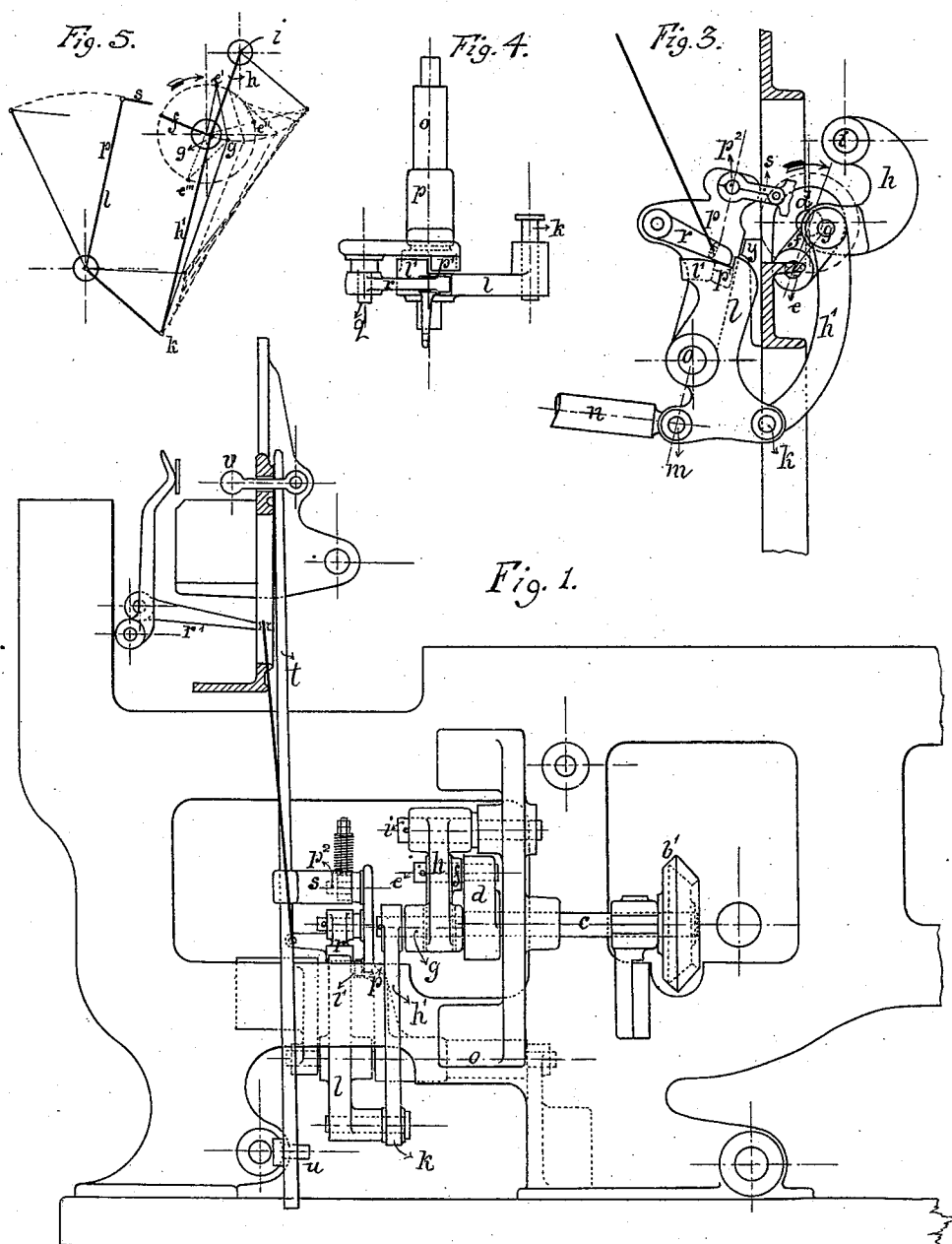


2 Sheets—Sheet 1.

No. 540,878.

Patented June 11, 1895.



Chas. W. Thomas
Eugenie A. Pericles

Inventor:
Georg Schwabe,
By *Atkins & Ainsworth*,
Attorney.

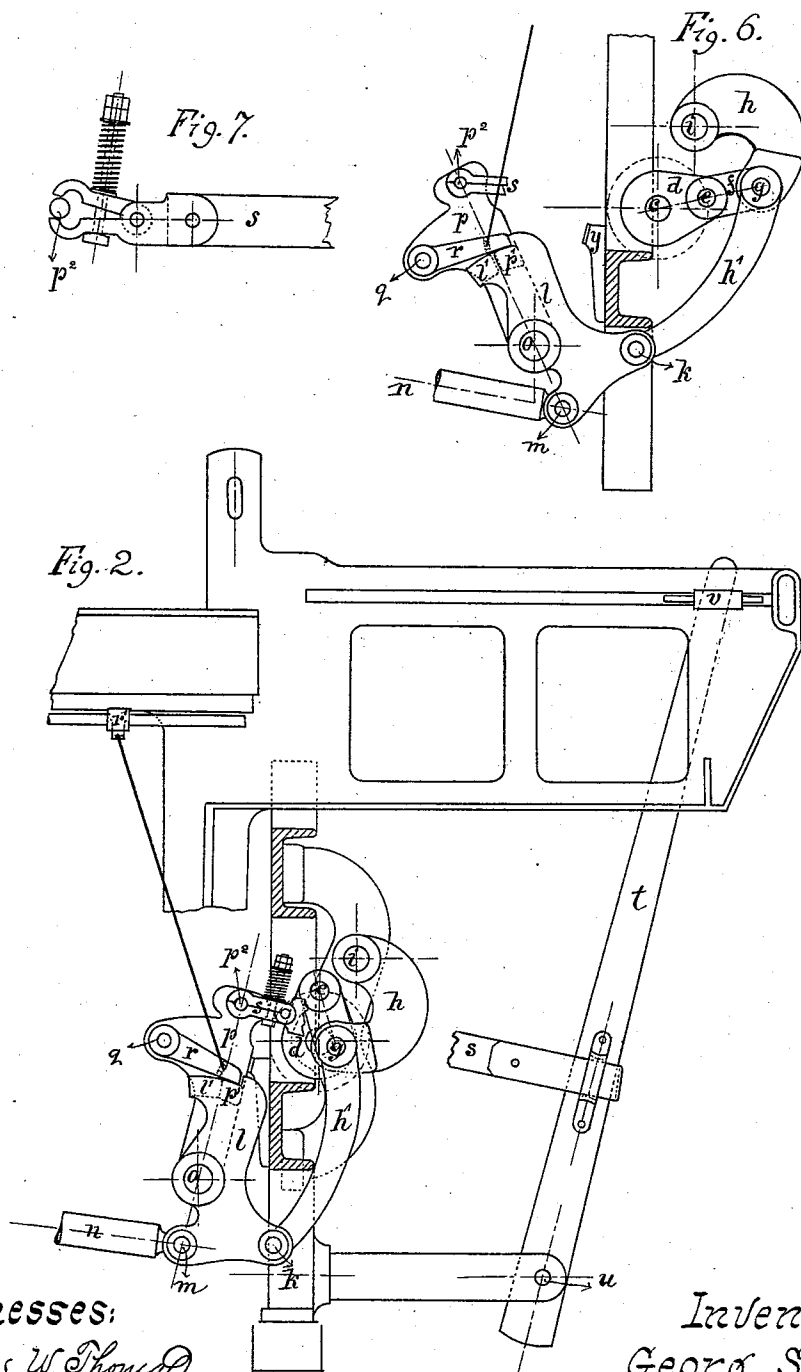
(No Model.)

2 Sheets—Sheet 2.

G. SCHWABE.
SHUTTLE THROWING DEVICE FOR LOOMS.

No. 540,878.

Patented June 11, 1895.



Witnesses:

Chas. W. Thomas
Eugene A. Perrin.

Inventor:

Georg Schwabe

By *Alfred duRoi*

Attorney.

UNITED STATES PATENT OFFICE.

GEORG SCHWABE, OF BIALA, AUSTRIA-HUNGARY.

SHUTTLE-THROWING DEVICE FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 540,878, dated June 11, 1895.

Application filed November 30, 1894. Serial No. 530,512. (No model.)

To all whom it may concern:

Be it known that I, GEORG SCHWABE, a subject of the Emperor of Austria-Hungary, residing at Biala, in the Empire of Austria-Hungary, have invented new and useful Improvements in Shuttle-Throwing Devices for Looms, of which the following is a specification.

In the various looms now in use, with the exception of the so-called "spring-loom," the shuttle (whether under or over) is thrown by the well-known mechanism wherein the eccentric or cam-projection, mounted on the lay shaft or on a separate shaft, actuates a pin with a roller and spindle appertaining thereto, and consequently drives forward the throw-sector secured to it, as well as (by means of a pawl or clink) the loosely mounted throw-lever, and thereby the picker-shaft, thus setting the shuttle in motion. The return of the roller and spindle together with the sector is effected by the tapering form of the cam-projection or nose. For this purpose a tension-spring presses the roller firmly to the latter. In order that the throw-lever (mounted loosely on the throw-shaft) and the picker-shaft may also be similarly actuated by the said tapering cam-projection, a second tension spring, secured to the throw-lever presses the lever closely to the sector. The power, exerted by the springs, must be in exact proportion to the speed or number of revolutions of the loom. The throw-lever and picker-shaft, with the picker, move freely on the band springs, upon the picker-guide, which springs by their compression and contraction, in combination with the other springs of the whole apparatus, must be adapted to create such a resistance as to take up or absorb the force developed by the throw. These spring-devices do not last long. The resistance of the springs is constantly diminishing, while the force of the throw increases in the same proportion. The consequent derangements, and the excessive wear developed in all the parts, as well as the great and constantly increasing consumption of power, diminish the efficiency of the loom, especially at high speeds.

The new shuttle-throwing device, which is the subject of this invention completely obviates these defects. In lieu of the eccentric

or cam-projection with the necessary tension springs, by means of which a positive motion in one direction only is obtainable, is substituted a revolving crank, which by means of the mechanism appertaining thereto is in constant connection with the throw-sector, so that all the movements thus generated in the sector, viz., a rapid outward swing for the stroke, a slow return on the completion of the stroke, and a long period of complete rest, during which the rise and fall of the pawl or clink are provided for, are rendered compulsory and unalterable.

In the accompanying drawings, Figure 1 is a side elevation of the arrangement of parts constituting my invention. Fig. 2 is a front elevation thereof. Figs. 3, 4, 5, and 6 illustrate the various principal positions of the same. Fig. 7 is a detail view of the safety-joint.

The crank *d* is connected by its crank-pin *e* and link *f* with the pivot-pin *g*, which latter is at the same time the connecting pivot-pin of the bent lever *h* and the connecting-rod *h'*, so that all circles struck from the point of suspension of the bent lever *h* as a center, and from the end of the connecting rod *h'* as a center, respectively, must pass through the center of the connecting pivot *g* (Fig. 5). At the outer end of the connecting rod *h'* is located a pin *k* through which it actuates the throw-sector *l*, which is secured on the throw-shaft *o*, whereon is also loosely mounted the throw-lever *p*, which has secured to it by the pivot-pin *g* the pawl or clink *r*, which is actuated from the lay actuated lever *r'*. The clink *r*, when dropped, encounters the nose or projection cast on the sector *l*, and the driver or projecting tooth *l'* (also cast on the sector) engages laterally (Fig. 4) with the corresponding tooth *p'* cast on the throw-lever *p*, so that the latter and the sector *l* are firmly engaged together, on the one hand by the two teeth *l' p'* and on the other hand by the clink or pawl *r*, when let fall in front of the nose or projection of the sector *l*.

The pin *p²* of the throw-lever *p* is connected with the throw-arm or picker-shaft *t*, by a wooden tension-bar *s* having its end affixed to the latter to be movable vertically. The throw-arm or picker-shaft *t* can turn on a pin *u* and its upper end is secured to the leather

picker *v*. The tension-bar is fitted with a usual safety-joint or hinge, the construction of which is shown on an enlarged scale in Fig. 7.

- 5 From the pin *m* on the throw-sector a tension-bar *n* is carried to the left side of the loom.

The action of the crank *d* during one revolution, upon the point *k* of the throw-sector *l* is as follows: The crank *d* rotating in the direction indicated by the arrow (Fig. 2, commencing position, and Fig. 5) communicates its movement first of all by the link *f* to the linking center *g* and there develops a reciprocating or to-and-fro-motion. As, in order to effect the throw, a forward movement or thrust of the point *g* during a very small portion of a revolution of the crank *d*, i. e., from *e'* to *e''*, in the diagram Fig. 5, is required the link *f* is made somewhat longer than the crank-radius, on the one hand, while on the other, the position of the point of suspension *i* and the length of the bent lever *h* are so arranged that the forward movement of the same at the point *g* is opposed to that of the rotation of the crank *d* and therefore the crank-point (or dead-point) at the extreme outward limit of the swing, approaches nearer to the commencing point of the reciprocating motion. The quick swing outward of the connecting joint *g* further generates a co-operative working of the bent lever *h* and connecting rod *h'*, which causes an upward swing of the point *k* of the throw-sector *l* and thereby produces the requisite throw-movement or action in the latter. This action is transmitted from the sector *l* by the clink or pawl *r*, throw lever *p* and wood-tension bars *s*, to the throw-arm or picker-shaft *t* and picker *v*, by which the shuttle is thrown. After the crank *d* and link *f* have brought the connecting point *g* to its highest position (Fig. 3), the crank, *d*, as the rotation proceeds, commences a retrograde movement, while still advancing circumferentially; and consequently, after a brief period of rest, the inward swing of the bent lever *h* and connecting point *g* commences, the direction of the movement being contrary to that, which has just terminated, and therefore now coincident with that of the crank-rotation. Thereupon follows a gradually diminishing backward movement (in a circular arc as shown in Fig. 5) of the point *g* during the return stroke, which is prolonged while the crank traverses the major part of the periphery of its circle of rotation; and simultaneously the return swing of the bent lever *h* in conjunction with the connecting rod *h'* proceeds, whereby through the joint *k*, the throw-sector *l*, lever *p* and tension-bar *s*, the throw-arm or picker-shaft *t* and picker *v* are slowly returned to their normal position, preparatory to the next shot or pick, as shown in Fig. 6. Although, during the latter portion of this revolution of the crank *d*, the connecting point *g* of the bent lever *h* and connecting rod *h'* undergo

a corresponding inward oscillation, while the crank itself passes the lowest point of its movement and continues its upward course, this has no effect upon the position of the point of connection *k* with the sector *l* because the points *g* and *k* as well as the sector *l* and the throw-lever *p* become stationary in the position shown in Fig. 6 during the inward bending of the joint *g* and so remain until the crank pin *e* once more arrives at the commencing point *e'* of the next throw (Figs. 2 and 5), when the outward swing and sudden displacement (causing the pick or shot) recur.

During the period of immobility of the throw-sector *l*, the pawl or clink *r* may be raised or lowered at pleasure. The throw-lever *p* rests against the skewback or abutment *y*, while the teeth *l'* and *p'* remain in contact, and a certain amount of play is given to the pawl or clink *r*, to allow of its rise and fall. When the pawl is lifted, the throw-lever *p* is left undisturbed, resting against *y*, unaffected by the outward swing of the feed sector *l* which through pivot *m* and the tension-bar *n*, then operates the throw-lever of the left side of the loom for the return pick or shot, to throw the shuttle back again. The rotating crank *d* is firmly mounted on a shaft *c*, to which is keyed the bevel-wheel *b'* driven by the bevel-wheel *b* cast on the main driving wheel of the power loom.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, I declare that what I claim is—

1. A shuttle throwing device for power looms comprising a rotary shaft, a crank mounted thereon, a vibrating lever *h* provided with a pivot-pin *g*, a link *f* coupled to the crank and pivot-pin, a throw-sector *l* connected with the pivot-pin *g*, a throw-lever *p*, a separable coupling uniting said lever and the throw-sector, a picker-arm *t*, and a connection between the same, and the throw-lever, substantially as described.

2. A shuttle throwing device for power looms comprising a rotary shaft, a crank mounted thereon, a vibrating lever *h* provided with a pivot-pin *g*, a link *f* coupled to the crank and pivot-pin, a throw-sector *l* connected with the pivot-pin *g*, a throw-lever *p* provided with a pawl engaging the throw-sector, a lever *r'* connected with said pawl and actuated by the lay, a picker-arm *t*, and a connection between the same and the throw-lever, substantially as described.

3. A shuttle throwing device for power looms comprising a rotary shaft *c*, a crank mounted thereon, a lever *h* having its free end provided with a pivot-pin, a link *f* connecting said pin with the crank pin, a throw-sector *l*, a rod *h'* connecting the latter with the pivot-pin *g*, a throw-lever *p* in engagement with the throw-sector and provided with a pawl *r* engaging the throw-sector, a lever *r'* actuated by the lay and connected with said pawl, a

picker-arm *t*, and a tension-bar *s* connecting the throw-lever with the picker-arm, substantially as described.

5 4. A shuttle throwing device for power looms consisting of a rotary shaft *c*, a crank *d* with a crank-pin *e*, a curved vibrating lever *h* mounted on a separate stud *i* and provided at its outer end with a pivot-pin *g*, a link *f* engaged at its ends by the crank-pin *e* and pin
10 *g*, a shaft *o*, a fixed throw-sector *l* on said shaft provided with pivot-pins *k* and *m*, a rod *h'* connecting the pivot-pins *g* and *k*, a throw-lever *p* loosely mounted on shaft *o* and pro-

vided at its end with a pawl *r*, a lever *r'* actuated by the lay and connected with said pawl, 15 a picker-arm *t*, and a connection *s* between the latter and the lever *p*, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of 20 two subscribing witnesses.

GEORG SCHWABE.

Witnesses:

ANTON BUDZIKIEWICZ,
KARL SCHMIDT.