April 11, 1939. W. E. LUNDGREN 2,154,050

SHUTTLE

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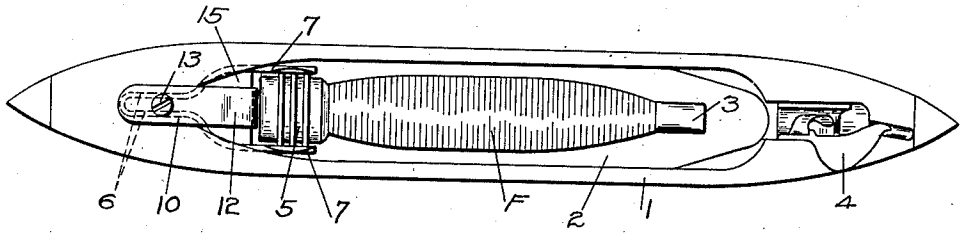


Fig. 1.

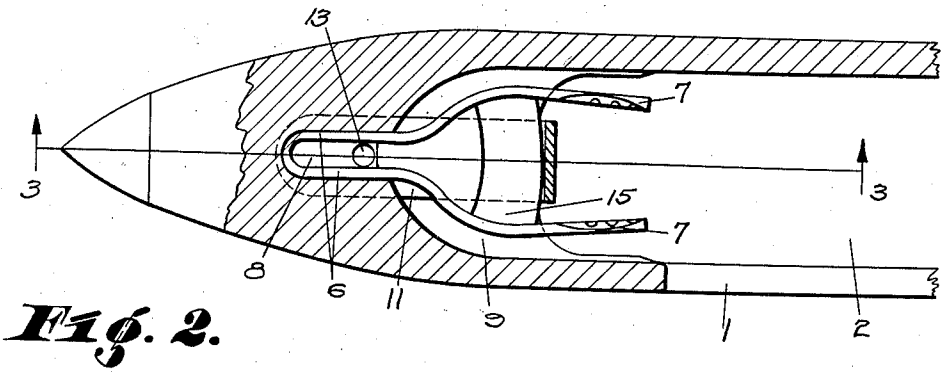


Fig. 2.

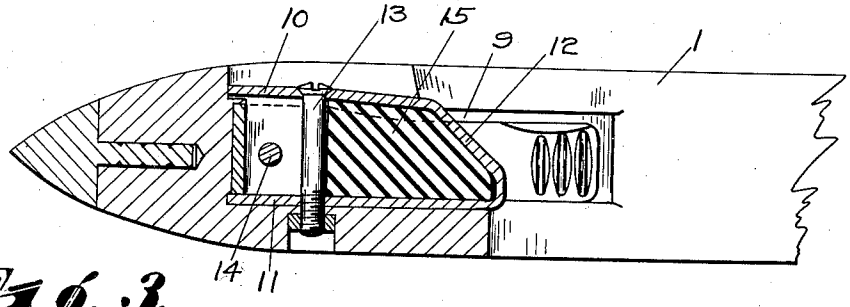


Fig. 3.

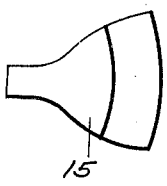


Fig. 4.

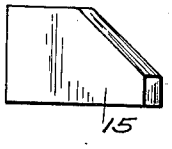


Fig. 5.

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SHUTTLE

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5 Claims. (Cl. 139—207)

The present invention pertains to loom shuttles and has more particular reference to the filling carrier holding means of such shuttles.

Loom shuttles of the type to which my invention applies commonly comprise a shuttle body having a cavity therein for receiving a filling carrier such as a bobbin or the like, and spring jaws, usually located at one end of the shuttle body, for holding the filling carrier in proper position in the cavity. The spring jaws are arranged to grip the butt end of the filling carrier, the filling carrier being otherwise free and unsupported. Such spring jaws have been subject to considerable breakage the cause of which has not been known heretofore.

The shuttle spring jaws are commonly constructed of good quality spring steel. They are of proper dimensions to provide adequate grip on the filling carrier, and are of such proportions that they should easily withstand the flexing to which they are subjected when the filling carrier is inserted or removed. In spite of this apparently correct design, the spring jaws have given a substantial amount of trouble from the aforesaid unexplained breakage.

Numerous attempts have been made to prevent said breakage by providing weakened or strengthened sections for shifting the point of flexure or for distributing the flexing over greater or less areas, for many of which attempts patents have been granted. Such prior attempts have not solved the problem and, prior to the present invention, shuttle spring jaws of whatever construction were still subject to unexplained breakage.

It has occurred to me, and I believe that I have demonstrated conclusively, that the aforesaid breakage of the spring jaws is the result of stresses which are caused by vibrations set up in the jaws by shock or jar. The jaws in shuttles for bobbing changing looms are subjected to a severe shock when the bobbing is transferred. Also, the jaws are subjected to a shock which may be sufficient to induce vibrations each time the shuttle is picked or checked. I propose to prevent the aforesaid spring jaw breakage by damping the vibrations in the jaws, to thereby prevent the setting up of stresses which the jaws are incapable of withstanding.

It is accordingly a principal object of the present invention to provide a loom shuttle having spring jaws therein for holding a filling carrier as aforesaid, and vibration damping material carried by the shuttle and engaging such jaws in a manner to substantially dampen out, or prevent the inducement of vibrations therein, whereby to entirely eliminate the above mentioned unexplained breakage of the spring jaws.

The foregoing and other objects of the invention are accomplished in the construction illustrated on the accompanying drawing, of which:

Fig. 1 is a plan view of a shuttle comprising the preferred embodiment of my invention;

Fig. 2 is a view of one end of the same shuttle, partly in section and to a larger scale;

Fig. 3 is a view in cross-section taken approximately on line 3—3 of Fig. 2;

Fig. 4 is a plan view of the vibration damping block of said shuttle; and

Fig. 5 is a view in elevation of said block.

The shuttle shown on the drawing comprises the usual shuttle body 1 having a cavity 2 therein for receiving a filling carrier such as bobbin 3. The shuttle is adapted for use in a conventional automatic bobbin changing loom and to this end is provided with a suitable threading block 4. The filling F on the bobbin threads into the block 4 automatically, as is well known in the art. The bobbin 3 is releasably held in the shuttle, so that it may be automatically ejected and a fresh bobbin transferred to the shuttle whenever the filling supply F becomes substantially exhausted.

In order that filling F may unwind freely from the bobbin 3 without restriction by the walls of the shuttle body, the bobbin is supported only by its butt end 5. The supporting means for the bobbin comprise opposed spring jaws consisting of shank portions 6 and free portions 7. The extreme ends of the free portions 7 are provided with suitable means such as the usual grooves whereby they are adapted to engage the usual rings on the butt end 5 of the bobbin. The free portions are biased toward each other in a manner to firmly grip the butt 5 of the bobbin. The shank portions 6 are fixed in the shuttle body as will hereinafter appear, and the portions 7 are free to flex toward and away from each other to permit the bobbin 3 to be ejected and replaced by another one.

In the particular construction shown, the spring bobbin holding jaws are formed from a strip of spring steel bent to the shape shown. The shuttle body 1 is cut out to provide a recess 8 of a size and shape to snugly receive the shank portions 6 of the spring jaws. The shuttle body is further cut out to provide a recess 9 opening into the adjacent end of cavity 2. The recess 9 receives the free portions 7 of the jaws and is sufficiently large to permit said portions to flex laterally of the shuttle body. A spring cover, so-

called consists of a plate 10 covering the shank portions 6, a similar plate 11 beneath said shank portions, and an inclined guide portion located between the free portions of the jaws and connecting the top and bottom plates 10 and 11. A vertical screw 13 passes through the plates 10 and 11 and between the shank portions 6, a screw 14 passes horizontally through the shuttle body and through the shank portion 6.

The screws 13, and 14, together with the cover plates 10 and 11 and the walls of the recess 8, fix the shank portions 6 of the jaws against movement in the shuttle body. The required flexing of the jaws is thereby confined to the free portions 7 and occurs primarily in the bowed or bent portions thereof. The spring jaws are so designed as to length, width and thickness, that they firmly grip the bobbin butt 5 and are still theoretically capable of flexing the required amount without breaking. In fact, the design is commonly such that the stresses caused by flexing the jaws the amount required to permit the transfer of bobbins may be below even the fatigue limit of the particular steel of which the jaws are made.

The shuttle and shuttle spring as thus far described are not, per se, of the present invention, they being substantially like the most successful of the prior shuttle and shuttle spring constructions. All of such prior constructions have been subject to excessive breakage of the spring jaws and as above noted, such breakage has occurred in spite of apparently correct design. As a result of extensive investigation of the problem, I have concluded that such breakage is the result of vibrations which are set up in the free portions of the jaws by the shock or jar of transfer or of picking and checking the shuttle. The vibrations mentioned are presumably of the same nature as those set up in any free spring when the latter is struck a sharp blow. When of sufficient magnitude, such vibrations will set up in the jaws stresses which result in the aforesaid spring breakage.

In accordance with the present invention, loom shuttles such, for example, as that above described, are to be provided with vibration damping material engaging the free portions of the spring jaws. By providing a suitable mass of resilient non-metallic material in engagement with the jaws, vibrations in the jaws are materially dampened, if not entirely prevented, and the aforesaid breakage is successfully prevented. Such vibration material should, of course, engage only the free portions of the jaws, that is the portions between shank 6 and the bobbin-gripping ends of the jaws 7.

In the particular embodiment shown, the vibration damping means comprises a mass of rubber in the form of a block 15. The rubber should be of such a composition or consistency that it is resilient or elastic to a substantial degree. The block 15 is of such a shape that when located between the free portions 7 of the jaws it will engage such jaws throughout a substantial proportion of their length. The said block may be held in place by the cover, 10, 11, 12 and to this end may be of proper length to extend longitudinally of the shuttle from screw 13 to the guide 12. I prefer to make the block 15 slightly thicker than the normal vertical distance between the plates 10 and 11. Thus, tightening the screw 13 compresses the block vertically and expands it laterally into firm engagement with the jaws. Since the block is located between the shank portions 6 and the ends of the portions 7 it does not interfere with the flexing of the jaws or with the transfer of bobbins.

The durability of shuttle springs is commonly tested by means of apparatus (not shown) which rapidly and with reasonable accuracy determines the number of bobbin transfers that would be required to break the spring being tested. Repeated tests with this apparatus indicate that in shuttles having vibration damping means as above described the spring jaws will withstand, without breaking, many times the number of transfers ordinarily required to break similar spring jaws in shuttles not having said vibration damping means.

Having fully disclosed the preferred embodiment of my invention, I claim:

1. A loom shuttle comprising a shuttle body having spring steel jaws therein for releasably holding a filling carrier, said jaws comprising shank portions fixed against movement in said body and gripping arms which are free to flex laterally of said shuttle body, and means for damping vibrations in said arms, said means comprising a rubber block located between said arms and in engagement therewith.

2. A loom shuttle comprising a shuttle body having opposed spring steel jaws therein, said jaws each comprising a shank portion rigidly fixed in said body, a bobbin-gripping end portion and an intermediate flexing portion integrally connecting said shank portion with said end portion, and means for damping vibrations in said jaws, said means comprising non-metallic vibration damping material engaging only said flexing portions of said jaws.

3. A loom shuttle comprising a shuttle body having opposed spring steel jaws therein, said jaws each comprising a shank portion rigidly fixed in said body, a bobbin-gripping end portion and a curved intermediate portion, and vibration damping means comprising a mass of non-metallic vibration absorbing material engaging said intermediate portions of said jaws.

4. A loom shuttle comprising a shuttle body having opposed spring steel jaws therein, said jaws each comprising a shank portion rigidly fixed in said body, a bobbin-gripping end portion and a curved intermediate portion, and rubber vibration damping material extending from said shank portions of said jaws along and in engagement with said intermediate portions for damping vibrations therein.

5. A loom shuttle comprising a shuttle body having spring steel jaws therein for releasably holding a bobbin, said jaws comprising shank portions fixed against movement in said body, bobbin-gripping end portions, and intermediate portions which are free to flex laterally of said shuttle body, and a mass of non-metallic vibration damping material located between said intermediate portions and in engagement therewith for damping vibrations in said jaws.

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