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(54) Closure and security grille for openings

(57) The closure and security grille for openings includes: a stationary frame (4) formed by two vertical guide section bars (5d,5e), which are fastened to the vertical walls (55) of a related opening (60) and by a transverse bar (6) fastened thereto by locks; a stationary cross bar (Tf), connected with the transverse bar by a series of uprights of predetermined length; a series of moving cross bars, respectively lower (Ti), intermediate (T1,T2) and upper (Ts), whose extremities are slidably guided by the section bars; connecting means (8) for mutually connecting the lower, intermediate and upper moving cross bars as well as the upper moving cross bar to the stationary cross bar, the connecting means (8) defining, in combination with said cross bars, two extreme configurations, respectively an extended configuration (O), in which the cross bars are spaced apart with the lower moving cross bar (Ti) situated in proximity or in abutment on the lower wall of the opening (60), and a compacted configuration (I), in which the cross bars are drawn packed closed to each other against the stationary cross bar (Tf).

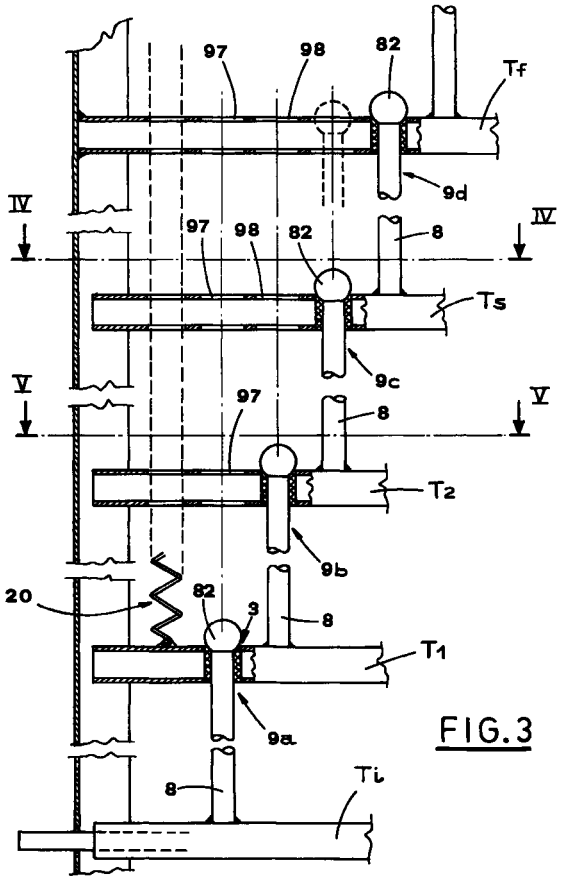

FIG.3

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Description

[0001] The present invention relates to closure and security grille for various openings.

[0002] Extensible grille gates have heretofore been provided, which are formed by articulated elements forming parallelograms. The elements are made of iron plates.

[0003] Other grilles are known, which are formed by a series of uprights, made from particular aluminum section bars, featuring thereinside strengthening elements and slides for connecting transversal bars, which allow to move different uprights close to or away from each other, so as to cover or open almost completely the opening.

[0004] The disadvantage of the parallelogram articulated grilles derives from the fact that they cannot be used in flats because of production finishing low level, difficult maintenance resulting from many external articulations subjected to oxidation, and because the aluminium plate can be cut quite easily.

[0005] There have been proposed extensible grille gates for houses with better finishing and security features, however, they must be removed manually in order to open the window, or, if they are sliding, they need a housing space in the wall, on both sides of the window.

[0006] The grille formed by a series of uprights features another disadvantage resulting from big space which it occupies when closed; actually, the closed grille covers a portion of the opening, to which it has been applied.

[0007] Another disadvantage of this type of grille results from the use of guides situated along the opening lower wall; sometimes, the guides can be closed toward the opening lateral walls, however, each time the grille is to be closed, the guides must be repositioned manually, which incurs the risk of getting dirty.

[0008] If the guides are fastened to the opening lower wall, the latter must be cleaned with care, because the dirty guides could cause difficulty in the grille opening/closing movements.

[0009] The object of the present invention is that of proposing a simple and cheap technical solution.

[0010] Another object of the present invention is to propose a grille which does not require any housing space in the opening walls, limiting the portion of the opening being covered, and which requires limited maintenance.

[0011] A further object of the present invention is to propose a grille, which has no components connected to the opening lower wall, when it is in the compacted position.

[0012] Still another object of the present invention is to propose a grille, which is well finished and secure.

[0013] Yet further object of the present invention is to propose a grille, fastened to a window, which can be positioned externally or internally with respect to the window rolling shutter, and which can be raised, if requested, from the windowsill, so that a drip pan can be placed there.

[0014] The characteristic features of the present invention are pointed out in the following description, taken in conjunction with the accompanying drawings, in which:

- Figure 1 is a schematic front view of the proposed grille in extended configuration;
- Figure 2a is a schematic front view of the proposed grille in the intermediate configuration;
- Figure 2b is a schematic front view of the proposed grille in compacted configuration;
- Figure 3 is an enlarged view of a portion of Figure 1, with some parts removed in order to point out some interesting technical-functional aspects;
- Figure 4 is a section view taken along IV-IV in Figure 3;
- Figure 4 is a section view taken along V-V in Figure 3.

[0015] With reference to the above mentioned figures, the reference numeral 2 indicates a closure and security grille gate for rooms.

[0016] The grille 2 includes a stationary frame 4 formed by two vertical guide section bars 5d, 5e, which are fastened to the vertical walls 55 of a relative opening 60 and by a transverse bar 6 fastened thereto by preferably mechanical locks.

[0017] The grille includes also: a stationary cross bar Tf, fastened to a series of uprights 7, e.g. seven, as in the illustrated example, which have a predetermined length, and which are fastened to the transverse bar 6 of the frame; a series of moving cross bars, respectively lower Ti, intermediate e.g. T1, T2 and upper Ts.

[0018] The extremities of the moving cross bars are slidably guided by the section bars 5d, 5e.

[0019] Locks (preferably mechanical) are fastened to the lower moving cross bar Ti, outside of the grille.

[0020] The locks fasten the lower cross bar Ti to the opening vertical walls when the grille 2 is in extended position (Figure 1) or in the compacted position (figure 2b).

[0021] A plurality of connecting vertical rods 8, e.g. seven, are fastened, at their base, to the lower moving cross bar Ti, and freely introduced into first through holes 9a, e.g. provided with bushings, made in the first intermediate moving cross bar T1.

[0022] Each of the heads of the vertical rods 8 forms a ball 82, which, when in the operation position, rests on a related seat 3, made in the upper part of the first intermediate moving cross bar T1, in the region of a corresponding first through hole 9a.

[0023] A plurality of connecting vertical rods 8, e.g. seven, are fastened, at their base, also to the first intermediate moving cross bar T1, and freely introduced into second through holes 9b made in the second intermediate moving cross bar T2.

[0024] Each of the heads of the above mentioned vertical rods 8 forms a ball 82, which, when in operation position, rests on a relative seat, made in the upper part of the second intermediate moving cross bar T2, in the region of a corresponding second through hole 9b.

[0025] The axes of the connecting vertical rods 8 fastened to the first intermediate moving cross bar T1 are offset with respect to the axes of the connecting vertical rods of the lower moving cross bar Ti, so as not to hinder the introduction of the connecting vertical rods 8 into the corresponding through holes and to allow the rods 8 to move vertically.

[0026] A plurality of connecting vertical rods 8, e.g. seven, are fastened, at their base, to the second intermediate moving cross bar T2, and freely introduced into third through holes 9c made in the upper moving cross bar Ts.

[0027] Each of the heads of the above mentioned vertical rods 8 forms a ball 82, which, when in the operation position, rests on a relative seat, made in the upper part of the upper moving cross bar Ts, in the region of a corresponding third hole 9c.

[0028] The axes of the connecting vertical rods 8 fastened to the second intermediate moving cross bar T2 are offset with respect to the axes of the connecting vertical rods of the first intermediate cross bar T1 and with respect to the ones fastened to the lower moving cross bar Ti, so as not to hinder the introduction of the connecting vertical rods 8 into the corresponding through holes and to allow the rods 8 to move vertically.

[0029] The second intermediate moving cross bar T2 features also first apertures 97 (Figure 5), coaxial with the connecting vertical rods 8 of the lower moving cross bar.

[0030] The diameter of the first apertures 97 is such as to allow the heads of the connecting vertical rods 8 of the lower cross bar to pass vertically therethrough.

[0031] A plurality of connecting vertical rods 8, e.g. seven, are fastened, at their base, to the upper moving cross bar Ts, and freely introduced into fourth through holes 9d made in the stationary cross bar Tf.

[0032] Each of the heads of the above mentioned vertical rods 8 forms a ball 82, which, when in the operating position, rests on a related seat, made in the upper part of the stationary cross bar Tf, in the region of a corresponding fourth hole 9d.

[0033] The axes of the connecting vertical rods 8 fastened to the upper moving cross bar Ts are offset with respect to the axes of the connecting vertical rods of the first intermediate moving cross bar T1 and the second intermediate moving cross bar T2 and with respect to the ones fastened to the lower moving cross bar Ti, so as not to hinder the introduction of the connecting vertical rods 8 into the corresponding through holes and to allow the rods 8 to move vertically.

[0034] The upper cross bar Ts features also first apertures 97 and second apertures 98 (Figure 4), which allow the connecting vertical rods 8 of the first intermediate moving cross bar T1 and of the lower cross bar Ti to pass vertically therethrough.

[0035] The stationary cross bar Tf features also a series of through holes which allow the vertical passage of the connecting vertical rods joined to the intermediate moving cross bars T2, T1 and to the lower cross bar Ti.

[0036] It is to be pointed out that the stationary cross bar Tf can be connected to the uprights 7, and therefore to the transverse bar 6, in movable way.

[0037] For this purpose the lower part of the uprights 7 form a kind of a ball.

[0038] The uprights 7 are introduced in corresponding first through holes made in the stationary cross bar Tf, so that the above mentioned balls support the stationary cross bar Tf, when in the operation position.

[0039] The grille includes also at least two elastic elements 20, e.g. springs, each of which has one end fastened to the transverse bar 6 of the frame, near a respective end thereof, and the other end fastened to the end of the first intermediate moving cross bar T1; the elastic elements 20 pass freely through corresponding coaxial through holes made in the second intermediate moving cross bar T2 and the upper moving cross bar Ts.

[0040] If necessary, the above mentioned elastic elements can cooperate with further elastic elements situated between the transverse bar 6 and the second intermediate moving cross bar T2.

[0041] Otherwise, the grille raising can be automated by substituting the elastic elements 20 with cables, fastened to the lower moving cross bar Ti.

[0042] The cables are operated by a self-braking motor, situated in the upper part of the grille.

[0043] The proposed grille can assume two extreme positions: an extended position O, shown in Figure 1 and a compacted position I, shown in Figure 2b.

[0044] In the extended position O, the lower moving cross bar Ti is situated near to or in abutment on the lower wall of the opening 60.

[0045] The grille can be mounted slightly raised with respect to the opening lower wall, so that e.g. a drip pan can be placed therebetween.

[0046] The first intermediate moving cross bar T1 and the second intermediate moving cross bar T2, as well as the upper moving cross bar Ts are spaced out e.g. equispaced, when the heads 82 of the connecting vertical rods 8 rest on the corresponding seats made in the first through holes 9a, 9b, 9c, 9d, associated to each of the connecting vertical rods 8.

[0047] In the above mentioned extended position O, the elastic elements 20 assume their maximum extension and the locks, preferably mechanical, fastened to the stationary cross bar Tf, stabilize the grille closure.

[0048] In the compacted position I, the lower moving cross bar T1, the first and second moving cross bars T1, T2 and the upper moving cross bar Ts are drawn close to touch each other and against the stationary

cross bar Tf.

[0049] The compacted position is obtained by raising manually upwards the lower moving cross bar Ti: the connecting vertical rods 8, combined therewith, move vertically until they are situated parallel to the connecting vertical rods 8 of the first intermediate moving cross bar T1, and then they enter first apertures 97 made in the second intermediate moving cross bar Ts (Figure 2a).

[0050] The above described movement makes the connecting vertical rods 8 of the first intermediate moving cross bar T1 enter the second apertures 98 made in the upper moving cross bar Ts and in the stationary cross bar Tf; the connecting vertical rods 8 of the second intermediate moving cross bar T2 enter the second apertures made in the stationary cross bar Tf, while the connecting vertical rods 8 of the upper moving cross bar Ts, placed in the fourth through holes 9d, move vertically toward the transverse bar 6 of the frame 4, parallel to the uprights 7 (as shown in Figure 2b).

[0051] The moving cross bars Ti, T1, T2, Ts can be blocked at different heights by others mechanic locks, situated outside the grille.

[0052] One of the advantages of the closure and security grille derives from the fact that it closes packed, and leaves the lower part of the opening 60 free, when in compacted position; only the part of the opening 60 in the region of the transverse bar 6 of the frame, i.e. the least used part, is occupied, which increases the used area of the opening.

[0053] Another advantage of the proposed grille results from the fact that it is very secure due to the number of the cross bars, the number and length of the uprights, which, when suitably arranged, define free spaces smaller than those established, particularly by insurance companies.

[0054] Thus, when the grille is in its extended position, undesired persons cannot enter the opening.

[0055] A further advantage of the grille results from the fact that it includes elastic elements which facilitate the grille pack-like closure to the compacted position I, while the grille is blocked by locks, preferably mechanical, situated near the stationary cross bar Tf (not shown in the enclosed figures).

[0056] The above mentioned elastic means can be introduced into vertical guide section bars 5d, 5e for aesthetic and functional reasons.

[0057] The so obtained grille has a nice appearance.

[0058] The grille opening and packed closing can be automated by suitable systems, known to those skilled in the art, which encourages people to use the grille also in habitations.

[0059] It is possible to obtain a grille, in which the distance between the lower moving cross bar T1 and the first intermediate moving cross bar T1 is fixed, the upper ends of the connecting vertical rods 8 are fastened to the relative cross bar and the lower ends thereof form a kind of a ball; in other words, a grille closing configuration is inverted by 180° with respect to the one shown in Figure 2b.

[0060] Moreover, it is possible to obtain a grille from the one shown in Figure 1 by rotating the relative components by 90° in any sense, so that the cross bars become vertical and the uprights become horizontal.

[0061] In this way, in the compacted configuration, the cross bars are packed close to each other, on the right, or left side of the opening 60.

[0062] It is understood that what above has been described as a mere, not limitative example, therefore possible modifications resulting from the use, remain within the protective scope of the technical solution as described above and claimed hereinafter.

Claims

1. Closure and security grille for openings characterized in that it includes:

   a stationary frame (4) formed by two vertical guide section bars (5d,5e), which are fastened to the vertical walls (55) of a related opening (60) and by a transverse bar (6) fastened to said walls;
   a cross bar (Tf), connected with said transverse bar (6) by means of at least two uprights;
   a series of moving cross bars, respectively lower (Ti), intermediate (T1,T2) and upper (Ts), whose extremities are slidably guided by said section bars;
   connecting means (8) for mutual connecting said lower, intermediate and upper moving cross bars and for connecting said upper moving cross bar to the said stationary cross bar, said connecting means (8) defining, in co-operation with said cross bars, two extreme configurations, respectively extended position (O), in which the cross bars are spaced apart with the lower moving cross bar (Ti) situated in proximity or in abutment onto the lower wall of said opening (60), and a compacted position (I), in which said cross bars are raised.

2. Grille according to claim 1, characterized in that the bars connecting said transverse bar (6) to said stationary cross bar (Tf) form a rigid connection between said transverse bar and said stationary cross bar, so as to define a predetermined distance therebetween, and in that said connecting means (8) allow the lower moving cross bar (Ti), intermediate moving cross bars (T1,T2) and the upper moving cross bar (Ts), which are situated below, to be drawn packed closed to each other against said stationary cross bar (Tf) connected rigidly to the transverse bar (6), when they are in said extreme extended position (I).

3. Grille according to claim 1 or 2, characterized in that said connecting means include at least two vertical connecting rods for each moving cross bar, said vertical connecting rods being fastened to the base of said cross bar and introduced freely in corresponding first through holes made in the moving cross bar situated above, with the heads of said vertical connecting rods going in abutment, when the grille is in said extended configuration, against complementary seats made in the upper part of said cross bar situated above, in the region of said first holes, and in that the remaining moving cross bars, situated over said heads feature, made therein, related second through holes for free passage therethrough of the heads when the grille passes from the extended configuration (O) to the compacted configuration (I) and vice-versa.

4. Grille according to claim 1, characterized in that the number and length of said vertical connecting rods (8) and the number of said cross bars are such as to delimit spaces, which are smaller than established values.

5. Grille according to claim 3, characterized in that said first holes feature bushings.

6. Grille according to claim 1, characterized in that it includes elastic means (20) for raising of said grille.

7. Grille according to claim 1, characterized in that it includes elastic means (20) for raising of said grille and in that said elastic means (20) have one end fastened to the transverse bar (6) of the frame and the other end fastened at least to the first intermediate moving cross bar (T1); said elastic elements (20) passing freely through corresponding coaxial through holes made in cross bars situated between said first intermediate moving cross bar (T1) and said transverse bar (6) of the frame.

8. Grille according to claim 1, characterized in that it includes cables fastened to the lower moving cross bar (Ti) and operated by a self-braking motor, so as to raise said grille.

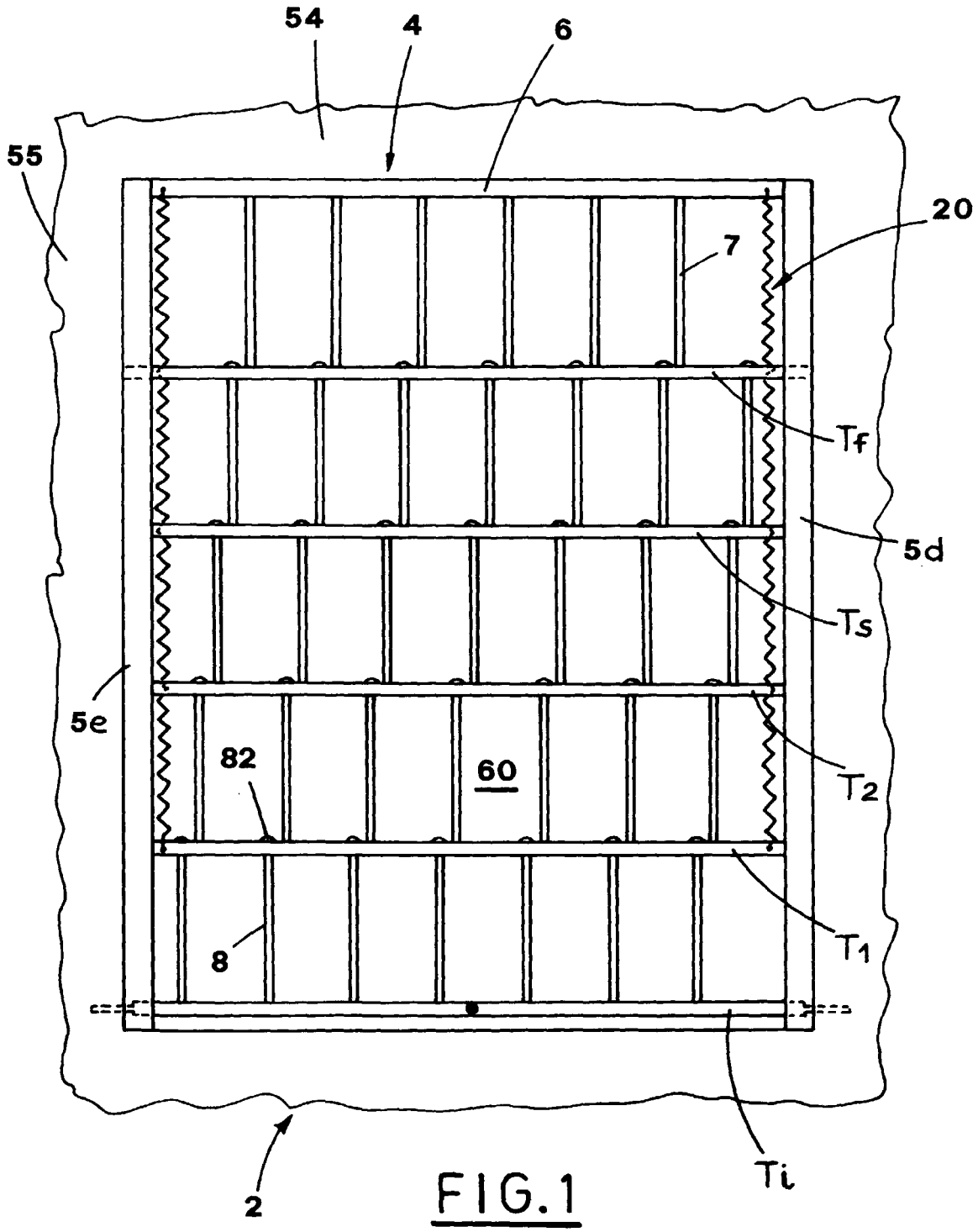

FIG.1

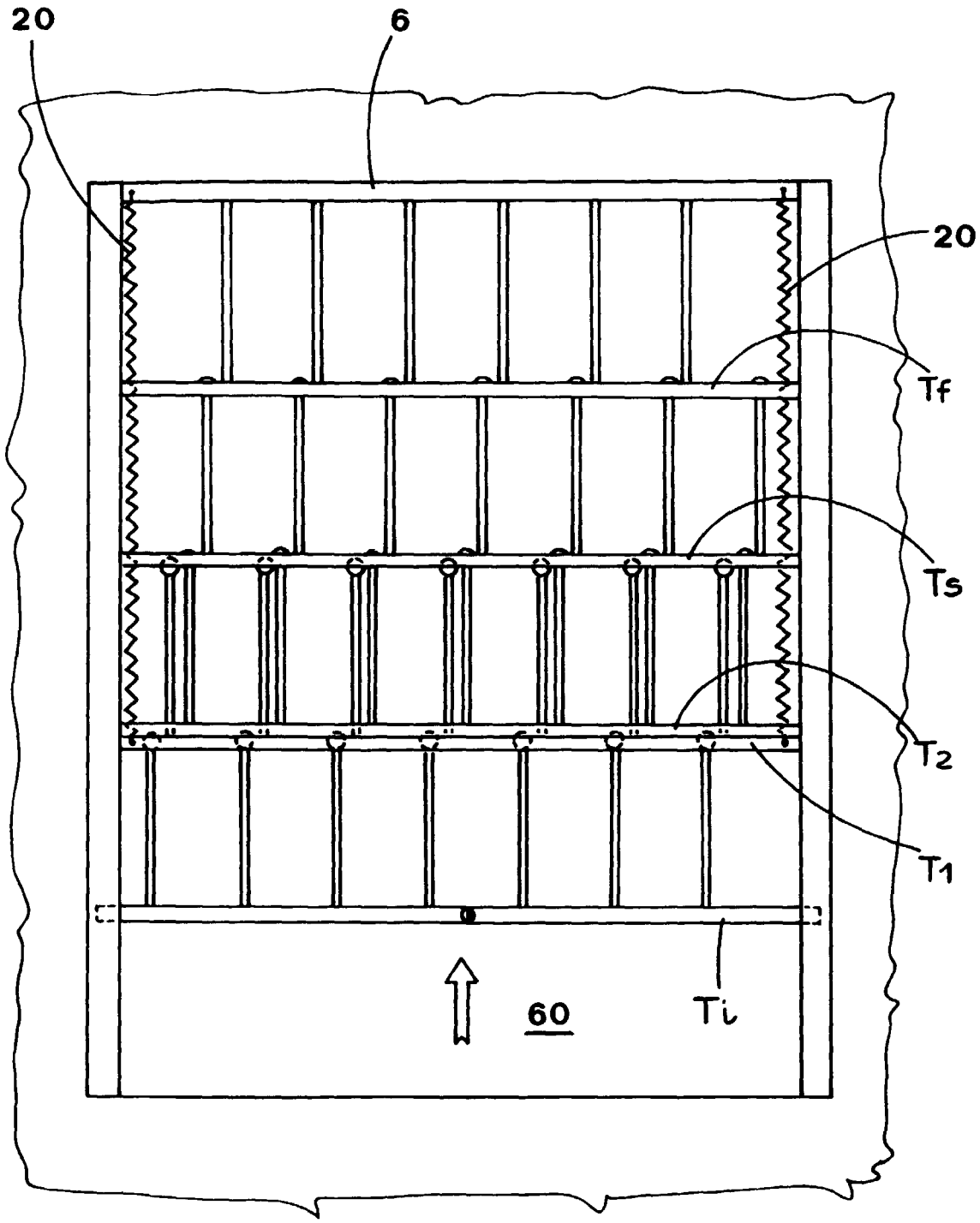

FIG. 2a

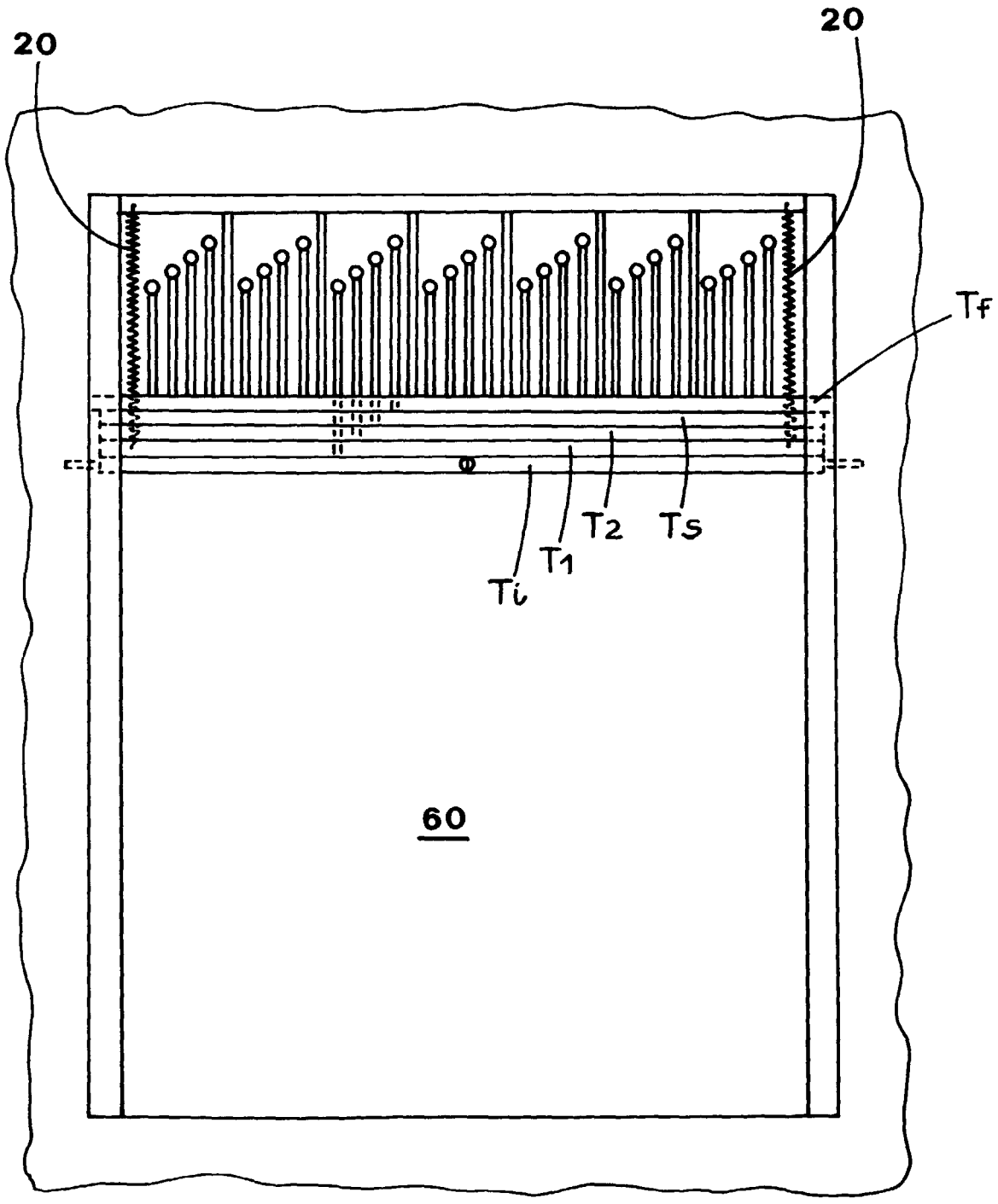

FIG. 2b

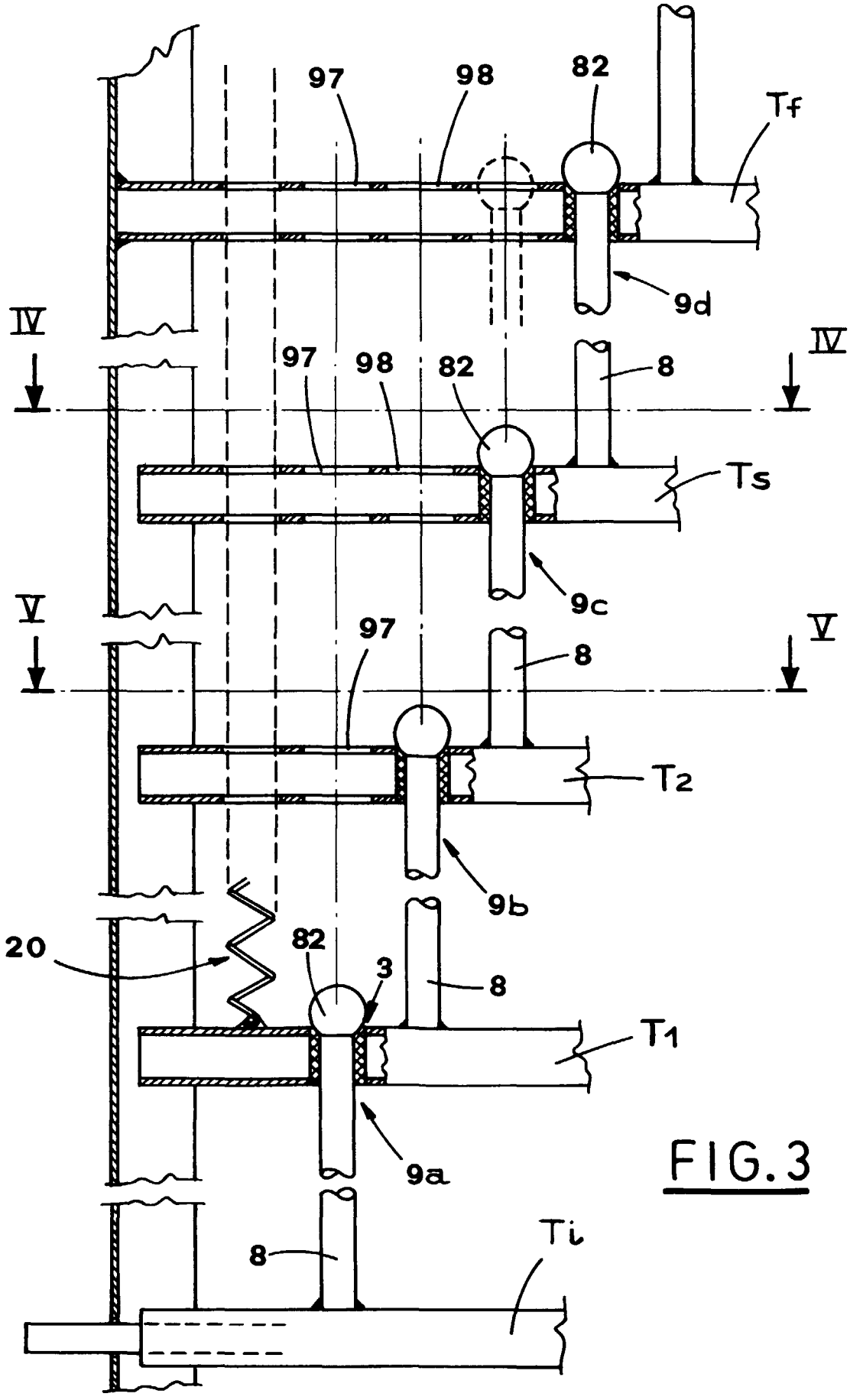

FIG.3

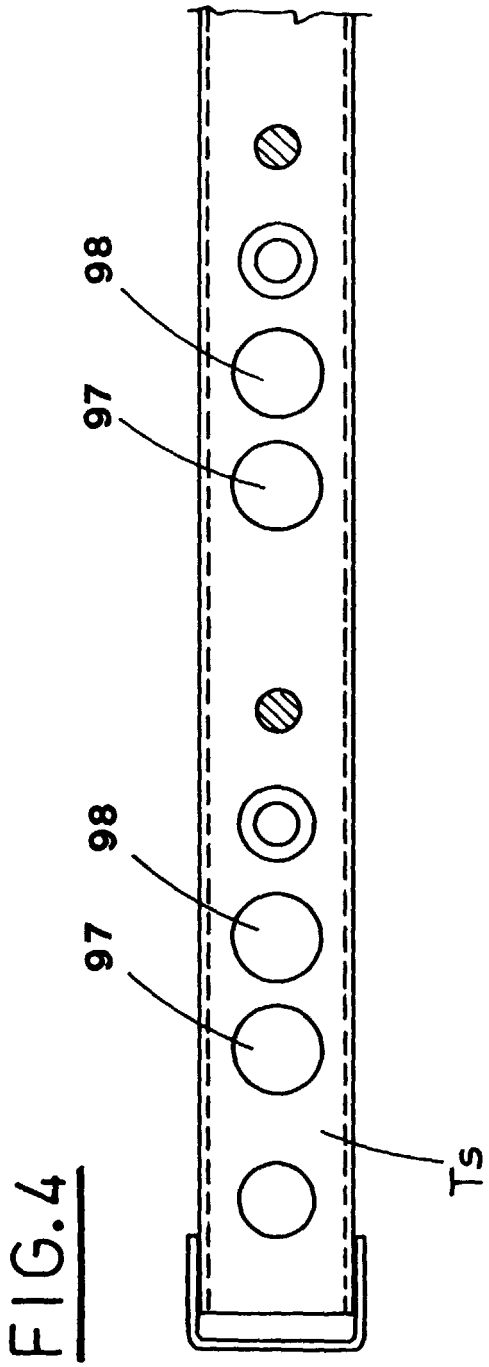

FIG.4

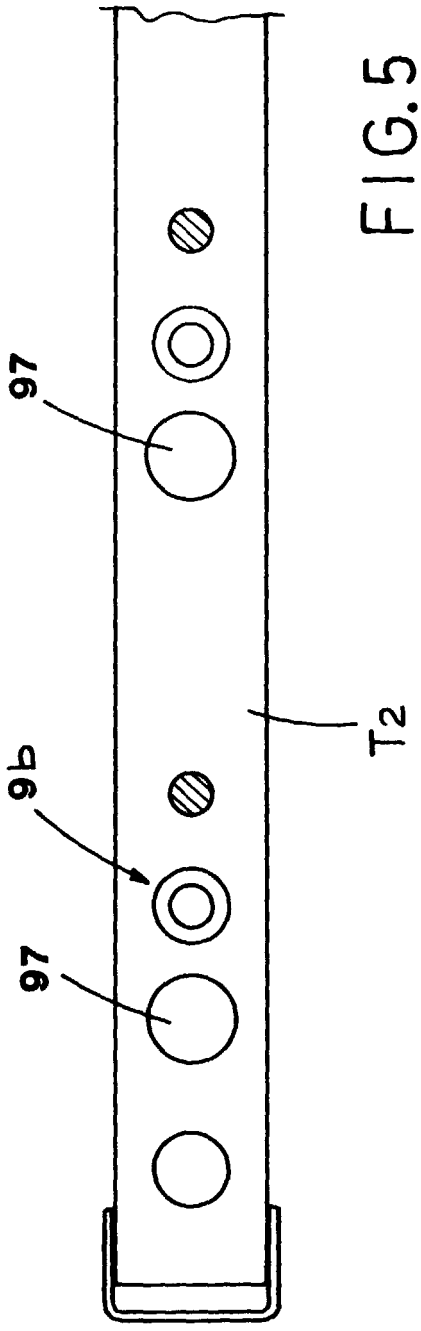

FIG.5