(No Model.)

H. P. RICHARDS.

SHUTTLE FOR SEWING MACHINES.

No. 594,429 Patented Nov. 30, 1897.

Fig. 1.

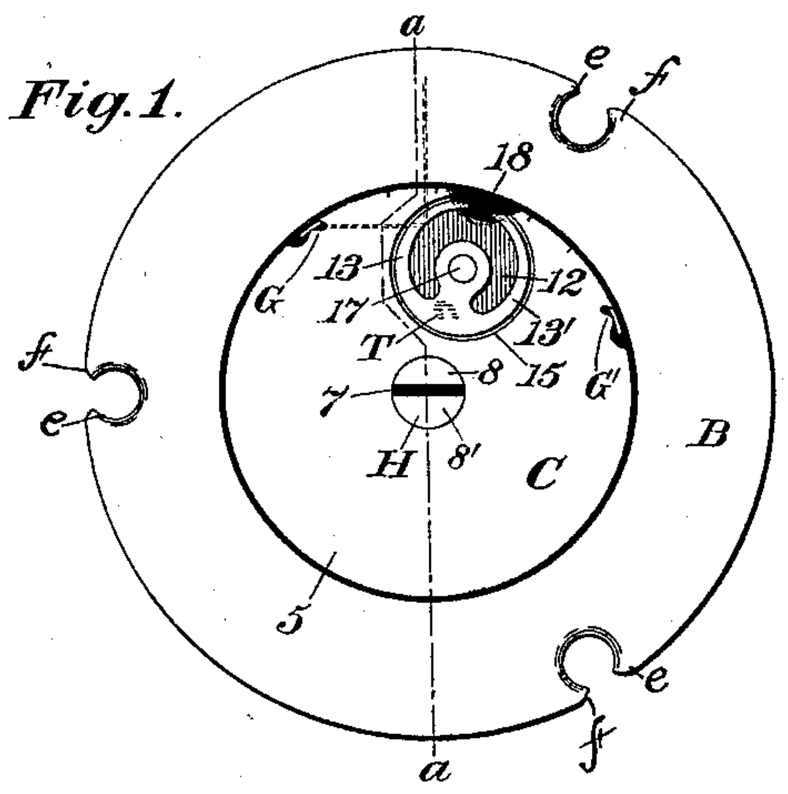


Fig. 2.

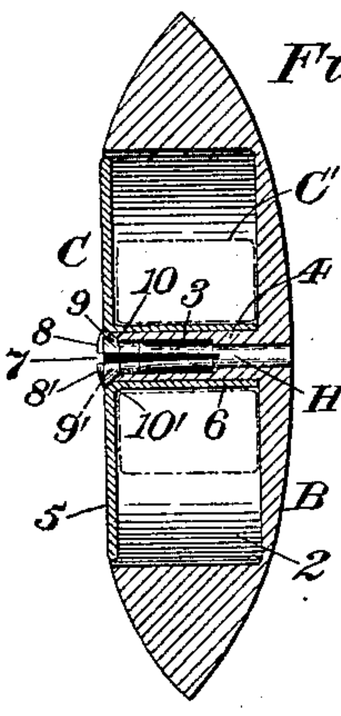


Fig. 3.

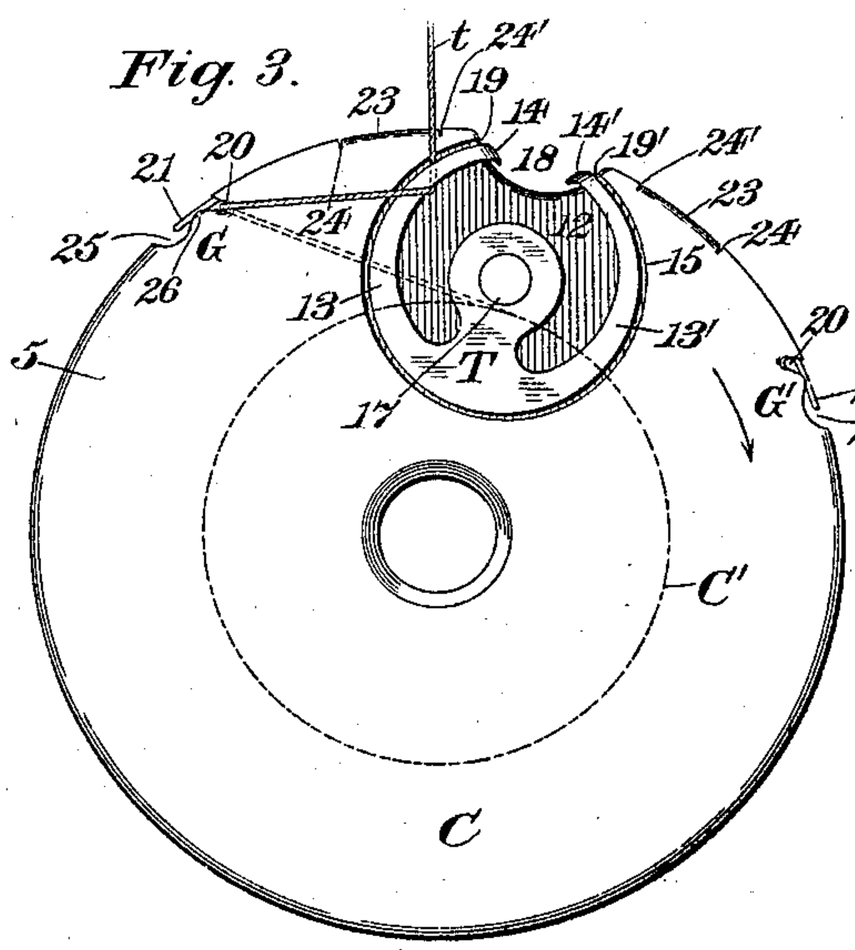


Fig. 4.

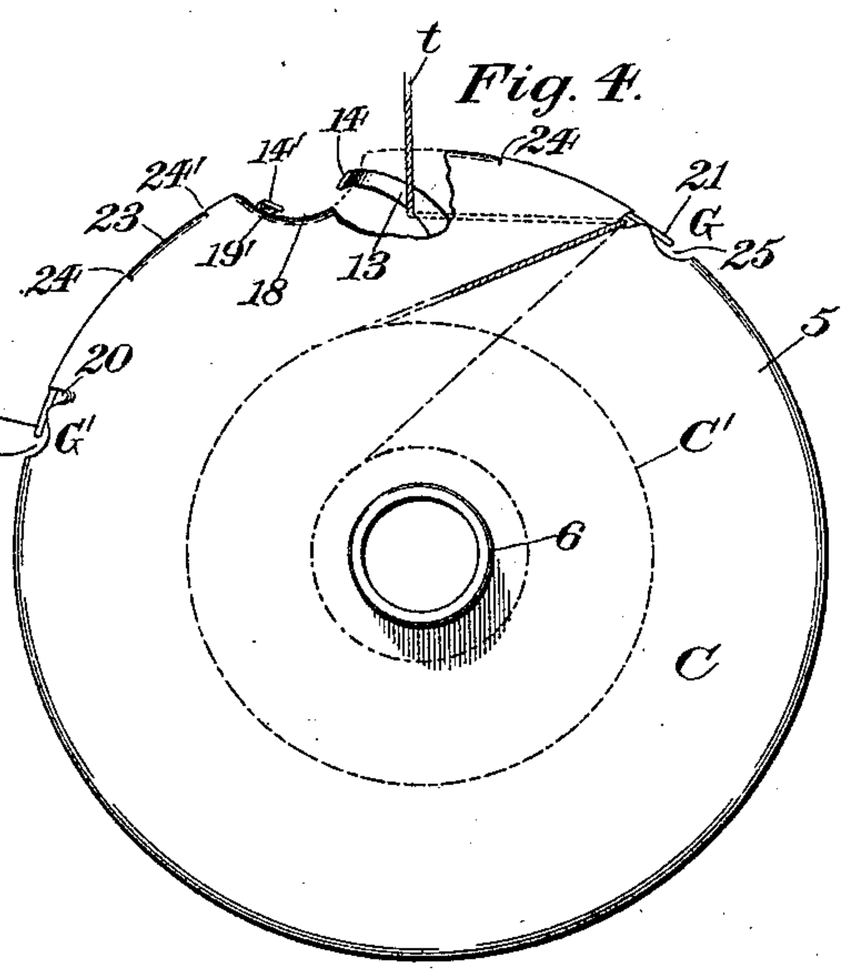


Fig. 5.

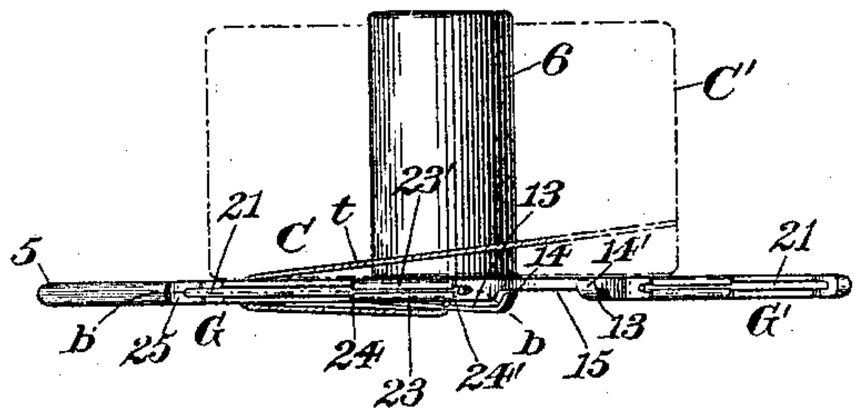


Fig. 6.

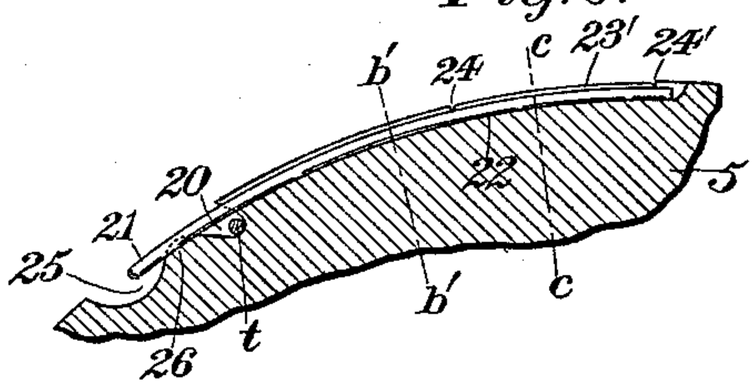


Fig. 7.

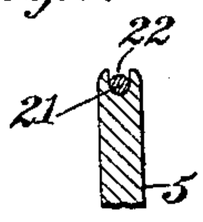
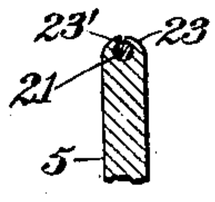


Fig. 8.



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UNITED STATES PATENT OFFICE.

HUBERT P. RICHARDS, OF NEW BRITAIN, CONNECTICUT.

SHUTTLE FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 594,429, dated November 30, 1897.

Application filed August 15, 1896. Serial No. 602,863. (No model.)

To all whom it may concern:

Be it known that I, HUBERT P. RICHARDS, a citizen of the United States, residing at New Britain, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Sewing-Machine Shuttles, of which the following is a specification.

This invention relates to a rotary sewing-machine shuttle of that class having a cop-case in which a cop is rotatively supported, within which the cop-carrier is usually held against rotative movement during the rotation of the shuttle in one or the other direction either by the stress of the lower thread upon the cop-carrier or by the engagement of some device on the carrier with a fixture on the frame of the machine with which the shuttle is used; and the invention more particularly relates to a thread-guard and tension device for the cop-carrier.

One object of this invention is to provide, in connection with a shuttle of the class specified, improved, simplified, and effective means for supporting, guiding, and controlling the tension of the shuttle-thread, and whereby the so-called "threading" of the shuttle will be materially facilitated, and whereby the thread will be so manipulated during the operation of sewing as to avoid the excessive tension and injurious strain upon the running end of the thread due to friction as the same is unwound from the cop, as in cop-carrying shuttles of ordinary construction.

A further object of the invention is to provide, in connection with an axially-chambered shuttle, a cop-carrier having a discous plate or cap of a diameter approximately equal to the diameter of the cop-receiving chamber of the shuttle and having on the perimeter thereof a thread-guide adapted for receiving and holding the running end of the shuttle-thread at one side and beyond the peripheral path of movement of the cop.

In the drawings accompanying and forming part of this specification, Figure 1 is a side view of one form of rotary sewing-machine shuttle embodying my improvements. Fig. 2 is a cross-sectional view of said shuttle, taken in dotted line *a a*, Fig. 1, and looking toward the left hand in said figure. Fig. 3 is a side view, similar to Fig. 1, of the cop-carrier detached from the shuttle proper and drawn upon a relatively large scale, said figure showing a cop in dotted line and also showing the running end of the shuttle-thread held in operative position by the thread-guide and tension device. Fig. 4 is a view, similar to Fig. 3, of the opposite side of the cop-carrier, a portion being broken away to show the position of the running end of the shuttle-thread. This figure also shows two positions assumed by that portion of the shuttle-thread between the thread-guide and cop as the cop is reduced in diameter by unwinding. Fig. 5 is a plan view of the cop-carrier as seen from above in Fig. 3, the cop being shown in dotted lines. Fig. 6 is a sectional view, upon a relatively large scale, of a segment of the cop-carrier, taken in dotted line *b b*, Fig. 5, and seen from the under side in said figure. Fig. 7 is a cross-sectional view of a portion of the cop-carrier, taken in dotted line *b' b'*, Fig. 6; and Fig. 8 is a similar cross-sectional view of a portion of the cop-carrier, taken in dotted line *c c*, Fig. 6.

Similar characters designate like parts in all the figures of the drawings.

My improved shuttle, which may be of any suitable conformation in a general way, is shown as a reversibly-rotatable shuttle comprising a hollow discoidal casing or outer member B, having on the periphery thereof two sets of loop-engaging hooks *e* and *f*, respectively, so disposed as to render the shuttle effective for engaging the loop of the needle-thread when the shuttle is rotated in either direction, and a cop-carrier or inner member C, removably and rotatably supported within the confines of the casing B.

As illustrated in the drawings, the body portion B is annularly recessed, as shown at 2, and is axially bored, as shown at 3, to form an inwardly-projecting tubular cop-carrier-supporting stem 4 and a surrounding cop-receiving chamber 2 of suitable diameter to accommodate a cop of the required size.

The cop-carrier C is shown comprising an axially-recessed disk or plate 5, having a tubular hub 6, adapted to receive the stem 4 of the body portion B of the shuttle, said hub 6 being of a length approximately equal to the length of the said stem 4, and when the two parts B and C of the shuttle are assembled

having a bearing at its inner end against the inner face of the side wall of the part B, as shown most clearly in Fig. 2 of the drawings.

As a convenient means for normally securing the body portion B and cop-carrier C together in operative relation and to permit a free movement of one relatively to the other the body portion B of the shuttle is shown having a holding device H located within the stem thereof, which holding device in the form thereof shown is in the nature of a pin slitted longitudinally at the outer end thereof, as shown at 7, to form resilient arms 8 and 8′, having oppositely-inclined bearing-faces 9 and 9′, respectively, which engage, when the parts are assembled, opposite faces 10 and 10′ of the conical central opening in the cop-carrier, as will be understood by a reference to Fig. 2 of the drawings. It will be understood, however, that any suitable holding device may be employed in lieu of the holding device described without departure from this invention.

As a means for controlling the so-called "shuttle-thread" (shown in dotted lines in Figs. 1, 3, 4, and 5) as it is unwound from the cop or bobbin C′ during the operation of sewing irrespective of the direction of rotation of the shuttle I have shown the cop-carrier provided with a duplex tension device T, located near the periphery of said cop-carrier, as will be hereinafter described, and the two oppositely-disposed thread-guides G and G′, which are located upon the perimeter of the cop-carrier, one at one side and the other at the other side of the tension device T.

The duplex tension device T, in the form thereof shown in Figs. 1 and 2, is in the nature of a sheet-metal disk cut away at 12 to form two independent opposing resilient arms 13 and 13′, the outer free ends of which are bent laterally, as shown at 14 and 14′, to form hooks for preventing the accidental displacement of the thread *t*, as will be hereinafter more fully described.

As a means for securing the duplex tension device T in proper position upon the cop-carrier, so that the same will not interfere with the passage of the loop of the needle-thread around the shuttle during the operation of sewing, the cap or plate 5 of the cop-carrier is shown having in the outer face thereof near the periphery a depression 15, the inner face of which constitutes a seat for the tension device, which tension device may be secured in place on said seat in any suitable manner, as by a pin or rivet 17. (See Figs. 1 and 3.)

The plate or flange 5 of the cop-carrier C has a depressed or cut-away peripheral portion, as 18, constructed to form opposing bearing-faces 19 and 19′ for the hooked or bent ends 14 and 14′ of the resilient arms 13 and 13′ of the tension device T, which hooked ends engage the bearing-faces at points within the peripheral line of the plate 5. One of the resilient arms, as 13, is intended to hold the thread *t* under tension when the shuttle is rotated in the direction designated by the arrow in Fig. 3, and the other arm, as 13′, is adapted for holding the thread under tension when the shuttle is rotated in the reverse direction.

In the drawings the cop-carrier C is shown furnished with two opposing thread-holding guides G and G′, which are located at opposite sides, respectively, of the tension device T; but it is desired to state in this connection that in some cases the cop-carrier will be furnished with but one thread-guide, which is all that is necessary if the shuttle is to be rotated in but one direction, and therefore I do not wish to limit myself to the particular number, construction, and organization of said guides shown in the drawings, nor do I wish to limit myself to the particular construction and arrangement of tension device shown, as these may be modified without departure from my invention.

Inasmuch as the thread-guides G and G′ are of substantial duplicate construction a description of one of said thread-guides will suffice for both.

Each thread-guide in the preferred form thereof shown in the drawings comprises a threadway 20, formed in the periphery of the plate 5 of the cop-carrier, and a thread-guard 21, normally extending over and closing the outer open end of the threadway 20. The threadway 20 is preferably in the nature of an elongated slot formed through the perimeter of the plate 5 of the cop-carrier in such manner that when the cop-carrier is in the operative position shown in Figs. 1 and 2 said slot or threadway will be located considerably above the periphery of the cop and in such position that when the thread *t* is in engagement with the threadway 20 and the arm of the tension device, as shown in said figures, the stress exerted upon the thread will be in a direction away from the cop C′, thus obviating injurious frictional resistance between adjacent portions of the thread, which would accrue if the thread-guide were located below the plane of the upper side of the cop. The longitudinal axis of the threadway is shown located in a plane tangent to the peripheral line of the cop; but, if desired, the plane of said axis may intersect the vertical plane of the axis of the cop-carrier at a point considerably above the peripheral line of the cop C′.

The thread-guard 21, in the form thereof shown most clearly in Figs. 5 and 6, is in the nature of a curved-wire spring, which is seated in a groove 22, formed longitudinally in the periphery of the cop-carrier plate 5, said guard having its free outer end extended over the open outer end of the threadway 20 and normally closing the entrance to said threadway and having its inner end fixedly secured to the periphery of said plate 5 in a suitable manner.

The thread-guard 21 is shown of a curva-

ture corresponding to the curvature of the peripheral groove 22, and is shown held at its inner end by means of the peripheral portions 23 and 23′ of the side walls of the plate 5, which are separated from the main portion of the periphery of the plate by slits 24 and 24′, and which are bent over upon and closely impinge the inner end of the guard 21, as will be understood by reference to Figs. 3, 5, and 6 of the drawings.

By constructing and arranging the thread-guard, comprising the threadway 20 and the resilient guard 21, as described it will be seen that the thread-guide as a whole is located within the outlines of the cop-carrier plate 5 and between said plate and the surrounding wall of the casing or body portion B of the shuttle and that when the cop-carrier is in operative position with respect to the body portion of the shuttle no part of said thread-guide protrudes beyond the outer face or pheriphery of the cop-carrier or the body portion of the shuttle to interfere with the free passage of the loop of the needle-thread around the shuttle, which is a desideratum in shuttles of this class.

For the purpose of facilitating the entrance of the thread through the threadway 20 the periphery of the cop-carrier plate 5 is notched or cut away at one side of said threadway to form a threading channel or guideway 25, which guideway 25 is separated from the threadway 20 by a peripheral segment, which is peripherally grooved, as at 26, to form a seat for the outer free end of the resilient guard 21, capable of preventing lateral displacement of this end of the guard with respect to the plate 5. The free end of the resilient guard terminates intermediate to the side walls of the guideway 25, sufficient space being left between the extreme end of said guard and the adjacent wall of the guideway to permit the ready insertion of the drawing end of the thread *t*.

In practice the cop C′ is placed upon the hub of the cop-carrier and threaded through the threadway 20 and between one of the resilient arms of the tension device T and plate 5 before the carrier is placed in operative position upon the body portion B of the shuttle, in the manner shown most clearly in Figs. 3, 4, and 5 of the drawings.

In threading the cop-carrier the end of the thread *t*, after the cop is placed upon the hub of said carrier, is drawn over the periphery of the plate 5 into the guideway 25 and underneath the free end of the guard 21, where a slight pull will carry the same into the threadway 20, the free end of the arm 21 being sprung upward to allow the passage of the thread between said guard and the guard-seat 26, after which the end of the thread is carried around and inserted between the crooked end of the arm of the tension device to the position shown in Fig. 3, which completes the threading operation.

After the cop-carrier is threaded, as hereinbefore described, and placed in coöperative relation with respect to the body portion of the shuttle, as shown in Fig. 1, the resilient guard 21 and the hooked end of the tension device T will positively prevent accidental displacement of the thread from the position shown in Fig. 2.

Having described my invention, I claim—

1. A reversibly-rotatable shuttle comprising an annularly-recessed casing having two sets of oppositely-disposed peripheral loop-engaging hooks; a cop-carrier rotatably supported in the recess of the casing and having a depressed peripheral portion; a duplex tension device carried on the side face of the carrier and having two oppositely-disposed resilient thread-engaging arms whose free ends extend laterally over the depressed portion of said carrier; two threadways formed transversely in the periphery of the carrier at opposite sides, respectively, of the tension device; and two independent oppositely-disposed resilient thread-guards located upon, and fixed at their adjacent ends to, the perimeter of the cop-carrier between said perimeter and the surrounding wall of the casing and having their outer free ends extending over the threadways, respectively.

2. The combination, with an annularly-recessed discoidal outer member having opposing loop-engaging hooks on the periphery thereof, of an inner member comprising a hub supported for rotative movement on the outer member, and an annular flange at the outer end of said hub, located wholly within the recess of the outer member, and having a depressed peripheral portion constituting two opposing bearing-faces; a discous tension device having two independent concentrically-curved resilient arms having laterally-projecting hooks at the free ends thereof that engage over the opposing bearing-faces of the depressed peripheral portion of the flange; and two opposite thread-guides located on the periphery of the inner member at opposite sides of the tension device and between said periphery and the surrounding wall of the outer member.

3. A reversibly-rotatable shuttle comprehending an annularly-recessed discoidal casing having peripheral loop-engaging hooks so disposed as to render the shuttle effective for engaging the loop of the needle-thread when rotated in either direction and also having a centrally-disposed, outwardly-extending hub; a cop-carrier rotatably supported on the hub of the casing and having an annular flange located within the recess of the casing, with its outer face flush with the outer face of said casing, and also having a depressed peripheral portion constituting two oppositely-disposed bearing-faces; a tension device fixed to the outer face of the cop-carrier near the periphery thereof and having two oppositely-curved resilient arms furnished with laterally-projecting hooks at the free ends thereof, which project over the two bearing-faces at a

point below the peripheral line of the cop-carrier flange; two transverse threadways formed in the periphery of the cop-carrier flange, one at each side of the tension device; and two resilient guards fixed at their adjacent ends to the perimeter of said flange in juxtaposition to the arms of the tension device and having their opposite ends extending one over each threadway.

4. In a shuttle, the combination, with an annularly-recessed outer member having peripheral loop-engaging hooks, of an annularly-flanged cop-carrying member rotatably supported on the outer member and having in the periphery thereof three transverse notches or recesses, the middle one of which is shaped to form two oppositely-disposed bearing-faces, and the two outer ones of which are each constructed to form a threadway and a thread-guide, and which flange is also peripherally grooved longitudinally to form two thread-guard-retaining grooves and holding-flanges located one at each side of the two bearing-faces; two resilient thread-guards secured in the retaining-grooves at their inner adjacent ends by the inturned flanges and extending at their outer free ends over the thread-guides and partially over the threadways; and a duplex tension device fixed to the outer face of the cop-carrying member near the periphery thereof and comprising two concentrically-disposed resilient arms, each having at the free end thereof a laterally-projecting hook which extends from one of the bearing-faces of the cop-carrier below the perimeter thereof.

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