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Examiner

No. 886,684.

PATENTED MAY 5, 1908.

P. J. DUKELOW.
PHOTOGRAPHIC RAY FILTER.
APPLICATION FILED JAN. 20, 1908.

Fig. 1.

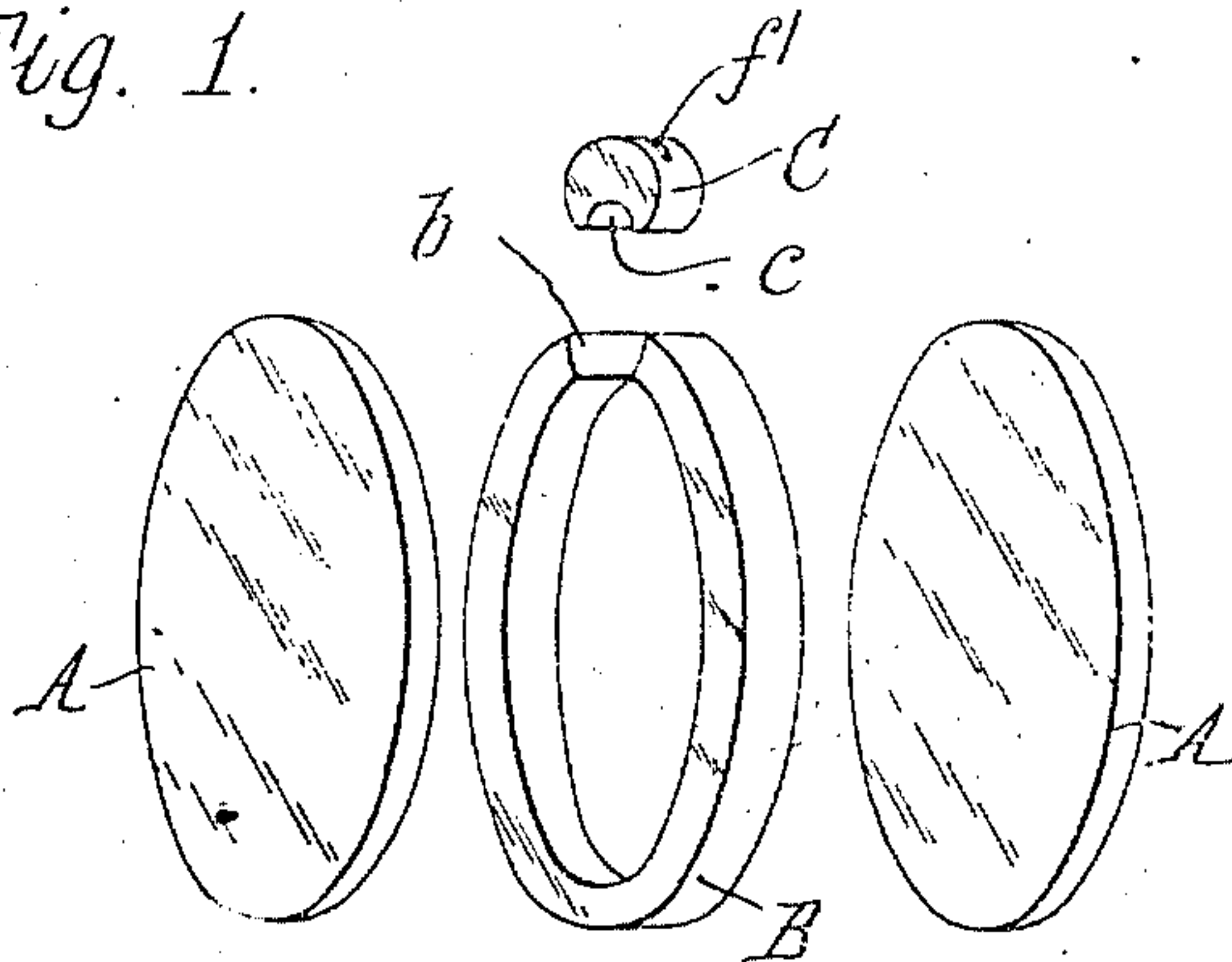


Fig. 2.

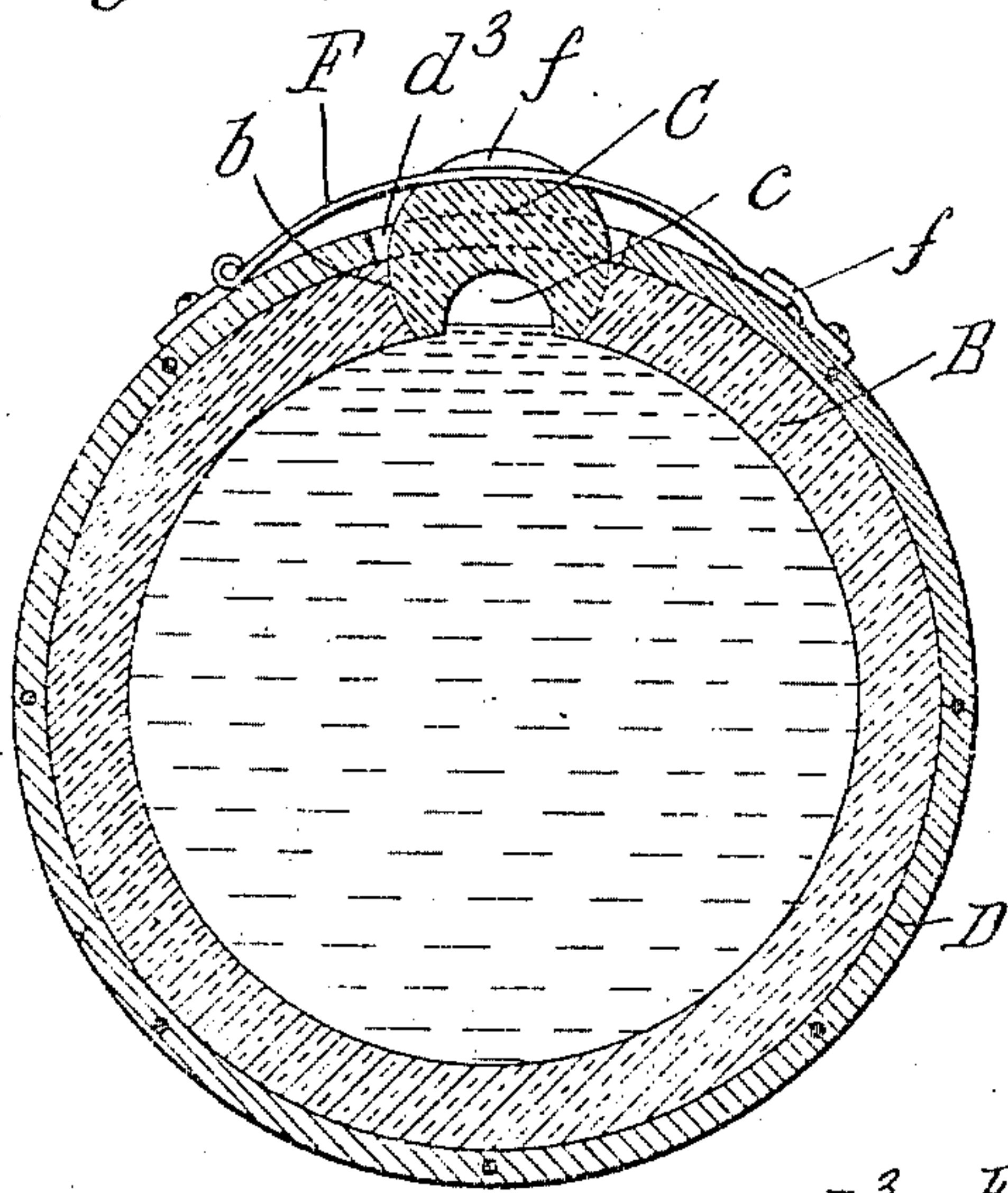


Fig. 3.

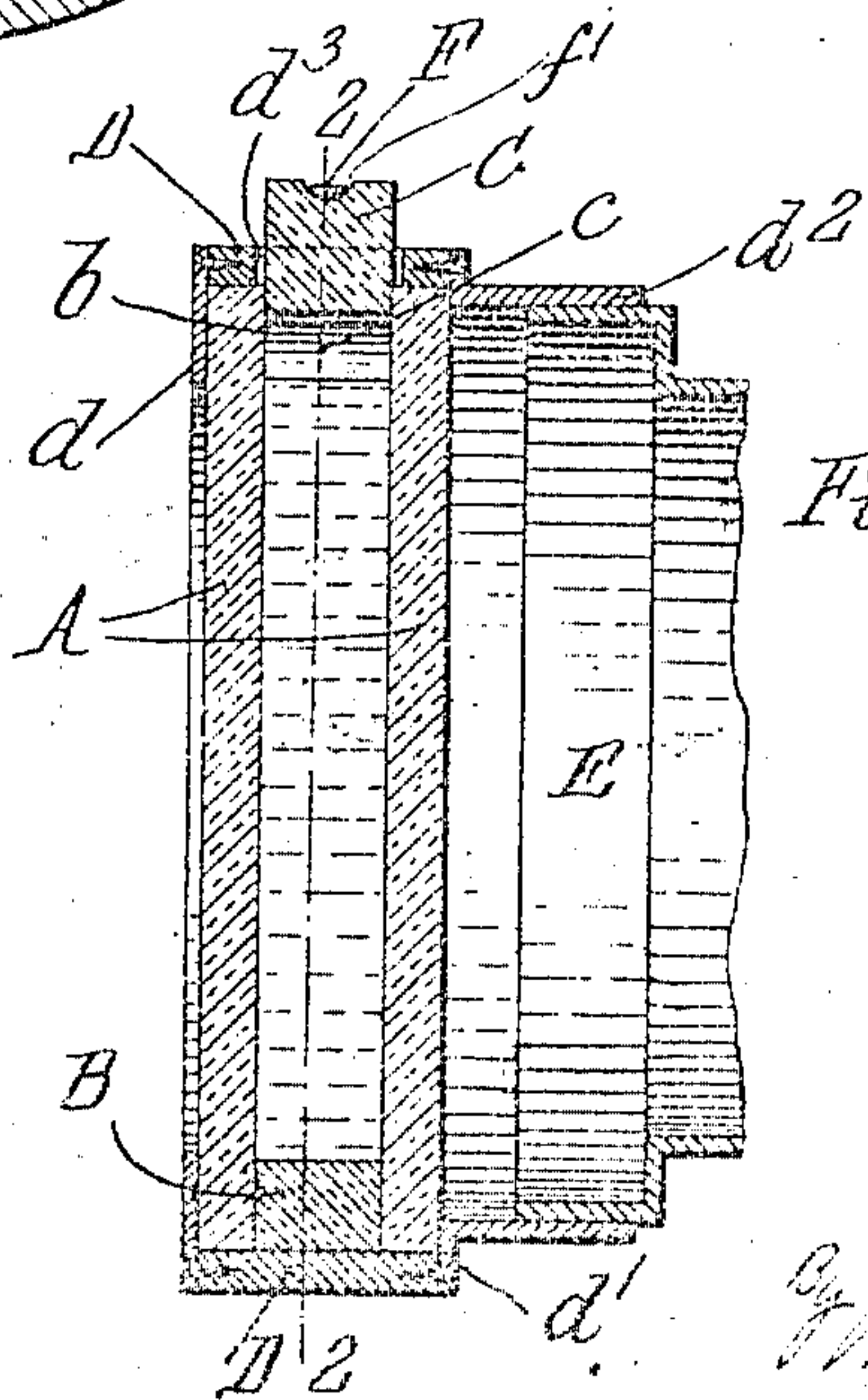
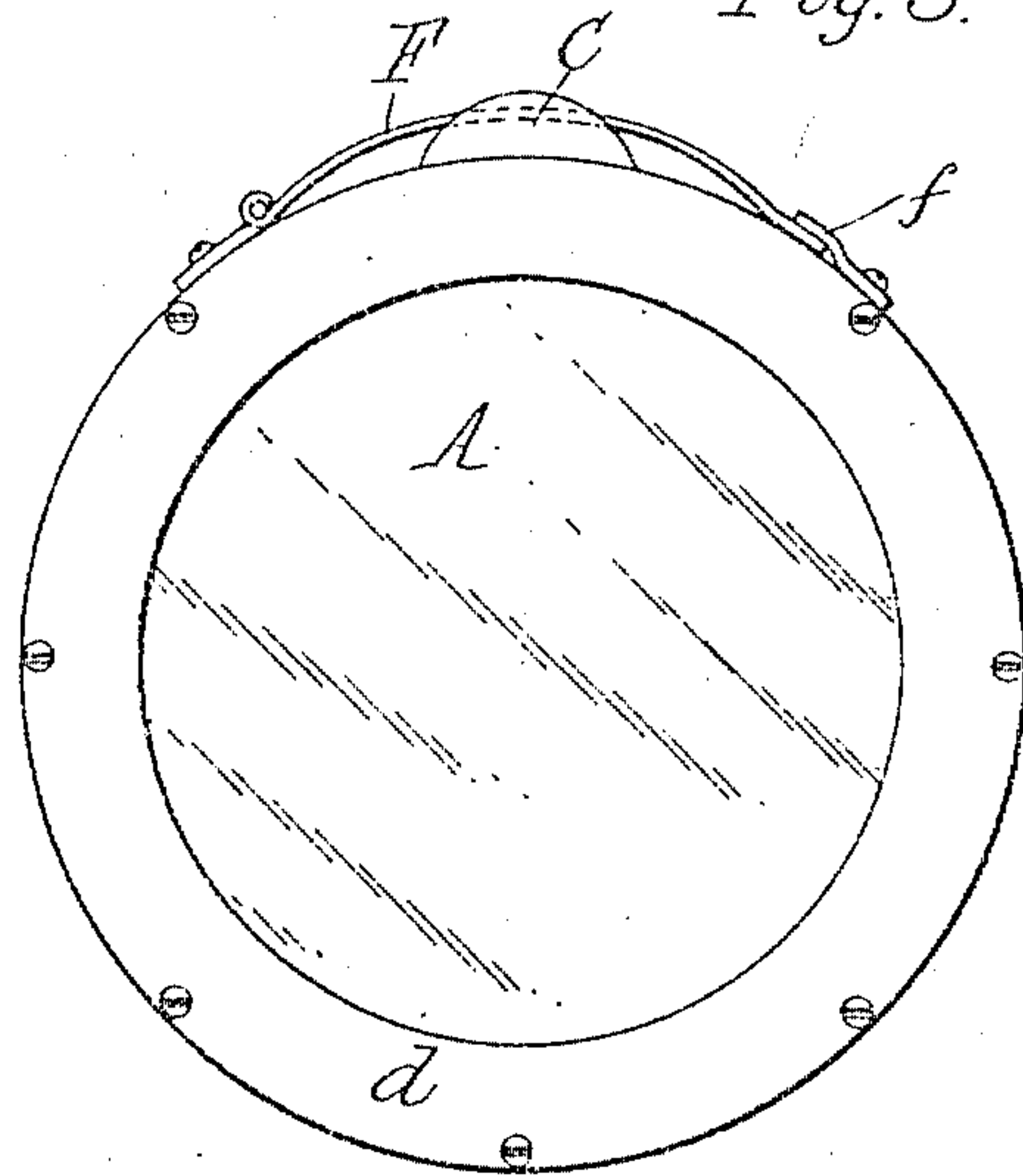


Fig. 4.

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UNITED STATES PATENT OFFICE.

PETER J. DUKELOW, OF BUFFALO, NEW YORK, ASSIGNOR TO SPENCER LENS COMPANY, OF
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PHOTOGRAPHIC RAY-FILTER.

No. 886,684.

Specification of Letters Patent.

Patented May 5, 1908.

Application filed January 20, 1908. Serial No. 411,670.

To all whom it may concern:

Be it known that I, PETER J. DUKELOW, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Photographic Ray-Filters, of which the following is a specification.

This invention relates to improvements in photographic ray filters of that type in which a suitable solution or fluid in a transparent container is employed for filtering the rays of light which pass to the photographic negative. Filters of this character have been made in which the container or receptacle for the filtering fluid consists of two glass plates spaced apart and held parallel with each other by an interposed flat-sided ring or short cylinder.

Owing to the nature of the filtering fluid generally employed, it is desirable to form the container entirely of glass and for this purpose a glass spacing ring or cylinder is employed which is preferably of the same diameter as the glass plates. As different filtering fluids are employed for different effects and the strength and nature of the various fluids are also changed in accordance with the character of the results required, it is necessary to either employ a number of different filters, which is expensive, or else change the fluid in the container as may be required, and in doing this, the container must be emptied and thoroughly washed before being refilled. In refilling the filter, air bubbles are frequently formed which gather on the inner surfaces of the glass plates and the spacing ring, and these bubbles, unless removed, interfere with the passage of light through the filter.

The objects of this invention are to construct a filter of this character which may be easily emptied, washed and refilled, and to provide the container with a suitable stopper for the filling opening in the same, which, when in place, will tightly close such opening and provide at the top of the container above the highest portion of the inner surface of the spacing ring, a pocket for receiving the air bubbles which may have formed in the filter, and holding them outside of the field of the filter where they will not interfere with the passage of light through the same.

In the accompanying drawings: Figure 1 is a perspective view of the container of a

photographic ray filter embodying the invention, the parts being separated to more clearly show the same. Fig. 2 is a transverse sectional elevation of the filter and its holder, taken in line 2—2, Fig. 4. Fig. 3 is a front elevation thereof. Fig. 4 is a vertical section thereof, showing the same in position upon the lens tube of a camera.

Like letters of reference refer to like parts in the several figures.

A A represent the two circular side plates, and B the spacing ring or cylinder of the filter container. This ring is of uniform width throughout, having opposite flat and parallel sides, and the flat surfaces of the ring and of the side plates are so ground that when the plates are in position against the opposite sides of this ring, they will be optically parallel with each other so as not to affect the parallelism of the rays of light passing through the filter.

The ring B is provided with a filling and discharging opening *b* which extends entirely through the ring from side to side thereof, and is of sufficient size to allow the container to be readily emptied and refilled. A stopper C of the same width as the ring B and of segmental cylindrical form, is adapted to close this opening, the end walls of which are concaved to fit the cylindrical surface of the stopper. The contacting surfaces of the stopper and end walls of the opening are ground so that the stopper fits closely in the opening or seat in the ring B and forms a tight closure for the same. On its inner or underside, the stopper is provided with a cavity extending from end to end thereof, which, when the stopper is in position upon its seat in the ring B, forms a pocket *c* located outwardly beyond the inner circumference of this ring, and adapted to receive and retain therein any air bubbles which may form in the filter and thus prevent the same from interfering with the passage of the rays of light through the filter. The inner or under-side of the stopper is concaved on the same curvature as the inner surface or periphery of the ring B and the stopper can be turned in its seat to place this under-concaved surface exactly flush with the inner surface of the ring, whereby the stopper will not project into the filter chamber and form an obstruction which would trap the air bubbles and prevent them from flowing freely into the receiving pocket *c*.

The contacting surfaces of the various parts of the filter are so ground that when they are placed together, closely fitting and practically fluid-tight joints are formed between such surfaces. If desired, however, some suitable material, such as vaseline, may be employed for more effectually sealing these joints.

Any suitable frame or holder is provided for securing the parts of the filter together and attaching the same to the camera. In the construction shown, this holder consists of a tube or ring D of substantially the same width as the filter container and adapted to surround the same. This tube or ring is provided on its front and rear sides with inwardly-extending retaining flanges *d* and *d'* which embrace the outer edges of the plates A of the container. These flanges are secured to the tube ring D by screws, or in any other desirable manner permitting them to be drawn up tightly against the plates A of the container to clamp the plates against the spacing ring B. The rear flange *d'* is provided with a tubular extension *d''* which is adapted to telescope with the lens tube E of a camera to hold the filter in position thereon. The holder tube or ring D is provided with a suitable hole or opening *d'''* opposite the filling and discharging opening of the filter, through which the stopper can be readily inserted into and removed from the filling and discharging opening. The stopper C is held firmly in place on its seat in the container by a suitable latch. A spring strip F is preferably employed which is hinged at one end to the holder tube or ring D at one side of the opening *d'''* with its free end adapted to detachably engage under a keeper *f* pivoted to the holder tube or ring D at the opposite side of the opening. A groove *f'* is provided on the outer side of the stopper C which forms a seat for this spring latch. Any other suitable means, however, could be employed for securing the stopper in position in the filter.

When it is desired to change the filtering fluid, the latch F is released and the stopper C removed and the contents poured from the container. The interior of the container is then washed by pouring therein some suitable washing fluid and when this is done, the container is filled with the new filtering fluid to be used and the stopper inserted and secured in place therein. The air bubbles

which may gather on the interior surfaces of the filter can be caused to rise into the pocket *c* on the under side of the stopper by gently jarring and turning the filter. The size of the opening in the ring B of the filter permits the rapid filling and emptying thereof and thus enables the contents of the filter to be quickly changed.

I claim as my invention:

1. In a photographic ray filter, the combination of front and rear transparent plates, a spacing ring between said plates forming therewith a container for the filtering fluid and having a filling opening therethrough which extends from side to side of said ring, and a stopper for closing said opening, substantially as set forth.

2. In a photographic ray filter, the combination of front and rear transparent plates, a spacing ring between said plates forming therewith a container for the filtering fluid and having a filling opening therethrough which extends from side to side of said ring and has concaved walls, and a stopper having a cylindrical outer surface adapted to fit said concaved end walls and close said opening, substantially as set forth.

3. In a photographic ray filter, the combination of front and rear transparent plates, a spacing ring between said plates forming therewith a container for the filtering fluid, a filling opening in said ring, and a stopper for closing said opening provided on its inner side with a cavity forming an air pocket extending outwardly beyond the inner circumference of said ring, substantially as set forth.

4. In a photographic ray filter, the combination of front and rear transparent plates, a spacing ring between said plates forming therewith a container for the filtering fluid, a filling opening in said ring, and a stopper for closing said opening provided with a concaved inner face flush with the inner periphery of said ring and having a cavity therein forming an air pocket extending outwardly beyond said inner periphery, substantially as set forth.

Witness my hand, this 10th day of January, 1908.

PETER J. DUKELOW.

Witnesses:

C. W. PARKER,
C. B. HORNBECK.