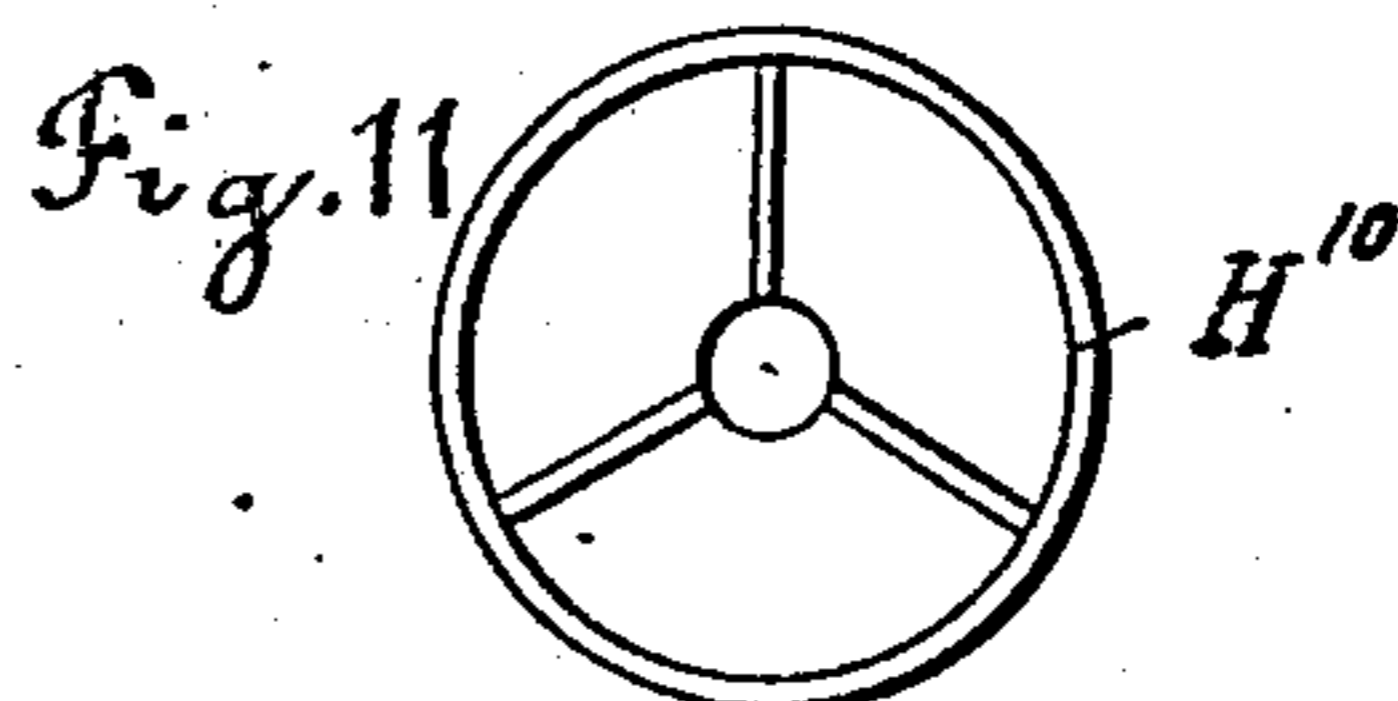
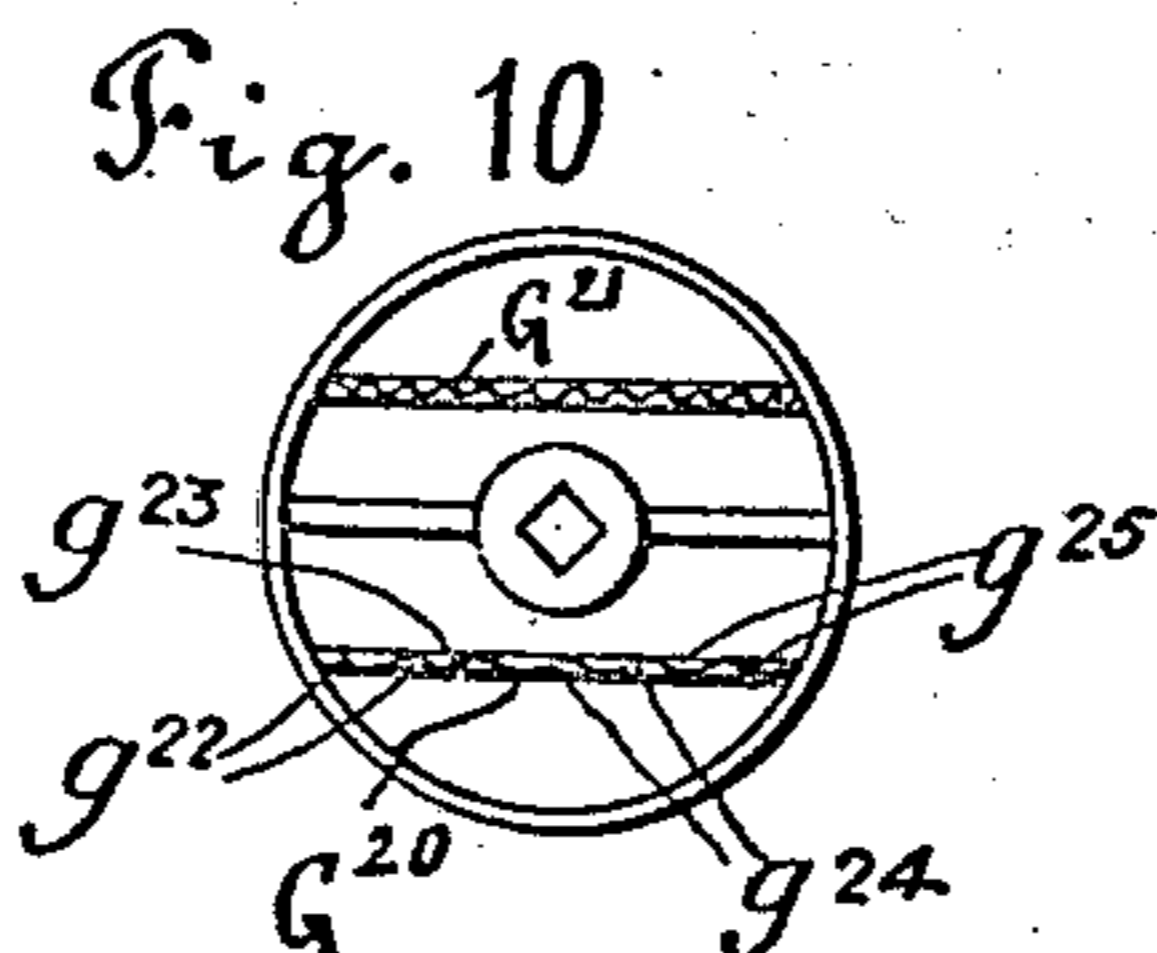
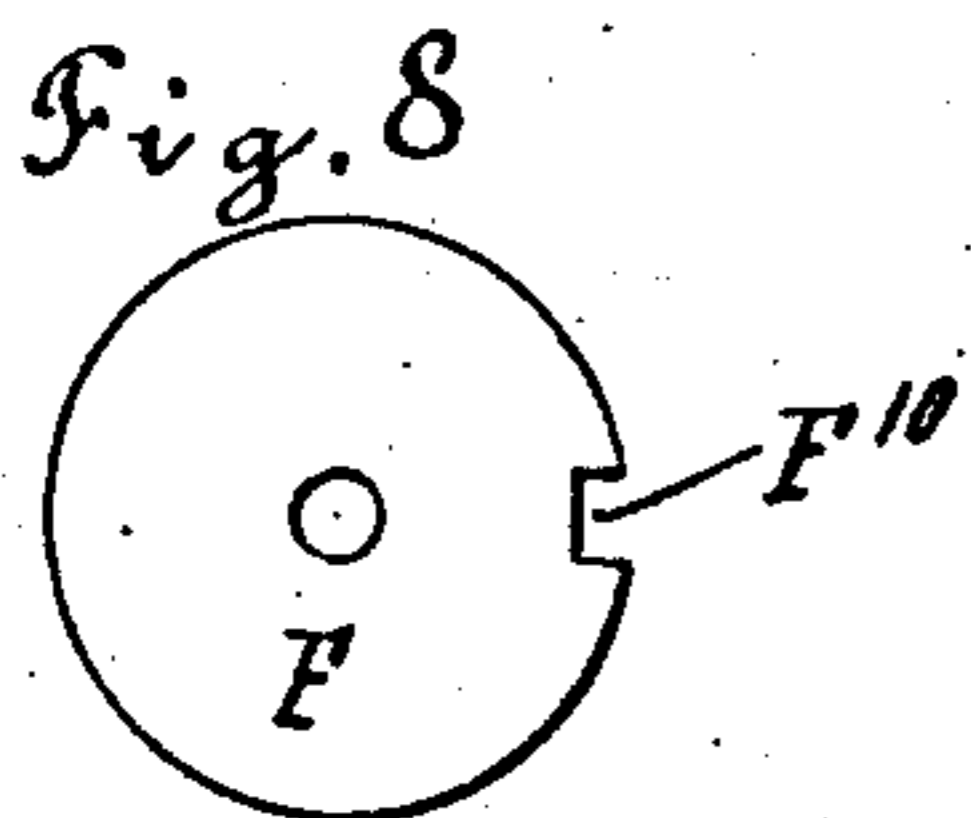
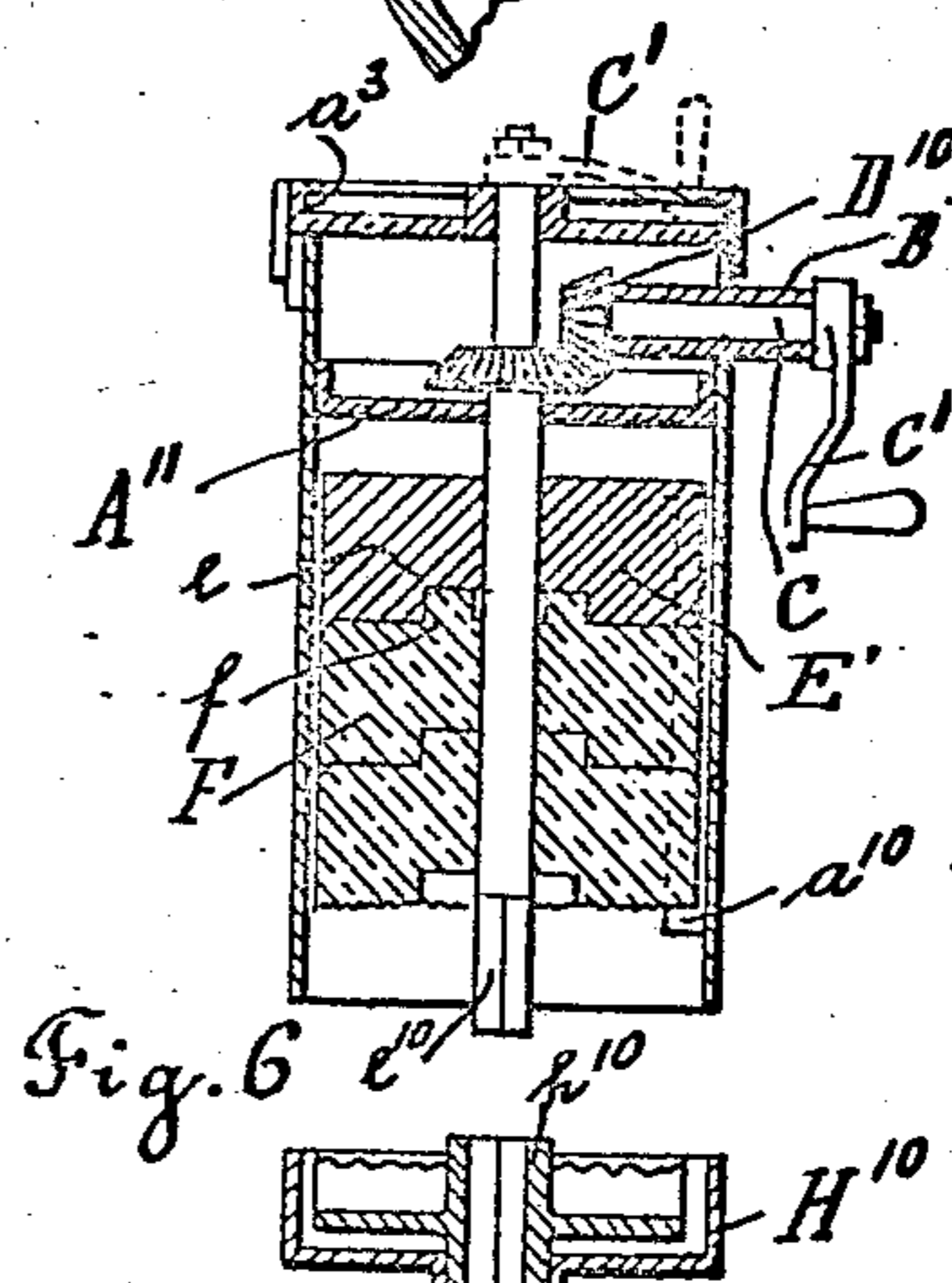
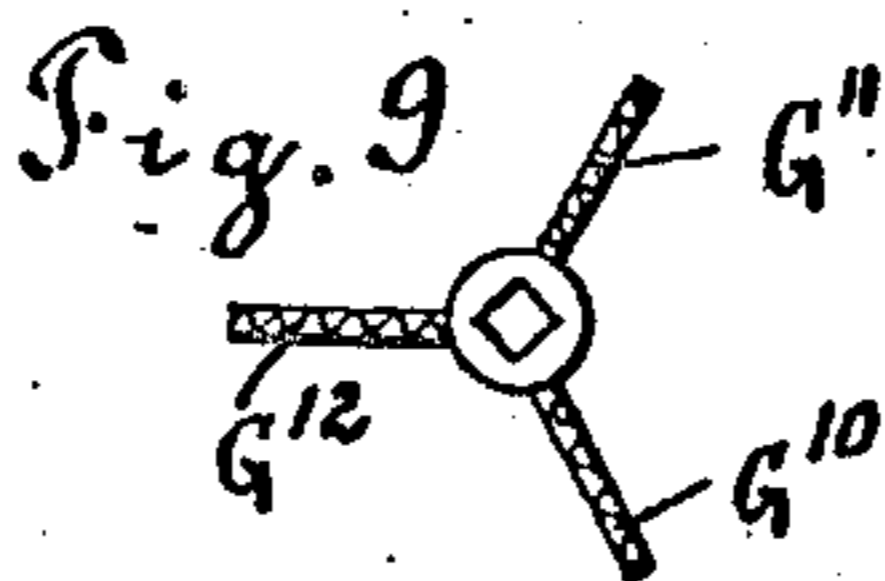
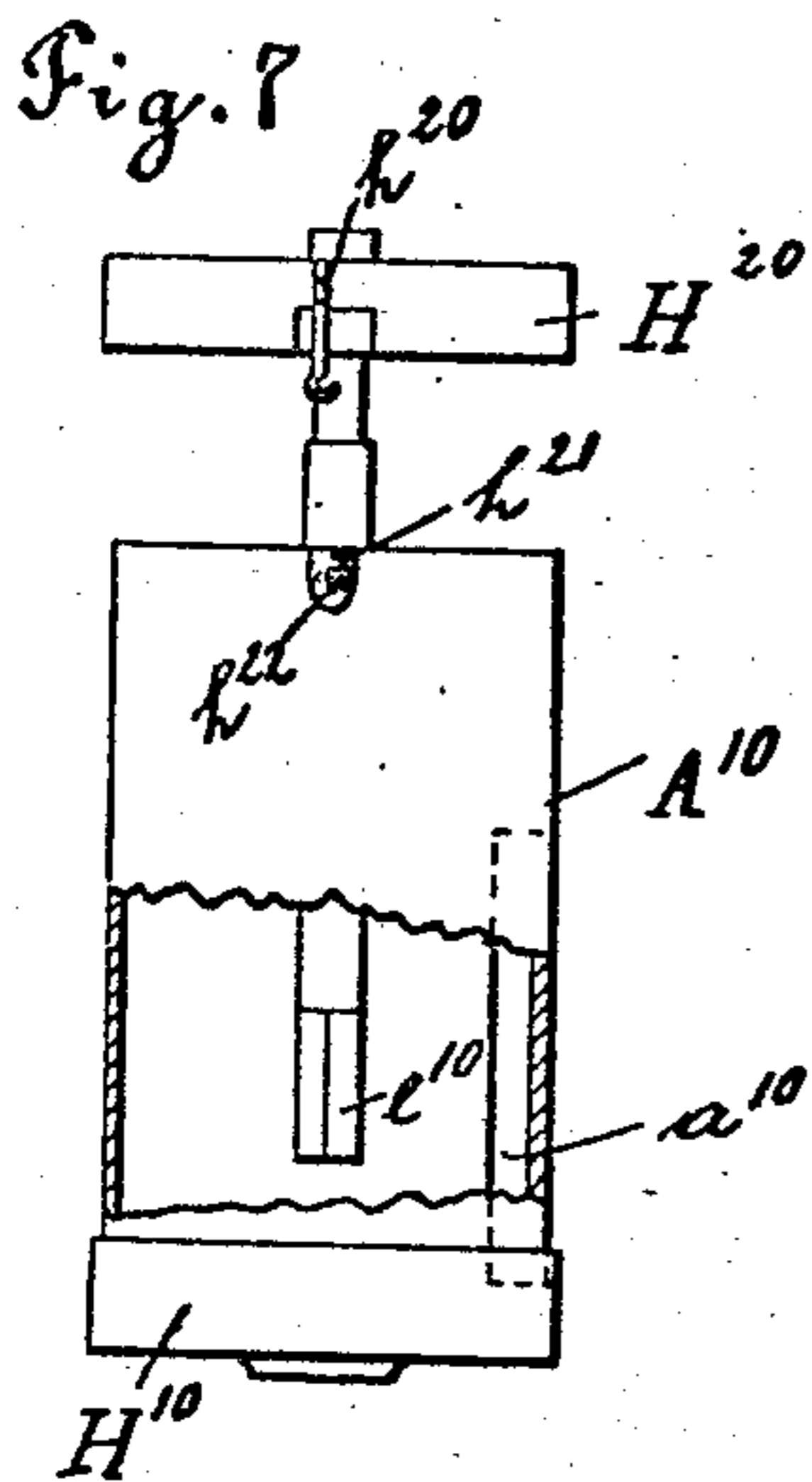
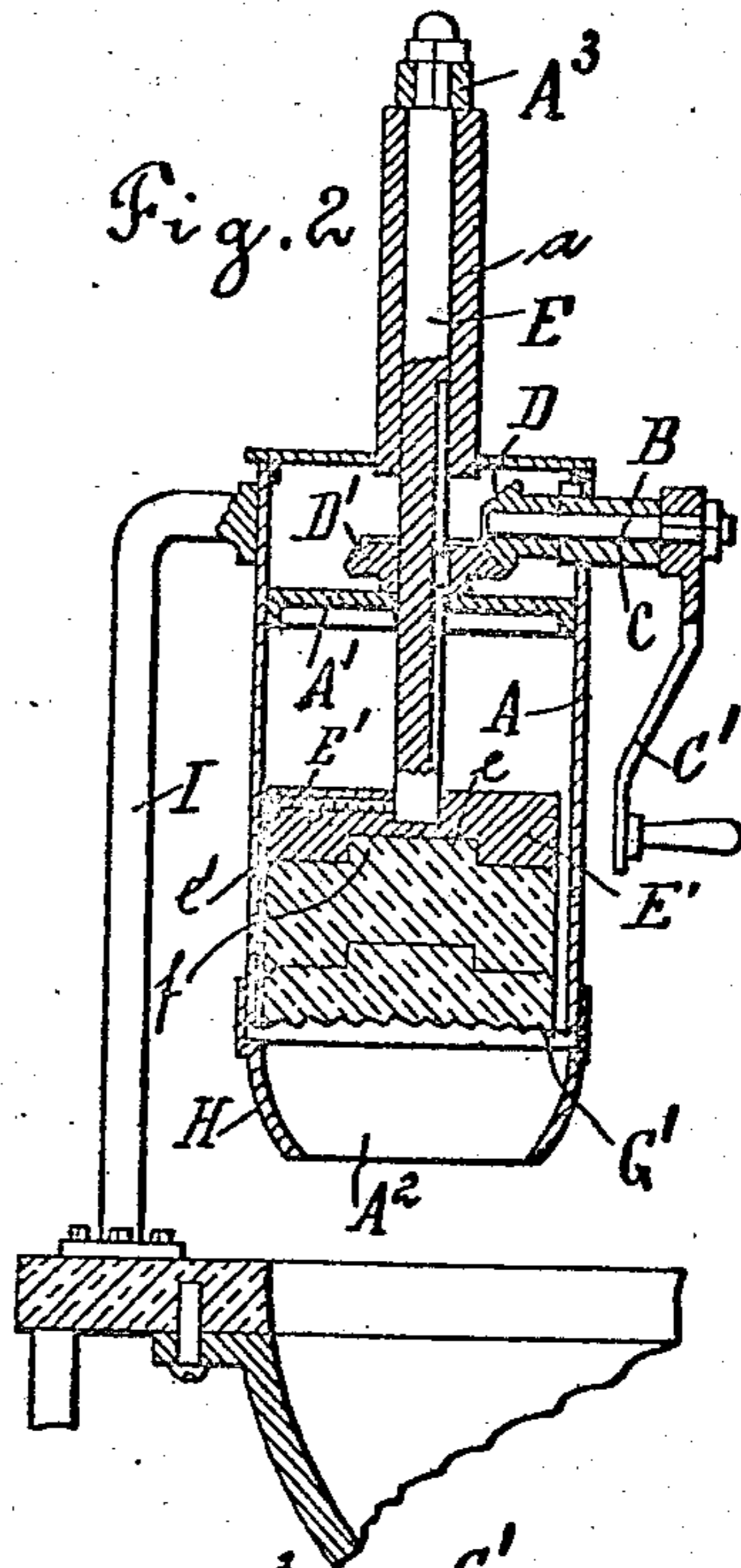
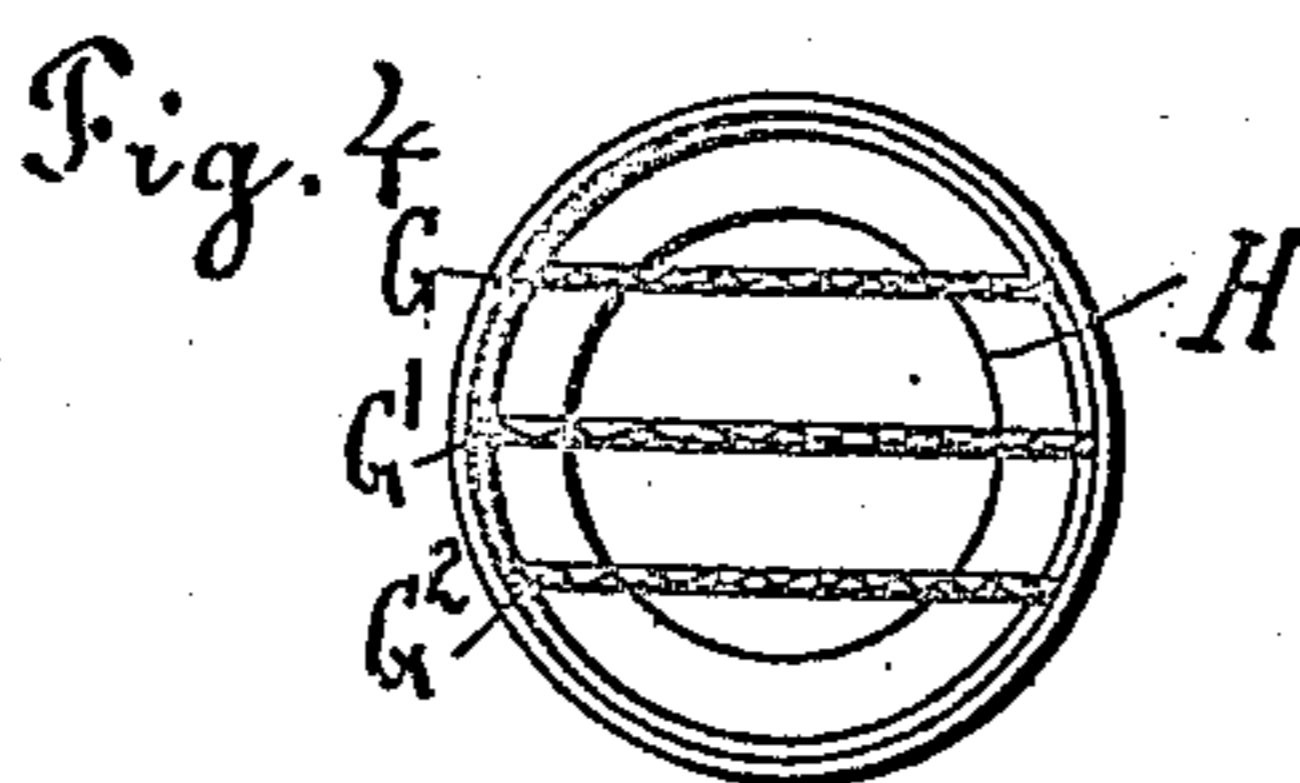
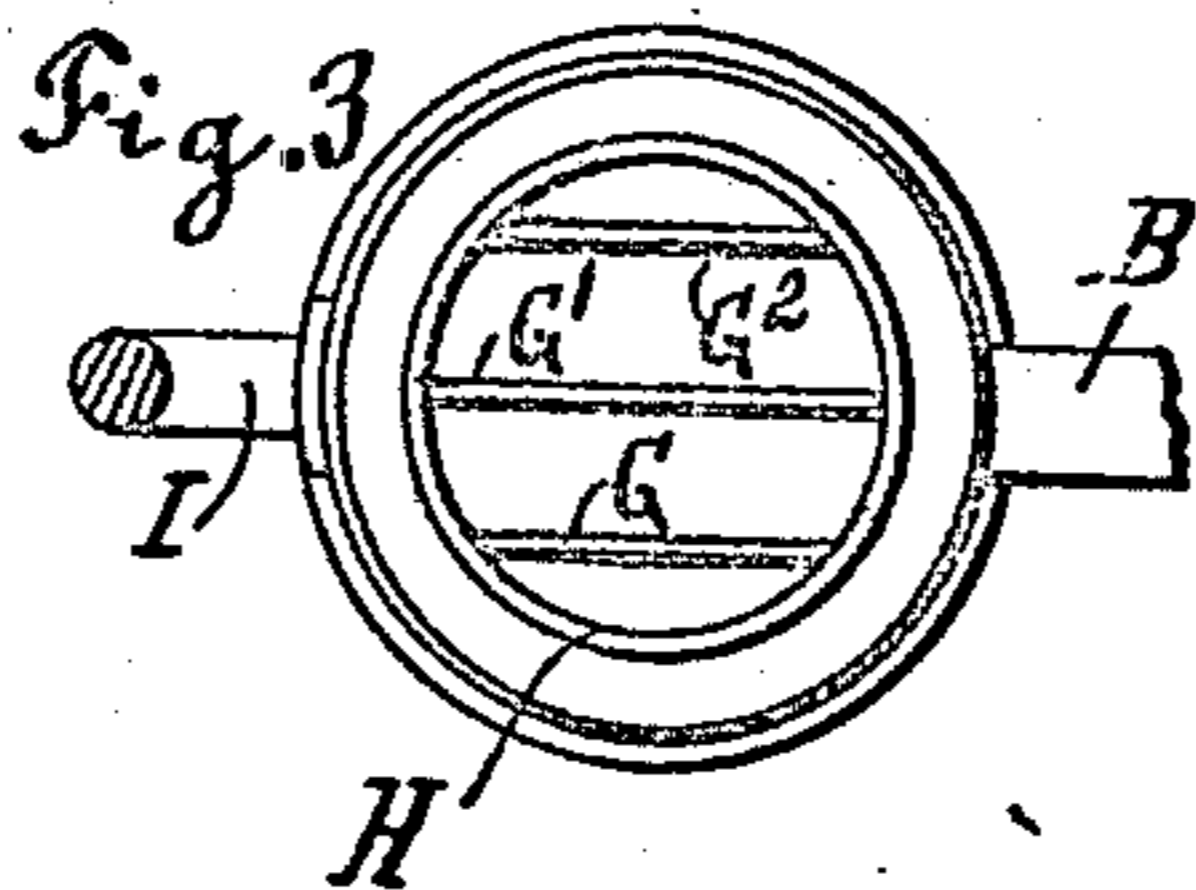
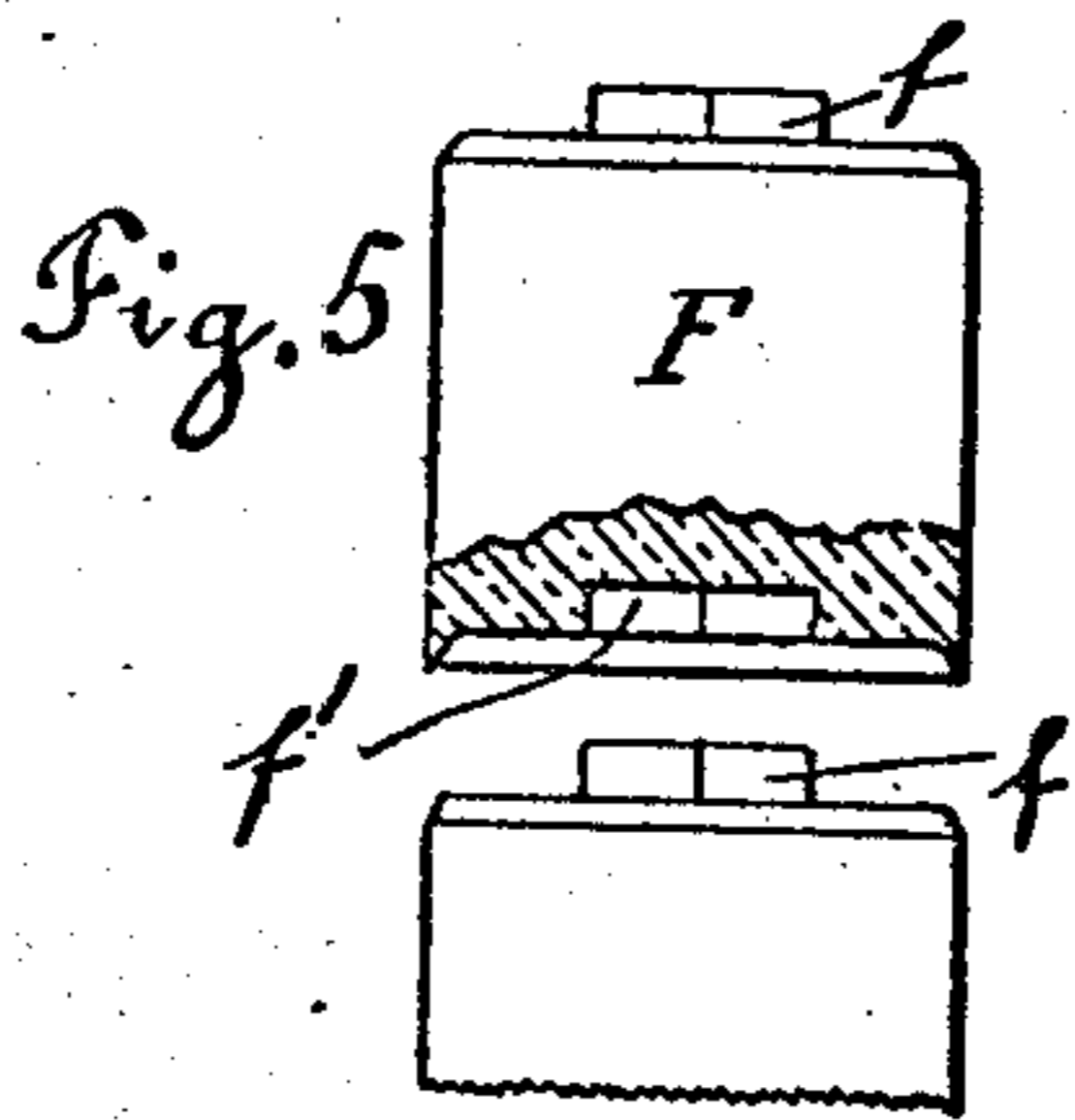
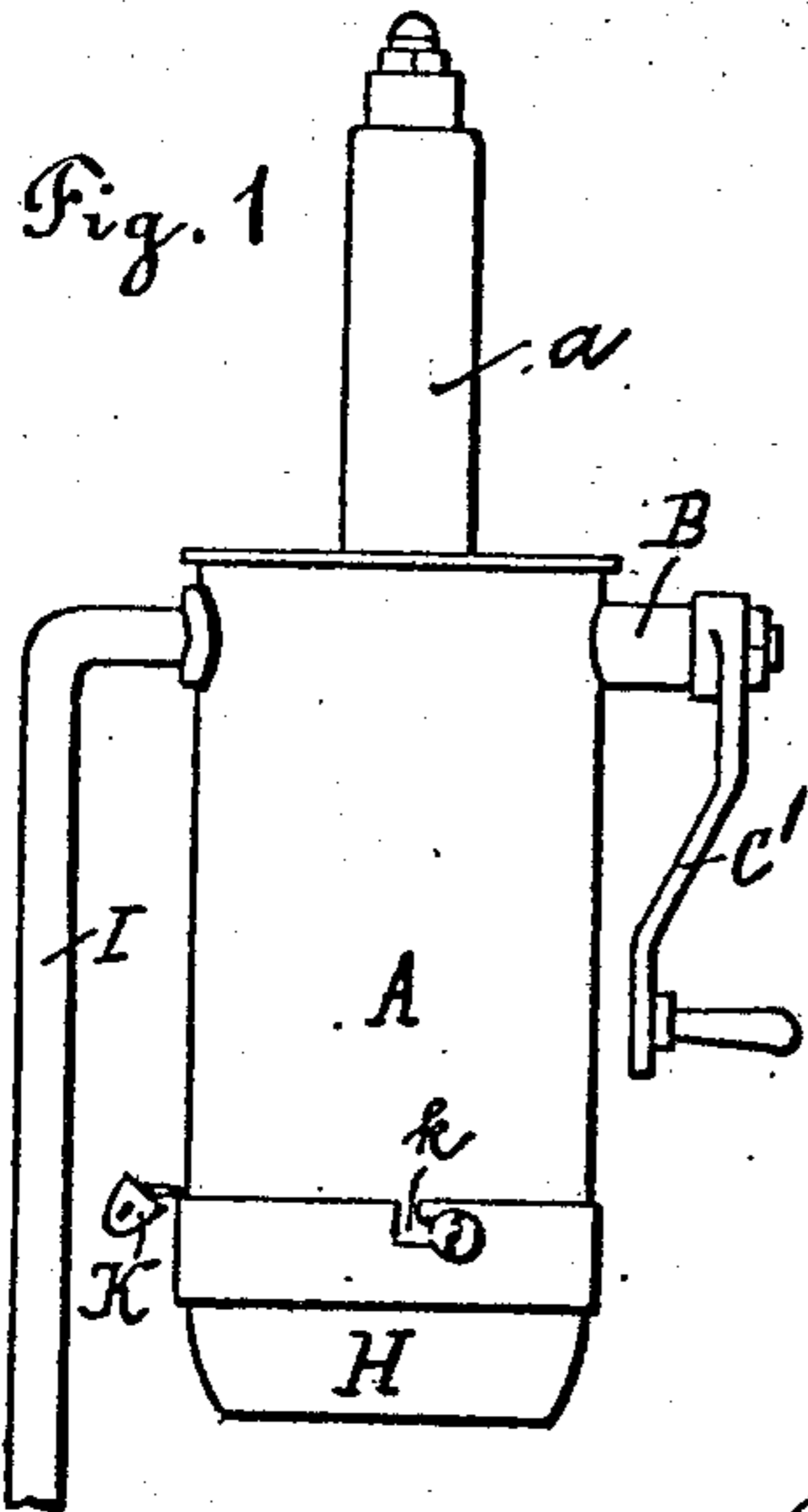


C. H. J. DILG & J. O. FOWLER.
ART OF COMMINUTING FRANGIBLE ARTICLES.
APPLICATION FILED OCT. 25, 1906.

899,008.

Patented Sept. 15, 1908.



WITNESSES

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ART OF COMMINUTING FRANGIBLE ARTICLES.

No. 899,008.

Specification of Letters Patent.

Patented Sept. 15, 1908.

Original application filed May 15, 1905, Serial No. 260,435. Divided and this application filed October 25, 1906.
Serial No. 340,465.

To all whom it may concern:

Be it known that we, CHARLES H. J. DILG and JONATHAN O. FOWLER, citizens of the United States of America, and residents of New York, in the county and State of New York, have invented a certain new and useful Art of Comminuting Frangible Articles, of which the following is a specification, the same being 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, the present application being a division of an application for soap-supplier filed by us on May 15, 1905, Serial No. 260,435.

This invention relates to a novel art by means of which solid blocks of material may be disintegrated and furnished for use in the form of fine shavings, or in a comminuted condition, and in particular to a method of disintegrating chemical compounds for washing or cleansing, as soap or like articles, and it has for its object the production of a method that will accomplish the above purpose, the same being explained in connection with and by reference to a machine by means of which our process may be carried on.

With this object in view the invention consists in a certain novel art, process or method which will be hereinafter described.

Figure 1 represents a side elevation of an apparatus employed in carrying out this invention; Fig. 2 is a sectional view of the same; Figs. 3 and 4 are views in detail of serrated cutting or granulating means; Fig. 5 is a detail view in elevation, partly in section, of interlocking cakes of soap; Fig. 6 is a view in section, and Fig. 7 is a side elevation, with the casing partly broken away, of other soap suppliers; Fig. 8 is a plan view of a cake of soap; Figs. 9 and 10 are views in detail of other cutting devices; and Fig. 11 is an end view of the soap supplier.

Like letters of reference indicate like parts in all the views.

Referring particularly to Figs. 1 and 2 of the drawings, A denotes the shell or casing of a soap supplier, the same preferably consisting of a cylinder upon which is ordinarily mounted the vertical tubular extension *a* communicating with the said shell. A bearing is ordinarily formed in the shell of the soap supplier consisting in the present em-

bodiment of a sleeve B. Within the said sleeve works a spindle C, which may be provided with any suitable means for operating the same, as the manually actuated crank arm C'. The inner end of the spindle C preferably carries a bevel gear D which meshes with another bevel gear D' mounted in a rotatable relation upon the plate or partition A' of the cylinder casing A. The said bevel gear D' is ordinarily keyed to a shank or spindle E which works in a bearing in the plate or partition A' and extends up into the upper portion of the tube *a*, with which spindle is engaged a weight E' in order that the rotation of the spindle E may cause the said weight or follower E' to revolve. The upper portion of the gravity shank or spindle E works in, and is embraced in, the sleeve A' contained in the tube *a* and the upper end of the said sleeve or spindle preferably projects up from the top of the casing in order to serve as a means of actuating the said shank or spindle E by means of the handle or crank arm C' if desired. The sleeve or spindle A' is provided with a longitudinal slot or keyway A¹, in which works a key or pin E¹ projecting from the upper part of the shank or spindle E.

The weight E' is ordinarily provided with any suitable means of interlocking with the soap through one or more engaging means, as for example the recess *e*, which recess is constructed and arranged to preferably engage the soap and to register and interlock with a head *f* in the top of the cake of soap F. Each cake of soap is not only ordinarily provided with means to engage with the weight through one or more interlocking devices, as for example the recessed portion *f'* on one say the lower face thereof, but is also preferably furnished with other interlocking means, as projecting portions *f*, of practically the same size and contour and ordinarily located in the upper face of the same, and constructed and arranged to interlock with the recessed portion *f'* of an adjacent cake of soap. One end, preferably the lower portion, of the casing A is provided with a cutting device consisting of a series of scraping, shaving or granulating devices, as for example, the serrated blades G, G', G², the serrations of said blades being preferably arranged in staggered order, the teeth of one of the blades, as

G', being wider than those of the other cutting blades or knives.

The lower part of the casing head H, which is ordinarily attached to the bottom of the casing A, is preferably reduced in diameter so as to converge and form a contracted opening or mouth A², which ordinarily detachable casing head is preferably interlocked, as at k, with the upper shell or casing A, and may be fastened to the casing or cylinder A, as by means of a padlock K.

The soap supplier may be sustained by any suitable means, as for example, by means of a supporting arm or standard I.

The depending portion of the projection e' of the weight E' will hold the body of the weight from the teeth of the cutting device, and thus prevent the same from being cut or marred, or the teeth being dulled, as might occur if the knives or cutting blades were to come into actual frictional contact with the weight in cases where the soap is practically entirely cut or worn away.

In the apparatus shown in Fig. 6, the casing A¹⁰ is provided with a partition A¹¹ through which and the top of the shell or casing works the spindle E¹⁰. The said spindle actuates the bevel gear D¹¹ fixed thereto, which meshes with another bevel gear D¹⁰, the shaft C of which works in a sleeve B and carries a crank arm C'. The crank arm may, however, be attached directly to the top of the spindle E¹⁰ if preferred, as is indicated by the dotted lines. The lower and detachable part of the casing, consisting of the head H¹⁰, supports the cutters G¹⁰, G¹¹, G¹², which are interlocked with the squared extension e¹⁰ of the spindle E¹⁰. The hub h¹⁰ of the said head H¹⁰ is elevated a short distance above the plane of the serrated blades in order to prevent the weight E' from coming at any time into frictional contact therewith. The interior of the casing or shell A¹⁰ is provided with means for preventing the rotation of the weight and the soap, consisting in the present instance of a vertical part a¹⁰ projecting into the chamber and registering and engaging with the groove or recess F¹⁰ of the soap F, and a similar groove formed in the weight E'. A recess e extending up into the weight E' engages the soap F as before described, whereby the weight and soap are held rigidly together. The top of the shell or casing is preferably furnished with an inbent rim or curb a³, thus forming a circular groove in which the end of the crank arm C' works when the handle is located at the top of the apparatus. In the soap supplier illustrated in Fig. 7, the upper head H²⁰ of the casing is detachable, and it (or, if so desired, the parts H or H¹⁰) may be secured to the casing of the apparatus by means of a catch or keeper h²⁰ which is constructed and arranged to be engaged with a pivoted spring latch h²¹ attached to the casing, and which may be released by

moving the lower arm of the catch h²¹ upwardly by means of a key inserted in the key-hole h²².

The operation is as follows: The cylinder A is charged with a suitable number of preferably interlocking cakes of soap, the upper one of which is interlocked with a follower consisting of a plate or weight E' which may be caused to descend by its own weight or by equivalent impelling devices, as a spring, and which weight is raised, when the apparatus is charged, to the position desired. The casing head is now fastened to the cylinder, upon which the apparatus is ready for use, and by turning the crank arm C', the soap and cutting device become engaged with an abrading or scraping action in practically a plane surface and the lowest cake of soap becomes gradually worn away by reason of its contact with the cutting blades, the said disintegrated particles of soap falling through the contracted discharge nozzle or mouth of the casing head.

As described and shown, the soap may be rotated against the stationary cutting blades, or the soap may be held stationary and the cutting blades may be caused to revolve, and as the soap is preferably fed by gravity, the action of the apparatus will be uniform until the soap is practically entirely worn away; or, if preferred, upon the lowest cake of soap becoming nearly ground away, it may be detached from the weight E', and a new series of cakes of soap inserted between the partially used cake and the said weight, thus avoiding any waste of soap whatever.

By arranging the serrations or cutting blades so as to be of different size, the face of the soap becomes evenly ground off without leaving any very marked ridges or grooves in the same.

Manifestly the casing or cylinder may be placed in a slanting or horizontal position, if preferred, and the soap propelled by means of other and equivalent soap feeding means, as a spring placed on the rod between the cross piece or partition A' and the upper face of the weight or plate E', in which case the mouth A² would be at the side of the cylinder or casing A.

The advantage gained by constructing the cakes of soap with uneven interlocking or intermeshing faces is a material saving of the soap, for the reason that as the body of the lower cake of soap gets worn down to a thin disk it will not break or crumble as it is supported by its upwardly extending part f and the parts surrounding the recess f' of the superimposed cake, but will retain its entirety until the engaging or intermeshing portions of the uneven face of the cake above it are presented for abrasion. Then for a period of time the abrasive action is on both cakes of soap, by which construction an even and uniform surface is always presented to

the serrated face of the cutter, and all liability of breakage and wastage of the soap cakes—such as occurs when non-interlocking or non-intermeshing cakes of soap are used

is overcome.

It will be observed that the blades, as G , G^2 and G^{20} , G^{21} have a serrated cutting edge which extends from the body slightly upwardly and is bent or inclined forwardly relative to the vertical case of the soap shaving machine, the serrations each having ordinarily two cutting edges, one edge, as g^{22} , Fig. 10, approximately circumferentially disposed, or lying practically parallel to the circumference of the case of the machine, and the other edge, as g^{23} , extending approximately in a radial plane or in one parallel therewith.

In respect to the blades named above, it will be seen that the actual cutting lines of the edges of the teeth are those of the individual serrations, and that as some of these lines are non-radial, they give a shear cut. One series of edged teeth, as G or G^{21} are preferably staggered in relation to another series, as G^2 or G^{20} , so that their circles of rotation will not coincide. We prefer to locate the serrations or teeth in lines at a distance from the axis of the cutter and to form the teeth so that their pointed ends will all face the same way in the same line, in order that, no matter in which direction the cutter is turned, some of the teeth will present a cutting edge to the soap, and the teeth which do not bite or cut will prevent the cutting teeth from burrowing too deeply into the soap and thus secure a fine or thin shaving.

We use the term "advancing cutting edge" to denote the presentation of one of the edges of each one of the serrations to the surface of the soap to be cut, whether the cutter is moved with relation to the cake of soap, as in Fig. 4, or the cake of soap is moved over a stationary cutter, as in Fig. 2, in either of which cases, each of the cutter points acts on the soap with a self burrowing cut. And inasmuch as the practically circumferentially parallel edge of a tooth limits or determines the width of the narrow shaving cut by the approximately radial or radially parallel edge, we denote the said former named edge by the term "offset", as by the said construction, each cutting edge cuts its own distinct shaving.

The blade G^{20} in Fig. 10 has the teeth formed, as stated, so as to cut when rotated in either direction. When the said blade is rotated clockwise, for example, the width of the shaving will be limited by the width of the radial or radially parallel edges g^{23} located on the left hand side of the cutter. If, however, the cutter is rotated in the opposite direction, or anti-clockwise, the width of the shaving will be determined by the width of the radial or radially parallel edges g^{25} .

The cutter blades we prefer to use are formed with a suitable supporting member, as a hub, or a ring or any other equivalent means with or without the use of a hub, and have, as stated, non-radially disposed blades, as G^{20} and G^{21} . In Fig. 9, a plurality of blades G^{10} , G^{11} , G^{12} extend from a central supporting member or hub.

It is manifest that although we ordinarily prefer to perform our new method, art or process by means of the use of a soap dispensing or soap shaving machine, such for example as the one herein described and shown, yet the said method of disintegrating soap or other frangible articles may be performed by simple manipulation, as by holding the interlocked column of soap cakes in one hand, and by pressing against the same, a suitable instrumentality or tool, as a cutter, held in the other hand and rotating either the material or the abrading device.

We do not claim in this application the machine or apparatus herein described and shown, as that is claimed in the application of which this is a division, although the same is preferably employed as a part of our art or method of comminuting or reducing to a fine condition any frangible or molded, or semiplastic or sequacious material, which latter we refer to herein broadly as a frangible article. And inasmuch as a great variety of devices may be used to disintegrate the mass of material to be operated upon according to the degree of fineness or quality of the product desired, and inasmuch as the result attained is caused by attrition or mutual contact or friction with a more or less cutting or scraping action, we designate such articles broadly as abrasive devices, although the different articles which are now in common use and which may be utilized for this purpose may be specifically termed cutting, paring, scraping, grating, granulating, grinding, abrading, planing, or shaving devices, and the disintegrated or finely divided products which may be obtained by the employment of the above named reducing agencies we designate broadly as being in a comminuted condition; nor do we claim herein the cake of soap *per se*, as that forms the subject matter of our application for a cake of soap, filed December 29, 1906, Serial No. 350,065, the same being a division of our application for a soap supplier filed May 15, 1905, Serial No. 260,435.

The essential feature of our invention of progressively reducing solid material consists in assembling a series or plurality of cakes or units so as to form a comparatively solid column or bar, the opposing or engaging faces of the units being so formed that, when engaged, there are preferably no interstices or open spaces between them, and, also so that their juncture shall be so positioned as regards the abrasive device that, when

presented endwise to the latter; different points of said juncture will lie at various distances from said abrasive device.

We prefer that the opposing or engaging faces shall be of an uneven contour, which shall be non-correspondent in form with that of the abrasive device; but it is essential that the operative surface of the abrasive device shall form one or more angles with the line of division, or the juncture, between the units, or with the ends thereof, in order to constitute what we term, an endwise engagement.

What we claim as our invention is:

The art of progressively reducing solid material, which consists essentially in assembling into a column or series a plurality of units having engaging faces; and presenting such column or series endwise to the action

of an abrading device, the engaging faces of the units and of the operative part of the abrading device being non-correspondent in form, so that different points of the juncture of the units shall lie at various distances from the said operative part, whereby it commences the reduction of a succeeding unit of the series before it has completed that of the preceding one.

In testimony of the foregoing specification we do hereby sign the same in the city of New York, county and State of New York this fifteenth day of October 1906.

CHARLES H. J. DILG.

JONATHAN O. FOWLER.

Witnesses:

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