APPLICATION ACCEPTED AND AMENDMENTS ALLOWED 6-4-90

1262-P9/GJD/PRT/KLW/3465T.8

PATENT APPLICATION FORM

COMMONWEALTH OF AUSTRALIA

Patents Act 1952

Regulation 9

79372/87

598306

I, FABRIQUE NATIONALE HERSTAL

of Voie de Liege 33 - 4400 HERSTAL, BELGIUM

hereby apply for the grant of a Standard Patent for an invention entitled TELESCOPIC GRENADE

which is described in the accompanying complete specification.

For a Convention application - details of basic application-

Number	Country	Date of Application
PV 2/61065 (def. No 905.563)	Belgium	7th October 1986

Our address for service is ARTHUR S. CAVE & CO., Patent and Trade Mark Attorneys, 1 Alfred Street, Sydney, New South Wales, Australia 2000.

Dated this 29th day of September, 1987.

FABRIQUE NATIONALE HERSTAL
By Its Patent Attorneys,
ARTHUR S. CAVE & CO.

P.R. TAYLOR F.I.P.A.A.

To:
Commissioner of Patents

ARTHUR S. CAVE & CO.
PATENT AND TRADE MARK ATTORNEYS
SYDNEY

ASC 1

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PATENT DECLARATION FORM (CONVENTION)

COMMONWEALTH OF AUSTRALIA

Patents Act 1952

DECLARATION IN SUPPORT OF A CONVENTION APPLICATION FOR A PATENT

In support of the Convention application made for a patent for an invention entitled: TELESCOPIC GRENADE

I, PAUL R TAYLOR

of 10 Barrack Street, Sydney, New South Wales, 2000, Australia

do solemnly and sincerely declare as follows:-

1. We are authorised by FABRIQUE NATIONAL HERSTAL the applicant for the patent to make this declaration on its behalf.

2. The basic Application as defined by Section 141 of the Act was made in the following country on the following date namely:-

in Belgium on 7 October, 1986 by FABRIQUE NATIONAL HERSTAL

3. ANDRE GABRIELS of Bonderstraat 76, 3600, Genk, Belgium is the actual inventor of the invention and the facts upon which the applicant is entitled to make the application are as follows:

The inventor is an employee of the applicant and the applicant is entitled to apply by virtue of Section 34(1)(fa) of the Patents Act.

4. The basic application referred to in paragraph 2 of this Declaration was the first application made in a Convention country in respect of the invention the subject of the application.

Declared at Sydney this 2nd day of April, 1990.

To:

The Commissioner of Patents

ARTHUR S. CAVE & CO.

PATENT AND TRADE MARK ATTORNEYS

SYDNEY

Signature of Declarant

(12) PATENT ABRIDGMENT (11) Document No. AU-B-79372/87
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 598306

(54) Title
TELESCOPIC MISSILE

International Patent Classification(s)
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(21) Application No. : **79372/87** (22) Application Date : **02.10.87**

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905563	**07.10.86**	**BE BELGIUM**

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(71) Applicant(s)
FABRIQUE NATIONALE HERSTAL

(72) Inventor(s)
ANDRE GABRIELS

(74) Attorney or Agent
ARTHUR S. CAVE & CO.

(56) Prior Art Documents
US 4448129

(57) Claim

1. A telescopic grenade comprising:

a first tubular tail portion having a head portion firmly attached to a first end thereof, the first tail portion and/or the head portion carrying an explosive charge and a first part of a detonator chain; and

a second tubular tail portion telescopically engaging the first tail portion and carrying a second part of the detonator chain, the tail portion comprised of a tubular tail section and a casing mounted on the tail section, the casing longitudinally movable relative to the tail section under the action of propellent gases when the grenade is fired, wherein the casing is mounted at one end of the tail section, the one end nearer the first end of the first tail portion than the other end thereof;

.../2

guiding means which determines the relative rotational positions of the first and second tail portions dependent on their relative axial positions; and

means for preventing accidental detonation of the grenade prior to firing of the grenade, and said longitudinal movement of the casing.

1262-P9/GJD/PRT/KLW/3465T.9

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AUSTRALIA

PATENTS ACT 1952

COMPLETE SPECIFICATION

(ORIGINAL)

FOR OFFICE USE

Application Number:
Lodged:

Complete Specification Lodged:
Accepted:
Published:

Priority:
Related Art:

This document contains the amendments made under Section 49 and is correct for printing.

TO BE COMPLETED BY APPLICANT

Name of Applicant: FABRIQUE NATIONALE HERSTAL

Address of Applicant: Voie de Liege 33 - 4400
HERSTAL, BELGIUM

Actual Inventor: Mr Andre GABRIELS

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Patent & Trade Mark Attorneys
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AUSTRALIA

Complete Specification for the invention entitled "TELESCOPIC GRENADE".

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

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ASC 49

Telescopic grenade.

This invention concerns a telescopic grenade, for instance a grenade designed to be launched by means of a rifle and fitted with a bullet way. We are already familiar with telescopic grenades provided with a head and a tubular tail prolonging the head, the grenade containing an explosive charge as well as a detonator chain for the explosive charge, the aforesaid tail being made of two telescopic tubular parts, one of which is firmly attached to the aforesaid head and carries together with the head a first portion of the aforesaid detonator chain, the other of said telescopic tubular parts carrying the remaining portion of this detonator chain, the grenade comprising guiding means distributed on the aforesaid two parts so as to assign them a relative position around the grenade axis the one with respect to the other, depending on their relative axial position.

Although these well-known grenades are very effective, this invention concerns such a grenade that features significant advantages in addition to the advantages of the grenades already known.

These additional advantages are a.o. those below:

very simple and robust explosive charge;

very reliable system;

shock-resistant system;

precise position and locking of telescopic elements in the extended position;

safety at the beinning of the trajectory;

controllable impact sensitivity.

Accordingly, the invention provides, in one broad form a telescopic grenade comprising:

a first tubular tail portion having a head portion firmly attached to a first end thereof, the first tail portion and/or the head portion carrying an explosive charge and a first part of a detonator chain; and

a second tubular tail portion telescopically engaging the first tail portion and carrying a second part of the detonator chain, the tail portion comprised of a tubular tail section and a casing mounted on the tail section, the casing longitudinally movable relative to the tail section under the action of propellent gases when the grenade is fired, wherein the casing is mounted at one end of the tail section, the one end nearer the first end of the first tail portion than the other end thereof;

guiding means which determines the relative rotational

positions of the first and second tail portions dependent on their relative axial positions; and

means for preventing accidental detonation of the grenade prior to firing of the grenade, and said longitudinal movement of the casing.

For the sake of greater clarity, one examplary embodiment of the invention is described below, for purposes of illustration and without any restriction in mind, by referring to the appended drawings, where:

Figure 1 shows a grenade according to the invention in storage and transport position,

Figure 2 shows the grenade according to figure 1 in launching position i.e. prior to firing;

Figure 3 shows an enlarged section according to line III-III of figure 2;

Figure 4 shows an enlarged scale view of the part referred

to by F4 in figure 2;

figures 5 and 6 show sections according to lines V-V and VI-VI of figure 4;

figure 7 shows the grenade according to figure 1 in the launched position i.e. subsequent to firing but prior to impact, specifically according to line VII-VII of figure 1;

figur 8 shows a section according to line VIII-VIII of figure 7;

figure 9 shows an enlarged scale section of the part referred to by F9 in figure 7;

figure 10 is a view similar to that of figure 4, but for an alternative embodiment;

figure 11 shows an alternative embodiment of figure 2.

The grenade shown by the figures has a head 1 and a telescopic tubular tail 2 with stabilizer 3. The tail 2 is made of two parts 4-5 of which part 4 is firmly attached to the head 1, the part 5 being able to slide over the first part. The head 1 has inside a plate 6 provided with a percussion tip 7 and a device 8 that prevents an involuntary explosion in flight. The head 1 is fitted to the end of a casing 9, the other end of which casing is provided with a flange 10.

Around the casing 9 and between the plate 6 and the flange 10 is located a body 11 that constitutes the explosive charge of the grenade. This body 11 presents one single longitudinal

groove 12 that is prolonged at its end closest to the head 1, by a curved part 13.

With the groove 12-13 co-operates a finger 14 fixed in a case 15, which case is so assembled that it can slide axially on part 5 of the tail 2.

Between the two tubular parts 4-5 of the tail 2 is provided a chamber 16 in which is housed a spring 17 that bears against a shoulder 18 of the flange 10. The flange 10 features a circular groove 19 that communicates, in the position of figure 2, with radial holes 20 provided in the aforesaid part 5, which holes communicate themselves with a circular chamber 21 in the case 15. Into the groove 19 emerge two grooves 22 putting the groove 19 in communication with the inside of the aforesaid part 5. The flange 10 has two radial chambers 23-24 that house each a ball 25 on which acts a spring 26.

The aforesaid part 5 of the tail 2 features two notches 27-28 with which the balls 25 can co-operate.

The case 15 is fitted to the aforesaid part 5 by means of a deformable bowl 29 that allows, subsequent to deformation, a translation movement of the case 15 with respect to the part 5. In a groove of the case 15 is assembled an elastic locking ring 36 that can co-operate with a groove 37 in part 5.

The pyrotechnic detonator includes the percussion tip 7, a detonator 30 and a relay 31 sunk into the aforesaid explosive charge 11. The percussion tip 7 as well as the relay 31 are part of the head 1 while the detonator 30 is placed in a notch of the case 15, which case 15 is part of the telescopic tubular tail 2.

The aforesaid device 8 that prevents an untimely explosion in flight consists of a damper 32 of which the dampening action is determined by a spring 33.

Finally, the head 1 is extended by a protective tube 34 for the explosive charge 11.

The grenade described above is used and functions in the following manner.

In the storage/transport position (figure 1), part 5 together with case 16 takes up a determined position around the axis as compared to the head 1 and the part 4 in such a manner that the tip 7 is out of alignment with the detonator 30, any relative movement of the part 5 towards plate 6 of the head 1 being prevented by the contact of a protrusion 35 fitted to the aforesaid part 5 against the plate 6 or by the contact of a protrusion 35 fitted to the plate 6 against the part (5).

To bring the grenade into firing position (figure 2), a traction is applied to the part 5 with respect to the head 1. The finger 14 slides in the groove 12 until the balls 25 enter into the notches 27-28 and thus determine the precise relative position of the parts 4 and 5. In this position, the spring 17 is under pressure.

The grenade is ready to be engaged onto the flange at the end of the barrel of a rifle used for its launching.

During the launching, the propellent gasses penetrate via the grooves 22 into the circular groove 19 and thus via the holes 20 into the groove 21. Under the effect of the propellent gasses on the walls of this groove 21, the case 15 moves with respect to tubular part 5 while deforming the bowl 29. At the end of the movement, the elastic ring 36 drops into the groove 37 and thus ensures the locking of the case 15 to part 5. At the same time and under the action of the propellent gasses, the balls 25 move in the two radial chambers 23-24 against the pressure of the springs 26, said springs undergoing such a deformation that they become inoperative.

After the grenade has left the flange of the rifle, the parts 4-5 of the grenade engage one into the other, due to the release of spring 17 and the aerodynamic forces, while the

finger 14 runs first through the groove 12 and then through the curved groove 13.

When the finger 14 enters the groove 13, it entails the rotation of part 5 as compared to the head 1 and the part 4. The grenade is now in the position of figure 7 in which the pyrotechnic chain is in alignment.

In this position, the device 8 prevents any further progression of part 5 up to the time of impact. The spring 33 has been calculated, as a matter of fact, to avoid any untimely explosion, for instance through contact of the grenade with tropical rain etc.

At the time of impact, the substantial mass of part 5 is put into movement and part 5 imparts all of its energy to the detonator 30 when the latter is striking the percussion tip 7.

It should be noted that the safety at the beginning of the trajectory of the grenade according to the invention can be controlled through the presence of tube 34 with which case 15 is co-operating. During the progress of case 15 in tube 34, as a matter of fact, case 15 acts in tube 34 like a dash-pot slowing down the aforesaid progress to some extent while clearing via a calibrated opening, the air that is present in the free space 38, which free space is created when the

grenade is in the position as shown by figure 2. The calibrated opening may be achieved by the radial clearance between the outer diameter of the case 15 and the inner diameter of the tube 34.

In a preferred embodiment, the aforesaid springs 26 will be calculated so that they remain deformed after the grenade has been launched in order to prevent any friction of the balls 25 against the inner wall of part 5.

As shown in the drawings, a back-up charge 40 may be lodged in the free space formed by the bullet way plug 41 and the flange 10.

Figure 10 shows an embodiment in which is interposed, between the springs 26, a bar 39 made of frangible material that can be destroyed by the passing bullet so as to make the support of the springs 26 disappear.

Figure 11 show an embodiment where the groove 12 is provided for in the tube 34 while the groove 13 is provided for in an protrusion 42 of the plate 6.

Obviously, numerous changes can be made in the example described above without exceeding the framework of the invention.

The claims defining the invention are as follows:

1. A telescopic grenade comprising:

a first tubular tail portion having a head portion firmly attached to a first end thereof, the first tail portion and/or the head portion carrying an explosive charge and a first part of a detonator chain; and

a second tubular tail portion telescopically engaging the first tail portion and carrying a second part of the detonator chain, the tail portion comprised of a tubular tail section and a casing mounted on the tail section, the casing longitudinally movable relative to the tail section under the action of propellent gases when the grenade is fired, wherein the casing is mounted at one end of the tail section, the one end nearer the first end of the first tail portion than the other end thereof;

guiding means which determines the relative rotational positions of the first and second tail portions dependent on their relative axial positions; and

means for preventing accidental detonation of the grenade prior to firing of the grenade, and said longitudinal movement of the casing.

2. The telescopic grenade of claim 1 wherein the means for preventing accidental detonation comprises an extension on the end of the tail section directed towards the head.

3. The telescopic grenade of claim 1 wherein the means for preventing accidental detonation comprises an extension on the head directed towards the tail section.

4. The telescopic grenade of claim 1 further including means to releasably secure the first and second tail portions in a firing position, comprising at least one spring biased ball mounted on the first tail portion, and at least one complementary groove in the tail section, the at least one ball and at least one complementary groove engaging together when the grenade is in the firing position to releasably secure the first and second tail portions in said firing position.

5. The telescopic grenade of claim 4 wherein the spring biasing the ball is deformed upon firing the grenade such that the means to releasably secure is no longer operative.

6. The telescopic grenade of claim 4 wherein there are two diametrically opposed spring biased balls, and a bar of frangiable material is interposed between the two springs.

7. The telescopic grenade of any one of claims 1 to 6 wherein the tail section surrounds the first tail portion and the first tail portion has at least one longitudinal groove in its outer surface extending from the other end thereof towards the one end and communicating with an annular groove therein adjacent the other end, the tail section having at least one passageway through its wall which communicates with the annular groove when the grenade is in a firing position, the casing is tubular, located around one end of the tail section and encloses an annular space between itself and the tail section, the annular space communicating with the at least one passageway, whereby propellant gasses enter the annular space from the at least one longitudinal groove and cause said

longitudinal movement of the casing and the tail section

8. The telescopic grenade of claim 7 wherein the casing carries the remainder of the detonator chain.

9. The telescopic grenade of claim 7 wherein the guiding means comprises a finger mounted on the casing which cooperates with a groove in the head, and/or the first tail portion or/and the explosive.

10. The telescopic grenade of claim 9 wherein the groove is in the explosive.

11. The grenade of claim 9 wherein the groove is in the head and a tubular extension from the head.

12. The grenade of claim 7 wherein the casing is rendered immovable on the tail section by retaining means, said retaining means deforming under the action of the propellent gases to allow said relative movement.

13. The grenade of claim 1 further including means to prevent accidental detonation of the grenade following firing, said means comprising a spring biased damper against which the casing is urged following firing and which the casing must overcome such that the remainder of the detonator chain may contact the part of the detonator chain.

14. The grenade of claim 1 wherein the damper and the part of the detonator chain are mounted on the head portion.

15. The grenade of clam 1 wherein there are means for preventing accidental detonation following firing, said means comprising a tubular extension extending from the head which closely surrounds the casing so as to act as an air controlled

damper.

16. A telescopic grenade, substantially as herein described with reference to the drawings.

DATED this 5th day of March, 1990.

FABRIQUE NATIONALE HERSTAL
By Its Patent Attorneys
ARTHUR S. CAVE & CO.

Fig. 1

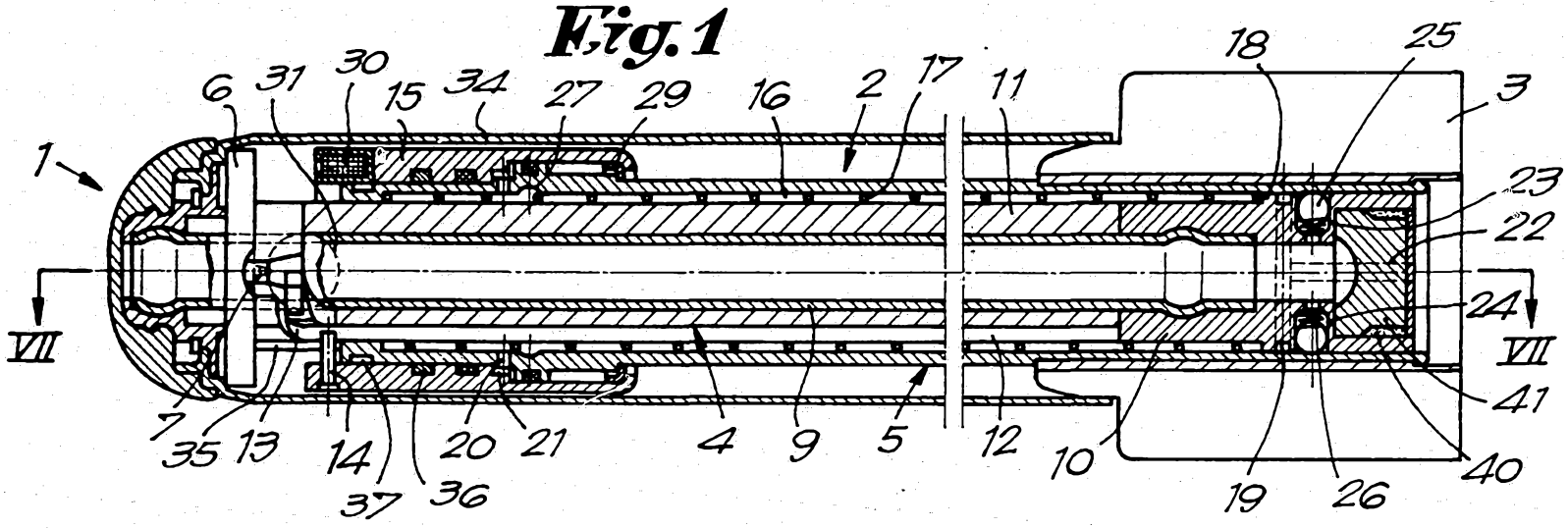
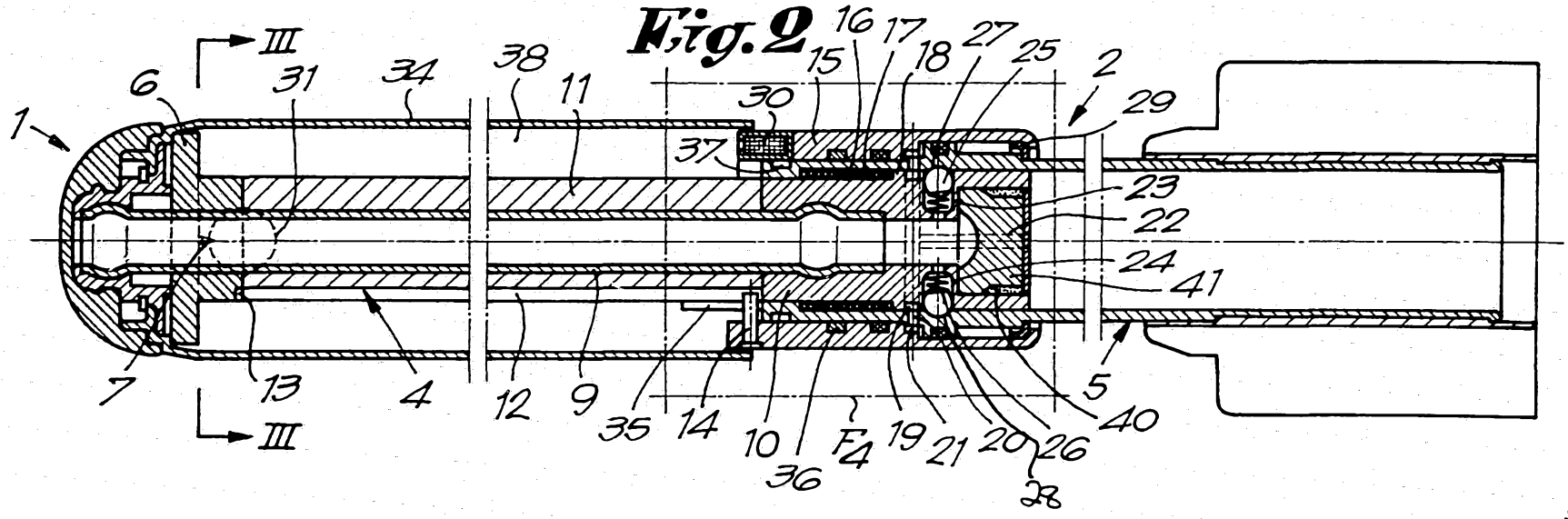


Fig. 2



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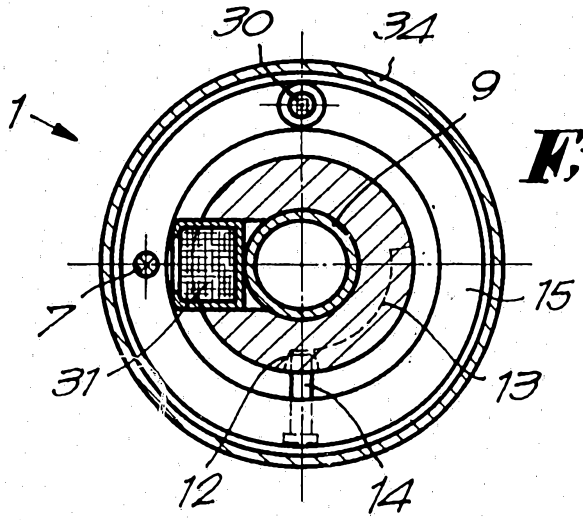

Fig. 3

Fig. 4

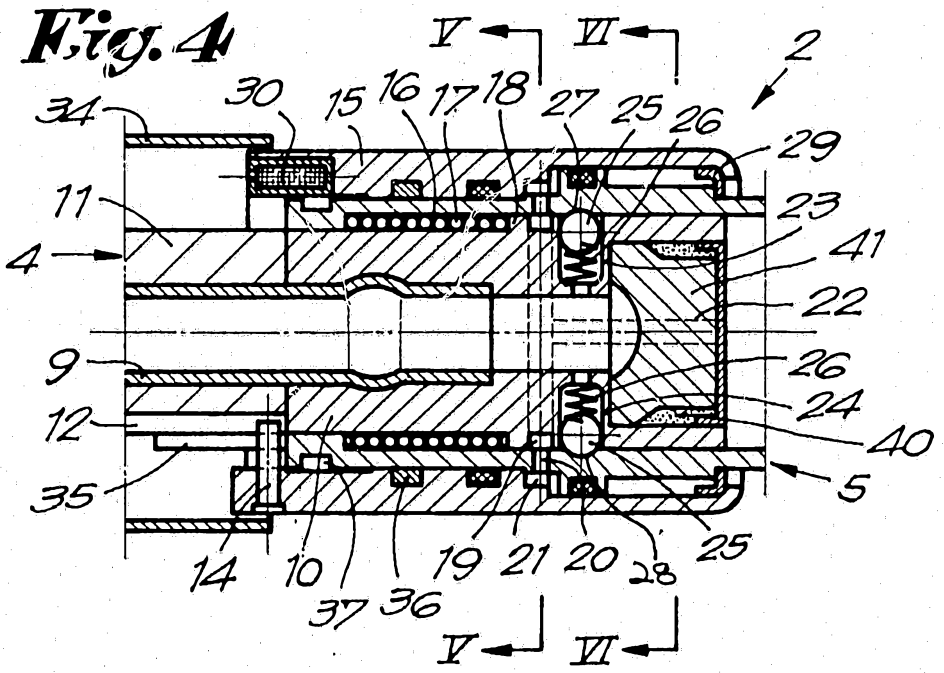

Fig. 5

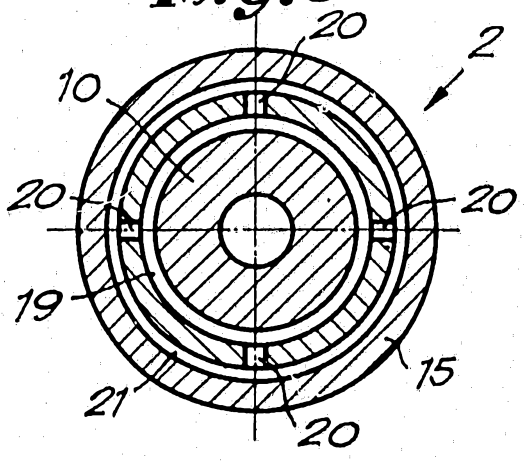

Fig. 6

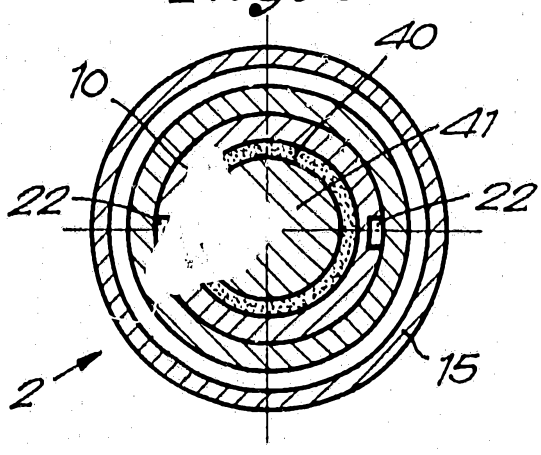

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Fig.7

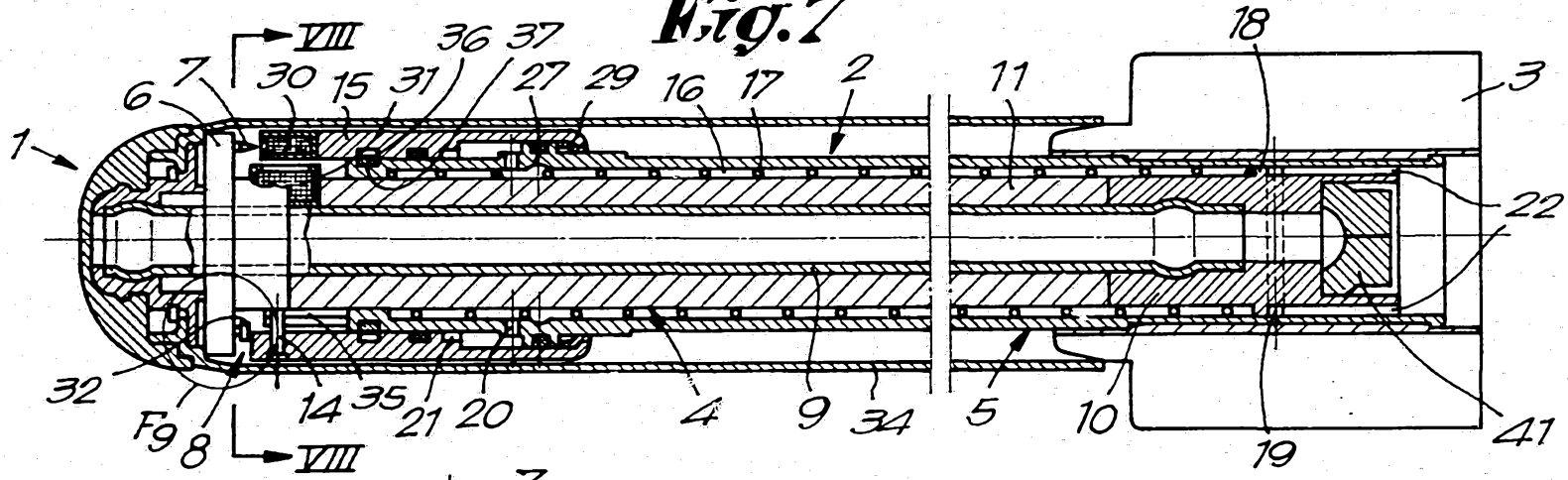


Fig.8

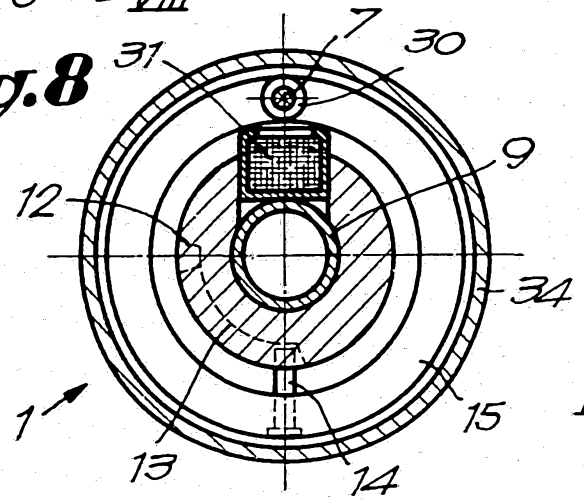
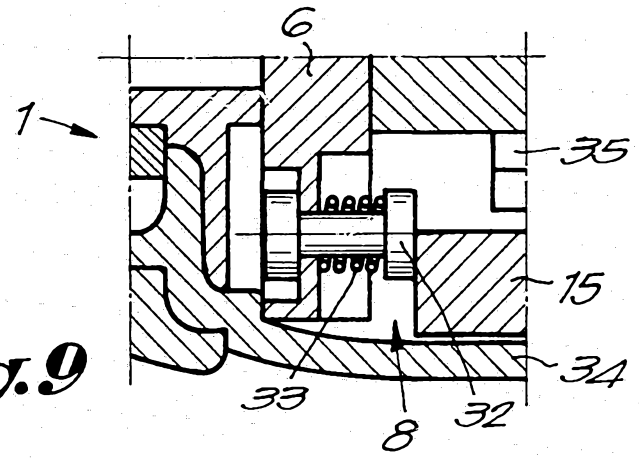


Fig.9



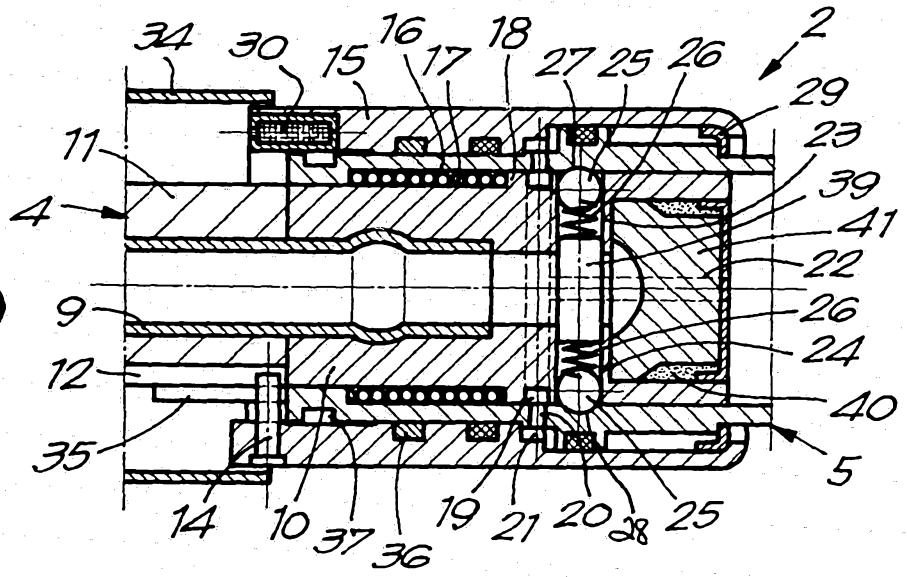

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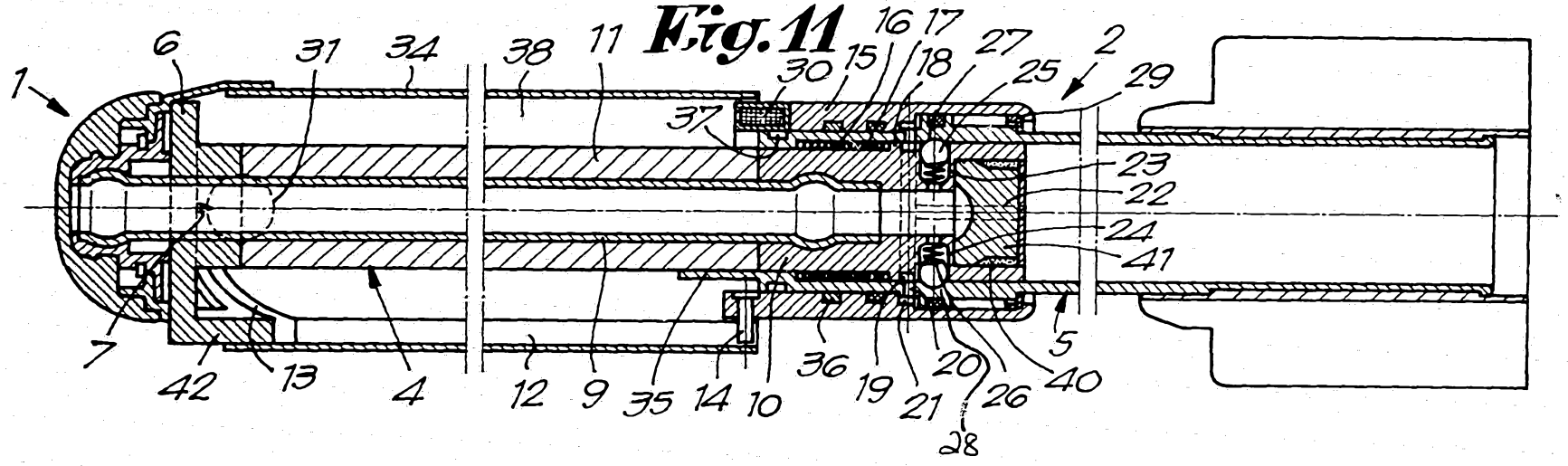
Fig.10

Fig.11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