Sept. 5, 1933. L. NAGY 1,925,108

AUTOMATIC KNIFE SHARPENER

Filed May 31, 1930 4 Sheets-Sheet 1

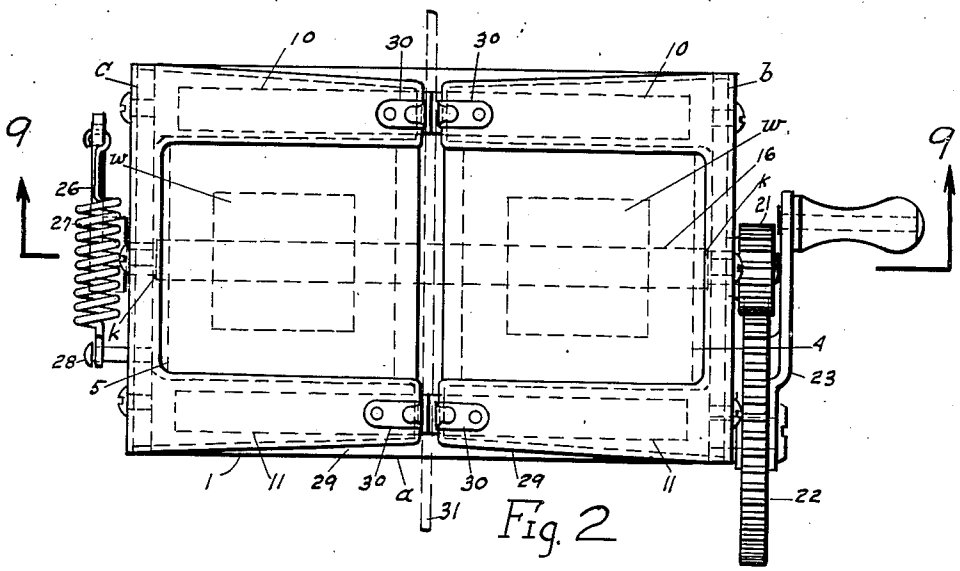

Fig. 2

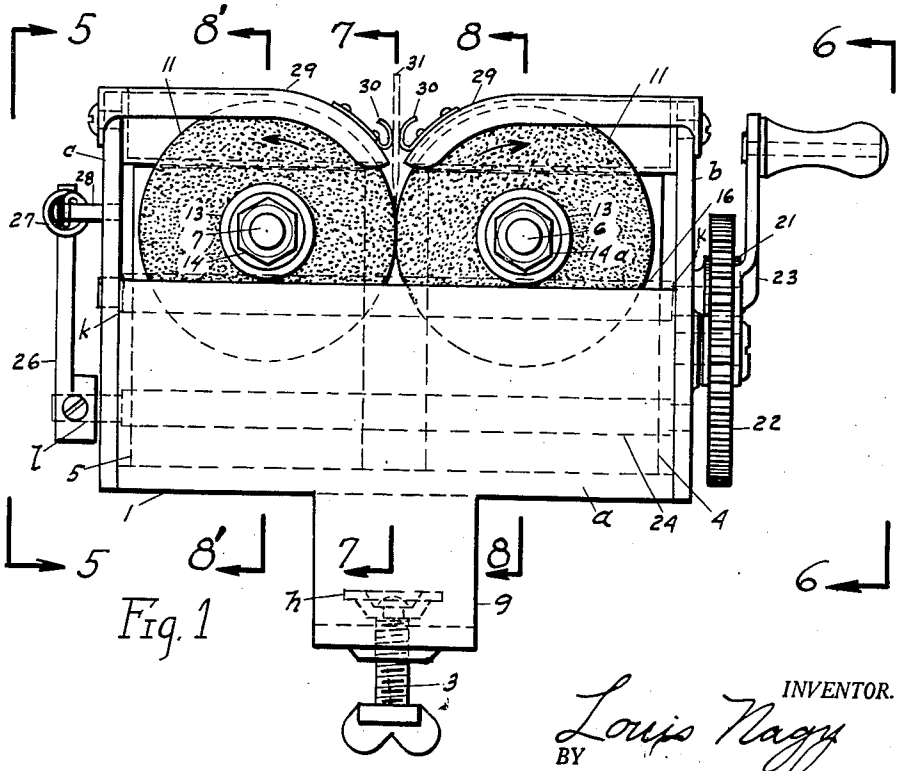

Fig. 1

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Sept. 5, 1933. L. NAGY 1,925,108

AUTOMATIC KNIFE SHARPENER

Filed May 31, 1930 4 Sheets-Sheet 2

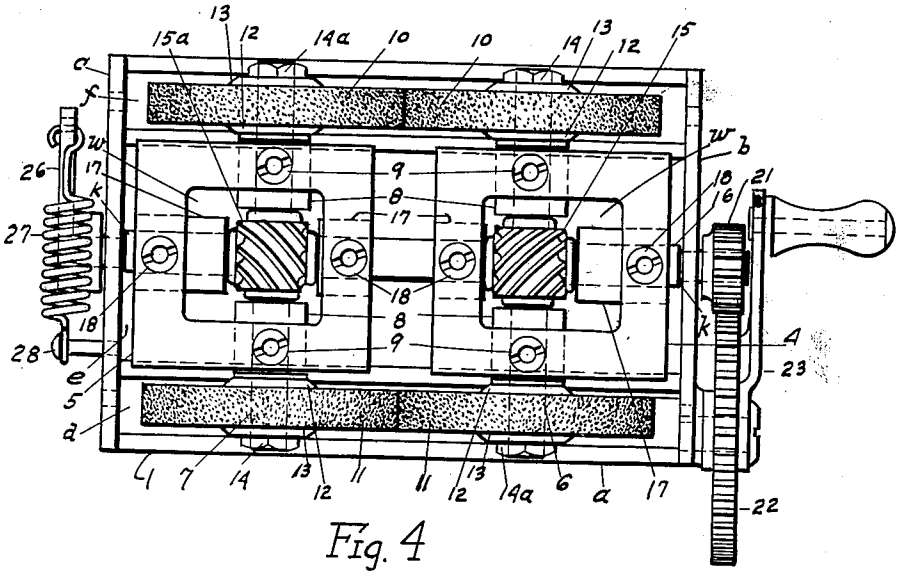

Fig. 4

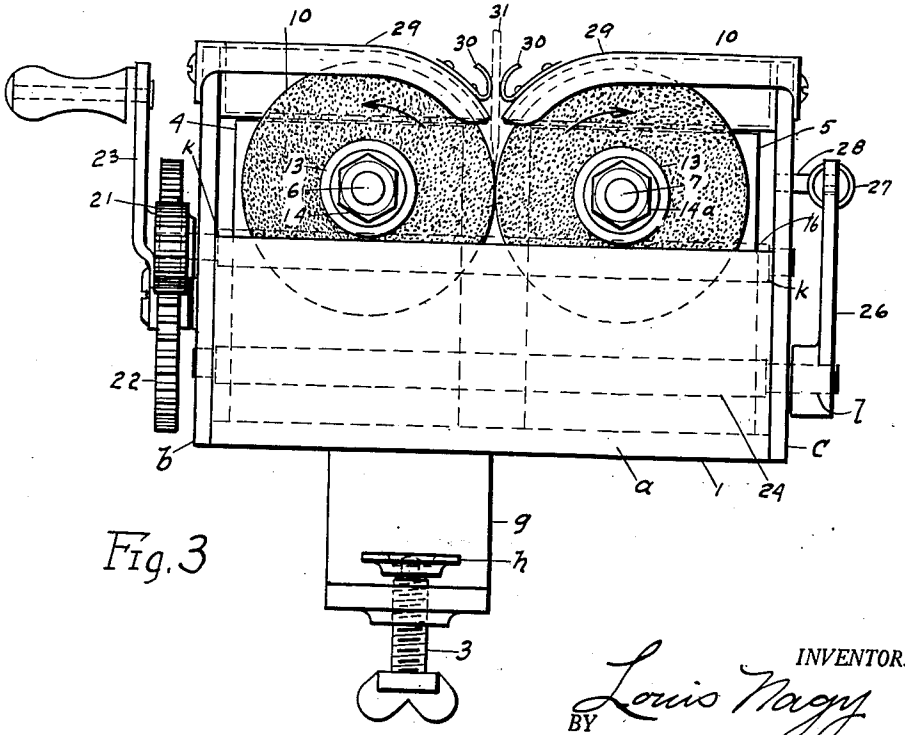

Fig. 3

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Sept. 5, 1933. L. NAGY 1,925,108

AUTOMATIC KNIFE SHARPENER

Filed May 31, 1930 4 Sheets-Sheet 3

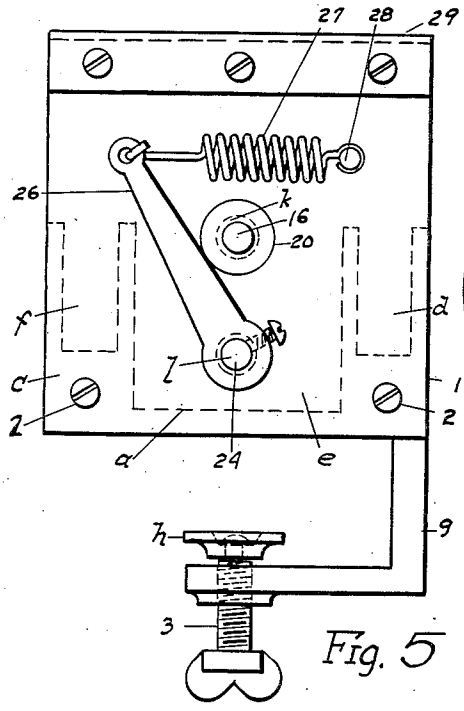

Fig. 5

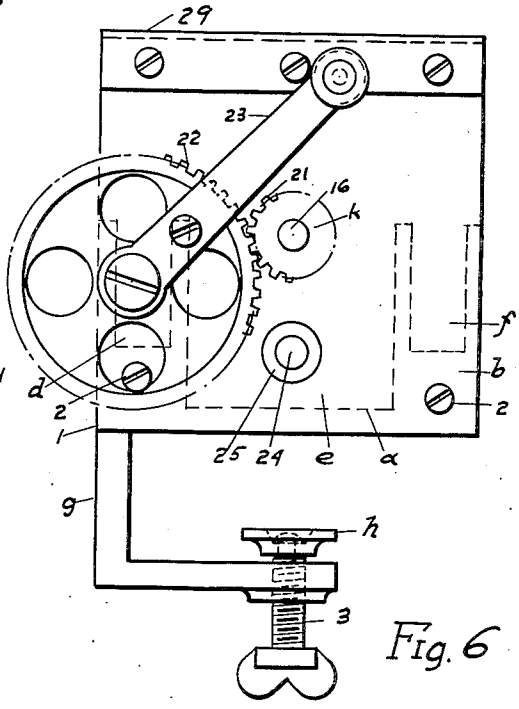

Fig. 6

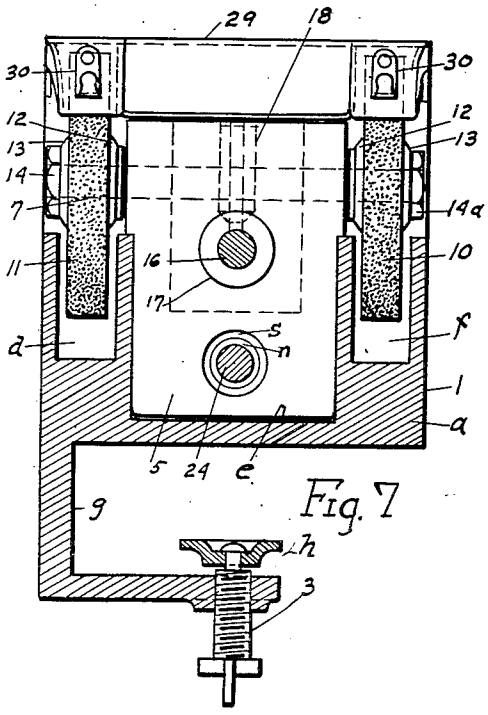

Fig. 7

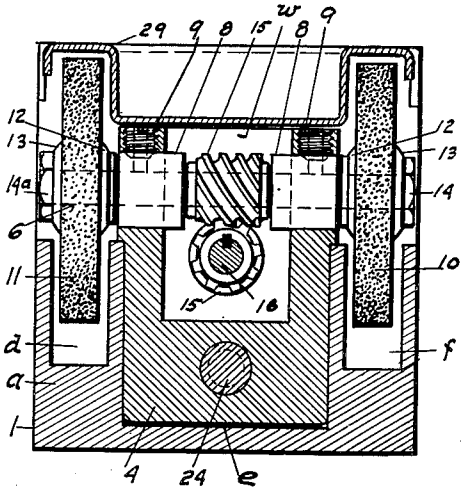

Fig. 8

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Sept. 5, 1933. L. NAGY 1,925,108

AUTOMATIC KNIFE SHARPENER

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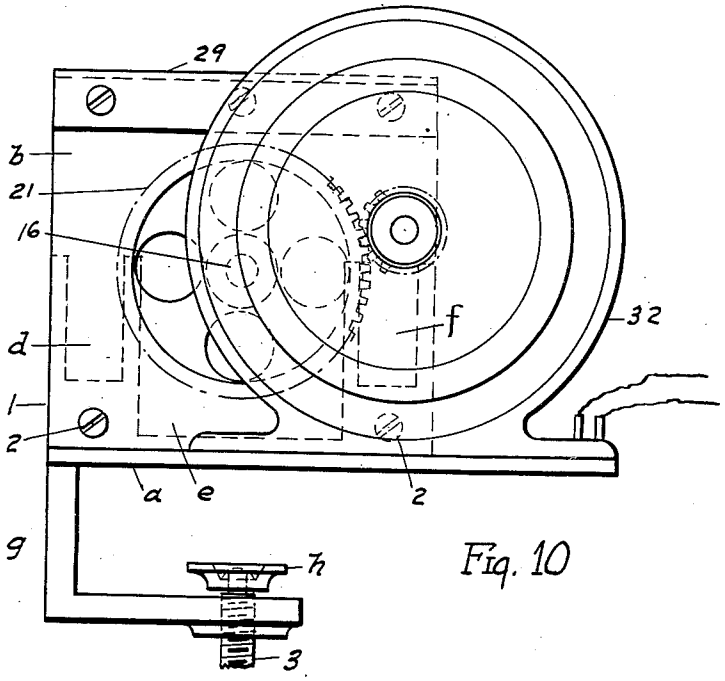

Fig. 10

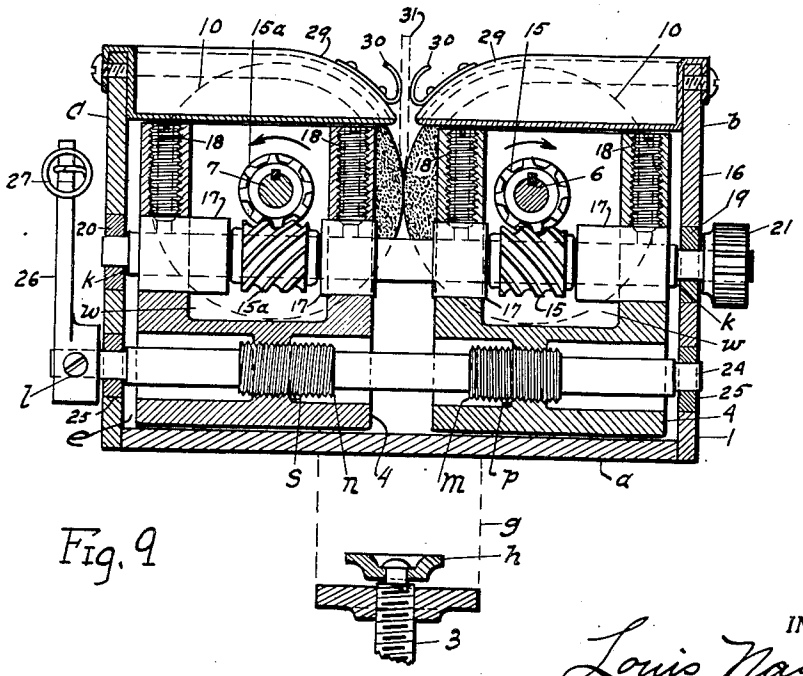

Fig. 9

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1,925,108

UNITED STATES PATENT OFFICE

1,925,108

AUTOMATIC KNIFE SHARPENER

Louis Nagy, Detroit, Mich., assignor, of one-half to Stephen F. Halach, Detroit, Mich.

Application May 31, 1930. Serial No. 458,646

1 Claim. (Cl. 51—80)

The object of my invention is to produce a device for quickly and accurately sharpening knife blades.

Another object is to produce a mechanical knife blade sharpener that is automatic and that will always re-grind the blades with the same edge angles.

A further object is to produce a mechanical device that will quickly sharpen a knife blade without producing a feather edge thereon.

A still further object is to produce an automatic knife sharpener that is simple in construction, easily and efficiently operated and that can be manufactured at a very low cost.

These several objects are attained in the preferred form by the construction and arrangement of parts more fully hereinafter set forth.

Similar parts on all drawings are marked by similar numerals and letters.

Fig. 1 is a front side view of the assembled device showing the finishing wheels and exterior frame structure.

Fig. 2 is a top view of the assembled device showing the guard means and the knife blade passage as provided therebetween.

Fig. 3 is the back side view of the sharpener showing the courser cutting wheels mounted therein.

Fig. 4 is a top view of the sharpening device with the top wheel guards removed, showing the relative positions of the operating mechanism.

Fig. 5 is an end view taken on the line 5—5 of the Fig. 1 showing the automatic wheel adjusting means.

Fig. 6 is an end view taken on the line 6—6 of the Fig. 1 showing the operating crank and connecting means for rotating the sharpener mechanism.

Fig. 7 is a vertical sectional view crosswise of the device taken on the line 7—7 of the Fig. 1, showing the adjustable mounting block and the relative positions of the operating shafts.

Fig. 8 is a vertical sectional view cross-wise of the device, taken on the lines 8—8 of Fig. 1 showing the general arrangement of the driving mechanism.

Fig. 9 is a vertical sectional view length-wise of the device taken on the line 9—9 of Fig. 2 showing the automatic adjusting means for holding the sharpening wheels together and means for driving these wheels in opposite directions.

Fig. 10 is an end view taken on the line 6—6 of Fig. 1 showing an alternate form of power means, where the operating crank is replaced by a small electric motor.

In general, my device comprises a rigid closed casing suitable for mounting on the edge of a table or like supports. Within the casing is rotatably mounted two cutting wheel shafts, each having different grades of wheels on its opposite ends, and so positioned within the frame that the pairs of wheel edges coincide and form a surface rolling contact with each other. A power shaft is mounted lengthwise through the frame and provided with operating means for engaging the two wheel shafts and rotating them in opposite directions. Automatic adjusting means is provided for retaining a wheel surface contact at all times.

I will now describe more fully the detailed construction of my device referring to the drawings and the marks thereon.

The casing —1— is made a rectangular box shaped frame, open along the side and top walls, and is preferably made of a rectangular shaped metal base block —*a*— having thin rectangular end plates —*b*— and —*c*— fixedly attached thereto by the screws —2—, said end plates being of sufficient size to completely cover the base block and extend thereabove. The base block —*a*— is formed with three parallel grooves —*d*—, —*e*— and —*f*— along the top side thereof extending the full length of the block, said grooves having vertical, parallel side walls. On the bottom side of the base —*a*— is formed a projecting L-shaped clamp arm —*g*—, attached thereto at one edge of the block and extended to nearly a central position therebeneath. A threaded clamp screw —3— is mounted within the outer end of the clamp arm —*g*—, and is provided with a swivel cap —*h*— on the inner screw end, the clamp arm and screw being designed to engage a horizontal table top or shelf support for rigidly and securely clamping the casing —1— thereto. If desired, the casing —1— may be made of cast metal and formed of a single piece. Within the central groove —*e*— of the base block are slidably mounted two adjustable bearing blocks —4— and —5—, capable of movement therein lengthwise of the groove. The bearing blocks —4— and —5— are made of metal, preferably formed a hollow rectangular box shaped casting, open at the top side, and of dimensions to fit and engage the groove side walls and allowing sufficient space between the two blocks for adjustment thereof along the groove, both bearing blocks being projected above the base block —*a*—. Through the tops of the bearing blocks —4— and —5— are mounted short horizontal wheel shafts —6— and —7—, both rotatably mounted therein by short

tubular bearings —8— pressed within wall sockets and fixedly attached therein by hollow set screws —9— mounted within the bearing block side walls. The wheel shafts —6— and —7— are positioned cross-wise of the casing —1—, at right angles to the base groove —*e*—, and are opposite and parallel to each other, said shafts being extended outside the bearing block walls at each side thereof, and carry mounted thereon pairs of grinding wheels —10— and —11— securely attached thereto by the shaft collars —12— and —13— and the threaded lock nuts —14— and —14*a*— in the ordinary manner, said lock nuts —14— and —14*a*— being made with right and left hand threads for the respective shaft ends as required for securely retaining the grinding wheels thereon by rotation thereof against the threaded nuts. The pairs of grinding wheels are positioned to project into the side base grooves —*d*— and —*f*—, and the wheels of each pair are placed directly opposite each other and forming a rim surface contact at all times, both pairs of wheels rolling together and always in opposite directions, the top of all wheels turning outward and away from each other as indicated by the arrows on Figs. 1 and 3 of the drawings. It is preferred that the wheels —10— be made of courser materials for cutting steel while the wheels —11— be made of finer materials for producing a fine finishing surface when grinding the edges of steel blades. The exact materials of the grinding wheels of both —10— and —11— may be varied, and such grades of grinding wheels used as may best suit the purpose and the type of knife to be sharpened thereon. Fixedly mounting on the wheel shafts —6— and —7—, inside the hollow bearing blocks —4— and —5— and between the tubular bearings —8—, are the worm drive gears —15— and —15*a*— and which gears are made by right and left hand helical teeth. Directly beneath the wheel shafts —6— and —7— is mounted a cylindrical drive shaft —16—, which is positioned lengthwise of the casing —1— and passes through both bearing blocks —4— and —5— and the casing end plates —*b*— and —*c*—, said shaft being at right angles to the shafts —6— and —7— and parallel to the centerline of the base groove —*e*—. The drive shaft —16— is rotatably mounted through the bearing blocks —4— and —5— by the short tubular bushings —17— pressed within the wall sockets and fixedly attached thereto by the hollow set-screws —18— mounted in the bearing block side walls. The ends of the shaft —16— are supported in the casing end bearings —19— and —20— fixedly mounted in the end plates —*b*— and —*c*—. The shaft —16— is preferably turned with shouldered ends —*k*— to prevent any endwise movement thereof, although small shaft collars may be used on the shaft ends if desired, and for the same purpose. One end of the shaft —16— is extended beyond the casing end plate —*b*— and carries a small pinion gear —21— fixedly mounted thereon. The pinion gear —21— meshes with a large drive gear —22— pivotally attached to the outer face of the casing end —*b*—, said gear —22— being provided with a turning handle —23— fixedly attached thereto, and suitable for applying manual power thereto for causing rotations of the drive shaft —16—. Splined to the drive shaft —16— within the hollow bearing blocks —4— and —5— are worm gears —15— and —15*a*— also formed with right and left hand helical teeth, and which mesh with like corresponding gears mounted on the wheel shafts —6— and —7—. The gears as mounted on the drive shaft —16— being splined thereto will allow for any adjustment of the bearing blocks —4— and —5— within the supporting base groove —*e*—, in either direction, and any rotation of the drive shaft by the attached gears —21— and —22— will likewise rotate the connected shafts and attached grinding wheels —10— and —11— in opposite directions. Through the bottom section of the bearing blocks —4— and —5— is mounted an adjusting screw —24—, also positioned lengthwise of the casing and parallel to the drive shaft —16— and casing base groove —*e*—, the ends of said adjusting screw being supported by bearings —25— formed in the casing end walls. One end —*l*— of the adjusting screw is extended through the casing end bearing and carries fixedly mounted thereon an adjusting arm —26—. The arm —26— is extended along the casing end wall and carries attached to the outer end thereof a tension coil spring —27— which has its opposite end attached to a fixed wall pin —28— mounted in the casing end, said spring being designed and stressed for causing a turning moment on the adjusting screw —24— at all times. The screw —24— is formed with double threaded sections —*m*— and —*n*— having right and left hand threads respectively thereon, each section engaging correspondingly threaded collars —*p*— and —*s*— formed within the bearing blocks —4— and —5—, and thus causing said bearing blocks to be moved in opposite directions along the base groove —*e*— upon any turning of the adjusting screw —24—. The arrangement of the right and left hand threads on said screw —24— and the attached tension spring arm —26— being designed to move said bearing blocks —4— and —5— together for retaining a grinding wheel contact at all times and under the spring tension. The hollow bearing block chambers —*w*— are preferably filled with thick grease for lubricating the gears and preventing gear noises when operating at high speed. The hollow set screws —9— and —18— provide means for oiling the shaft bearing on the shafts —6— and —7— and —16—, by an extension oil hole formed through the tubular bushings —8— and —17—. Over the top of each grinding wheel is mounted a guard plate —29—, designed to inclose the upper portions of the grinding wheels —10— and —11— and also cover the upper open ends of the bearing blocks —4— and —5—. The guards —29— are separated slightly at the center, directly over the grinding wheel contact edges, and are provided with spring guide clips —30— formed along the inner edges thereof, said clips being preferably placed in pairs, opposite each other, and suitable for receiving a knife blade —31— therebetween and guiding same along a vertical plane through the wheel contact edges, and as shown in Figs. 1 and 2 of the drawings.

If desired, the driving gear —22— and hand crank —23— may be replaced by an electric motor —32— as illustrated in Fig. 10 of the drawings, and the size of the pinion gear —21— adjusted accordingly. The operation of the device is the same as heretofore described.

In operating my device for sharpening knife blades, the casing —1— must first be securely attached to a horizontal table top or shelf support, by the clamp screw —3—, and it is preferred for the best results that the base grooves —*d*— and —*f*— be partially filled with oil, sufficiently for the grinding wheels to dip therein, and as the pairs of cutting wheels —10— and —11— are rotated in opposite directions, the wheel tops ro-

tating outward, a knife blade —31— may be inserted between the guard clips —30— forcing the knife edge downward to engage the pairs of grinding wheels —10— and —11— near the contact points, and then drawing the knife blade lengthwise through between the rotating grinding wheels, preferably in the direction from the courser toward the finer wheel. The process may be repeated until the blade is sharpened and always grinding the blade at exact the same angle and without producing a feather edge thereon.

If desired, and for constructing a cheaper grinding device, one set of grinding wheels may be removed or omitted altogether. The operation is the same as before.

It is apparent that my device is subject to various modifications in both mechanical details and design, without departing from the spirit of my invention, and I claim as my invention the design as herein shown and any design that is substantially substitution of parts herein shown.

Having fully described my automatic knife sharpener, what I claim as my invention and desire to secure by Letters Patent is:

A grinding device adapted for sharpening knife blades, comprising a suitable casing frame having clamping means for fixedly attaching same to a support member, two bearing blocks slidably mounted within said casing frame movable only along a plane lengthwise of said casing, a threaded adjusting screw mounted through said casing frame and bearing blocks capable of adjusting the block position therein lengthwise of said casing frame, (a turning lever mounted on said threaded adjusting screw and provided with a tension coil spring attached thereto and also fixedly connected to the casing capable of causing rotation of said threaded adjusting shaft), a driving shaft having right and left hand worm gears thereon rotatably mounted through the top of said frame and bearing blocks, parallel wheel shafts rotatably mounted through said bearing blocks at right angles to said drive shaft and connected thereto by right and left hand worm gears in a manner capable of causing rotation of said wheel shafts in opposite directions as the drive shaft is rotated, pairs of oppositely disposed grinding wheels mounted on the ends of the parallel wheel shafts, said oppositely disposed grinding wheels being set with rolling surface contact with each other, a guard shield mounted over the casing top and carrying knife guides thereon capable of guiding a knife blade between the said grinding wheels, and power means mounted on said casing connected to the drive shaft for causing continuous rotations of the rotatably mounted grinding wheels.

LOUIS NAGY.