

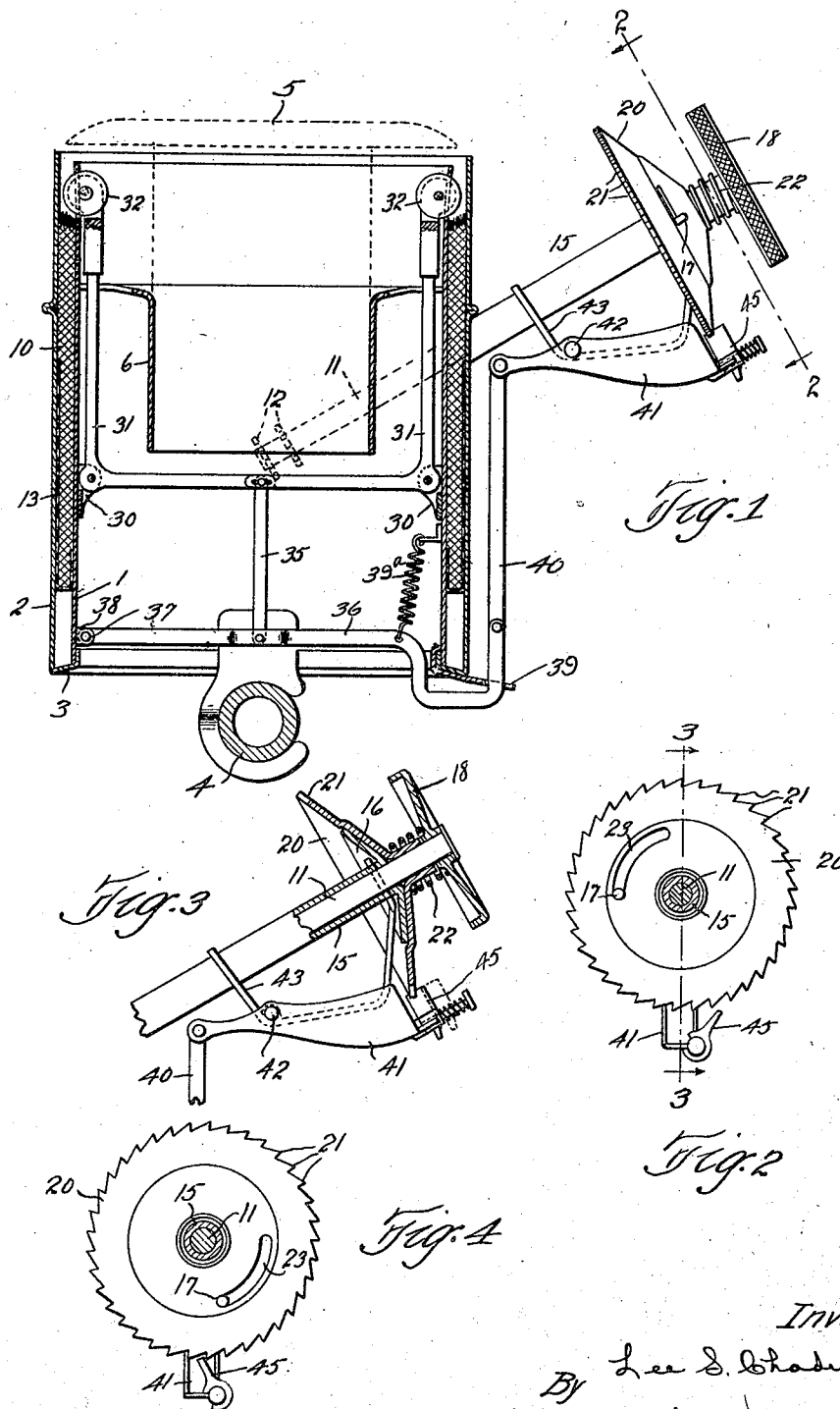
Oct. 23, 1923.

L. S. CHADWICK

1,471,541

AUTOMATIC WICK ADJUSTMENT FOR LIQUID FUEL BURNERS

Filed Feb. 26, 1921



Inventor
By Lee S. Chadwick
Shull, Brock & West Attys.

UNITED STATES PATENT OFFICE.

LEE S. CHADWICK, OF SHAKER HEIGHTS, OHIO, ASSIGNOR TO THE CLEVELAND METAL PRODUCTS COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

AUTOMATIC WICK ADJUSTMENT FOR LIQUID-FUEL BURNERS.

Application filed February 26, 1921. Serial No. 448,109.

To all whom it may concern:

Be it known that I, LEE S. CHADWICK, a citizen of the United States, residing at Shaker Heights Village, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Automatic Wick Adjustment for Liquid-Fuel Burners, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to liquid fuel burners of the class employing wicks and involving wick raising means, and a stop which, through the intervention of said means, serves to restrain the wick against being raised too high.

As the wicks become charred and require trimming from time to time, the relation between the upper end of the wick and the stop which governs the wick raising means is disturbed and makes necessary an adjustment of the stop to compensate for the part trimmed off the wick. Heretofore, this adjustment has been manual.

It is the fundamental purpose of this invention to provide an automatic adjustment for the stop which is under the direct control of the wick so that the user is relieved of having to adjust the stop from time to time as the wick is trimmed. Under my improvements, therefore, the user may trim the wick when occasion requires and continue to adjust the wick by the wick raising means, feeling assured at all times that there is no danger of raising the wick beyond a safe distance.

In its broad conception, the invention comprehends the basic idea of stopping the wick by means engaged and actuated by the burned portion of the wick—that is, the part adapted to be lighted; which will not deform the flame controlling part of the wick—that is, the edge which determines the continuity and uniform character of the flame; and which automatically withdraws itself from the burned portion of the wick when the wick is in burning position. A primary object of the invention, therefore, is to provide a satisfactory construction for effectually carrying into practice this basic idea.

Further objects of the invention are to provide a comparatively simple and inexpensive contrivance that is positive of operation; adapts itself readily to burners of prevailing types; interferes in no way with the usual manipulation of the burner; and is durable and not likely to get out of order.

The foregoing objects, and others which will become apparent as the description proceeds, are attained in the embodiment of my invention illustrated in the drawing accompanying and forming a part hereof, and while I shall proceed to describe this particular embodiment in detail, it is to be understood that I do not limit myself to the present structural details further than is required by the terms of the claims annexed hereto.

In the drawings, Fig. 1 is a central vertical section through a burner incorporating my improvements; Fig. 2 is a sectional detail on the line 2—2 of Fig. 1; Fig. 3, a section on the correspondingly numbered line of Fig. 2; and Fig. 4 is a detail similar to Fig. 2, showing the stop in effective position.

The burner wherewith I have elected to show my improvements associated, with no thought of limiting it thereto, is of the type involving inner and outer wick tubes 1 and 2, respectively, that are joined in a liquid tight manner at their lower ends by an annular wall 3, thereby to enclose a wick space between the tubes that is communicatively connected in the usual way with a supply pipe 4 whereon the burner is mounted. The manner of connecting such burners and supply pipes is so well known that illustration of this detail is deemed unnecessary in the present instance. A flame spreader 5 is shown as supported in the upper end of the inner wick tube by a member 6 that is attached to the wall of said tube. In some uses to which the burner is put, the flame spreader is omitted. In any event, it pertains in no way to my present invention.

The wick is designated 10 and is adapted to be raised and lowered by means of the wick raising spindle 11 having the usual pinions 12 which cooperate with the perforations of the wick carrier 13. The spindle is encased within a tube 15 which ter-

minates a short distance inward of the outer end of the spindle, and immediately adjacent the end of the tube the spindle has a disk 16 secured to it which carries a pin 17. The spindle may be rotated by means of the usual hand wheel 18 that is fastened to its outer end. A circular stop plate 20, the edge whereof is provided with teeth 21, is mounted upon the spindle between the disk 16 and the hand wheel 18, and a spring 22 interposed between the hand wheel and stop plate tends to force the latter into frictional engagement with the disk 16. The stop plate has an arcuate slot 23 concentric with its axis of rotation, through which the pin 17 projects.

Pivotally supported through brackets 30 from diametrically opposite points of the inner wick tube 1 are a pair of bell cranks 31 that carry rollers 32 (or equivalents) at their upper ends. The portions of the bell cranks wherein the rollers 32 are supported extend through openings in the upper end of the inner wick tube so that the rollers normally repose within the wick space in a position to be engaged by the upper end of the wick when the latter is elevated. The inner ends of the bell cranks are pivotally connected to the upper end of a link 35 and the lower end of this link is similarly connected to a lever 36 which has one of its ends pivoted at 37 to a bracket 38 that is attached to the wick tube 1 adjacent its lower end. The free end of the lever 36 extends out from under the wick tubes at a point substantially opposite the point where the lever is pivoted, and it is shown as guided by a member 39 that is carried by the wick tubes. A spring 39^a tends to maintain the free end of the lever elevated and, through the intervention of the link 35, the bell cranks 31 rocked in a direction to project the rollers 32 into the wick space. The outer end of the lever 36 is connected, through a link 40, with the inner end of a rocker arm 41 that is pivoted at 42 to a bracket 43 that depends from the tube 15 a suitable distance inward from the stop plate 20. The outer end of the rocker arm 41 reposes beneath the stop plate and there has pivoted to it a pawl 45 which has a limited angular movement. The pawl is so shaped as to engage with adjacent portions of the rocker arm to positively stop it in both directions. The manner of mounting the pawl 45 upon a pivot pin 46 that projects forwardly from the rocking arm 41, permits the pawl to be shifted outwardly along the pin against the tension of a spring 47 that is compressed between the head of the pin and the pawl, thereby to move the pawl out of reach of the stop plate 20 so that the stop plate, and consequently the spindle, may be rotated freely for a purpose that will be presently explained.

While I have shown two bell cranks 31 with rollers 32 engaging the wick, it is obvious that one bell crank of sufficiently substantial construction would operate equally as well wherefore the invention may be regarded as embracing in its scope one or a plurality of such elements.

When the spindle is turned by means of the hand wheel 18 to elevate the wick, the wick engages the rollers 32 and displaces them inwardly, rocking the bell cranks 31 in a direction to depress, through link 35, the lever 36. As the lever swings downwardly it rocks the arm 41 through the intervention of link 40 to elevate the outer end of the arm and project the pawl 45 into engagement with the teeth of the stop plate 20. As the stop plate rotates, it swings the pawl over into the position shown in Fig. 5, and the pawl, being arrested against further movement, serves as a positive stop for the plate, and further movement of the spindle is permitted by reason of the "lost motion" connection between the stop plate and the disk 16 afforded by slot 23 and pin 17. This excess movement of the spindle after the rollers 32 withdraw from the burned portions of the wick is sufficient to elevate the wick to burning position or its maximum height.

Thus it will be seen that my invention provides an automatic adjustment between the wick, and the stop which controls the wick raising means, and removes the human element from the operation, thereby insuring at all times against an unsafe condition by an undue elevation of the wick.

It will also be noted that the element which actually governs the stopping of the wick is engaged and actuated by the burned portion of the wick; that the element (in the present case, the roller 32) cooperates with a part of the wick removed from the portion (in the present instance, the outer edge of the wick) which controls the character of the flame so that the flame is not affected or influenced in any way by the element; and that the element automatically removes itself from the wick before the wick assumes burning position.

When it is desired to remove the wick from the burner, as for the purpose of replacing it with a new wick, the pawl 45 is moved out of reach of the stop plate 20 in the manner previously explained and the spindle is rotated in a direction to elevate the wick carrier 13 beyond the pinions 12 after which the wick may be readily withdrawn from the wick space. The manner of inserting a new wick will be obvious from the above.

I have filed the following applications on other divisions of the same general subject matter as that to which the present case relates: Serial No. 448,108, filed February 26,

1921; renewal application No. 565,748, filed June 3, 1922 (originally Serial No. 449,842, filed March 5, 1921); Serial No. 528,813, filed Jan. 12, 1922, and Serial No. 528,814, filed January 12, 1922.

Having thus described my invention, what I claim is:—

1. In a burner of the class set forth, the combination of wick raising means, a stop for the wick raising means which acts there-through to limit the upward movement of the wick, and means arranged to be engaged and actuated by the wick for placing the stop in operative condition.

2. In a burner of the class set forth, the combination of wick raising means, a stop for said means, a "lost motion" connection between the stop and wick raising means, and means arranged to be engaged and actuated by the wick for rendering the stop effective.

3. In a burner of the class set forth, the combination of wick raising means, a movable stop, a stop member, a "lost motion" connection between the wick raising means and stop member, and means arranged to be engaged and actuated by the wick for moving the stop into cooperation with the stop member.

4. In a burner of the class set forth, the combination of wick raising means, a member movable with the wick raising means, a stop member frictionally engaging the former member and tending to move with it, a "lost motion" connection between said members, a stop adapted to be moved into cooperation with the stop member to arrest the movement of the latter, and means arranged to be engaged and actuated by the wick for moving the stop into cooperation with the stop member.

5. In a burner of the class set forth, the combination with a wick raising spindle, a member fixed to said spindle, a stop member mounted on the spindle and frictionally engaging the former member, the stop member having a series of teeth, said members having parts cooperating to limit their relative angular movement, a stop movable into cooperation with the teeth of the stop member, and means arranged to be engaged and actuated by the wick for moving the stop into cooperation with the teeth of the stop member.

6. In a burner of the class set forth, the combination with a wick raising spindle, a member fixed to said spindle, a stop member mounted on the spindle and frictionally engaging the former member, the stop member having a series of teeth, said members having one an opening and the other a pin projecting through said opening thereby to limit the relative angular movement between the members, a stop movable into cooperation with the teeth of the stop member, and

means arranged to be engaged and actuated by the wick for moving the stop into cooperation with the teeth of the stop member.

7. In a burner of the class set forth, the combination of a wick raising spindle, a member secured to said spindle, an operating handle fastened to the spindle and spaced longitudinally thereof from the said member, a stop plate mounted upon the spindle between the member and operating handle, a spring interposed between the operating handle and stop member for urging the stop member into frictional engagement with the first mentioned member, said members having parts cooperating to limit the angular movement of one of said members with respect to the other, a stop adapted to be moved into cooperation with the stop member, and means arranged to be engaged and actuated by the wick for moving the stop into cooperation with the stop member.

8. In a burner of the class set forth, the combination of stop mechanism for limiting the upward movement of the wick, a member movably supported by the burner and arranged to be engaged and moved by the top of the wick, and operative connections between said member and the aforesaid mechanism, said member being out of contact with the top of the wick when the wick is in burning position.

9. In a burner of the class set forth, the combination of wick raising means, a stop for limiting the movement of said means, a member movably supported by the burner and arranged to be engaged and moved by the top of the wick, and operative connections between said member and the aforesaid stop, said member being out of contact with the top of the wick when the wick is in burning position.

10. In a burner of the class set forth, the combination of wick raising means, a stop for limiting the movement of said means, a member pivotally supported by the burner and arranged to be engaged and swung by the wick, and operative connections between said member and the aforesaid stop whereby the stop is rendered effective when the wick is elevated above a predetermined point.

11. In a burner of the class set forth, and involving a wick tube wherein a cylindrical wick is adapted to be guided, wick raising means, a stop for limiting the movement of said means, a pair of bell cranks pivotally supported at their angles from diametrically opposed parts of the wick tube and situated interiorly thereof, the corresponding branches of the two bell cranks being arranged to be engaged by the wick thereby to swing the bell cranks when the wick is elevated, a lever pivotally supported within the lower end of the wick tube, means connecting said lever with the other ends of the

bell cranks, and operative connections between said lever and the aforesaid stop.

12. A burner of the class set forth and involving an inner and an outer wick tube between which a cylindrical wick is adapted to be guided, a wick raising spindle supported by the outer wick tube, a stop member having a "lost motion" connection with the spindle, a movable stop for cooperation with the stop member, means situated interiorly of the inner wick tube and arranged to be engaged and moved by the wick, and operative connections between said means and the stop.

13. A burner of the class set forth, and involving an inner and an outer wick tube between which a cylindrical wick is adapted to be guided, a wick raising spindle supported by the outer wick tube, a stop member having a "lost motion" connection with the spindle, a stop for cooperation with the stop member, a rocker arm pivotally supported by the burner structure and carrying said stop, the stop having a limited swinging movement with respect to the rocker arm, means situated interiorly of the inner wick tube and arranged to be engaged and moved by the wick, and operative connections between said means and the rocker arm.

14. In combination, a wick guide, a wick, wick raising means, a stop movable into and out of operative position for limiting the movement of the wick raising means, means operated by the top of the wick for moving the stop into operative position when the top of the wick is raised to a point near the top of the guide, and means permitting the wick to be raised a predetermined distance after the stop has been moved into operative position.

15. In a burner of the class set forth, in combination with the wick, a wick stop, and means operated by the burned portion of the wick for rendering the wick stop operative, said means being out of contact with the burned portion of the wick when the wick is in burning position.

16. In a burner of the class set forth, in combination with the wick, means having operative connection with a portion of the wick other than its burned portion for restricting the wick against movement above a predetermined position, and means operated by the burned portion of the wick for rendering the aforesaid means operative.

17. In a burner of the class set forth, in combination with the wick, a stop for limiting the upward movement of the wick, and means for rendering the stop operative, said means being engaged and actuated by the burned portion of the wick and arranged to automatically withdraw therefrom when the wick is in burning position.

18. In a burner of the class set forth, the combination of wick raising means, a stop

for the wick raising means, and means arranged to be engaged and actuated by the top of the wick for rendering the stop effective, the top of the wick being unobstructed when the wick is raised to burning position.

19. In combination, a wick guide, a wick, wick raising means, a stop movable into and out of operative position for limiting the movement of the wick raising means, means operated by the top of the wick for moving the stop into operative position when the top of the wick is raised to a point near the top of the guide, and means permitting the wick to be raised a predetermined distance after the stop has been moved into operative position, the second mentioned means being withdrawn from the top of the wick when the wick is raised to burning position.

20. In an oil burner, in combination with the wick, wick raising means, a member arranged to be engaged and moved by the wick when the latter is elevated, mechanism which when coupled to the wick raising means serves to limit the movement of said means, and further means actuated by the movement of the member for coupling said mechanism to the wick raising means.

21. In a burner of the class set forth, the combination of wick raising means, a detent for cooperation therewith to limit the movement of the wick raising means, and means arranged to be engaged and actuated by the wick for presenting the detent in operative relation to the wick raising means.

22. In a burner of the class set forth, the combination of wick raising means, a movable stop adapted to cooperate with and limit the movement of the wick raising means, and means arranged to be engaged and actuated by the wick for moving the aforesaid stop into cooperation with the wick raising means.

23. In a burner of the class set forth, the combination of wick raising means, a stop for cooperation therewith, a carrier for the stop and with respect to which the stop has limited movement, and means arranged to be engaged and actuated by the wick for moving the carrier so as to present the stop to the wick raising means.

24. In a burner of the class described, the combination with the wick, of a member movable therewith, a device connectible to said member, means engaged and moved by the wick when the latter is elevated for effecting the connection of said device to the member, and a stop for limiting the movement of said device.

25. In a burner of the class described, the combination with the wick, of a member movable therewith, a device connectible to said member, means engaged and moved by the wick when the latter is elevated for effecting the connection of said device to the

member, means for limiting the movement of the device, and further means for rendering the connection between the device and aforesaid member ineffective.

5 26. In a burner of the class described, the combination with the wick, of a member movable therewith, a device having limited movement in the direction of movement of

said member, and means engaged and actuated by the wick when the latter is elevated 10 for effecting connection between the device and said member.

In testimony whereof, I hereunto affix my signature.

LEE S. CHADWICK.