(No Model.)

E. HILL.

Air Compressor.

No. 237,274. **Patented Feb. 1, 1881.**

FIG. 2.

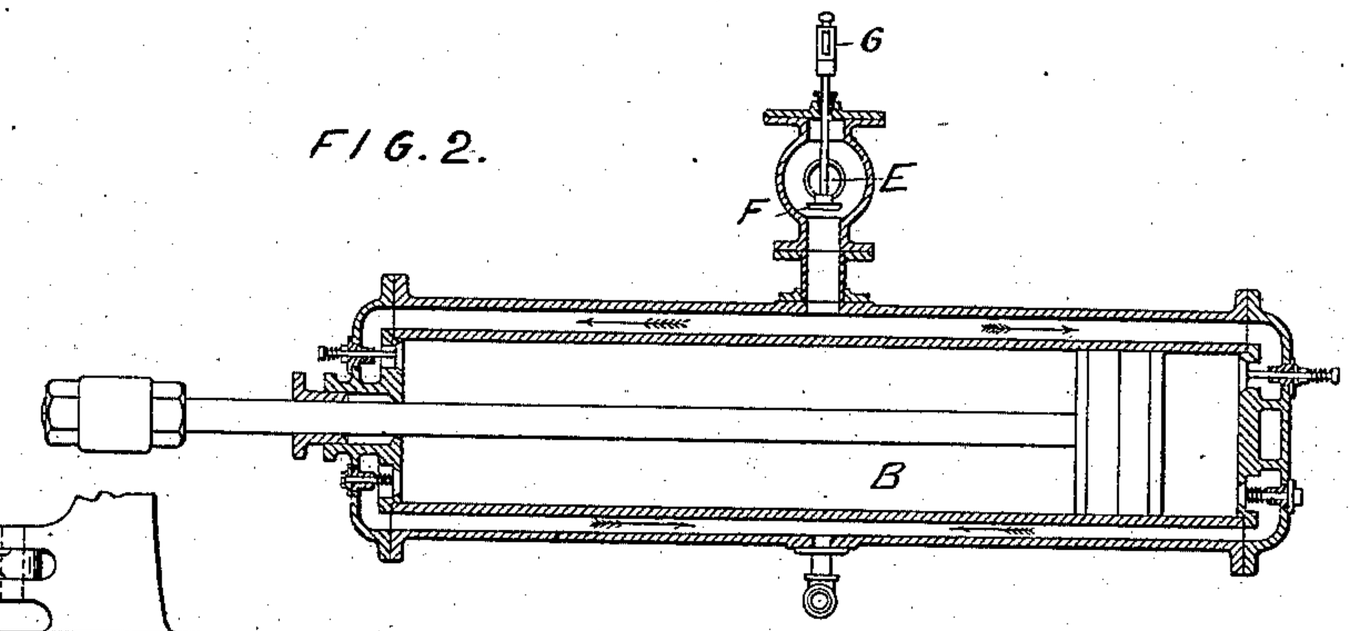
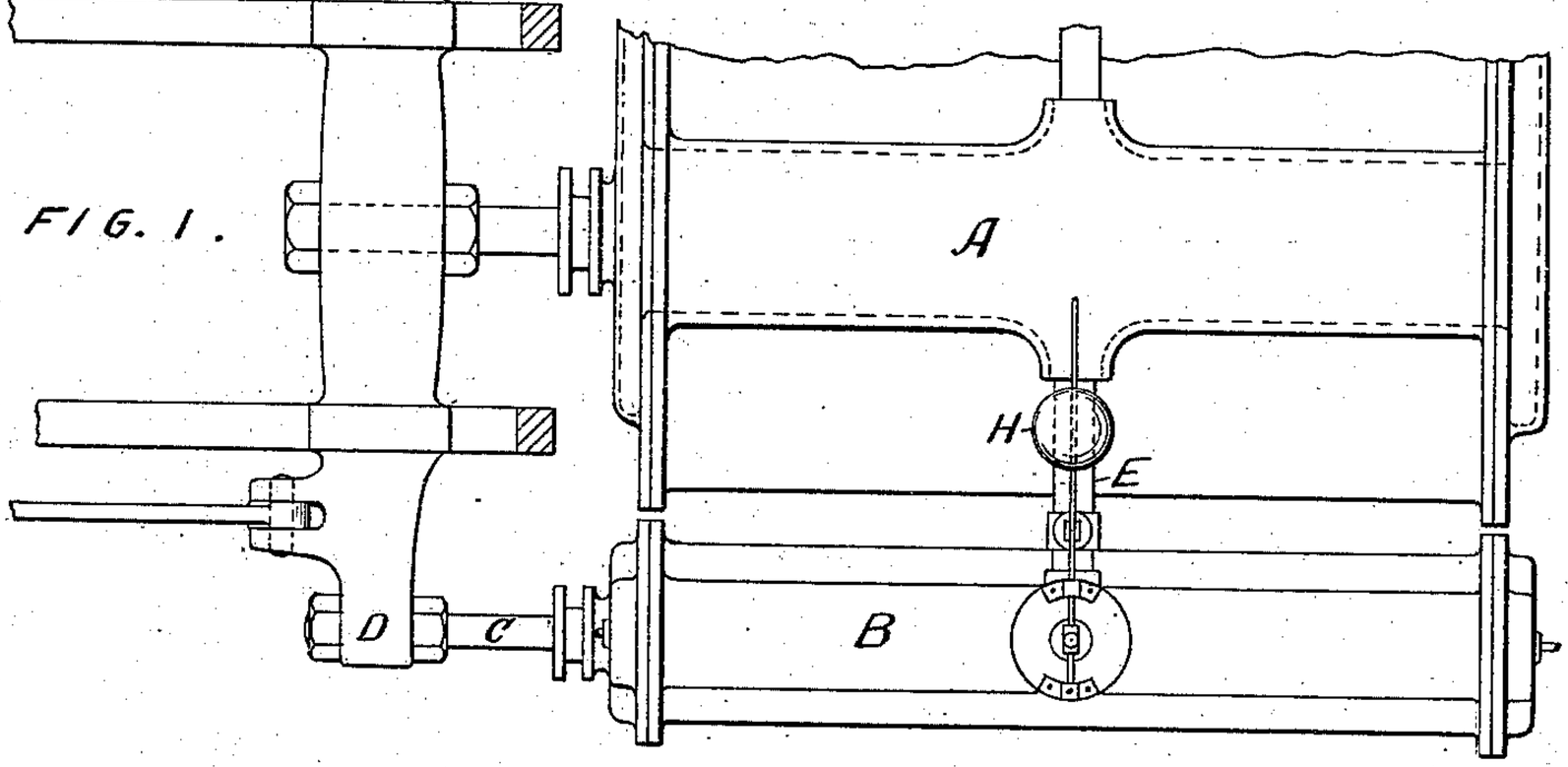


FIG. 1.



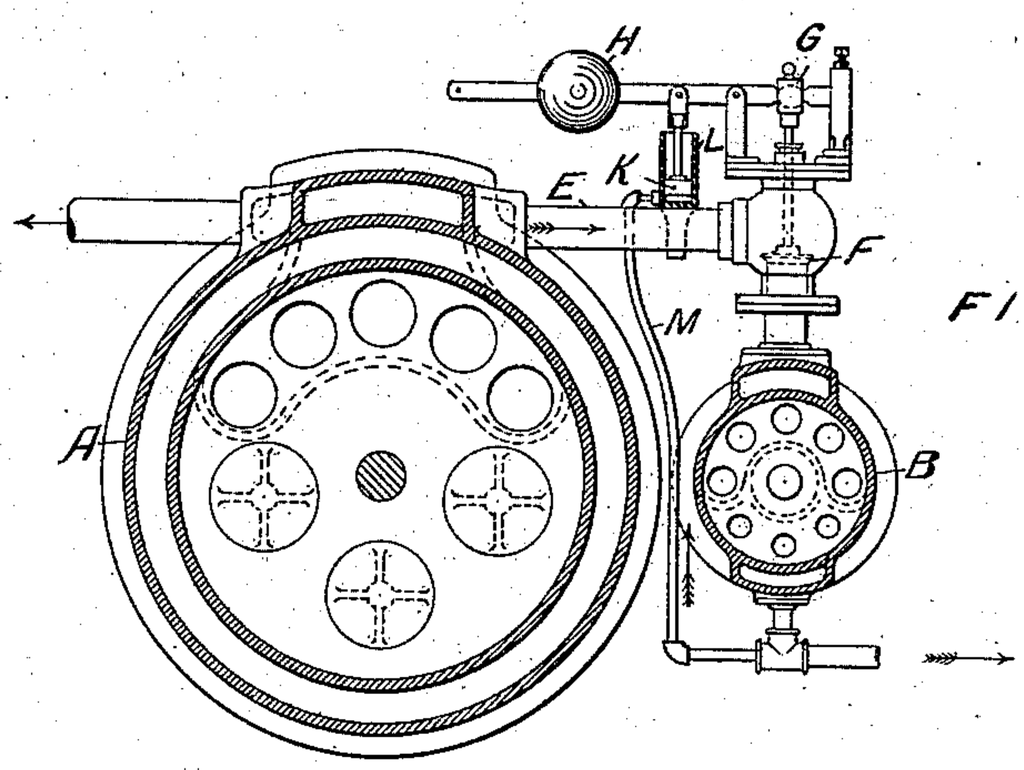


FIG. 3.

WITNESSES.

Eugene N Elliott

Geo Lupton

INVENTOR.

Ebenezer Hill

By Boyd Elliott

Atty

UNITED STATES PATENT OFFICE.

EBENEZER HILL, OF SOUTH NORWALK, CONNECTICUT.

AIR-COMPRESSOR.

SPECIFICATION forming part of Letters Patent No. 237,274, dated February 1, 1881.

Application filed December 16, 1880. (No model.)

To all whom it may concern:

Be it known that I, EBENEZER HILL, of South Norwalk, in the county of Fairfield and State of Connecticut, have invented new and useful Improvements in Air-Compressors, of which the following is a specification.

This invention pertains to that class of air-compressors in which serial compression is accomplished by means of two or more compression-pumps in combination with a steam or other similar engine, and where a high degree of compression is required; and the invention consists, chiefly, in combining an automatic governing apparatus between two compression-pumps of different capacities, so that air or gas under pressure from the larger may be conducted to the smaller pump and again compressed to any predetermined degree at which the regulator may be set and said pressure maintained at said fixed degree automatically, as will hereinafter appear.

It may be here remarked that in carrying out the purposes of this invention the arrangement or construction of devices as here shown need not be followed, as many other methods will be suggested to competent engineers for operating the supplemental pump or the governing or regulating devices; but a great necessity exists, as in mines, in the construction of tunnels, &c., and for hoisting purposes, where air is used as the agent for operating the drills, hoisting-engines, &c., that a much greater degree of air-pressure be furnished than is required for the ordinary work in such places. Consequently I have devised the plan of so constructing a supplemental air-compressing pump with the other compressors or their reservoirs, whether one or more, in such a manner that whenever this extra force is required it will be supplied by the said pump, and its supply will be furnished automatically by the governing devices. One form of such an apparatus is shown in the drawings.

Figure 1 is a plan of two air or gas compression pumps or cylinders combined to cooperate together. Fig. 2 is a longitudinal section through the smaller pump. Fig. 3 is a transverse section through both pumps, as shown in Fig. 1.

At A is represented one of the pumps for compressing the air for ordinary pressures, or as used in serial compression, and at B is the supplemental pump, in this case arranged by the side of the other, and its piston-rod, as at C, is attached to a projection from the cross-head of the other pump, as shown at D, and a connecting-pipe, as at E, leads from the first to the second pump; but in the said pipe E there is provided a valve, as at F, which, when closed, prevents the passage of the air from the larger to the smaller pumps, and said valve F is attached by a stem to a lever, as at G, mounted upon the exterior of the valve-chamber, as shown, and said lever is weighted by a ball, as at H, that may be moved to and fro, as on the ordinary safety-valve, to keep the said valve open or raised from its seat, as shown at Fig. 3.

At K is a piston attached to said lever G, which works in a short cylinder, as at L, which is mounted upon the connecting-pipe E, or in other suitable or convenient position, and the lower end of said cylinder L is connected with the discharge side of the supplemental compressor, so that whatever pressure exists in the pipes or reservoirs on the discharge side of the said supplemental compressor will be exerted against the piston K and tend to raise the weighted lever, and thereby close the valve F, and whenever the pressure is sufficient to close said valve, then the supply of compressed air from the other pump is cut off and the piston of the supplemental pump will work *in vacuo*, or nearly so. But whenever a draft is made upon the reservoir attached to the supplemental pump, then the pressure against the piston K will fall and the valve will be opened and another supply of the already compressed air from the other pump or reservoir will be furnished to the supplemental compressor until its reservoir is again charged to the predetermined or required pressure, and thus extra supplies of air-pressure for special purposes will be furnished automatically.

It is evident that said supplemental pump or compressor may be operated by an independent engine, in which case some kind of an already well-known governing attachment for controlling its motion would have to be provided to keep the engine under control, according to the work required.

I therefore claim—

1. In a system of air or gas compressors in which serial compression is accomplished by two or more compression-pumps, the combination of a supplemental pump for special compression with suitable governing devices for controlling its supply of compressed air, as hereinbefore set forth.

2. The combination, with an air or gas compression-pump or its reservoir, of a supplemental pump or compressor for special pressures, and a valve connected to a weighted lever which has a piston connected thereto working in a cylinder, which has a connection with the discharge side of said supplemental pump, substantially as hereinbefore set forth.

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

EBENEZER HILL.

Witnesses:
EUGENE N. ELIOT,
CHAS. BARTRAM.