

No. 865,015.

PATENTED SEPT. 3, 1907.

N. A. CHRISTENSEN.
COMPRESSOR.

APPLICATION FILED AUG. 13, 1902.

Fig. 1.

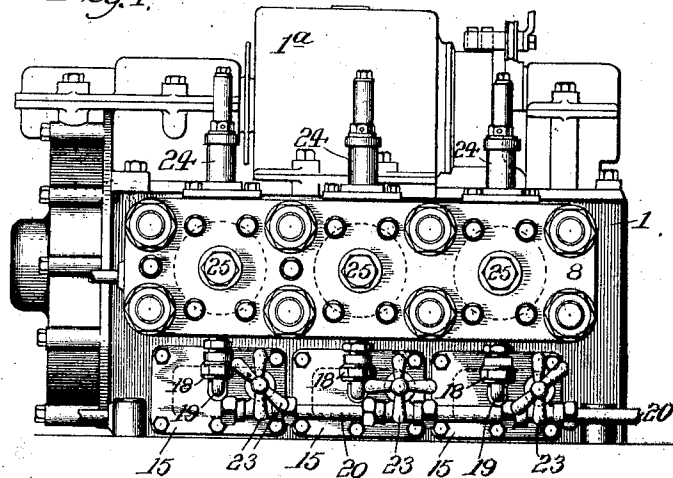


Fig. 2.

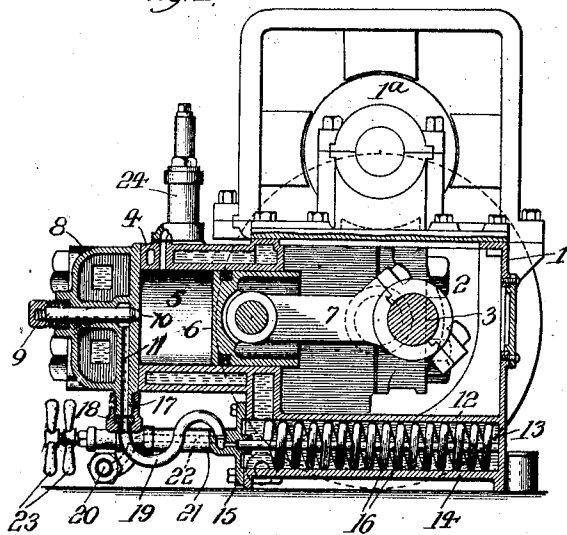
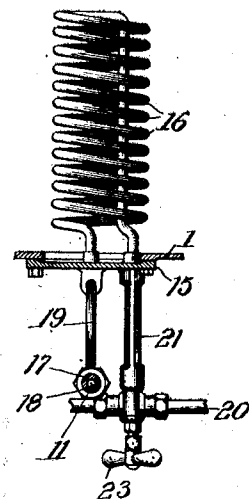


Fig. 3.



Witnesses:
Lute S. Alter,
Louis B. Erwin

Inventor:
Niels Anton Christensen
By Rector & Hibben
His Attorneys

UNITED STATES PATENT OFFICE.

NIELS ANTON CHRISTENSEN, OF MILWAUKEE, WISCONSIN.

COMPRESSOR.

No. 865,015.

Specification of Letters Patent.

Patented Sept. 3, 1907.

Application filed August 13, 1902. Serial No. 119,486.

To all whom it may concern:

Be it known that I, NIELS ANTON CHRISTENSEN, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Compressors, of which the following is a specification.

My invention relates to those air compressors in which a plurality of air compressing cylinders are employed and the object thereof is to provide means for cutting out of service, so far as compression is concerned, any one or more of the compressing cylinders without disturbing or interfering with the operation of the remaining cylinders or with their separate cooling coils as herein shown.

In the drawing Figure 1 is a front elevation of my combined motor and compressor embodying the within improvements; Fig. 2 is a section taken substantially centrally and longitudinally of one of the cylinders; and Fig. 3 a detail view of one of the removable plates, cooling coil and attached fixtures.

In the present instance to illustrate a compressor having a plurality of compressing cylinders, I have shown my type of combined motor and compressor as patented to me on October 17, 1899, by Letters Patent No. 635,280, in which are illustrated two single acting pumps or compressors but in present application, I have chosen to illustrate a series of three such pumps or compressors.

The main frame or compressor casing 1 forms an inclosed crank chamber 2 in which the crank shaft 3 and connections operate. In a forward extension 4 of the casing are formed or arranged a series of three compression cylinders 5 in which travel pistons 6 connected by pitmen 7 with the crank shaft. The crank is driven by an electric motor 1^a in the manner described in my said patent. The outer ends of the cylinders are closed by a removable head 8 which is made hollow for water circulation for cooling purposes. This head contains a discharge valve 9 for each cylinder to govern discharge port 10 and the discharge of air under pressure from said port to the discharge passage 11.

The main casing has a partition or false bottom 12, forming the bottom proper for the crank-shaft chamber and the top of a cooling coil chamber 13 thereby formed by such false bottom between it and the bottom proper marked 14.

Immediately below each cylinder, the cooling coil chamber has an opening which is closed by a removable plate or cover 15 secured to the casing. As there are

three cylinders illustrated in the drawings, so there are three such openings closed by as many plates or covers as shown in Fig. 1.

Referring to Figs. 2 and 3, each plate or cover 15 has connected to it in such manner as to be removable with it a cooling coil 16, whose two ends are brazed or otherwise fastened to the cover. There are three of these cooling coils, one for each plate and consequently one for each cylinder, and the same are arranged in the cooling-coil chamber 13 hereinbefore described.

The discharge passage 11 from each cylinder terminates in a nozzle 17 which is screw threaded to receive a coupling nut 18 for securing or coupling thereto the end of a goose neck connection 19 whose other end is secured to its respective plate 15 and in such manner as to communicate with the cooling coil attached to that plate.

To receive the compressed air from all of the compressing cylinders after it has traversed the cooling-coils and thereby become cooled and to conduct such compressed air to a storage reservoir or to a place of use, I employ a discharge pipe 20 common to all the cylinders and extending transversely of the compressor in front of the cooling-coil chamber, as illustrated in Fig. 1.

Each removable plate 15 has an extension 21 in which is a passage 22 communicating between the delivery end of the cooling-coil and the common discharge pipe 20 as best seen in Fig. 2. This communicating passage 22 is governed by a cut-out valve of suitable and approved construction (not shown) and operated and locked by the handles 23, with the result that such passage may be opened or closed as desired by the operator.

The hereinbefore described arrangement is such that in case it is necessary to inspect, overhaul or repair the suction or discharge valve of any one of the compressing cylinders, such particular cylinder may be cut out of connection with the other or active compressing cylinders without stoppage of the compressor. To this end, the suction valve 24 of the cylinder to be cut out is first removed or opened so that the cylinder will work without compression. The cut out valve is then closed to cut off communication between that cylinder and the common discharge pipe. The discharge valve may also be removed for any desired purpose by unscrewing the bolt 25 exposed on the outer face of the head 8, after which the valves are replaced and the cut-off valve opened, whereupon the cylinder will be cut in again, so as to work in conjunction with its companions. I thus provide a compressor having a plurality of compressing

cylinders independent of each other as to their compressing functions, and each provided with its own cooling-coil and its own cut-out valve.

I claim:

- 5 In a compressor, the combination of a casing, a series of cylinders arranged therein for independently compressing air, a corresponding series of pistons, a single crank shaft, a series of connecting rods between the pistons and crank-shaft, a corresponding series of separate and independent
10 delivery pipes or passages one for each cylinder, a discharge pipe common to all of said delivery pipes and com-

municating therewith along its length, and a series of independently operating and separately controlled cut-out valves, one for each delivery pipe whereby any or more of the cylinders may be cut out of service without stopping the compressor or interfering with the function or operation of the remaining cylinder or cylinders. 15

NIELS ANTON CHRISTENSEN

Witnesses:

J. DADMUN,
BERN SEGERBERG.