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W. W. TUBBY & W. H. BROOMHEAD.

SHUTTLE CHECKING MECHANISM FOR LOOMS.

(Application filed Oct. 5, 1901.)

(No Model.)

Fig. 1.

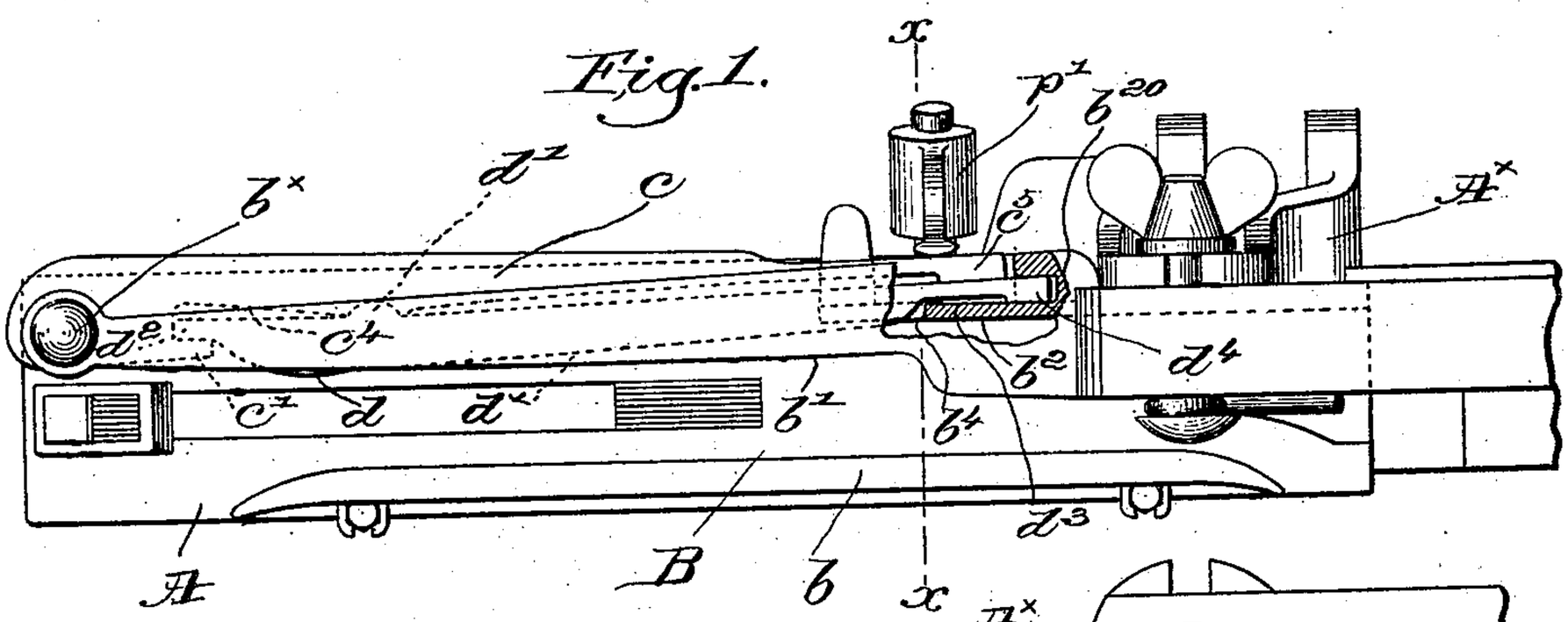


Fig. 2.

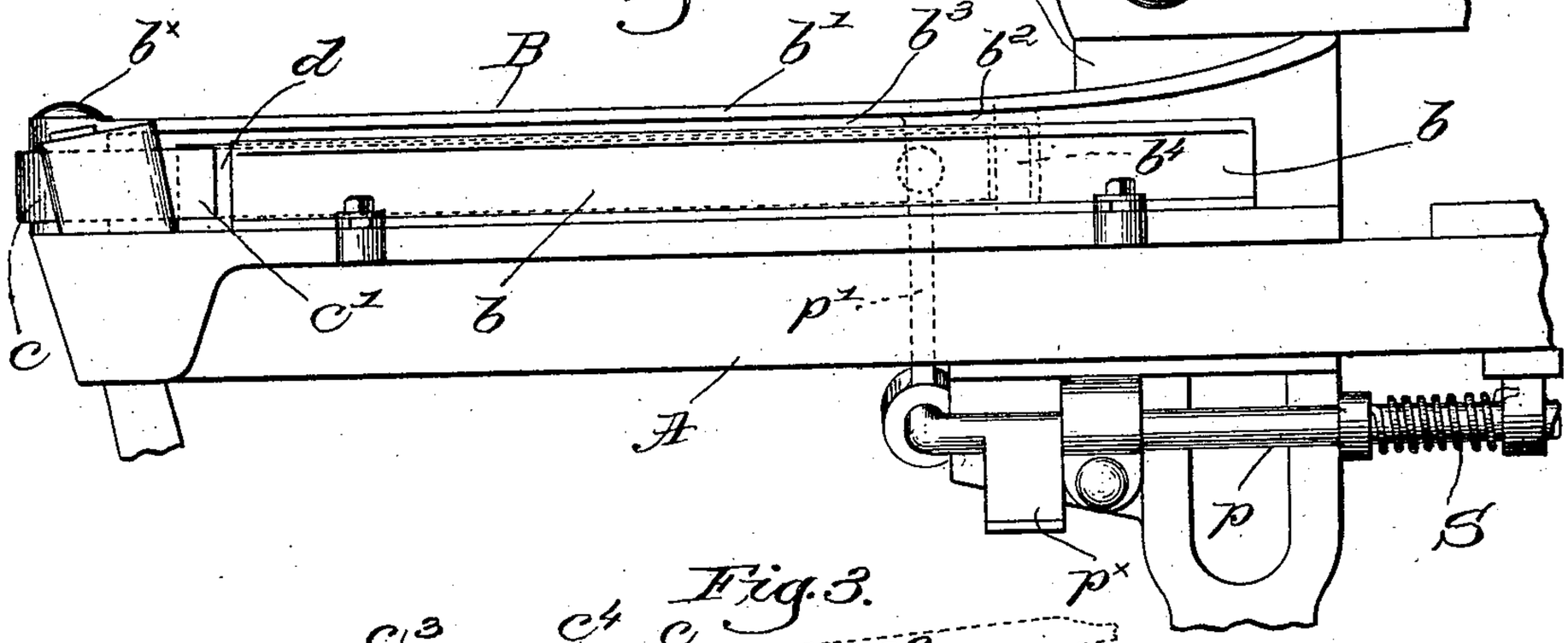


Fig. 3.

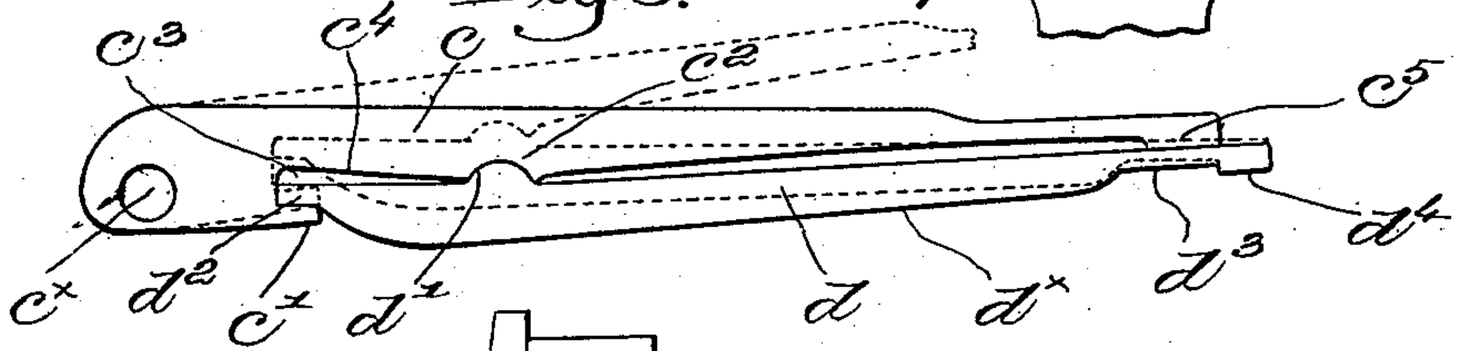
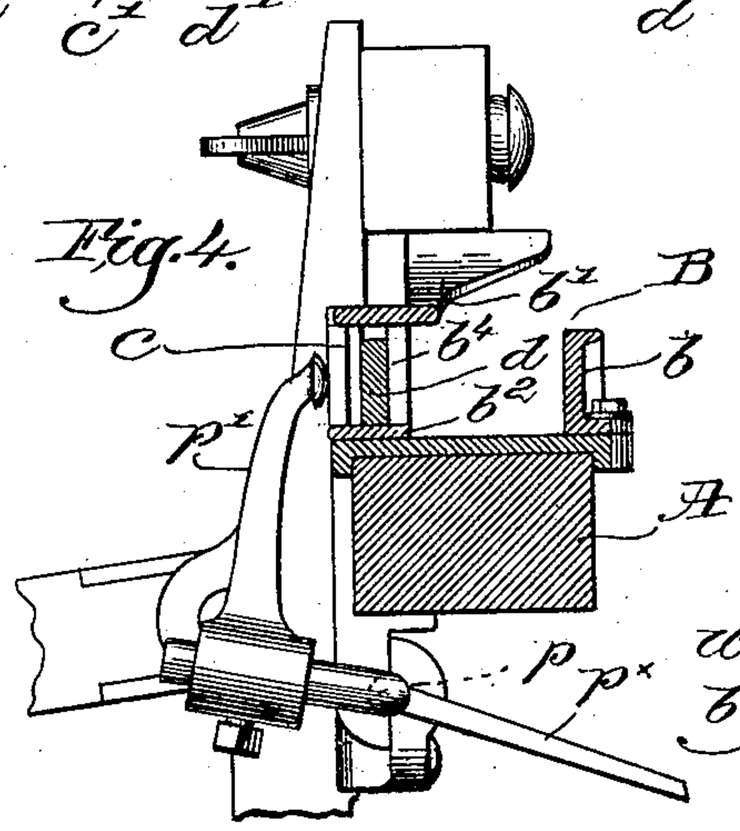


Fig. 4.



Witnesses:
Thomas L. Drummond.
Edward F. Allen.

Inventors,
Walter W. Tubby,
William H. Broomhead,
by Darby & Gregory
Attys.

UNITED STATES PATENT OFFICE.

WALTER W. TUBBY AND WILLIAM H. BROOMHEAD, OF FALL RIVER, MASSACHUSETTS, ASSIGNORS TO DRAPER COMPANY, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

SHUTTLE-CHECKING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 705,980, dated July 29, 1902.

Application filed October 5, 1901. Serial No. 77,639. (No model.)

To all whom it may concern:

Be it known that we, WALTER W. TUBBY and WILLIAM H. BROOMHEAD, citizens of the United States, and residents of Fall River, county of Bristol, and State of Massachusetts, have invented an Improvement in Shuttle-Checking Means for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates more particularly to means for checking a loom-shuttle as it enters the shuttle-box at the end of its flight across the lay; and one of the objects of the invention is the provision of means which will gradually reduce the speed of the shuttle and bring the maximum pressure thereupon at about the time the shuttle is properly boxed, preventing rebound of the shuttle.

Among other objects attained by our invention are decrease in wear of the different parts, prevention of cop breakage in cop-weaving due to abrupt or sudden checking of the movement of the shuttle, and coöperation of the shuttle-checking means with the usual protector mechanism.

Other features of our invention will be hereinafter described, and particularly pointed out in the following claims.

Figure 1 is a top or plan view, partly broken out, of one end of the lay of a loom having a shuttle-box thereon with one embodiment of our invention applied thereto. Fig. 2 is a front elevation of the apparatus shown in Fig. 1. Fig. 3 is a detached plan view of the members of the checking means; and Fig. 4 is a transverse sectional view of the lay and shuttle-box on the line 4 4, Fig. 1, looking toward the right.

Referring to the drawings, the lay A has mounted upon it a shuttle-box B, having a fixed front wall b, cover-plate b', and back plate b^2, all of usual construction, the lay being provided with protector mechanism comprising a rock-shaft p, having a dagger $p^\times$ and an upturned finger p' to coöperate with the shuttle-checking means, said finger being normally pressed toward the front of the lay by a spring S, surrounding and connected with the rock-shaft in well-known manner. At its outer end the back wall and top plate of the box are supported by an upright stud $b^\times$, secured to the lay, and at the mouth of the shuttle said members are secured to the lay-sword $A^\times$, a longitudinal opening b^3 in the back wall, extending from the stud to an upright shoulder b^4, providing access for the binding means to the shuttle-path.

The binding or shuttle-checking means herein shown comprises two coöperating lever-like members arranged in juxtaposition and oppositely extended, one of said members, which is operatively connected with the protector mechanism, having a fixed fulcrum adjacent the outer end of the shuttle-box and having pivotally connected with it the other member, which we have termed the "impact member," inasmuch as it receives the impact of the entering shuttle and coöperates directly therewith in checking its movement. The impact member at its outer end rests upon a fixed support and rocks thereupon as a fulcrum; but it is also free to move or slide longitudinally by or through the operation of the binding means, and we have hereinafter referred to the impact member as having a slidable or shifting fulcrum.

Referring now to the drawings, the member c is fulcrumed at its outer end on the stud b^4, which passes through a hole $c^\times$, Fig. 3, in said member, the other end of the latter being extended inward in front of and to be engaged by the upturned finger p', as clearly shown in Figs. 1 and 4, the action of the spring S normally pressing the member c against the back or adjacent face of the coöperating impact member d, as shown in Fig. 1. The inner face of the member c is shaped near its outer end to present an inwardly-extended lug or stop c', and a rounded upright socket c^2 is made in the face of said member, near its outer end in the present embodiment of our invention, the inner face sloping away, as at c^4, Fig. 3, from the socket to the recess c^3, adjacent the stop c'. From the opposite side of the socket c^2 the member c is gradually reduced in thickness toward its inner end, as shown in Fig. 3.

The rear face of the impact member d is

herein provided with an upright rounded enlargement or projection d', which seats in the socket c^2, so that the impact member can rock upon the member c, the projection and socket forming a pivotal connection between the two members. The widest portion of the impact member is shown in Fig. 3 as just beyond the projection d', and from such widest portion to its inner end the impact member is reduced in thickness and presents a tongue d^2 at its outer end, said tongue loosely entering the recess c^3, the beveling or inclining of the parts c^4 of the inner face of the member c permitting a limited rocking movement of the impact member. From the widest portion the impact member is gradually decreased in thickness toward its inner end and presents an elongated plane face $d^\times$, which receives the impact of the incoming shuttle and which contacts with the side of the shuttle when the latter is boxed.

We have shown the impact member as having a cut-away portion or clearance d^3 and a bearing d^4 at its extremity, the said bearing loosely entering a socket b^{20}, (see Fig. 1,) formed in the casting of the back wall of the box, the clearance d^3 preventing interference between the impact member and the upright shoulder b^4 of the back wall.

The foot c^5, at the inner free end of the spring-controlled member c, bears upon the back of the impact member, between the fulcrum of the latter and its pivotal connection with the member c, and thereby normally maintains the tongue d^2 pressed against the stop c', as shown clearly in Figs. 1 and 3, thus limiting the inward movement of the impact member into the shuttle-path, and referring to Fig. 1 it will be noted that the elongated face $d^\times$ of the impact member is normally extended into the shuttle-path and at an acute angle thereto. Now when the shuttle enters the box it engages the impact member, at or near the inner end of the latter, and as the shuttle advances after the initial engagement the said impact member is turned or rocked about its inner end, the latter resting against the support or back wall b^2, and at the same time this swinging movement of the impact member acts, through the pivotal connection d' c^2, upon the spring-controlled member c to swing the latter on its fulcrum $b^\times$, but in the opposite direction, the foot c^5 moving away from the path of the impact member, and the rocking movement of the impact member tends to bring it into substantial parallelism with the side of the shuttle at or about the time the latter reaches its final proper position in the box, so that the entire plane face $d^\times$ bears against the shuttle, and thereby gradually increases the friction-surface acting to check the shuttle.

So far as the impact member is concerned the lever-arm or distance between the inner end of said member and the point of impact with the shoulder of the shuttle gradually increases as the shuttle enters the box, so that as the power of the shuttle to force the member c outward diminishes it is in a measure compensated for by the increased lever-arm, so that the protector mechanism will be properly operated against the action of its controlling-spring when the shuttle attains its proper position in the box. In the embodiment of our invention which is illustrated in the accompanying drawings both the binder c and the impact member d are made of wood.

The wear upon the shuttle and upon the impact member is distributed over a greater surface on both parts by the pivotal mounting of the impact member, thus reducing wear not only on the shuttle, but also on the impact member, and by the gradual action of the checking means upon the shuttle a sudden stoppage of the latter is prevented and the splitting or breakage of cops in cop-weaving is obviated.

By increasing the number of bearings for the checking means the wear upon such bearings is more evenly divided and the life of the device is greatly increased.

By providing a sliding or movable fulcrum for the inner end of the impact member the slight longitudinal movement of such member due to its rocking movement about its fulcrum and also on the member c is permitted to take place.

Our invention is not restricted to the precise construction and arrangement herein shown, as we have illustrated one practical embodiment of our invention, and the same may be modified or changed in various particulars by those skilled in the art without departing from the spirit and scope of our invention.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A shuttle-box, a spring-controlled binder having a fixed fulcrum adjacent the outer end of the box, and an impact member in pivotal connection with the binder and having a sliding fulcrum adjacent the mouth of the box, said impact member being normally maintained by the binder at an angle part way across the shuttle-path and constituting the movable wall of the shuttle-box.

2. A shuttle-box, and a shuttle-checking device comprising two oppositely-extended, juxtaposed members fulcrumed adjacent the inner and outer ends of the shuttle-box, respectively, and pivotally connected, one of said members having a sliding fulcrum, the inner of said members constituting the movable wall of the box, which is encountered by the shuttle as it enters the shuttle-box, and a spring to act upon the outer member and therethrough normally maintain the impact-face of the inner member partly across and at an acute angle to the shuttle-path.

3. A shuttle-box, and a shuttle-checking device comprising a spring-controlled, swinging member having a fixed fulcrum at its outer end, and a coöperating pivotally-connected

impact member slidably supported at its inner end adjacent the mouth of the box, the impact member being normally maintained at an acute angle to and intersecting the shuttle-path.

4. A shuttle-box, and a shuttle-checking device comprising a spring-controlled, swinging member having a fixed fulcrum at its outer end, and a coöperating pivotally-connected impact member slidably supported at its inner end adjacent the mouth of the box, the impact member being normally maintained at an acute angle to and intersecting the shuttle-path, and means to limit the inward movement of the impact member.

5. A shuttle-box, and a shuttle-checking device comprising a spring-controlled member having a fixed fulcrum adjacent the outer end of the box, and a coöperating impact member having a sliding fulcrum at its inner end adjacent the mouth of the box and near its outer end pivotally connected with the spring-controlled member, the impact member having its elongated plane inner face normally maintained in the path of the shuttle at an angle thereto.

6. A shuttle-box, and a shuttle-checking device comprising a spring-controlled member, a juxtaposed and oppositely-extended impact member in pivotal engagement therewith near the outer end of the impact member, fulcra for said members adjacent the ends of the shuttle-box, the impact member being normally maintained in the path of the shuttle at an angle thereto, and a stop on the spring-controlled member to limit inward movement of the impact member.

7. A shuttle-box, and a shuttle-checking device comprising a spring-controlled member having a fixed fulcrum adjacent the outer end of the box, an impact member having a sliding fulcrum at its inner end, a rounded projection on one member to enter a socket in the adjacent face of the other member, to form a pivotal connection between them at or near the outer end of the impact member, and a stop on the spring-controlled member to coöperate with and limit inward movement of the impact member, the elongated, plane inner face of the latter being normally in the path of the shuttle at an acute angle thereto.

8. A shuttle-box, and a shuttle-checking device comprising a spring-controlled member having a fixed fulcrum adjacent the outer end of the box, and an impact member slidably supported at its end adjacent the mouth of the box, a lateral projection on one member to seat in a socket in the adjacent face of the other member, to form a pivotal connection between them adjacent the outer end of said impact member, the inner face of the latter being normally in the path of the shuttle at an angle thereto, engagement of the incoming shuttle with the impact member rocking it about its support and in turn rocking the coöperating member against its spring, the pressure of the impact member upon the shuttle gradually increasing as the latter approaches the outer end of the box and the inner face of the impact member parallels the shuttle side.

9. A shuttle-box, and a shuttle-checking device comprising a spring-controlled member having a fixed fulcrum adjacent the outer end of the box, and an impact member mounted to rock on said spring-controlled member and normally maintained with its inner elongated face in the path of the shuttle at an angle thereto, and a fixed support on which the inner end of the impact member can fulcrum and slide, the incoming shuttle simultaneously rocking the impact member upon the spring-controlled member and moving its inner end upon said fixed support, to thereby gradually increase the area of engagement between the impact member and the shuttle and the pressure upon the latter as it advances in the box.

10. In a loom, a spring-controlled protector rock-shaft, the lay having a shuttle-box, and a compound binder, comprising a member fulcrumed adjacent the outer end of the box and operatively connected with the said rock-shaft, and an impact member mounted at or near its outer end to rock on the first-mentioned member, and a fixed support for and on which the inner end of the impact member may slide, said impact member being normally maintained with its inner face in the path of the shuttle at an acute angle thereto.

11. A shuttle-box, and a shuttle-checking device, comprising an outer spring-controlled movable member, and a coöperating inner impact member, having a sliding fulcrum at its inner end, near the entrance of the shuttle-box, and bearing near its outer end upon said outer member, said impact member normally intersecting the shuttle-path.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

WALTER W. TUBBY.
WILLIAM H. BROOMHEAD.

Witnesses:
GEORGE OTIS DRAPER,
ERNEST W. WOOD.