A. CARPENTER.

REGULATOR FOR HEATERS.

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1,012,596. Patented Dec. 26, 1911.

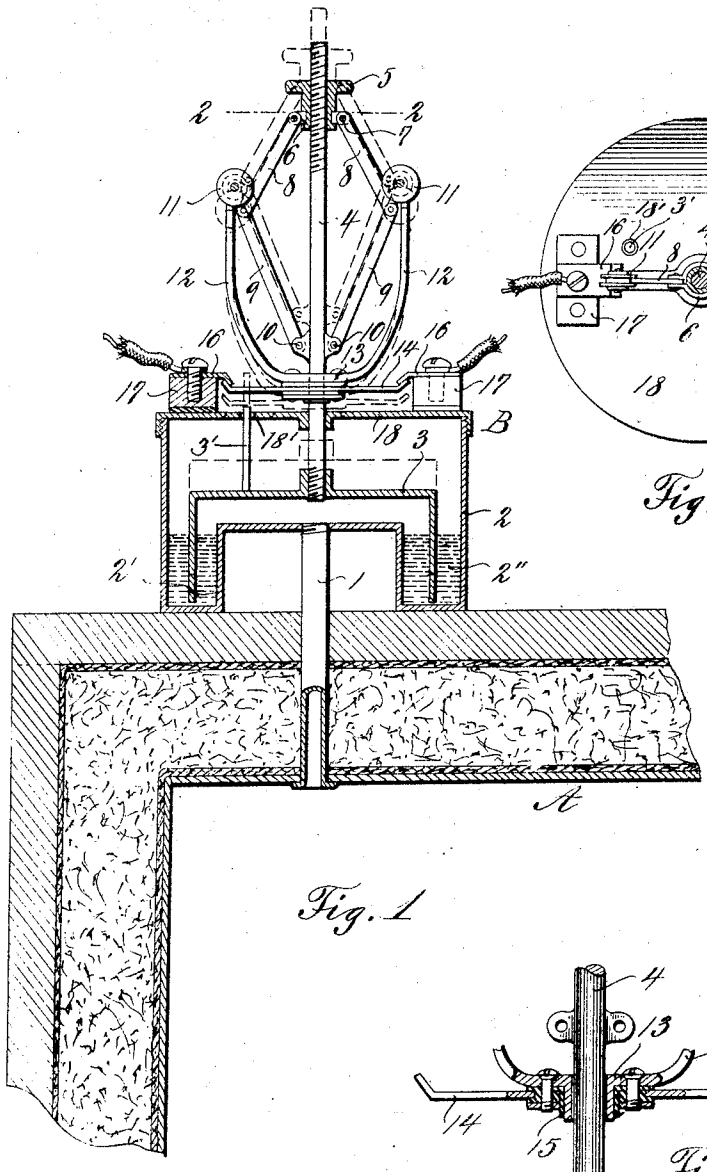

Fig. 1

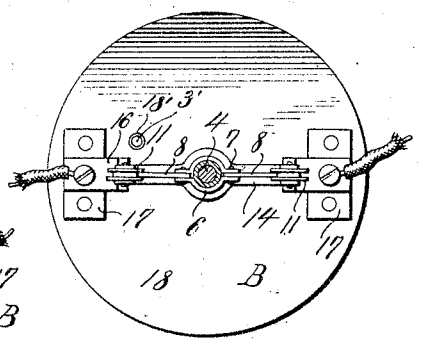

Fig. 2

Fig. 3

WITNESSES:

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REGULATOR FOR HEATERS.

1,012,596. Specification of Letters Patent. Patented Dec. 26, 1911.

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To all whom it may concern:

Be it known that I, ADAM CARPENTER, a citizen of the United States, residing at Tacoma, in the county of Pierce and State of Washington, have invented certain new and useful Improvements in Regulators for Heaters, of which the following is a specification.

This invention consists of novel improvements in automatic regulators for heaters.

While the invention is designed to be used particularly in connection with electric or gas heated compartments, whereby to control automatically the operation of the heater, the device constructed in accordance herewith is susceptible of use in connection with heaters of almost any type, in so far as certain of the broader principles of construction are concerned.

In its preferable embodiment, the invention is associated with a suitable compartment adapted to confine the steam generated by articles of food being cooked therein, said steam being adapted to pass from the compartment into a chamber of the regulator to act upon the mechanism of the latter, so that when the heat reaches a predetermined degree the same will be cut off, and when the temperature in the heated compartment lowers beyond a certain point, the heating medium will be put in connection again, such operations being continued automatically by the use of the present invention.

For a full understanding of the present invention, reference is to be had to the following description and to the accompanying drawings, in which—

Figure 1 is a view partly in elevation and partly in section, showing an automatic regulator constructed in accordance with this invention, as when in use; Fig. 2 is a section taken about on the line 2—2 of Fig. 1; and Fig. 3 is an enlarged detail section showing more clearly the connection between the spring arms and movable contact member.

Referring to Fig. 1 of the drawings particularly, the part A illustrated is the upper portion of a closed compartment, such as an oven, a fireless cooker, or similar heater, and upon which is mounted the automatic regulator B. The compartment A will receive articles of food which in the operation of cooking will give off steam in the customary manner, and said steam is adapted to pass through a pipe 1 into the lower portion of a water chamber 2 secured in any substantial manner to the top of the compartment A. The chamber or casing 2 is provided centrally with a flange 2′ closed at its top and providing an annular space 2″ adapted to receive water or any similar liquid. Movably mounted in the chamber 2 is a bell or fluid pressure operated device 3, the lower portion of which is immersed in the water or liquid in the space 2″, the upper portion of the bell carrying a rod or vertical support 4. On the upper portion of the rod 4 is adjustably mounted a collar 5, having screw-thread connection with the rod and carrying a ring 6 having swivel or rotative connection therewith. Suitable pivot lugs 7 project from the ring 6 and are pivotally connected with links 8 at the upper ends of the latter. The links 8 are in turn connected pivotally at their lower ends with other links 9, the lower ends of which are pivotally connected to the rod 4 at 10. The upper links 8 associated with the lower links 9 comprise reversely, or oppositely inclined cams on the outer edges of which are adapted to ride the rollers 11 carried by spring arms 12. The arms 12 are integrally or otherwise formed with a sleeve 13 having an opening through which the rod or support 4 passes, the sleeve 13 being very loose with respect to the rod.

Secured to a flanged portion of the sleeve 13 is a contact plate 14 separated electrically from the member 13, however, by means of insulation 15. The contact plate 14 is so arranged that opposite end portions thereof are adapted to coöperate with spaced contacts 16 carried by blocks 17 secured to and insulated from the removable top 18 of the chamber 2. The contacts 16 are preferably the terminals of a main electric circuit connected with electric heating units, whereby the compartment A is heated.

In the operation of the invention, it will be seen that when the heat in the chamber A reaches a predetermined degree in heating articles of food in said chamber, steam passing from articles of food in the compartment will be conducted through the pipe 1 into the space inclosed by the bell 3 and thereupon exert a pressure upwardly on said bell, raising the latter with the supporting rod 4. As the rod 4 moves upwardly, it carries with it the cams 8 and 9, the rollers 11

riding downwardly from the lower ends of the cams 8 to the upper ends of the cams 9. As soon as the rollers 11 pass the points of pivotal connection between the parts 8 and 9 the spring arms 12, which normally tend to move toward one another, cause a quick inward movement of the arms 12 in contact with the cams 9, whereby a quick downward movement is imparted to the arms 12 and the contact plate 14 connected therewith. The terminals 16 of the electric circuit will be disconnected by the above operation, discontinuing the operation of the electric heating means included in said circuit. When the heat has lowered sufficiently in the compartment A to reduce the steam pressure on the bell 3, the latter will move downwardly with the rod 4 causing the rollers 11 to move to positions in operative contact with the cams 8 quickly restoring the electric connection between the contacts 14 and 16 and starting again the operation of the heater. It is contemplated that the member 5 may be adjusted vertically along the rod 4 to correspondingly adjust the positions of the cams 8 and 9, whereby the inclination of said cams may be varied to increase or decrease the resistance thereof to the movement of the rollers 11. In this manner the regulating means may be adjusted so as to control automatically the operation of the heater, to start or stop such operation at different degrees of temperature, according to the desire of the user. The various details of construction herein specified may be modified to accord with the special application of the invention, it being understood that the part 14 is a heater controlling member and may be adapted to electrical or mechanical control of a heater, as may be desired in carrying out the invention. The removable top 18 has an air vent 18′ therein, and a guide rod 3′ on the bell 3 passes upwardly through the vent. This guiding means prevents rotation of the bell and member 4 which would be likely to prevent coöperation of the contacts 14 and 16.

Having thus fully described my invention, what is claimed as new is:

1. In an automatic regulator, the combination of a longitudinally movable rod, cams at opposite sides of said rod and movable therewith, a controlling member through which the rod passes loosely, a pair of spring arms connected at one end to the controlling member and curving outwardly and extending in parallel relation to the rod on opposite sides of the cams aforesaid, rollers carried by the free ends of said arms and movable along the cams for the purpose described, and means for actuating the rod to vary the position of the cams in respect to the spring arms.

2. In an automatic regulator, the combination of a longitudinally movable supporting rod, a fluid pressure operated device connected therewith for actuating the same, a casing inclosing said fluid pressure operated device and provided with an opening through which the rod is movable, a controlling member, means carried by the rod for actuating said controlling member at predetermined points in the movement of the rod and consisting of a cam, a spring arm carried by the controlling member and coacting with said cam, and guide means on the fluid pressure operated device coacting with the casing to direct the movement of the rod so as to hold the spring arm in proper relation to the cam aforesaid.

3. In an automatic regulator, the combination of a supporting rod, oppositely inclined cams carried thereby, a controlling member, a spring arm carried by said controlling member and operable by said cams to move the controlling member in either of opposite directions, and means for varying the relative inclination of the cams.

4. In an automatic regulator, the combination of a supporting rod, oppositely inclined cams carried thereby, a controlling member, a spring arm carried by said controlling member and operable by said cams to move the controlling member in either of opposite directions, and a collar adjustable upon the supporting rod and connected with the cams for varying the relative inclination of the same.

5. In an automatic regulator, the combination of a vertically movable rod, a collar adjustable lengthwise thereof, a pair of cams having swivel and pivotal connection at their upper ends with the collar, a second pair of cams pivotally connected at their upper ends with the lower ends of the first mentioned pair of cams and pivotally connected at their lower ends with the supporting rod, a controlling member provided with an opening through which the supporting rod is freely movable, spring arms carried by said controlling member and having rollers arranged to operate in contact with the cams aforesaid, and electric circuit terminals in spaced relation and in the path of movement of the controlling member.

In testimony whereof I affix my signature in presence of two witnesses.

ADAM CARPENTER.

Witnesses:
C. B. Robb,
S. E. Dodge.