No. 698,203. Patented Apr. 22, 1902.

G. F. HUTCHINS & J. T. CYR.

SWIVEL LOOM.

(Application filed Dec. 11, 1901.)

(No Model.)

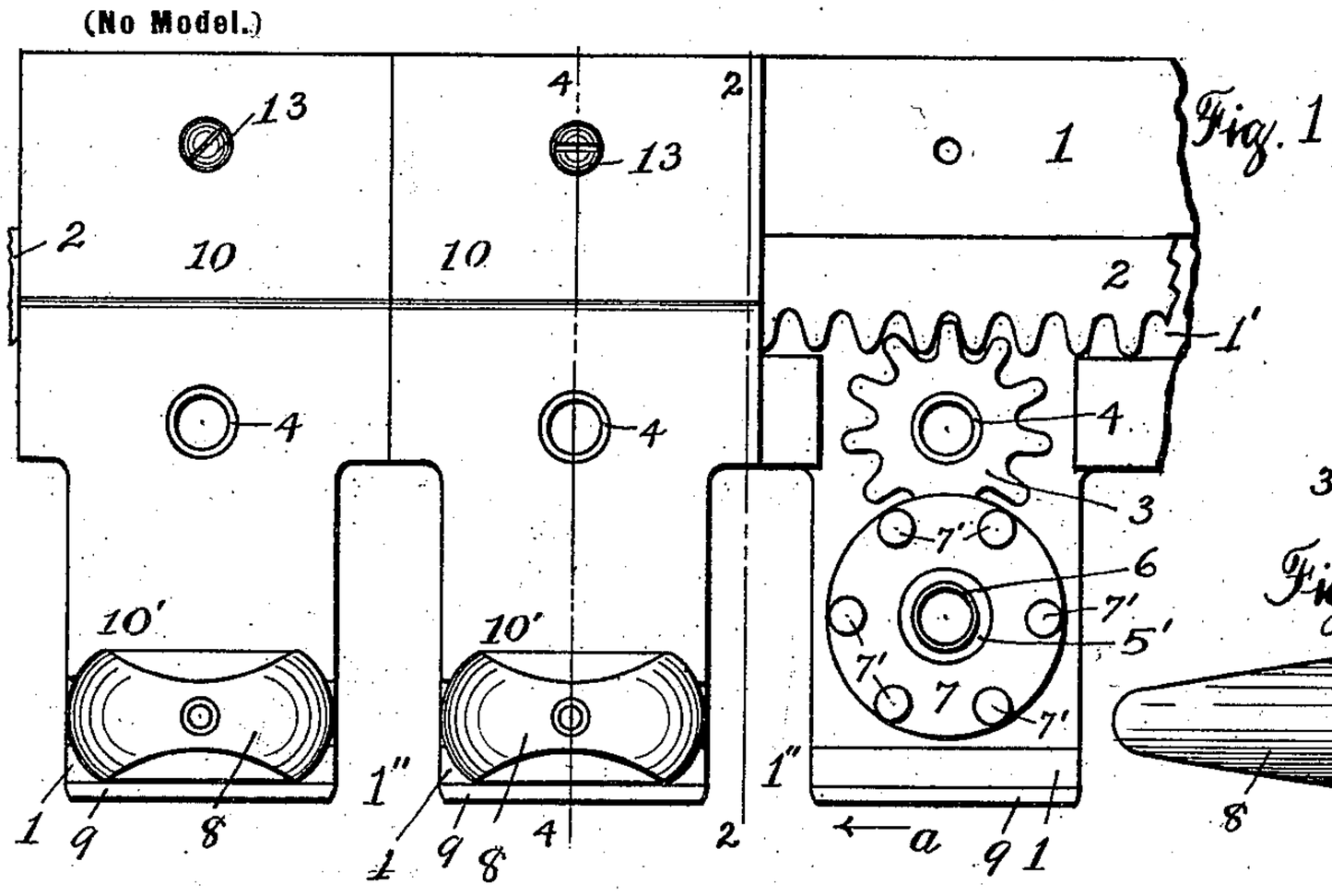

Fig. 1

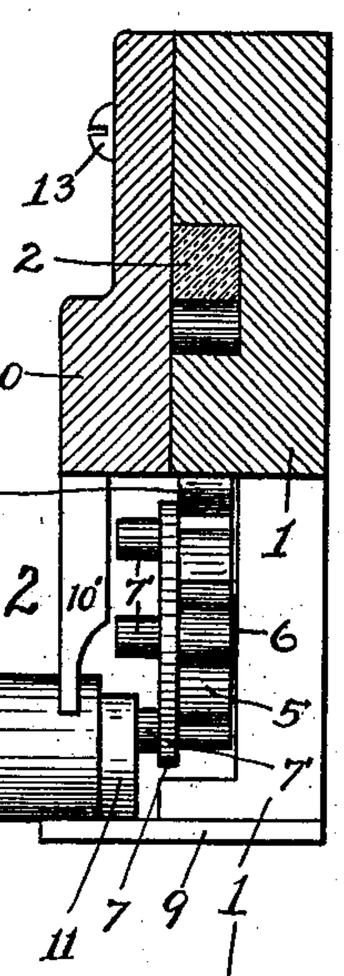

Fig. 2

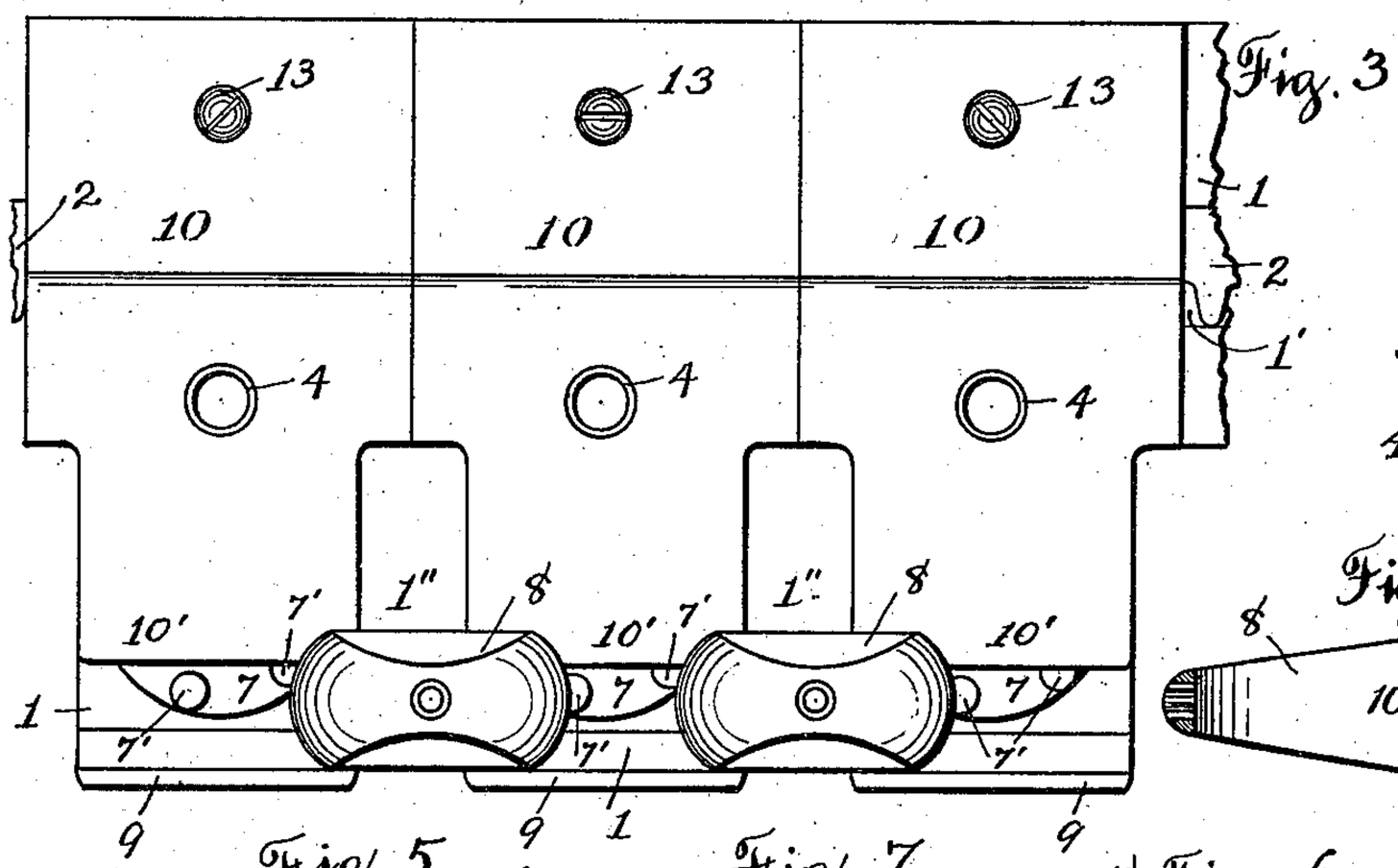

Fig. 3

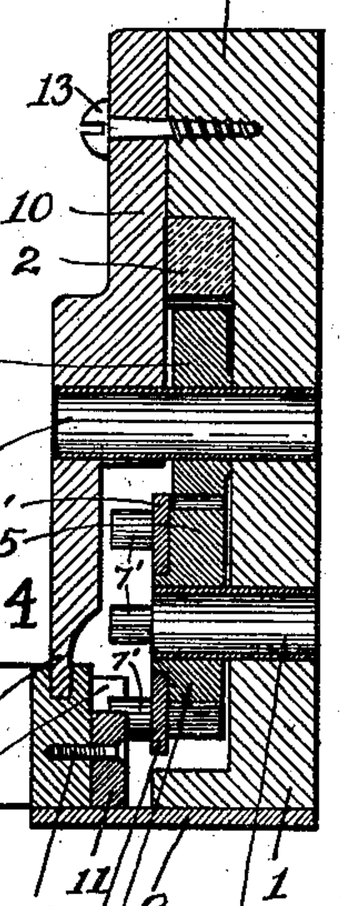

Fig. 4

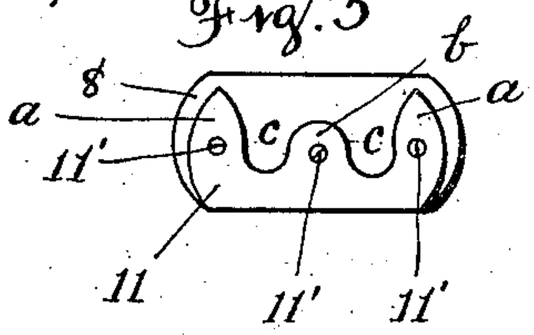

Fig. 5

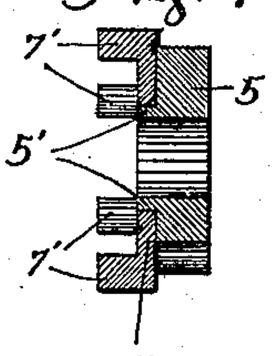

Fig. 7

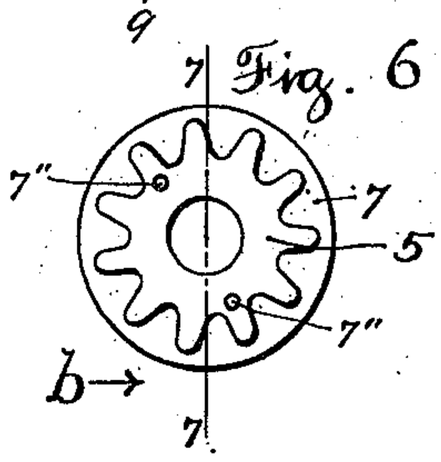

Fig. 6

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UNITED STATES PATENT OFFICE.

GEORGE F. HUTCHINS AND JOSEPH T. CYR, OF WORCESTER, MASSACHUSETTS, ASSIGNORS TO CROMPTON & KNOWLES LOOM WORKS, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

SWIVEL-LOOM.

SPECIFICATION forming part of Letters Patent No. 698,203, dated April 22, 1902.

Application filed December 11, 1901. Serial No. 85,422. (No model.)

To all whom it may concern:

Be it known that we, GEORGE F. HUTCHINS and JOSEPH T. CYR, citizens of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have jointly invented certain new and useful Improvements in Swivel-Looms, of which the following is a specification.

Our invention relates to swivel-looms, and more particularly to the shuttle-motion of a swivel-loom in which a rack-and-pinion mechanism is used to communicate motion to the swivel-shuttles and cause them to have a reciprocating motion in a horizontal plane in the well-known way. In this class of looms it is very desirable to be able to weave with the swivel-shuttles spots or small figures close together in transverse lines on the face of the fabric and at the same time to have the spaces between the blocks carrying the shuttles, into which spaces the warp-threads enter during the operation of weaving the spots or small figures, as wide as possible, so that larger spots or figures can be woven than could be if said spaces were narrower. In order to weave spots or small figures close together transverse of the fabric and to have the ordinary width of space between the shuttle-blocks, the distance between the centers of the swivel-shuttles must be as little as possible.

Heretofore in the ordinary construction of swivel-looms, in which the swivel-shuttles have a reciprocating motion in a horizontal plane through a pinion driven by a rack and meshing directly with a rack on the inner end of the swivel-shuttle, it has not been found practical to keep the same width of the space between the shuttle-blocks and reduce the amount of travel of each swivel-shuttle, so that the distance between the centers of the shuttles has to be considerable—for example, two inches or more—and therefore the spots or small figures woven by the swivel-shuttles cannot be at a less distance apart.

The object of our improvements is to make an improved driving mechanism for swivel-shuttles, by means of which the amount of travel of each swivel-shuttle in a horizontal plane is reduced, so that the centers of the swivel-shuttles can be closer together, thus bringing the spots or small figures transverse of the fabric nearer together, and at the same time the ordinary width of the spaces between the shuttle-blocks is maintained, so that the size of the spots or small figures need not be reduced, as will be hereinafter described.

Our invention consists in certain novel features of construction of our improvements, as will be hereinafter fully described.

We have only shown in the drawings sufficient portions of the swivel-shuttle mechanism of a loom with our improvements applied thereto to enable those skilled in the art to which our invention belongs to understand the construction and operation thereof.

Referring to the drawings, Figure 1 is a front view of a portion of a swivel-shuttle-driving mechanism embodying our improvements with a face-plate at one end removed. Fig. 2 is a vertical cross-section on line 2 2, Fig. 1, looking in the direction of arrow *a*, same figure. Fig. 3 corresponds to Fig. 1, but shows the swivel-shuttles in their middle position. Fig. 4 is a vertical cross-section on line 4 4, Fig. 1, looking in the direction of arrow *a*, same figure. Fig. 5 is an inner end view of the shuttle detached, showing the toothed segment or rack thereon. Fig. 6 is a rear view of the pin-carrying disk, showing the pinion to which the disk is attached; and Fig. 7 is a section on line 7 7, Fig. 6, looking in the direction of arrow *b*, same figure.

In the accompanying drawings, 1 is the back plate, having a longitudinal recess 1′ therein for the horizontally moving and reciprocating toothed rack 2 in the ordinary way.

The lower part of the back plate 1 has a series of open-end slots 1″ in the ordinary way and is recessed on its front surface to receive the pinions 3, each loosely mounted on a tube 4, fast in the back plate 1 in the ordinary way, and the pinions 5, each extending below a pinion 3 and meshing therewith and loosely mounted on a tube 6, fast in the back plate 1. (See Fig. 4.)

Upon an annular extension 5′ on the front side of the pinion 5 is mounted a disk 7, having a series of pins 7′ (six in number in this instance) extending out at right angles from

the front face of said disk. The disk 7 is in this instance secured to the pinion 5 by rivets 7″, Fig. 6.

The swivel-shuttles 8 are supported at their lower edges on a plate 9, secured to the lower edge of the plate 1, and have a groove in their upper edges to receive an extension 10′ on the lower edge of the face-plates 10 in the ordinary way. The face-plates 10 extend over the rack-and-pinion mechanism and are recessed upon their lower inner surface (see Fig. 3) and are secured to the back plate 1 in the ordinary way by screws 13. The tubes 4 extend through and have a bearing in the plates 10.

Upon the inner end of each swivel-shuttle 8 is a toothed segment or rack 11, secured thereto by screws 11′ and preferably of the shape shown in Fig. 5, having the two longer end teeth *a a* and the intermediate shorter tooth *b* and the two recesses *c c* between the teeth.

A reciprocating motion is communicated to the toothed rack 2 in the ordinary way and through pinions 3 and 5 to the disk 7, carrying the pins 7′, which in the revolution of said disk come into engagement with one end tooth *a* of the toothed segment 11 on the back of a swivel-shuttle 8 and enter into the recesses *c c* between the teeth *a a* to move the swivel-shuttle first in one direction and then in the other across the open-end slots 1″, as shown in Fig. 3.

It will be seen that by means of the pin 7′ on the disk 7 (which is rotated from the rack 2 through pinions 3 and 5) and the long teeth *a a* on the toothed segment 11 on the swivel-shuttle 8 the beginning of the rotation of the disk 7 will cause one of the pins 7′ (which are arranged on the disk 7 to correspond with the distances between the longer teeth *a a* of the toothed segment 11) to engage one of the teeth *a a* and move the shuttle, and the continued revolution of the disk 7 carries the swivel-shuttle from one extreme position to its other extreme position.

By means of the pins 7′ on the disk 7 and the toothed segment or rack 11 on the swivel-shuttle 8 the amount of travel or motion of each shuttle is reduced, so that the swivel-shuttles can be placed nearer together and the distances between their centers reduced, thus permitting of the weaving of spots or small figures transverse of the fabric nearer together.

It will be understood that the details of construction of our improvements may be varied, if desired. The intermediate pinion 3 may be omitted and the rack 2 mesh directly with the pinion 5, connected with the disk 7. The intermediate pinion 3 is used to allow the rack 2 to be placed in its usual position at the upper part of the back plate 1.

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

1. In a swivel-shuttle motion, in which the swivel-shuttles have a reciprocating motion in a horizontal plane, the combination with a rack, a disk carrying a series of pins extending at right angles from the face thereof to engage a toothed segment or rack on the inner end of a swivel-shuttle, and mechanism intermediate the rack and disk, to rotate the disk by the movement of the rack, of said swivel-shuttle, having a toothed segment, or rack on its inner end, substantially as shown and described.

2. In a swivel-shuttle motion, in which the swivel-shuttles have a reciprocating motion in a horizontal plane, the combination with a rack, a disk carrying a series of pins to engage a toothed segment or rack on the inner end of a swivel-shuttle, and mechanism intermediate the rack and disk to rotate the disk by the movement of the rack, of said swivel-shuttle having a toothed segment or rack on its inner end, comprising two longer end teeth, an intermediate shorter tooth, and two recesses between the teeth, substantially as shown and described.

3. In a swivel-shuttle motion, in which the swivel-shuttles have a reciprocating motion in a horizontal plane, the combination with a rack, a pinion meshing therewith, a second pinion meshing with the first-mentioned pinion, a disk connected with the second-mentioned pinion and carrying a series of pins extending at right angles from the face thereof to engage a toothed segment or rack on the inner end of a swivel-shuttle, of said swivel-shuttle having a toothed segment or rack on its inner end, substantially as shown and described.

4. In a swivel-shuttle motion, in which the swivel-shuttles have a reciprocating motion in a horizontal plane, the combination with a rack, a pinion meshing therewith, a second pinion meshing with the first-mentioned pinion, a disk connected with the second-mentioned pinion and carrying a series of pins to engage a toothed segment or rack on the inner end of a swivel-shuttle, of said swivel-shuttle having a toothed segment or rack on its inner end, comprising two longer end teeth, an intermediate shorter tooth, and two recesses between the teeth, substantially as shown and described.

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