Feb. 8, 1966 E. BAVERS ET AL 3,233,486

APPARATUS FOR TRIMMING LOOSE THREAD-ENDS OF BOOK-SEWING STITCHES

Filed Dec. 5, 1963 2 Sheets-Sheet 1

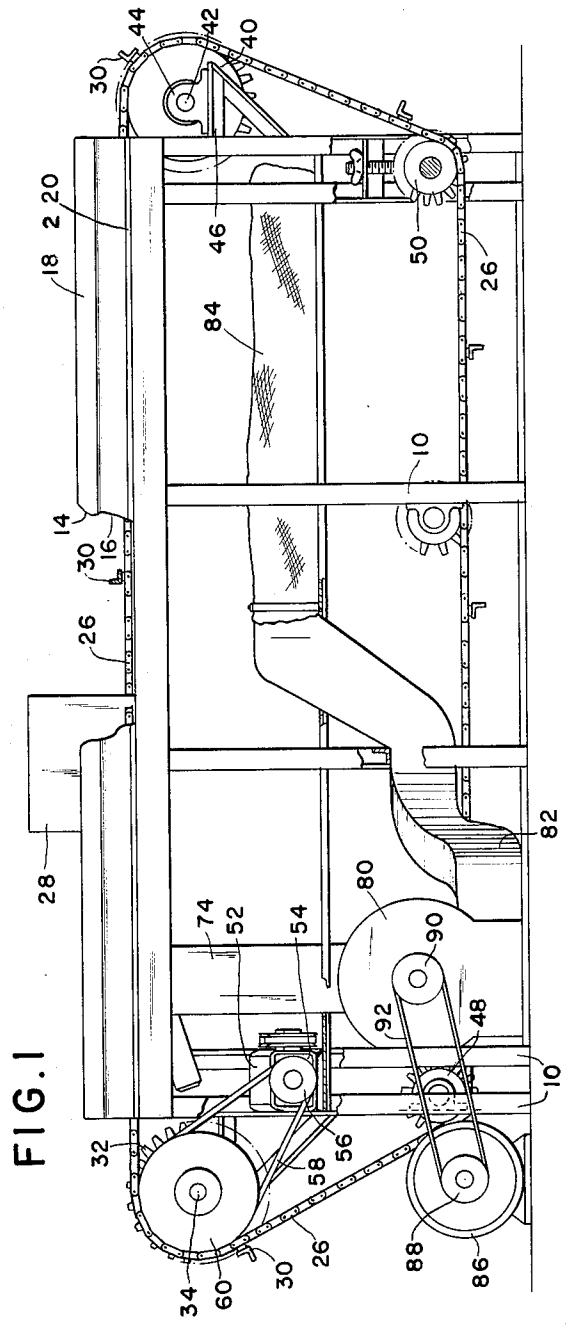


FIG. 1

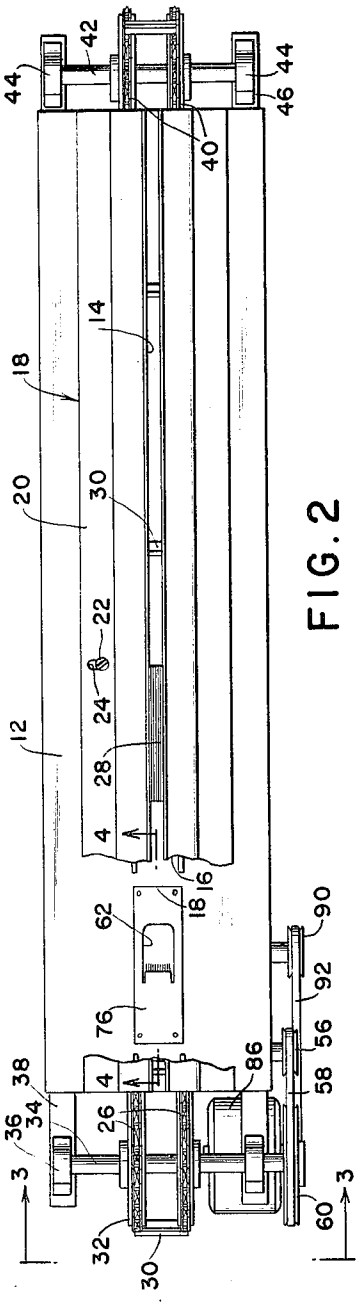


FIG. 2

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FIG. 3

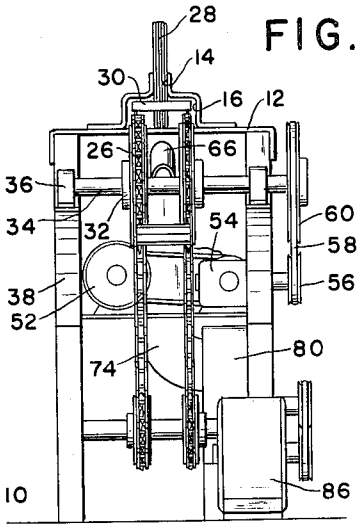


FIG. 5

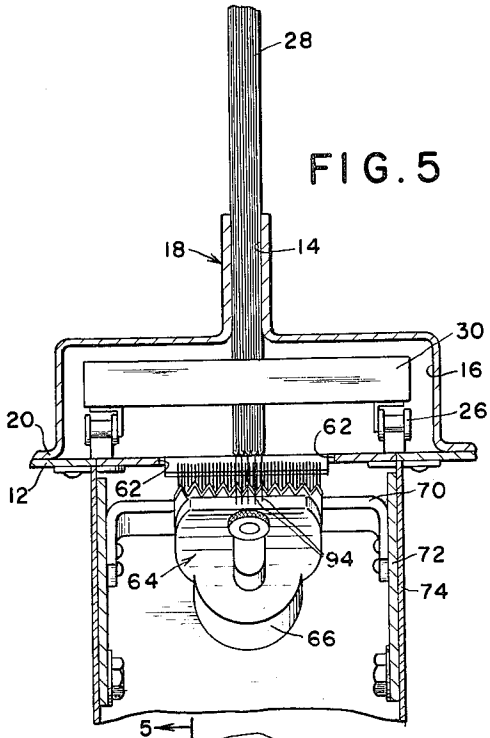
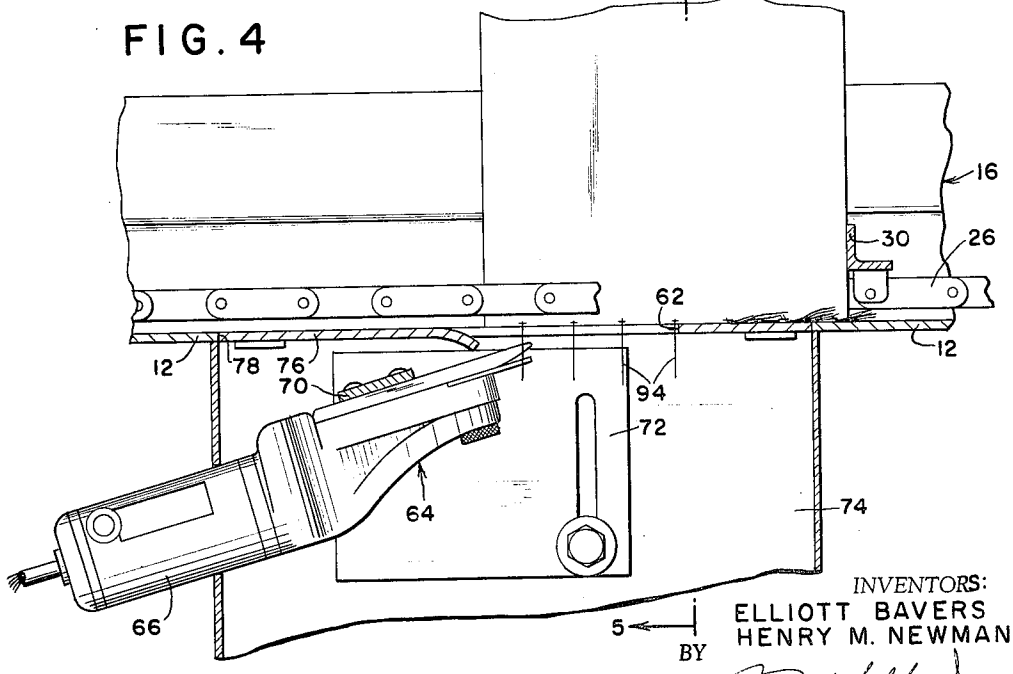


FIG. 4



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APPARATUS FOR TRIMMING LOOSE THREAD-ENDS OF BOOK-SEWING STITCHES

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6 Claims. (Cl. 83—100)

The present invention relates to apparatus for trimming the thread ends of the stitches by which the signatures of books are sewn, individually and together with one another into a book prior to the binding of the book.

In the bookmaking process, the printed folios are folded to lead size and the leaves are sewn together at a number of spaced points along their inner edges, by groups of several stitches taken on a sewing machine. When these stitches are severed from the machine, lengths of loose thread remain attached to them; generally, about two inches in length. Similarly, the several signatures which are to be combined into a book are sewn together at a number of points along the inner edge of the leaves by a number of groups of stitches, taken on a sewing machine, which are likewise left with loose thread ends. Before binding the sewn-together signatures between book covers, these loose threads have to be snipped off, so as not to interfere with the binding procedure. Heretofore, such snipping had to be manually effected by an operator wielding scissors, who had to separately and individually cut the loose thread ends that are generally arranged in a number of rows transversely of the back of the sewn-together signature. Obviously, such procedure is time and labor consuming and, therefore, costly.

It is the general object of the present invention to provide apparatus which will mechanically and automatically snip or sheer off the loose thread ends left from the sewing together of the leaves of the signatures and of the several signatures to one another, to thereby eliminate the manual and costly operation heretofore required for the purpose.

It is antother object of the present invention to provide apparatus, of the character described, by which the thread-cutting operation may be carried out at a rapid pace.

It is still another object of the present invention to provide apparatus, of the character described, which is simple and easy to operate and whose operation does not require any training or skill.

It is a further object of the present invention to provide apparatus, of the character described, which is of relatively simple construction, relatively compact and sturdy, and may be run with a minimum of care and attention.

The foregoing and other objects and advantages of the present invention will become more readily apparent to those skilled in the art from the embodiment shown in the accompanying drawings, and from the description following. It is to be understood, however, that such embodiment is shown by way of illustration only, to make the principles and practice of the invention more readily comprehensible, and without any intent of limiting the invention to the specific details therein shown.

In the drawings:

FIG. 1 is a side elevational view of the embodiment of the apparatus of the present invention, partly broken away to show details of arrangement and construction;

FIG. 2 is a top plan view of the same, partly broken away to show structural details;

FIG. 3 is an end elevation taken along the plane of line 3–3 of FIG. 2;

FIG. 4 is a section, on an enlarged scale, taken on line 4–4 of FIG. 2; and

FIG. 5 is a section taken on line 5–5 of FIG. 4.

Generally stated, the present invention consists of apparatus utilizing air suction means for straightening out and holding taut the thread ends of the signatures and book stitches and presents them while in such straight and taut position to cutters or clippers arranged to engage the loose threads at their base, and to clip them close to the body of the stitched-together book.

More specifically stated, the present invention comprises an upright frame formed of a plurality of suitably braced posts **10** supporting an elongated flat table **12** lengthwise of which there is provided a guideway for books; including a relatively narrower upper portion **14** and a wider lower portion **16** formed, preferably, by a pair of generally parallel, suitably bent guide plates **18** which may be adjustably secured on the table **12** by their oppositely offset horizontal end portions **20** as by means of the transverse slots **22** provided in such end portions, and the set screws **24** engageable over the edges of the slots to thereby make possible the adjustment of the width of the upper guideway portion **14** to accommodate books of various thicknesses.

An endless conveyor is passed through the guideway section **16** in close proximity to the table **12**; such conveyor consisting, preferably, of a pair of spaced, parallel, endless sprocket chains **26** which are interconnected at intervals spaced apart a distance preferably exceeding the length of a book **28** by pusher bars **30** preferably consisting of angle-bar sections connected by one leg to the chains **26** with their other leg uprightly disposed and facing the direction of the movement of the sprocket chain **26**.

The endless conveyor is operated by a pair of sprocket wheels **32**, each engaging one of the chains **26** which are mounted on a drive shaft **34** journalled in bearings **36** supported on brackets **38** secured at the forward end of the frame **10**. A pair of idler sprockets **40** are provided at the opposite end of the table, mounted on a shaft **42** journalled in bearings **44** supported on brackets **46** at the other end of the frame **10**. Additional, suitably supported idler sprockets **48** and **50** may be provided at the forward and rear ends of the frame **10**, adjacent the bottom thereof, each engaging the sprocket chains **26**.

The driving shaft **34** is driven by a motor **52** which is operatively connected to a gear box **54** having a pulley wheel **56** that is operatively connected by belt **58** to a pulley wheel **60** mounted on the driving shaft **34**.

Formed in the table **12**, adjacent the forward end thereof, within the area of the lower guideway portion **16**, is an opening **62** disposed between the paths of the sprocket chains **26** below the forward edge of which is mounted cutting clippers such as of the horse-hair clippers type, generally designated as **64**, preferably of the type having a self-contained electric motor **66**. The clippers are mounted, as by bracket **70**, secured to vertically adjustable plates **72** provided on opposed walls of a flue **74** engaging against the underside of the table **12**. The clippers are mounted in position to have the ends of its cutting teeth project partly into the opening at a level even with or slightly below the underside of the table **12**. Preferably, the opening **62** is formed in an insert plate **76** which is set into a larger opening **78** provided in the table **12** so as to facilitate access to the clippers **64** for purposes of convenience of maintenance or replacement.

The flue **74** is connected to the inlet of an air pump **80** whose outlet opening is connected to a second flue **82**, whose outlet end is removably connected to an elongated sac **84** formed of an air-permeable fabric or provided with other, fine-mesh means for air-escape therethrough. The air-pump **80** is operated from a motor **86** by means of the pulley wheels **88** and **90** and the driving belt **92**.

This completes the description of the apparatus of the

present invention. Its methods of operation will now be described.

After the electric circuits, through the endless conveyor driving motor **52**, the air pump motor **86** and the clipper motor **66** are closed to set each of these motors into operation, stitched books **28** may be successively placed in the guideway **14** with the stitched side downwardly disposed parallel to the table **12**, and pushed inwardly until it rests on or close to the table **12**. It will be clear that the books will be engaged by the pusher bars **30** and advanced towards the opening **62**. As the book is moved over the opening **62**, the suction created by the pump **80** will dispose and slightly tense the thread ends **94** into depending position, in which position they will, on the further forward movement of the book, encounter the cutting blades of the clippers **64** to be cut thereby. The cut thread ends **94** will be blown by air pump **80** into the sac **84** where they will be accumulated and disposed of when necessary by the emptying of the sac; the pumped air escaping through the wall of the sac or through the other air escape means provided, to limit air resistance to the action of the pump.

It may be here stated that chute means may be provided at the forward end of the table **12** which will direct the processed books out of the apparatus in a manner that will be readily understood and not thought necessary to be specifically shown. It may here also be stated that the rear end portions of the plates **18** may be laterally flared to facilitate the guiding and insertion of books into the guideway **14**.

It will be apparent that the apparatus of the present invention provides rapid, automatic and highly efficient means for the trimming away of loose ends of signatures on book stitching. It will also be apparent that the apparatus is relatively compact and occupies a minimum of floor space. It will be likewise apparent that the apparatus is simple to operate and requires no skill or training for that purpose.

It will be further apparent that numerous variations and modifications in the apparatus of the present invention may be made by any one skilled in the art, in accordance with the principles and invention hereinabove set forth, and without the exercise of any inventive ingenuity. We desire, therefore, to be protected for any and all such modifications and variations that may be made within the spirit of the invention and the scope of the appended claims hereto.

What we claim is:

1. Apparatus for trimming the loose thread-ends of a stitched book, comprising a supporting table, a guide way adapted to accomodate the thickness of a book provided over said table, an opening formed in said table encompassed by said guide way, an air pump having its air-inlet opening connected to the other side of said table around said opening, thread-cutting means including reciprocable cutting blades secured to said other side of said table with its cutting blades extending into said opening adjacent one edge thereof, and conveyor means for moving a book disposed in said guide way toward and over said cutting blades in position to have said thread-ends extend into said air-inlet opening.

2. The apparatus of claim **1**, wherein the portion of said guide way adjacent said table is of greater width than its upper portion and said conveyor means comprises a pair of spaced endless belts disposed within said wider guide way portion, said belts connected at intervals by book-pusher bars, and means moving said endless belts.

3. The apparatus of claim **2**, wherein said endless belts comprise sprocket chains and the means moving said endless belts include sprocket wheels engaging said sprocket chains.

4. The apparatus of claim **1**, wherein said guide way comprises a pair of plates secured on said table in spaced relation to one another.

5. The apparatus of claim **4**, wherein said plates are adjustably secured on said table for movement toward and away from one another to thereby narrow and widen said guide way.

6. The apparatus of claim **1**, wherein said air pump is formed with an air-outlet opening and a sac having air-permeable wall sections is removably secured to said pump over said air-outlet opening.

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