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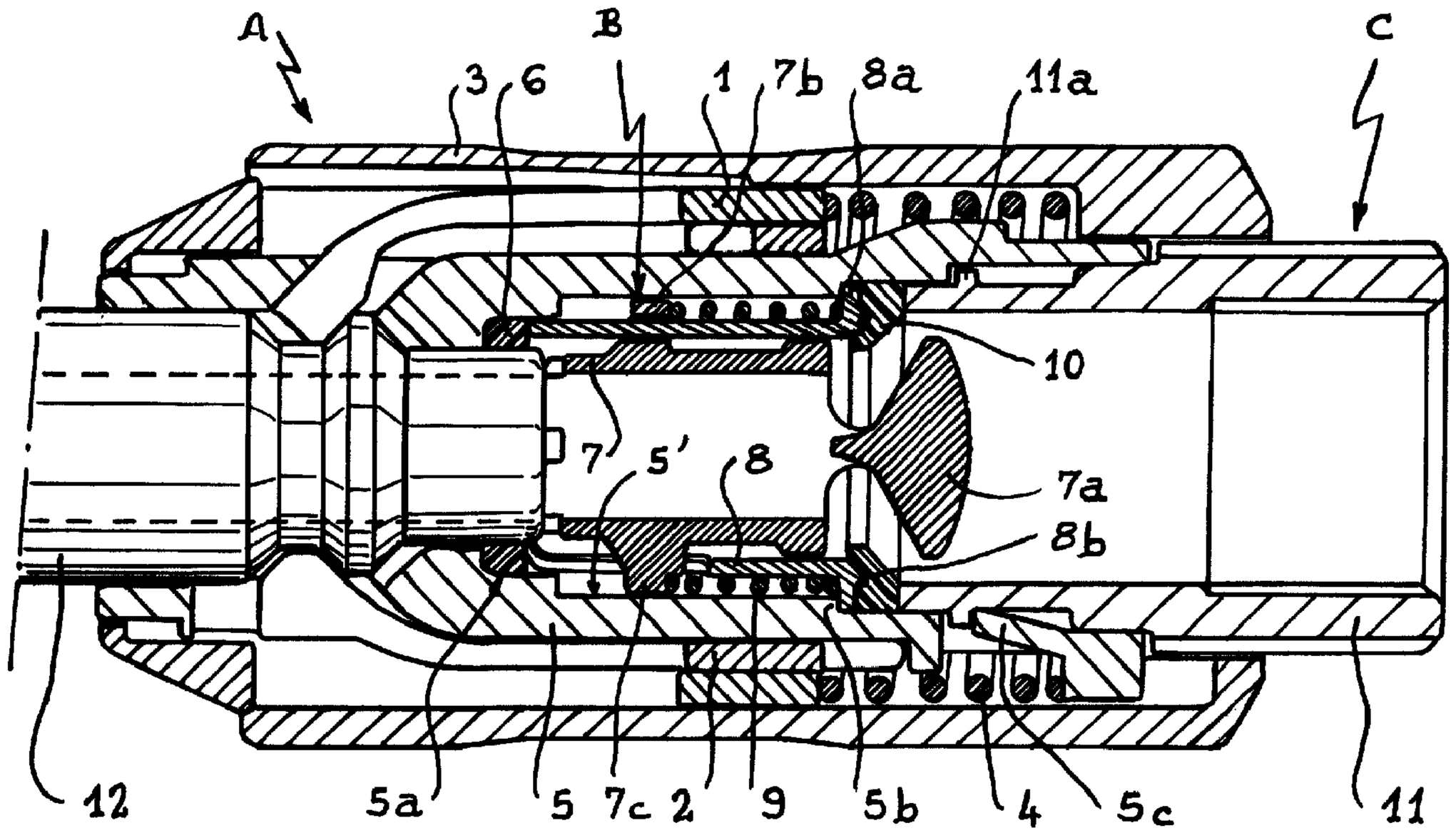
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(54) **Titre : AMELIORATIONS APPORTEES AUX RACCORDS RAPIDES**
(54) **Title: IMPROVEMENTS IN QUICK CONNECTIONS**



(57) **Abrégé/Abstract**:
This invention relates to quick connections for removably coupling pipes, incorporating a valve and an O-ring, wherein the valve, its spring, a fixed ring and the seat or O-ring constitute an independent assembly which is mounted in the principal piece of the body of the female element. The rear piece of this body is fixed by elastically clipping tongues behind an annular projection.

ABSTRACT OF THE DISCLOSURE

This invention relates to quick connections for removably coupling pipes, incorporating a valve and an O-ring, wherein the valve, its spring, a fixed ring and the seat or O-ring constitute an independent assembly which is mounted in the principal piece of the body of the female element. The rear piece of this body is fixed by elastically clipping tongues behind an annular projection.

FIELD OF THE INVENTION

The present invention relates to quick connection devices used for the dismountable coupling of pipes, and in particular to those which comprise two male and female elements fixed at the ends of the pipes to be connected and adapted to fit one in the other, provoking automatic opening of a loaded valve provided inside the female element.

BACKGROUND OF THE INVENTION

In known constructions, the body of the female element is generally constituted by the tight assembly of two tubular pieces, ordinarily screwed one in the other, ensuring at the same time assembly of the valve and of the closure spring which is associated therewith, which valve, directly mounted in the core of the body, cooperates with a seat formed by an O-ring suitably retained inside one of the afore-mentioned pieces.

It will be readily appreciated that such a structure does not lend itself well to automatic assembly employing robots or manipulators. Furthermore, it will be recalled that the shape and dimensions of the rear piece of the body which is intended to be fastened to the end of a pipe, vary as a function of the type of coupling envisaged, which obviously complicates storage of the connections if it is desired to have a wide range of products available.

It is an object of the present invention to overcome these drawbacks.

SUMMARY OF THE INVENTION

The present invention therefore relates to a quick connection for removably coupling pipes, of the type in which the tubular body of the female element, constituted by the tight assembly of a principal piece and a rear piece, contains a valve which is associated with an O-ring forming seat and with a closure spring and which is brought into position of opening during fit

of the male element in said female element, characterized in that the valve itself, an outer ring which surrounds it, the O-ring which is borne by the front end of this ring, and the spring which is maintained between the valve and said ring, form an independent assembly which, up to fastening of the rear piece of the body, is maintained axially in the axial bore of the principal piece, by friction of the deformable wall of the O-ring or seat against the smooth wall of said bore.

In other words, the valve, an outer ring which surrounds it, the closure spring which is maintained between said valve-bearing ring and the valve, and the O-ring or seat mounted on the valve-bearing ring, is in the form of an independent assembly adapted to be introduced as a whole inside the body of the female element and to be retained in place therein up to fastening of the rear tubular piece of said body, by friction of the deformable periphery of the O-ring or seat against the smooth wall of the bore of the body which contains said assembly, which fastening may be obtained by simple elastic clipping.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be more readily understood on reading the following description with reference to the accompanying drawings, in which:

Figure 1 shows the three principal assemblies constituting the female element of a quick connection according to the invention, before they are assembled.

Figure 2 is an axial section on a larger scale of the loaded valve assembly.

Figure 3 is a transverse section along plane III-III of Figure 2.

Figure 4 is an axial section of the female element finally produced, with the male element in the fitted position.

DESCRIPTION OF PREFERRED EMBODIMENT

It has been assumed that the quick connection in question was of the type as described in Applicants' French Patent Application No. 95/00612 filed on January 16, 1995 for "Quick safety connection for removable coupling of pipes", to which reference may be made for more structural details.

It will simply be recalled that, in this type of connection, the locking mechanism intended for axially immobilizing the male element comprises two concentric sets of clasps 1 and 2 (Figure 1) controlled by a sliding manoeuvring sleeve 3 associated with a return spring 4.

However, it must be observed that the present invention is applicable to all types of quick connections incorporating a loaded valve, whatever the arrangement of the mechanism intended for locking the male element inside the female element.

Referring to the drawings, the female element of the connection according to the invention is formed by three principal assemblies referenced A, B and C respectively in Figure 1.

Assembly A essentially comprises a tubular piece 5 which is equipped with the locking mechanism 1-2-3-4 mentioned hereinabove. This piece 5, completed by an inner O-ring 6 intended to be housed in an annular cavity 5a in its axial bore 5', receives the assembly B which has been shown in detail in Figures 2 and 3.

As shown, this assembly B comprises a valve constituted by a sliding sleeve 7 which bears at one of its ends a suitably profiled obturation head 7a. Near its opposite end, the sleeve or valve 7 is provided with a ring 7b which is perforated along its longitudinal axis for assembly and guiding of an outer valve-bearing ring 8, split longitudinally to leave room for the radial arms 7c defined

by the perforations of the sleeve. A spring 9, engaged on the valve-bearing ring 8 between a shoulder 8a thereof and the ring 7b of the sleeve 7, tends to push the latter and to apply its head 7a elastically against a seat for tightness borne by said ring 8. This seat is constituted by an O-ring 10 made of natural or synthetic elastomer.

It will be observed that the seat or O-ring 10 is sectioned to comprise, on the one hand, an annular cavity adapted to centre on a corresponding projection 8b provided on the terminal face of the ring 8, on the other hand a projecting lip 10a.

It will be appreciated that the bearing of head 7a against ring 8 limits axial displacement of valve 7 under the effect of spring 9, this latter itself ensuring hold of said ring in place. Under these conditions, assembly B behaves as a single independent assembly whose constituent parts cannot be released from one another in untimely fashion.

This independent assembly B may thus be introduced axially in the rear opening of bore 5' of the principal tubular piece 5 of assembly A, in the manner illustrated in Figure 4. The shoulder 8a abuts against an inner shoulder 5b of piece 5, enclosing O-ring 6 which is thus maintained in cavity 5a. It is important to observe that, due to its projecting nature, the peripheral lip 10a of ring 10 is wedged in the axial bore of piece 5, so that assembly B is retained in place by friction inside assembly A.

This assembly A, provided with assembly B, may thus be stored as it is in order to be equipped, at the opportune moment, with assembly C. The latter is in fact constituted by a tubular piece 11 whose front part is intended to engage in the rear opening of the bore 5' of the principal piece 5, while its rear part is sectioned to ensure fixation thereof to the end of a pipe.

Piece 11 may be conventionally fixed in piece 5 by screwing and/or adhesion. However, according to a particularly advantageous characteristic of the invention, the inner wall of the axial bore 5' of piece 5 has a series of longitudinal tongues 5c cut out therein, oriented obliquely, inwardly and forwardly. Taking into account this oblique orientation, these tongues 5c are deformed when piece 11 is axially engaged by force in bore 5' of piece 5 and return elastically to clip behind an annular projection 11a provided to that end on the periphery of said piece 11. Any dismantling of the latter is thus impossible, it being observed that no special tools are required for assembly which can therefore be effected very simply when the connections are delivered.

It will be noted that the seat or O-ring 10 simultaneously ensures tightness of the assembly of the two pieces 5 and 11 which form the body of the female element, by bearing and gripping between the shoulder 8a and the terminal edge of the piece 11.

Functioning of valve 7-7a is otherwise identical to that of conventional valves, in that it is axially pushed into position of opening when the male element 12 of the connection is fitted in the body 5-11 of the female element.

It will be appreciated that assembly B may be retained by friction, no longer by providing a projecting annular lip 10a, but by giving the periphery of the O-ring 10 an accentuated deformability adapted to ensure friction against the wall of the bore 5'.

WHAT IS CLAIMED IS:

1. Quick connection for removably coupling pipes, of the type in which a tubular body of a female element, constituted by a tight assembly of a principal piece and a rear piece, contains a valve which is associated with an O-ring forming seat and with a closure spring and which is brought into position of opening during fit of a male element in said female element, wherein the valve itself, an outer ring which surrounds it, the O-ring which is borne by a front end of this ring, and a spring which is maintained between the valve and said ring, form an independent assembly which, up to fastening of the rear piece of the body, is maintained axially in the axial bore of the principal piece, by friction of the deformable wall of the O-ring or seat against the smooth wall of said bore.

2. The connection of Claim 1, wherein the O-ring or seat comprises a projecting annular lip.

3. The connection of Claim 1, wherein a terminal face of the outer ring comprises an annular projection which cooperates with a corresponding annular cavity made in the O-ring to ensure centering thereof on the ring.

4. The connection of Claim 1, wherein the O-Ring ensures, by bearing and gripping between an outer shoulder of the ring and a terminal edge of the rear piece, tight assembly of the two pieces which form the body of the female element.

5. The connection of Claim 1, wherein the rear piece of the body of the female element is fixed in the principal piece by elastic clipping.

6. The connection of Claim 5, wherein an inner wall of the axial bore of the principal piece has longitudinal tongues cut out therein, oriented obliquely to be elastically deformed and applied against the periphery of the piece behind an annular projection thereof.

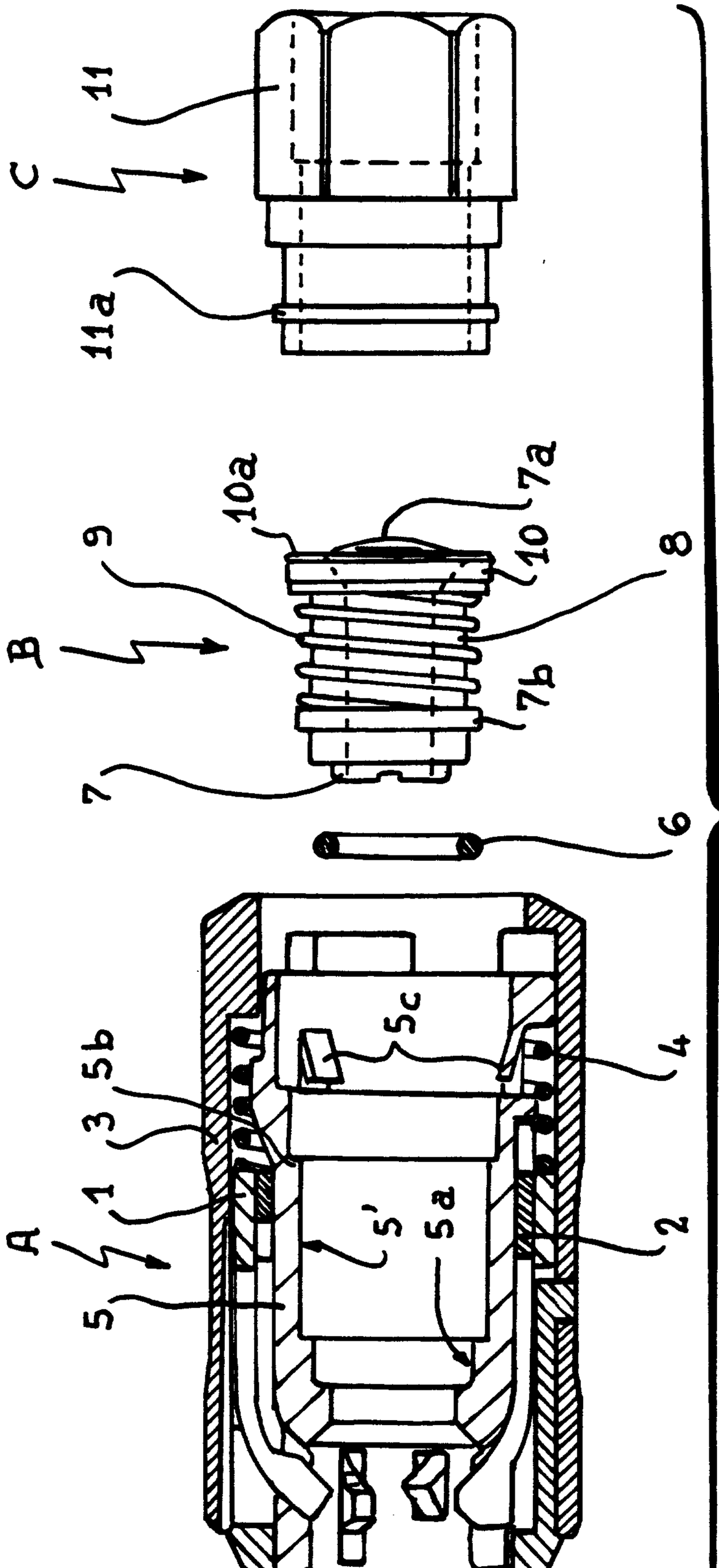


Fig. 1

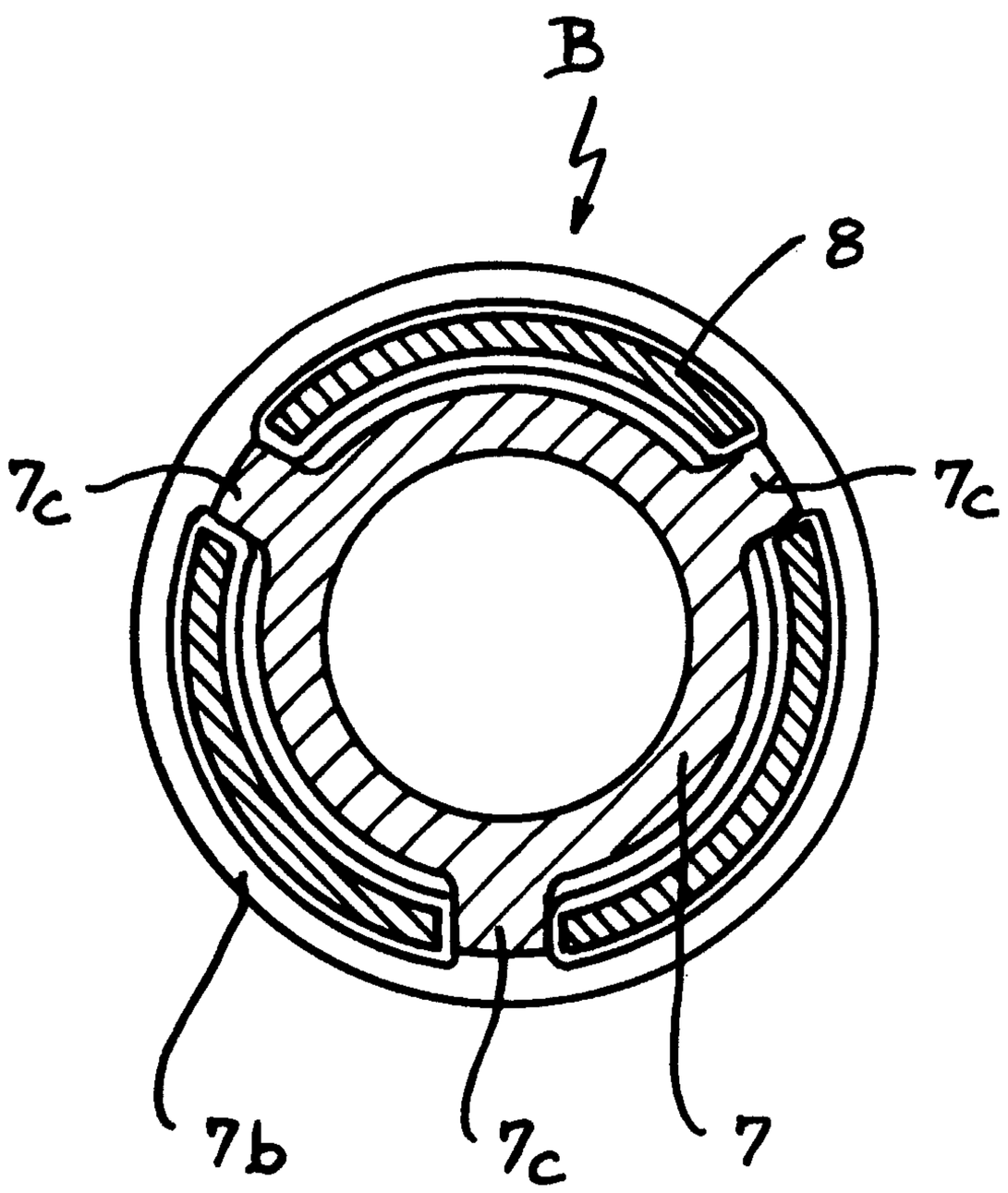


Fig. 3

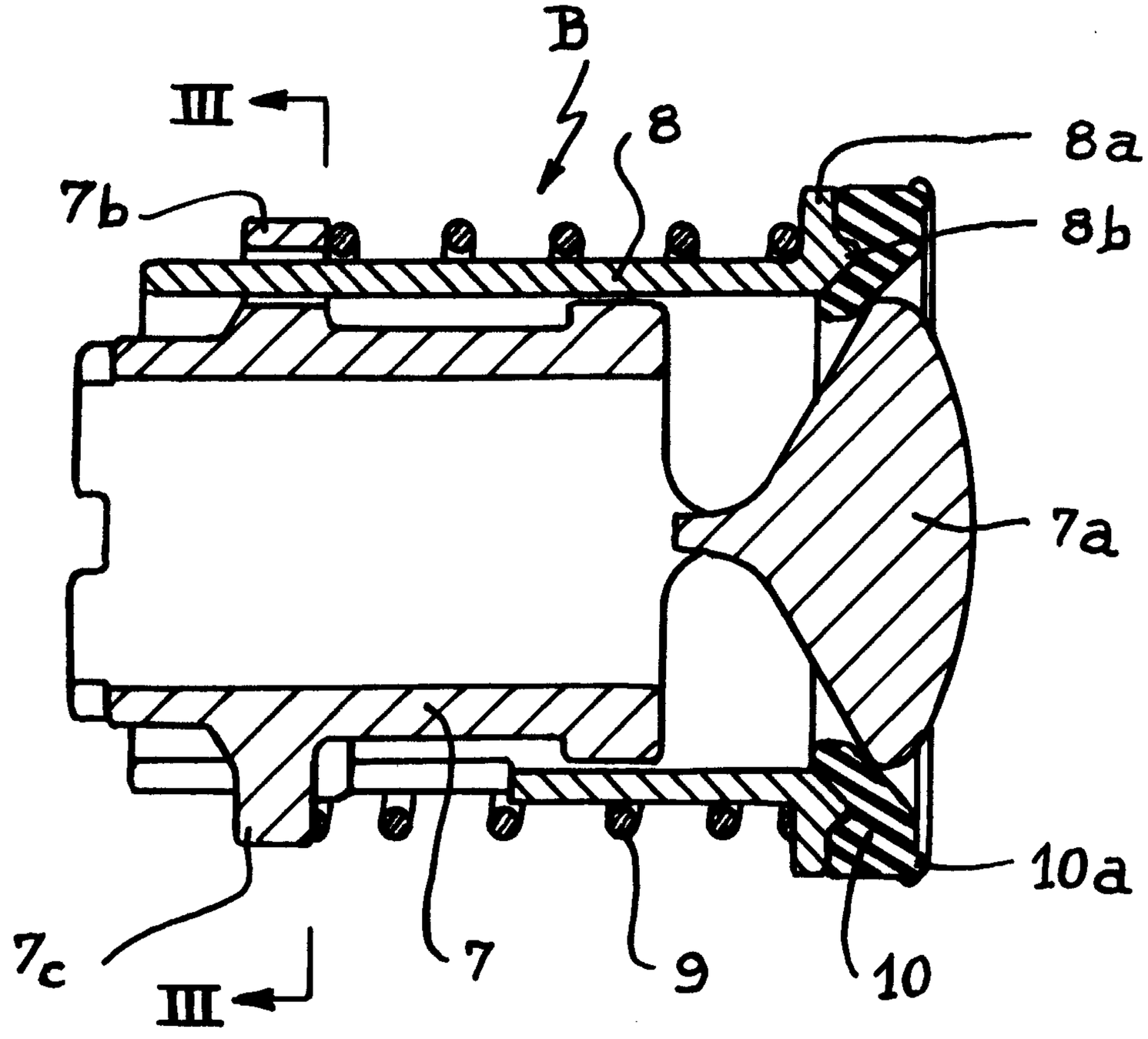


Fig. 2

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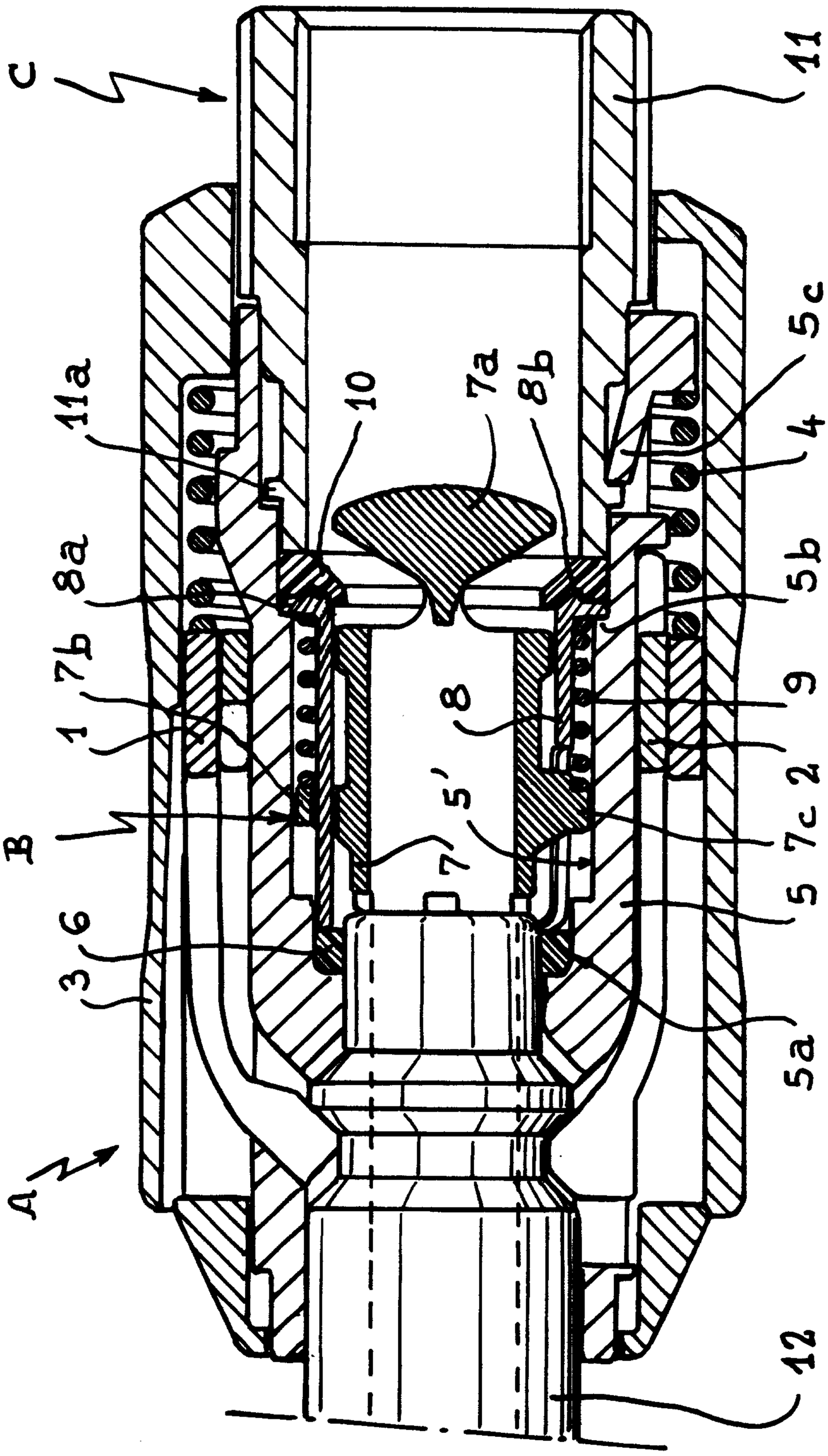
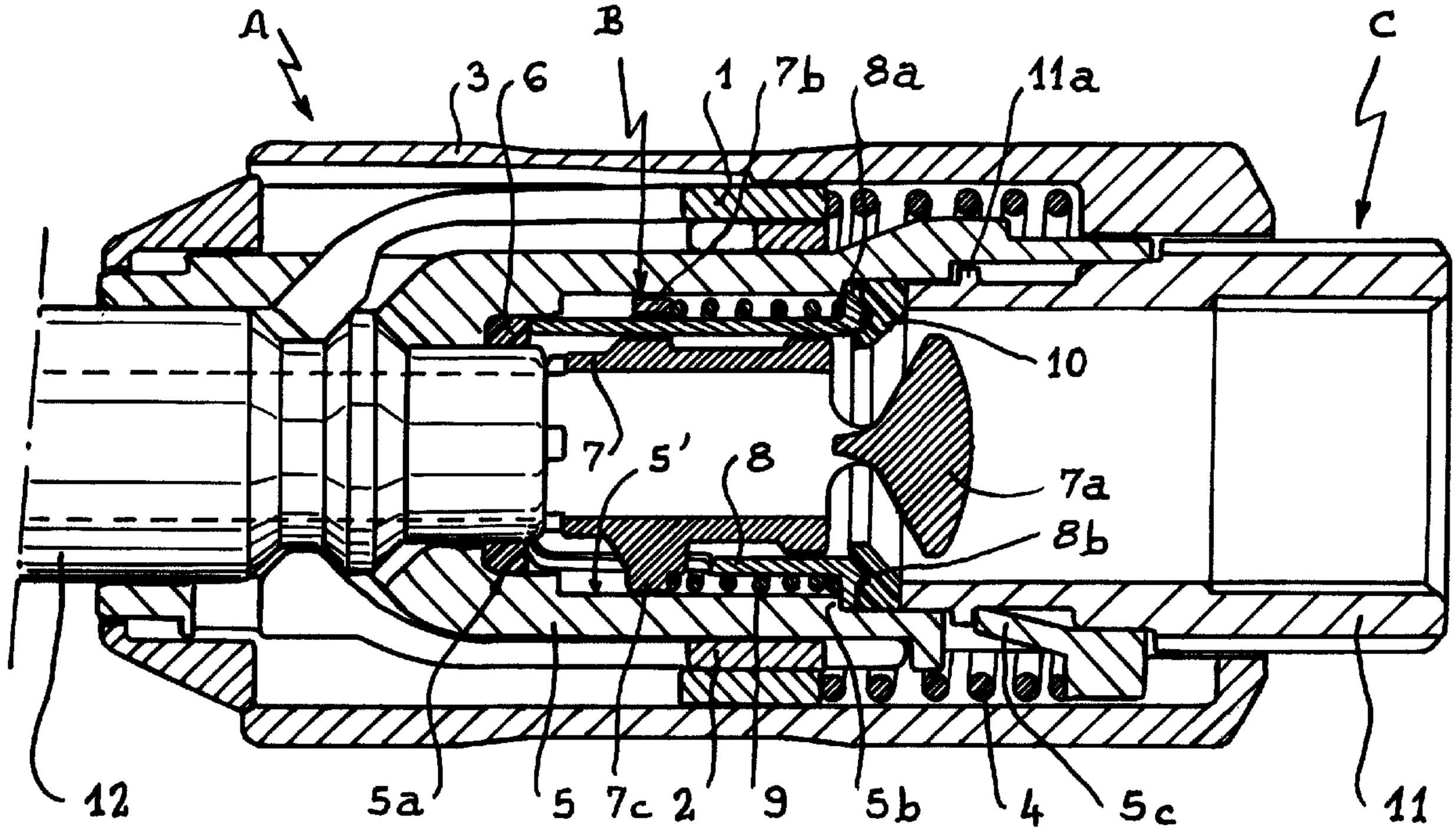


Fig. 4


A
B
C
3
6
1
7b
8a
11a
10
7
5'
8
7a
8b
12
5a
5
7c
2
9
5b
4
5c
11