Oct. 1, 1968 G. A. SUNDQUIST, JR 3,403,708

SHUTTLE BOX

Filed Sept. 22, 1966

FIG. 1

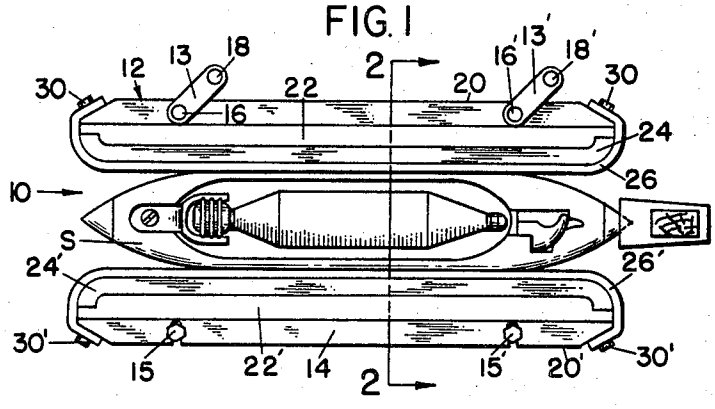


FIG. 2

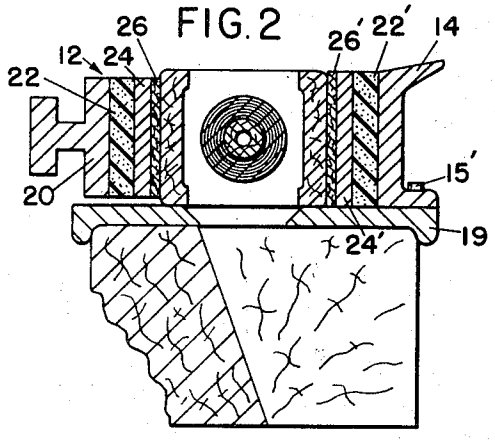
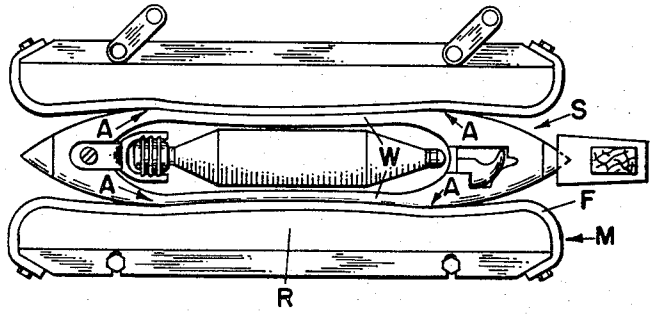


FIG. A

PRIOR ART



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SHUTTLE BOX

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ABSTRACT OF THE DISCLOSURE

A shuttle box means for checking a shuttle comprising a rigid base, a resilient sponge-like element, an elongated rigid member floatingly supported by the resilient element and a frictional covering member encompassing the rigid member and the resilient means.

This invention, in general, relates to improvements in shuttle boxes for looms and more particularly relates to improvements in shuttle checking means to bring the shuttle to a gradual but certain stop without damaging the shuttle.

Conventional looms employ at least one shuttle box at each end of a reciprocating lay across which a shuttle is propelled at a very high velocity during the weaving process. Upon completion of a flight across the lay it is of paramount importance to stop or check the travel of the shuttle in the box in a manner to avoid stopping the shuttle so abruptly as to damage the shuttle or to cause so-called "slough-off" of the filling on the bobbin in the shuttle. To assist in stopping or checking the shuttle, the box is usually equipped with one or more walls that are covered with a friction material such as leather. One or more of these walls are usually resiliently supported and the walls are cammed apart by the shuttle, which is wider than the space between the walls. The friction material thus exerts a braking force on the sides of the shuttle to check or stop its travel gradually but surely without damaging the shuttle or "sloughing-off" the filling.

One such checking means which has been very successful in practice is illustrated in U.S. Patent No. 3,096,794, granted to Clarence R. Kronoff. This patent discloses the use of a shuttle checking member which comprises a rigid body with a layer of a resilient material attached to one side of it and a layer of a friction material such as leather which encompasses the resilient material and the end portions of the rigid body. The body is then located in the shuttle box in a position where entry of the shuttle into the box compresses the resilient layer through the friction material. Thus, the resilient material exerts a uniform pressure on the shuttle throughout the length of the member. While this was felt to be desirable at first it has been found deleterious in usage over a long period of time due to the fact that the thin walls of the shuttle are deformed by the pressure necessary to ensure proper checking of the shuttle to the end that the shuttle walls become permanently bowed, eventually to the extent that the shuttle walls interfere with the unwinding of filling from the bobbin during weaving. Accordingly, the bowed shuttles become unsatisfactory and must be discarded. This condition is illustrated in FIGURE A of the drawings.

It is therefore an object of the invention to provide a shuttle box equipped with resilient means for checking the flight of the shuttle without distorting or bowing the shuttle.

Another object of the invention is to provide a shuttle box equipped with a binder covered with a resilient material for checking the flight of the shuttle without distorting or bowing the shuttle.

Yet another object of the invention is to provide a shuttle box equipped with a box front covered with a resilient material for checking the flight of the shuttle without distorting or bowing the shuttle.

In order that the invention may be clearly understood reference is made to the accompanying drawings in which:

FIGURE A illustrates the prior art shuttle box and shows the deformation or bowing of the shuttle caused by such prior art shuttle boxes.

FIGURE 1 is a diagrammatic plan view of the box on the drive end or right hand side of the loom embodiying the invention; and

FIGURE 2 is a sectional view of the box taken on line 2—2 of FIGURE 1.

FIGURE A illustrates diagrammatically the shuttle box of the Kronoff patent, supra, and the bowing of the shuttle caused by its checking device. As explained above, the pressure exerted by the resilient material R on the shuttle S through the friction material F is uniform for a given degree of compression. Thus, the force exerted by resilient means M on the thick portions A will not distort these portions due to the rigidity of these portions. However, the walls W are too thin to compress the resilient material R to the same degree that portions A do and the walls bow inwardly as seen in the Prior Art Figure. This bow becomes progressively worse during the life of the shuttle because the initial bow becomes set and thus offers even less resistance to the pressure exerted on it by the resilient means, thereby resulting in further bowing until the walls of the shuttle becomes so bowed as to interfere with the unwinding of filling yarn from the shuttle bobbin.

The invention overcomes this defect of the Kronoff shuttle box by providing a rigid member between the resilient material and the friction material to transmit the force exerted by the resilient material along a line that is substanially parallel to the centerline of the shuttle when the shuttle is properly boxed. This insures that a distorting force will not be applied to the thin shuttle walls.

Referring now to FIGURE 1 which shows diagrammatically a shuttle box **10** having a binder **12** and a box front **14** which are covered in accordance with the invention. Further details of the means for supporting the binder are shown in the Kronoff patent, supra, which is incorporated herein for such known structure. Since the present invention is not limited to any specific means for supporting the binders and box fronts it would be useless to go into such mechanisms in greater detail.

As seen in the Kronoff patent and in that instant FIGURE 1, binder **12** is supported by pivoted linkages **13, 13'**. These linkages pivotally support the binder by means of pivots **16, 16'**. The other ends of the linkages are pivotally supported by pivots **18, 18'** on the box frame **19**. It will be readily apparent to those skilled in the art that friction generated between the binder surface **26** and the shuttle S will cause the binder to exert additional pressure on the shuttle as it moves into the box and less as it moves out of the box during picking due to the pivoted supporting arrangement of linkages **13, 13'**.

As readily seen in FIGURE 1 box front **14** is adjustably mounted on the box frame **19** by means of the usual screws **15, 15'** to permit adjustment of the shuttle box for different shuttles.

The binder and the box front shown in FIGURES 1 and 2 may be covered with a resilient material to assist in checking the flight of the shuttle. Since this covering is the same, whether on the binder or the box front it will be described in detail with reference to the binder with similar parts of the box front being identified by the same reference characters with primes added.

Binder **12** comprises an elongated rigid body **20**, a

layer of resilient material **22** abutting one surface of the body, an elongated rigid member **24** which is floatingly supported by the resilient material. Encompassing rigid member **24**, resilient material **22**, and at least a portion of body **20**, is a layer of friction material **26**, the ends of which are secured to the backside of body **20** by suitable means such as screws **30**. The floating arrangement of member **24** permits it to move longitudinally relatively to body **20** but more importantly, does not permit member **24** to exert any force on its own as would be the case if member **24** was fixed to said body at one end in a cantilever fashion.

Layer **22** may comprise any resilient material, such as foam rubber, natural or synthetic, that is capable of expanding to its original thickness after being compressed. Other resilient materials such as that shown in the Kronoff patent may be used instead of a foamed material, the particular form and composition of this layer not being critical and one skilled in the art may readily select any material which possesses the requisite resiliency.

Layer **24** may be formed of any rigid material such as metals, wood, plastics, and the like, with requisite rigidity to distribute the forces exerted by the resilient material along a line that is substantially parallel to the centerline of the shuttle when it is properly boxed, thereby avoiding the exertion of undue force on the thin walls of the shuttle. Aluminum has been found to possess the necessary rigidity and has the added advantage of being very light in weight.

Friction material **26** may comprise a leather strip or a strip of any other flexible material with the requisite strength and friction characteristics and can be readily selected from available materials by the artisan.

Layer **22** may be bonded to body **20** and to rigid member **24** if desired to facilitate assembly but this is not necessary to the operation of the binder. From the foregoing description it will be appreciated that the invention offers a simple solution to a difficult problem. While this description has been restricted to a single embodiment of the invention, various changes and variations will occur to those skilled in the art which may be made within the scope of the appended claims without departing from the spirit and scope of the invention.

What is claimed is:

1. In a shuttle box for looms having means for checking the shuttle, said means comprising:

(a) an elongated rigid body;

(b) resilient means abutting one surface of said rigid body;

(c) an elongated rigid member floatingly supported by said resilient means to permit said member to move longitudinally, relative to said rigid body;

(d) frictional means encompassing said rigid member, said resilient means, and a portion of said body whereby said frictional means adjacent said shuttle is substantially parallel to the centerline of said shuttle when said shuttle is in said box.

2. In a shuttle box as set forth in claim **1** wherein said resilient means is a binder.

3. In a shuttle box as set worth in claim **1** wherein said resilient means is the box front.

4. In a shuttle box as set forth in claim **1** wherein said resilient means comprises the binder and the box front.

5. In a shuttle box as set forth in claim **1** wherein said frictional means is bonded to said rigid member.

6. In a shuttle box as set forth in claim **1** wherein resilient means is an elastomeric material.

7. In a shuttle box as set forth in claim **6** wherein said elastomeric material is bonded to said body.

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