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 [33] **France**
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[54] **THERMOSTATIC CONTROL MEANS FOR**
VESSELS SUBJECTED TO A THERMAL ACTION
10 Claims, 15 Drawing Figs.

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33; 219/450

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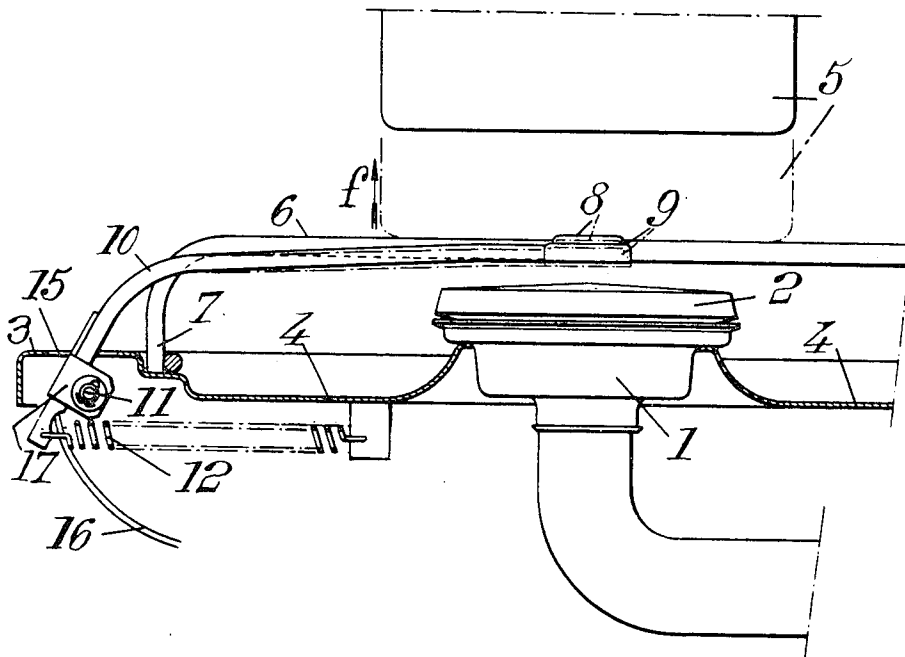
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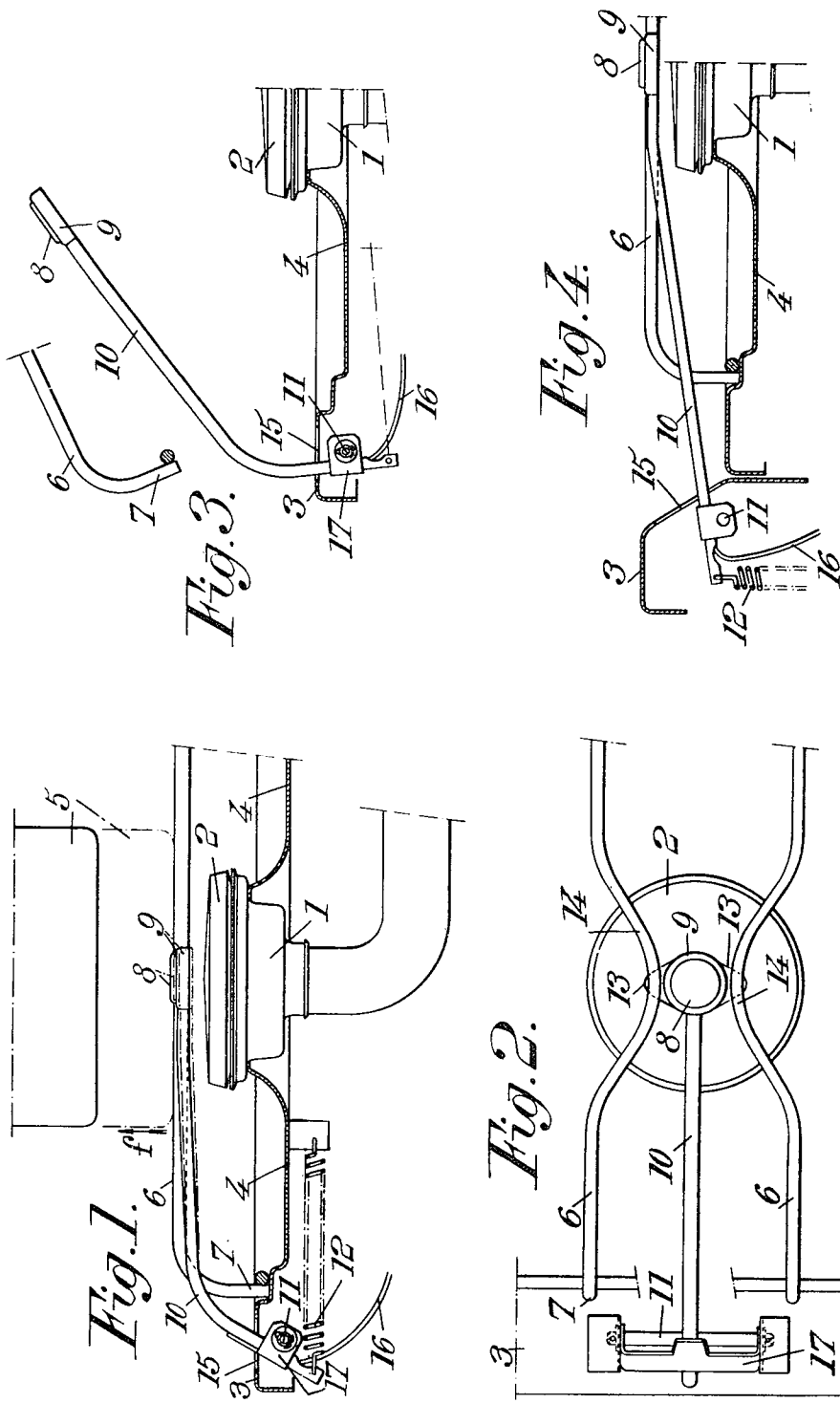
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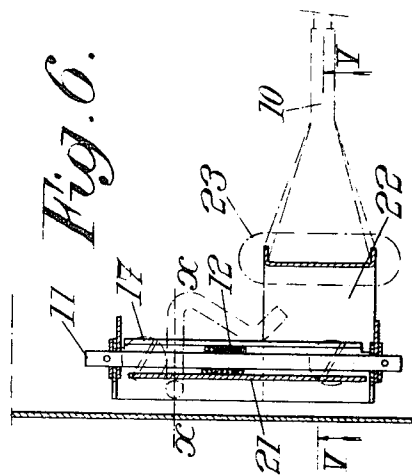
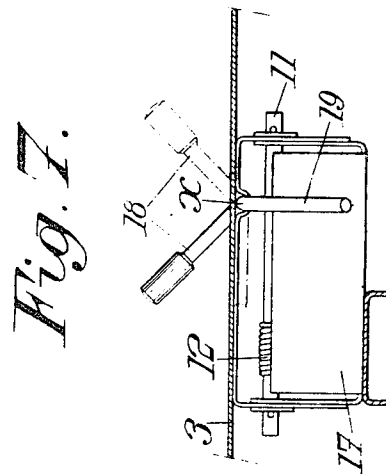
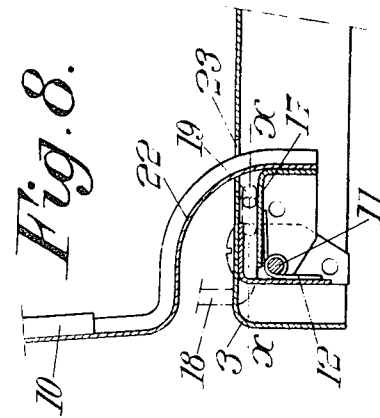
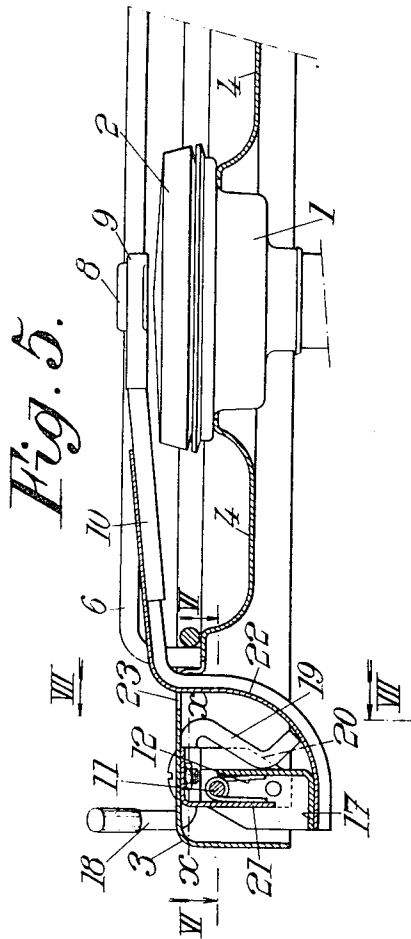
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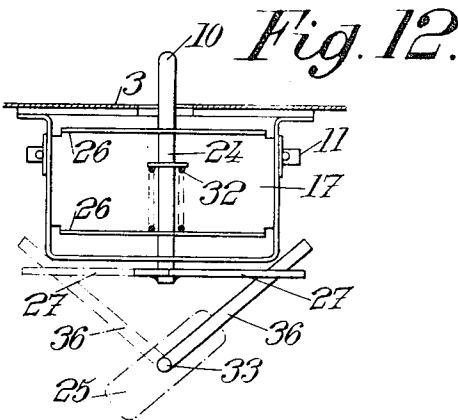
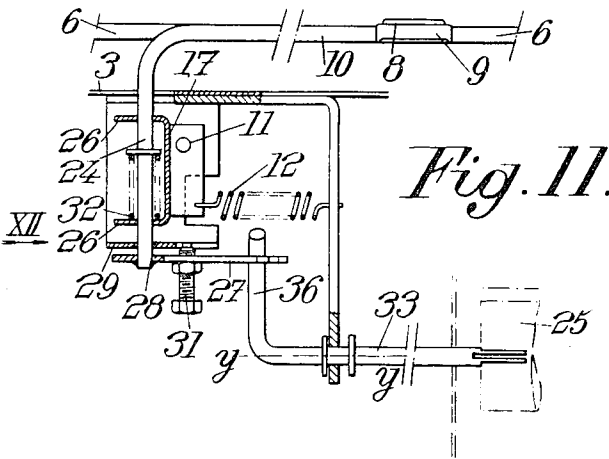
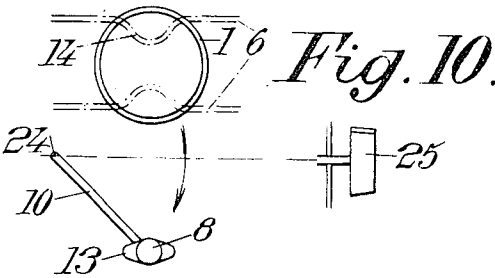
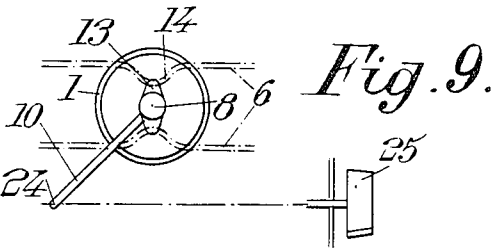
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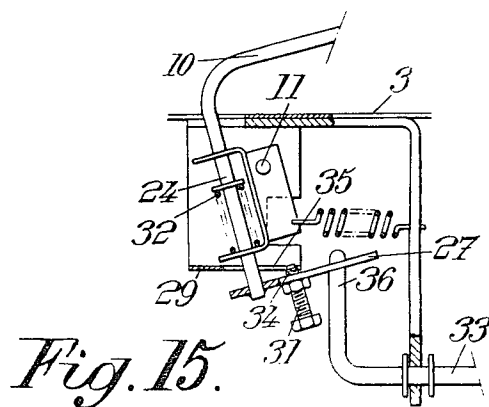
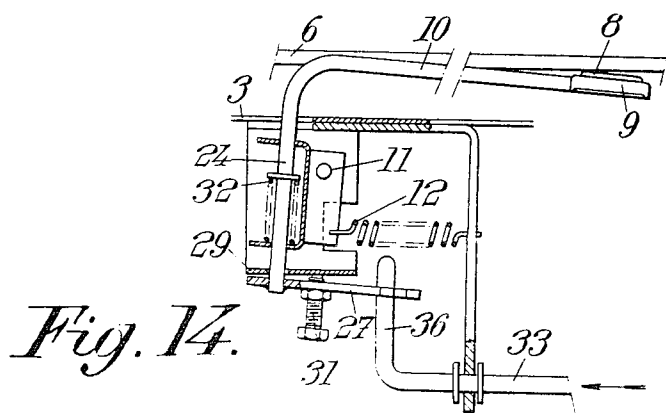
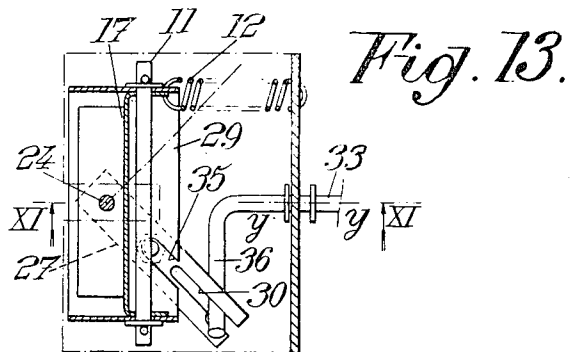
ABSTRACT: A thermostat sensing element is held, in a zone not subjected directly to the thermal action of the burner, in a starting position from which it is moved, by contact with the vessel to be heated as this vessel is placed in position on the burner, into a working position in which it is pushed firmly against the vessel by a spring. The sensing element can be moved upwardly, by pivoting about a horizontal axis, into a retracted position to facilitate cleaning of the burner; this upward retraction can be controlled manually from a handle. In a particular embodiment, the sensing element can be retracted laterally, either as well as or instead of the upward retraction, and this lateral retraction can be controlled manually from a knob.











THERMOSTATIC CONTROL MEANS FOR VESSELS SUBJECTED TO A THERMAL ACTION

The invention relates to thermostatic control means for vessels subjected to a thermal action, in particular for equipment for domestic appliances such as cookers, kitchen ranges, etc.

It has the aim, above all, of making these means such that their structure and fitting are simpler than they have been heretofore.

It consists principally in including in the means of the kind in question a sensing element which can be held, in a zone not subjected directly to the thermal action of the source or of the burner, in a position such that when the vessel is brought into the heating position it can contact said sensing element and push it back in opposition to a resilient action, the sensing element being preferably mounted in such manner that it can be retracted when desired.

The invention can in any case be clearly understood with the aid of the following additional description and of the accompanying drawings, which additional description and drawings are, of course, given above all by way of indication.

FIGS. 1 and 2 of these drawings show respectively, partly in elevation with portions in section and in plan view, the assembly formed by a burner and thermostatic means for controlling the temperature of a saucepan, said assembly being set up in accordance with the invention;

FIG. 3 shows, similarly to FIG. 1, the same assembly in another position;

FIG. 4 illustrates similarly a modified form of the invention;

FIGS. 5 to 7 show respectively and partly in section on the line V—V in FIG. 6 and on the lines VI—VI and VII—VII in FIG. 5 the assembly formed by a burner and a sensing element in accordance with other arrangements of the invention;

FIG. 8 is a drawing similar to FIG. 5 showing the arrangement in another position;

FIGS. 9 and 10 illustrate, in diagrammatic plan view in two working positions, an assembly of the same kind in accordance with another arrangement of the invention;

FIGS. 11 to 13 show respectively and partially, in greater detail, an assembly of the kind illustrated in FIGS. 9 and 10, in action on the line XI—XI in FIG. 13, in side view in the direction of the arrow XII in FIG. 11 and in plan view;

FIG. 14 is a section similar to that of FIG. 11 in another position;

Finally, FIG. 15 is a section similar to FIG. 11, but again in another position.

According to the invention and more particularly according to that one of its modes of application and to those embodiments of its various parts to which it seems there is every reason to give preference, if it is proposed, for example, to combine with a gas burner thermostatic means for regulating the burner for the purpose of obtaining a certain temperature in a saucepan or other vessel or container (and its contents) placed over said burner, this is set about as follows or in a similar manner.

It is appropriate to recall beforehand that such means are known in principle. Heretofore, however, they have involved a special design of the burner and devices which are generally rather complex and bulky for receiving the sensing device of said means at the center of the burner. These devices moreover have the drawback of destroying the tight fit of the spill tray of the cooker at the locations of the burners.

According to the invention, where there are, for example, burners 1 of type having a circular cover (FIGS. 1 and 2) allowing the flames to escape laterally, the idea has been conceived of arranging above said cover a sensing element held in a preliminary starting position in opposition to a resilient action, so that when the saucepan is brought into the heating position the base thereof can push the sensing element back against said action and thus ensure excellent contact.

In particular, according to a first constructional form illustrated in FIGS. 1 to 4, it is possible to make use, in the preliminary starting position, of the bars generally provided above the burner for receiving the saucepan, said bars bearing on a suitable

support for said sensing element, this support being rendered movable (by pivoting, translation, etc.) in opposition to the action of the aforesaid resilient means.

In FIGS. 1 to 3, it has been assumed that the burner 1, of the type having a cover allowing the flames to escape laterally, belongs to a stove or cooker the spill tray of which can be seen at 3, with the usual recess of dished portion 4 provided around the burner and designed to receive any fat, splashes or spills, etc. from the saucepan 5.

With this burner there cooperates a set of bars 6 of any suitable form, the feet 7 of which rest on the rim of the dished portion 4.

Next, with the assembly obtained in this way there is associated the thermostatic device, which comprises:

on the one hand, a sensing element 8 carried by a support 9 mounted at the end of an arm 10 articulated, for example, by means of a yoke 17 on a spindle 11 arranged laterally of the burner, and opposing the action of a spring 12 tending to raise the sensing element 8, accordingly in the direction of the arrow *f* (FIG. 1),

and, on the other hand, the thermostat proper, which is not visible in the drawing and to which the sensing element 8 (constituted, for example, by a liquid diaphragm or liquid capsule) is connected, again by way of example, by a flexible capillary tube 16, if a liquid-type thermostat is concerned, it being understood that any other type of thermostat could be used.

The support 9 of the sensing element is provided with lateral lugs 13 on which the central portions 14 of the bars 6 can bear, these central portions being bent to this end towards the burner.

When the bars are in their position of use, the assembly consisting of the sensing element 8, 9 and its arm 10 is shifted in the opposite direction to that of the arrow *f* so as to adopt the position shown in FIG. 1, in which the sensing element proper 8 projects slightly with respect to the bars 6, 7.

Under these conditions, when the saucepan 5, which is shown in solid lines in FIG. 1 away from the burner, is brought into contact (position shown in chain-dotted lines) with the bars, said saucepan pushes the sensing element 8 back towards the position shown in chain-dotted lines in opposition to the action of the spring 12 and this ensures good contact between the saucepan and the sensing element.

In any event, since the sensing element is disposed along the axis of the burner, it is protected from the action of the flames as these are lateral and it can be considered that its temperature is substantially the same as that of the saucepan and its contents.

This arrangement fully preserves the tight fit of the dished portion 4, which can easily be cleaned, FIG. 3 showing the position assumed by the assembly when the bars 6 are removed for this cleaning operation. The arm 10 then adopts a raised position together with the support 9 and the sensing element 8, so that the user is in no way impeded in the cleaning of said dished portion.

FIG. 4 shows a modified construction in which the assembly is fitted to another type of cooker or stove in which the dished portion such as 4 is sunk further with respect to the upper edge of the top 3 of the cooker or stove. In this case, the arm 10, which is bent in the construction of FIG. 1, may be substantially straight, as shown in FIG. 4.

In both cases, the spindle 11 on which the arm 10 pivots can be disposed below the spill tray or top, the arm 10 extending therethrough an opening such as 15.

According to another arrangement of the invention, which will be explained with reference to FIGS. 5 to 15, means are provided, for example of the lever type, for enabling the sensing element to be put into or out of action at will. It can be assumed that the putting out of action is obtained as hereinbefore by raising, in particular for cleaning purposes, that is to say by pivoting about a horizontal axis (constructional form shown in FIGS. 5 to 8). It is also possible to provide lateral retraction (FIGS. 9 to 15) when it is not desired to make use of the thermostatic action.

Means may moreover be provided, for example, for adjusting the upper position of the sensing element.

According to the constructional form of FIGS. 5 to 8, a handle 18 is used which is adapted to turn about an axis $x-x$, for example parallel to the top 3 of the cooker, and carry along a kind of elbowed lever 19 arranged in such manner that, again for example:

in that position of the handle which is to correspond to the working position of the assembly (left-hand position in FIG. 7), said lever 19 locks the yoke or other part 17 articulated on the spindle 11 and serving as a foot or support for the assembly, more particularly by means of an elbow 20 (FIG. 5),

and in another position (the right-hand one in FIG. 7), the same lever, on the other hand, releases said part 17, so that under the effect of the spring 12 the sensing element assembly can take up a raised position, such as that shown in FIG. 8, for cleaning.

In the above-mentioned constructional form, it is assumed that the spring 12 is mounted in spiral form on the spindle 11 and that its two ends bear, on the one hand, against an angle iron 21 fast with the fixed frame and, on the other hand, against another angle iron constituting the part 17 aforesaid. The arm 10 is connected to this part 17 by a leg 22 having, for instance, a cylindrical form with its axis substantially coinciding with the spindle 11. This form permits free movement of the capsule 8 and its support under the effect of the placing in position of the saucepan, without being hindered by the elbowed lever 19, 20. Said leg extends through the spill tray or top 3 by way of an elongated opening 23.

It is to be noted that in the arrangement which has just been described it is the operating means 18, 19 themselves that are able to define the working position (that shown in FIG. 5) without it being necessary to fix the same by the placing in position of the bars 6.

According to the embodiment shown in FIGS. 9 to 15, which relate to the use of means adapted to enable the sensing element and its support to be brought into a retracted position when it is not desired to make use of the thermostatic action, the procedure adopted is, for example, as follows.

The retraction is shown very diagrammatically in FIGS. 9 and 10, which illustrate an assembly of the above-mentioned kind, with a sensing unit 8, 9 placed in the operative position by the action of the bars 6 (the latter bearing at 14 on the lugs 13 of the support 9 of the sensing element). The arm 10 of the sensing unit 8, 9 is then mounted pivotally on a vertical axis 24 arranged at the side and taking the form, for example, of a vertical elbowed portion forming an extension of the arm 10.

It will therefore be understood that by a turning action about the pivot 24 the arm 10 can easily be brought either into the operative working position (FIG. 9) or into a retracted position (FIG. 10).

The retraction can be effected either directly with the hand by acting on the arm 10, or with the aid of operating means, for example controlled by a knob such as 25, such as the means described hereinafter with reference to FIGS. 11 to 15.

It is appropriate to say that, for retraction, just as for bringing into action again, it is necessary to make the sensing element pass below the bars 6, which can easily be achieved:

either by causing the assembly to pivot about the horizontal spindle 11 as referred to above,

or, if desired, by moreover providing the possibility of vertical displacement in the direction of the pivot 24, which solution will be examined hereinafter and could be used separately.

According to the embodiment of FIGS. 11 to 15, the arm 10 is continued by an elbow 24 acting as a pivot, which pivot is engaged freely in the flanges 26, which are suitably drilled to this end, of the supporting part 17 serving as a seat. The assembly consisting of this support and the arm 10, 24 is again articulated in this case on the horizontal spindle 11, said part 17 being subjected to the action of the return spring 12.

The pivot 24 moreover extends through a fixed plate 29 by way of an elongated aperture (or the slot 35 referred to hereinafter) and it is rendered fast at its free end with an arm

27 terminating in a fork 30 the function of which will be described, and adjusting screw 31 extending through said arm and the free end thereof bearing against the plate 29 under the effect of a spiral spring 32 mounted on the pivot 24 and tending to urge the whole assembly upwardly.

It will be seen that the combination of the screw 31 and the support 29 enables the working position of the capsule 8, 9 to be secured and that it would even be possible to do without the lugs 13 associated with the bars 6.

This screw 31 would in any case enable the initial position of the sensing element 8 in its working location to be adjusted, but it is understood that this combination could be used independently, even in assemblies other than that shown in FIGS. 11 to 15, for example with a sensing element of the kind shown in FIGS. 1 to 8.

Returning now to the operating means for enabling the assembly consisting of the arm 10 and the sensing element 8 to be pivoted about the axis of the pivot 24, these means are constituted by the combination with the fork 30 of an elbowed lever 36, a straight or other portion 33 of which is adapted to pivot about an axis such as $y-y$, this being achieved by the action of a knob such as 25.

By turning said knob, the arm 27 with its fork 30 will therefore be made to pass from the position shown in solid lines in FIG. 13 to the position at 90° therefrom shown by a chain-dotted line.

Preferably, it will only be possible to act on the fork 30 by applying pressure to the knob 25 in the direction of the axis $y-y$, in combination with suitable engaging means, as generally occurs with the control knobs of cookers.

Such an assembly meets perfectly the aim proposed.

It will be seen that, to enable the sensing element 8 to pass from the position of FIG. 9 to the position of FIG. 10, it is sufficient first to apply pressure to the sensing element to disengage it if necessary from the bars (FIG. 14) (this being done by causing the sensing element to pivot about the spindle 11 or, possibly, by shifting the pivot 24 axially), and then to operate the knob 25 to cause the shifting of the arm 27 and, consequently, ensure the pivoting action about 24.

It is to be noted, moreover, that this assembly will permit the raising of the arm 10 for cleaning purposes.

This raising will be effected, for example, by a pivoting action about the spindle 11, as shown in FIG. 15.

For this pivoting movement (FIG. 15) the operative end 34 of the screw 31 will be presented in front of a slot 35 formed in the plate 29 and which may follow on from the elongated aperture referred to hereinbefore, or may be identical therewith, it being understood that any other solution could be adopted.

As a result of which, whatever the constructional forms adopted, it is possible to produce sensing systems the operation of which is sufficiently apparent from the foregoing for it to be unnecessary to dwell thereon and which have many advantages in comparison with those of the kind in question already in existence, in particular:

that of being capable of being manipulated more easily, that of enabling the top of the cooker to be kept tight and of allowing it to be cleaned easily,

and that of being retractable whenever desired, that is to say every time it is desired not to use the thermostat, it being moreover understood that this retraction could be achieved in many ways.

As it is obvious and as is moreover already apparent from the foregoing, the invention is by no means limited to those forms of application thereof or to those constructional forms of its various parts which have been more particularly considered; it covers, on the contrary, all variants.

What I claim is:

1. In a stove having a burner or the like and thermostatic control of said burner or the like, a thermal control device comprising a sensing element operatively connected to said thermostatic control, means mounting said sensing element on the stove, said mounting means including an arm mounted

pivotaly on a horizontal spindle external to the periphery of the burner, said sensing element being carried by said arm at the free end thereof so as to be pushable by contact with the base of the vessel to be heated during the placing in position of the vessel on said burner or the like from a starting position to a working position, both of said positions being located substantially centrally above said burner or the like, resilient biasing means coupled to said arm at the end thereof remote from said sensing element for urging said sensing element towards said starting position so that the sensing element is pushed firmly against the vessel when the vessel is in position on said burner or the like, said sensing element then being in its working position.

2. In a stove having a burner or the like and thermostatic control of said burner or the like and furthermore having a top or spill tray, a thermal control device according to claim 1 in which the horizontal spindle and the resilient biasing means are disposed below said top or spill tray of the stove.

3. In a stove having a burner or the like and thermostatic control of said burner or the like and furthermore having bars for supporting said vessel, a thermal control device according to claim 1, in which said sensing element is held in the starting position by said bars of the stove.

4. In a stove having a burner or the like and thermostatic control of said burner or the like, a thermal control device according to claim 1 further comprising retracting means for moving said sensing element to a position remote from said starting and working positions and vice versa.

5. In a stove having a burner or the like and thermostatic control of said burner or the like, a thermal control device according to claim 4, in which said retracting means comprises a handle pivotable about a horizontal axis and operating an elbowed lever which, in one of the positions of the handle, locks the sensing element in its starting position, while allowing said

sensing element to be pushed into its working position, whereas said elbowed lever, in the other handle position, retracts and allows the sensing element to rise, under the action of said resilient biasing means, to its retracted position.

6. In a stove having a burner or the like and thermostatic control of said burner or the like, a thermal control device according to claim 1 further comprising screw means for adjusting the starting position assumed by said sensing element before the vessel is placed in position.

7. In a stove having a burner or the like and thermostatic control of said burner or the like, a thermal control device according to claim 4 in which said retracting means comprises a pivot having a vertical axis, comprising an arm hinged on said pivot, whereby said sensing element is retractable laterally.

8. In a stove having burner or the like and thermostatic control of said burner or the like, a thermal control device according to claim 7, in which said retracting means comprises a fixed part bearing said pivot, said fixed part being mounted rockably on a horizontal axis, whereby said sensing element has two retracted positions, namely a retracted position into which it moves by pivoting of said arm about said vertical axis, and a retracted position into which it moves by rocking of said fixed part about said horizontal axis.

9. In a stove having a burner or the like and thermostatic control of said burner or the like, a thermal control device according to claim 7, wherein said retracting means for effecting the lateral retraction, comprises a knob positioned outside the stove and operationally connected to said arm.

10. In a stove having a burner or the like and thermostatic control of said burner or the like, a thermal control device according to claim 9, wherein said retracting means comprises a forked lever, arranged to convert rotary movement of said knob into pivoting of said arm.

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