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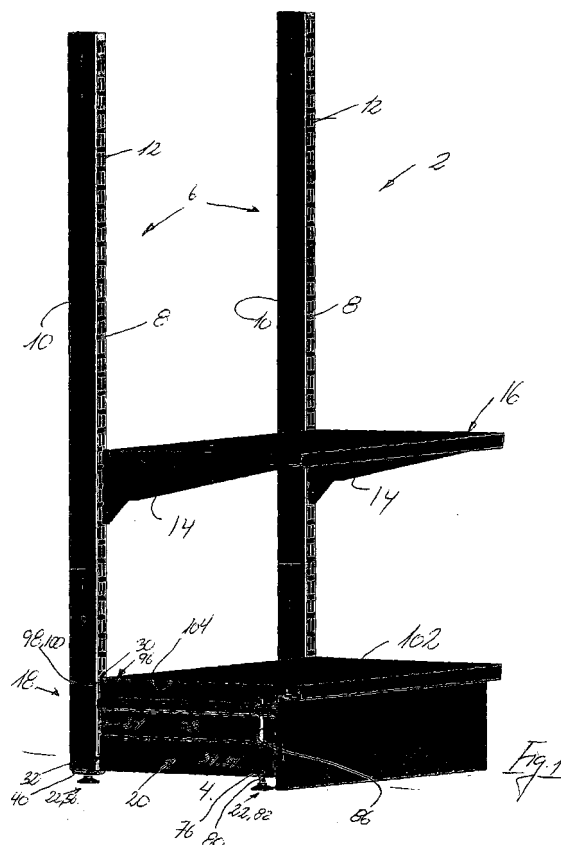
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### (54) Shelf system

(57) Shelf systems for shop furniture, typically comprising upright columns (6) with supports (14) between which shelves (16) are placed. The columns are supported by at least one releasably attached foot member (20) projecting from the lower end of the column, including adjustable legs (22).

The prior art shelf systems include foot members (20) made up of a plurality of single parts that are assembled by welding, or which include mechanical locking members, making these shelf systems expensive to manufacture.

There provided a new shelf system (2) of the kind indicated, which is peculiar in that the projecting foot members (20) are only constituted by two laterally reversed, identical, profiled plate members (34, 34') extending in parallel and with the mutually facing side faces (36, 36') of which abutting on each other over a length (38), and which plate members in this area being secured, preferably by spot welding, and that the foot members (20) are locked to the lower end (18) of the columns by a U-shaped locking member (40), the flaps (42, 44) of which being inserted into the cavity (46) of the column.



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## Description

**[0001]** The present invention concerns a shelf system, preferably for displaying articles in shops, department stores, supermarkets and warehouses, of the kind including vertically upright tubular columns standing from a base, where at least one side, and preferably two opposite sides include first apertures extending in the longitudinal direction of the columns and running in parallel for mounting supports projecting from the columns and between which shelves are disposed, where the columns are supported by at least one releasably attached foot member projecting from the lower end of the column and at the same side of the column to which the shelf supports are projecting, including adjustable legs, and where one end side of the adjustable legs include at least one first upper projecting lock tongue and a second lower lock tongue interacting with a first upper and second lower aperture at the column side.

**[0002]** A similar shelf system is known from EP 1 075 809 A1 in which is indicated a foot member for the shelf system on which on the central rail, fittings with adjustable legs may be mounted. The foot member is made of a plate and may be connected to the fitting with the adjustable leg. The foot is furthermore provided with an adjustable leg.

**[0003]** EP A 1 106 119 describes a foot member for a pipe in a shelf system where in the centre axis of the pipe there is disposed an adjustable leg, and at the side of the pipe there is fitted a foot member. The foot member is made of a four-sided pipe section. The document also indicated different embodiments where the central pipe may be finished in different ways by ends/transition pieces at which foot members may be mounted at one or both sides of the pipe.

**[0004]** In the US patent 5 433 327 there is indicated a foot member for a shelf system with a central rail, where the rail is provided with an adjustable rail leg. The rail is provided at both sides with a cutout in which a foot member is attached. The foot member is designed so that at one end it has one or more projections that engage the cutouts in the rail, and at the opposite end adjustable legs are provided. The said adjustable leg is adjustable as it is adapted for mounting with a pull arrangement incorporated in the plate section of the foot member. The foot member is made of a plate with edges so that it has an I-shaped cross-section. The said plate furthermore includes welded retainer flanges at the sides with the purpose of retaining the foot member in the rail.

**[0005]** Common to the above patent publications is that their foot members are constructed of a number of single parts that are assembled with joints/weldings which make them expensive to produce. Thus it is the purpose of the invention to provide a shelf system with strength properties entirely corresponding to those of known shelf systems, but where the foot member is designed in a considerably more simple way and of fewer individual parts, while at the same time the shelf system

is just as easy to assemble as the known shelf systems.

**[0006]** This purpose is achieved by a shelf system of the indicated kind with the properties specified in the characterising part of claim 1. Hereby is achieved a foot member with significant strength properties, as the two welded laterally reversed and identically profiled plate pieces together represent a not insignificant moment of resistance for absorbing the moment exerted on the columns in connection with the load on the shelves mounted on the column. The foot member is furthermore solidly secured to the column by using the U-shaped locking profile having its flaps inserted into the cavity of the column in such a way that these are accommodated in a slot in the lower part of a locking tongue that project from the side edge of the foot member facing the column. Hereby, the flaps of the U-shaped locking member blocks against withdrawal of the locking tongue of the foot member, as the said flap is disposed between the locking tongue and the internal column wall. The construction is also adapted so that the same opposite flap of the U-shaped profile may lock a second foot member, the locking tongue of which being inserted into apertures adapted therefore at the opposite side of the column.

**[0007]** At the side of the slot facing the internal side of the column being disposed at the underside of the locking tongue with spacing to the side of the foot member facing the column corresponding to at least the material thickness of the column, space for accommodating the column wall is provided between the underside of the foot member and the opening of the slot.

**[0008]** By furthermore designing the slot in the second lower locking tongue with at least one projection at one or at both sides, there is formed a minor reduction of the width of the slot, however allowing pressing in of one of the flaps of the U-shaped locking member in the slot to the bottom of the slot, there is achieved the advantage that the U-shaped locking member is retained in its engagement with the foot member, which means that one may move the columns at will without risking loss of the foot member.

**[0009]** The U-shaped locking member is furthermore designed so that the bottom of the U-shaped locking member is wider than the flaps and has a width at least corresponding to the external width/diameter of the column. This implies that the locking member also serves as support for the column. By furthermore providing the U-shaped locking member with threaded hole for receiving threaded spindle at one end of which an adjustable leg is fitted, there is thus achieved that the U-shaped locking member will further serve as level adjusting possibility of the shelf system.

**[0010]** The foot member of the shelf system is formed by two laterally reversed, identically profiled plate pieces extending in parallel that over a length have mutually facing sides in mutual contact, so that the plates in this area can be joined by e.g. spot weldings. The profiling of these plates implies that in conjunction these form an upper U-shaped profile over the joining area and a lower

inverted U-shaped profile under the joining area.

**[0011]** With the object of increasing the moment of resistance of the foot member, the upper profile is furthermore provided with a parallel offset. It is indicated that the first upper locking tongues are disposed in the ends of the flaps in the upper U-shaped profile, and the lower locking tongues are placed in the ends of the lower inverted U-profile under the joining area. It is furthermore noted that the lower locking tongues are considerably broader and stronger in their structure than the upper locking tongue. This is due to the fact that the moment and the pull in the foot member on this spot is considerable due to the moment from the column.

**[0012]** The lower inverted U-shaped profile has furthermore cutouts or slots in the flaps close to the end edge of the foot member. This cutout is intended for receiving a piece, preferably of metal or similar suited material, in which is provided a threaded hole for receiving one end of a threaded spindle, the other end of which including an adjustable leg. The free end of the threaded spindle is furthermore formed with a non-circular recess for receiving a another part of a tool. Hereby will be achieved that adjustment of the adjustable leg may be performed by inserting tools from the front edge of the foot member between the flaps in the U-profile.

**[0013]** With the intention of ensuring better access to the top of the threaded spindle for inserting the tool in connection with adjusting the height of the adjustable leg at the front end of the foot member, the foot member may furthermore have a second slit-shaped aperture oriented transversely of the longitudinal axis of the foot member, the centre line of which coinciding with the centre of the first slit-shaped apertures and extending at least from the bottom of the upper, mainly U-shaped profile above the joining area between the plate pieces to the bottom of the lower, inverted U-shaped profile under the joining area. Hereby, it will be possible to insert an adjustable tool from the side of the foot member. By making the said slot sufficiently broad, it will be easy to perform level adjusting operations by turning the threaded spindle with a tool inserted in the recess at the top of the threaded spindle.

**[0014]** With the purpose of securing shelves placed upon the foot members, the upward facing side edge of the foot member nearest the column may include a slot for arresting reception of downwards projecting parts of the shelf placed on the foot member.

**[0015]** With the purpose of retaining a wire or wooden shelf at the upwards facing side of the foot member, the upwards facing side edge of the foot member may include a recessed area in which parts projecting from the underside of the said shelves may be received.

**[0016]** The invention is explained in more detail in the following with reference to the drawing, where:

Fig. 1 is a perspective view of a section of the shelf system according to the invention;

Fig. 2 is a perspective view of a column with mount-

ed foot member according to the invention;  
Fig. 3 is a view of a side of a column with apertures for supports;

Fig. 4 is a side view of the column shown in Fig. 3;  
Fig. 5 is a cross-sectional view of the column along the line B-B in Fig. 4;

Fig. 6 is a side view of a foot member according to the invention;

Fig. 7 is a sectional view of the foot member shown in Fig. 6;

Fig. 8 is a side view of a column with mounted foot member according to the invention;

Fig. 9 is a front side view of the columns shown in Fig. 8;

Fig. 10 is a top view of the column shown in Fig. 8;

Fig. 11 is a detailed sectional view of mounting the foot member at the column foot in the area C-C in Fig. 9;

Fig. 12 is a detail of the fastening mechanism for securing the foot member; and

Fig. 13 is a perspective view of a U-shaped locking member.

**[0017]** In Fig. 1 is shown an embodiment of a section for a shelf system 2 that include a tubular column standing vertically from a base 4, where at least one side 8 of the column include first apertures 12 extending in parallel oriented in longitudinal direction of the column for mounting these projecting supports 14, where between shelves 16 are provided. The columns 6 are supported by at least one releasably attached foot member projecting from the lower end of the column and the same side of the column 6 to which the supports 14 for shelves 16 project, where the foot member includes adjustable legs 22. One end side of the foot member includes at least one first upper projecting locking tongue 30 and a second lower locking tongue 32 interacting with a first upper aperture 12 and a second lower aperture 28 in the column side 8.

**[0018]** In Fig. 2 is shown a perspective view of the column mounted with a foot member 20.

**[0019]** In Fig. 3 is shown a side 8 including parallel rows of apertures 12 for mounting shelf supports 14. At the lower part 18 of the column is seen the mounting holes 26 for the first upper locking tongues 30 in the foot member 20 and under these, longer slots 28 for accommodating the other, lower locking tongues 32.

**[0020]** Fig. 4 is a side view of a column, and Fig. 5 is showing a cross-section of an embodiment of the column as shown in Fig. 3.

**[0021]** In Fig. 6 is shown a side view of an embodiment of a foot member 20. The foot member 20 consists of two laterally reversed, identical, profiled plate pieces 34, 34' (see Fig. 7) extending in parallel that in a joining area 38, where the mutually facing sides 36, 36' of the plates are in contact with each other, are preferably joined by spot welding. The profile curves of the plate pieces 34, 34' implies that an upper U-shaped section

58 is formed above the joining area 38, and a lower inverted U-shaped profile 60 is formed under the joining area 38.

[0022] As it further appears from Fig. 6, the plate pieces at the end opposite the locking tongues 30, 32 at the underside include an aperture 74 intended for receiving a metal piece 76, cf. Fig. 11, the metal piece having a threaded hole 78 for receiving a threaded spindle 80 in the end of which is provided an adjustable leg 82. The threaded spindle 80 includes a non-circular recess 84 at the upper end for receiving a tool so that it will be possible to turn the threaded spindle 80 and thereby perform a level adjustment of the front end of the foot member. Above the slot 74 is provided a slit-shaped slot 86, the longitudinal axis 90 of which is oriented transversely of the longitudinal axis 88 of the foot member, cf. Fig. 10. The said slot 86 will facilitate the access to the non-circular recess 84 at the end of the threaded spindle 80 with a tool, whereby the tool, whereby the work with adjusting the said adjustable leg will be significantly eased, as this may be done either from the front edge of the foot member 20 or from the side of same.

[0023] As it further appears from Fig. 6, the foot member includes an upper locking tongue 30 and, compared with the latter tongue, a considerably stronger locking tongue 32 including a slit 43 having an aperture oriented towards the lower edge 97 of the foot member. The side 41 of the slot 43 facing the internal side 48 of the column 6 at the underside of the locking tongue 32 is disposed at a distance from side of the foot member 24 facing column 6, corresponding to at least the material thickness of the column, whereby space is made for accommodating the column wall between the underside of the foot member and the slot opening, as outlined in Fig. 12.

[0024] A U-shaped locking member 40 belongs to the shelf, as shown in details in Fig. 13.

[0025] The U-shaped locking member has a bottom 50 that include a threaded hole 52, and the bottom also include flaps 42, 44 standing up from it and having a width less than the width of the bottom 50. In Figs. 8, 9, 10, 11 and 12 is seen how the U-shaped locking member is used in connection with fastening the foot member 20 to the columns 6. Fig. 8 is thus a side view of the column provided with the foot member, and Fig. 9 is a front view of the same, and Fig. 10 is a top view of the column shown in Fig. 8.

[0026] The use of the U-shaped locking member 40 for fastening the foot member to the column is shown in Fig. 11. The flaps 42, 44 are, as it particularly appears from Fig. 12, a detail of Fig. 11 made in the cavity 46 of the column, so that the flap 44 of the U-shaped locking member is inserted into the slot 43 at the underside of the locking tongue 32, and the said flap 44 is furthermore in contact with the internal column wall 48. Hereby is made a very secure anchoring of the foot member 20 to the lower part 18 of the column 6. In combination with the strong design of the lower locking tongue, this means that a column element 6 provided with the said

foot members 20 will be capable of absorbing an even very large moment. As it further appears from particularly Figs. 11 and 12, the U-shaped locking member includes an adjustable leg 56 on a threaded spindle 54 which is inserted in the threaded hole 52 in the bottom 50 of the U-shaped locking member.

[0027] In the shown embodiment, the slot 43 has a projection 45 at one side 41, forming a minor reduction of the width of the slot, though allowing pressing in of one of the flaps 42, 44 of the U-shaped locking member 40 in the slot 43 to the bottom 49 of the slot, as it appears from Fig. 12. Hereby is achieved the advantage that the U-shaped locking member is retained in its engagement with the foot member, irrespectively whether the column is lifted completely free of the base 4 on which it is placed.

[0028] As it further appears from i.a. Figs. 2, 6, 8 and 11, the foot member includes in the upwards facing side edge close to the column side 8 a slit-shaped slot 98 for receiving downwards projecting parts of a shelf 102 placed upon the foot member 20.

[0029] The foot member is furthermore adapted for supporting wire shelves or wooden shelves, as the upper side 96 of the foot member 20 has a recessed area 104 for receiving parts projecting downwards from wooden shelves and wire shelves.

[0030] As it particularly appears from Fig. 7, which is a cross-sectional view of a foot member, it is seen that a profile curving of the plate parts 34, 34' has been made, so that the distance between the flaps 62, 62' of the U-profile 58 over the joining area 38 is wider than the distance between the flaps 64, 64' in the inverted U-profile under the joining area 38 of the plate parts 34, 34'. The flaps are, however, by a parallel offset 68, 68' brought in so that the free ends 66, 66' are disposed with mutual spacing corresponding to the distance between the flaps 64, 64' in the inverted U-section 60. However, by broadening the U-profile 58, there will be achieved a significant increase of the moment of resistance that the foot member represents and can absorb.

[0031] Thus there is thus provided a very cheap and efficient shelf system, the strength properties of which entirely corresponding to already known shelf systems. However, the manufacture of a foot member will be very cheap as a such is formed by welding by spot welding at two laterally reversed profiled plate sections extending in parallel, including all functions required for a shelf, and nothing else, as opposed to other known shelf systems that are built up of a number of individual parts welded together.

[0032] The inventor has, of course, realised that a shelf system with foot member according to the invention may assume other embodiments than those indicated and described above. E.g. the profiling of the plate pieces 34, 34' may be different with the purpose of attaining a further increased moment of resistance, but this does not change the inventive aspect constituted in that a fully usable foot member is made by joining two

identically profiled but laterally reversed plates, as indicated in the claim, and are secured in the column member with a U-shaped locking member which is inserted between the locking tongue and the internal column wall.

List of reference numbers:

### [0033]

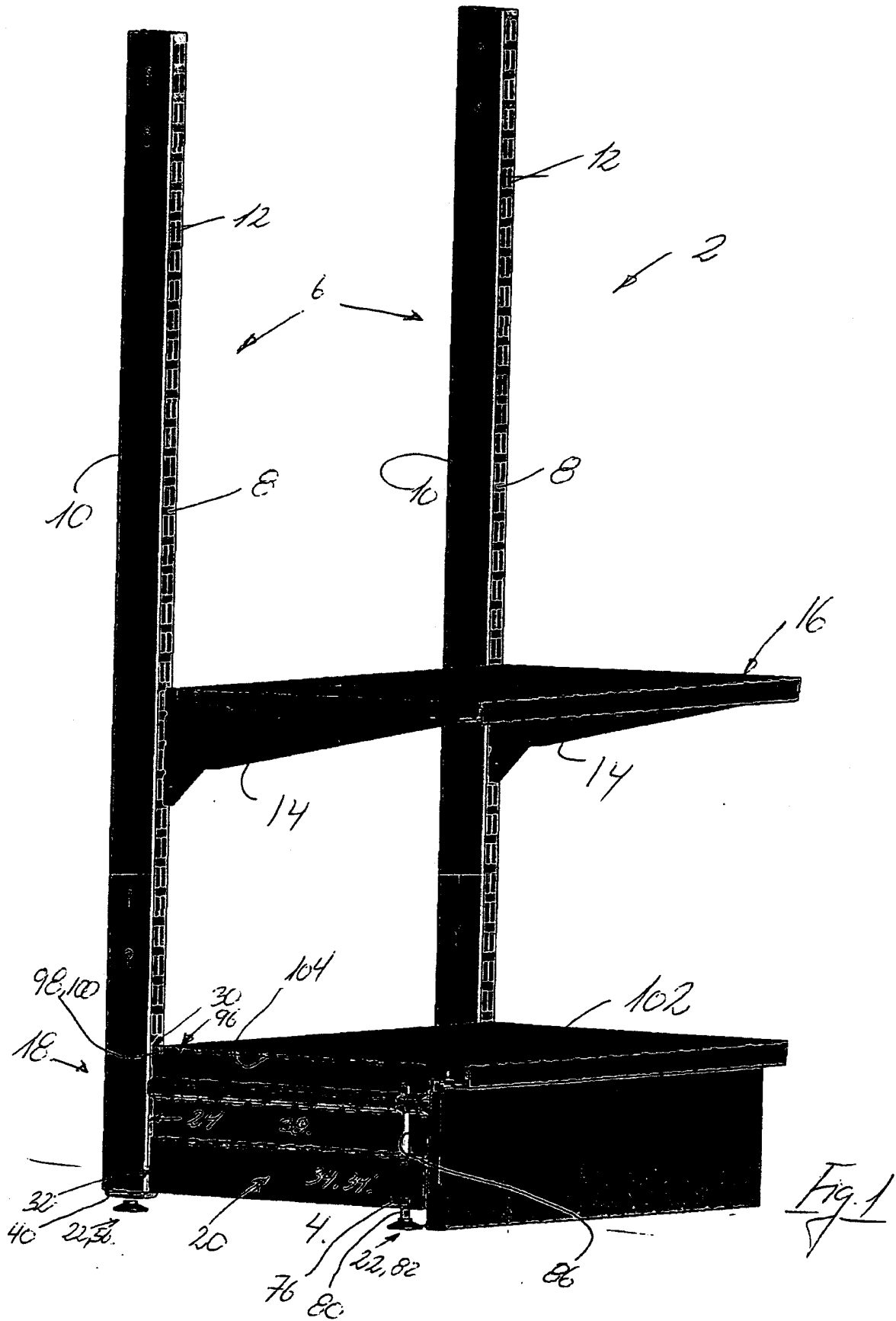
2	shelf system	
4	base	
6	columns	
8	side of column (where brackets are suspended for supporting shelves)	
10	other opposite side of column (where brackets are suspended for supporting shelves)	
12	apertures or slots for supports	
14	supports	
16	shelves	20
18	lower end of column	
20	projecting foot members	
22	adjustable legs	
24	end side facing the column	
26	upper slot in column at lower end of column	25
28	lower slot in column at the lower end of it	
30	first upper locking tongue on 24	
32	second lower locking tongue on 24	
34, 34'	laterally reversed, identical, profiled plate pieces extending in parallel (constitute 20)	30
36, 36'	side faces of 34 facing each other	
38	joining area between 34, 34'	
40	U-shape locking member	
41	side of slot 43	
42	flap of 40	35
43	slot in locking tongue 32	
44	flap of 40	
45	projection in slot 43	
46	cavity of column	
47	side of slot 43	40
48	internal column wall	
49	bottom of slot 43	
50	bottom of U-shaped locking member 40	
52	threaded hole in 50	
54	threaded spindle	45
56	adjustable leg on 54	
58	upper U-shaped profile over the joining area 38 between 34, 34'	
60	lower inverted U-shaped profile under the joining area 38 between 34, 34'	50
62, 62'	flaps of 58	
64, 64'	flaps of 60	
66, 66'	upper parts of 62, 62'	
68, 68'	parallel offset of 66, 66'	
70	free ends of 66, 66'	55
72, 72'	ends of flaps 64, 64'	
74	slit-shaped aperture oriented in longitudinal direction of 20 for a metal piece	

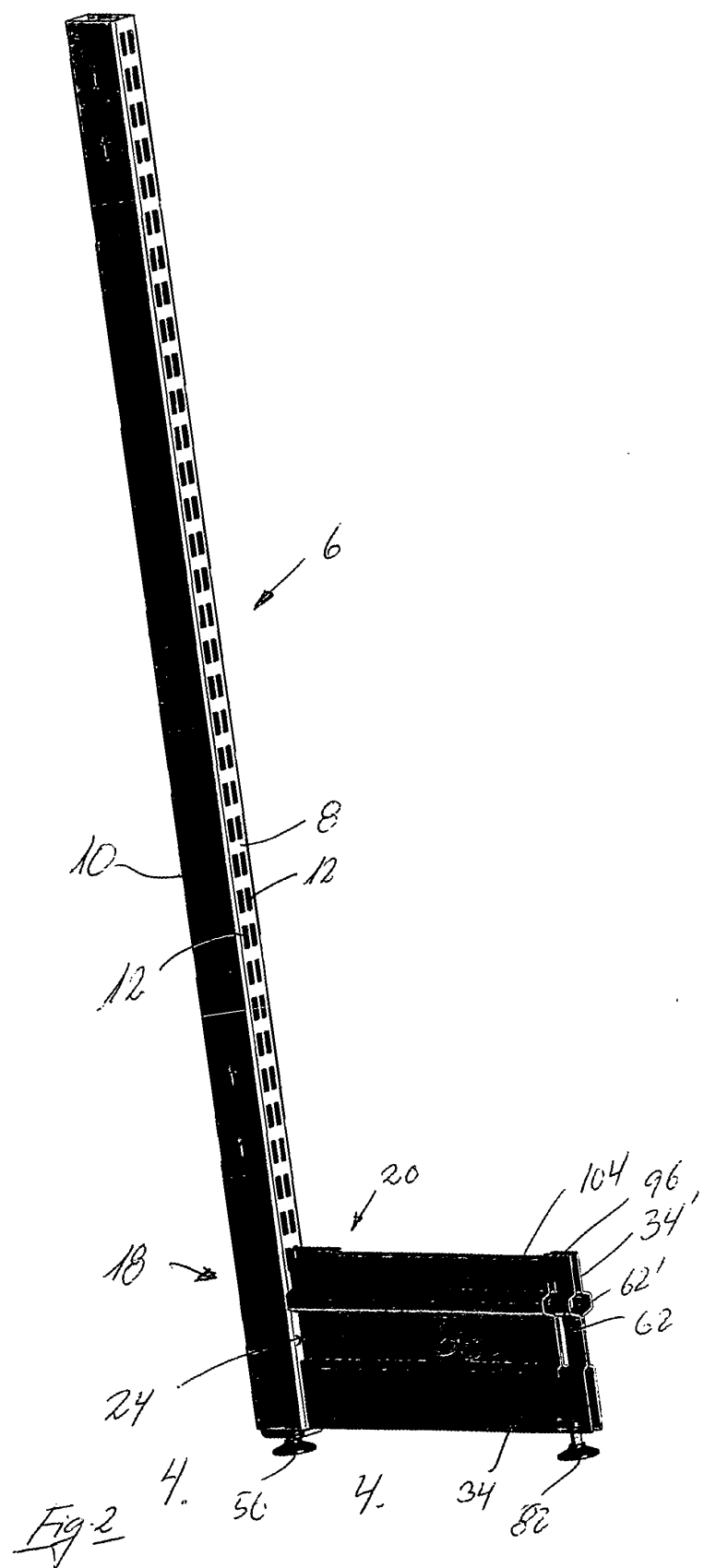
76	metal piece
78	threaded hole in 76
80	threaded spindle for reception in hole 76
82	adjustable leg in end of 80
5 84	non-circular recess at end of 80 for receiving a tool
86	second slit-shaped slot in 20
88	longitudinal axis of foot member
90	centre line of slot 86
10 92	bottom of the upper U-shaped profile 58
94	bottom of lower inverted U-shaped profile 60
96	upwards facing side edge of 20
97	lower edge of foot member 20 or plate pieces 34, 34'
15 98	slot for receiving downwards facing parts from a shelf placed on the foot member
100	downwards facing parts of shelf
102	shelf
104	recessed area on 96

### Claims

1. Shelf system (2), preferably for displaying articles in shops, department stores, supermarkets and warehouses, of the kind including vertically upright tubular columns (6) standing from an base (4), where at least one side (8), and preferably two opposite sides (8, 10) include first apertures (12) extending in the longitudinal direction of the columns and running in parallel for mounting supports (14) projecting from the columns and between which shelves (16) are disposed, where the columns (6) are supported by at least one releasably attached foot member (20) projecting from the lower end (18) of the column and at the same side of the column to which the shelf supports are projecting, including adjustable legs (22), and where one end side (24) of the adjustable legs include at least one first upper projecting lock tongue (30) and a second lower lock tongue (32) interacting with a first upper and second lower aperture (26, 28) at the column side, **characterised in that** the projecting foot members (20) are constituted by two laterally reversed, identical, profiled plate members (34, 34') extending in parallel and with the mutually facing side faces (36, 36') of which abutting on each other over a length (38), and which plate members in this area being secured, preferably by spot welding, and that the foot members (20) are locked to the lower end (18) of the columns by a U-shaped locking member (40), the flaps (42, 44) of which are inserted into the cavity (46) of the column so that the flaps (42, 44) in the mounted position of the foot members are inserted in a slot (43) with the sides (41, 47) at the underside of the lock tongue (32) and thereby are disposed between the lower lock tongue (32) and the internal column wall (48).

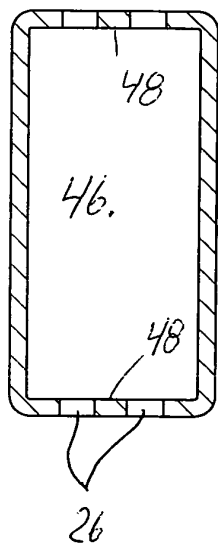
2. Shelf system according to claim 1, **characterised in that** the side (41) of the slot (43) facing the internal side (48) of the column (6) is disposed at the underside of the locking tongue (32) with spacing to the side of the foot member (24) facing the column (6) corresponding to at least the material thickness of the column, and which slot (43) has at least one projection (45) at one or at both sides (41, 47) that provide a minor reduction of the slot width, however allowing pressing in of the flaps (42, 44) of the U-shaped locking member (40) in the slot (43) to the bottom of the slot (49). 5
3. Shelf system according to claim 1 or 2, **characterised in that** the bottom (50) of the U-shaped locking member (40) is wider than the flaps (42, 44) and has a width at least corresponding to the outer diameter/width of the column. 10
4. Shelf system according to any of claims 1-3, **characterised in that** at the bottom (50) of the U-shaped locking member (40) there is a threaded hole (52) for receiving a threaded spindle (54) one end of which including a first adjustable leg (56). 15
5. Shelf system according to any of claims 1 - 4, **characterised in that** the cross-sectional profile of a foot member (20) formed by the mutual fixed connection (38) of the profiled plate members (34, 34') includes an upper, mainly U-shaped profile (58) over the joining area (38) between the plate members (34, 34') and a lower inverted U-shaped profile (60) under the joining area. 20
6. Shelf system according to claim 5, **characterised in that** the flaps (62, 62') of the upper, mainly U-shaped profile (58) are laterally reversedly bent profiled so that the mutual spacing of the flaps is greater close to the bottom than the spacing between the flaps (64, 64') in the lower inverted, mainly U-shaped profile (60) under the joining area (38), but where the upper part (66, 66') of the flaps (62, 62') of the upper U-profile (58) has a parallel displacement (68, 68'), whereby the free ends of the flaps (70, 70') are provided the same mutual distance as between the flaps (64, 64') in the lower U-shaped profile (60). 25
7. Shelf system according to claim 6, **characterised in that** the flaps (64, 64') in the lower inverted U-shaped profile (60) nearest the ends (72, 72') of the flaps include mutually oppositely disposed slit-shaped first slots (74) that are oriented in longitudinal direction of the foot member for accommodating a metal piece (76) including a threaded hole (78) for receiving one end of a threaded spindle (80), the opposite end of which includes a second adjustable leg (82), and the free end of which threaded spindle including a non-circular recess (84) for receiving a part of a tool. 30
8. Shelf system according to claim 6 or 7, **characterised in that** foot member (20) furthermore has a second slit-shaped slot (86) oriented transversely of the longitudinal axis (88) of the foot member, and the centre line (90) of which coincides with the centre of the first slit-shaped slots (74) and extending at least from the bottom (92) of the upper, mainly U-shaped profile (58) above the joining area (38) between the plate pieces (34, 34') to the bottom (94) of the lower, inverted U-shaped profile (60) under the joining area (38). 35
9. Shelf system according to any of claims 1 - 9, **characterised in that** the upwards facing side edge (96) of the foot member (20) nearest the column (6) includes a slot (98) for arresting reception of downwards projecting parts (100) of a shelf (102) placed on the foot member (70). 40
10. Shelf system according to any of claims 1 - 9, **characterised in that** the upwards facing side edge (96) of the foot member (20) includes a recessed area (104) in the form of a cutout for arresting reception of a wire or wooden shelf on the upwards facing side of the foot member. 45



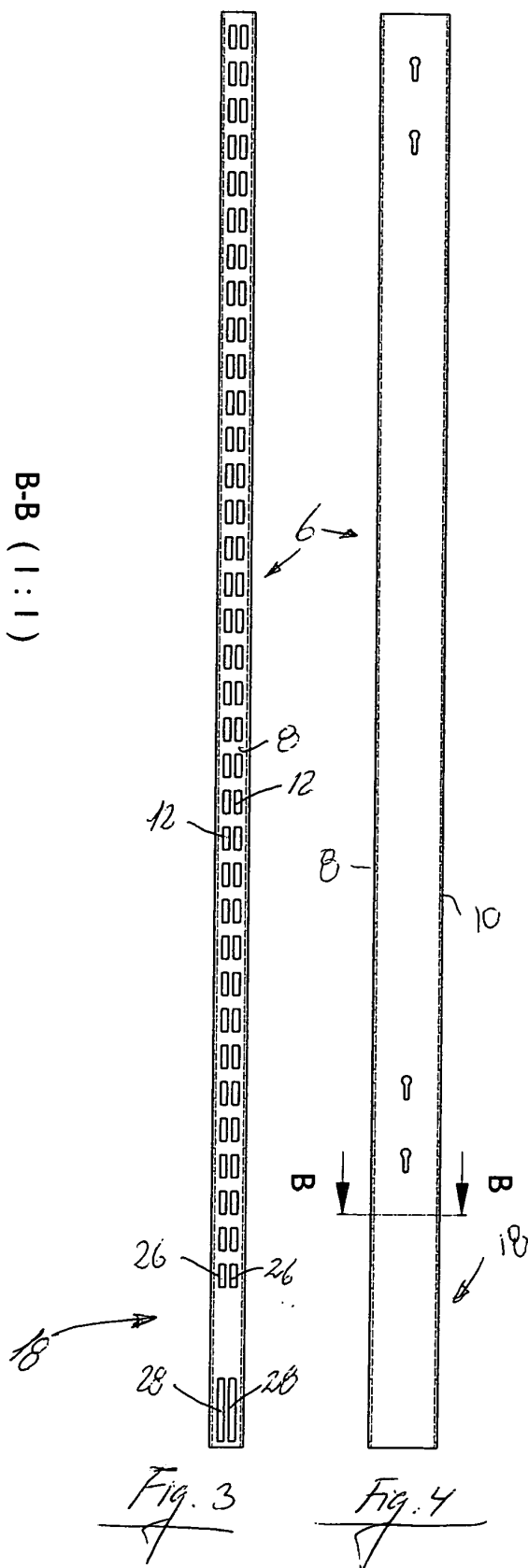




*Fig. 5*

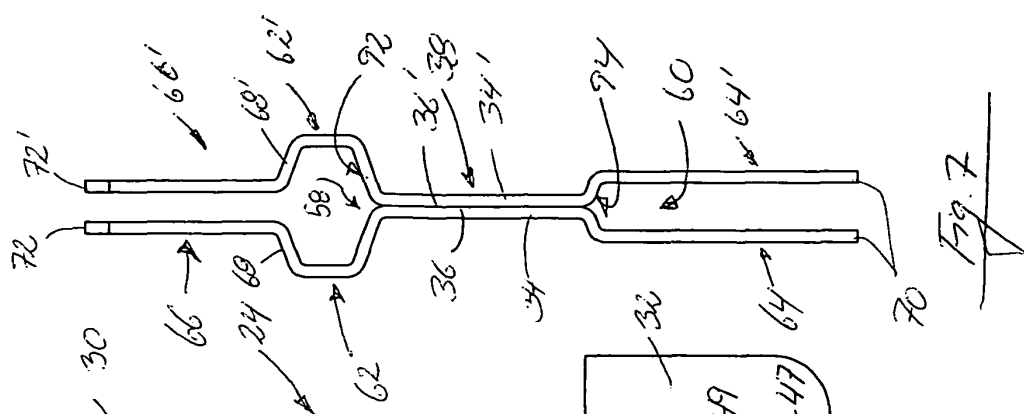
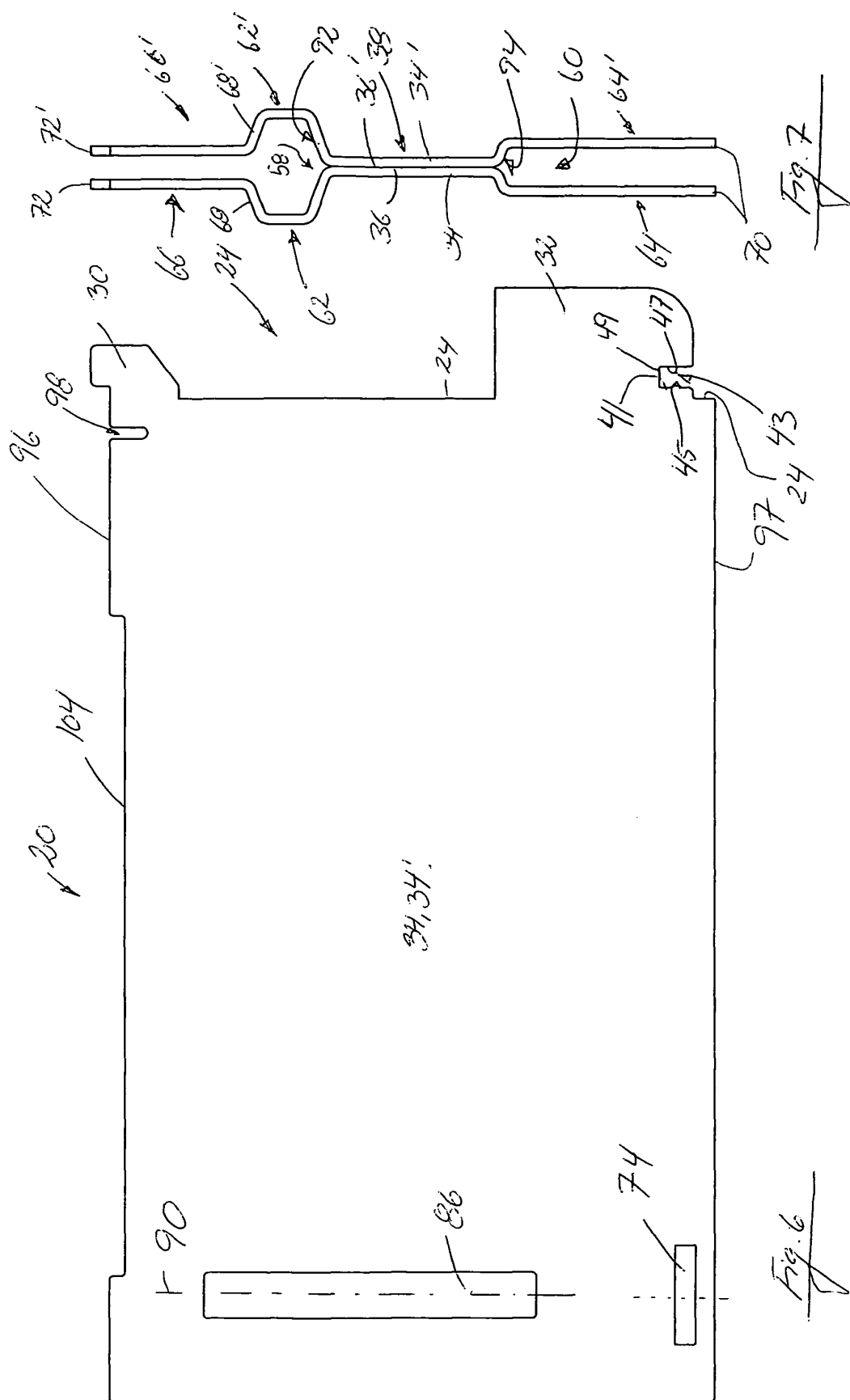


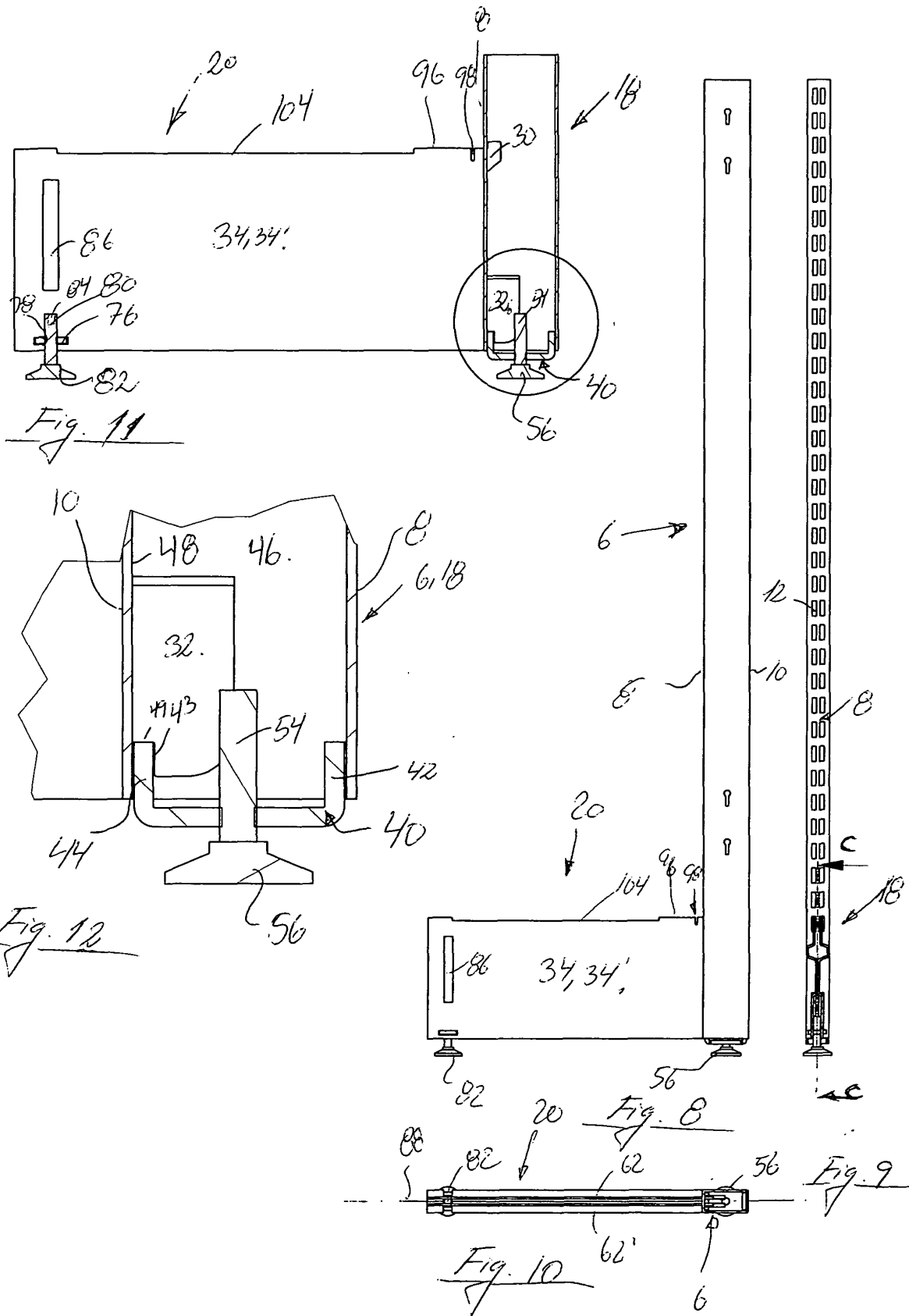
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*Fig. 3*

*Fig. 4*





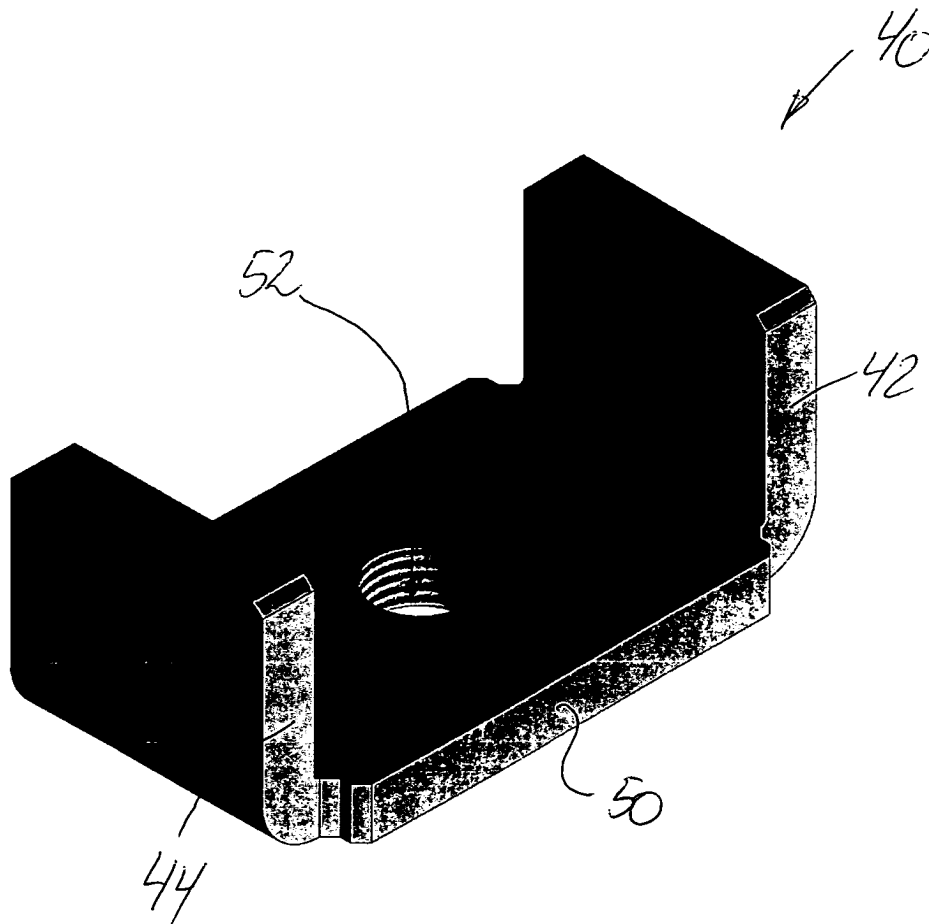


Fig. 13