No. 647,073. Patented Apr. 10, 1900.

J. BUSER.

LOOM SHUTTLE.

(Application filed Apr. 6, 1898.)

(No Model.)

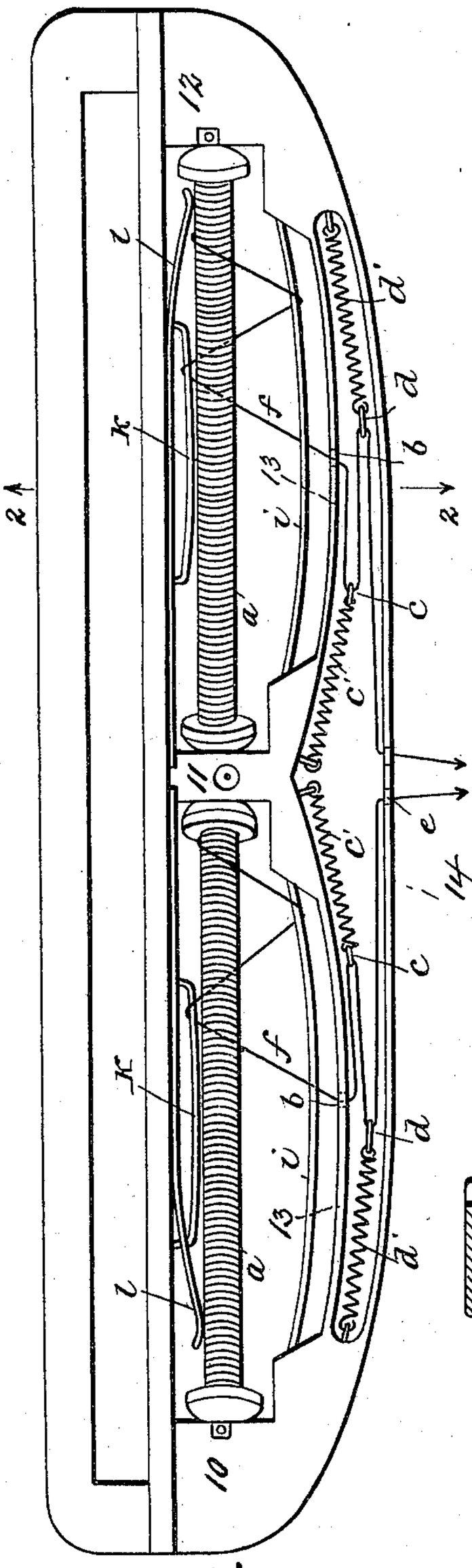

Fig. 1.

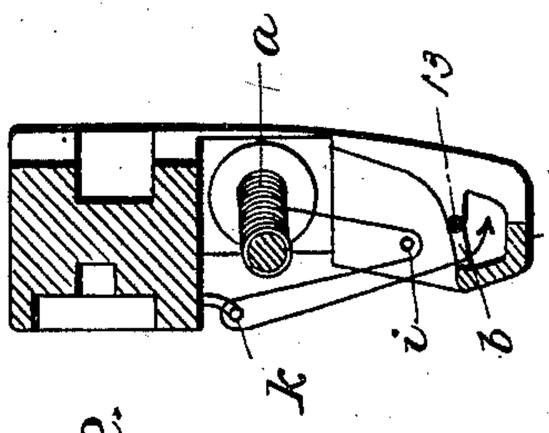

Fig. 2.

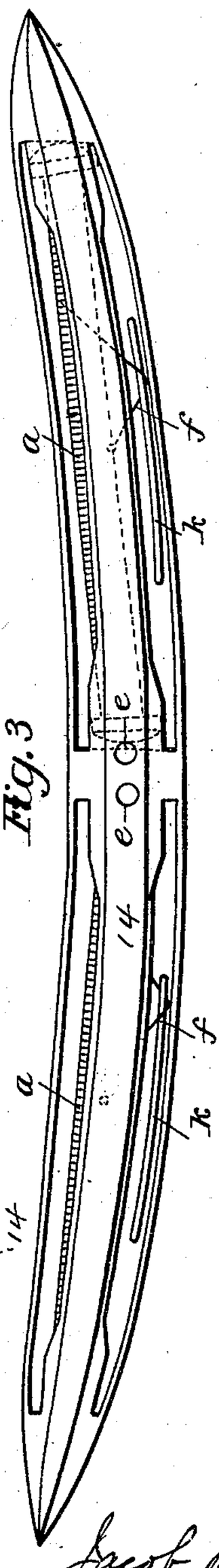

Fig. 3.

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JACOB BUSER, OF SESTO SAN GIOVANNI, ITALY, ASSIGNOR TO THE FIRM OF SIEGMUND STRAUSS, JR., OF FRANKFORT-ON-THE-MAIN, GERMANY, AND MILAN, ITALY.

LOOM-SHUTTLE.

SPECIFICATION forming part of Letters Patent No. 647,073, dated April 10, 1900.

Application filed April 6, 1898. Serial No. 676,649. (No model.)

To all whom it may concern:

Be it known that I, JACOB BUSER, a citizen of Switzerland, and a resident of Sesto San Giovanni, near Milan, Italy, have invented certain new and useful Improvements in Loom-Shuttles, of which the following is a specification.

This invention relates to shuttles for looms, especially for ribbon-looms, and has for its object to enable sufficient space to be provided in the shuttle for the insertion of long weft bobbins, cops, or pirns, (I will refer to it as the "bobbin,") while at the same time securing protection for the weft-thread, the arrangement being such that the thread is in all cases inclined very slightly as it is unwound or drawn off the bobbin. To this end the portion of weft-thread extending between the bobbin and the drawing-off eye is conducted by guides or diverters, (which allow of sidewise movement of the said thread,) so that it is diverted at more than one point and runs alternately forward and rearward. In most shuttles as hitherto constructed the weft-thread passes from the bobbin through a glass eye attached to the shuttle-body and then through a set of small glass rings suspended from tension-springs and then leaves the shuttle through an outlet or delivering eye. This arrangement requires the guiding-eye to be placed very close to the bobbin, seeing that the height of the whole shuttle structure to accommodate the narrow shed of ribbon-looms has to be very limited, the consequence being that the force with which the weft-thread as it unwinds rotates the bobbin must vary greatly. In the center, where the thread runs at right angles to the axis of the shuttle, the pull need only be very slight, but it rapidly increases toward both ends, mainly because the unwinding angle becomes more and more acute and partly also by reason of the fact that as the thread is drawn off at an angle to the axial line lateral pressure is exercised upon the bobbin, so that when the unwinding angle is acute the friction is very considerable. In order to reduce the tension of the thread to a minimum, it is necessary, therefore, that the unwinding angle should continue as near to ninety degrees as possible, and this, where the thread passes direct from the bobbin to the guiding-eye, is only practicable when the bobbin is very short, and consequently holds but little thread. Attempts have also been made by a special construction of the front wall of the shuttle to pass the thread around such front wall, with the theoretical object that the thread may always unwind the portion of the thread between the bobbin and guiding-eye to be bent once by the slotted front shuttle-wall, which is constructed in parabolic shape and affords the thread a point of support, the guiding-eye being shifted rearward into the focus of the parabola, while the axis of the bobbin intersects the axis of the parabola at right angles. In this case also the bobbin cannot be as long as is desirable, as the bobbin has to be situated within the parabola, and the thread, owing to the friction to which it is subjected, is in reality drawn off somewhat obliquely. All the practical effect that this mode of construction produces is the doubling of the free length of thread between the bobbin and the drawing-off eye.

In order to accommodate a greater length of thread between the drawing-off eye and the bobbin in the limited space available within the shuttle, the thread, in accordance with this invention, is diverted more than once. Thus in the form of shuttle shown by way of example in the accompanying drawings, the shuttle is supposed to comprise two bobbins and the thread is bent or diverted in two places, whereby nearly treble the length of thread is secured.

In the drawings, Figure 1 is a plan view of the shuttle; Fig. 2, a section on the line 2 2 of Fig. 1; Fig. 3, a side view.

The shuttle-body is provided with suitable bearings 10, 11, and 12 for the bobbins, the bearing 11 being in the middle and supporting adjacent ends of the two bobbins *a*. The shuttle-body is also provided with spaced flanges or ribs 13 and 14, in the latter of which the drawing-off eyes *e* are formed, and in the rib 13 eyes *b* are formed. In the space between the ribs 13 and 14 springs *d' c'* are supported, the springs *d'* each having a ring *d* at its free end and the springs *c'* each having a

ring *c* at its free end. On opposite sides of the bobbins *a a* thread-deflecting wires *i* and *k* are secured to the body in any suitable manner, each being slightly curved, and the wires *i*, which are adjacent to the ribs 13, being about twice as long as the wires *k*. These wires *i* and *k* in each pair are so arranged that their longitudinal centers are in substantially the same plane. Springs *l* are secured at one end to the shuttle-body and engage with their free ends the thread on the bobbins. These springs are to prevent the bobbins from turning too freely. The thread *f* passes from the bobbin around the wire *i*, thence around the wire *k* and through the eye *b* in the rib 13, thence through the rings *c* and *d* of the springs *c'* and *d'* to the delivery-eye *e*.

As seen in Fig. 1, the thread is unwinding at the end of the bobbin, and as the unwinding progresses the angle of inclination of the thread portions between the bobbin and wire *i*, wires *i* and *k*, and wire *k* and eye *b* will gradually decrease until the thread is unwinding from the bobbin midway its length, when said portions will be in substantially the same plane, and from this point their angle of inclination will gradually increase until the unwinding-point is at the other end of the bobbin. As the angles of the inclination of the thread change, there will also be slight changes in the degree of friction on the wires *k* and *i*, and the opposing tensions of the springs *d'* and *c'* will tend to compensate any such changes, so that the thread will pass out from the delivery-eye under substantially-uniform tension. By this arrangement of deflecting-wires and compensating springs much longer bobbins can be employed than is the case where the thread passes direct from the bobbin to the delivery-eye, and consequently the loom may be kept in uninterrupted operation for a much longer period of time.

Having described the invention, I claim—

A shuttle provided with ribs 13 and 14, the former having an eye *b* and the latter a drawing-off eye *e*, deflecting-wires *i*, *k*, on opposite sides of the bobbin around which the thread passes from the bobbin to the eye *b*, and springs *c' d'* having rings *c* and *d* through which the thread passes from the eye *b* to the eye *e*, substantially as set forth.

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

JACOB BUSER.

Witnesses:

FRITZ TRICE,

PIETRO JACHETTRO.