April 16, 1940. G. BARSCH 2,197,119

HAND-OPERATED BLADE GRINDER

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Fig. 1

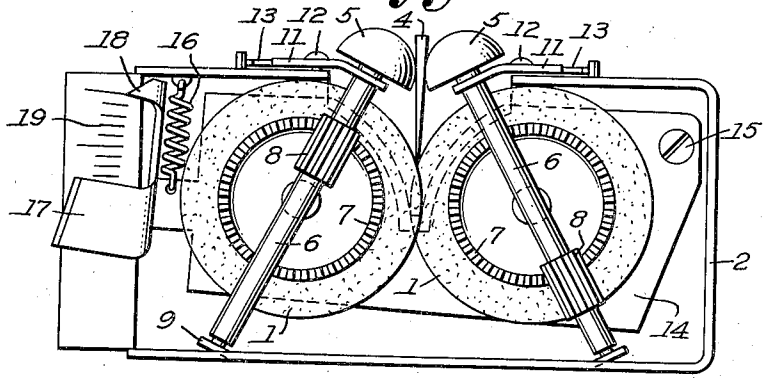


Fig. 2

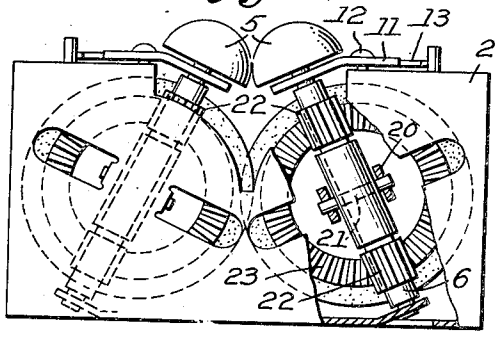
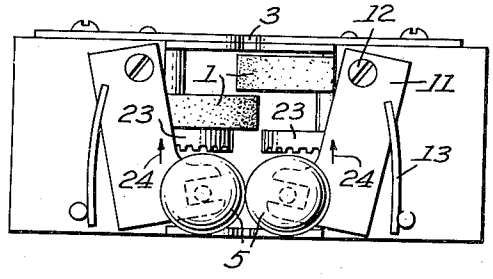


Fig. 3



Inventor:
GUILLAUME BARSCH

By Walter S. Bleistein
Attorney.

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HAND-OPERATED BLADE GRINDER

Guillaume Barsch, Luzern, Switzerland

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8 Claims. (Cl. 51—80)

This invention relates to hand-operated blade grinders, more particularly for knives of any description.

It is an object of this invention to provide a machine of this kind, the construction of which will be very simple and cheap in production and assembly and the efficiency of which will be very high.

Further objects of the invention will be clear from the following detailed description of the invention.

According to the invention the device comprises rotating grinding wheels in tandem arrangement and means adapted to rotate the grinding wheels by the reciprocating movements of the blade between the grinding wheels in the grinding action. These means include a gear system adapted to convert the reciprocating movement of the knife blade into a rotating movement. The conversion of the reciprocating movement of the knife to be sharpened into a rotating movement according to this invention may be effected for instance in such a manner that the knife blade which is to be moved between the grinding wheels is guided between friction wheels or the like which engage the knife blade from opposite sides and the rotation of which is transferred, by means of one shaft each and further friction wheels, toothed wheels or the like, upon the grinding wheels. It is not necessary for the friction wheels to engage the knife blade directly, but the device may be so provided that the friction wheels or the like engage a reciprocating guiding bar serving as a blade holder. In this case, the friction wheels are preferably replaced by toothed wheels or pinions and the reciprocating bar of the knife holder is preferably formed as a toothed rack engaged by said pinions.

Further features of the invention will be clear from the following detailed description of the drawing, showing by way of example and schematically some embodiments of the invention, viz.—

Figure 1 is an inside view of an embodiment of my novel grinding device;

Figure 2 is an inside view of a modified form, the casing being partly broken away;

Figure 3 is a plan view of Figure 2.

In each of the embodiments shown in the drawing, two grinding wheels 1 are arranged side by side with parallel axes, partly overlapping each other. In order to introduce the blade between the grinding wheels 1, the casing 2 has recesses 3 which are reduced in width towards the bottom. In each of the said embodiments, moreover, the grinding wheels are rotated by the reciprocating movement of the knife blades between the grinding wheels. Identical reference numerals have been used in the different figures to denote identical parts.

Referring to Figures 1 to 3, the knife blade 4 is engaged on both sides by friction wheels 5, for instance of rubber, which transmit their rotation caused by the rocking or reciprocating movement of the knife blade upon the grinding wheels 1, through shafts 6. According to Figure 1, the grinding wheels 1 have toothed rims 7 engaging the toothed wheels or pinions 8 of the driving shafts 6. One of the two toothed wheels 8 engages the upper part of the toothed rim 7 of its coordinated grinding wheel and the other toothed wheel 8 engages the lower portion of the toothed rim of the other grinding wheel, thus producing a rotation of the two grinding wheels in the same direction. Accordingly one of the two grinding wheels acts against the blade and the other grinds "off" the blade. This direction of rotation of the two grinding wheels 1 changes with each reversal of the movement of the knife blade 4. The friction wheels 5 are formed as end "knobs" or caps of the obliquely arranged driving shafts 6 which are mounted at their lower end in bent off tongues 9 of the casing 2 and at their upper ends in plates 11. The plates 11 are swingable in a horizontal direction round pivots 12 and are acted upon by springs 13 which tend to press the knobs 5 together or against the knife blade 4, respectively. Thus, the knobs 5, the driving shafts 6 and the grinding wheels 1 will be driven by the knife blade 4 when it is reciprocated by hand in the grinding action. The two grinding wheels 1 are mounted, according to Figure 1, on two swingable levers or plates in such a manner that the grinding angle depends on the pressure exerted during the grinding movement upon the knife blade. It will be seen that only one of the swingable plates serving as a support of one of the grinding wheels has been shown, that is to say the plate 14 which is swingable round the pivot 15 and acted upon by a spring 16 which tends to hold the plates and thus the grinding wheels 1 in their extreme upper positions.

The second plate which serves as a support for the second grinding wheel and is caused to follow the movement of plate 14 by a guiding slot and a pin engaging said slot, under action of spring 16, is covered and not visible.

It will be understood that by exerting a greater pressure upon the knife blade 4 in the grinding

action, the grinding wheels are depressed against action of spring 16, whereby the grinding angle is increased. It is also possible to adjust a predetermined grinding angle before grinding. To this end, the plate 14 is formed with a bent-off portion 17 in the form of a handle by which the plates with the grinding wheels can be swung by hand into any desired position and held in this position during the grinding action. A pointer 18 provided at the bent-off portion 17 permits of adjustment of a predetermined grinding angle on a scale 19 gauged according to grinding angles.

I contemplate to provide rests or arresting means between pointer 18 and scale 19 so as to hold the handle 17 mechanically in a predetermined position.

According to Figures 2 and 3, the reciprocating movement of the knife blade upon the grinding wheels 1 is transmitted upon the grinding wheels 1 substantially in the manner shown in Figure 1 except differences in the details of construction. Thus, the grinding wheels 1 in this instance do not have the same direction of rotation, but run in opposite directions and grind "against" the edge. However, when the movement of the knife blade is reversed, the direction of rotation of the grinding wheels is not changed, but the wheels maintain their (opposite) directions of rotation. To this effect, the driving shafts 6 are arranged swingable or tiltable around pivots 21 supported in bent-off tongues 20 of the casing. Moreover, the driving shafts 6 are provided with two toothed or friction wheels 22 each in order to transmit the rotation of the end knobs 5 and shafts 6 upon the grinding wheels 1. The members 22 are so arranged that with one stroke of the knife blade the lower toothed or friction wheel 22 and with the opposite stroke the upper toothed or friction wheel 22 will automatically engage the lower portion or the upper portion, respectively, of the toothed friction rim 23.

Figure 3 indicates one extreme position of the swingable driving shafts 6. It will be understood that the end knobs 5 will move in the direction of the arrow 24 to their opposite extreme position when the moving direction of the knife blade is reversed and vice versa. In order to render possible the alternating rocking of the driving shafts 6, the two ends thereof are supported in slots of the spring-acted plates 11 and in slots of the tongues 9.

While I have herein shown and described certain preferred embodiments of my invention, I wish it to be understood that I do not confine myself to all the precise details herein set forth by way of illustration, as modification and variation may be made without departing from the spirit of the invention or exceeding the scope of the appended claims.

I claim:

1. In a grinding machine, a pair of grinding wheels adapted to sharpen knife blades which are moved to and fro between the grinding wheels, a pair of friction wheels adapted to engage between them the said knife blades, a swingably mounted shaft for each of said friction wheels, two driving wheels on each of said shafts adapted to be brought selectively into engagement with opposite portions of a drive-transmitting rim on a lateral face of said grinding wheels, by swinging movement of said shaft caused by the reciprocating movements of said knife blade, whereby the said friction wheels are driven in a continuous direction by the reciprocating movement of said knife blade.

2. In a grinding device, at least one pair of grinding wheels having axes parallel to and on opposite sides of a center plane, said grinding wheels being adapted to sharpen simultaneously from both sides the edge of a blade reciprocated in said center plane, a pair of friction wheels associated with said grinding wheels respectively, said friction wheels being arranged close to each other and on the same sides of said center plane as the associated grinding wheels so as to be simultaneously in frictional engagement with both sides of a blade when the edge of the latter engages the grinding wheels, and means for transmitting to the grinding wheels a rotating movement imparted to the friction wheels by the reciprocated blade.

3. In a grinding device, at least a pair of grinding wheels rotatable in parallel planes and having axes parallel to and on opposite sides of a center plane, a segment of each wheel protruding beyond said center plane, a pair of friction wheels associated with said grinding wheels respectively, said friction wheels having axes in an identical plane perpendicular to said center plane, and being arranged close to each other and at the same sides of said center plane as the associated grinding wheels, so as to be simultaneously in frictional engagement with both sides of a blade reciprocated in said center plane when the edge of said blade engages said grinding wheels, and means for transmitting to the grinding wheels a rotating movement imparted to said friction wheels by the reciprocated blade.

4. In a grinding device, at least one pair of grinding wheels having axes parallel to and on opposite sides of a central plane, and having cylindrical grinding surfaces, said grinding wheels being adapted to simultaneously sharpen both sides of a blade edge reciprocated in said center plane between said cylindrical surfaces, a pair of friction wheels associated with said grinding wheels respectively, said friction wheels being arranged on the same sides of said central plane as the associated grinding wheels, means for urging said friction wheels towards each other, and means for transmitting to the grinding wheels a rotating movement imparted to the friction wheels by said blade inserted and reciprocated between said friction wheels.

5. In a grinding device, a pair of grinding wheels adapted to sharpen a knife blade which is reciprocated between the grinding wheels, a pair of friction wheels adapted to engage said knife blade from both sides, a shaft for each of said friction wheels, a driving wheel on each of said shafts, a drive-transmitting rim on a lateral face on each of said grinding wheels, said driving wheels being in engagement with said rims respectively on opposite sides thereof with respect to the axes of said grinding wheels so as to rotate both said grinding wheels in the same direction when the driving wheels rotate in opposite directions to each other owing to the rotating movement imparted to the friction wheels by the movement of said blade reciprocating between the friction wheels.

6. In a grinding device, at least one pair of grinding wheels arranged with their axes parallel to and on opposite sides of a central plane so as to overlap each other partly, means for selectively adjusting the distance of said parallel axes from each other, a pair of friction wheels associated with said grinding wheels respectively, said fric-

tion wheels being arranged on the same sides of said central plane as the associated grinding wheels, means for urging said friction wheels towards each other, and means for transmitting to the grinding wheels a rotating movement imparted to the friction wheels by a blade inserted and reciprocated between said friction wheels.

7. In a grinding device, at least one pair of grinding wheels arranged with their axes parallel to and on opposite sides of a central plane so as to overlap each other partly, at least one lever pivoted so as to be swingable in a plane perpendicular to said central plane, one of said grinding wheels being journaled in said lever, means for setting said lever in a selected position to adjust the distance of said grinding wheels from each other, a pair of friction wheels associated with said grinding wheels respectively, said friction wheels being arranged on the same sides of said central plane as the associated grinding wheels, means for urging said friction wheels towards each other, and means for transmitting to the grinding wheels a rotating movement imparted to the friction wheels by a blade inserted and reciprocated between said friction wheels.

8. In a grinding device as claimed in claim 7, a pointer at said lever and a scale opposite said pointer to indicate the grinding angle between said overlapping grinding wheels.

GUILLAUME BARSCH.