

A. MEHLHORN & P. VON KLITZING.

FLOATING DOCK.

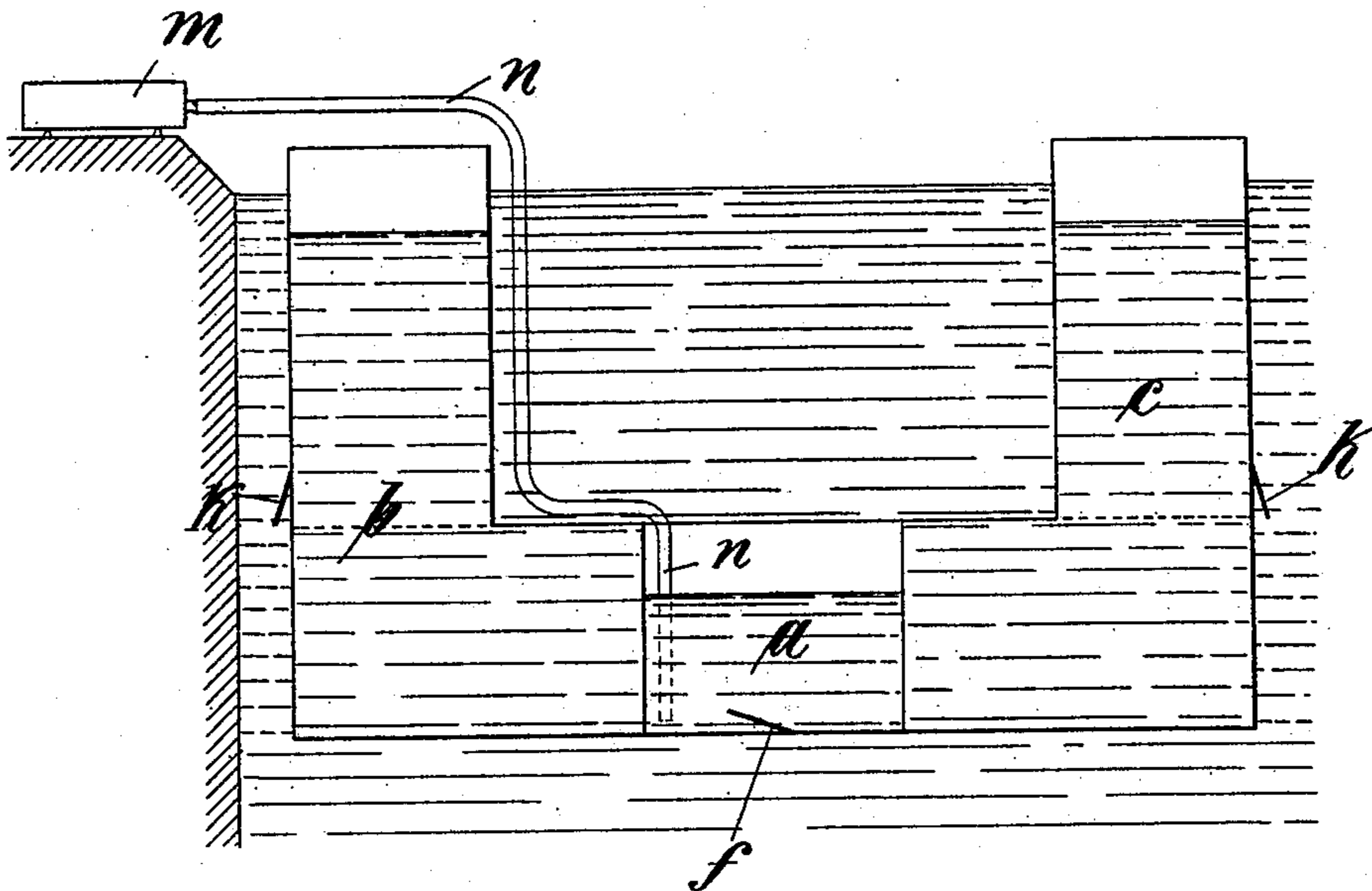
APPLICATION FILED OCT. 13, 1905.

903,598.

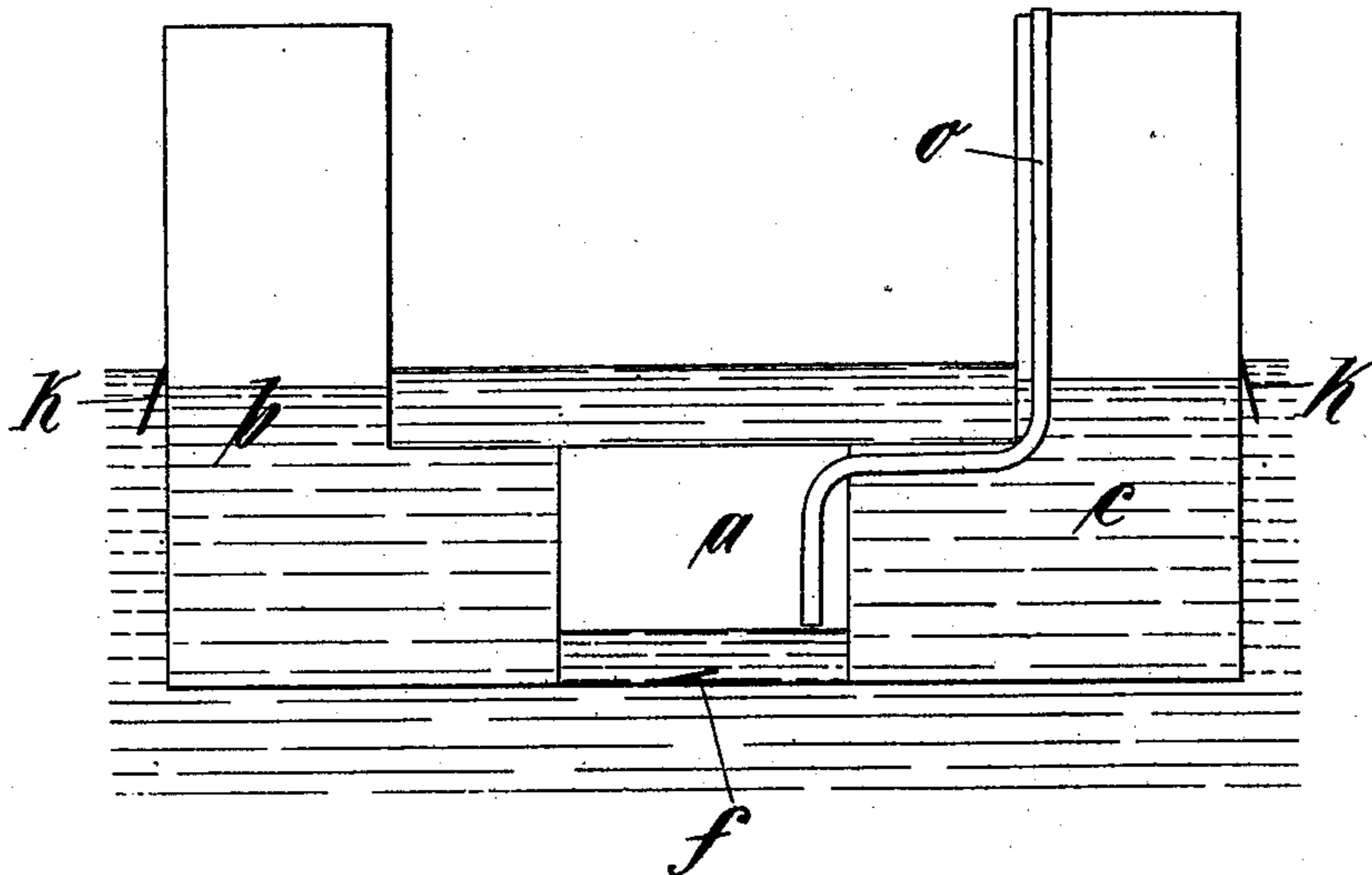
Patented Nov. 10, 1908.

2 SHEETS—SHEET 1.

*Fig. 1.*



*Fig. 2.*



Witnesses:  
Helen Kechler  
Walter P. Harris.

Inventors:  
Alfred Mehlhorn,  
Philipp von Klitzing.  
By H. de Vries  
Attorney.

A. MEHLHORN & P. VON KLITZING.  
FLOATING DOCK.

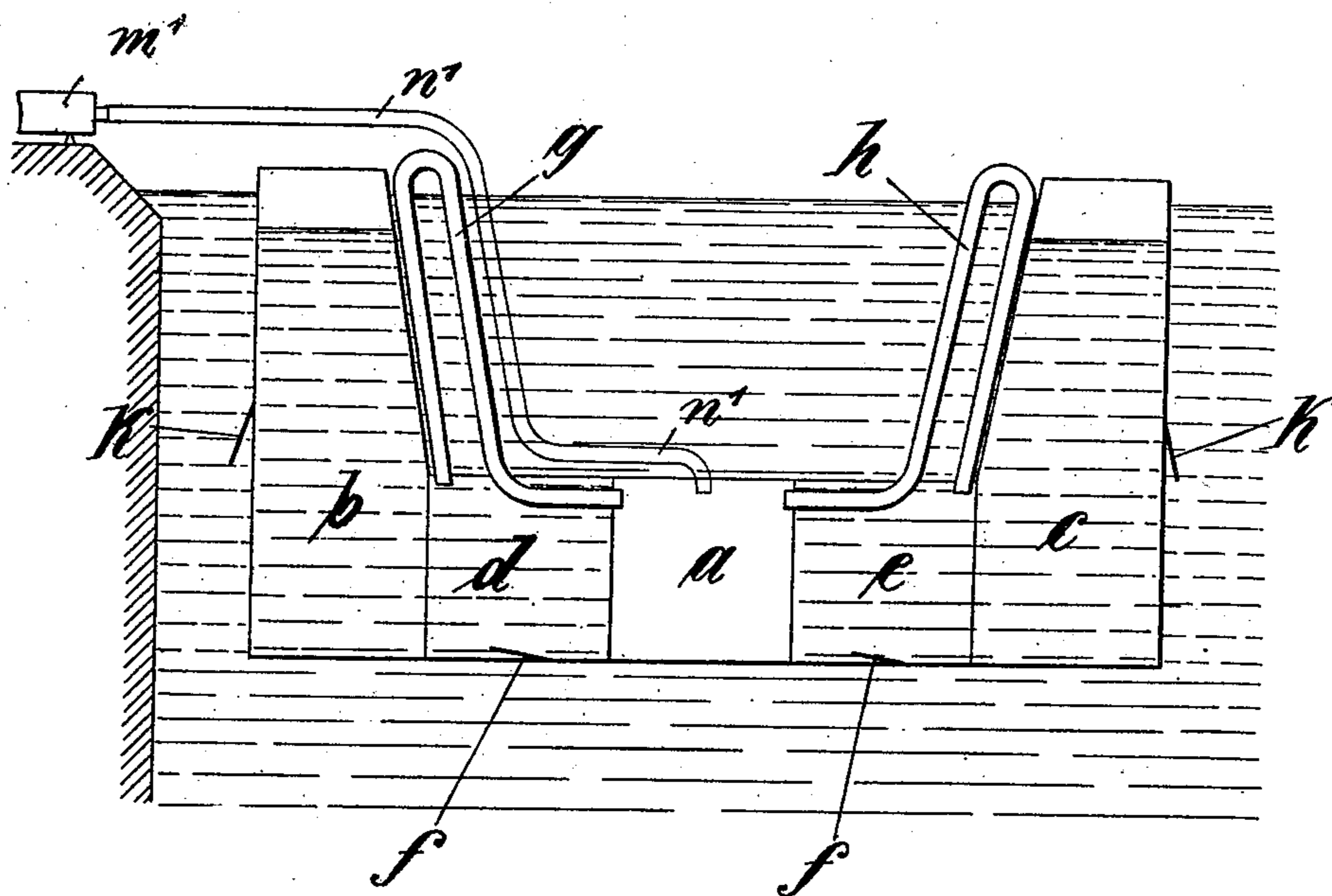
APPLICATION FILED OCT. 13, 1905.

903,598.

Patented Nov. 10, 1908.

2 SHEETS—SHEET 2.

*Fig. 3.*



Witnesses:  
Helen Wechsler  
Walter N. Harris.

Inventors:  
Alfred Mehlhorn  
Philipp von Klitzing.  
By J. H. de Vries  
Attorney.

# UNITED STATES PATENT OFFICE.

ALFRED MEHLHORN, OF DIETRICHSDORF, NEAR KIEL, AND PHILIPP VON KLITZING, OF CHARLOTTENBURG, GERMANY.

## FLOATING DOCK.

No. 903,598.

Specification of Letters Patent.

Patented Nov. 10, 1908.

Application filed October 13, 1905. Serial No. 282,541.

*To all whom it may concern:*

Be it known that we, ALFRED MEHLHORN, a subject of the King of Prussia, residing at Dietrichsdorf, near Kiel, in the Kingdom of Prussia and German Empire, and PHILIPP VON KLITZING, a subject of the King of Prussia, residing at Charlottenburg, in the Kingdom of Prussia and German Empire, have invented new and useful Improvements in Floating Docks, of which the following is a specification.

Our present invention relates to floating docks of the kind in which air-tight chambers are divided off in the bottom pontoon which are in communication with the exterior water so that on sinking the dock, the water enters into said chambers and compresses the air contained therein, said air expelling the water when the dock is again raised. In the docks of this kind hitherto known the water was pumped out of the side chambers, in the first instance and part of the water in the divided off chambers of the bottom pontoon was expelled by the compressed air, the remaining water in said divided off chambers being also pumped out.

According to the present improvement the water flows out of the side chambers automatically and is only pumped out of the middle chambers containing the compressed air, on lifting an empty or but slightly loaded dock.

In the accompanying drawing illustrating the invention: Figure 1 shows such a dock in the sunk condition. Fig. 2 is a similar view of a modified form of the dock in the raised position and Fig. 3 shows a second modification of the dock in the sunk position.

The air compressed in the chamber *a* by the water entering therein nearly carries the weight of the empty dock, so that the interior water level in the side chambers *b* and *c* is approximately equal to the exterior water level. Now instead of the water being pumped out of the side chambers *b* and *c*, as in the case of the loaded dock being raised, the empty or but slightly loaded dock is raised by pumping water exclusively out of the chamber *a* or by forcing compressed air into said chamber *a*, which can be done by a compressor *m* or the like connected with the chamber *a* by a pipe *n*. By such means the dock is raised sufficiently to allow the water in the side chambers *b* and *c* to flow out to

such an extent that the top of the bottom pontoon is exposed.

It is evident that in the case of an empty dock not all the water in the chamber *a* need be pumped out, but only a part thereof, so that when the entire quantity of water is pumped out a small vessel could be raised with the dock. As soon as the water level in the side chambers *b*, *c* is somewhat above the exterior water level and the valves *k* are opened, the further raising operation is carried out automatically. An empty dock can in this manner be raised very quickly.

After the dock has been raised and the valves closed, the normal air pressure can be maintained, when desired, by opening an air pipe *o* (Fig. 2) which leads from the top of the dock into said chamber *a*. The air pipe *o* can be so arranged that it does not quite reach to the bottom of the chamber *a*. By this arrangement the air first escapes through this pipe on beginning to sink the dock until the water level has reached the level of the opening at the bottom end of the pipe. Only then is the further escape of the air prevented by the water and consequently the compression commenced. The object of this arrangement is to cause the compression of the air in *a* to begin when the external water level is above the top of the bottom pontoon. Further the pipe *o* is adjustably arranged so that the size of the air chamber can be adjusted according to requirements. The valves *k* are so constructed that the water can flow through the same, when open, in both directions.

In the modified construction shown in Fig. 3 which represents a broader construction of the dock the bottom pontoon is not divided into three parts, in accordance with Figs. 1 and 2, but into five parts, *b*, *d*, *a*, *e*, *c* in order to afford sufficient rigidity. In this case the water employed to compress the air in *a* is allowed to enter into the chambers *d* and *e* through valves *f*. The said chambers *d* and *e* are so connected with the chamber *a* by pipes *g*, *h* that the air displaced by the water entering is conveyed into the chamber *a*, the water however not being allowed to pass over with the air. In order to raise an empty or but moderately loaded dock only the chambers *d* and *e* need be pumped out or emptied by forcing in compressed air from a compressor *m'* or the like through

the pipe  $n'$ , while the water flows automatically out of the chambers  $b$  and  $c$  through the valves  $k$ . This arrangement has the advantage that the water flowing out in raising the dock can cause an essentially larger load to be carried, because the quantity of water displaced is much larger. Further the transverse partition dotted in Fig. 1 is not required. The chamber  $a$  can of course be divided into various compartments in the direction of the length of the dock so that only one of the side chambers communicates with an air chamber. By this means the stability of the dock and safety of operation in raising and lowering the same are better assured.

What we claim and desire to secure by Letters Patent is:

The combination in a floating dock, of a bottom pontoon, water-chambers adjacent to said pontoon, means to allow the water to

flow into said water-chambers when sinking and out therefrom when raising the dock, means to admit water into said pontoon, thus compressing the air contained therein in sinking the dock, compressed-air supplying means for said pontoon for expelling the water in raising the dock, and an air-pipe communicating with said pontoon above the bottom thereof and extending into and up through a water-chamber and out at the top thereof.

In witness whereof we have hereunto signed our names this 29th day of August 1905, in the presence of two subscribing witnesses.

ALFRED MEHLHORN.  
PHILIPP VON KLITZING.

Witnesses:

JULIUS ROPKE,  
FERDINAND ROHWEDDER.