April 9, 1968 G R. WOLTER 3,376,671

KNIFE SHARPENER

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Fig. 1.

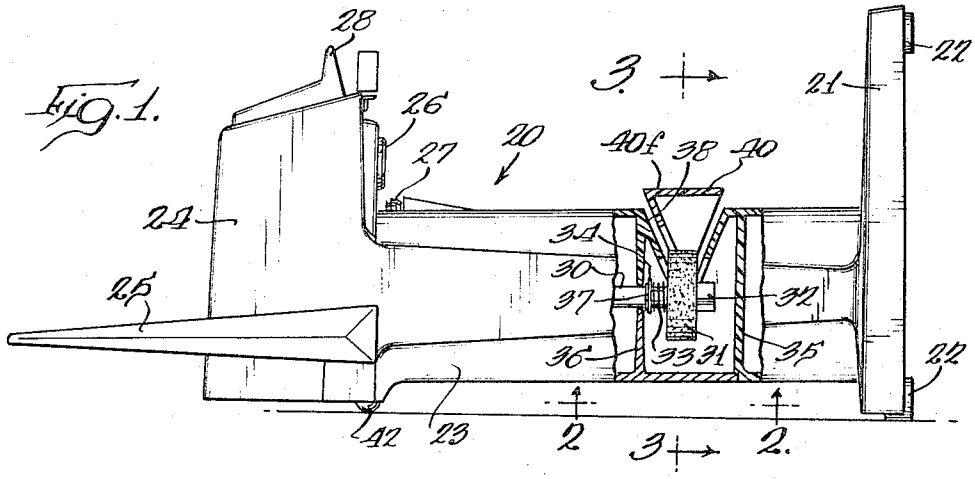


Fig. 2.

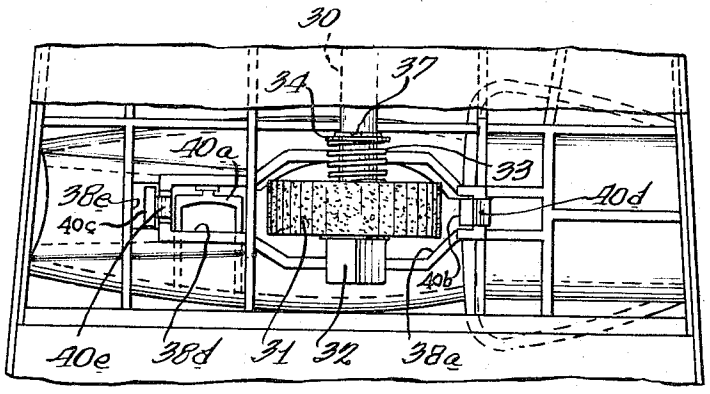


Fig. 3.

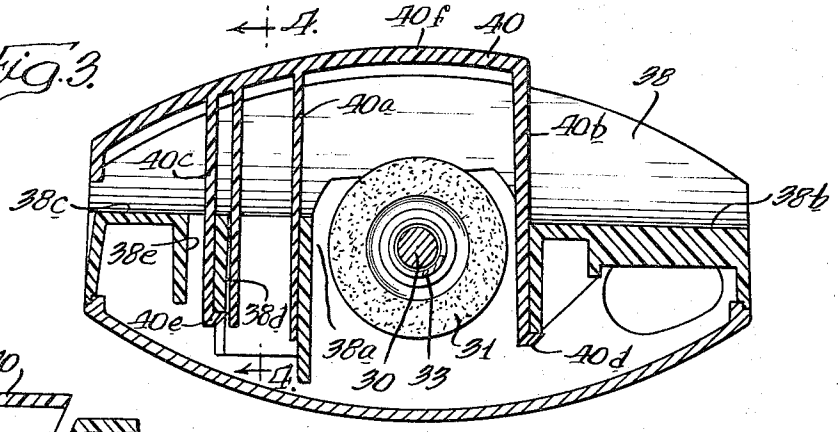
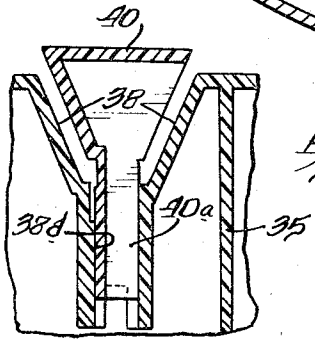


Fig. 4.



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Fig. 5.

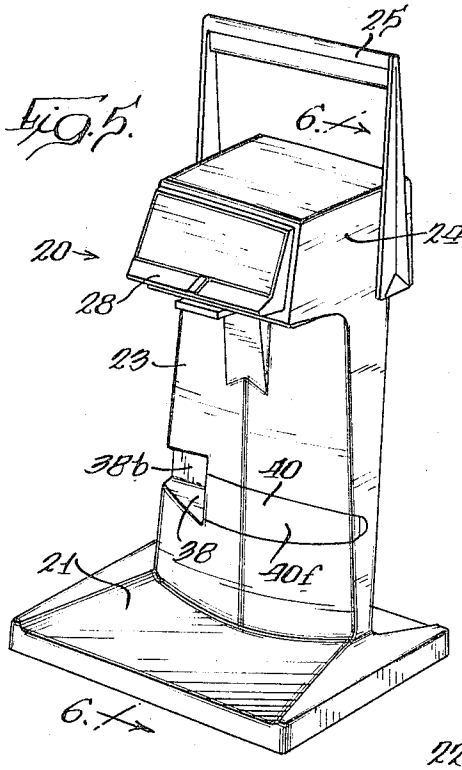


Fig. 6

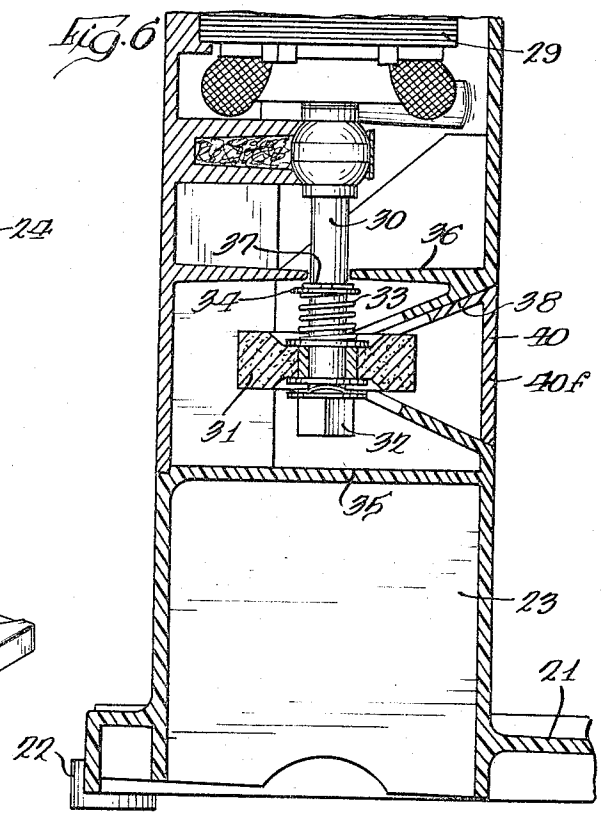
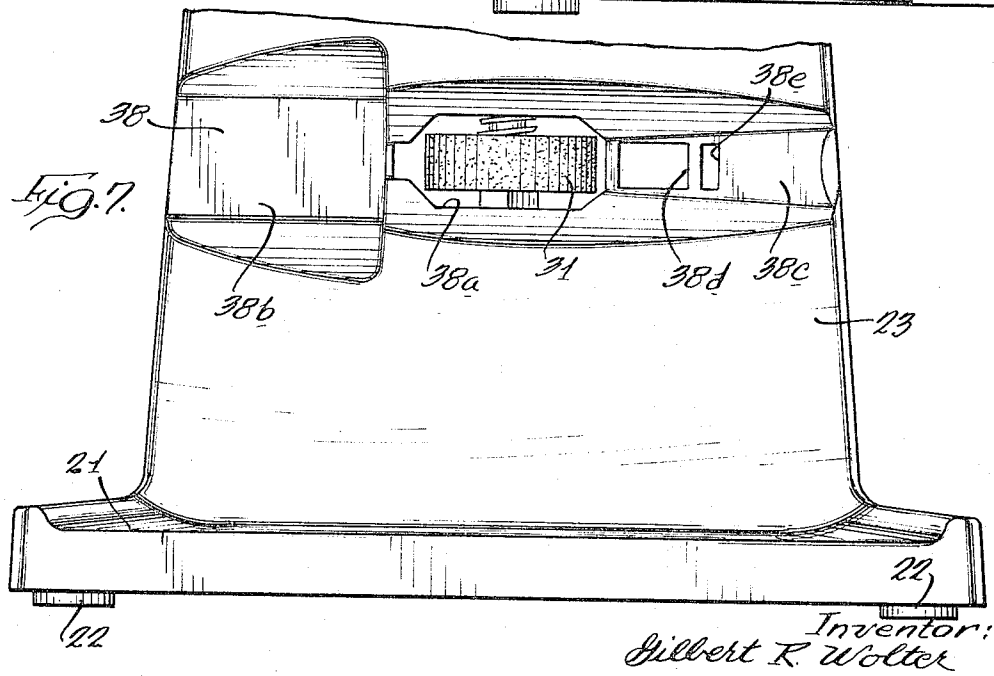


Fig. 7.



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KNIFE SHARPENER

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Filed Jan. 10, 1966, Ser. No. 519,580
7 Claims. (Cl. 51—5)

This invention relates generally to knife sharpeners and more particularly improvements in combination appliances for opening cans and sharpening knives.

As the market for electric can openers has developed in this country, a substantial demand has built up for can openers which will also perform the knife sharpening function. The power requirements of the can opener are such that the motor provided therein is well suited to power a small abrasive wheel suitable for sharpening knives. Since the knife sharpening portion of the appliance is used rather infrequently as compared to the can opening portion, these combination appliances have been designed to emphasize the can opener portion and make this portion as easy as possible to use. The knife sharpening wheels have generally been positioned to one side or to the rear of the can opener portion of the housing so as to be out of the way during the can opening operation. These sidewardly and rearwardly extending appendages have been unsightly from a design standpoint and expensive to manufacture.

In general, the sidewardly or rearwardly extending knife sharpeners require belts or gearing to couple the abrasive wheel to the motor used for the can opener. The additional housing structure plus the drive connection between the motor and the abrasive wheel result in the knife sharpening portion of the appliance costing almost as much as a separate knife sharpener would cost. Obviously, it would be desirable to add the knife sharpening feature to a can opener at as low a cost as possible. The embodiment of the invention disclosed herein includes a can opener of the type disclosed and claimed in Jepson et al. Patent No. 3,216,108. This can opener is of the type in which the cover is severed from the can be making a circular cut along the inside diameter of the end seam. The particular structure of the can opener is, however, immaterial to the application of the present invention.

The invention is applicable to any upright can opener having means for supporting within the normal confines of the housing an abrasive wheel driven by the can opener motor. The invention involves means for slidably supporting a combination knife guide and sharpener cover means on the can opener housing.

It is an object of the present invention to provide an improved knife sharpener which may be combined with a can opener at very little extra cost.

It is another object of the present invention to provide an improved can opener and knife sharpening appliance which utilizes a rotary abrasive wheel having a movable cover member attached to serve as a blade guide.

Further objects and advantages of the present invention will become apparent as the following description proceeds and the features of novelty which characterize the invention will be pointed out with particularity in the claims annexed to and forming a part of the specification.

For better understanding of the present invention reference may be had to the accompanying drawings in which:

FIG. 1 is a side elevational view of the combined can opener and knife sharpener with the appliance resting in the knife sharpening position;

FIG. 2 is an enlarged fragmentary sectional view taken substantially on line 2—2 of FIG. 1 with portions of the housing cut away to expose the knife sharpening mechanism;

FIG. 3 is an enlarged sectional view taken along line 3—3 of FIG. 1 assuming FIG. 1 shows the complete structure;

FIG. 4 is a fragmentary sectional view taken on line 4—4 of FIG. 3 assuming FIG. 3 shows the complete structure;

FIG. 5 is a perspective view of the combined can opener and knife sharpener in the can opening position;

FIG. 6 is an enlarged fragmentary section taken substantially on line 6—6 of FIG. 5; and

FIG. 7 is an enlarged fragmentary front elevational view of the combined can opener and knife sharpener with the cover for the knife sharpener removed for illustrative purposes.

The combined can opener and knife sharpener of the instant invention involves a can opener of the type having a motor positioned in an upright column with a drive connection between the motor and the can cutting means. The abrasive wheel for use in sharpening knives is simply mounted in the interior of the can opener housing with a slidable cover provided to gain access to the edge of the wheel. The sliding cover serves the dual purpose of completing the housing surrounding the wheel in the closed position and of guiding the knife blade into engagement with the wheel when the slide is in the open position.

Referring now to the drawings wherein like reference characters designate corresponding parts throughout the several views, there is shown a power operated can opener generally designated by reference numeral **20**. The details of the can opener mechanism are disclosed and claimed in an application Ser. No. 519,616, now Patent No. 3,348,305, for Can Opener filed in the name of Sigmund H. Bielak on the same day as the instant application. In normal operation, the can opener of FIG. 1 is rotated 90° clockwise to an upright position in which it is supported by a base **21** as shown in FIG. 5. The base **21** is formed with recesses in the corners thereof which receive rubber supporting feet **22**. The can opener **20** includes a column portion **23** within which an electric motor **29** is mounted and a head portion **24** which encloses the remainder of the can opener mechanism other than the motor. When the can opener **20** is in the upright position for use as a can opener, the column portion **23** extends generally vertically. For the purpose of controlling the can opener mechanism, there is provided an operating handle **25** which is pivotally connected to the head **24**. The operating handle **25** serves among other things to move a cutter **26** and a feed wheel **27** into operative position to grip the end seam of a can to be opened.

As rotation of the operating handle **25** moves the cutter and feed wheel **26** and **27** respectively, the free end of handle **25** engages a front switch actuation bar **28**. Thus, when the operating handle **25** is pivoted 90° from the position shown in FIGS. 1 and 5, the handle strikes the switch actuating bar **28** energizing the motor and causing the feed wheel **27** to rotate the can in engagement with the cutter **26**.

The can opener motor **29** includes an armature shaft **30** which extends lengthwise within the upright column **23**. Supported on the lower end of the armature shaft **30** is an abrasive wheel **31**. A retaining nut **32** is threadedly received on the lower end of the armature shaft while a helical spring **33** is compressed between a washer **34** secured to the shaft **30** and the abrasive wheel **31**. The washer **34** is retained against axial displacement on shaft **30** under the biasing force of spring **33** by a resilient C-shaped ring which is received in an annular groove in shaft **30**. The spring provides a friction drive between the motor and the abrasive wheel so that under conditions of overload, the spring coupling may slip to prevent burning out of the motor.

The column portion **23** of the housing is formed with a pair of transversely extending walls **35** and **36** which are disposed on either side of the abrasive wheel **31** as is best shown in FIGS. 1 and 6. The walls **35** and **36** together with the adjoining portions of the housing provide an enclosure for the abrasive wheel which is essentially separate from the motor housing portion except for the snug opening in wall **36** through which shaft **30** extends. Extending transversely of the upright column **23** is a molded V-shaped slot **38**. The slot **38** is provided at its central portion with an opening **38***a* through which the abrasive wheel **31** extends. The adjoining portions at the bottom of slot **38** are closed by walls **38***b* and **38***c* as is best shown in FIG. 3.

To protect the abrasive wheel **31** against accidental engagement by the user of the can opener, a cover **40** is formed which is received within the slot **38** as is best seen in FIGS. 1 and 4. The cover **40** is formed with a somewhat pie-shaped contour so that it may slide into seated engagement within the slot **38**. To guide the cover **40** for movement with respect to the slot **38**, there is provided an elongated guide **40***a* which is received in a box-like passageway **38***d* formed in the bottom wall **38***c* of the slot. In addition to the guide **40***a* the cover **40** is provided with spaced retaining projections **40***b* and **40***c* which lie on both sides of the guide **40***a* and are all in the same plane. As is best seen in FIG. 3, the retaining projection **40***c* is received in a passageway **38***e* while projection **40***b* extends through opening **38***a* adjacent to wheel **31**. The inner ends of the retaining projections **40***b* and **40***c* are provided with hook-shaped portions **40***d* and **40***e* respectively which engage wall portions of the slot **38** to prevent detachment of the cover **40**.

The hook-shaped portions **40***d* and **40***e* are positioned to permit the cover to move outwardly approximately one-fourth inch from its seated position within the slot **38**. In FIGS. 1–4 of the drawings, the cover is shown in this outermost position in which the abrasive wheel **31** is accessible for use in sharpening knives while FIGS. 5 and 6 show cover **40** in the closed position. As is shown best in FIG. 1, there is defined between the inclined walls of slot **38** and the edges of the cover **40** a pair of converging slots into which a knife blade may be inserted to be sharpened against the wheel **31**. The slots serve to guide the knife blade into engagement when either face of the abrasive wheel at the proper angle for sharpening the blade.

Referring to FIG. 3, it is noted that the cover extends across the entire forward face of the abrasive wheel **31** and to the left edge of the upright column **23**. On the right edge of the column as viewed in FIG. 3, however, the cover does not extend above the portion of the slot adjacent the bottom wall **38***b*. The slot **38** is widened in this area to provide clearance for the handle of the knife as is best shown in FIGS. 5 and 7. Thus, the knife blade may be sharpened from the tip of the blade down to a point very close to the handle.

When the can opener **20** is used as a knife sharpener rather than a can opener, it is positioned on a table or counter top as shown in FIG. 1 with the column **23** extending horizontally. Beneath the head portion **24** of the can opener there are provided a pair of rearwardly extending resilient buttons **42** which serve to support the upper end of the can opener **20** when it is positioned in the knife sharpening position. The support feet **22** on the rear edge of the base **21** project rearwardly as well as downwardly and are, therefore, effective to support the lower end of the can opener **20** in the knife sharpening position. After positioning the can opener as shown in FIG. 1, the cover **40** is then moved to the open position and the operator may then sharpen in successive steps the two sides of a knife blade by inserting it in the converging slots formed by the cover **40** with the V-shaped slot **38**. When the appliance is used for knife sharpening only, there is no need to utilize the operating handle **25**.

The operator may apply a pivoting force on the switch actuating bar **28** directly to energize the motor and thereby cause rotation of the abrasive wheel **31**. When the knife sharpening operation has been completed, the cover **40** may be simply pushed inwardly to a seated position in which it completely closes the opening **38***a* in the bottom of the slot **38** as is evident from FIGS. 5 and 6. This prevents any accidental engagement of the wheel **31** and also prevents food or other foreign matter from being spilled on the wheel and thereby lessening its effectiveness. The cover **40** is provided with a curved outer wall **40***f* which has the same contour as the remainder of the column **23** so that when the cover is in the closed position the cover blends with the front portion of the column to present a smooth, appealing contour.

On initial assembly of the cover **40** to the column **23** or upon removal therefrom, the retaining projections **40***b* and **40***c* may be deflected sufficiently so that the hook-shaped portions **40***d* and **40***e* will clear the wall portions at the base of the slot **38** and will pass through the opening **38***a* and passageway **38***e*. This integral plastic means for securing and guiding the cover **40** with respect to the column **23** obviously has considerable cost advantage. In view of the fact that the knife sharpener utilizes an abrasive wheel which is mounted directly on the lower end of the armature shaft **30**, the entire knife sharpening portion of the appliance **20** adds very little to the cost of the unit. The guiding portions comprising the slot **38** on the column **23** are obtained at little or no cost when the molded plastic housing is fabricated. Similarly, the internal walls **34** and **35** which separate the sharpening area from the remainder of the housing are obtained for only the cost of the material involved which is obviously very small. The assembly means for the abrasive wheel **31** are also relatively inexpensive items. Accordingly, the knife sharpener of the instant invention is very inexpensive and provides a knife sharpener which is well integrated with the can opener so as to be easy to use when necessary but at the same time it does not obstruct use of the can opener in any way or detract from the styling of the unit.

While there has been illustrated and described a single preferred embodiment of the invention, it will be readily understood by those skilled in the art that numerous changes and modifications can be made without departing from the present invention.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. A combination appliance having can opening and knife sharpening means comprising a housing enclosing a motor drivingly connected to can opening means, said motor having an armature shaft supporting at one end thereof an abrasive wheel within said housing, a V-shaped knife blade guiding slot formed in one wall of said housing, said abrasive wheel extending into said slot through an opening in the bottom thereof, a combined blade guide and cover mounted on said housing for slidable movement in said slot, said cover movable between a first position closing said slot and a second position in which the walls of said cover and the converging walls of said slot define a pair of converging knife blade guiding slots the planes of which intersect opposite faces of said wheel.

2. The combination appliance of claim **1** wherein said cover comprises a one-piece plastic part having molded guiding and retaining projections formed thereon, said projections being received in passageways formed on said housing to guide said cover for said slidable movement.

3. The combination appliance of claim **1** wherein said housing includes a pair of transverse walls extending completely across said housing on either side of said abrasive wheel to provide a chamber separate from the remainder of the interior of said housing.

4. The combination appliance of claim **2** wherein said projections comprise a first relatively rigid elongated member extending rearwardly and being received in an

elongated passageway formed in said housing, second and third projections extending parallel said first elongated projection and being flexible in a plane common to said projections, said second and third projections having retaining means on their free ends which interlock with the interior of said housing to retain said cover on said housing.

5. A combination can opener and knife sharpening appliance comprising a generally upright housing supporting a can opening means in the upper portion thereof, a motor in said housing drivingly connected to said can opening means and driving a vertically extending shaft, an abrasive wheel supported on said shaft within said housing, said housing being formed with a V-shaped slot extending horizontally thereon below said can opening means, said wheel extending into the bottom of said slot through an opening in said housing, a combined cover and blade guide mounted for limited horizontal movement in said slot, said combined cover and guide being movable between a first position in which it completely closes said slot and a second position in which it defines with the walls of said slot a pair of converging blade receiving openings which terminate at the opposite faces of said wheel.

6. The combination can opener and knife sharpener of claim 5 wherein support means are provided on said housing to support said housing in horizontally extending position in which said V-shaped slot is facing upwardly and said wheel supporting shaft extends horizontally.

7. The combination can opening and knife sharpening appliance of claim 5 including a operating lever pivotally mounted on said housing for energizing said motor and controlling said can opening means, said lever being movable into engagement with motor switch controlling means positioned exteriorly of said housing to energize said motor, said switch controlling means being positioned for manual operation when said appliance is used for sharpening knives.

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