

No. 704,062.

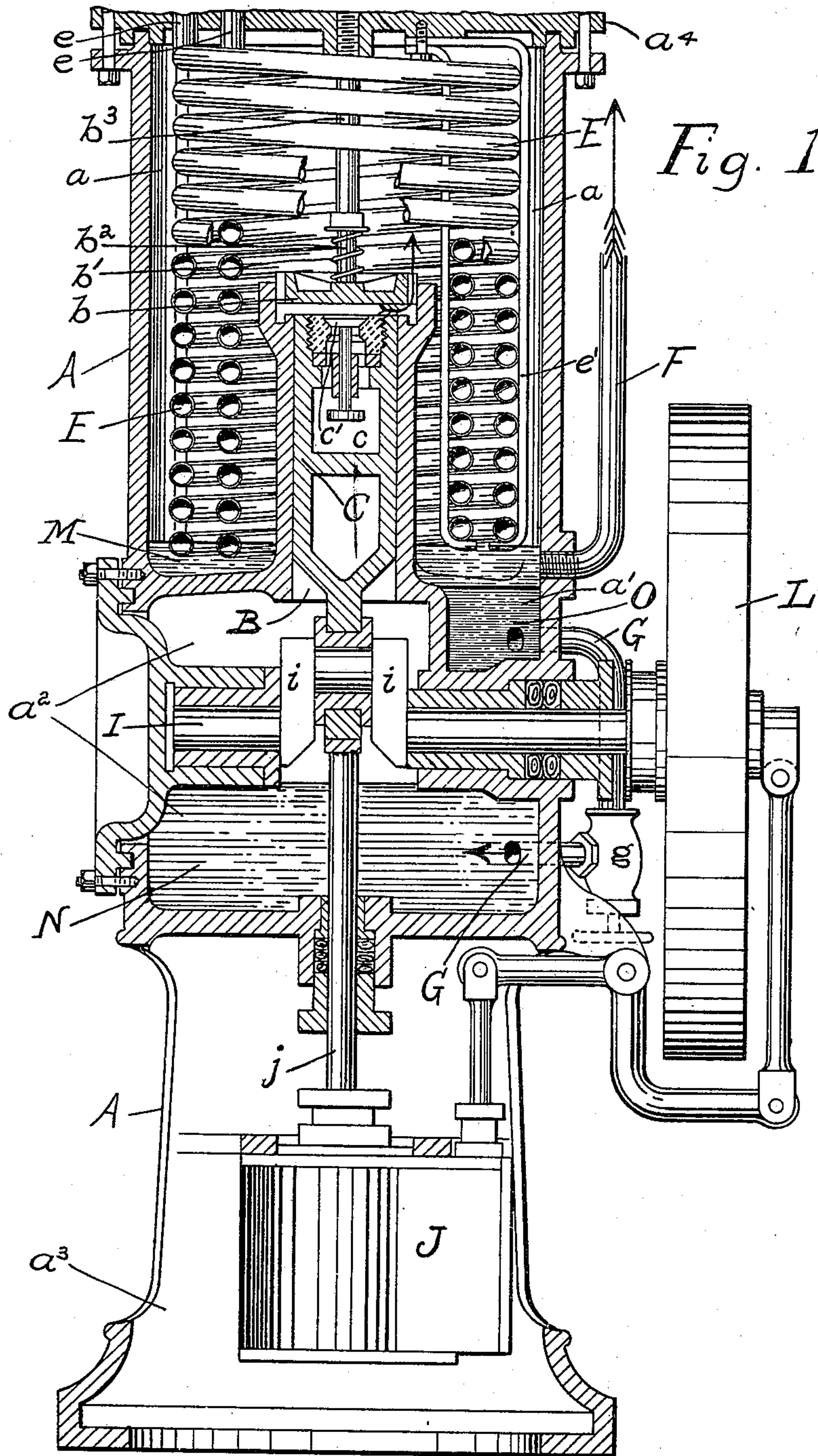
Patented July 8, 1902.

J. T. LUDLOW.
AMMONIA COMPRESSOR.

(Application filed June 28, 1901.)

(No Model.)

3 Sheets—Sheet 1.



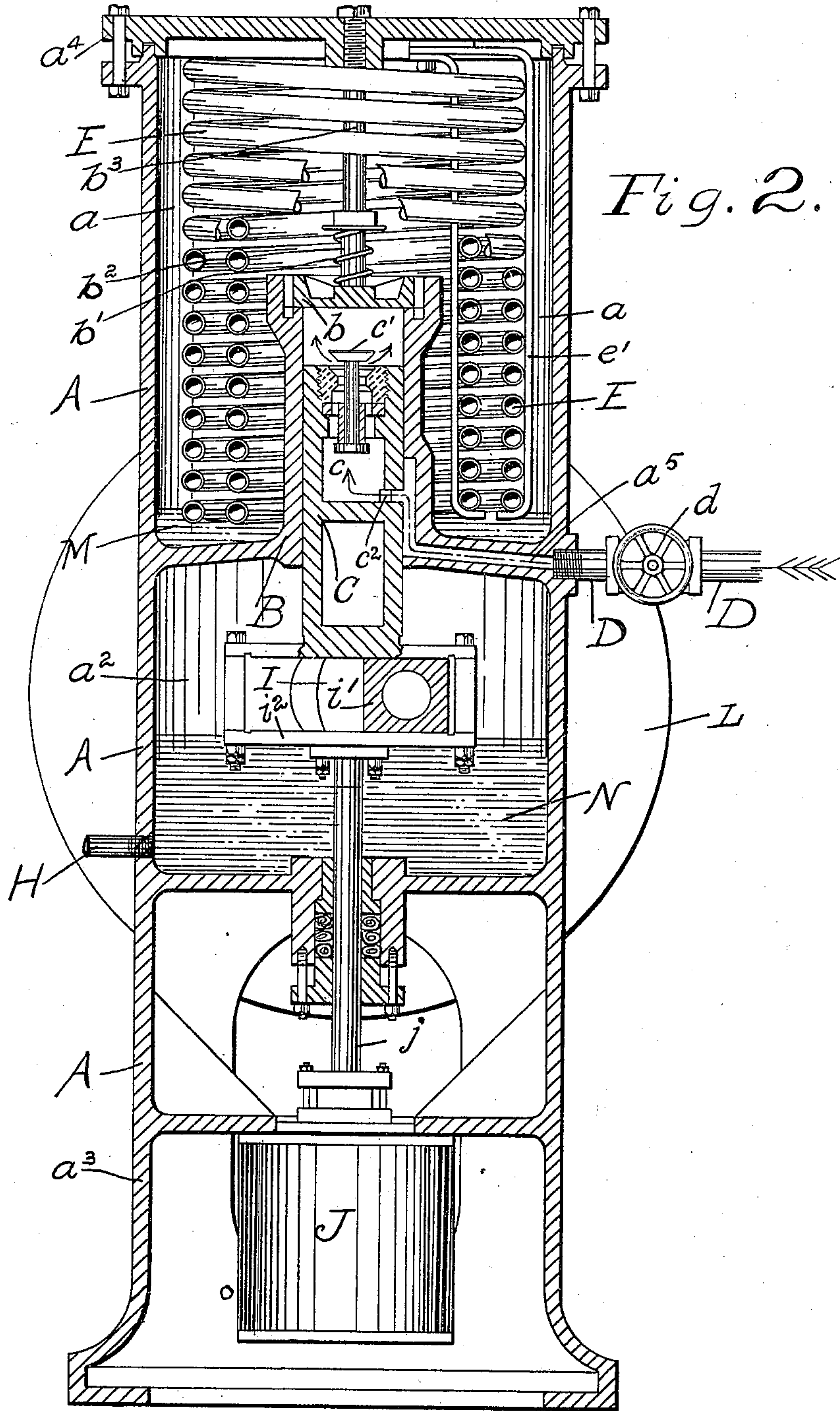
WITNESSES.
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W. B. Richards

INVENTOR.
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3 Sheets—Sheet 2.



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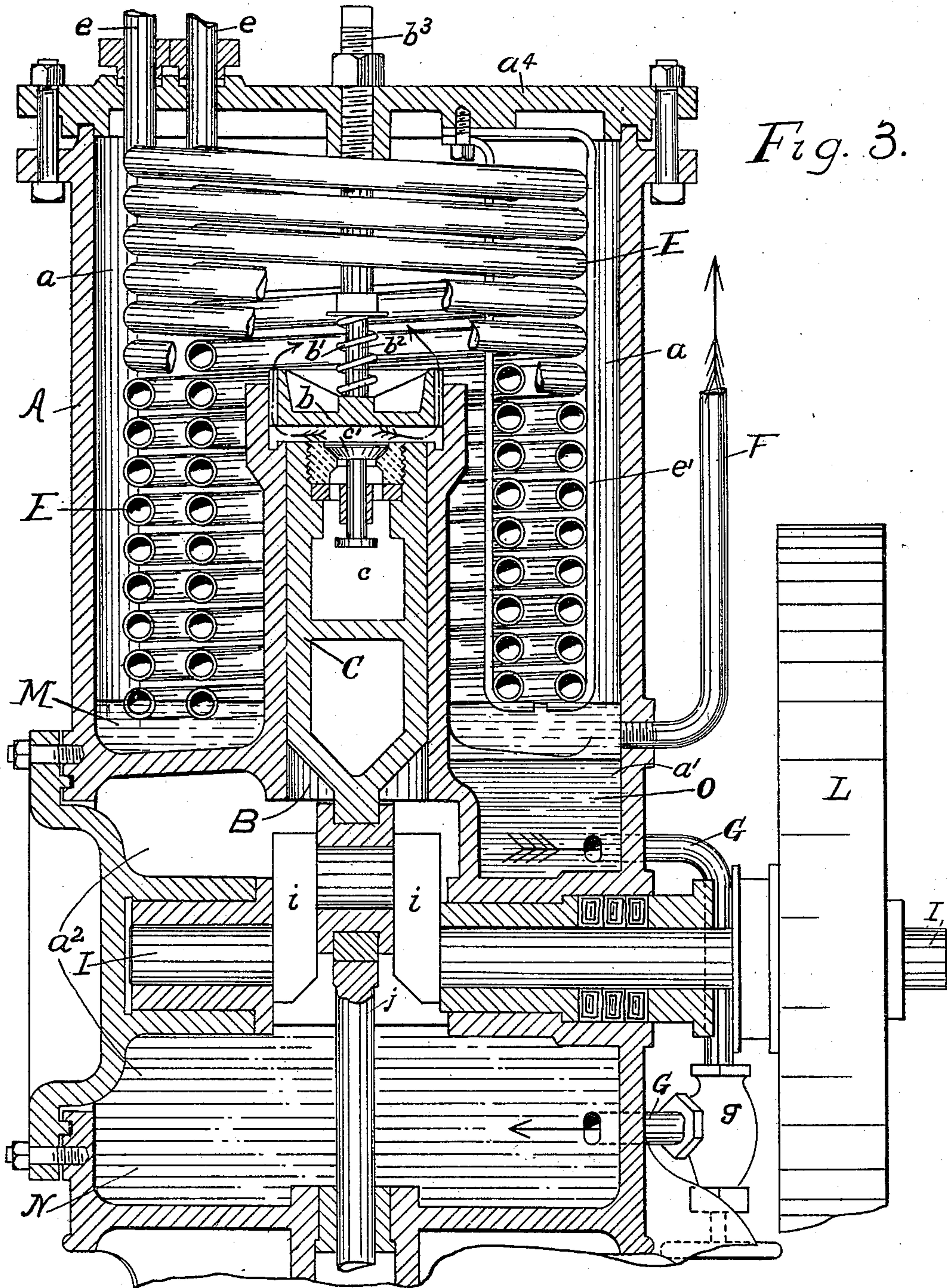


Fig. 3.

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UNITED STATES PATENT OFFICE.

JAMES T. LUDLOW, OF SAN FRANCISCO, CALIFORNIA.

AMMONIA-COMPRESSOR.

SPECIFICATION forming part of Letters Patent No. 704,062, dated July 8, 1902.

Application filed June 28, 1901. Serial No. 66,378. (No model.)

To all whom it may concern:

Be it known that I, JAMES T. LUDLOW, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented certain new and useful Improvements in Ammonia-Compressors; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to the class of ammonia-compressors; and it consists in the novel constructions, arrangement, and combinations of parts, which I shall hereinafter fully describe and claim.

The object of my invention is to obtain simplicity of construction by combining in one frame or casing all the essential parts of an ammonia compressing and condensing system.

Referring to the accompanying drawings, Figure 1 is a vertical sectional view of my ammonia-compressor, showing the piston compressing and discharging the gas. Fig. 2 is a similar view at right angles to that of Fig. 1, showing the piston descending and taking in gas. Fig. 3 is an enlarged view similar to Fig. 1, the base portion being omitted.

A represents the frame or casing. It is best, though not essentially, made of a single casting, as shown. The upper portion of the casing forms a condensing-compartment a , the floor of which at one portion is depressed to form an oil-collector well a' , as shown in Figs. 1 and 3. The central portion of the casing forms a compartment a^2 for the piston-driving connections and for the oil in which said connections work. The lower portion forms the base a^3 . The casing is formed with a cylinder B, which rises centrally into the condensing-compartment a and is provided at its head with a valve b , normally held to its seat by a spring b' upon its stem b^2 . The extent of the movement of the valve is regulated by the rod b^3 , adjustably suspended from the cap a^4 of casing A.

Within the cylinder B is the piston C. This piston has a chamber c , controlled by a suction-valve c' . In piston-chamber c is a side port c^2 , Fig. 2, which communicates with the gas-inlet passage a^5 , Fig. 2, formed in casing A, with which said passage the pipe D, Fig. 2, supposed to lead from the evaporating coils (not shown) of the general refrigerating cir-

cuit or system, is connected. A suitable valve d controls pipe D.

Within the upper compartment a of the casing is the condensing-coil E, through which by means of pipes $e e$ a flow of cold water is had. The condensing-coil E is best arranged by being suspended within chamber a from the cap a^4 of the casing by means of the stirrup e' , so that it can be readily removed by taking off said cap. From the lower portion of chamber a issues a pipe F, Figs. 1 and 3, which may be supposed to lead to the evaporating-coils of the general circuit or system. A pipe G connects the oil-collector well a' of compartment a with the lower compartment a^2 of the casing, said pipe being controlled by a valve g , Figs. 1 and 3.

H in Fig. 2 is a pipe through which oil is drawn into compartment a^2 as needed.

Within compartment a^2 of the casing is mounted the shaft I, having a crank i , operating in a slide-box i' of a yoke i^2 , Fig. 2, which is connected with the piston C. The driving connections may be operated either by the steam-engine J, carried in the base of the casing, the piston-rod j of said engine being connected with the yoke i^2 , or by any available power through the wheel L on the crank-shaft I.

The condensed ammonia lying in the bottom of compartment a is shown by M. The oil for lubricating the driving connections is shown by N, while that portion of the oil which is carried up by the piston into compartment a is shown in Figs. 1 and 3 in the oil-collector well by O.

The operation of the machine is as follows: The ammonia-gas is drawn from the evaporating circuit or coils of the general refrigerating system through pipe D, Fig. 2, through passage a^5 into the chambered piston C. Thence passing through the suction-valve c' of said piston, as shown by the arrows in Fig. 2, it is compressed in the upper end of cylinder B. Thence it is discharged through the valve b on top of said cylinder directly and with no intervening piping into compartment a . In this compartment the gas is condensed into a liquid by contact with the cold pipes of condensing-coil E, and the liquefied gas falls to the bottom of said compartment, as shown at M. There it lies and is thence ex-

panded or drawn through pipe F into the evaporating circuit or coils of the general system, where it cools or freezes various materials or space, as usual in the ammonia expansion system.

The oil N in compartment a^2 is for the purpose of lubricating the driving connections. Any oil which is carried by the piston into compartment a sinks through the liquefied ammonia M (the oil being heavier) into the collecting-well a' , Figs. 1 and 3, where it lies, as shown at O, and it may be drawn back again into the main oil body N through pipe G. The advantage of the machine constructed as I have described may be stated to be the combining in one frame or casing of all the essential parts of an ammonia compressing and condensing system, dispensing with the separate ammonia-receiver, the oil-receiver, the condensing-tank, and the pipe connections for ammonia between the compressor and the liquid-pipe of the evaporating-coils, all of which are usual with ammonia-compressing systems. In my machine the single frame or casing is so constructed as to act as a cylinder, an oil-separator, an ammonia-receiver, a case for the condenser, and a case for the working parts to be inclosed and to work in oil. It is also adapted to receive and to compress ammonia-gas and discharge it directly in a surrounding space without intermediate piping, the gas being condensed in said space by contact with the water-cooled condenser-coil therein, said space also acting as an ammonia and oil receiver.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An ammonia-compressor having a casing with an upper compartment, to receive the condensed ammonia, and a lower compartment, to hold the lubricating-oil, a compressing mechanism in the upper compartment,

adapted to receive the ammonia-gas from the evaporating-circuit and to compress and discharge it into said upper compartment, means within said upper compartment for condensing the gas therein, driving connections in the lower compartment for the compressing mechanism, said connections working in the oil contained therein, a communication between the upper and lower compartment, to draw back again into the lower compartment, any oil which may be carried by the compressing mechanism into the upper compartment, and an outlet for the condensed ammonia, to the evaporating-circuit.

2. An ammonia-compressor having a casing with an upper compartment, to receive the condensed ammonia, said compartment having a depression in its floor to form an oil-collecting well, and said casing having also a lower compartment to hold the lubricating-oil, a compressing mechanism in the upper compartment, adapted to receive the ammonia-gas from the evaporating-circuit and to compress and discharge it into said upper compartment, means within said upper compartment for condensing the gas therein, driving connections in the lower compartment for the compressing mechanism, said connections working in the oil contained therein, a communication between the oil-collecting well of the upper compartment and the lower compartment, to draw back again into the lower compartment, any oil which may be carried by the compressing mechanism into the upper compartment, and an outlet for the condensed ammonia, to the evaporating-circuit.

In witness whereof I have hereunto set my hand.

JAMES T. LUDLOW.

Witnesses:

WALTER F. VANE,
D. B. RICHARDS.