No. 768,605. PATENTED AUG. 30, 1904.

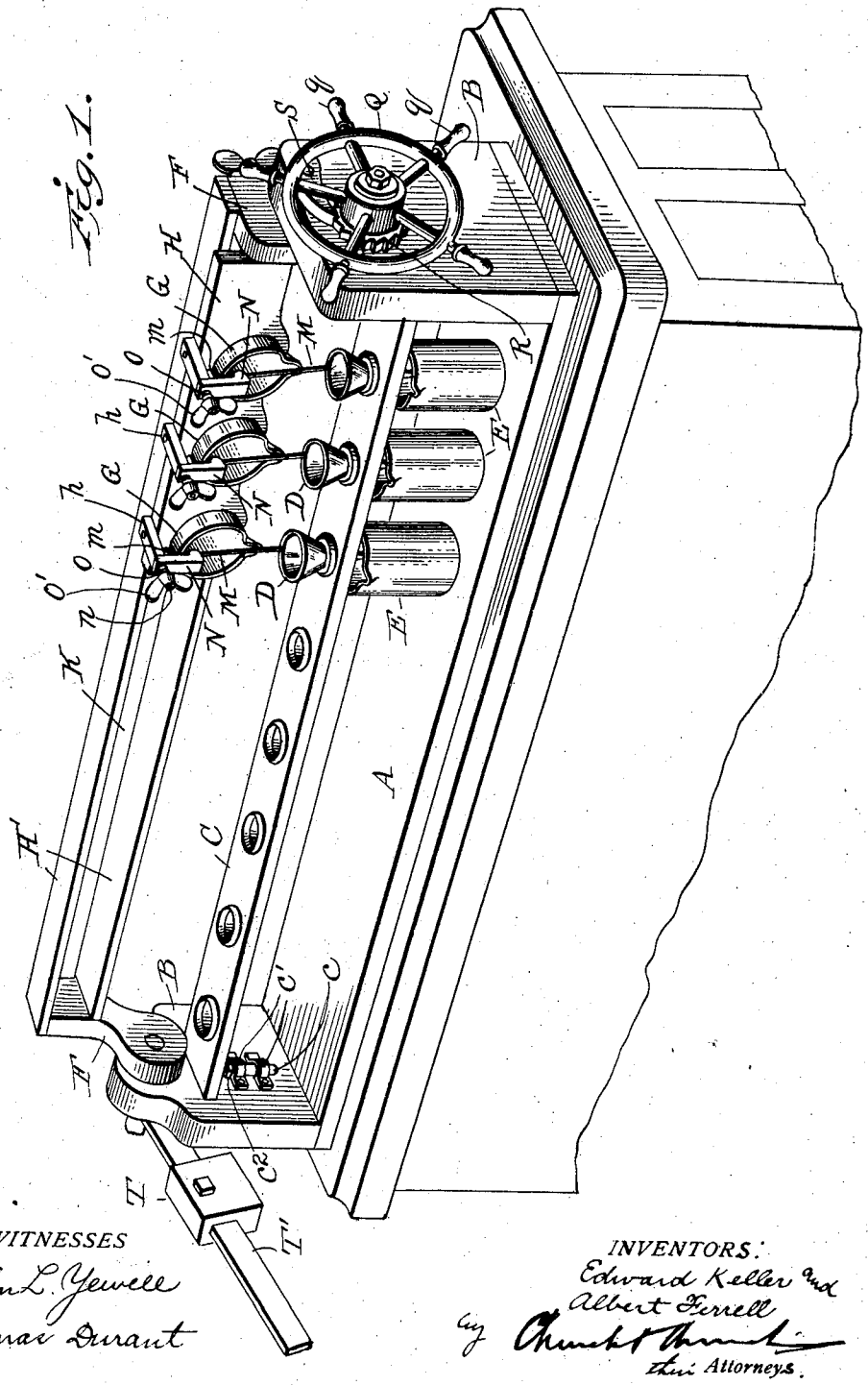
E. KELLER & A. FERRELL.

APPARATUS FOR POURING AND FILTERING.

APPLICATION FILED MAR. 1, 1904.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.




WITNESSES

Edwin L. Yewell

Thomas Durant

INVENTORS:

Edward Keller and

Albert Ferrell

by Church & Church

their Attorneys.

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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 1.

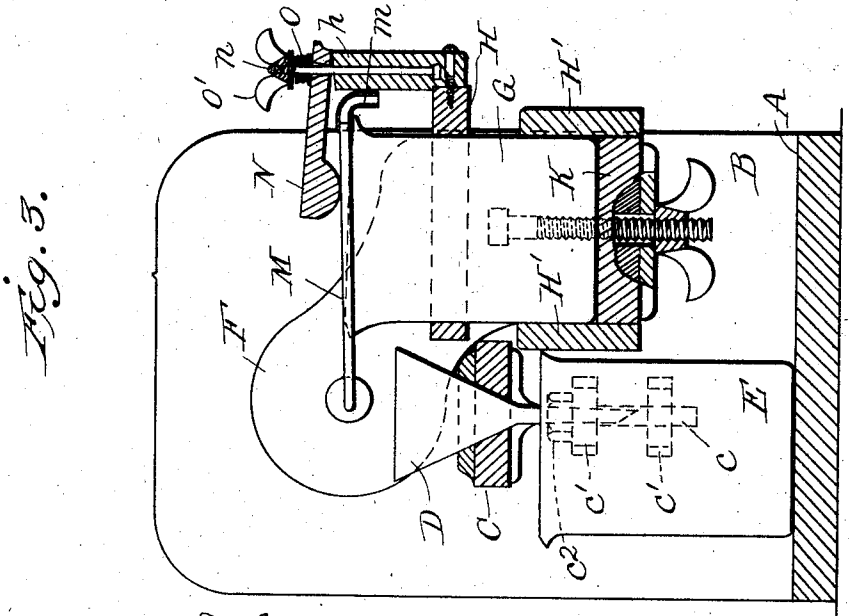
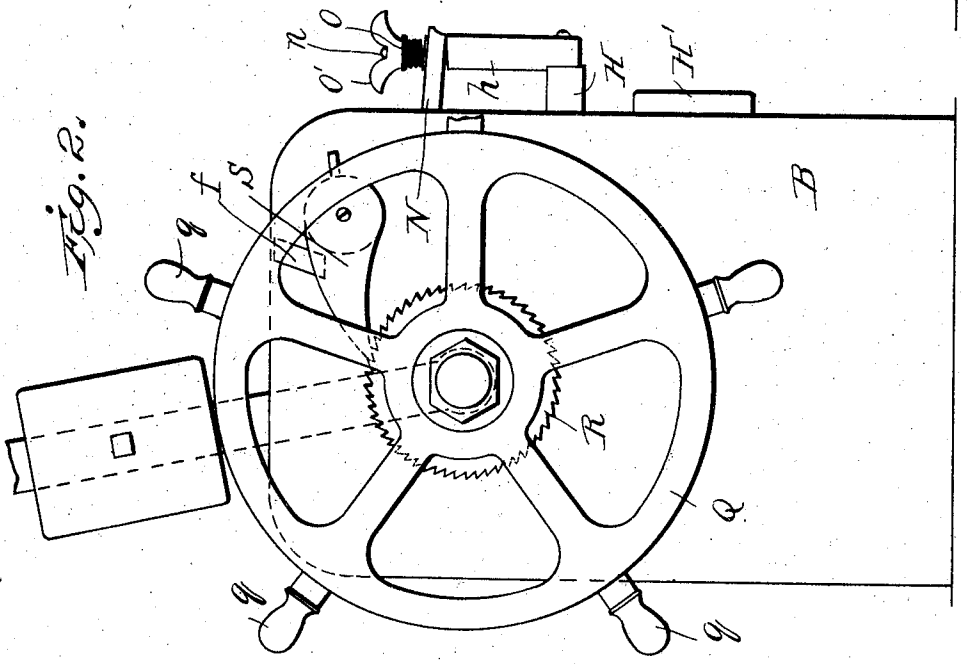



Fig. 2.




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Edwin L. Yewell

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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 5.

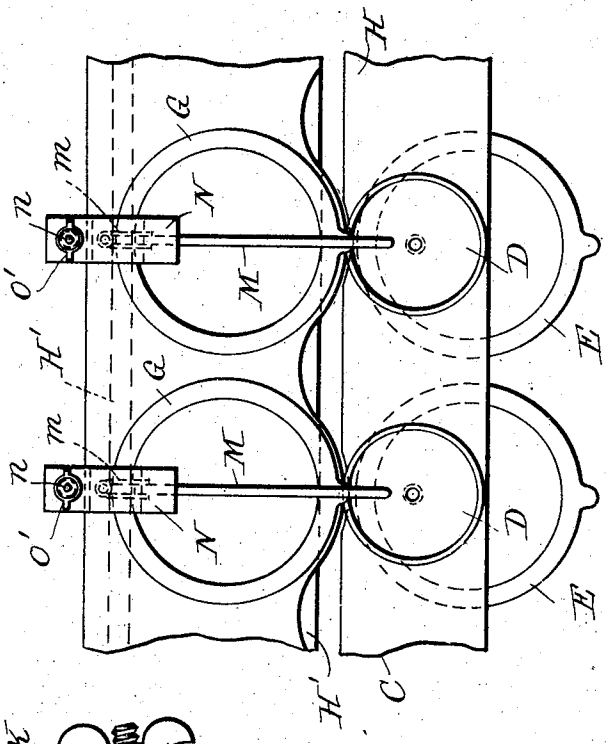
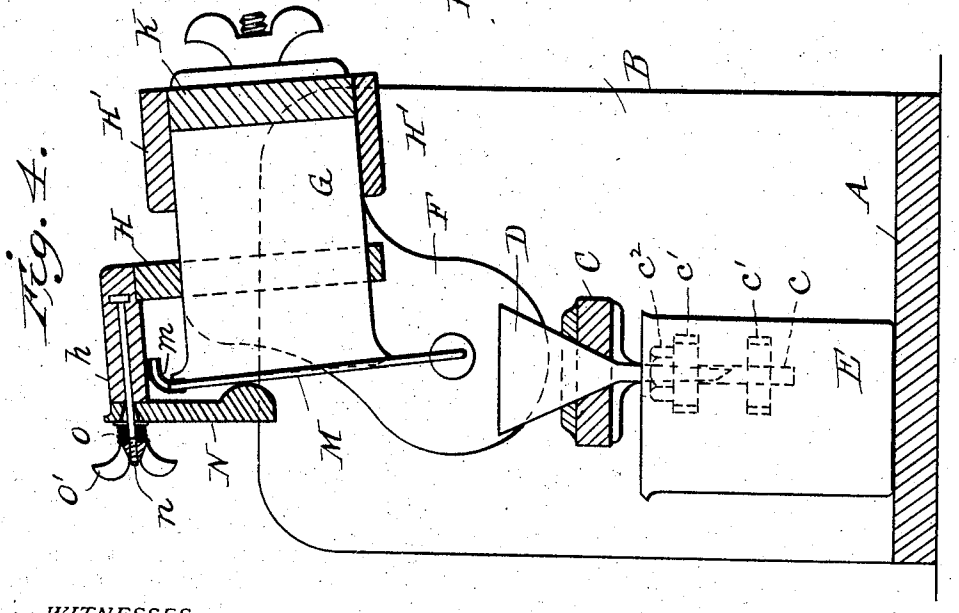



Fig. 4.




WITNESSES

Edwin L. Yewell

Thomas Durant

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Edward Keller and

Albert Ferrell

by Church & Church

their Attorneys

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# UNITED STATES PATENT OFFICE.

EDWARD KELLER AND ALBERT FERRELL, OF BALTIMORE, MARYLAND.

## APPARATUS FOR POURING AND FILTERING.

SPECIFICATION forming part of Letters Patent No. 768,605, dated August 30, 1904.

Application filed March 1, 1904. Serial No. 196,071. (No model.)

*To all whom it may concern:*

Be it known that we, EDWARD KELLER and ALBERT FERRELL, of Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Apparatus for Pouring and Filtering; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the letters of reference marked thereon.

This apparatus relates to improvements in appliances for facilitating the handling of laboratory apparatus, and more particularly for facilitating the pouring of solutions from beakers or other vessels in which the solutions have been formed and the precipitate allowed to settle, although the apparatus may be employed for handling vessels for other purposes.

In laboratory manipulations, especially for the determination of the various metal constituents of samples—copper, for instance—it is customary to dissolve said samples or form solutions therefrom in beakers, which beakers are subsequently set aside in order to permit of a gravity separation or settlement of the undissolved or heavier elements, the solutions being subsequently poured out of the beakers through filtering-funnels into other beakers. The pouring operations must be of necessity carefully performed, the solution being guided into the funnels usually by glass rods held against the top of the beakers and projecting beyond the pouring-lips. The pouring operations are found to consume a great deal of time; and the objects of the present invention are to provide an apparatus for facilitating this step both by reducing the time required and by performing the pouring operations in such manner as to facilitate the passage of the solutions through the funnels and to prevent the agitation of the solution during the pouring operations whereby the clearer portions are first passed through the funnel and the heavier or solid portions allowed to remain in the beakers until the last.

Referring to the accompanying drawings, Figure 1 is a perspective view, partially broken away, of an apparatus embodying the present invention. Fig. 2 is an end elevation looking at the right-hand end of the apparatus. Figs. 3 and 4 are sectional views showing the beakers in normal and in pouring positions. Fig. 5 is a top plan view of a portion of the apparatus.

Like letters of reference in the several figures indicate the same parts.

In said drawings the letter A indicates a base of any improved type, but preferably arranged to support end pieces B, between which is a vertically-adjustable rack C, having seats or apertures therein for the reception of the funnels or filters D. The rack C is made vertically adjustable, preferably by being provided with end guides $c$, working in guideways formed in lugs $c'$ on the end frames, and it is adapted to be held in adjusted position by nuts $c^2$, threaded on the end pieces $c$. This construction permits the rack to be lifted out bodily with all of the filters or funnels when so desired either for cleaning or for the insertion or removal of the receiving-beakers E, which are seated on the base A in proper position beneath the filters or funnels to receive the solution therefrom.

Journaled in the end frames B and at a point above the mouths of the filters or funnels is a pouring-frame, preferably consisting of end pieces F, connected together by parts extending longitudinally of the frame A and adapted to constitute holders for the reception of the pouring-beakers G. In the preferred construction the end pieces F support between them a longitudinally-extending frame H, having apertures therein of such size as to receive beakers of the largest dimension, said beakers passing down through the apertures a considerable distance and being held at their bottoms between side pieces H', also extending between and connecting the ends F of the pouring-frame. The beakers are adapted to seat upon an adjustable bottom piece K, preferably adjusted by means of thumb-nuts and screws L, held in the end pieces F and passing through the bottom pieces K, as shown clearly in Figs. 3 and 4. By forming the bottom of the pouring-frame adjustable it may be adjusted for the reception of different-sized beakers, the pouring-lips of which may as a consequence all be brought into proper pouring

position, so as to deliver the solutions correctly in the funnels or filters.

For holding the beakers in position in the pouring-frame during the pouring operation they are bridged by pouring-rods M, of glass, which at one end project beyond the pouring-lips of the beakers and at the other ends simply rest on the rear edge of said beakers, the latter end of said rods being preferably provided with a rubber sleeve—such, for instance, as indicated at *m*. The rods M are held down in position by spring-pressed clamps N, the rear ends of which are mounted on screw-stems *n*, held by the longitudinal frame H or an upward extension *h* thereof, said clamps being pressed downwardly by springs O and thumb-nuts O′, the arrangement being such that said clamps may be readily swung over the beakers, so as to engage the rods, or to one side, so as to free the rods and beakers to permit of the ready insertion or removal of the latter. The spring is normally set to exert sufficient pressure to hold the beakers in position when turned up for pouring; but at the same time the clamps may be readily manipulated by hand for freeing the beakers without the necessity of changing the screw adjustment of the springs.

At one end, and preferably outside of the frame B, the journal for the pouring-frame is provided with a hand-wheel Q, by which the frame may be turned from the position indicated in Fig. 3 to that indicated in Fig. 4, and in order that this movement may be effected steadily and without undue jarring, such as would tend to disturb the solutions, the hand-wheel is preferably provided with a series of handles *q*, and, further, in order to prevent retrograde movement a ratchet-wheel R is provided on the journal for coöperation with a pawl S on the end frame B. Thus the pouring-frame and beakers may be turned up to any desired angle and left for the draining of the solution, and when it is desired to return the pouring-frame to normal position the pawl is thrown out of engagement with its wheel and held out by frictional contact with a projection *f*, from which it may be readily freed when it is desired to again hold the frame in tilted position.

For convenience in handling a heavy pouring-frame it is found desirable to provide a counterbalance, which may be most conveniently arranged in the form of an adjustable weight T on an arm T′, attached to one of the journals and extending on the opposite side thereof from the bearing-frame.

In practice the various liquids and ingredients are placed in the beakers and thoroughly stirred to form the solutions, and if this step is performed before the beakers are placed in the pouring-frame they are then placed therein either before or after the solutions have been allowed to settle, and at the proper time when the solutions are to be poured therefrom the frame is given a partial rotation, so as to tilt the beakers up as a body and permit the solutions to pour or trickle from all of the beakers down into the funnels or filters. The axis about which the beakers turn is located at approximately the pouring-point, and as a consequence funnels or filters of small size may be employed with the assurance that the solutions will be discharged into the same properly with the beakers at any inclination. In other words, the rotation of the pouring-frame to a greater or less extent does not change the position of the pouring-point, and by the adjustments before described said frame may be set to accommodate beakers of any ordinary dimensions.

When the solutions have been poured from the beakers, there may still remain in said beakers sediment and ingredients which must be finally discharged into the filters or funnels, and with the present arrangement the breakers may be left in the position shown in Fig. 4, while a small hose or jet of water is used to flush out such sediment at the pouring-point. This operation may be performed most expeditiously, inasmuch as the solutions will have been poured from all of the beakers and they will all be ready for flushing at the same time, whereas by the old process each beaker in turn was poured and flushed out before the next beaker was given attention.

In the use of the term "beakers" herein it will be understood that we do not wish to be limited to the use of vessels technically known as "beakers," as any other vessels may be handled, and the apparatus is capable of use for other manipulations than the mere handling of such vessels in laboratory work.

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

1. In beaker-handling apparatus the combination with the main frame, of a pouring-frame having a series of beaker-holders arranged in a single line, said frame being journaled on an axis located at approximately the pouring-point parallel with said line of holders and adapted when turned on said axis to impart a uniform angular movement to the beakers mounted in said holders whereby the liquid contents of said beakers may be evenly and uniformly discharged; substantially as described.

2. In beaker-handling apparatus, the combination with the main frame of a pouring-frame having a series of beaker-holders, said frame being journaled to turn on an axis substantially coincident with the discharge-points of the beakers mounted in said holders and means for turning said frame; substantially as described.

3. In beaker-handling apparatus, the combination with a funnel-support, of a pouring-frame having a series of beaker-holders arranged in a single line, said frame being jour-

naled on an axis above said funnel-support, clamps on said pouring-frame for holding beakers in the holders when the frame is turned, means for turning said frame and means for holding the frame in any desired angular position of adjustment; substantially as described.

4. In beaker-handling apparatus, the combination with the main frame, the pouring-frame journaled therein and having the series of beaker-holders located at one side of the pivotal axis of the frame, a handle for turning said frame and a retainer for holding said frame in any desired position of adjustment about said axis, of a funnel-rack located below the axis of the frame and a support below said funnel-rack for beakers into which the solution is discharged by the funnel; substantially as described.

5. In beaker-handling apparatus, the combination with the main frame, and the funnel-rack, of the pouring-frame journaled in said main frame above the funnel-rack, a series of beaker-holders carried by said pouring-frame at one side of the axis, a handle for rotating said frame and a counterweight for counterbalancing the weight of the beakers; substantially as described.

6. In a beaker-handling apparatus, the combination with the main frame and the funnel-rack, of the pouring-frame journaled in said main frame above the funnel-rack, a series of beaker-holders in said pouring-frame and arranged in a single line and individual spring-pressed clamps for retaining the beakers in the pouring-frame; substantially as described.

7. In beaker-handling apparatus, the combination with the main frame, of a pouring-frame journaled therein, a series of beaker-holders arranged in said pouring-frame and an adjustable bottom for said holders whereby beakers of different dimensions may be mounted therein; substantially as described.

8. In beaker-handling apparatus, the combination with a vertically-adjustable funnel-rack, of a pouring frame journaled on an axis above said rack, beaker-holders arranged in a single line in said frame at one side of the axis and an adjustable bottom for said beaker-holders whereby beakers of different dimensions may be mounted therein and their pouring-lips arranged in substantially the same position with relation to the axis on which the frame turns; substantially as described.

9. In beaker-handling apparatus, the combination with a pouring-frame having a series of beaker-holders arranged therein and journaled to rotate on an axis parallel with said series of holders, of rotatable spring-pressed clamps projecting one over each of the holders and adapted to coöperate with pouring-rods resting on the beakers in the holders; substantially as described.

EDWARD KELLER.
ALBERT FERRELL.

Witnesses:
WM. L. FLYNN,
JAMES J. MULLANEY.