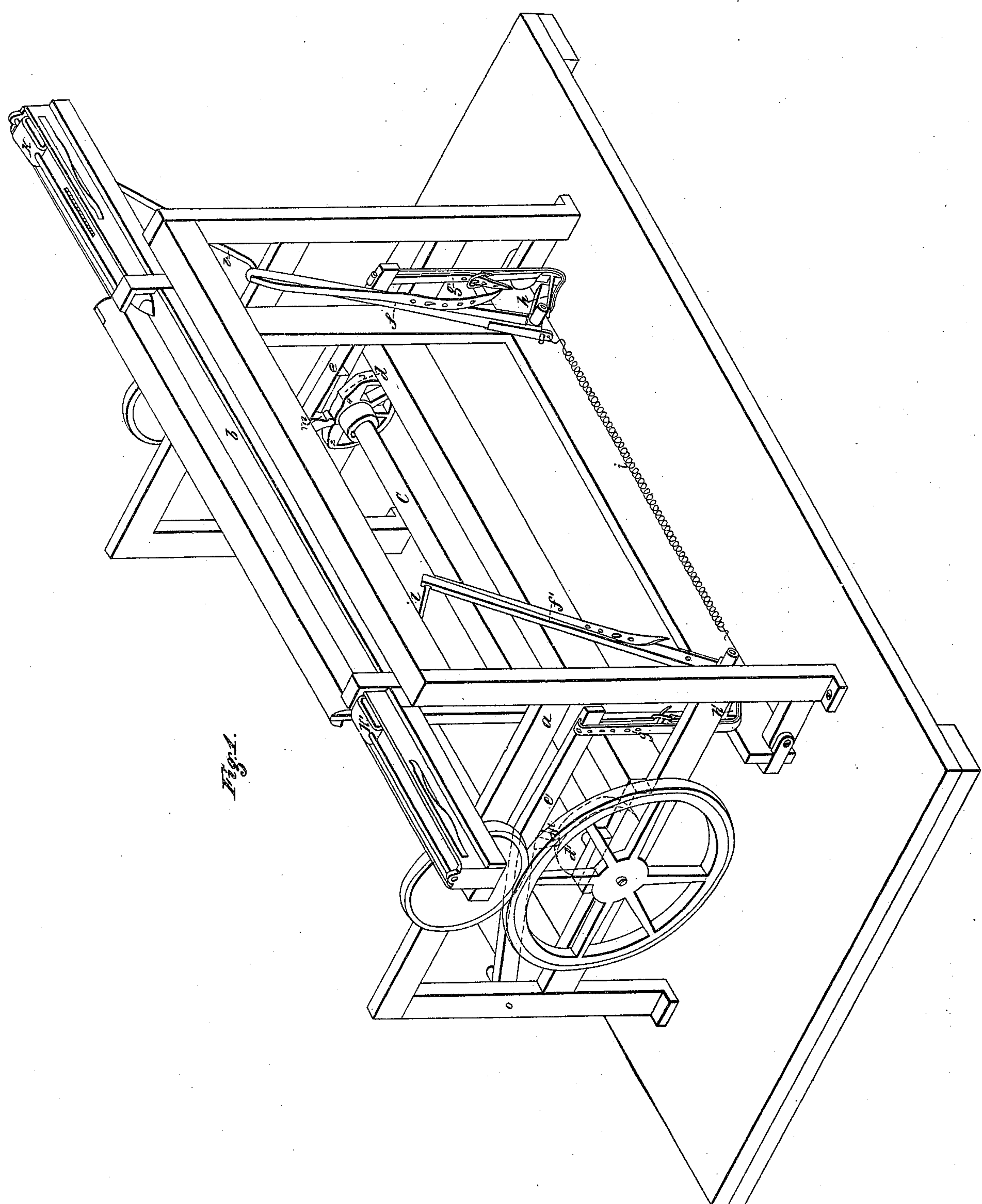


Sheet 1  
2 Sheets.

*R. P. Cunningham.*  
*Shuttle Motion.*

*N<sup>o</sup> 4,308.*

*Patented Dec. 16, 1845.*



*Fig. 1.*

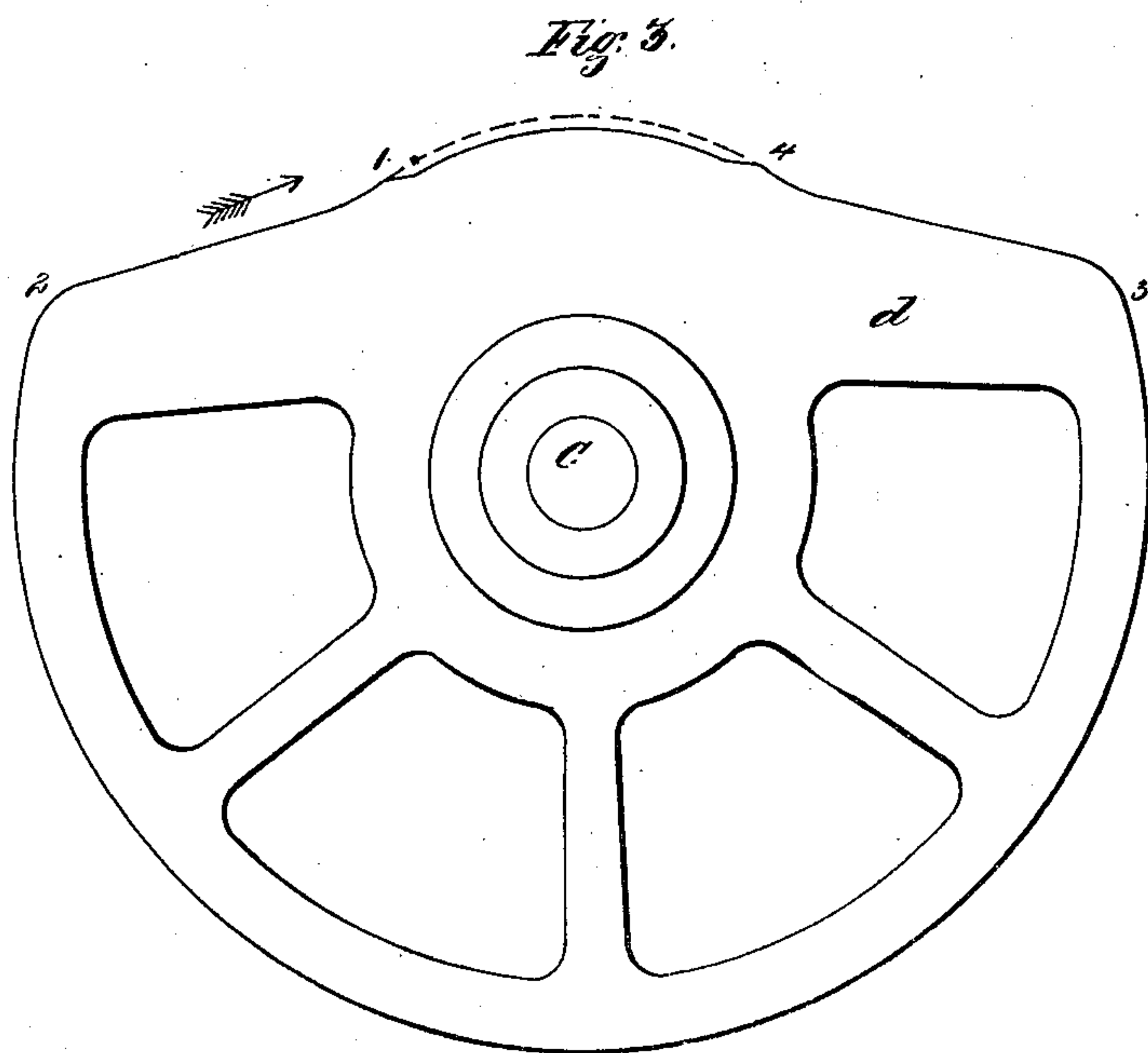
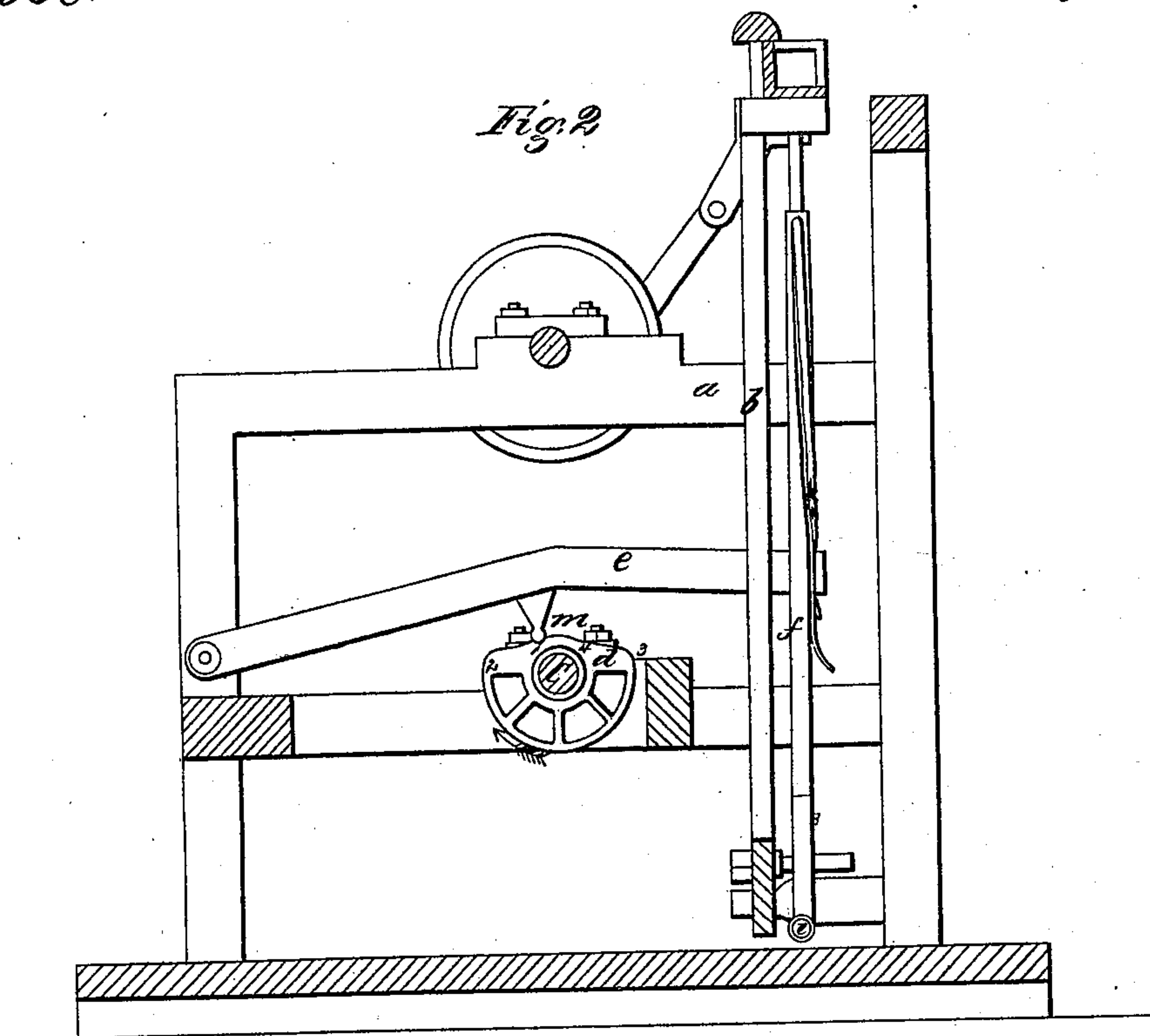
Sheet 2  
2 Sheets.

R. P. Cunningham.

Shuttle Motion.

No. 4,308.

Patented Dec. 16, 1845.





# UNITED STATES PATENT OFFICE.

R. P. CUNNINGHAM, OF ABINGTON, CONNECTICUT.

## IMPROVEMENT IN MACHINERY FOR OPERATING SHUTTLES IN LOOMS.

Specification forming part of Letters Patent No. 4,308, dated December 16, 1845.

*To all whom it may concern:*

Be it known that I, ROB. P. CUNNINGHAM, of Abington, in the county of Windham and State of Connecticut, have invented a new and useful method of relieving the picker or pickers from the end of the shuttle in looms having shifting shuttle-boxes, such as are used for weaving fabrics requiring a variety of colors or changes of threads of any kind in the weft or filling; and I do hereby declare that the following is a full, clear, and exact description of the principle or character thereof, which distinguishes it from all other things before known, and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a perspective view of so much of a loom as will exhibit the application of my improvement; Fig. 2, a transverse section of the same, and Fig. 3 an enlarged view of one of the cams.

The same letters indicate like parts in all the figures.

In all looms that work with shifting shuttle-boxes for weaving fabrics with a change or changes of colors, textures, or sizes in the filling it is necessary that the picker should be separated from the end of the shuttle, that it may pass the picker freely when it rises with the box in making the change. To effect this end an extra-acting spring has been used on the shuttle-box to arrest the shuttle before it strikes against the picker at the end of its course, and there hold it until the next throw. This is objectionable, not only on account of the liability of derangement in the action of a spring, but because this spring retains its hold on the shuttle and impedes its motion at the next throw. Another mode resorted to is the employment of a spring-lever, which holds back the picker by pressing against a pin projecting from the shuttle and passing through a slot in the back of the shuttle-box, so that when a stop at the end of the race is lifted out of the way the picker is immediately thrown back by this spring-lever to clear the point of the shuttle. This, in addition to the serious objection of complexity, presents the same difficulties as the first. All these evils are avoided by my invention, which consists simply in making a depression in the face of the cams which operate the shuttle-levers, so that these

levers, after they have brought the shuttle to a state of rest, are permitted to descend a little by a depression in the face of the cams and draw back the picker sufficiently to clear the end of the shuttle.

And this my invention is particularly applicable to the kind of shuttle-cams secured by Letters Patent granted to me on the 25th day of April, in the year 1843, and formed as represented in the accompanying drawings, and which present the peculiar characteristic of gradually arresting the momentum of the shuttle by giving to the picker toward which it is moving a retrograde movement in accordance with that law of mechanics by which the momentum of a moving body can be arrested with the least resistance and percussion.

In the accompanying drawings, *a* represents in part the frame of a loom; *b*, the lay; *c*, the main or cam shaft; *d d'*, the shuttle cams; *e e'*, the levers on which the cams act, and which are connected with the picker-staffs *f f'* (turning on stud-pins on the lay) by means of straps *g g'*, passing around and attached to sector-arms *h h'* of the picker-staffs, which are connected together by a helical spring, *i*, the tension of which keeps the shuttle-levers *e e'* on the face of the cams *d d'*; and *k k'*, the pickers, connected with the picker-staffs by means of straps or rods *l l'*. By this arrangement it will be perceived that the pickers can only move back when the form of the cams is such as to permit the shuttle-levers to descend. The cams are put on the shaft the reverse of each other, and by their peculiar form, as fully described in my Letters Patent, to which I have before referred, as the cam *d* moves around from 1 to 2 the lever *e* is lifted and throws the shuttle, and just before the shuttle in its flight reaches the opposite picker *k'* the part 3 of cam *d'* has reached the stump-face or roller *m* of the shuttle-lever *e'*, which rests on the face of the cam, so that this cam, in passing from 3 to 4, gives to the picker *k'* a retrograde movement, which gradually arrests the momentum of the shuttle, the face of the cam at 4 being for a very short distance concentric, which necessarily brings the picker and shuttle to a state of rest without the necessity of employing an extra spring or other fixture in the shuttle-box. In this stage of the operation the point of the shuttle rests in a cavity in the face of the picker, (formed in

the face of a picker by the point of the shuttle,) and, as it is at this time (in looms to which my invention is applicable) that the shuttle-boxes are shifted, it becomes necessary to relieve the picker from the point of the shuttle before the change takes place; and for this purpose the face of the cams is depressed from the concentric part 4 to the part 1, which is the commencement of that part of their face which lifts the lever to throw the shuttle, and therefore, as the stump-face or roller *m* follows this depression, the picker is drawn back sufficiently to clear the point of the shuttle, and at the end of this depression the picker is again grad-

ually brought up to the point of the shuttle to prepare for the throw.

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

Forming the face of the shuttle-cams with a depression, as herein described, to permit the picker to be moved back clear of the shuttle-point after the shuttle has been arrested and before the shuttle-boxes are shifted, as herein described.

ROBT. P. CUNNINGHAM.

Witnesses:

T. C. DONN,

JAMES H. KELLER.