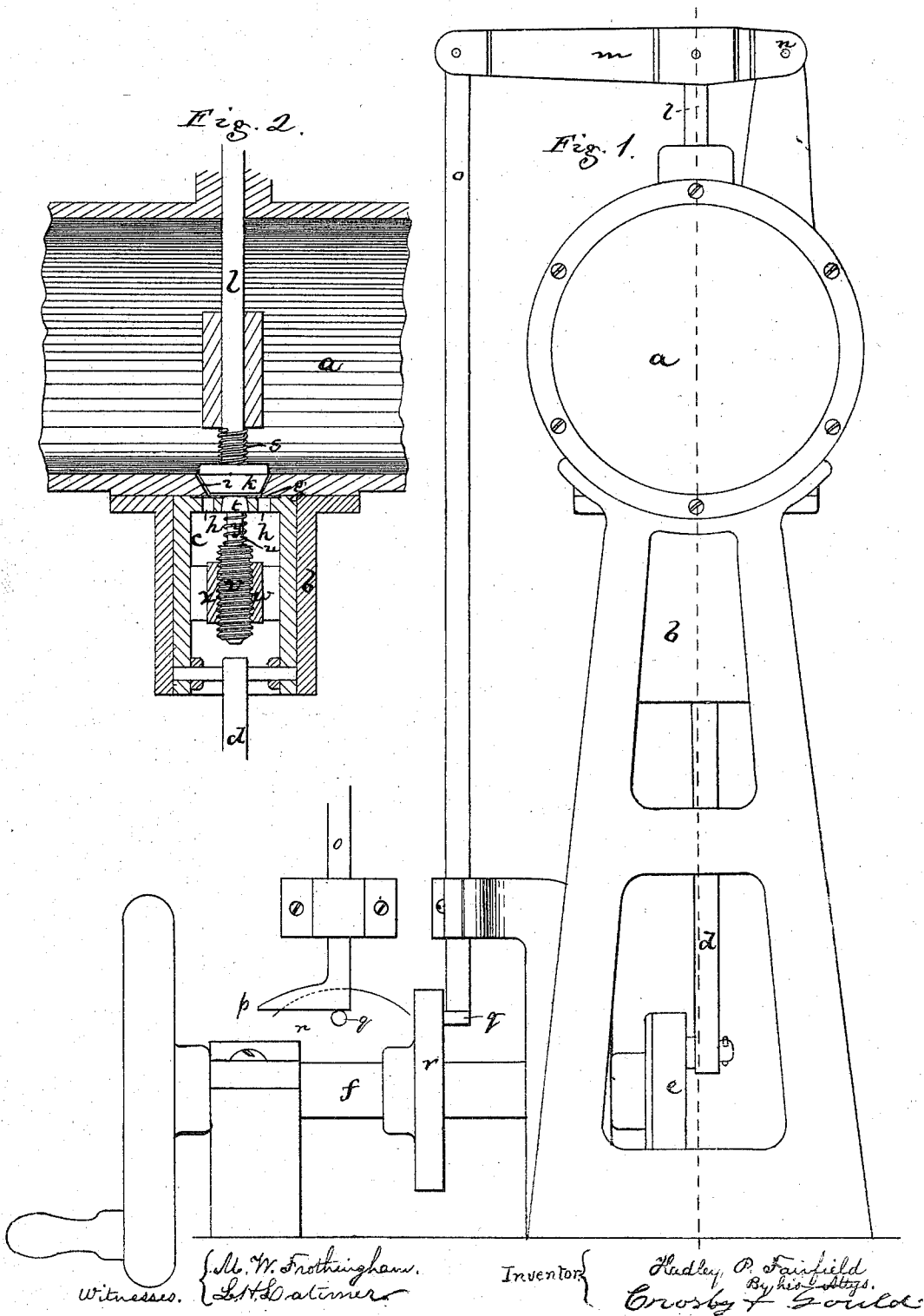


H. P. FAIRFIELD.
Air-Compressors.

No. 142,452.

Patented September 2, 1873.



UNITED STATES PATENT OFFICE.

HADLEY P. FAIRFIELD, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO JAMES W. BROOKS, TRUSTEE, OF SAME PLACE.

IMPROVEMENT IN AIR-COMPRESSORS.

Specification forming part of Letters Patent No. **142,452**, dated September 2, 1873; application filed July 24, 1873.

To all whom it may concern:

Be it known that I, HADLEY P. FAIRFIELD, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Air-Compressors; and I do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

My invention relates to certain details in the valvular mechanism of air-compressing pumps or engines; and consists, first, in the employment of a valve at the top of the compressor-pump, which valve is positively raised by a connection with the shaft that works the compressor-piston; and, secondly, in the employment of a valve connected with the pump-piston, and so arranged as to automatically open, at any required pressure of the air, the normal pressure upon this valve to keep it closed being made by a spring, the stress of which is preferably made adjustable, so that the valve will yield against the pressure of the compressed air in the tank, at any required degree of compression.

The drawing represents a compressor mechanism embodying my invention.

Figure 1 shows the mechanism in elevation. Fig. 2 is a sectional view of the valvular mechanism.

a denotes the compressor-tank or chamber, into which the compressed air is forced, and from which it is led for use. *b* denotes the compressor-pump. The pump-cylinder is stationary, and its piston *c* is reciprocated by the link *d* jointed to the piston and to a crank-pin extending from a crank-wheel, *e*, on a driving-shaft, *f*. At the head of the piston is a thin flexible disk-valve, *g*, fastened at its center to the piston, and covering apertures *h* leading to the interior of the piston. When the piston is driven up the valve closes, and the air is compressed before it, and enters the tank *a* through an opening, *i*, controlled by a valve, *k*. When the piston descends, the edges of the valve *g* yield to the pressure of air below, and the air passes through the apertures into the space above the piston. To insure the closing of the valve *k*, before the piston begins to descend, and independently of the action of the valve, I attach this valve

to the foot of a vertical rod, *l*, the top of which is jointed to a lever, *m*, fulcrumed at *n*, and jointed at its outer end to the top of a rod, *o*, the foot of this rod *o* having an arm, *p*, which is struck by a crank-pin, *q*, extending from a wheel, *r*, on the driving-shaft. When the piston reaches its highest position the pin *q* holds the valve *k* open, but before the piston begins to descend the pin *q* passes the arm *p*, and a spring, *s*, closes the valve *k*, so that the compressed air from the tank is prevented from re-entering the pump-cylinder. In the piston-head is the relief-valve *t*. This valve is fixed to the upper end of a slide, *u*, that passes through a screw, *v*, the screw working through a nut, *w*, in a spider, *x*, stretching across the interior of the piston, and the slide passes through a spring, *y*, bearing against the top of the screw and the bottom of the valve *t*, the stress of the spring tending to keep the valve *t* closed.

It will be obvious, however, that as the density of the air above the piston increases, the pressure of the air will at some point overcome the pressure of the spring, and the valve will then open and permit the air to escape, until the pressure of the spring again counterbalances or overbalances the pressure of the air.

By employing the valve and spring, and especially by making the pressure of the spring adjustable, the pump may be continuously worked, the pressure of the spring being so graduated that at any given point of compression the valve will open for escape of the air through the piston.

The pressure is adjusted by turning the screw *v*, and thus increasing or decreasing the intensity of the spring.

I claim—

1. In combination, with the compressor-pump and piston, a valve, *k*, positively raised by connection with the driving-shaft, substantially as described.

2. In combination, with the pump-piston, a relief-valve, *t*, operating substantially as described.

Executed this 17th day of July, A. D. 1873.
H. P. FAIRFIELD.

Witnesses:

FRANCIS GOULD,
M. W. FROTHINGHAM.