June 7, 1966 S. L. ABBOTT 3,254,388

SLUB CATCHER

Original Filed July 22, 1963 3 Sheets-Sheet 1

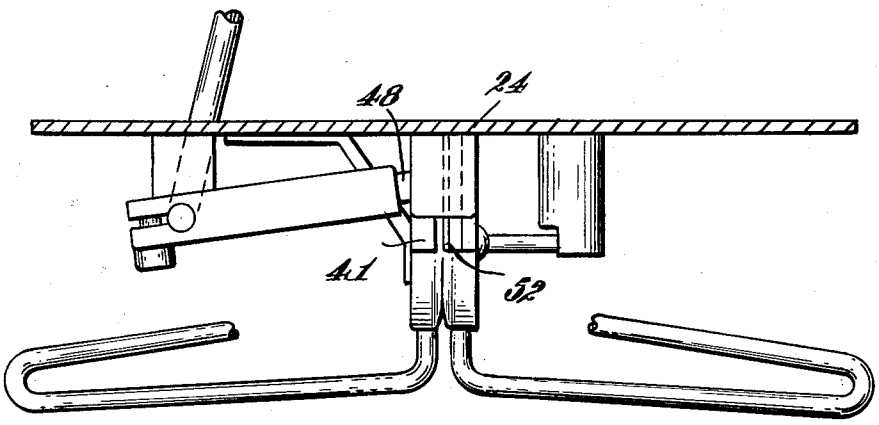


Fig. 2

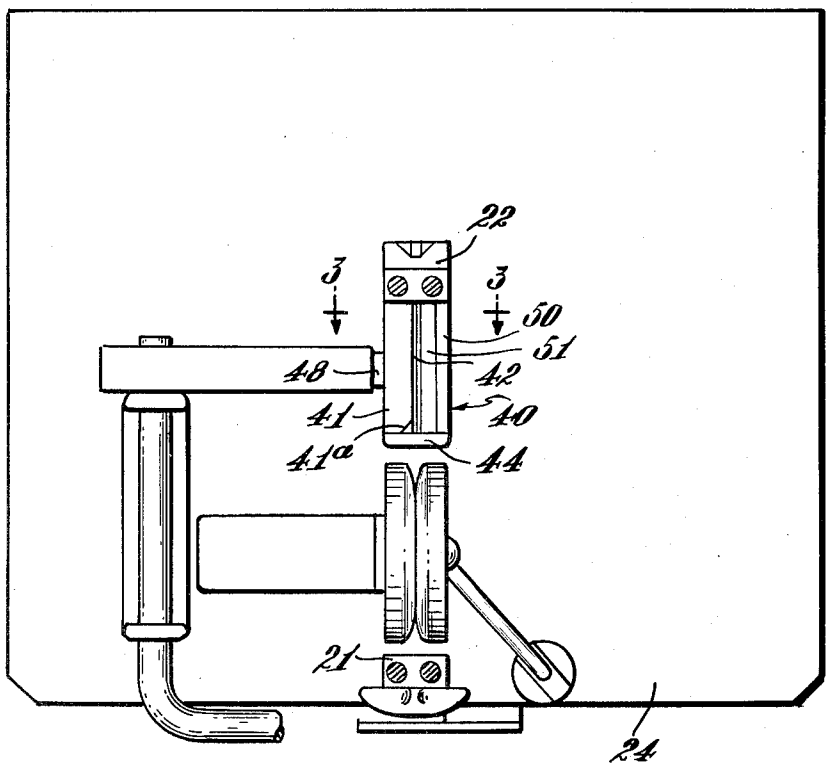


Fig. 1

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SLUB CATCHER

Original Filed July 22, 1963 3 Sheets-Sheet 2

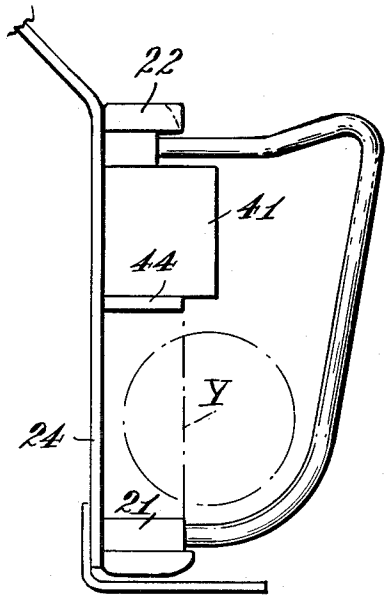


Fig. 2a

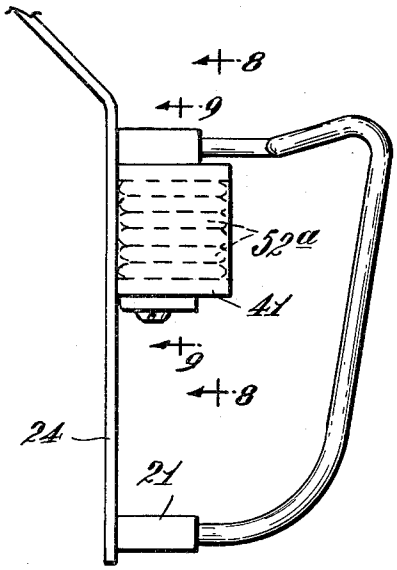


Fig. 6

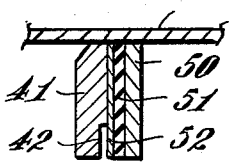


Fig. 3

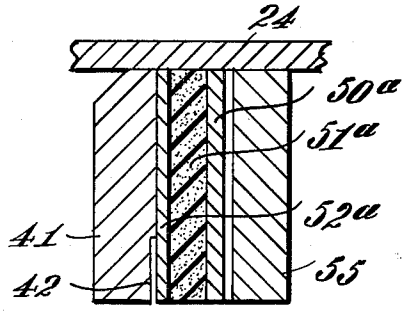


Fig. 7

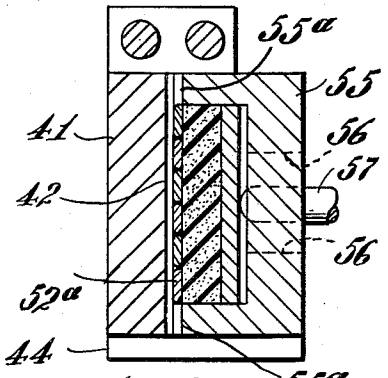


Fig. 8

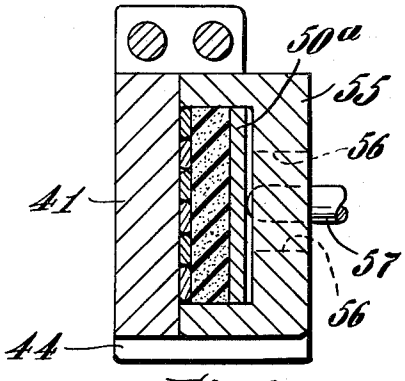


Fig. 9

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SLUB CATCHER

Original Filed July 22, 1963 3 Sheets-Sheet 3

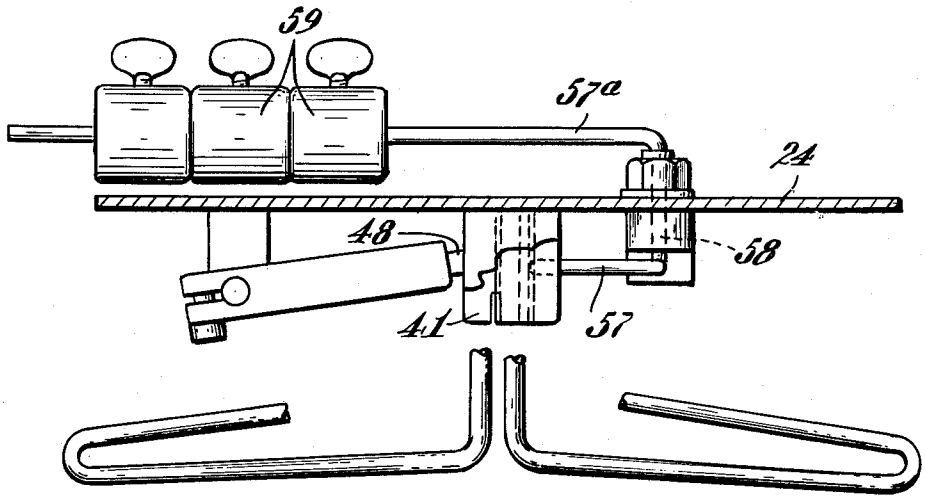


Fig. 5

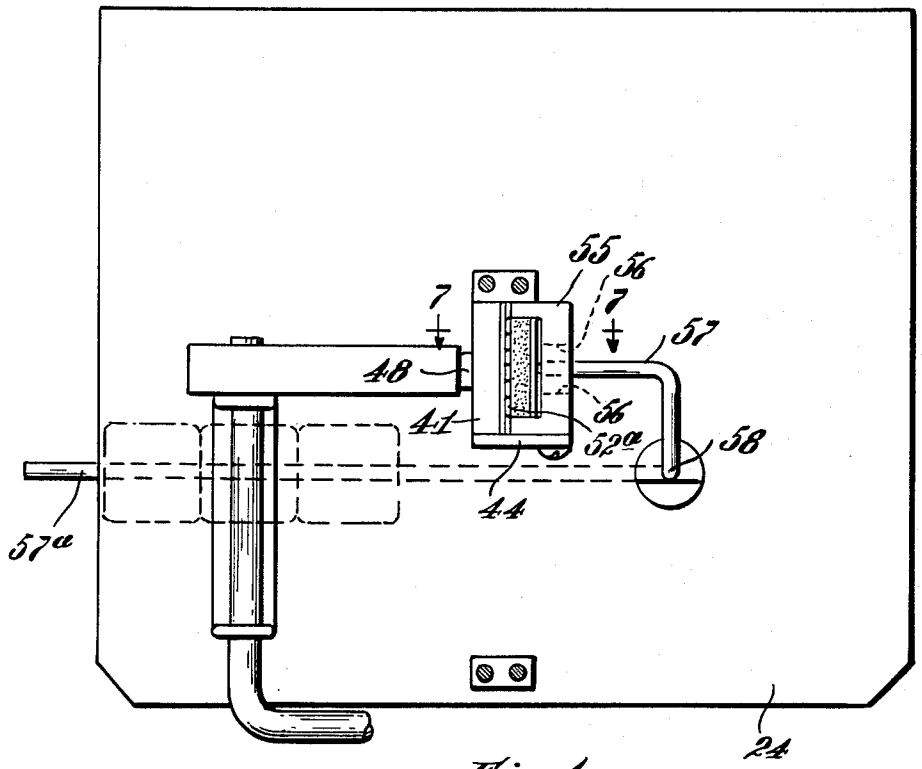


Fig. 4

United States Patent Office 3,254,388 Patented June 7, 1966

3,254,388

SLUB CATCHER

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Continuation of application Ser. No. 296,693, July 22, 1963. This application Apr. 30, 1965, Ser. No. 452,292
7 Claims. (Cl. 28—64)

This application is a continuation of my application Serial No. 296,693, filed July 22, 1963 now abandoned.

This invention relates to slub catchers and although some of its features are of general applicability it is of greatest utility when incorporated in a so-called wide blade slub catcher. The term "wide" used with reference to the blades refers to width in the direction of travel of the yarn and hence indicates length of yarn passage of the device. Slub catchers of the wide blade type are intended to distinguish between yarn enlargements of different lengths, so as to break the yarn in the case of long enlargements and not break the yarn in the case of short enlargements. Accordingly the length of the yarn passage in the direction of yarn travel is made long enough, as by using two wide blades, to engage at one time the whole length of a fairly long enlargement. A typical length of yarn passage may be, for example, one inch, obtained by using two opposed blades each one inch wide.

Assuming that two slubs are of similar constitution but one has the full length of the yarn passage and the other has only half of such length the lateral squeezing together of the long slub would be expected to apply twice as much force to the blades as would the similar squeezing together of the short slub. Again, assuming that the coefficient of friction is the same in each case, the retarding force exerted on the longer slub would be expected to be twice as great as that exerted on the shorter slub. It would be desirable to cause yarn breakage in either such supposed case. However, there are some really short enlargements such as "nibs" which it is better to leave in the yarn than to remove and replace with knots, and it is accordingly desired to avoid yarn breakage in the case of unobjectionable short enlargements. The ability of wide blades to distinguish between enlargements of different lengths is discussed in U.S. Patent No. 1,905,259 of E. J. Abbott, and an improved form of slub catcher employing the wide blade principle is described and claimed in U.S. Patent No. 2,623,265 of said E. J. Abbott. Although the device of this latter patent has gone into extensive use, a difficulty still exists in the case of yarns containing synthetic fibers. These yarns are considerably harder to break than for example, worsted yarns. For instance, the break strength of Dacron may be about three grams per denier whereas that of worsted may be about one gram per denier. A blend of half Dacron and half worsted will thus be considerably harder to break than an equivalent all worsted yarn. The wide blade slub catcher can still discriminate as to length of enlargements under these more difficult conditions, but the catching action becomes less certain in the case of the smaller slubs. To remedy this it would be desirable to set the blades closer, but setting the blades close enough to catch all slubs with certainty causes the device to catch many short enlargements such as "nibs" which are relatively unobjectionable but which are relatively incompressible. This causess unnecessary yarn breaks.

The wide blade slub catcher in its improved form as disclosed in the latter of said E. J. Abbott patents has further advantages besides its ability to distinguish as to lengths of enlargement. Among these other advantages are very good accuracy of the yarn passage. This passage is determined in practice by grinding away a face portion of one of two blocks, and the block having a ground away face portion is arranged to slide in firm engagement with the other stationary block so as to expose the ground away face portion for cleaning. This sliding block can also be slid farther, for complete removal. Sliding blocks ground to various depths can be kept in stock, and to change the yarn passage from one setting to another, a sliding block ground to the appropirate depth is simply substituted. The fact that the block is marked with the dimension of resulting yarn passage gives assurance that the intended passage is provided.

The invention aims to retain the advantages of wide blade sliding block slub catchers, including particularly the feature of discriminating as to length of enlargements, but to make the action more certain in the case of slubs in strong yarns without causing breakage when unobjectionable enlargements appear.

In the wide blade sliding block slub catchers the compression of the slub has been by unyielding opposed blade faces. While the forces of reaction of the slub to lateral compression decrease with decrease in length of slub, they increase as an enlargement is less readily compressible. Consequently, a short enlargement, if hard, will tend to cause breakage.

In reexamining the wide blade sliding block slub catcher it can now be seen that it not only discriminates as to length but also as to resistance to compression. The effect of this latter type of discrimination could advantageously be reduced. Taking as an extreme case a hard knot, it would be a good thing if the inability of this hard knot to be squeezed down to the normal thickness of the yarn would not result in breakage.

The present invention involves the though that through the use of a slub-engaging member which is resilient transversely of its face, and can permit deformation of its face by yarn enlargements, the hardness and relative incompressibility of certain yarn enlargements becomes less of a factor.

In another aspect, the invention involves the though that although resiliency of the slub-engaging member, as contrasted with rigidity, would imply for a given setting, less compression of a given slub, less retarding and less tendency to break the yarn, this latter tendency can be effectively offset by use of a closer setting. It is not any longer necessary to avoid settings that tend to compress the short hard enlargements.

In the drawings:

FIG. 1 is a fragmentary front elevation of a portion of a head of a traveling spindle winding unit including a slub catcher of the present invention;

FIG. 2 is a fragmentary view mainly in plan of the device of FIG. 1;

FIG. 2*a* is a fragmentary left side elevation, with some parts omitted, of the device of FIG. 1;

FIG. 3 is a horizontal section taken on the line 3—3 of FIG. 1;

FIG. 4 is a view similar to FIG. 1 but showing a further form of slub catcher of this invention;

FIG. 5 is a fragmentary view mainly in plan of the device of FIG. 4;

FIG. 6 is a fragmentary left side elevation, with some parts omitted, of the device of FIG. 4;

FIG. 7 is a horizontal sectional view, on an enlarged scale, taken on the line 7—7 of FIG. 4;

FIG. 8 is a vertical sectional view on an enlarged scale, taken on the line 8—8 of FIG. 6; and

FIG. 9 is a vertical sectional view on an enlarged scale, taken on the line 9—9 of FIG. 6.

The winding unit head will be assumed to be, for example, like that of the said Abbott Patent No. 2,623,265 and to have an apron plate **24** carrying yarn guide blocks **21** and **22** which establish a vertical path for the yarn Y (FIG. 2*a*).

The member of the slub catcher corresponding in position to the stationary block **40** of said Patent No. 2,623,265, and here referred to generally by the reference character **40**, is affixed to the apron plate **24**.

As in said patent a sliding block **41** is ground away at its right side at **42** to define the yarn passage between it and the non-sliding member **40**, and the right face portion of the block **41** which is not ground away serves to space the opposed face portions of the yarn passage and define the clearance between them. The remaining right-hand surface of the block **41** except at *42* is firmly seated against the non-sliding member, being held so by the strongly spring-pressed plunger **48** of said patent. The sliding block is slidable on a plate **44**, toward the observer in FIG. 1, to expose the ground away portion **42** for cleaning, and may be manually slid still farther for complete removal of the sliding block. As indicated above, the slub catcher differs from that of the patent by the member **40** presenting a resilient face to the yarn passage. In the device of FIGS. 1 to 3 the member **40** comprises a steel backing plate **50**, a pad **51** of resilient material such as rubber, and a thin sheet **52** of steel of, for example, 0.0015 inch thickness, these parts being glued together. The dimensions of the yarn passage and the thin sheet **52** are necessarily exaggerated in FIGS. 2 and 3. Whereas, for a given yarn No. 46s Dacron-worsted, the slub catcher of said patent would not normally have a setting of less than 0.01 inch because of a tendency to catch short hard nibs at closer settings, the slub catcher of FIGS. 1 to 3 could well have a setting of 0.007 inch. This closer setting makes the slub-removing action more certain. The resilient face of the stationary block can be deformed by either a slub or a nib; the slub because of its greater length will be caught, but the nib can pass through without breakage.

By omitting the thin steel layer **52** in the device of FIGS. 1 to 3 and having the sliding block **41** abut against the rubber **51**, the deformation is made easier. A similar result can be secured by forming the metal layer in sections which are successively encountered by an enlargement. This latter construction is embodied in the device of FIGS. 4 to 9. The device of FIGS. 4 to 9 also includes provision for regulating the deformability of the resilient face, and for pre-stressing the material which backs up this face so that this material is under a certain compressive stress in the normal condition of the device with no slub present.

Most of the parts in FIGS. 4 to 9 corresponding to those described in connection with FIGS. 1 to 3 will not be again described in detail, but merely designated by the same reference characters. The stationary or right hand member is formed of a steel backing plate **50***a*, a pad **51***a* of resilient material such as sponge rubber glued to the backing plate, and a face layer comprised for example of six adjacent flexible steel fingers **52***a* glued to the spong rubber, the fingers **52***a* being in firm engagement with the sliding block **41** excepting where the sliding block is ground away at **42**. The member comprised of parts **50***a*, **51***a* and **52***a* thus presents a resilient face to the yarn passage. This member is retained in a stationarily mounted block **55** of channel section having an opening **56** through its right face. In rear of the yarn passage, left face portions of the block **55**, adjacent the top and bottom thereof, abut against the block **41** as seen in the sectional view of FIG. 9, but in the region of the yarn passage these face portions are cut back at **55***a* as seen in FIG. 8. This cutting back of the block **55** at the region of the yarn passage prevents catching knots between the rigidly opposed blocks **41** and **55**.

A lever **57** pivoted at **58** extends through opening **56** in block **55** and bears against the plate **50***a*. An arm **57***a* of the lever **57** carries adjustably mounted thereon one or more weights **59**. By change or adjustment of the weights a desired load can be imposed on plate **50***a*. This puts the rubber **51***a* under more or less compression, so as to vary the resistance to flexure of the fingers **52***a*.

It is desirable to form the fingers **52***a* of somewhat thick stock than the metal layer **52** of FIGS. 1 to 3, and fingers of 1/32 inch stock may be used. The sponge rubber **51***a* will, however, be softer than the rubber **51** of the device of FIGS. 1 to 3.

The device of FIGS. 4 to 9 can advantageously be run at a little closer setting than that of FIGS. 1 to 3, for instance at a setting of 0.006 inch for the same yarn mentioned above.

In each case one of the members presenting a face of the yarn passage is resilient transversely of such face and may be deformed by yarn enlargements. Thus in the case of sufficiently short enlargements, relative incompressibility of the enlargement is less of a breakage-inducing factor than in prior wide blade devices.

It was previously considered necessary to have the two blocks of the wide blade slub catcher present square edges at the mouth of the yarn passage where the yarn enters between them, this in order to increase the difficulty of entrance of a slub. This had a tendency to catch and roll back fibers and strip them from the running yarn. The closer setting that can be employed with the present device increases the difficulty of travel of a slub through the yarn passage and hence renders practicable an easier entrance into the yarn passage, which will reduce stripping off of fibers and will tend to hold them into the yarn. Thus the entrance may be made easier by beveling the edge of block **41** at **41***a* at the entrance to the yarn passage as in FIG. 1 or by slightly rounding off the bottom left-hand corner of the lowermost finger **52***a* as in FIG. 8.

I claim:

1. A slub catcher including members presenting opposed faces and means spacing said faces to define a clearance between said faces to form a yarn passage, one at least of said members being resilient transversely of its face at the yarn passage and said last named face being locally deformable by yarn enlargements.

2. A slub catcher as claimed in claim 1 in which said transversely resilient member includes a plurality of individually yieldable elements disposed in succession along the yarn passage.

3. A slub catcher as claimed in claim 1 in which said transversely resilient member includes a body of compressible material, the slub catcher including means for applying a compressive force to said material in a direction opposing opening of the yarn passage.

4. A slub catcher including members presenting opposed faces and means spacing said faces to define a clearance between said faces to form a yarn passage, one at least of said members being resilient transversely of its face at the yarn passage and comprising thin metal at said face and compressible material backing up the thin metal, and said last named face being locally deformable by yarn enlargements.

5. A slub catcher including members presenting opposed faces and means spacing said faces to define a clearance between said faces to form a yarn passage, one at least of said members being resilient transversely of its face at the yarn passage and comprising a plurality of flexible fingers disposed in succession along the yarn passage and compressible material backing up the fingers, and said last named face being locally deformable by yarn enlargements.

6. A slub catcher including members presenting opposed faces and means spacing said faces to define a clearance between said faces to form a yarn passage, one at least of said members being resilient transversely of its face at the yarn passage and comprising a plurality of flexible fingers disposed in succession along the yarn passage and compressible material backing up the fingers, the slub catcher including means for applying a compressive force to said material in a direction opposing opening of the yarn passage, and said last named face being locally deformable by yarn enlargements.

7. A slub catcher including members presenting opposed faces and means spacing said faces to define a clear-

ance between said faces to form a yarn passage, one at least of said members comprising a plurality of individually laterally displaceable fingers disposed in succession along the yarn passage and compressible material backing up the fingers, thereby to permit a yarn enlargement to encounter the fingers successively in passing through the yarn passage.

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DONALD W. PARKER, *Primary Examiner.*