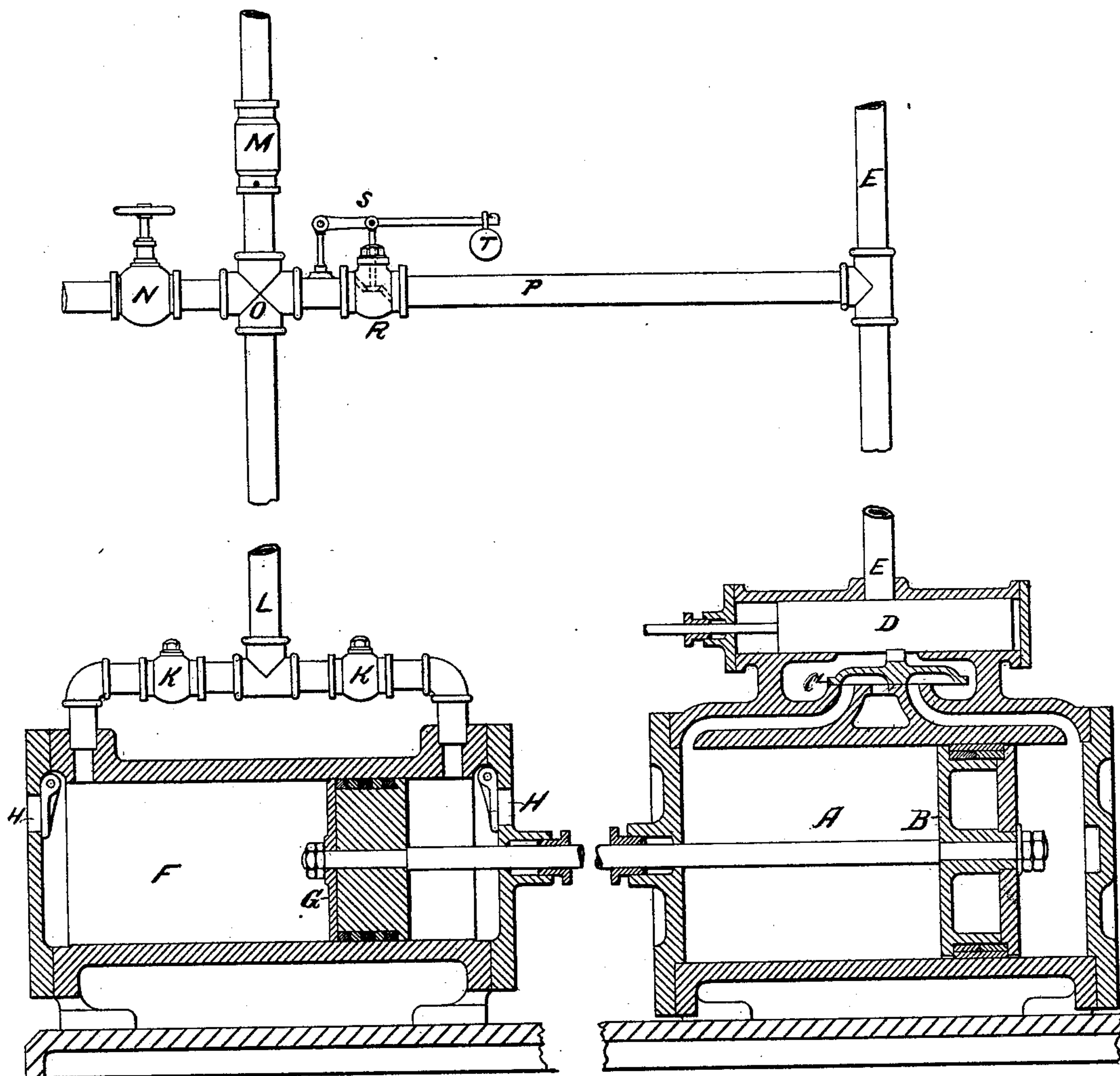


(No Model.)

E. HILL.
Engine for Compressing Air.

No. 229,821.

Patented July 13, 1880.



WITNESSES.
Eugene N Eliot
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UNITED STATES PATENT OFFICE.

EBENEZER HILL, OF SOUTH NORWALK, CONNECTICUT.

ENGINE FOR COMPRESSING AIR.

SPECIFICATION forming part of Letters Patent No. 229,821, dated July 13, 1880.

Application filed April 8, 1880. (No model.)

To all whom it may concern:

Be it known that I, EBENEZER HILL, of South Norwalk, county of Fairfield, and State of Connecticut, have invented new and useful
5 Improvements in Engines for Compressing Air for Mines, Drills, &c., of which the following is a specification.

This invention pertains to certain improvements in engines for compressing air for mines,
10 drills, &c.; and the invention consists in providing a connection or conduit from the discharge side of the air pump or receiver to the port side of the steam-engine, and combining with said conduit or connection a regulating-
15 valve, so that when the air-pressure on the discharging side of the air-pump equals the resistance of said valve sufficiently to open it the air, instead of escaping, as now permitted, passes into the steam-conduits and displaces
20 its equivalent of steam in resistance, thereby acting as a throttle to the steam in its passage to the working-cylinder, and thus becomes an automatic governor to the engine at any required pressure to which the regulating-valve
25 may be adjusted.

The advantages of such an arrangement or combination of devices are that a great saving of steam is effected by preventing the useless
30 escape of the air under pressure, which represents that amount of steam-pressure; and second, in engines or compressors that are not direct-acting or provided with cranks and fly-wheels, they are by this arrangement prevented from stopping, as the air escapes through the
35 exhaust in proportion to its set or determined pressure, and thus the engine maintains its usual velocity.

That it may be easily understood how such a result is accomplished, reference may be had
40 to the accompanying drawing, in which—

A represents the steam-cylinder of the compressor, provided with a piston, B, valve C, and supplemental valve D, to which steam is supplied through the pipe, as at E, all in the ordinary
45 manner.

At F is represented the cylinder of the air-pump, with its piston G and inlet-valves H, outlet K, and pipe L, leading to the receiver,

which is also provided with another check-valve, as at M, and between it and the outlet-
50 valves, at K, an escape or blow-off cock, as at N, is attached to one branch of the cross O, said cock N being so located for the purpose of relieving the pressure on the discharge side when it is desired to start the engine when
55 there is considerable pressure in the receiver. From the opposite branch of the said cross O a pipe, as at P, leads to the steam-pipe E, which supplies steam to the engine.

At R in the pipe P is placed a valve provided with some means of being graduated, as
60 by a lever and weight, as at S and T, as shown; or it may be done by a spring and compression-nut, or in other suitable manner, so that when said valve is set to any desired pressure it will
65 not permit the air to escape through the pipe P until said weight or pressure is overcome, but which, as soon as done, then permits the air that would otherwise blow off into the open
70 air to pass through the pipe into the live-steam space, and so displace or throttle to that extent the steam, and thus become an automatic regulator to the engine, permitting it to keep its
proper velocity without the usual waste of
75 steam or mechanical complications for such purposes.

The drawing here represents the steam-engine as provided with a supplemental valve for a direct-acting engine; but the invention will
80 be most useful when applied to single-crank engines with fly-wheels, though it will be valuable on any kind of an air-compressor.

I therefore claim—

In combination with an air-compressing engine, a return pipe or conduit and regulating-
85 valve, for conducting any surplus of air from the receiver into the steam-passages, as and for the purposes hereinbefore set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing
90 witnesses.

EBENEZER HILL.

Witnesses:

J. A. SLATER,
C. BARTRAM.