THREAD CONTROLLING MECHANISM FOR BRAIDING MACHINES

Filed Dec. 29, 1927 2 Sheets-Sheet 1

Fig. 3.

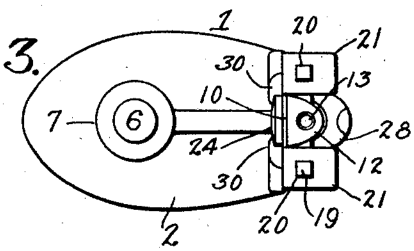



Fig. 2.

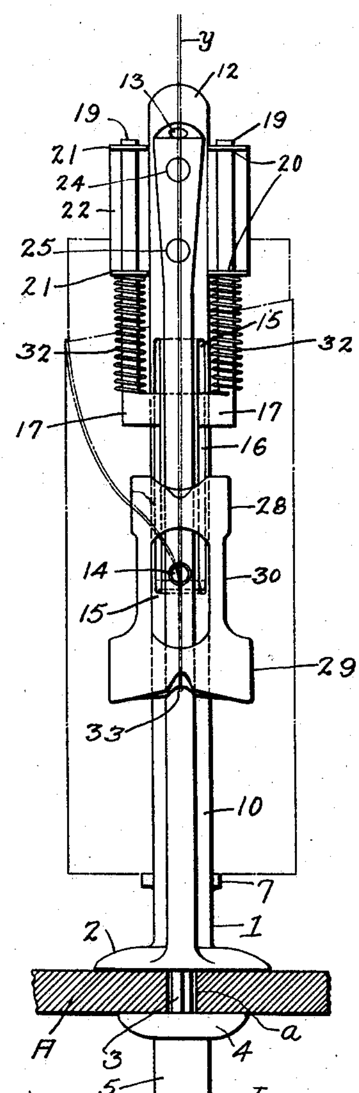
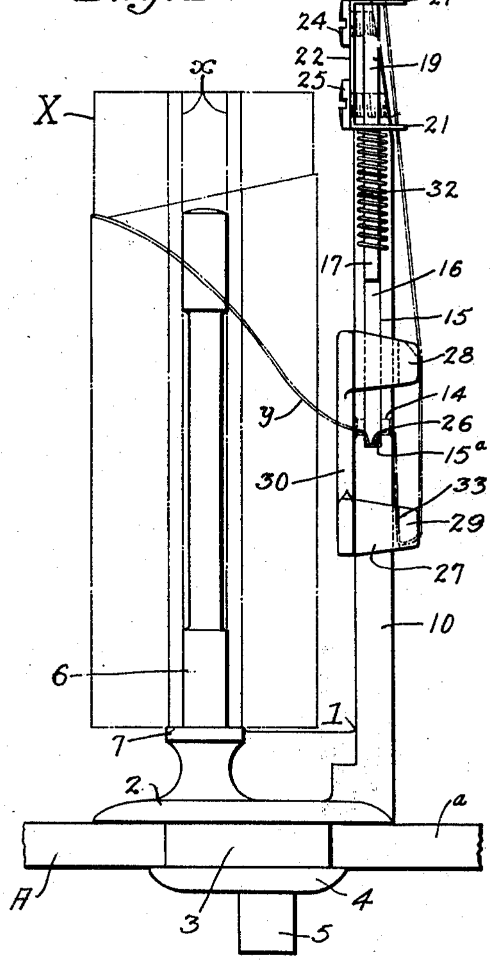



Fig. 1.




Inventor:-
Sidney B. Blaisdell
by his Attorneys
Howson & Howson

Dec. 31, 1929. S. B. BLAISDELL 1,742,124

THREAD CONTROLLING MECHANISM FOR BRAIDING MACHINES

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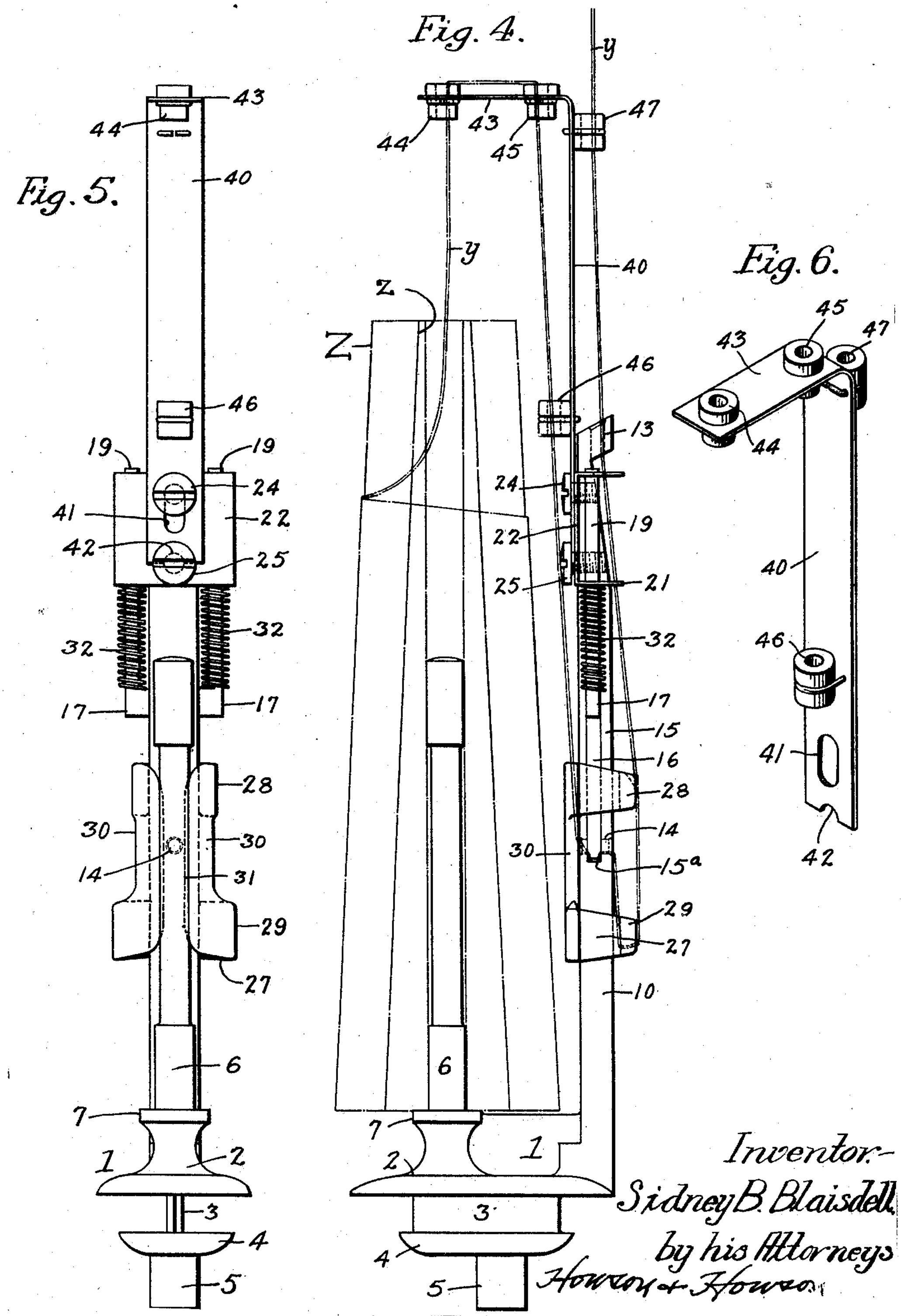


Inventor:-
Sidney B. Blaisdell,
by his Attorneys
Howson & Howson

Patented Dec. 31, 1929 **1,742,124**

# UNITED STATES PATENT OFFICE

SIDNEY B. BLAISDELL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO FIDELITY MACHINE COMPANY, OF WILMINGTON, DELAWARE, A CORPORATION OF DELAWARE

## THREAD-CONTROLLING MECHANISM FOR BRAIDING MACHINES

Application filed December 29, 1927. Serial No. 243,406.

This invention relates to braiding machines, such as that shown in my co-pending application, Serial No. 187,301, filed April 28, 1927.

As illustrated in said co-pending application, each braiding unit of the machine comprises a base plate and a superposed bobbin supporting platform spaced apart from but rigidly attached to said base plate. On the bobbin supporting platform is mounted a series of bobbin carriers, each of which is provided with a depending extension which projects through one of a pair of similar slots formed in the bobbin platform. These slots each follow a circuitous path consisting of a series of waves arranged around a general center and function to guide the bobbin carriers, on their movement over the bobbin supporting platform, in such a manner as to cause the threads carried by the bobbin carriers to intertwine with each other to effect the braiding operation adjacent the braiding mandrel of the machine, which is located above the bobbins and substantially in line with the general center of the circuitous paths traversed by the bobbin carriers. Intermediate the base plate and the bobbin supporting platform, each unit is provided with an intermeshing train of gears, each gear having a lug adapted to successively engage the depending projections on the respective bobbin carriers, for the purpose of moving the bobbin carriers over the surface of the bobbin supporting platform in the manner described.

Each bobbin carrier is provided with a bobbin supporting spindle and a thread guiding post adjacent said spindle. On the spindle is rotatably mounted a holder for the yarn package having a flange on at least one end, which is provided with a series of ratchet teeth. On the post is slidably mounted a pawl which is adapted to engage the ratchet teeth of the yarn package holder, and below the pawl a tension weight is slidably mounted on the post. A thread guide-opening is formed in the thread guiding post at a point intermediate the opposite ends of said post.

In the operation of this type of braiding machine the individual braiding thread carried by each bobbin carrier is led from the yarn package on the carrier, through the thread guide-opening in the post, under the lower side of the tension weight, through a second thread guide-opening formed in the upper end of the post, and from there to the braiding point of the unit.

These yarn packages usually consist of a wooden spool having a cylindrical core and a flange on each end thereof, the thread being wound on the cylindrical core between the flanges, or a yarn package may consist of a paper tube having the thread universally wound thereon. When this type of yarn package is employed the tube is forced on a cop holder comprising a cylindrical body having a flange on one end in which is formed the above mentioned series of ratchet teeth.

As the bobbin carriers are moved in the circuitous path over the bobbin supporting platform the braiding is effected in the manner above noted. The pawl on the post of each carrier, being in engagement with one of the ratchet teeth of the cop holder, prevents rotation of the yarn package, the thread previously drawn from the yarn package being formed in a loop adjacent the post with the tension weight resting in the lower part of the loop, thus a substantially uniform tension is maintained on the yarn passing to the braiding point of the unit. As the yarn is consumed the loop becomes shorter until finally the tension weight is raised to a point where it engages the lower side of the pawl and raises the pawl out of contact with the engaged ratchet tooth of the spool or cop holder, whereupon the said spool or cop holder and the yarn package carried thereby rotates under the influence of the tension weight in drawing the thread from the yarn package and forming a new loop of thread adjacent the post. As the tension weight descends, by gravity, the pawl is again permitted to engage another ratchet tooth and stop the rotation of the yarn package.

The release of the pawl from the ratchet teeth of the spool or cop holder takes place at the high point of one of the waves of the circuitous path, which is located the greatest distance away from general center of the paths. As the bobbin carriers move into the low points of the waves, or the points nearest the general center of the paths, the tension weight further descends on the post and takes up the slack which would otherwise form in the thread as the carrier moves closer to the general center of the circuitous paths.

There are times in the operation of the machine when the pawl will stick after being raised out of contact with the engaged ratchet tooth, permitting the yarn package to continue to rotate, consequently the tension weight will continue to descend to a point where it will engage the stop motion operating lever of the unit and thereby stop the operation of the unit. During this free running of the yarn package there is practically no tension on the braiding thread and consequently imperfect and loose braiding is formed.

If the machine is operated above a predetermined rate of speed the tension weights are sometimes caused to rise at such a rate that the pawls are knocked completely off their supporting posts, or the pawls are raised to such an extent that they cannot again descend in time to engage the next successive ratchet tooth or any one of several teeth following thereafter, whereupon the condition above described ensues.

The principal object of my invention is to eliminate the unreliable pawl and ratchet control of the yarn package and to provide mechanism which operates directly on the thread as it is drawn from the yarn package through the lower thread guide-opening in the post. Employment of my invention permits the use of the yarn packages having the paper tube core which can be supported directly on the bobbin supporting spindle without the use of the above mentioned cop holder, and also eliminates the flanged spool type of bobbin having the ratchet teeth thereon. Also, by the employment of my invention yarn packages of the cone type may be used, the conical core of the package being supported directly on the bobbin supporting spindle of the carrier.

Details of the construction of the invention will be fully disclosed hereinafter, reference being had to the accompanying drawings, of which:

Fig. 1 is a side elevation of a bobbin carrier showing a bobbin having a tubular core applied thereto;

Fig. 2 is a rear elevation of the structure shown in Fig. 1;

Fig. 3 is a plan view of the structure shown in Fig. 1;

Fig. 4 is a side elevation of a bobbin carrier illustrating a bobbin having a conical core applied thereto;

Fig. 5 is a front elevation of the structure shown in Fig. 4, and

Fig. 6 is a perspective view of a detail of the invention.

In the drawings of the present application, the bobbin supporting platform is illustrated at A. One of the bobbin carriers is illustrated at 1, and comprises a foot 2 which rests on the upper surface of the bobbin supporting platform. The foot 2 is provided with a depending projection 3 which projects through one of the guide slots *a* in the bobbin supporting platform. Integrally formed on the lower end of the projection 3 is a plate 4 which engages the under side of the bobbin supporting platform A for the purpose of maintaining the bobbin carrier in an upright position on said supporting platform. The retaining plate 4 is provided with a depending projection 5 which is adapted to be engaged by the lugs of the operating train of gears (not shown). The foot 2 of the bobbin carrier is provided with a vertical extending spindle 6 which is adapted to receive the tubular core *x* of a yarn package or bobbin X, the lower end of said tubular core resting upon a circular flange 7 formed on the foot 2 of the carrier.

The carrier 1 is also provided with a vertically extending thread guiding post 10, the upper end of which is undercut, as illustrated at 11, whereby a rearwardly extending lug 12 is formed at the upper end of the said post 10. In the lug 12 is formed a vertically extending aperture 13 which acts as a guide-opening for a thread *y*. Intermediate the foot 2 and the guide lug 12, a second thread guide-opening 14 is provided which extends horizontally through said post 10 from the front to the rear side thereof. The post 10 is provided with a vertical slot 15 which intersects the opening 14 and extends from a point adjacent the lower side of the opening 14 to a point intermediate said thread guide-opening 14 and the guide lug 12. In the slot 15 is slidably mounted a blade 16, the lower end of which is bevelled, as illustrated at 26, and projects into the lower portion $15^a$ of the slot 15. The side edges of the blade 16 are flush with the adjacent surfaces of the post 10. At its upper end, the blade 16 is provided with laterally extending arms 17, 17. Extending vertically from and integrally formed on each of the laterally extending arms 17 is a guide rod 19, which projects through openings 20, 20 formed in rearwardly extending flanges 21, 21, integrally formed with a vertically extending plate 22. The plate 22 is secured to the front side of the post 10 by means of screws 24 and 25.

Slidably mounted on the post 10 is a tension weight 27, comprising an upper collar 28 and a lower collar 29 connected by vertically extending portion 30 adjacent the front side of the said post 10. The collars 28 and 29 and the connecting portion 30 thereof are so formed as to provide a slot 31 from the lower edge of the collar 29 to the upper edge of the collar 28 in order that the said tension weight 27 may have free movement on the post 10 without interfering with the passage of the thread *y* through the thread guide-opening 14 in the post 10. This slot 31 is clearly shown in Fig. 5. The collar 29 of the tension weight 27 is provided with a thread guide opening 33.

On each of the guide rods 19, between the upper side of the laterally extending arm 17 and the under side of the lowermost flange 21 of the plate 22, is a spring 32 which forces the blade 16 downwardly in the slot 15 of the post 10, causing a snubbing action on the thread *y*, between the bevelled sides of the end 26 of said blade and the adjacent walls of the opening 14 and between the lower end $15^a$ of the slot 15 and the lower edge of the blade.

In operation, the thread *y*, is led from the bobbin X through the thread guide-opening 14 in the post 10, the blade 16 being manually elevated to permit the passage of the said thread through said opening, thence through the opening 33 of the tension weight 27 and upwardly through the thread guide-opening 13 at the upper end of said post 10, to the braiding mandrel of the machine.

As the machine operates, the bobbin carriers 1 are caused to follow the paths of the slots *a* in the bobbin supporting platform A to effect the braiding operation in the manner above described, and the finished braided product is taken up by the usual take-up mechanism of the machine. As the braiding operation progresses the loop formed in the thread *y* is shortened which causes the tension weight 27 to move upwardly on the post 10 until the upper side of the collar 28 engages the lower sides of the laterally extending arms 17, 17 of the blade 16. Acceleration of the pull on the thread *y*, caused by the carrier riding a high point of one of the waves, causes the tension weight 27 to raise the blade 16 in the slot 15, thereby releasing the thread from the said snubbing action and permitting the thread to pass through the guide-opening 14 until the tension weight 27 moves downwardly a sufficient distance to permit the blade 16 to again descend and effect the above mentioned snubbing action on the said thread, whereby further passage of the thread through the opening 14 is stopped until the tension weight again engages the arms 17 and raises the blade 16 in the slot 15. By this means the thread is delivered in minute quantities as it is consumed by the braiding operation and at no time or under any circumstances is a sufficient quantity of yarn permitted to be released which would allow the tension weight to descend on the post 10 a sufficient distance to engage the stop motion lever of the machine, consequently the desired uniform tension is maintained at all times in the thread, which produces first-class braiding without loose spots or other defects usually caused by the erratic operation of the common pawl and ratchet control of the yarn package. If the thread *y* should break the weight 27 will be permitted to drop, and thereby operate the stop motion of the machine in the usual manner.

In Figs. 4 and 5 a bobbin having a conical core *z* is illustrated, the bobbin Z assuming the same general shape as the core *z*. In the case where the conical bobbin is employed, it is not practical to lead the thread *y* from the side of the bobbin directly through the opening 14, the thread, therefore, is drawn vertically from the cone, which remains stationary on the spindle 6. For this purpose, I provide the bracket illustrated in Fig. 6, which comprises a vertically extending arm 40 which, adjacent its lower end, is provided with a slot 41 and immediately in the lower end thereof a notch 42 is formed. This bracket is applied to the post 10 of the bobbin carrier in the following manner:

The upper screw 24, which secures the plate 22 to the post 10, is removed and the lower screw 25 is bracked off sufficiently to permit the lower end of the arm 40 of the bracket to be inserted between the head of the screw 25 and the plate 22, the notch 42 resting on the shank of the screw 25, as illustrated in Fig. 5. The screw 24 is then replaced, being passed through the slot 41 in the arm 40 of the bracket, the head of said screw subsequently engaging the face of the arm 40 and securing the same rigidly in place on the post 10. The bracket also comprises an arm 43 which extends forward over the bobbin Z, and is provided with a thread eye 44 in axial alignment with the spindle 6 on which the bobbin is mounted.

The thread *y* is fed upwardly through the thread eye 44, then downwardly through a second thread eye 45 carried by the laterally extending arm 43 of the bracket, through a thread eye 46 carried by the vertical arm 40 of the bracket, thence through the thread guide-opening 14 in the post 10, then up through the thread guide-opening 13 in the lug 12 of the post, and through a second thread eye 47 carried on the rear side of the arm 40 of the bracket, passing from the thread eye 47 to the braiding mandrel of the machine in the usual manner.

The operation of this form of the invention is the same as that described with respect to the form of the invention shown in Figs. 1, 2 and 3 with the exception that the thread *y* is led vertically from the bobbin Z instead of from the side of the bobbin, as illustrated in Figs. 1 and 2.

In order to replace the bobbin Z, the screws 24 and 25 are loosened and the bracket moved vertically until the notch 42 in the lower end of the arm 40 thereof is free of the screw 25, whereupon the bracket may be swung around the screw 24 to a position permitting the bobbin Z to be moved vertically relative to the spindle 6 whereby the said bobbin may be removed from the spindle and another one put in its place, the slot 41 in the arm 40 of the bracket permitting the vertical movement of the said bracket relative to the post 10.

After a new bobbin has been placed on the spindle 6, the bracket may be replaced in its proper position with the thread eye 44 in axial alignment with the spindle 6 and the notch 42 in engagement with the screw 25, after which the screws 24 and 25 are set up in the manner above described for securing the said bracket rigidly to the post 10.

I claim:

1. In a bobbin carrier the combination of a spindle adapted to support a bobbin thereon, a thread guiding post adjacent said spindle having a thread guide-opening and a slot intersecting said opening formed therein, a member movably mounted in said slot and adapted to cooperate with the wall of the mouth of the opening for gripping a thread passing from a bobbin carried by the spindle through the guide-opening in the post to arrest the movement of said thread, and means operable by said thread when the tension thereon increases above a predetermined value for releasing the movable element from said thread.

2. In a bobbin carrier the combination of a spindle adapted to support a bobbin thereon, a thread guiding post adjacent said spindle having a thread guide-opening and a slot intersecting said opening formed therein, a member movably mounted in said slot and adapted to co-operate with the wall of the mouth of the opening for gripping a thread passing from a bobbin carried by the spindle through the guide-opening in the post to arrest the movement of said thread, means operable by said thread when the tension thereon increases above a predetermined value for releasing the movable element from said thread, and means for returning said movable member to its thread gripping position when the tension on said thread is reduced to said predetermined value.

3. In a bobbin carrier the combination of a spindle adapted to support a bobbin thereon, a thread guiding post adjacent said spindle having a thread guide-opening and a slot intersecting said opening formed therein, a blade slidably mounted in said slot adapted to move across said intersected opening for gripping a thread, passing through said opening from a bobbin carried on said spindle, between the blade and the mouth of the opening adjacent thereto for arresting the movement of said thread.

4. In a bobbin carrier the combination of a spindle adapted to support a bobbin thereon, a thread guiding post adjacent said spindle having a thread guide-opening and a slot intersecting said opening formed therein, a blade slidably mounted in said slot adapted to move across said intersected opening for gripping a thread, passing through said opening from a bobbin carried on said spindle, between the blade and the mouth of the opening adjacent thereto for arresting the movement of said thread, and means operable by said thread for releasing said blade therefrom when the tension on the thread increases above a predetermined value.

5. In a bobbin carrier the combination of a spindle adapted to support a bobbin thereon, a thread guiding post adjacent said spindle having a thread guide-opening and a slot intersecting said opening formed therein, a blade slidably mounted in said slot adapted to move across said intersected opening for gripping a thread, passing through said opening from a bobbin carried on said spindle, between the blade and the mouth of the opening adjacent thereto for arresting the movement of said thread, means operable by said thread for releasing said blade therefrom when the tension on the thread increases above a predetermined value, and means for returning the blade to its thread engaging position when the tension thereon resumes said predetermined value.

6. In a bobbin carrier the combination of a spindle adapted to support a bobbin thereon, a thread guiding post adjacent said spindle having a thread guide-opening and a slot intersecting said opening formed therein, a blade slidably mounted in said slot adapted to move across said intersected opening for gripping a thread, passing through said opening from a bobbin carried on said spindle, between the blade and the end of the slot adjacent the opening for arresting the movement of said thread.

7. In a bobbin carrier the combination of a spindle adapted to support a bobbin thereon, a thread guiding post adjacent said spindle having a thread guide-opening and a slot intersecting said opening formed therein, a blade slidably mounted in said slot adapted to move across said intersected opening for gripping a thread, passing through said opening from a bobbin carried on said spindle, between the blade and the end of the slot adjacent the opening and between a beveled edge formed on the end of blade and the mouth of the opening adjacent thereto for arresting the movement of the thread.

8. In a bobbin carrier the combination of a spindle adapted to support a bobbin thereon, a thread guiding post adjacent said spindle having a thread guide-opening and a slot intersecting said opening formed therein, a blade slidably mounted in said slot adapted to move across said intersected opening for gripping a thread, passing through said opening from a bobbin carried on said spin-

dle, between the blade and the end of the slot adjacent the opening and between a beveled edge formed on the end of blade and the mouth of the opening adjacent thereto for arresting the movement of the thread, and means operable by said thread for releasing the blade therefrom when the tension on the thread increases above a predetermined value.

9. In a bobbin carrier the combination of a spindle adapted to support a bobbin thereon, a thread guiding post adjacent said spindle having a thread guide-opening and a slot intersecting said opening formed therein, a blade slidably mounted in said slot adapted to move across said intersected opening for gripping a thread, passing through said opening from a bobbin carried on said spindle, between the blade and the end of the slot adjacent the opening and between a beveled edge formed on the end of blade and the mouth of the opening adjacent thereto for arresting the movement of the thread, means operable by said thread for releasing the blade therefrom when the tension on the thread increases above a predetermined value, and means for returning the blade to its thread engaging position when the tension thereon resumes said predetermined value.

10. In a bobbin carrier the combination of a spindle adapted to support a bobbin thereon, a thread guiding post adjacent said spindle having a thread guide-opening and a slot intersecting said opening formed therein, a blade slidably mounted in said slot and adapted to engage a thread passing from a bobbin carried by said spindle through said opening, a fixed abutment in said slot, and means for moving said blade and the thread engaged thereby into gripping contact with said fixed abutment for arresting the movement of said thread.

11. In a bobbin carrier the combination of a spindle adapted to support a bobbin thereon, a thread guiding post adjacent said spindle having a thread guide-opening and a slot intersecting said opening formed therein, a blade slidably mounted in said slot and adapted to engage a thread passing from a bobbin carried by said spindle through said opening, a fixed abutment in said slot, means for moving said blade and the thread engaged thereby into gripping contact with said fixed abutment for arresting the movement of said thread, and means operable by said thread for releasing the blade therefrom when the tension on said thread increases above a predetermined value.

12. In a bobbin carrier the combination of a spindle adapted to support a bobbin thereon, a thread guiding post adjacent said spindle having a thread guide-opening and a slot intersecting said opening formed therein, a blade slidably mounted in said slot and adapted to engage a thread passing from a bobbin carried by said spindle through said opening, a fixed abutment in said slot, a laterally extending arm on said blade, and a spring engaging said arm for moving said blade and the thread engaged thereby into gripping contact with said fixed abutment for arresting the movement of said thread.

13. In a bobbin carrier the combination of a spindle adapted to support a bobbin thereon, a thread guiding post adjacent said spindle having a thread guide-opening and a slot intersecting said opening formed therein, a blade slidably mounted in said slot and adapted to engage a thread passing from a bobbin carried by said spindle through said opening, a fixed abutment in said slot, laterally extending arms on said blade, guide rods attached to said arms, guides on said post for said guide rods, and springs on said guide rods between said arms and said guides for moving said blade and the thread engaged thereby into gripping contact with said fixed abutment for arresting the movement of said thread.

14. In a bobbin carrier the combination of a spindle adapted to support a bobbin thereon, a thread guiding post adjacent said spindle having a thread guide-opening and a slot intersecting said opening formed therein, a blade slidably mounted in said slot and adapted to engage a thread passing from a bobbin carried by said spindle through said opening, a fixed abutment in said slot, means for moving said blade and the thread engaged thereby into gripping contact with said fixed abutment for arresting the movement of said thread, and means for guiding said thread from said bobbin to the thread guide-opening formed in the post.

15. In a bobbin carrier the combination of a spindle adapted to support a bobbin thereon, a thread guiding post adjacent said spindle having a thread guide-opening and a slot intersecting said opening formed therein, a blade slidably mounted in said slot and adapted to engage a thread passing from a bobbin carried by said spindle through said opening, a fixed abutment in said slot, means for moving said blade and the thread engaged thereby into gripping contact with said fixed abutment for arresting the movement of said thread, means for guiding said thread from said bobbin to the thread guide-opening formed in the post comprising a bracket carried by said post having an arm extending over said bobbin, and a thread eye carried by said arm in axial alignment with said bobbin supporting spindle.

16. In a bobbin carrier the combination of a spindle adapted to support a bobbin thereon, a thread guiding post adjacent said spindle having a thread guide-opening and a slot intersecting said opening formed therein, a blade slidably mounted in said slot and

adapted to engage a thread passing from a bobbin carried by said spindle through said opening, a fixed abutment in said slot, means for moving said blade and the thread engaged thereby into gripping contact with said fixed abutment for arresting the movement of said thread, means for guiding said thread from said bobbin to the thread guide-opening formed in the post comprising a bracket carried by said post having an arm extending over said bobbin, a thread eye carried by said arm in axial alignment with said bobbin supporting spindle, and means for adjustably securing said bracket to said post whereby the extended arm thereof may be moved from its normal position over said bobbin to a position permitting the removal of said bobbin from said spindle.

17. In a bobbin carrier the combination of a spindle adapted to support a bobbin thereon, a thread guiding post adjacent said spindle having a thread guide-opening and a slot intersecting said opening formed therein, a blade slidably mounted in said slot and adapted to engage a thread passing from a bobbin carried by said spindle through said opening, a fixed abutment in said slot, laterally extending arms on said blade, springs for moving said blade and the thread engaged thereby into gripping contact with said fixed abutment, a tension weight slidably mounted on said post and supported by said thread for applying a predetermined uniform tension thereon, said tension weight being adapted to engage the lateral arms on said blade for raising said blade to release the thread when the tension thereon exceeds the predetermined value established by said weight.

SIDNEY B. BLAISDELL.