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J. A. MacMILLAN.

FECAL ANALYZER.

APPLICATION FILED JAN. 15, 1906.

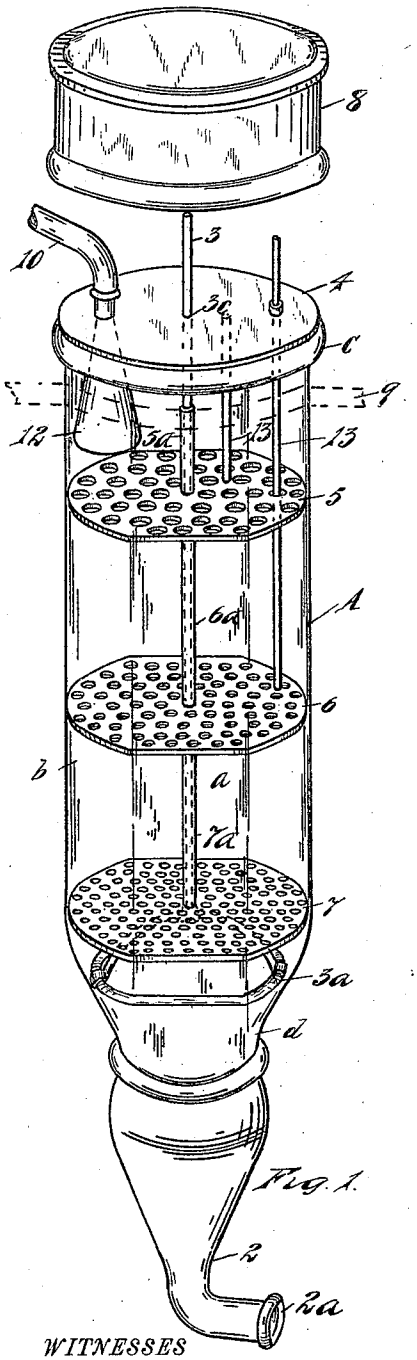


Fig. 1.

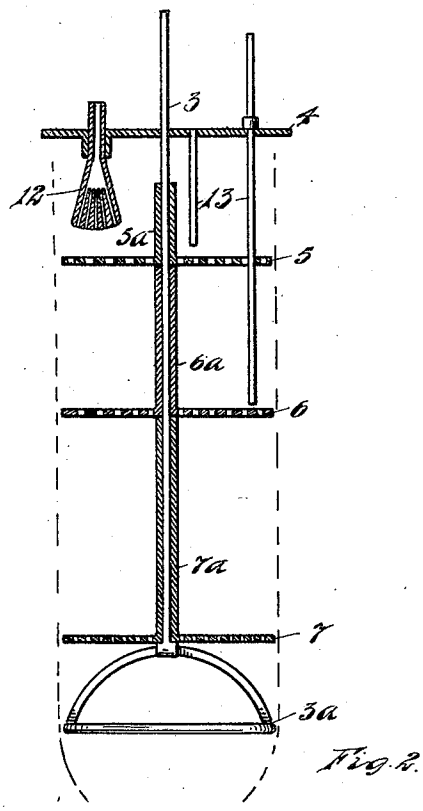


Fig. 2.

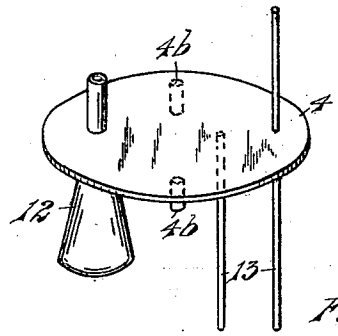


Fig. 3.

WITNESSES

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UNITED STATES PATENT OFFICE.

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FECAL-ANALYZER.

No. 820,004. Specification of Letters Patent. Patented May 8, 1906.

Application filed January 15, 1906. Serial No. 296,057.

To all whom it may concern:

Be it known that I, JAMES ALEXANDER MACMILLAN, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Fecal-Analyzers; and I 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 pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to fecal-analyzers for physicians' use, and has for its object an improved device for separating into its constituent parts as regards solidity and consistency the contents of the stomach or bowels of a patient for minute examination by themselves of any or all of the parts thus separated. It is particularly useful for analyses which do not, in the first instance at least, require the action of chemicals for the process of separation or identification.

In the drawings, Figure 1 is a perspective of the entire device with the cap portion raised somewhat above the top of the body part. Fig. 2 is a sectional elevation through the center of the parts contained within the body portion, which is shown in outline by dotted lines. Fig. 3 is a perspective of a slightly-modified form of the lid or cover part.

A represents a containing vessel, preferably of glass, having plane parallel sides *a* and rounded side portions *b*, crowned by a circular collar *c* at the top. At the bottom the vessel converges into a neck *d*, over which a discharge-nipple 2, preferably of soft rubber, engages. Through the center of the vessel A extends a stem 3, which at its lower end is bent to circular form to constitute a base or standard 3^a, which rests upon the converging walls of the vessel at the top of the neck *d*. The upper end of the stem 3 extends through a hole 3^c in the cover or lid 4, which closes the top of the vessel, resting upon the collar *c* either in a countersunk groove or channel about the inner edge of the collar, or being held from slipping as it is turned by engagement of the lugs 4^b (shown in Fig. 3) against the inner face of the collar of the vessel.

Supported upon the stem 3 are any desired number of screens or sieves, as 5, 6, and 7, of varying degrees of fineness, the coarsest being at the top and the finest at the bottom. Rigidly attached to each sieve and registering with a central hole in each are sleeves 5^a, 6^a, and 7^a, which engage about the stem 3 and by means of which each screen or sieve is kept in proper position across the vessel A. The lowermost screen rests on the crotch of the base 3^a. Each of the other screens rests upon the top of the sleeve of the sieve immediately below it, which being of the same size as the other prevents it from slipping over its end and farther down the stem than is intended. These screens and sleeves may be of either metal or hard rubber, as desired.

The lid 4 having been removed, the matter it is desired to analyze is poured into the vessel and upon the screen 5. The liquid parts and those of the solids which are smaller than the perforations in this screen fall through to the screen 6, the larger solids being retained by the screen 5. The mesh of this screen in turn catches some of the solids not caught by the screen 5, while still others fall with the fluids to the screen 7 with the smallest perforations. Through this the liquid portions drain into the discharge-nipple 2, whence they are discharged into a suitable receiving vessel, or, if their retention for a time is desired, the mouth 2^a may be closed by a pinch-cock or even a tightly-wound cord.

If it be desired that the process of draining be unaided and slow, the cap 8 is placed over the top to prevent the possible escape of any odor and the vessel suspended or supported by means of the belt or bracket 9. If, however, it is thought advisable to rinse the contents of the vessel in order to hasten the separating process or to increase its thoroughness, a tube 10, connected to a faucet or other source of water-supply, is attached to the outer end of a spraying-nozzle 12 and a shower of water turned directly onto the matter still lying on the upper screen 5. This washes away and through the screen the adhering slime and leaves the solids still held by the screen and in condition for further examination, as desired. Similarly the water passing through this screen and down cleanses the contents of the screens 6 and 7, finally escaping through the discharge-nipple 2. To further aid in the disintegrating process either during or after the rinsing process, the matter held in the screens may

be raked apart and distributed thereover by the use of the agitating-needles 13, which may be either removable or fixed to the lid 4 and of whatever length desired, the entire lid being revolved as desired upon the collar *c* and about the stem 3 for this purpose. The vessel may now be held to the light and the matter held by the several screens subjected to examination, the plane and parallel sides *a* facilitating this, because of the absence of any convexity in that part of the glass walls or, if desired, the screens may be lifted over the end of the stem 3 and entirely out of the vessel for further examination of their contents as desired. The entire series of screens, as well as the central stem, may similarly be removed as a unit, if desired.

While I find a vessel of the shape described to be the most satisfactory for the reasons above given, I do not limit myself to that type. Vessels of either circular or elliptical cross-section, with correspondingly-shaped screens may be substituted for the form illustrated, as may woven screens for those of sheet metal. It is also within the invention to substitute for the single central stem several supporting-stems attached to each screen in the vicinity of its edge, forming a sort of scaffolding.

What I claim is—

1. In an analyzer, in combination with an inclosing vessel, a longitudinally-extending stem therewithin, a plurality of screens engaging about said stem, and sleeve members rigidly attached to said screens and engaging about said stem, adapted to hold said screens accurately in position with respect to said stem and vessel, substantially as described.

2. In an article of the class described, in combination with a transparent casing, a stem extending longitudinally thereof, a plurality of screens of varying mesh adapted to be spaced from one another and to be supported in a position transverse of said casing by said stem, a cover for the large end of said casing having extending through it an agitating-needle, and a cap member for the top of said casing, substantially as described.

3. In an analyzer, in combination with an inclosing vessel, a plurality of screens disposed therein in parallel planes, means for spacing said screens, and means adapted to be manually actuated from without said vessel whereby the contents of any of said screens may be spread thereover, substantially as described.

4. In an article of the class described, in combination with an inclosing casing open at the ends, one of said ends being contracted to form a delivery-nozzle, a cover for the other end, agitating-needles extending therethrough, a spraying-nozzle for introducing water into the interior of the casing, a plurality of screens adapted to extend entirely across the casing, and a stem lengthwise of said casing for supporting said screens in transverse position and for spacing the screens from one another, substantially as described.

5. In an article of the class described, the combination of a transparent vessel having plane parallel sides, a plurality of screens of varying degrees of fineness of mesh within the same, means for holding them in position across the vessel and spaced from one another, and means for rinsing matter placed upon any one of said screens, substantially as described.

6. In an article of the class described, in combination with an inclosing casing, a plurality of screens lying transversely thereof, means for holding the same in place, means for rinsing said screens and their contents and for carrying away fluids not retained thereby, and means for agitating the contents of any screen separately, substantially as described.

7. In an analyzer, in combination with a vessel, a screen located therewithin in a plane perpendicular to the axis of the vessel, means for directing a flow of water upon said screen, and means adapted to be manually manipulated whereby matter supported upon said screen may be agitated, substantially as described.

8. In an analyzer, in combination with a system of screens disposed in parallel planes, a sleeve member rising perpendicularly from each screen and registering with a perforation therein, a stem passing through each of said screens and sleeve members, means for directing a stream of water upon said screens, and inclosing means for limiting the lateral extent of the diffusion of the water, substantially as described.

9. In an analyzer, the combination of a vessel, a cover, screens disposed within said vessel in parallel planes to that of said cover, means for directing a flow of water upon said screens from the same end as that closed by the cover, agitating-needles extending through said cover to points adjacent to the top surface of one of the screens, and means whereby the vessel may be supported in upright position, substantially as described.

10. In a device of the class described, in combination with a vessel open at both ends, a discharge-nipple located at the delivery end thereof, a longitudinally-extending standard therein having its base portion resting on an inclined portion of the walls of said vessel, a series of screens engaging about said standard, spacing-pieces carried by each screen for regulating its proximity to those adjoining, a cover member for the receiving end of said vessel, and means extending through said cover for spreading and rinsing matter spread upon said screens, substantially as described.

11. In a device of the class described, the combination of an inclosing vessel, a remov-

able framework, a plurality of screens carried thereby in parallel planes and spaced from one another, each screen being adapted to be removed from said vessel and from engagement with said framework independently of the screens below it, substantially as described.

12. In an analyzer, the combination of a supporting-stem, a plurality of sieve members arranged thereon in parallel planes, means carried by each of said sieve members whereby it is spaced from the one adjoining, and transparent inclosing walls about the sieves, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

J. ALEXANDER MACMILLAN.

Witnesses:

CLARENCE F. DAY,

LOTTA LEE HAYTON.