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(71) Applicant: **MIRALFIN S.R.L.**
Via L. Seitz 47
I-31100 Treviso(IT)

(72) Inventor: **De'Longhi, Giuseppe**
Vicolo Rovero, 1
I-31100 Treviso(IT)

(74) Representative: **Rapisardi, Mariacristina,**
Brevetti S.r.l., Largo V Alpini 15
I-20145 Milano(IT)

(54) Burner with high operating flexibility particularly for gas cooking devices.

(57) The burner with high operating flexibility particularly usable for gas-powered cooking devices comprises elements (2) for feeding the gas and elements (3) for burning it in a preset manner, and also comprises means (4; 5) for the selective or simultaneous forming of at least a first flame and a second flame (30; 31) which are mutually distinct and coaxial.

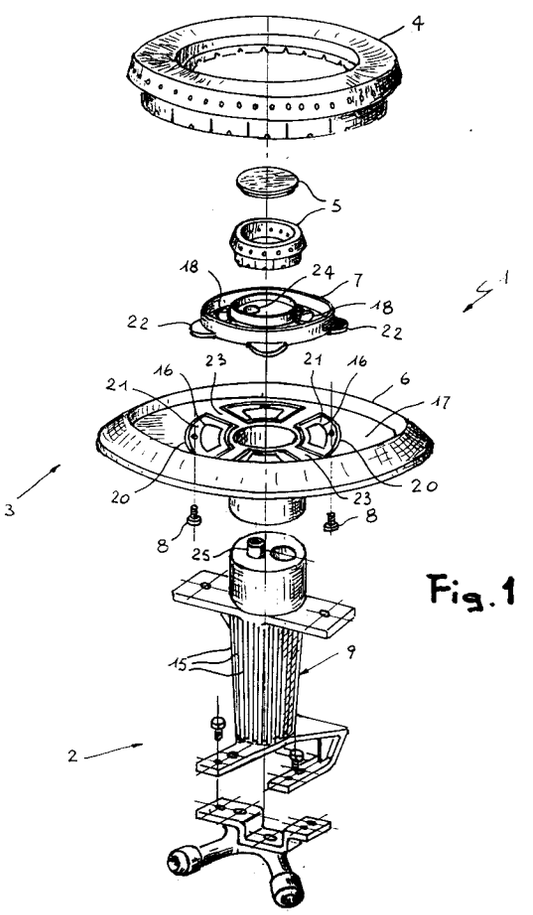

Fig.1

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The present invention relates to a burner with high operating flexibility particularly for gas-powered cooking devices of the type which comprises elements for feeding the gas and elements for burning said gas in a preset manner.

As is known, current burners, which are used in gas-powered cooking devices such as for example classic domestic gas ranges, normally have a manifold each, said manifold being suitable for connecting the gas feed pipes to a gas injector, a mixer which has an internal duct which conveys the gas to a gas distributor and to a flame separation ring from the holes of which the flame escapes in a preset manner as a function of the setting of the cock for controlling the amount of gas which passes from the pipe to the burner.

These known types of burner can normally vary the intensity of the energy flow of the flame from a minimum value to a maximum value indeed as a function of the setting of the control cock.

In view of the above, it is evident that in order to obtain flames which are larger and have a greater or smaller flow of energy it is necessary to provide the surface of the gas range with a plurality of burners of different dimensions relatively to the extent of the cooking surface of said range.

Normally, therefore, a burner suitable for producing a small-size flame suitable for affecting surfaces of small-size containers, a burner suitable for producing a large flame so as to be able to affect large-size containers, and burners which deliver flames the size of which is intermediate between said two flames are provided in a gas range as a function of the requirements of the user and of the purposes for which said range is manufactured.

However, it often occurs that the user must simultaneously place over the flames for example three large-size containers or three small-size containers, so that in the first case a flame energy flow not sufficient to cook or bring to a boil the food product in a short time is obtained, whereas in the second case there is an excess of flame energy flow which can cause disadvantages during cooking or even, for certain food products, a qualitative deterioration of the cooked product.

Obviously, in order to obviate these disadvantages it would be possible to use ranges which have a cooking surface provided with a large number of burners, but this would imply the use of large rooms with considerable costs for the user, who normally has available small rooms in which space must necessarily be used in the best possible manner.

In this situation, the technical aim at the base of the present invention is to solve the above described disadvantages of the known art.

Within the scope of this aim, an important object of the present invention is to provide a burner with high operating flexibility particularly for gas-powered cooking devices, which can provide the user with substantially three distinct values of the energy flow of a flame, said values being comprised between a maximum value and a minimum value with respect to a single value of the energy flow of a flame which can be obtained with a conventional burner.

Another object of the present invention is to provide a burner which occupies, for an equal maximum and minimum supplied energy flow, a smaller space than that occupied by conventional burners of a gas range.

Not least object of the invention is to provide a burner which has an extremely simple and functional structure and furthermore has a modest cost which is suitable for facilitating its diffusion with the public.

This aim, these objects and others are achieved by a burner with high operating flexibility, particularly for gas-powered cooking devices, comprising elements for feeding gas to elements for burning said gas in a preset manner, characterized in that it comprises means for the selective or simultaneous forming of at least a first flame and a second flame which are mutually distinct and coaxial.

Further characteristics and advantages of the invention will become apparent from the description of a preferred but not exclusive embodiment of the burner with high operating flexibility according to the invention, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is an exploded perspective view of the burner according to the invention;

Figure 2 is a partially transversely sectional lateral elevation view of the burner according to the invention;

Figure 3 is a lateral elevation view of the manifold of the burner illustrated in Figure 2 according to the invention;

Figure 4 is a plan view of the first gas distributor of the burner according to the invention;

Figure 5 is a view of the distributor of Figure 4, taken along the sectional line V-V;

Figure 6 is a bottom plan view of the distributor illustrated in Figure 4;

Figure 7 is a plan view of the second gas distributor according to the invention;

Figure 8 is a view taken along the sectional line VIII-VIII of Figure 7 according to the invention; and

Figure 9 is a bottom view of the second distributor according to the invention.

With reference to the above figures, the burner with high operating flexibility according to the invention, generally indicated by the reference numeral 1, comprises, in a per se known manner, gas feeding elements, generally indicated by 2, and elements for burning said gas in a preset manner, generally indicated by 3.

Advantageously, the burner furthermore comprises means for the selective or simultaneous forming of at least a first flame 30 and of a second flame 31 which are mutually distinct and coaxial, since a first flame separation ring and a second flame separation ring, respectively indicated by 4 and 5, are provided and are mutually associated coaxially with gas distribution means.

More in particular, said distribution means comprise a first distributor and a second distributor, respectively indicated by 6 and 7, which are associated with one another concentrically by means of screws 8.

The first distributor 6 and the second distributor 7 are therefore removably associated with mixing means for distributing the gas individually or simultaneously to each of the two rings 4 and 5.

The mixing means for the distribution of the gas are defined by a mixer 9 which is internally provided with a first Venturi-effect duct and with a second Venturi-effect duct, indicated by 10 and 11, which have a truncated-cone configuration the smaller diameter whereof faces respective injectors 12 and 13 which are supported by a manifold 14 which is suitable for connecting said injectors to the gas feed pipes, not illustrated in the drawings.

The mixer 9 furthermore advantageously has, on its outer surface, a plurality of longitudinal ridges 15 which are suitable for facilitating the dispersion of heat therefrom due to the high temperature which is transmitted from the flame separation rings 4 and 5 to said mixer by conduction.

It should be furthermore specified that the first distributor 6 furthermore has means for feeding air to the second ring 5, in order to allow a balanced feeding of oxygen for the optimization of the burning of the gas and therefore of the flame; said means comprise ports, each of which is generally indicated by 16, which are conveniently arranged circumferentially on the planar surface 17 of said distributor.

The ports 16 are connected to corresponding openings 18 which are arranged circumferentially on the second distributor 7.

The value of the diameter on which the ports 16 are arranged is conveniently substantially equal to the value of the diameter on which the openings 18 are arranged, so that there is a perfect correspondence therebetween.

The ports 16, as can be seen in Figure 4, are furthermore surrounded by a raised portion 20 which defines, on the planar surface 17, an accommodation seat 21 in which a corresponding enlarged portion 22 which surrounds the openings 18 of the second distributor 7 is arranged.

In this manner, besides having a perfect correspondence between the ports 16 and the openings 18, the escape of air during its passage from the first distributor to the second distributor, is prevented, so as to allow the feeding of the second ring 5.

At the same time, the raised portions 20 define, in the first distributor 6, channels 23 for guiding the gas from the second duct 11 to the first flame separation ring 4 so that said gas is not affected by the air which passes through the ports 16 and the openings 18 and vice versa.

The feeding of the gas from the first duct 10 to the second gas distributor 7 is instead obtained by virtue of the presence, on said second distributor, of a passage channel 24 which removably engages a second passage channel 25 defined on the mixer 9.

It should be furthermore specified that the openings 18 have, on the side directed toward the second flame separation ring 5, at least two diverging walls, indicated by 26, the function whereof is to uniformly distribute the gas along the entire circumference of the second ring 5 so as to optimize the flame delivered by said second ring.

The operation of the burner according to the invention is evident from what has already been described and illustrated; in particular, with reference to Figure 2, it can be seen that the manifold 14 has two gas inlets 29 at which there are injectors 12 and 13 for feeding respectively the second flame separation ring 5 and the first flame separation ring 4.

The feeding of the gas to the inlets of the manifold 14 is furthermore adjusted in a per se known manner by one or two cocks which are not illustrated.

Whereas the adjustment of the flames occurs in the conventional manner in the case of two cocks, in the case of a single cock, said cock allows for example to feed gas to the second flame separation ring if it is rotated clockwise, whereas it allows to feed gas to the first flame separation ring if it is rotated in counter-clockwise position.

If the cock is arranged in a position which is substantially central with respect to the two preceding ones, it furthermore allows the simultaneous feeding of the two rings, thus obtaining a double flame the energy flow whereof is equal to the sum of the energy flow of the individual flames obtained on the individual rings.

The gas mixed with air rises from the injectors 12 and 13 through the first duct 10 and the second duct 11 to pass, as already shown, by means of the first distributor and second distributor, to the first flame separation ring and to the second flame separation ring, thus producing the intended flame or flames.

In order to optimize the flame formed by the second flame separation ring 5, the passage of air is furthermore conveniently allowed by means of the ports 16 and the openings 18 for the optimum burning of the gas which feeds the second flame separation ring 5.

In practice it has been observed that the burner according to the invention is particularly advantageous in that it allows to obtain a flame with three energy flow values, each of which is variable by means of a cock from a maximum value to a minimum value, together with the fact of having different flame sizes for the same burner.

This enormous operating flexibility furthermore allows, if a burner according to the invention is arranged in replacement of every conventional burner, in practice to increase considerably and with a minimum expense the potentiality of a gas range while keeping its original dimensions unchanged.

The invention thus conceived is susceptible to numerous modifications and variations, all of which are within the scope of the inventive concept; all the details may furthermore be replaced with technically equivalent elements.

In practice, the materials employed, as well as the dimensions, may be any according to the requirements and the state of the art.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. Burner with high operating flexibility particularly for gas cooking devices, comprising elements (2) for feeding gas to elements (3) for burning said gas in a preset manner, characterized in that it comprises means (4; 5) for the selective or simultaneous forming of at least a first flame and a second flame (30; 31) which are mutually distinct and coaxial.

2. Burner according to claim 1, characterized in that said means for the selective or simultaneous forming of said first flame and of said second flame comprise a first flame separation ring (4) and a second flame separation ring (5) which are coaxially associated with means (6; 7) for distributing said gas.

3. Burner according to claim 2, characterized in that said first flame separation ring and said second flame separation ring are mutually coaxial.

4. Burner according to claim 2, characterized in that said gas distribution means comprise a first gas distributor (6) and a second gas distributor (7) which are concentrically and removably associated with mixing means (9, 10, 11) for the distribution of said gas individually or simultaneously to each of said rings.

5. Burner according to claim 4, characterized in that said mixing means comprise at least two injectors (12, 13) for said gas which are supported by a manifold (14) with the pipes for conveying said gas and a mixer (9) which has at least two Venturi-effect ducts (10; 11) arranged above and coaxially to said injectors.

6. Burner according to claim 5, characterized in that said ducts have a truncated-cone configuration.

7. Burner according to claim 4, characterized in that said first distributor has means (16) for feeding air to said second ring.

8. Burner according to claim 7, characterized in that said feed means comprise ports (16) which are arranged circumferentially on the planar surface of said first distributor and are connected to corresponding openings (18) which are arranged circumferentially on said second distributor.

9. Burner according to claim 8, characterized in that said ports are surrounded by a raised portion (20) which defines, on said planar surface (17), a seat (21) for the accommodation of a corresponding enlarged portion (22) which surrounds said openings.

10. Burner according to claim 8, characterized in that said ports and said openings mate with one another.

11. Burner according to claim 9, characterized in that said raised portions define, on said planar surface, channels (23) for guiding said gas to said first ring.

12. Burner according to claim 4, characterized in that said second distributor has a passage channel (24) which is connected to one of said ducts and in that each of said openings has at least two diverging walls (26) directed toward said second ring for the uniform distribution of said gas to said second ring.

13. Burner according to claim 5, characterized in that said mixer has, on its outer surface, a plurality of longitudinal ridges (15).

Amended claims in accordance with Rule 86-(2) EPC.

1. Burner with high operating flexibility particularly for gas cooking devices, comprising elements (2) for feeding gas to elements (3) for burning said gas in a preset manner, said elements (3) comprising a first flame separation ring (4) and a second flame separation ring (5) which are coaxially associated with a first gas distributor (6) and a second gas distributor (7) which are concentrically and removably associated with mixing means (9, 10, 11) for the distribution of said gas individually or simultaneously to each of said rings, characterized in that said mixing means comprise at least two injectors (12, 13) for said gas which are supported by a manifold (14) with the pipes for conveying said gas to a mixer (9) which has at least a first and a second Venturi-effect ducts (10, 11), having a truncated-cone configuration, arranged above and coaxially to said injectors.

2. Burner according to claim 1, characterized in that it comprises ports (16) surrounded by a raised portion (20), said raised portions defining on the planar surface of said first distributor, channels (23) for guiding only said gas coming from said second Venturi-effect duct (11) to said first ring.

3. Burner according to claim 1, characterized in that said second distributor has a passage channel (24) which is connected to said first Venturi-effect duct and openings (18) each having at least two diverging walls (26) directed toward said second ring for the uniform distribution of said gas to said second ring.

4. Burner according to claim 1, characterized in that said mixer (9) has, on its outer surface, a plurality of longitudinal ridges (15).

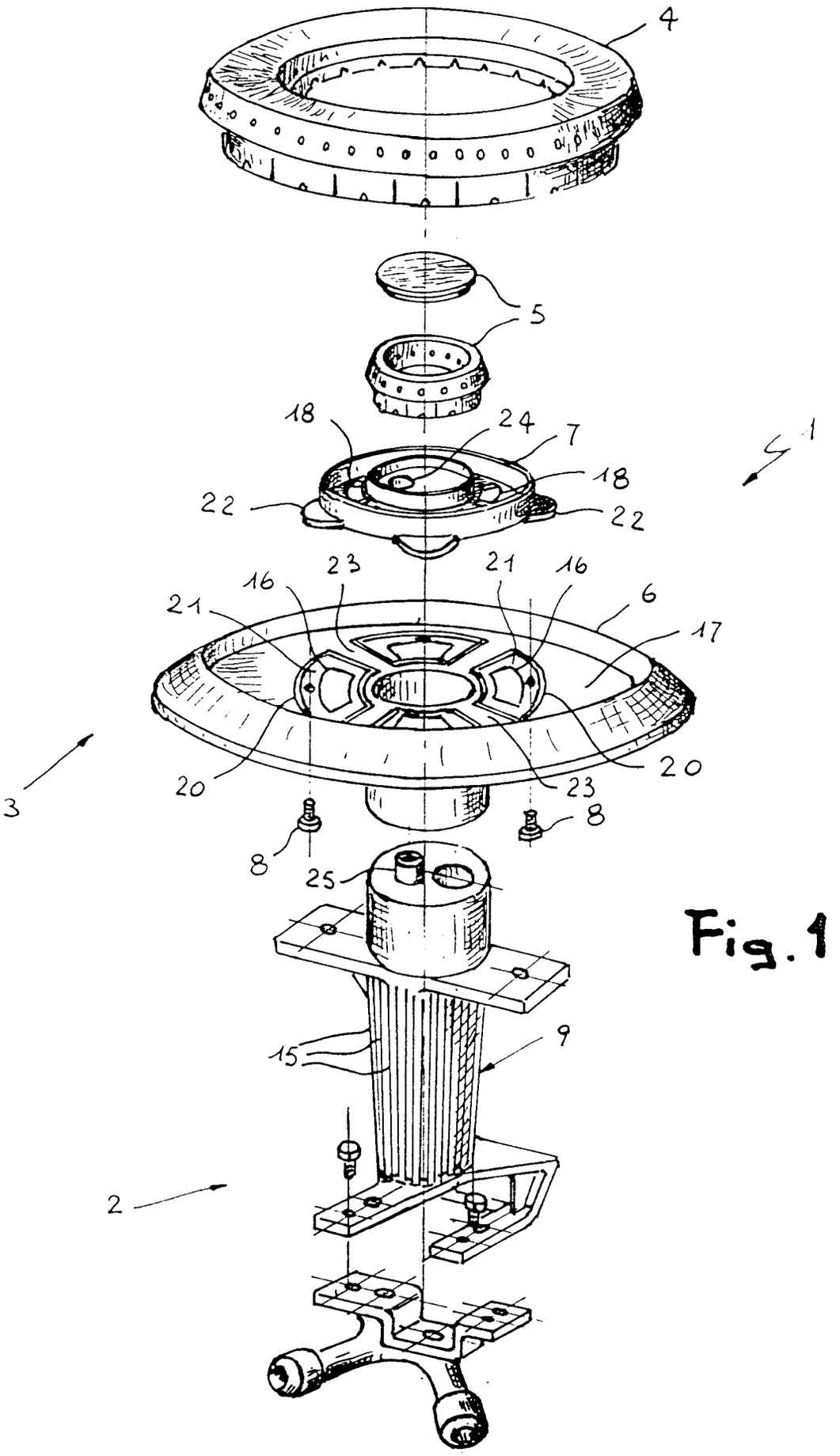


Fig. 1

Fig.3

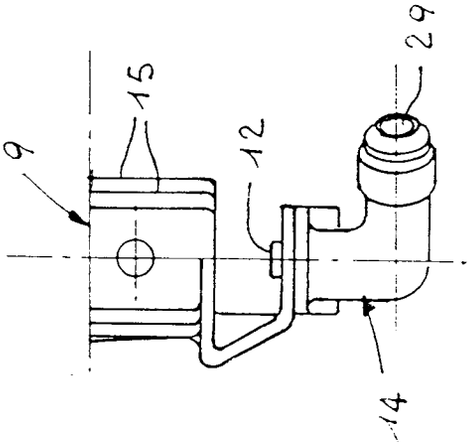
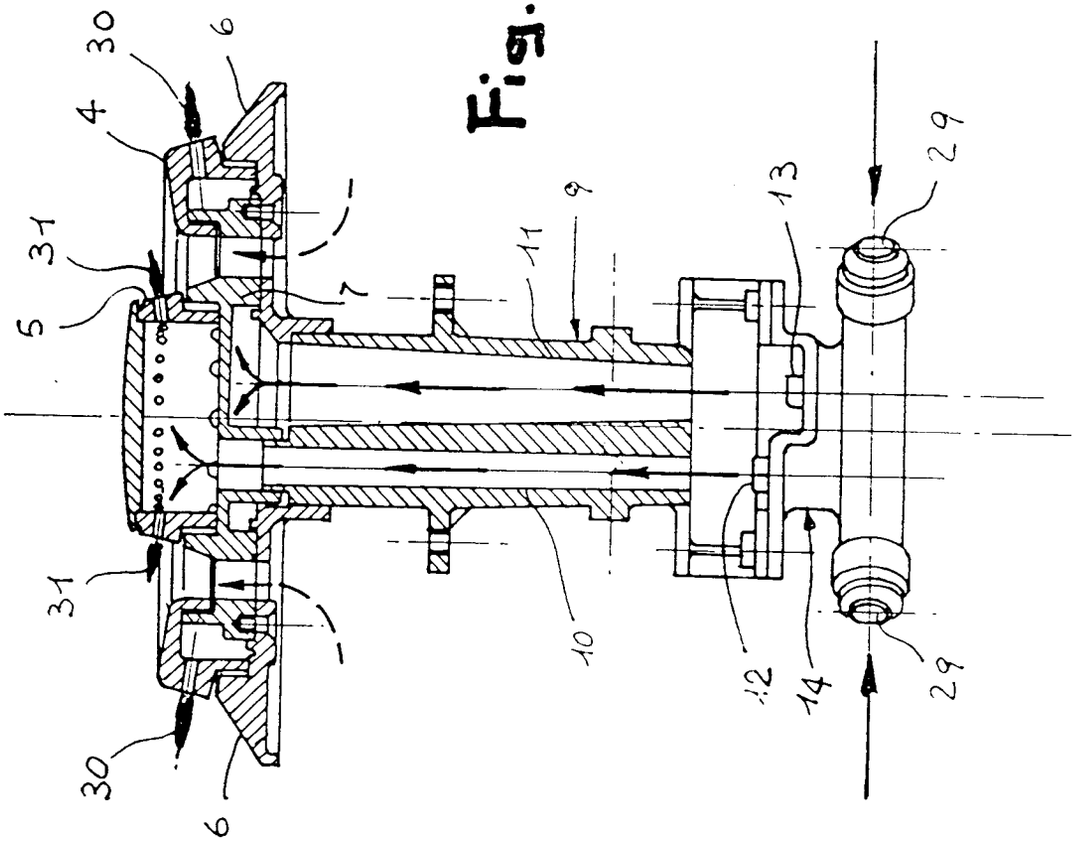


Fig.2



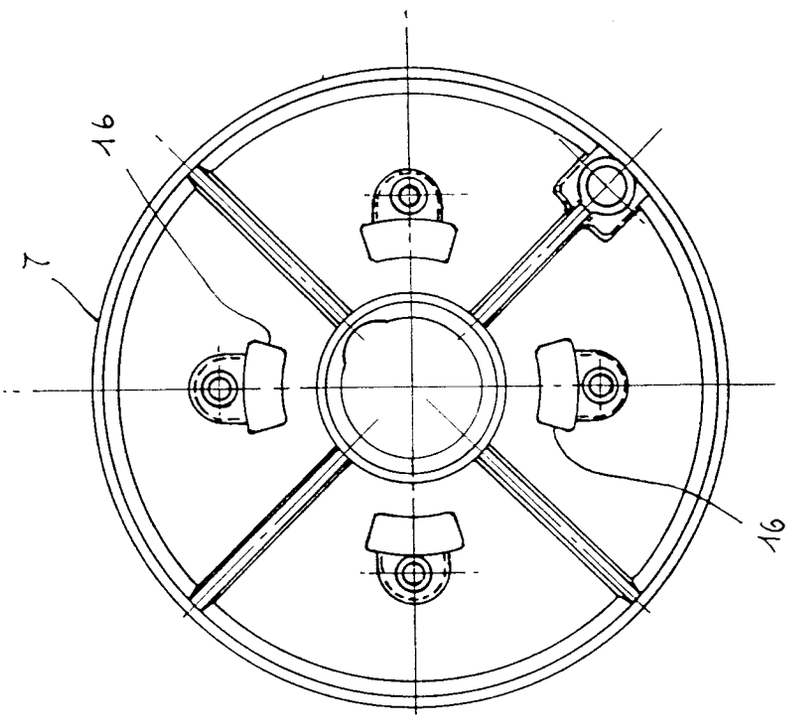


Fig.6

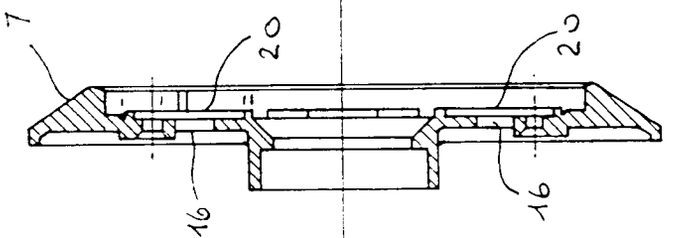


Fig.5

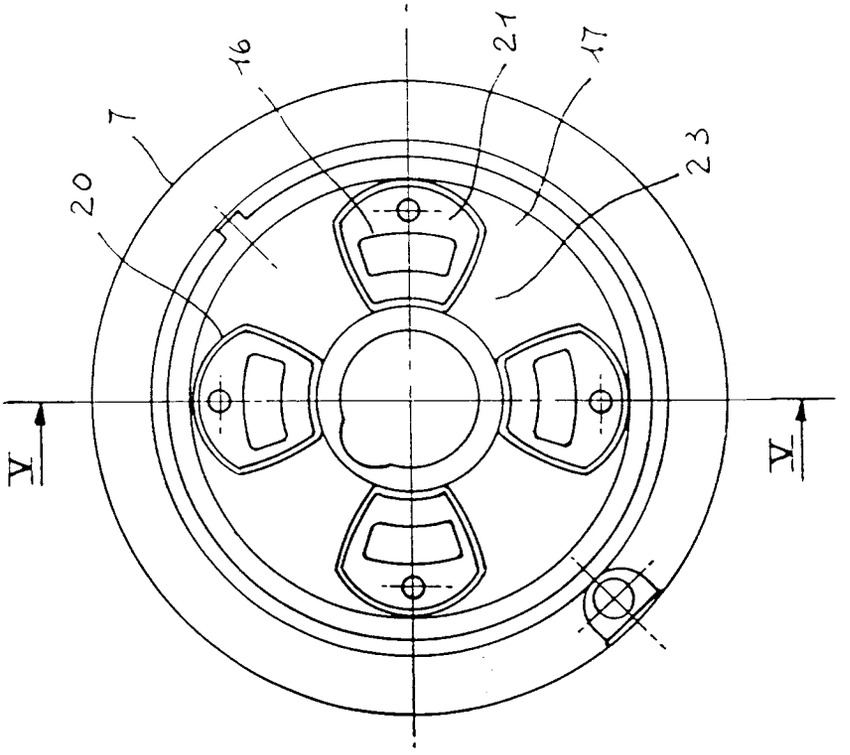


Fig.4

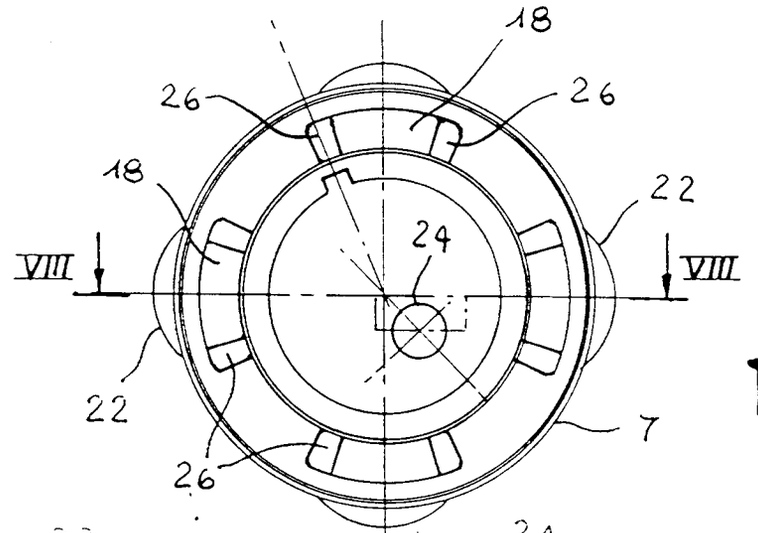


Fig.7

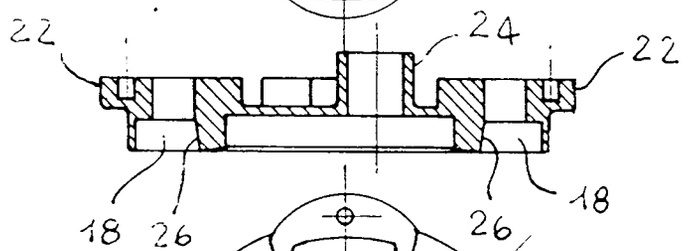


Fig.8

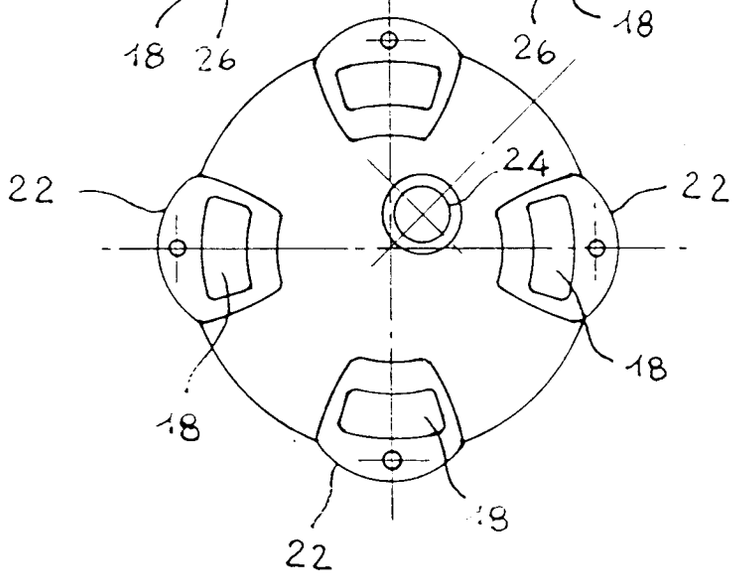


Fig.9

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EUROPEAN SEARCH REPORT

Application Number

EP 90 12 1601

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	FR-A-1 335 280 (FARGASS) * Figures 1,2; claims 1,2 *	1-4,7-11	F 23 D 14/06 F 24 C 3/08
X	FR-A- 989 069 (BOIDIN et al.) * Page 1, right-hand column, lines 14-29; figures 1,2 *	1-5	
X	CH-A- 166 409 (LE REVE) * Page 1, left-hand column, lines 1-14; figures 1-3 *	1-4,12	
A	FR-A-2 404 803 (SOURDILLON) * Figures 1,3 *	6	
A	FR-A-1 421 600 (SOURDILLON) * Figure 9; page 2, left-hand column, lines 48-56 *	13	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

F 23 D
F 24 C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	24-05-1991	COLI E.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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