H. H. GOVE.

THREAD TENSION DEVICE.

APPLICATION FILED JAN. 21, 1918.

1,361,716. Patented Dec. 7, 1920.

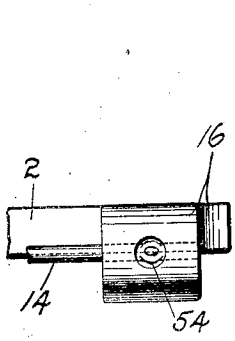

Fig 6

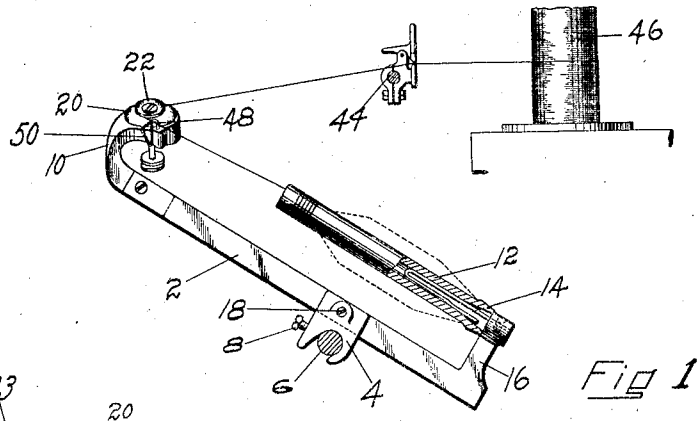

Fig 1

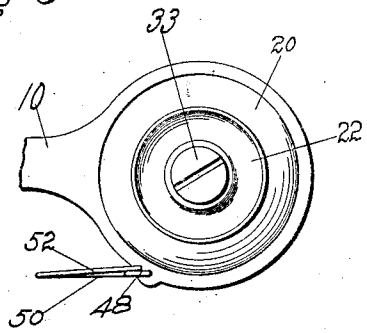

Fig 4

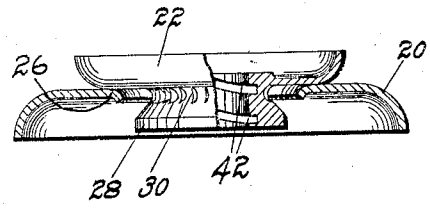

Fig 5

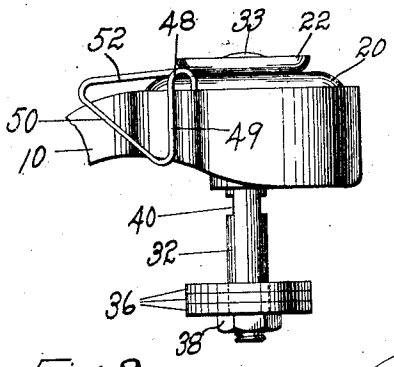

Fig 2

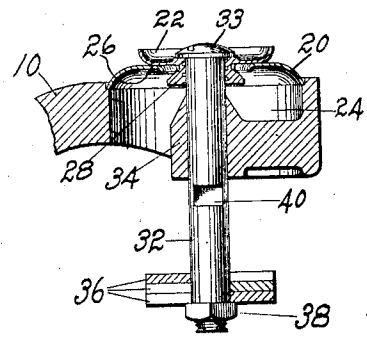

Fig 3

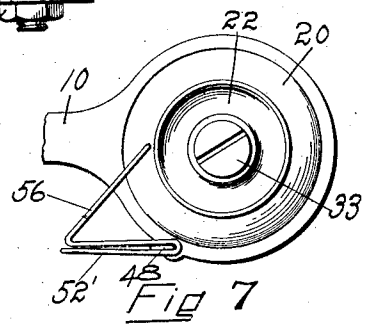

Fig 7

INVENTOR

Henry H. Gove,

By his attorneys,

McDermott & McCready

UNITED STATES PATENT OFFICE.

HENRY H. GOVE, OF BIDDEFORD, MAINE, ASSIGNOR OF ONE-HALF TO HOWARD R. WHITEHEAD, OF SACO, MAINE.

THREAD-TENSION DEVICE.

1,361,716. Specification of Letters Patent. Patented Dec. 7, 1920.

Application filed January 21, 1918. Serial No. 212,965.

To all whom it may concern:

Be it known that I, HENRY H. GOVE a citizen of the United States, residing at Biddeford, in the county of York and State of Maine, have invented certain Improvements in Thread-Tension Devices, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to tension devices of the character used in winding, spooling, and other machines, to maintain a tension or drag on the thread, yarn, twine, or similar material, handled by the machine. For convenience, this material will be referred to hereinafter as "thread."

The invention aims to devise a tension device of the character indicated which will be simple in construction, in which the thread can be easily inserted or removed, which will maintain a substantially uniform tension on the thread at all times, in which the degree of tension can be readily adjusted, and which will not be subject to clogging, due to accumulations of lint or other foreign material.

The invention is particularly concerned with thread tensions of the disk type; that is, tension devices having two disks in face to face engagement with each other, one or both of which is rotatable, and between which the thread is lightly pinched, some means, usually a spring, being employed to press the disks lightly together. Tensions of this type are probably more commonly used than any other on spooling and winding machines. Among their advantages may be mentioned the fact that they are easily threaded, are not subject to localized wear, and when kept in good operating condition, they exert a fairly uniform tension on the thread. A very serious objection to these tensions, however, is the fact that they are liable to become clogged by lint or other foreign material carried by the thread, and such clogging tends to hold the disks apart and thus relieve their tension on the thread. It also prevents the rotation of the disks thus tending to cause the thread to wear grooves in the disks. Furthermore, the use of springs is objectionable in tensions of this character since it is practically impossible to adjust the springs so that any two tension devices will exert exactly the same tension on the thread. The present invention aims to devise a tension device of the disk type that will have all the present advantages of tension devices of this type and will not be subject to the objections just mentioned.

The invention also is directed to the improvement of other features of devices of this character, including the thread guiding means, the support for the thread supply, and the provision for adjustment, all of which will be readily understood from the following description of the embodiment of the invention at present preferred, and the novel features of which will be pointed out more particularly in the appended claims.

Referring now to the accompanying drawings:

Figure 1 is a view, partly in side elevation and partly in cross section, showing an apparatus embodying this invention;

Fig. 2 is a view in side elevation of the bracket head and thread tension device supported thereby;

Fig. 3 is a vertical cross sectional view of the parts shown in Fig. 2;

Fig. 4 as a plan view of the parts shown in Fig. 2;

Fig. 5 is a view, partly in side elevation and partly in vertical cross section, of the thread-engaging disks of the tension device;

Fig. 6 is a side elevation showing a detail of construction; and Fig. 7 is a plan view illustrating a modified construction of thread guide.

Fig. 1 of the drawings shows the invention as applied to a spooler. The apparatus comprises a bracket 2 supported in a block 4 which is mounted on the bar 6, with which these machines usually are provided, a set screw 8 being employed to bind the block on the bar. A bracket head 10 is mounted at the forward end of the bracket 2 and sup-

ports the thread tension device. At the opposite end of this bracket a support is provided for the bobbin or cop 12 or other source of thread supply. This support consists of a U-shaped spring wire 14 having one leg longer than the other, this longer leg being secured in a part 16 of the bracket while the shorter leg is free. The support is made of proper dimensions to fit in the bore of the ordinary empty bobbin or core and the spring action of the free leg of the support 14 holds the bobbin firmly in position while permitting an easy disengagement of the bobbin whenever necessary. It will be noted that the member 14 supports the bobbin with its axis directed toward the thread tension device that is mounted on the bracket head 10.

The bracket 2 sets in a slot formed in the upper side of the block 4 and is held in adjusted position by a set screw 18 threaded through one side of the block and bearing against the bracket. This arrangement enables the workman to adjust the bracket longitudinally of itself through the block 4 to suit various operating conditions and to secure the bracket in any adjusted position.

The thread tension device comprises a lower disk 20 and an upper disk 22, both disks being dished or convex in shape and having their convex faces in engagement with each other, so that they are adapted to bear on a thread running between them at points adjacent to their central portions while their margins flare away from each other and facilitate the placing of a thread between them. It will be noted that the bracket head 10 is of goose-neck shape so that its upper face occupies a position inclined somewhat from a horizontal plane. An aperture 24 extends through the head 10 in a nearly vertical direction. A shallow counter-sink is formed at the upper end of this aperture and the margin of the lower disk 20 fits in this countersunk seat.

Formed centrally in the disk 20 is a relatively large aperture or port and the material of the disk along the edge of this aperture is turned downwardly, forming an annular lip, as clearly shown in Figs. 3 and 5. The upper disk 22 is provided with a central hub 28 of substantially frusto-conical shape that normally is positioned in the aperture in the lower disk and the top or smaller end of this hub adjoins the central portion of the disk 22 and is roughened or knurled, as indicated at 30, so that the thread running between the disks and coming in contact with the roughened surface of the hub will rotate the upper disk 22. The upper disk is centered with reference to the lower one by a bolt or pin 32 that passes freely through a hole formed in the hub 28 and is guided in an appropriately vertical hole formed in a projection 34 extending into the aperture 24 from one side of the bracket head, the hole in this projection being concentric with the aperture 24. A series of weights 36 resting on a nut 38 threaded on to the lower end of the pin 32 act through this pin to press the upper disk yieldingly against the lower disk. In order to provide for the convenient removal of the weights 36 from the pin 32 or the placing of them on the pin, this pin may be flattened, as indicated at 40, and each weight may be provided with a slot just wide enough to admit this flattened portion. A self-lubricating friction surface is provided between the pin 32 and the hub 28 by grooving one of these members, preferably the hub, as indicated at 42, Fig. 5, and filling the grooves with graphite or similar lubricant.

The thread is led from the bobbin or cop 12 through the tension device and over the traverse bar 44 to the spool 46, as clearly shown in Fig. 1. It is usual to provide a thread guide between the tension device and the source of thread supply and in the present construction a thread guide of novel form is employed. This device comprises an eye 48 which performs the normal thread guiding function of a device of this character. In the construction shown this eye is formed by bending a piece of wire into a U-shape and making one leg of the U much longer than the other, the short leg being fastened in a hole drilled vertically in the upper face of the bracket head 10. The other leg, designated at 49 in Fig. 2, extends downwardly close beside the vertical wall of the bracket head, leaving a space between these two parts through which the thread may be guided into the eye 48. From the lower end of the part 49 the wire is bent to form an upwardly inclined thread deflecting member 50 and is then bent to form a horizontal portion 52 which is snapped over behind the eye 48.

It will be evident from an inspection of Fig. 1 that the natural operation of threading the apparatus after the bobbin has been placed on the support 14 is to swing the thread around the tension device bringing it into contact with the upper curved part of the bracket head 10 or against the lower disk 20 and then carrying it over the traverse bar 44 to the spool 46. The pull of the spool on the thread draws the thread in between the disks 20 and 22 into contact with the hub 30 and also brings the thread against the inclined part 50 of the thread guide. As the tension on the thread is increased, it is guided downwardly or deflected by the member 50 into the vertical slot between the parts 49 and 10 and it then travels upwardly through this slot into the eye 48. This action is entirely automatic and is produced merely by the pull exerted on

the thread either by the operative or by the spool. The threading operation thus is made very simple and quick.

It will be noted that the upper disk 22 is dished to such an extent that the head 33 of the pin 32 lies nearly level with the upper edge of the disk. This arrangement avoids any liability of catching the thread under the head of the pin during the threading operation. If the thread comes in contact with either of the disks or with the upper part of the head 10 it will be guided into the proper position between the disks by the subsequent pull exerted on it. The thread guide also presents the advantage of preventing the accidental escape of the thread from the eye 48. That is, when the spooling operation is carried on at high speeds the thread "balloons" off the end of the bobbin; and the thread guides ordinarily employed are liable to permit the escape of the thread if it comes from a bobbin that is wound in the opposite direction to that for which the guide is intended. This construction, however, effectually prevents the escape of the thread from the eye 48 due to the ballooning action whether the thread is wound either right or left hand.

It will now be understood that when the spooling operation is being performed, the thread will be pinched lightly between the disks 20 and 22 and that the engagement of the thread with the hub 30 of the upper disk will rotate this disk and distribute the wear uniformly over the face of the disk. The drag of the upper disk on the lower one will cause the lower disk to creep slowly around in its seat, thus preventing localized wear on this disk. Obviously the tension or drag exerted on the thread by the disks may be varied at will by using weights 36 of suitable mass. This construction maintains a very uniform tension on the thread, notwithstanding the usual variations in the dimensions of the thread and the presence of slubs or other imperfections in it.

The provision of the opening or port in the lower disk 20 produces the very important advantage of keeping the tension device free from lint or other accumulations of foreign materials that are liable to gather between the disks. As above stated, this has been one of the serious objections to disk tensions of the construction heretofore proposed, not only because this foreign material releases the tension of the disks on the thread, but also because it prevents the normal rotative movements of the disks. In the construction shown, any foreign material that enters the space between the disks drops through the port in the lower disk and this space thus is kept free from accumulations of foreign material. The tapered construction of the upper end of the port 34 prevents this lint or other foreign material from accumulating in the neighborhood of the thread engaging disks. Practically all opportunity for lint to enter the bearing surface between the pin 32 and the upper disk 22 thus is eliminated. This is a very important practical advantage since it insures the constant maintenance of the disks in their normal rotatable condition. Furthermore, if after a long period of operation enough lint should work into the bearing between the upper disk and the pin 32 to prevent the free rotation of the disk relatively to the pin, the pin is always free to rotate with the disk so that the normal action of the disks would not be interfered with. In fact, the pin always does rotate with the disk although probably not at the same speed as the disk. The fact that both the pin and the disks, therefore, are freely rotatable is an important practical advantage. Since the pin 32 slides freely in the member 34, any snarl or bunch of thread that is drawn into the tension may be readily removed by lifting the upper disk 22, which operation affords free access to the space between the disks. The peculiar shape of the hub 28 tends to prevent lint from accumulating around the portion of the pin immediately below the hub and the motion of the hub also tends to throw the lint away from the pin through centrifugal action.

Fig. 6 shows the method of mounting the support 14 in the member 16 of the bracket. From an inspection of this figure it will be seen that the long leg of the member 14 is inserted in a hole drilled in the part 16, and a blunt ended tool is then inserted in the hole 54 and is struck a blow with a hammer which serves to flatten out the wire. The flattened place so produced holds the support against twisting and also against withdrawal from the member 16.

The ease with which this device may be threaded is an important advantage of this construction, but it is possible for a very careless or unskilled operator to pass a thread through the thread guide 48 without inserting it between the disks. In order to avoid this difficulty, I may construct the thread guide as shown in Fig. 7, in which the member 52′, corresponding to the member 52 of the construction shown in Figs. 1, 2 and 4, is bent back upon itself and then turned at an acute angle and extended to a point adjacent to the periphery of the upper disk 22, forming the member 56. With this construction it is practically impossible for the operator in performing the ordinary threading action to thread the guide without also threading the tension.

It is obvious that the lower disk and the head 10 might be made integral, but, for most purposes, I prefer the construction shown both for manufacturing and operating reasons.

While I have herein shown and described the best embodiment of the invention of which I am at present aware, it is obvious that this embodiment may be modified in minor particulars without departing from the spirit or scope of this invention.

What I claim as new is:

1. A thread tension device, comprising two disks in face to face engagement with each other and having marginal portions that flare away from each other, one of said disks having a central aperture formed therethrough providing a free space through which lint and foreign material may be discharged from between the central portions of the disks, supporting means for said apertured disk, a pin projecting through said aperture, means for centering said pin in said aperture, and means acting on said pin to hold the second disk yieldingly in engagement with said apertured disk.

2. A thread tension device, comprising two disks in face to face engagement with each other and having marginal portions that flare away from each other, one of said disks having a central aperture formed therethrough providing a free space through which lint and foreign material may be discharged from between the central portions of the disks, supporting means for said apertured disk, a hub formed on the other disk and positioned in said aperture, said hub having a roughened surface to be engaged by the thread running between said disks, and means for pressing said disks yieldingly together.

3. A thread tension device, comprising two disks in face to face engagement with each other and having marginal portions that flare away from each other, one of said disks having a central aperture formed therethrough providing a free space through which lint and foreign material may be discharged from between the central portions of the disks, a bracket head supporting the marginal portion of said apertured disk, a pin projecting centrally through the other disk, said bracket head being provided with a guide for said pin, and a weight acting on said pin to cause it to press the second disk yieldingly into engagement with said apertured disk.

4. A thread tension device comprising a bracket head having an aperture formed therethrough, a disk overlying said aperture and having its margin supported on said bracket, said disk being substantially convex in shape and having a central aperture formed therethrough with the parts of the disk adjacent to said aperture bent inwardly, a second disk having a convex face in engagement with the convex face of said first disk and having a hub positioned in said aperture, a pin passing loosely through said hub, a guide for said pin formed in said bracket head, and a weight acting on said pin to cause it to hold the second disk yieldingly in engagement with the first disk.

5. In a device of the character described, the combination of a thread tension device, a thread supply mounted adjacent to said device, and a thread guide positioned between said supply and said tension device, said guide comprising an eye and a thread deflecting portion positioned in the path of movement of the thread during the act of leading it from said supply through said tension device and constructed to guide the thread into said eye.

6. In a device of the character described, the combination of a thread tension device, a thread supply mounted adjacent to said device, and a thread guide positioned between said supply and said tension device, said guide having an eye and a lateral opening through which the thread may be guided into said eye, said opening being located with reference to the eye to prevent the accidental escape of the thread whether coming from said supply in either a right hand or left hand wind, and an inclined member shaped and positioned to guide the thread into said passage when it is led from said supply and inserted in said tension device.

7. A thread tension device comprising two relatively rotatable disks in face to face engagement with each other, one above the other, said disks having marginal portions that flare away from each other, and the lower of said disks having an aperture formed therethrough providing a free space through which lint and foreign material carried by the thread may be discharged from between the central portions of the disks, means for supporting the lower disk, means for holding the upper disk centered with reference to the lower disk, and a thread engaging member in said aperture.

8. A thread tension device comprising two disks in face to face engagement with each other, one above the other, said disks having marginal portions that flare away from each other, and the lower of said disks having an aperture formed therethrough providing a free space through which lint and foreign material carried by the thread may be discharged from between the central portions of the disks, stationary means for supporting the lower disk, means for guiding the upper disk by engagement with the peripheral portion thereof for rotative movement and holding it centered with reference to the lower disk, and a thread engaging member in said aperture.

9. A thread tension device comprising two relatively rotatable disks in face to face engagement with each other, one above the other, said disks having marginal portions that flare away from each other, and the

lower of said disks having an aperture formed therethrough providing a free space through which lint and foreign material carried by the thread may be discharged from between the central portions of the disks, stationary means for supporting the lower disk, a pin supported by the upper disk, means coöperating with said pin to hold it centered with reference to the lower disk, and thread guiding means including a thread engaging part in said aperture.

In testimony whereof I have signed my name to this specification.

HENRY H. GOVE.