Oct. 16, 1956 E. G. GAGE 2,766,566

SHARPENING DEVICE FOR CUTTING WHEELS

Filed Aug. 26, 1953 4 Sheets-Sheet 1

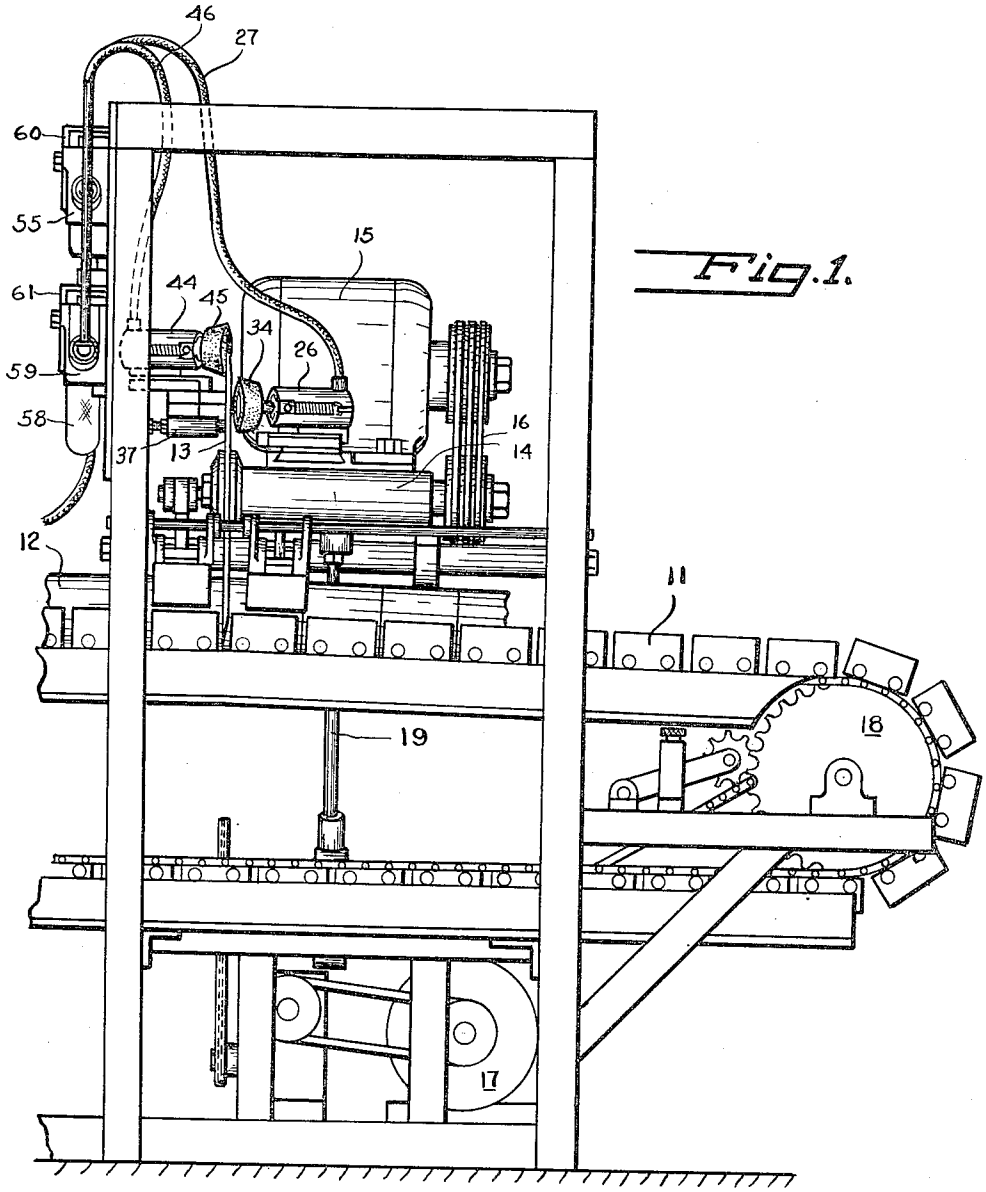


Fig. 1.

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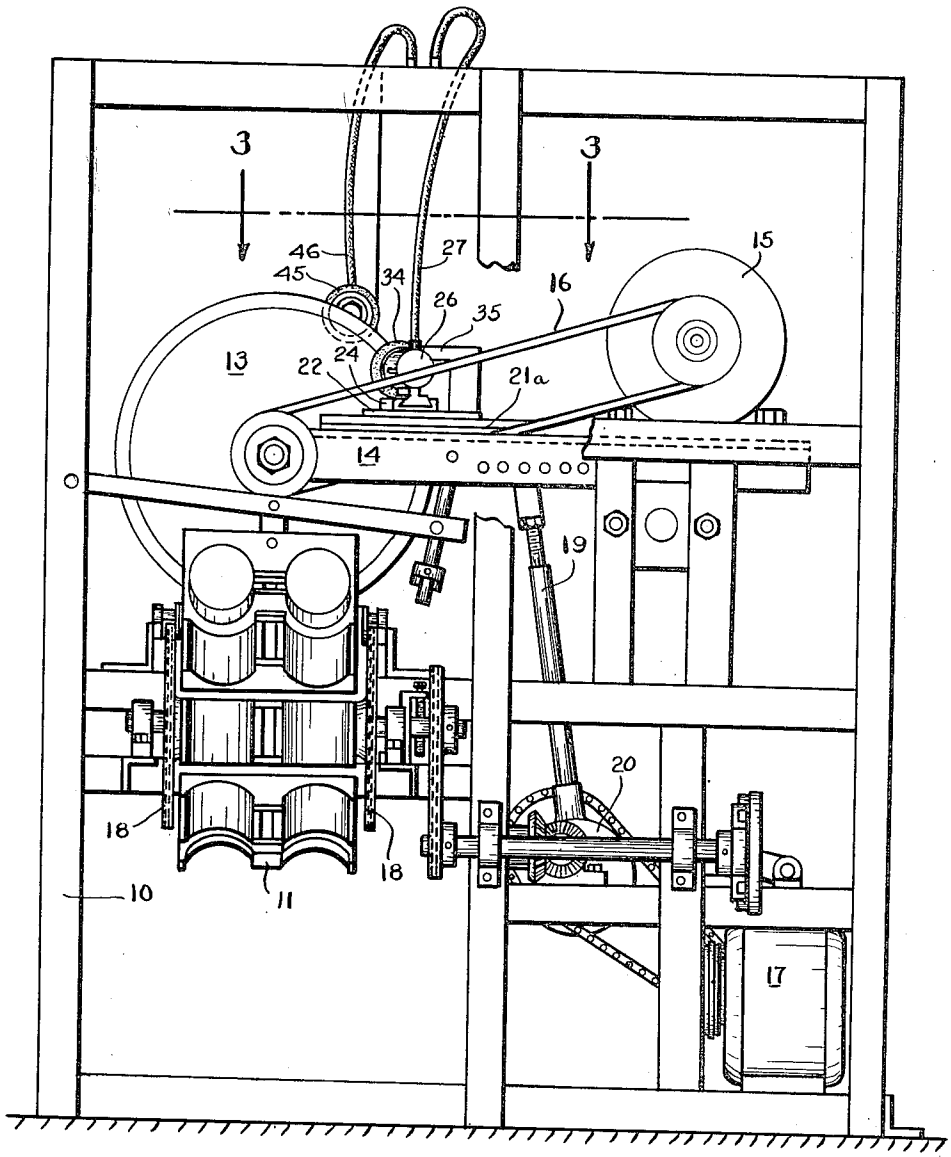


Fig. 2.

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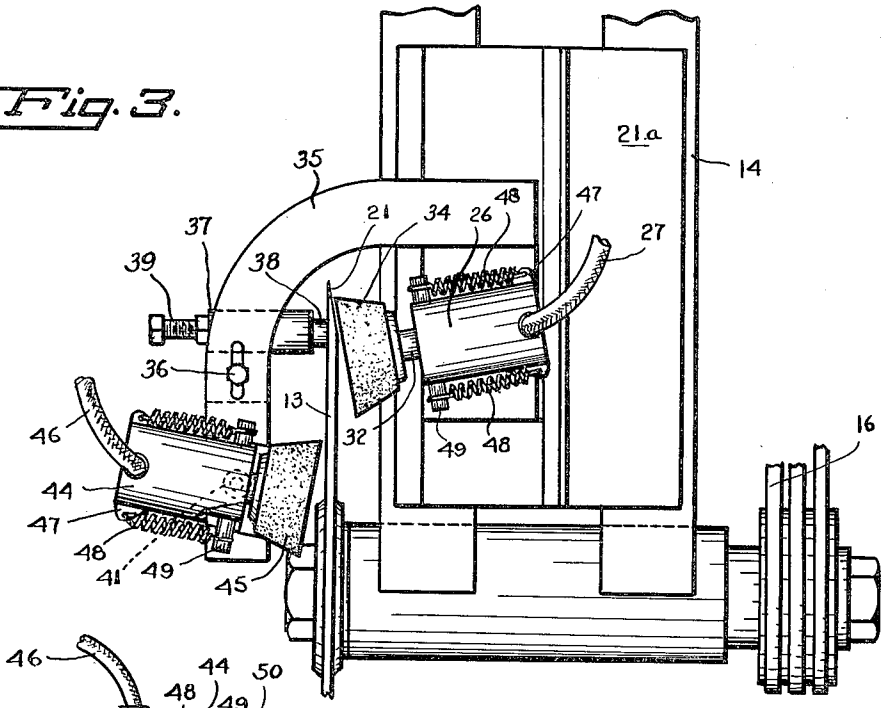
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SHARPENING DEVICE FOR CUTTING WHEELS

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Fig. 3.



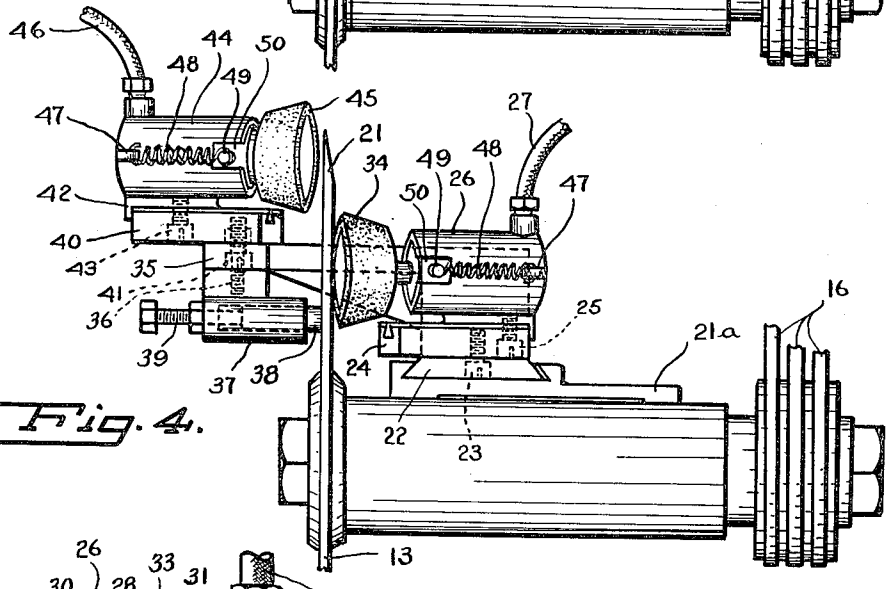


Fig. 4.

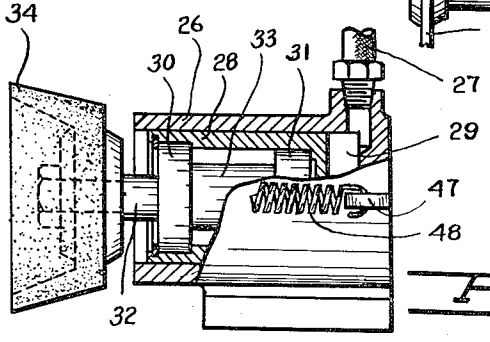


Fig. 5.

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SHARPENING DEVICE FOR CUTTING WHEELS

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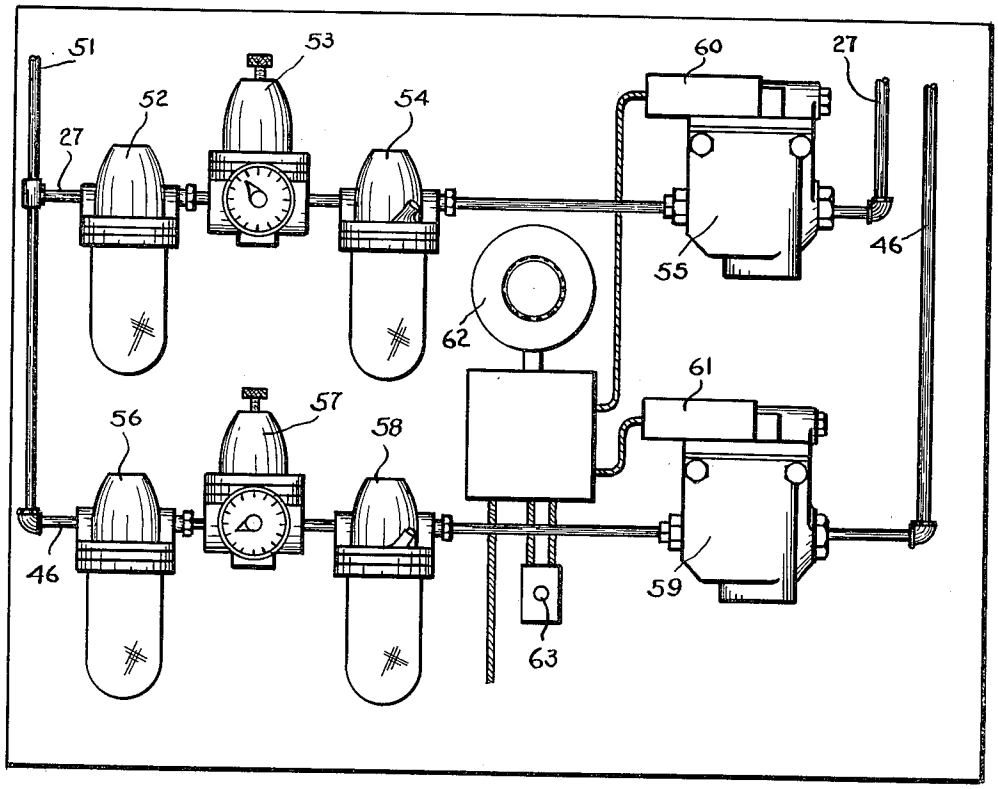


Fig. 6.

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2,766,566

SHARPENING DEVICE FOR CUTTING WHEELS

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Application August 26, 1953, Serial No. 376,578

4 Claims. (Cl. 51—248)

This invention relates to new and useful improvements in sharpening devices and relates particularly to such devices adapted for use in sharpening rotary cutters.

An object of the invention is to provide new and improved means for sharpening rotary cutters without removing the rotary cutters from operative position in the cutting machine.

Another object is to provide sharpening means of the type set forth which allows the sharpening of either one side or both sides of the cutter, as desired, and where both sides are to be sharpened, they may be sharpened simultaneously.

Another object is to provide an apparatus of the type set forth wherein the sharpening means may be employed to sharpen the cutter during the normal operation of the cutter.

Another object is to provide a device of the type set forth wherein the sharpening means may be operated automatically at predetermined intervals.

Another object is to provide new and improved sharpening means for rotary cutters of the type in which the cutter is mounted for oscillation relative to the work and whereby the cutter may be automatically sharpened without interfering with the normal cutting operation and at predetermined intervals during the operation of the cutter.

Other objects and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawings. It will be understood that changes may be made in the details of construction and arrangement of parts shown and described without departing from the spirit of the invention as set forth in the accompanying claims.

Referring to the drawings:

Fig. 1 is a front view of an apparatus embodying the invention;

Fig. 2 is a side view thereof;

Fig. 3 is a fragmentary top or plan view taken on line 3—3 of Fig. 2, looking in the direction of the arrows and on an enlarged scale;

Fig. 4 is a fragmentary front view generally similar to Fig. 1, but on an enlarged scale;

Fig. 5 is a front view, partially in section, of one of the grinding or sharpening elements; and

Fig. 6 is a schematic view showing one form of the pneumatic system which is adaptable for operating the grinding or sharpening elements.

The present invention relates particularly to new and improved means for sharpening the rotary cutter of a cutting machine such as is shown in my application, filed January 19, 1953, Serial Number 331,892, now Patent No. 2,752,999, for Automatic Cutting Machine, and which device is particularly adapted for cutting logs of paper or the like into predetermined length, although it will be apparent that the sharpening device of the present invention may be employed in connection with any rotary type cutter.

Referring more particularly to the drawings wherein similar reference characters designate corresponding parts throughout, the arrangement shown embodying the invention comprises a support 10 on which is positioned the endless carrier 11 adapted to carry logs of paper or other material 12 into position relative to the rotary

cutter 13 by which it is cut into sections of predetermined length.

The rotary cutter 13 is carried by the oscillating support 14 and is adapted to be rotated by motor 15 through belt drive 16.

The sectional carrier or support 11 is adapted to be actuated by motor 17 through gear 18 to carry the logs into cutting position and to carry the sections of the log away from such position.

The cutter support 14 is adapted to be oscillated through the arm 19 which is oscillated through the eccentric 20.

The foregoing apparatus is shown and described in detail in my previous application, Serial Number 331,892, now Patent No. 2,752,999, referred to above, and to which reference is made for further description thereof, as necessary.

The cutter 13 shown is of the type having a bevel 21 on one side thereof only. It will be understood that the invention is applicable to cutters having bevels on either one or both sides thereof, as desired.

In the form of the invention shown, the supporting plate 21*a* is carried by the support 14 and the support 22 is mounted in a dove tail in support 21*a* for adjustment thereon and is adapted to be locked in adjusted position thereon by lock screw 23.

Cross slide 24 is mounted for adjustment relative to support 22 and is adapted to be locked in adjusted position by lock screw 25. On cross slide 24 is carried cylinder 26 which is adapted to be connected through line 27 with a source of pneumatic power, as hereinafter described.

Within cylinder 26 is positioned cylinder 28 behind which is provided the working portion of the cylinder 29 which is in communication with line 27.

Journalled inside cylinder 28 is the ball bearing 30 and the thrust bearing 31 in which is positioned the shaft 32 having the spacer portion 33 formed integral therewith or separately as desired, and which portion is between ball bearing 30 and thrust bearing 31. At its outer end shaft 32 carries the grinding or sharpening member 34.

On support 22 is provided the arm 35 which extends around behind the opposite side of the cutter 13 and on the side of the cutter 13 opposite sharpening member 34 is positioned the adjustable support 37 which is adapted to be adjusted and locked in adjusted position by set screw 36, and in member 37 is positioned the plug 38 of wood or other similar material which is adapted to be urged towards cutter 13 by screw 39.

It is pointed out that because cutter 13 has only a single bevel 21 that the supporting plug 38 is provided behind cutter 13 opposite sharpener 34 to prevent any displacement of cutter 13 during the sharpening operation.

Adjacent the end of support 35 is provided the adjustable support or slide 40 adapted to be locked in adjusted position by set screw 41 and on support 40 is cross slide 42 adapted to be locked in adjusted position by set screw 43.

On support 42 is carried the cylinder member 44 which is similar to the cylinder member 26 previously described and the mechanism therein is similar to that previously described in connection with cylinder 26 which mechanism carries sharpening or grinding member 45.

It is pointed out that the cylinders 44 and 26 are mounted for pivotable adjustment on set screws 41 and 23 respectively.

Cylinder 44 is connected to pneumatic line 46 in the manner similar to the connection between cylinder 26 and pneumatic line 27.

Each of the cylinders 44 and 26 has connecting members 47 on opposite sides thereof to which are con-

nected springs 48 which at their opposite ends are connected to lugs 49 on cylinders 28 and which lugs are positioned within slots 50 in the opposite sides of the cylinders and are adapted to reciprocate in said slots 50 and to be moved toward the cutter by pneumatic force through the lines 46 and 27 and away from the cutter through the action of the springs 48 when the pneumatic pressure is reduced to a point below the spring force.

In the pneumatic system shown in Fig. 6, two separate systems are shown, one for each of the cylinders 44 and 26 respectively because in the arrangement shown with the cutter having but a single bevel, different operating pressures are preferably employed for actuating the sharpeners 45 and 34. In the arrangement shown, it has been found satisfactory to employ a pressure of twenty pounds for actuating the sharpener 45 on the side of the cutter opposite the bevel and an operating pressure of thirty-five pounds for actuating the sharpener on the side of the cutter 13 having the bevel. If the cutter had bevels on both sides, then the same pressure could be employed, as desired, on both sides thereby necessitating but a single pneumatic control system.

In the arrangement shown, the line 51 is connected to a pneumatic source and the branch 27 passes through the filter 52, pressure control valve 53 and automatic oiler 54 for the control valve 55.

The branch 46 passes through the filter 56, pressure control valve 57 and automatic oiler 58 to the control valve 59.

The control valves 55 and 59 are of the solenoid operated type adapted to be controlled by the solenoids 60 and 61 respectively and may be automatically controlled through the automatic timer 62 or manually operated by the push button control 63.

The manual operating switch 63 may be employed either alone or to bypass the automatic timer 62, as desired.

Where the automatic timer 62 is employed, it may be set to sharpen the cutter at predetermined time intervals automatically and these intervals may be changed in accordance with the type of cutting wheel employed or by material cut thereby.

In operation when the control valves 55 and 59 are operated by either the push button switch 63 or the automatic timer 62, air is forced through the lines 27 and 46 into the cylinders 26 and 44 respectively to urge the sharpening or grinding wheels 34 and 45 into engagement with the opposite edges of the cutter 13, either for such time as the push button 13 is held in operative position or for such length of time as the timer 62 is set, after which the pressure in the lines 27 and 46 is discontinued and the springs 48 pull the sharpeners 34 and 45 back away from engagement with the cutter.

The plug 38 may be retained in slight engagement with the side of the cutter 13 opposite sharpening wheel 34 by adjustment of screw 39 and thereby prevents deflection of cutter 13 upon engagement of sharpener 34 therewith.

It will be seen from the foregoing that with the present arrangement that the cutter 13 may be sharpened at intervals during its use without interfering with the normal operation of the cutter and without loss of working time on the part of the cutting machine.

From the foregoing it will be seen that I have provided simple, economical and efficient means for obtaining all of the objects and advantages of the invention.

I claim:

1. A sharpening device for a rotary cutter comprising at least one cylinder supported adjacent the periphery of said cutter having one end open, and one end closed, a piston slidably mounted in said cylinder, a shaft mounted for free rotation in said piston and having an end extending beyond the open end of said cylinder toward said rotary cutter, a grinding wheel fixed to said shaft end, means to normally retract said piston into said cylinder to pull said wheel from said cutter, a source of pneumatic pressure connected to said cylinder at its closed end to move said wheel toward and against said cutter, and an adjustable non-abrasive support positioned adjacent the periphery of the cutter opposite said grinding wheel to prevent deflection of said cutter by pressure of said grinding wheel thereagainst.

2. A sharpening device for a rotary cutter comprising at least one cylinder supported adjacent the periphery of said cutter having one end open, and one end closed, a piston slidably mounted in said cylinder, a shaft mounted for free rotation in said piston and having an end extending beyond the open end of said cylinder toward said rotary cutter, a grinding wheel fixed to said shaft end, means to normally retract said piston into said cylinder to pull said wheel from said cutter, a source of pneumatic pressure connected to said cylinder at its closed end to move said wheel toward and against said cutter, a timing device, and valve means controlled by said timing device installed between said source of pneumatic pressure and said cylinder to actuate said piston in said cylinder to press the grinding wheel against said cutter at predetermined intervals.

3. A sharpening device for a rotary cutter comprising at least one cylinder supported adjacent the periphery of said cutter having one end open, and one end closed, a piston slidably mounted in said cylinder, a shaft mounted for free rotation in said piston and having an end extending beyond the open end of said cylinder toward said rotary cutter, a grinding wheel fixed to said end, means to normally retract said piston into said cylinder to pull said wheel from said cutter, a source of pneumatic pressure connected to said cylinder at its closed end to move said wheel toward and against said cutter, a timing device, valve means controlled by said timing device installed between said source of pneumatic pressure and said cylinder to actuate said piston in said cylinder to press the grinding wheel against said cutter at predetermined intervals, and having means for adjusting the pneumatic pressure to vary the amount of material to be abraded during the sharpening cycle.

4. A sharpening device for rotary cutter having its edge bevelled on one face only, comprising a pair of cylinders supported adjacent the periphery of said cutter at each side thereof and each having one open, and one closed end, a piston slidably mounted in each said cylinder, a shaft mounted for free rotation in each said piston and each having an end extending beyond the open end of its cylinder toward said rotary cutter, a grinding wheel fixed to each said shaft end, means to normally retract said pistons into said cylinders to pull said wheels from said cutter, a regulated source of pneumatic pressure connected to said cylinders at their closed ends to move said wheels towards and against said cutter, the pneumatic pressure to the cylinder on the bevelled side of the cutter being greater than that on the flat side.

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