

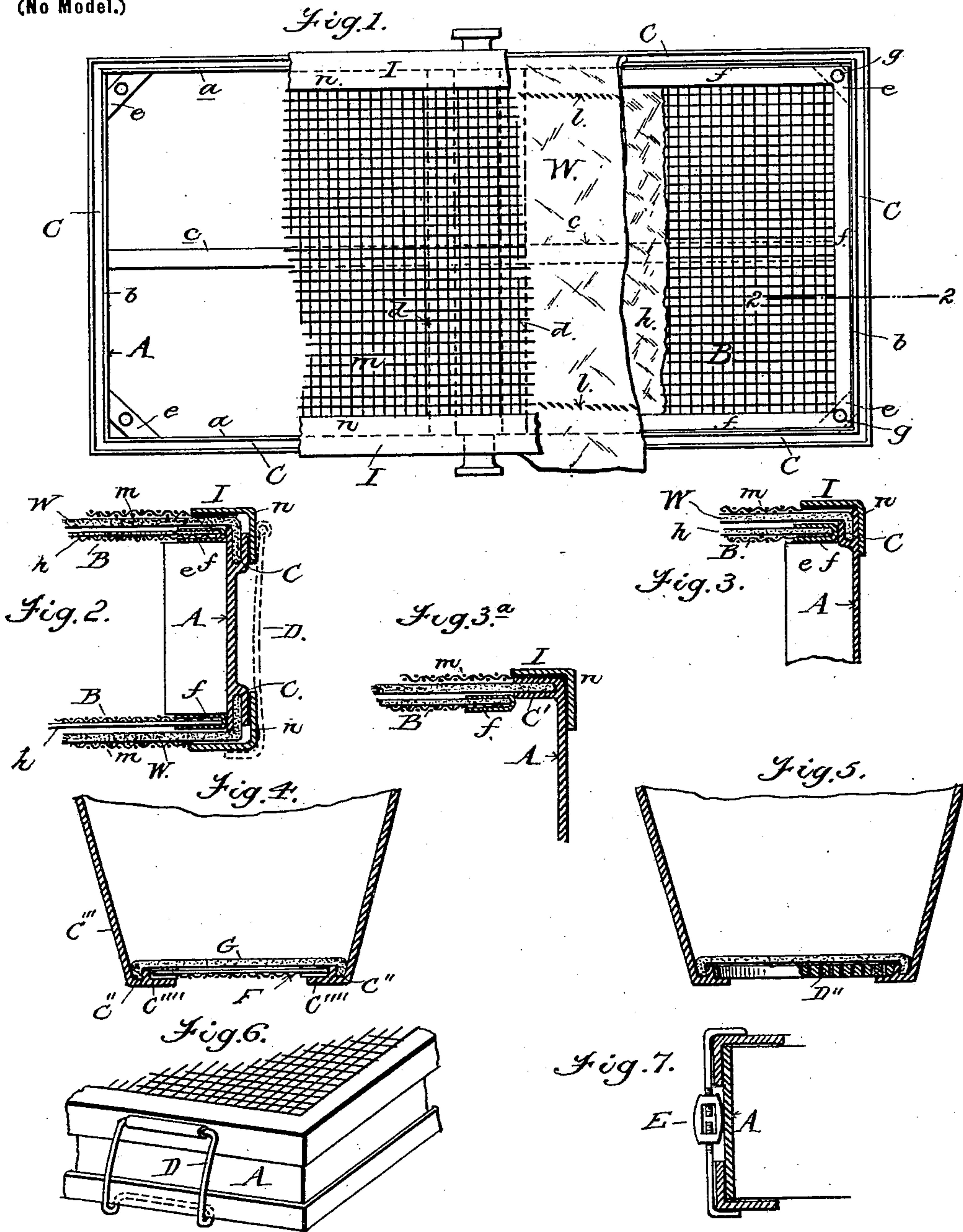
No. 690,524.

Patented Jan. 7, 1902.

E. M. KNIGHT.  
FILTER.

(Application filed May 17, 1901.)

(No Model.)



Witnesses:

Chapman W. Fowler  
T. H. Buckhead.

Inventor:

Edward M. Knight  
by J. Walter Fowler  
his atty.



# UNITED STATES PATENT OFFICE.

EDWARD M. KNIGHT, OF BROOKLYN, NEW YORK.

## FILTER.

SPECIFICATION forming part of Letters Patent No. 690,524, dated January 7, 1902.

Application filed May 17, 1901. Serial No. 80,662. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD M. KNIGHT, a citizen of the United States, residing at New York, in the borough of Brooklyn and State  
5 of New York, have invented new and useful Improvements in Filters, of which the following is a specification.

My invention relates to filters, and particularly to the type employing a filtering medium  
10 composed of fabric or a woven material or a material in the form of a felt; and my invention consists, essentially, of a novel means hereinafter claimed for forming a filter-joint in contradistinction to a water-tight joint be-  
15 tween the said fabric, woven material or felt, and the frame of the filter.

The invention also consists of the parts and the constructions and combinations of parts, which I will hereinafter fully describe and  
20 claim.

In the accompanying drawings, in which similar letters of reference indicate like parts, Figure 1 is a plan view of a filter-frame embodying my invention, showing a portion of  
25 the fabric or filtering medium broken away with two of the edges thereof tucked or tamped into the retaining groove or channel of the frame. Fig. 2 is an enlarged sectional view on the line 2 2 of Fig. 1. Figs. 3 and 3<sup>a</sup>  
30 are similar views showing modifications to be hereinafter referred to. Figs. 4 and 5 illustrate the application of my invention to a circular filter-frame. Fig. 6 illustrates one means of securing the parts of the filter-frame  
35 together. Fig. 7 is a modified form of securing means.

In carrying out my invention I construct an interior frame A, of suitable material, size, and configuration. If intended for some forms  
40 of pressure-filters, the frame may have a general rectangular shape, and it will thus include the sides *a*, ends *b*, longitudinal bars *c*, and transverse bars *d*, which longitudinal and transverse bars have openings through them  
45 for the free passage of water, the central transverse bars *d* forming a chamber between them and which communicates with an outlet-pipe for filtered water. This arrangement of bars forms a sort of skeleton frame or spider  
50 of great strength and yet one of but little weight, the interior space furnishing a reser-

voir for filtered water. To further strengthen the frame, I may also add the corner-braces *e*, which will also be of advantage in securing the foraminous plates hereinafter described. 55

Upon opposite sides of the frame A, I place the woven-wire or foraminous plates or pieces of material B, the raw or cut edges of which may be bound by metal strips *f* and the corners of which may be secured directly to the  
60 corner pieces or braces *e* of the frame A by screws *g*, passing through said corners and engaging threaded holes in the braces. Access to these screws is readily obtained, and but little difficulty is experienced in attaching or  
65 detaching the woven-wire or foraminous plate or piece. Before binding the edges of the plates or woven-wire pieces B, I place upon each plate or piece a sheet or piece of fabric  
70 *h* of suitable form and bend its edges over the edges of the woven wire or plate and then apply the binding-strip and secure the edges of both the fabric and the woven wire. A suitable fabric for the purpose indicated is  
75 woven asbestos, which because of its known indestructible character and filtering properties is well suited for my purpose. When the woven wire and the covering and binding are thus assembled, they form a light  
80 interior frame which occupies the space between the inner walls of the outer frame A, and the outer surface of the fabric *h* lies substantially flush with the edges of the sides of the main frame A, the interior bars of this  
85 outer frame being sufficiently depressed below the edges of the main frame to accomplish the purpose. Over each piece of fabric  
90 *h* is placed a sheet, pad, or film of filtering medium W, which may be composed in whole or in part of asbestos, or any other material or fabric may be used, the edges of which extend over the binding-strip *f* and beyond the  
95 sides of the frame A, this fabric being, if desired, secured to the woven-wire plate or foraminous piece B, as by a line of stitching *l*, so as to leave the edges free and unattached. To secure these edges and at the same time form a filter-joint which while permitting the passage of water filters this water, I form in or on the frame a surrounding groove or  
100 channel C, into which the loose edges of the sheet, pad, or film is tucked or tamped, as



shown. This arrangement covers the joint between the binding-strip and the adjacent walls of the frame A and prevents any leakage of unfiltered water. In Figs. 1 and 2 the groove or channel C stands about parallel with the walls of the frame A and at right angles to the plane of the woven-wire sheet or piece; but this disposition of the parts is not essential, as the same results are obtained in Fig. 3<sup>a</sup>, where the groove or channel C' stands at about right angles to the walls of the main frame and substantially parallel with the woven-wire piece or sheet. Over the parts thus described is then fitted an outer frame I, composed of woven wire or foraminous material *m* and a surrounding flange *n*, which incloses the edges of the main frame and the packed joint, there being one of these outer frames and also one of the first-named bound frames and a pad, film, or sheet upon each side of the main frame, the said outer frames being held together and the intermediate parts locked together by suitable means—for instance, by the hook-shaped bails D (shown in Fig. 6) or the hooks D' and turnbuckle E (shown in Fig. 7) or by any well-known fastening devices. When thus assembled, I provide a strong and effective filter-frame which is capable of resisting high pressure of water and which permits the free percolation of water, yet rapidly and thoroughly filters out of the water all deleterious matter and affords an abundant and constant supply of filtered water.

In Fig. 4 I illustrate the essential part of my invention applied to a circular form of filter-frame F, over which is laid the sheet, pad, or film G of filtering medium, with its edges tucked or tamped into the groove or channel C'', formed in or on a frame or vessel C''', said vessel having a ledge or flange C''', upon which the filter-frame rests, and in Fig. 5 I illustrate the same idea in connection with a finely-perforated disk of stone D'' or fire-clay or other porous substance.

The arrangements hereinbefore described possess many advantages over the known art and among which advantages may be noted the following: Up to the present time it has been customary to attempt to make a water-tight joint between the filtering medium and the filter-frame proper to prevent the leakage of unfiltered water into the filtered-water chamber. Among the plans adopted for the purpose has been the employment of nuts and bolts or pressure-screws or soldering or cementing the filtering medium into the filter-frame, either of which methods is expensive in the first place and, second, it made the changing and renewal of the filtering material or the cleansing of the filter very difficult and quite impossible in many instances to any one but an expert. The present invention overcomes these evils by entirely doing away with all bolts and nuts, soldering, or cementing, which require an expert to ma-

nipulate or perform, and in place of such means employing a method of packing the joints which is inexpensive and so simple that any person can renew the filtering medium and thoroughly cleanse the filter rapidly and with ease. I obtain these results by dispensing with the necessity for a water-tight joint and employing in lieu thereof a packed filter-joint, or, in other words, the joining of the filter-frame and the filtering medium is such that a water-tight joint is not necessary, but only such a joint that while permitting water to pass will filter out the impurities during the passage of the water to the filtered-water chamber.

The covering for the woven-wire plate or piece may be omitted and the pad or filtering material may be laid directly on the plate or piece and its edges packed, as before described, this and other variations being within the scope of this invention.

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

1. The combination of a filter-frame or supporting member forming a single element and having a self-contained groove or channel, and a filtering-pad having its edges tucked or packed edgewise into said groove or channel.
2. In a filter, a frame or supporting member having integral walls provided with a groove or channel, in combination with a filtering medium having its edges turned edgewise into said groove or channel.
3. In a filter, a frame forming a single element the surrounding walls of which are forked or bifurcated to form a circumscribing groove or channel, in combination with a filtering medium having its edges tucked or packed into said groove or channel.
4. In a filter, a frame constituting a single rigid element, said frame having a circumscribing groove or channel presented toward the flow of water through the filter, and a filtering medium supported upon the frame and having its edges turned away from the flow of water and into said groove, and tamped therein.
5. In a filter a frame having a circumscribing groove or channel, a foraminous plate or piece supported between the inner walls of said frame, a fabric covering for the plate or piece, having a surrounding binding-strip, and a filtering medium overlaying the fabric and the point between the binding-strip and inner walls of the frame and having its edges packed into said groove or channel.
6. In a filter a frame having upon each side, a circumscribing groove or channel, a foraminous plate or piece supported within said frame, one on each side, a fabric covering for each of the plates or pieces, a filtering medium upon each piece of fabric, each having its edges packed into one of said grooves or channels, outer frames of foraminous material having flanged rims overlapping the



main frame, and means for uniting the outer frames and holding the parts together.

5 7. In a filter, a frame having corner-braces with holes therein, a foraminous plate or piece thereon, means for detachably securing the plate or piece to said corner-pieces, and a filtering medium overlying the plate or piece.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

EDWARD M. KNIGHT.

Witnesses:

HAROLD A. LEWIS,  
JAMES H. TUTTLE.