

No. 692,091.

Patented Jan. 28, 1902.

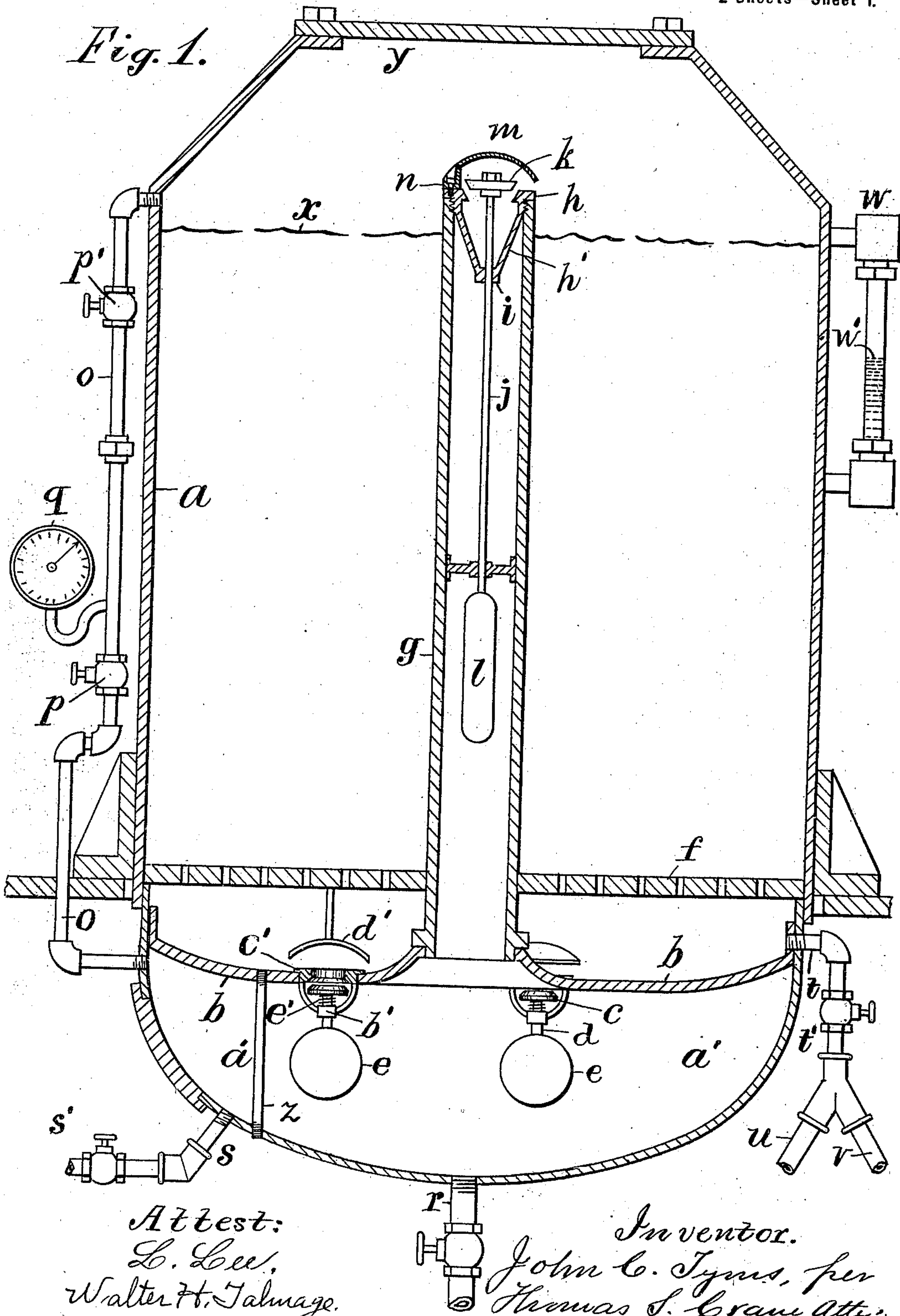
J. C. TYMS.
BLEACHING KEIR.

(Application filed Oct. 5, 1901.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.



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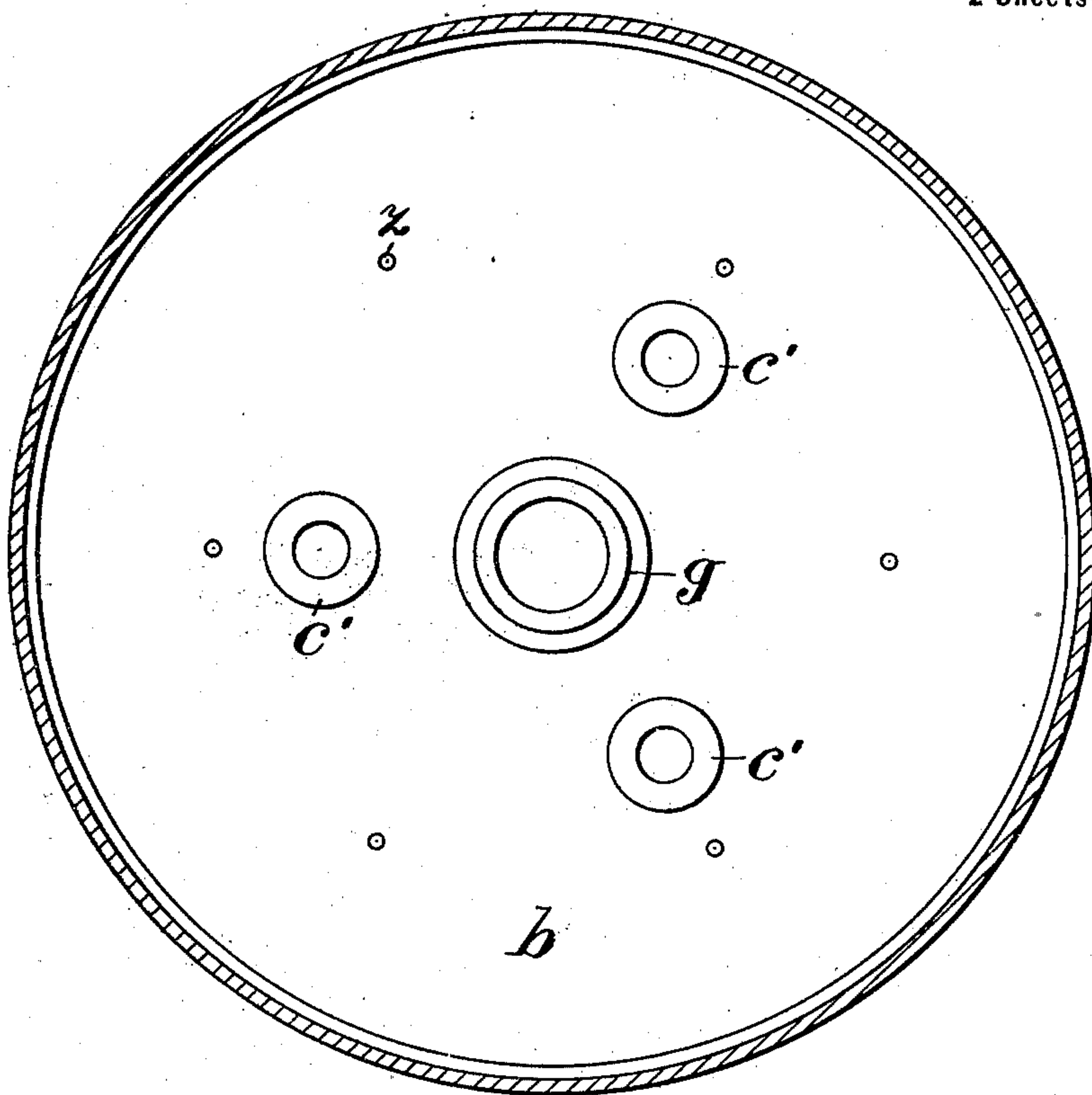


Fig. 2.

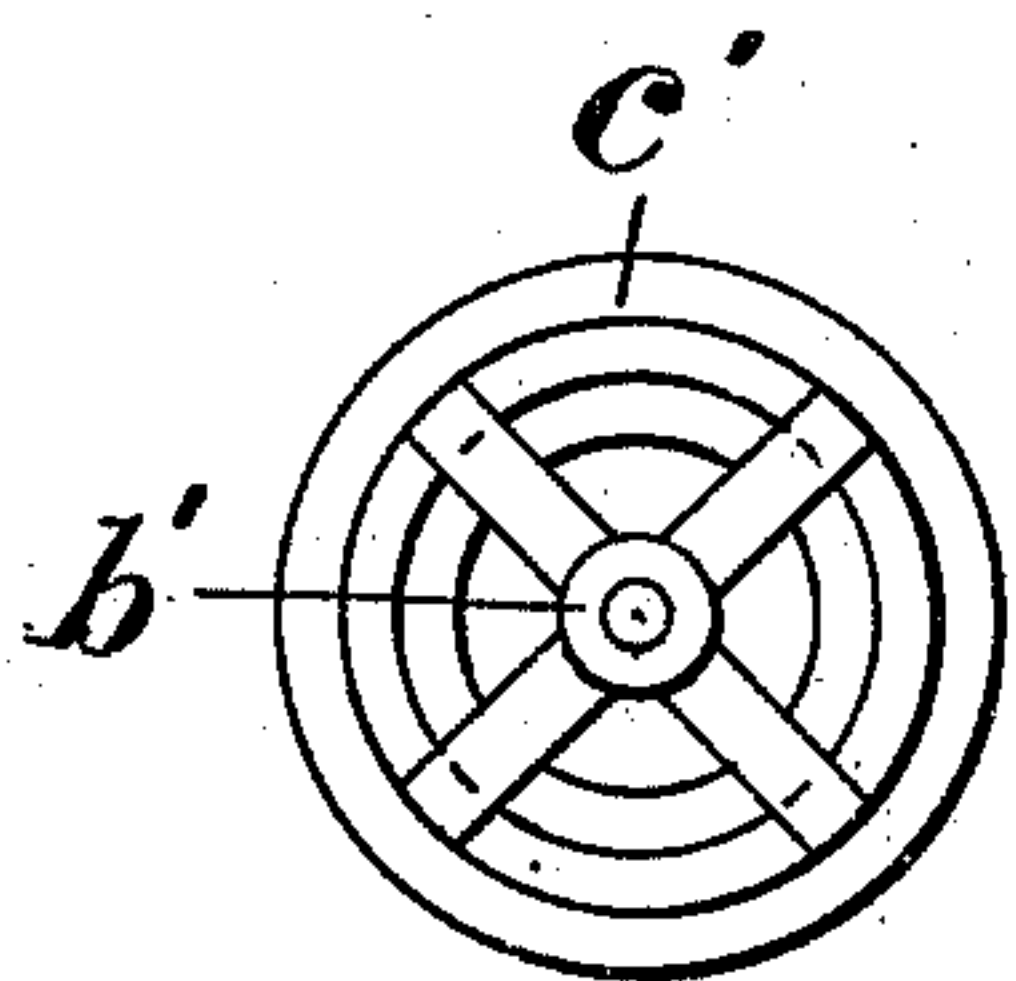


Fig. 3.

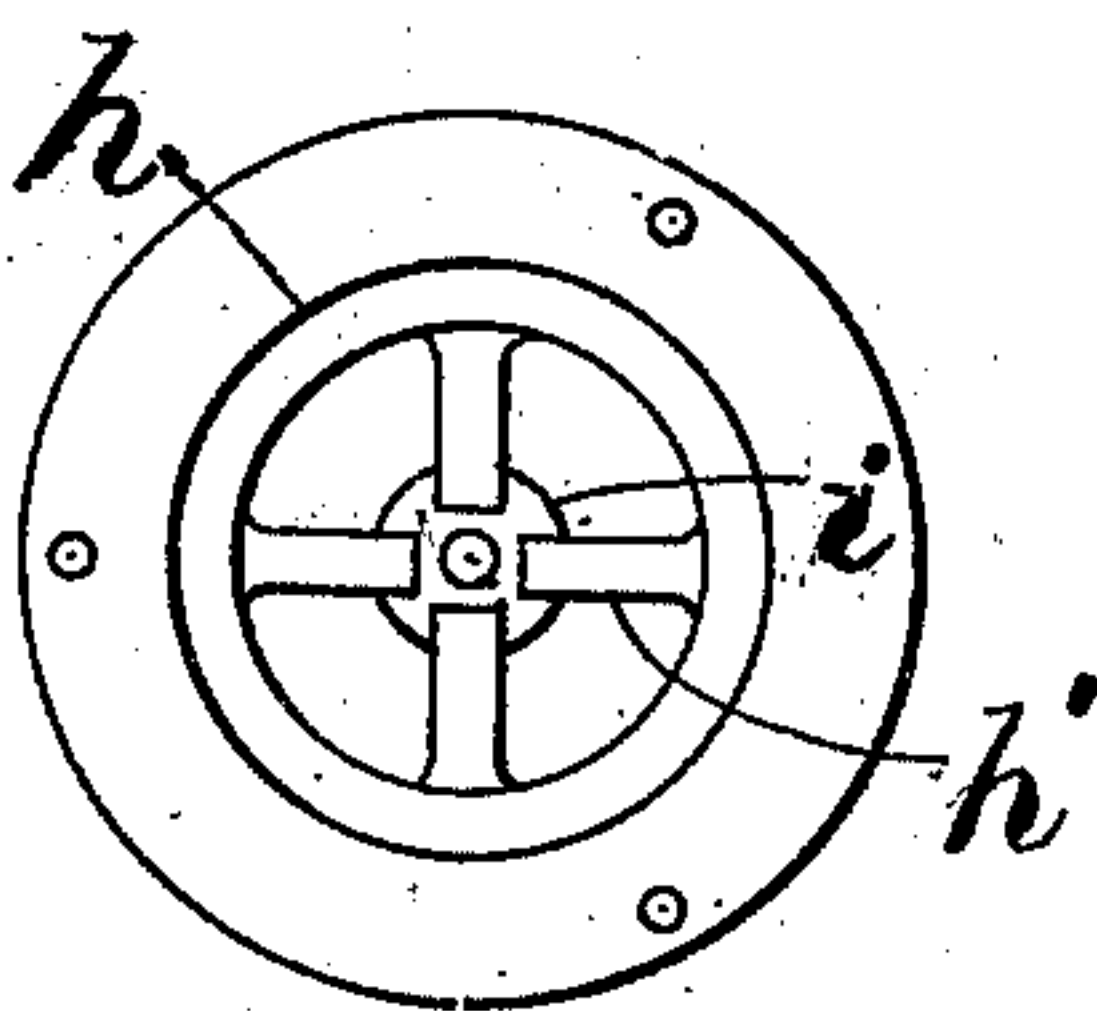


Fig. 4.

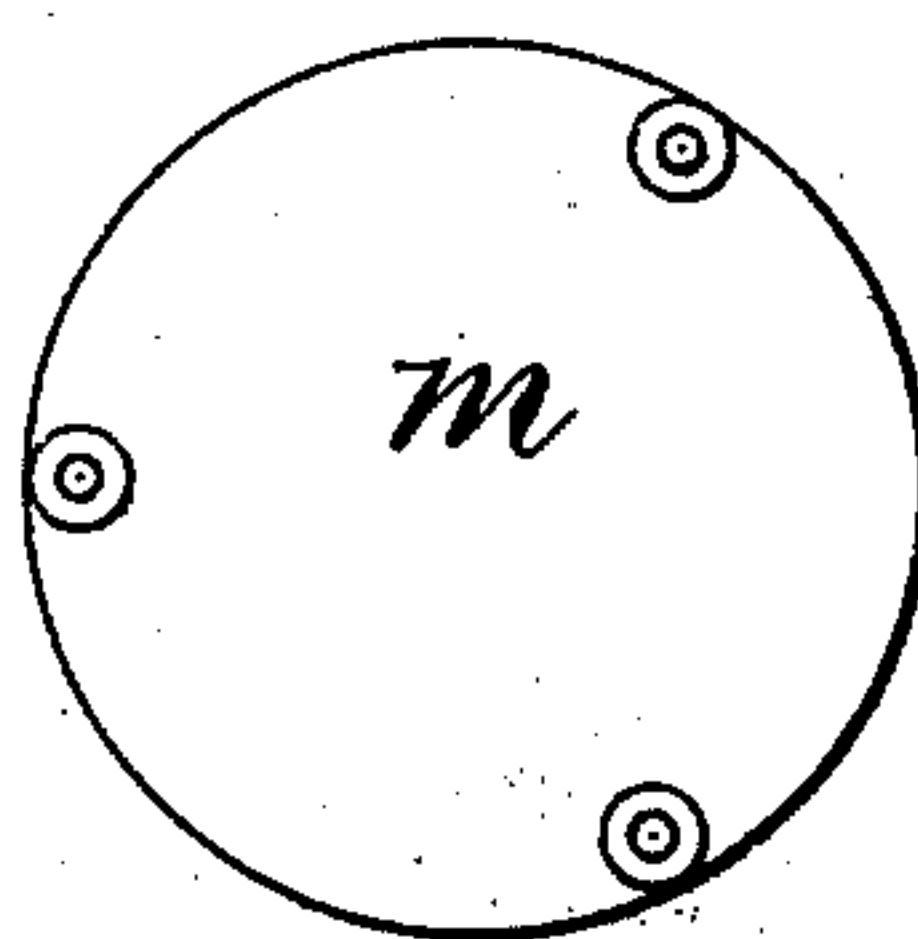


Fig. 5.

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UNITED STATES PATENT OFFICE.

JOHN C. TYMS, OF GARFIELD, NEW JERSEY.

BLEACHING-KEIR.

SPECIFICATION forming part of Letters Patent No. 692,091, dated January 28, 1902.

Application filed October 5, 1901. Serial No. 77,641. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. TYMS, a citizen of the United States, residing at the corner of Cambridge and Grant streets, Garfield, county of Bergen, State of New Jersey, have invented certain new and useful Improvements in Bleaching-Keirs, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The object of the present invention is to furnish a bleaching-keir in which the liquor shall be discharged from a chamber in the bottom of the tank through a stand-pipe to the upper part of the tank and thereafter circulate downward through the goods and upward through the stand-pipe by variations of pressure arising within the tank and chamber. To effect such operation, check-valves opening downward are formed in a partition which separates the bottom chamber from the body of the tank, and the top of the stand-pipe is also provided with a check-valve opening upwardly.

The invention also includes various details of construction, which will be understood by reference to the annexed drawings, in which—

Figure 1 is a vertical section upon the center line (where hatched) of the bleaching-keir. Fig. 2 is a cross-section of the same just above the partition *b*. Fig. 3 shows the under side of one of the valve-seats *c'*. Fig. 4 is a plan of the valve-seat *h*; and Fig. 5, a view of the under side of the guard *m*, fixed upon such valve-seat. Figs. 3, 4, and 5 are drawn upon an enlarged scale.

The tank *a* is provided near the bottom with partition *b*, having apertures in which valve-seats *c'* are secured. Each seat faces downwardly and is provided with arms to sustain a guide *b'* for the stem *d* of the valve *c*, which is supported upon the guide by spiral spring *e'* when not pressed upwardly against the seat by a float *e*, attached to the valve-stem. A grating *f* is fixed in the tank a short distance above the partition to support the goods to be bleached, and each of the valve-seats *c'* is protected by a guard-plate *d'*, which is suspended from the grating and serves to prevent lint and other particles which work down through the grating from falling directly upon the valve. A stand-pipe *g* is fixed in the mid-

dle of the partition and extended to the upper part of the tank, and a valve-seat *h* is secured within the top of the stand-pipe and provided with downwardly-extending arms *h'*, having a guide *i* for a valve-stem *j*. The top of the stem is provided with the valve *k*, which opens upwardly from the seat *h*, and the bottom of the stem is provided with a float *l*, which is suspended below the middle of the stand-pipe. A guide is fixed in the stand-pipe and fitted to the stem *j* just above the float. A dome-shaped guard *m* is fixed above the valve-seat *h*, being sustained upon three studs *n*, through which screws are passed into the valve-seat to support the guard with its edge above the seat to permit the escape of the liquor. A glass water-gage *w* is connected with the side of the tank near the upper part, and a pipe *o* connects the upper part of the tank with the chamber *a'* and with a pressure-gage *q*. Cocks *p* and *p'* are placed above and below the pressure-gage, and the opening of each in turn serves to indicate the pressure in the part of the keir with which such cock is connected. A waste-pipe, with cock *r*, is shown in the bottom of the chamber *a'*. A steam-pipe *s*, with cock *s'*, is also connected to the chamber, and the tank next above the partition *e* is connected with a pipe *t*, having cock *t'* and branches *u* and *v* for supplying water or liquor, as may be desired, to the keir.

The operation of the apparatus is as follows: The goods to be bleached are placed in the tank, which may be filled to the level indicated by the heavy broken line *x* near the top of the stand-pipe, and the cover *y* of the tank is then tightly closed. Before any liquor is introduced the check-valves *c* are held open by their weight and that of the float *e*, as shown in Fig. 1; but the valve *k* upon the stand-pipe is closed by its weight and that of its float. Liquor is then introduced through the pipe *t* above the partition *b* and flows through the open valves *c* into the chamber *a'* until the liquor raises the floats and closes the valves *c*, after which the liquor is supplied to the tank above the partition until it reaches a level somewhat below the top of the goods, as indicated by the line *w'* in the water-gage *w*. The cock *t'* being closed, the cock *s'* is opened, and the steam admitted to the

chamber *a'*, being confined therein by the closed valves *c*, rises in the stand-pipe *g* and opens the valve *k*. The upward movement of the steam carries more or less of the liquor therewith and produces a constantly-increasing pressure in the upper part of the tank. The liquor is not raised by the steam until it is thoroughly heated and boiled, so that the ebullition raises it to the bottom of the stand-pipe, and it is then carried upward by the steam, raising the valve *k* in its passage, which promotes the upward flow of the fluids, as the upper part of the keir is at much lower pressure than the chamber *a'*. When the level of the liquor is lowered sufficiently by its upward discharge, the floats *e* drop and the valves *c* open, and as the pressure becomes equalized in the upper and lower parts of the keir the valve *k* closes. The liquor which is thus raised from the chamber *a'* above the goods percolates gradually downward through the same and through the grating *f* and descends through the valve-seats *e'* into the chamber. When the liquor accumulates sufficiently to close the valves *c*, the pressure rises in the chamber, as before, and drives the liquor from the chamber upward again through the stand-pipe, opening the valve *k* and discharging the liquor upon the top of the goods, after which the intermittent movement of the liquor is continued first upwardly through the stand-pipe and then downwardly by percolating through the goods until the valves *c* are closed.

It should be understood that the apparatus does not raise the liquor from the chamber *a'* when first introduced thereto until it has been thoroughly heated and boiled, as it is in a sense the boiling over of the liquor from the chamber in a high state of ebullition which forces it up the stand-pipe *g*. If the stand-pipe *g* extended down through the partition *b* into the chamber, the liquor would be forced upwardly therein as soon as the steam pressure had been introduced to the chamber, and such a construction would operate, in a measure, like my invention; but I prefer to have the stand-pipe terminate at the partition, as shown and described above. The intermittent flow of the bleaching liquor is promoted by the remoteness of the upper part of the tank from the steam-pipe which heats the chamber *a'*, which circumstance causes the condensation of much of the steam that is projected into the upper part of the tank and tends normally, especially when the valve *k* is closed, to produce a vacuum or low pressure above such valve. As the valve *k* is normally closed by its own weight, it is obvious that when the valves *c* are closed by the accumulation of liquor in the chamber *a'* the pressure of steam in such chamber may rise considerably above the pressure in the upper part of the tank before the valve *k* is opened, and this circumstance induces a violent and temporary up-rush of the liquor through the stand-pipe when the valve is finally opened by the pressure.

It should be understood that the spiral springs *e'* (shown upon the stems of the valves *c*) do not operate at all to close the valves, which stand normally open, as shown in Fig. 1; but these springs act simply as cushions to prevent concussion when the valves are lowered by the fall of their respective floats.

Having thus set forth the nature of the invention, what is claimed herein is—

1. In a bleaching-keir, the combination, with the tank *a* having the partition *b* forming the chamber *a'* in the bottom, of the pipe for supplying steam to such chamber, the check-valves *c* opening downwardly in the partition, and the stand-pipe *g* connecting the chamber with the upper part of the tank.

2. In a bleaching-keir, the combination, with the tank *a* having the partition *b* forming the chamber *a'* in the bottom, of the pipe for supplying steam to such chamber, and the check-valves *c* opening downwardly in the partition, and provided each with float *e* adapted to close the valve when the liquor accumulates in the chamber.

3. In a bleaching-keir, the combination, with the tank *a* having the partition *b* forming the chamber *a'* in the bottom, of the pipe for supplying steam to such chamber, the check-valves *c* opening downwardly in the partition, and the stand-pipe *g* extending from the chamber *a'* to the upper part of the tank and having the check-valve *k* opening upward, as and for the purpose set forth.

4. In a bleaching-keir, the combination, with the tank *a* having the partition *b* forming the chamber *a'* in the bottom, of the pipe for supplying steam to such chamber, the check-valves *c* opening downwardly in the partition, and the stand-pipe *g* extending from the chamber *a'* to the upper part of the tank and having the check-valve *k* opening upward and provided with float *l* suspended within the stand-pipe, substantially as herein set forth.

5. In a bleaching-keir, the combination, with the tank having the partition *b* with check-valves opening downwardly therein, and the stand-pipe *g* extended from the partition to the upper part of the tank, of the valve-seat *h* secured in the top of the stand-pipe with arms *h'* projected downwardly and carrying the guide *i*, the valve-rod *j* fitted to the guide and provided at its upper end with the valve *k* and at its lower end with the float *l*, the whole arranged and operated substantially as herein set forth.

6. In a bleaching-keir, the combination, with the tank *a* having the partition *b* forming the chamber *a'* in the bottom, of the pipe for supplying steam to such chamber, the check-valves *c* opening downwardly in the partition, and the stand-pipe *g* connecting the chamber with the upper part of the tank and having the guard *m* supported above the top of the pipe to protect the valve, while permitting the escape of the liquor.

7. In a bleaching-keir, the combination, with the tank *a* having the partition *b* forming the chamber *a'* in the bottom, of the pipe for supplying steam to such chamber, apertures in the partition with valve-seats *c'* fitted to each, and the valves *c* fitted to such seats and opening downwardly in the partition, and provided each with float *e* adapted to close the valve when the liquor accumulates in the chamber.

8. In a bleaching-keir, the combination, with the tank *a* having the partition *b* forming the chamber *a'* in the bottom, of the pipe for supplying steam to such chamber, apertures in the partition with valve-seats *c'* fitted to each, the valves *c* fitted to such seats and opening downwardly in the partition and provided each with float *e* adapted to close the valve when the liquor accumulates in the chamber, and the grating *f* sustained above the partition and having the guards *d'* fastened thereto over the valve-seats to prevent the direct access of obstructions to the valves.

9. In a bleaching-keir, the combination,

with the tank *a* having the partition *b'* forming the chamber *a'* in the bottom, of the pipe for supplying steam to such chamber, the check-valves opening downwardly in the partition, stand-pipe *g* having the check-valve opening upward upon the top, the pipe *o* connecting the chamber *a'* with the upper part of the tank and provided with cocks *p* and *p'* and with pressure-gage *q* intermediate of the cocks, and the upper part of the tank having the glass water-gage *w* attached thereto, the whole arranged and operated to intermittently discharge the liquor upon the goods and to indicate the height of the liquor when filling the tank, and the pressure in the tank and chamber when in operation, substantially as herein set forth.

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

JOHN C. TYMS.

Witnesses:

L. LEE,

THOMAS S. CRANE.