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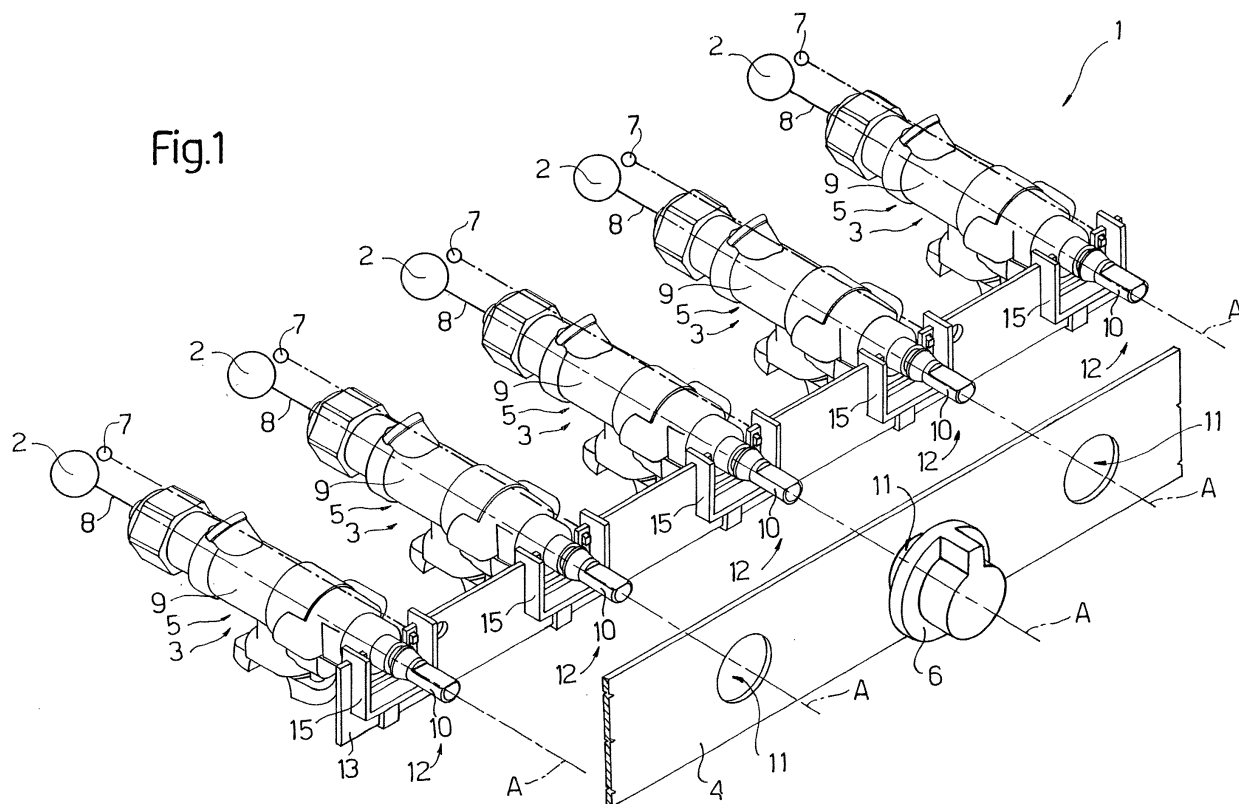
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(54) **Cooking range with an indicator device**

(57) A cooking range has at least one gas burner (2); a control device (3) in turn having a knob (6), a gas feed valve (5) controlled by the knob (6), and a first sensor (7)

for detecting the presence of a flame emitted by the burner (2); and an indicator device (12) having a first light source (14), which is activated when the first sensor (7) detects the presence of a flame.



Description

[0001] The present invention relates to a cooking range with an indicator device.

[0002] More specifically, the present invention relates to a cooking range with an integrated indicator device.

[0003] A cooking range normally comprises at least one gas burner; and a control device in turn comprising a knob, a gas feed valve controlled by the knob, and a first sensor for detecting the presence of the flame in the burner.

[0004] If the flame goes out accidentally, the sensor detects the absence of the flame, and the valve automatically cuts off the gas supply to prevent gas leaking from the burner. In other words, the sensor emits a no-flame, valve control signal to close the valve immediately. Currently used control devices therefore ensure a high degree of safety of cooking ranges, but, as yet, no control devices are known which warn the user when the burner has inadvertently been left on. In other words, with a low flame in particular lighting conditions of the cooking range, or when using large pans covering the whole of the burner, the user is unable to see whether the burner is on, and may therefore leave it on inadvertently.

[0005] It is an object of the present invention to provide a straightforward, low-cost solution to the aforementioned drawback.

[0006] According to the present invention, there is provided a cooking range comprising at least one gas burner; and a control device in turn comprising a knob, a gas feed valve controlled by the knob, and a first sensor for detecting the presence of a flame emitted by the burner; the cooking range being characterized by comprising an indicator device comprising a first light source, which is activated when the first sensor detects the presence of a flame.

[0007] The presence of the flame emitted by the burner can thus be indicated, to avoid inadvertently leaving the burner on. The system is particularly simple by partly using existing parts of the cooking range, such as the first flame-detecting sensor normally used to emit a signal to close the valve automatically in the event of the flame going out accidentally.

[0008] In one particular embodiment of the present invention, the knob is made of light-conducting material, e.g. semitransparent acetate; the first light source being arranged to only transmit the light signal out of the cooking range through the knob.

[0009] In this way, the cooking range need not be equipped with an auxiliary display, and the knob illuminated by the light source is associated immediately with the corresponding burner.

[0010] A non-limiting embodiment of the invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a partly exploded view in perspective, with parts removed for clarity and parts indicated

schematically, of a cooking range in accordance with the present invention;

Figure 2 shows a smaller-scale front view, with parts removed for clarity, of a detail of the Figure 1 cooking range;

Figure 3 shows a view in perspective, with parts removed for clarity, of a variation of the Figure 1 cooking range;

Figure 4 shows an operating block diagram of the Figure 1 cooking range;

Figure 5 shows an operating block diagram of a variation of the device in Figure 1.

[0011] Number 1 in Figure 1 indicates as a whole a cooking range, which comprises a number of gas burners 2, each having a control device 3. Cooking range 1 comprises a front panel 4 forming part of a casing not shown completely in the drawings.

[0012] Each control device 3 comprises a valve 5; a knob 6 (only one shown in Figure 1); and a sensor 7 for detecting the presence of a flame close to a corresponding burner 2. Sensor 7 is normally a thermocouple located alongside burner 2 to intercept the flame from burner 2.

[0013] Each valve 5 is connected on one side to the gas mains, and, on the other side, supplies a gas supply circuit 8 shown schematically in Figure 1. Each valve 5 comprises a valve body 9 extending along an axis A; and a shaft 10 projecting from valve body 9 and extending along axis A. Each knob 6 is fitted prismatically to a corresponding shaft 10, and provides for pushing shaft 10 in a direction parallel to axis A, and rotating shaft 10 about axis A.

[0014] Front panel 4 has openings 11, through which shafts 10 project, so that valves 5 are located inside said casing (not shown), and knobs 6 are located outside the casing. Openings 11 are much larger than the diameter of shaft 10, to allow primary combustion air to flow through the casing.

[0015] Each knob 6 is made of light-transmitting material. In the example shown, each knob 6 is made of semitransparent acetate.

[0016] Each sensor 7 is connected to a respective valve 5 so that, in the absence of a flame, a safety device, not shown in the drawings, activates valve 5 in known manner to cut off the gas supply.

[0017] For each burner 2, cooking range 1 comprises an indicator device 12, which in turn comprises a printed circuit board 13; a light source 14 defined, in the example shown, by one or more LEDs (Figure 2); and a light guide defined, in the example shown, by a contoured wall 15 connected optically to light source 14.

[0018] As shown in Figure 1, printed circuit board 13 is shared by all the indicator devices 12, each of which, of course, has its own circuit and light source on printed circuit board 13. Alternatively, each indicator device 12 comprises a dedicated printed circuit board. One printed circuit board 13 for all the indicator devices 12, however, is preferable by simplifying assembly. Printed circuit

board 13 is located between valves 5 and front panel 4, and has slots for the passage of shafts 10; the LEDs of light source 14 are located along the edge of the slot; and printed circuit board 13 is cooled, in use, by the primary airflow through openings 11 in front panel 4.

[0019] The circuit of each indicator device 12 is shown in the Figure 4 block diagram, and comprises a block 16 for supplying a reference value T; a comparing block 17 for comparing reference value T with a signal S from sensor 7; and a control block 18 which, by means of a signal S1, selectively turns light source 14 on and off as a function of the digital signal F emitted by comparing block 17. That is, if signal S is above reference value T, this means sensor 7 has detected the presence of a flame and accordingly informs control block 18, which provides for turning on light source 14. Conversely, when signal S is below reference value T, this means the sensor has detected no flame, so control block 18 leaves light source 14 off.

[0020] In the Figure 3 variation, each indicator device 12 comprises a sensor 19 associated with shaft 10 to determine when shaft 10 (knob 6) is in other than the off position. In the Figure 3 example, sensor 19 is a micro-switch, which supplies a signal related to the position of shaft 10 (knob 6) with respect to the off position. In this variation, indicator device 12 also comprises a further light source 20 (shown by the dash line in Figure 2) which, in the example shown, comprises at least one LED of a different colour from the LED/s of light source 14.

[0021] An operating block diagram of the above variation of the invention is shown in Figure 5, which actually shows sensor 19 and light source 20 in addition to the blocks described with reference to Figure 4. Operation is as follows. The signal S from sensor 7 (thermocouple) is compared with reference value T to inform control block 18, by means of a digital signal F, of the presence or absence of a flame. Sensor 19 (microswitch) emits a signal EN to enable control block 18 when shaft 10 (knob 6) is in other than the off position. When enabled, control block 18 emits a signal S1 to turn on light source 14 in the presence of a flame, and a signal S2 to turn on light source 20 in the absence of a flame.

[0022] When knob 6 is on, indicator device 12 therefore provides for indicating both the presence of a flame by means of light source 14 of a given colour, and the absence of a flame by means of light source 20 of a different colour from light source 14.

[0023] The variation described has the advantage of providing for additional safety, in the event of a malfunction preventing valve 5 from closing automatically, and in any case informs the user that a burner has been turned off accidentally, and alerts the user to take the necessary steps.

Claims

1. A cooking range comprising at least one gas burner

(2); and a control device (3) in turn comprising a knob (6), a gas feed valve (5) controlled by the knob (6), and a first sensor (7) for detecting the presence of a flame emitted by the burner (2); the cooking range being **characterized by** comprising an indicator device (12) comprising a first light source (14), which is activated when the first sensor (7) detects the presence of a flame.

2. A cooking range as claimed in Claim 1, **characterized in that** the knob (6) is made of light-conducting material, such as semitransparent acetate; the first light source (14) being arranged to only transmit the light signal out of the cooking range through the knob (6).
3. A cooking range as claimed in Claim 1 or 2, **characterized in that** the first light source (14) is located between the valve (5) and the knob (6).
4. A cooking range as claimed in any one of Claims 1 to 3, **characterized in that** the first light source (14) comprises at least one LED.
5. A cooking range as claimed in any one of the foregoing Claims, **characterized in that** the indicator device (12) comprises a printed circuit board (13), in turn comprising comparing means (17) for comparing a first signal (S) from the first sensor (7) with a reference value (T), and control means (18) for controlling the first light source (14); said control means (18) being controlled by the comparing means (17).
6. A cooking range as claimed in Claim 5, **characterized in that** the printed circuit board (13) supports the first light source (14).
7. A cooking range as claimed in Claim 6, **characterized in that** the printed circuit board (13) is located between the valve (5) and the knob (6).
8. A cooking range as claimed in any one of Claims 5 to 7, **characterized by** comprising a light guide for conducting the light signal from the first light source (14) to the knob (6).
9. A cooking range as claimed in Claim 8, **characterized in that** the light guide comprises a contoured wall (15) connected optically to the first light source (14).
10. A cooking range as claimed in Claim 9, **characterized in that** the contoured wall (15) is fitted to the printed circuit board (13).
11. A cooking range as claimed in any one of Claims 5 to 9, **characterized by** comprising a front panel (4) located close to the printed circuit board (13).

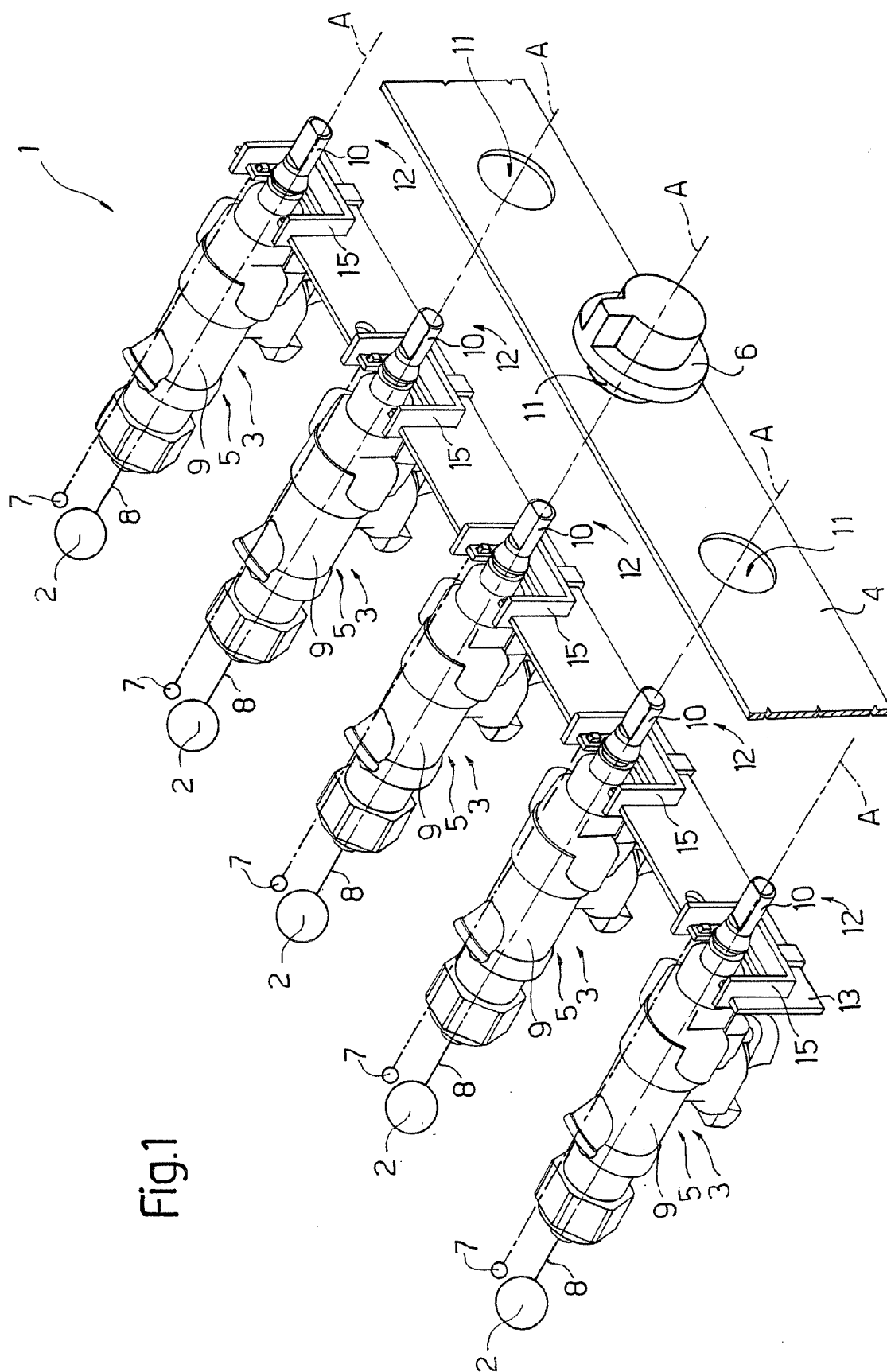
12. A cooking range as claimed in Claim 11, **characterized in that** the front panel (4) comprises a number of openings by which to connect the knob (6) to the valve (5), and to permit primary airflow to the burner (2); the printed circuit board (13) being cooled by the primary airflow through the openings (11). 5
13. A cooking range as claimed in any one of the foregoing Claims, **characterized by** comprising a second sensor (19) for determining whether the knob assumes a position other than the off position; and a second light source (20) distinguishable from the first light source, and which is activated when the knob (6) is in other than the off position and in the absence of a flame. 10 15
14. A cooking range as claimed in Claim 13, **characterized in that** the first and second light source (14, 20) emit respective light signals differing in colour. 20
15. A cooking range as claimed in Claim 12 or 13, **characterized in that** the second light source (20) comprises at least one LED located close to a LED forming part of the first light source (14). 25
16. A cooking range as claimed in any one of the foregoing Claims, **characterized by** comprising a number of gas burners (2), each of which has a respective control device (3) and a respective indicator device (12). 30
17. A cooking range as claimed in Claim 16, **characterized by** comprising a printed circuit board (13) common to all the indicator devices (12). 35

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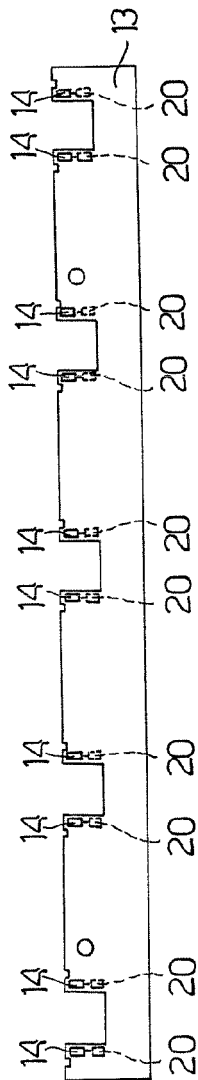


Fig. 2

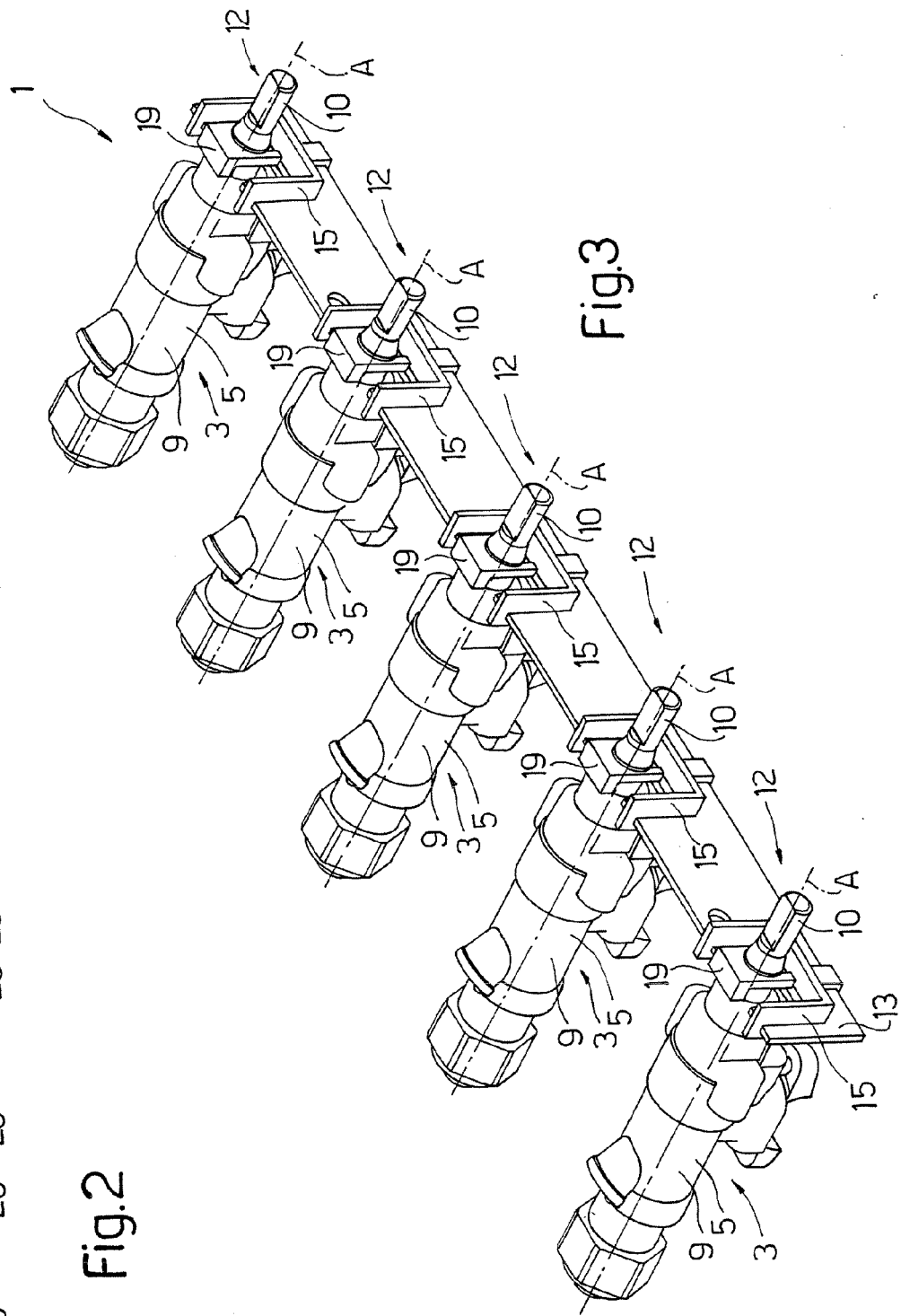


Fig. 3

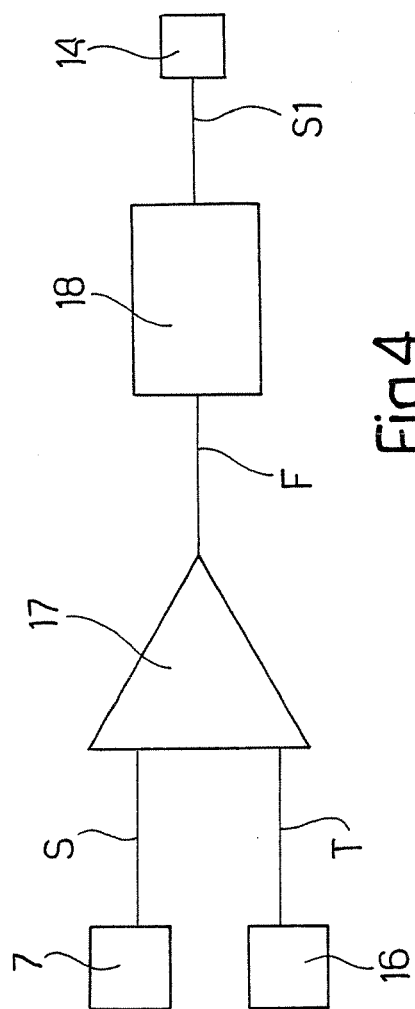


Fig. 4

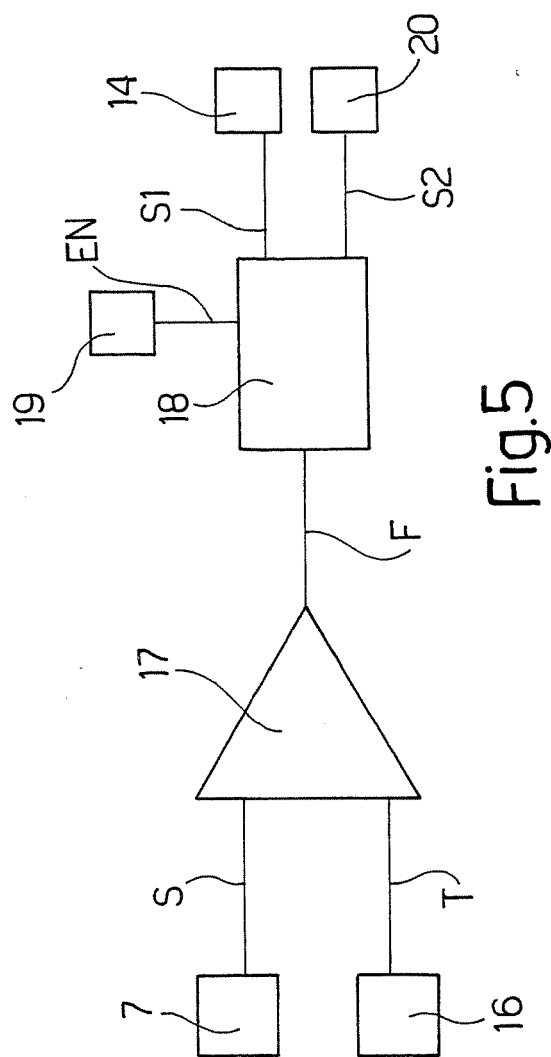


Fig. 5