June 2, 1925.

1,539,846

J. O. JANSSON

OPTICAL INSTRUMENT DRIER

Filed Dec. 29, 1923

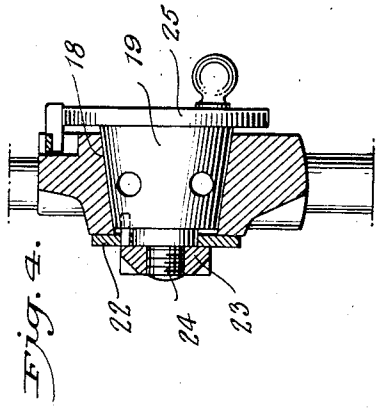


Fig. 4.

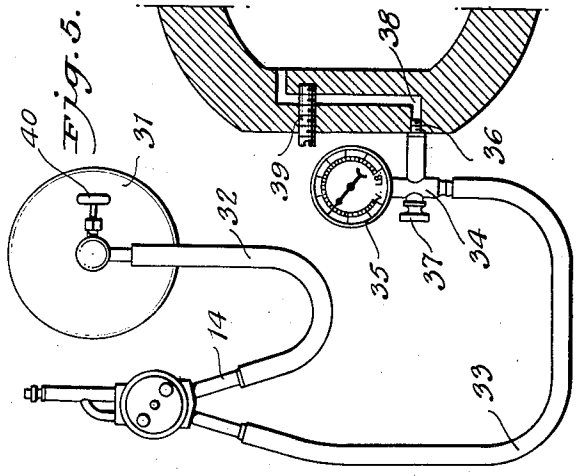


Fig. 5.

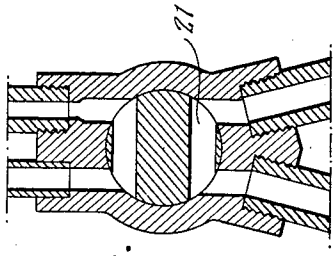


Fig. 2.

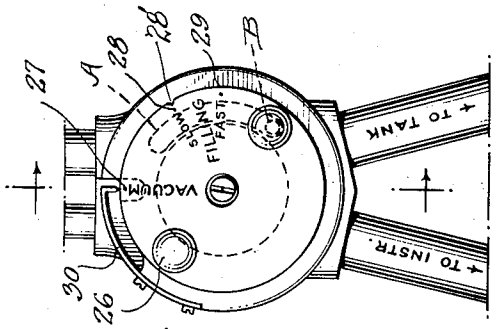


Fig. 3.

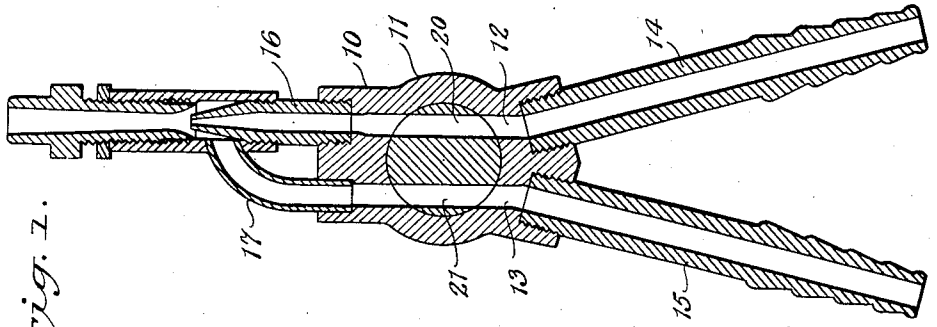


Fig. 1.

INVENTOR

John O. Jansson

BY

George Cook & Sons

ATTORNEYS

Patented June 2, 1925. 1,539,846

UNITED STATES PATENT OFFICE.

JOHN O. JANSSON, OF HOBOKEN, NEW JERSEY, ASSIGNOR TO KEUFFEL AND ESSER COMPANY, OF HOBOKEN, NEW JERSEY, A CORPORATION OF NEW JERSEY.

OPTICAL-INSTRUMENT DRIER.

Application filed December 29, 1923. Serial No. 683,311.

To all whom it may concern:

Be it known that I, JOHN O. JANSSON, a citizen of the United States, and a resident of Hoboken, in the county of Hudson and State of New Jersey, have made and invented certain new and useful Improvements in Optical-Instrument Driers, of which the following is a specification.

My invention relates to a novel method and apparatus for drying optical instruments and has for its object to provide a drier which will be small and compact in size and extremely light in weight, so as to be particularly useful in the drying of periscopes of submarine boats, although it will be readily appreciated that the novel method and apparatus may be efficiently employed for the drying of other instruments.

In a great many optical instruments, such as, for example, gun sights, and particularly periscopes, it is extremely important that the interior of the instrument be free from moisture or dry, otherwise dew is liable to collect upon the inner surfaces of the lenses and by fogging the same will prevent their proper use and function. It has been found that in actual service it is necessary to dry a periscope from time to time, and it has heretofore been necessary to either remove it from the boat and ship it to the repair base or else provide each submarine boat with a vacuum pump, but due to the very limited amount of available space in a submarine boat this latter has been found to be objectionable and impractical.

With my novel method and apparatus I am able to first create a vacuum within the interior of the instrument and then slowly allow a sufficient quantity of dry gas to enter so as to bring the pressure up to approximately atmospheric. By repeating this process several times, I am able to entirely free the interior of the instrument from moisture.

A further object of my invention is to provide a novel method of drying and maintaining in a dry condition the interior of optical or other instruments by causing previously compressed and dried gas to create a vacuum within the interior of the instrument and then allow the vacuum producing gas to pass over into the exhausted chamber of the instrument, and then by sealing the instrument insure that it will remain in a dry condition.

A further object is to provide a novel apparatus for utilizing gas under pressure, either from a tank or from a compression pump, by passing the same through an ejector and in so doing exhaust the periscope or other instrument to which the ejector is connected; and to further provide for the closing of the instrument to the atmosphere and slowly allowing the gas under pressure to enter the exhausted chamber and thus prevent any sudden change of pressure within the instrument which might tend to dislodge or disrupt some of the more sensitive parts of the same.

A further object is to accomplish the aforementioned ends in a simple and practical manner, and with the foregoing and other objects in view my invention resides in the novel method of drying instruments and in the novel apparatus employed, the combination and arrangement of parts thereof, and in the details of construction, all of which will more fully hereinafter appear, it being understood that changes may be made within the scope of the appended claims without departing from the spirit of the invention.

In the drawings accompanying and forming a part of this application:

Figure 1 is a view in longitudinal section of my novel ejector apparatus;

Figure 2 is a fragmental view illustrating a somewhat different setting of the control valve thereof;

Figure 3 is a top plan view of the valve portion of the ejector apparatus and particularly disclosing the dial inscriptions;

Figure 4 is a view in section taken on the line 4—4 of Figure 3; and

Figure 5 is a diagrammatic view illustrating my novel apparatus in actual use.

Referring specifically to the several views, wherein similar reference numerals designate corresponding parts throughout, the ejector 10 comprises a main body portion 11 having the two parallel ducts 12 and 13 extending therethrough. The duct 12 terminates at its one extremity in the gas inlet pipe 14 and at its remote extremity communicates with the ejector nozzle proper 16. The duct 13 terminates at its one extremity

in the exhaust nozzle 15 and at its remote end communicates with the vacuum producing portion 17 of the ejector nozzle 16.

A transverse opening 18 extends through the body 11 and intercepts the ducts 12 and 13. The opening 18 is of conical outline and forms a seat for the controlling valve 19. The valve 19 is provided with two openings or ducts 20—21. A suitable washer 22 and nut 23 (which latter engages the threaded shank 24) hold the valve in proper and gas-tight position upon the seat 18. The top of the valve 19 is preferably provided with a dial 25, and upon which are mounted the finger-engageable knobs 26, and is further characterized by suitable markings such as "Vacuum" at the point 27, "Slow filling" at the point 28, and "Fast filling" at the point 29. The periphery of the dial is preferably provided with a notch 28′, which, together with the spring latch member 30, acts as a suitable index arrangement and prevents the valve from being accidentally turned past the slow filling position. The spring latch member 30 also acts as an indicator and when pointing to the several dial markings indicates the position of the valve. The body of the valve is further routed out to provide a curved slot A, which in conjunction with the pin B which is carried by the dial plate limits the extreme positions of the valve.

The ducts 20 and 21 are so arranged that with the valve in the position as indicated by the marking "Vacuum" the duct 20 will connect the ejector nozzle proper 16 with the gas inlet pipe 14 and the duct 21 will connect the vacuum nozzle 15 with the vacuum producing pipe 17 of the ejector proper, this position being illustrated in Figure 1. With the dial turned to the position indicated by "Fast filling," the gas inlet nozzle 14 and vacuum nozzle 15 will both be closed to the atmosphere and will be connected one to the other as disclosed in Figure 2. The intermediate position of the dial as indicated by the point "Slow filling" will provide the closing of the nozzles 14 and 15 to the atmosphere but will allow a very slow leakage of gas from the inlet pipe over into the exhaust pipe 15.

In carrying out my novel method of drying instruments and in the actual use of the apparatus described, a tank 31, filled with compressed gas and preferably nitrogen, is connected by a hose 32 to the inlet nozzle 14 of the ejector. A second hose 33 is secured to the exhaust nozzle 15 and leads to an attaching fixture 34. The attaching fixture includes a pressure gauge 35 which is adapted to register pressures both above and below atmospheric. The attaching fixture 34 also includes a threaded end member 36 which when rotated by the thumb screw 37 is adapted to engage the threaded wall of an opening 38 which leads to the interior of the instrument which is to be dried. A shut-off plug 39 is adapted to close the duct 38 after the vacuum drying and instrument filling has been accomplished.

With the parts as thus arranged, the valve is turned to the vacuum position and the tank valve 40 is then opened. The rapid passing of the compressed gas through the ejector causes a vacuum to be produced within the interior of the instrument. After a vacuum equal to approximately 22″ of mercury has been obtained, the valve of the ejector is turned until the index latch 30 snaps into the indexing notch 28′ and at which position the valve is held until the gas from the tank slowly filters into and reduces the vacuum within the instrument, thus preventing any sudden changes of pressure therein. After the vacuum has been materially reduced the valve is further turned until the fast filling position is reached and a pressure of approximately 10 lbs. per square inch is allowed to build up within the instrument, these pressures, however, are relative and may be varied as experience may direct.

In most instances it will be advisable to repeat this process several times in order to be sure that the instrument will be thoroughly and completely dry, after which the plug 39 is again returned to its place and the instrument accordingly sealed. I have found that the best results are obtained when nitrogen gas is used, although it will be readily appreciated that air from an air compressor could be substituted for the gas tank and fairly good results be obtained, and in this regard it is to be understood that the term "gas" refers to air as well as nitrogen, which latter is ordinarily used for the drying of instruments.

Having thus described and explained my invention, I claim and desire to secure by Letters Patent:

1. An apparatus for drying a closed receptacle comprising an ejector, the pressure side of the ejector adapted to communicate with a source of gas under pressure, with the vacuum side of the ejector adapted to communicate with the receptacle to be dried, and a valve associated with said ejector whereby the pressure side of the ejector and the vacuum side thereof may be closed to the atmosphere and brought into communication one with the other.

2. A drying apparatus comprising an ejector including pressure and vacuum ducts extending therethrough, a valve associated with said ejector and provided with two ducts communicating with the ducts of the ejector and also adapted to close said ejector ducts to the atmosphere and to bring the pressure duct into communication with the vacuum duct.

3. A drying apparatus comprising an ejector including pressure and vacuum ducts extending therethrough, a valve associated with said ejector and provided with two ducts communicating with the ducts of the ejector and also adapted to close said ejector ducts to the atmosphere and to bring the pressure duct into communication with the vacuum duct, and means for indicating the position of the valve ducts and to arrest the movement of the valve at the position of slow leakage from the pressure duct of the ejector into the vacuum duct.

4. A drying apparatus comprising a tank of compressed dry gas, and ejector connected thereto and including pressure and vacuum ducts, the pressure duct communicating with said tank, the vacuum duct communicating with the chamber to be dried, a valve associated with said ejector and ejector ducts and adapted to open the pressure duct to the atmosphere and the vacuum duct to the vacuum-producing portion of the pressure duct to thereby allow the escapement of the dried gas to the atmosphere and cause a vacuum to be set up within said chamber thereby, said valve further adapted to close said vacuum and pressure ducts to the atmosphere and to provide a by-pass from said pressure duct to said vacuum duct to thereby allow the dry compressed gas to pass from the said tank into said chamber and relieve the vacuum therein.

Signed at Hoboken in the county of Hudson and State of New Jersey this 27th day of December, A. D. 1923.

JOHN O. JANSSON.

Witnesses:
SAMUEL WOOD, Jr.,
CARL W. KEUFFEL.