Sept. 19, 1944. H. G. DAVIS 2,358,561

HINGE

Original Filed Jan. 5, 1942

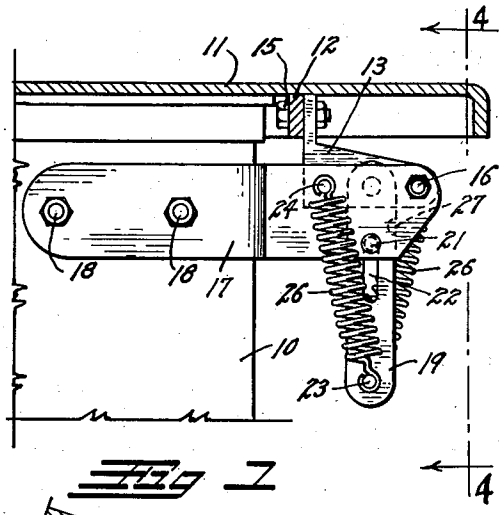


Fig 1

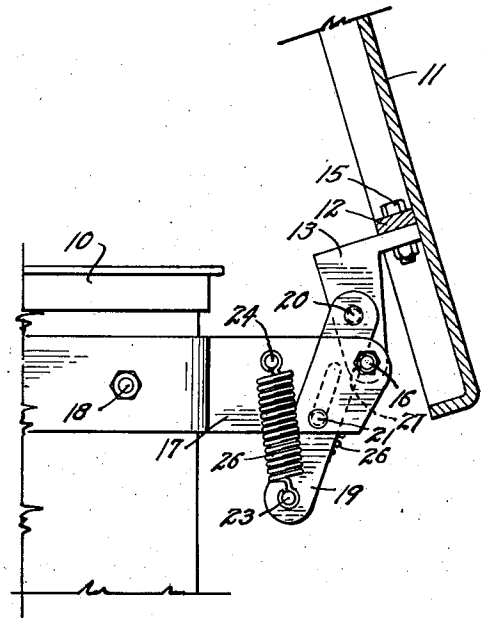


Fig 3

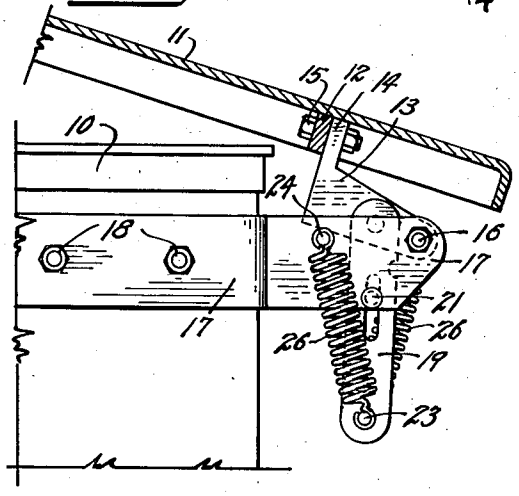


Fig 2

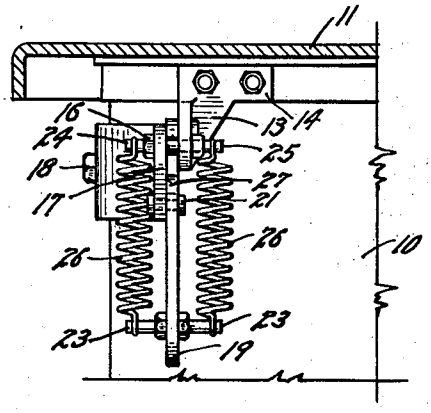


Fig 4

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2,358,561

# UNITED STATES PATENT OFFICE

2,358,561

## HINGE

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Original application January 5, 1942, Serial No. 425,679. Divided and this application August 2, 1943, Serial No. 497,110

5 Claims. (Cl. 16—180)

This is a divisional application of applicant's copending application, Serial No. 425,679 for a dishwashing machine. This application relates more particularly to the hinge construction employed for supporting the lid of the dishwasher, and while more particularly adaptable to this use, will be found valuable wherever it is desired to hingedly support a cover or lid operating on a horizontal hinge axis.

The principal object of the invention is to provide a hinge structure which will counter-balance the weight of a lid or hood at all positions of elevation, so that the lid or hood will not fall to the closed or rise to the open position without outside effort.

Another object is to provide a hinge structure which will, when open, support the lid or hood away from its closed position so that it will not obstruct full use of the entire top of the structure.

The invention will be found valuable for use on devices having hinged lids, hoods, or covers such as refrigerators, stoves, washing machines, automobile hoods, and the like.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention reference is had to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawing:

Figs. 1, 2, and 3 are side views of the improved hinge illustrating it in the closed, partially open, and fully opened positions, respectively.

Fig. 4 is a rear view of the hinge taken on the line 4—4, Fig. 1.

For the purposes of description, the hinge has been illustrated applied to a dishwashing machine of the type disclosed in applicant's copending application.

In the drawing, a dishwashing machine is designated in its entirety by the numeral 10, and the lid thereof is illustrated at 11. The lid is provided with a cross piece 12 parallel with its rear edge, and it is to this cross piece that the hinge structure connects. The lid is provided with two similar hinges, one having a right hand arrangement and the other a left hand. The drawing illustrates the right hand hinge. The left hand hinge would be exactly the same except the position of the various parts would be reversed. This reversal is within the knowledge of anyone skilled in the art.

The hinges employ a hinge bracket 13 provided with a vertical ear 14 which is attached to the cross member 12 by means of suitable attachment bolts 15 or in any other desired manner. The bracket 13 is hingedly mounted, through the medium of a hinge bolt 16, on the extremity of a hinge brace arm 17. The hinge brace arm is secured to the dishwasher 10, or any other desired structure, by means of attachment bolts 18.

A pusher bar 19 is pivoted at its upper extremity, as shown at 20, to the bracket 13, and extends vertically downward to a normal position below the brace arm 17. The pusher bar is guided in its vertical movement by means of a guide pin 21, which rides in a vertical slot 22 in the bar. The lower extremity of the bar 19 is provided with outwardly extending spring posts 23. The brace arm 17 carries two spaced-apart spring posts 24 and 25 projecting from its opposite sides on opposite sides of the normal position of the bar 19. The post 25 may be formed as an extension on the pivot bolt 16 as illustrated. Two helical tension springs 26 are stretched between the spring posts 23 and 24, and 23 and 25, respectively.

It can be readily seen that these springs will constantly urge the bar 19 upwardly and the bar 19 will in turn tend to urge the bracket 13 upwardly to cause it to rotate about the hinge bolt 16. The springs both have the same tension so that the pull in opposite directions on the bar will be balanuced and friction against the guide member 21 is thereby reduced. It will be noted that when the lid approaches its horizontal position, as shown in Fig. 2, the greatest weight will be placed on the bar 19. At this point, however, the bar has its greatest leverage about the bolt 16, and the springs are under their greatest tension so that the weight of the lid can be easily counterbalanced. As the lid approaches its uppermost position, as shown in Fig. 3, the weight on the bar 19 decreases. At this time, however, the reaction of the bar has also decreased, due to the shorter lever arm, and due to the fact that the tension in the springs has decreased. Therefore the weight of the lid is accurately counterbalanced at all positions so that it will retain itself in any position.

In the fully opened position a double stop is provided, that is, the pin 21 rests against the slot 22 and the bar 19 rests against the spring pin 25, so that an efficient stop is provided. It will be noted that the bar 19 is notched as in-

dicated at 27 to allow it to partially pass the spring pin 25.

While a specific form of the improvement has been described and illustrated herein, it is desired to be understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is:

1. Means for hinging a cover on an article comprising: a brace arm extending substantially horizontally rearwardly from said article; a hinge bracket extending downwardly and rearwardly from said cover to a pivotal connection on said brace arm adjacent the rearward extremity of the latter; a longitudinally movable pusher bar pivoted to said bracket and extending downwardly therefrom to a point below said brace arm; and spring means tensioned between said brace arm and the lower portion of said pusher member urging the latter longitudinally upward.

2. Means for hinging a cover on an article comprising: a brace arm secured to said article; a hinge bracket secured to said cover and extending to a pivotal connection with said brace arm; a pusher bar pivoted to said bracket at its one extremity and extending across said brace arm; and spring means tensioned between the free extremity of said pusher bar and said brace arm; tending to urge said bar in a substantially longitudinal direction toward the pivoted extremity thereof; and means on said brace arm for guiding and preventing rotation of said pusher bar.

3. Means for hinging a cover on an article comprising: a brace arm extending substantially horizontally rearward from said article; a hinge bracket extending downwardly and rearwardly from said cover to a pivotal connection on said brace arm adjacent the rearward extremity of the latter; a longitudinally movable pusher bar pivoted to said bracket and extending downwardly therefrom below said brace arm; a spring on each side of said brace arm tensioned between said brace arm and the lower portion of said pusher member, said springs acting to move said pusher bar longitudinally upward.

4. Means for hinging a cover on an article comprising: a brace arm extending substantially horizontally rearward from said article; a hinge bracket extending downwardly and rearwardly from said cover to a pivotal connection adjacent the rearward extremity of said brace arm; a pusher bar pivoted to said bracket and extending downwardly therefrom below said brace arm; a first spring tensioned between the lower extremity of said pusher bar and one side of said brace arm; a second spring similarly tensioned between the lower extremity of said pusher bar and the opposite side of said brace arm; and means on said brace arm for guiding the movements of said pusher bar.

5. Means for hinging a cover on an article comprising: a brace arm extending substantially horizontally rearward from said article; a hinge bracket extending downwardly and rearwardly from said cover to a pivotal connection adjacent the rearward extremity of said brace arm; a pusher bar pivoted to said bracket and extending downwardly therefrom below said brace arm; a first spring tensioned between the lower extremity of said pusher bar and one side of said brace arm; a second spring similarly tensioned between the lower extremity of said pusher bar and the opposite side of said brace arm; and a guide pin on said brace arm, there being a vertically elongated slot in said pusher bar for receiving said guide pin so as to guide the movements of said pusher bar.

HAROLD G. DAVIS.