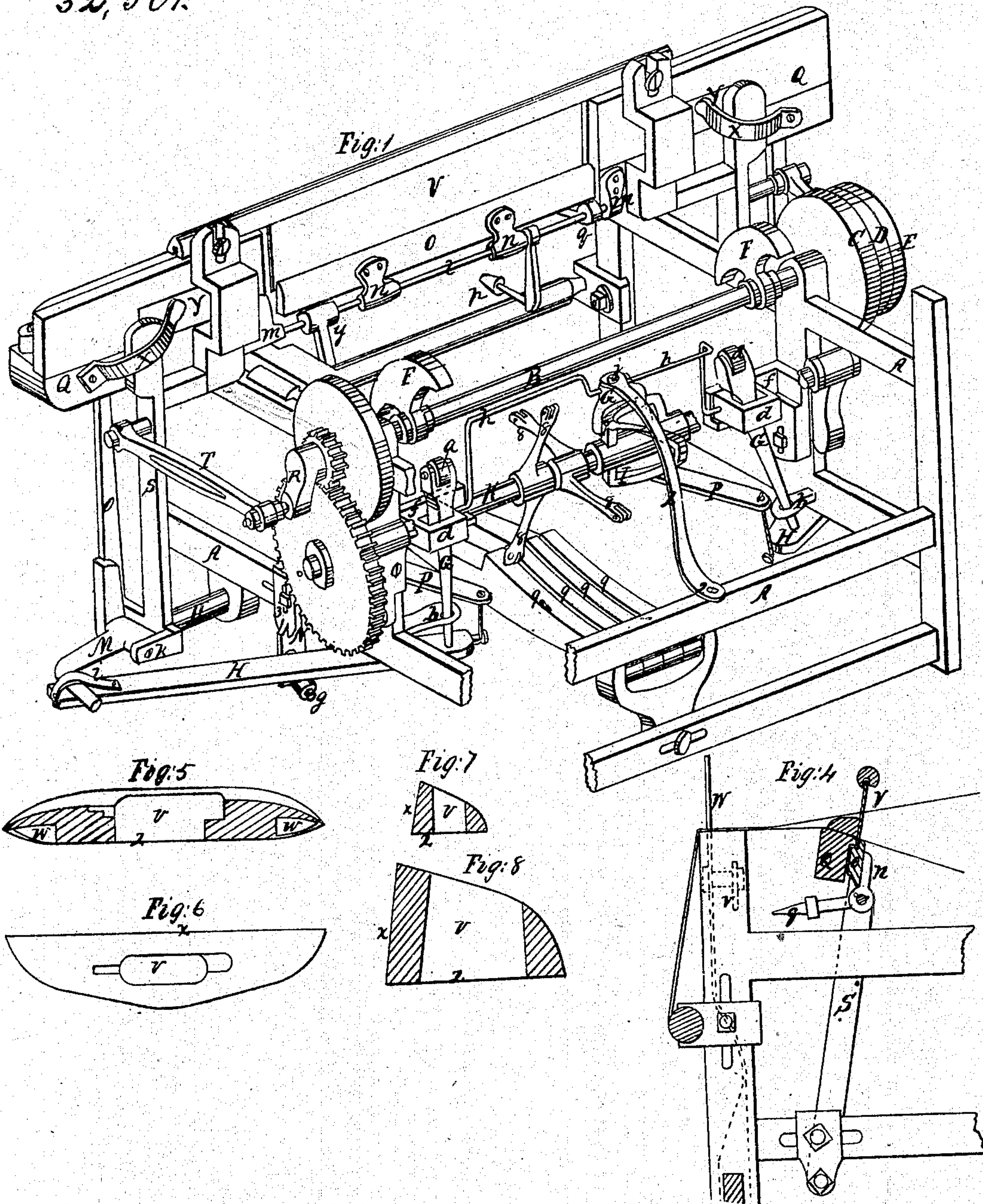


C. Zwicky.
Shuttle Motion.

Patented Jun. 4, 1861.

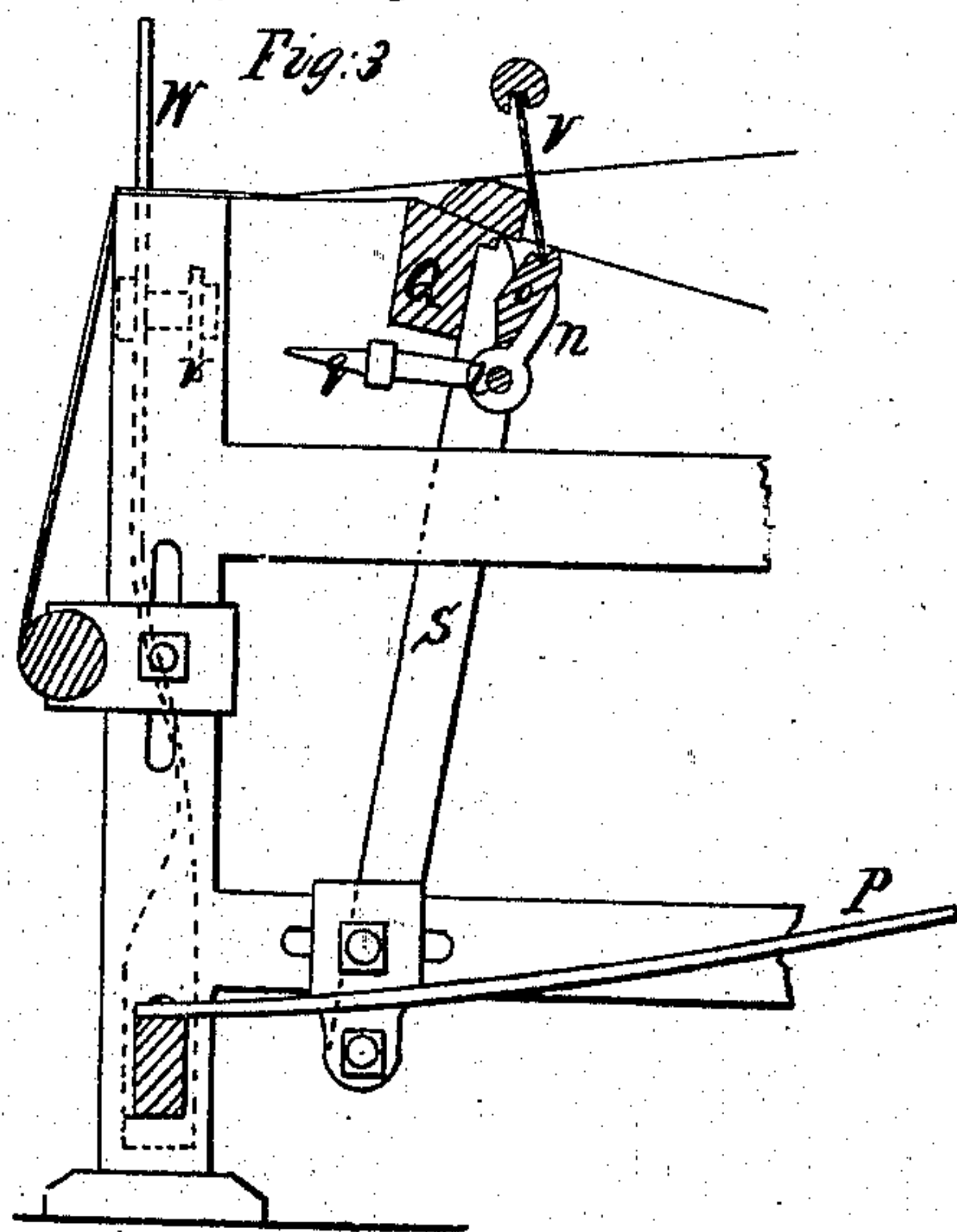
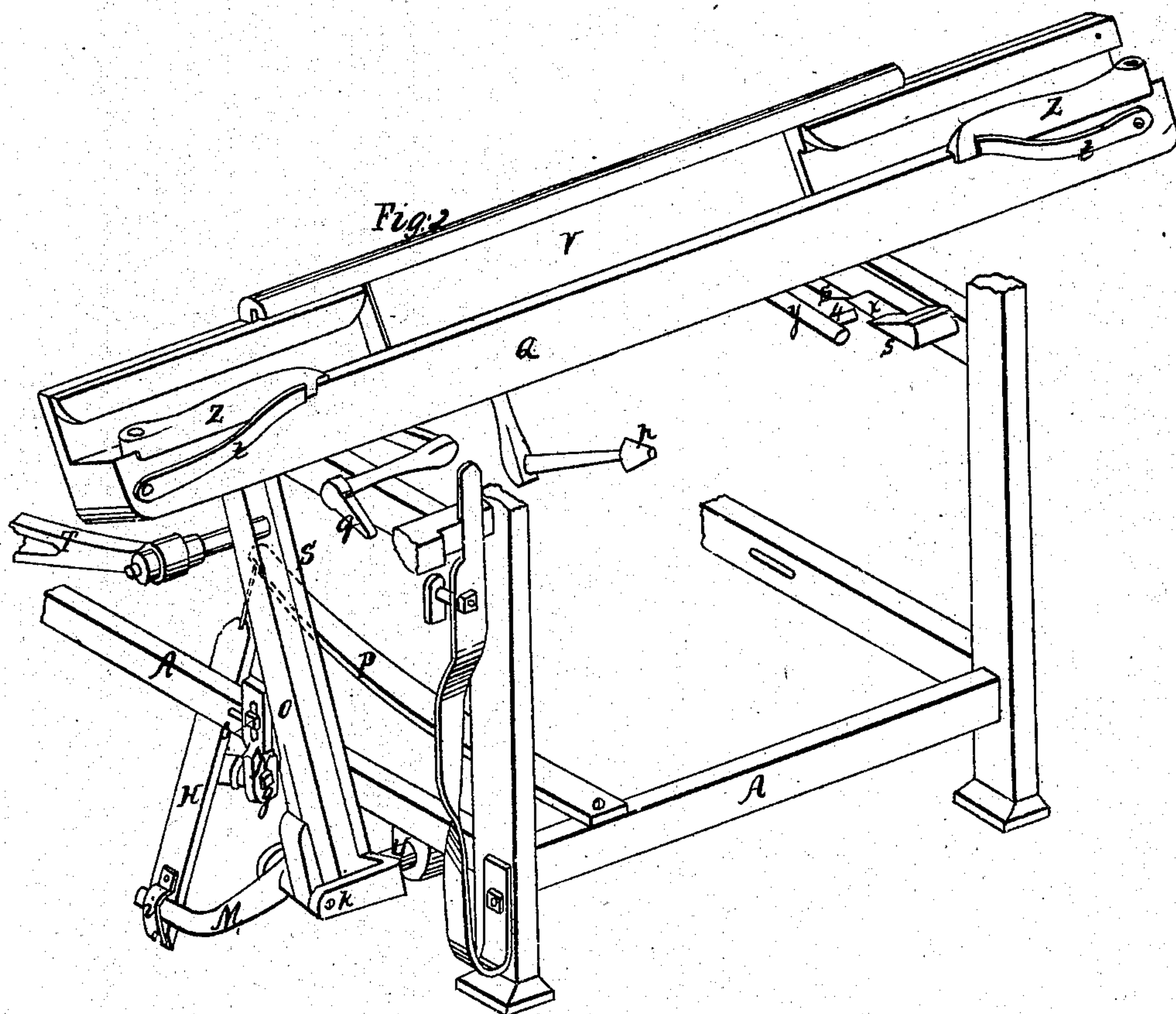
32,501.



C. Zwicky.
Shuttle Motion.

Patented Jun. 4, 1861.

32,501.



Witnesses:
C. Cohen
J. Harsh

Inventor
Caspar Zwicky
By atty
A. B. Stoughton

UNITED STATES PATENT OFFICE.

CASPAR ZWICKI, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO HIMSELF, JOHN MASON, ANTHONY SNYDER, AND NICHOLAS SNYDER, OF SAME PLACE.

LOOM.

Specification of Letters Patent No. 32,501, dated June 4, 1861.

To all whom it may concern:

Be it known that I, CASPAR ZWICKI, of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain
5 new and useful Improvements in Looms; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying draw-
10 ings, in which—

Figure 1 represents a perspective view of such parts of my loom as more particularly relate to my invention. Fig. 2 represents a perspective view of the shuttle race, one of
15 the picker staffs and the parts pertaining to them. Figs. 3 and 4 represent cross sections through the shuttle race. Fig. 5 represents a longitudinal section through my shuttle. Fig. 6 represents a top view and Fig. 7 a
20 cross section through the same. Fig. 8 represents on an enlarged view a cross section through the shuttle.

My invention relates firstly to the construction and operation of the devices by
25 which the shuttle is driven, whereby I am enabled to drive the loom at a very high speed, and without a blow or jar.

It also relates to the peculiar construction of the shuttle and race by which the shuttle
30 is kept in close contact with the side of said race, permits of the use of a proportionally larger bobbin than in the old shuttles and can pass with greater security through the shed.

To enable others skilled in the art to make
35 and use my invention I will proceed to describe its construction and operation.

A represents the frame of the loom, the main shaft B is turned by means of the pul-
40 leys, C, E and in its turn operates the several parts of the loom. The cams F, from which the shuttle is operated are secured to the shaft B, and in their operation they press against the rollers, *a*, of the rods G, these
45 rods rest with their lower ends loosely on the levers H and are retained in their respective positions by means of the stationary boxes, *b*, and the sliding boxes, *d*, the latter are set in the frames, *f*, on which they can freely
50 slide when they are moved by the action of the cam, I, which is secured to the lower shaft K. The cam I in turning on its shaft

operates the forked stud *c*, this stud is piv-
oted at, 1, to the brace L, which can freely
swing on the bolt, 2, by which it is secured 55
to the frame of the loom, and the sliding
boxes, *d*, are connected with the stud *c*, by
means of the rods, *h*, thus when the cam I,
revolves it alternately operates the sliding
boxes, *d*, and the rods, G, bringing them into 60
such positions as to permit only one of the
cams F, at a time to press on the rollers, *a*,
and rods, G, for the purpose of operating the
picker staffs and throwing the shuttle
through the shed. When one of the rods, 65
G, is pressed downward by its respective cam
it strikes the short end of the lever, H, this
lever is pivoted at, *g*, to a hanger, N, and can
freely turn on said pivot, the long end of the
lever, H, is secured by means of a strap, *i*, 70
or other loose connection to the short lever,
M, which turns on the fulcrum *k*, and to
which the pickerstaff O, is also secured
which drives the shuttle through the race
by striking it direct and without the inter- 75
vention of pickers. The short end of the
lever H is secured to a spring rod, P, by
means of a cord or otherwise whereby said
end of the lever is raised when released from
the pressure of the cam, F, causing the pick- 80
erstaff, O, to return suddenly after having
thrown shuttle. The beam Q is operated by
means of the cranks, R, (there being one at
each end thereof) on the shaft, B, which is
connected with the arm S, of said beam by 85
means of the connecting rod, T, the arm, S,
swinging on the shaft, U, as its fulcrum,
and thus at each vibration of the beam one
only of the rods G is pressed down to throw
the shuttle through the shed. 90

As above described the cams, F, which
throw the shuttle are secured to the upper
shaft B, which in this loom as well as in
others of the same description runs at a
higher velocity than the lower shaft, K, and 95
when this loom is operated at a high speed
the devices for throwing the shuttle must be
such as to work with the greatest facility
and without sudden jars; this I accomplish
by so shaping the cams, F, as to impart to the 100
rods, G, a very short positive motion which
is afterward increased and transmitted by
the system of levers, H, and, M, by which
sufficient motion is imparted to the picker-

staff to throw the shuttle while the action of the cam, F, is short acting instantaneously without producing any jar or blow and moving the rods, G, by a cam working on a shaft with comparatively a low speed and thus affording the means of operating the loom at a very high speed without shifting the rods, G, at that high speed.

The throw of the pickerstaff, O, can be increased or diminished by adjusting the position of the hanger, N, the same being secured to the frame A by means of a bolt, 3, passing through a vertical slot in said hanger, by raising the hanger the throw is increased, by lowering it, it is diminished and thus the operation of the shuttle can be adjusted with the greatest accuracy to suit the speed of the loom.

The tripping apparatus of this loom consists of the following parts: *l*, Fig. 1 represents a shaft which is supported at its ends by the boxes, *m*, at the lower side of the beam; to the shaft are pivoted the brackets, *n*, which hold the piece, *o*, against which the reed frame, V, rests as represented in Figs. 1 and 4 in the operation of the loom the piece *o* is retained in its proper position by the counterpoise, *p*, which holds the parts in the position represented in Fig. 4, when the shuttle passes regularly through the shed the peg *q* which is secured to the shaft *l*, is then in the position represented in Fig. 4 and during the movements of the beam it does not come in contact with the stud *r* (Figs. 3 and 4) as its position is too low, the stud *r*, is secured to the spring lever W, which when struck by the peg, *q*, moves sidewise and shifts the belt which drives the loom from the fast pulley, E, to the loose pulley, D, to arrest the motion of the loom. If therefore the shuttle in passing over the race should be caught in the warp, the beam on driving home the weft strikes the shuttle and thus the reed frame is pressed outward to the position represented in Fig. 3, and the peg, *q*, is now in a raised position where it can strike the stud, *r*, at the next operation thereby operating the belt shifter, W, and arresting the motion of the loom.

To make these devices operate with accuracy and to prevent the reed frame from being pressed out at an improper time, I use a tripping device, *y*, which is secured to the shaft, *l*, the peg, 4, passes by a reciprocating motion on the lower side of the ledge, *s*, and during that time retains the reed frame in its proper position and the latter can only be pressed outward when the peg, 4, comes opposite the notch, *x*, whereby the action of this tripping device is controlled with great accuracy. I have also made the parts, Y, of the race on both sides of the reed frame, yielding and use the springs, X, for the purpose of retaining them in their proper positions, the object of these yielding pieces is

to insure the operation of the tripping devices in case of a small part only of the shuttle being in contact with the reed frame; if the race in those parts were rigid the shuttle could not press on the reed frame in the above described emergency when only a small part say $\frac{1}{3}$ or $\frac{1}{4}$ of the length of the shuttle is in contact with the reed frame. The bottom line of the race on which the shuttle runs is inclined and forms an acute angle with the reed frame, this causes the shuttle which is of a corresponding shape to run on the lower side of said incline and thus to keep it in close contact with the reed frame and to insure its passage through the shed.

Z, represents the brakes for arresting the motion of the shuttle at the proper time. They are pivoted to the lay at 6, and pressed inward by the springs, *t*, as represented in Fig. 2.

The shape of my shuttle is represented in Figs. 5, 6, 7 and 8. *v*, represents the space into which the bobbin is inserted, *w*, represents two recesses on the lower side near the ends into which the ends of the pickerstaffs work for throwing the shuttle directly without the application of pickers, the side, *x*, which is in contact with the race is oblique, forming an acute angle with the bottom *z* to conform with the shape of the race, this insures a constant contact of the shuttle with the side of the race as the former has the tendency to move down by its own gravity. The upper side of the shuttle is oblique and rounding off outward, this shape permits of a wider shuttle to be used which is capable of containing a larger bobbin than the square shuttles used heretofore as its oblique outer side clears better the warp. I thus gain the advantages of a safer run and of using a larger bobbin than could be used in the square shuttles.

The arms S, which operate the treadles, 9, for working the harness are secured to the shaft K; of the four treadles two may be coupled together for plain weaving or they may all be worked separately for twilled weaving.

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

1. In combination with the cams F, on the fast moving shaft, B, for operating the rods, G, the cam I, on the slow shaft, K, for shifting said rods, substantially as and for the purpose described.

2. In combination with the cams F secured to the upper shaft of the loom, the rods, G, levers, H, and M, and pickerstaffs, O, when constructed and operated substantially in the manner herein described.

3. A three sided shuttle the two straight sides of which are in contact with the shuttle race and bear the relation of an acute

angle to each other while the third or outer side is convex substantially as and for the purpose herein described.

5 4. In combination with a three sided shuttle as herein described, a shuttle race the two sides of which bear the relation to each other of an acute angle to conform to the sides of

the shuttle and to allow the shuttle to run close to or in contact with the reed frame substantially in the manner herein described. 10

CASPAR ZWICKI.

Witnesses:

EDWIN MILES,
THOS. S. BLAIR.