FORM 1
REGULATION 9

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952-1973

APPLICATION FOR A PATENT 624371

We FOCKE & CO. (GmbH & CO.)

of Siemensstrasse 10, D-2810 Verden, WEST GERMANY

hereby apply for the grant of a Patent for an invention entitled:

APPARATUS FOR THE TESTING OF CIGARETTES

which is described in the accompanying complete specification. This Application is a Convention Application and is based on the Application numbered: P 38 12 689.3 for a Patent or similar protection made in West Germany on 16 April 1988.

Our address for service is:

GRIFFITH HACK & CO.
71 YORK STREET
SYDNEY N.S.W. 2000
AUSTRALIA

DATED this 14th day of April 1989

FOCKE & CO. (GmbH & CO.)
By their Patent Attorneys

J.H. Hse

GRIFFITH HACK & CO.

TO: THE COMMISSIONER OF PATENTS
COMMONWEALTH OF AUSTRALIA

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B — APPLICATION BY ASSIGNEE OF INVENTOR

COMMONWEALTH OF AUSTRALIA
PATENTS ACT 1952

DECLARATION IN SUPPORT OF AN APPLICATION FOR A PATENT

(Name of applicant)

In support of an application made by: FOCKE & CO. (GmbH & CO.)

(Title)

for a patent for an invention entitled: APPARATUS FOR THE TESTING OF CIGARETTES

(Full name and address of signatory)

I, Heinz Focke

of Moorstrasse 64, D-2810 Verden/ West Germany

do solemnly and sincerely declare as follows:

1. I am authorised by the above mentioned applicant for the patent to make this declaration on its behalf.

(Full name and address of inventor(s))

2. The name and address of each actual inventor of the invention is as follows: Heinz Focke of, Moorstrasse 64, D-2810 Verden/ West Germany

(State whether by assignment or contract of employment)

and the facts upon which the applicant is entitled to make this application are as follows: the applicant is the assigne of the said invention from the said inventor.

(Delete paragraphs 3 and 4 for non-Convention application)

3. The basic application(s) as defined by Section 141 of the Act was (were) made as follows:
Country WEST GERMANY on 16 April 1988
in the name(s) FOCKE & CO. (GmbH & CO.)
and in ..... on .....
in the name(s) .....
and in ..... on .....
in the name(s) .....

4. The basic application(s) referred to in the preceding paragraph was(were) the first application(s) made in a Convention country in respect of the invention the subject of this application.

(Place and date of signing)

Declared at Verden this 27th day of April 1989.

Signed: Focke & Co. (GmbH & Co.)

Position: - Heinz Focke / manager -

GRIFFITH HACK & CO

SYDNEY OFFICE
G.P.O. BOX 4164
SYDNEY. N.S.W. 2001

MELBOURNE OFFICE
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MELBOURNE. VIC. 3004

(12) PATENT ABRIDGMENT (11) Document No. AU-B-33055/89
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(54) Title
APPARATUS FOR THE TESTING OF CIGARETTES

International Patent Classification(s)
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(21) Application No. : **33055/89** (22) Application Date : **14.04.89**

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3812689 **16.04.88** **DE FEDERAL REPUBLIC OF GERMANY**

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(56) Prior Art Documents
US 4648232
AU 498390 87756/75 A24C 5/34
AU 419112 22293/67 33.4.243

(57) Claim

1. An apparatus for the testing of cigarettes in conjunction with a magazine of a packaging machine, rows of cigarettes located above one another being guided through a testing unit and being tested in the region of vertical test shafts of the latter by testing members in a test zone situated in the testing unit and above a cigarette store formed by the tested cigarettes, wherein straight vertical guide shafts are formed as a continuation of the test shafts underneath the test zone and terminate above the cigarette store, and wherein vertical plane straight guide-shaft walls limiting the guide shafts are arranged in the same vertical planes as test-shaft walls limiting the test shafts, so that tested intact cigarettes fall in an orderly and fault-free manner from said testing unit to the cigarette store.

2. An apparatus for the testing of cigarettes in conjunction with a magazine of a packaging machine, rows of cigarettes located above one another being guided through a testing unit and being tested in the region of vertical test shafts of the latter by optoelectrical testing members in a test zone situated in the testing

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unit and above a cigarette store formed by the tested cigarettes, wherein guide shafts are formed as a continuation of the test shafts underneath the test zone and terminate above the cigarette store, and wherein the cigarette level in the cigarette store is monitored by check barriers comprising a lower check barrier for switching off the packaging machine, a middle check barrier for controlling the packaging machine or cigarette-producing machine in terms of their output and an upper check barrier for switching off a cigarette-producing machine.

5. An apparatus for the testing of cigarettes in conjunction with a magazine of a packaging machine, rows of cigarettes located above one another being guided through a testing unit and being tested in the region of vertical test shafts of the latter by optoelectrical testing members in a test zone situated in the testing unit and above a cigarette store formed by the tested cigarettes, wherein guide shafts are formed as a continuation of the test shafts underneath the test zone and terminate above the cigarette store, wherein said optoelectrical testing members are active in the region of the ends of the cigarettes, and wherein the testing members are arranged on a common test beam and are movable by means of the latter into, and retractably out of a testing position.

COMMONWEALTH OF AUSTRALIA 624371

PATENTS ACT 1952 Form 10

COMPLETE SPECIFICATION

FOR OFFICE USE

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Complete Specification-Lodged:
Accepted:
Lapsed:
Published:

Priority:

Related Art:

TO BE COMPLETED BY APPLICANT

Name of Applicant: FOCKE & CO. (GmbH & CO.)

Address of Applicant: Siemensstrasse 10, D-2810 Verden, WEST GERMANY

Actual Inventor: Heinz Focke

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Complete Specification for the invention entitled:

APPARATUS FOR THE TESTING OF CIGARETTES

The following statement is a full description of this invention, including the best method of performing it known to me/us:-

9930A:rk

The invention relates to an apparatus for the testing of cigarettes in conjunction with a packaging machine, rows of cigarettes located above one another being guided through a testing unit and being tested in the region of vertical test shafts of the latter by (optoelectrical) testing members in a test zone situated above a cigarette store formed by the tested cigarettes.

Before packaging, cigarettes are checked for correct formation, especially for a proper filling of tobacco and, if appropriate, the presence of a filter. It is expedient for the test of the cigarettes to be carried out before the formation of cigarette groups as the content of a cigarette pack. The test is appropriately carried out in the region of a cigarette magazine or immediately in front of this.

In the apparatus according to the older German patent application P 37 29 213.7, a testing unit having a plurality of vertical test shafts located next to one another is arranged in an enlarged cigarette magazine. A vertically downward-running row of cigarettes arranged above one another is formed in each of these test shafts. The testing of the cigarettes is carried out in the region of their ends during a temporary standstill phase. The defective cigarettes are separated out of the testing unit in their longitudinal direction, whilst the intact cigarettes pass downwards into the

region of a cigarette store as result of their own weight.

A problem with this is that the cigarettes drop over a relatively great height in free fall before they strike the cigarettes in the cigarette store. This can result in damage to the cigarettes and also in slanted positions.

Starting from this, the object on which the preferred embodiment of the invention is based is to guarantee greater safety in the region of the testing unit, especially as regard the further transport of the tested cigarettes.

According to the present invention there is provided an apparatus for the testing of cigarettes in conjunction with a magazine of a packaging machine, rows of cigarettes located above one another being guided through a testing unit and being tested in the region of vertical test shafts of the latter by testing members in a test zone situated in the testing unit and above a cigarette store formed by the tested cigarettes, wherein straight vertical guide shafts are formed as a continuation of the test shafts underneath the test zone and terminate above the cigarette store, and wherein vertical plane straight guide-shaft walls limiting the guide shafts are arranged in the same vertical planes as test-shaft walls limiting the test shafts, so that tested intact cigarettes fall in an orderly and fault-free manner from said testing unit to the cigarette store.

According to another aspect of the present invention

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there is provided an apparatus for the testing of cigarettes in conjunction with a magazine of a packaging machine, rows of cigarettes located above one another being guided through a testing unit and being tested in the region of vertical test shafts of the latter by optoelectrical testing members in a test zone situated in the testing unit and above a cigarette store formed by the tested cigarettes, wherein guide shafts are formed as a continuation of the test shafts underneath the test zone and terminate above the cigarette store, and wherein the cigarette level in the cigarette store is monitored by check barriers comprising a lower check barrier for switching off the packaging machine, a middle check barrier for controlling the packaging machine or cigarette-producing machine in terms of their output and an upper check barrier for switching off a cigarette-producing machine.

According to a further aspect of the present invention there is provided an apparatus for the testing of cigarettes in conjunction with a magazine of a packaging machine, rows of cigarettes located above one another being guided through a testing unit and being tested in the region of vertical test shafts of the latter by optoelectrical testing members in a test zone situated in the testing unit and above a cigarette store formed by the tested cigarettes, wherein guide shafts are formed as a continuation of the test shafts underneath the test zone and terminate above the cigarette store, wherein said optoelectrical testing members are active in

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the region of the ends of the cigarettes, and wherein the testing members are arranged on a common test beam and are movable by means of the latter into, and retractably out of a testing position.

Preferred embodiments of the present invention will now be described by way of example only with reference to the accompanying drawings.

The invention is explained in detail by means of exemplary embodiments. In the drawing:

Figure 1 shows a front view and vertical section of part of a cigarette magazine in an older version.

Figure 2 likewise shows a front view and vertical section of a cutout of the cigarette magazine in a version according to the invention, on an enlarged scale (sectional plane II-II in Figure 3).

Figure 3 shows a vertical section, transverse relative to Figure 2, of the cigarette magazine in the region of the testing unit.

Figure 4 shows a representation similar to that of Figure 3, with cleaning tools in a changed relative position.

Figure 5 shows a horizontal section through a cutout of the cigarette magazine in the region of the testing unit.

Figure 6 shows a vertical section through the cigarette magazine in the region of testing members.

Figure 7 shows a representation corresponding to that of Figure 6, with testing members in a changed relative position.

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Figure 8 shows a view of a portion of a test beam with a cutout of the cigarette magazine,
Figure 9 shows a horizontal section at the level of the testing members, likewise in cutout form.

Figure 1 shows a cigarette magazine 10 in the version of the older patent application P 37 29 213.7. A testing unit 13 is arranged in an inner space limited by side walls 11, 12, approximately of half the height of the side walls 11, 12, converging upwards and downwards. Cigarettes 14 are checked in this testing unit 13 for a correct formation. Correctly formed cigarettes pass into a cigarette store 15 underneath the testing unit 13. In contrast, defective cigarettes are ejected in the longitudinal direction in the region of the testing unit 13.

The cigarette store 15 is located above magazine shafts 16 or above shaft groups 17 of such magazine shafts. At the lower ends of the magazine shafts 16, cigarette groups are ejected in the longitudinal direction of the cigarettes in proportion to the content of a cigarette pack. This corresponds to the conventional mode of operation of a cigarette magazine 10.

The testing unit 13 consists of a plurality of vertical test shafts 18 formed next to one another. In each of these is a cigarette row 19 of individual cigarettes 14 located above one another. The test shafts 18 are limited by a corresponding number of vertical and parallel test-shaft walls 20. A sufficient cigarette stock 21 is maintained constantly above the testing unit 13 by introducing appropriate quantities of cigarettes via an upper orifice in the cigarette magazine 10.

The cigarettes 14 are tested in the region of a test plane 22 by testing members, particularly optoelectrical sensors. As described in detail further below, these are on the one hand transmitters 23 and on the other hand receivers 24. In the exemplary embodiment illustrated, two cigarettes located above one another in a test shaft 18 are tested simultaneously in the

test plane 22 by a respective group of testing members.

During the test, the cigarettes 14 are secured momentarily in the test shafts 18, in the illustrated exemplary embodiment by clamping fingers 25 which are arranged laterally in the test shafts 18 and which each press a cigarette against a test-shaft wall 20 below the test plane 22.

At the lower outlet end of the test shafts 18, the cigarettes of the cigarette row 19 rest temporarily on a supporting member, particularly on supporting webs 26 of a comb-like transversely movable cigarette carrier 27. In the closing position for the test shafts 18 (Figures 1 and 2), the cigarettes previously identified as defective are ejected in the longitudinal direction. The cigarette carrier 27 is thereafter shifted transversely, so that the supporting webs 26 extend underneath the test-shaft walls 20. With cigarettes being clamped simultaneously by the clamping fingers 25, the two particular cigarettes located underneath the clamping fingers 25 can now pass downwards into the cigarette store 15.

The tested cigarettes are transferred to the cigarette store 15 by free fall. This is controlled by guide shafts 28 which are formed underneath the testing unit 13 in an extension or as a continuation of the test shafts 18. The guide shafts 28 are limited by vertical guide-shaft walls 29 which continue downwards in the planes of the test-shaft walls 20 and which are of the same width. The guide shafts 28 terminating immediately above the cigarette store 15 cause an aligned ordered fall movement of the tested cigarettes 14.

The level of the cigarettes 14 in the region of the cigarette store 15 is monitored, specifically by transversely directed check barriers (light barriers). A lower check barrier 30 marks the permissible minimum level of cigarettes within the cigarette store 15. If the cigarette stock decreases further, the following packaging machine is switched off.

A middle check barrier 31 in the region of the

cigarette store 15 marks the "normal stock" of cigarettes in the cigarette store 15. Upward or downward deviations give rise to a, within predetermined limits, higher output of either the packaging machine or a cigarette-producing machine preceding the cigarette magazine.

An upper check barrier 32 extends in the upper part of the guide shafts 28. If cigarettes have accumulated in the cigarette store 15 until there is a backflow into the guide shafts 28 as far as the check barrier 32, the supply of cigarettes to the cigarette magazine 10 is interrupted. The guide-shaft walls 29 are equipped with passage bores 33 for the passage of the check barrier 32.

As is evident from Figures 3 and 4, the guide-shaft walls 29 are respectively connected to or made in one piece with the associated test-shaft walls 20. In the lower region of the guide-shaft walls 29, the continuous shaft walls 20/29 are connected respectively to a rear wall 35 of the cigarette magazine 10 by means of a connecting web 34. In the one-piece shaft walls 20/29 are arranged transversely directed recesses 36 for receiving the clamping fingers 25 and shorter slots 37, particularly extending only over some of the transverse dimension of the shaft walls 20/29, and intended for the passage of the supporting webs 26 of the cigarette carrier 27. The abovementioned members are actuated outside the cigarette magazine 10, in particular next to the rear wall 35 (Figures 3 and 4).

The testing members, particularly the transmitters 23 and receivers 24, are arranged in a special way. For this, carriers for receiving all the testing members are arranged on both sides of the cigarette magazine 10. In the illustrated exemplary embodiments of the invention, these are test beams 38 (Figures 3, 4 and 5) and 39 (Figures 6 to 9). The transmitters 23 and receivers 24 assigned to each cigarette 14 are arranged on these test beams 38, 39.

In the exemplary embodiments shown, the cigar-

ettes are tested on the transmitted-light principle. Light-emitting transmitters 23 are mounted at the end faces of the cigarettes. These are assigned receivers 24 arranged laterally next to the cigarettes 14. In the present case, for each cigarette 14, two receivers are arranged above one another and on both sides of the cigarettes, specifically adjacent to the end faces. A transmitter 23 therefore acts on four receivers 24.

The test beams 38, 39 are made comb-like in view of the abovementioned test method. The transmitters 23 are located respectively in the region of recesses 40 (Figure 9). The receivers 24 are mounted on transversely directed flanks 41 of comb-like projections 42. The transmitters 23 and receivers 24 are connected to an electronic evaluation circuit, appropriately within the hollow test beams 38, 39. Any error signals from the transmitters 23 and receivers 24 are evaluated by this and converted into control signals for a cigarette ejector (not shown).

The rear wall 35 of the cigarette magazine 10 and a front wall 43, which consists of transparent plastic in this particular case, are each equipped with a clearance 44 for the passage of the test beams 38, 39. As a result of an appropriate movement, the test beams 38, 39 can be advanced via the clearance 44 to the facing ends of the cigarettes 14 in the test plane 22. So that the projection 42 of the comb-like test beams 38, 39 can enter the region between the adjacent cigarettes 14, in this region, particularly adjacent to the clearance 44, the test-shaft walls 20 are equipped with an offset 45. This allows the projections 42 to enter between the cigarettes 14 because the test-shaft walls 20 are made with a smaller width. The receivers 24 are therefore arranged at the sides of the cigarettes.

In the embodiment according to Figures 3 to 5, the test beams 38 are transversely movable, for example in a horizontal plane. In the testing position (Figure 3), the test beam 38 passes through the clearance 44 by means of the projections 42. To carry out repairs,

especially cleaning work, on the testing members, the test beams 38 can be retracted into a cleaning position according to Figure 4.

In this position, dust, etc., can be cleared from the transmitters 23 and receivers 24 by cleaning tools. According to Figure 4, cleaning brushes 46 are assigned to the test beams 38. The arrangement is such that a row of elongate vertical cleaning brushes 46 comes into engagement with each test beam 38. The appropriately designed cleaning brushes 46 enter the recesses 40 of the test beam 38, in such a way that the transmitters 23 arranged in the recesses 40 and the receivers 24 on the flanks 41 are cleaned. Cleaning takes place as result of a relative movement between the test beam 38 and cleaning brushes 46, in the present case by an up-and-down movement of the cleaning brushes 46.

For this purpose, these are arranged on brush carriers 47, 48 extending laterally next to the cigarette magazine 10, specifically as overhanging members directed downwards. The brush carriers 47, 48 are connected to one another at the ends, next to the cigarette magazine 10, by means of a crosspiece 49. This in turn is connected to a vertical lifting bolt 50, on which the frame-like supporting structure consisting of the brush carriers 47, 48 and of the crosspiece 49 is movable up and down by means of a sliding bush 51. The latter can be driven in a suitable way, for example by a connecting rod 52 movable up and down (Figure 2).

The lifting bolt 50 is supported on the bearing piece 53 which is connected laterally to the side walls 11, 12 of the cigarette magazine 10. The bearing piece 53 serves at the same time for fastening the test beams 38. These are mounted at their ends on transversely directed supporting journals 54. As result of a sliding movement on these supporting journals 54, the test beams 38 are shifted into the cleaning position or into the testing position.

In the embodiment according to Figures 6 to 9 too, the test beam 39 is mounted movably, in particular

pivotably. For this purpose, the test beam 39 designed as a hollow body here too is equipped, at its ends, with bearing journals 55 which are mounted rotatably in a transverse support 56. This is connected to the cigarette magazine 10 or to the side walls 11 and 12. A suitable rotary drive (gear-wheel drive) ensures a to-and-fro oscillating rotational movement of the bearing journal 55 and consequently of the test beams 39.

In this exemplary embodiment too, the movement of the test beams 39 takes place mainly in order to clean the transmitters 23 and receivers 24. For this purpose, stationary cleaning brushes are assigned to the two test beams 39. As result of (multiple) pivoting movements of the test beams 39, these are moved with the projections 42 and recesses 40 past the cleaning brushes 57, so that the sensors are cleaned.

In the present exemplary embodiment, the cleaning brushes 57 are mounted on the rear wall 35 and front wall 43 of the cigarette magazine 10, specifically pointing downwards at an angle.

So that the clearances 44 in the rear wall 35 and front wall 43 are closed during the cleaning of the sensors or when the test beams 39 are in a position outside the testing position (Figure 7), a closing segment 58 is attached to each of the test beams 39. This fits into the clearance 44.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An apparatus for the testing of cigarettes in conjunction with a magazine of a packaging machine, rows of cigarettes located above one another being guided through a testing unit and being tested in the region of vertical test shafts of the latter by testing members in a test zone situated in the testing unit and above a cigarette store formed by the tested cigarettes, wherein straight vertical guide shafts are formed as a continuation of the test shafts underneath the test zone and terminate above the cigarette store, and wherein vertical plane straight guide-shaft walls limiting the guide shafts are arranged in the same vertical planes as test-shaft walls limiting the test shafts, so that tested intact cigarettes fall in an orderly and fault-free manner from said testing unit to the cigarette store.

2. An apparatus for the testing of cigarettes in conjunction with a magazine of a packaging machine, rows of cigarettes located above one another being guided through a testing unit and being tested in the region of vertical test shafts of the latter by optoelectrical testing members in a test zone situated in the testing unit and above a cigarette store formed by the tested cigarettes, wherein guide shafts are formed as a continuation of the test shafts underneath the test zone and terminate above the cigarette store, and wherein the cigarette level in the cigarette store is monitored by check barriers comprising a lower check barrier for switching off the packaging machine, a middle check barrier for controlling the packaging machine or cigarette-producing machine in terms of their output and an upper check barrier for switching off a cigarette-producing machine.

3. An apparatus as claimed in claim 2, wherein vertical plane guide-shaft walls limiting the guide shafts are arranged in the same planes as test-shaft walls limiting the test shafts.

4. An apparatus as claimed in claim 1 or 2, wherein

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the test-shaft walls and the guide-shaft walls are connected to one another or are made in one piece and have recesses or slots for the reception or passage of transversely movable members of the testing unit.

5. An apparatus for the testing of cigarettes in conjunction with a magazine of a packaging machine, rows of cigarettes located above one another being guided through a testing unit and being tested in the region of vertical test shafts of the latter by optoelectrical testing members in a test zone situated in the testing unit and above a cigarette store formed by the tested cigarettes, wherein guide shafts are formed as a continuation of the test shafts underneath the test zone and terminate above the cigarette store, wherein said optoelectrical testing members are active in the region of the ends of the cigarettes, and wherein the testing members are arranged on a common test beam and are movable by means of the latter into, and retractably out of a testing position.

6. An apparatus as claimed in claim 5, wherein said testing members comprise transmitters, assigned to end faces of the cigarettes, and receivers assigned to the lateral end region of the cigarettes, said transmitters and receivers being arranged on said common test beam which is made comb-like for receiving the transmitters in the region of recesses and the receivers in the region of flanks of projections.

7. An apparatus as claimed in claim 5 or 6, wherein the test beam is designed as an elongate hollow body for the reception of electronic switch elements.

8. An apparatus as claimed in claim 6 wherein the test beam is movable into and retractable out of the testing position by means of a transverse movement, namely a to-and-fro movement transverse relative to the magazine.

9. An apparatus as claimed in claim 8, wherein test beams are arranged on both sides of the cigarette magazine and are mounted displaceably at their ends next

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to the cigarette magazine on supporting members.

10. An apparatus as claimed in claim 8, wherein, in the position of the test beam retracted from the cigarette magazine, cleaning members are advanced to the test beams in the region of the testing members, said cleaning members comprising cleaning brushes movable up and down and entering the region of the recesses between the projections.

11. An apparatus as claimed in claim 5, wherein the test beam is mounted pivotably and is movable out of and into the testing position by means of a pivoting movement.

12. An apparatus as claimed in claim 11, wherein the testing members of the test beams are cleaned as a result of a multiple pivoting movement in relation to cleaning brushes of fixed location.

13. An apparatus as claimed in claim 11, wherein clearances are arranged in a rear wall and front wall of the magazine for the passage of a region of the test beam having the testing members.

14. An apparatus as claimed in claim 13, wherein, with the test beam retracted or pivoted, the clearances are closed by means of movable closing members.

15. An apparatus for the testing of cigarettes in conjunction with a packaging machine according to any one embodiment substantially as hereinbefore described with reference to Figures 2 to 9.

Dated this 25th day of June 1991.

FOCKE & CO. (GmbH & CO.)
By their Patent Attorney
GRIFFITH HACK & CO.

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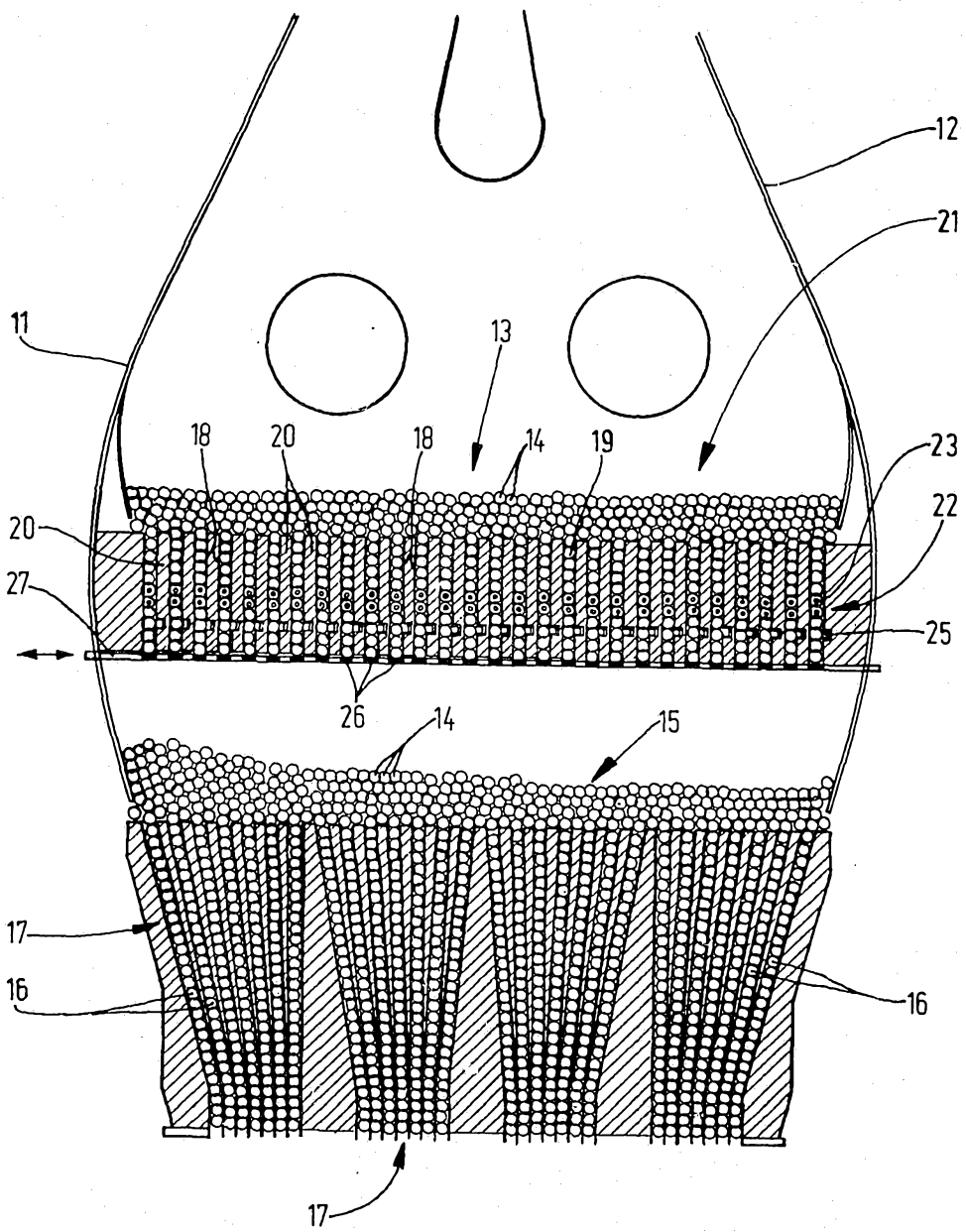


Fig. 1

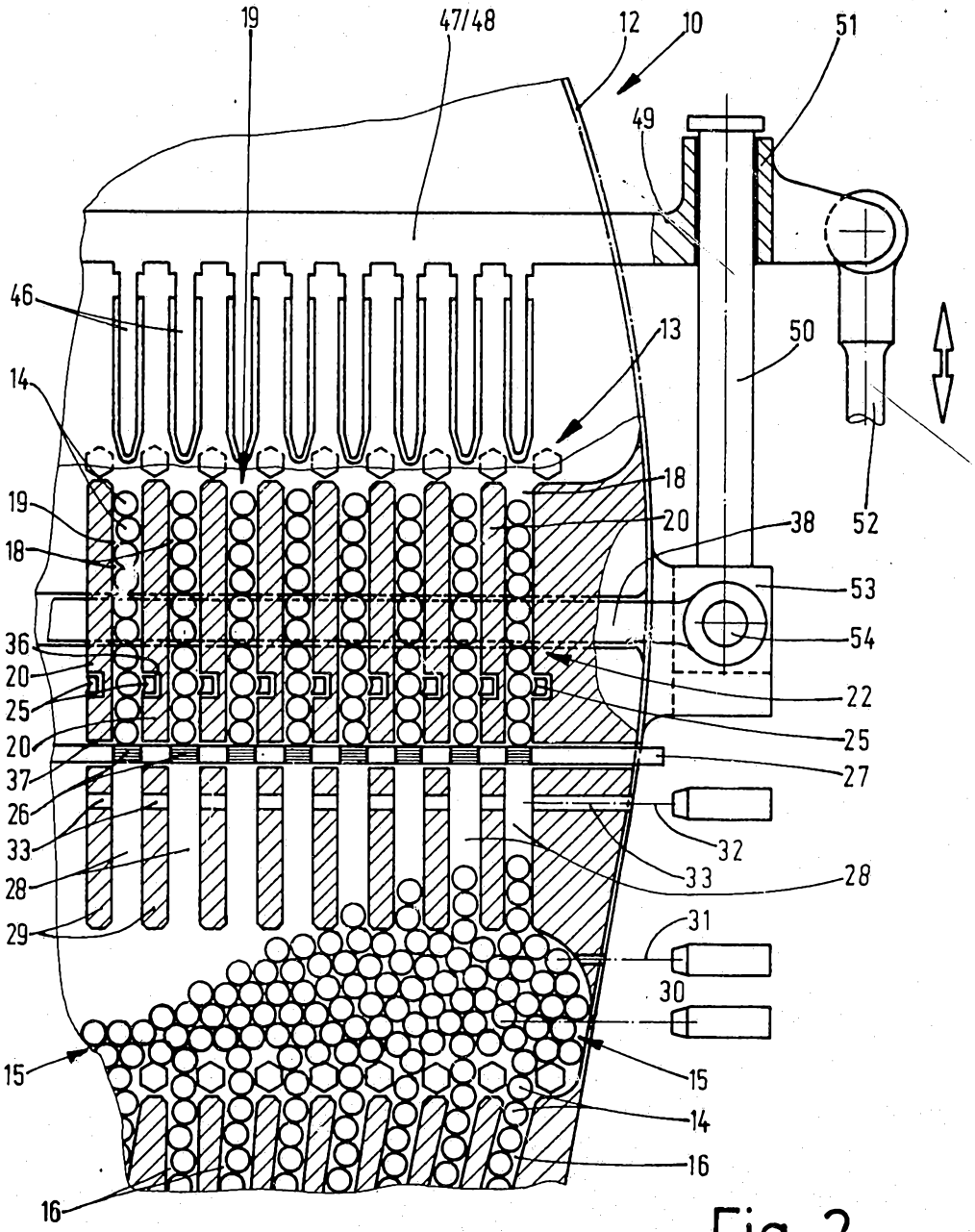

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Fig. 2

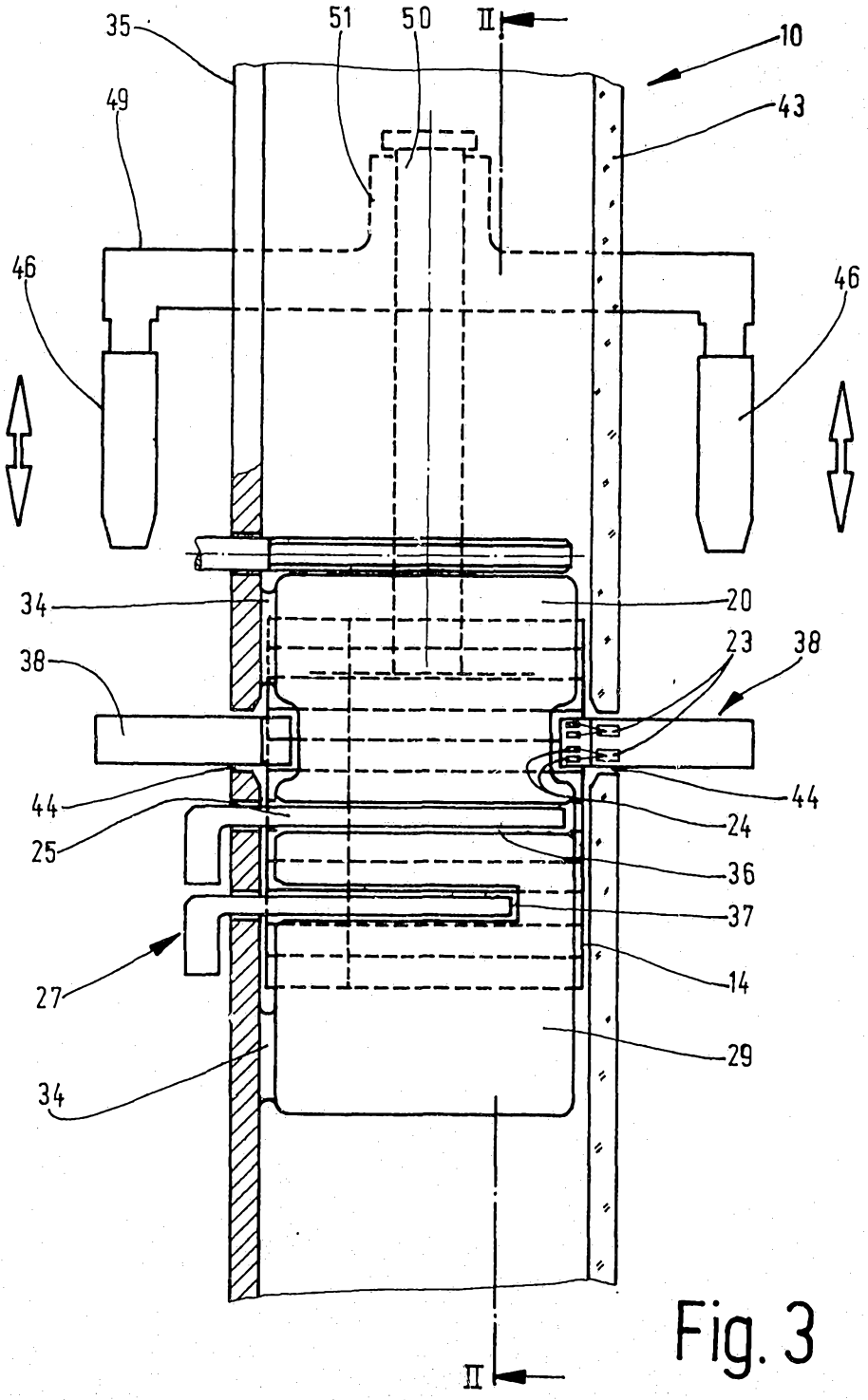

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Fig. 3

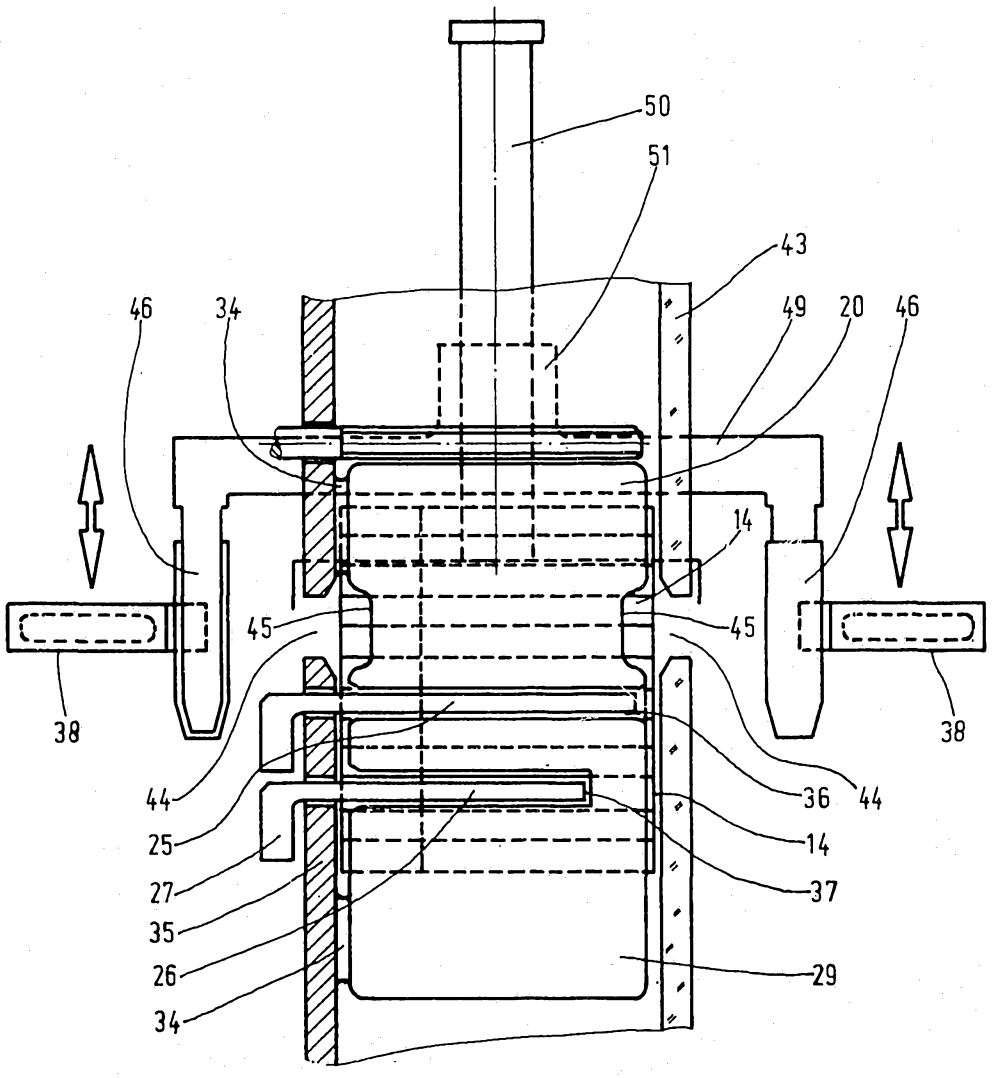


Fig. 4

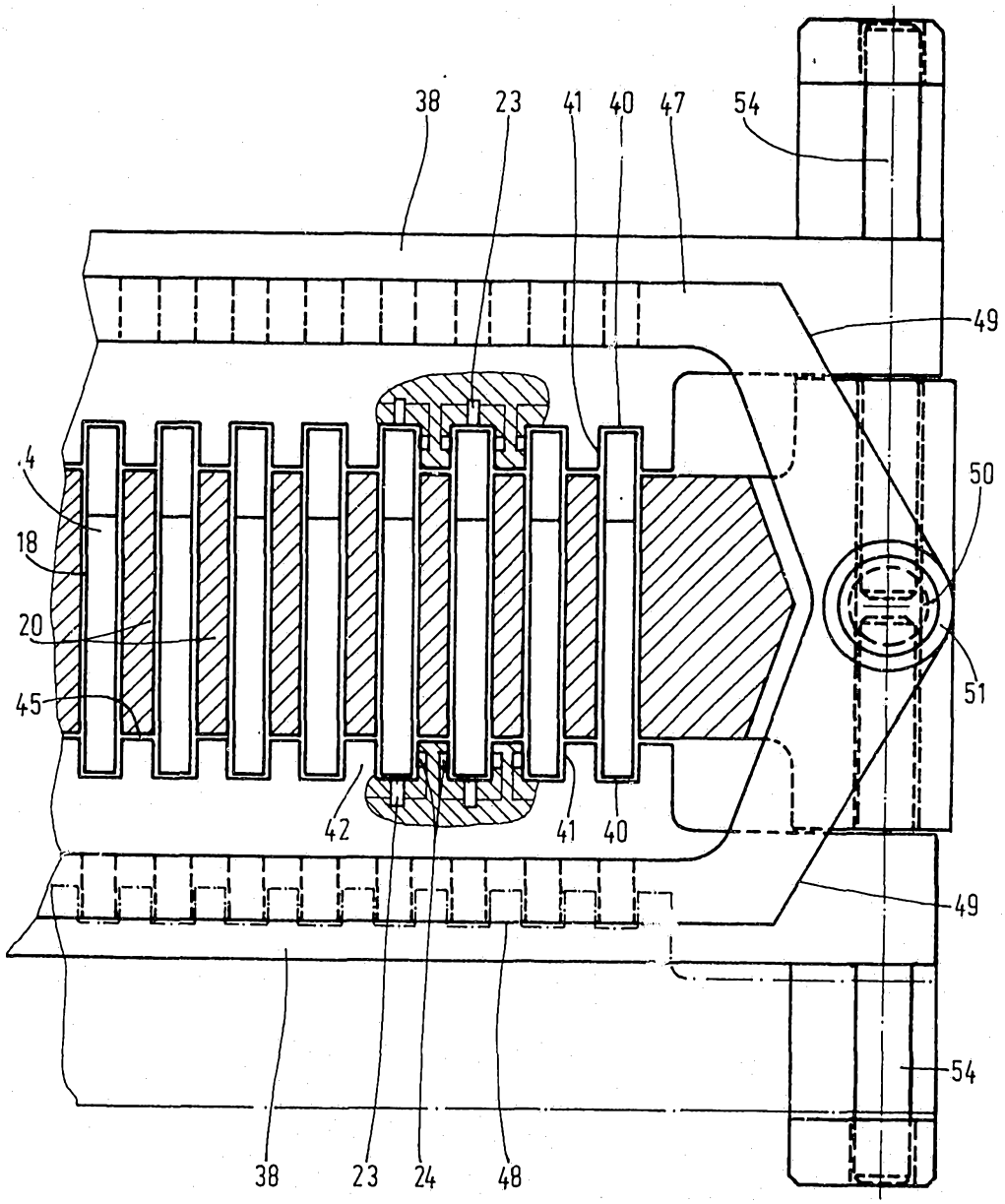
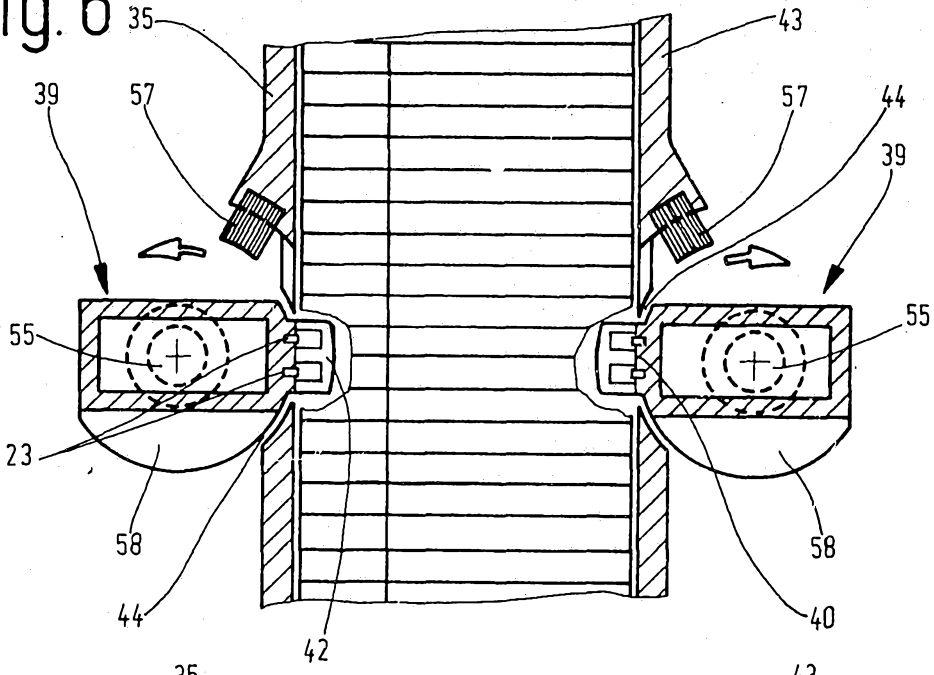


Fig. 5

Fig. 6


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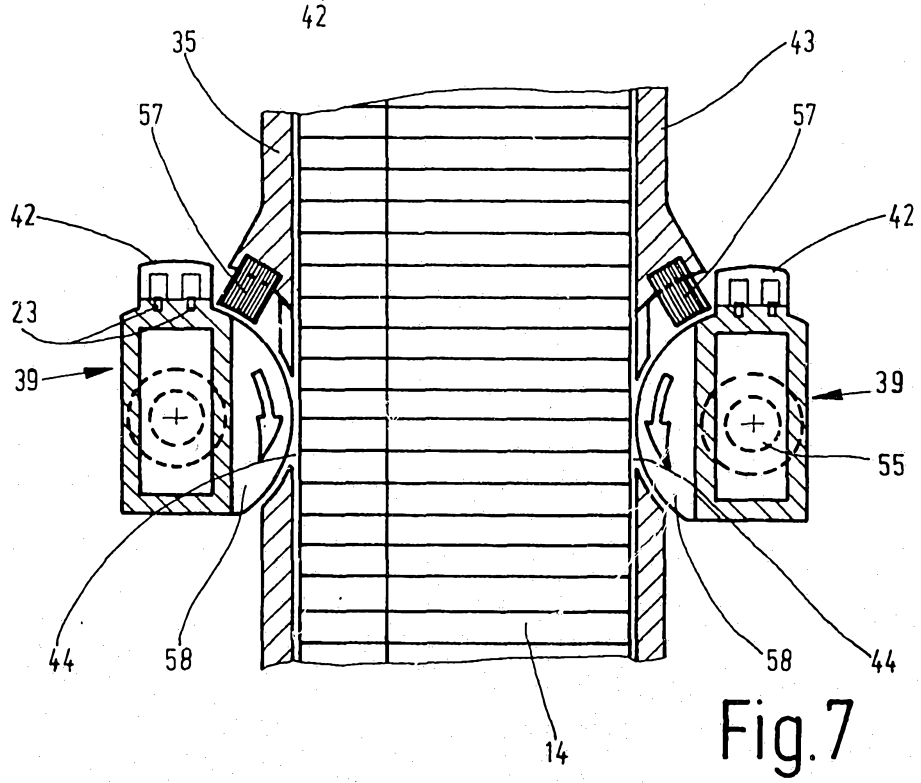

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Fig. 7

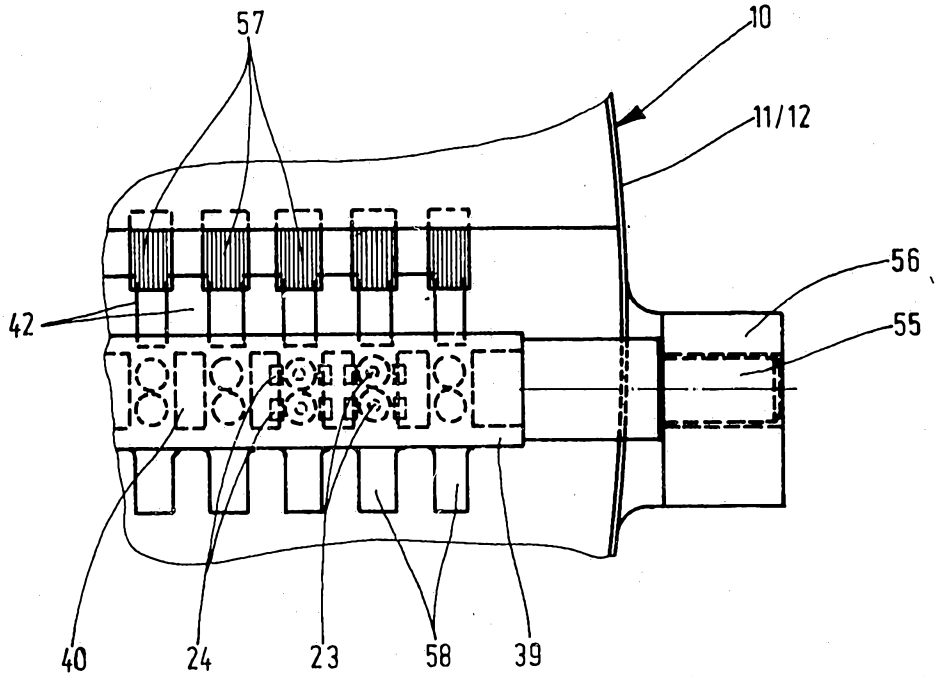


Fig. 8

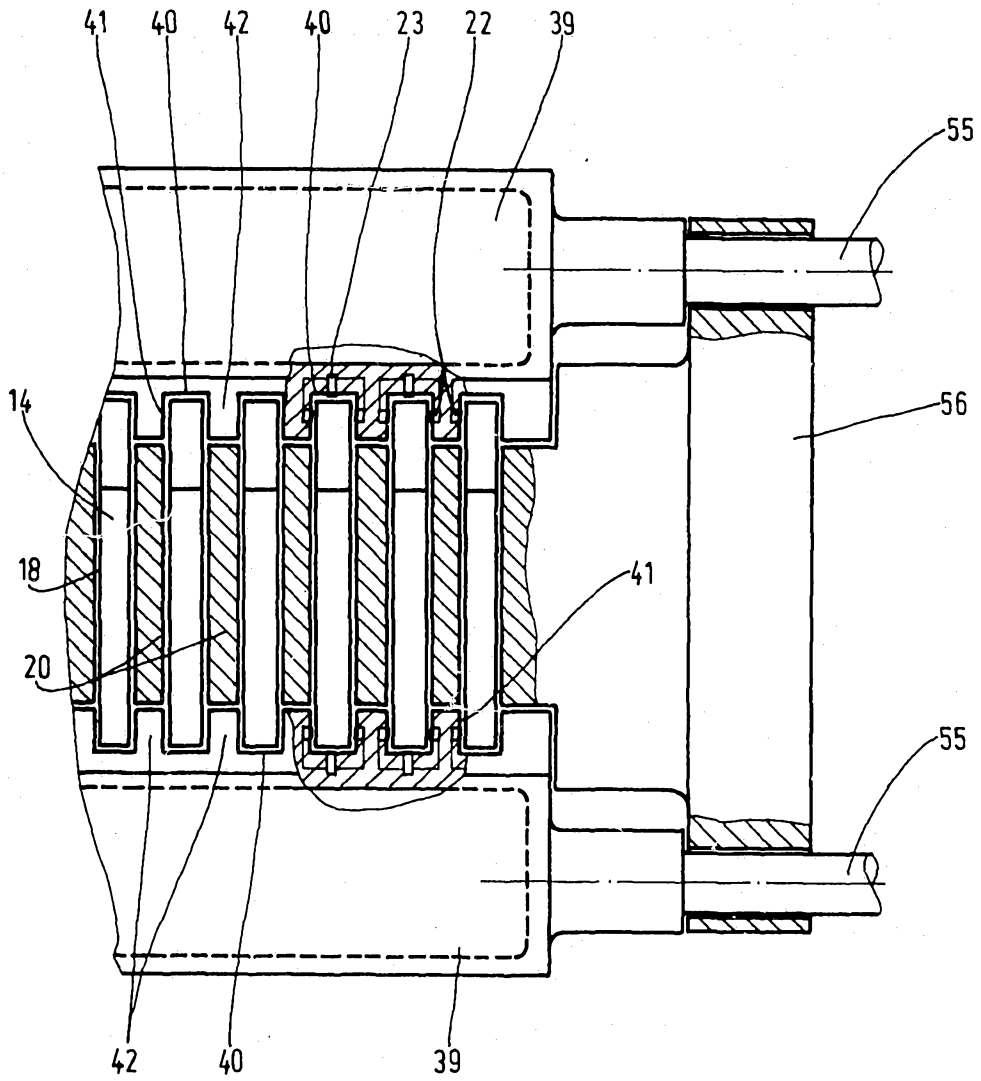


Fig. 9