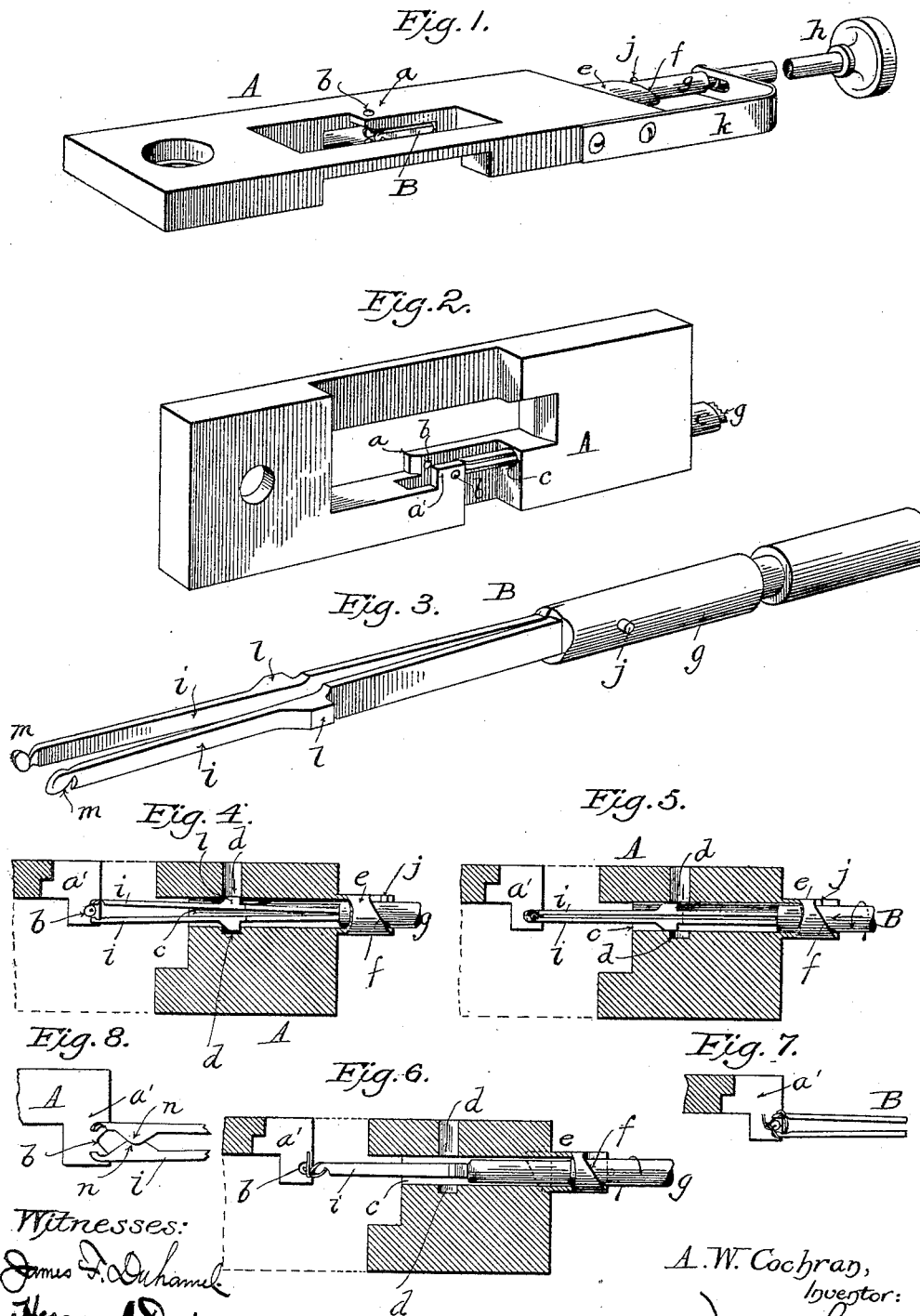


(No Model.)

A. W. COCHRAN.
KNOTTER FOR SEWING MACHINES.

No. 453,730.

Patented June 9, 1891.



Witnesses:
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UNITED STATES PATENT OFFICE.

ALFRED W. COCHRAN, OF BIRMINGHAM, ALABAMA.

KNOTTER FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 453,730, dated June 9, 1891.

Application filed May 17, 1890. Serial No. 352,116. (No model.)

To all whom it may concern:

Be it known that I, ALFRED W. COCHRAN, a citizen of the United States, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented certain new and useful Improvements in Knotters, of which the following is a specification.

My invention relates to sewing-machine attachments, and has reference more particularly to a device for uniting in a knot the ends of the upper (needle) and lower or shuttle thread at the beginning and termination of the seam to prevent raveling. The method of forming the stitch in shuttle-machines is to use two threads, one passing through an eye near the point of the needle and the other carried by and wound upon a bobbin within a shuttle vibrating at right angles to the path of the needle. When the needle descends through the fabric to its lowest point and commences to ascend, the needle-thread (which of course has followed the needle downward, closely pressed against the same) expands and forms a loop. The shuttle now passes bodily between the needle and its thread, carrying with it and paying out the thread wound upon the bobbin. The needle continuing to ascend draws the two threads tightly together, and the stitch is thereby formed. The fabric rests upon the top of a "throat-plate," and the needle passes through the fabric and through a small hole formed in the throat-plate, the seam being formed above the upper face of the throat-plate. As the stitches are formed, the fabric is pushed along by a feed-bar and the under or shuttle thread passes downward through the hole in the throat-plate. At a point half-way between the two extreme points reached by the shuttle the shuttle-thread becomes slack, being taut only at the extreme points; and in carrying out my invention I seize the shuttle-thread at this half-way point, where it is loose, and just before the needle penetrates the fabric, and form a loop in said thread by twisting it over upon itself by the twister, my twister being operated by hand. The needle and its thread then penetrates, first, the fabric, and immediately beneath it the loop in the under thread, which has just been formed. The needle then passes on downward to its lowest point and begins to ascend, the needle-thread leaving the needle

and expanding to form a loop to be penetrated by the shuttle, as before. When the needle ascends, the loop in under the thread contracts, the two threads are drawn together, and a knot formed.

In the drawings, Figure 1 is a perspective view of my improved device; Fig. 2, a perspective view of the throat-plate, looking from the under side; Fig. 3, a perspective view of the arms of the thread-twister; Figs. 4, 5, 6, and 7, sectional views showing the parts in different positions, and Fig. 8 a view illustrating a slight modification.

A indicates what I term the "throat-plate," having two arms *a a'* separated from each other, as shown in Fig. 2, each of said arms being provided with a hole or opening *b* to receive the needle. The throat-plate is further provided with a longitudinally-extending hole or opening *c*, the axis of which is at right angles to the needle-holes *b b*. Formed within the walls of the hole or opening *c* are lateral cavities or depressions *d*, while projecting from the end of the plate *A* around the hole *c* is a hub or tubular extension *e*, the outer end of which is made inclined or cam-shaped, as at *f*.

Instead of forming a hub upon the throat-plate, the inclined wall *f* may be formed in the countersunk and enlarged end of the opening *c*, as indicated by the dotted lines in Fig. 6.

B indicates the thread-twister, comprising a body *g* to fit the hub *e*, a head or enlargement *h*, by which it may be turned, a pair of spring-arms *i i*, which extend inward between the arms *a a* of the plate *A* to grasp the thread passing downward through the latter, and a pin or stud *j*, which, acting upon the cam-face *f* of the tubular hub *e*, will cause the twister as a whole to move longitudinally as it is turned.

A spring *k*, secured to the plate *A* and engaging the twister *B*, holds the latter normally in the position shown in Figs. 1 and 4, and also presses twister forward when pin has reached the proper point on the cam. The spring-arms *i i* are provided with shoulders or lugs *l l*, which, as shown in Fig. 4, normally lie within the cavities *d d*, so that ordinarily the arms *i i* will be separated; but it will be observed that when these lugs *l l* are not in the cavities but are in the hole proper *e*, the

arms *i i* will be closed or forced toward each other, as shown in Fig. 5.

The operation is as follows: With the parts in the position shown in Fig. 4 the twister B is pushed inward longitudinally, so that the lugs *l l* will ride out of the cavities *d d* and cause the arms *i i* to take the thread between their inner ends, as shown in Fig. 5, the twister being shown as at the limit of its inward movement. The twister is now turned by hand to the left, as indicated by the arrow in Fig. 6, in order to form a loop in the thread; but it will be observed that as the twister is thus turned or rotated its pin or stud *j*, riding along the cam or incline *f*, will cause the twister to also move outward. If the twister were moved outward without being turned or rotated, the lugs *l l* would drop into the cavities *d d*; but by turning or rotating the twister to form a loop in the thread this is avoided, for the cam-surface is so made that when the twister has made about one-quarter ($\frac{1}{4}$) of a complete revolution or rotation the twister will have been moved outward far enough to prevent the lugs *l* entering the cavities. Another effect of the gradual withdrawal backward of the twister by the cam is that it forms a bow in the under thread at a point between the two arms of my throat-plate and brings the points of each spring-arm back behind the thread grasped between them, and allows the latter to pass over these points, and thus facilitates the formation of the loop. Continuing the revolution or rotation of the twister will bring the stud *j* into such position that the spring *k* or the operator may move the twister forward lengthwise sufficiently to bring the open loop directly in line with the openings *b b*, as shown in Fig. 7. At this point the lugs drop into the recesses or cavities *d d* and permit the arms to separate. While in this position, the needle descends to its lowest point, and after the shuttle moves forward the needle ascends. The loop, which is always made in the under thread is then lifted off the ends of the spring-arms by the ascending needle-thread just before the tension takes effect, this action resulting in the formation of a sailor's knot. The ends of the arms *i i* are preferably notched, as at *m*, in order to take a better hold upon the thread in forming the loop, but they do not prevent the disengagement of the loop from the arms. The cavities *d d* are long enough to allow the arms *i i* to remain open until the thread is safely within the grasp of the arms before they close. In other words, a slight longitudinal movement of the arms is permitted without their being closed by such movement. The opening *b* in the lower arm *a'* need not be circular, but may be made V-shaped or open on one side, as shown in Fig. 8, and in such case and in order to prevent the thread from passing out of the opening and too far inward between the arms the latter will be

provided with lugs *n n*, which, while not preventing the arms from coming together, effectually preclude the entrance or passage of the thread behind the lugs. This construction avoids the necessity of threading the thread through the opening in the arm *a'*.

It is obvious that many other forms of twister than that shown can be used with the throat-plate herein shown and described, and while I prefer to use the present form of twister, I do not wish to be understood as limiting myself to the use of the special twister with my improved throat-plate.

Having thus described my invention, what I claim is—

1. In combination with the throat-plate A, having two arms *a a'*, and openings for the needle in said arms, a twister journaled in the body of the throat-plate and extending inwardly between the arms.

2. In combination with a twister, the throat-plate A, provided with perforated arms *a a'*, a longitudinal opening *c*, lateral cavities *d*, and a cam-face *f*.

3. In combination with a throat-plate, the twister B, comprising a main body *g*, and two spring-arms *i i*, having lugs or projections *l l*.

4. In combination with plate A, having hub *e*, provided with cam-face *f*, twister B, provided with spring-arms *i i*, and stud *j*, and a spring *k*, arranged substantially as shown.

5. In combination with plate A, having the perforated arms *a a'* and the recessed opening *c*, a twister B, provided with spring-arms *i i*, and lugs *l l*.

6. In combination with a throat-plate provided with the openings or holes *b* for the needle, a manually-operated twister journaled in the main body of the throat-plate and projecting inwardly into line with the thread-openings, but at right angles thereto.

7. In combination with a throat-plate having two separated arms *a a'*, adapted to receive and hold the thread, and also provided with a cam-face *f*, a twister mounted in the plate and adapted to move lengthwise and also to be rotated relatively to the plate, and a spring acting upon the twister, all substantially as shown.

8. In combination with a throat-plate having two separated thread-holding arms *a a'*, a twister mounted therein and provided with two spring-arms adapted to work between the thread-holding arms *a a'*, and means, substantially such as shown, for moving the twister inward and outward and opening and closing its arms as it is turned or rotated.

In witness whereof I hereunto set my hand in the presence of two witnesses.

ALFRED W. COCHRAN.

Witnesses:

W. I. GIBSON,
P. M. AGAN.