(No Model.)

2 Sheets—Sheet 1.

T. F. FREEMAN.

AIR COMPRESSOR.

No. 290,764. Patented Dec. 25, 1883.

Fig. 1.

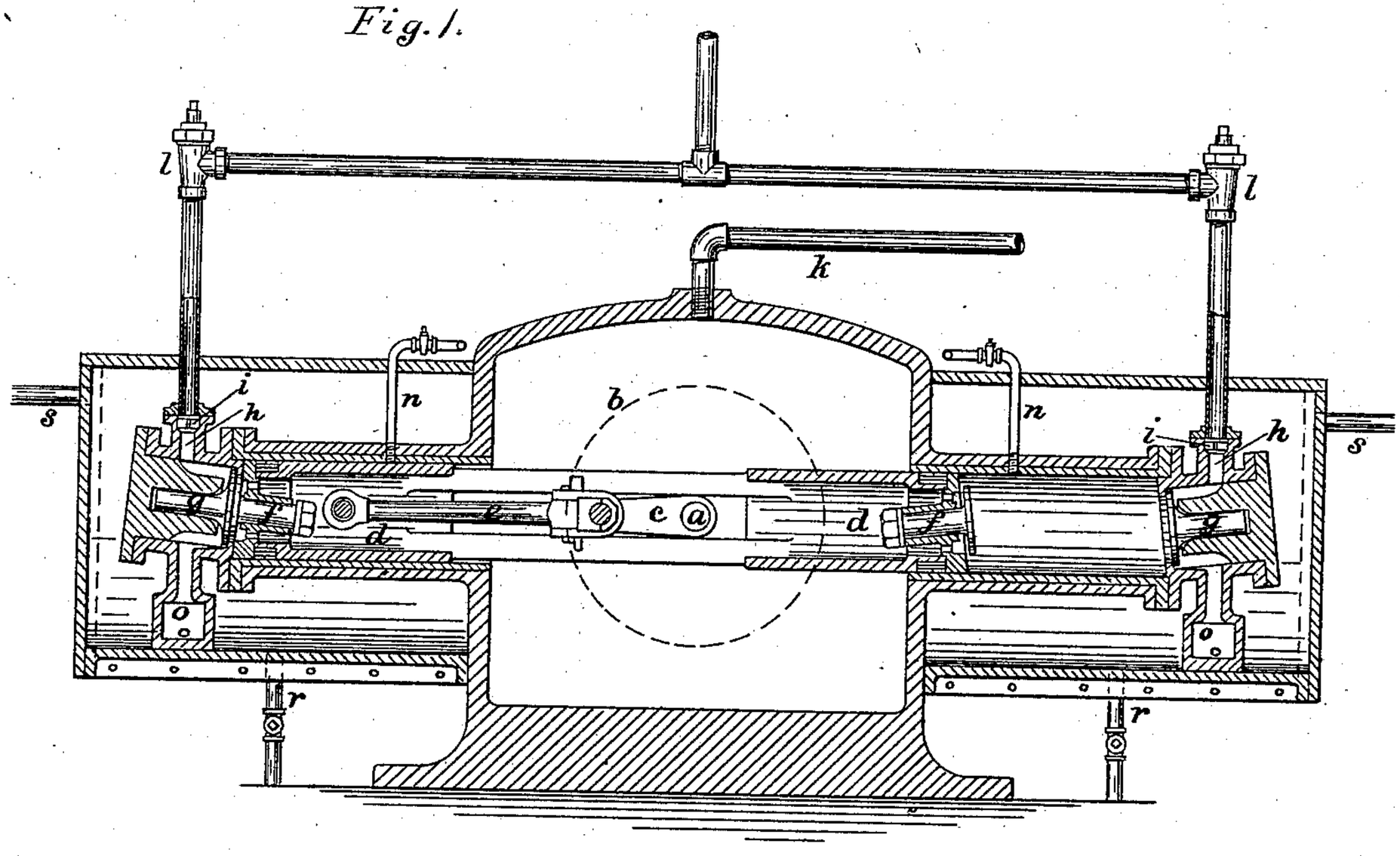


Fig. 3.

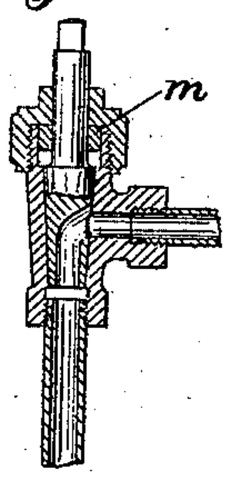
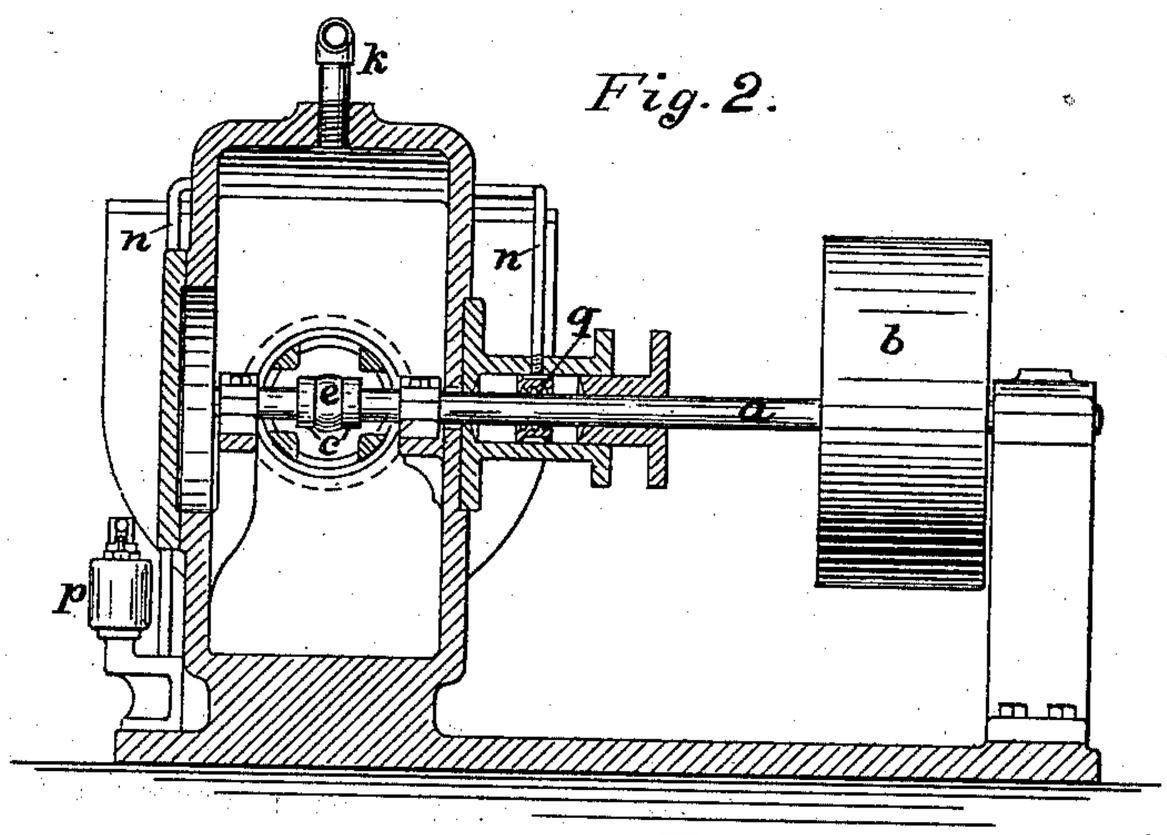


Fig. 2.



WITNESSES:

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(No Model.)

2 Sheets—Sheet 2.

T. F. FREEMAN.

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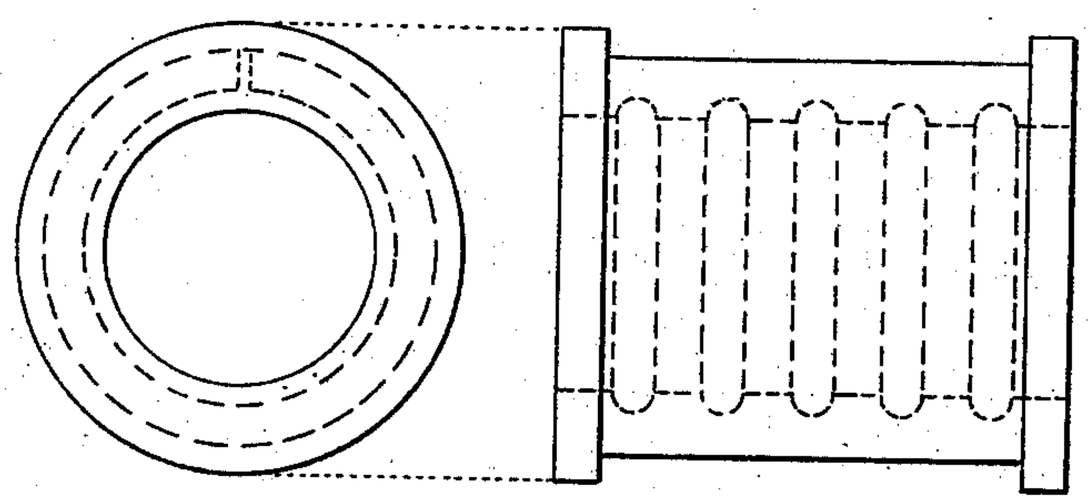
Fig. IV.



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UNITED STATES PATENT OFFICE.

THOMAS F. FREEMAN, OF BROOKLYN, ASSIGNOR TO WILLIAM KOCH, OF NEW YORK, N. Y.

AIR-COMPRESSOR.

SPECIFICATION forming part of Letters Patent No. 290,764, dated December 25, 1883.

Application filed March 30, 1883. (No model.)

To all whom it may concern:

Be it known that I, THOMAS F. FREEMAN, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Compressors, of which the following is a specification.

The said improvements relate to machines that are used for compressing air or gas for refrigerating purposes. A pair of single-acting plunger-pumps provided with suitable valves are driven by a connecting-rod from a crank-shaft operated by a small engine, or in any other convenient manner. In a machine employed upon ammoniacal gas which is returned to the machine, (and it is important there should be no connection between the interior of the machine and the external air,) the lubricating material is collected in closed receptacles and returned by suitable pipes.

In the drawings hereto annexed, Figure 1 is an elevation, in longitudinal section, of a machine made according to my improvements. Fig. 2 is a transverse section of the same, and Fig. 3 is a section of the valve which I prefer to use in the connecting-pipes of the machine. Fig. 4 is an enlarged representation of a collar in the stuffing-box of the machine, showing it in end and side elevations.

The revolving shaft *a* is driven by the belt-pulley *b*, and the crank *c* within the machine operates the plungers *d d* by the connecting-rod *e*. The two plungers are made in one casting, or are secured together so that one connection drives both pumps. The pump-barrels are lined or made of two thicknesses, as shown in the drawings, that there may be no continuity of blow-holes or pores in the metal to occasion leakage. The suction-valves *f f* in the bottoms of the plungers, and the delivery-valves *g g* at the ends of the pump-barrels, are placed at a slight incline, to facilitate their seating by gravity, as well as by the elasticity of the gas. It is essential that the valves *f* be made conical, that they may be readily ground and kept tight in their seats in the moving piston. In the delivery-pipes *h h* of each pump there is an additional check-valve, *i*, to prevent the return or downward flow of the gas. When the compressed air or gas has been delivered to the refrigerating apparatus by the pipe *h*, it is returned to the compressor by the pipe *k*. It will be seen, therefore, that the circulation of the gas is from the central crank-chamber of the machine through the plungers *d d*, the valves *f f* and *g g*, to the delivery-pipes *h h*, and back to the compressors by the return-pipe *k*.

As it may be desirable, in making repairs or grinding valves in one part of the machine, to keep the other part in operation, the delivery-pipes are furnished with stop-cocks *l l*, which are shown in section in Fig. 3. The inlet is at the bottom of the plug, which is made with a shoulder at the top, so that the packing and the gland at *m* keep the plug in position. Under the gland and inside the stuffing-box there is an additional loose ring that compresses the packing below the gland. These cocks are shown in the drawings with only a single passage; but they may be made in the same manner as a three or four way cock.

The lubricating material, which is supplied by the pipes *n n*, is carried through the valves of the machine and settles in the oil-receptacles *o o*, whence it may be pumped by the pump *p* and returned to the oil-cups. The pump may be worked by hand, when required, or operated continuously by any appropriate connection with the working machinery. When the machine is in operation, the pressure of the compressed gas will drive the oil from the receptacle *o* into the pump-barrel when the plunger is being withdrawn, and the pipes *n* are supplied with cocks to enable this to be effected. The oil-pipes are also connected with a grooved sleeve, *q*, within the shaft stuffing-box, (shown in Fig. 2,) so that the grooved metallic ring placed between the parts of the packing may be kept supplied with oil to form an oil seal. This sleeve is shown separately on an enlarged scale in Fig. 4. The oil reaches the grooves on the internal surface, where the seal is needed on account of the motion and wear of the shaft, by means of the leakage around the parts that are not purposely fitted with an oil-tight joint.

Both the pump-barrels and their connections

are inclosed in open tanks or water-jackets, through which circulates the water supplied by the pipes *r*, and that escapes by the overflow-pipes *s*.

I claim as my invention and desire to secure by Letters Patent—

1. A horizontal compressing-pump having its piston provided with inclined conical suction-valves *f*, substantially as and for the purpose stated.

2. In a gas-compressing machine, the combination of the oil-pipe *n*, the well *o*, and the independent pump *p*, by which the oil may be returned under a pressure in excess of that in the compressor, substantially as described.

3. In the stuffing-box of a compressing-machine, the sleeve *q*, with grooves on its interior surface for the reception of oil, in the manner described.

THOMAS F. FREEMAN.

Witnesses:
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WM. KEMBLE HALL.