Aug. 17, 1965 D. O. CULLIGAN 3,200,807

GAS SUPPLY ARRANGEMENT FOR RANGE

Filed Sept. 20, 1962 3 Sheets-Sheet 1

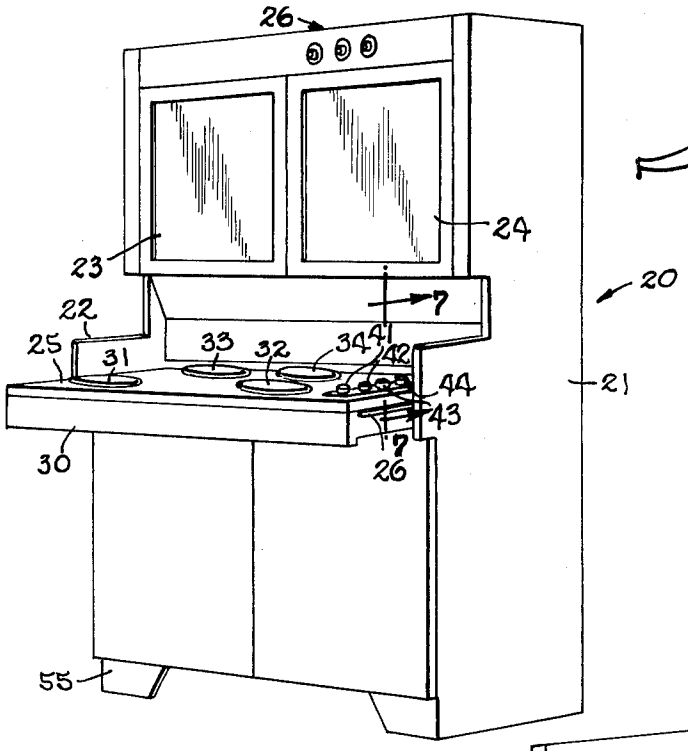


Fig. 1

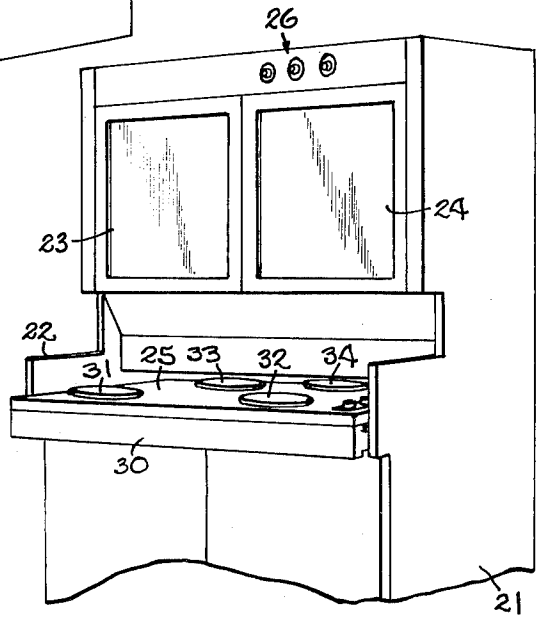


Fig. 2

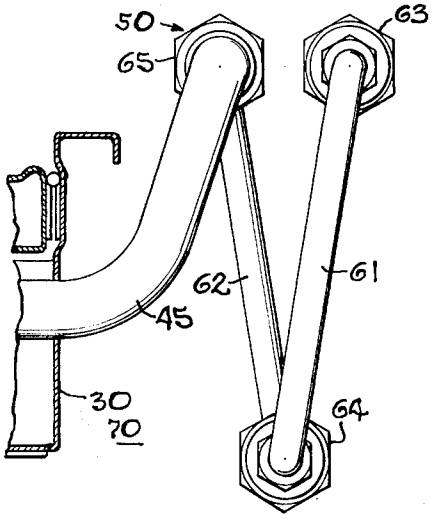


Fig. 3

INVENTOR
DUANE O. CULLIGAN

by: Wolfe, Hubbard, Voit & Osann
ATTORNEY

Aug. 17, 1965 D. O. CULLIGAN 3,200,807

GAS SUPPLY ARRANGEMENT FOR RANGE

Filed Sept. 20, 1962 3 Sheets-Sheet 2

Fig. 4

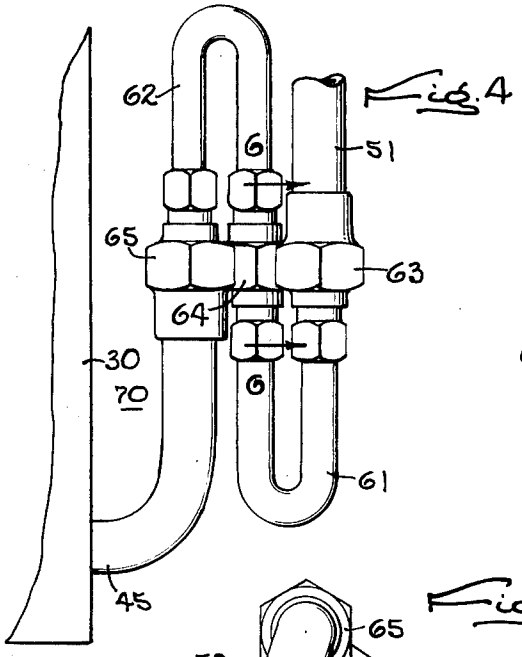


Fig. 6

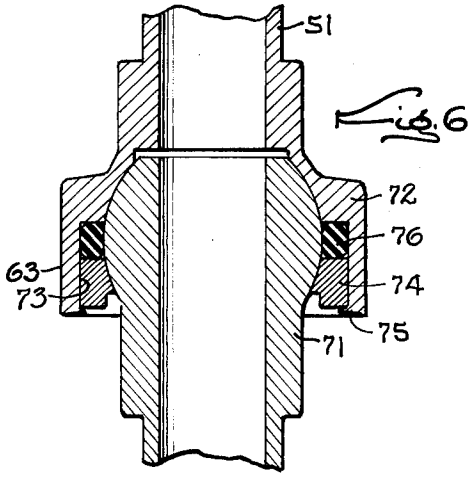


Fig. 5

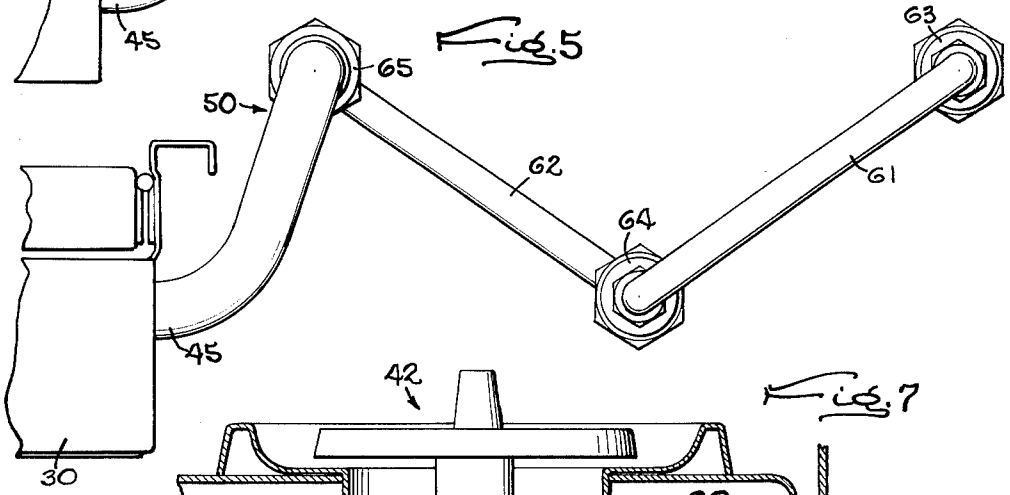
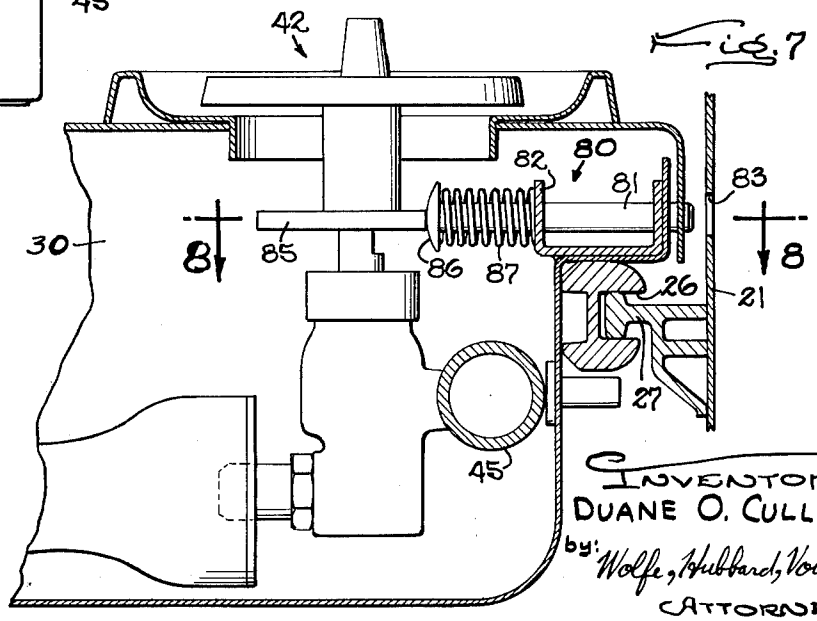


Fig. 7



INVENTOR
DUANE O. CULLIGAN
by: Wolfe, Hubbard, Voit & Osann
ATTORNEY

Aug. 17, 1965 D. O. CULLIGAN 3,200,807

GAS SUPPLY ARRANGEMENT FOR RANGE

Filed Sept. 20, 1962 3 Sheets-Sheet 3

Fig. 8

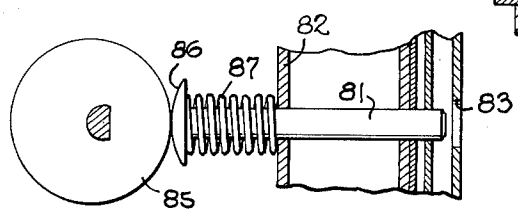


Fig. 10

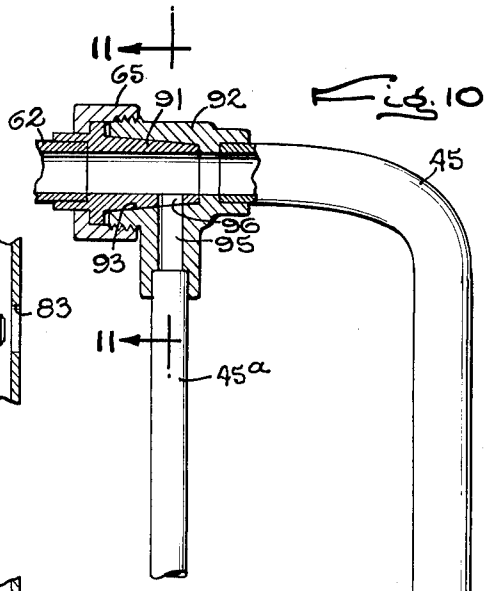


Fig. 9

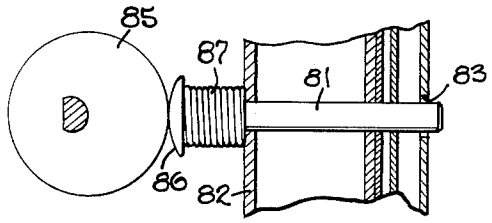


Fig. 11

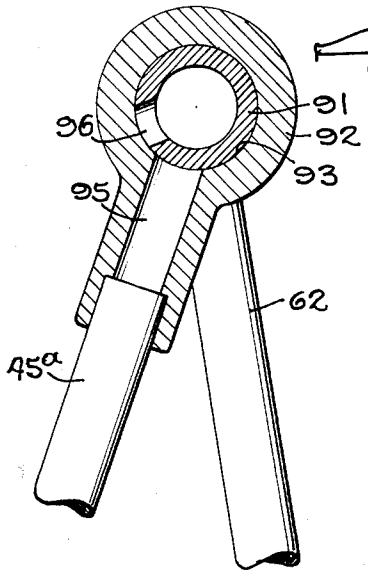
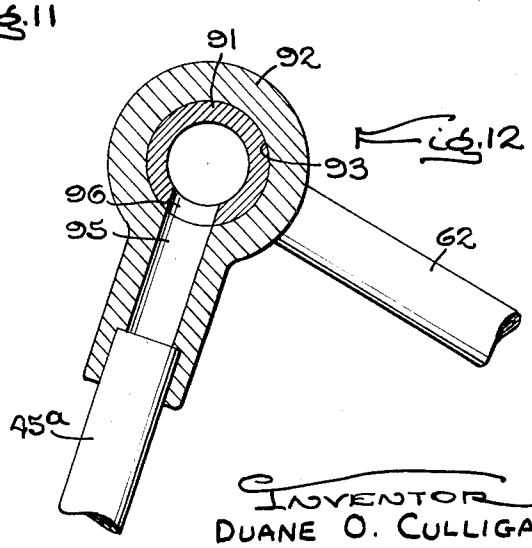


Fig. 12



INVENTOR
DUANE O. CULLIGAN

by: Wolfe, Hubbard, Voit & Osann
ATTORNEYS

United States Patent Office 3,200,807 Patented Aug. 17, 1965

3,200,807

GAS SUPPLY ARRANGEMENT FOR RANGE

Duane O. Culligan, Kankakee, Ill., assignor, by mesne assignments, to Geo. D. Roper Corporation, Kankakee, Ill., a corporation of Delaware

Filed Sept. 20, 1962, Ser. No. 225,041
3 Claims. (Cl. 126—37)

The present invention relates to gas ranges and more particularly to a range of the type having a cooking surface or burner box which is movable inwardly and outwardly of the range.

Recent gas and electric ranges have featured ovens located at the top of the range with a cooking surface spaced below the oven and arranged for sliding outwardly into a cooking position and inwardly to a nested or recessed position so as to minimize projection into the room when the cooking surface is not in use.

It is an object of the present invention to provide an improved range having improved means for conducting gas to the burners in a burner box of the slidable type.

It is a more specific object to provide a novel articulated piping arrangement connected to the gas supply line and to the burner manifold which permits substantial relative movement of the burner manifold as the burners are pulled out into working position.

It is another object of the present invention to provide a novel, articulated piping arrangement for use in a gas range which, in spite of the relative movement which it provides, is safe and free of leakage over many thousands of operations covering a period of time which is in excess of the life of the usual gas range.

It is another object of the present invention to provide a gas range having an articulated piping arrangement for feeding gas to a movable burner box which is free and easy in operation, which does not require any substantial force to move from the compact to the extended position or return and which is free of any tendency toward binding either initially or later on as a result of use.

It is a related object of the invention to provide a novel, articulated piping arrangement in a gas range which is well suited to the liberal manufacturing tolerances used in this field and which does not require careful installation or adjustment.

It is still another object of the present invention to provide a folded piping arrangement for piping gas to a movable burner box in a cooking range which permits a high degree of compactness, which minimizes the projection of the burner box, and which compactly occupies unused space normally available at the rear edge of the burner box.

It is still another object of the present invention to provide means for insuring that the rearmost burners cannot be turned on except when the burner box is pulled fully into its extended position and which insures further that the burners must be turned off before the burner box can be pushed into recessed position.

Consequently, it is an object to provide an automatic interlock which prevents the rearmost burners from being operated when the burner box is pushed in but which nevertheless permits the front burners to be employed even though the burner box is in its fully recessed position.

Thus it is an object of the present invention to provide a range in which one half of the burners are still usable even though the burner box is pushed into its recessed or out-of-the-way position. In this connection, it is an object to provide an interlocking arrangement for the rear burners which is simple and inexpensive and which may be used with conventional types of valves and with the addition of only a few simply and inexpensively formed parts to the basic structure.

In one of its aspects it is an object of the present invention to provide articulated burner piping in which one of the articulated joints is employed for achieving automatic shut-off of the supply of gas to the rear burners while maintaining a supply of gas to the front burners.

Other objects and advantages of the present invention become apparent upon reading the attached detailed description and upon reference to the drawings in which:

FIGURE 1 is perspective of a range employing the present invention showing the burner box pulled outwardly into extended position;

FIG. 2 is a fragmentary perspective similar to FIG. 1 but with the box recessed;

FIG. 3 is a fragmentary elevation showing the articulated piping which supplies the burner box viewed from the right-hand side of the range;

FIG. 4 is a top view of the piping of FIG 3;

FIG. 5 is a side elevation similar to FIG. 3 but showing the position of the piping links when the burner box is drawn outwardly;

FIG. 6 is a section taken through one of the articulated joints, for example, along the line **6—6** in FIG. 4;

FIG. 7 is a fragmentary section of one of the rear burner control valves looking along the line **7—7** in FIG. 1 and with the valve in the "off" position;

FIG. 8 is a fragmentary horizontal section taken along the line **8—8** in FIG. 7;

FIG. 9 is a fragmentary section similar to FIG. 8 but with the valve in the "on" position.

FIG. 10 shows a modified form of the present invention in which the final articulated joint effects an automatic shut-off of the rear burners while maintaining gas flow to the front burners when the burner box is pushed into its recessed position;

FIG. 11 is a fragmentary cross section taken along the line **11—11** in FIG. 10; and,

FIG. 12 is a view similar to FIG. 11 but of the ports alined for supply of gas to the rear burners when the burner box is pulled out.

While the invention has been described in connection with a preferred embodiment, it will be understood that I do not intend to be limited to the embodiment shown but intend to cover the various alternative constructions included within the spirit and scope of the appended claims.

Turning now to FIG. 1 there is disclosed a range generally indicated at **20**, having a frame which includes a pair of side members **21, 22** with oven compartments **23, 24** at the top and providing a work space **25**. Arranged above the oven **24** are the oven timer and controls **26**. Mounted between the side members **21, 22** are slidable in and out on suitable guides or ways **26, 27** (FIG. 7), is a burner box **30** having a pair of front burners **31, 32** and a pair of rear burners **33, 34**. Along the right-hand edge of the burner box is a set of valves **41, 42** for the front burners and **43, 44** for the rear burners. These valves are connected to a manifold **45** which is located in the burner box. The manifold is connected by an articulated coupling **50** to the supply line **51** which is stationarily mounted in the frame of the range. The range is shown in the drawings as supported upon a base **55** but, if desired, the base may be omitted and the range may be instead, secured to the kitchen wall.

In accordance with the present invention a gas connection is provided between the source **51** and the manifold **45** in the form of articulated piping made up of a plurality of U-shaped tubular members which are joined to one another as well as to the source and manifold, by means of swivel joints or couplings capable of swiveling about their own axis through a substantial angle without leakage of gas.

Referring to FIGS. 3 and 4, the preferred form of the invention employs a first U-shaped link of tubing 61 which is oriented in a generally vertical direction and a second, similar length of tubing 62, with two links of tubing facing one another in folded back relation as shown. Interposed between the source 51 and the first link of tubing 61 is a swivel connection 63. A second swivel connection 64 is provided between the adjacent ends of the links 61, 62. Finally a connection 65 is made between the downstream end of the link 62 and the manifold 45 in the burner box.

Because of the vertical orientation and folded back relation of the tubular members 61, 62, unused space, indicated at 70 and which is rearwardly of the burner box is fully utilized permitting the burner box when in the rearward or recessed position to be pushed back the desired amount, limited by other design considerations. However, when the burner box is drawn forwardly as in FIG. 5, relative scissoring movement occurs between the members 61, 62, permitting the box to be freely drawn forward the necessary amount which, in a practical case, may be on the order of eight inches. It will be noted in FIG. 5 that while the axis of the supply line 51 and manifold 45 are at approximately the same height causing the swivel couplings 63, 65 to be at the same height, the central coupling 64, being unsecured, is free to rise and fall thereby to accommodate the toggle-like action of the members 61, 62.

While swivel joints 63, 65 of various specific design may be employed without departing from the present invention, it is desirable that the construction shown in FIG. 6 be used since it permits limited ball-and-socket action, i.e., slight angling of the input and output portions thereby to accommodate minor misalinement and to enable each of the couplings to be self-alining for complete avoidance of binding. Taking the coupling 63 by way of example, it includes a ball end 71 and a complementary recessed socket end 72. To hold the ball captive and to accommodate a sealing member, a recess indicated at 73 is provided in the member 72 into which is inserted an annular filler piece 74. This is staked about a line 75 to provide the desired clearance between the ball and the socket. Seated in the recess 73 is an O-ring 76 which is preferably chosen so that it exerts pressure resiliently against the ball when the filler piece 74 is in its desired clearance position. The space surrounding the O-ring is preferably filled with grease of the type generally employed to lubricate plug valves in gas ranges. The structure shown in FIG. 6 not only permits 360° swiveling movement but permits ball-and-socket skewing of the axes of the two portions at an angle of approximately 10° which is sufficient to accommodate any misalinement. Because of the skewing accommodation provided by the three couplings, the manifold and supply line may be positioned within a relatively wide tolerance range without running risk of introducing binding in the slide mechanism employed for mounting the burner box (not shown).

In accordance with a feature of the invention, a mechanical interlock is provided for the valves 43, 44 which control the rearmost burners 33, 34 so that the vales cannot be turned on unless the burner box is fully withdrawn, and, conversely, so that the burner box cannot be pushed into its recessed position unless these valves are off, but with the valves 41, 42 which feed the front burners being free of any interlock so that the front burners can be operated in all positions of the burner box. Thus referring to FIG. 7, which is a section taken through the valve 43, there is disclosed an interlock 80 having an interlocking pin 81 which is transversely slidable in a U-shaped guide or bracket 82 which is secured, by welding or the like to the burner box. Registering with the locking pin 81 when the burner box is fully extended is an opening 83 which is formed in the structure of the stationary side member 21 of the range. For the purpose of causing the pin 81 to project when the valve 43 is turned on, a cam 85 is mounted at the inner end of the valve knob engaging a cam follower surface 86 at the other end of the pin. To

keep the cam and follower surfaces in engagement, a coil spring 87 is telescoped over the pin and seated on the bracket 82, the pin being thereby biased inwardly. Consequently, when the valve is turned in the "off" direction the cam is rotated from the locking position shown in FIG. 9 to the retracted position shown in FIG. 8 thereby unlocking the burner box so that it is free to be pushed inwardly. It will be understood that a corresponding interlock mechanism is provided for the valve 44, with the pin thereof engaging its own registering hole in the side member of the range. In order to prevent the pin of the valve 43 from engaging the hole intended for the valve 44, i.e., to prevent the valve 43 from being rotated with the burner box not fully pulled out, the two locking pins may be located at slightly different elevations.

The above interlocking arrangement provides a valuable safety feature in that the housewife need not be concerned whether or not the burner is fully extended when the rear burners are turned on; the fact that she is unable to rotate the two rear knobs provides adequate notice and the burner box may be pulled out what ever additional amount may be necessary to secure registration. Preferably stops (not shown) are provided for limiting the outward movement of the burner box with the pins and holes in registering position so that it is not necessary to "feel" for the proper extended position. Since the front burners do not have interlocks, they may be operated in any or all positions of the burner box, providing compact two-burner operation when fully recessed. In many instances two burners plus the oven suffice for preparation of a meal.

In accordance with one of the aspects of the present invention, a modified swivel coupling is provided in the articulated linkage for establishing gas flow to the rear burners when the burner box is pulled out and for automatically cutting off the flow of gas to the rear burners when the burner box is pushed to its recessed position. More specifically, the final one of the swivel joints indicated at 65 is provided with a radical outlet feeding the rear burners as well as the regular axial outlet for the front burners with the relative rotation of the two parts of the coupling serving to aline registering radial ports when the burner box is pulled out. Thus, referring to FIGS. 10–12, the swivel coupling includes a plug portion 91 and an annular housing portion 92 having a conical interface 93 at which relative rotation takes place. The plug portion of the coupling is connected to the tubular link 62 while the housing portion has an axial connection with the manifold 45 which leads to the valves supplying the two front burners. Secured to the housing portion 92 and extending radially therefrom is a second manifold 45*a* which leads to the valves 43, 44. Communicating with the manifold 45*a* in the housing 92 is a radial port 95. The plug portion 91 carries a corresponding radial port 96.

As shown in FIG. 11, when the burner box is pushed in, and with the articulated piping in its compact folded position, the two ports 95, 96 are rotated out of register so that no gas can be supplied to the manifold 45*a*. However, under such conditions, gas continues to be made available to the front burners through the manifold 45.

When the burner box is pulled out, the relative movement of the plug portion 91 of the coupling causes the port 96 to be rotated into register with the port 95 so that gas is supplied to the rear valve manifold 45*a* so that all of the burners may be operated under the control of their respective valves. It will be understood that the range includes a conventional pilot capable of igniting all of the burners so that in the event either of the valves 43, 44 controlling the rear burners is left "on" when the burner box is recessed, automatic relighting will occur when the burner box is extended so that there is no possibility of escape of unignited gas.

It is found that the above arrangement satisfies the numerous requirements for a kitchen range. Because of the recessed burner box the range is extremely compact, permitting operation of the front two burners when the burner box is recessed. Moreover, the range is safe to

operate with novel means for preventing operation of the rear burners under such conditions. The novel arrangement of articulated piping and associated couplings causes the movement of the burner box to be free and easy, permitting operation over the life of the range without any tendency toward binding or risk of escape of gas from the joints.

I claim:

1. In a range the combination comprising a frame including top and side walls and having a source of gas, a burner box slidably mounted in said frame for movement between a forwardly extending position and a rearwardly recessed position, said burner box having a plurality of burners together with associated valves, means for receiving gas from said source for feeding it to the burner valves in all positions of the burner box, at least one of said valves including a mechanical linkage cooperating with means on its respective adjacent side wall for locking said box in its outwardly extended position when the said one valve is set to feed gas to its associated burner.

2. In a range the combination comprising a frame including top and side walls and having a source of gas, a burner box slidably mounted in said frame for movement between a forward extended position and a rearward recessed position, a set of front and rear burners in said box, said rear burners being received beneath said top wall when the burner box is moved to the rearwardly recessed position, a set of valves located along one of the lateral edges of the box, means for receiving gas from the source and for feeding it to the respective valves, the valves associated with the rear burners each having a mechanical locking arrangement so constructed and arranged that movement of the valves to the "on" position with the burner box extended effects locking between the burner box and the frame thereby to maintain the burner box in such extended position while movement of the valves to the "off" position unlocks the locking means so

that the box can be moved to the rearwardly recessed position.

3. In a range the combination comprising a frame including top and side walls and having a source of gas, a burner box slidably mounted in said frame for movement between an outward extended position and an inward recessed position, said frame side walls extending upwardly along the lateral edges of the burner box, a plurality of front and rear burners in said burner box, said rear burners being received beneath said top wall when the burner box is moved to the inward recessed position, a set of valves arranged along one of said lateral edges of the burner box and having a manifold, a flexible connection interposed between the source and the manifold, the valves which are associated with the burners at the rear of the burner box each having a cam and associated locking pin, said lateral portion of the frame having a cooperating opening which is in registration with the locking pin thereby permitting the valve to be turned "on" and to immobilize the burner box only when the burner box is in its forwardly projecting position.

References Cited by the Examiner

UNITED STATES PATENTS

1,989,749	2/35	Fullerton	126—37
2,040,598	5/36	Cronyn et al.	126—37
2,045,061	6/36	Ahrens et al.	126—42
2,879,760	3/59	Pellegrin	126—37
2,972,036	2/61	Pollock et al.	126—37 X
3,051,819	8/62	Smith	126—37
3,130,719	4/64	Mayer et al.	126—37

FOREIGN PATENTS

224,774	8/10	Germany.

FREDERICK L. MATTESON, JR., *Primary Examiner.*

JAMES W. WESTHAVER, *Examiner.*