June 1, 1965 P. WATERHOUSE 3,186,282

SLITTER FOR PAPER WINDER OR REWINDER

Filed Aug. 16, 1962 3 Sheets-Sheet 1

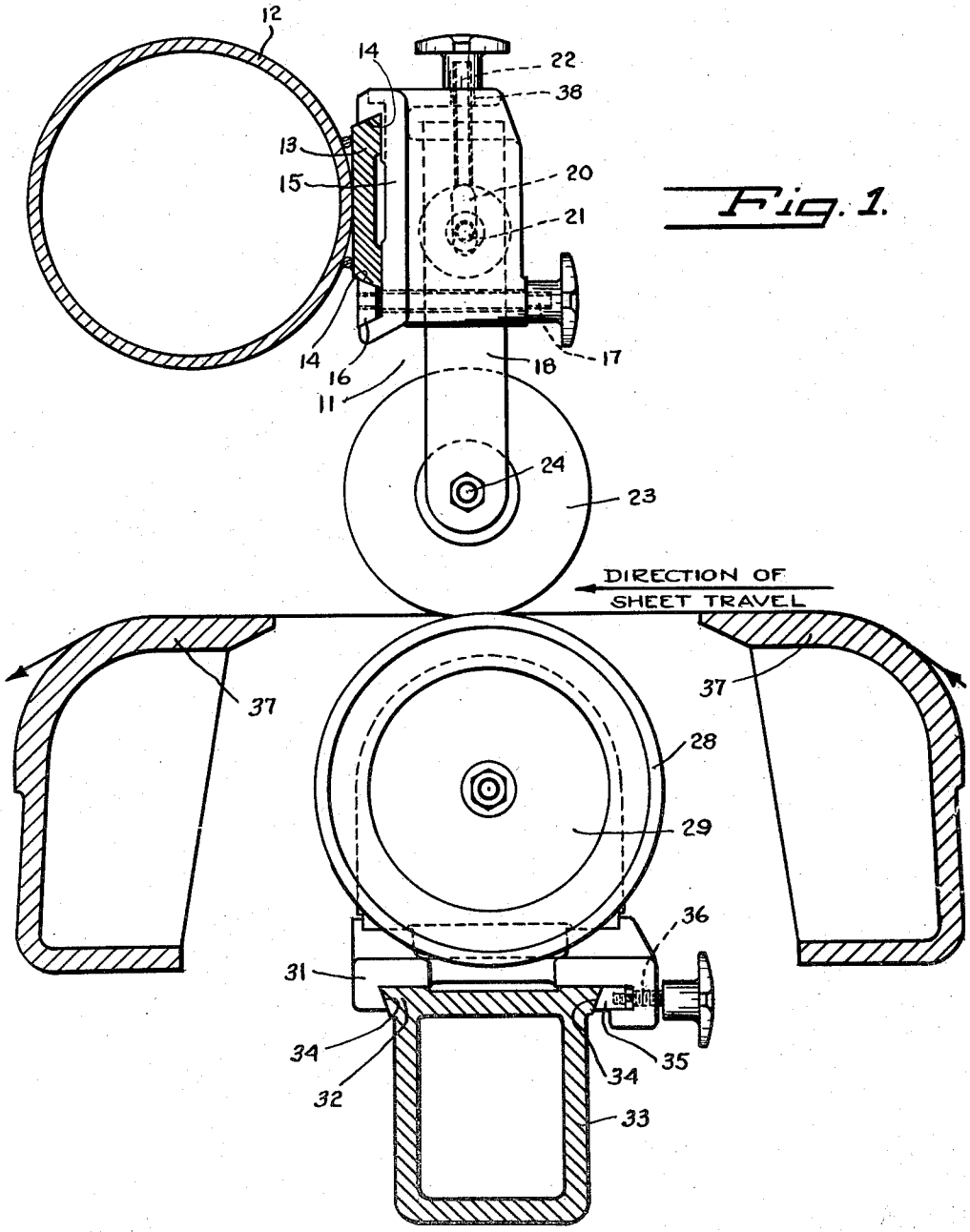


Fig. 1.

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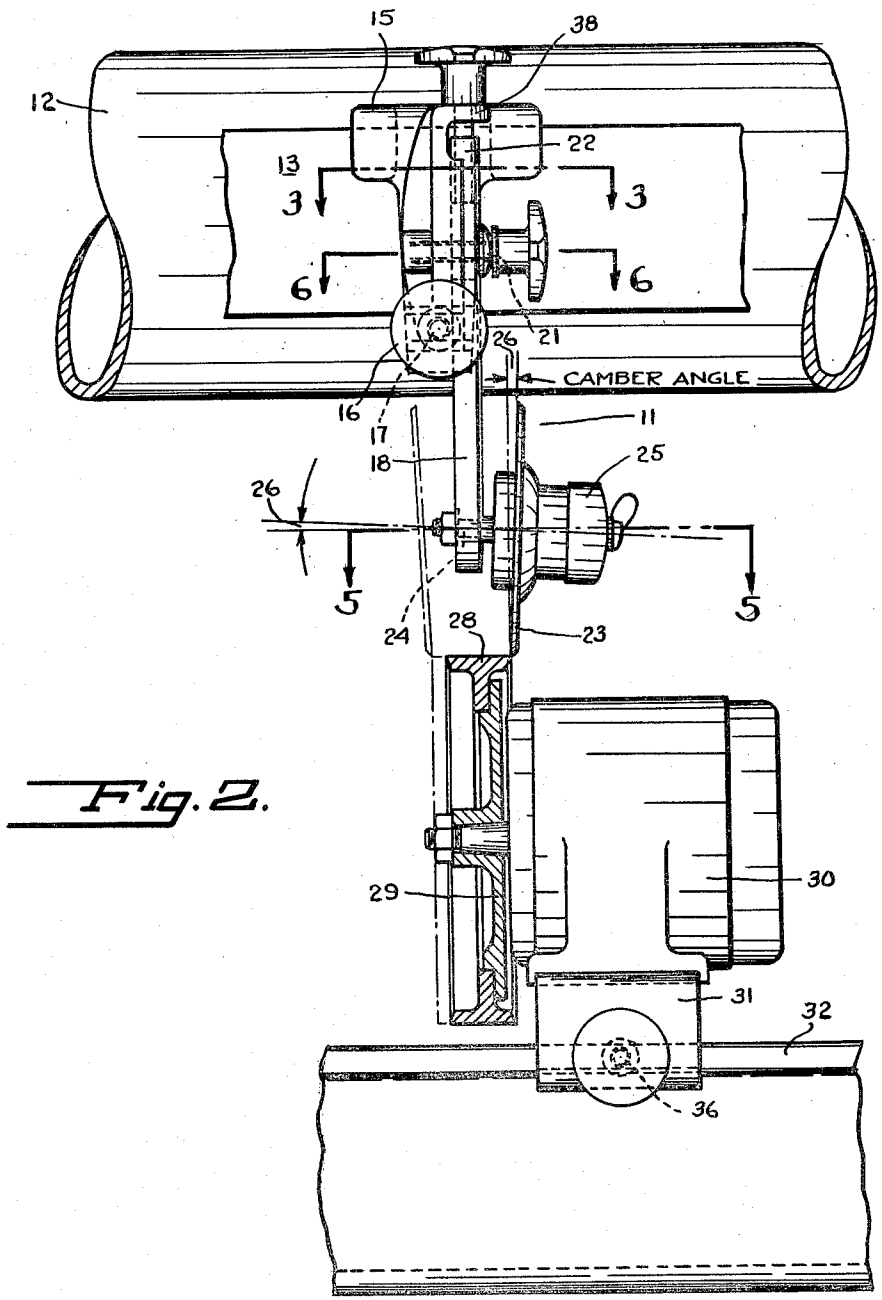


Fig. 2.

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Filed Aug. 16, 1962 3 Sheets-Sheet 3

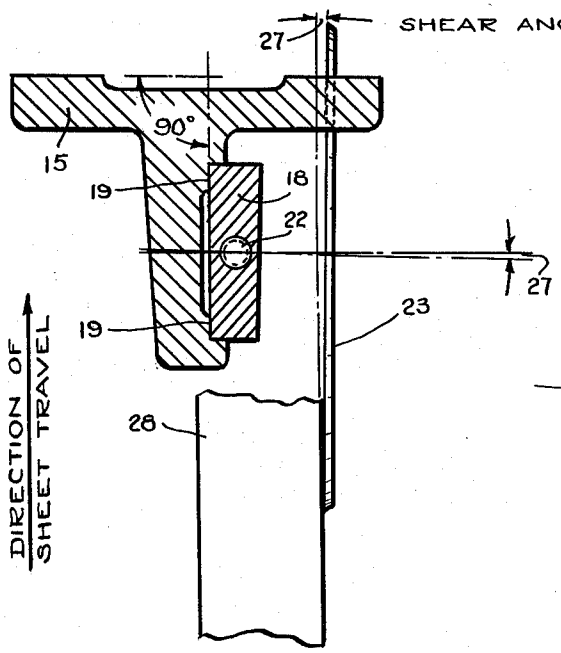


Fig. 3.

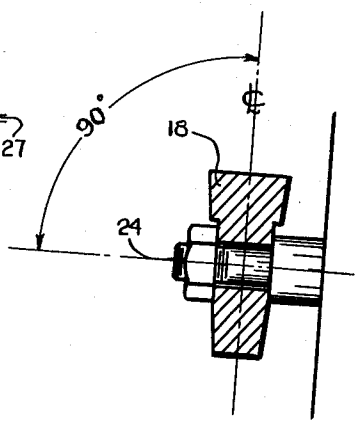


Fig. 5.

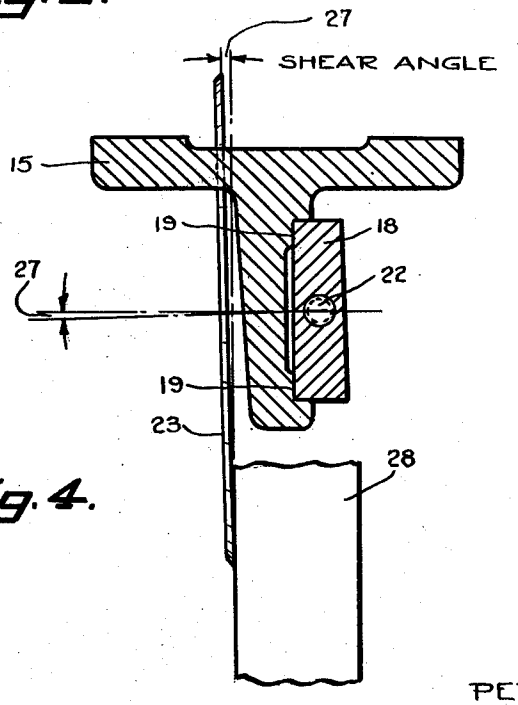


Fig. 4.

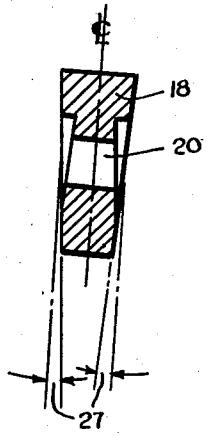


Fig. 6.

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3,186,282

SLITTER FOR PAPER WINDER OR REWINDER

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2 Claims. (Cl. 83—497)

This invention relates to slitters for winders or rewinders in which a web of material such as paper is slit lengthwise for winding into finished rolls whose width is a fraction of the width of the web.

Such a slitter should make a clean, straight dust-free cut and should do this consistently, with minimum outage for maintenance.

The slitter blade is a bevel-edged circular disc, freely journaled for rotation; it cooperates with one edge of a double-edged rotary bottom slitter band, in a manner similar to the way in which one blade of a pair of scissors or shears cooperates with the other in shearing a web or sheet of material.

The bottom slitter band is a T-section circular rim mounted on a power-driven hub whose axis of rotation is parallel with the winder drum axes. This T-section rim is formed with concave conical flanks, so that the peripheral edges are slightly acute-angled.

The slitter blade, offset to one side of the bottom slitter band, overlaps it slightly as viewed axially. The axis of rotation of the slitter blade is not parallel with the axis of the bottom slitter band but is at a small compound angle. This compound angle is made up of the "camber" and the "shear angle." The "camber" is apparent to a viewer looking along the line of motion of the paper and the "shear angle" is apparent to a viewer looking along a line normal to the paper. The slitter blade is urged axially, usually by a spring, into contact with one of the acute-angled peripheral edges of the bottom slitter band.

The slitter blade, located above the web and freely journaled, is easily removable for sharpening. The bottom slitter band, on the other hand, being located below the web and power driven, is less accessible for removal. However, in the case of the bottom slitter band, necessity for sharpening arises less frequently than for the slitter blade because the former is of greater diameter, the functional edge angle is coarser, and it may be made with two functional edges of which only one is used at a time.

It is customary, when one edge of the bottom slitter band has become dulled, to move the bottom slitter band axially so as to bring its other edge into the plane of the slit, and then to relocate the slitter blade so that it will cooperate, at the correct compound angle, with the second edge of the bottom slitter band.

With contemporary slitters, the time taken to switch over from the dull edge of the bottom slitter band to the other edge is largely made up of the time taken to re-establish the correct camber and shear angles of the reversed slitter blade.

The object of this invention is to reduce the time and the difficulty of switching over from one edge of the bottom slitter band to the other.

This object is achieved by elimination of the necessity of re-setting the camber and shear angles. These angle settings are so built into the supporting means for the slitter blade journal that they are carried undisturbed, but reversed in sign when the slitter blade is relocated on the other side of the bottom slitter band.

The manner in which the objects of the invention are achieved will be apparent by reference to the folowing description and drawings, in which:

FIG. 1 shows a side elevation of a slitter blade and bottom slitter band assembly embodying the present invention.

FIG. 2 shows a front elevation corresponding with FIG. 1, looking in the direction of sheet travel.

FIG. 3 is an enlarged section on 3—3 of FIG. 2 and shows specific details of the invention. In this view the axis of the bottom slitter band has been moved further away from the axis of the slitter blade, to show more clearly the shear angle setting between the slitter blade and the bottom slitter band.

FIG. 4 is a section similar to FIG. 3, but showing the slitter blade assembly reversed to cooperate with the other cutting edge of the bottom slitter band.

FIG. 5 is an enlarged section on 5—5 of FIG. 2, showing exaggerated, the slitter blade shaft at 90° to the centre line of the slitter post; and

FIG. 6 is an enlarged section on 6—6 of FIG. 2, showing the slitter post only, with angles exaggerated for clarity.

With reference now to the figures, the slitter blade assembly, shown generally at **11**, is slidably carried on transverse support member **12** by dovetail bar **13** which is fixed to support member **12**, and the upper half of dovetail groove **14** formed in slitter blade mounting bracket **15**. The lower half of dovetail groove **14** is formed by one side of wedge **16**, which also serves as the means for locking slitter blade assembly **11** to dovetail bar **13**, when locking screw **17** is tightened. Thus, to change the position of slitter blade assembly **11** axially along transverse support member **12**, locking screw **17** is loosened and the assembly moved to the required position. Locking screw **17** is then retightened.

Slitter post **18** is mounted in recess **19** in mounting bracket **15** (see FIG. 3) and is adjustable vertically by means of slot **20** in slitter post **18**, clamping screw **21** and vertical adjusting screw **22**. The back face of recess **19** is normal to support member **12**.

Slitter blade **23** is rotatably mounted on shaft **24** and is urged axially towards slitter post **18** by spring assembly **25**.

Shaft **24** is non-rotatably positioned on the lower end of slitter post **18** to give the required slitter blade compound angle, consisting of camber angle **26** and shear angle **27**.

Bottom slitter band **28** is positioned below, and cooperates with, slitter blade **23** to provide the necessary shearing action, with spring assembly **25** providing the necessary shearing pressure between slitter blade **23** and bottom slitter band **28**. Bottom slitter band **28** is mounted on hub **29** which is journaled on the shaft of driving motor **30**.

Driving motor **30** is attached to mounting plate **31** which is slidably mounted on dovetail **32** formed by the upper surface of transverse support member **33**. One half of dovetail groove **34**, which cooperates with dovetail **32**, is formed in mounting plate **31** and the other half of dovetail groove **34** is formed by wedge **35**. Wedge **35** also serves as the means for locking the bottom slitter band assembly to dovetail **32** on transverse support member **33**, when locking screw **36** is tightened.

Draw-tables **37** support and position the sheet as it passes through the slitters.

Vertical adjusting screw **22** is positioned in slot **38** formed in the top flange of mounting bracket **15**. Therefore, when it is required to reposition slitter blade **23** to cooperate with the other cutting edge of bottom slitter band **28**, clamping screw **21** is withdrawn and slitter post **18**, complete with slitter blade **23**, is turned through 180°, plus or minus twice the shear angle **27**, and replaced in recess **19**. Then clamping screw **21** is replaced and tightened. Vertical adjusting screw **22** passes out through slot **38** and so is returned, maintaining the same vertical setting of slitter post **18** and slitter blade **23**.

Shaft 24 is positioned in slitter post 18 at a fixed angle of camber 26 as viewed in the direction of sheet travel, and at 90° to the centre line of slitter post 18 as viewed along a line normal to the direction of sheet travel (see FIG. 5). Therefore, when slitter post 18 is reversed to present its alternate face to recess 19 of mounting bracket 15, the shear and camber angles are maintained but reversed in sign, and slitter blade 23 is in correct position for cooperating with the other cutting edge of bottom slitter band 28 to provide shearing action.

The main advantage of the present invention over contemporary arrangements for providing the same result, is that the operation of reversing the slitter blade to utilize both cutting edges of the bottom slitter band is accomplished simply and quickly, without the need for slitter blade angle readjustments.

Another advantage is that it is possible to obtain extreme accuracy in camber and shear angle settings, due to the fact that the operator has no adjustments to make, and that complete interchangeability and spares replacement may be effected without losing the accuracy of the blade angle settings.

Still another advantage is that vertical adjustments may be made to compensate for slitter blade wear without upsetting the shear angle setting.

From the foregoing it will be seen that new and improved means have been provided for accomplishing all of the objects and advantages of this invention.

I claim:

1. A slitter for slitting a web moving in a given direction of motion, said slitter comprising: a circular slitter band mounted for rotation on a first axis located on one side of said web parallel thereto and transverse to said direction of motion, said slitter band having first and second axially spaced outer cutting edges; a circular slitter blade mounted for rotation on a second axis located on the opposite side of said web, said second axis making a shear angle with said first axis, said shear angle being apparent when said slitter is viewed along a line normal to said web, said slitter blade having an outer sharp edge; a fixed mounting bracket having a mounting surface; a mounting post supporting said slitter blade, said mounting

post having a first clamping surface on one side and a second clamping surface on the opposite side, said first clamping surface being non-parallel with and at a predetermined angle with said second clamping surface; means for clamping said mounting post with either said first or said second clamping surface against said mounting surface, said clamping surfaces being so related to said second axis that when said first clamping surface is clamped against said mounting surface, said sharp edge is in shearing cooperation with said first cutting edge and shear angle has a pre-selected magnitude, and when said second clamping surface is clamped against said mounting surface, said sharp edge is in shearing cooperation with said second cutting edge and said shear angle is maintained at said pre-selected magnitude but is reversed in sign.

2. A slitter as defined in claim 1, characterized by said second axis making a camber angle with said first axis, said camber angle being apparent when said slitter is viewed in said direction of motion, said clamping surfaces being so related to said second axis that when said first clamping surface is clamped against said mounting surface, said camber angle has a desired magnitude, and when said second clamping surface is clamped against said mounting surface, said camber angle is maintained at said desired magnitude but is reversed in sign.

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