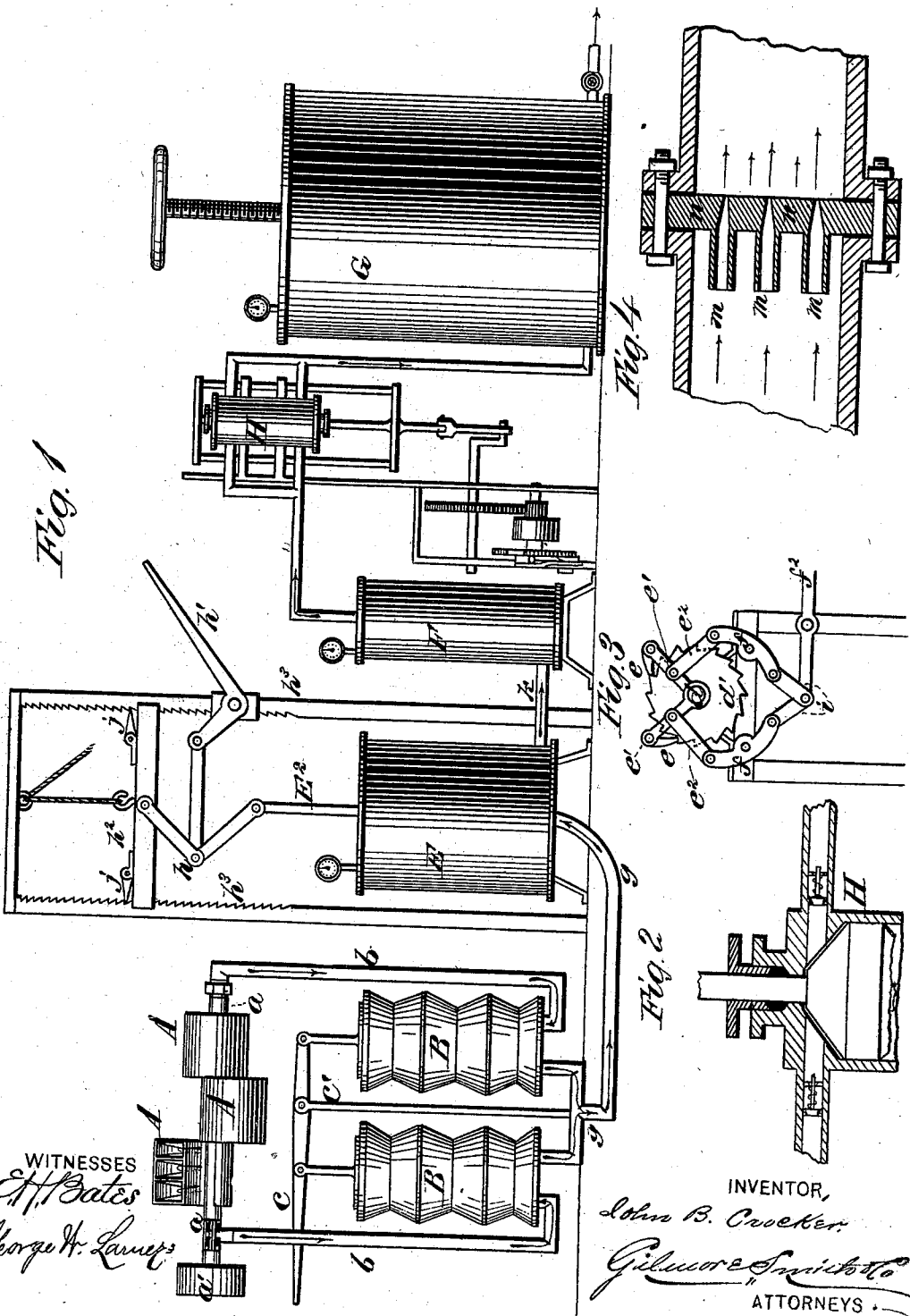


J. B. CROCKER.
AIR-COMPRESSING APPARATUS.

No. 176,931.

Patented May 2, 1876.



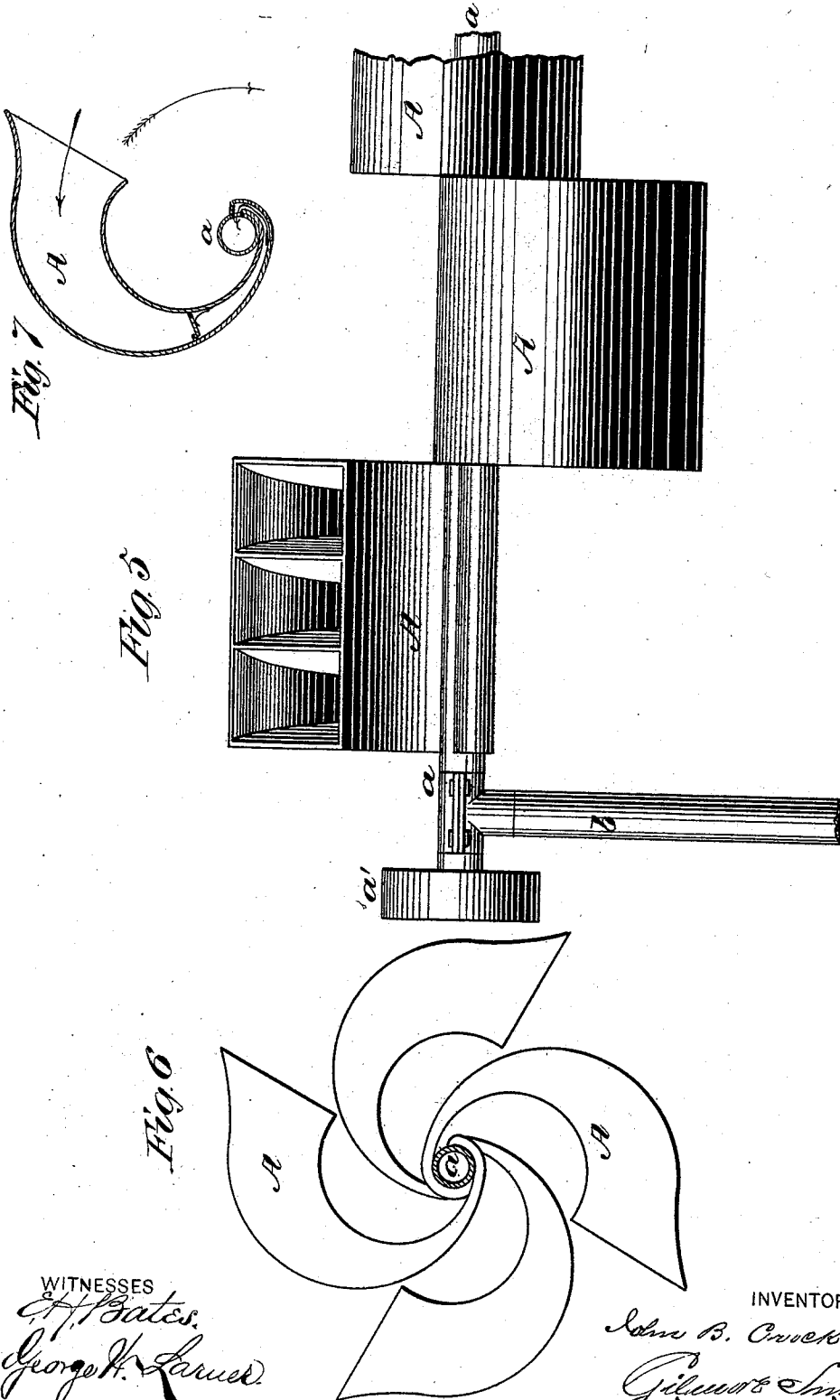
WITNESSES
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George H. Lamer

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John B. Crocker
Gilmore Smith & Co.
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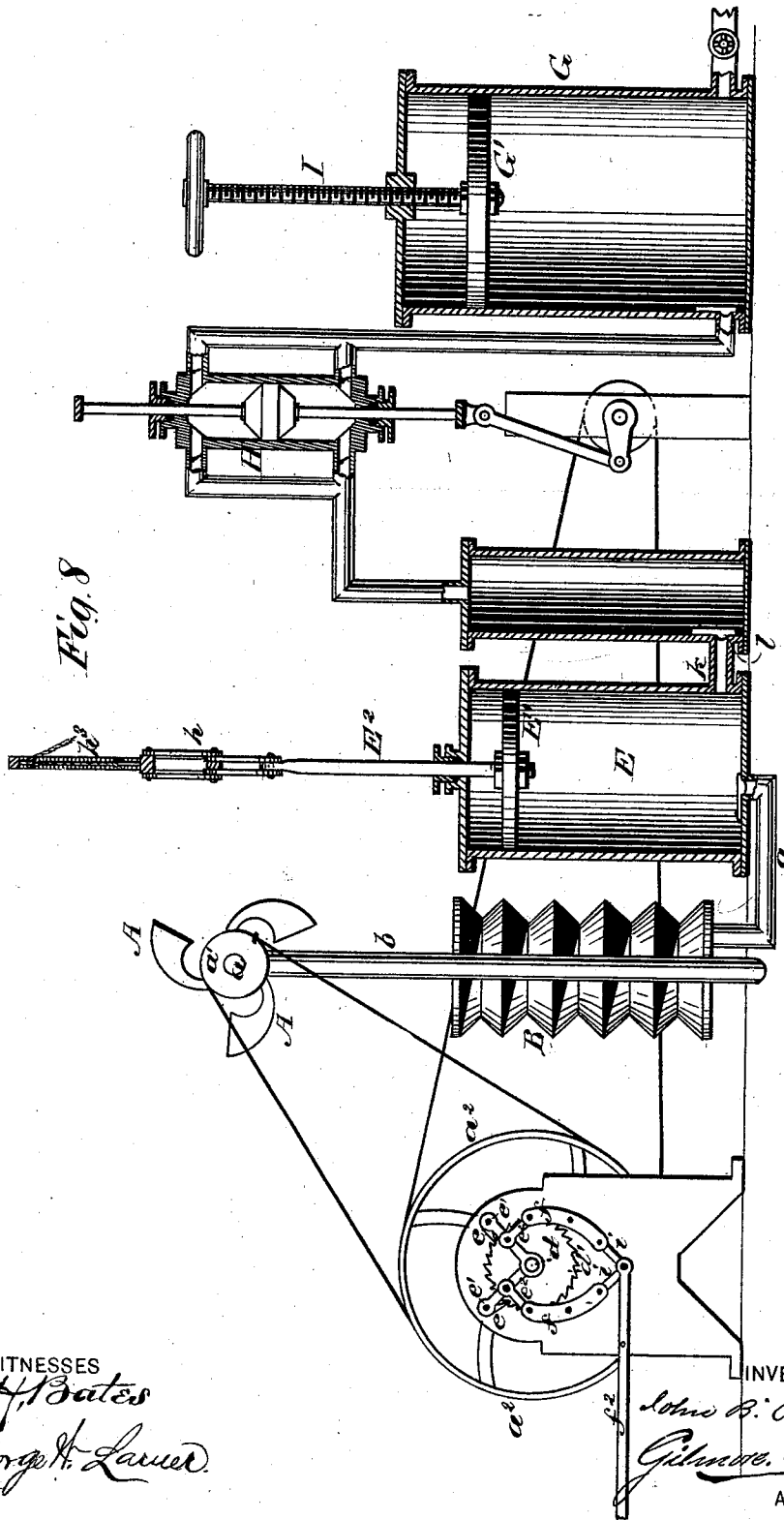


Fig. 8

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E. H. Bates
George H. Lauer

INVENTOR
John B. Crocker
Gilmore, Smith & Co.
ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOHN B. CROCKER, OF ALTON, ILLINOIS.

IMPROVEMENT IN AIR-COMPRESSING APPARATUS.

Specification forming part of Letters Patent No. **176,931**, dated May 2, 1876; application filed February 12, 1876.

To all whom it may concern:

Be it known that I, JOHN B. CROCKER, of Alton, in the county of Madison and State of Illinois, have invented a new and valuable Improvement in Motors; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a front elevation of my motor; and Figs. 2, 3, 4, 5, 6, and 7 are detail views thereof. Fig. 8 is a longitudinal vertical sectional view of the same.

This invention has relation to a motive power which is designed for operating portable as well as stationary machinery of various kinds; and the principle involved in my invention consists in aggregating a motive force from common atmospheric air without heating it, and continually maintaining such force equal to the requirements of the occasion; or, in other words, my main object is to accumulate such a pressure of a given number of pounds to the square inch as may be required to overcome all opposing force, and then maintaining that pressure or supplying continuously an equivalent pressure to that expended in working the machinery.

In carrying my invention into effect I maintain an equalization of force by a peculiar arrangement of instrumentalities, which compress the air previous to forcing it into a general discharging-reservoir by means of an air-pump.

The nature of my invention consists, first, in one or more air-gatherers, which are applied to a hollow rotary shaft and communicate with the interior thereof, which shaft communicates with one or more bellows through pipes provided, in a suitable manner, with valves, in combination with means for collapsing the bellows and forcing the air therefrom into a receiver through pipes suitably provided with valves, as will be hereinafter explained; second, in providing the said air-receiver with a piston and certain pawls, racks, and levers, hereinafter explained, which will, at proper times, further condense the air and force it

into a retainer through a pipe provided with a cock or a check-valve; third, in an air-engine which is actuated by a steam-engine through the medium of a ratchet-wheel and compound pawl-levers, in combination with the condensed-air retainer and a general air-receiving reservoir, to which a compressing and relieving piston is applied, from which reservoir the highly-compressed air is drawn as it is required for driving various kinds of machines or engines.

In carrying out my invention I shall employ an ordinary steam-engine of any required horse-power. This engine actuates the air-condensing apparatus which I am about to describe.

A A designate air-gatherers, of a trumpet form, which are suitably applied to a hollow horizontal shaft, *a*, and communicate with the interior thereof. The ends of this shaft *a* are journaled in the ends of pipes *b*, which lead into one or more bellows, B, at the lower ends thereof. The bellows are filled with air by giving rapid rotation to the air-gatherers A, and the bellows are collapsed by means of a lever, *c*, having its fulcrum on a post, *c'*, and two rods, which are suitably connected to the upper heads of the bellows.

The shaft *a* carries a belt-wheel, *a'*, on one end, which receives motion from a large wheel, *a''*, on a shaft, *d*. Shaft *d* has keyed on it a ratchet-wheel, *d'*, with which two pawls, *e e'*, engage, that are pivoted to the free ends of two arms, *e' e'*, free to articulate about the shaft *d*. The arms *e' e'* have links *e'' e''* pivoted to them at the middle of their length, which links are again pivoted to the lower ends of curved levers *f f'*. These curved levers are connected to a lever, *f''*, by means of short links *i i'*. The lever *f''* is actuated by means of a steam-engine, so as to give rapid motion to the wind-gatherers. The lever *c* is connected in a suitable manner with the steam-engine, so that at proper times this lever will be actuated by the engine, and can be detached and worked by hand-power when it is desired to fill the several receivers with air previous to starting the engine. Air from the bellows is forced through a pipe, *g*, (provided with a check-valve,) into a receiver, E. This receiver is provided with a piston, E', the rod

E² of which is connected to toggle-levers *h*, actuated by an angular lever, *h*¹.

In practice, I shall connect the upper link of the toggle to a follower, *h*², to which pawls *j* are applied, that engage with teeth formed on standards *h*³. Lever *h*¹ may be worked by hand or by a steam-engine. By these means the air which is forced into the receiver *E* can be condensed and forced through a pipe, *k*, into a retainer, *F*, which pipe is provided with a valve, *l*, to prevent a reflux of the air. *H* designates an air-pump, which is constructed with a cylindro-conical piston, and with inlet and outlet valves. The pump *H* receives air from the retainer *F*, and discharges the air into a reservoir, *G*, and the piston of this pump is actuated by a contrivance similar to that which I have described for actuating the air-gatherers *A*. Inside of the reservoir *G* is a solid piston, *G'*, to which a rod, *I*, is centrally secured, which rod passes up through the head of the reservoir, and is screw-tapped through a stuffing-box. The object of the piston *G'* and its rod is to enlarge or diminish the capacity of the reservoir, which can be done by adjusting the piston up or down, as circumstances may require. If desired, the threads on the piston-rod *I* may be omitted, and weights put upon a disk at the upper end of this rod, for the purpose of giving an even pressure at all times during the op-

eration of the engine. Fig. 4 shows the means which I shall adopt for introducing the air into the several receivers, which consists in the employment of a number of jet-tubes, *m*, applied to diaphragms *n*, for the purpose of injecting the air through small orifices instead of in a large volume. I shall employ a single steam-engine for operating the entire condensing apparatus.

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

1. One or more air-gatherers, *A*, applied to a hollow rotary shaft, which communicates with one or more bellows, *B*, in combination with the lever *c* and its connections, for collapsing the bellows, and with an air-receiver, *E*, for the purposes set forth.

2. In an apparatus described, the receiver *E*, provided with a piston, *E'*, actuated by toggle-levers, substantially as set forth.

3. An air-pump, *H*, actuated as described, in combination with the air-retainer *F* and an air-reservoir, *G*, provided with a piston, which is controlled as set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

JOHN B. CROCKER.

Witnesses:

JOHN F. ACKER, Jr.,
GEORGE E. UPHAM.