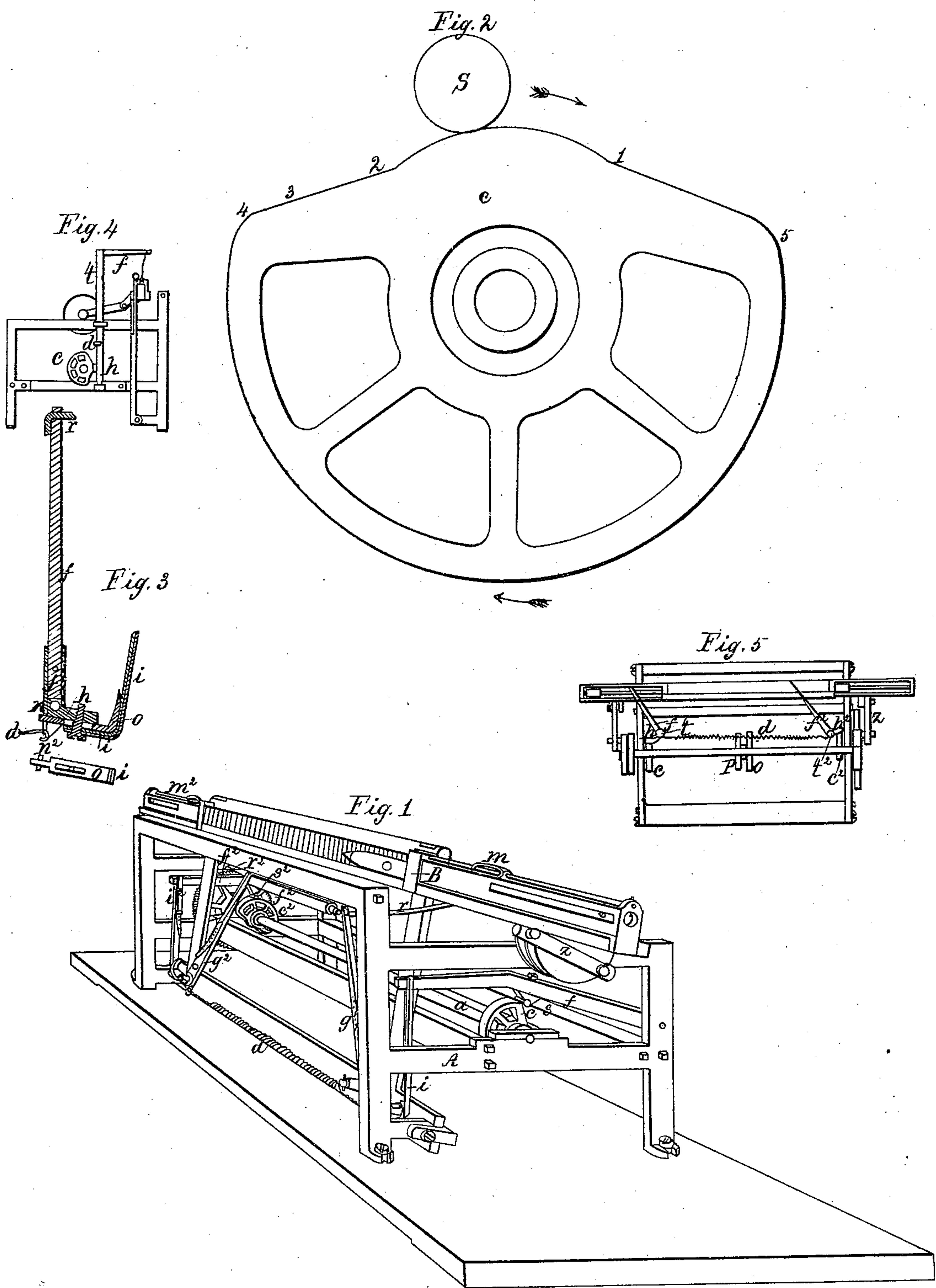


Shuttle Motion.

N^o 3.062

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R. P. CUNNINGHAM, OF HAMPTON, CONNECTICUT.

MODE OF THROWING SHUTTLES IN POWER-LOOMS.

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To all whom it may concern:

Be it known that I, ROBERT PIERPONT CUNNINGHAM, of Hampton, in the county of Windham and State of Connecticut, have
5 invented new and useful improvements on power-looms the shuttles in which are so actuated as that their terminating motions and those of the vibratory parts mediate between them and the picker-cams act on
10 those cams which receive the momentum and transmit much to the rotation of the shaft, thence to be held in reverse motion to be again transmitted, with that accumulating from the accessive power, to a new motion
15 of the shuttle in succession, whereby great accession of speed and economy of power in the operation of the power-loom are effected, a large portion of the power which is lost or wasted in the ordinary modes of throwing
20 such shuttles being saved by my manner of forming, arranging, and actuating the respective parts applied in that operation, while at the same time much of that tremor, noise, and wear incident to power-looms as
25 now made is prevented; and I do hereby declare that the following is a full and exact description of my improvements.

In the accompanying drawings, Figure 1, is a perspective representation of such parts
30 of my improved power loom as are necessary to show the construction and arrangement of the improved apparatus invented by me. Fig. 2, shows a variation in the manner, the arrangements of the cams, the treadles, and
35 the picker staves, but operating on the same principles as that shown in Fig. 1. Figs. 3, and 4, in profile, show the general form of one of my two similar sets of alternate wide and narrow picker cams, and of the fac-
40 ings, or friction-rolls, or stumps of the opposite levers, or treadles, to act with them. These cams may, if desired, be varied in form, so as to effect two, or more, reciprocating motions of the picker staves in one
45 revolution of the cam shaft. Fig. 5, shows a form of collars, *h*, and of connecting rods, *r*, which I sometimes use to connect the picker staves, *g*, and the picks, *m*; and in
50 Figs. 1, and 2, *n*, is a form of my application of boxes, as fixed to treadles to extend the bearings on their center pins, which I use sometimes, in preference to the ordinary treadle guide.

I contemplate varying the ordinary pro-
55 portions of the heddle cams, in such manner

as to effect a less proportionate velocity of the heddles, for texturing on some tender warps, with increased despatch independ-
ently of increased velocities in their spring. The frame, lay, heddles, picks, shuttles, and
60 various other parts of the loom, may be made in any of the forms now known and used in their construction.

In Fig. 1, *a*, is the cam shaft upon which I place two similar sets of picker cams *c*, *d*,
65 and *c*², *d*², so the wide and narrow cams, in a set, are alternate to each other, one of the cams, *c*², is in great part hidden in this figure by the sword of the lay. The cams *c*, and *d*², project from the shaft in the same
70 direction with each other, and the cams *d*, and *c*², in the opposite direction, being proper to the necessary motions of the treadles thus situated. The heddle cams are not shown, but they are to be placed, and to
75 operate in the usual way; *f*, *k*, and *f*², *k*², are the picker treadles carrying the rolls, or stumps, *s*, *t*, *s*, *t*, opposite to the picker cams with which they operate, and are acted and alternately act. The picker staves *g*, and
80 *g*², with the attached pulleys *h*, and *h*², are formed similar to those used singly in ordinary use; and the straps *i*, and *i*², attached to these pulleys, couple the treadles and have the usual appliances for adjustments of
85 length and fixture.

In Fig. 2, the narrow cams are represented as fixed to the shaft nigher the mid length than the wide ones, and as acting with the
under sides of the treadles, the picker staves
90 being attached to the cross pieces *h* and *h*², which work on center pins, and produce the same effect with the arrangement shown in Fig. 1.

The picker staves *g*, *g*, operate with the
95 picks *m*, and *m*², by the mediate rods, *r*, *r*, Fig. 1. I have formed these rods, sometimes with elastic ends, as shown in Fig. 5, *r*, where they are attached to the picks, *m*, nearly up opposite to the points of impinge-
100 ment *o*, of the picks and the points of the shuttle,—and to the picker staves nigh their ends *g*, by collars fitted on so as to admit a small range of position of fixture, in order
to time the motions of the shuttle, with those
105 of the receding picks.

The forms of the cams as exemplified, correspondent with the opposite friction rolls, or stumps fitted to act with them, Figs. 3
and 4, may be varied, and calculated to any
110

scales of pressures which it may be desired to be acted between them, or between the picks and the shuttle on the motions of each other. In Figs. 3 and 4, the part of the
 5 wide cams from l , to w , act on the bearings s , and actuate the shuttle with the intermediate parts, to the maximum of their transverse velocities, while the opposite bearing, or stump, t , follows in on the accelerated re-
 10 cedure of the alternate narrow cam from v , to k , and thence, acts the power of the velocities of the mediate parts, now free of the shuttle, in pressing in on the retarding part from k , to x , where the recedure of the cam
 15 terminates, and the pick and intermediate parts have acted back a return of their momentum; the velocity of the shuttle is diminishing on its way, and the opposite narrow cam, by its acting part from x^2 , to k^2 ,
 20 presses on the lever-bearing t^2 , and acts a return motion, through the mediate parts, to the opposite pick, m^2 , nearly equal to the velocity remaining on the shuttle, which now joins, or soon overtakes and joins the pick
 25 on its declining motion, and is thence retarded with the motive mediate parts, these having followed on the accelerated recedure of the opposite wide cam from v^2 to w^2 , by the stump
 30 s^2 , now act, together with the shuttle, on the part of decreasing recedure from w^2 to l , where the recedure of the cam terminates, and having received the extra momentum of the original motions of the shuttle and these intermediate parts, it is retained, with
 35 that preceding from the other motive parts, and augments the reserve, in aid of the accessive power, to effect the opposite motion in like manner, and thus on, in succession. Thin additions as v , o , k , x , and v , o , w^2 , l ,
 40 &c., are made to the static calculated faces of the cams, as allowances for the elastic yieldings of materials in manner to insure a close continuance of following parts.

If free of allowances for component mat-

ter, or resistances, the cams in each set, with 45 the opposite bearings, or stumps carrying the mediate parts, are so formed that as one lever, or treadle is forced out, the other is permitted to return in with the same velocity, the alternate motions are reversed in 50 traverse, and in their relative velocities, and likewise are varied in their periodic rates; while in operation, stress is applied to the more or less ponderous, and elastic materials, in drawing them into motion, and in 55 overcoming the resistances of labor, &c., thence I add to the motionary parts of the cam faces such additional quantities as are required to put the connecting parts to such stress, and to insure the contiguity of the 60 bearings with the accelerating recedures of the cam-faces, as represented in the drawings, where accelerations in the following are behind those of the leading parts.

Having thus fully described the nature of 65 my improvements and shown the operation of the respective parts of my apparatus, what I claim therein as new, and desire to secure by Letters Patent, are—

The methods, on which I have formed, 70 combined, and arranged the two sets of picker cams; and the arrangements of two picker staves to act in combinations with these cams and the other new, or ordinary, specified parts, required in the power loom, 75 in manner, or on the principles herein set forth; thereby effecting an improved power loom of increased conservatory economy of power, and facilities of speed, obviating at the same time, much tremor, noise, and wear, 80 incident to the ordinary power loom, and all tending to the most silent and expeditious texttrine fabrications imaginable.

R. P. CUNNINGHAM.

Witnesses:

PHILIP PEARL,
 CLARISSA PEARL.