Aug. 18, 1964 A. E. BROUGHTON 3,144,674

DOCTOR BLADE RETAINER

Filed Jan. 3, 1963

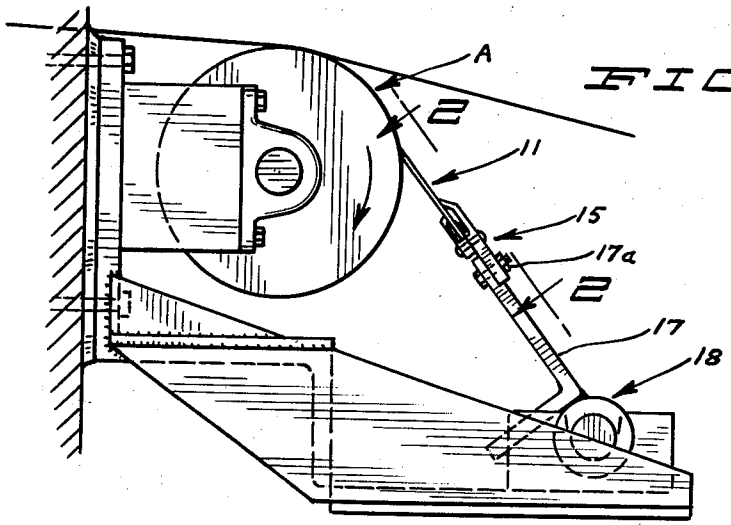


FIG. 1

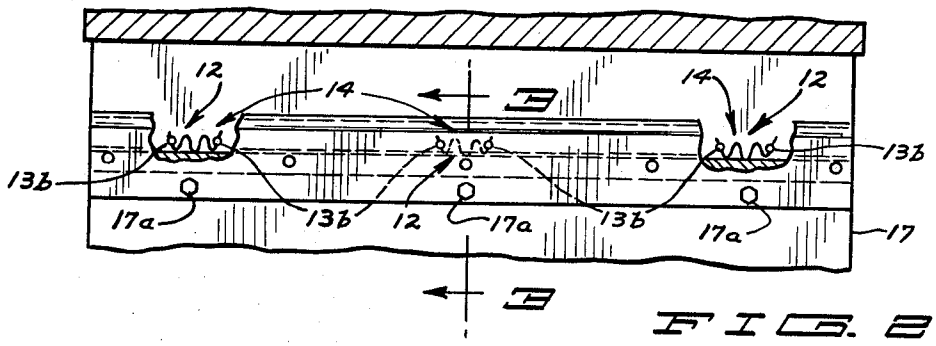
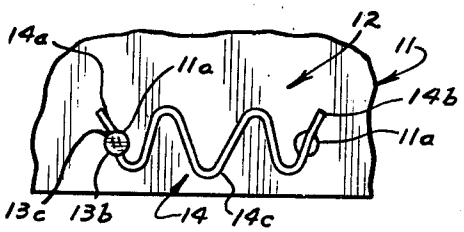


FIG. 2

FIG. 4



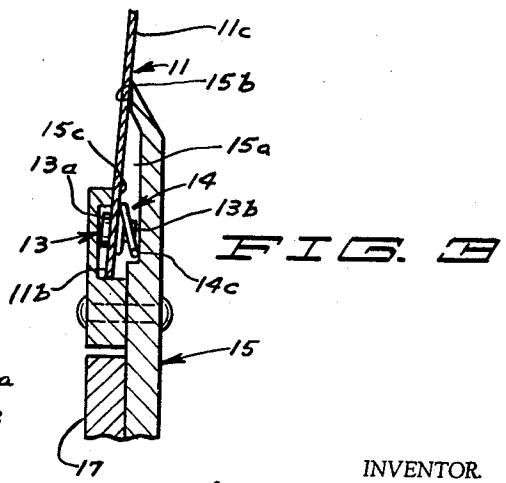


FIG. 3

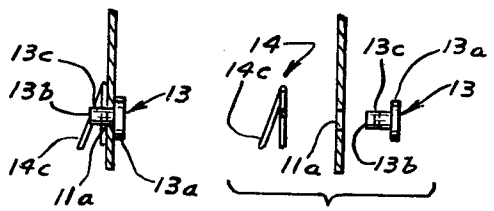


FIG. 6

FIG. 5

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DOCTOR BLADE RETAINER

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This invention relates generally to doctor blades used in the papermaking industry and more specifically to a spring clip for removably mounting a doctor blade on a doctor blade holder.

In papermaking machinery, it is necessary to maintain rollers in a very clean condition so that particles which may otherwise collect thereon will not leave their impression on the surface of paper sheets passing thereon. For this reason, a doctor blade is provided at certain of these rolls which is supported adjacent the surface of the roll and will scrape any foreign particles therefrom so as to present a smooth surface over which the paper passes.

A doctor blade comprises a long strip of metal which extends the entire length of a roller and is flexible so as to conform to the shape thereof to scrape the roll absolutely clean. The blade is held in proper relation to the roll in a doctor blade holder and is usually provided with an attachment spring positively riveted to the blade to resiliently hold the blade in proper relation to the holder. In order to efficiently clean the roller, it is necessary to periodically grind the scraping edge of the doctor blade. For the grinding operation, the blade must be securely and accurately positioned. It is necessary to remove the blade from the holder and remove the attached spring means. Since it has long been the practice to rivet these spring elements to the doctor blade, removal has been a time-consuming and difficult task, particularly because the blade must not be damaged during this operation.

Applicant has devised a new and unique method of attaching these spring elements to a doctor blade which will maintain the desired position of the blade within the holder and also be easily removable therefrom to facilitate grinding of the blade and further will permit reuse of the spring and anchoring elements thereby substantially reducing replacement cost and time.

In order to provide a reusable and easily removable blade retaining spring and means for attaching the spring to a doctor blade, applicant has devised spring retaining means which are held onto the blade by providing a portion of the spring itself to cooperate with and maintain the elements in proper relation to the blade.

It is an object of this invention to provide a doctor blade spring clip to hold the doctor blade in proper position within a doctor blade holder in which the spring clip is formed to provide tension in both a horizontal and a vertical plane.

It is a further object of applicant's invention to provide a spring clip held in relation to a doctor blade by retaining pins, said pins and spring being readily removable therefrom in such a manner as to facilitate removal of the blade.

It is a specific object of applicant's invention to provide a retaining pin including a head portion and a body portion of substantially smaller diameter than said head portion and having a passage formed diametrically through said body portion to receive one end portion of a resilient spring member to secure the pin and spring to a doctor blade and thus resiliently mount the blade in its holder.

It is a further specific object to provide a doctor blade spring and pin assembly wherein the body portion of the pins respectively pass through passages in a doctor blade maintaining the head of the pin on one side of the blade and the spring on the other with the ends of the spring clip being provided to interfit with a passage through the body portion of said pin on said other side of the blade, thus maintaining the pins and spring in blade anchoring position.

These and other objects of the present invention will become apparent to those skilled in the art upon a study of the following specification, appended claims and accompanying drawing, in which:

FIG. 1 is an elevational view of a doctor blade positioned in relation to a roll of a papermaking machine;

FIG. 2 is a partial section view taken substantially along line 2—2 of FIG. 1 with portions broken away;

FIG. 3 is a transverse section view taken substantially along the line 3—3 of FIG. 2;

FIG. 4 is a plan view of a fragmentary portion of a doctor blade and spring with one pin removed and drawn to an enlarged scale;

FIG. 5 is a transverse sectional view showing the assembled spring blade and pin; and

FIG. 6 is an exploded view of the parts shown in FIG. 5.

In my invention for mounting a doctor blade **11** on a holder **15**, the holder **15** is secured to an angular support **17** as by screw fasteners **17***a*. The support **17** is mounted on a journal member **18** in a manner to permit the blade **11** to be shifted into and out of engagement with a rotating paper roll A.

More specifically, the blade **11** is retained in the holder **15** by providing a plurality of spaced apart clip assemblies each generally designated by the numeral **12** wherein each assembly is provided with a pair of spaced apart pin members **13** firmly attached and held to the blade **11** by the attachment portion of a resilient spring member **14**.

As best shown in FIGS. 5 and 6, the pin members **13** are provided with an enlarged head portion **13***a* and a substantially smaller body portion **13***b* designed to be received within a passage **11***a* through the blade **11**. The body portion **13***b* of the pin **13** is further provided with a diametrically oriented passage **13***c* therethrough so as to receive one of the attachment portions of the spring **14** such as the end **14***a* as shown in FIG. 4, the other end forming a second attachment portion and being designated **14***b*. The endmost portions **14***a* and **14***b* of the spring **14** have slight bends therein to produce a resilient interference fit when received in the passage **13***c* such that a snap action will be produced on assembly thereof and thus lock said spring ends **14***a*–**14***b* securely therein.

As shown in FIGS. 5 and 6, the passage **13***c* through each pin is spaced longitudinally from the enlarged head portion **13***a* such that when positioned in a doctor blade **11**, the head portion **13***a* will be engaged on one side thereof and the passage **13***c* will be exposed on the other side thereof for insertion of the end of said spring member **14**.

As shown in FIGS. 4, 5 and 6, the spring **14** embodies a series of the curved sections wherein the center section **14***c* is angularly offset upwardly from the plane defined by the blade **11**. The center section **14***c* which will engage the holder **15** is by this angular offset actually in skewed relation to and is laterally spaced from the other portions of spring **14**. As best shown in FIG. 3, when the assembled blade **11** is placed within the blade holder **15**, the central offset portion **14***c* of the spring **14** causes the rearmost end **11***b* of the blade **11** to be urged downwardly in the blade retaining cavity **15***a* and urges the intermediate portion of the blade **11** upwardly against the guiding lip **15***b* of the holder **15**. Further, as shown in FIG. 3, the enlarged head portion **13***a* of the pin **13** provides an abutting shoulder for abutment with the retaining lip **15***c* of the blade holder **15** and thus holds the blade **11** securely therein. The offset convolute section **14***c* of the spring member **14** allows the spring and at-

tached blade **11** to find its own force center within the cavity **15***a* and allows the scraping end thereof to align itself resiliently against the paper roll A. As best shown in FIG. 2, a plurality of these clip assemblies **12** are provided at spaced intervals along the blade **11** for positively securing and aligning the blade **11** within the holder **15**.

When constant use of the blade **11** requires re-grinding of the scraping edge, it is necessary to remove the blade **11** from the holder **15** and remove any attachments thereon so as to allow the same to be properly held during the grinding operation. In preparation for this operation it is necessary to slide the blade **11** longitudinally out of the blade holder cavity **15***a* and remove the clip assemblies **12** therefrom. Using my new spring **14** and pin **13** method, it is only necessary to slide the ends **14***a*–**14***b* of the spring **14** from the passage **13***c* of the pin member **13** and push the pins **13** through the blade passage **11***a*. After the grinding operation the pin **13** and spring **14** may be re-assembled in reversed procedure. It is obvious that my invention simplifies the usually complicated process of rivet removal which ordiarily requires mutilation of the rivets and attached springs and therefore prevents reuse thereof.

Although I show a plurality of spaced clip assemblies **12** along a doctor blade **11**, it is not always possible in papermaking machinery to remove the blade **11** from the doctor blade holder **15** by drawing the same entirely therethrough from one end thereof. In this situation I provide clip assemblies **12** only on the extreme end portions of the blade **11** and for removal thereof the blade is pulled partially through said holder so as to allow removal of the clip assembly **12** on one end and the blade is then reinserted so the other end of the blade may extend from the holder **15** and allow removal of the other end of the clip assembly **12**. When this has been accomplished, the blade **11** may be removed by passage transversely through the blade cavity **15***a* as the pin head portion **13***a* will no longer be in a position to impede such a removal.

It will be seen that I have provided a simple and unique clip assembly which will hold a doctor blade within its holder for scraping of a paper roll but is easily removed from the doctor blade so as to facilitate periodic regrinding of the cleaning edge of said blade. It will be seen further that I have provided a method for securely attaching the blade to the positioning springs which will not require mutilation of the attachment elements when removal of the springs is required, thereby allowing reuse of these spring and attachment elements.

It will be appreciated that various departures and deviations may be made by those skilled in the art without actually departing from the spirit and scope of the present invention.

What I claim is:

1. A positioning spring maintaining in the blade retaining cavity of a conventional holder a doctor blade of the type having a plurality of spaced apertures therethrough; said spring having a portion thereof engaged with a surface of said doctor blade and having another portion engaged with the holder to maintain a predetermined position between the holder and the blade, one of said engaging portions being laterally offset and skewed from the other of said portions, a retaining pin removably inserted through one of the apertures in said doctor blade and having an enlarged head on one end thereof and having a transversely disposed

opening through the other end portion thereof, said spring having an anchoring portion insertable through the opening in said pin with means for releasably holding said spring portion in said pin opening.

2. The structure set forth in claim 1 and said last mentioned means comprising a bend in the anchoring portion of said spring sufficient to provide a resilient interference fit when inserted through the opening in said pin thereby producing a resilient snap action when forceably inserted into said opening to lock the anchoring portion of said spring and said pin together.

3. A spring clip for maintaining in the blade retaining cavity of a conventional holder a doctor blade of the type having a plurality of spaced apertures therethrough; said spring clip comprising resilient spring means having spaced apart end portions, a pair of attachment means extending through said blade and removable therefrom cooperating with said spaced apart spring ends to maintain said spring means in fixed relation to said blade producing a friction force on said holder when said blade and attached spring are mounted therein, said attachment means including a pair of generally cylindrical attachment members having a head portion and a body portion of substantially smaller diameter than said head portion, said body portion being provided with a diametric passage therethrough, the center of said passage being spaced longitudinally from said head portion of a distance greater than the thickness of the doctor blade plus ½ the cross sectional thickness of said spring so as to arrange the head portion on one side of the doctor blade and said passage on the other side to allow the spring to be received into the passage and position said attachment members on the blade.

4. The structure as set forth in claim 3 wherein said spring means comprises a plurality of cycloidic repeating sections wherein one of said sections is angularly offset to the normal plane of said other sections so as to be in compressed abutting relation with a doctor blade holder when attached to said blade and inserted therein.

5. The structure as set forth in claim 4 wherein said spaced apart spring ends are receivable within the diametric passage through the body portion of the attaching element to hold the same in a fixed relation to said blade.

6. The structure as set forth in claim 5 and locking means provided on each of said spaced apart spring ends to prevent passage through said diametric opening and removal of said spring element therefrom.

7. The structure as set forth in claim 5 and friction means on the endmost portions of said spaced apart spring means ends for engagement with the inner walls of said passage through the attachment body to retard movement therethrough.

8. The structure as set forth in claim 7 wherein said friction means includes an angularly offset portion on each of said spaced apart spring means ends such that the endmost portions thereof are directed angularly from the portion directly therebehind.

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