April 28, 1942. A. BARNSTEINER ET AL 2,281,018

HINGE MECHANISM

Filed Dec. 29, 1939 2 Sheets-Sheet 1

Fig. 1.

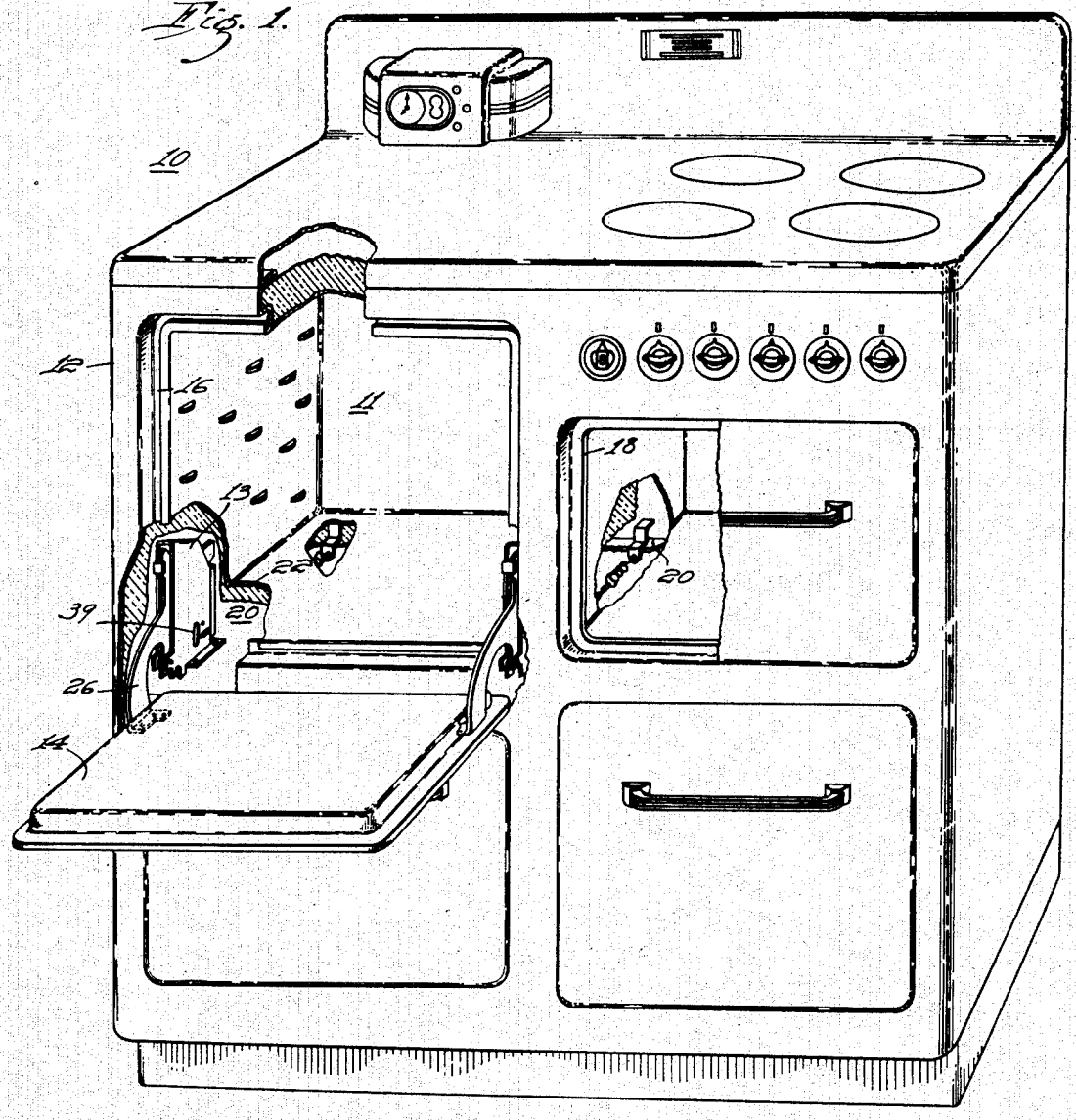
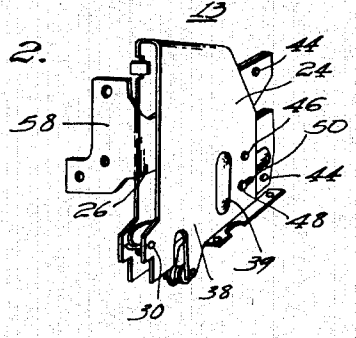


Fig. 2.



WITNESSES:
E. F. Oberheim.
H. G. Hopler.

INVENTORS
Alfons Barnsteiner and
Edwin A. Lockwood.
BY
W. R. Coley
ATTORNEY

April 28, 1942. A. BARNSTEINER ET AL 2,281,018

HINGE MECHANISM

Filed Dec. 29, 1939 2 Sheets-Sheet 2

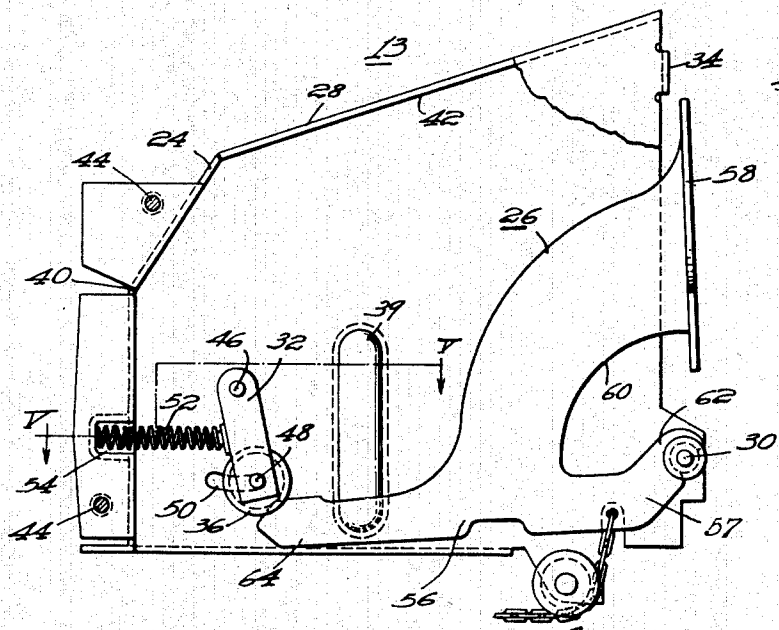


Fig. 3.

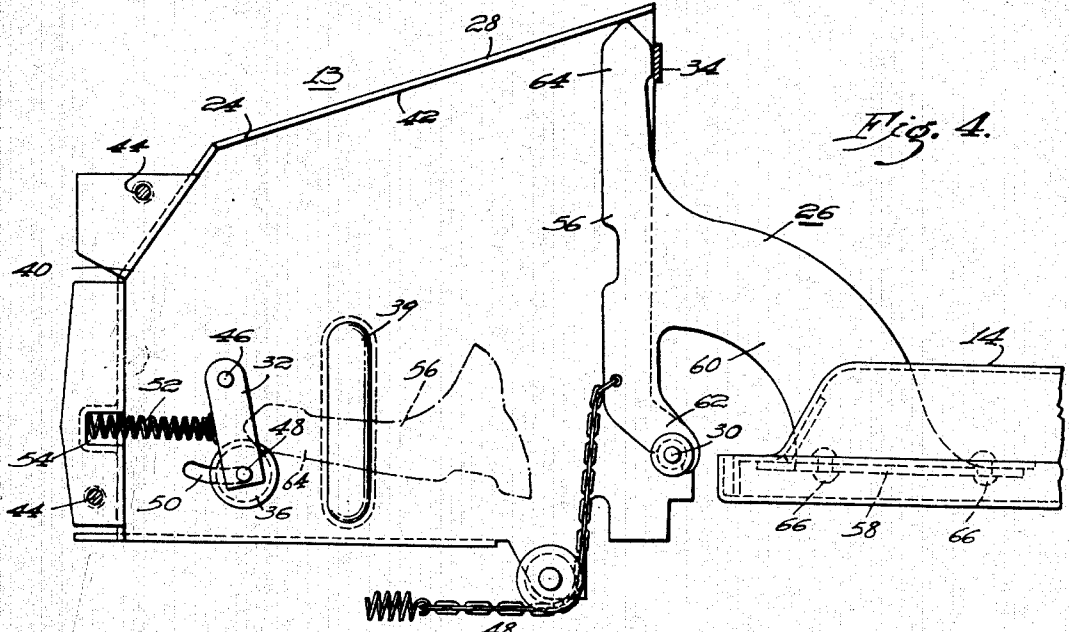


Fig. 4.

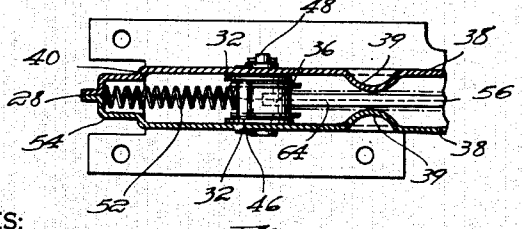


Fig. 5.

WITNESSES:

E. C. Keeling

W. G. Kepler.

INVENTORS

Alfons Barnsteiner and

Edwin K. Lockwood.

BY

W. R. Coley

ATTORNEY

Patented Apr. 28, 1942

2,281,018

UNITED STATES PATENT OFFICE

2,281,018

HINGE MECHANISM

Alfons Barnsteiner and Edwin H. Lockwood, Mansfield, Ohio, assignors to Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., a corporation of Pennsylvania

Application December 29, 1939, Serial No. 311,633

3 Claims. (Cl. 126—194)

Our invention relates to hinges and more particularly to range oven door hinge structures.

There has been a tendency for some oven doors utilizing oven door hinge structures now known to the art, to become locked in their closed position. This is caused by the unpredictable warping or expansion and contraction of various parts of the range during its operation, or, in some cases, the rough handling due to a long and protracted shipment of the range structure. The binding or locking of the door is particularly caused by the hinge arms which are attached to the door becoming bound with or locked behind the necessary latching devices associated with the hinge mechanism. After careful research and consideration of the known locking cases, it has been found that this binding is caused by the hinge arm becoming misaligned with the latching devices. Various ingenious attempts have been made in the art to overcome this binding action. However, none of the attempts have been fully successful. A reason for the failure to overcome this serious problem has been that no attempt has been made to take into consideration the relative movement between the hinge arms and the latching devices.

It is, therefore, an object of our invention to provide a hinging mechanism including a hinge arm and latching device having means incorporated therewith for limiting the relative movement therebetween so as to guarantee that there cannot be any binding action between such hinge arm and such latching device.

A further object of our invention is to provide a hinge mechansm having hinge arm guides located in close relationship to the latching devices so as to guide the hinge arm just before it engages the latching device.

It is a further object of our invention to provide a hinge mechanism having a housing to which various hinge mechanism parts may be attached, and by means of which said parts may be mounted as a unit within the range structure, said housing having inwardly extending bosses therein to function as guiding members for the hinge arm to prevent binding action between such arms and other parts of such mechanism.

A further object of our invention is to provide an efficient, inexpensive, economical, rugged hinge mechanism which may be readily mounted within any range structure or the like.

Other objects of our invention will either be pointed out specifically in the course of the following description of a device embodying our invention, or will be apparent from such description.

In the accompanying drawings:

Figure 1 is a perspective view of a range embodying our invention with a portion thereof broken away;

Fig. 2 is a perspective view of the hinge mechanism embodying our invention.

Fig. 3 is a side elevational view of the hinge mechanism in its closed position;

Fig. 4 is a side elevational view of the hinge mechanism in its open position; and

Fig. 5 is a sectional view taken along the line V—V of Fig. 3.

Referring to the accompanying drawings, in which like reference characters indicate like parts in the figures, we show a range structure 10 including an enclosing wall structure 12 comprising a plurality of functionally integral walls which embrace a plurality of spaced compartments including an oven 11, two hinge mechanisms 13 and an oven door 14 pivotally mounted on the wall structure 12 by means of the mechanisms.

The range structure 10 may be constructed in any suitable manner. However, it is preferred that such range structure 10 embody the "wrap around" feature, in which the wall structure 12 comprises a plurality of angularly related functionally integral walls substantially as described in a copending patent application of E. H. Lockwood, Serial No. 177,726, filed December 2, 1937, and assigned to the Westinghouse Electric & Manufacturing Company. However, it is to be understood that the door hinge mechanism 13 herein disclosed may also be associated with other range structures.

The range wall structure 12 comprises substantially a continuous wall member which forms two sides and a front, the front having a plurality of apertures 16 and 18 located therein substantially as shown in Fig. 1. The range structure 10 includes a horizontally disposed supporting plate 20 which is rigidly attached to the wall structure 12 by suitable reinforcing brackets (not shown).

The oven 11 is provided with a liner 22 which is spaced from the walls and the supporting plate 20. The space between the sides of the oven liner 22 and the walls, and between the bottom of the oven liner 22 and the plate 20 is filled with a suitable insulating material, such as rock wool.

Each of the hinge mechanisms 13 comprises a unitary sub-assembly 24 mounted on the wall structure and a bell crank hinge bracket or arm 26 attached to the oven door 14 and operatively

associated with the sub-assembly **24**. The sub-assemblies **24** are mounted on the supporting plate **20** on opposite sides of the oven liner **22**, each sub-assembly being disposed in the space between the adjacent walls or wall structure and the liner.

Each sub-assembly **24** comprises generally a housing **28**, a hinge pin **30**, a latch lever **32**, a stop strap **34** and a latching roller **36** all mounted on the housing **28**. The housing **28** thus serves for assembling these parts into a unitary structure and for mounting them as a unit in the range wall structure. It also serves to prevent the insulating material filling the space between the wall structure and the oven liner **22** from becoming tangled with the various working parts of the hinge mechanism, as well as preventing undesired relative movement between various working parts.

Referring now in detail to the hinge mechanisms shown in Figs. 3 and 4, the housing **28** is preferably formed of sheet material and comprises a pair of side walls **38**, a rear wall **40** and a top wall **42**. It is open at the front and the bottom to permit the operating parts of the hinge mechanism to be readily placed therein. The sides **38** are held together by a plurality of rivets or pins **44** which extend therethrough, and are riveted over against the side walls **38**.

The hinge pin **30** extends between and through the side walls **38**, and is secured thereto in any suitable manner, as by peening or riveting the ends over against the outer surfaces of the side walls. The latching lever **32**, which comprises a channel-shaped member, may be swingably mounted within the housing in any suitable manner. However, in this instance, it is swingably mounted at one end by means of a pin **46**. The pin **46** is rigidly attached to the side walls **38** of the housing **28**, as by extending through the side walls of said housing and being peened over. The latching roller **36** is located at the other or free end of the latching lever **32** (see Figs. 3 and 4). The roller **36** is attached to the latching lever **32** by means of a pin **48** which extends through the lever **32**, the roller **36**, and protrudes through small arcuate slots **50** located in the sides **38** of the housing **28**. With the latching lever **32** mounted in such a manner, and with the pin **48** located within the slots **50**, such latching lever will be able to rotate about the pin **46** as an axis, but will be limited in its travel by the length of the arcuate slots **50**.

A resilient member **52** is operatively associated with the rear wall **40** of the housing **28** at one end, by being positioned within a cylindrically formed boss **54** within the side walls **38** of such housing **28**, and with the latching lever **32** at its other end (see Figs. 3 and 4). The resilient member **52** is under compression and will then bias the latching lever forwardly or in a counter-clockwise direction. However, the movements of such latching lever **32** will be limited by the pin **48** engaging one end of each of the cooperating arcuate slots **50** as hereinbefore described.

The latching lever **32** and roller **36** may be construed as a latching device which is adapted to cooperate with the hinge bracket or arm **26** to latch such bracket or arm and the oven door **14** attached thereto in their closed position, as hereinafter described.

Elongated substantially vertically extending guide means or bosses **39** are formed within each of the side walls **38** of the housing **28**. Such bosses are positioned directly across from each other and are located in front of the latching lever **32** and latching roller **36**. The bosses **39** being located opposite to each other, intermediate the latching device and hinge bracket **26**, provide a substantially reduced area or passage therebetween through which the bell crank hinge bracket or arm **26** must pass. While the bosses or guide means are located intermediate latching device and hinge bracket **26** they are close enough to the roller **36** to ensure that the latching portion **64** of bracket **26** cannot possibly work around the bosses and engage anything but the roller. The relative angular or sidewise position of the hinge bracket **26** is thus limited, ensuring the direct cooperation of bracket **26** with the latching roller **36** at all times. This in turn prevents the hinge bracket or arm **26** from becoming bound with or jammed between the latching lever **32** and the side walls **38** of the housing **28**.

The bell crank hinge bracket **26** comprises a pair of arm or leg portions **56** and **57** joined by a central arcuate arm portion **60**.

The inner arm or leg **56** of bracket **26** has a hook portion **62** and an elongated portion **64**. The hook portion **62** is adapted to fit over and rest upon the hinge pin **30** to support such bracket **26** and the oven door **14**. The elongated or latching portion **64** of inner arm **56** is adapted to engage the latching roller **36** when in substantially a horizontal position and to engage the stop **34** when in a vertical position.

The arm **60** of bracket **26** is adapted to cooperate with and to be rigidly attached to the oven door **14** in any suitable manner as by flange **58** so as to rotatably support such door about the hinge pin **30**.

In assembling the range structure, a pair of hinge mechanism sub-assemblies **24** are placed on each side of the oven liner **22** within the space between the oven liner **22** and the wall structure, with the open ends of the housings **28** thereof facing the front wall of the range assembly and lined up with apertures in front of the wall of the range assembly. The exact method of assembling the hinge mechanisms and the oven door is more clearly described and claimed in a copending application of E. E. Sutherland and L. E. Lown, Serial No. 308,782, filed December 12, 1939.

To mount the oven door **14**, a pair of hinge brackets or arms **26** are fastened to the door, one on each side, by means of suitable rivets **66**. Then the arms of the hinge brackets **26** are projected through the apertures in the front wall of the range assembly, and the hook portions **62** of the hinge brackets **26** are hooked over the hinge pins **30** about which the oven door **14** is adapted to pivot.

The inner leg or arm **56**, when the oven door hinge bracket or arm **26** is in its closed position, is substantially in a horizontal position, and the latching end **64** thereof will be located below the roller **36** (see Fig. 3), which in turn holds the hinge bracket lever **26** and oven door **14** in a closed position.

The inner leg **56**, when the oven door **14** is in the open position, is substantially in a vertical position, and the latching end **64** thereof is adapted to rest against the stop strap **34**, which in turn holds the hinge bracket lever **26** and the oven door **14** in the open position.

When the oven door **14** is closed, the inner leg **56** of hinge bracket **26** moves from its vertical position in an arcuate manner to its sub-

stantially horizontal position. However, as it passes from its vertical to its horizontal position, if not properly aligned with roller **36** it encounters the inwardly extending bosses **39** which direct its movement and limit the horizontal side play of such leg. The bosses being formed within the housing thus ensure that the inner leg **56** will contact the latching roller **36**. In other words, the bosses **39** prevent the inner leg or arm **56** of hinge bracket **26** from engaging the outer edge of the latching roller **36**, or from being forced around the outside of such roller, or between the side walls **38** and such roller.

It is, therefore, obvious that the presence of the bosses **39** within the side walls **38** of the housing **28** will prevent any relative sidewise movement between the inner leg **56** of the bell crank hinge bracket **26** and latching roller **36**. This in turn ensures a smooth, even operation of the hinge mechanism, and guarantees the absence of any locking or binding action between the hinge bracket and the remaining parts of the mechanism.

In addition, it follows that, due to the compact structure of such hinge mechanism, in which the whole structure will move as the range expands and contracts, the bosses formed within the housing thereof will at all times ensure a satisfactory operation and prevent the oven door from becoming locked in a closed position.

While we have shown our invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof, and we desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

We claim as our invention:

1. In a hinge mechanism for pivotally mounting an oven door on a range structure, a unitary sub-assembly comprising a housing formed with two opposite walls and open at one side to receive a hinge bracket attached to said oven door, a hinge pin mounted on and disposed in said housing and adapted to be pivotally engaged by said hinge bracket, a latching device mounted on said housing and disposed therein in position to engage said hinge bracket when the oven door is in closed position for holding the same in closed position, and bosses formed within opposite walls of the housing positioned between the hinge pin and latching device for guiding the hinge bracket in its movement so that said bracket will engage the latching device in a predetermined manner as the door is closed.

2. A hinge mechanism for horizontally pivotally mounting an oven door on a range structure comprising a functionally integral hinge bracket rigidly attached to said door, a latching device for engaging such bracket and retaining it in place as the door is moved to a substantially vertical position, and guide means positioned between the bracket and latching device and entirely clear of said bracket when the door is in a substantially horizontal position for directing the movement of said bracket past said means as said door is moved to said vertical position so as to insure the proper engagement of said bracket with said latching device.

3. A hinge mechanism for horizontally pivotally mounting an oven door on a range structure comprising a housing having a hollow passage, a functionally integral hinge bracket rigidly attached to said door and adapted to move within such passage, a latching device retained within such housing for engaging said bracket and retaining it in place as the door is moved to a substantially vertical position, and means between the bracket and latching device and entirely clear of said bracket when the door is in a substantially horizontal position restricting the passage to direct the movement of said bracket through said passage as said door is moved to said vertical position so as to insure the proper engagement of said bracket with said latching device.

ALFONS BARNSTEINER.
EDWIN H. LOCKWOOD.