Oct. 31, 1950 J. MANTELET 2,528,381

HOUSEHOLD GRATER HAVING ROTARY DISKS

Filed Sept. 10, 1946 4 Sheets-Sheet 1

Fig. 1

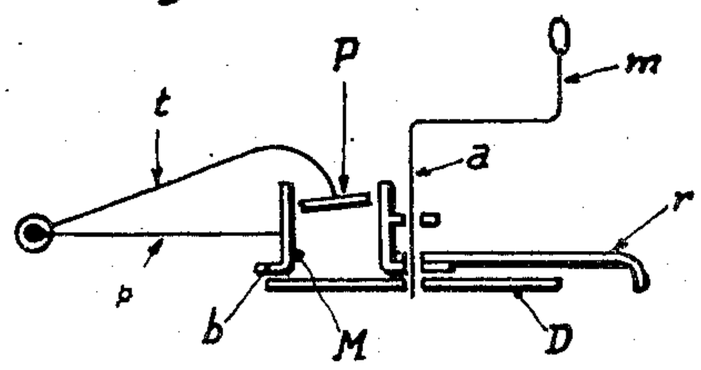


Fig. 2

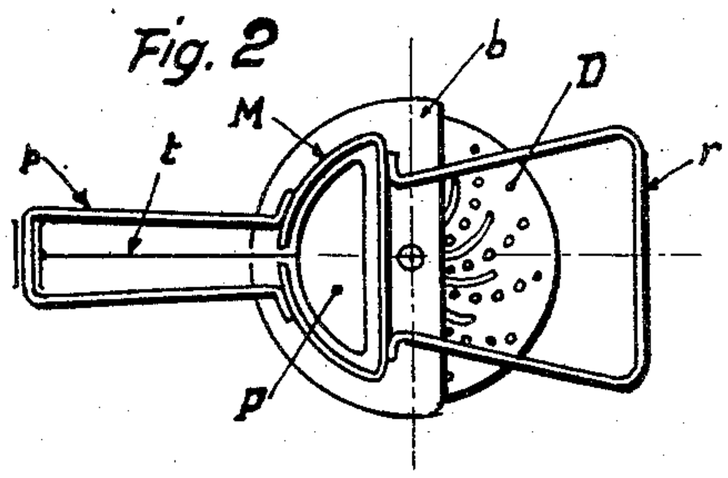


Fig. 3

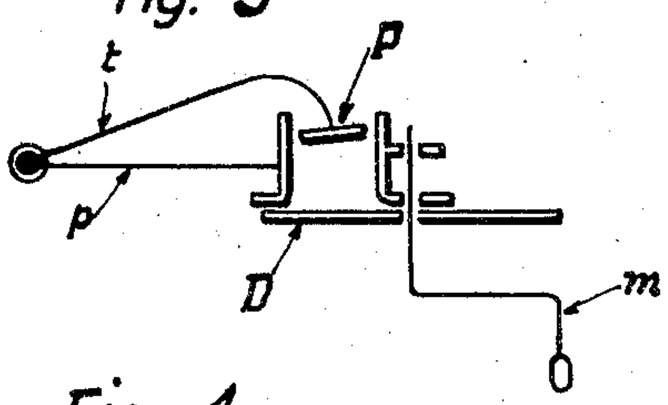


Fig. 4

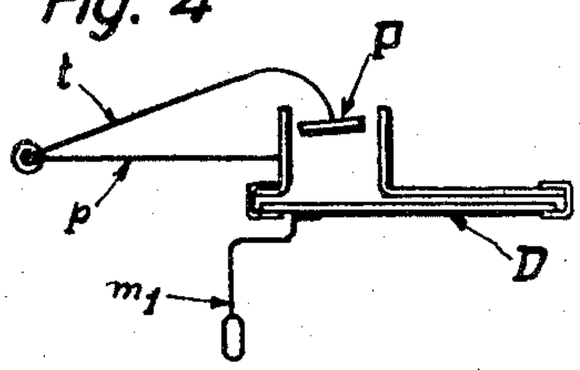


Fig. 5

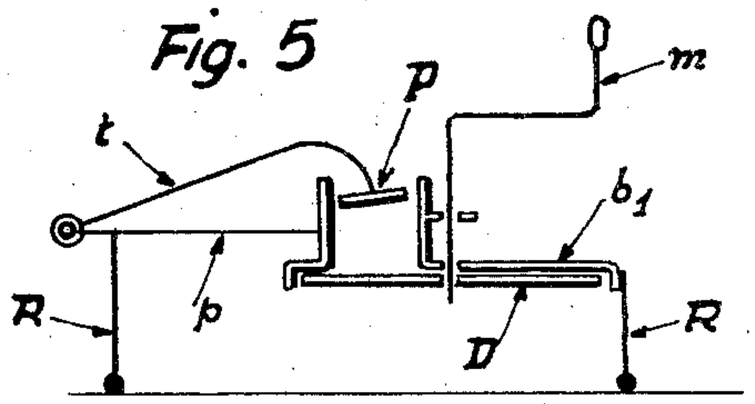


Fig. 6

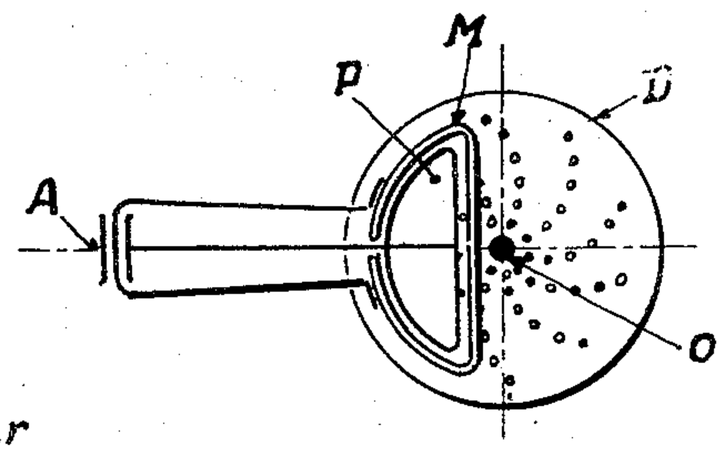


Fig. 7

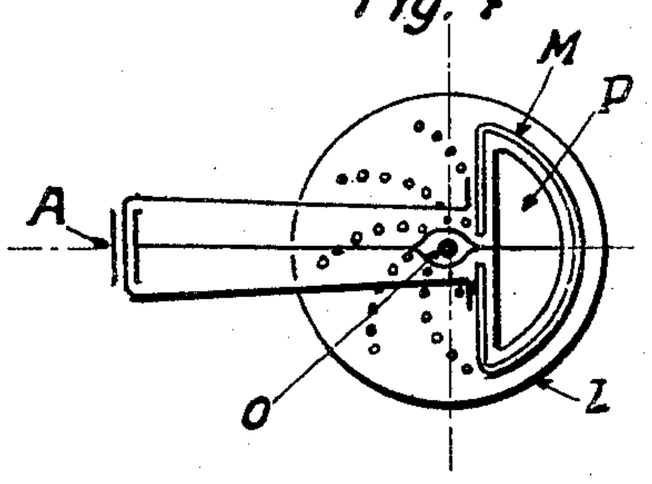
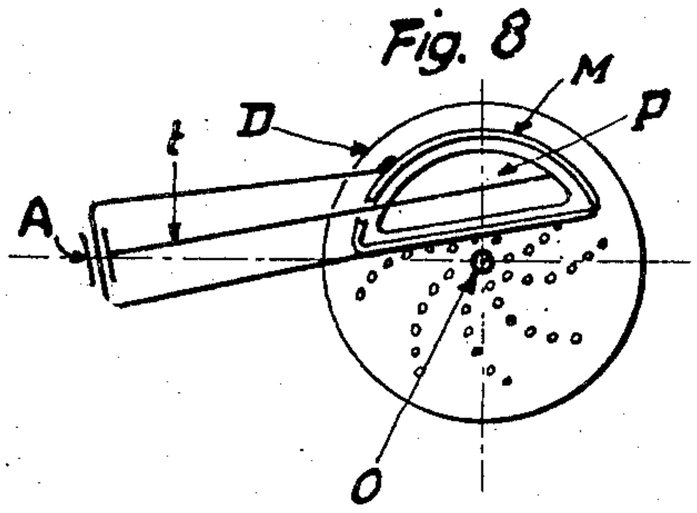


Fig. 8



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HOUSEHOLD GRATER HAVING ROTARY DISKS

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Fig. 9

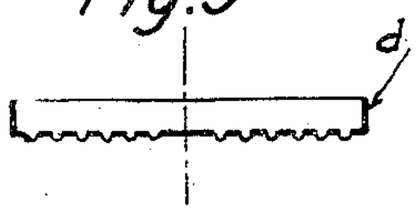


Fig. 10

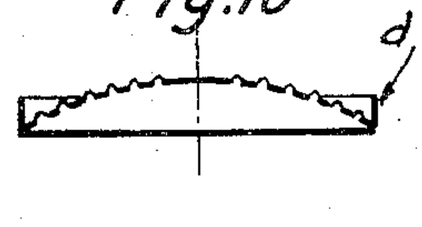


Fig. 11

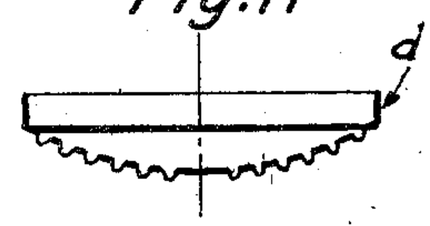


Fig. 12

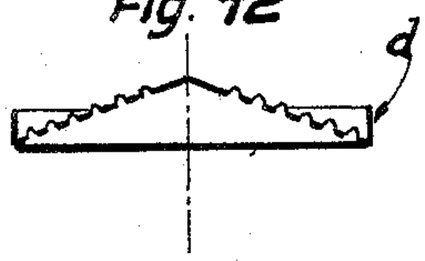


Fig. 13

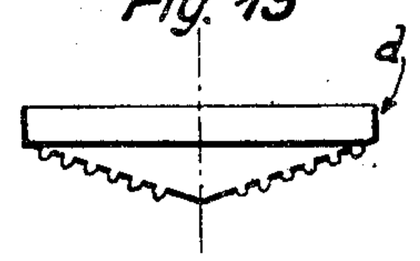


Fig. 14

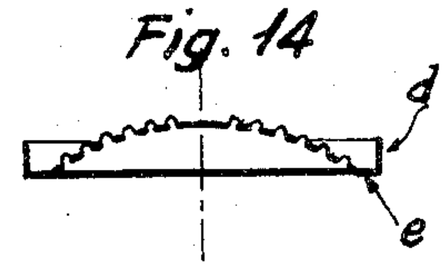


Fig. 15

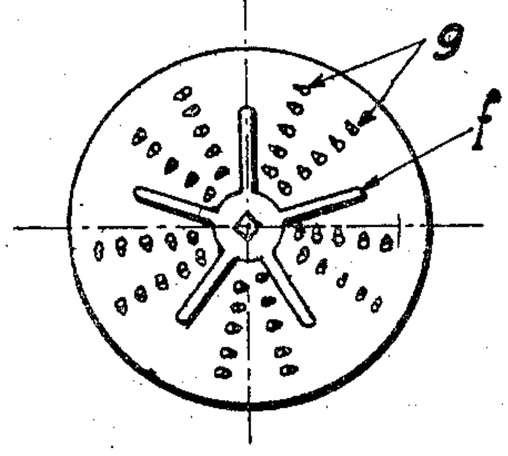


Fig. 16

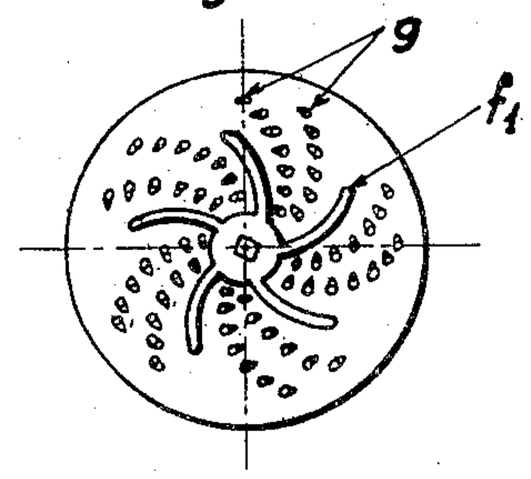


Fig. 17

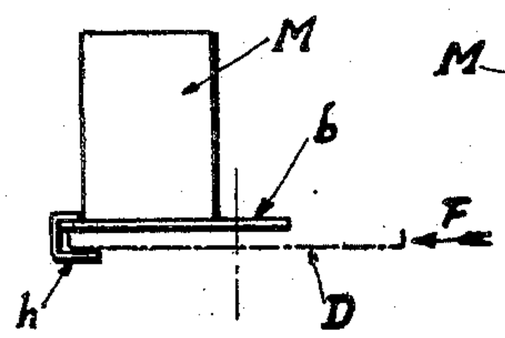


Fig. 19

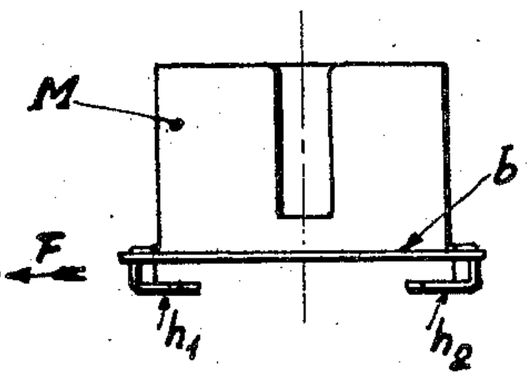


Fig. 21

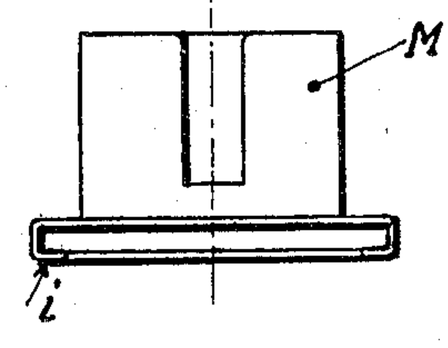


Fig. 18

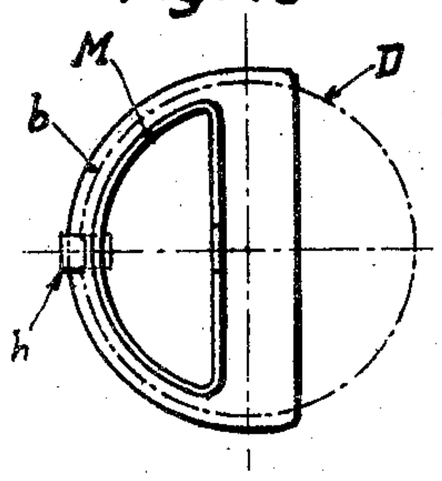


Fig. 20

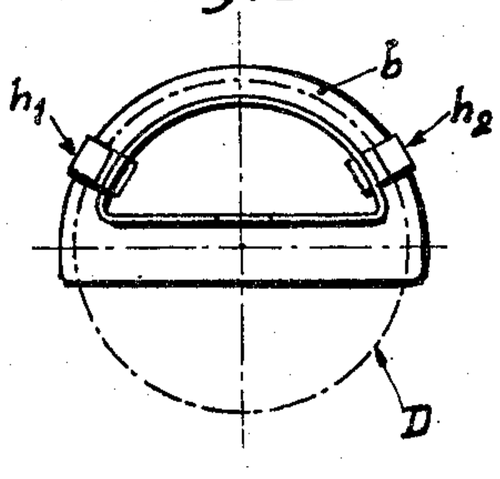
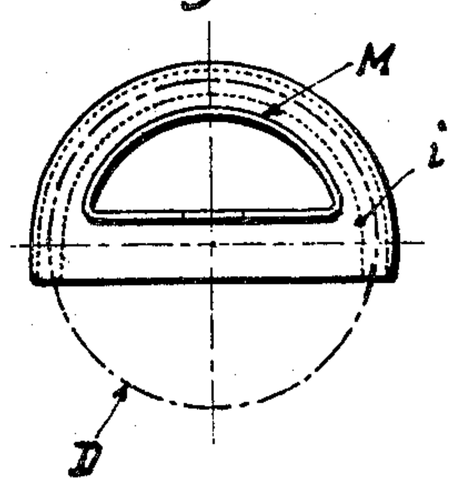


Fig. 22



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HOUSEHOLD GRATER HAVING ROTARY DISKS

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Fig. 23

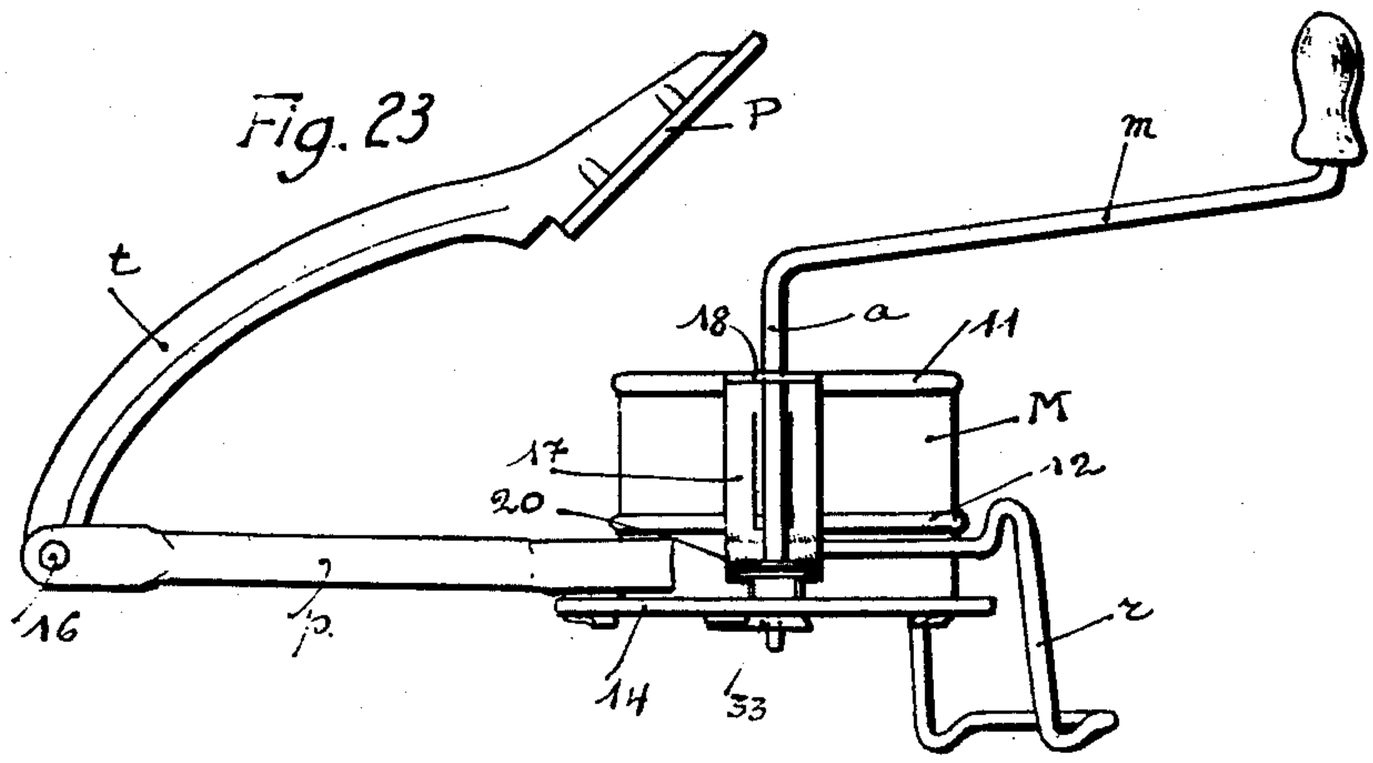


Fig. 24

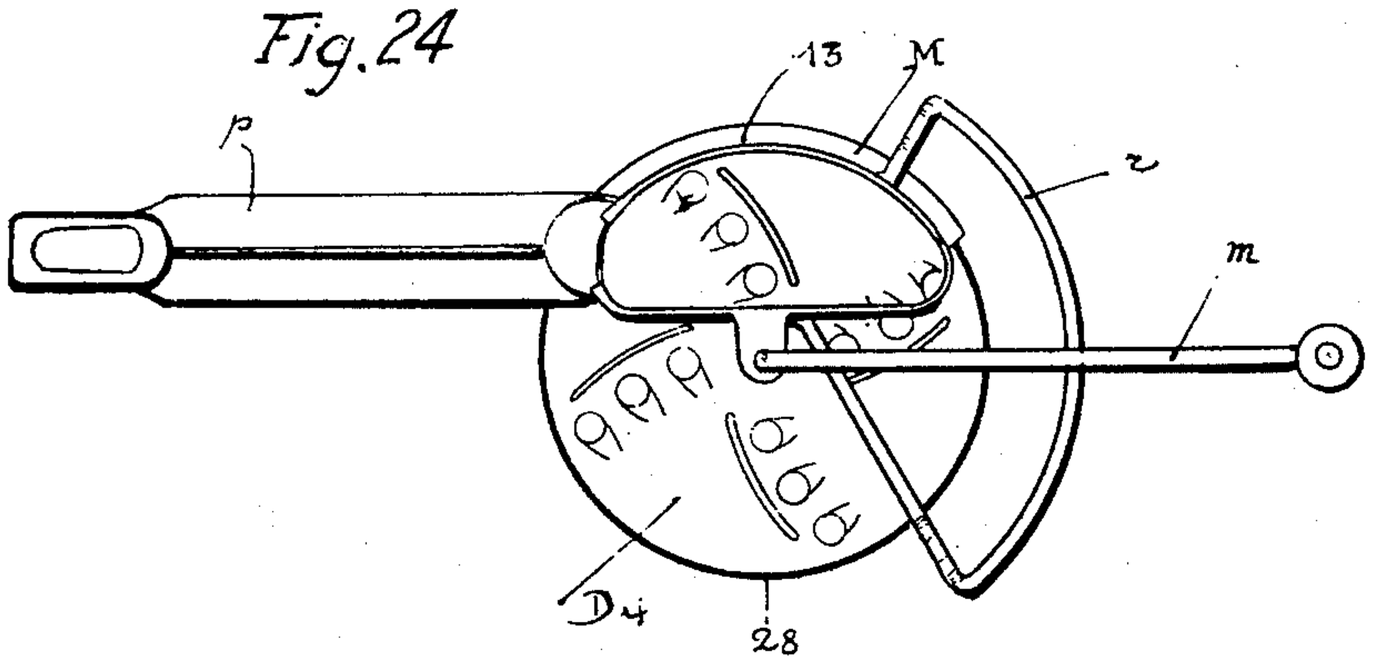


Fig. 25

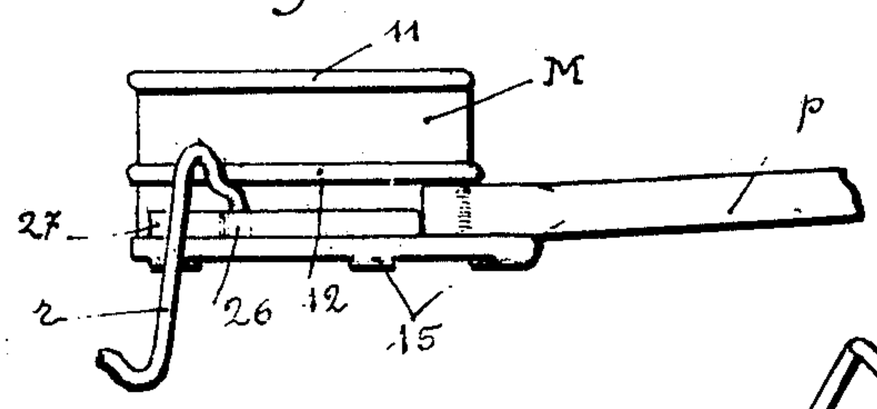


Fig. 25A

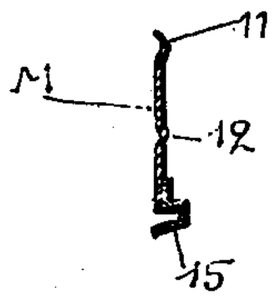
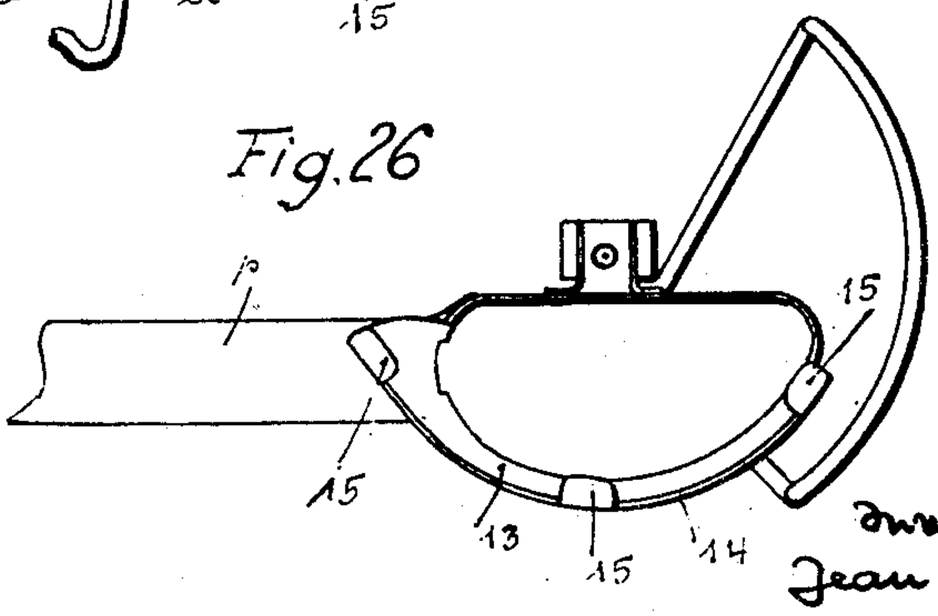


Fig. 26



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HOUSEHOLD GRATER HAVING ROTARY DISKS

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Fig. 27

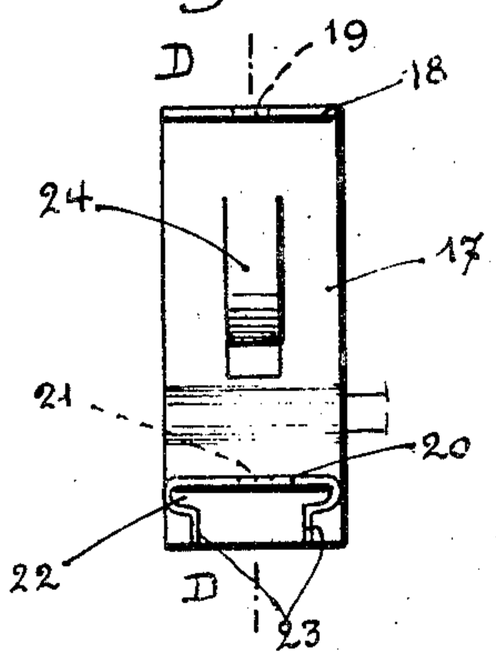

Fig. 28

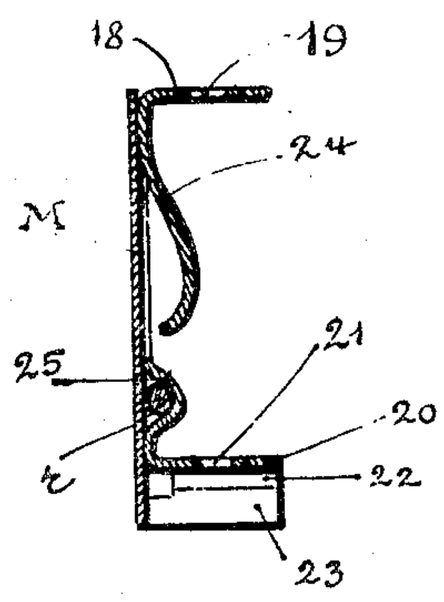

Fig. 29

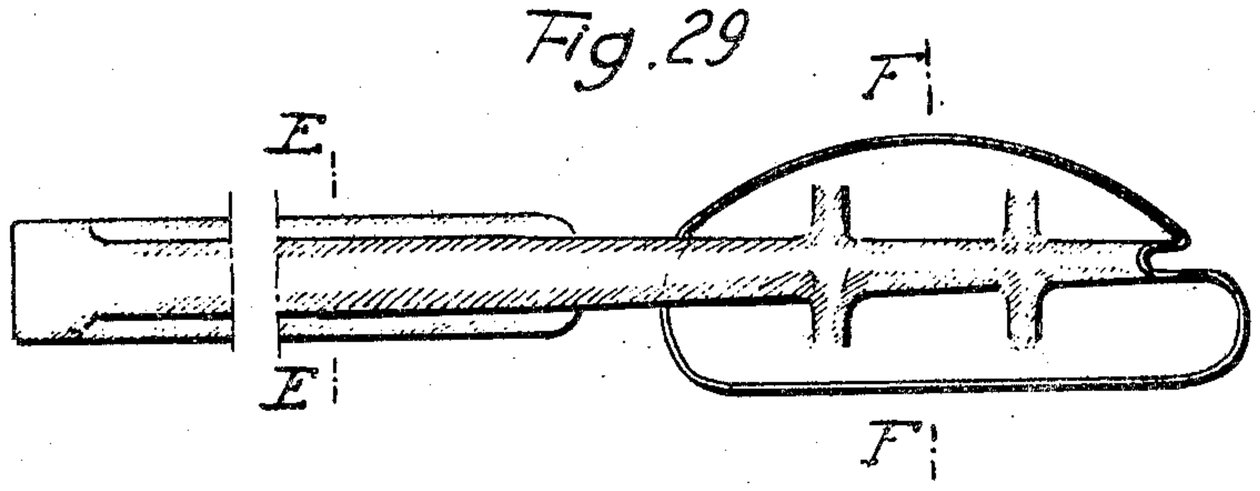

Fig. 30

Fig. 31

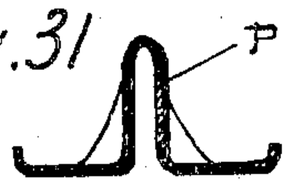

Fig. 33

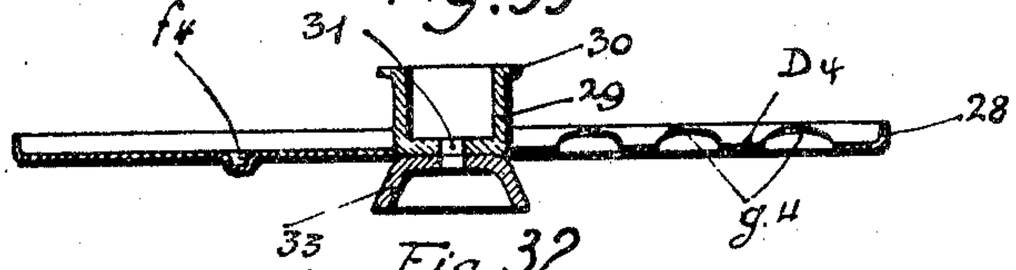

Fig. 32

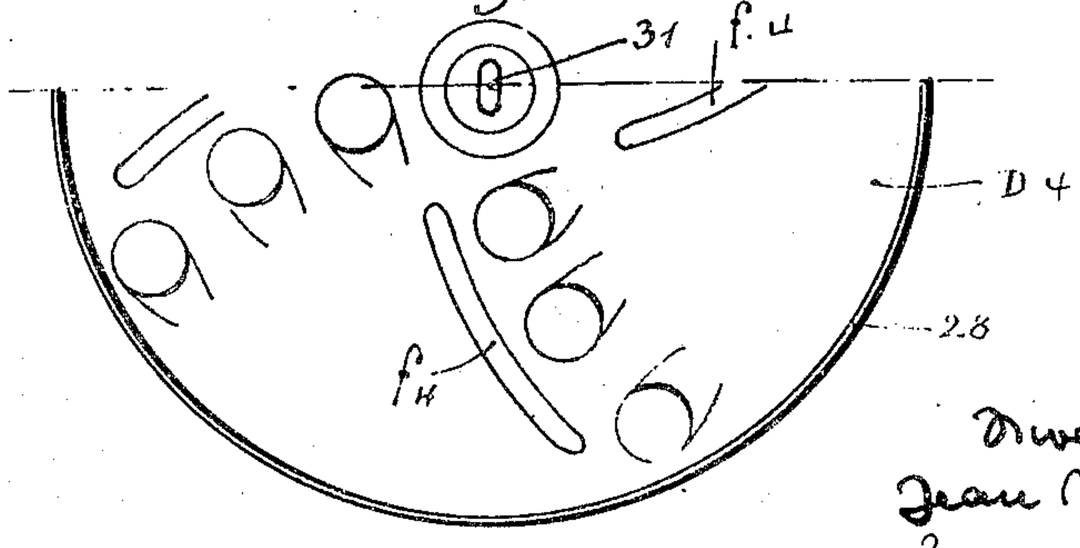

Fig. 34.

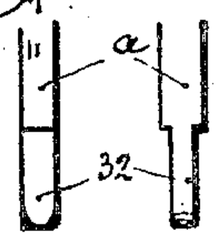

Fig. 35

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Patented Oct. 31, 1950

2,528,381

UNITED STATES PATENT OFFICE

2,528,381

HOUSEHOLD GRATER HAVING ROTARY DISK

Jean Mantelet, Bagnolet, France, assignor, by mesne assignments, to Le Moulin-Legumes Corporation, Wilmington, Del., a corporation of Delaware

Application September 10, 1946, Serial No. 695,842
In Morocco September 13, 1945

6 Claims. (Cl. 146—177)

1

Existing disc graters comprise a magazine open at both its ends, carried by a frame provided with means for enabling it to be fixed on the edge of a table for example and carrying in a rotary manner an axle of a crank secured by its end to a disc forming a grater and closing the outlet opening of the magazine, whereas a pusher, which is independent of or hinged on said magazine, enables the substance contained in the magazine to be pressed against the disc to which a rotary motion is imparted by the crank.

The frame of such graters is generally made of cast-iron; owing to this fact, they are heavy and cumbersome and their cost of manufacture is comparatively high owing to the quantity of metal required for their manufacture.

The disc forming the grater is solely held at its centre by the axle of the crank; it has therefore to be made of comparatively thick metal, often reinforced by embossing, in order to enable it to withstand without deformation the heavy pressure to which it is subjected in an overhanging position.

This results in an increase of the quantity of metal used and, consequently, a further increase in the cost of manufacture. Furthermore, the thick metal forming the disc necessitates a delicate sharpening, the effects of which disappear after a more or less prolonged use.

The present invention has for its object a household grater which is made of light materials: thin sheet metal and wire, which is cheap to manufacture and can be supported by hand or rested on a receptacle or on a table.

This grater, which comprises a magazine secured to a handle on which is pivoted a lever terminated by a pusher intended to penetrate into the magazine, and optionally a rest or feet, said magazine being open at its two opposite ends, one of which, the lower one, is closed by a disc forming a grater driven by the axle of a crank, is characterised by the fact that the magazine acts as a support for the disc which it holds at least at one point of its periphery.

According to another characteristic of the invention, the disc forming a grater is made of thin sheet metal provided with a turned down edge and with reinforcing ribs which are preferably evenly distributed and extend from the centre towards the periphery.

2

The fact that the disc is made of thin sheet metal has the advantage of eliminating the sharpening without the duration of use having an effect on the efficiency of the apparatus.

The invention is furthermore characterised by the fact that the magazine is secured, preferably by means of a case, to at least one hook which is intended to receive the peripheral part of the disc and which is arranged in such a manner that the centre of the magazine is located inside the zone between said hook or hooks and the centre of the disc.

The deformation of the disc in the zone where the pressure of the pusher is applied is thus prevented during operation.

Said hooks are distributed over an arc of a circumference at the most equal to 180° in order to enable the disc to be mounted; they may be replaced by a gutter having the same maximum extent and performing the same function.

A number of embodiments of my invention are illustrated by way of examples in the accompanying drawing in which:

Figs. 1 to 8 are diagrammatic views showing various arrangements of the household graters according to the invention.

Figs. 9 to 14 show in diagrammatic section various discs which can be used in combination with said graters.

Figs. 15 and 16 are plan views showing two discs provided with ribbings according to the invention.

Figs. 17 and 18 show an elevational view and a plan view of a magazine carrying a hook for the peripheral guiding of the disc.

Figs. 19 and 20 show similarly a magazine carrying two guide hooks.

Figs. 21 and 22 are similar views of a magazine carrying a guide gutter extending over a semi-circumference.

Fig. 23 is an elevational view of a preferred embodiment of the disc grater according to the invention.

Fig. 24 shows a plan view of the grater, the pusher being assumed to have been removed.

Fig. 25 shows in partial elevation the magazine and the handle seen on the other face.

Fig. 25A is a transverse section of the wall of the magazine opposite a hook.

Fig. 26 is a partial plan view of the magazine and the handle, seen from underneath.

Figs. 27 and 28 are detail views on a larger scale respectively showing in elevation and in section through DD of Fig. 5, the support for the axle of the driving crank.

Fig. 29 shows a plan view of the pusher pivoted to the end of the handle.

Figs. 30 and 31 are transverse sections thereof respectively through EE and FF of Fig. 7.

Fig. 32 is a partial plan view of a disc forming a grater.

Fig. 33 is a transverse section of said disc, and

Figs. 34 and 35 are two views at right angles showing the end of the axle of the driving crank.

Figs. 1 and 2 show diagrammatic elevational and plan views of a first embodiment of portable household grater according to the invention, constructed of light materials such as: thin sheet metal and wire.

Said grater comprises a magazine M provided with a right angle flange *b* forming a case and covering a part of the disc D in the example but capable, in certain cases, of covering it entirely. Said magazine is secured to a handle *p* made of suitably cambered wire and fixed for example by soldering. On the end of said handle is pivoted the rod *t* of a pusher P which is intended to penetrate into the magazine and press against the disc D the substance to be grated. A rest *r*, which is moreover optional and is also made of wire and fixed to the magazine, enables the apparatus to be rested on a receptacle.

The disc D is driven by its centre by means of a suitably guided crank *m*. Said crank is located on the same side as the pusher in Fig. 1. It may also be located below said pusher (Fig. 3), thereby effecting a saving of metal by reducing the length of the axle. Finally, the axle may be completely eliminated (Fig. 4), the crank *m* in that case being radially fixed under the disc D. It is necessary to provide for said disc guide means, the various embodiments of which will be described in detail hereinafter.

Fig. 5 shows a variant of construction in which the case *b* completely covers the disc. This arrangement enables, amongst other advantages, the feet R to be adopted by means of which the apparatus can be rested on a table.

Figs. 6 to 8 show diagrammatically the three positions which the magazine may occupy. In Fig. 6 it is located on the line of the centres AO and between said centres; in Fig. 7 it is located on this same line, but outside. In this case it is necessary for the stem of the pusher to be subdivided into two arms on either side of the axle O in order to enable the axle of the crank to pass.

Finally, in Fig. 8 the magazine is inclined relatively to the line AO; by means of this arrangement, the pusher is reinforced over its entire length and the bending moment is reduced during operation, thereby preventing any deformation which is detrimental to the efficiency of the apparatus.

The symmetrical arrangement of the magazine could obviously be adopted with the same advantage.

Figs. 9 to 14 show diagrammatically in axial section and without this being in any way limitative in character, six constructions of discs forming graters and which are made of thin sheet metal; they are provided with a turned over edge *d* which may be non-parallel to the axis. That of Fig. 14 is moreover provided with a flat peripheral ring *e*.

In order to increase their rigidity, said discs are provided according to the invention, with straight radial ribs *f* (Fig. 15) or curved radial ribs f_1 (Fig. 16). The curved ribs are obviously of greater length and enable the number of perforations *g* to be increased, their alignment following that of the ribs.

According to the invention, the disc, which is again held by its centre, is held and guided by at least one point of its periphery; the peripheral guiding points are so arranged that the magazine, which forms the centre of application of the pressures, is located in the zone between said points and the centre of the disc.

In Figs. 17 and 18, the peripheral guiding means for the disc comprises a hook *h* fixed on the case *b*; the disc is placed in position by moving it in the direction of the arrow F.

In Figs. 19 and 20, the case carries two hooks h_1, h_2.

In Figs. 21 and 22, the case is secured to a lower gutter *i*.

The fraction of the edge of the case on which the hooks are fixed or that which is secured to the gutter is at the most equal to a semi-circumference so as to enable the disc to be placed in position and removed.

The hooks may also be distributed over the entire periphery of the case when said case completely covers the disc; it is only necessary for one or more of them to be retractably mounted in order to enable the disc to be mounted.

The disc grater shown in Figs. 23 to 35 essentially comprises a thin sheet metal magazine M provided with two annular grooves 11, 12 which project outwardly, said magazine being secured by its base to a flat perpendicular portion 13 which is limited by a fraction of a low annular crown 14. Said crown is secured to three hooks 15 serving as peripheral bearing points supporting the disc during the operation of the grater, as will appear hereinafter.

Between the annular projection 12 and the flat portion 13 is fixed, for example by electric spot welds, a rolled sheet metal tail *p*, on the end of which is hinged, by means of a pin 16, the end of the rod *t* formed integral with the pusher P by stamping and cambering a metal sheet. The cross-sections of the rod and of the pusher are shown in section respectively in Figs. 30 and 31.

On the external wall of the magazine is fixed, for example by electric spot welding, a sheet metal part 17 of generally rectangular shape, the upper end of which is turned over at right angles at 18 and provided with a hole 19 adapted to receive the axle *a* of the crank. The lower end, which is of greater width, is turned over at right angles at 20 and provided with a hole 21 coaxial to the hole 19, whereas the side edges are folded as shown in Fig. 27, so as to form two guideways 22 which are continued by two parallel sides 23.

The part 17 also has at its medial part a punched out tongue 24 which is curved outwardly so as to form a spring and hold the axle of the crank engaged in the holes 19 and 21 of the supports 18 and 20. Finally, the metal sheet 17 is provided with a transverse corrugation 25 forming with the wall of the magazine M a housing in which is inserted and fixed by welding (Figs. 23 and 28) one of the ends of a rest *r* made of wire and shaped as shown in the figures. The other end of said wire is engaged and held in a similar manner in the housing formed by a corrugation 26 of a metal strip 27 fixed to the base of the magazine.

The disc D4 (Figs. 24, 32 and 33) is made of thin sheet metal provided with an edge 28 turned over at right angles. It is provided with ribs f_4 arranged in star formation and evenly distributed and with perforations g_4 which are located between the ribs and which are provided, in a known manner, with a projecting edge which cuts the vegetables and other food.

The disc D4 is secured to a concentric cylindrical cup 29 which is provided at its upper part with a collar 30 turned over at right angles, and at its base with a central hole 31 of elongated shape adapted to receive the end 32 of same cross-section of the shaft a of the crank which is thus rotarily fixed to the disc. Said disc is furthermore secured, by its lower face, to a concentric cup 33 of flared shape, which prevents the particles of food from reaching the shaft.

It should be noted that the distance between the lower faces of the collar 30 and the disc is substantially equal to that between the upper faces of the guideways 22 and the hooks 15. Similarly, the distance between the walls 23 preferably corresponds substantially to the diameter of the cup 29.

Assembling is effected by inserting the edges of the collar 30 in the slideways 22; the side wall of the cup 29 is centered by means of the walls 23, whereas the disc rests with its edge on the upper face of the hooks 15. The end of the shaft a of the crank is then engaged in the perforations of the supports 18 and 19 then in the elongated hole 31 of the disc; the crank is locked by the lateral pressure exerted on the shaft by the punched out portion 24 forming a spring.

The thin sheet metal disc which is reinforced by its turned over edge and by the star-shaped ribs, is held both at its centre and at three points of its periphery corresponding to the hooks, it thus withstands without deformation the pressure exerted by the pusher inside the quadrilateral thus formed.

I claim:

1. A kitchen grater comprising in combination a feeder receptacle having a top opening and a bottom opening; a grater disc extending in operative position across said bottom opening; supporting means on said feeder receptacle slidably supporting said grater disc in operative position along the edge thereof at a plurality of points of its periphery located along said edge of said grater disc within an arc not exceeding 180°, so that said grater disc can be removed from said operative position by sliding in its own plane; and means associated with said feeder receptacle and movable between engaged blocking position engaging said grater disc and preventing sliding of the same out of its operative position, and disengaged releasing position spaced from said grater disc and permitting sliding of the same out of its operative position.

2. A kitchen grater comprising in combination a feeder receptacle having a top opening and a bottom opening; a grater disc extending in operative position across said bottom opening; supporting means on said feeder receptacle slidably supporting said grater disc in operative position along the edge thereof at a plurality of points of its periphery located along said edge of said grater disc within an arc not exceeding 180°, so that said grater disc can be removed from said operative position by sliding in its own plane; and a member removably mounted on said feeder receptacle so as to engage in mounted position said grater disc and prevent sliding of the same out of its operative position and to disengage said grater disc, when removed from said feeder receptacle, and permit sliding of said grater disc out of its operative position.

3. A kitchen grater comprising in combination a feeder receptacle having a top opening and a bottom opening; a grater disc; supporting means on said feeder receptacle turnably and slidably supporting said grater disc in operative position extending across the bottom opening of said receptacle so that said grater disc can be removed from said operative position by sliding in its own plane; a turning member for said grater disc journalled to said feeder receptacle turnable about an axis passing through the center of said grater disc when the same is in its operative position and normal to the plane of such grater disc, said turning member having an end portion projecting toward said grater disc; and a disengageable cooperative connection between said end portion of said turning member and said grater disc by which said turning member engages said grater disc at its center, when moved toward said grater disc, preventing sliding of the same out of its operative position.

4. A kitchen grater comprising in combination a feeder receptacle having a top opening and a bottom opening; a grater disc; supporting means on said feeder receptacle turnably and slidably supporting said grater disc in operative position extending across the bottom opening of said receptacle so that said grater disc can be removed from said operative position by sliding in its own plane; journal means having an axis passing through the center of said grater disc and being normal to the same when said grater disc is in operative position; a turning member slidably journalled in said journal means and having an end portion projecting toward said grater disc; and a disengageable cooperative connection between said end portion of said turning member and said grater disc by which said turning member engages said grater disc at its center, when moved toward said grater disc, preventing sliding of the same out of its operative position.

5. A kitchen grater comprising in combination a feeder receptacle having a top opening and a bottom opening; a grater disc; arcuate supporting means on said feeder receptacle turnably and slidably supporting said grater disc on opposite sides thereof along a portion of less than 180° of its periphery in operative position extending across the bottom opening of said receptacle so that said grater disc can be removed from said operative position only by sliding in its own plane; journal means having an axis passing through the center of said grater disc and being normal to the same when said grater disc is in operative position; a turning member slidably journalled in said journal means and having an end portion projecting toward said grater disc; and a disengageable cooperative connection between said end portion of said turning member and said grater disc by which said turning member engages said grater disc at its center, preventing sliding of the same out of its operative position.

6. A kitchen grater comprising in combination a feeder receptacle having a top opening and a bottom opening; a grater disc extending in operative position across said bottom opening; arcuate supporting means on said feeder receptacle slidably supporting said grater disc in

operative position along the edge thereof at a plurality of points of its periphery located along said edge of said grater disc within an arc not exceeding 180°, so that said grater disc can be removed from said operative position by sliding in its own plane; and means associated with said feeder receptacle and movable between engaged blocking position engaging said grater disc and preventing sliding of the same out of its operative position, and disengaged releasing position spaced from said grater disc and permitting sliding of the same out of its operative position.

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