United States Patent [19]

Gossling

[11] **3,760,664**

[45] **Sept. 25, 1973**

[54] **WINDOW SHADE CUTTER**

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[22] Filed: **Oct. 6, 1971**

[21] Appl. No.: **187,057**

[52] **U.S. Cl.** ..... **82/63 R,** 82/70.2

[51] **Int. Cl.** **B23b 3/04,** B23b 5/14

[58] **Field of Search** ..... 82/46, 48, 46 A, 82/101, 70.2, 71, 72, 73, 74, 75, 76, 77, 59, 63

[56] **References Cited**

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[57] **ABSTRACT**

A window shade cutter in which the shade is immovably clamped in rolled up condition and then cut to pre-determined length by a motor driven cutting head that revolves around the shade. Centrifugal force acting upon components of the rotating cutting head insures that optimum cutting pressure is applied to the shade during the cutting operation.

7 Claims, 6 Drawing Figures

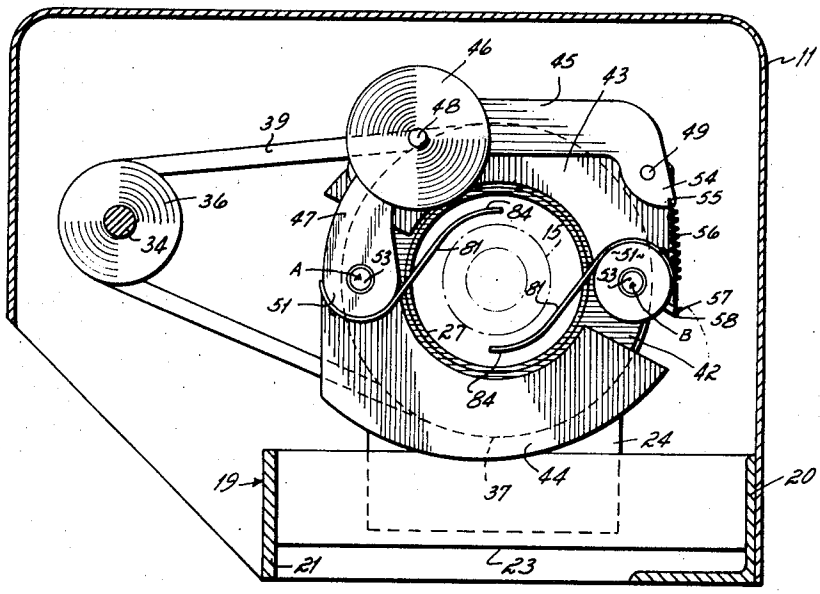
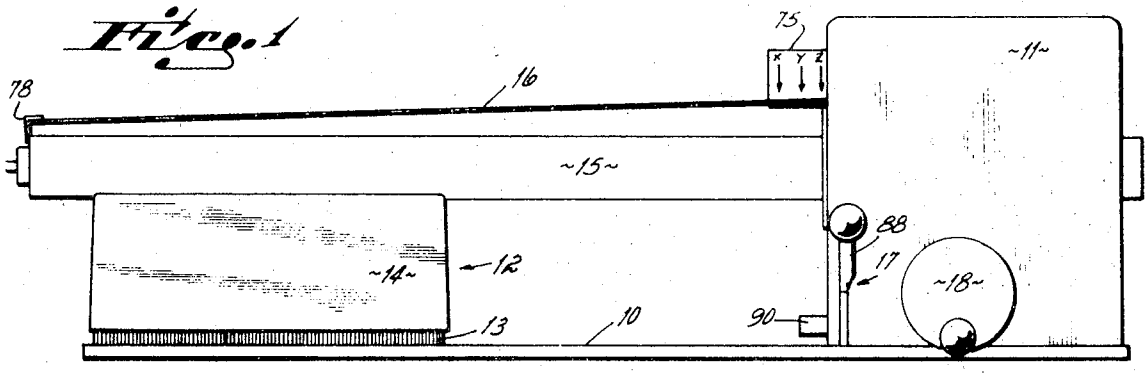


Fig. 1



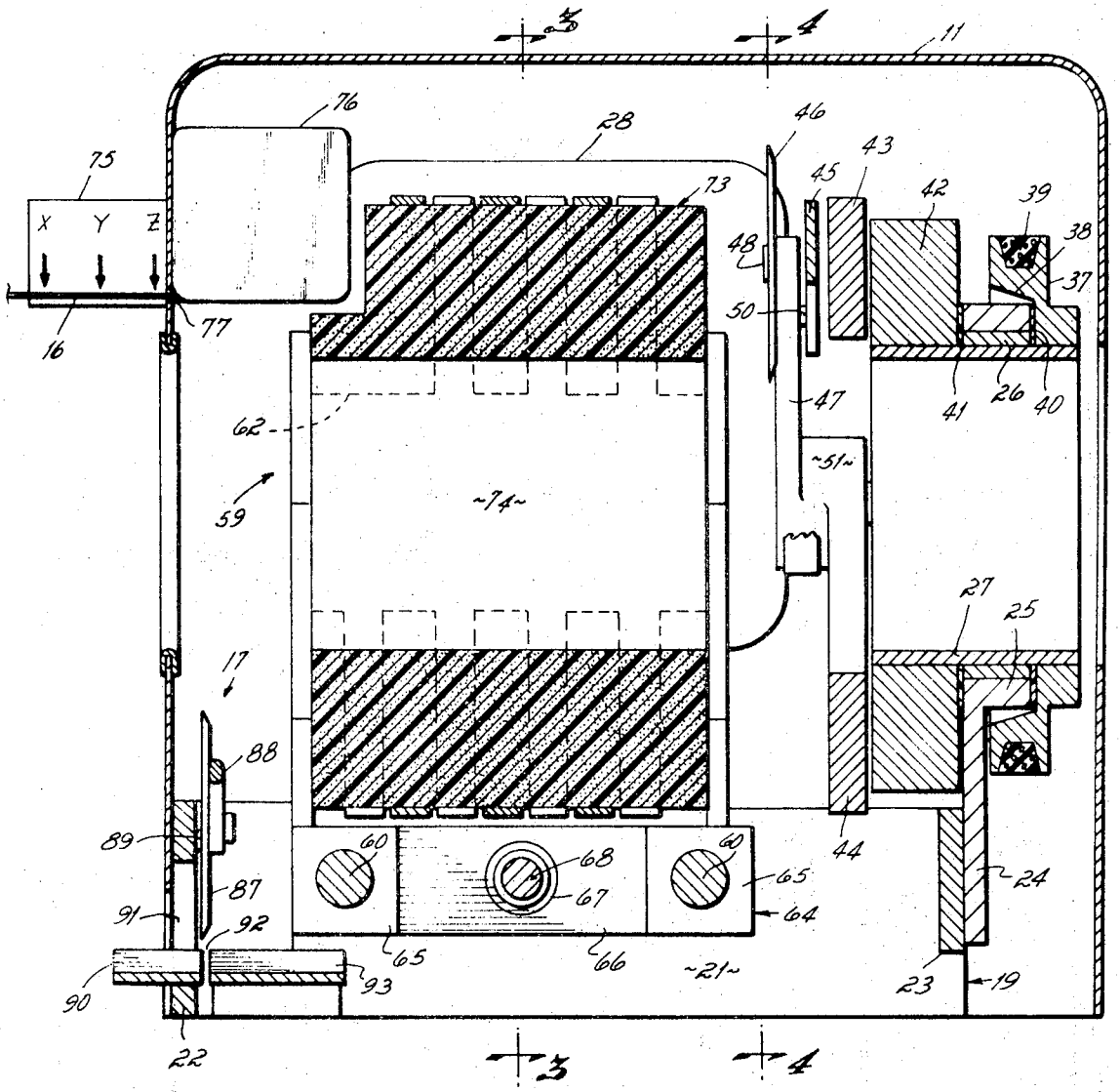


Fig. 2

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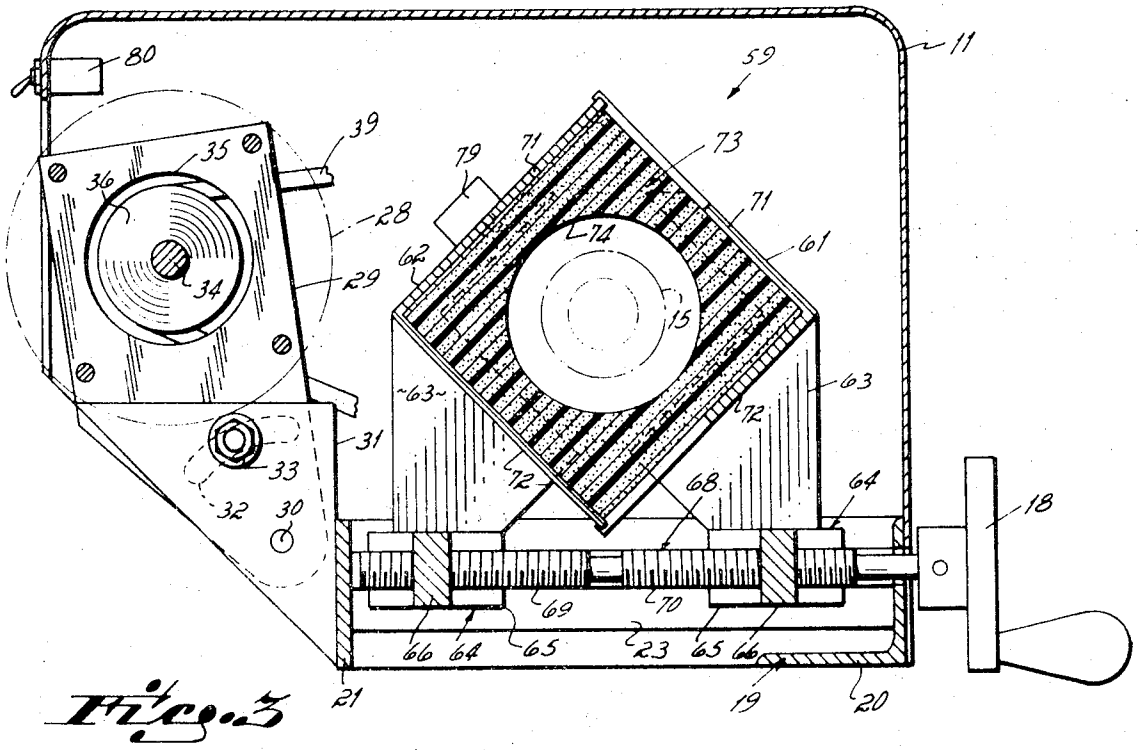

Fig. 3

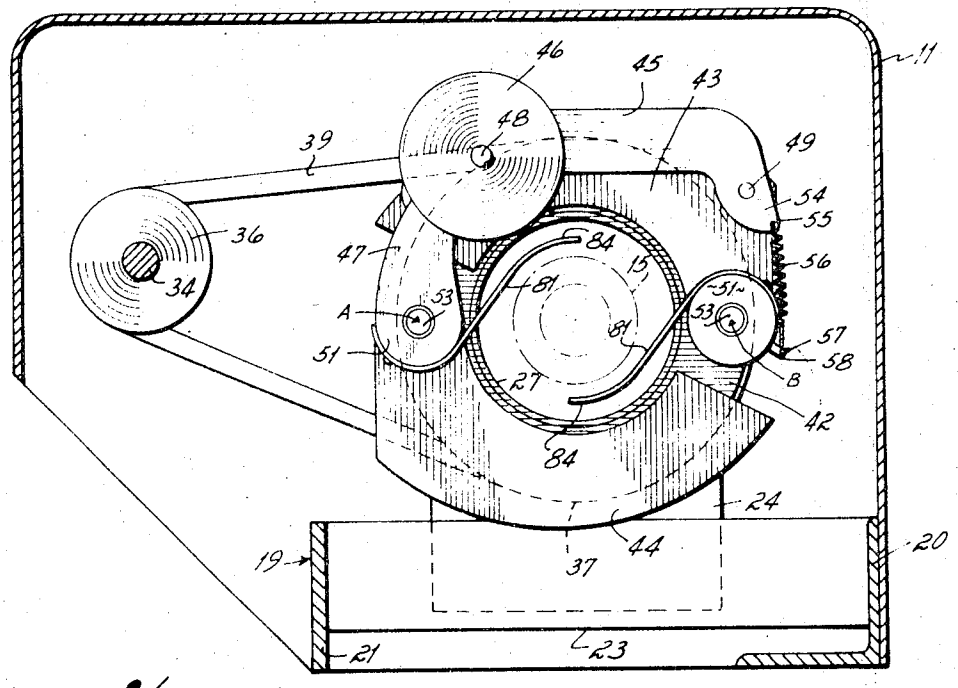

Fig. 4

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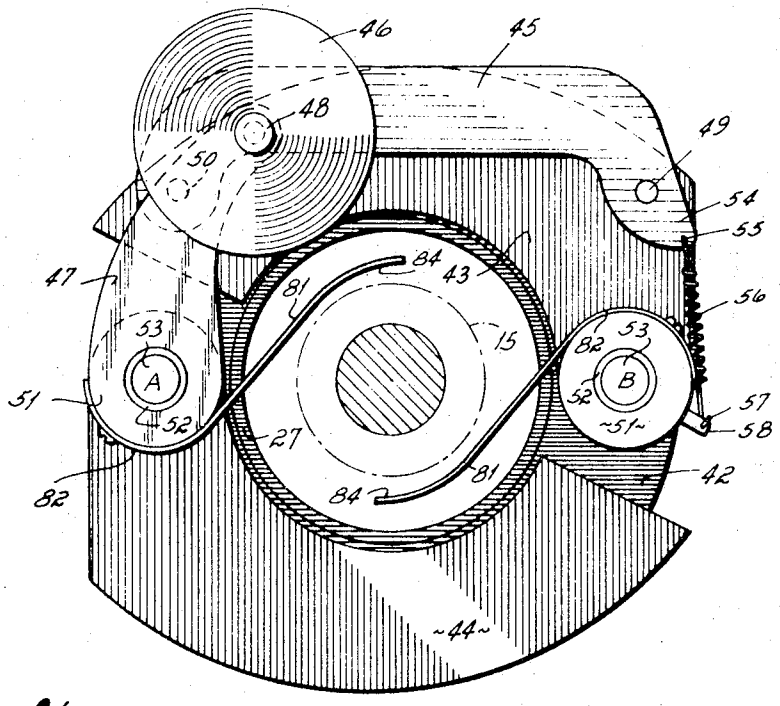

Fig. 5

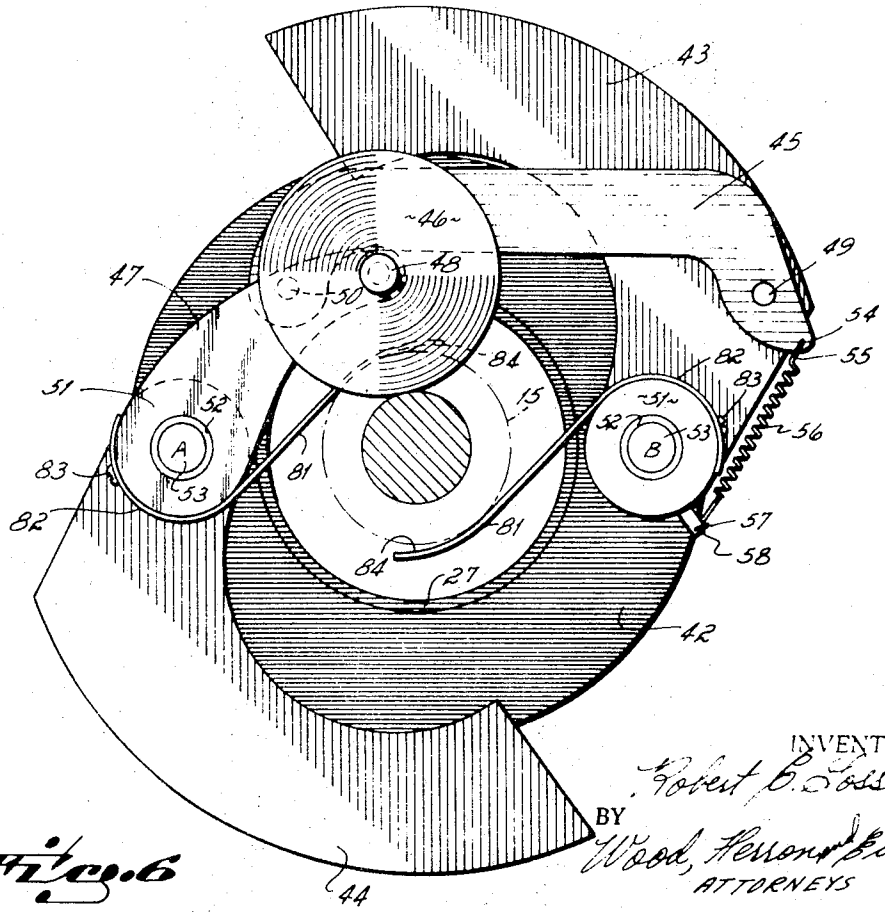

Fig. 6

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WINDOW SHADE CUTTER

This invention relates to window shade cutters, and it is directed in particular to a window shade cutter having a motor driven cutting head that revolves around the shade to be cut so that centrifugal force acting upon the components of the head generates the cutting pressure applied to the shade.

Although it will be apparent that the window shade cutter of this invention is adapted for cutting other types of window shades, it has particular utility in operating on window shades of the type disclosed in Gossling et al. U.S. Pat. Nos. 3,203,468, 3,299,944 and 3,580,323 owned by the assignee of this invention.

The window shades of these patents have in common that the shade rollers are adapted to telescope. In one embodiment of the window shades disclosed, one part of the shade roller is tubular, being made of metal whereas the other part is a wooden dowel telescopingly seated within the first part. A tube of readily cuttable material surrounds that part of the dowel projecting from the tubular part. The inner or top edge of the shade itself is fastened to the tubular part and to the tube of readily cuttable material by a continuous band of adhesive. The point is, that for shortening purposes, a cut may be made through the dowel end of the shade material, passing through the rolled up shade material, through the tube of readily cuttable material and stopping at the surface of the dowel. Since the cut is made while the shade is rolled up, the part of the shade to be discarded is neatly attached to a short length of the tube of readily cuttable material, and this short length of tube can be slipped off the end of the dowel. The projecting end of the dowel then may be telescoped back into the tubular part of the roller. The main advantage to this arrangement is that it saves cutting the dowel and the attendent removal and replacement of the end cap, which operations are routinely required before the inventions disclosed in the patents were made.

Thus, one of the objectives of this invention has been to provide a window shade cutter that greatly simplifies the cutting of window shades of the types disclosed in the above patents, as well as others.

Other objectives of the invention will be readily apparent from the following detailed description of the drawings in which:

FIG. 1 is a front elevational view of a window shade cutter machine incorporating the principles of this invention;

FIG. 2 is a longitudinal cross sectional view taken through the cutting head that is shown at the right in FIG. 1;

FIG. 3 is a cross sectional view taken on the line 3—3 of FIG. 2;

FIG. 4 is a cross sectional view taken on the line 4—4 of FIG. 2;

FIG. 5 is a view similar to FIG. 4 showing components of the cutting head at rest; and

FIG. 6 is a view similar to FIG. 5 illustrating the relative positions of the components of the cutting head during a cutting operation.

A preferred embodiment of a window shade cutter machine incorporating the principles of this invention as disclosed in FIG. 1 may be mounted upon a flat rectangular base plate **10**. The cutting me chanism is enclosed within a housing **11** shown at the right in FIG. **1**. A self-leveling, resiliently mounted shade support **12** is mounted on the base at the end opposite housing **11**. This support comprises essentially a block **13** of foamed plastic material that is enclosed within an inverted box-like cover **14**. The upper surface of the cover **14** may have a longitudinal groove therein to cradle a shade roller as illustrated at **15**. As will be shown, the cutting mechanism requires that the shade roller **15** be supported with its longitudinal axis in alignment with the central axis of the cutting mechanism. Thus, the self-leveling characteristic of cradle **12** accommodates shade rollers of different diameters and it also insures that the supported end of the shade roller is in proper horizontal alignment. Also shown in FIG. **1** is a measuring tape indicated generally at **16**, a slat cutter shown generally at **17** and a hand wheel shown generally at **18**.

The cutting mechanism is mounted upon a rigid rectangular frame shown generally at **19**. This frame is affixed to base plate **10** by welding or other means. Frame **19** comprises an angle **20** extending across the front, a plate **21** extending across the rear and end walls **22–23** extending across the left and right ends respectively of the frame as viewed in FIG. **2**. The elements of a frame may be secured to one another by welding or other means.

End wall **23**, at the right in FIG. **2**, mounts a vertically disposed journal plate **24** which plate, in turn, mounts a circular bearing retaining sleeve **25** in which is seated a self-lubricating bronze bearing liner **26**. A cylindrical sleeve **27** is rotatably journalled in bearing liner **26**. The central axis of sleeve **27** is the longitudinal central axis of the cutting mechanism and it is coextensive with the longitudinal central axis of a window shade roller that is in place in the machine ready to be cut.

The sleeve **27** is motor driven. For this purpose a fractional horse-power electric motor **28** is provided. This motor is bolted to a mount plate **29**. The plate in turn is adjustably supported as at **30** on a bracket **31** welded or otherwise affixed to the rear of the frame **19** as best shown in FIG. **3**. Pivotal adjustment for the motor mount is provided by an arcuate slot **32** cut through the motor mount plate. A bolt passing through a hole in mount bracket **31** receives a nut **33** to clamp the motor mount in fixed relation to the mount bracket.

The motor shaft shown at **34** passes through a circular opening **35** in the motor mount plate **29** and a small pulley wheel **36** is keyed to its outer end. The sleeve **27** has a large pulley wheel **37** seated on it and affixed to it. The inner face of this pulley wheel shown at **38** is cut out to accommodate the bearing for sleeve **27**. A drive belt **39** connects the two pulley wheels **36** and **37**.

As shown in FIG. **2** a Teflon ring **40** is interposed between pulley wheel **37** and the bearing **26** for sleeve **27**. At the opposite side of the bearing another Teflon ring **41** is mounted between the bearing and a circular disc **42**. Disc **42** has a hole in its center which encircles sleeve **27**, being affixed thereto to rotate with the sleeve.

Referring now to FIG. **4** the disc **42** mounts the cutting mechanism itself. This mechanism comprises essentially a flyweight **43** shown in the upper part of FIG. **4**, a flyweight **44** shown in the lower part of this Figure, a connector link **45** and a circular cutting blade **46**. The two flyweights **44** and **43** respectively are pivotally mounted upon disc **42** at points A and B that are equally spaced from the center of rotation of disc **42**

and that are on diametrically opposite sides of this center of rotation, the respective pivot points A and B and the center of rotation of disc **42** residing in a common plane. The bodies of the flyweights **43** and **44** are substantially the same, being somewhat arcuate in configuration. However, flyweight **44** has an arcuate arm **47** extending from it upon which circular cutter blade **46** is rotatably journalled as at **48.**

The link **45,** at one end thereof, is pivotally affixed to flyweight **43** by means such as a pin **49.** The opposite end of the link **45** is rotatably pinned as at **50** to the arm **47.** In this relationship the distance between the point A, about which flyweight **44** may pivot, and the center of link pin **50** is the same as the distance between the point B, about which flyweight **43** may pivot, and the center of link pin **49.**

Each of the flyweights has a hub **51.** In the case of flyweight **43** the hub provides a journal for a bearing **52** that receives and seats a pin **53** projecting from disc **42.** The hub of flyweight **44** is similarly pivotally mounted with respect to disc **42** but it also includes as an integral part thereof the arm **47** in which the knife **46** is mounted. Both flyweights may be of cast construction such that in the case of flyweight **44,** the arm **47,** hub **51** and the weight itself are cast as one piece.

The link **45** has an extension **54** extending outwardly beyond pin **49** by which it is attached to flyweight **43.** The outer end of this extension has a small hole through it in which is hooked one end **55** of a coil spring **56.** The opposite end **57** of coil spring **56** is hooked to an anchor pin **58** seated in hub **51.** A comparison of FIGS. **5** and **6** will show that when the cutter rotates, centrifugal force acting upon the two flyweights will cause them to swing out into the positions of FIG. **6.** In this movement, the two flyweights are tied together by the link **45** so that they move equally outwardly away from the center of rotation, such movement causing the circular cutter blade **46** to swing in toward the center of rotation. At the same time, the outward extension of the two flyweights causes the spring **56** to expand, tensioning it, so that when rotation stops, the spring is adapted to return the flyweights and their associated components to the positions illustrated in FIG. **5.** It may be seen, therefore, that the cutting pressure of the circular cutter blade **46** is a direct result of centrifugal force acting upon the two flyweights **43–44.**

In the operation of the machine, a window shade to be cut is gripped and held immovably in place relative to the rotating cutting blade **46** by means of a vise designated generally by the number **59.** This vise is mounted upon a pair of spaced parallel guide rods **60–60** which are supported at their respective ends in appropriate seats provided in the rear wall **21** and angle **20** of the frame **19.** The vise **59** comprises a front half **61** and a rear half **62.** These halves are substantially identical. Each half is mounted on a pair of end brackets **63–63** disposed in spaced parallel relation. Each pair of brackets is affixed to the respective ends of a carriage **64,** there being a carriage for each vise half. Each carriage **64** as viewed in plan is generally H-shaped comprising slide blocks **65–65** and a cross bar **66** joining the slide blocks. Each cross bar **66** has a threaded insert **67** seated in an appropriate bore. See FIG. **2.** A screw shaft shown generally at **68** engages the threaded inserts in both carriages. One threaded section of shaft **68,** indicated at **69,** has right hand threads while another section of the screw shaft, indicated at **70,** has left hand threads. The threads in the inserts **67—67** are formed accordingly. The screw shaft **68** extends out through an opening in the front of the housing **11** and has the hand wheel **18** pinned to it. It may be seen, therefore, that rotating hand wheel **18** in one direction causes the two carriages and the two halves of the vise to move away from one another, whereby rotating the hand wheel in the opposite direction causes the two halves to move toward one another. In these two movements, the carriages move on the guide rods **60** that slideably mount slide blocks **65—65.**

The jaws for the respective halves of the vise are substantially the same. Each is right angular in configuration being arranged with an upper wall **71** at a 45° angle to the horizontal and a lower wall **72** also at a 45° angle to the horizontal. Both the upper wall **71** and the lower wall **72** of each jaw is cut to provide a plurality of fingers that are best shown in FIG. **2.** The fingers of the walls of the forward jaw alternate with the fingers of the wall of the rear jaw such that when these jaws are moved toward one another the fingers loosely intermesh with one another.

A block **73** of foamed plastic material that is square in cross section is seated between the jaws of the vise device **59.** See FIG. **3.** An enlarged central bore **74** passes through the center of the block **73** such that its center is aligned with the center of rotation of the cutting assembly. Clamping pressure is brought to bear upon a window shade roller inserted longitudinally through the block **73** by turning the hand wheel **18** to bring the vise jaws toward one another, which action squeezes the roller, thus reducing the size of the bore **74.**

To cut a window shade the operator first has to know the length window shade desired by a customer. In most cases the customer makes his own measurement at home. The measurement can be done in three ways. The measurement may be made from tip to tip, using the overall length of the window shade, including the pins that are at the opposite ends of a shade roller. The measurement may be made from end cap to end cap. Or the customer may measure the width of the shade material itself. In any event, the machine is provided with a measuring device that takes the three different types of measuring methods into consideration.

An index plate shown at **75** is mounted at the left side of the housing **11** as shown in FIG. **1.** This measuring tape may be a conventional one. The tape itself is preferably of spring steel that retracts automatically into a case **76** which may be affixed to the inside of the housing **11** for the machine with the tape itself extending through a slot **77** in the side of the housing. The tape is extensible from the case **76** out to the left over the top of the support **14.** The tape requires a slight modification, entailing the cutting off of the first 6–7 inches. The actual length cut off being equal to and determined by the distance between the left side of housing **11** as it appears in FIG. **2** and the cutting plane of the circular cutter blade **46.** Once this first end of the tape is removed, a right angular bracket **78** may be affixed to the end thereof.

It is to be noted that there are three arrows imprinted on the index plate **75,** these arrows being designated as X, Y and Z going from left to right respectively as the machine is viewed in FIGS. **1** and **2.** If the customer has measured the width of the shade material, the measure-

ment is made with respect to the arrow designated X. If the measurement has been made from end cap to end cap the arrow Y is used, and if the measurement is made from tip to tip, the arrow Z is utilized. Thus, when a window shade selection has been made and it is to be cut to a new, shorter dimension, the slat is removed from the rolled up window shade and the window shade then inserted into the machine as shown in FIG. **1.** In this position the left end of the shade rests on the support **12** and the right end passes through the vise **59** and into or through sleeve **27** depending upon the initial overall length of the window shade. The measuring tape is then withdrawn and engaged over the end of the shade as shown in FIG. **1** and the desired length determined by adjusting the tape and shade with reference to the appropriate one of the three arrows X, Y and Z. At this time, the hand wheel **18** may be rotated to clamp the window shade securely within the foamed plastic block **73.** Of course, the housing **11** has appropriately sized openings in the side walls thereof, as shown, to accommodate the shade.

Reference is made to FIG. **3** wherein there is shown a pressure sensitive switch **79** that is mounted on the rear vise jaw **62.** The switch contact (not shown) extends between fingers of the jaw into contact with the block **73** such that the switch is tripped or closed when the vise is tightened onto a window shade into gripping relation with it, thereby exerting pressure on the foamed material to cause the switch to close. Switch **79** is wired directly into the motor circuit which also includes a main off-on switch **80,** preferably mounted at the back of housing **11** shown in FIG. **3.** Thus, the switch **79** is a safety factor insuring that the main switch to turn on the machine does not become effective until sufficient gripping pressure is exerted on a window shade roller to hold it firmly in place.

Attention is now directed to FIGS. **4–6** which show a pair of leaf springs **81—81** that are respectively mounted upon the hubs **51—51** of the flyweights **43** and **44.** Each flat spring is bent into an arcuate configuration as at **82** in the areas thereof where the spring seats on a hub **51.** This part of the spring is affixed to the hub by means of a screw **83.** From its seat on a hub the spring extends outwardly on a straight line that is chordal with respect to a circle on the inside surface of the sleeve **27.** At its extended outer end each flat leaf spring is bent slightly arcuately as shown at **84** in toward the center of the longitudinal axis of sleeve **27.** Thus as shown in FIG. **5,** the two leaf springs are spread apart when the machine is at rest so that a window shade can be received between them. However, when the flyweights **43–44** shift under the influence of centrifugal force in the operation of the machine, the inner arcuate ends **84—84** of the flat springs move toward one another into gripping relation with a window shade being cut. When operating upon a window shade of the type disclosed in the patents previously listed, the leaf springs being beyond the cutter blade **46,** toward the right as viewed in FIG. **2,** make contact with the cut-off part of the window shade material that is to be discarded. An important consideration is that these springs travel with the rotating cutter head assembly and as soon as a cut has been made down to the dowel of the telescoping window shade shown, the end to be discarded starts to rotate with the head, giving an immediate indication to the operator that the cutting operation has been completed.

With the completion of the cut, the jaws of the vise may be moved away from one another by hand wheel **18** and the window shade withdrawn from the machine. At this time, the extending dowel of the shade may be telescoped back in so the shade is at the proper overall length.

Provision is also made in the machine to cut the wooden slat to proper length. In the instance shown there is provided a circle blade **87.** This blade is mounted on an operating handle **88** pivoted to the inside of the end wall **22** as shown at **89.** As shown in FIG. **1** the handle **88** extends through the forward wall of housing **11.** The arrangement of the handle is such that when it is forced downwardly, blade **87** makes contact with a slat resting on a channel member **90** seated within a slot **91** in side wall **22.** The channel provides a shear edge against which the cut is made. Another short channel **93** is affixed in alignment with channel **90** but in spaced relation thereto to provide a slot **92** into which cutter **87** may descend upon operation of handle **17.** For simplicity, blade **87** may be the same as that used at **46** in the shade cutting mechanism.

I claim:

1. A window shade cutter comprising a hollow cutting head mounted for rotation,

drive means to rotate said cutting head,

means to clamp a rolled up window shade such that the part to be cut is inside of said hollow cutting head and such that the longitudinal central axis of said shade is coextensive with the axis of rotation of said cutting head,

first and second flyweights pivotally mounted on said head at diametrically opposite points equally spaced from the axis of rotation of said head, each flyweight being arcuate and extending from its pivotal mount toward the pivotal mount for the other flyweight,

an arm extending from said first flyweight,

a cutter blade mounted on said arm,

said arm disposed with respect to said first flyweight such that centrifugal force acting upon said flyweights to cause them to swing outwardly with respect to said central axis causes said arm to swing inwardly with respect to said central axis to bring said cutter head into cutting relation with a window shade inside of said hollow cutting head, and

a link joining said first and second flyweights such that said flyweights are constrained to move simultaneously and in equal amounts.

2. A window shade cutter as set forth in claim **1** in which said means to clamp a rolled up window shade comprises a vise having a pair of opposed jaws,

means to manually adjust said jaws toward and away from one another,

a block of foamed plastic material engaged between said jaws, and

said block being hollow to receive said window shade therethrough, whereby upon the moving of said jaws toward one another said block is compressed to clamp said window shade.

3. A window shade cutter as set forth in claim **2** in which the means to rotate said cutting head comprises an electric motor,

a pressure sensitive switch associated with said block of foamed plastic material, and

said pressure sensitive switch being in the electrical circuit of said electric motor and adapted to close

only upon the compression of said foamed plastic block to the extent that a window shade within said plastic block is held in immovable position therein.

4. A window shade cutter as set forth in claim **1** in which window shade gripping means are provided and mounted on said flyweights and movable into shade gripping relation upon the swinging out of said flyweights away from said central axis.

5. In a window shade cutter having

a base, a hollow cutting head mounted at one end of said base, clamp means mounted on said base adjacent said cutting head, said clamp means adapted to hold a rolled up window shade in fixed relation with one end thereof inside said cutting head, the improvement comprising

a self-levelling support for the opposite end of said window shade, said support comprises a block of resilient foamed plastic material seated on said base, and

an inverted box-like cover encloses the upper portion of said block.

6. A window shade cutter comprising a hollow cutting head adapted to receive an end of a window shade to be cut,

means to rotate said cutting head,

flyweights pivotally carried by said head and adapted to shift outwardly under the action of centrifugal force upon the rotation of said head, and

spring means carried by said flyweights and adapted to shift inwardly as said flyweights shift outwardly moving into positions to embrace said end of said window shade.

7. A window shade cutter as set forth in claim **6** in which said spring means comprise flat leaf springs.

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