

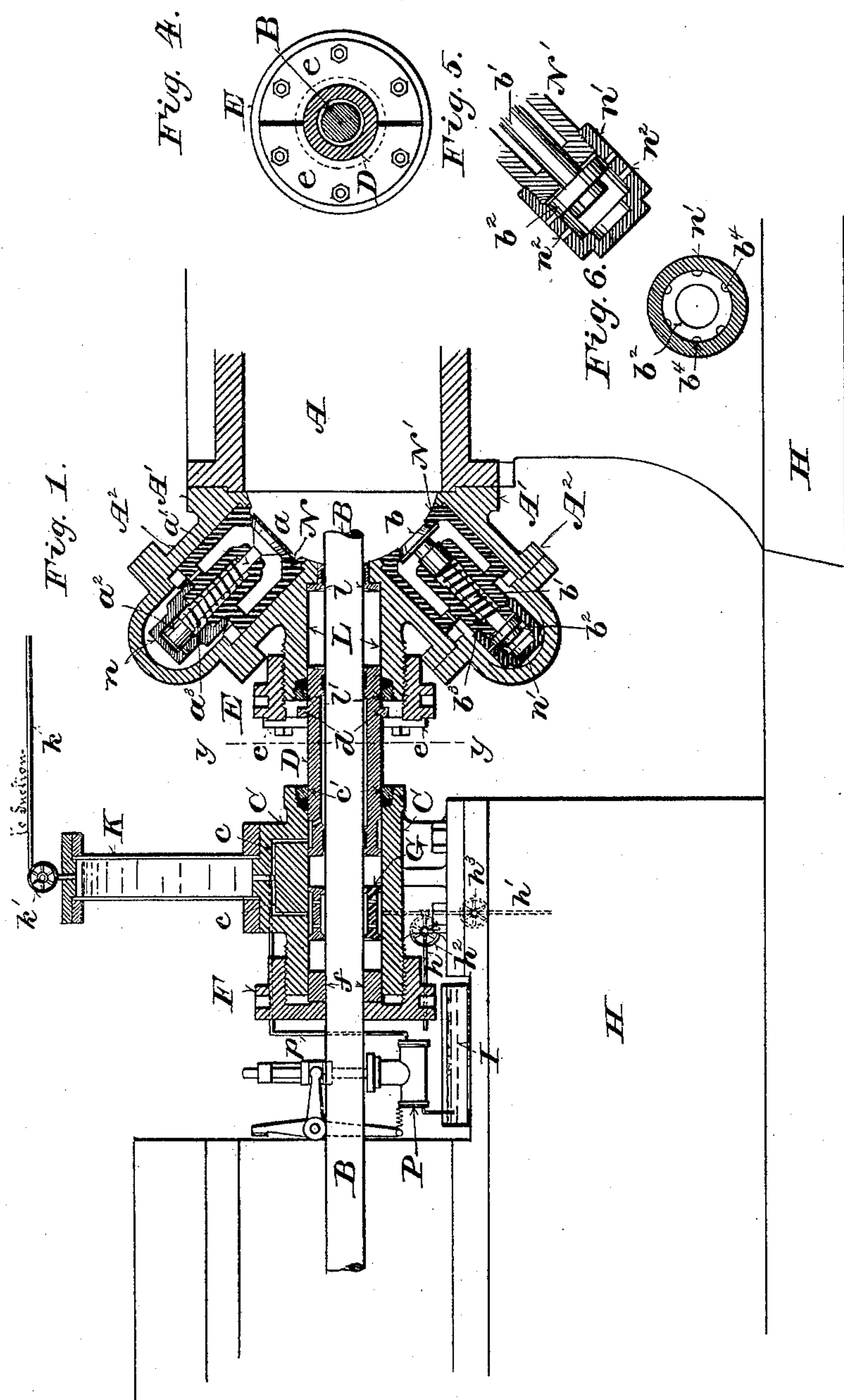
(No Model.)

2 Sheets—Sheet 1.

P. WEISEL.
AIR COMPRESSOR.

No. 467,389.

Patented Jan. 19, 1892.



WITNESSES:
Chas. L. Goss.
August Lindemann

INVENTOR
Peter Weisel
BY *E. A. Bottom*
ATTORNEY

(No. Model.)

2 Sheets—Sheet 2.

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Fig. 2.

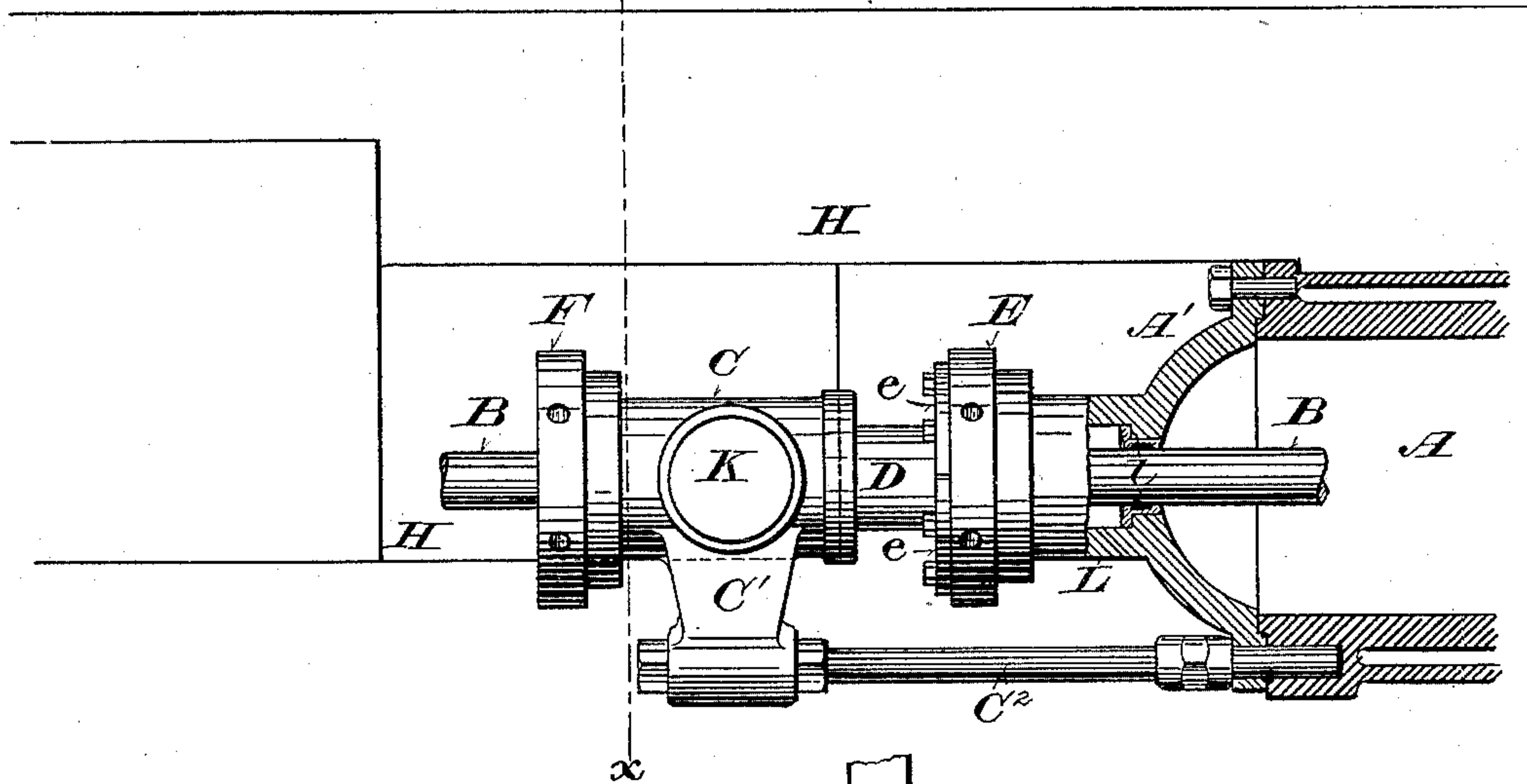
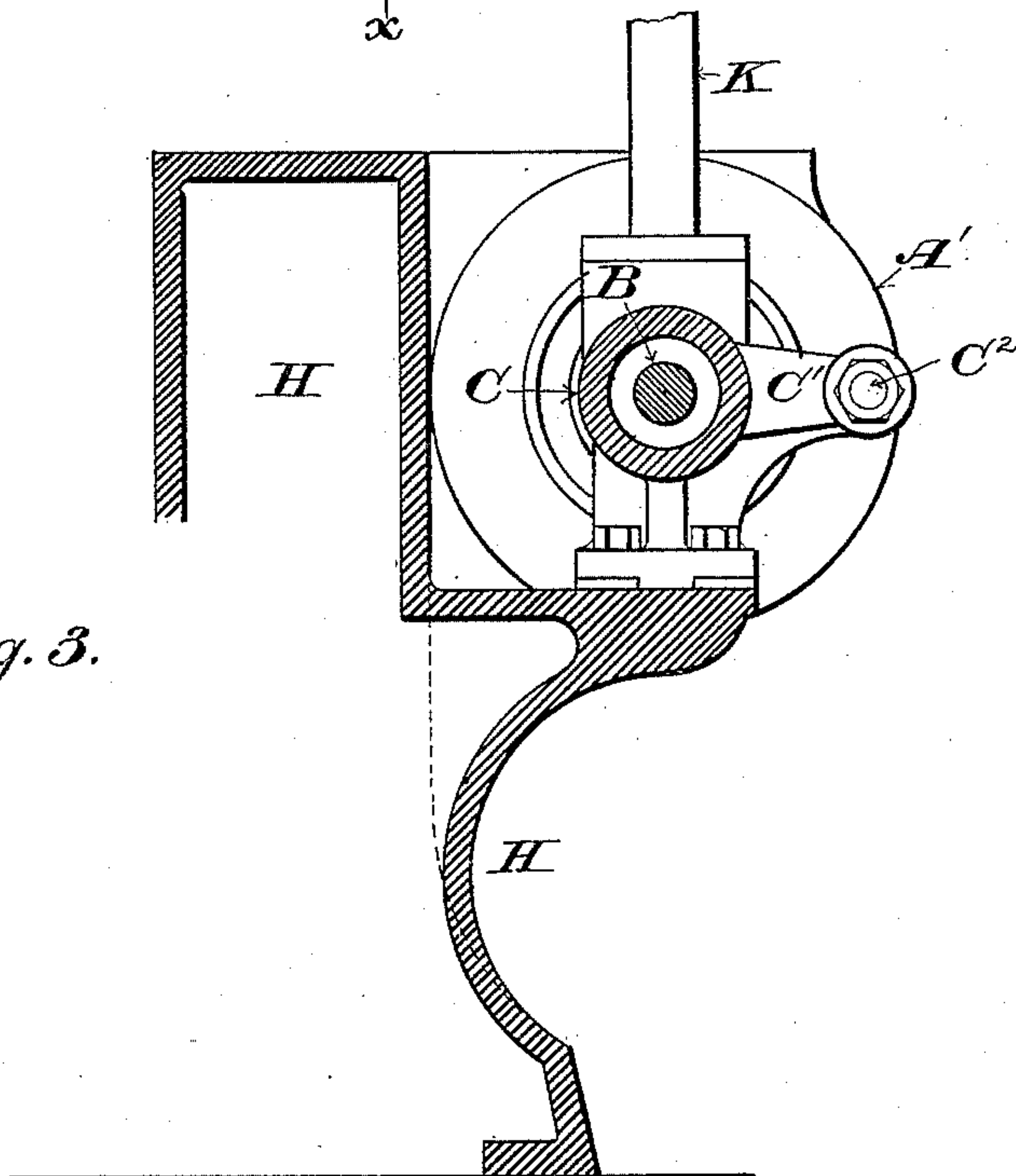


Fig. 3.



WITNESSES:

Chas. L. Goss.

August Lindemann

INVENTOR

Peter Weisel

BY

E. A. Rotherman

ATTORNEY

UNITED STATES PATENT OFFICE.

PETER WEISEL, OF MILWAUKEE, WISCONSIN,

AIR-COMPRESSOR.

SPECIFICATION forming part of Letters Patent No. 467,389, dated January 19, 1892.

Application filed February 2, 1887. Serial No. 226,331. (No model.)

To all whom it may concern:

Be it known that I, PETER WEISEL, of the city and county of Milwaukee, and State of Wisconsin, have invented certain new and useful Improvements in Air-Compressors; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The primary objects of my invention are, first, to render the packing of the compressor-piston rod more effectual; second, to facilitate the operation of packing; third, to effectually lubricate the piston-rod, and, fourth, to prevent concussion and noise in the operation or the valves.

It consists, essentially, of two stuffing-boxes, one attached to the compressor-cylinder and the other having an independent foundation or attachment; of an oil-supply pipe or passage communicating with both stuffing-boxes, of pistons applied to the valve-stems and working in closed or partially-closed chambers, and of certain other features hereinafter set forth.

In the accompanying drawings like letters designate the same parts in the several figures.

Figure 1 is a vertical axial section of a portion of the compressor-cylinder embodying my improvements. Fig. 2 is a plan view of the same, the cylinder being shown in medial horizontal section. Fig. 3 is a cross-section on the line $x x$, Fig. 2. Fig. 4 is a cross-section on the line $y y$, Fig. 1, showing in elevation the divided washer by which the sleeve or gland of one of the stuffing-boxes is operated. Fig. 5 is a sectional detail, on an enlarged scale, of a piston and its case constituting an air-cushion for one of the valves; and Fig. 6 is a section taken at right angles to that shown in Fig. 5 and showing a modified form of the piston employed in connection with the valves.

It is well understood by those familiar with this class of machines that it is difficult to prevent the gas commonly employed therein, when subjected to the usual high pressure,

from escaping more or less through the stuffing-box about the piston-rod without causing said piston-rod to bind and work imperfectly.

The foregoing observation is particularly true with respect to the ammonia gas commonly employed in refrigerating-machines.

As heretofore constructed double stuffing-boxes have been so connected that to compress the packing next to the cylinder it was necessary to effect the same by means of the gland of the outer stuffing-box, which, operating first upon the packing therein, spent the greater part of its force before acting upon the packing nearest the cylinder.

To meet the foregoing difficulties is the design of the compound or double stuffing-box hereinafter described.

Referring to the drawings, A represents a portion of the compressor-cylinder, A' one of the heads of said cylinder formed with the stuffing-box L, and wells or pockets A² for the reception of the valve-cases N N'.

D is a sleeve mounted upon the piston B and inserted at one end into the stuffing-box L, of which it constitutes the gland.

E is an internally-threaded ring engaging and working with screw-threads cut in the outer face of the stuffing-box L. To the outer face or side of the ring E is bolted the ring or washer e , which bears against an annular flange d , formed on the outside of the sleeve D. The ring or washer e is divided, as shown in Fig. 4, to facilitate its removal or adjustment upon the sleeve D.

C is a cylinder placed around the piston-rod B a short distance from the stuffing-box L and secured independently thereof to the frame or bed H of the machine. The sleeve D is extended beyond the stuffing-box L into the adjacent end of the cylinder C, constituting one of the glands thereof, as shown in Fig. 1. At the opposite end the cylinder C is externally screw-threaded to receive and engage the internally-screw-threaded ring or cap F, which bears against and retains the gland or follower f in place.

G is a sleeve placed inside of the cylinder C midway between the sleeve D and gland f and formed inside and out with annular recesses, which are connected by openings through said sleeve. Upon the cylinder C is mounted a closed oil-chamber K, connected

at the top by a pipe k with the suction side of the compressor. By means of the valve k' in pipe k communication between the compressor and oil-chamber K may be opened or closed at will. An annular recess d' is formed in the outer face of the sleeve D at the end inserted in the cylinder C and communicates through an opening or openings with a larger recess formed inside of said sleeve about the piston B. Passages c c , formed in cylinder C, connect the annular recesses in the outer faces of the sleeves D and G with the lower part of the oil-chamber K.

h' is a pipe connected with the under side of cylinder C opposite the recess in the outer face of sleeve G. It is provided with a valve h^3 , by which the said pipe may be opened or closed.

Between the cylinder C and the valve h^3 a pipe h is connected with the pipe h' and overhangs at its discharging end an oil-well or drip-pan I, placed underneath the outer end of said cylinder C to catch the oil which may escape therefrom upon the piston-rod B. The valve h^2 regulates the flow of oil in the pipe h and closes the same whenever it is desired to discharge the oil from the cylinder C through the pipe h' for the purpose of cleansing said cylinder, &c.

P is a pump connected by a pipe with the oil-well I and on the force side by a pipe p with the lower part of the oil-chamber K. The pump P may be arranged, as shown in the drawings, to be operated automatically by the movement of the piston or by other suitable means, or it may be operated by hand.

To further insure against the escape of gas through the packing outside of the sleeves D, I form annular recesses in the outer end of the stuffing-box L and in the adjacent end of the cylinder C and insert in said recesses suitable packing, which is compressed and retained therein by means of the annular threaded followers c' and l' . In the opening at the inner end of the stuffing-box L, where the piston-rod B enters the cylinder A, I prefer to place an internally-rabbeted gland l , as shown in Fig. 1.

To stiffen or brace the compressor-cylinder A and preserve its alignment and adjustment with reference to the stuffing-boxes and to prevent the deflection by the movement of the piston-rod B of either the cylinder or the stuffing-boxes, also to avoid the binding and unequal wear of the packing and piston-rod, the outer stuffing-box C is directly and rigidly secured to the frame or bed H of the machine and connected with the compressor-cylinder A by a tie rod or bolt C^2 .

To prevent the percussion of the valves a and b with their cases and seats N N' , I provide their stems a' b' with pistons a^2 b^2 , which are inclosed in caps n n' , secured to the valve-cases N N' .

To allow the valve sufficient freedom of

movement, openings n^2 n^2 , as shown in Fig. 5, may be made in the caps inclosing the pistons on said valve-stems. As the piston b^2 (shown in Fig. 5) passes the openings n^2 in either direction and approaches the ends of the chamber formed by the cap n' and valve-case N' , the confined air forms a cushion for said piston and prevents the valve from being violently seated.

In place of the openings through the caps inclosing the pistons on the valve-stems, as described, recesses or openings b^4 may be formed, as shown in Fig. 6, in the periphery of said pistons, or said pistons may be a little smaller than the caps or cases in which they work, so as to permit the passage of air between them and said cases and allow sufficient freedom of motion of the valves. The pistons a^2 on the stems of the suction-valves a need to be cushioned at one end of their stroke only, since in opening they work against the spring a^3 , and their movement in that direction requires no further check. In connection with the force-valves the movement of the piston b^2 in both directions should be checked at the proper limits to prevent said valves from being violently seated, or when opened from striking the cases N' in which they work.

To pack or repack the piston-rod, suitable packing is placed in the stuffing-box L and the sleeve D forced snugly against the same by screwing up the threaded ring E and washer e , which engages and works with the flange d upon said sleeve. The packing in stuffing-box L having been sufficiently compressed, packing is placed in the cylinder C between the sleeve G and the sleeve D and the follower f and compressed by screwing up the cap F on the outer end of said cylinder C. The annular recesses in the outer faces of the sleeve D and sleeve G are of sufficient width to permit of their adjustment in the operation of packing without moving them out of communication with the oil-passages c c , through which lubricant is supplied to both sleeves D and G and to the piston-rod B. Any gases escaping from the compressor-cylinder A around the piston B into the sleeve D passes through passage c into the chamber K, where it rises to the top of the oil therein and may be drawn therefrom through the pipe k back into the compressor-cylinder. Any excess of oil forced into the chamber K escapes from the under side of the sleeve G through the pipe h into the oil drip-pan I, the discharge of oil from the cylinder C being regulated by the valve h^2 , so as to maintain a certain level in the chamber K. Whenever the oil becomes dirty and it is desired to discharge the same from chamber K and cylinder C, the valve h^2 is closed and the valve h^3 opened, thus permitting the oil, with all the impurities therein contained, to drain or run entirely out of said cylinder through the pipe h' .

It is obvious that various changes may be

made in the details of construction in carrying my invention into practice without departure from the spirit thereof.

I claim—

5 1. The combination, with the cylinder provided with a stuffing-box, the piston, and piston-rod, of a supporting-bed to which said cylinder is fixed and an auxiliary stuffing-box supported independently of said cylinder, substantially as and for the purposes set forth.

10 2. The combination, with the cylinder having a stuffing-box formed in one head and the piston and piston-rod, of a stuffing-box formed separately from the first-mentioned stuffing-box, and a sleeve placed around the piston-rod and inserted in the adjacent ends of said boxes and serving as glands therefor, substantially as and for the purposes set forth.

15 3. The combination, with the cylinder and its piston and piston-rod and a supporting bed or frame, of a stuffing-box formed in the cylinder-head, an auxiliary stuffing-box independently attached to said bed or frame which constitutes a separate independent support for said auxiliary box a short distance from said cylinder and its stuffing-box, a longitudinally-adjustable sleeve placed over the piston-rod between said stuffing-boxes and serving as glands for their adjacent ends, and a gland adjustably attached to the outer end of said auxiliary stuffing-box, substantially as and for the purposes set forth.

20 4. The combination, with the cylinder and its piston and piston-rod and a supporting bed or frame, of a stuffing-box formed in one cylinder-head, an auxiliary stuffing-box attached independently thereof to said frame or bed which constitutes a separate independent support for said auxiliary box and provided at the end opposite the cylinder with a gland, an internally-recessed sleeve, the ends of which form glands for the adjacent ends of said stuffing-boxes, mounted upon the piston-rod between them, and an oil-passage communicating with the recess in said sleeve, substantially as and for the purposes set forth.

25 5. The combination, with the cylinder and its piston and piston-rod and a supporting bed or frame, of a stuffing-box formed in one cylinder-head, an auxiliary stuffing-box independently attached to said bed or frame which constitutes a separate independent support for said auxiliary box, an internally-recessed sleeve mounted upon said piston-rod and forming at the ends glands for said stuffing-boxes, an external recess in said sleeve within one stuffing-box and connected with the internal recess therein, an oil-supply pas-

sage communicating with the external recess in said sleeve, and means for adjusting said sleeve longitudinally upon said piston-rod, substantially as and for the purposes set forth.

6. The combination, with a cylinder and its piston-rod, of a stuffing-box attached to said cylinder, a stuffing-box having a support independent thereof, an internally and externally recessed sleeve mounted upon said piston-rod between said stuffing-boxes and a similar sleeve placed inside of said last-mentioned stuffing-box, and oil-passages communicating with the exterior recesses in said sleeves, substantially as and for the purposes set forth.

7. The combination, with the cylinder and its piston and piston-rod and a supporting bed or frame, of a stuffing-box formed in one cylinder-head, an auxiliary stuffing-box attached independently thereof to said bed or frame which constitutes a separate independent support for said auxiliary box, a longitudinally-adjustable sleeve interposed between said stuffing-boxes and forming glands for the adjacent ends thereof, and a tie-rod connecting said auxiliary stuffing-box with said cylinder, substantially as and for the purposes set forth.

8. The combination, with a cylinder and its piston-rod, of a stuffing-box, an oil-chamber mounted thereon and communicating with the interior of said stuffing-box, a discharge-pipe connected with the under side of said stuffing-box and discharging below the same, a valve arranged to open and close said pipe, and a branch connected therewith between said valve and stuffing-box and provided with a valve arranged to regulate the flow of oil from said stuffing-box, substantially as and for the purposes set forth.

9. The combination, with a cylinder and its piston-rod, of a stuffing-box, an oil-chamber mounted thereon and communicating with the interior of said stuffing-box, a pump connected with and arranged to force oil into said oil-chamber, a discharge-pipe connected with the lower part of said stuffing-box and furnished with a regulating-valve, and a pipe provided with a valve connecting the upper part of said oil-chamber with said cylinder, substantially as and for the purposes set forth.

I testify that I claim the foregoing as my own I affix my signature in presence of two witnesses.

PETER WEISEL.

Witnesses:

CHAS. L. GOSS,
ERNST VILTER.