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AUTOMATIC KNIFE SHARPENER

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Fig. 1.

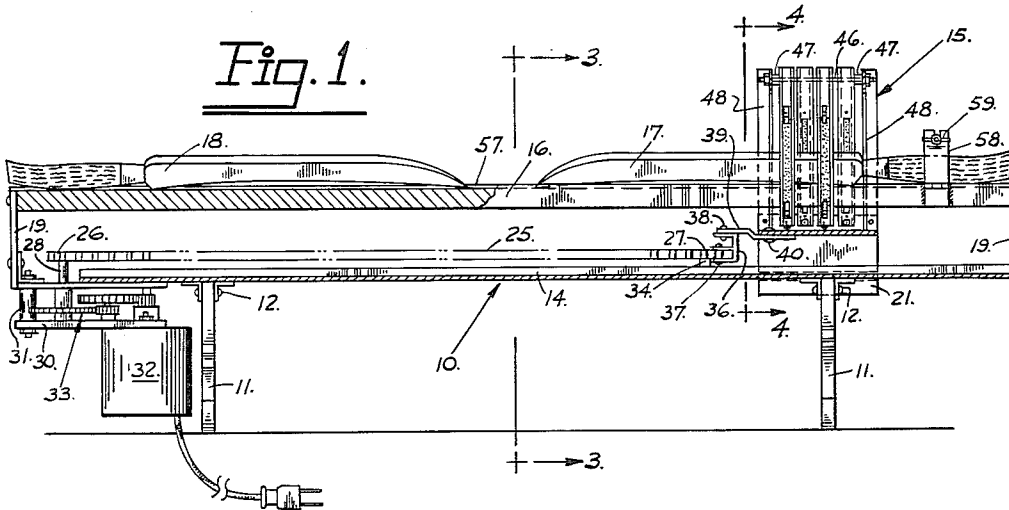


Fig. 2.

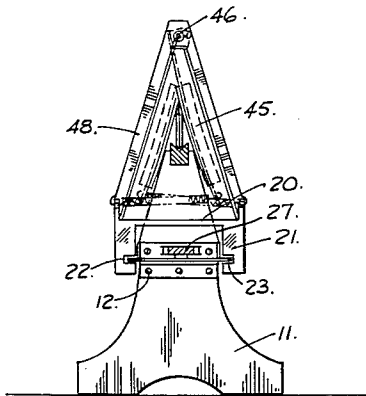
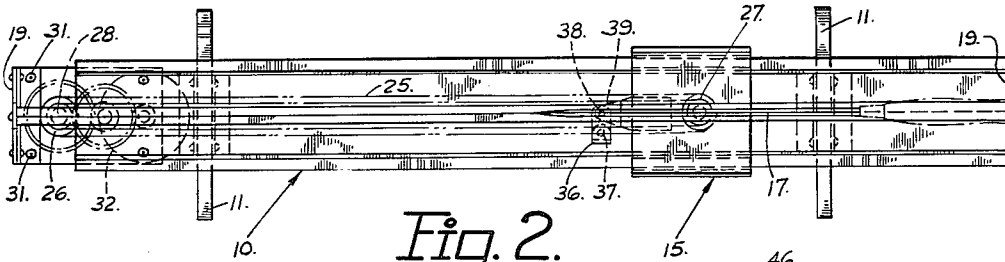


Fig. 3.

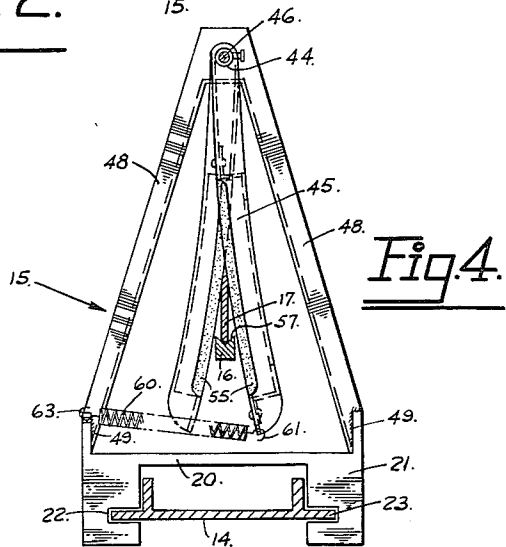


Fig. 4.

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AUTOMATIC KNIFE SHARPENER

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2 Claims. (Cl. 51—59)

This invention relates to knife sharpeners, and more particularly to a power driven machine for automatically sharpening any type of cutlery.

The principal object of this invention is to provide an improved automatic power driven knife sharpener which is easy to operate and has superior sharpening qualities.

Another object is to provide, in such a novel knife sharpener, an arrangement of sharpening elements which automatically adjust themselves to the size, width and contour of the blade of the knife being sharpened.

Still another object is to provide an automatic knife sharpener which can sharpen two knives at the same time in a novel and improved manner.

Yet another object of this invention is to provide an automatic knife sharpener in which the sharpening elements comprise a plurality of readily replaceable elongated downwardly depending members which may all be faced with suitable sharpening stones, or with steel, or alternate members may be of steel, and others of stone.

A further object of this invention is to provide a power driven automatically operated knife sharpener which requires no manual attendance or effort apart from placing the knife to be sharpened in position in the machine.

A still further object of this invention is to provide an automatic knife sharpener in which the knives to be sharpened are held in a fixed position on a stationary horizontally disposed rack, and the sharpening elements are carried by a reciprocally movable carriage, and maintained in automatically self-adjustable relationship with the cutting edge of the knives being sharpened throughout the operation.

Other objects and advantages obtained from the novel and unusually effective arrangement of parts of the knife sharpener of this invention will readily become apparent from a reading of the following detailed description, and by referring to the accompanying drawings in which:

FIGURE 1 is a side elevation partially in cross section of the knife sharpener of this invention.

FIGURE 2 is a plan view of the knife sharpener of FIGURE 1, but showing the carriage for the sharpening elements in a position which is further advanced along the knife supporting rack.

FIGURE 3 is a cross sectional view taken along the line 3—3 of FIGURE 1, looking in the direction indicated by the arrows, and

FIGURE 4 is an enlarged cross sectional view taken along the line 4—4 of FIGURE 1.

Referring now to the drawings in which like reference characters indicate like parts throughout the several views a horizontally disposed stationary rack or frame, indicated generally by the numeral 10, is provided which has legs or supporting members 11 fixed to the underside thereof at 12 by rivets, welding or any other suitable means. This frame 10 is composed of two horizontally disposed elongated members, the lower one of which is numbered 14, and forms a track for a carriage 15 which supports the sharpening elements, and the upper one is numbered 16 and forms a supporting rack for a pair of knives 17 and 18 to be sharpened. Vertically disposed end members 19 are suitably fixed to the ends of each of the members 14 and 16 and maintain them in desired parallel spaced apart relationship.

The reciprocally movable carriage 15, which is designed to support and carry the sharpening elements, comprises a base portion 20 having downwardly extending side

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members 21 with longitudinal slots 22 formed on the inner side edges of each of the lower downwardly extending members 21, as best illustrated in FIGURES 3 and 4. The slots 22 are designed to receive laterally projecting side rails 23 formed along each side edge of the lower member 14 of the frame 10 throughout its length.

Thus it may be readily seen that the carriage 15 for the sharpening members is slidably mounted on the lower member 14 of the frame 10 and adapted for reciprocal movement, back and forth, along the entire length of the member 14, which acts as a track for the carriage 15, and is suitably guided there along by the projection of the side rails 23, which are in slidable engagement with the slots 22 of the carriage 15.

The carriage 15 may be suitably power driven in any desired manner, and by any desired means, to cause it to travel back and forth continuously on the lower member or track 14. The means utilized in the embodiment, illustrated herein, comprises a chain 25, similar to a bicycle chain, which extends longitudinally for the greater portion of the length of the frame 10, see FIGURES 1 and 2. Two sprocket gears 26 and 27, are suitably mounted on the upper side of the lower member 14. The vertical driving axle 28, which carries the gear 26, extends through the lower frame, member 14, and is journaled in a supporting plate 30, which is suitably fixedly mounted on the underside of the member 14 by bolts 31, or in any other desired manner.

The plate 30 serves as a support or mounting plate for an electric motor 32, and a series of reduction gears 33, all of which is conventional and well known in the art. The motor 32 drives the sprocket 26 through the reduction gearing 33, which in turn drives the axle 28, on which the sprocket gear 26 is mounted, thus furnishing the driving power for the chain 25.

The second sprocket gear 27 is suitably mounted on a vertical axle 34, which is fixed to the other end of the lower member 14 of the frame 10. The sprocket gear 27 is an idler gear.

The endless bicycle type chain 25 encircles and operatively engages the teeth of sprockets 26 and 27 located near the ends of the lower member 14 of frame 10, and is continuously driven by the electric motor 32, as above described.

The carriage 15 is operatively connected to the power driven chain 25 by means of a U-shaped connector member 36, which is fixed to the chain 25 at 37, best shown in FIGURES 1 and 2. The connector member 36 is pivotally connected by a pin 38 to a projecting arm 39, which is fixedly mounted to the underside of the lower portion 20 of the carriage 15 by rivets 40, or otherwise. Thus the carriage 15 is moved back and forth along the track 14 by the driving chain 25. As clearly shown in FIGURES 1 and 2, the connector member 36 extends inwardly from its fixed engaged position on the chain 25, and constantly moves with the chain, rotating around the outer circumference of the sprockets 26 and 27, thus pulling the carriage 15 along with the moving chain 25. The pivotal connection between the U-shaped connector member 36 and the projecting arm 38 of the carriage 15, by means of the pin 38 permits the member freely to rotate around each sprocket on which the chain is mounted.

As the chain 25 rotates around the sprockets 26 and 27 and is continuously driven by the power furnished by the motor 32, the U-shaped connector member 36 travels in one direction along the outside of the chain 25, as shown, pulling the carriage 15 with it, until it reaches one of the sprockets 26 or 27, whereupon the connector 36 rotates with the chain to which it is fixed around the sprocket, and proceeds with the moving chain along the other outer side thereof, thus reversing its direction and

carrying the carriage 15 with it in the opposite longitudinal direction. The carriage 15 thus is reciprocatingly driven, back and forth constantly by the power driven chain 23 throughout the major portion of the length of the frame 10.

One of the most novel features of this invention comprises the manner in which the sharpening elements are arranged and operated, as well as their unique design which produces a better sharpener, obtains better results, and in an entirely new manner than any in the known prior art. Knives all have blades, the cutting edges of which have a different contour and vary in size, shape, width and thickness.

In this invention, a plurality of elongated sharpening elements 45 are mounted on a horizontally extending rod 46. The upper ends of these sharpening elements 45 are bored at 44 so that they may be slidably mounted on the rod 46, depend downwardly therefrom, and rockable thereon. See FIGURES 1, 3 and 4. If desired, spacer washers 47 may be located on the rod 46 and be used between the sharpening elements 45. A pair of upwardly extending triangular end frames 48 are mounted at the outer ends of the carriage 15, and fixed at their lower ends at 49 to the lower or base portion 20 of the carriage 15 at its outer ends by welding or any other suitable means. These upstanding triangular end frames 48 are suitably bored to receive the outer ends of the horizontally extending rod 46 and suitable nuts in conventional fashion.

The inner edge surfaces of the sharpening elements 45 may be faced with any desired grinding, honing or sharpening material 55, such as stone, Carborundum or other composition abrasives. If desired, steel facing or steel elements may be used entirely, or alternately in combination with stone. These stone sharpening faces may be fixed to the inner edge surfaces of the sharpening elements 45 by adhesive or metal clamps, or by any other method well known in the art.

The upper elongated member 16 of the frame 10 has a groove 47 formed throughout the entire length of its upper edge to receive the back edge of the knife or other cutlery to be sharpened, as clearly shown in FIGURES 1, 3 and 4 of the drawings. The knife 17 is placed in this groove upside down, with the cutting edge to be sharpened uppermost. A suitable clamp 58 is fixed to the stationary frame 10 at the outermost end of the upper portion 16 thereof, and is adapted to receive the handle or grip of the knife 17 therein. A wingnut 59 may be used to tighten the clamp and hold the knife securely in fixed stationary position on the frame 10 in sharpening position thereon, as clearly illustrated in the drawings. A similar clamp 58 may be employed and mounted in a similar manner to hold the knife 18 in sharpening position at the other end of the frame 10, if the operator of the machine desires to sharpen two knives simultaneously.

Now the sharpening elements 45 which depend downwardly from the rod 46 of the carriage 15 are alternately arranged so that each adjacent sharpener 45 hangs down against opposite sides of the knife 17, and each alternate stone 55 bears against an opposite edge of the knife or knives to be sharpened. That is to say, if four sharpener members 45 are used in a particular machine, two will be disposed on one side of the knife, and two on the opposite side. See FIGURE 1. If eight sharpener members 45 are used, four will be disposed on one side of the knife, and four on the other, alternately, every other one.

The downwardly hung sharpener members are urged towards the knife by springs 60, one suitably fixed to the lower end of each sharpener at 61, and extending across the carriage 10 and suitably fixed at 62 to the opposite side 21 of the carriage. See FIGURES 1, 3 and 4. Each alternately disposed sharpener is thus urged under constant spring tension against the knife to be sharpened.

In the operation of this machine, it is thus apparent that as the carriage 15 is reciprocated back and forth along the length of the stationary frame 10, the spring tensioned sharpening members are all urged into abrading contact with the edge of the knife to be sharpened. Since these elongated downwardly depending sharpeners 45 are pivotally mounted at their upper ends and urged together and toward the knife blade at their lower ends by spring tension, they will constantly accommodate themselves in a floating abrading position to any contour, such as the curved and rounded ends of some knife blades, to thin or thicker knife blades, and to different widths of blades automatically.

The sharpeners 45 may be slightly curved, as shown, to give a hollow ground finish, or they may be straight if desired. They will automatically adjust to the shape of the knife and approach it from its pointed end with facility and no manual attention on the part of the operator except to mount the knife or knives in position, as hereinbefore described.

The feature of having a multiplicity of sharpeners in close operative arrangement, and alternately disposed on both sides of the blade, produces an extremely fine sharpening action never before achieved in this art. It is this feature which allows for constant minute automatic adjustment to the varied contours of any variety or condition of blade.

While this machine has limitless uses and utility in various sizes, household and commercial, it is particularly adaptable for use in meat markets, butcher shops and commercial installations.

Having thus described this invention, I claim:

1. An automatic power driven knife sharpening machine comprising an elongated stationary frame adapted to mount a knife in fixed position thereon for sharpening, a movable carriage slidably mounted on said stationary frame and adapted to reciprocate thereon throughout substantially the length thereof, a plurality of independently mounted knife sharpening elements carried by said movable carriage and disposed in continuous individually spring pressed engagement with the cutting edge of the knife to be sharpened, each of said sharpening elements pivotally movable independently of the remainder of said sharpening elements to maintain contact with the cutting edge of the knife, said sharpening elements alternatively disposed in a downwardly depending position with every other element disposed on opposite sides of the knife to be sharpened, and power means to reciprocate said carriage on said stationary frame.

2. An automatic power driven knife sharpening machine as described in claim 1, wherein the sharpening face of each of the independently mounted and movable knife sharpening elements is slightly curved.

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