

(No Model.)

J. REBSAMEN.
FLUID COMPRESSOR.

No. 500,720.

Patented July 4, 1893.

Fig. 1.

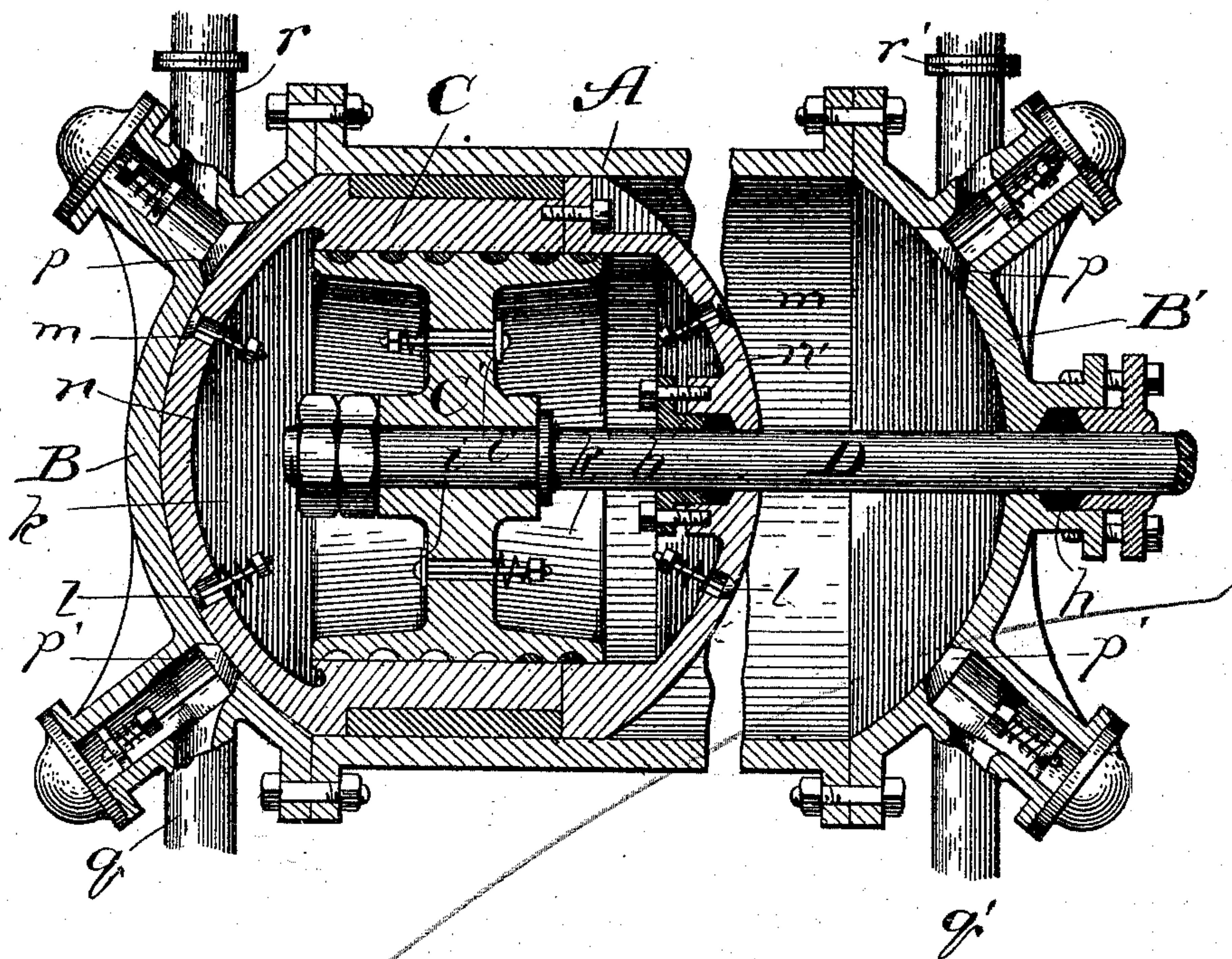
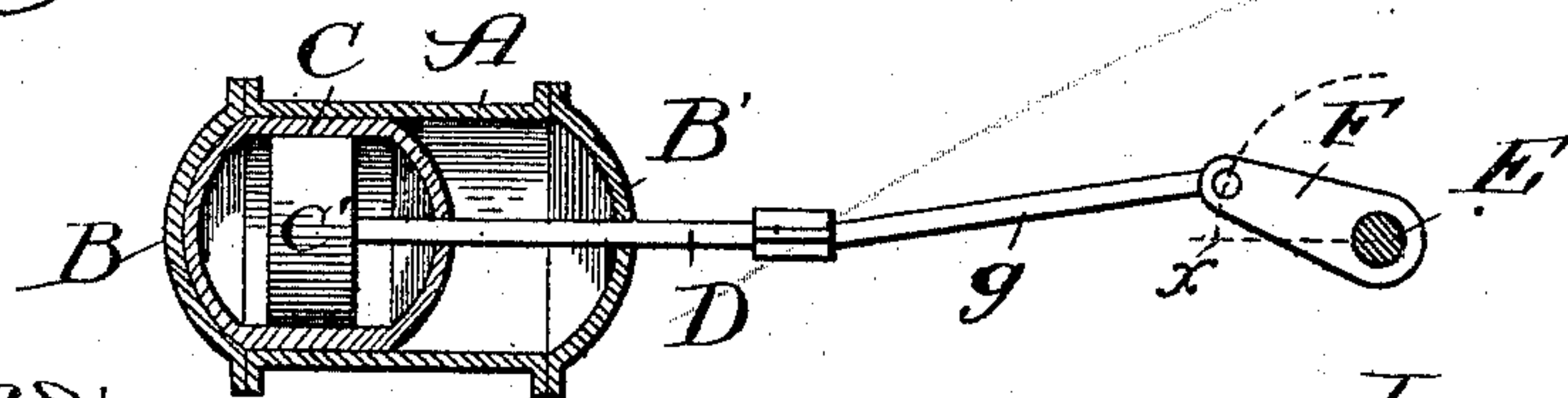


Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

JULIUS REBSAMEN, OF CHICAGO, ILLINOIS.

FLUID-COMPRESSOR.

SPECIFICATION forming part of Letters Patent No. 500,720, dated July 4, 1893.

Application filed January 15, 1892. Serial No. 418,182. (No model.)

To all whom it may concern:

Be it known that I, JULIUS REBSAMEN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Fluid-Compressors, of which the following is a specification.

The object of my improvement is to provide for avoiding clearance of the pistons in the cylinders of compressors of the class to which my invention relates, thereby to overcome the loss of power incidental to clearance of the pistons particularly in air and gas compressors.

I have especially devised my improvement with relation to the compressor of a so-called "ammonia" ice or refrigerating machine, and therefore intend the description, hereinafter contained, in the main to apply to the use of my improvement in that particular connection, though it will be understood as being equally and similarly operative in any connection with which it is adapted to be used, and that I do not intend to limit it in respect to any particular connection.

Generally stated, my improvement involves a hollow piston in and controllably communicating with its cylinder and containing a supplemental piston, the two pistons being relatively yielding under abnormal resistance, and a piston-rod connecting the pistons with the driving-medium, whereby when the stroke of the hollow piston has carried it to a cylinder-head, any excess of the stroke that would tend to force it beyond the cylinder-head will be taken up by the piston-yield.

In the accompanying drawings, Figure 1 is a broken longitudinal sectional view of a compressor having the piston itself constructed to render it yielding for my purpose; and Fig. 2 is a sectional view in the nature of a diagram, showing the relation of the piston to its driving-medium at the end of a stroke.

A is the cylinder shown as provided with bulging heads B and B', though the heads might be flat or of still other form without departure from my invention. Inlet-pipes r , r' , and discharge-pipes q and q' for the ammonia gas to be acted on, are connected with the heads, as represented, and are controlled,

in a usual manner, respectively, by inlet-valves p and outlet-valves p' .

The foregoing details belong to the particular compressor selected for demonstrating my improvement, and may be modified or departed from in various ways without affecting my invention.

Inside the cylinder A is a hollow piston C, suitably packed, and the heads n and n' of which should conform to those of the cylinder, each piston-end containing a safety-valve m and a pressure-inlet valve l . Inside the piston C is closely fitted and suitably packed a supplemental piston C', containing check-valves i and i' , the one opening into a chamber k , formed between the forward ends of the hollow piston C and supplemental piston C', and the other opening into a chamber k' formed between the rear ends thereof. The two chambers k and k' are thus rendered intercommunicating.

D is the piston-rod connected with the supplemental piston C', passing thence through stuffing-boxes h' and h , respectively in the heads n' and B', and connected at its rear end with a driver E, represented in the present instance, in Fig. 2, as a rotary shaft having a crank F, with which the rod D is connected by means of a pitman g . The connection of the supplemental piston with the piston C, while yielding under abnormal resistance, such as would be presented by impact of the piston against a head of a cylinder, is adequately stiff to resist yielding under the stress of the work to which the supplemental piston C' is applied in driving the piston C.

The back-stroke of the piston C draws gas into the cylinder A at its forward end through the valve p , and compresses that previously admitted, by the forward stroke of the piston into the rear end of the cylinder through the valve r' , out through a valve p' ; and the forward stroke of the piston obviously draws gas behind it into the cylinder and discharges that in front of it through a valve p' . The valves m and l have their controlling-springs set to resist any pressure lower than that at which the gas is to be compressed out of the cylinder, so that gas at the same pressure is admitted into the interior of the piston C as

into the cylinder A; and the check-valves i and i' convey the pressure from one of the chambers k k' into the other when the supplemental piston comes into play, as herein-
5 after described.

Reference to Fig. 2 will show that the piston C reaches, in its forward stroke, the forward head B of the cylinder A before the crank F has reached its dead-center line x
10 with the piston-rod, and that, were the piston unyielding, further turning of the crank to the point x would force out the cylinder-head. The yielding nature of the piston, however, by the movable quality of its supplemental piston C' against the resistance of the gas under
15 pressure in the chamber k , enables it to be moved forward against the cushion afforded by the gas in that chamber, the pressure against which forces it past the check-valve i' into the chamber k' ; and that movement
20 causes the supplemental piston to take up, as it were, the excess of the forward stroke, thereby insuring the avoidance of clearance of the piston without damage or even inju-
25 rious strain to the cylinder. The same conditions present themselves under the back stroke of the piston C.

Other means than those described and illustrated may be employed, for effecting my purpose, as within the scope of my general state-
30 ment of invention herein contained, provided such means involve the employment of a hollow piston within and communicating with the cylinder and any means be provided for
35 rendering the hollow piston and the supplemental piston contained therein relatively yielding under abnormal pressure.

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

40 1. In a compressor, the combination with

the cylinder and the piston driving-medium, of a hollow piston in and controllably communicating with the cylinder, a supplemental piston confined in the hollow piston, the two
45 pistons being relatively yielding under abnormal pressure, and a piston-rod connecting the pistons with the driving-medium, whereby, when the stroke of the hollow piston has carried it to a cylinder-head, any excess of
50 the stroke that would tend to force it beyond the cylinder-head will be taken up by the piston-yield, substantially as described.

2. In a compressor, the combination with the cylinder and the piston driving-medium, of a hollow piston in and controllably communicating with the cylinder, a supplemental
55 piston yieldingly confined in the hollow piston, and a piston-rod connecting the supplemental piston with the driving-medium and adjusted to continue the stroke of the piston-rod when the hollow piston has reached the
60 end of its stroke, substantially as and for the purpose set forth.

3. In a compressor, the combination with the piston driving-medium of a cylinder A
65 having valve-controlled inlets r , r' and outlets q , q' , a hollow piston C within the cylinder and provided with valves m and l , a supplemental piston C' yieldingly confined in the hollow piston and provided with valves i , i' ,
70 and a piston-rod D connecting the supplemental piston with the driving-medium and adjusted to continue the stroke of the supplemental piston when the hollow piston has reached the end of its stroke, substantially as
75 and for the purpose set forth.

JULIUS REBSAMEN.

In presence of—

M. J. FROST,
J. N. HANSON.