



(12)

(14)

가

가

가

(22)

(26)가

1

1

2 1  
1/4

3

4a 2  
4b 4a 4b-4b  
4c 4a 4b-4b  
5 가

6

가

7

8 7

9 7

10 7 9  
가 가 3

가

11a 10 가

11b 가

12a 12c

, 7 9

13

14 13 180°

15

13

16

15

17 16

18 16

19 16

20

13

20a 13

21 13

22 13

가

23 13

가

24 23

가

25 23

26  
27 13  
28 27  
29 27

25

가  
가

<  
11 :  
12 :  
14 :  
16 :  
18 :  
20 : 가  
40 :

>

(肺) , 가

(丸劑;pills), (elixir)

가 (消化管;digestive tract) 가

(proteolytic enzyme) 가

(皮下注射;subcutaneous injection)

(systemic drug delivery)

(insulin) (經皮; transdermal), (直腸內; intrarectal), (腔內; intravaginal) (肺)

(鼻腔內; intranasal), (齒槽; alveolar)

(MDI) (liquid nebulizers),

r spray -dried powers) (lyophilized o

가 가 , 가 , 가 , 가

가 , 1 ( ) 가 , 가 , 가

가 가 가 (手持式)

가 가 가 가

1μm 5μm 가 20psig 150psig 가 2Mℓ 25Mℓ 가

가 (丸塊; bolus) 가 /

3,921,637

467172 ( (blister pack)  
) , WO 91/02558 , WO 93/09832 , WO 94/08522 , 4,627,432 , 4,811,731  
, 5,035,237 , 5,048,514 , 4,446,862 3,425,600

4,889,114 4,884,565 , 4,338,931 , 3,991,761 , 4,249,526 , 4,069,819 , 4,995,385 ,  
(loose powder reservoir)가 469814 . WO 90/07351

1983 3 14-16 Aber

deen Proving Ground

(Dry Dispersion with Sonic Velocity Nozzles)", Witham and Gates

가 4,807,814

(Pittman and Mason)(1986) C4 C-41 C51  
( 2)

SU 628930 ( ) 가  
SU 1003926 ( ) 가 가  
(Bubrik and Zhelonkina) "  
(Ejector Feeders for Pneumatic Transport Systems"(1978)

Zholab and Koval(1979) 6 13-16 가

Powder Technology 302-313 Bohnet(1984) "가 / "

1988 3 , Powder and Bulk Engineering Fox and Westawag(1988) 33-36  
가

NL 7712041 ( ) 가  
EP 347 779 가  
EP 490 797 가

3,994,421 가  
J. Aerosol med. 7 49-75 Byron and Patton(1994)

1

가

가

80%, 90%) ( 70%,  
(bulk)" ( )

1µm 5µm

가

1

2

1 가 (fluidization air) (formulations)

(流入端) 가 ( ) (流出端)

2 가 가 ( )

70%, 80%, 90%) (1) (2)

20 psig, 14.7 psig 20 150 psig 40 80 psig 15 psig, ( S T P ) (吸氣)

P) 4Mℓ 15Mℓ 가 (negative) 1:2 1:4( 가 : ) ( S T P ) (plu

me capture chamber)

가 / 가

5, 10, 20 가 (流入端) 가 (流出端)

) " " 가 (enclosure) 가

) 가 ( ), 가 가 ,2 가

가 ( )

" (plume)" 가 (jets) (ejector tubes) 가 가

가 " 가 ( , 가 )

) ( , ) (carriage)

( , )

가  
가 , 가 / 가 가  
2  
(displacement air)  
(dispersión station) 가  
(內腔; lumen)  
. 12.5 ° 65 °  
가  
90% ) , ( 80%,  
가 , ( 가 ) , 가 2  
( ) 가  
(throat) 0.5mm<sup>2</sup> (A<sub>1</sub>) 0.05mm<sup>2</sup> 0.3mm<sup>2</sup> , 가 ( )  
(mixing volume) 0.6mm<sup>2</sup> (A<sub>2</sub>) 0.6mm<sup>2</sup> 11mm<sup>2</sup> 0.5mm 3mm  
0.6mm<sup>2</sup> (A<sub>3</sub>) 15mm<sup>2</sup> (A<sub>4</sub>)  
(diffuser tube)  
가 , 0.5cm 5cm 2 ° 10 °  
( 가 ) 4 가 가 가 가  
(flow-directing member), 가  
가 가 가 가 가  
가 가 가 가 가  
( valve poppet )  
( toggle link ) 가  
( linkage ) 가  
tracted position) (charged position) (r  
가 가  
( pawl ) ( rack )  
가 가  
가





가 ) 2Mℓ 25Mℓ가 가 , 4Mℓ 15Mℓ가 가 (14) S T P (18) 2Mℓ 100Mℓ가 , 4Mℓ 60Mℓ (14)

가 (20) , , 가 WO 90/07351 가

가 ,가 (10) , 2 (14) (18)

가 (30) (30) (遠位端; distal end) (32)

, (14) (internal volume) (30)

( 50Mℓ 1000Mℓ , 100Mℓ 750Mℓ 07/910,048 ) (30)

7 9 (34) , (30) (32)

, (36) , 2 (30)

(14) 가 가 (30)

가 (20) . 가 (12) (30)

(32) , 가 가 (alveolar r

egion) 가 (14) (14) (16)

2 (40) , (44) (30) (12)

(40) (同軸管) (42) (18)

가 (40) (內腔)(46) (16) (14)

(46) (A2)( 4a) 가 (1)

4) (20) , 가 (annular plenum)(52) (50) (46)

가 (52) 가 (40) (46)

가 (54) 가 (54) (46)

, 가 (18) (58)

(46) (18) (A2)( 4a) 0.5mm<sup>2</sup> 10mm<sup>2</sup>, 1mm<sup>2</sup> 4mm<sup>2</sup>

, (46)( 4a) (A4) (A<sub>2</sub>) , 0.6mm<sup>2</sup> 15mm<sup>2</sup>

(46)

4a ( ) (A<sub>3</sub>) (L<sub>2</sub>) 가 (60) (40) (

18) (A<sub>3</sub>) (A<sub>2</sub>) ( )

(60) 1 5 , 0.5mm 2mm 11mm<sup>2</sup> (L<sub>2</sub>) ( )

가 (54)( 4b) 3 , 4 , 4 (54')가 4c

, ( )

5 , 가 (72) (70) ( ) , ( ) ( )

( ) 12.5° 65° , 25° 40°

5 가 (72) 6 (82)

(80) , ( ) ( )

, (82) 가 가 (A<sub>2</sub>)

(80) (W) 0.005mm 0.1mm (92)

(16) (14) (12) (16) (92) (90)( 3) (40)

, 7 10 , 가 (90) (90) (12)

(90) (94)(6) (40) 가 (90) (30) (30)  
 (14) (96) (44) (44) (95)가  
 (12) (44) (96) (98) (44) (94) 80%,  
 (30) (32) (40) (16) (94)  
 (12) (14) (46)  
 90%) (100) 7 9 (100) (14)  
 100) 1 (14) (100) (14)  
 (100) (102), 가 (104), (106), (108),  
 (110), (114) 가 (112) (106) (104)  
 (100) (106) (14)  
 (118) (114) (116) (118) (116) (14)  
 8 가 (104) (120)  
 100mm<sup>2</sup> , 1 10 8 5mm<sup>2</sup> 150mm<sup>2</sup> 40mm<sup>2</sup>  
 (120) 가 가 가  
 가 가 가 가 가  
 (120) (102) (122)( 9) 가  
 (124) (126) (120) 가  
 " (chase)" (120) (110)  
 (108) (128) 9 가 (126) (102) (100)  
 (126) (110) 가 (106) (11)  
 (102) (108) (130) (106) 9  
 (102)( 7) (130) (114) 9  
 (114) 가 (14) (100)  
 10 11a , 7 9 가 (140)  
 (140) (106) 11a (140)  
 (144) (142) (144) 4  
 (146) (104) (146)  
 (144) (本管; host tube)  
 (150) (152) (150)가 (140)  
 (100) 가 (112) 1 가 10  
 11b 2 가 (151)  
 (153)가 (151)  
 가 (151)

12a 12c , 7 9 (100) (R)가 12a 가 (112) (106)  
 ) (104) .가 (112) (R) 가 (204) 가 (112) (200) (lid flap)  
 (R)가 , (106) 가 12b , (114) .  
 (210) (106) , (R) , (120) ,  
 (120) (202) ) 가 , (120)  
 (106) 가 , 가 (212)  
 , 12c (120) (126) (128)  
 (126) 가 (110)가 가 (120) (R)  
 ,  
 13 (300) (300) (302)  
 (302) 가 (304) (302) 가 (100)  
 (306)가 . (306) 7 9 (300) (33  
 ) , (304) (304)  
 8) (306) (302) 가 (342)( 20)  
 (340) (304) (304)가 (302) (304)가  
 ( 20 ) ( 14 ) (302) , (304)가  
 (304) (304) 가 가  
 (302) (304) (304)  
 (308, 310) . (308, 310) (302) (304) (304)  
 (308, 310) 가 (316, 318) (304)  
 (322) (324) (320) (308, 310) ( )  
 ) (322) (308) (304)가 ,  
 (310) (304)가 V (308, 310) ( )  
 304) (322) (326, 328) . V (326, 328)  
 (304) (304) 가 가  
 (304) (310) (304) (302) (304)  
 (304) (302) (304) (304)  
 , (304) (304) (308)  
 (302) (304) (308)  
 . (304) (304)가  
 (304) (302) (304)가  
 (331) (330)( 14 )가 (304)  
 (fire button)(418)( 21 )  
 (320) (320) (324) (304)가 (302) (324)  
 (302) (302) (302)가 (302) (304) (3  
 20) (302) , (302) (302) (304) , (324)  
 ) (320) (320) (320) (320) (320) (320)  
 (320) 가 (322) (302) (320)  
 (320) (335)가 (302) , ,  
 (320) (320)  
 5,342,889 , 5,348,995 , 4,719,263

14 (304) (304)가 (330) (344) (344) (304) (344)  
 (304) (306) (330) (346) (304) (346) 가 (304) (344)  
 ) (344)가 (304) 가 (346) (304) (346) 가 (344)  
 (344) (bleed valve) (344) "1 (吹氣)(puff)" 가 가  
 (304) 50Mℓ 750Mℓ, 100Mℓ 250Mℓ "P<sub>1</sub> V<sub>1</sub> = P<sub>2</sub> V<sub>2</sub>, T = "  
 (Boyles' law) 가 (net gas)  
 (346) 8Mℓ 가 가 , 210Mℓ , 8Mℓ 가 0.6 psi 가  
 가 (thin mylar) (petal), (plate)  
 (346)

15 (302) (306)가 (302) (306)  
 ) (306) (348) (348) (306)  
 (keyed portion)(352) (350) (350)가 (306)가  
 (348) (306) (348) (354)가 (354)가 (354)  
 (356) (354) (354) (354)가 (306) (306) (302)  
 (306) (354) (306) (348) (348) (306) (348)  
 ) (354) (306) (348) (306) (348) (306) (348)  
 16 17 (342) (106) 17  
 가 (306) (358) , 가 (360) , (3)  
 62) , (364) , (366), 가 (368) (306)  
 (306) 7 9 (100)  
 (100) (370) (362) (370) (372)  
 (100) (370) (362) (370)가 (342)  
 , (342) (372)가 (372)가 (306)  
 372) 가 (372) (306)  
 21, 23 24 가 가 (372)  
 가 가 가  
 18 19 가 (342) (378) 가 (376) (3)  
 80) (374) (382) (380) (370) (372)가 (376)  
 (376) (342)가 (306)가 (372) (370)  
 (342)가 (376) (184) (362)  
 , 12a 12c (100) (372)가 (376)  
 가 (342) (370) (372)가 (376)  
 가 (368) (374) (342)  
 20 20a (340) (342) (342) (342) (342) (3)  
 80) (374) (374) (375)가 (377)( 21 ) (374)  
 가 (374) (340) (382) (386) (442)( 22 )가  
 (368) ( 19 ) (386) (382) (342) 가  
 40) (380) (380) (302) (386) (382) (304)  
 가 (380) (304) (380) (342)가  
 (300) (304)가 (304) (304) (342)  
 가 (300) (386) (342) 가  
 (300)

21 , 27 , (336) , (338) (388) (300) , 21 (3  
90) , 가 (336) (392)가 (388) (388) (338) , 25 (3  
26 가 , (338)가 (302) (388) (388)가 ( 25 ), ( (390)  
392) (390) (388) (338)가 (302) (388) (388) (396)  
(388) (390) 가 21 가 (394) (388) , 가  
(390) " (duck bill)" (338)가 ,  
(394)가 가 (390) (394) 가 (390)  
(398)( 21 25 ) (400) , 가 19  
(384) (400) (306) (400) (306) (402)  
(400) 가 (400) (400) (306)  
가 (402) , , (402)  
(306) (306) , , (402)  
(302) , , (404)  
(400) 가 (400) , 21 24 , (390)  
(406) , 27 29 (390) 가 (398)  
(400) (406) , (390) (398)  
가 가 (400)가 , (398) (390)  
" (1 ) (full stroke)" 가 , (300)  
(388) (400) (390)  
(338)가 (302) (400)  
(336) (410) (408)( 22 ) ( (404)  
410) (valve reset link)(414) (412) ( 21 24 ). 21 ( (416)  
24 가 , (414) (416) , , (416)  
416) (418) (338)가 (302) , , (414)가 (412)  
25 26 가 (408) (420) , , (414) (422)  
(412) (左側端) (416) (338) (338)가 (418)  
(416) (416) (416) (418)  
(302) , (404) (406) (452)  
( 29 ) , (400) , (388) (392)  
(338)가 (302) (414) (412)  
8) (416) (400) , (38)  
(390) 가 (390) (416) 가 (304)  
(400)가 (418) (416)  
(300) (416) (400) (338)가  
(338)가 (302) (410) (426) (inter  
lock pawl)(424)( 22 ) (338)가 (422) (416)  
(424) (410) (426) , (416) (400)  
(338) (416) (424) (426) 가 (33  
(425) , (306)  
8) 가 (306) (342)  
(400)가 (306) (342)  
가  
22 25 , (302) (338) (336  
) (432) (302) (430) (338) (392,  
408) (434) (392, 408, 430, 434) (338) (302)  
4- (338) (302)  
(400)가 , (338)가 (302) , (3)  
38) (390)  
(338)가 (302) 가 ,

22 가  
(436) 23 가 , (300) (340) (342)  
(440) (370) (372)가 (342) (436)  
(342) (442) (442) (444) (a thumb toggle)(438)  
(436) (342)가 (438) (342) (442) (438) (340)  
) (306) (442) (444)가 25 가 (438) (3)  
06)가 (342) (444)가 (342) (444)가 (306) (438)  
(368) ( 25 ) (442) (342)가 (436) (442)  
(306) (342) (306) (442) (4)  
38) (444) (342) (380)  
(340) (342) (340) (400)  
27 29 (448) (450) (446) (390) (400)  
(398) (448) (402) (450) ( )  
306) (400)가 (406) O - ((452)  
(406) (diaphragm)(456) (450) )  
(454) (398) (454) (406)  
(450) ( 29 ) , (398) (454)  
가 (454) 가 (452) (406)  
(400) (406) (452) 120 psi , 80 psi  
(400) (418) (416)  
(406) (452) (406) (452)  
(457) (457) (454)  
) (418) (457) (454)  
(406) (452) 가 (450) 가  
(390) (398) 가 (450)  
(454) (306) (400) " (snap)" 가  
(306) 가 가  
가 (302) (300) 가  
PAL 가 가 (304) 가 EPROM , PROM ,  
(304) (336) 가

1

(57)

1.

가 가

가 ,

가 ,

가 ,

가 ,

가 ,

, 가 가 가 가 가

2.

1 , 가

3.

1 ,

4.

3 가 ,

5.

4 , 가

6.

4 , 가

7.

1 , 가 가 가 가

8.

7 ,

9.

8 ,

10.

8 ,

11.

1 , 4 ,

12.

가 가 가 가 가

13.

12 , 가

14.

12 , 가

15.

14  
가

가

16.

가 가

가

가

가

가

가 가

4

17.

가

가

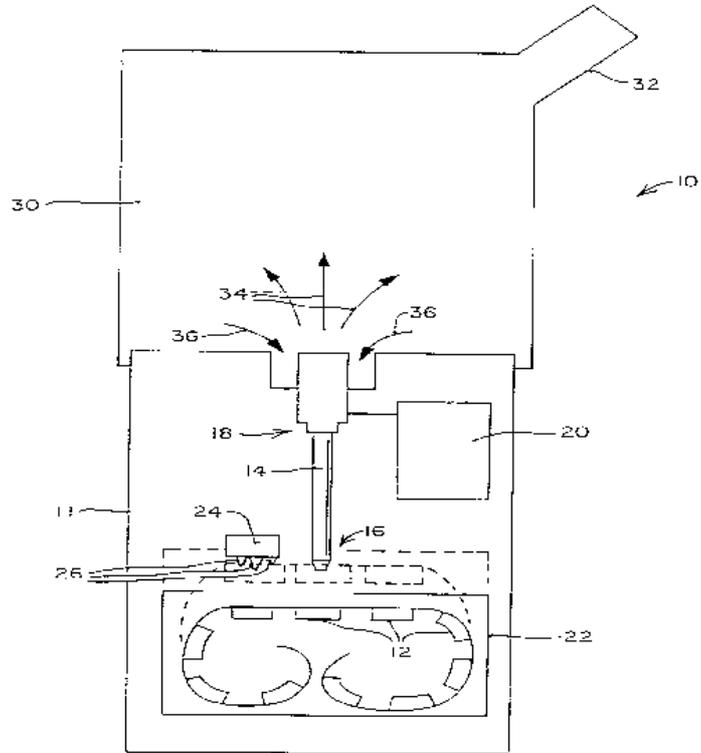
가

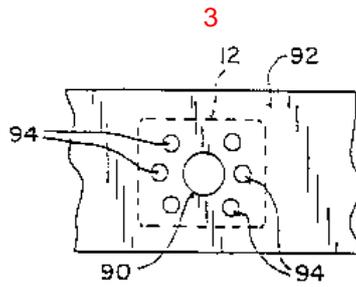
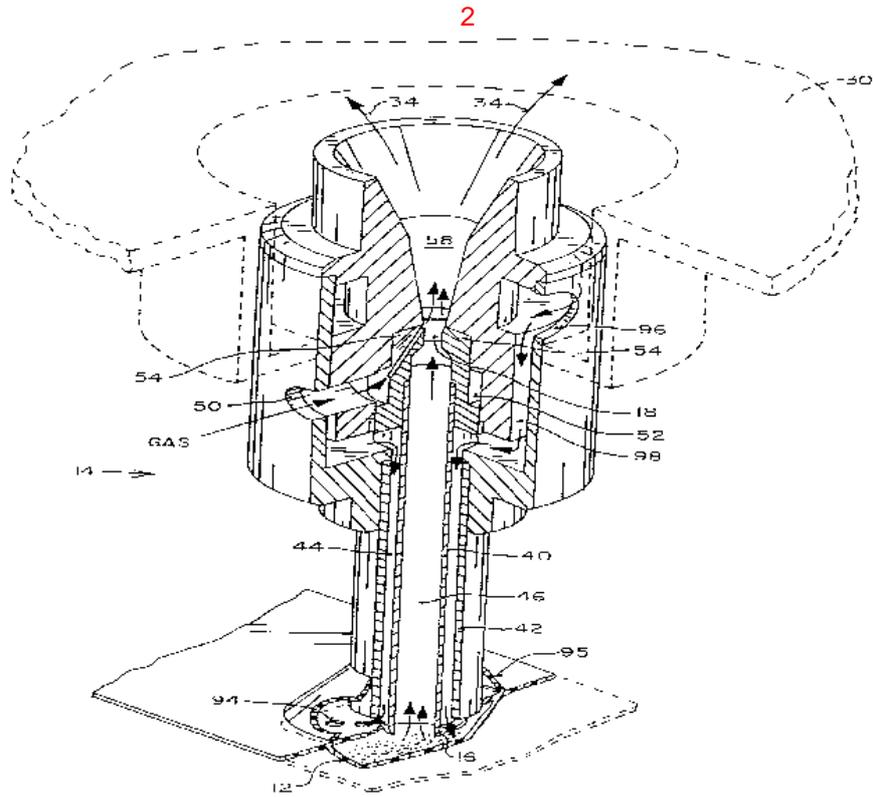
, 가 가

가

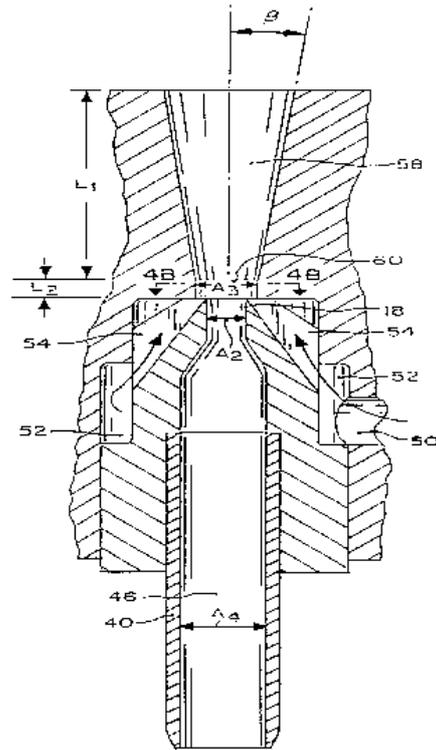
가

1

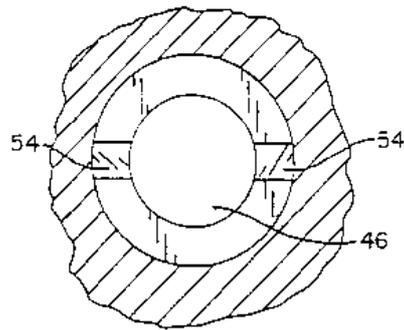




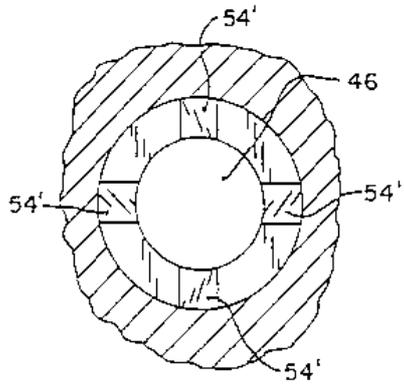
4a

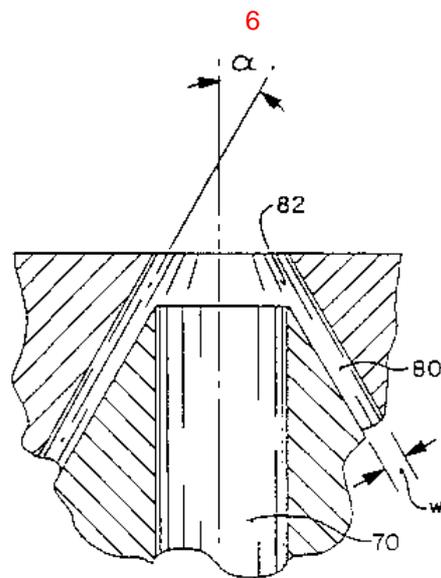
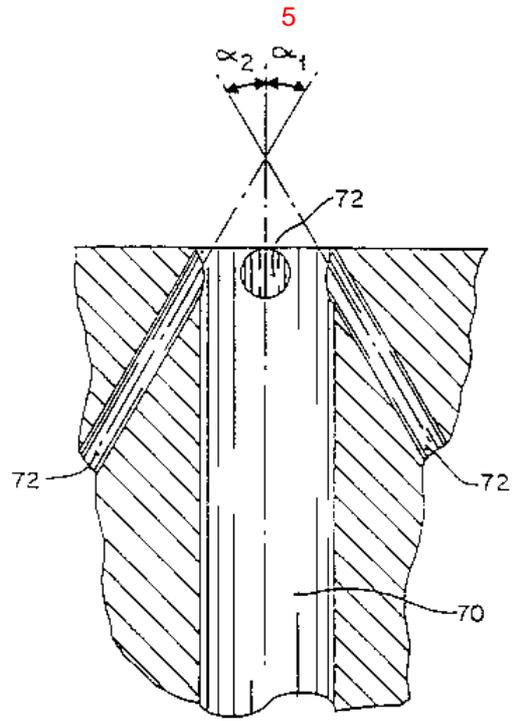


4b

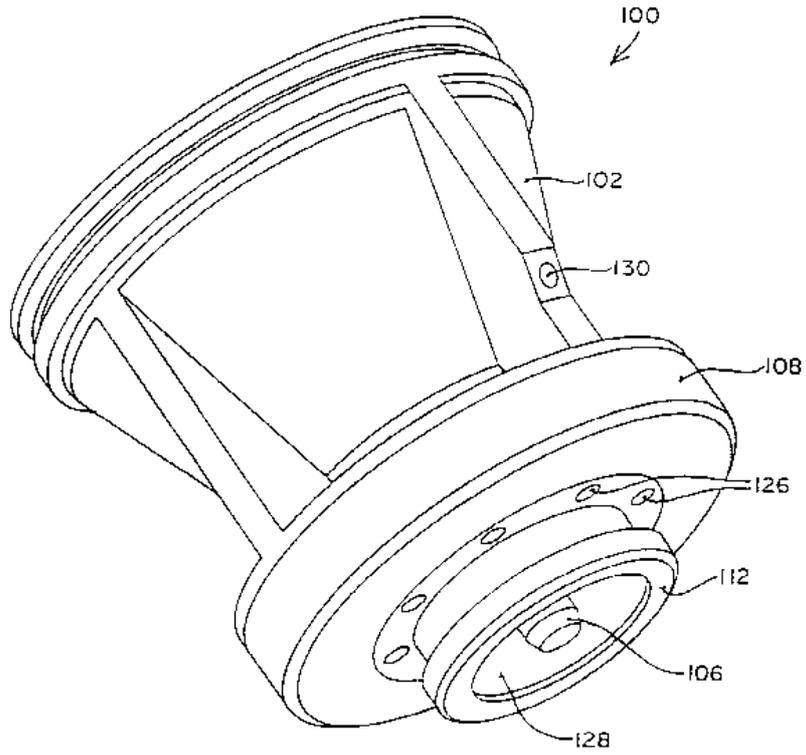


4c

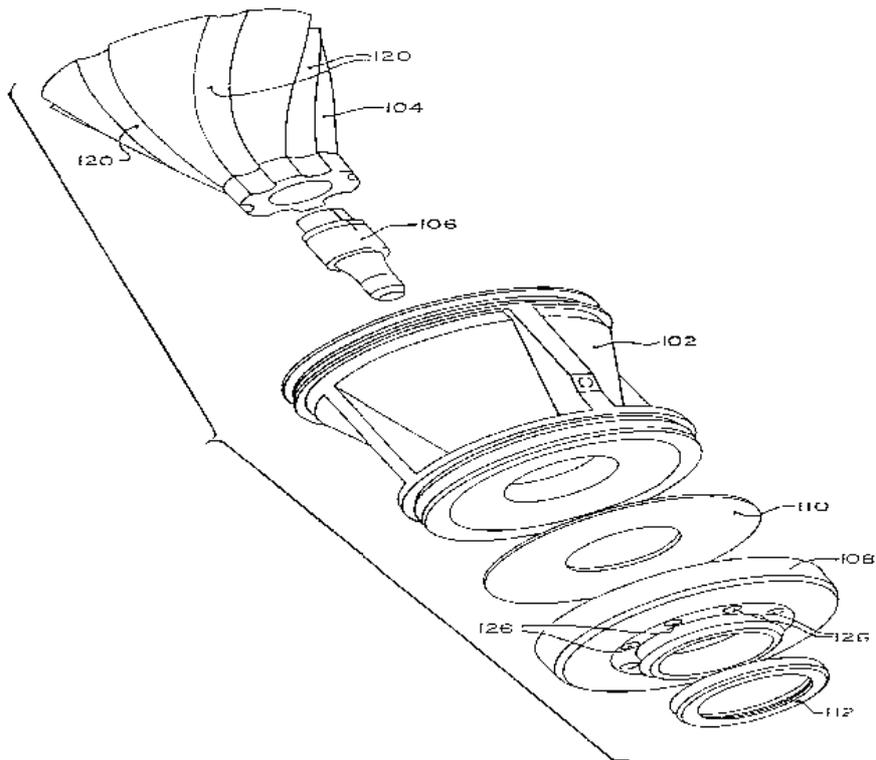




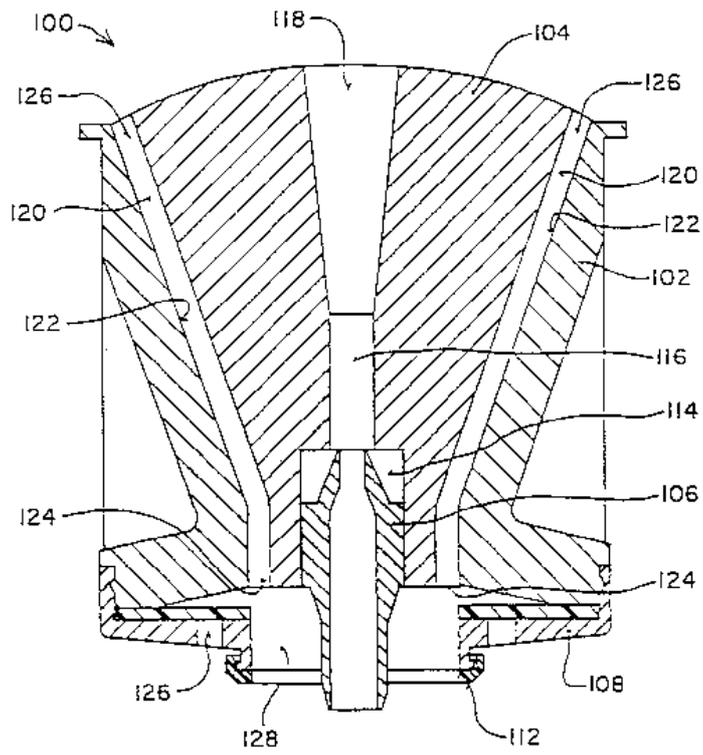
7



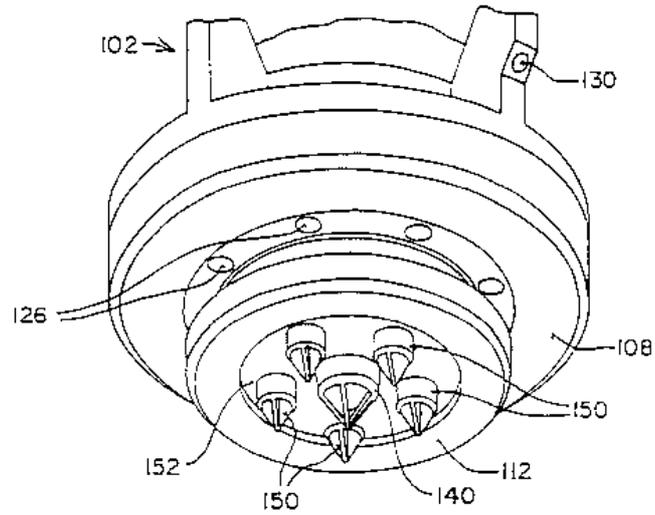
8



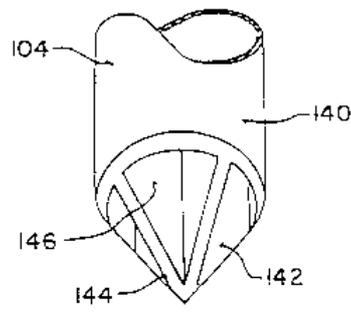
9



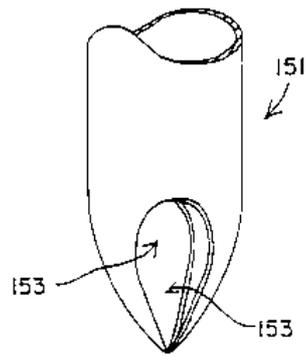
10



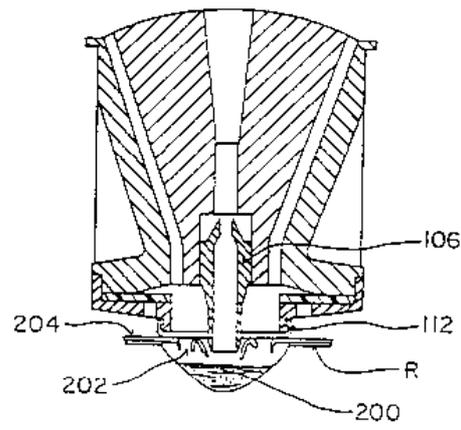
11a



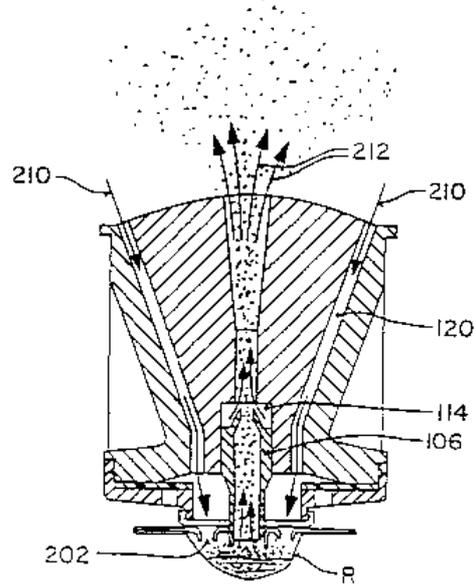
11b



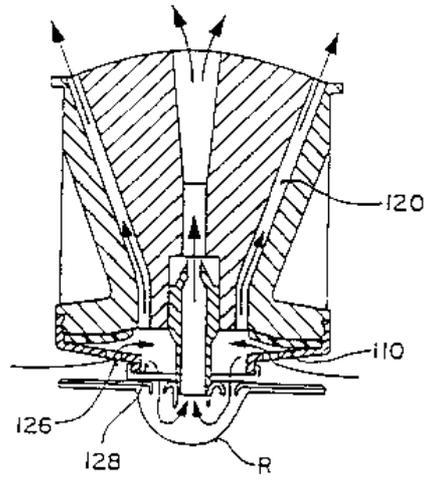
12a



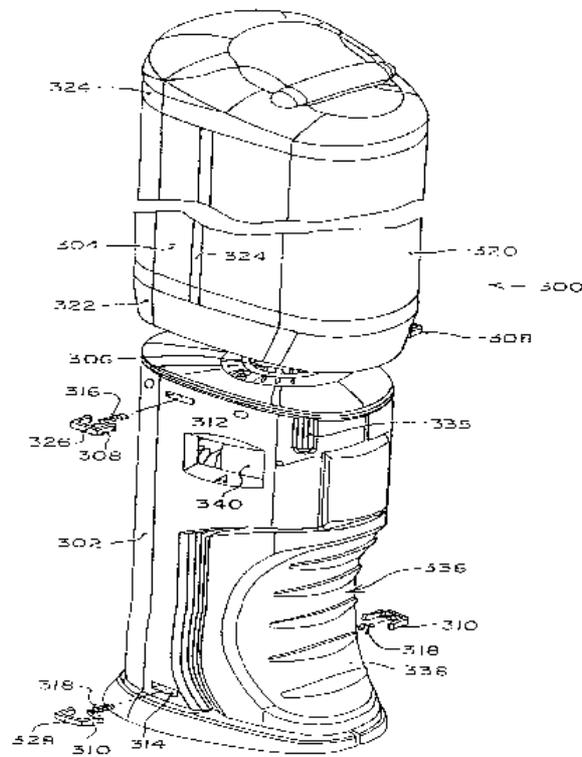
12b



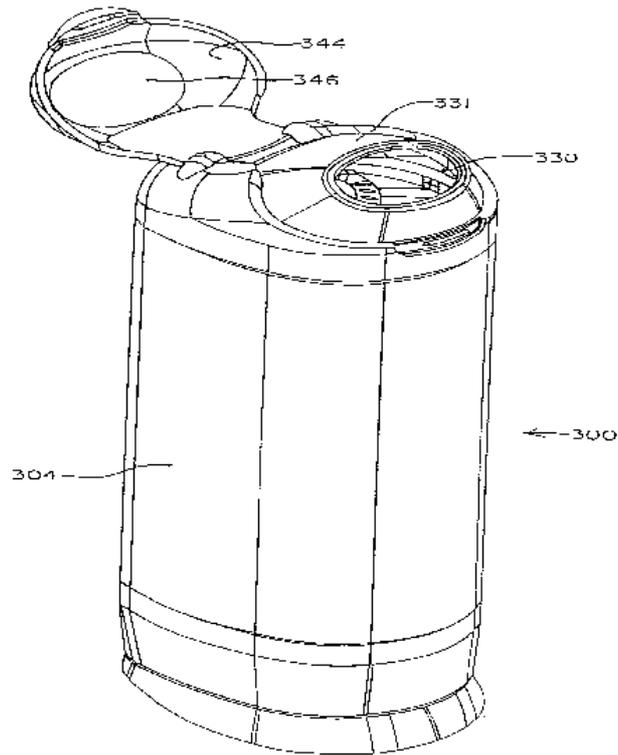
12c



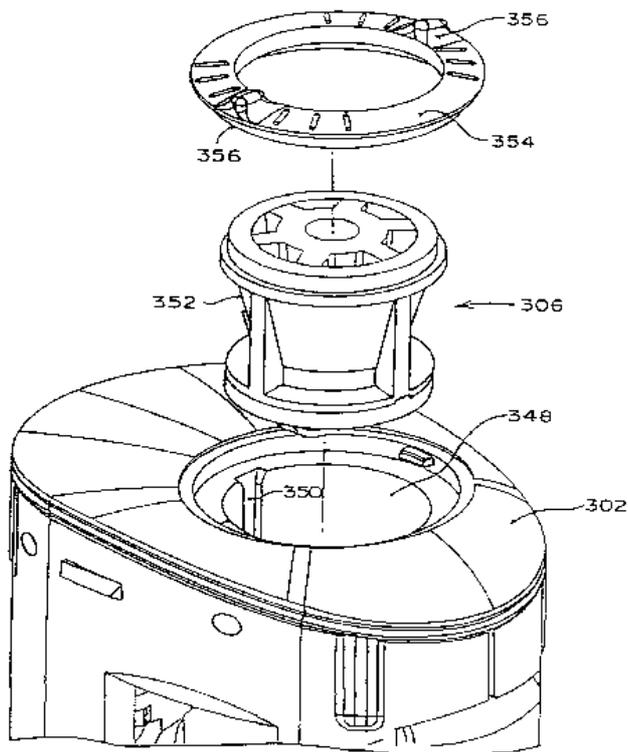
13



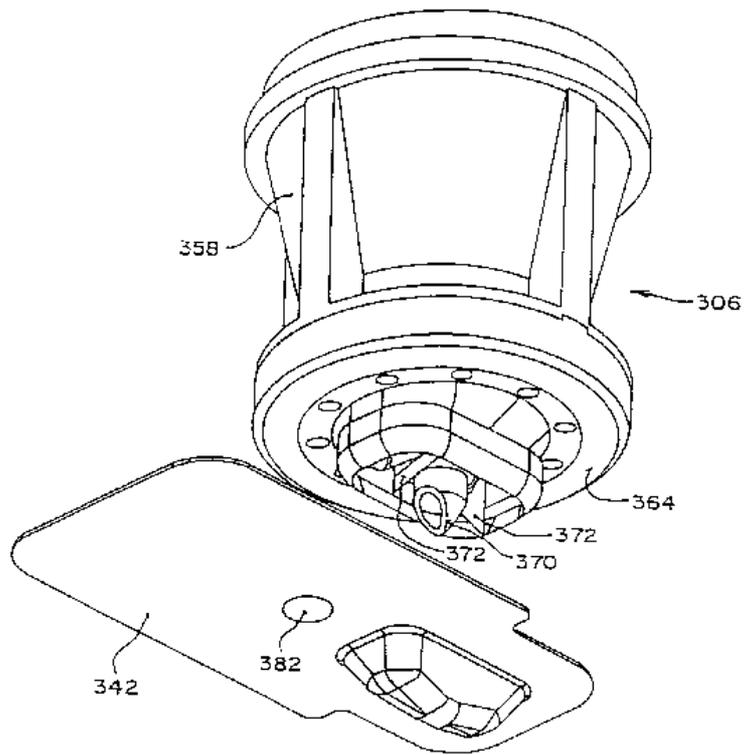
14



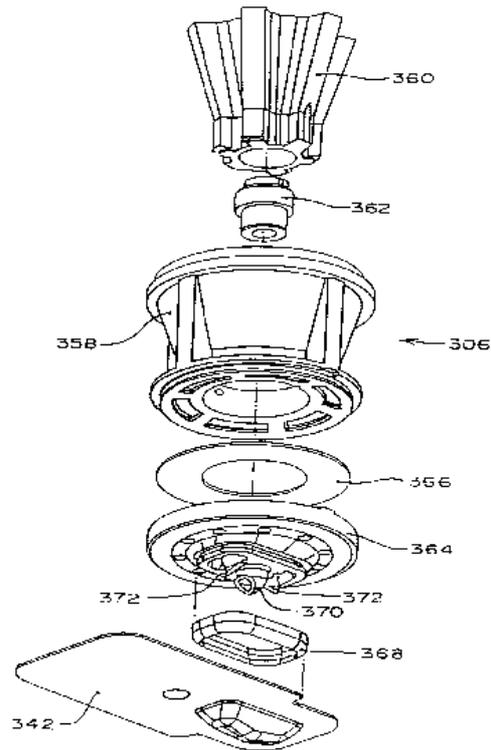
15



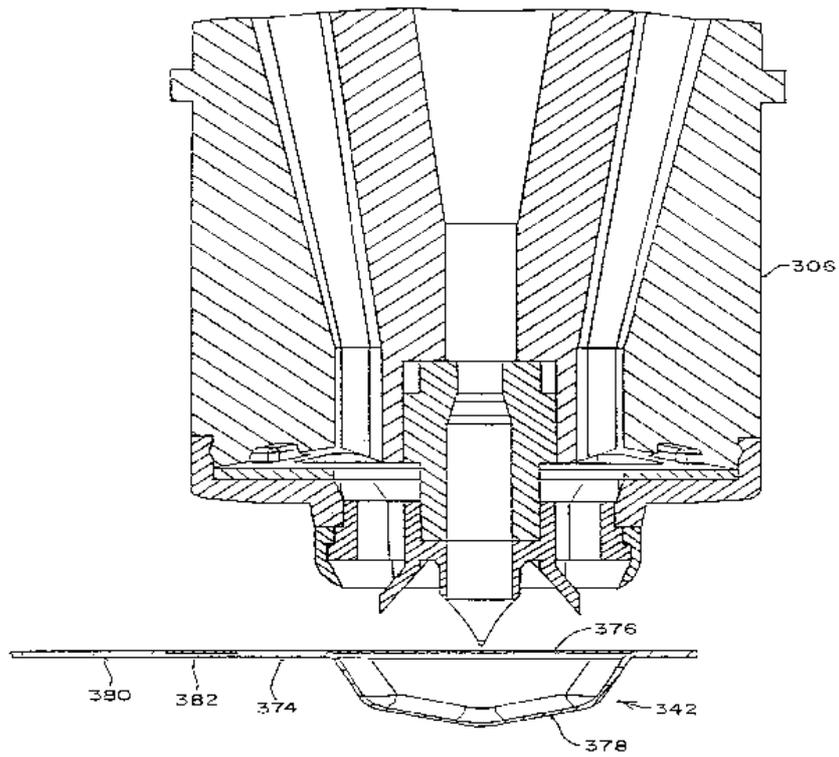
16



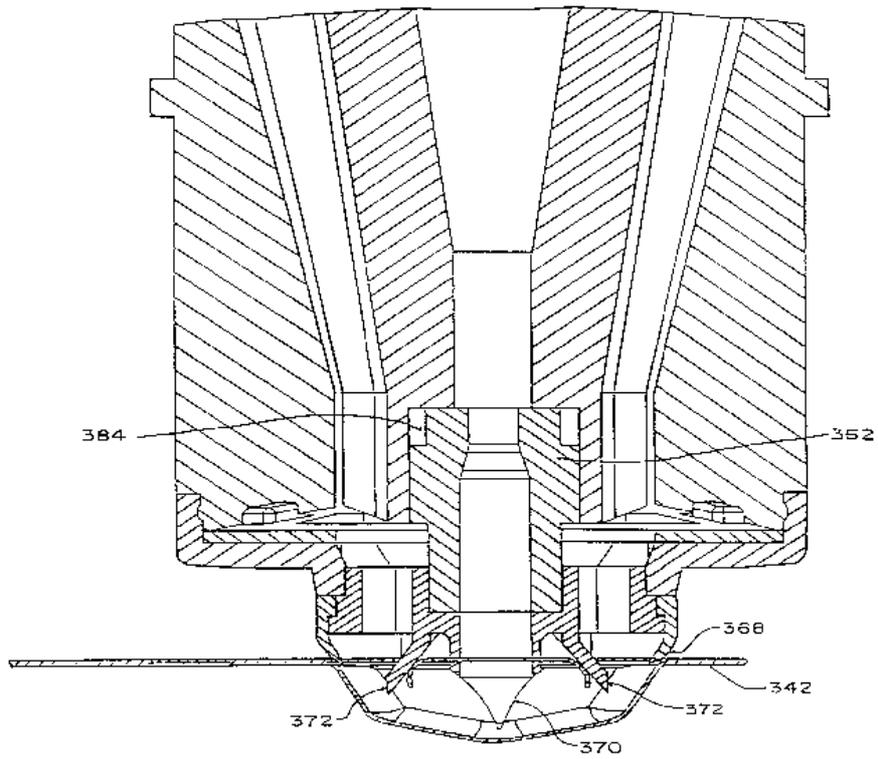
17



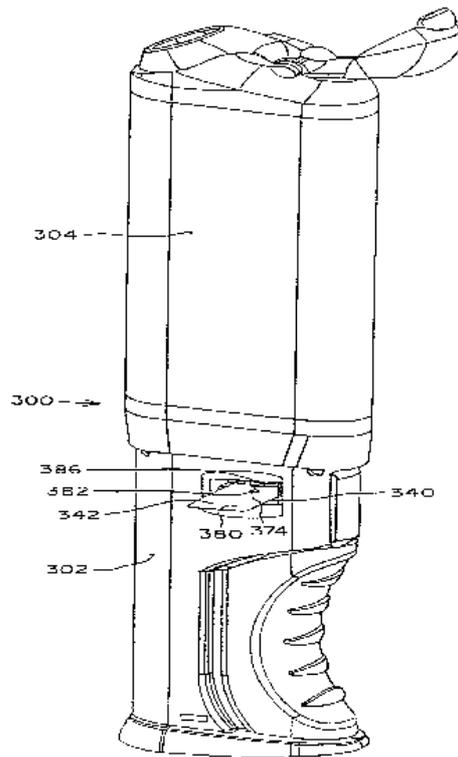
18



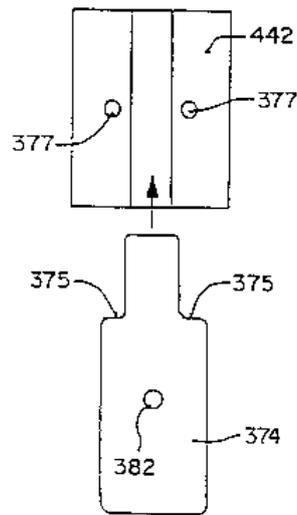
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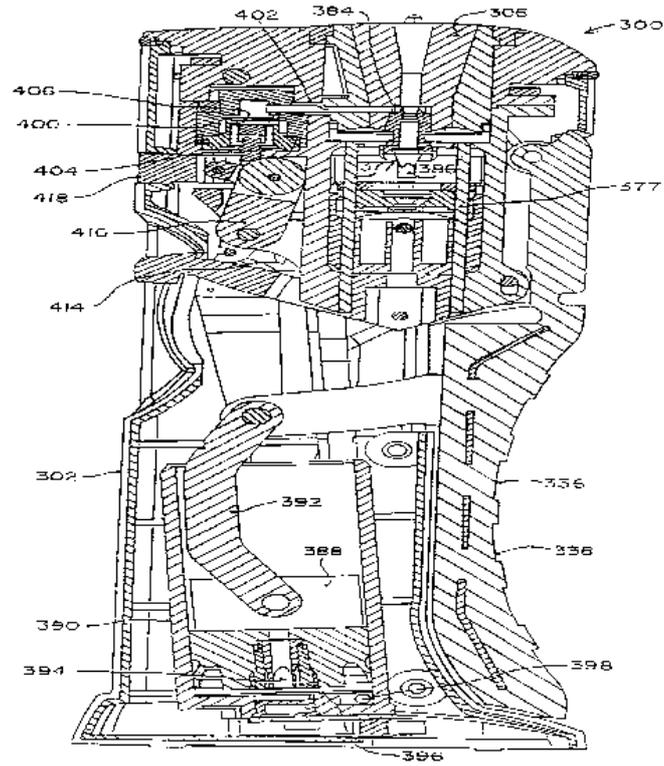
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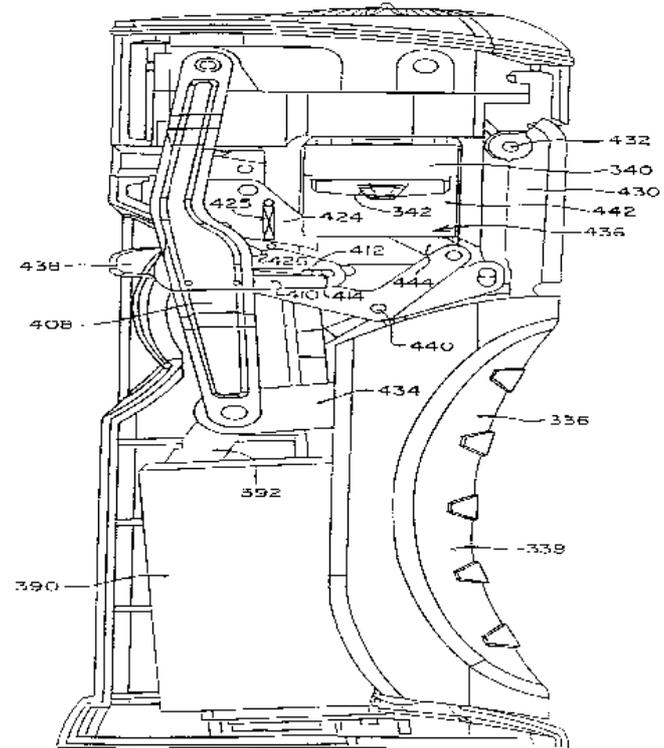
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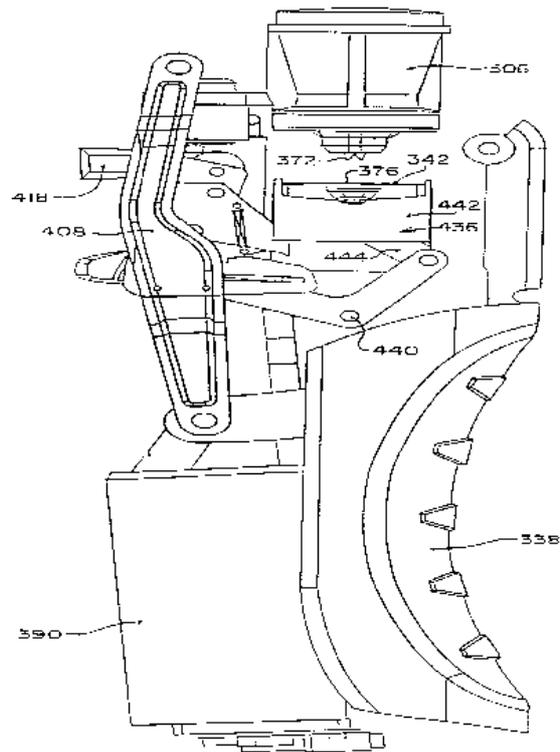
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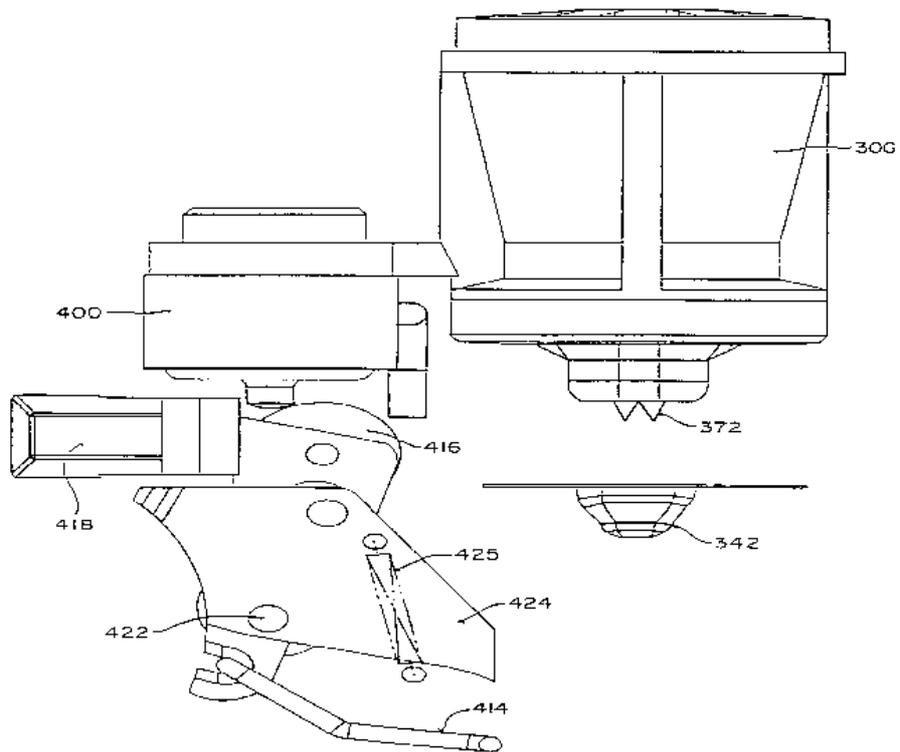
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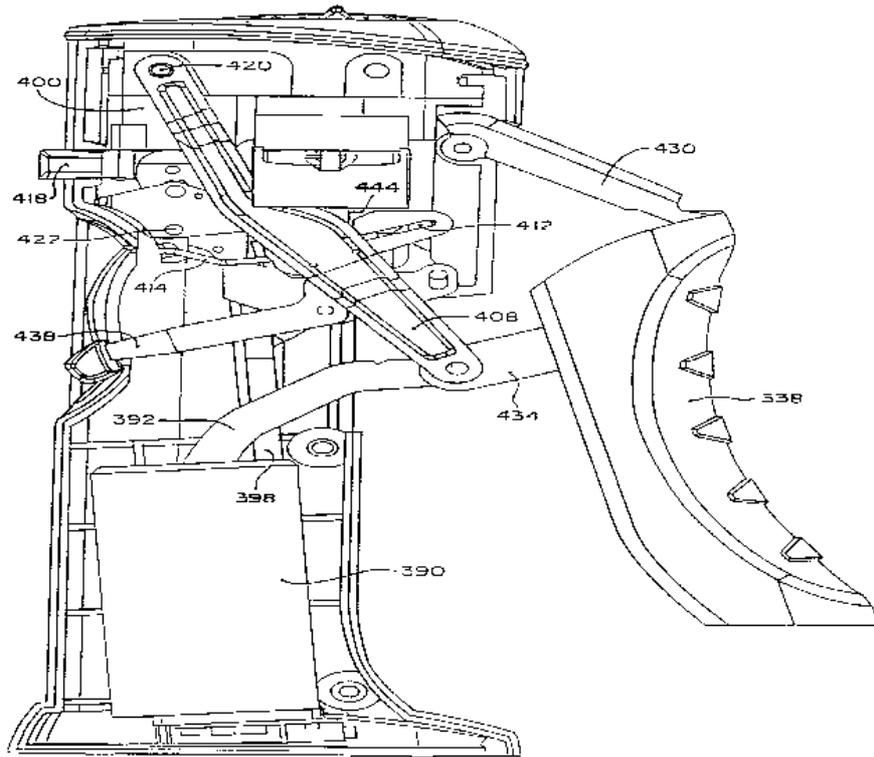
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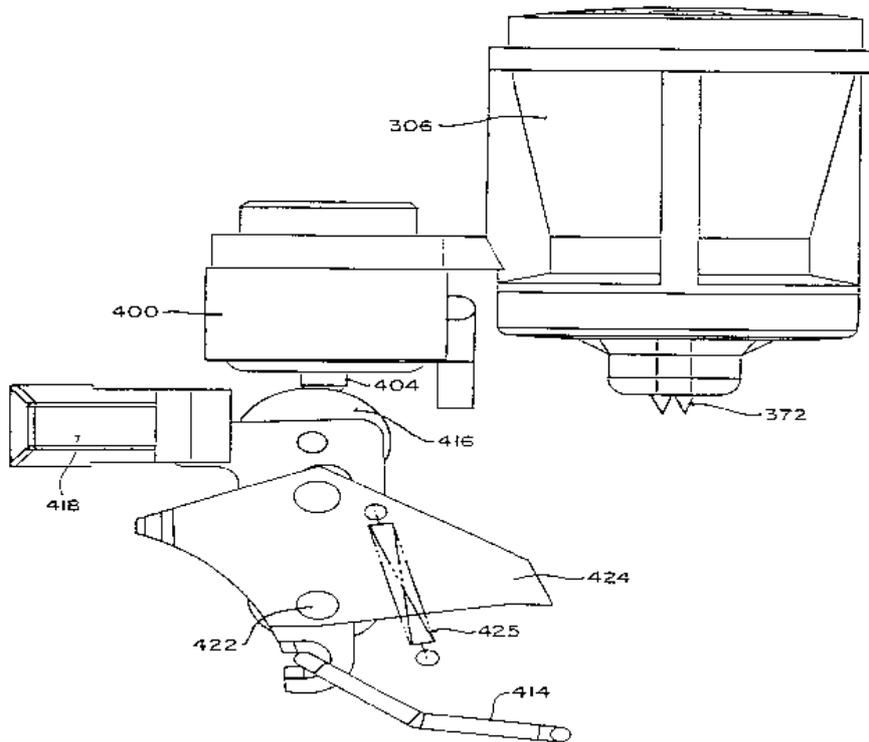
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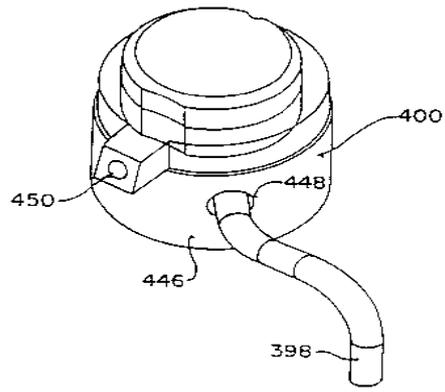
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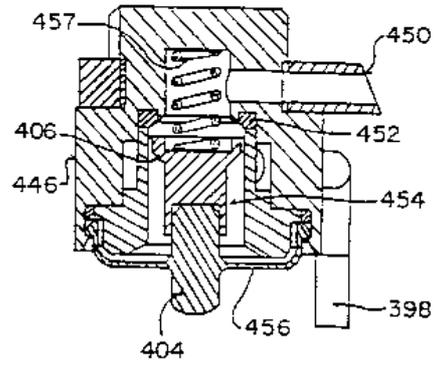
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