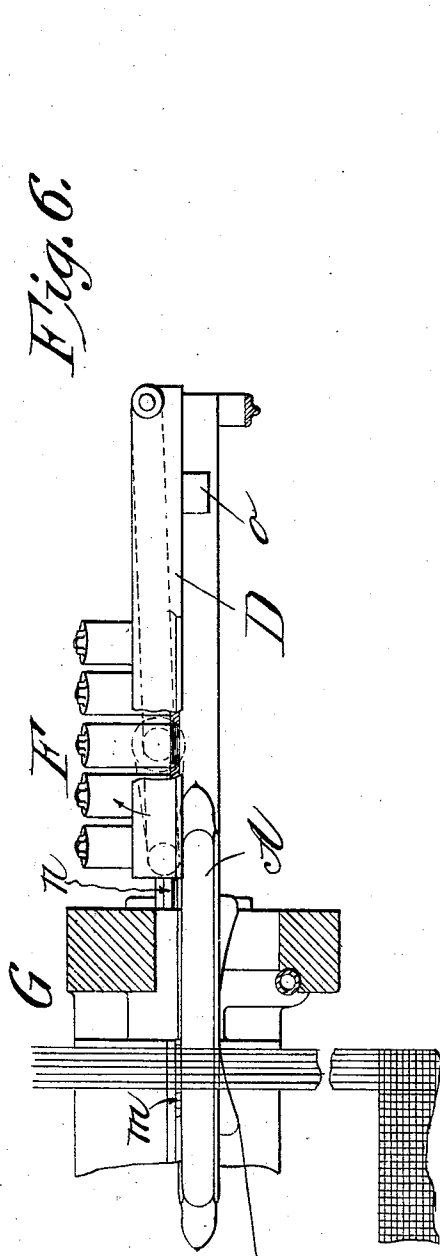


C. H. ATKINS.

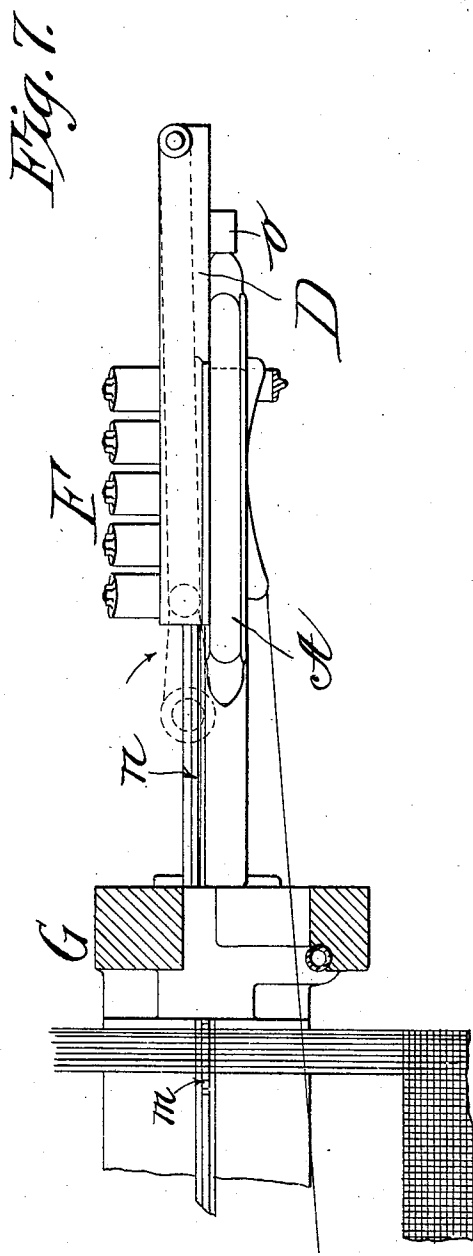
LOOM SHUTTLE AND BOBBIN TENSIONING MEANS THEREFOR.

APPLICATION FILED JUNE 18, 1906.

2 SHEETS—SHEET 2.



Witnesses:
H. L. Sprague
E. H. Seaborn



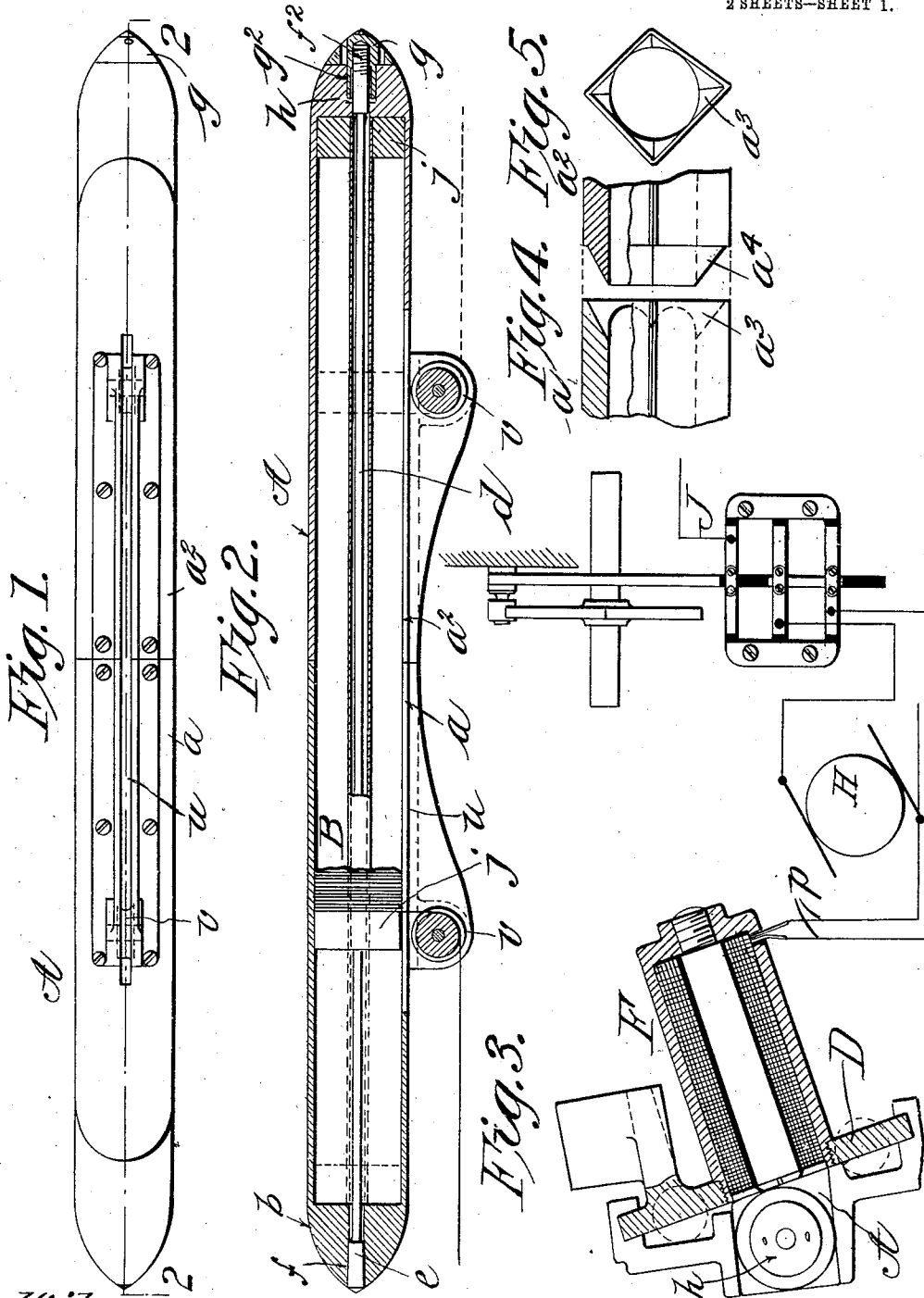
Inventor.
Charles Henry Atkins.
by *[Signature]* Attorney

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Charles Henry Atkins.
by *A. S. Allen* Attorney.

UNITED STATES PATENT OFFICE.

CHARLES HENRY ATKINS, OF SPRINGFIELD, MASSACHUSETTS.

LOOM-SHUTTLE AND BOBBIN-TENSIONING MEANS THEREFOR.

No. 858,137.

Specification of Letters Patent.

Patented June 25, 1907.

Application filed June 18, 1906. Serial No. 322,319.

To all whom it may concern:

Be it known that I, CHARLES HENRY ATKINS, a citizen of the United States of America, and a resident of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Loom-Shuttles and Bobbin-Tensioning Means Therefor, of which the following is a full, clear, and exact description.

This invention relates to improvements in shuttles for looms; and a primary object thereof is to provide a shuttle including a rotatable thread-carrying bobbin therein, of such character or quality as to be operable to tension the bobbin, at times when the bobbin tension is most desirable or necessary, by causing a circular rotatable portion or portions of the bobbin to frictionally bind against the interior of the shuttle body by reason of the attraction thereof in a direction toward an electro magnet located adjacent a position at which the shuttle is regularly or periodically received after having been shot across the loom. By this means in the final portion of the movement of the shuttle, at a time when any ordinary, or special, weft take-up mechanism is operating on the bobbin thread or wire the too free delivery of the thread or wire, by momentum or otherwise, from the bobbin will be prevented, while on the other hand the tensioning or frictioning of the bobbin may be efficiently controlled.

Another object is to constitute the body of the shuttle, in whole or part as may be desired, a permanent magnet, so that in the projection of the shuttle from one side of the loom to the other adjacent the iron or steel reed of the lay, the shuttle, because of the not excessive, though sufficient magnetic attraction between it and the reed will be constrained in its traversing movements to adhere in a course closely alongside of the reed, instead of possibly deviating in a forward direction, and whereby the shuttle, traveling on the lower set of warp wires, having always the same height relatively to the lay, will find, or be guided into, the receiver shuttle box or shuttle thrower, as the latter may be variously constituted in the loom. And another object of this invention is to so construct the shuttle in respect of the details thereof as to render it, consistent with the permanently magnetic quality of the shuttle body and with the characteristic that the bobbin has the quality or property of an armature to an electro magnet, susceptible of

entire convenience of manipulation at the time of opening or separating the parts of the shuttle body and again joining or connecting them at the quite frequent times of taking out an empty bobbin or spool and replacing it with one filled with thread or wire.

The present improvements are made apparent in and by the accompanying drawings and the description in conjunction therewith hereinafter given.

In the drawings,—Figure 1 is a front side view of the shuttle. Fig. 2 is a horizontal sectional view of the same as taken longitudinally thereof on the line 2—2, Fig. 1. Fig. 3 is an end view of the shuttle shown as in its relation to a receiver shuttle box or shuttle thrower having appurtenant thereto an electro magnet and showing by diagram means for periodically energizing and deenergizing the electro magnet. Fig. 4 is an enlarged view of the adjoining portions of the separable sections of the shuttle body. Fig. 5 is an end view of the shuttle. Fig. 6 is substantially a plan view showing the shuttle just moving into proximity with the receiver or shuttle thrower having a plurality of electro magnets for attracting and tensioning the bobbin,—the relative position of the lay and its reed being shown (represented in horizontal section) and the shuttle thrower is indicated as in its innermost or non-retired position. Fig. 7 is a similar view to Fig. 6 but showing the shuttle as fully moved into or onto the shuttle thrower and the latter as in its extreme outward or retired position.

In the drawings,—A represents a shuttle, the body of which consists of two separated hollow sections a and a^2 , said sections having solid outer end heads b . The adjoined ends of the said shuttle body sections a , a^2 are made the one with a flaring mouth, as indicated at a^3 , Fig. 4, and the other with a beveled end as indicated at a^4 to match into the said flaring mouth.

d represents a comparatively long, slender, straight, rigid rod having an engagement with one of the end heads, as shown at the left in Fig. 2, by having a tapered head e made for a crowding fit into a correspondingly tapered socket f in such head; the same extending centrally and longitudinally through both of the shuttle body sections and through an opening therefor within the head of the other section, the extremity of the rod being screw threaded, as indicated at f^2 , and is engaged by the clamping nut g which

screw engages the extremity of the rod and is brought to bearing against the flattened end of the solid head.

The head of the shuttle body section at which the clamping confinement is made is constructed with a cylindrical socket *h* to form a guide for a cylindrical hub or boss *g*² of the clamping nut, so that in the action of initially engaging the clamping nut with the threaded rod, the nut will be properly squared, or in its true position, for the screw thread engagement whereby liability of cross threading the nut on the screw will be avoided. The clamping nut has spanner holes to afford means for turning it.

In practice the entire body of the shuttle is steel and is made a permanent magnet.

B represents the bobbin, the same being made in the form of a tubular spool having circular and somewhat bulky end heads *jj* of soft iron, such tubular spool or bobbin being loosely fitted about and supported by said rod; and the cylindrical heads are peripherally adjacent the wall of the shuttle body and may be frictioned to impart a tension to the bobbin within and against the shuttle body whenever the shuttle is suitably adjacent an active magnet.

It, therefore, becomes apparent that if one or more electro magnets are provided to the shuttle receiver,—whether the same be a stationary shuttle box or a movable shuttle thrower, and energized, the iron bobbin heads united by the tubular body of the bobbin will act in the manner of an armature to the magnet, and will be drawn in a direction toward the pole thereof, and the axial hole through the bobbin being somewhat larger than the rod, the bobbin has a transverse play so that the end heads *jj* may be frictionally bound against the inner wall of the shuttle body. And the fact that the shuttle body is a permanent magnet will insure the adherence of the shuttle in its progress across the loom, closely to the loom reed and without liability that the shuttle will be deflected forwardly from proximity to the reed; and the shuttle being, furthermore, guided on the lower set of warp wires or threads will be moved with all sufficient accuracy into the shuttle race, receiver, or shuttle thrower.

In Figs. 3, 6, and 7, the shuttle thrower is indicated by *D*, connected and mounted on which are electro magnets *F F*, the poles thereof having their locations at the front of the shuttle thrower.

G, Figs. 6 and 7, represents the loom lay of which *m, m*, are reed wires or dents, and *n* represents the slideway for the reciprocatory shuttle thrower.

The example of the shuttle thrower here given is one which is substantially like that described in an application for Letters Patent of the United States filed by me of even date herewith, for improvements in picker mech-

anism for looms, Serial No. 322,318 and the means for imparting the movements back and forth to the shuttle thrower from one to the other of the positions seen in Figs. 6 and 7 is immaterial so far as concerns the present invention.

It is, however, appropriate to state at this time that while the shuttle thrower has its inward position, Fig. 6,—and while the shuttle moves so that its one end comes to or near the buffer *o*, the electro magnets will be properly energized for the magnetic attraction of the iron heads of the bobbin for frictioning the latter, such frictioning continuing because the electro magnets remain energized for the time in which the shuttle thrower is being fully retired to the position of Fig. 7 and until at or a little after the instant of the violent inward projection of the shuttle thrower,—the tensioning of the bobbin is accomplished; and the time of such tensioning, as desirable, is when the shuttle has come fully across the loom and the weft-take-up device is performing its work on the bobbin thread or wire.

As a means for periodically energizing and deenergizing the electro magnets, I have here illustrated conductors *p p* connected with electro magnets oppositely connected with a generator *H*, also having in connection therewith a controller or circuit opening and closing device *J* operable, as apparent on an inspection of the drawings, Fig. 3 to alternately establish and render open the electro magnet circuit.

The shuttle body may be of various dimensions and forms, and in the form thereof here shown, it has a long straight slot *u* in its front side, and has externally and adjacent the ends of the slot thread or wire guiding rolls *v v*.

I claim:—

1. A loom shuttle, the body of which is a permanent magnet, for the purpose set forth.
2. A loom shuttle consisting of a shuttle body and a bobbin rotatably fitted therein, and said bobbin comprising a soft iron portion capable of being attracted by a magnet, and adapted, by being magnetically attracted, to establish a frictional tensioning engagement between the bobbin and a portion of the shuttle relatively to which it turns.
3. A loom shuttle consisting of a shuttle body and a bobbin rotatably fitted therein, and said bobbin comprising a soft iron portion capable of being attracted by a magnet, and adapted, by being magnetically attracted, to establish a frictional tensioning engagement between the bobbin and a portion of the shuttle relatively to which it turns in combination with a shuttle receiver having a magnet subject to the attraction of which the shuttle is brought.
4. A loom shuttle consisting of a shuttle body and a bobbin rotatably fitted therein, and said bobbin comprising a soft iron por-

tion capable of being attracted by a magnet, and adapted, by being magnetically attracted, to establish a frictional tensioning engagement between the bobbin and a portion
5 of the shuttle relatively to which it turns, in combination with a shuttle receiver having an electro magnet, and in proximity to which the shuttle, in the operation of a loom, may be brought, and means for alternately energizing and deenergizing the said electro
10 magnet.

5. A loom shuttle consisting of a shuttle body and a bobbin rotatably fitted therein, and said bobbin comprising a soft iron portion capable of being attracted by a magnet,
15 and adapted, by being magnetically attracted, to establish a frictional tensioning engagement between the bobbin and a portion of the shuttle relatively to which it turns, in
20 combination with a movable shuttle receiver having an electro magnet, and in proximity to which the shuttle, in the operation of a loom, may be brought, means for alternately energizing and deenergizing the said electro
25 magnet.

6. A loom shuttle comprising a chambered shuttle body having end heads, a rod extending longitudinally through said chamber and supported by said end heads, and a spool or
30 bobbin having a tubular body, and circular end heads of soft iron, and loosely fitted about, said rod, said heads being peripherally adjacent the wall of the shuttle body, and adapted to be frictionally tensioned against
35 said wall by magnetic attraction externally of the shuttle.

7. In a shuttle a chambered shuttle body

consisting of sections separable between the ends of the body, and said sections having
40 outer end heads, a rod having an engagement with an end head extending longitudinally through both sections and through an opening therefor within the head of the other section, and confinement means therefor, and a
45 tubular spool or bobbin having circular end heads of soft iron, loosely fitted about, said rod, said heads being peripherally adjacent the wall of the shuttle body and adapted to be magnetically frictioned, for the bobbin tension, against such wall.
50

8. In a loom shuttle two axially alined separable shuttle body sections having end heads and at their matching portions made, the one with a flaring mouth and the other with its end wall beveled, and one of the sections having an endwise outwardly opening
55 nut-receiving hole therein, and having a cylindrical hole of smaller diameter in inward continuation of such hole, the bobbin having a tubular body and a rod having one end thereof in engagement with one of said end heads, and having its other extremity screw threaded, and extending centrally to and within
60 said nut receiving hole, and a binding nut screw engaging the threaded extremity of the rod and having an inner end cylindrical extension, for the purpose explained.

Signed by me at Springfield, Mass., in presence of two subscribing witnesses.

CHARLES HENRY ATKINS.

Witnesses:

WM. S. BELLOWS,
G. R. DRISCOLL.