



(51) International Patent Classification:

A47J 42/00 (2006.01) A47J 42/38 (2006.01)
A47J 42/04 (2006.01) A47J 42/40 (2006.01)
A47J 42/24 (2006.01)

(21) International Application Number:

PCT/CN2010/079617

(22) International Filing Date:

9 December 2010 (09.12.2010)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

200920266651.X 10 December 2009 (10.12.2009) CN

(71) Applicant (for all designated States except US): **LENG-JER METAL & PLASTIC CO., LTD.** [CN/CN]; 188 Industrial Zone, Ping-Shen Management Area, Tang Hsia Chen Dongguan, Guangdong 523728 (CN).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **WU, Ming-Feng** [CN/CN]; No.2-1, Sinsin Rd., South District, Tainan, Taiwan (CN).

(74) Agent: **NTD PATENT & TRADEMARK AGENCY LIMITED BEIJING OFFICE**; 10th Floor, Block A, Investment Plaza, 27 Jinrongdajie, Beijing 100033 (CN).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH,

[Continued on next page]

(54) Title: PEPPER MILL

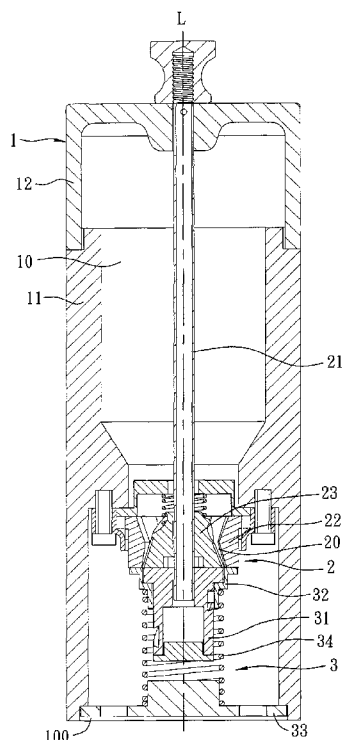


FIG. 1

(57) Abstract: A pepper mill includes a grinding unit (2) and a closure unit (3). The grinding unit (2) is disposed in a container body (11), and includes a rotatable coupling shaft (21), an inner grinding seat (23) that is coupled co-rotatably to the coupling shaft (21), and a stationary outer grinding seat (22) that surrounds the inner grinding seat (23). The closure unit (3) includes a rotatable member (31) that is coupled co-rotatably to the coupling shaft (21), and a closure member (32) that engages rotatably and that is movable relative to the rotatable member (31). The coupling shaft (21) is operable to rotate the inner grinding seat (23) and the rotatable member (31) relative to the outer grinding seat (22), thereby driving the closure member (32) to move from a closed position, where the discharge of the ground pepper is blocked, to an opened position, where the discharge of the ground pepper is permitted.



GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG,
ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ,
TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,
EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU,
LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,

SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

PEPPER MILL

BACKGROUND OF THE INVENTION

1. Field of the Invention

5 The invention relates to a grinder, more particularly to a pepper mill.

2. Description of the Related Art

10 A conventional pepper mill generally has a receiving unit for receiving peppercorns therein, and a grinding unit disposed in a bottom part of the receiving unit for grinding the peppercorns into ground pepper. The grinding unit generally includes a stationary annular outer grinding seat, and an inner grinding seat disposed within the outer grinding seat, cooperating with the outer grinding seat to define a grinding opening therebetween, and rotatable relative to the outer grinding seat for grinding the peppercorns into ground pepper discharged through the grinding opening.

15 However, after use, when the conventional pepper mill is put on a cabinet or a dining table, a portion of residual ground pepper will fall out of the conventional pepper mill and scatter on the cabinet or the dining table, thereby making the cabinet or the dining table untidy.

SUMMARY OF THE INVENTION

20 Therefore, the object of the present invention is to provide a pepper mill capable of preventing residual ground pepper from falling out therefrom.

30 Accordingly, a pepper mill of the present invention comprises a receiving unit, a grinding unit and a closure unit. The receiving unit includes a container body that surrounds a vertical axis, that defines a receiving space for receiving peppercorns, and that has a discharge end for discharging ground pepper. The grinding unit is disposed in the receiving space,

and includes a coupling shaft that extends rotatably along the vertical axis, an inner grinding seat that is coupled co-rotatably to the coupling shaft, and a stationary outer grinding seat that surrounds the inner grinding seat and that cooperates with the inner grinding seat to define a grinding space therebetween. The closure unit includes a rotatable member that is disposed between the grinding unit and the discharge end of the container body and that is coupled co-rotatably to the coupling shaft, and a closure member that engages rotatably and that is movable vertically relative to the rotatable member. The coupling shaft is rotatably operable to rotate the inner grinding seat and the rotatable member relative to the outer grinding seat, thereby driving the closure member to move downwardly relative to the rotatable member along the axis from a closed position, where discharge of the ground pepper through the discharge end of the container body is blocked, to an opened position, where discharge of the ground pepper through the discharge end of the container body is permitted.

BRIEF DESCRIPTION OF THE DRAWINGS

Other features and advantages of the present invention will become apparent in the following detailed description of the preferred embodiment with reference to the accompanying drawings, of which:

Fig. 1 is a sectional view of a preferred embodiment of a pepper mill according to the invention;

Fig. 2 is a fragmentary exploded perspective view of a grinding unit and a closure unit of the preferred embodiment;

Fig. 3 is an enlarged fragmentary sectional view of the preferred embodiment, illustrating a closure member at a closed position; and

Fig. 4 is a view similar to Fig. 3, but illustrating the

closure member at an opened position.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

As shown in Figures 1 to 3, the preferred embodiment of a pepper mill according to the present invention comprises
5 a receiving unit 1, a grinding unit 2 and a closure unit 3.

The receiving unit 1 includes a container body 11 that surrounds a vertical axis (L), that defines a receiving space 10 for receiving peppercorns (not shown), and that has a discharge end 100 for discharging ground pepper. The receiving
10 unit 1 further includes a cover member 12 coupled rotatably to a top end of the container body 11 for closing a top end of the receiving space 10.

The grinding unit 2 is disposed in a lower portion of the receiving space 10, and includes a coupling shaft 21, an inner
15 grinding seat 23 and a stationary outer grinding seat 22. The coupling shaft 21 extends rotatably along the vertical axis (L) and is configured to have a rectangular cross-section. The inner grinding seat 23 is coupled co-rotatably to the coupling shaft 21. The outer grinding seat 22 is mounted to
20 the container body 11, surrounds the inner grinding seat 22, and cooperates with the inner grinding seat 23 to define a grinding space 20 therebetween. The coupling shaft 21 has an upper portion coupled co-rotatably to the cover member 12, and a lower portion coupled co-rotatably to and extending
25 through the inner grinding seat 23.

The closure unit 3 includes a rotatable member 31, a closure member 32, a stationary member 33 and a resilient member 34.

The rotatable member 31 is disposed between the grinding unit 2 and the discharge end 100 of the container body 11,
30 and is coupled co-rotatably to a bottom end of the coupling shaft 21. The rotatable member 31 includes a round base wall 311 that is formed with a rectangular shaft hole 313 into which

the bottom end of the coupling shaft 21 fittingly extends (i.e., the bottom end of the coupling shaft 21 engages fittingly the shaft hole 313), and a surrounding wall 312 that extends downwardly from a periphery of the base wall 311. The surrounding wall 312 has an outer surrounding surface formed with three equi-angularly spaced-apart spiral grooves 316, and three spaced-apart restoring grooves 315 that extend parallel to the vertical axis (L) and that are arranged alternately with the spiral grooves 316. Each of the spiral grooves 316 has an upper groove end 317 and a lower groove end 318 formed below the upper groove end 317. Each of the restoring grooves 315 has a top groove end that is in spatial communication with the upper groove end 317 of a respective one of the spiral grooves 316, and a bottom groove end that is in spatial communication with the lower groove end 318 of an adjacent one of the spiral groove grooves 316 (i.e., the top and bottom groove ends of each restoring groove 315 are not aligned with each other in the axial direction).

The closure member 32 includes an annular first wall segment 321 and a second wall segment 322. The first wall segment 321 is disposed between the grinding unit 2 and the discharge end 100 of the container body 10. The second wall segment 322 extends downwardly from the first wall segment 321, surrounds the rotatable member 31, and has an inner surrounding surface that confronts the outer surrounding surface of the surrounding wall 312 of the rotatable member 31. The second wall segment 322 has a step-shaped configuration with an outer diameter smaller than that of the first wall segment 321. The closure member 32 is formed with three protrusions 324 (only two are visible in Figure 2) engaging respectively and slidably the spiral grooves 316 of the rotatable member 31, such that the closure member 32 is rotatable relative to the rotatable member

31, and is movable vertically relative to the rotatable member 31 along the axis (L) between a closed position (see Figure 3), where discharge of the ground pepper through the discharge end 100 of the container body 10 is blocked by the closure member 32, and an opened position (Figure 4), where discharge of the ground pepper through the discharge end 100 is permitted by the closure member 32.

The stationary member 33 has a plate portion 331 mounted in the discharge end 100 of the container body 10 and formed with a plurality of equi-angularly spaced-apart through holes 333, and a projecting portion 332 projecting upwardly from the plate portion 331.

The resilient member 34 has opposite first and second end sections 341, 342 that are sleeved fittingly, respectively and resiliently on the second wall segment 322 of the closure member 32 and the projecting portion 332 of the stationary member 33 for biasing the closure member 32 toward the closed position.

Before use, the closure member 32 is at the closed position, while the protrusions 324 of the closure member 32 are disposed respectively at the upper groove ends 317 of the spiral grooves 316 of the rotatable member 31. In use, the cover member 12 is rotated together with the coupling shaft 21 to drive rotation of the inner grinding seat 23 relative to the outer grinding seat 22 for grinding peppercorns. During the rotation of the cover member 12, the closure member 32 is driven to move downwardly relative to the rotatable member 31 along the axis (L) through the engagement between the protrusions 324 and the spiral grooves 316 from the closed position to the opened position, while the protrusions 324 travel from the corresponding upper groove ends 317 to the lower groove ends 318 of the spiral grooves 316. Consequently, the ground pepper

can be discharged out of the discharge end 100 through the through holes 333 of the stationary member 33. At this time, the resilient member 34 is compressed.

When the cover member 12 is released, an upward restoring
5 force of the resilient member 34 is applied to the closure member 32 to result in an upward movement of the closure member 32 along the axis (L) from the opened position to the closed position. Since the lower groove ends 318 of the spiral grooves 316 are in spatial communication with the bottom groove ends
10 of the restoring grooves 315, the protrusions 324 are moved from the corresponding bottom groove ends of the restoring grooves 315 to the top groove ends of the restoring grooves 315, respectively, during the movement of the closure member 32 from the opened position to the closed position. Therefore,
15 after use, the closure member 32 can effectively prevent residual ground pepper from falling out of the discharge end 100.

It should be noted that, positions of the protrusions 324 and the grooves for engaging the protrusions 324, including
20 the spiral grooves 316 and the restoring grooves 315, may be interchanged in other embodiments of this invention, i.e., the spiral grooves 316 and the restoring grooves 315 may be formed in the inner surrounding surface of the second wall segment 322 of the closure member 32, while the protrusions
25 324 may be provided on the outer surrounding surface of the surrounding wall 312 of the rotatable member 31. Moreover, the number of the protrusions 324 as well as the corresponding pairs of the spiral grooves 316 and the restoring grooves 315 may vary in other embodiments of this invention.

30 While the present invention has been described in connection with what is considered the most practical and preferred embodiment, it is understood that this invention is not limited

to the disclosed embodiment but is intended to cover various arrangements included within the spirit and scope of the broadest interpretation so as to encompass all such modifications and equivalent arrangements.

Claims:

1. A pepper mill comprising:

a receiving unit including a container body that surrounds a vertical axis, that defines a receiving space for receiving
5 peppercorns, and that has a discharge end for discharging ground pepper;

a grinding unit disposed in said receiving space, and including

10 a coupling shaft that extends rotatably along the vertical axis,

an inner grinding seat that is coupled co-rotatably to said coupling shaft, and

a stationary outer grinding seat that surrounds said inner grinding seat and that cooperates with said inner grinding
15 seat to define a grinding space therebetween; and

a closure unit including

a rotatable member that is disposed between said grinding unit and said discharge end of said container body, and that is coupled co-rotatably to said coupling shaft, and

20 a closure member that engages rotatably and that is movable vertically relative to said rotatable member;

wherein said coupling shaft is rotatably operable to rotate said inner grinding seat and said rotatable member relative to said outer grinding seat, thereby driving said closure member
25 to move downwardly relative to said rotatable member along the axis from a closed position, where discharge of the ground pepper through said discharge end of said container body is blocked, to an opened position, where discharge of the ground pepper through said discharge end of said container body is
30 permitted.

2. The pepper mill as claimed in claim 1, wherein:

said rotatable member of said closure unit is formed with

a spiral groove that has an upper groove end and a lower groove end formed below said upper groove end; and

said closure member of said closure unit is formed with a protrusion that engages slidably said spiral groove of said rotatable member, said protrusion being disposed adjacent to said upper groove end when said closure member is at the closed position, and being disposed adjacent to said lower groove end when said closure member is at the opened position.

3. The pepper mill as claimed in claim 1, wherein:

said rotatable member of said closure unit includes a base wall formed with a shaft hole that engages fittingly said coupling shaft, and a surrounding wall extending downwardly from a periphery of said base wall; and

said closure member of said closure unit includes a first wall segment disposed between said grinding unit and said discharge end of said container body, and a second wall segment extending downwardly from said first wall segment, surrounding said rotatable member, and having an inner surrounding surface that engages rotatably and movably said surrounding wall of said rotatable member.

4. The pepper mill as claimed in claim 3, wherein:

said surrounding wall of said rotatable member has an outer surrounding surface confronting said inner surrounding surface of said second wall segment of said closure member, and formed with

a plurality of spiral grooves, each of which has an upper groove end and a lower groove end formed below said upper groove end, and

a plurality of angularly spaced-apart restoring grooves extending parallel to the vertical axis and arranged alternately with said spiral grooves, each of said restoring

grooves having a top groove end that is in spatial communication with said upper groove end of a respective one of said spiral grooves, and a bottom groove end that is in spatial communication with said lower groove end of an adjacent one of said spiral grooves;

said inner surrounding surface of said second wall segment of said closure member is formed with a plurality of protrusions engaging respectively and slidably said spiral grooves.

5. The pepper mill as claimed in claim 1, wherein said closure unit further includes:

a stationary member mounted in said discharge end of said container body; and

a resilient member having opposite first and second end sections that are connected respectively and resiliently to said closure member and said stationary member for biasing said closure member toward the closed position.

6. The pepper mill as claimed in claim 5, wherein said stationary member has:

a plate portion mounted in said discharge end of said container body and formed with a through hole to permit discharge of the ground pepper through said discharge end of said container body; and

a projecting portion projecting upwardly from said plate portion, and sleeved fittingly in said second end section of said resilient member.

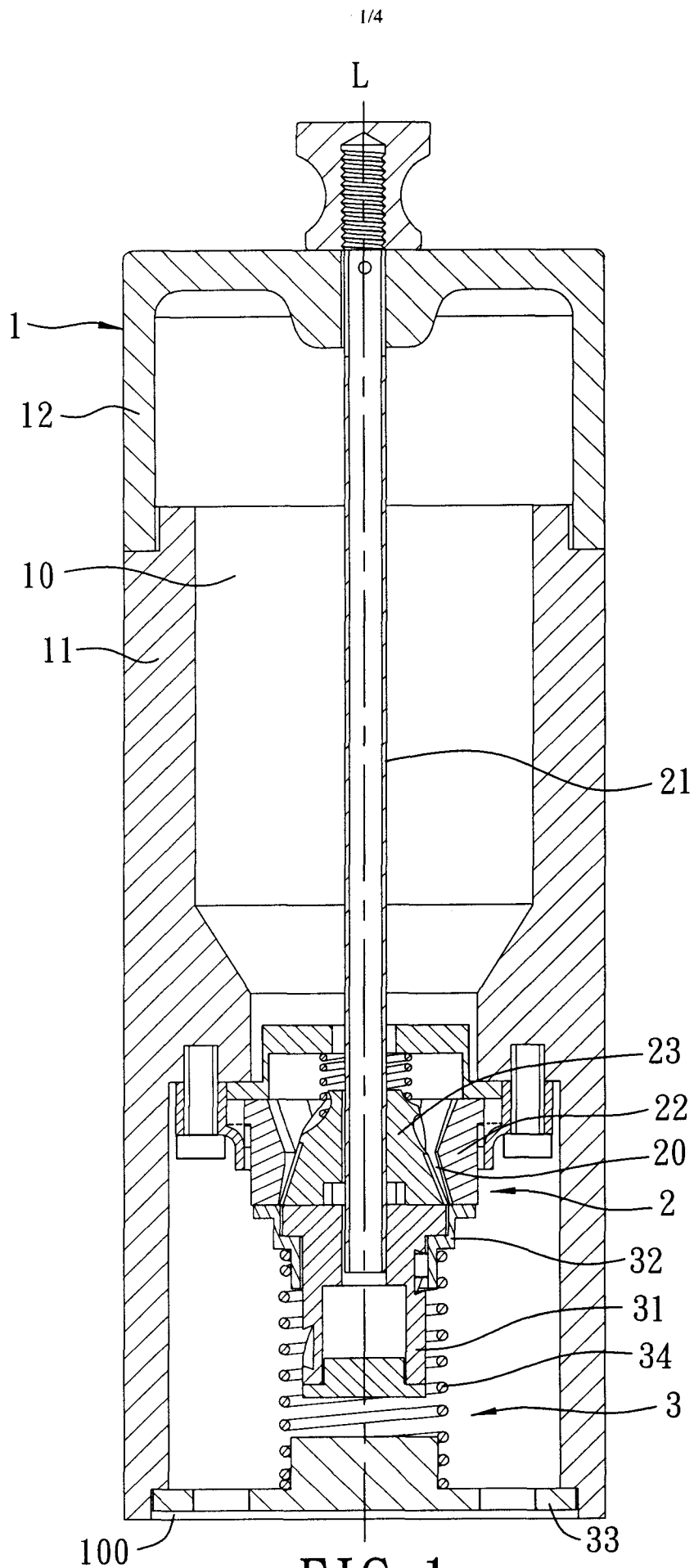


FIG. 1

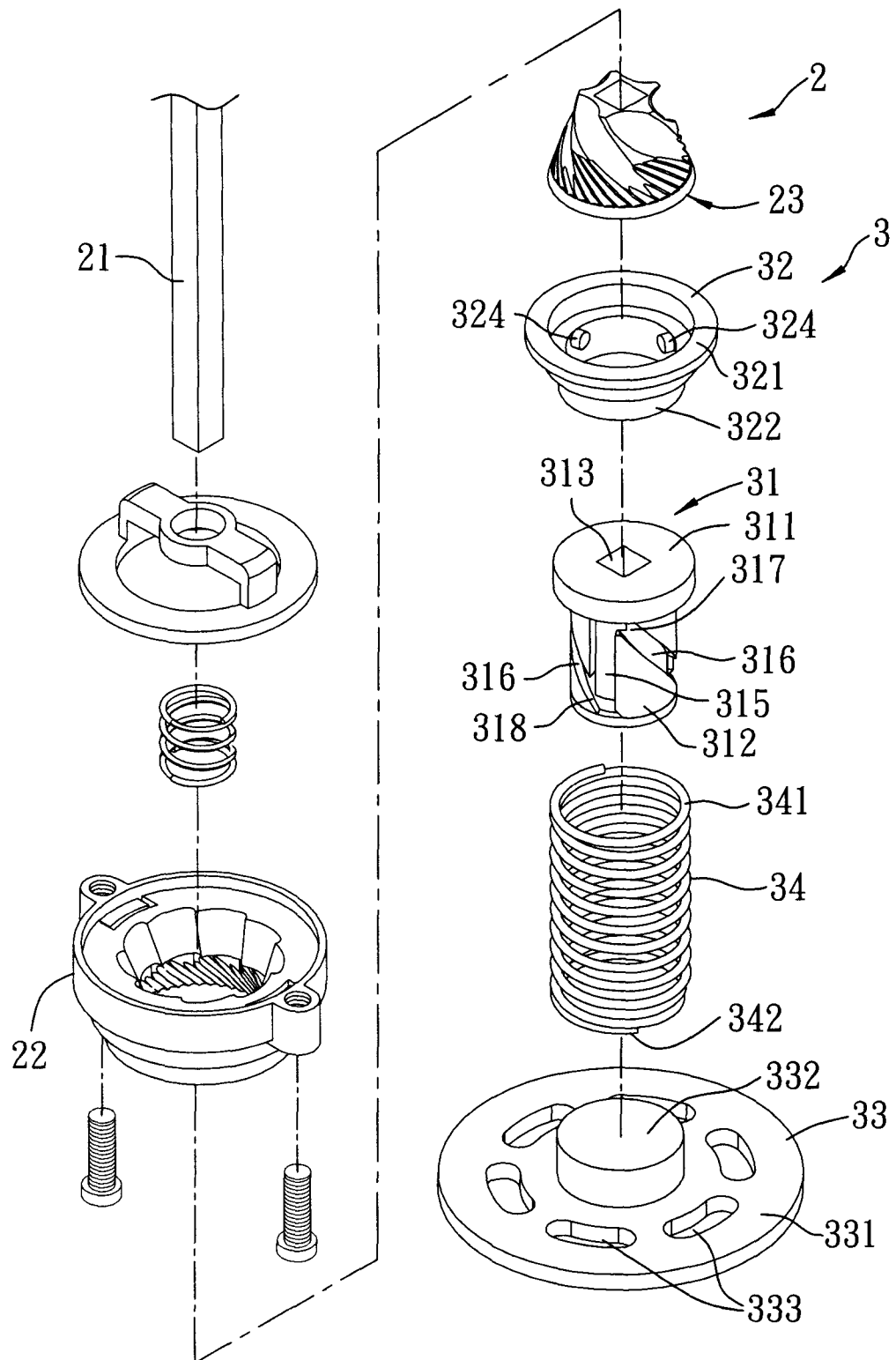


FIG. 2

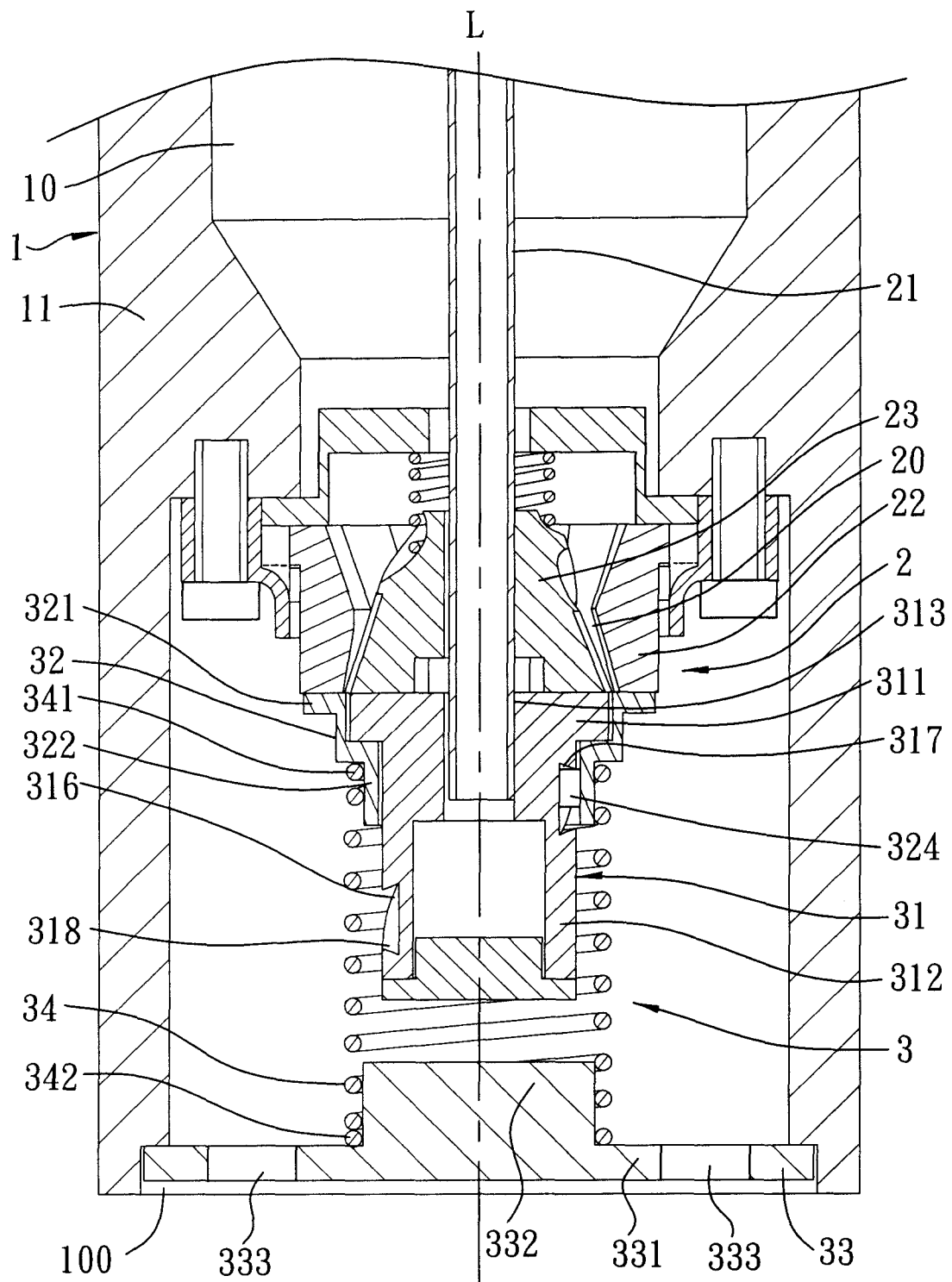


FIG. 3

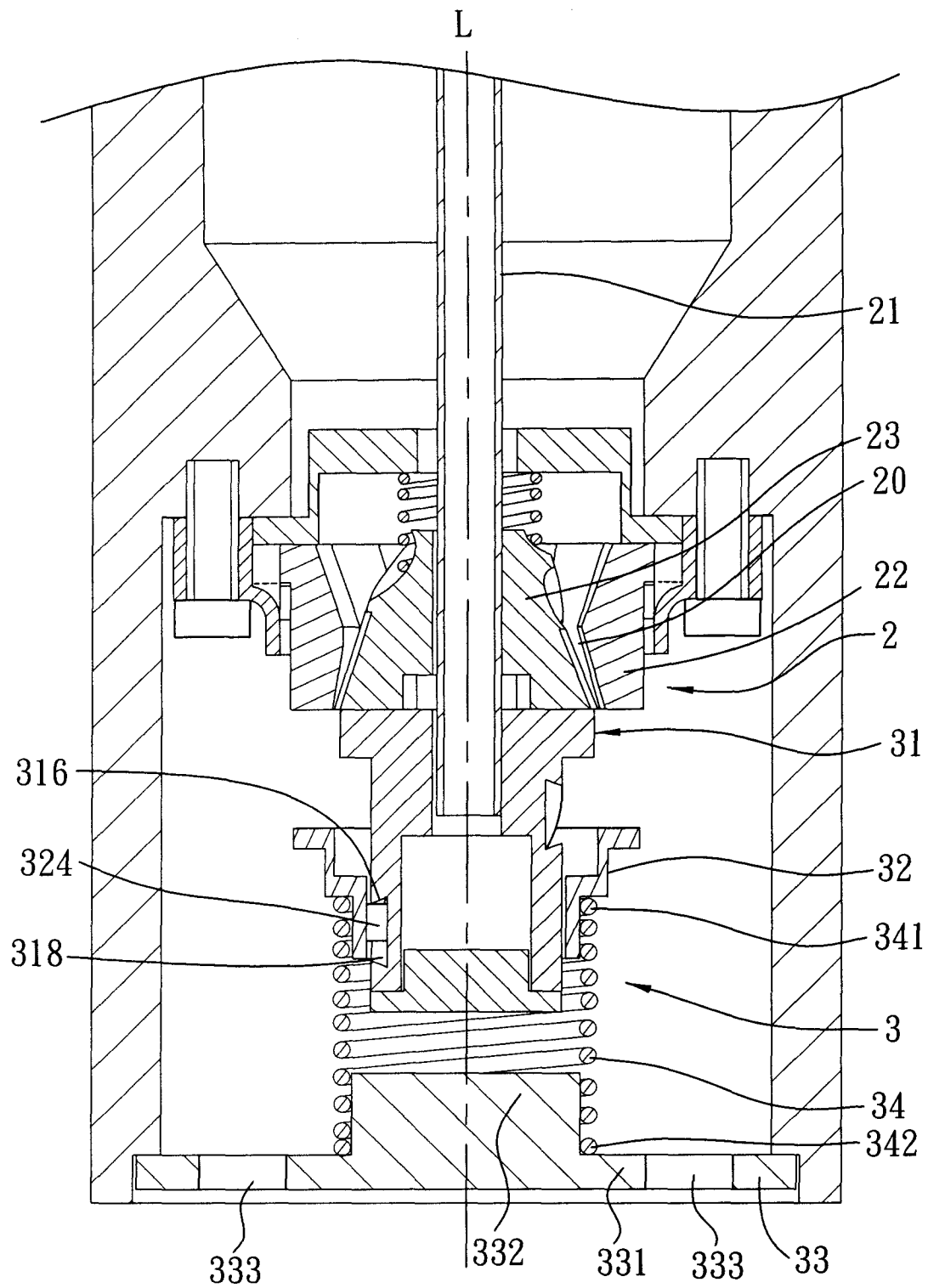


FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2010/079617

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: A47J42

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNPAT, WPI, EPODOC: pepper, mill, close, closure, lengjer, yienn lih

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN201591476U (YINGLI ENTERPRISE CO LTD) 29 Sept. 2010 (29.09.2010) Paragraph 4 – paragraph 33 of the description, figures 1-4	1-6
PX	CN201631032U ((YINGLI ENTERPRISE CO LTD) 17 Nov. 2010 (17.11.2010) Paragraph 4 – paragraph 31 of the description, figures 1-4	1-6
PA	CN101703373A (DONGGUAN LIANGJIA HARDWARE PLA) 12 May 2010 (12.05.2010) The whole document	1-6

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:	“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
“A” document defining the general state of the art which is not considered to be of particular relevance	“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
“E” earlier application or patent but published on or after the international filing date	“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
“L” document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified)	“&” document member of the same patent family
“O” document referring to an oral disclosure, use, exhibition or other means	
“P” document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 24 Feb. 2011 (24.02.2011)	Date of mailing of the international search report 17 Mar. 2011 (17.03.2011)
Name and mailing address of the ISA/CN The State Intellectual Property Office, the P.R.China 6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China 100088 Facsimile No. 86-10-62019451	Authorized officer LIU, Shikui Telephone No. (86-10)62085842

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2010/079617

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN101579195A (DONGGUAN LIANGJIA HARDWARE PLA) 18 Nov. 2009 (18.11.2009) Page 4-page 9 of the description, figures 1-7	1-6
A	CN2588909Y (WALBEIG GOODS MOBILIZING AG) 03 Dec. 2003 (03.12.2003) The whole document	1-6
PA	US7673828B1 (YIENN LIH ENTPR CO LTD) 09 Mar. 2010 (09.03.2010) The whole document	1-6
PA	GB2468334A (YIENN LIH ENTPR CO LTD) 08 Sept. 2010 (08.09.2010) The whole document	1-6
A	US5897067A (GENIN TRUDEAU & CIE LTEE) 27 Apr. 1999 (27.04.1999) The whole document	1-6
PA	EP2238882A2 (YIENN LIH ENTPR CO LTD) 13 Oct. 2010 (13.10.2010) The whole document	1-6

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2010/079617

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN201591476U	29.09.2010	none	
CN201631032U	17.11.2010	none	
CN101703373A	12.05.2010	none	
CN101579195A	18.11.2009	none	
CN2588909Y	03.12.2003	DE20214170U	13.02.2003
US7673828B1	09.03.2010	none	
GB2468334A	08.09.2010	none	
US5897067A	27.04.1999	WO9848682A1	05.11.1998
		AU7022798A	24.11.1998
		US5897067A	27.04.1999
EP2238882A2	13.10.2010	CA2681073A1	09.08.2010

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2010/079617

A. CLASSIFICATION OF SUBJECT MATTER

A47J 42/00 (2006.01) i

A47J 42/04 (2006.01) i

A47J 42/24 (2006.01) i

A47J 42/38 (2006.01) i

A47J 42/40 (2006.01) i