

W. HILTON.  
Loom for Weaving Straw-Matting.  
No. 218,969. Patented Aug. 26, 1879.

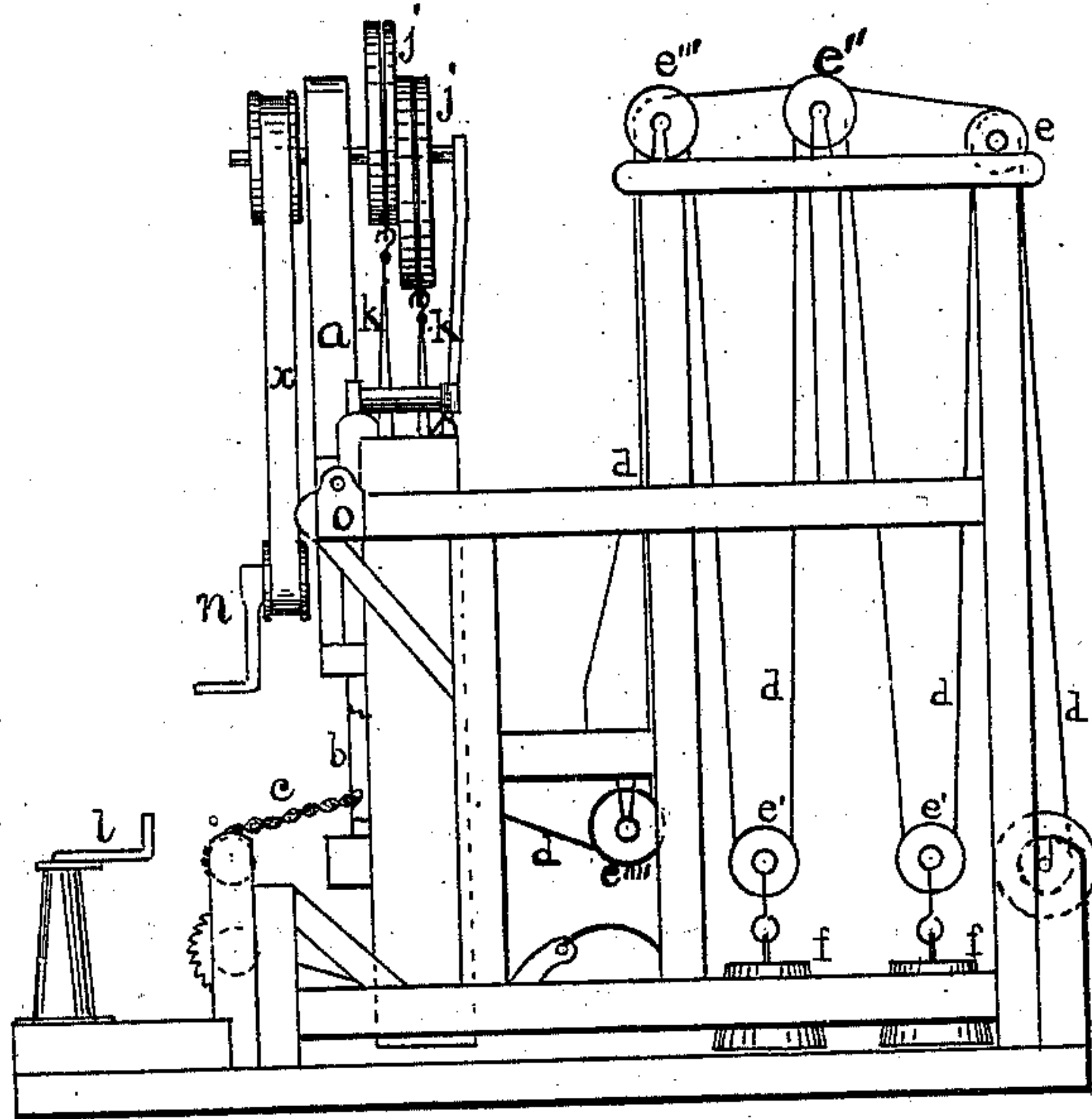


Fig. 1.

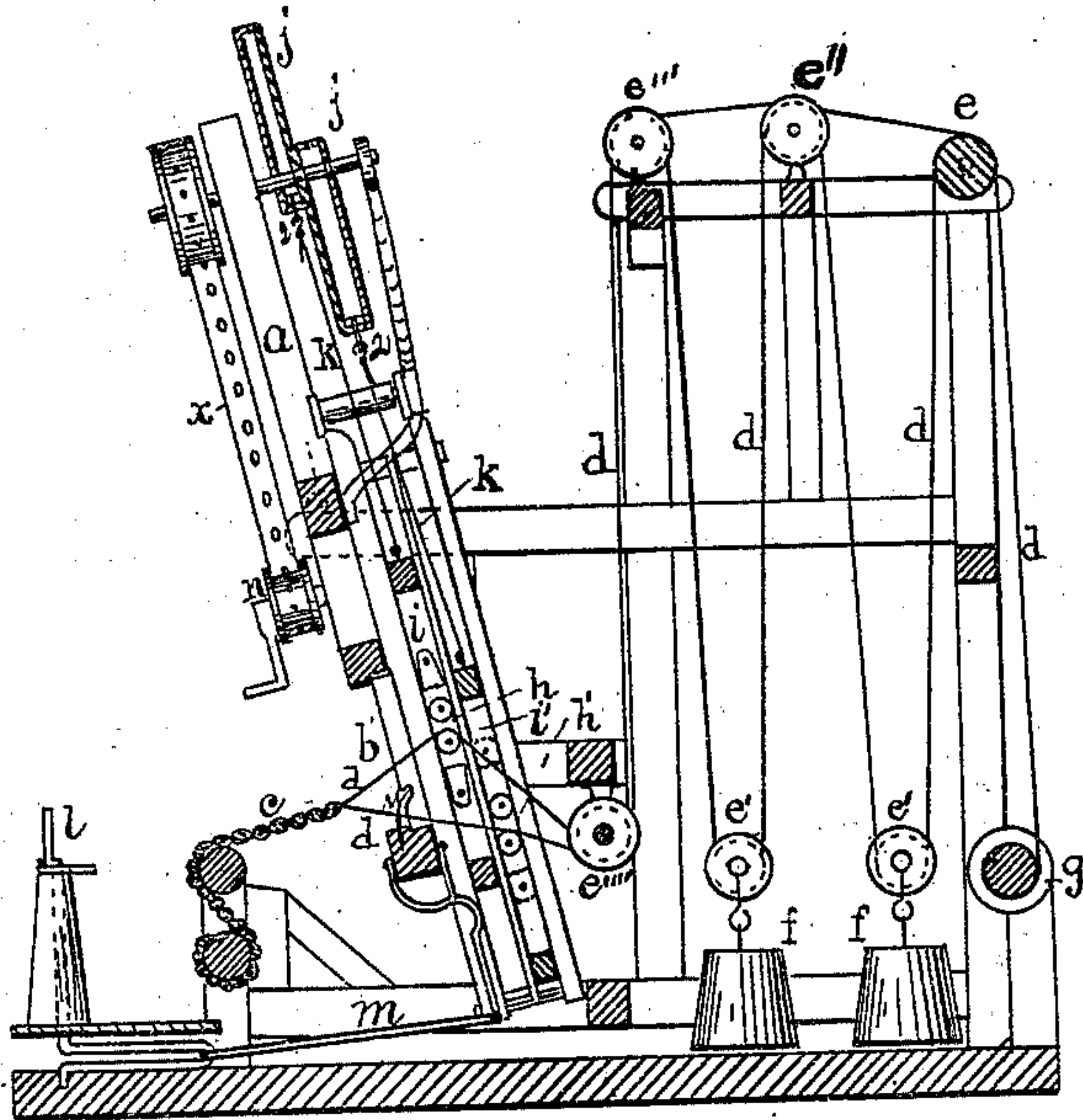


Fig. 2.

WITNESSES

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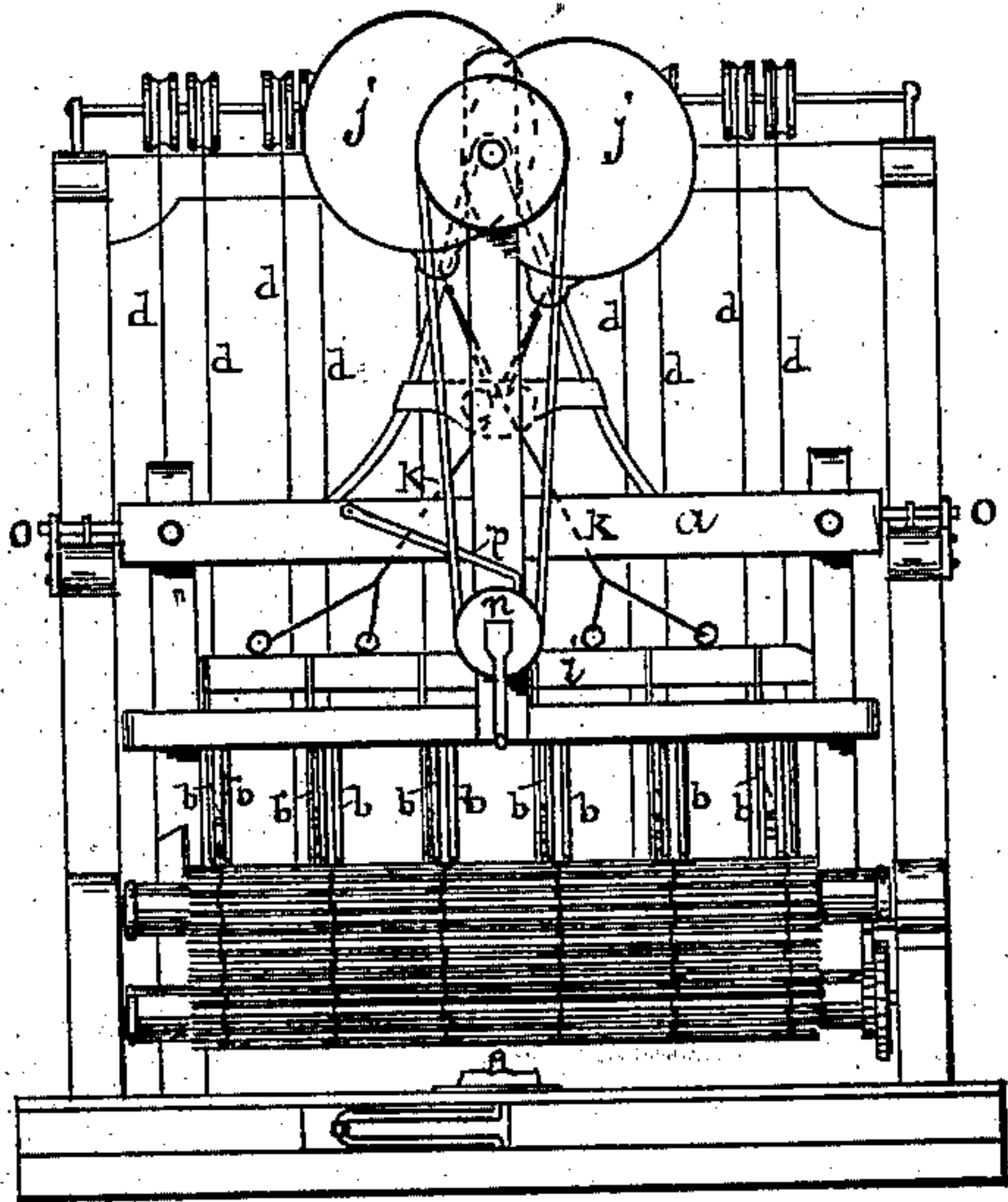


Fig. 3.

Fig. 4.

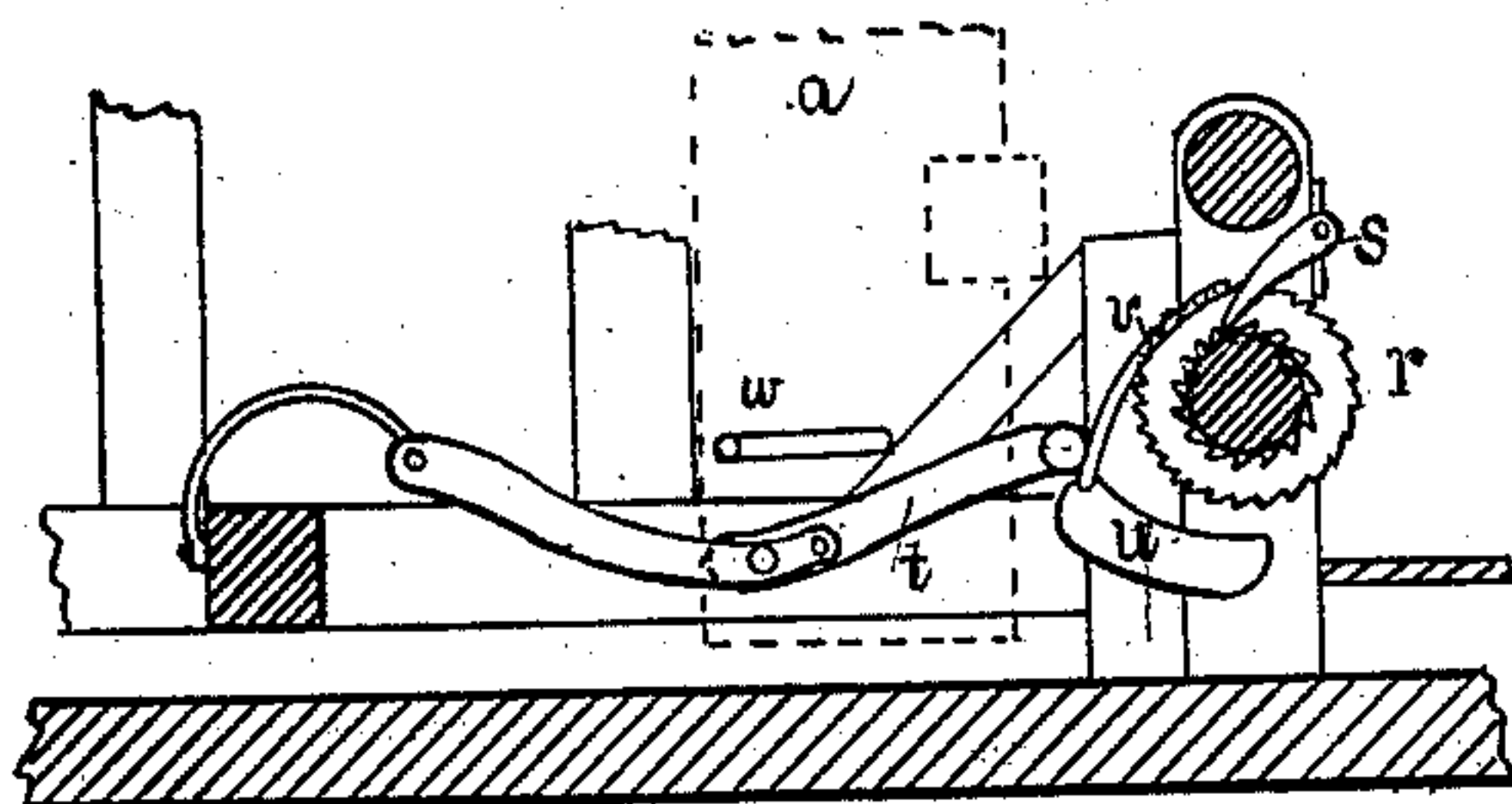
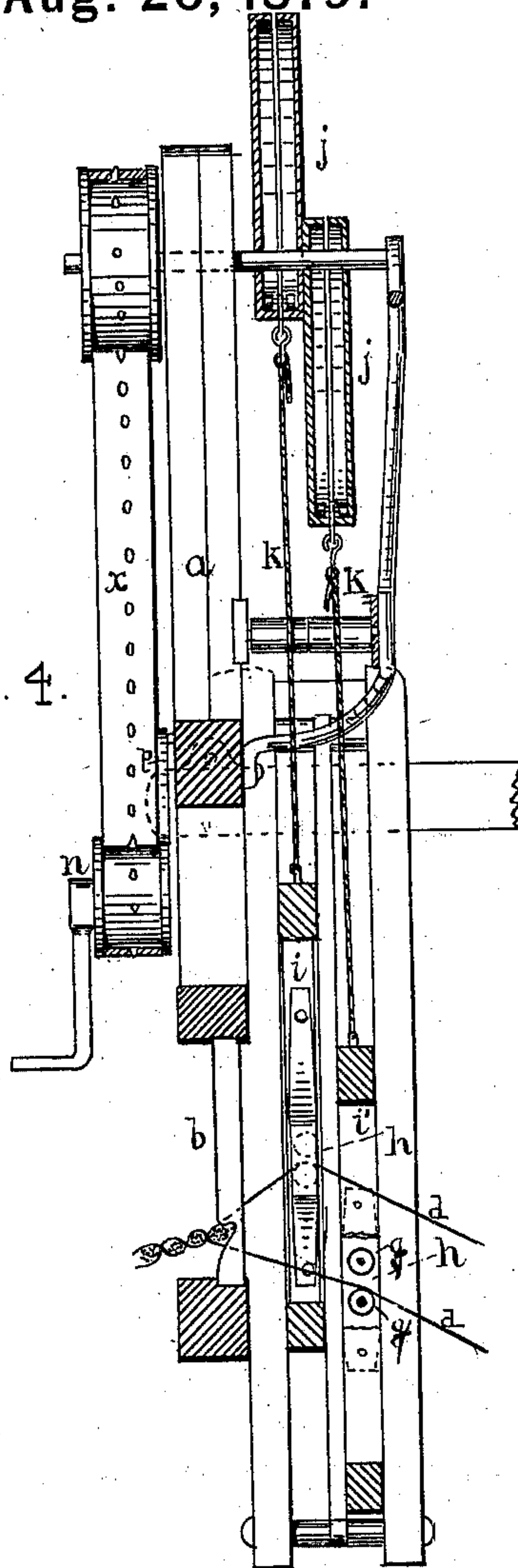


Fig. 5.

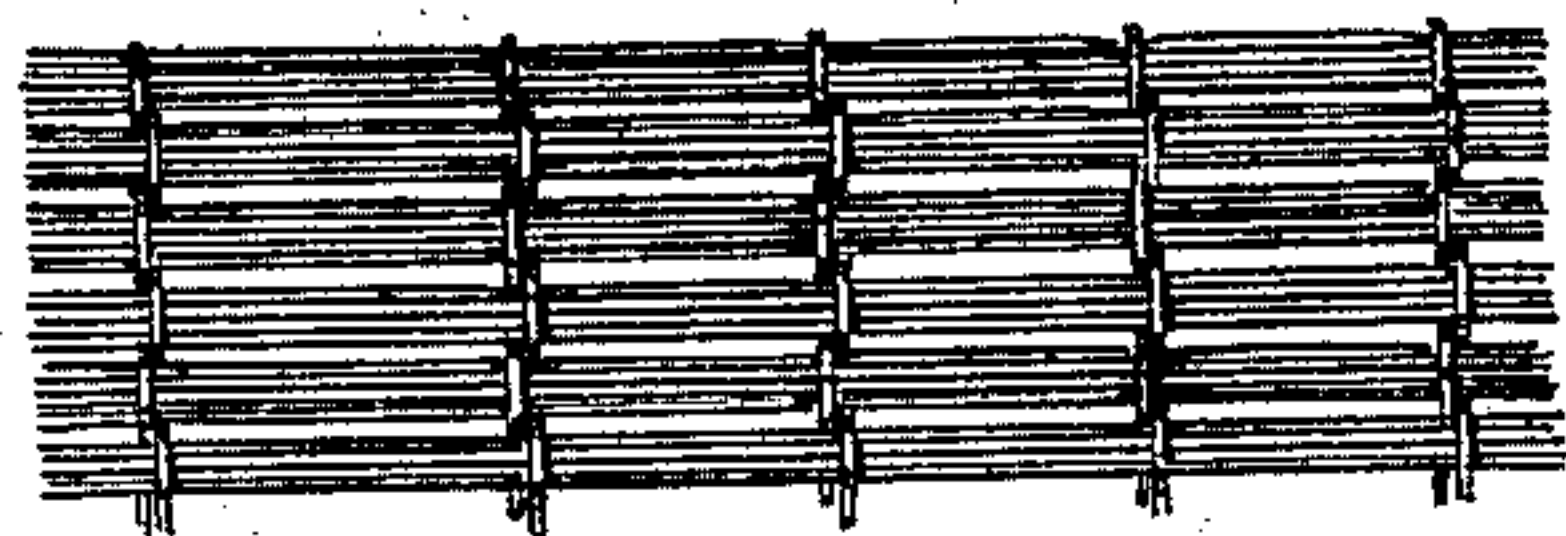


Fig. 6.



Fig. 7.

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN LOOMS FOR WEAVING STRAW MATTING.

Specification forming part of Letters Patent No. **218,969**, dated August 26, 1879; application filed August 24, 1876.

*To all whom it may concern:*

Be it known that I, WILLIAM HILTON, of Waltham, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Looms for Weaving Straw Matting; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention relates to plane or broad looms, as distinguished from circular looms, for the manufacture of matting from straw and other coarse or suitable material—such as is ordinarily used for covering hot-beds and green-houses as a protection against cold, and for other purposes; and my invention consists in the combination and arrangement of certain devices, as herein explained and claimed.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawings, in which—

Figure 1 is a side elevation of a loom embodying my invention, and showing the batten in position to bring the reed against the web. Fig. 2 is a vertical cross-section, showing the batten forced back to carry the reed away from the web. Fig. 3 is a front elevation, showing the position of the internal cams and the harness. Fig. 4 is an enlarged view of the harness and the mechanism for operating the same. Fig. 5 is a detached view, showing the take-up mechanism. Fig. 6 is a side view, and Fig. 7 an end view, of the finished matting.

*a* represents the batten, with reed *b*, and *c* is the web on which the reed operates. *g* is the beam containing the cord *d*, that forms the warp of the web, and from which it passes over and around the pulleys *e e' e'' e''' e''''*, as shown in Fig. 2, and through the heddle-eyes *h h'* of the harness *i* and *i'*, to the web *c*. *f f* are tension-weights attached to the pulleys *e' e'*. *j j* are the internal cams, which give motion to the harness *i i'* through the medium of the straps *k k*.

Motion is given to the batten *a* by means of the crank-shaft *l* and the connecting-rod *m*, the batten being hung on journals in bearings *o* on the frame. The shaft to which the cams

*j* are fastened is rotated by a crank, *n*, by means of a belt or chain, *x*.

*p* is a dog that drops into a notch in the crank *n* to keep it from turning. The blades of the reed *b* are hooked on the front at the point *y*, that bears on the web. The heddle-eyes *h h'* are formed by a combination of heddle bars and guards for sides of eyes and rollers for top and bottom of eyes. The rollers *g* prevent friction when shedding or when the batten is making the ordinary movements. The roller upon which the web is wound has a ratchet-wheel, *r*, with stationary pawl *s*.

*t* is a lever, which is weighted at *u* and has a movable pawl, *v*. When the batten is carried back, a pin, *w*, on the same bears on the lever *t*, causing the weight *u* and pawl *v* to rise. The pawl *v* will take hold of teeth in the wheel *r*, and on the return of the batten the weight will cause the roller to turn just enough to take up whatever slack there may be in the web.

The coarse nature of the filling and the desirable compactness of web require that a deep shed should be made, so that the bulky filling can be readily entered, and also that the force of tension should more immediately affect the web when the reed is passing the bulky filling into position while the crossing is being made. These results are secured by attaching the heddles and the mechanism to operate them to the batten-frame, thus locating the shuttle-race and reed at all times approximately in the deepest part of the shed. When the batten is moved backward or forward, the heddles are carried along with it, changing the locality of the greatest depth of shed by the movement of the batten. When the batten is forced back, the deepest and longest shed is obtained for the entrance of bulky filling, and when the batten is forced forward and the reed pressing against the filling, the greatest depth of shed and range of crossing occurring so near the web, a greater force of tension is exerted on the filling than otherwise, and produces the desirable compactness of web.

The long sweep of the batten and the deep shed necessary for the convenience of bulky filling necessarily cause great friction in the heddle-eyes. This friction is overcome in a great measure by special devices in the con-



struction of the heddle-eyes and heddle-guards. The eye is formed by the heddle-bar on one side and heddle-guard on the other, and two rollers, *q q*, placed between the bar and guard, one roller forming the bottom and the other the top part of the eye.

The ends of the rollers are protected by projecting beads or flanges on the inner sides of the bar and guard, or by countersinking the same. This side protection prevents the warp-cords catching the ends of the rollers. The heddle-guard on one side of the bar prevents friction of the warp-cords when crossing and carries the ends of the rollers.

The close vicinity of the greatest depth of shed to the web in crossing—in consequence of the shuttle-race and reed being approximately in the deepest part of the shed—necessitates a construction of reed which will prevent the web, or parts of it, from being raised from its working level by the great tension forced upon it when raising a shed in crossing; also, the frequent need of altering the warp-cords in changing the breadth of the web, or in modifying the warp-pattern, necessitates a change in the construction of the reed. Both of these necessities are met by forming the reed of blades hooked in the front at *y*. The hooks at *y* hold the web down to its proper level when making a shed in crossing.

The tension by which the web is held together in place and form is produced by a weight, *f*, suspended from each separate cord of the warp. This arrangement is made necessary by the fact of each bundle of filling being irregular and of unequal thickness from end to end, and so causing more or less warp-cord to be used in different parts of the filling or web; but by the tension and feed of each cord being independent of the others, a uniform tension of warp-cord is produced in the web.

The extreme force of tension necessary in producing this web necessitates special devices in shedding to overcome the great resistance of the combined cord-tension, and to equalize the strain on the loom-frame and on the shedding mechanism. This is effected by the two grooved internal cams *j j*, which are secured on one shaft in such a manner that the lower-

ing of one cam and shed transfers their force and momentum to the rising cam and shed. By this means a counterpoise of harness and tension is created at every point in the revolution of the cams.

The roller circuit or course in the cams being circular, the grade of movement and point of transfer are gradual and equal; and as each cam bears an equal load of tension through the medium of the heddle-straps and rollers, the harness, with their freight of tension, work in an approximated equilibrium, balancing and equalizing all force, strain, or friction on the loom-frame and on the shedding mechanism through and by said internal cams *j*.

The operation of the loom is as follows: The cords *d* being arranged in their proper places and attached to the take-up roller, the batten *a* is forced back by turning the crank *l*, the straw is introduced between the cords, and by reversing the crank the batten is brought forward and the reed *b* pressed against the straw. While at this point the position of the harness is reversed by turning the crank *n*, thus crossing the cords over the straw while the hooked blades of the reed are keeping the filling firmly down to its proper place. Each motion of the batten pushes the web forward the thickness of the filling employed, and is wound on the roller by the take-up mechanism.

The matting thus produced is very firm in texture, and can be made almost any desired thickness, and is very flexible, which permits it to be easily rolled into compact bundles for handling or transportation.

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

1. The batten *a*, in combination with and carrying the harness *i i* and its operating mechanism, the heddle-eyes, constructed as described, and the reeds *b*, provided with hooked fronts *y*, all constructed, arranged, and operated as set forth.

2. The double cams *j j*, having internal grooves, in combination with a sliding eye, 2, straps *k k*, and harness *i i*, as described.

WILLIAM HILTON.

Witnesses:

N. S. HILL,  
D. E. BANGS.