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Description

[0001] The invention relates to a connection element comprising a fixing element and to a method for fixing the connection element.

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Prior art

[0002] Devices for fastening components to walls, for example to house walls of thermally insulated buildings, are known.

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[0003] EP 0 921 252 B1 discloses a fastening element for fastening slats, profiles or panels to a solid surface so as to have a spacing, the element consisting of a stud, which can be fixed to the surface and has a threaded portion at the end that protrudes freely from the surface in the intended position, and a mounting, which can be screwed onto the threaded portion, the stud being provided with threaded portions formed at least at the two end regions of said stud, and having a tool engagement means for a screw-driving tool in the region between the two threaded portions, one threaded portion being in the form of a wood thread and the other being in the form of a machine thread, and a disk-like flange being formed below the tool engagement means, which flange has tabs for the slats, profiles or panels, and a sleeve that is provided with an inner thread and has a tab or bracket tab.

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[0004] EP 0 086 751 A2 discloses an anchor subject to tensile stress. The anchor is used to connect two adjoining components, e.g., a balcony, elevator or stairwell extension to an externally thermally insulated house or high-rise building. Said anchor has a sleeve to be set into one component and a tension rod to be set into the other component, which tension rod is anchored in the sleeve in an elastically flexible manner and, when a tensile force occurs, pulls out of the sleeve by a limited distance under compression of disk springs.

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[0005] FR 2 954 374 A1 relates to a supporting construction for a platform, for example a balcony or a deck, which platform is provided with a housing in order to be fastened to a facade construction. According to the invention, the mentioned support device comprises a fastening part which is in the form of a pipe that is provided at its ends with means for supporting the fastening on the facade, and a further pipe is also provided which, at its ends, has a support element, the two pipes being locked or lockable with respect to one another. The holding device comprises a thermally insulating body which is arranged between the pipes of the fastening part and support part.

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[0006] US 2005/050818 A1 discloses an adjusting device. The adjusting device for an elevated floor comprises a threaded pipe having an inner thread for connection to the connecting hole which is located on the elevated floor. The threaded pipe is connected, by means of a thread, to a foot seat and a fastening bolt which is mounted above the foot. The foot seat has, at its upper end, an adjustment opening, and the fastening bolt has a through-hole which is extended from top to bottom and is larger than the adjustment opening of the foot seat such that the adjustment tool can be extended through the through-hole and inserted into the adjustment opening in order to adjust the displacement of the profile pipe relative to the foot seat. The adjusting device can effectively reduce the overall height of the movable floor and reduce wasted space.

[0007] WO 2017/153049 A1 discloses a thermally insulated building wall comprising a spacer for retrospectively fastening a functional part, for example a porch, to the outside, the fastening via the spacer taking place through the thermal insulation, and the spacer engaging into the building wall by means of a threaded rod or an anchor, and a reinforcer being provided which abuts the building wall when the threaded rod is seated in the building wall. The reinforcer has, on the contact surface with the building wall, at least three to five times the outer diameter of the threaded rod.

[0008] WO 2017/153049 A1 discloses a connection element according to the preamble of claim 1.

[0009] The disadvantage of the known devices is that length adjustability, which is advantageous for installing structural elements on thermally insulated facades, and an appropriate means for securing the holding force are not provided.

[0010] The object of the invention is therefore to provide a device which allows the position of the adjustable elements of a connection apparatus to be secured, and to provide a corresponding method for connecting elements of the connection apparatus in order to securely fix a connection element to the surface.

Disclosure of the invention

[0011] A connection element comprising a fixing element and a method for fixing a length of the connection element are disclosed.

[0012] The connection element is formed of multiple parts and has a main element, an attachment element and an option for adjusting the length of the entire connection element.

Furthermore, the connection element has a securing element for fixing and securing the length of the connection element.

[0013] A main element is installed on a supporting construction, in particular a building wall, using a fastening means. The fastening takes place using one or more fastening means. The fastening means may be bolts or other suitable fastening means.

[0014] A securing element is introduced into an attachment element. This takes place by the securing element being pushed in, inserted or screwed in. The attachment element has an inner thread for the screw connection, for example, and the securing element has an outer thread. The insertion can take place manually or using a suitable mounting means.

[0015] After the securing element has been inserted, the attachment element is attached to the main element. This takes place in particular by the main element having an outer thread and the attachment element having an inner thread and the two elements being carried out by screwing the attachment element onto the main element. The desired length of the connection can be set by the variable screw-in depth of the attachment element in the main element. Said element can also be inserted by being pushed on if there is at least one groove in the main element and attachment element. To secure the position, the securing element can be pushed in.

[0016] After the selected length has been set, the securing element is rotated in the direction of the main element, in particular using a mounting means. Once the securing element is abutting the main element, the two elements—the main element and the securing element—are braced via the contact surfaces. This secures the position of the attachment element on the main element. This prevents the attachment element from turning any further. The screw-in depth is variable owing to the selection of the contact within the range of the variable screw-in depth.

[0017] The position is secured in a reversible manner, i.e., the securing element can be detached from its position again and the length of the entire connection element can then be recalibrated.

[0018] The attachment element Z can have an opening at its upper, distal end, i.e., the end facing away from the supporting construction, which opening is intended for subsequently screwing in a selectable fastening means, or for inserting said means through, for example for add-on elements. This opening can be in the form of a round or elongate hole. A hammer-head bolt is introduced into this opening J This can be secured against being pulled out or falling out by turning the bolt by 90°. A washer and a fastening nut can be used for this.

[0019] The device according to the invention has the advantage that the connection element is

adjustable in length in order to be able to be adapted to the different requirements due to the different thicknesses of the insulating material, in particular of a building wall. This setting of the length of the connection element can be secured in position by the securing element according to the invention, such that the individual elements of the connection element can no longer turn against one another.

[0020] Further advantages and advantageous embodiments of the invention can be found in the following description of the figures, the drawings and the claims.

[0021] Embodiments of the solution are explained in more detail below with reference to the accompanying schematic drawings, in which:

Fig. 1 shows the mounting of a main element on a supporting construction using a fastening means;

Fig. 2 shows the mounting of the main element on the supporting construction using a plurality of fastening means;

Fig. 3 shows the mounting of the main element on a supporting construction using an integrated fastening means;

Fig. 4 shows the attachment element;

Fig. 5 shows the securing element to be screwed into the attachment element;

Fig. 6 shows the securing element screwed into the attachment element;

Fig. 7 shows the securing element;

Fig. 8 shows an attachment element according to the invention;

Fig. 9 shows the securing element screwed into the attachment element of Fig. 8 Z;

Fig. 10 shows the attachment element together with the securing element;

Fig. 11 shows the main element onto which the attachment element from Fig. 10 is screwed;

Fig. 12 shows the determination of an adjustable length by a variable screw-in depth of the attachment element in the main element;

Fig. 13 shows a selected adjustable length by the selected screw-in depth of an Z attachment element (not according to the invention) in the main element;

Fig. 14 shows the setting of the selected length;

Fig. 15 shows the fixing of the set selected length using a tool;

Fig. 16 shows the connection element having a set length, the position of which is secured;

Fig. 17 shows the connection element having a set length, the position of which is secured, in one embodiment (not according to the invention);

Fig. 18 shows the connection element in another embodiment;

Fig. 19 shows the connection element having a screwed-in add-on element;

Fig. 20 shows the Z connection element (not according to the invention) according to Fig. Z 17

Z having a screwed-in end plate and threaded holes for add-on elements; and

5 Fig. 21 is an exploded view of the connection element.

[0022] In Fig. 1, mounting of a main element 10 of a connection element on a support structure 12 is shown. The main element 10 has an outer thread 11, which allows an attachment element to be subsequently attached. Furthermore, the main element 10 can have holes of different
10 thicknesses that are continuous in the longitudinal extension or are arranged in one portion, in this embodiment a first continuous hole 13. A fastening means 14, in this embodiment a bolt 14, is used to establish the connection to the supporting construction 12. The supporting construction 12 can be installed on a building wall, for example. The main element 10 can be designed to be wider at its base, which is the region to be arranged on the supporting
15 construction 12, and can have a foot region 15. In this embodiment, the fastening means 14 is designed in such a way that it projects through the entire main element 10 and then into the supporting construction 12 for anchoring.

[0023] Fig. 2 shows the mounting of the main element 10' of the connection element on the supporting construction 12 using a plurality of fastening means: a first fastening means 14 and
20 a second fastening means 16. The foot region 15 is designed to be so wide that it has sufficient space for the arrangement of the two fastening means 14 and 16. The main element 10' has a hole 17 arranged in one portion.

[0024] In Fig. 3, the mounting of the main element 10" on the supporting construction 12 is shown, which element, in this embodiment, has a third fastening means 18 integrated into the
25 main element 10, which means is thus integrally formed. A hole 17' is formed.

[0025] For mounting, the main element 10, 10', 10" is thus initially installed on the supporting construction 12, in particular a building wall, using at least one fastening means 14, 16, 18. The fastening means 14, 16, 18 may be bolts or other suitable fastening means 14, 16, 18.

[0026] Fig. 4 shows an attachment element 20. In this embodiment, the attachment element 20
30 has an inner thread 22. The attachment element 20 has an open end 21. At its upper, distal end 23, i.e., the end facing away from the supporting construction, the attachment element 20 can have an opening 24 for subsequently screwing in a selectable fastening means, or for inserting said means through, for example for add-on elements. Another opening 34 can be in the form

of a round or elongate hole. In particular, a hammer-head bolt can be introduced into this opening 34. Said bolt can be secured against being pulled out or falling out by turning the bolt by 90°. A washer and a fastening nut can be used for this. A securing element, which is shown in the following Fig. 5, is intended to be introduced into the attachment element 20.

5 [0027] Fig. 5 shows the securing element 26, which is introduced into the attachment element 20. This takes place by the securing element 26 being pushed in, inserted or screwed in. The introduction can take place manually or using a suitable mounting means.

The securing element 26 has a third, continuous hole 28. The straight arrow A pointing upward points to the side of the attachment element 20 into the open end 21 of which the securing
10 element 26 is screwed. The direction of the arrow B represents the direction of rotation in the inner thread 22 of the attachment element 20.

[0028] Fig. 6 shows how the securing element 26 is screwed into the attachment element 20.

[0029] Fig. 7 shows the securing element 26 in another embodiment. The arrow D shows a screwing-in direction for the securing element 26, which is screwed into the attachment
15 element 20 shown in Fig. 8. The screwing-in takes place by hand or using a suitable mounting tool.

[0030] Fig. 8 shows the Z attachment element Z 20' (not according to the invention) comprising the inner thread 22. At the end 30 of said attachment element, the securing element 26 shown in Fig. 7 is inserted.

20 [0031] Fig. 9 shows how the securing element 26 is inserted into the attachment element Z 20'. The securing element 26 is screwed into the attachment element 20'.

[0032] Fig. 10 and 11 show the screwing of the attachment element 20 onto the main element 10. After the securing element 26 has been inserted, the attachment element 20 is screwed onto the main element 10. In the embodiments shown, this takes place by the main element 10
25 having the outer thread 11 and the attachment element having the inner thread 22 and the two elements 10, 20 being carried out by screwing the attachment element 20 onto the main element 10. The desired length of the connection can be set by the variable screw-in depth of the attachment element 20 in the main element 10.

[0033] Fig. 10 shows the attachment element 20 into which the securing element 26 has already
30 been screwed. The arrow F shows the direction of rotation in which the attachment element 20 is screwed onto the main element 10, which is shown in Fig. 11.

[0034] In Fig. 11, the main element 10 having its outer thread 11 is shown. The arrow G indicates the direction from which the attachment element 20 from Fig. 10 is screwed onto this

main element 10.

[0035] Fig. 12 shows the determination of the desired length L by the variable screw-in depth VE of the attachment element 20 on the main element 10.

[0036] Fig. 13 shows the determination of the desired length L by the variable screw-in depth VE of the attachment element 20' into the main element 10.

[0037] The attachment element 20' is screwed onto the main element 10 until the entire desired length L is reached by the correspondingly selected screw-in depth VE.

[0038] Fig. 14 shows how, in this embodiment, after setting the final length L, the attachment element 20 is screwed onto the main element 10 in the direction of rotation H using a mounting means 32 and is thus moved in the direction of the arrow.

[0039] In Fig. 15, the attachment element 20 is screwed onto the main element 10.

Once the securing element 26 is abutting the main element 10, the two elements—the main element 10 and the securing element 26—are braced via the respective contact surfaces. This secures the position of the attachment element 20 on the main element 10.

Further rotation of the attachment element 20 is thereby prevented. Subsequent detachment of the securing element 26 allows the length L to be recalibrated. The position is secured reversibly, i.e., the securing element 26 can be detached from its position again and the length L of the entire connection element 100 can then be recalibrated.

[0040] Fig. 16 shows a finished connection element 100 which is adapted to the desired length L and is secured in position. The attachment element 20 has an opening 34. Such openings 34 can generally be in the form of a round or elongate hole. In this embodiment, the opening 34 is in the form of an elongate hole. This opening 34 is designed such that a fastening means for further add-on elements can be screwed in or inserted through. In particular, a hammer-head bolt can be introduced into the opening 34. This hammer-head bolt can be secured against being pulled out by turning it by 90°. Said bolt can be turned both in the longitudinal axis and in the transverse axis.

[0041] Fig. 17 shows one embodiment (not according to the invention) of a finished connection element 100 which is adapted to the desired length L and is secured in position. The attachment element 20' can also have, in its distal region having the opening 30, the inner thread 22' for subsequently screwing in fastening means or additional mounting panels, for example for add-on elements. An add-on element can be a fastening bracket, for example. An end plate can also be screwed in. This has threaded holes for fastening add-on elements.

[0042] Fig. 18 shows, in another embodiment, the finished connection element 100 that is

adapted to the desired length and is secured in position. A hammer-head bolt 36 is screwed into the opening 24 by being guided through the opening 34. A nut 38 and a washer 40 are also provided.

[0043] Fig. 19 shows, in another embodiment according to Fig. 18, the finished connection element 100 that is adapted to the desired length and is secured in position. A fastening bracket 44 is screwed onto the attachment element 20 by means of a bolt 42.

[0044] Fig. 20 shows, in another embodiment (not according to the invention), the finished connection element 100 that is adapted to the desired length and is secured in position. An end plate 46 is screwed into the attachment element 20'. The end plate 46 has a first threaded hole 48 and a second threaded hole 50. Add-on elements can be arranged thereon or fastened thereto.

[0045] Fig. 21 is an exploded view showing the components of the connection element 100. Said figure shows the main element 10, the fastening element 14, the securing element 26, the attachment element 20, the hammer-head bolt 36, the washer 40 and the nut 38. The opening 34 is in the form of an elongate hole in order for the hammer-head bolt 36 to be introduced, which bolt is rotated by 90° in order to secure it. The hammer-head bolt 36 is thus protected against falling out or being pulled out.

[0046] The connection element 100 is thus formed in multiple parts and has the main element 10, 10' and 10'', the attachment element 20, 20' and an option for adjusting the length of the entire connection element 100. For being able to fix the length or for securing, the connection element 100 has the securing element 26, which is reversibly arranged for setting the length L of the connection element 100.

[0047] Z The invention is defined by the scope of the accompanying claims.

List of reference signs

[0048]

10 main element

10' main element

10'' main element

11 outer thread

12 supporting construction

13 first hole

	14	first fastening means
	15	foot region
	15'	foot region
	16	second fastening means
5	17	second hole
	17'	second hole
	18	third fastening means
	20	attachment element
	20'	attachment element (additional example, not according to the invention)
10	21	first open end
	22	inner thread
	22'	inner thread
	23	second open end
	24	first opening
15	26	securing element
	28	third hole
	30	third open end
	32	mounting means
	34	second opening
20	36	hammer-head bolt
	38	nut
	40	washer
	42	bolt
	44	fastening brackets
25	46	end plate
	48	first threaded hole
	50	second threaded hole
	100	connection element
30		
	A	first arrow
	B	second arrow

	D	third arrow
	E	fourth arrow
	F	fifth arrow
	G	sixth arrow
5	H	seventh arrow
	I	eighth arrow
	L	length
	VE	variable screw-in depth

Patentkrav

1. Forbindelselement (100) med et basiselement (10, 10', 10") og et påsætningselement (20), hvor forbindelselementet (100) er udformet længdejusterbart ved valg af en variabel installationsdybde VE, hvor der kan fastlægges en længde L, og omfattende et
- 5 sikringselement (26), med hvilket længden L kan fastlægges reversibelt, hvor længden L er fastlagt ved, at sikringselementet (26) virker som anslag mod basiselementet (10, 10', 10"), og basiselementet (10, 10', 10"), sikringselementet (26) og påsætningselementet (20) er spændt sammen via deres respektive kontaktflader, **kendetegnet ved, at** sikringselementet (26) har mindst et tredje hul (28), og der er isat en hammerhovedskrue (36), som er ført ind i en første
- 10 åbning (24) og gennem en anden åbning (34), og hvis hoved er anbragt drejet på en sådan måde, at dets sider virker som anslag mod påsætningselementet (20).
2. Forbindelselement (100) ifølge krav 1, **kendetegnet ved, at** basiselementet (10, 10', 10") har et udvendigt gevind (11), og påsætningselementet (20) et indvendigt gevind (22), hvor
- 15 længden L kan fastlægges ved valg af den variable installationsdybde VE af påsætningselementet (20) på basiselementet (10, 10', 10").
3. Forbindelselement (100) ifølge et af kravene 1 eller 2, **kendetegnet ved, at** sikringselement (26) har et udvendigt gevind og kan drejes ind i påsætningselementet (20).
- 20
4. Forbindelselement (100) ifølge et af de foregående krav, **kendetegnet ved, at** basiselementet (10, 10', 10") har mindst en udsparring (13, 17) eller en åben ende (23), og påsætningselementet (20) har mindst en første åbning (24).
- 25
5. Forbindelselement (100) ifølge et af de foregående krav, **kendetegnet ved, at** forbindelselementet (100) er udformet til at forbinde en bygningsvæg eller en bærende konstruktion (12) af en bygningsvæg med et påbygningselement.
- 30
6. Fremgangsmåde til at fastlægge længden af et forbindelselement (100) ifølge et af kravene 1 til 5, med følgende trin:
- a) montering af et basiselement (10, 10', 10") til et underlag (12) med mindst et fastgørelsesmiddel (14, 16, 18)
 - b) indføring af et sikringselement (26) i et påsætningselement (20)

c) anbringelse af påsætningselementet (20) med sikringselementet (26) på basiselementet (10, 10', 10")

d) valg af den variable installationsdybde VE

e) fastlæggelse af længden L af forbindelseselementet (100)

5 f) placering af sikringselementet (26) som anslag mod basiselementet (10, 10', 10") og herved fastlæggelse af længden L af forbindelseselementet (100), hvor i trin d) den ønskede længde L vælges via den variable indskruningsdybde VE ved at længden af kontakten mellem det udvendige gevind (11) af basiselementet (10, 10', 10") og det indvendige gevind (22) af påsætningselementet (20) vælges, hvor Z i trin f) efter
10 fastlæggelse af længden L i trin e) sikringselementet (26) drejes i retning mod basiselementet (10, 10', 10"), og hvor i trin f) basiselementet (10, 10', 10"), påsætningselementet (20) og sikringselementet (26) spændes mod hinanden, så snart sikringselementet (26) virker som anslag mod basiselementet (10, 10', 10").

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7. Fremgangsmåde ifølge krav 6, **kendetegnet ved, at** i trin b) sikringselementet (26) skrues i fra en åben ende (21) Z af påsætningselementet (20).

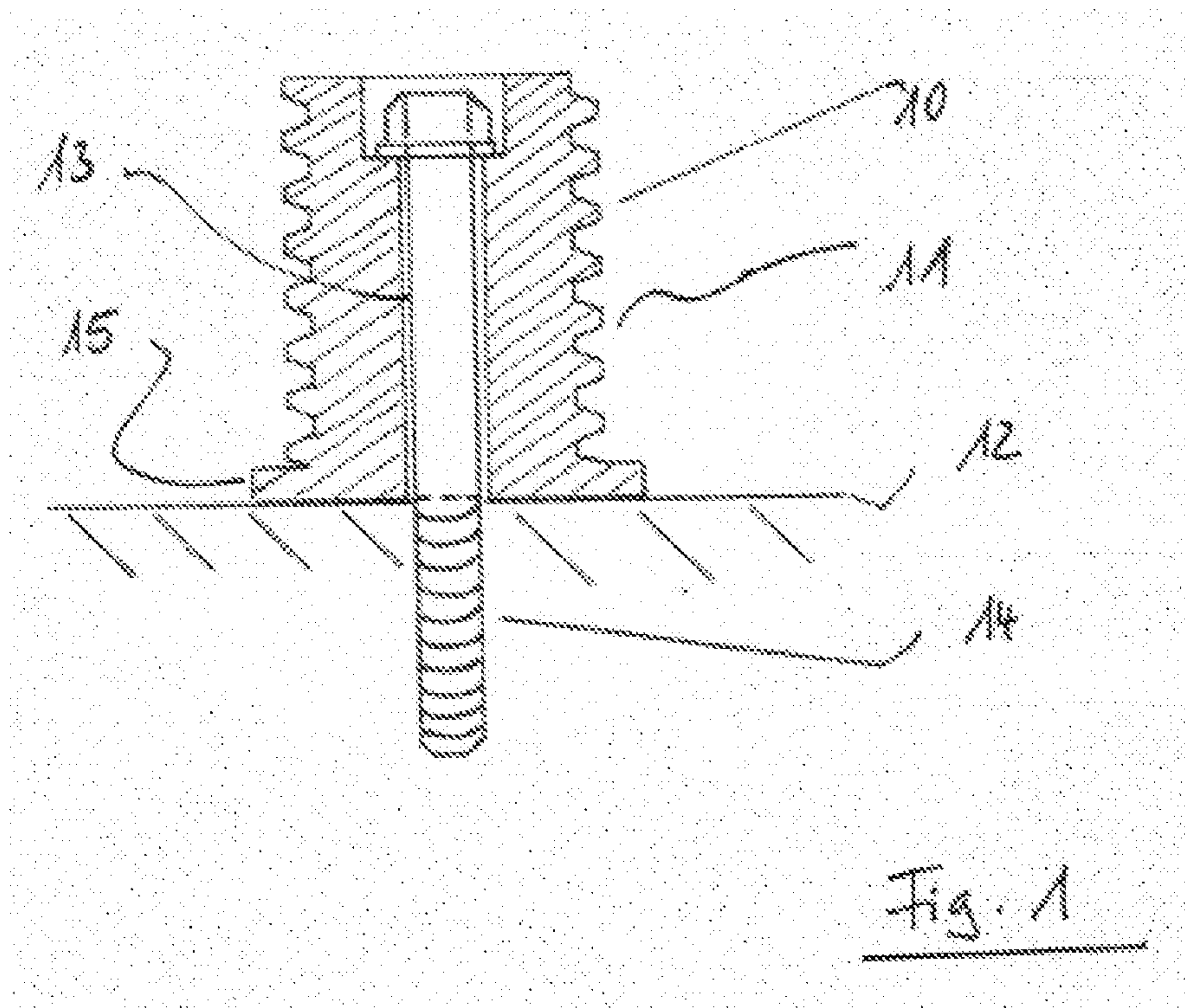
8. Fremgangsmåde ifølge et af kravene 6 eller 7, **kendetegnet ved, at** i trin c) sikringselementet (26) indføres i påsætningselementet (20) manuelt eller med et monteringsmiddel.
20

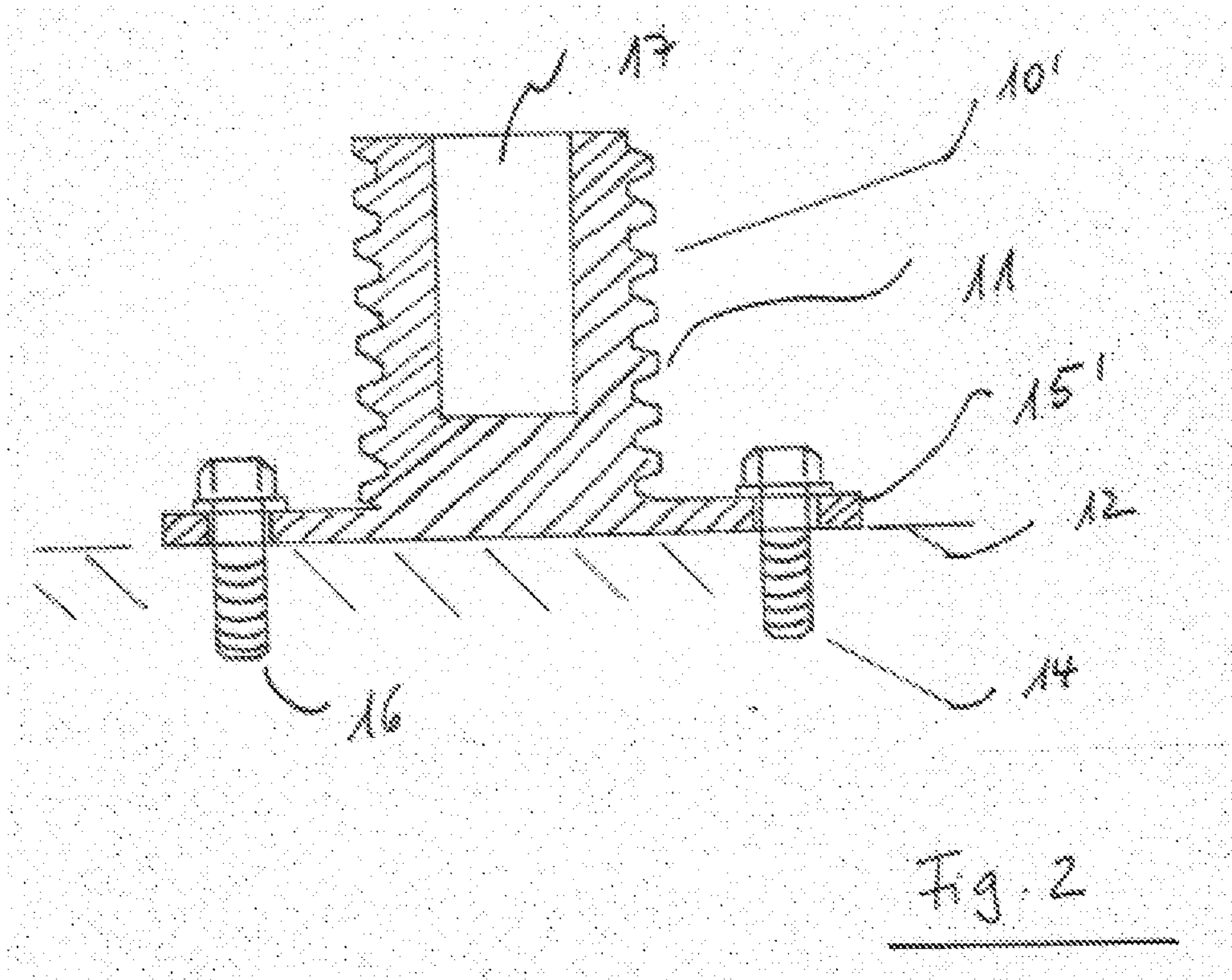
9. Fremgangsmåde ifølge et af kravene 6 til 8, **kendetegnet ved, at** i trin c) indføringen sker ved iskruning.

25

10. Fremgangsmåde ifølge et af kravene 6 til 9, **kendetegnet ved, at** der efter trin f) gennemføres et yderligere trin g), i hvilket påsætningselementet (20) løsnes, og længden L indstilles på ny.

30





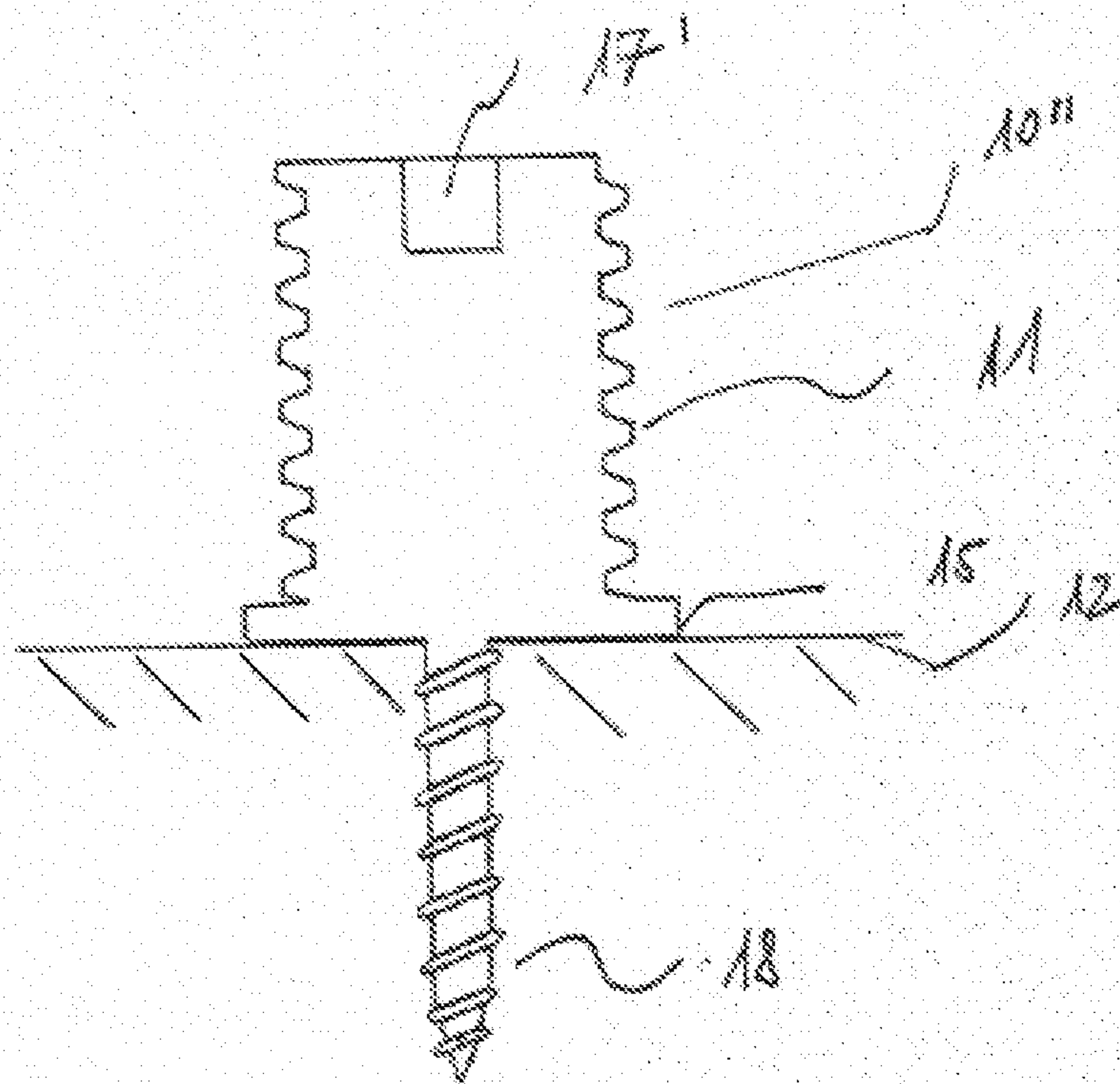
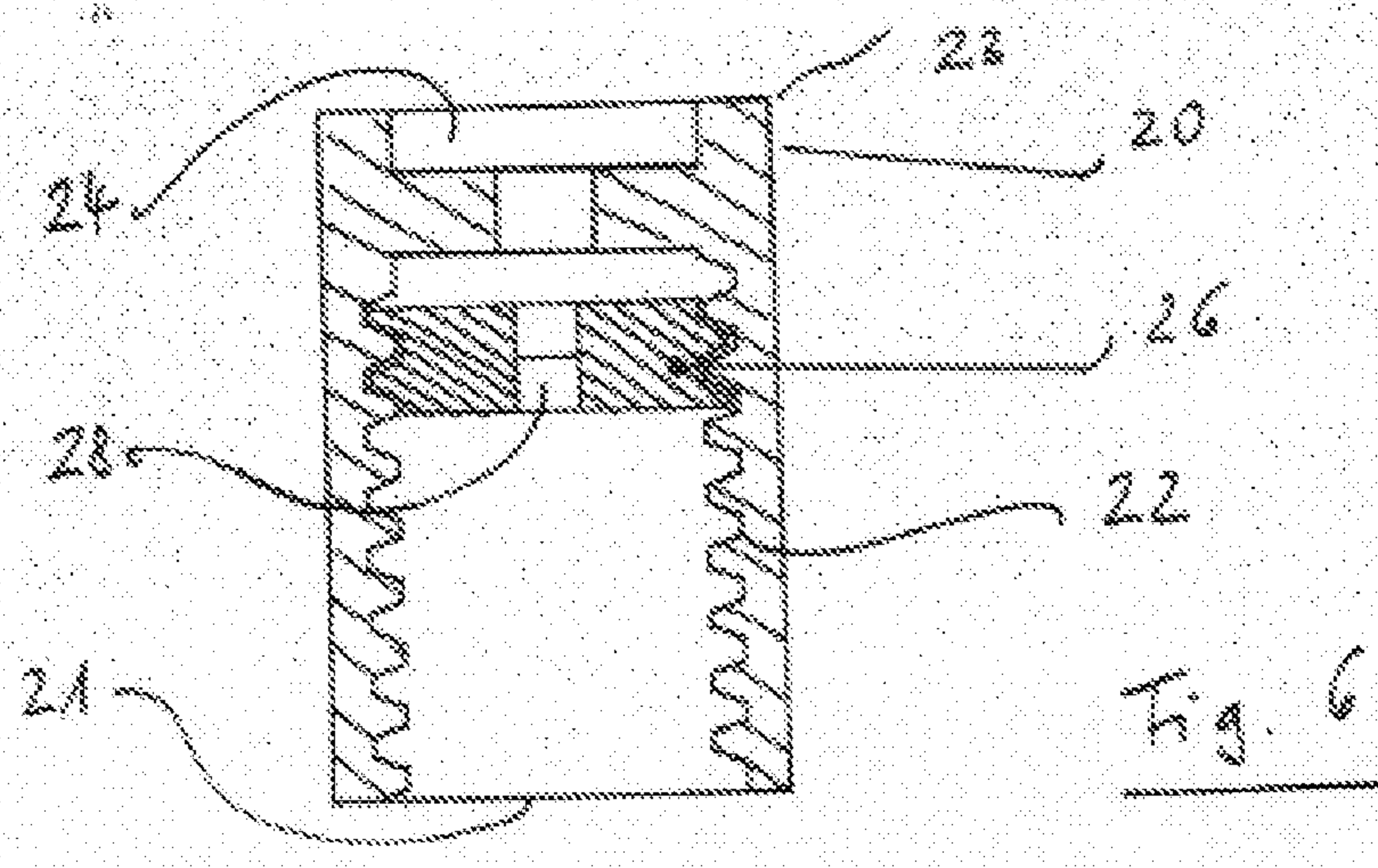
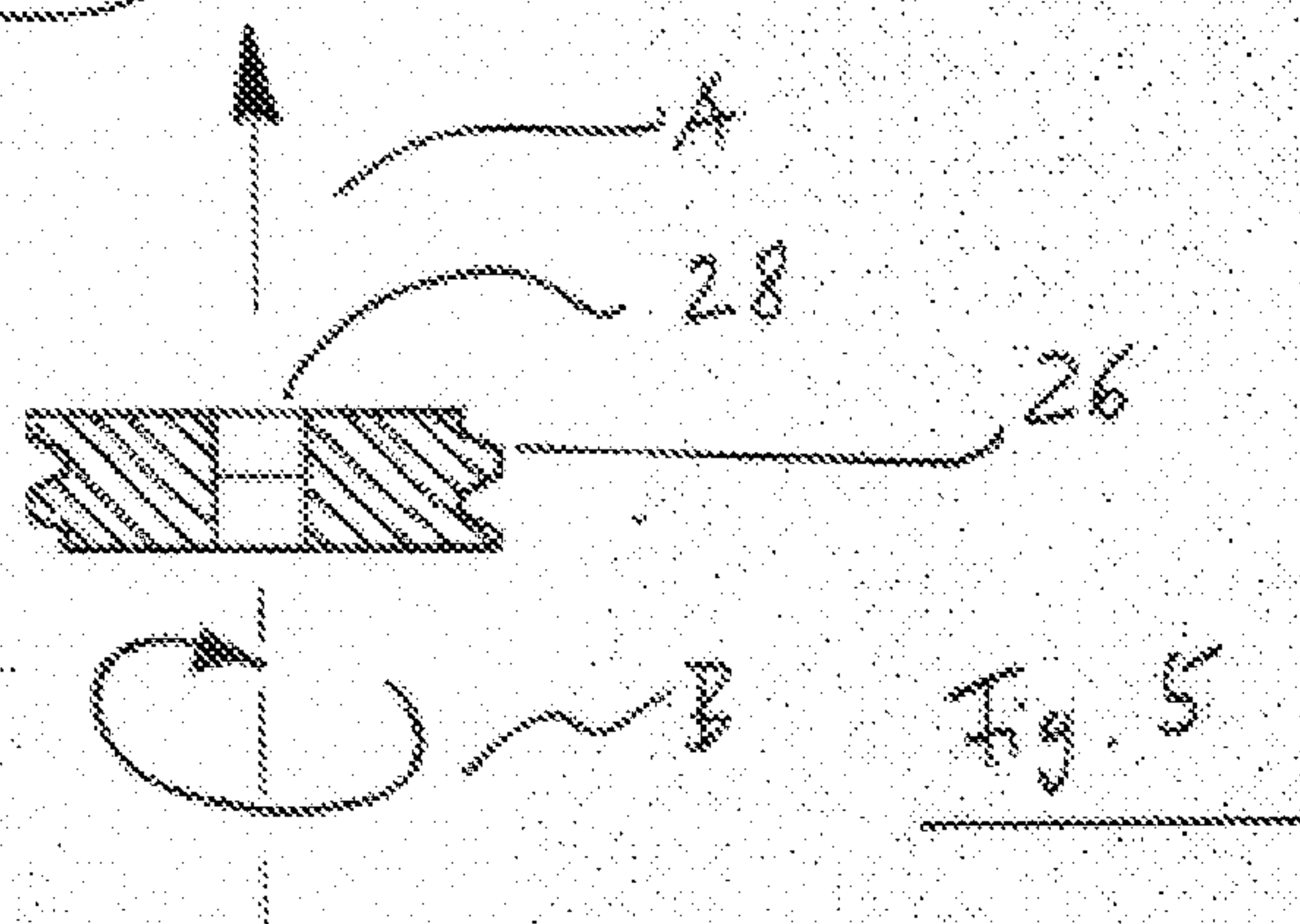
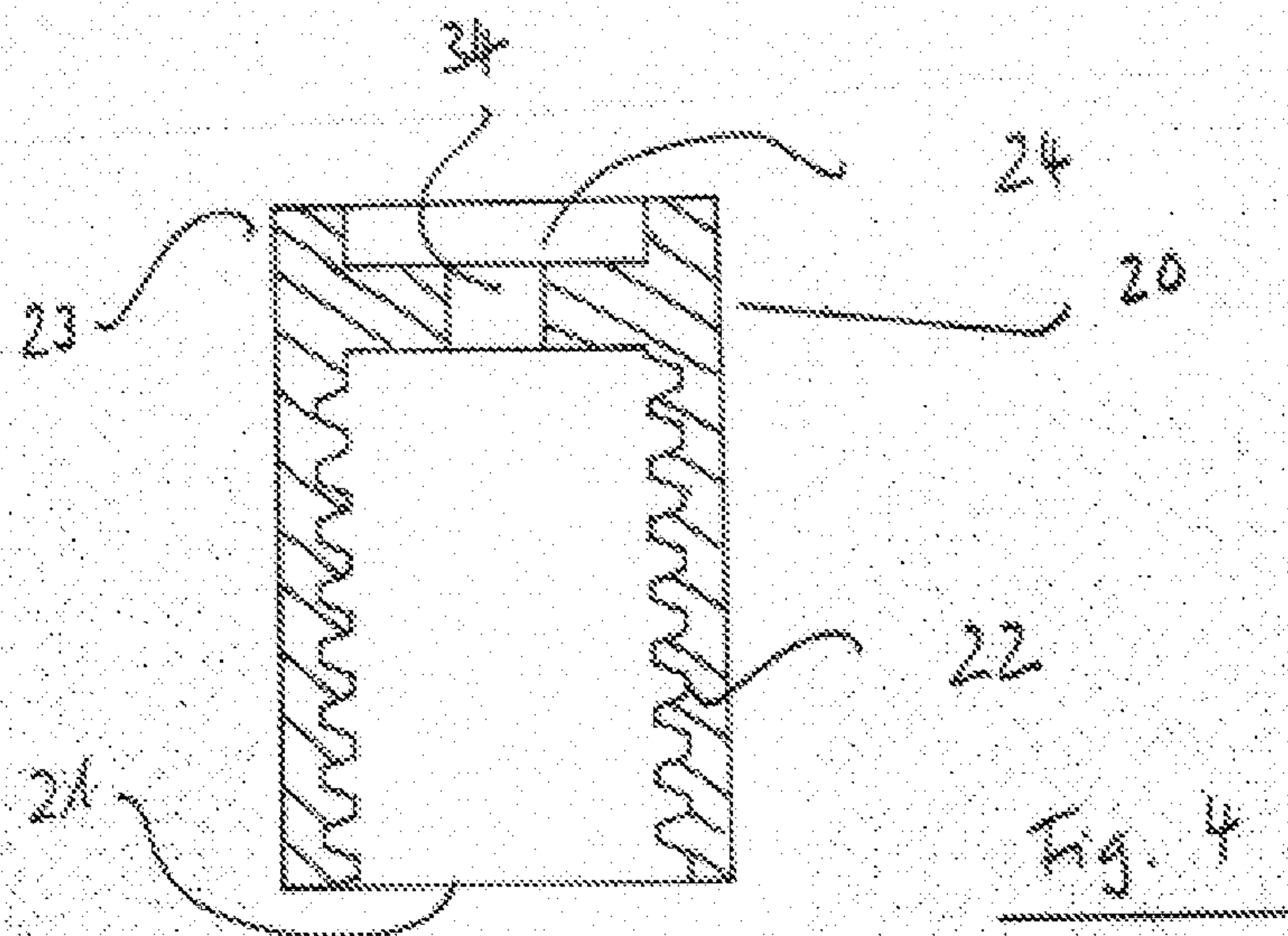
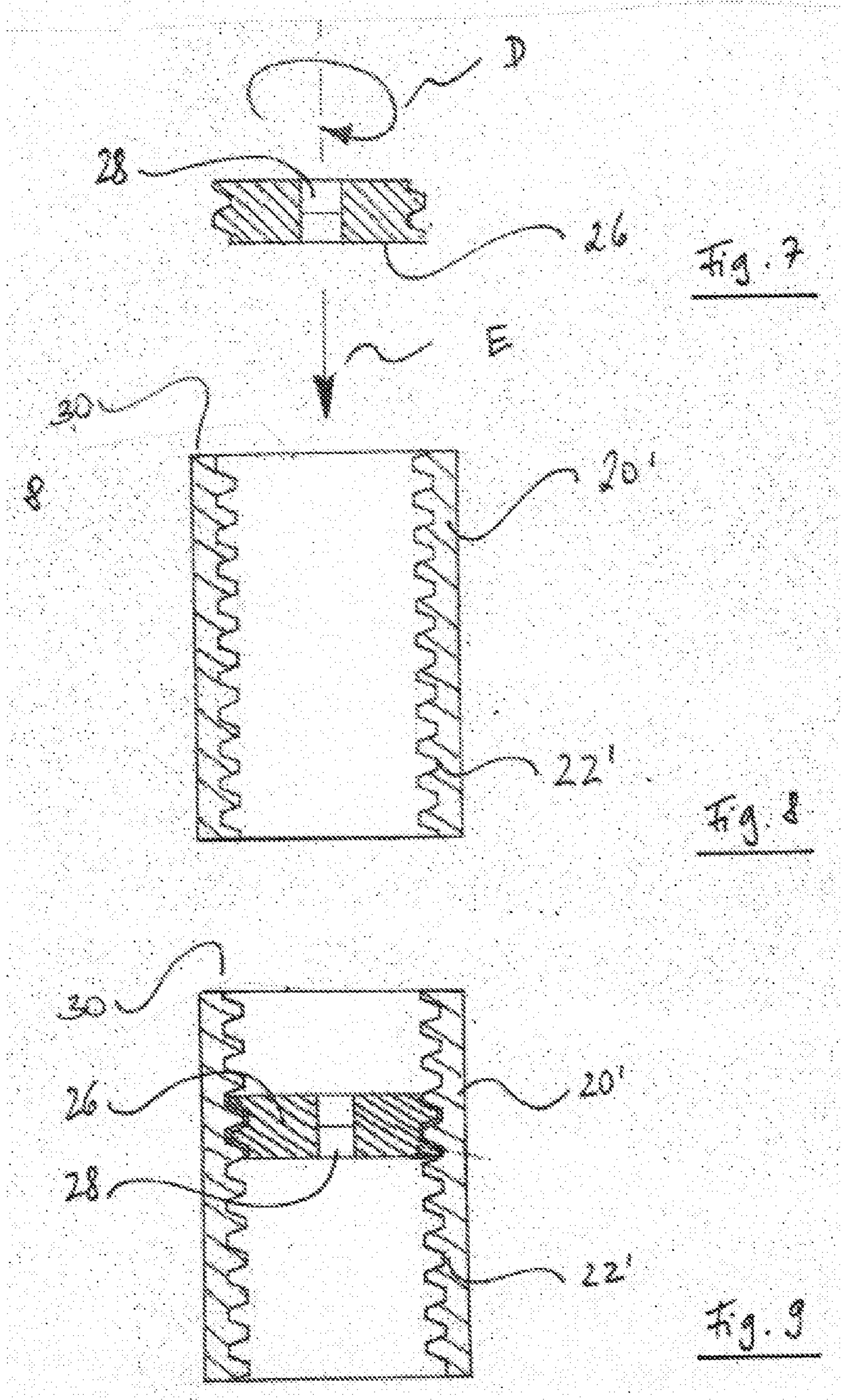
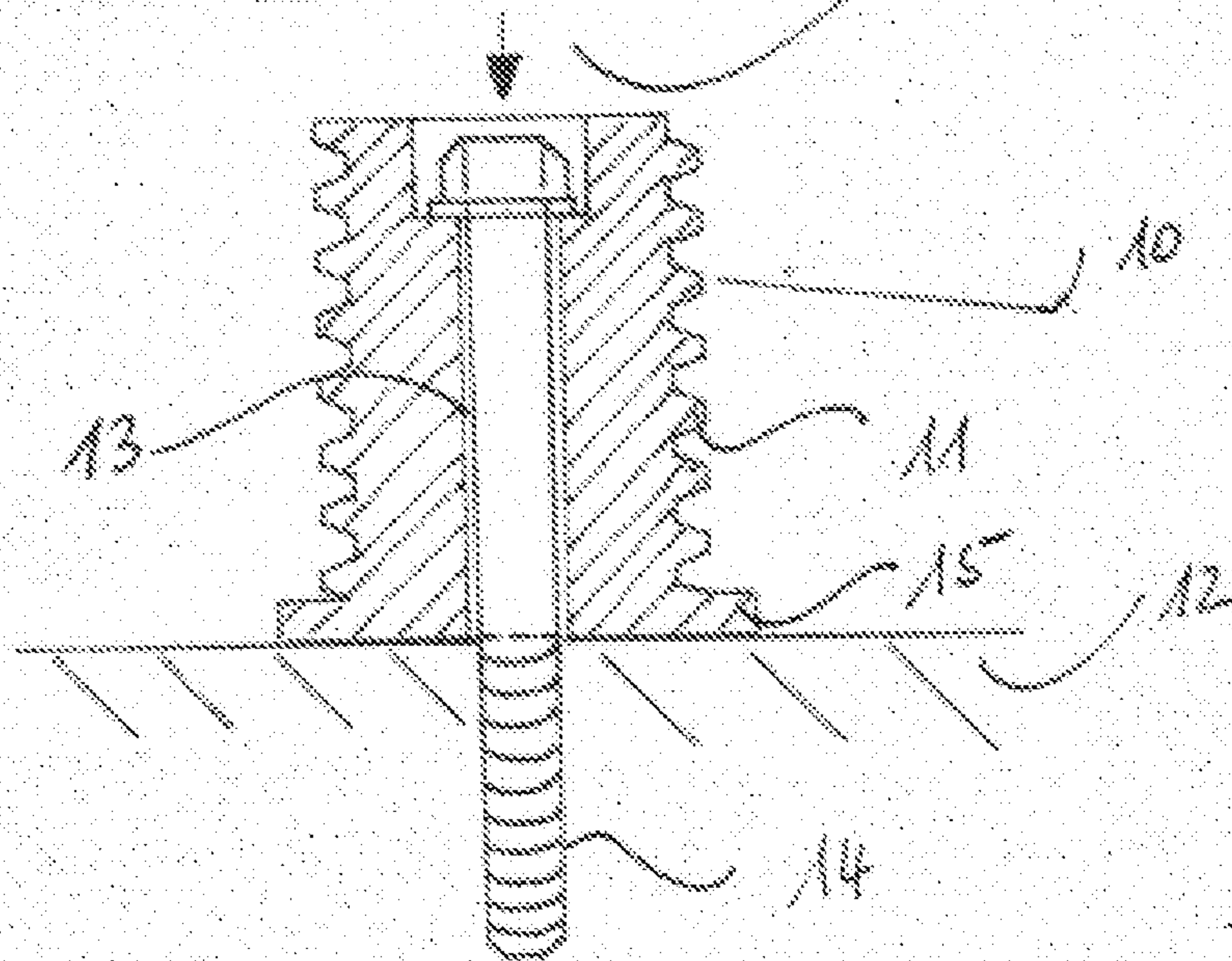
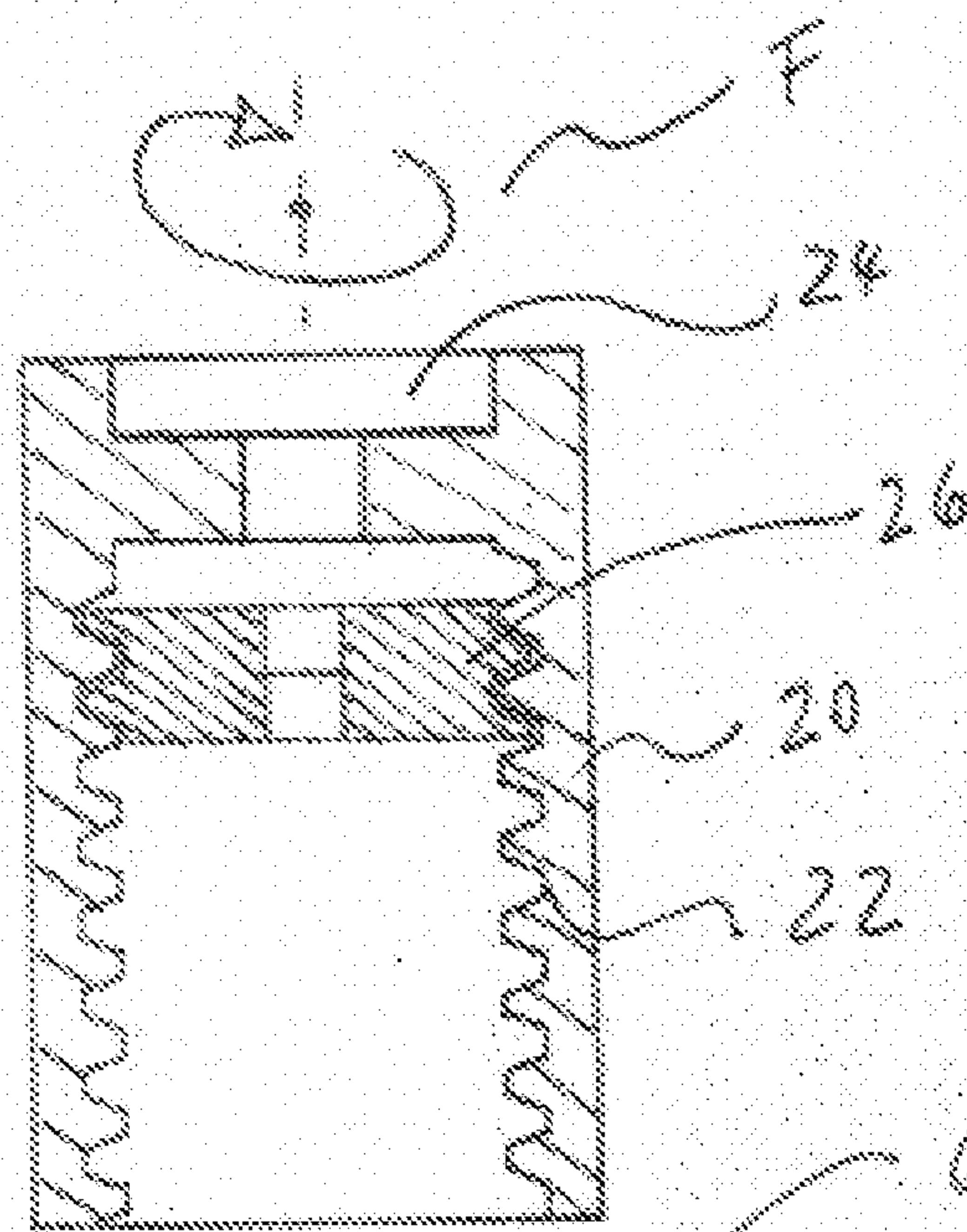
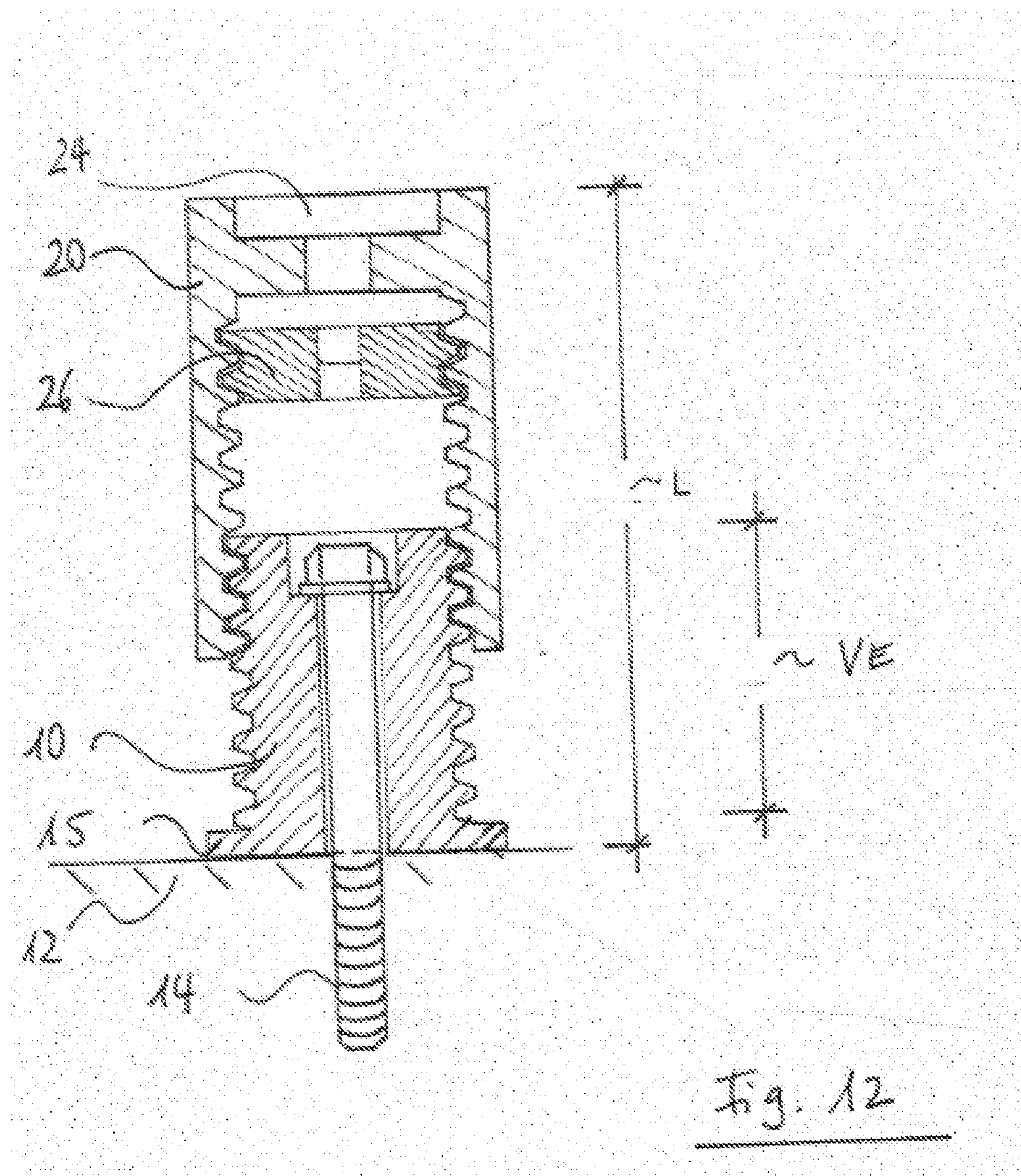


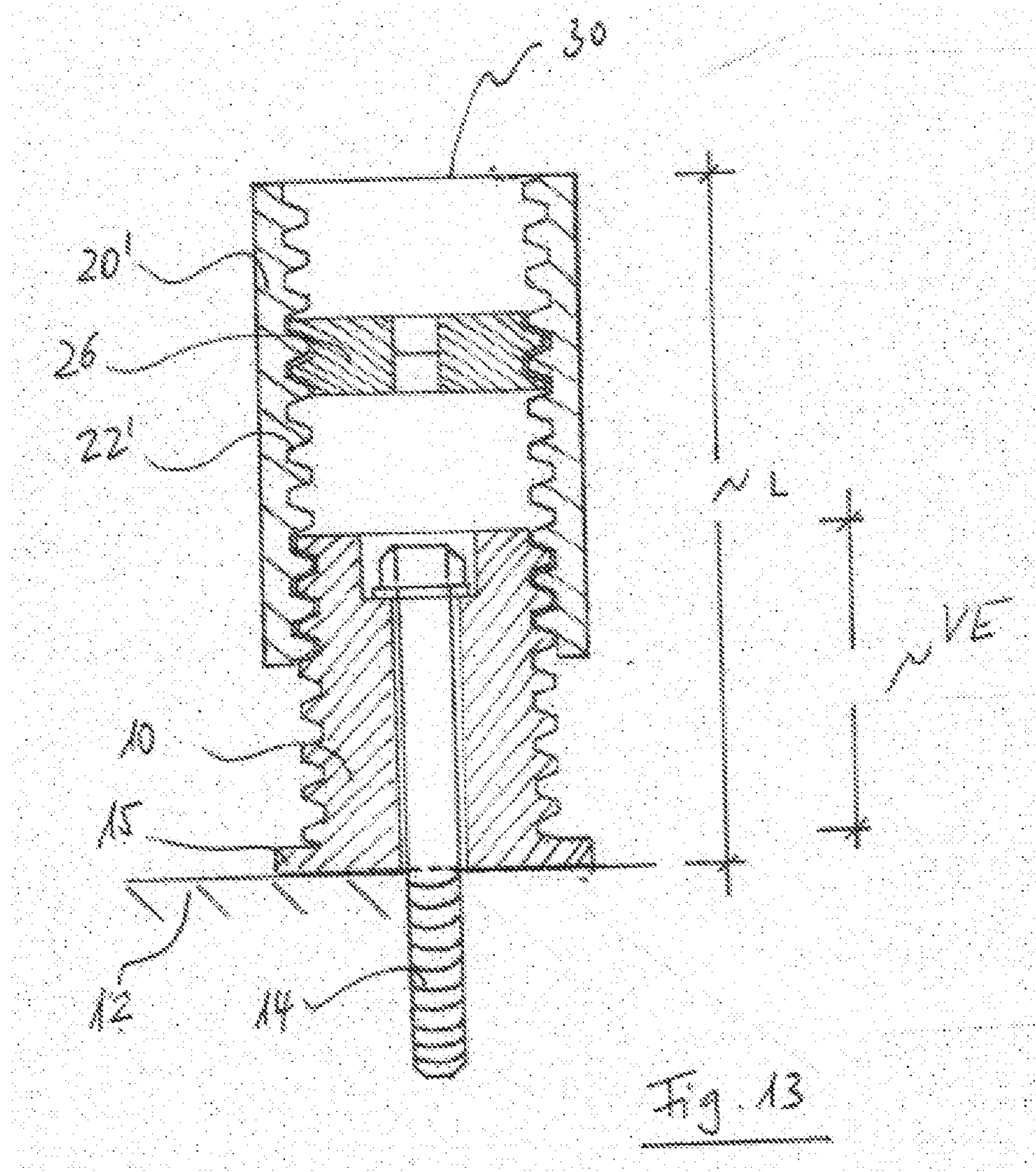
Fig. 3











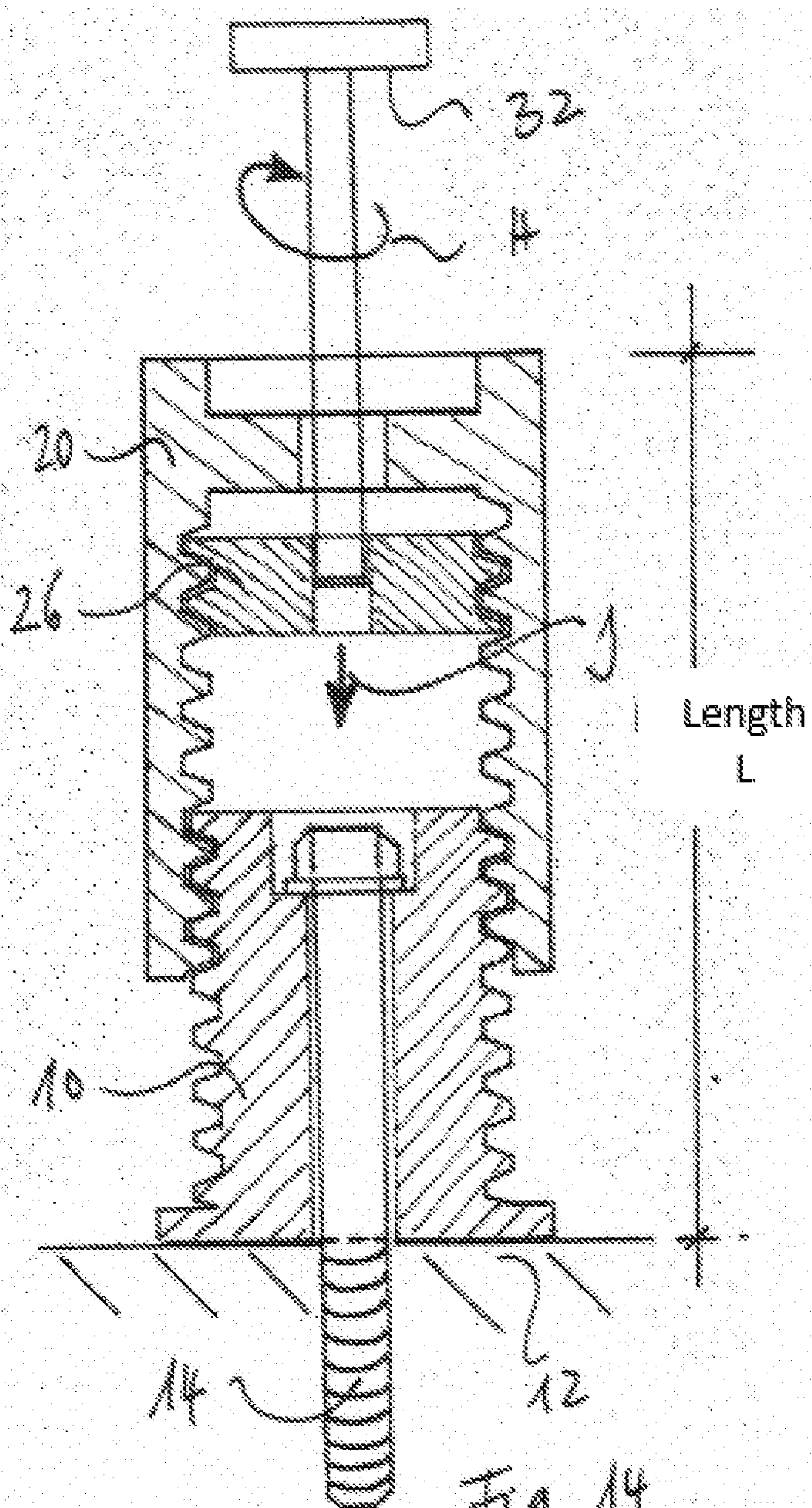
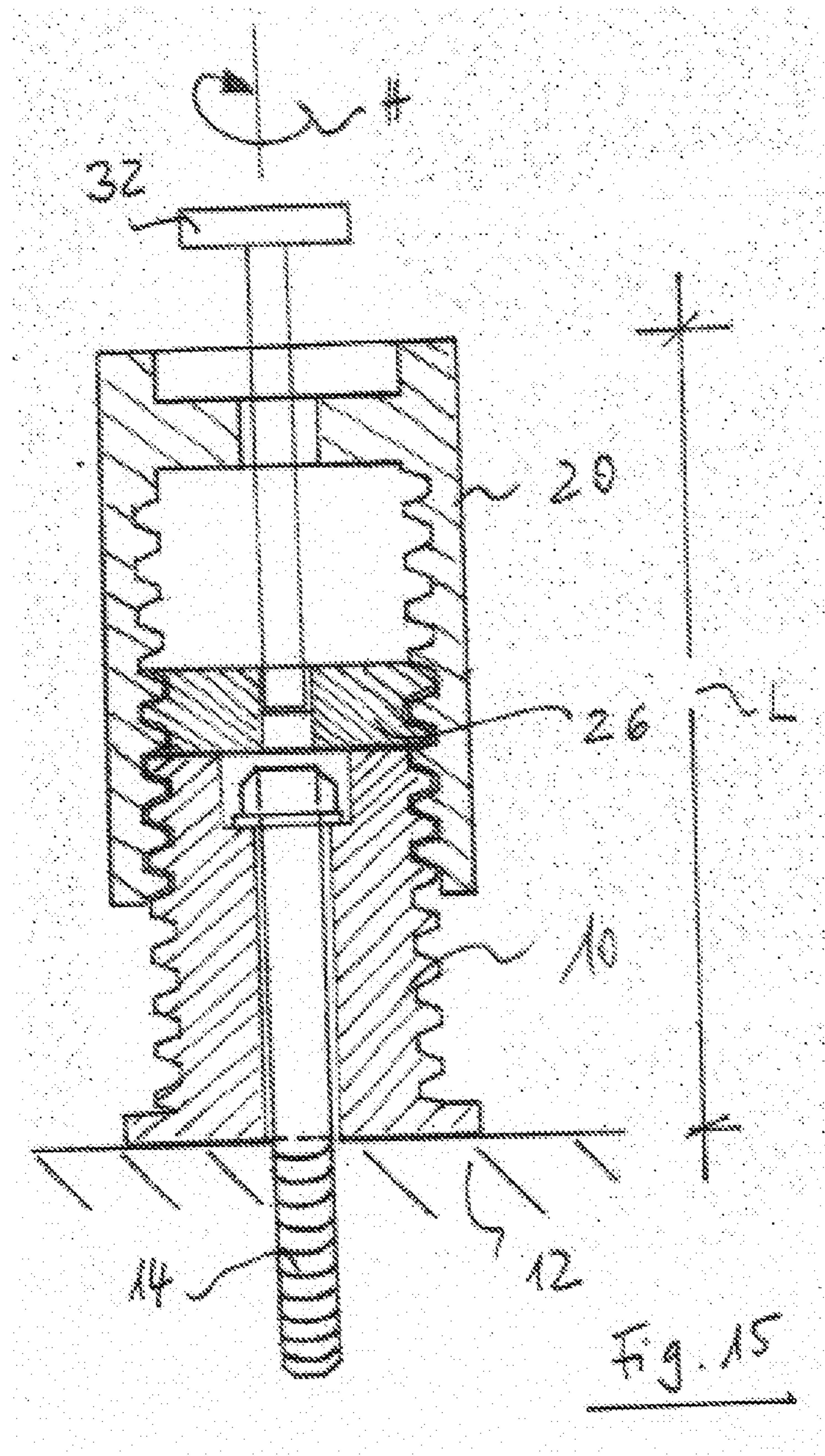
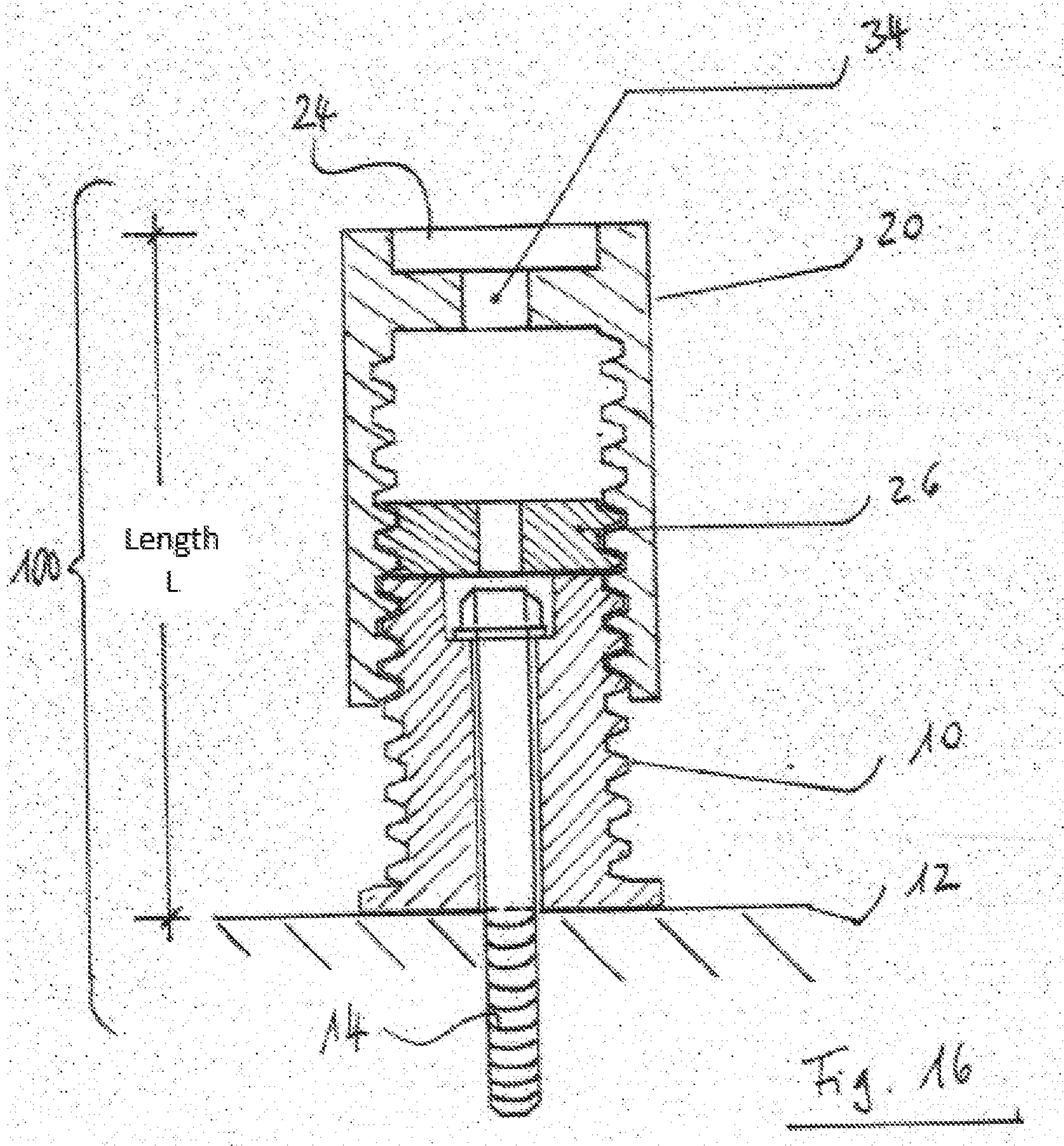
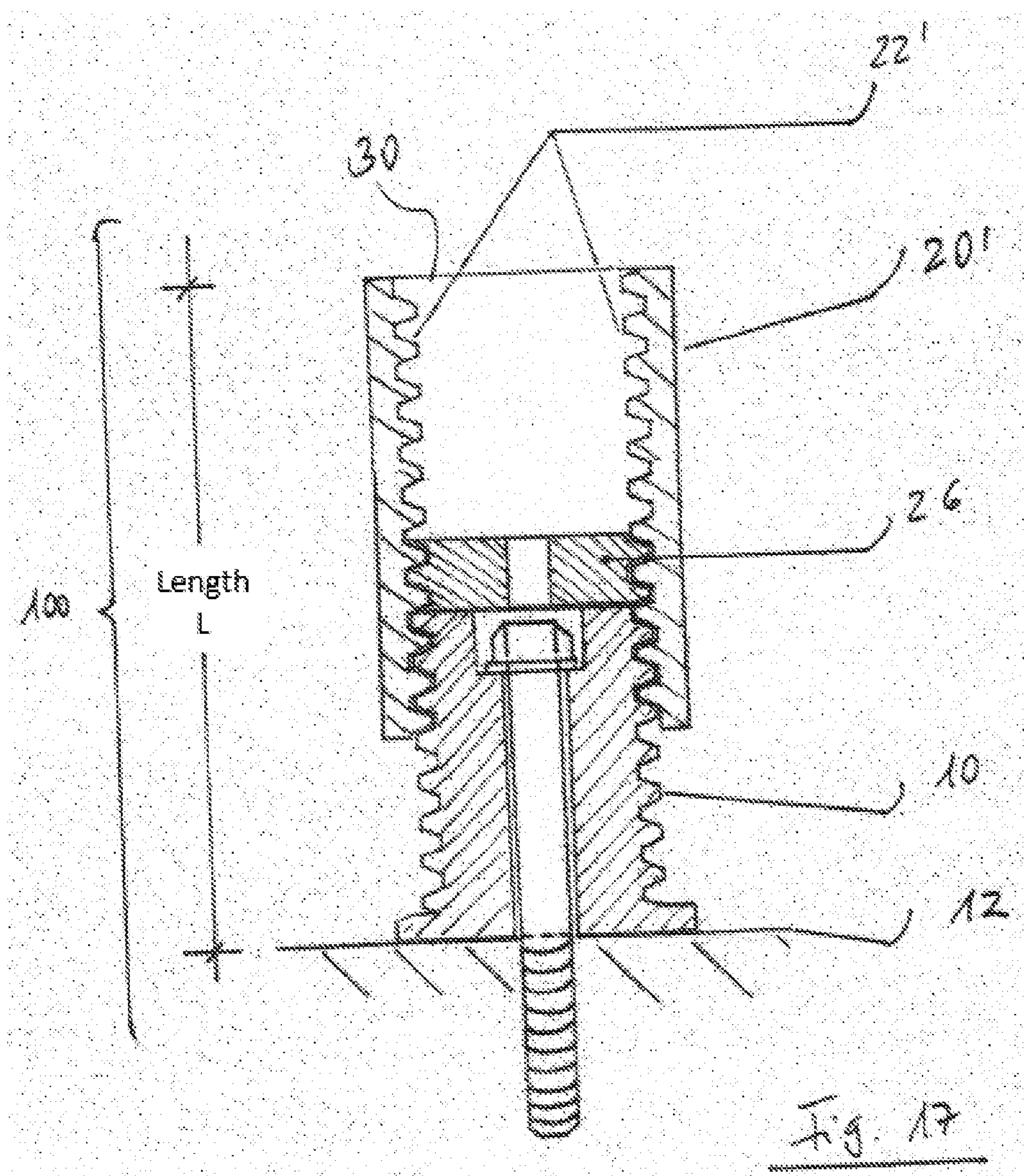


Fig. 14







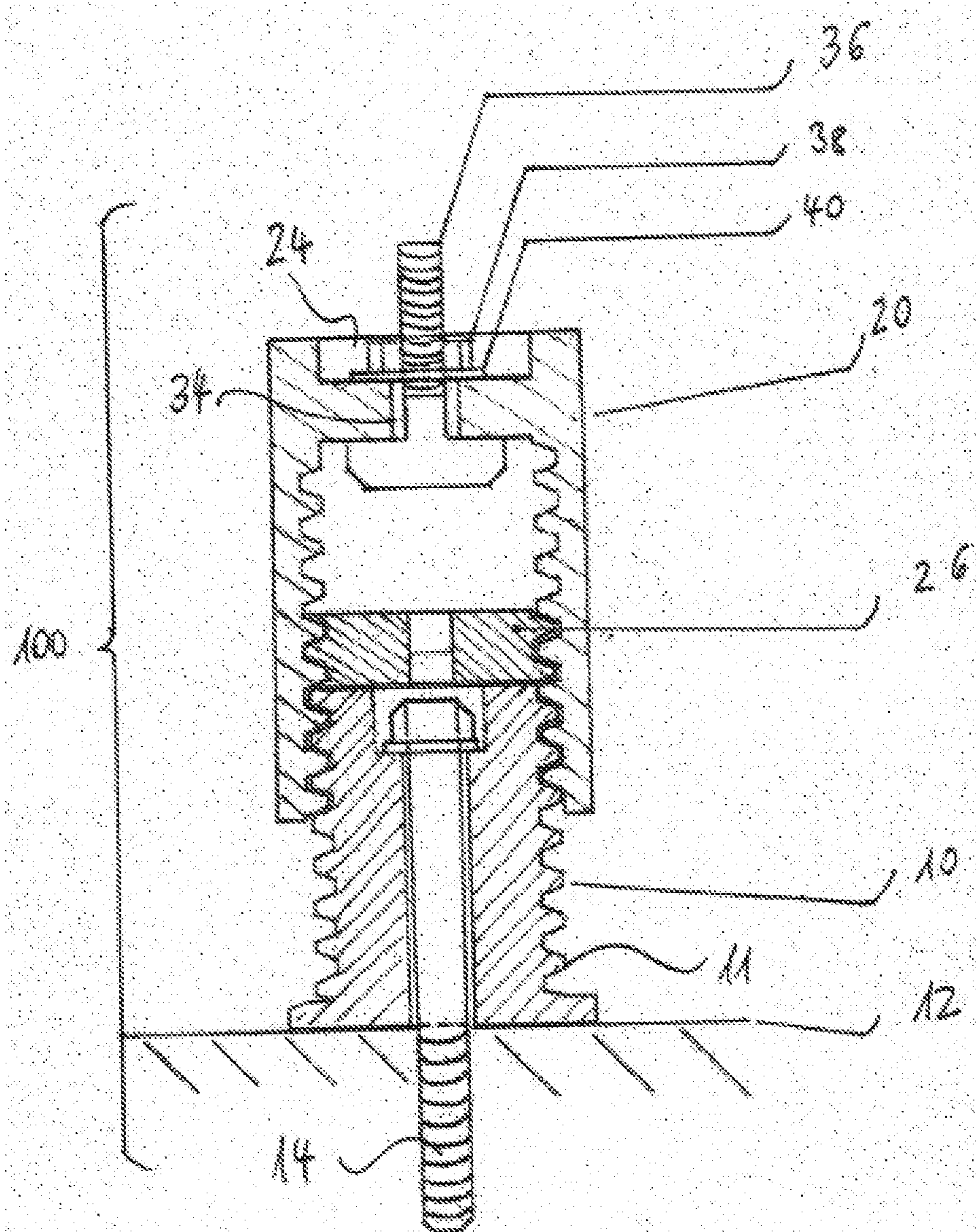
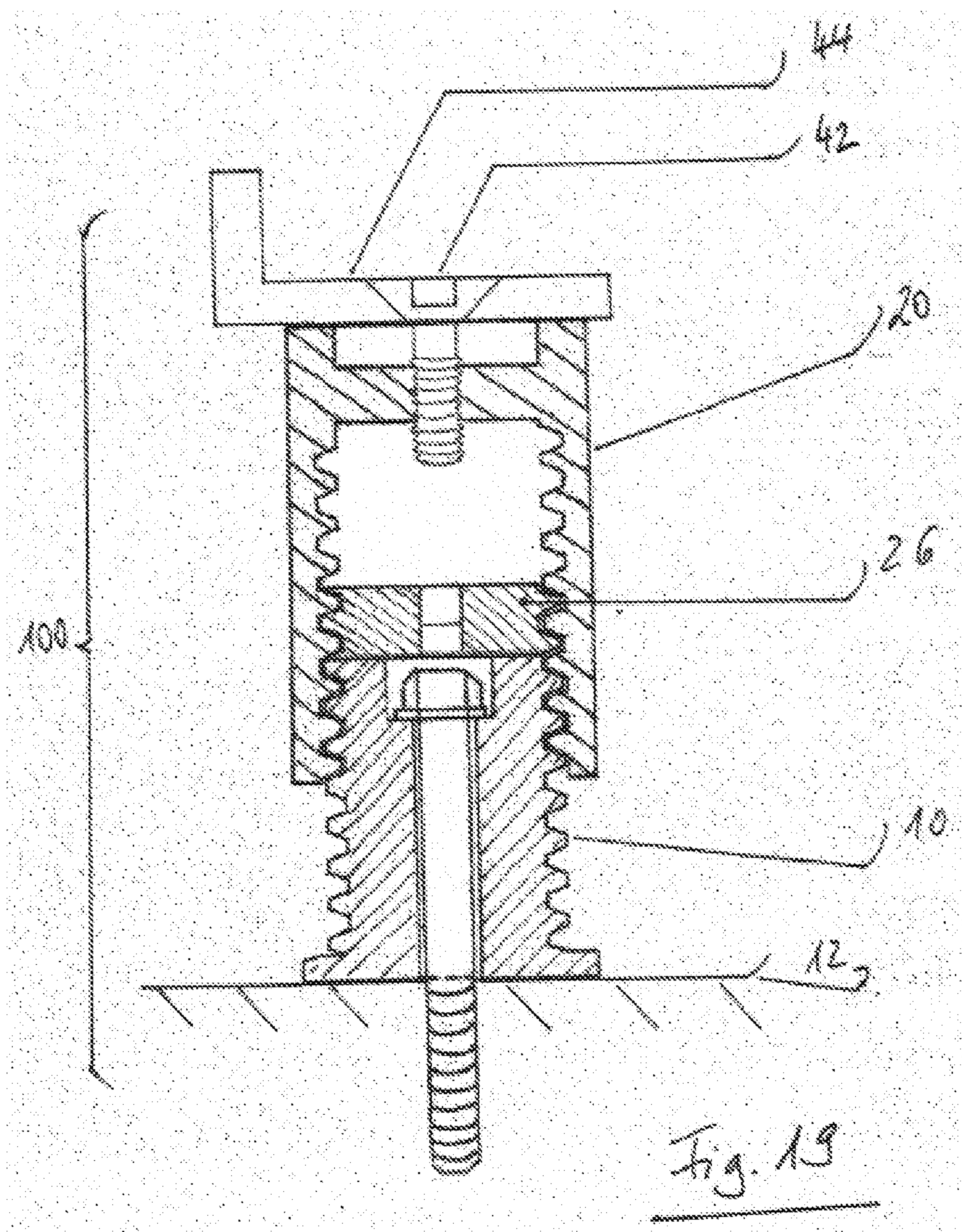


Fig. 18



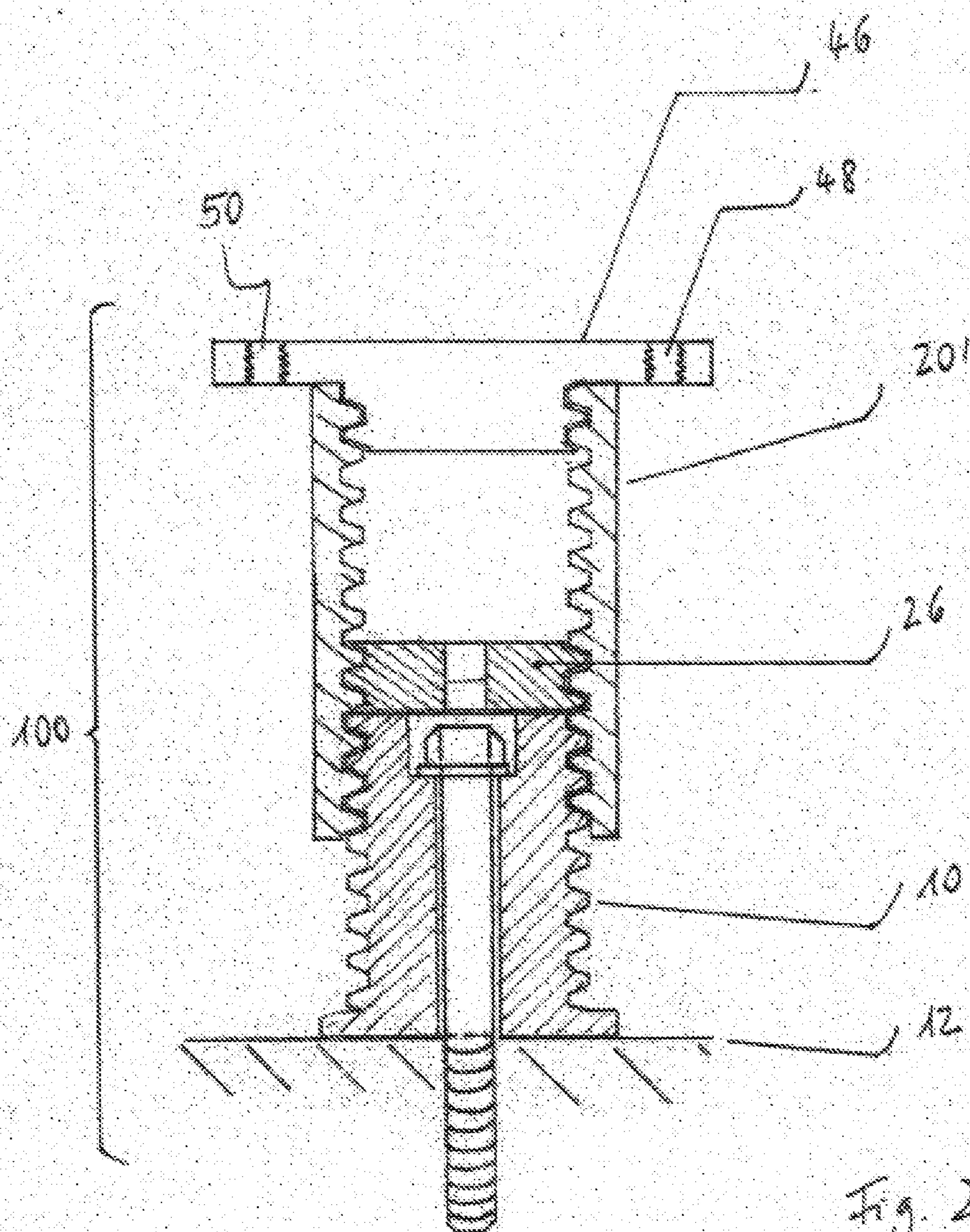


Fig. 20

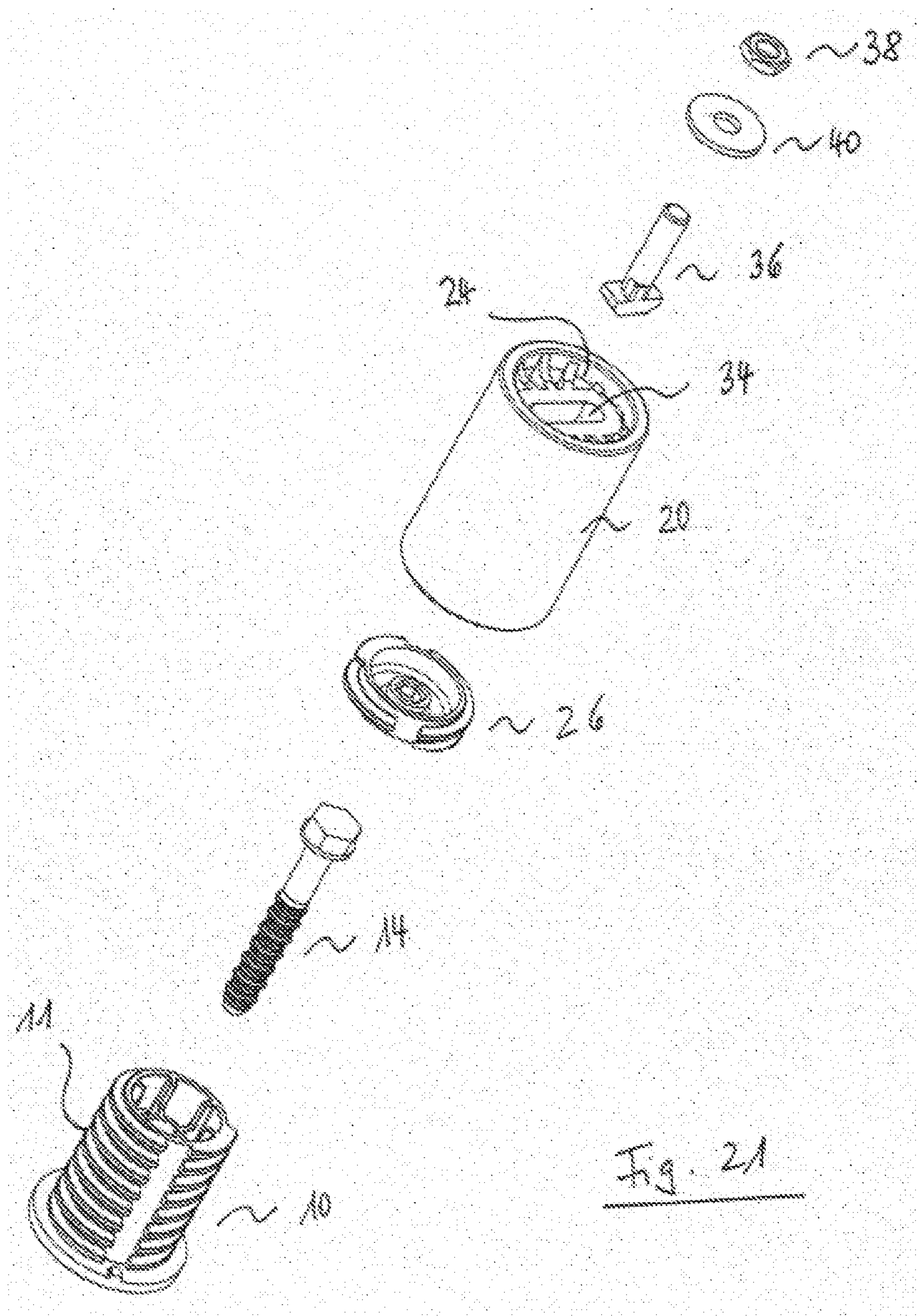


Fig. 21