Aug. 23, 1960 E. R. MILLS 2,949,801

AUTOMATIC WIPER FOR ROTARY BLADE

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Fig. 1

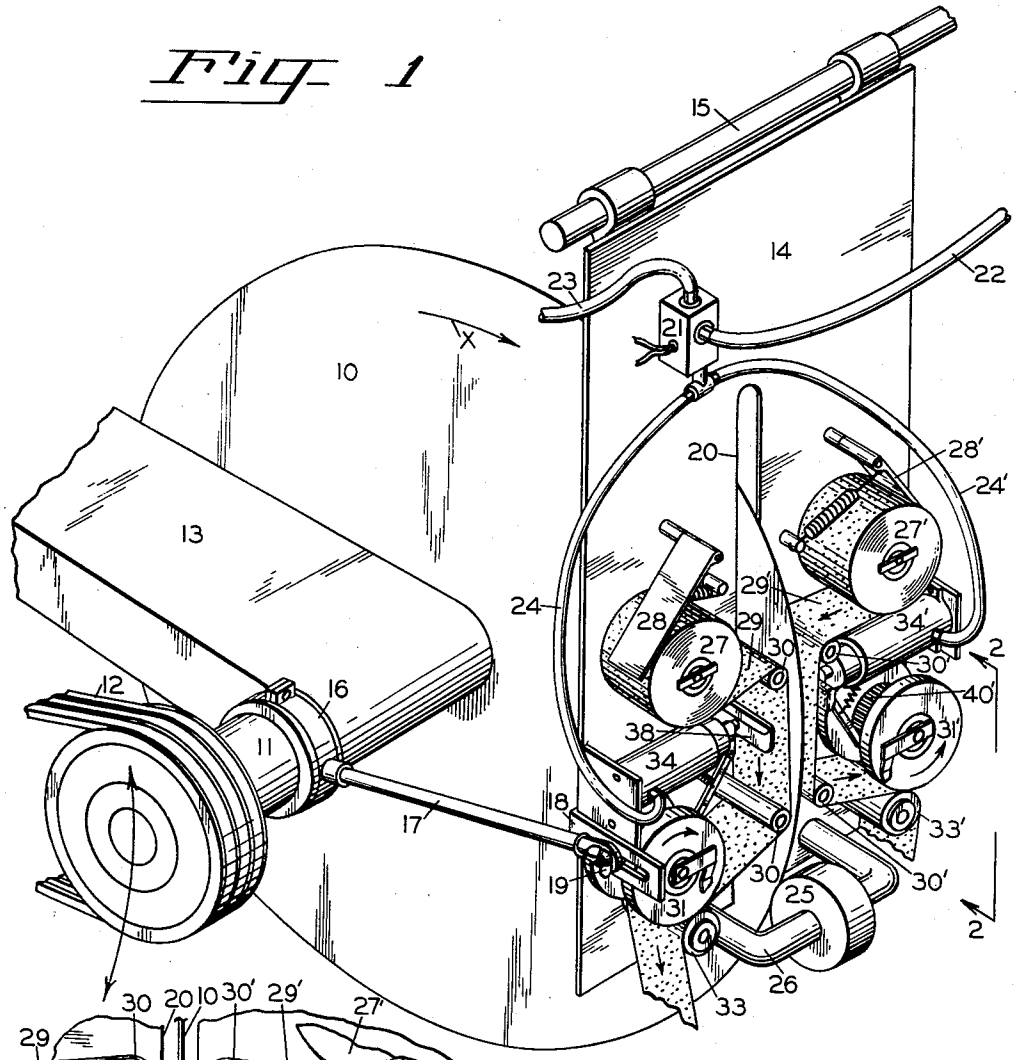
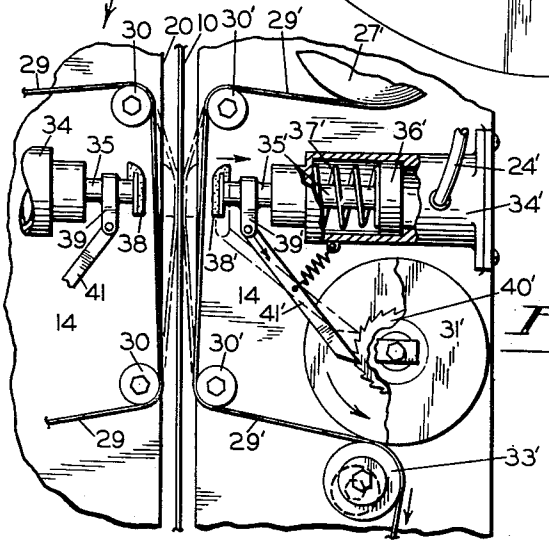


Fig. 2



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AUTOMATIC WIPER FOR ROTARY BLADE

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5 Claims. (Cl. 83—168)

This invention relates to rotary cutters which require frequent grinding or sharpening while in use, and relates in particular to the so-called rotary saws which are employed in the paper mills for cutting long rolls of tissue into the customary toilet roll size.

In order to keep such cutters or roll tissue saws operating at maximum efficiency, and thus enabling them to make quick cuts through the tissue rolls in rapid succession, it is customary to give the cutting edges of the blades a momentary sharpening every few minutes. One way in which such sharpening is accomplished without loss of operating time on the part of the tissue saws is by means of pairs of grinding elements which are momentarily pressed against the opposite faces of the cutting edge respectively, such operation of the grinders taking place intermittently and preferably automatically. A grinding assembly of this type which has come into extensive use includes a pair of grinders operated automatically at regular intervals every few minutes by compressed air under electric controls. Oil is applied to both faces of the cutter to facilitate the cutting action.

A serious problem occasioned by such sharpening of the rotary cutters or tissue saws arises from the fact that with each grinding some grinding particles and some oil remain on the blades and this residue is then deposited on the cut edges of the first rolls encountered by the blades immediately following their sharpening. This frequently produces sufficient soiling along the cuts to necessitate discarding some of the cut rolls.

An object of the present invention is to provide suitable means for wiping such grinding particles and oil from the cutter blade after each sharpening operation so as to prevent such residue from being deposited on the rolls which are cut.

A related object of the invention is to provide blade wiping means which will wipe both sides of the blade simultaneously.

A further object is to provide such blade wiping means which will operate entirely automatically and in proper synchronization with the blade sharpening means so as not to cause any operating time to be lost by the blade in the wiping of the blade.

The manner in which these objects are achieved with the blade wiper constituting the present invention, and the construction and method of operation of such blade wiper will be briefly explained and described with reference to the accompanying drawings, wherein:

Fig. 1 is a perspective view of the automatic wiper, showing the same mounted in operating position with respect to the rotating blade; and

Fig. 2 is a fragmentary elevation drawn to a larger scale and taken on the line indicated at 2—2 in Fig. 1, with some portions broken away and parts shown in section for the sake of clarity.

Referring first to Fig. 1, the rotary blade or tissue saw **10** is secured on a shaft **11** which is driven by belt connection **12** with suitable driving means (not shown) causing the blade to rotate rapidly in the clockwise direction

indicated by the arrow *x*. The blade shaft **11** is rotatably mounted in a support arm **13** which is swung rapidly up and down in an arc by suitable means (not shown) so as to cause the blade to be raised after each roll-cutting operation and immediately lowered for the next roll-cutting operation in the usual manner.

The automatic grinders for the two faces of the rotating blade are omitted from the drawing for clarity, since such grinders are old and well known and form no part of the present invention. It is to be understood, however, that such grinders are operated in the usual manner by compressed air from a suitable source.

The blade wiping assembly is mounted on a plate **14** which is pivotally supported from a stationary shaft **15**, this shaft being parallel to the blade shaft **11**. The blade shaft **11** carries a split bearing collar **16** with which one end of a rod **17** is connected. The other end of the rod **17** is adjustably attached to a bracket **18** on the plate **14**, this rod being attached to the bracket by suitable means such as the clamping bolt and wing nut **19** shown. The plate **14** has a central slot **20** to provide a passageway for the edge of the blade **10**. A bumper roll **25** is rotatably mounted on a support bracket **26** near the bottom of the plate **14**. This bumper roll has a surface of rubber or other soft resilient material and its purpose is to serve as a safety stop for limiting the movement of the plate **14** with respect to the blade **10** to prevent any possible damage to the blade, and also to minimize the hazard when any maintenance work is being done on the wiper assembly.

An electrically-operated, one-way control valve assembly **21** is supported on the plate **14** and is connected with a suitable source (not shown) of air under pressure by a main air line **22**. A branch air line **23** connects with the grinders, and the branch air lines **24** and **24'** connect with air cylinders in the wiper assembly to be described presently.

A pair of supply rolls **27** and **27'** of blade-wiping material, such, for example, as soft paper or tissue, for the blade are rotatably supported on the plate **14** on opposite sides of the blade respectively and in the relative positions shown in Fig. 1. The supply of tissue **29** from the roll **27** is passed over a pair of guide rolls **30**, **30** and drawn between a draw roll **31** and a squeeze roll **33**. Similarly the tissue **29'** from the supply roll **27'** is passed over the pair of guide rollers **30'**, **30'** and drawn between the draw roll **31'** and squeeze roll **33'**, on the opposite side of the rotating blade. Spring-pressed friction plates **28** and **28'** bear against the supply rolls **27** and **27'** respectively to prevent the tissue from becoming loose on the supply rolls and to prevent inadvertent rotation of the supply rolls. The squeeze rolls **33** and **33'** are rotatably mounted on shafts which in turn are supported by means (not shown) causing the squeeze rolls normally to bear against the respective draw rolls but enabling the squeeze rolls to be moved a slight distance away from the draw rolls when the wiping material is being mounted in place.

A pair of air cylinders **34** and **34'** are mounted on the plate **14**, also on opposite sides of the blade respectively, as shown in Fig. 1. Each cylinder has a piston, the piston for the cylinder **34'** being shown in Fig. 2 and designated by the reference character **36'**. A similar piston is carried in the cylinder **34** but it is not shown in the drawings. The pistons in the cylinders **34** and **34'** have piston rods **35** and **35'** respectively which extend towards the cutter blade and which carry pushers **38** and **38'** respectively at their outer ends. These pushers bear against the wiping tissue **29** and **29'** respectively in the space between the pairs of guide rollers **30**, **30** and **30'**, **30'** respectively. Preferably the pushers **38** and **38'** are covered with soft or resilient material, inasmuch as their

purpose is to push the wiping tissue from time to time into contact with the respective faces of the blade.

Air under pressure is delivered at regular intervals into the ends of the cylinders **34** and **34'** through the air lines **24** and **24'** respectively, with the automatic operation of the valve control assembly **21**, and the delivery of the air into the cylinders forces the pistons, piston rods and pushers to move towards the respective faces of the blade **10** and thus causes the wiping tissue to be brought into contact with the two faces of the rotating blade. A spring engages the piston in each cylinder, the spring **37'** in cylinder **34'** being shown in Fig. 2. A similar spring bears against the piston in cylinder **34** but is not shown. These springs cause the pistons, piston rods and pushers to move in opposite direction away from the blade when the air pressure in the cylinders is relieved.

In order to provide clean sections of the wiping tissue for contact with the blade faces each time the pushers **38** and **38'** bring the wiping tissue into contact with the blade, the draw rolls **31** and **31'** are driven slowly intermittently and, with the assistance of the respective squeeze rolls **33** and **33'**, draw the strips of wiping tissue down from the respective supply rolls and over the ends of the pushers. For the purpose of operating these draw rolls each draw roll is attached to a ratchet wheel which is actuated by a pawl link connected with the piston rod of the respective cylinder. The collars **39** and **39'** (Fig. 2) are secured on the piston rods **35** and **35'** respectively and in turn carry the pawl links **41** and **41'**. The ratchet wheel **40'** for the draw roll **31'** is shown in Fig. 2, and it will be apparent from this figure that each time the piston rod **35'** moves from left to right under the force of the spring **37'** the ratchet wheel **40'**, and therewith the draw roll **31'**, will be caused to turn slightly in counter-clockwise direction. A similar ratchet wheel (not shown) attached to the draw roll **30** and actuated by the pawl link **41**, moves the draw roll **30** correspondingly in clockwise direction.

The operation of the wiper assembly will now be apparent. Whenever the air supply valve is opened and air under pressure causes the grinders to operate, a supply of air will also be delivered to the cylinders **34** and **34'** moving the piston rods and pushers towards the rotating blade **10** and causing the wiping tissue to be pressed against the faces of the blade. The pushers hold the tissue in contact with the blade for a short time after each grinding due to the operation of a one-way flow control air valve which causes the air to be exhausted slowly from the cylinders after the cylinders have been actuated, thus holding the pushers and tissue against the blade long enough to clean the blade completely from any grinding residue.

Since the plate **14** is hingedly supported on the stationary shaft **15** and is connected with the blade shaft and moving support for the blade by the rod **17**, the plate **14** will oscillate slightly in a substantially horizontal direction with the up and down arcuate movement of the rotating blade. This additional relative movement of the wiping assembly insures the wiping of the faces of the blade completely, not only at the cutting edge but also over the adjacent area on which there may be any grinding particles or oil, and aids in providing the desired positive cleaning of the blade immediately after each grinding before the blade enters upon its next cutting operation. Also the mounting of the plate **14** and the entire wiping assembly on the stationary shaft **15** instead of on a shaft supported on the moving arm for the blade shaft causes only a minimum oscillating inertia load to be placed on the up and down movement of the rotating cutting blade. When access to the rotating blade is desired the disconnecting of the rod **17** enables the plate and entire wiping assembly to be swung up away from the blade. Minor modifications in the mechanism of the blade wiping assembly would be possible without departing from the principle of the invention, but that which is illustrated and described is considered the preferred means for controlling the feeding of the wiping tissues and for bringing them intermittently into wiping contact with the two faces of the blade.

I claim:

1. In a wiping assembly for a driven rotating cutter blade, a pair of supply rolls of blade-wiping material, supporting means for said supply rolls on opposite sides of said blade respectively, guide means for guiding the blade-wiping material from each of said supply rolls in paths along opposite sides of said blade respectively, means for moving the wiping material over said guide means, a pair of elements engaging the wiping material on opposite sides of said blade respectively and intermittently thrusting said material into contact with the respective faces of said blade, and means for operating said elements.

2. In a wiping assembly for a driven rotating cutter blade, a pair of supply rolls of blade-wiping material, supporting means for said supply rolls on opposite sides of said blade respectively, guide rollers on said supporting means for guiding the blade-wiping material from each of said supply rolls in paths along opposite sides of said blade respectively, means on said supporting means for moving the wiping material over said rollers, a pair of pushers engaging the wiping material on opposite sides of said blade respectively and intermittently thrusting said material into contact with the respective faces of said blade, and means on said supporting means for operating said pushers.

3. In a wiping assembly for a driven rotating cutter blade, a mounting plate extending in a plane perpendicular to the plane of said rotating blade, means for supporting said plate, said plate having a slot, a portion of said blade extending through said slot, a pair of supply rolls of blade-wiping material mounted on said plate on opposite sides of said blade and said slot respectively, guide rollers on said mounting plate for guiding the blade-wiping material from each of said supply rolls in paths along opposite sides of said blade respectively, means including a pair of draw rolls on said mounting plate on opposite sides of said blade respectively, for moving the wiping material over said rollers, a pair of elements engaging the wiping material on opposite sides of said blade respectively and intermittently thrusting said material into contact with the respective faces of said blade, and means on said plate for operating said elements and for operating said draw rolls.

4. In a wiping assembly for a driven rotating cutter blade of the character described mounted on a shaft and oscillating in a fixed plane, a mounting plate extending in a plane perpendicular to the plane of said rotating blade, said plate pivotally supported from a stationary shaft extending parallel to the shaft of said blade, said plate having a slot, a portion of said blade extending through said slot, positioning means connecting the free end of said plate with said blade shaft, a pair of supply rolls of blade-wiping material mounted on said plate on opposite sides of said blade respectively, guide means on said mounting plate for guiding the blade-wiping material from each of said supply rolls in paths along opposite sides of said blade respectively, means for moving the wiping material over said guide means, a pair of pushers engaging the wiping material on opposite sides of said blade respectively and intermittently thrusting said material into contact with the respective faces of said blade, and means for operating said pushers.

5. A wiping assembly for a driven rotating cutter blade of the character described mounted on a shaft and oscillating in a fixed plane, said assembly including a mounting plate extending in a plane perpendicular to the plane of said rotating blade, said plate pivotally supported from a stationary shaft extending parallel to the shaft of said blade, said plate having a slot, a portion of said blade

extending through said slot, plate positioning means connecting the free end of said plate with said blade shaft, a pair of supply rolls of blade-wiping material mounted on said plate on opposite sides of said blade respectively, guide rollers on said mounting plate for guiding the blade-wiping material from each of said supply rolls in paths along opposite sides of said blade respectively, means on said mounting plate on opposite sides of said blade respectively for moving the wiping material over said guide rollers, a pair of pushers engaging the wiping material on opposite sides of said blade respectively and intermittently thrusting said material into contact with the respective faces of said blade, a pair of air cylinders and pistons supported on said plate on opposite sides of said blade respectively for operating said pushers, and means connected with said cylinder pistons for operating said means for moving said wiping material over said guide rollers.

No references cited.