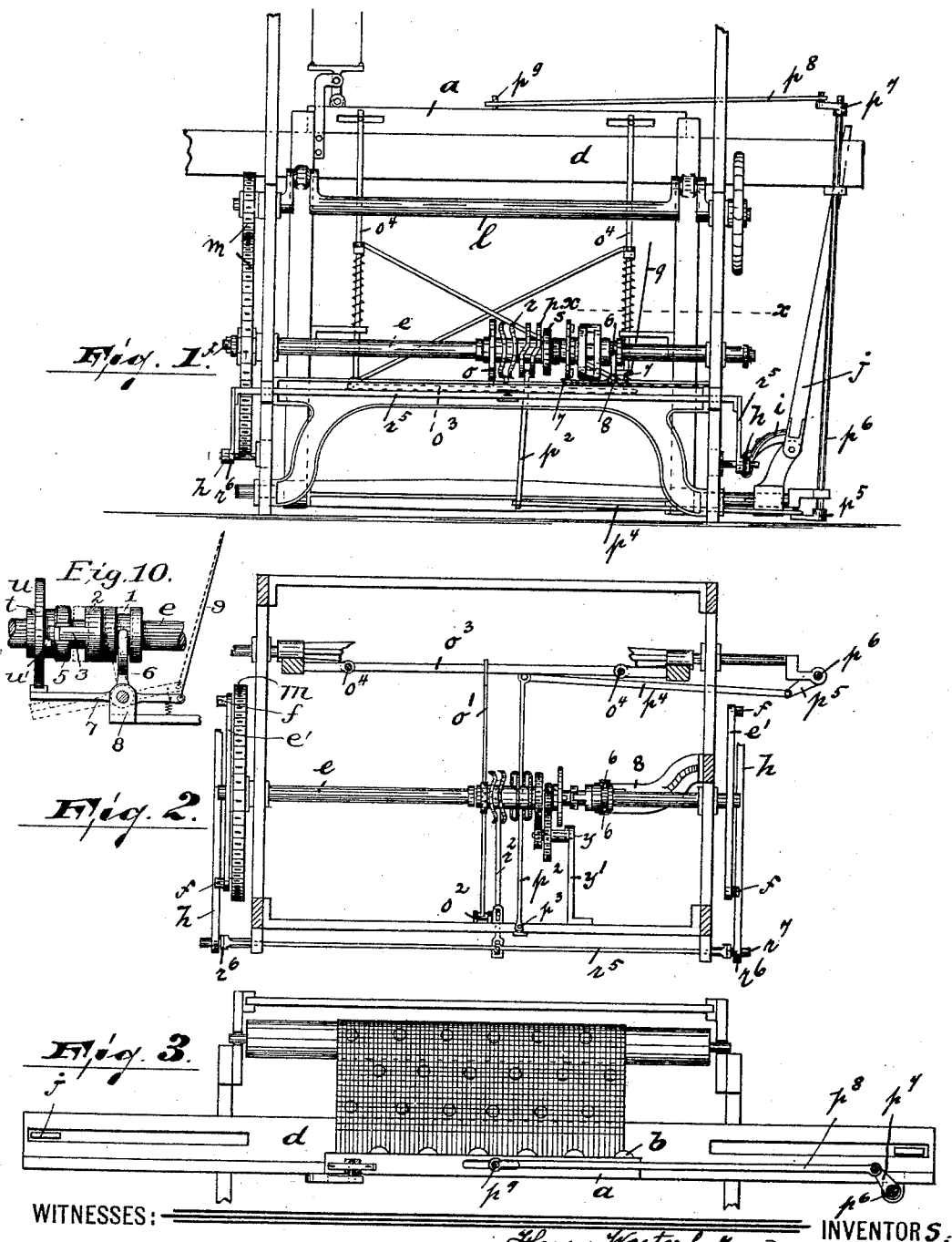


2 Sheets—Sheet 1.

No. 519,802.

Patented May 15, 1894.



Wm. D. Bell.
D. M. Robertson.

Henry Westerhoff and
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BY

Gartner & Co

INVENTORS:

ATTORNEYS

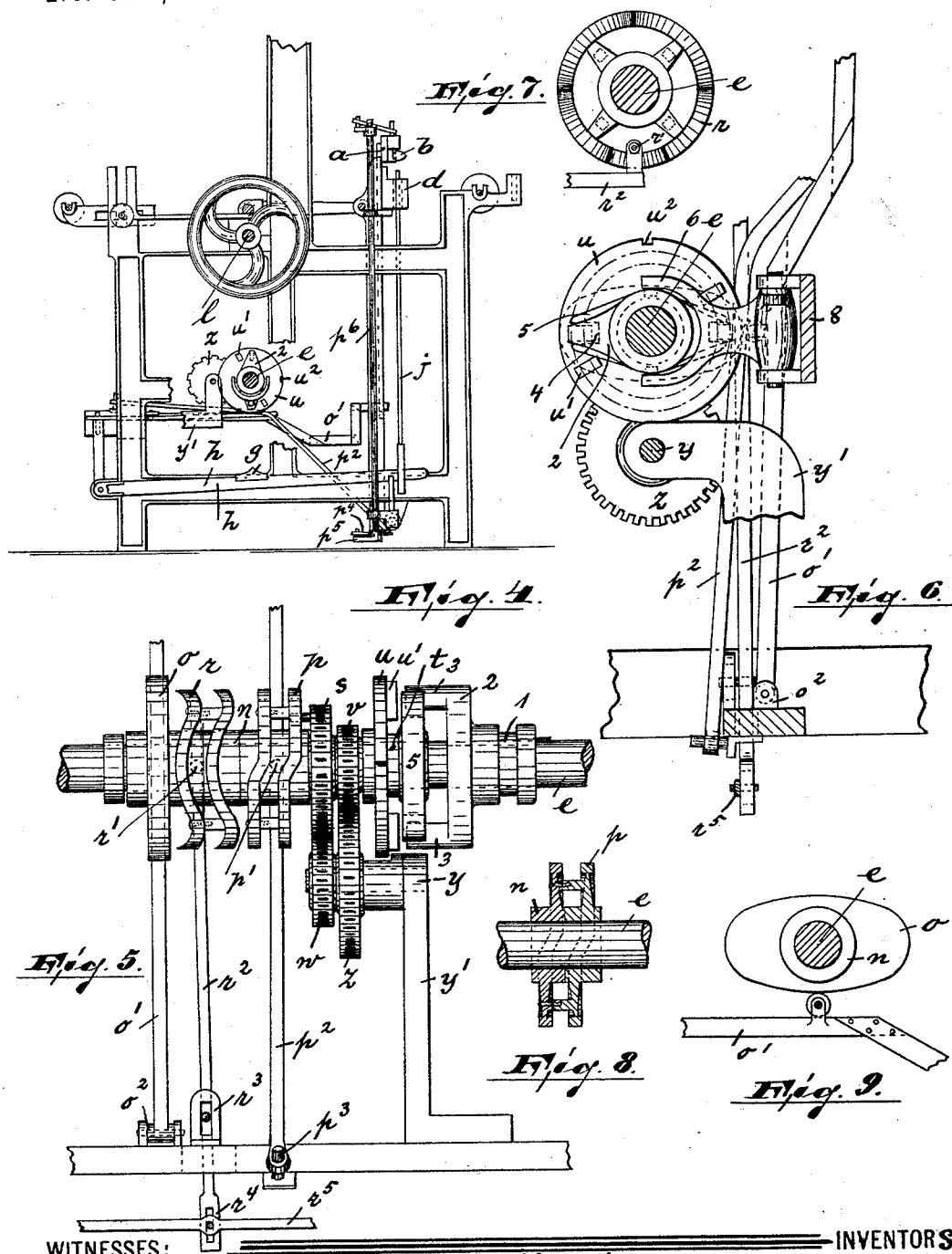
(No Model.)

2 Sheets—Sheet 2.

H. & P. D. WESTERHOFF.
SWIVEL LOOM.

No. 519,802.

Patented May 15, 1894.



WITNESSES:

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UNITED STATES PATENT OFFICE.

HENRY WESTERHOFF AND PETER D. WESTERHOFF, OF PATERSON, NEW JERSEY.

SWIVEL-LOOM.

SPECIFICATION forming part of Letters Patent No. 519,802, dated May 15, 1894.

Application filed August 12, 1893. Serial No. 483,000. (No model.)

To all whom it may concern:

Be it known that we, HENRY WESTERHOFF and PETER D. WESTERHOFF, citizens of the United States, residing in Paterson, county of Passaic, and State of New Jersey, have invented certain new and useful Improvements in Swivel-Looms; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters and figures of reference marked thereon, which form a part of this specification.

Our invention relates to a new and useful improvement in swivel looms and particularly to that portion of the mechanism of the loom designed at stated intervals to operate the swivel shuttle rack by bringing said rack into engagement with the main driving mechanism.

The invention consists in the combination and arrangement of parts hereinafter more fully described and claimed.

In the drawings Figure 1 is a rear view of a loom embodying our invention, certain portions of the same being removed in order to more clearly show the swivel shuttle rack operating mechanism. Fig. 2 is a top plan view of the same taken on the line *xx* Fig. 1. Fig. 3 is a detail top plan view of the swivel shuttle beam and adjacent parts slightly enlarged. Fig. 4 is a side elevation of the improved loom. Fig. 5 is a top plan view enlarged of the mechanism designed to bring the swivel shuttles into operation. Fig. 6 is a side view thereof. Fig. 7 is a vertical section taken through the center of the cam or worm designed to shift the picker stick levers; Fig. 8 is a transverse sectional view of the cam or worm designed to actuate the mechanism for operating the swivel shuttle rack and, Fig. 9 is a side view of a cam arm adapted to lower the swivel shuttle beam, and Fig. 10 is a detailed side view of the lever which serves to throw the swivel operating mechanism into and out of gear.

In said drawings *a* represents the swivel shuttle beam containing the usual swivel shuttle rack adapted to shift the swivel shuttles *b* back and forth. This beam *a* is mount-

ed on the lay *d* of the loom in the usual manner. Situated in suitable bearings in the loom frame is the cam shaft *e* to which is secured the arm *e'* which carries the picker balls *f*, adapted to strike upon a shoe *g* (see Fig. 4) on the picker stick lever *h* and to thereby operate through the flexible connection *i* the picker sticks *j* all in the usual well known way. The cam shaft *e* receives its motion from the driving shaft *l* by means of suitable gearing *m*. Secured loosely on said cam shaft *e* (that is to say not revolving therewith) is a sleeve *n* (see Fig. 5) carrying a cam *o* and a two and four throw cam or worm, respectively designated *p* and *r*. The sleeve *n* also carries a gear wheel *s*. Rotating loosely on the cam shaft *e* is placed another sleeve *t* carrying a disk *u* and a gear wheel *v*. The sleeves *n* and *t* are geared together by the gear wheels *w* and *z* rotating on a stud *y* placed in a suitable bearing on a bracket *y'* of the loom frame. The relative diameter of these gears is so calculated that the sleeve *n* will be rotated at one-half the speed of the sleeve *t*.

Splined to the cam shaft *e* is an annularly grooved sleeve 1 carrying a forked plate 2, the prongs 3 of which are guided in recesses 4 (see Fig. 6) of a disk 5 keyed to the cam shaft *e*. These prongs 3 are adapted when the sleeve 1 and plate 2 are slid over on the cam shaft as hereinafter more fully explained to engage the projections *u'* on the face of the disk *u* and to thereby rotate said disk. The sleeve 1 is slid on the shaft by means of a fork 6 secured to a lever 7 which is pivoted in a bracket 8 of the loom frame. One arm of this lever 7 is connected by the cord 9 (see Fig. 1) to the jacquard while the other end rests on the periphery of the disk *u* and is adapted to fit into a recess or recesses *u''* thereof, and to thereby instantly stop the rotation of said disk.

The two throw cam or worm *p* operates through a pin *p'* a lever *p''* pivoted as at *p'''* to the loom frame. The free end of this lever *p''* is pivoted on one end of a link *p''''* (see Fig. 2), the other end of said link being pivoted to an arm or crank *p'''''* of the vertically disposed rocking shaft *p''''''*. This rocking shaft *p''''''* is held in suitable bearings upon the swinging lay and is connected through the arm *p'''''''* and

rod p^8 to the driver p^9 of the swivel shuttle rack.

The four throw cam or worm r operates through a pin r' a lever r^2 adjustably secured as at r^3 to the loom frame and at its end as at r^4 to the link r^5 , which connects the ends of the picker stick levers. The ends of the picker stick levers terminate in a sleeve r^6 which slides on studs r^7 projecting from the sides of the loom frame. The link r^5 , when shifted by the worm r and by the pin r' and lever r^4 slides these sleeves r^6 on the studs r^7 to bring the levers h alternately in and out of engagement with the picker balls.

The cam o on the cam shaft e rests over and is adapted when rotated to depress an arm o' pivoted as at o^2 to the loom frame; the free end of the arm projecting over a bar o^3 connecting the ends of the spring controlled rods o^4 which are adapted when the bar o^3 is depressed to lower the swivel shuttle beam against the action of the springs of said rods o^4 .

The operation is as follows: When the swivel shuttles are desired to make a pick in the fabric, the jacquard cord 9 is raised and the fork 6 actuated. The sleeve 1 is slid on the cam shaft carrying with it the forked plate 2, which, through the contact of its prongs 3 with the projections u' , then rotates the disk u , the end of the lever 7 being drawn out of the recess u^2 in the periphery of the disk u . The disk u through its sleeve t and the intermediate gearing rotates the sleeve n , its cam o and the two and four throw cams or worms p and r respectively. The cam o in rotating depresses the arm o' and thereby brings the swivel shuttle beam down into position for weaving. The two throw cam or worm p through pin p' and intermediate connections then operates the rocking shaft p^6 which in turn through its intermediate connections operates the swivel shuttle rack to make a pick of the swivel shuttles. The four throw cam or worm r through the pin r' and intermediate connections shifts the picker stick levers out of alignment with the picker stick balls, so that the fly shuttle is at rest on one or the other side of the loom for one pick. This operation continues as long as the jacquard calls for swivel weaving, that is to say, for every revolution of the cam shaft there are alternate fly shuttle and swivel shuttle picks because the cam shaft revolves twice as rapidly as the sleeve carrying the two and four throw cams or worms which actuate the swivel shuttle rack and shift the picker stick levers. Should more than one swivel pick be desired for each pick of the fly shuttle, as for instance, where two or more colors of swivel weaving are to be woven, I arrange in the periphery of the disk u a second recess u^2 diametrically opposite to the first recess u^2 . Into this recess u^2 the outer arm of lever 7 is adapted to fit to stop the revolution of the disk u and the sleeve n , cam o and cams or worms p and r , when the mechanism has reached a position, where the picker stick le-

vers have been shifted out of engagement with the pickerstick balls. The swivel mechanism is stopped in such position for that half a revolution of the cam shaft e , in which ordinarily the fly shuttle is actuated and a fly shuttle pick is thereby dropped, the next half revolution of the cam shaft e resulting in a swivel pick by reason of the jacquard cord releasing the disk u by disengaging the arm of lever 7 from the recess in its periphery.

It is obvious that an innumerable number of picks of swivel may follow each other, there being of course a dead pick for the usual pick.

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

1. In a loom, the combination of a cam shaft, an annularly grooved sleeve splined thereto, a forked plate carried by said sleeve, a disk keyed upon the shaft and, recessed to form a guide for the forks of said plate, a sleeve rotating loosely on said cam shaft, a disk carried thereby and provided with projecting lugs adapted to engage the forks of the forked plate when said plate and its sleeve are slid on the cam shaft, with a second sleeve rotating loosely on said cam shaft, a two throw cam or worm carried by said sleeve, a system of gearing connecting the two loose sleeves together, so that they rotate respectively at different speeds, and with the swivel shuttle rack, a vertically disposed rocking shaft, arms on said rocking shaft and a link connecting one of said arms with the swivel shuttle rack, and with a lever pivoted to the loom frame, a pin connecting said lever with the cam or worm, and a link connecting said lever with the other of said arms on the rocking shaft, and with a lever carrying a fork and pivoted in the loom frame, said fork being adapted when one arm of said lever is elevated to slide the annularly grooved sleeve on the cam shaft and to thereby bring the forked plate into engagement with the disk carrying the projecting lugs, substantially as described.

2. In a loom, the combination of a cam shaft, an annularly grooved sleeve splined thereto, a forked plate carried by said sleeve, a disk keyed upon the said shaft and, recessed to form a guide for the forks of said plate, a sleeve rotating loosely on said cam shaft, a disk carried thereby and provided with projecting lugs adapted to engage the forks of the forked plate when said plate and its sleeve are slid on the cam shaft, with a second sleeve rotating loosely on said cam shaft, a two throw cam or worm carried by said sleeve, a system of gearing connecting the two loose sleeves together, so that they rotate respectively at different speeds, and with the swivel shuttle rack, a vertically disposed rocking shaft, arms on said rocking shaft and a link connecting one of said arms with the swivel shuttle rack, and with a lever pivoted to the loom frame, a pin connecting said lever with the cam or worm, a link connecting said lever with the

other of said arms on the rocking shaft, and with a lever carrying a fork and pivoted in the loom frame, said fork being adapted when one arm of said lever is elevated to slide annularly the grooved sleeve on the cam shaft and to thereby bring the forked plate into engagement with the disk carrying the projecting lugs, said disk being provided with a recess on its periphery into which the other arm of said lever carrying the fork is adapted to enter to stop the rotation of said disk, substantially as described.

3. In a loom, the combination of a cam shaft, an annularly grooved sleeve splined thereto, a forked plate carried by said sleeve, a disk keyed upon the shaft and, recessed to form a guide for the forks of said plate, a sleeve rotating loosely on said cam shaft, a disk carried thereby and provided with projecting lugs adapted to engage the forks of the forked plate when said plate and its sleeve are slid on the cam shaft, with a second sleeve rotating loosely on said cam shaft, a two throw cam or worm carried by said sleeve, a system of gearing connecting the two loose sleeves together, so that they rotate respectively at different speeds, and with the swivel shuttle rack, a vertically disposed rocking shaft, arms on said rocking shaft and a link connecting one of said arms with the swivel shuttle rack, and with a lever pivoted to the loom frame, a pin connecting said lever with the cam or worm, a link connecting said lever with the other of said arms on the rock-

ing shaft, and with a lever carrying a fork and pivoted in the loom frame, said fork being adapted when one arm of said lever is elevated to slide the annularly grooved sleeve on the cam shaft and to thereby bring the forked plate into engagement with the disk carrying the projecting lugs, and with the picker balls carried thereby, the picker stick, picker stick levers and flexible connections between the same, and shafts on which the ends of the picker stick levers are adapted to slide, with means for communicating required reduced motion from the cam shaft to said loosely rotating sleeve, a four throw cam or worm carried by said sleeve, a lever pivoted to the loom frame, a pin connecting said lever to said worm so as to give said lever a reciprocating motion, a link connecting the ends of said picker stick levers with the reciprocating lever, all arranged so that when said worm is rotated the picker stick levers through the intermediate connection will be shifted on their shafts alternately into and out of alignment with the picker balls, substantially as described.

In testimony that we claim the foregoing we have hereunto set our hands this 20th day of July, 1893.

HENRY WESTERHOFF.
PETER D. WESTERHOFF.

Witnesses:

HENRY E. EVERDING,
JACOB KEYSER.