exposed to the chamber L and the passage Y the valve E will throttle the passage of live steam to the low-pressure engine, acting as a reducing-valve.

The port *d*, communicating with the stack,
70 is closed by an emergency-valve F, and to the stem of the latter is connected a piston G, fitting a cylinder U, to which motor-fluid may be supplied through a pipe 8, communicating with a valve device S, and a branch
75 pipe 9 will supply the cylinder Z also with motor fluid to operate the motor R to close the valve A at the same time that the emergency-valve is opened.

When the engine starts with the intercepting-valve open and the emergency-valve
80 closed, the motor R will be shifted by the live-steam pressure to close the intercepting-valve; but when the exhaust from the high-pressure engine increases the pressure in the section
85 V of the receiver the intercepting-valve A will be thrown to the left, while the increased pressure will close the reducing-valve, and the engine will then run compound.

When an emergency occurs requiring the
90 engine to be run simple, motor fluid is admitted, by operating the valve device S, to the cylinders U Z, when the motor-piston R will be carried to the right and close the intercepting-valve at the same time the emergency-
95 valve is opened.

When it is desired to run the engine with the high-pressure engine alone, in consequence of the breaking down of the low-pressure engine, the valve E is locked to its seat
100 through the medium of any suitable appliances—as, for instance, by reversing the po-

sition of a flanged nut Q upon the stem of the valve E, as shown in Fig. 2, when live steam can no longer pass to the low-pressure engine. Pressure is then admitted to the cylinders U Z to open the emergency-valve and to bring such a pressure upon the motor-piston R as will hold the intercepting-valve closed.

A dash-pot D may be arranged between the intercepting-valve and the emergency-valve to secure a buffer action when either valve is opened suddenly.

A spring 15, bearing on a collar 26 of a stem 7, projecting from the piston G, serves to aid in closing the emergency-valve when the valve device S is adjusted to permit the contents of the cylinders to escape to the atmosphere.

I do not here claim the combination, with a reducing-valve, of devices for locking it in a closed position; but it will be seen that by combining such devices with a valve arranged between the receiver Y and the motor-piston R of the intercepting-valve I can cut off the communication of live steam to the low-pressure cylinder, while still maintaining a pressure upon the motor tending to close the intercepting-valve.

While I have referred to the valve E as constituting both an admission and a reducing

valve, I can use separate reducing and admission valves in combination with the other features set forth.

Without limiting myself to the precise construction and arrangement shown, I claim as my invention—

1. The combination of the intercepting-valve and actuating-piston independent of said valve and of the admission-valve, and the valve E controlling the flow of live steam to the low-pressure section of the receiver, and provided with means for locking it in its closed position, substantially as set forth.

2. The combination of the live-steam passage H, a chamber L communicating therewith through a port, a piston controlling said port and arranged to actuate an intercepting-valve, and a reducing-valve controlling a port communicating with the chamber L, said valve consisting of the piston E having differential faces, and adapted to be closed by overbalancing pressure in chamber y, substantially as described.

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

EZEKIEL F. C. DAVIS.

Witnesses:

WALTER T. WELLER,
R. J. ROUSE.