

(No Model.)

C. H. WILLCOX & S. BORTON.
TENSION APPARATUS FOR SEWING MACHINES.

No. 472,097.

Patented Apr. 5, 1892.

FIG. I.

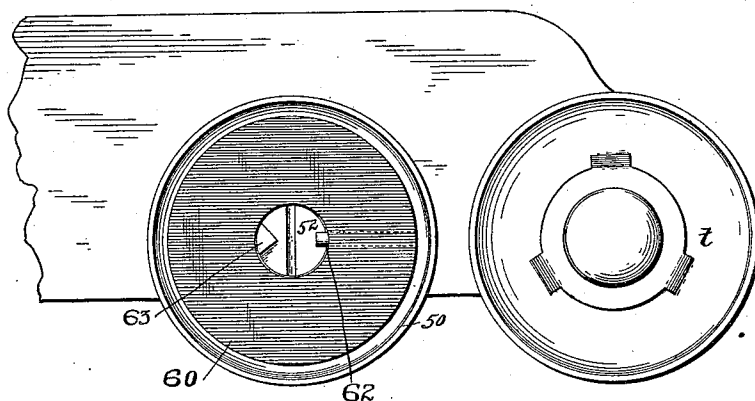


FIG. II.

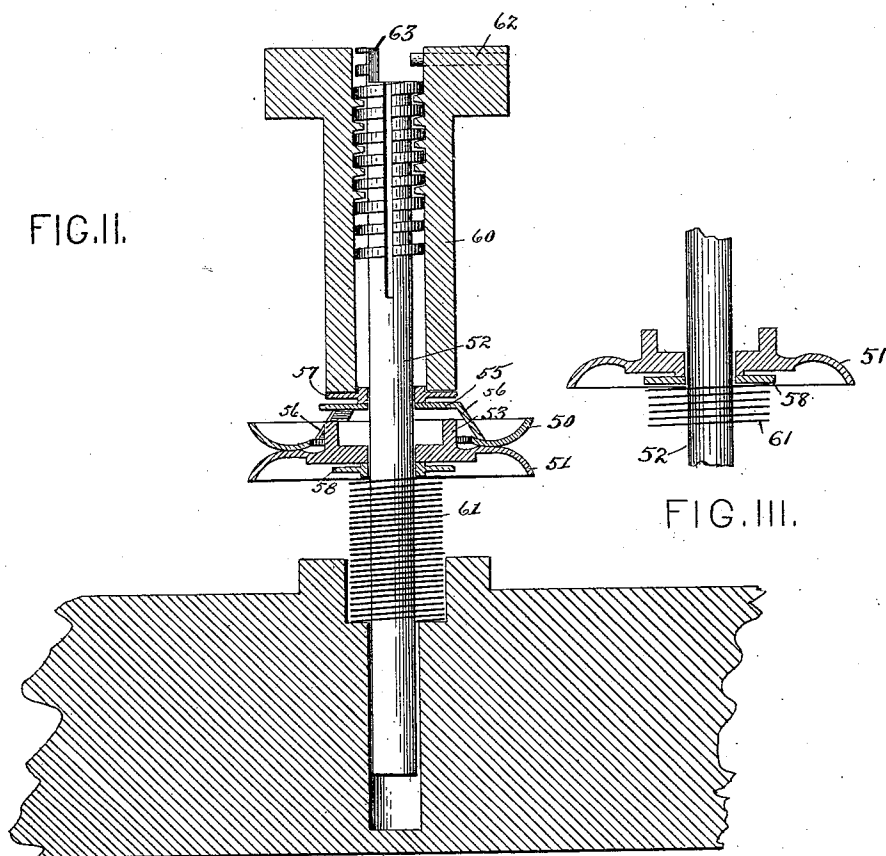


FIG. III.

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UNITED STATES PATENT OFFICE.

CHARLES H. WILLCOX, OF NEW YORK, N. Y., AND STOCKTON BORTON, OF PROVIDENCE, RHODE ISLAND, ASSIGNORS TO THE WILLCOX & GIBBS SEWING MACHINE COMPANY, OF NEW YORK, N. Y.

TENSION APPARATUS FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 472,097, dated April 5, 1892.

Original application filed May 24, 1890, Serial No. 353,091. Divided and this application filed July 6, 1891. Serial No. 398,584.
(No model.)

To all whom it may concern:

Be it known that we, CHARLES H. WILLCOX, of New York city, State of New York, and STOCKTON BORTON, of Providence, State of Rhode Island, have invented a new and useful Improvement in Tension Apparatus for Sewing-Machines, which improvement is fully set forth in the following specification.

The present invention relates to the construction of tension apparatus for sewing-machines and includes certain improvements originally described and claimed in our application filed May 24, 1890, Serial No. 353,091, whereof the present application is a division and continuation.

In sewing certain kinds of goods—such, for example, as cut knitted fabric—it is sometimes desirable to employ for one of the threads a soft single yarn similar to the yarn of which the fabric is knitted. Such yarn in passing through a tension apparatus sheds a great deal of lint, which soon clogs an ordinary friction-tension, and by holding the friction-surfaces apart impairs their action. To overcome this difficulty we have devised a tension apparatus which partakes of the nature of both the wheel and friction varieties and comprises two tension washers or disks mounted so as to revolve freely upon their support or stud and pressed into contact by a comparatively light tension-spring, the several parts being constructed and combined, as hereinafter described and claimed, in such manner that the drawing of the thread between the washers causes them to revolve, so that any lint that may be left between the washers is being constantly removed. A good hard-twist thread, such as usually employed on sewing-machines, does not shed lint; but small pieces of cotton or lumps on the thread frequently get caught between the tension-disks and hold them apart, so that the utility of the improved tension is not confined to sewing with soft thread. A smooth hard thread, however, requires considerable tension, and in order to insure that the washers will revolve it is preferred to add a supplemental tension or friction device, which insures that the thread will take a sufficiently firm hold upon the barrel of the friction-washer.

In the accompanying drawings, which form part of this specification, Figure I is a top view of the tension mechanism; Fig. II, a vertical section; and Fig. III indicates a modification or equivalent construction.

The parts of the tension mechanism which act directly upon the thread are two washers 50 51, which loosely surround a pin 52, threaded at its upper end. The lower washer has a hub or barrel 53, and the thread is given a partial turn around the barrel. The upper washer 51 is struck up at the center, forming a hollow or depression which fits over the barrel 53 without touching the same. The raised central disk 55 of the upper washer is connected with the lower part thereof only by narrow strips 56, between which are left spaces for the escape of lint. These strips do not touch that part of the thread which surrounds barrel 53 and lies in the triangular space between these parts, so that the tension (so far as the same is imparted to the thread by pressure of the opposing friction-surfaces) is confined in its action to a small surface, the faces of the washers being designedly made convex. As the thread is drawn by the needle it partly slips between the friction-surfaces and also slightly revolves the washers, so that any lint that may be left between the friction-surfaces is being constantly removed by the thread during the rotation of the washers. Between the nut 60 and upper tension-washer is interposed the washer 57, and between the spring 61 and lower tension-washer is the washer 58, the bearing-surfaces of the washers 57 and 58 being reduced, as shown, so that the tension-washers may rotate with greater freedom. With reference to the size of the surfaces against which the tension-washers bear, it is only necessary to observe that the parts should be so proportioned that the friction will not prevent the operation of the tension, as above pointed out, and it is immaterial whether this result be secured by reducing the diameter of the tension-washer itself, as indicated in Fig. III, or of the adjacent part against which it bears, as shown in Fig. II. The pressure of the tension-spring 61 may be regulated by turning the nut 60 in the proper direction. To limit the adjust-

ment, a cross-pin 62, carried by the nut 60, makes contact with a projection 63 of the screw-pin 52 and is arrested thereby.

When a hard twist thread is used, it is advantageous to employ, in connection with the principal tension mechanism, a supplemental tension, as indicated at *t*, Fig. I, which is or may be of the same form as that already described. Since a loosely-spun yarn has a rough surface, which enables it with a comparatively light tension to turn the washers, the use of the additional tension with such thread is neither necessary nor desirable.

Heretofore tension devices have been composed of two washers mounted without positive holding devices upon a stud or pin, or of two washers, one mounted on a stud or pin and the other on a sleeve or hub in one piece with the first. Such devices, however, are ordinary friction or clamping tensions, the tension-spring being arranged to bear directly against one of the washers in such manner as to preclude its rotation when the needle is drawing thread through the tension. When friction-tensions have been constructed as above described, it is for the purpose of enabling the pressure of the spring to be taken off the washers or disks at intervals. The tension apparatus herein described is readily distinguished in construction and operation from devices of the sort referred to above. The tension-washers rest against small bearing-surfaces, and the pressure of the spring is so light as to permit the rotation of the tension-washers, as already pointed out.

Having now fully described our said invention, what we claim is—

1. A sewing-machine tension apparatus comprising two tension-washers mounted face to face on their tension pin or stud so as to rotate independently thereon and having small bearing-surfaces on the sides opposite the faces in contact, a spring pressing said tension-washers together with light pressure, and means for holding the washers against the pressure of the spring, said parts being all constructed, proportioned, and combined in

the manner set forth, so that the drawing of the thread through the tension causes said washers to revolve, substantially as described.

2. The combination of a rotatable tension-washer having a barrel or hub, a second rotatable washer having a raised central portion which surrounds said barrel or hub and of sufficiently greater diameter to form an annular thread-space between them, a spring which presses said washers together while permitting them to rotate when the thread is drawn between them, and a stop for holding the washers against the pressure of the spring, substantially as described.

3. The combination of a rotatable tension-washer having a barrel or hub, a second independently-rotatable washer having a raised central portion which surrounds said barrel or hub and of sufficiently greater diameter to form a thread-space between it and said barrel or hub, said central portion being provided with openings for the escape of lint, a spring for holding the friction-surfaces of said washers together with light pressure, and means for supporting the washers in opposition to the action of the spring, substantially as described.

4. The combination of a rotatable tension-washer provided with a hub or barrel, a second washer having a raised central portion which surrounds said barrel or hub, forming an annular thread-space between them, the adjacent faces of the washers being rounded or convex from the inner to the outer edges, thereby forming a small friction-surface at a distance from the center of the washers, a spring for pressing the washers together, and means for holding the washers against the action of the spring, substantially as described.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

CHAS. H. WILLCOX.
STOCKTON BORTON.

Witnesses:

J. PARMLY,
S. A. SWART.