March 25, 1947. R. J. LOOS 2,417,941

SHUTTLE BOBBIN TAKE-UP MECHANISM

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Fig. 1.

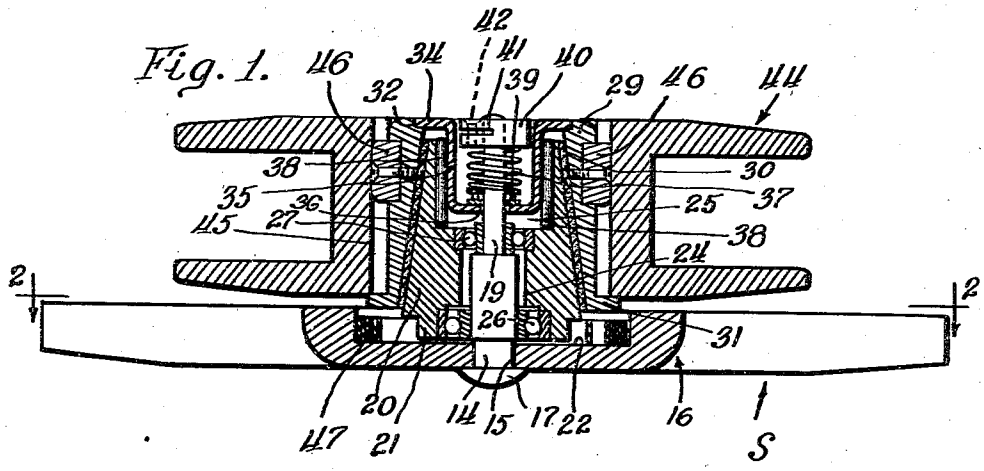
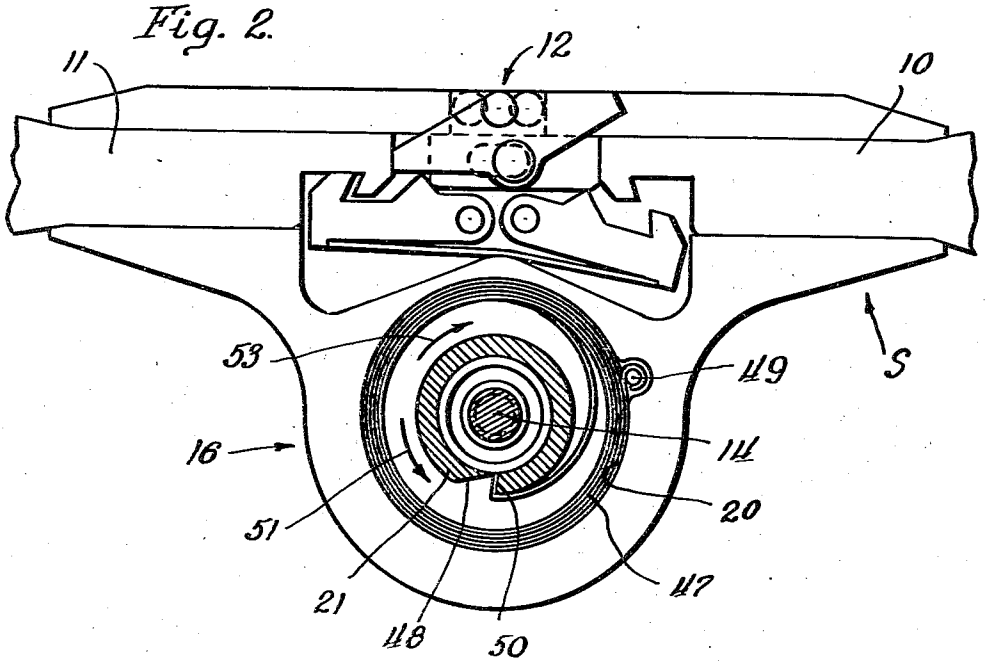


Fig. 2.



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SHUTTLE BOBBIN TAKE-UP MECHANISM

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16 Claims. (Cl. 139—197)

1

This invention relates to a shuttle bobbin take-up mechanism. The invention is designed for use in looms for weaving wire although it is equally applicable for weaving fabric cloth.

As the shuttle passes through the shed of the warp of the loom the bobbin rotates in reeling out weft wire, and when the shuttle comes to a stop, the bobbin tends to continue to rotate due to its inertia. Most shuttles are provided with a supporting means upon which the bobbin is mounted and which has a friction surface reacting to the rotation of the bobbin, and rotating therewith. Means is then provided for limiting the rotation of the supporting means and after rotation of the supporting means has been checked, the rotating bobbin overcomes the friction between itself and the supporting means and continues to rotate with respect to the supporting means.

I provide a supporting means forming a novel feature of my invention. It is in the form of a cone and will be hereinafter referred to as such. The bobbin proper is provided with a member cooperating in shape with the cone and fitting thereover. The shuttle is so designed that the weight of the bobbin adds to the effectiveness of the frictional engagement described. When the bobbin is filled and heavy, the friction becomes greater, whereas as the wire is removed from the bobbin the friction is lessened, and the tendency is therefore to maintain uniform tension on the unreeling wire.

In addition to the novel cone feature, spring means is provided for biasing the frictional members described into engagement, thus supplementing the weight of the bobbin.

Yielding means in the form of a clock spring is mounted on the shuttle body and engages the cone for yieldingly limiting rotation of the cone on the shuttle in one direction. This also helps to maintain uniform tension on the wire. The spring resists the normal tendency of the cone to rotate with the bobbin. When, however, the limit of rotation of the cone on the shuttle is reached, the bobbin, in spite of the friction with the cone rotates with respect to the cone. Whenever the pull on the wire permits, the spring will tend to rewind to compensate for unevenness in the force rotating the bobbin.

The clock spring has releasable connection with the cone to provide a safety feature in the event the weft wire breaks. If the weft wire should break, the spring would reverse the rotation of the cone which, on continued rotation in the reverse direction beyond the point where the spring has reached its fully recoiled condition, would break or distort the spring but for this safety feature. The releasable connection permits unrestricted rotation of the cone in the reverse direction free of the control of the spring.

2

An object of the invention is the provision of a novel structural shape for producing friction between the bobbin of a shuttle and the supporting means therefor.

Another object is to provide an arrangement whereby the weight of the bobbin and the wire thereon directly affects the friction between the bobbin and its supporting means.

Still another object is the provision of spring means for supplementing the weight of the bobbin in thus producing friction.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my device whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in the claims, and illustrated in the accompanying drawings, in which:

Fig. 1 is a vertical sectional view of the device and,

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1, and looking in the direction indicated by the arrows on the section line of Figure 1.

Referring now in detail to the drawings, a shuttle body is shown at "S." Coacting carrying arms 10 and 11 carry the shuttle back and forth through the warp shed. Shown generally at 12 is a latching mechanism for latching the shuttle to the carrying arms.

A round post 14 is rigidly supported in an opening 15 in the rounded portion 16 of the shuttle body and riveted at 17 thereto. The upper outer end of the post is of reduced diameter as shown at 19. Supported on the post 14 is a supporting member 20 in the form of a truncated cone which has a reduced cylindrical portion 21 at its larger lower end extending into the cavity 22 in the shuttle body. The cone 20 is provided with an axial bore 24 considerably larger in di-

ameter than the post 14 for free rotation thereon, and this bore is enlarged to form a well 25 in the upper or small end of the cone. The cone 20 is supported on the post 14 by means of anti-friction bearings 26 and 27. Supported on the cone 20 for rotation with respect thereto is a hollow winder 29, being cylindrical in outer contour, and having its interior bored comparable to the shape of the cone 20. The hollow winder 29 fits over the cone 20, and has secured to its inner surface a friction material 30 for engaging the outer surface of the cone 20. This friction material may be leather or any other durable material which will provide sufficient friction. The hollow winder also has a flange 31 at its inner lower end.

The cone 20 may be considered a wedge member, since the hollow winder 29 on being brought into engagement therewith produces an actual wedging effect. The outer end of the hollow winder has an enlarged rabbet 32 in which a flange 34 of a winder transfer cup 35 is press fitted. The body of the winder transfer cup 35 fits into the well 25 and has a central opening 36 in the center which loosely fits over the reduced outer end 19 of the post 14. Roller bearings 38 are interposed between the body of the transfer cup 35 and the well 25 to prevent any tipping effect between the winder 29 and the cone 20 which would cause uneven wear on the friction material 30. A compression spring 37 is inserted into the transfer cup 35 supported on anti-friction bearing 39 positioned between the spring 37 and the bottom of the transfer cup and is held therein by a nut 40 on the outer end of the post 19. The nut 40 is slotted as shown at 41 and a lockscrew 42 passes through the ears formed thereby to lock the nut in place.

A bobbin 44 with a central opening to fit the hollow winder 29 is placed over the hollow winder and rests on flange 31. The bobbin has keyways 45 which receive keys 46 on the cone 20 for securing the bobbin for rotation with the hollow winder. Keys 46 are in the form of blocks secured to winder 29 by screws or other similar means. Fig. 1 shows the position in which the shuttle will assume when in use. The bobbin is merely slid over the hollow winder for placing it in the proper position. In this position the weight of the bobbin effectively biases the hollow winder into frictional engagement with cone 20.

The winder transfer cup 35 rotates with the winder 29, and rotates freely on the post 29. The compression spring 37, acting through the winder transfer cup 35, biases the winder downwardly and thereby adds to the weight of the bobbin in bringing the winder into frictional engagement with the cone 20.

A coil spring 47 similar to a clock spring is positioned in the cavity 22 of the shuttle body and surrounds the reduced cylindrical portion 21 of the cone supporting member 20. One end of the spring 47 is rigidly secured at 49 on a post fixed in the shuttle body. The inner end of the spring is formed with a hook 50 which fits into a V-shaped notch 48 in the periphery of the reduced portion 21 of the cone 20.

Operation

In normal operation when the shuttle is passed through the warp shed, weft wire on the bobbin is unreeled, rotating the bobbin as indicated by the arrow 53 in Fig. 2. In the initial rotation of the bobbin, the friction existing between the cone 20 and the hollow winder 29 causes the cone 20 to rotate with the bobbin. The spring 47 being connected to the cone is tensioned and permits rotation of the cone to a limited extent, or until the spring is fully tensioned, and thereafter the rotation of the bobbin overcomes the friction existing between the cone 20 and the hollow winder 29. The bobbin and the hollow winder then rotate with respect to the cone.

The tendency of the spring 47 is to bias the cone 20 in the direction opposite to the unreeling direction, and when the shuttle completes its passage through the warp shed and comes to a stop, the force which unreeled the weft wire has ceased and friction is then built up again between the cone 20 and the hollow winder 29. Therefore, the bobbin comes to a stop and does not unreel slack wire. The spring 47 yields enough to compensate for uneven impulses occuring in the motion of the bobbin, this action assuring even and uniform tautness in the weft wire.

In the event the weft wire breaks, the force of the spring 47 reacting against the cone 20 reverses the rotation of the cone (and the bobbin) in a direction indicated by the arrow 51. On continued rotation of the cone in the latter direction the spring 47 resumes its original, or fully recoiled condition. If the spring were fixedly connected to the cone, the cone after it reached this point would break or distort the spring. By the present arrangement the hook 50 on the inner end af the spring 47 is displaced out of the notch 48 permitting the cone to rotate free of the spring.

Although I have herein shown and described a preferred embodiment of my invention, manifestly it is susceptible of modification and rearrangement of the parts without departing from the spirit and scope thereof. I do not, therefore, wish to be understood as limiting my invention to the precise form herein disclosed, except as I may be so limited by the appended claims.

I claim as my invention:

1. The combination of a shuttle body, with a post rigidly secured in the shuttle body, a cone rotatably mounted on said post, a hollow winder rotatably mounted on said cone, friction means disposed between said cone and said hollow winder, spring means coacting between said cone and said hollow winder, and means on said hollow winder for non-rotatably supporting a bobbin, the effectiveness of said friction means being responsive to the weight of the bobbin and said spring means.

2. The combination of a shuttle body with a post rigidly secured in the shuttle body, a cone rotatably mounted on said post, a hollow winder rotatably mounted on said cone, friction means disposed between said cone and said hollow winder, spring means biasing said cone and said hollow winder into engagement, means on said hollow winder for supporting a bobbin, and means interposed between said cone and the shuttle body for limiting rotation of said cone.

3. The combination of a shuttle body with a post rigidly secured in the shuttle body, a cone rotatably mounted on said post, a hollow winder rotatably mounted on said cone, friction means disposed between said cone and said hollow winder, spring means biasing said cone and said hollow winder into engagement, means on said hollow winder for supporting a bobbin, and means carried by the shuttle body for yieldingly limiting rotation of said cone in one direction.

4. In a shuttle structure for looms including a shuttle body, the combination of a cone rotatably

mounted on the shuttle body, a hollow winder rotatably mounted on said cone, friction means disposed between said cone and said hollow winder, spring means biasing said cone and said hollow winder into engagement, means on said hollow winder for supporting a bobbin, and means carried by the shuttle body releasably connected to said cone for limiting rotation of said cone in one direction, said cone being free for unrestricted rotation in the opposite direction.

5. A shuttle structure for looms comprising, in combination, a shuttle body, a cone rotatably mounted on the shuttle body, there being a well formed in the small end of said cone, a hollow winder rotatably mounted on said cone, friction means disposed between said cone and said hollow winder, a winder transfer cup supported by said hollow winder and extending into the well in said cone, and spring means in said transfer cup coacting between said cone and said hollow winder for biasing them into frictional engagement.

6. A shuttle structure for looms comprising, in combination, a shuttle body, a post rigidly secured in the shuttle body, a cone rotatably mounted on said post, there being a well formed in the small end of said cone, a hollow winder rotatably mounted on said cone, friction means disposed between said cone and said hollow winder, a winder transfer cup supported by said hollow winder and extending into the well in said cone, and surrounding said post, spring means in said transfer cup and surrounding said post, and retention means secured on the outer end of said post for retaining said spring means in said transfer cup, said spring means coacting between said retention means and said transfer cup for biasing said cone and said hollow winder into frictional engagement.

7. A shuttle structure for looms comprising, in combination, a shuttle body, a cone rotatably mounted on the shuttle body, there being a well formed in the small end of said cone, a hollow winder rotatably mounted on said cone, friction means disposed between said cone and said hollow winder, means on said hollow winder for supporting a bobbin, the assembly being so arranged that the weight of the bobbin biases said cone and said hollow winder into frictional engagement, a winder transfer cup supported by said hollow winder and extending into the well in said cone, and spring means in said transfer cup coacting between said cone and said hollow winder and supplementing the weight of the bobbin for biasing said cone and said hollow winder into frictional engagement.

8. A shuttle structure for looms comprising, in combination, a shuttle body, a post rigidly secured in the shuttle body, a cone rotatably mounted on said post, there being a well formed in the small end of said cone, anti-friction bearing means supporting said cone on said post, a hollow winder rotatably mounted on said cone, friction means disposed between said cone and said hollow winder, a winder transfer cup supported by said hollow winder and rotatable therewith, said transfer cup extending into the well in said cone and surrounding said post, spring means in said transfer cup and surrounding said post, retention means secured on the outer end of said post for retaining said spring means in said transfer cup, said spring means coacting between said retention means and said transfer cup for biasing said cone and said hollow winder into

frictional engagement, and anti-friction bearing means disposed between said spring means and said transfer cup.

9. A shuttle structure for looms comprising, in combination, a shuttle body, a wedge member rotatably mounted on the shuttle body, a cooperating wedge member rotatably mounted on said wedge member, friction means disposed between said wedge member and said cooperating member, and means on said cooperating member for supporting a bobbin, the assembly being so arranged that the weight of the bobbin biases said wedge member and said cooperating member into frictional engagement.

10. A shuttle structure for looms comprising, in combination, a shuttle body, a wedge member rotatably mounted on the shuttle body, a cooperating wedge member rotatably mounted on said wedge member, friction means disposed between said wedge member and said cooperating member, means on said cooperating member for supporting a bobbin, the assembly being so arranged that the weight of the bobbin biases said wedge member and said cooperating member into frictional engagement, and spring means coacting between said wedge member and said cooperating member and supplementing the weight of the bobbin for biasing said wedge member and said cooperating member into frictional engagement.

11. In a shuttle bobbin take-up mechanism, a shuttle body, a cone rotatably mounted on the body, a hollow winder rotatably supported on the cone, and adapted to hold a bobbin, friction means between the cone and the hollow winder, and means for yieldably biasing the hollow winder into frictional engagement with the cone.

12. In a shuttle bobbin take-up mechanism, a shuttle body, a cone rotatably mounted on the body, a hollow winder rotatably supported on the cone, and adapted to hold a bobbin, friction means between the cone and the hollow winder, means for yieldably biasing the hollow winder into frictional engagement with the cone, and yielding means interposed between the cone and shuttle body for limiting relative movement of the cone on the shuttle body in one direction, said yielding means being adapted to release the cone for movement in the other direction.

13. In a shuttle bobbin take-up mechanism, a shuttle body, a supporting member rotatably mounted on the body, a hollow winder rotatably supported on the supporting member, and adapted to hold a bobbin, friction means between the supporting member and the hollow winder, and means for yieldably biasing the hollow winder into frictional engagement with the supporting member.

14. A shuttle structure for looms comprising, in combination, a shuttle body, a cone rotatably mounted on the shuttle body, there being a well formed in the small end of said cone, a hollow winder rotatably mounted on said cone, friction means disposed between said cone and said hollow winder, a winder transfer cup supported by said hollow winder and extending into the well in said cone, bearing means in said well between said transfer cup and said cone, and spring means in said transfer cup coacting between said cone and said hollow winder for biasing them into frictional engagement.

15. In a shuttle bobbin take-up mechanism, a shuttle body, a supporting member rotatably mounted on the body, a hollow winder rotatably supported on the supporting member, and adapted to hold a bobbin, friction means between

the supporting member and the hollow winder, means for yieldably biasing the hollow winder into frictional engagement with the supporting member, and bearing means separate from said friction means for maintaining aligned relationship between said hollow winder and said supporting member.

16. A shuttle structure for looms comprising, in combination, a shuttle body, a wedge member rotatably mounted on the shuttle body, a cooperating wedge member rotatably mounted on said wedge member, friction means disposed between said wedge member and said cooperating member, bearing means separate from said friction means for maintaining aligned relationship between said wedge member and said cooperating member, and means on said cooperating member for supporting a bobbin.

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