

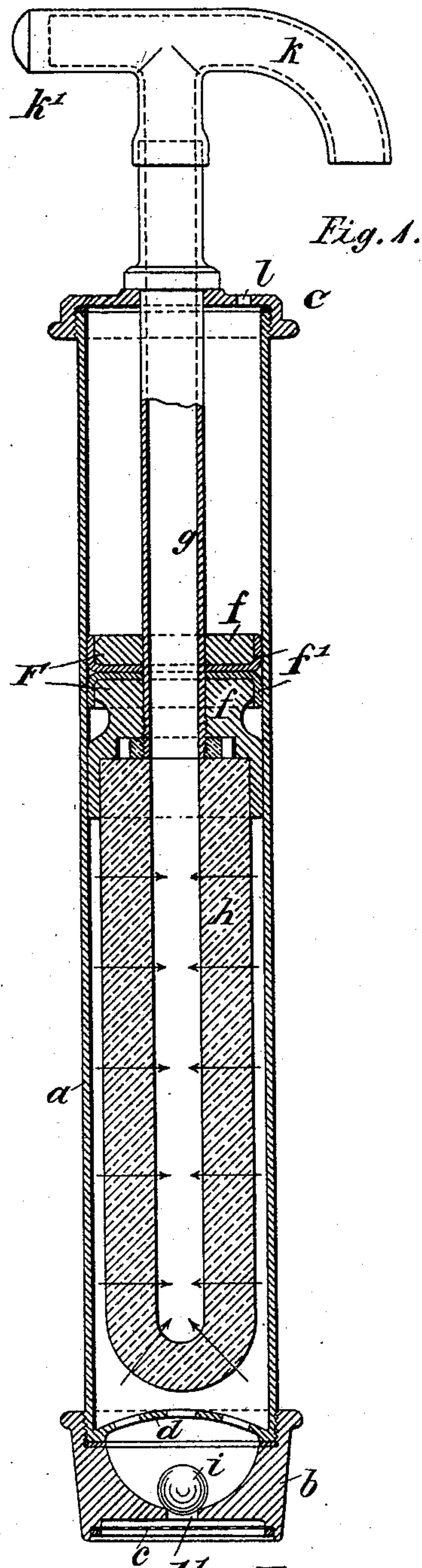
(No Model.)

2 Sheets—Sheet 1.

H. NORDTMEYER.
FILTER PUMP.

No. 472,547.

Patented Apr. 12, 1892.



Witnesses:

H. G. Dieterich
B. H. Sommers.

Inventor:

Hermann Nordtmeyer
by *[Signature]* Atty:

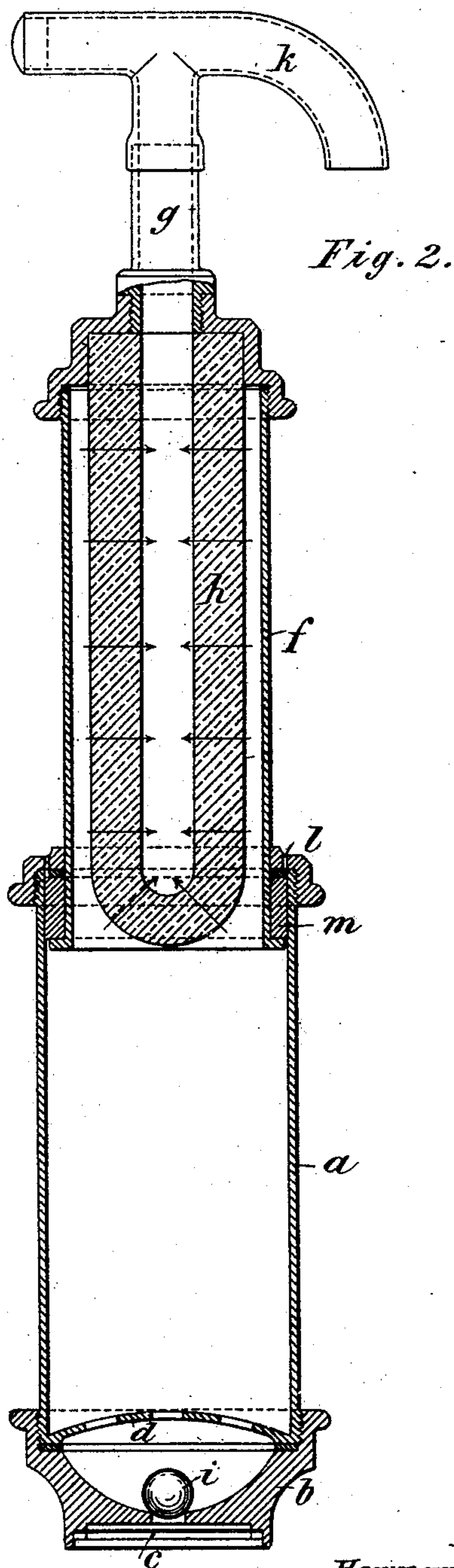
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UNITED STATES PATENT OFFICE.

HERMANN NORDTMEYER, OF BRESLAU, GERMANY.

FILTER-PUMP.

SPECIFICATION forming part of Letters Patent No. 472,547, dated April 12, 1892.

Application filed July 14, 1891. Serial No. 399,447. (No model.) Patented in Belgium May 15, 1891, No. 94,668; in Spain June 2, 1891, No. 12,035; in Italy June 30, 1891, XXV, 29,615, and LVIII, 333; in France August 20, 1891, No. 213,027; in Germany September 21, 1891, No. 60,157; in India October 5, 1891, No. 2,439, and in Austria-Hungary November 11, 1891, No. 20,436 and No. 40,275.

To all whom it may concern:

Be it known that I, HERMANN NORDTMEYER, head master of the Modern School of the Holy Ghost, a subject of the King of Prussia, residing at Breslau, Silesia, German Empire, have invented certain new and useful Improvements in Filter-Pumps, (for which Letters Patent have been granted in Germany, No. 60,157, dated September 21, 1891; in Austria-Hungary, No. 20,436 and No. 40,275, dated November 11, 1891; in France, No. 213,027, dated August 20, 1891; in Belgium, No. 94,668, dated May 15, 1891; in Italy, Vol. XXV, 29,615, and Vol. LVIII, 333, dated June 30, 1891; in Spain, No. 12,035, dated June 2, 1891, and in East Indies, No. 2,439, Reg. 176, dated October 5, 1891;) and I hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to pumps, and has for its object the combination, with the pump-piston, of a filtering device, so that the fluid pumped will be simultaneously filtered.

My said invention consists in the construction of the pump, as will now be fully described, reference being had to the accompanying drawings, in which I have illustrated two forms of portable filter-pumps, in vertical axial sectional elevations. The pump shown in the drawings is more particularly designed for use as a portable apparatus for travelers and explorers, in order that they may have the means of obtaining pure water for drinking and other purposes.

Figure 1 shows a vertical section, and Fig. 2 a modification of my pump.

Referring to Fig. 1, α indicates the pump-cylinder, to the lower end of which is secured the suction-valve box b , provided with a suction-port b' and a spherical check-valve i , the interior of the suction-box being a section of a sphere, in order to insure the return of the valve to its seat when unseated by the liquid drawn in. To exclude coarser impurities, the

suction-box is provided with a strainer c , arranged below the valve-port b' , while the valve i is confined in the box by an arched perforated guard-plate d . The upper end of the pump-cylinder α is closed by a cover C , in which is formed an air-vent l , and to which cover is secured the discharge-pipe g , that serves, also, as a piston-rod and has a discharge-nozzle k , provided with a lateral extension k' , so as to form a substantially T-shaped handle for operating the pump. The pipe g and its nozzle k may, if desired, form an integral part of the cover C , and said nozzle may form a separate part of the pipe and be screwed thereto.

The piston F , as shown, is constructed of two sections, the section f' being simply a packing-ring, while the section f , which is also provided with a packing, is chambered for the reception of the upper open end of the hollow or chambered filtering medium h , said piston being secured to the discharge-pipe or hollow piston-rod g . The filtering medium h may consist of a hollow body of any suitable porous material such as is usually employed for filtering purposes, and said body may be of cylindrical or other form in cross-section, but of less diameter than the pump-barrel, so as to admit of the water drawn in filling said barrel and completely surrounding the filtering medium, so as to obtain as great a filtering area as possible. The thickness of the walls of the filtering medium h may vary according to the porosity of the material used.

Instead of a porous material, a granular or pulverulent or a spongy filtering material may be used, which will be inclosed in a foraminous double-walled filter-case of any suitable form in cross-section, although for the use for which the pump is more especially designed I prefer a filtering medium of a porous nature for the reason that it is more readily cleansed and may be as readily sterilized by boiling in water.

In operation, when the piston is drawn up water is drawn in at the bottom of the cylinder, the valve i being moved off its seat by the suction. When the piston is moved down again, the valve moves back to its seat and

is held there by the pressure, while the water is forced through the walls of the filtering medium into the interior space thereof and thence through the hollow piston-rod to the discharge-nozzle. Inasmuch as there is no pressure within the filtering medium other than that exerted by the weight of the column of water therein and in the hollow rod *g*, the said filtering medium offers sufficient resistance to the passage of the water, so that the latter cannot flow back into the pump-cylinder, and the check-valve usually required in pumps is here dispensed with, the filtering medium performing the function of the check-valve.

From the described construction it will be seen that the water after its passage through the filtering medium—that is, after its filtration—cannot again come in contact with the walls of the pump-cylinder or any water therein.

A pump constructed as described requires a cylinder of a length equal to that of the filtering medium plus the length of the stroke of the piston, and in a pump adapted to fulfil the conditions for which it is designed the pump-cylinder will necessarily be of considerable length and more or less difficult of transportation. This may, however, be avoided by the construction shown in Fig. 2, in which the pump-piston *f* is constructed in the form of a hollow cylinder of substantially the same length as the pump-barrel *a*, thereby reducing the length of the pump about one-half. The cover *C* in this case is secured to the outer end of the piston, and the filtering medium is also secured to the cover, a very short hollow piston-rod *g* being required. At its lower open end the piston has two annular flanges for a packing-ring *m*.

I have hereinabove described a portable filter-pump; but the principles of construction involved may be applied to stationary, hand, and other pumps as well, and I desire it to be understood that I do not limit myself in the application of said principles of construction to any particular class of pumps, nor to the use of the filter-pump for pumping and filtering any particular fluid.

The filtering-medium may also be variously modified in its construction and arrangement—for instance, if a filtering medium of great porosity is employed it may be constructed in the form of a disk or plate and secured in the chambered portion of the piston, Fig. 1, or to the lower end of the cylindrical hollow piston, Fig. 2; but as hereinabove stated with a view to increasing the filter-surface as much as possible I prefer to

construct the filtering medium in the form of a hollow body.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. A portable filter-pump comprising a pump-barrel provided at its lower end with a suction-valve, a piston composed of a piston-head provided with an axial bore, and a cylindrical filter of less diameter than the pump-barrel secured to the piston-head and having an axial chamber in communication with the bore thereof, in combination with a tubular piston-rod seated in said bore, for the purpose set forth.

2. A portable filter-pump comprising a pump-barrel provided at its lower end with a suction-valve, a piston composed of a piston-head provided with an axial bore, a cylinder secured to said head and working fluid-tight in the pump-barrel, and a cylindrical filter contained within and of less diameter than the piston-cylinder, said filter being secured to the piston-head and having an axial chamber in communication with the bore thereof, in combination with a tubular piston-rod connected with the bore of the piston-head, for the purpose set forth.

3. The combination, with the pump-barrel provided at its lower end with a suction-valve, of a piston having an axial bore and working fluid-tight in the barrel, a cylindrical filter of less diameter than the pump-barrel secured to the piston-head and constructed of a porous substance, and with an axial chamber in communication with the bore of the piston-head, and a tubular piston-rod connected with the bore of said piston-head, for the purpose set forth.

4. The combination, with a pump-barrel composed of two sections *a* and *f*, working telescopically and fluid-tight within each other, the section *a* having a suction-valve at its outer end, of a piston-head secured to the outer end of section *f* and having an axial bore, a cylindrical filter of less diameter than section *f* secured to the piston-head, constructed of a porous substance and having an axial chamber in communication with the bore of said piston-head, and a tubular piston-rod connected with the said bore and provided with the tubular cross-handle *K*, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

HERMANN NORDTMEYER.

Witnesses:

ERNEST JAECKEL,
MORRIS SKIBO.