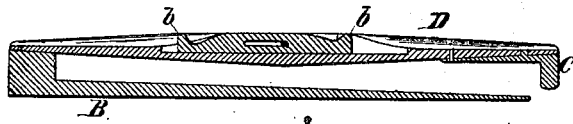


E. H. GRAHAM.  
Shuttle-Motion.

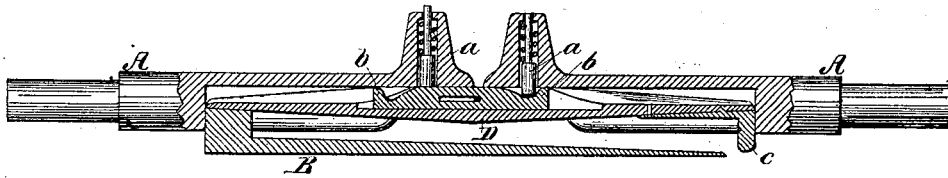
No. 196,795.

Patented Nov. 6, 1877.

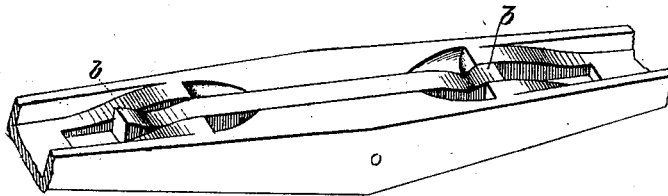
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



*Witnesses:*

*John H. Small*  
*Ira A. Hill*

*Inventor:*

*Edmund H. Graham*

# UNITED STATES PATENT OFFICE.

EDMUND H. GRAHAM, OF BIDDEFORD, MAINE, ASSIGNOR OF THREE-EIGHTHS  
OF HIS RIGHT TO REUBEN W. RANDALL, OF SAME PLACE.

## IMPROVEMENT IN SHUTTLE-MOTIONS.

Specification forming part of Letters Patent No. **196,795**, dated November 6, 1877; application filed  
October 23, 1876.

*To all whom it may concern:*

Be it known that I, EDMUND H. GRAHAM, of Biddeford, in the county of York and State of Maine, have invented a new and Improved Shuttle, of which the following is a specification:

My invention relates to that class of shuttles containing a locking and unlocking device, by means of which the shuttle is transmitted through the warp upon arms, being unlocked from one arm and simultaneously locked upon the other.

The drawings herewith filed form a part of this specification, and, with the following description, are sufficient to enable any one skilled in the art to which this invention appertains to construct and use my improved shuttle and arms.

Figure 1 represents a sectional side view of the shuttle disengaged; Fig. 2, the shuttle engaged; Fig. 3, a perspective view of the shuttle, showing the locking device.

The shuttle-arms are alike constructed to receive one-half of the shuttle in a channeled groove with overlapping edges. Near the extremity of the arm is a projecting pin, backed by a spiral spring. The body of the shuttle is wedge-shaped from the middle toward each extremity, and contains the locking device.

The principal device, in addition to the peculiar formation of the shuttle, by means of which the locking and unlocking are accomplished, is a slide lying lengthwise in the shuttle, secured by a pin passing through a slot, as shown in the drawing, upon which it slides back and forth. This slide is operated by the projecting pin in the arm.

As the shuttle is received upon the arm, the projecting pin enters a groove in the shuttle leading to a socket in the body thereof, traverses it until it strikes the end of the slide, and pushes it forward. Simultaneously with the pin's reaching a portion of the groove that is provided with an inclined plane, it is depressed into its socket until it clears the projection of the slide, and then snaps into a socket in the body of the shuttle, and rests upon a depression in the slide made to correspond in its location with the socket. In the unlocking of the shuttle, the formation of this portion of the

slide, corresponding with the socket, plays an important part.

The shuttle being locked upon one arm, as it is received upon the other the pin in that arm presses against the disengaged end of the slide, and pushes it forward. Now, in order to disengage the pin in the other arm, it is necessary to depress it into its socket. This is accomplished as follows: When engaged, the pin rests in a socket in the body of the shuttle upon a depression in the slide. The surface of this depression rises in a gradual inclined plane toward the middle of the shuttle, and as the slide moves the pin is depressed into its socket, and so remains until, the arms separating, it is disengaged from the slide and shuttle, and the carrying of the woof through the warp is accomplished.

The approach to the socket in the shuttle is described as follows: The pin in the shuttle-arm enters a groove in the shuttle, which extends up an inclined plane to a socket near the middle of the shuttle. This groove is broader than the slide, and when the pin in the shuttle-arm enters the groove and pushes forward the slide, the pin, being depressed, rides over the end of the slide and up the inclined plane, resting against the bottom of the groove which extends each side of the slide, and by this movement, as above described, the depression in the slide is made to conform in its position to the depression or socket in the shuttle, and the locking effected.

Another peculiarity of the shuttle is, that the spindle is fixed and immovable, the cap being placed thereon by moving the nose of the shuttle, which swings upon a pivot, and is firmly held in place by a pin fitted and sprung into a socket near its extremity.

Fig. 1 shows the shuttle disengaged; Fig. 2, the shuttle engaged with a longitudinal section of the arms containing the shuttle.

Like figures indicate same parts.

A A are the shuttle-arms. *a a* are the pins in the arms, backed by spiral springs. *b b* is the slide in the shuttle, showing the form thereof, and the pins *a a*, one engaged and the other depressed, ready to be disengaged from the shuttle. B is the spindle; C, the nose of the spindle; D, the body of the shuttle.

I claim as my invention—

1. A shuttle-body provided with the slide *b b*, inclined planes, and recesses, constructed as described, and for the purpose specified.

2. The arms constructed with channels having overlapping edges, and provided with pins or bolts having spiral springs, substantially as described.

3. The combination of the arms *A A* and the pins *a a* with the shuttle, constructed as described, for the purpose of carrying the woof through the warp upon a loom weaving textile fabrics.

4. A shuttle provided with a pivoted nose, *C*, constructed as described, whereby the cap may be placed upon the immovable spindle *B*, as and for the purpose specified.

In testimony that I claim the foregoing I have hereunto set my hand this 16th day of October, A. D. 1876.

EDMUND H. GRAHAM.

Witnesses:

JOHN H. SMALL,  
IRA A. PHILBRICK.