J. ROBINSON.

SHUTTLE.

APPLICATION FILED JAN. 18, 1909.

934,017. Patented Sept. 14, 1909.

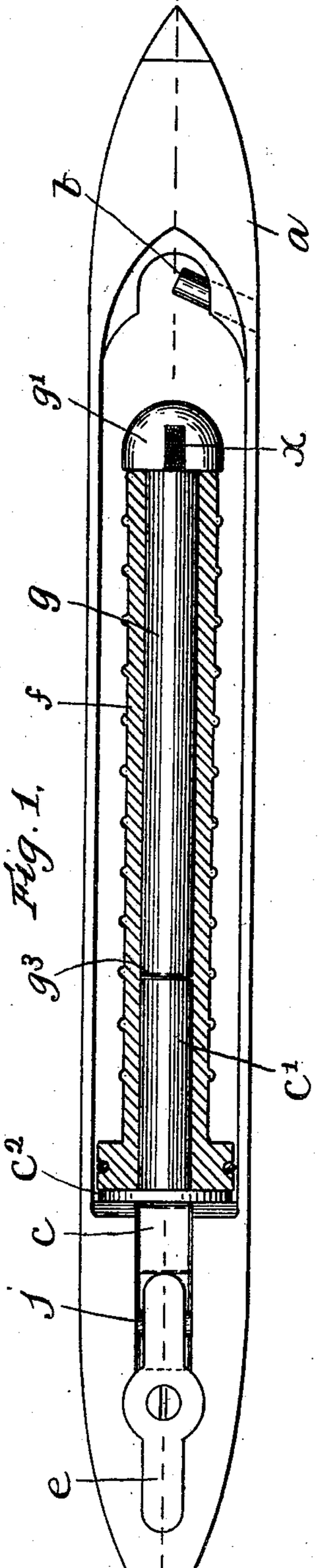

Fig. 1.

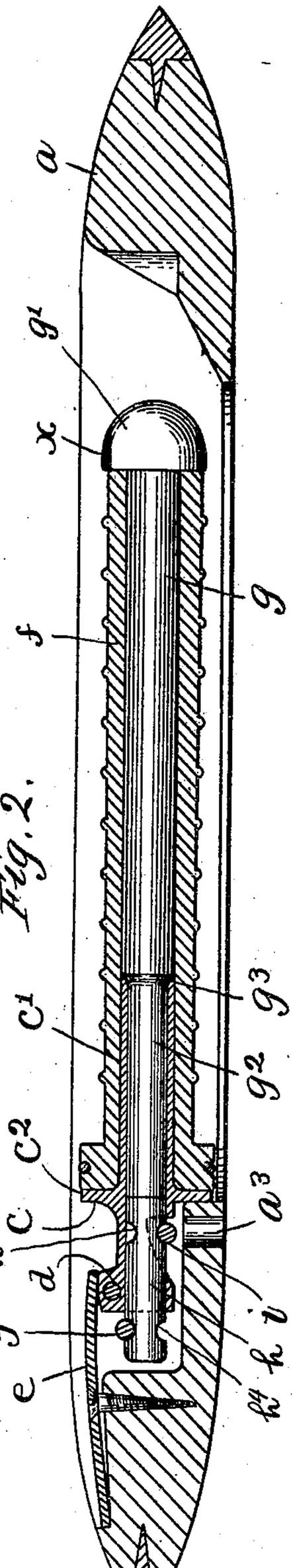

Fig. 2.

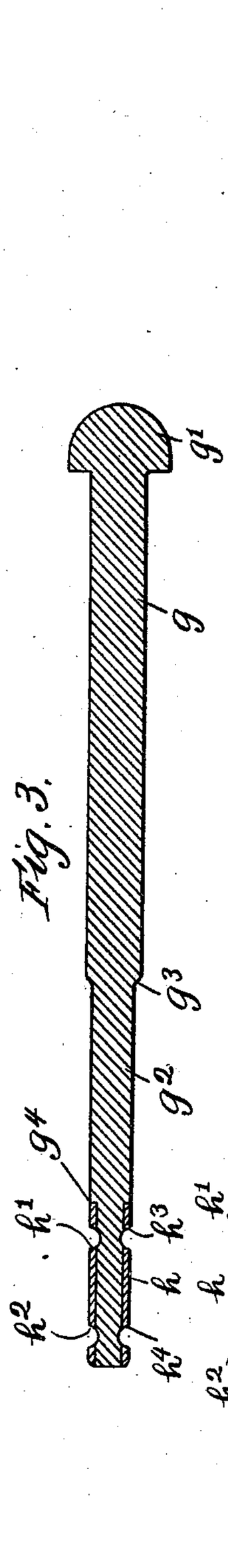

Fig. 3.

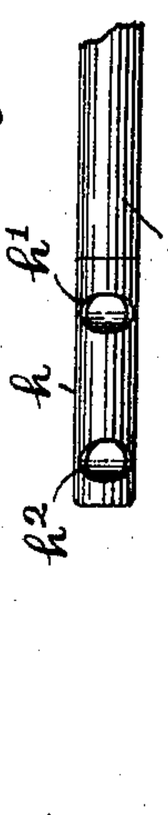

Fig. 4.

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UNITED STATES PATENT OFFICE.

JOSHUA ROBINSON, OF LAWRENCE, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO ARTHUR W. SAUNDERS AND CHARLES O'NEIL, OF LOWELL, MASSACHUSETTS.

SHUTTLE.

934,017. Specification of Letters Patent. Patented Sept. 14, 1909.

Application filed January 18, 1909. Serial No. 472,788.

To all whom it may concern:

Be it known that I, JOSHUA ROBINSON, of Lawrence, county of Essex, State of Massachusetts, have invented an Improvement in Shuttles, of which the following is a specification.

This invention relates to certain improvements in shuttles for woolen or worsted looms, and more particularly to that class of shuttles in which the spindle is provided with a bobbin-retaining head, and is adapted to be inserted in a socket which is pivoted in the shuttle, and to be locked therein by transversely extending locking pins, when the spindle is pressed down into the shuttle.

Prior to my invention it has been customary to use in all instances, so far as I am aware, in shuttles of this character, a spindle of solid iron, or steel, and when the notches in the opposite sides of the spindle, in which the locking pins engage to hold the spindle in place in the socket, become slightly worn, the spindle will no longer be held in its central position, but will be permitted to swing transversely, so that its head will strike against the sides or bottom of the shuttle, with the result that the filling will be frequently broken. In this form of shuttle, the bobbin is usually supported at its base end by a short nipple or projection on the socket which fits into the end of the bobbin, and at its tip end by a short enlargement on the spindle next its head. The wear on the bobbin is thus confined to two short portions thereof and the result is that its bore becomes worn or enlarged at these particular points. Moreover, the end of the projection of the socket and the shoulder at the end of the enlargement of the spindle strike against the ends of the bobbin, as it is placed in position, with similar effect, so that when worn, the bobbin will be loosely held upon the spindle. Shuttles of this character are objectionable on account of their excessive weight, which is due to the metal spindle in a large measure, for the lighter the shuttle is the less the strain upon the parts and the greater the speed at which the loom may be operated.

The objects of my invention are to provide a form of shuttle of the above character, in which the spindle is materially lighter than the metal spindle, previously employed, and which may be made of wood at a greatly reduced cost, as compared with the metal spindle, but which will further be capable of much longer wear than the ordinary metal spindle; further, to provide a form of socket and spindle which will support the bobbin throughout the entire length of its bore, so that appreciable enlargement of the bobbin bore, by use, is avoided; to provide a form of socket which will securely hold the spindle from transverse swinging movement, without increasing the weight of the shuttle, to provide an improved form of guiding means for the filling as it runs off over the end of the bobbin to the eye; and to improve devices of this character in other particulars, as will be hereinafter more fully described. I accomplish these objects by the means shown in the accompanying drawings, in which,—

Figure 1 is a top view of a shuttle provided with my invention. Fig. 2 is a longitudinal section thereof on the line 2—2 of Fig. 1. Fig. 3 is a longitudinal, central sectional view of a shuttle spindle embodying my invention. Fig. 4 is a detail plan view of the base end portion of the spindle.

As shown in the drawing, a shuttle body *a* of ordinary form is provided, said body having the usual eye *b* at one end. At the opposite end a socket *c* is pivotally mounted on a cross pin *d*, the usual holding spring *e* being provided for holding the socket in position. Said socket is similar in construction to the socket ordinarily employed in shuttles of this character, except that it is provided with a bobbin-supporting extension *c'*, which projects from the base flange c^2 thereof for approximately one-fourth the length of the bobbin *f*, and is adapted to fit, throughout its entire length, in the bore of said bobbin. The spindle *g* is of wood, and is provided with a head *g'* of approximately hemispherical form, preferably somewhat elongated to correspond to the path of the thread as it swings about the end of the bobbin, and runs therefrom through the eye, so that, when the thread is slack, it will be supported in nearly the position to which it is drawn when it is pulled. The main portion of the spindle is of the same diameter as that of the bore of the bobbin, and the socket-engaging portion g^2 thereof is of reduced diameter, so that it will fit closely into the bore of the socket *c*, and its extension *c'*, a shoulder g^3 being provided at the end of said portion g^2 against which the end of

the extension c' bears when the spindle is in place in the socket, so that the main portion of the spindle and the extension present a practically continuous surface.

A metal ferrule h is tightly fitted on the socket-engaging portion g^2, said ferrule extending from the extreme end of the spindle to a point nearly midway said socket-engaging portion, the portion of the spindle on which the ferrule is fitted being reduced in diameter to an extent corresponding to the thickness of the material, and the diameter of said ferrule being the same as that of the spindle portion g^2 between the ferrule and the shoulder g^3, so that the outer surface of the ferrule will be continuous with the surface of said portion g^2, the inner end of the ferrule bearing against a shoulder g^4 on the spindle and the outer end thereof being rounded or beveled, as shown. A pair of pin-receiving recesses or notches h', h^2 and h^3, h^4 are provided in each side of the ferrule at directly opposite points and adjacent the opposite ends thereof, said recesses extending through the ferrule and, to a slight extent, into the wood of the spindle at the middle thereof. Either of the pairs of recesses at opposite sides and ends of the ferrule are arranged in position to receive the fixed locking pins i and j which are mounted in the base end of the shuttle at opposite sides of the bore of the socket, in positions corresponding to those of corresponding pins in shuttles of this character. With this arrangement the spindle may be locked in either of two positions, in the shuttle, that is, in one position of the spindle, the pins i and j will engage in the recesses h^3 and h^2, respectively, and in the other position they will engage in the recesses h' and h^4 respectively, so that, with this arrangement, the wear of the spindle on the locking pins i and j, and upon the ferrule at the points of engagement by said pins will be distributed over twice as much surface as before, for, in practice, the spindle will be put into the shuttle in each position with practically equal frequency, and, as it is at these points that the wear is greatest, the extent which the spindle may be used is practically nearly doubled. For convenience in inserting the spindle, a mark may be made with paint, as indicated at X in Fig. 1, at diametrically opposite points on the head g', and in the central plane of the notches h' to h^4, and, as a spindle of this form may be inserted in either of two positions, it will be obvious that the time consumed on the average in inserting it will be materially lessened as compared with one which may be inserted in only one position.

The diameters of the socket portion g^2 of the spindle, and, therefore, of the bore of the socket, are materially greater than the corresponding diameters in the metal spindle socket, so that, although the middle portion of the bottom of the locking pin recesses in the spindle is of wood, yet the actual metal surface exposed for wear by the locking pins is practically as great as in the case of the metal spindle. This increase in diameter of the spindle is practically made possible by the use of wood for the main portion of the spindle, for the weight is materially lessened as compared with the metal spindle shuttle, while an appreciable increase in the diameter of the metal spindle shuttle would cause such an increase in weight as to be highly objectionable.

In addition to the provision of metal surfaces for wear, the metal ferrule greatly strengthens the spindle at points where the greatest strain is ordinarily placed thereon, and it also protects the end of the spindle from injury as it is inserted in the socket.

By providing the socket with the long extension which is fitted in the bore of the bobbin, and in which the spindle is fitted, the bobbin is rigidly held from transverse swinging both directly by the socket, and indirectly by the spindle which is fitted therein, said spindle being closely fitted in the bobbin from the end of the socket to the head of the spindle and being engaged by the socket throughout nearly one half its length. As the bobbin is supported throughout the length of its bore instead of at its ends only, there is never any appreciable wear on the bobbin and the extent to which the bobbin may be used is thereby greatly increased. These results are, moreover, accomplished not only without increase in weight of the shuttle, but with a material decrease in the weight thereof, as well as a decrease in expense of manufacture. The above results could not be practically accomplished with a metal spindle, as the weight would be so increased as to prevent practical use of the shuttle.

A hole a^3 may be formed in the bottom side of the shuttle body through which a tool may be inserted and the pin i be bent inward, if it is found necessary to raise the locked position of the bobbin.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In combination with a shuttle having a pivoted socket, and spindle-locking devices mounted therein, a wooden spindle adapted to be inserted in said socket and having a metal ferrule on the insertible end portion thereof provided with recesses, disposed to receive said locking devices, substantially as described.

2. In combination with a shuttle having a pivoted socket, a spindle-locking device mounted in the shuttle body at each side of the bore of said socket, a spindle having a pair of recesses at each side thereof, one

recess of each pair being disposed respectively to receive said locking devices when the socket is in locked position, to permit said spindle to be inserted and locked in either of two positions, substantially as described.

3. In a shuttle of the character described, a socket having a bobbin-supporting extension adapted to fit the bore of the bobbin for a substantial portion of the length thereof, said socket and its extension having a longitudinal bore, and a spindle having a reduced end portion adapted to fit in the socket and its extension throughout the length thereof and having its main portion of the same diameter as said extension and providing a shoulder to engage the end of said extension, substantially as described.

4. In combination with a shuttle having a socket, a wooden spindle adapted to be inserted in said socket, and having a metal ferrule mounted on the insertible end portion thereof, said spindle having a recess leading through said ferrule to the end portion thereof directly therebeneath, and a locking device disposed to enter said recess to lock the spindle in the socket, substantially as described.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JOSHUA ROBINSON.

Witnesses:
L. H. HARRIMAN,
H. B. DAVIS.