June 28, 1966 C. C. BUTLER 3,258,036

SHUTTLE CHECKING DEVICE

Original Filed Oct. 15, 1962

Fig. 1.

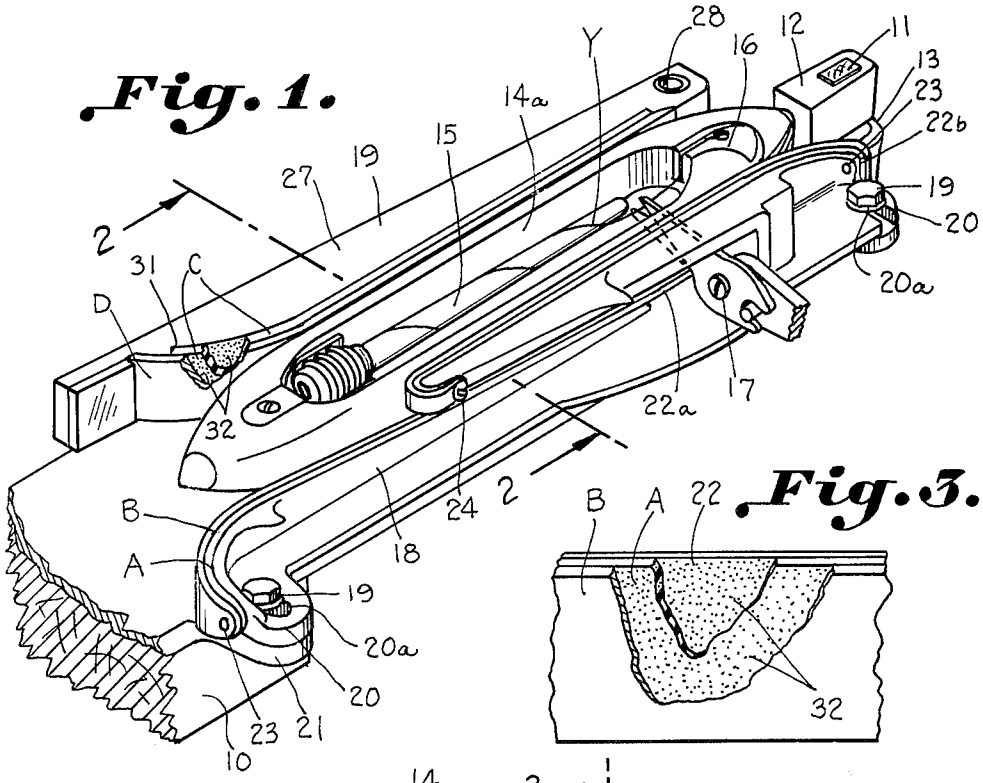


Fig. 3.

Fig. 2.

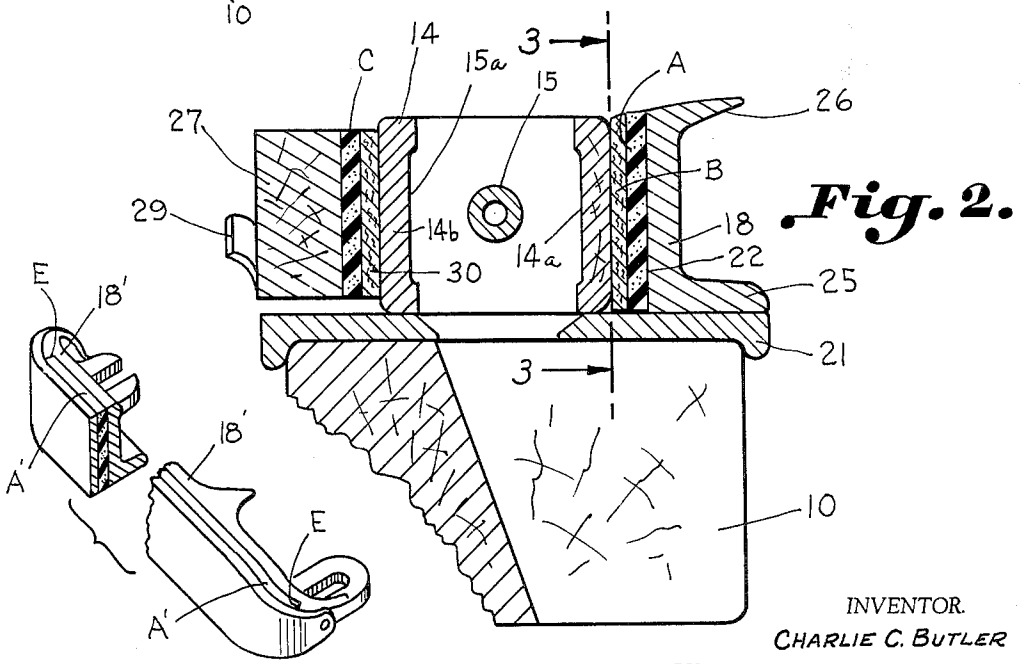


Fig. 4.

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SHUTTLE CHECKING DEVICE

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Original application Oct. 15, 1962, Ser. No. 230,634. Divided and this application June 1, 1965, Ser. No. 466,500

4 Claims. (Cl. 139—185)

This is a division of application Serial No. 230,634, filed Oct. 15, 1962 now abandoned.

This invention relates to an improved shuttle checking device for use on looms.

The invention is especially concerned with the shuttle boxing mechanism and the problem of reducing the severe impact and vibration imparted to the shuttle during checking. Shuttle boxes presently in use offer resistance to the movement of the shuttle through frictional engagement with the shuttle so that the box tension must be relatively great. Damage to the filling often results, especially with high twist yarn, during checking because of excess filling being fed off of the bobbin and becoming confined between the shuttle and the race plate of the loom. A major cause of jerked in filling is a result of the duckbill of the thread cutter missing such filling which falls out of the path of the duckbill. If the filling fails to be thus engaged and cut, the end of the filling will be jerked into the fabric. It has been found that there is a substantial reduction in jerked in filling using the subject matter of the present invention because of smoother checking action. The variation in weight of the shuttle which results from the variation in the amount of yarn carried by the bobbin causes a variation in yarn tension which results in looped selvages and the like. Use of checking devices constructed in accordance with the invention greately reduce such effects upon the fabric being woven. Box fronts are sometimes broken as a result of being struck by crooked shuttles and the structure of the present invention minimizes this possibility.

The inside surfaces of the boxing elements must be covered with leather or some material capable of successively engaging the shuttle and offering sliding frictional resistance to the movement thereof. The placing of such material upon the rigid body portions of the binder and box front as is normally the case causes excessive wear upon the binder leather and upon the shuttle especially at points of initial contact. It is desirable, therefore, to offer a resilient, yielding, compressive force against the sides of the shuttle during boxing, and yet provide a surface for frictional engagement with the shuttle. Many attempts have been made especially in connection with the binder to accomplish this, and with respect to the binder, a partial solution to the problem has been found in the form of the subject matter of United States Letters Patent No. 3,010,483, A. J. Pruitt et al., issued November 28, 1961 entitled Shuttle Binder. While the invention of this patent made substantial progress toward improving the action of the binder, there remained no solution with respect to the action of the box front or to the over-all problem. Many attempts have been made in connection with the box front to offer a yielding surface for engagement by the shuttle, but none have provided a uniform frictional force applied along the entire side surface of the shuttle engaged by the box front during the entry of the shuttle into the box.

Accordingly, it is an important object of this invention to provide an improved checking device in which a uniform, yielding, resilient, compressive force will be exerted upon the shuttle by the box front during entry of the shuttle into the box.

Another important object of the invention is to provide a shuttle box offering a resilient frictional force to both sides of the shuttle during boxing to reduce the vibration and impact exerted upon the shuttle to avoid damage filling and jerked in filling.

Another important object of the invention is to provide an effective means for reducing wear upon the leather covering for the box front of a loom and at the same time reduce wear upon the shuttle.

Still another object of the invention is to provide improved boxing means offering softer boxing of the shuttle while permitting reduced box tension and a consequent reduction in loom power consumption.

Another object of the invention is to provide a checking device capable of consistently offering the same uniform, resilient, compressive force to the sides of a shuttle after repeated engagements by the shuttle.

The construction designed to carry out the invention will be hereinafter described, together with other features thereof.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawing forming a part thereof, wherein an example of the invention is shown and wherein:

FIGURE 1 is a persepective view illustrating a shuttle checking device constructed in accordance with the present invention.

FIGURE 2 is an enlarged transverse sectional view taken on the line 2—2 in FIGURE 1,

FIGURE 3 is an elevation taken on the line 3—3 in FIGURE 2, and

FIGURE 4 is a perspective is a view of a box front constructed in accordance with a modified form of the invention.

Referring more particularly to the drawing, a preferred embodiment of the invention is illustrated mounted upon the lay of a loom. The checking device has a box front with an elongated rigid body. A cushion A of a closed cell rubber like material, consisting essentially of neoprene extends substantially across the box front body contacted by the shuttle during boxing. This material is capable of withstanding excessive impacts by the shuttle and preferably conforms to the marginal portions of the body. A covering of leather and the like B carried in fixed relation to the box front body is provided in order to engage a side of the shuttle for frictional sliding contact. The box front leather substantially covers the cushion material and conforms to the body of the box front. The shuttle box is illustrated as including a spring biased shuttle binder having an elongated rigid body with a cushion C constructed of a closed cell rubber like material consisting essentially of neoprene. A covering of binder leather D extends over the cushion which is carried within a receptacle in the area of the binder contacted by the shuttle. It is desirable that both cushion elements A and C be of substantially uniform cross section so as to exert a more nearly uniform checking action upon the shuttle. A modified form of the invention includes a box front having a receptacle E formed within said elongated body extending substantially over the area contacted by the shuttles. The cushion is of substantially uniform rectangular cross section conforming to the box front body so that the surface of the cushion conforms with the inner surface of the box front body.

The drawing illustrates a portion of a loom lay constructed of wood **10** which has the usual picker stick **11** carrying a picker **12** oscillated therein. The picker stick is checked by the usual check strap **13** when the picker receives the shuttle **14**. The shuttle **14** carries a bobbin **15** within the bobbin cavity **14***a*, and yarn Y is fed off the bobbin through the shuttle eye **16** during weaving. Upon the occurrence of an automatic bobbin change operation, the duckbill assembly **17** of the thread cutting mecha-

nism is advanced so that the remaining yarn Y of the nearly exhausted yarn supply is grasped by the projections so that the end of yarn will not be drawn into the woven fabric causing what is known as jerked in filling. As previously pointed out, it is one of the important objects of this invention to prevent the yarn from falling so that the duckbill **17** is unable to grasp the yarn and so that the yarn is not otherwise damaged.

The members forming what is known as the shuttle box include, a box front **18** and a shuttle binder **19**. The box front **18** has an elongated rigid body which is adapted to be connected, as by bolts **19** through laterally extending bracket portions **20**, to the lay end plate **21**, which is in turn carried by the lay wood **10**. It will be noted that the brackets **20** have slots **20***a* therein for transverse adjustment of the box front.

It will be noted that the box front **18** has a vertical portion **22**, the inside surface of which engages one of the sides **15***a* of the shuttle. The vertical portion **22** has a longitudinal slot **22***a* therein for accommodating the duckbill **17**. The ends of the vertical portion **22** are turned outwardly as at **22***b*.

The cushion insert A is of a closed cell rubber like material preferably consisting essentially of neoprene. This insert is confined on the inside of the leather B by suitable fastening means such as the rivets **23** at both ends of the box front body, and by the rivets **24** in the intermediate portion of the box front. The box front is provided with a lower flange **25** and an upper flange **26** essentially for the purpose of providing strength.

The binder **19** has an elongated wooden body **27** which is pivotally mounted at one end as at **28**. A leaf spring **29** normally urges the free end of the binder inwardly so that the binder leather D engages the side **14***b* of the shuttle. The cushion C is carried within a recess or cut out portion **31** within the binder, and is preferably of substantially uniform cross section.

A suitable adhesive **32** fixes the leather members B and D with respect to the inserts A and C and fixes the inserts A and C with respect to the inside surfaces of the box front body **22** and the binder wood **27** respectively. It should be noted that a material capable of providing suitable frictional contact with the shuttle may be substituted for leather.

A suitable material for constructing the cushions A and C is described in U.S. Letters Patent No. 2,873,481 and a closed cellular material having the following composition in parts by weight has been found suitable:

Neoprene	100
Calcium silicate	55
Zinc oxide	4
Magnesium oxide	5
Antioxidant	1
Nitrogen flowing agents	8

A modified form of the invention is illustrated in FIGURE 4 is in which like reference characters are used to identify like parts with prime notations added. A recess or cutout portion E has been placed within the inner portion of the box front **18'** for the reception of the cushion A'. As illustrated the receptacle preferably originates in the outwardly turned end portion contacted by the shuttle upon its entry into the box. The receptacle extends rearwardly in the area contacted by the shuttle during boxing. Such a receptacle may be placed in existing box fronts.

The important objects of the invention are thus accomplished through the use of simple, durable and inexpensive structural elements. It has been found in practice that checking devices embodying the invention produce significant advantages in reducing wear on loom parts, improved quality of product, and reduced power consumption.

While a preferred embodiment of the invention has been described using specific terms, such description is for illustrative purposes only, and it is to be understood that changes and variations may be made without departing from the spirit or scope of the following claims.

I claim:

1. In combination with a shuttle box, a box front having outwardly turned end portions for receiving a shuttle and having an elongated rigid body intermediate the end portions, a cushion constructed essentially of a closed cell rubber-like material capable of withstanding successive impacts by the shuttle covering the entire inner surface of the box front body including at least the outwardly turned end portions contacted by the shuttle, said cushion being of substantially uniform rectangular cross-section, the surface of said cushion conforming to the inner surface of the box front body so as to receive the shuttle upon initial impact upon the box front and to resiliently engage the same during its progress into the box, a covering of leather like material over the cushion fixed to the box front body, adhesive means fastening the cushion to the box front body over substantially the entire surface of their engagement and fastening the cushion to the covering over substantially the entire surface of their engagement, and mechanical fastening means removably securing the leather and the cushion to the box front adjacent each end thereof.

2. The combination of claim **1** wherein the mechanical fastening means are rivets.

3. The combination of claim **1** wherein said body has a substantially rectangular cut-out portion extending substantially the length of the body for receiving said cushion.

4. The combination of claim **1** wherein a pivotally mounted, elongated binder is provided opopsite the box front for engaging a portion of a shuttle and which includes a cut-out portion for receiving a cushion of a closed cell rubber-like material capable of withstanding successive impacts by the shuttle and covering substantially the entire inner surface of the binder, the surface of said cushion conforming to the inner surface of the binder and a covering of leather like material over the cushion fixed to the binder, adhesive means fastening the cushion to the binder over substantially the entire surface of their engagement and fastening the cushion to the covering over substantially the entire surface of their engagement.

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