# M. SAFFORD.

## Loom-Shuttle.

No. 160,843. Patented March 16, 1875.

*Fig. 1.*

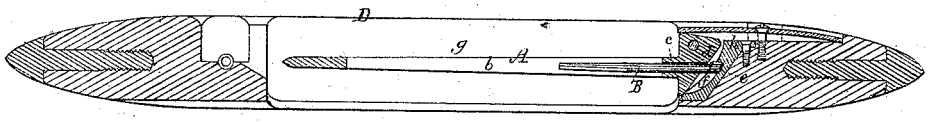


*Fig. 2.*

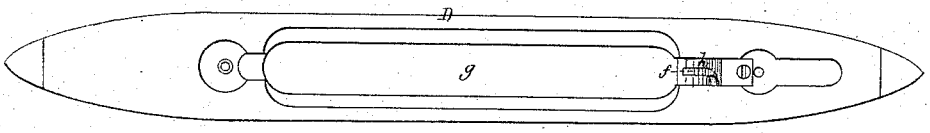


*Fig. 3.*

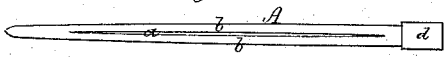


*Fig. 4.*

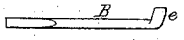


*Fig. 5.*

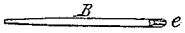


*Fig. 6.*


Witnesses
S. N. Piper.
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# UNITED STATES PATENT OFFICE.

MARK SAFFORD, OF MELROSE, ASSIGNOR TO HIMSELF AND PERCIVAL D. RICHARDS, OF WEST MEDFORD, MASSACHUSETTS.

## IMPROVEMENT IN LOOM-SHUTTLES.

Specification forming part of Letters Patent No. **160,843**, dated March 16, 1875; application filed November 17, 1874.

*To all whom it may concern:*

Be it known that I, MARK SAFFORD, of Melrose, of the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Shuttles for Looms; and do hereby declare the same to be fully described in the following specification and represented in the accompanying drawings, of which—

Figure 1 is a longitudinal section of a shuttle provided with my invention. Fig. 2 is a top view of the body of the shuttle without the spindle and its operative spring. Fig. 3 is a top view of the spindle. Fig. 4 is a side view, and Fig. 5 a top view, of the spindle-expander. Fig. 6 is a front view of the grooved cam for operating the expander.

My invention is for the purpose of expanding the spindle while it may be in the act of being turned down into the cop-chamber of the shuttle, such expansion of it being to hold the cop securely, and prevent it from working loose upon so as to be thrown off the spindle, while the shuttle may be at work in a loom.

The spindle A is split lengthwise and bowed from near its point to its head, as shown at *a b b* in Fig. 3, and it is provided with a bore, *c*, leading from the split through the head *d*. This bore is to receive the rotary expander B, which is wedge-shaped where it goes between the bows *b b*, and at its rear end it is provided with a short arm or head, *e*, projecting from it, and shaped as shown. The said head or part *e* is to operate with a cam-groove, *f*, arranged, as shown, in the back stop or abutment, against which the spindle-head brings up, when the spindle is down in its lowest position within the cop-chamber *g* of the shuttle-body D. This cam-groove I prefer to make in a plate or block, *h*, of metal arranged in the shuttle-body, and duly fastened thereto, as the block, besides being a cam for operating the expander, constitutes a very enduring back-stop for it.

While the spindle may be in the act of being turned down, the expander will be partially revolved in the spindle, and in so doing will expand the spindle or move its bows *b b* apart within the cop, so as to securely fasten the said cop to the spindle. On turning up the spindle with the cop, the expander will be turned backward, so as to allow the inherent elasticity of the bows *b b* to cause them to contract or approach each other in a manner to loosen their hold upon the cop.

I claim—

In the loom-shuttle, the combination of the split spindle A, with the rotary expander B, and piece *h* provided with the cam-groove *f*, all constructed and arranged to operate together, as and for the purpose specified.

MARK SAFFORD.

Witnesses:

R. H. EDDY,

J. R. SNOW.