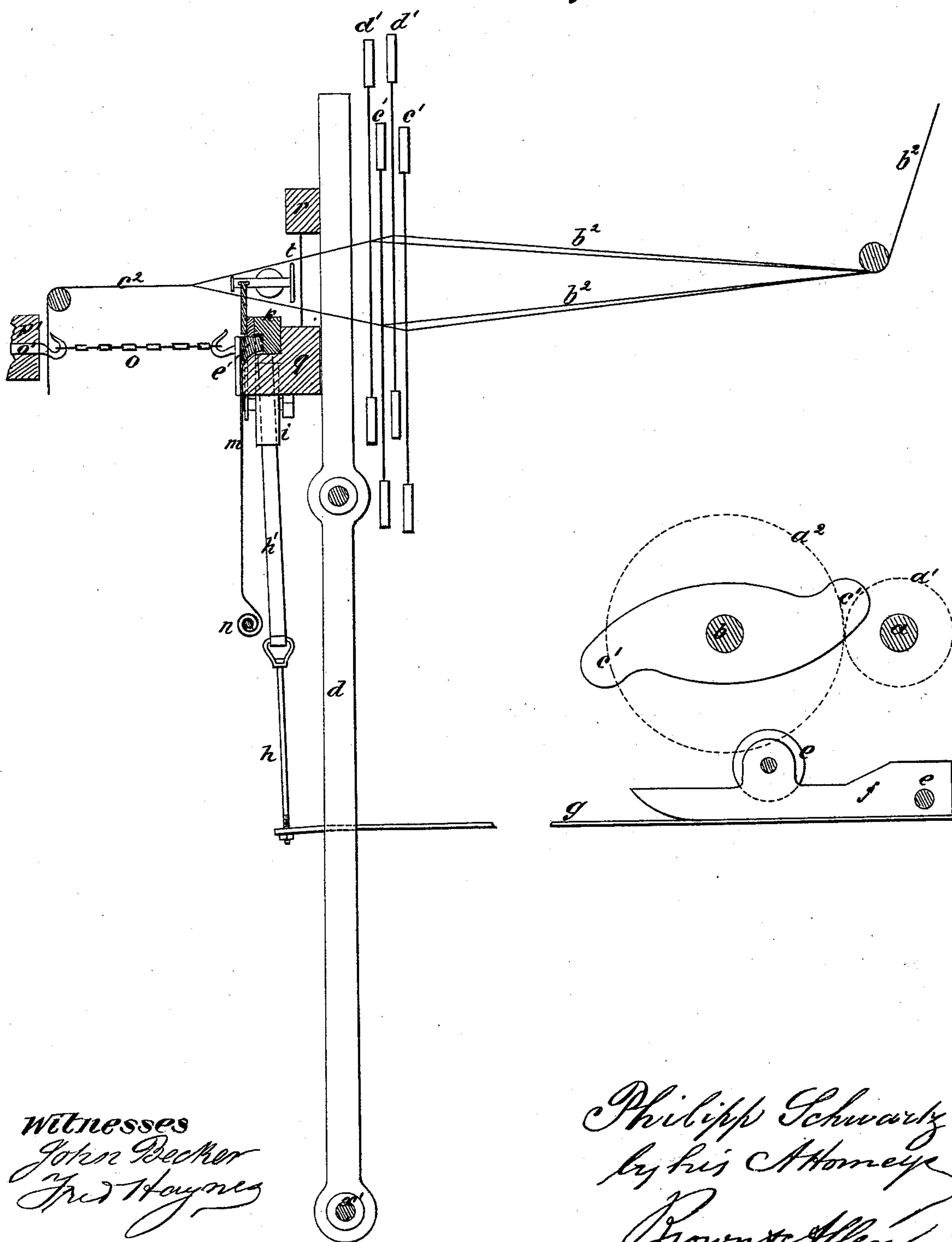


P. SCHWARTZ.  
RIBBON-LOOM.

No. 170,904.

Patented Dec. 7, 1875.

Fig. 1.



Witnesses  
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Fred Haynes

Philipp Schwartz  
by his Attorney  
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Fig. 2.

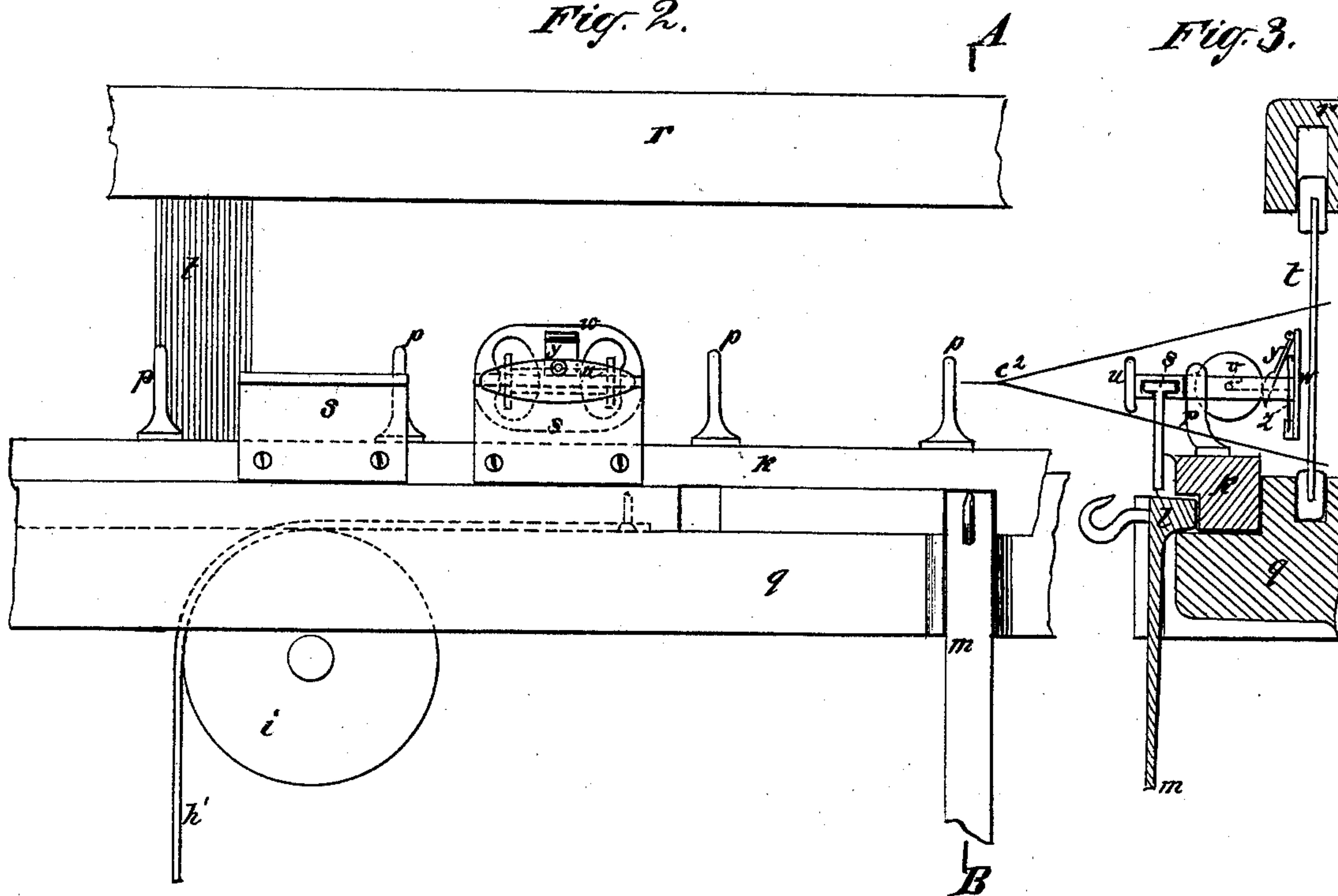


Fig. 3.

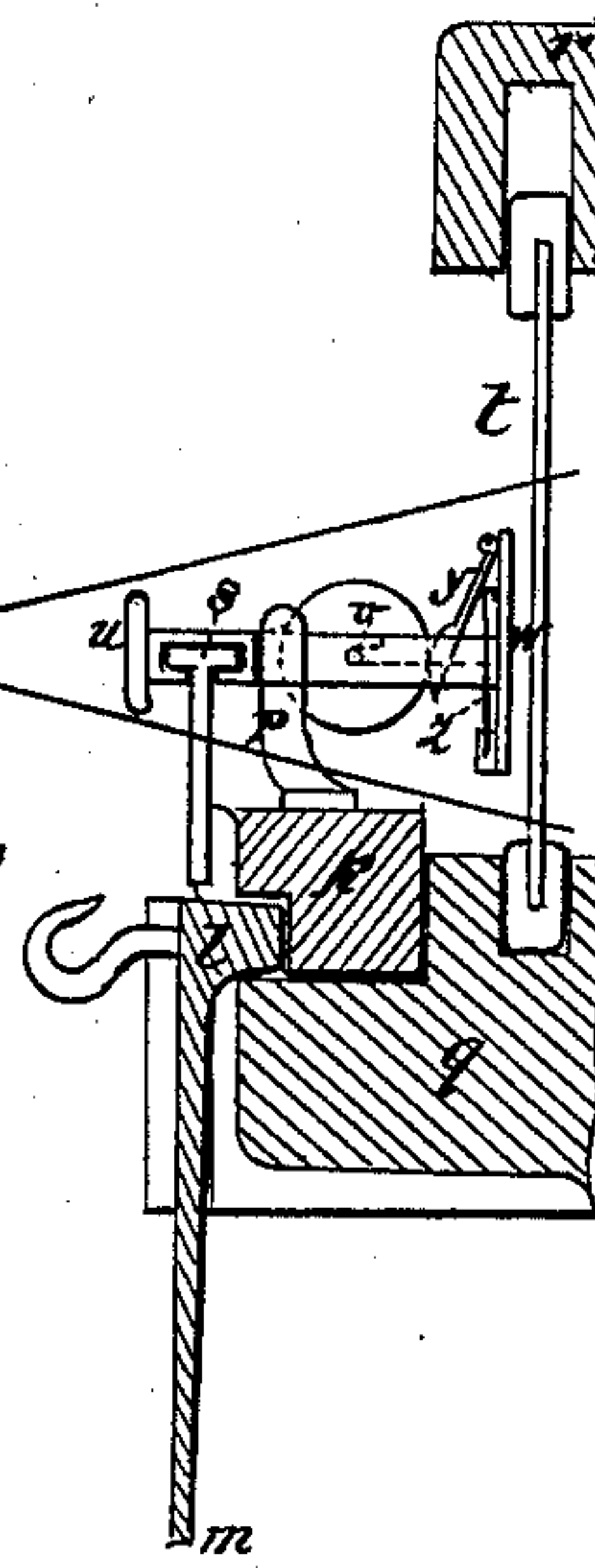


Fig. 4.

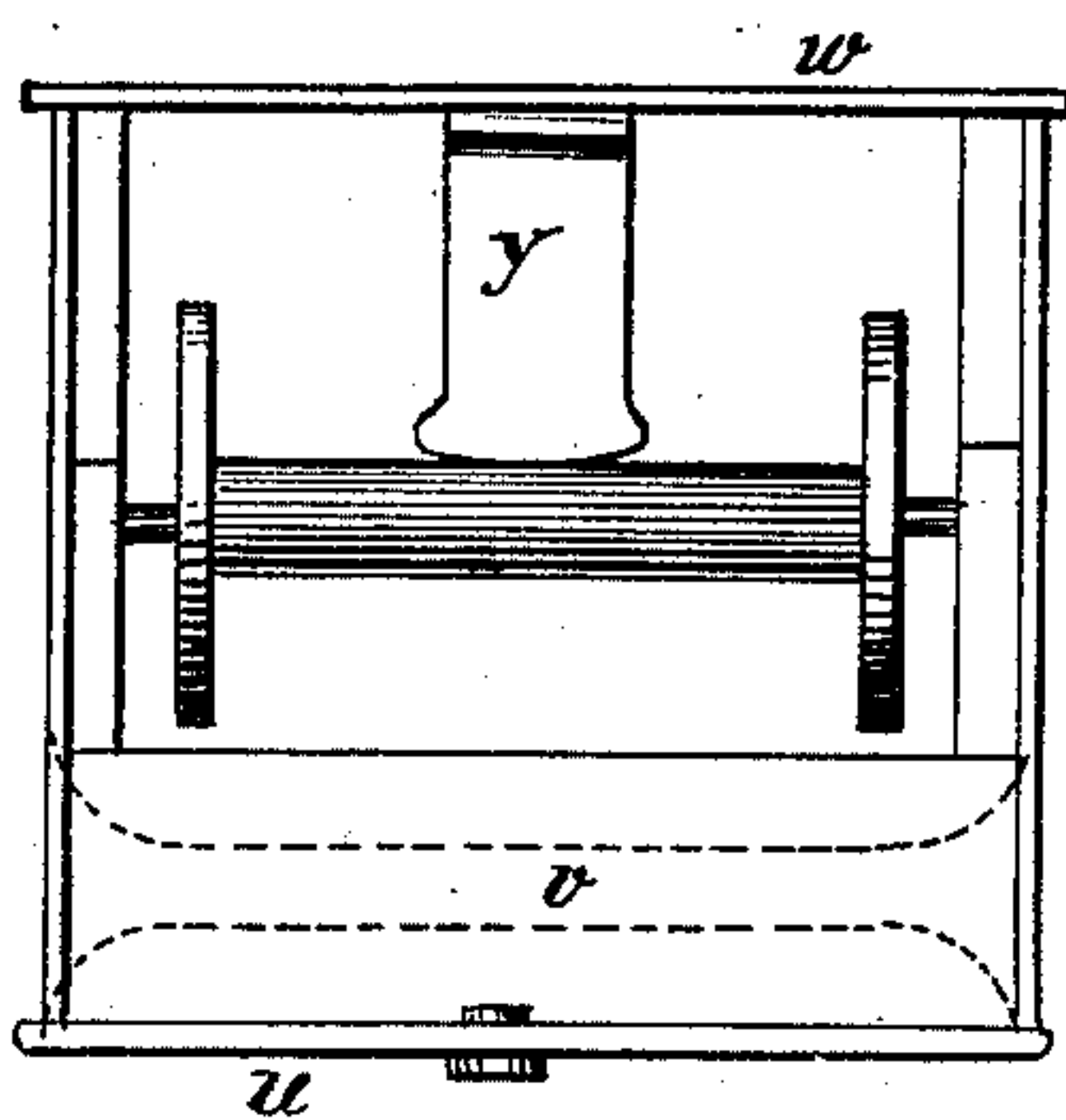


Fig. 5.

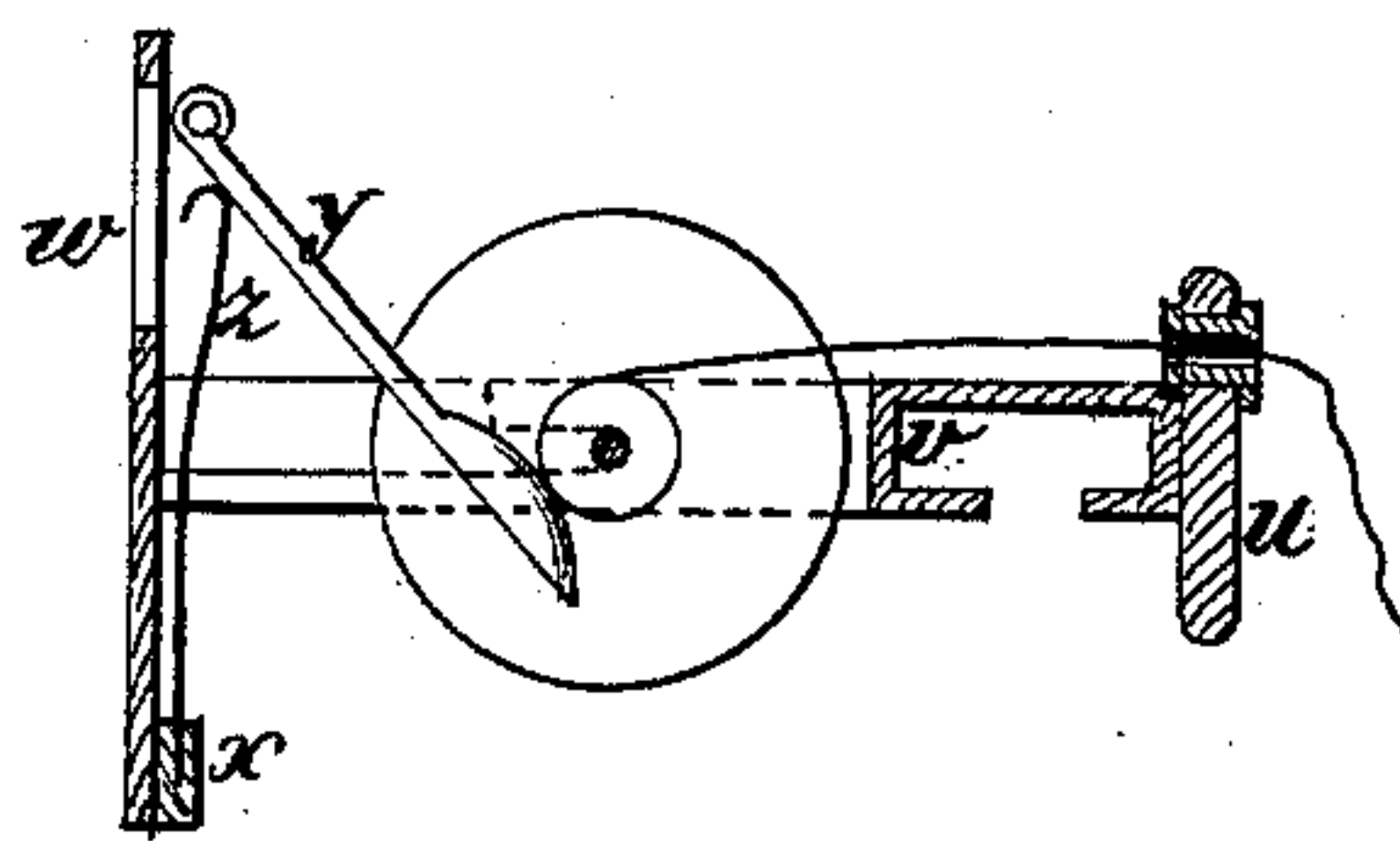
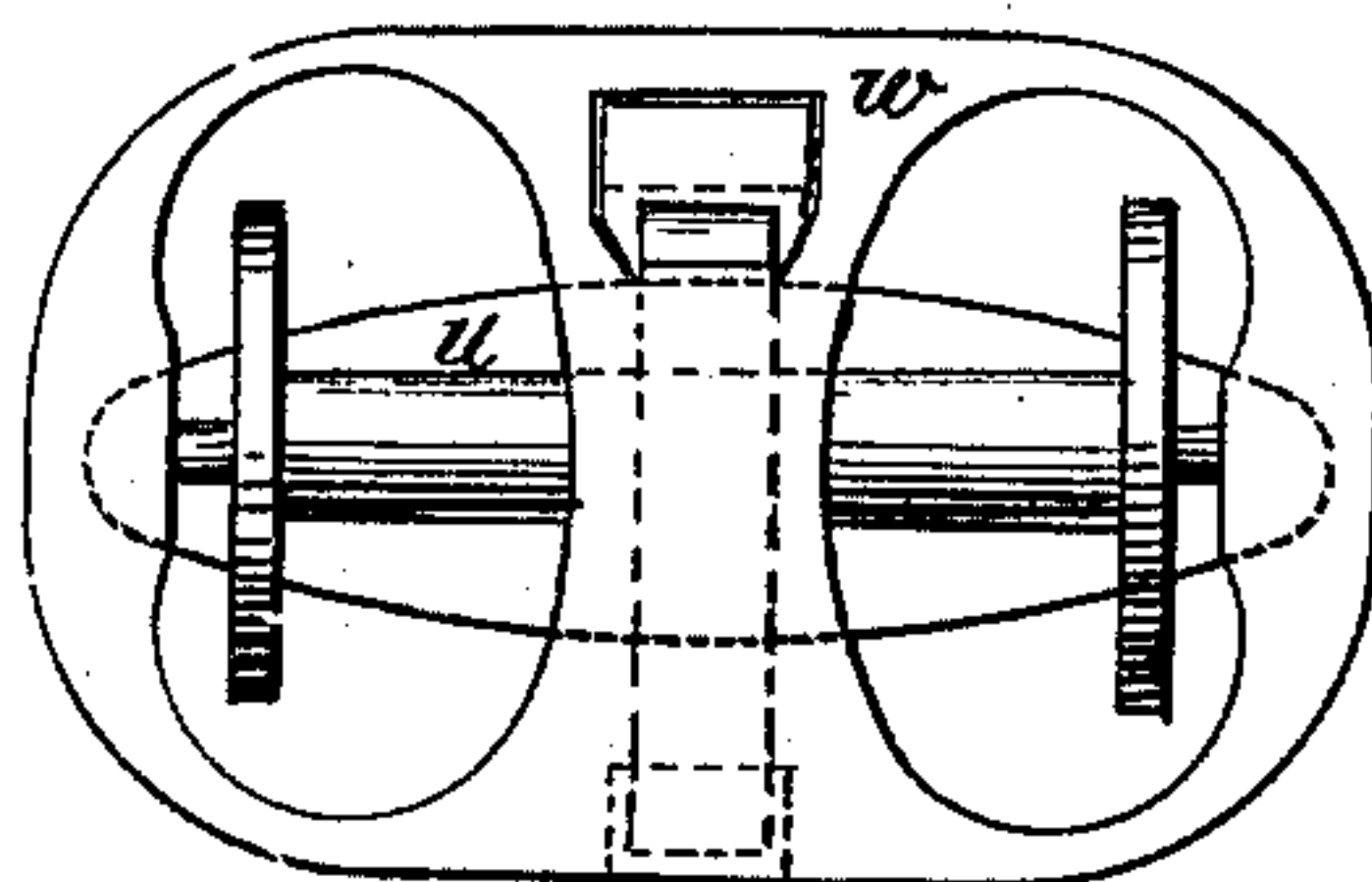


Fig. 6.



Witnesses  
John Becker  
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# UNITED STATES PATENT OFFICE.

PHILIPP SCHWARTZ, OF GROSS AMMENSLEBEN, PRUSSIA.

## IMPROVEMENT IN RIBBON-LOOMS.

Specification forming part of Letters Patent No. 170,904, dated December 7, 1875; application filed March 17, 1875.

*To all whom it may concern:*

Be it known that I, PHILIPP SCHWARTZ, of Gross Ammensleben, near Magdeburg, in the Kingdom of Prussia, have invented certain Improvements in Looms; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing making part of this specification.

My invention relates to certain improvements in looms for weaving tape and other narrow fabrics, whereby the operation of the loom is steadied and accelerated, and its capacity is relatively increased.

The invention consists in a novel construction of the shuttle, and arrangement and location of the supporting devices or raceways, whereby the shuttle is enabled to operate nearer the weaving-point in the shed, and to carry a larger bobbin and a greater supply of weft-thread, and thereby allow the loom to run longer without replenishing the shuttle than in looms of ordinary construction. The invention consists further in a novel construction, arrangement, and operation of means for driving the shuttle, whereby it is operated in a steady and uniform manner without being affected by variations in the speed of the loom.

In the accompanying drawing, Figure 1 is a side view, partly in section, of a portion of a loom with my invention applied thereto. Fig. 2 is a front view, showing parts of the batten, the driving or picker bar, the shuttle-carrier, the shuttle-driver, the shuttle, and the reed. Fig. 3 is a transverse section, taken in the line A B of Fig. 2. Fig. 4 is a top view of the shuttle. Fig. 5 is a transverse section of the same. Fig. 6 is a rear view of the shuttle.

In Fig. 1, *a* represents the main shaft of a tape-loom, which receives motion from the primitive power in any suitable manner, and communicates motion to the batten by any of the well-known means. We prefer to attach the batten to a swinging frame, *d*, having its fulcrum *x'* in the lower portion of the frame; but it may be attached to such swinging frames as have their fulcra in the upper part of the loom. Motion is communicated from the shaft

*a* to the shaft *b* by means of gearing *a<sup>1</sup> a<sup>2</sup>*, and from the shaft *b* the heddles receive motion in the usual manner. The shaft *b* carries a double cam, *c<sup>1</sup> c<sup>1</sup>*, the ends of which act upon a roll, *e*, journaled in a shoe, *f*, having its rear end pivoted at *e'*. A flat spring, *g*, has one end attached to the shoe *f*, and its other end extends forward, and has attached to it the screw-threaded lower end of a rod, *h*, which passes through the spring, and is provided with a nut for regulating it. Two sets of the mechanism, consisting of the cam, roller, shoe, spring, and rod are used—one at each end of the loom, as hereinafter described. The warp is represented by *b<sup>2</sup>*, and the completed tape by *c<sup>2</sup>*, the warp being shown as opened by the action of the heddles *c<sup>1</sup> d'*. Attached to the swinging frame *d* are the parts *q* and *r* of the batten, and between these parts the reed *t* is located.

The remaining parts of the machine will now be more fully understood by referring to Figs. 2, 3, 4, 5, and 6.

The shuttle consists of two elliptical metallic plates—a small one, *u*, and a larger one, *w*—connected by the shuttle-frame *v*. The small one, *u*, is provided with an eye of steel, porcelain, glass, or other material, through which the weft-thread from the bobbin passes. The portion of the shuttle-frame immediately in rear of the plate *u* is formed with a groove corresponding in form with the T-shaped upper edge of the shuttle-carriers *s*, the ends of these grooves being rounded, to facilitate the easy passage of the shuttle from one carrier to another. In the shuttle-frame are slots, open at the rear, into which the ends of the pin which carries the bobbin are easily inserted and removed. The bobbin is held in place by the pressure of the brake *y*. In the plate *w* is a recess, *x*, in whom is inserted one end of a spring, *z*, the other end of which bears against the spoon-shaped brake *y*, and presses it against the yarn on the bobbin, so as to produce the necessary strain during the running off of the thread. The brake is easily pressed back to remove the empty bobbin and insert a full one.

The shuttle is placed in position by inserting the T-shaped upper edge or head of the



shuttle-carrier *s*, into the correspondingly-shaped groove in the shuttle-frame *v*, so as to allow the shuttle to slide freely on the carrier, and from one carrier to another, as before described. The shuttle-carrier *s* is attached to the extreme front edge of the lower portion *q* of the batten, as shown in Figs. 1 and 3.

By constructing the shuttle substantially as herein described, and attaching it by its foremost and smallest edge or side to the shuttle-carrier, arranged as shown, with the bobbin in the rear portion of the shuttle, and occupying the widest part of the shed, the shuttle is enabled to operate nearer the weaving-point, to carry a larger bobbin and greater supply of weft-thread, and thereby allow the loom to run longer without replenishing the shuttle than by the ordinary construction and arrangement.

For imparting the reciprocating motion to the shuttle, the following-described means are employed: In the batten *q* is a groove, in which rests the driving or picker bar *k*, the groove being long enough to allow a considerable longitudinal motion of the bar. To the ends of this bar are attached straps *h'*, which pass over pulleys *i*, journaled in bearings in the batten. Each of the straps *h'* has its lower end attached to one of the rods *h*, hereinbefore described, so that when one of the springs *g* is depressed, the picker-bar *k* is moved in one direction, and when the other spring is depressed the picker-bar is moved in the opposite direction.

The picker-bar *k* is provided with pickers *p*, arranged at suitable points with relation to the shuttles, which pickers operate upon the shuttles as the picker-bar is moved to and fro, to give the required reciprocating motion to the same, and move them from one of the shuttle-carriers to another.

A flat spring, *m*, has its lower end attached to a fixed point, *n*, on, or connected with, the batten *q*. On the upper end of the spring is a tapering head, *l*, which projects through an opening in the batten *q*, for engagement with two recesses in the picker-bar *k*. On the rear side of the upper end of the spring *m* is a hook, which is connected by a chain, *o*, to a screw-bolt attached to the front beam of the loom. The distance between the spring *m* and the front beam is increased or diminished by loosening or tightening a nut on the screw-bolt, whereby the motion of the head *l*, and the movement of the picker-bar *k*, may be nicely adjusted.

The spring *m*, with its head *l*, thus serves to hold the picker-bar stationary, and the chain *o* serves to withdraw the head when the batten is moved backward, and to allow the picker-bar to move longitudinally to drive the shuttles.

The operation of the springs *g* with relation to the shuttles is as follows: Said springs, arranged on either side of the loom, are, at cer-

tain times, alternately strained by the pressure of the cam *c'* on the roll *e*. When one spring is strained the other remains at rest, and the first spring moves the picker-bar in one direction. When the second spring is strained the first one remains at rest, and the second spring moves the bar in the opposite direction. As the picker-bar *k* moves in one direction or the other the picker *p* drives the shuttle from one shuttle-carrier, *s*, through the opening in the warp, to the next shuttle-carrier, so as to lay the weft-thread in said opening; and after the movement of the batten to beat in the weft the motion of the picker-bar is reversed to lay in the next weft-thread, and so on until the operation is completed, or the thread on the shuttle-bobbin becomes exhausted, and it is necessary to stop the loom to replace the empty bobbin by a full one.

The working parts of the loom are so arranged with relation to each other that the operation is as follows: When the batten advances to beat in the weft-thread, both of the springs *g* are relaxed, the chain *o* is slack, and the spring-head *l* is pressed into one of the recesses in the picker-bar. When the batten returns a new opening of the warp takes place, and one of the springs *g* is gradually strained and the chain *o* gradually tightened. When the batten has passed through about three-fourths of its backward motion the spring *g* has arrived at its utmost depression; but the head *l* still remains engaged with the picker-bar, and prevents it from moving. When the backward motion of the batten is nearly completed the chain *o* is tightened, so as to suddenly withdraw the head *l* and allow the picker-bar to be moved longitudinally by means of the strap *h'*, connected by the rod *h* to the spring *g*, as before described. When the picker-bar has completed its longitudinal movement and driven the shuttle through the warp, and the batten advances to beat in the weft, the head *l* enters the second recess in the picker-bar, and arrests it, and holds it in position until the spring *g* is sufficiently strained and sufficient power is accumulated thereby to drive the picker-bar in the opposite direction, when the stop *l* is withdrawn, as before described, and the shuttle again driven by the pickers.

The distance from each other of the two openings in the picker-bar determines the length of travel of said picker-bar.

There may be two of the springs *m* and heads *l*, and four of the recesses in the picker-bar for engagement with the same; and, instead of being arranged vertically, the spring *m* may be arranged in a horizontal position, with the fixed point *n* directly on the batten *q*.

The length of the chain *o* is regulated by means of the screw *q'*, so that the motion of the shuttle through the opening in the warp will only take place when said warp is properly opened.

The motion imparted to the picker-bar *k* by



the spring *g* is regulated by means of the rod *h*, as before described, according to the weight of the shuttles, the amount of slack in the strap *h'*, and the force or stiffness of the spring *g*.

By the means described the shuttle is operated at a steady and uniform speed without being affected by variations in the speed of the loom.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a shuttle, constructed substantially as herein described, and a shuttle-race, arranged to support or carry the shuttle wholly in front of its bobbin, whereby the shuttle is enabled to operate in the narrowest portion of the shed, with the bobbin occupying the rear of the shuttle and widest

portion of the shed, substantially as and for the purpose set forth.

2. The combination of the shafts *a* and *b*, double cam *c' c'*, shoe *f*, flat spring attached to the shoe, the vertical rod *h*, attached to the flat spring, and provided with strap *h'*, attached to the ends of the picker-bar, the spring *m*, having a head, *l*, for engaging with the picker-bar to hold it stationary, and a chain, *o*, connected with the front beam *p'*, for releasing the head from the picker-bar, all substantially as shown and described.

This specification signed by me this 19th day of November, 1874.

PHILIPP SCHWARTZ.

Witnesses:

HERMANN KREISMANN,  
CARL KOLLBERG.