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PATENTED NOV. 27, 1906.

F. A. WHITMORE.  
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APPLICATION FILED JAN. 4, 1905.

2 SHEETS—SHEET 1.

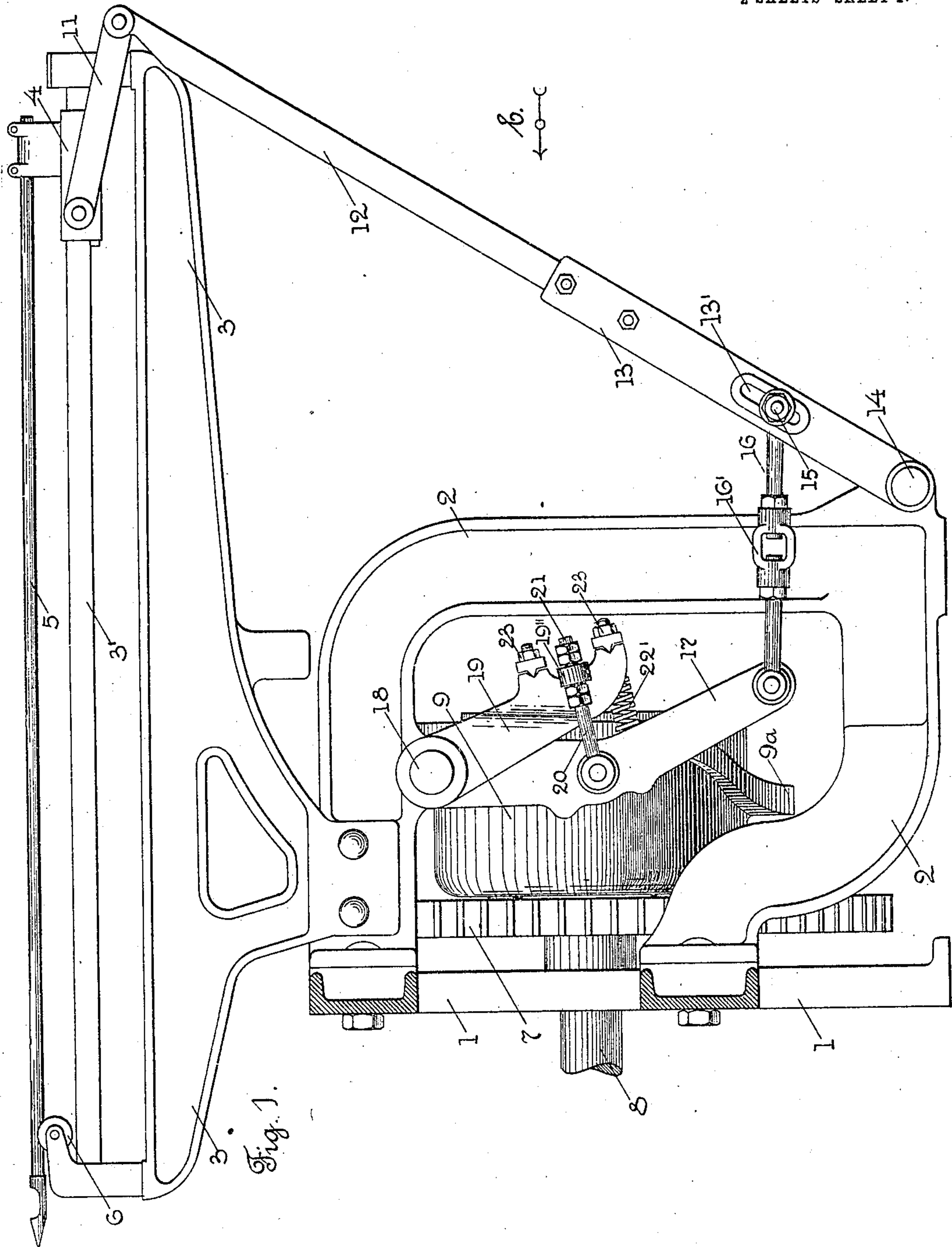


Fig. 1.

Witnesses  
M. B. Redt.  
W. H. Hens.

Inventor  
F. A. Whitmore.  
By John L. Dewey  
Attorney.

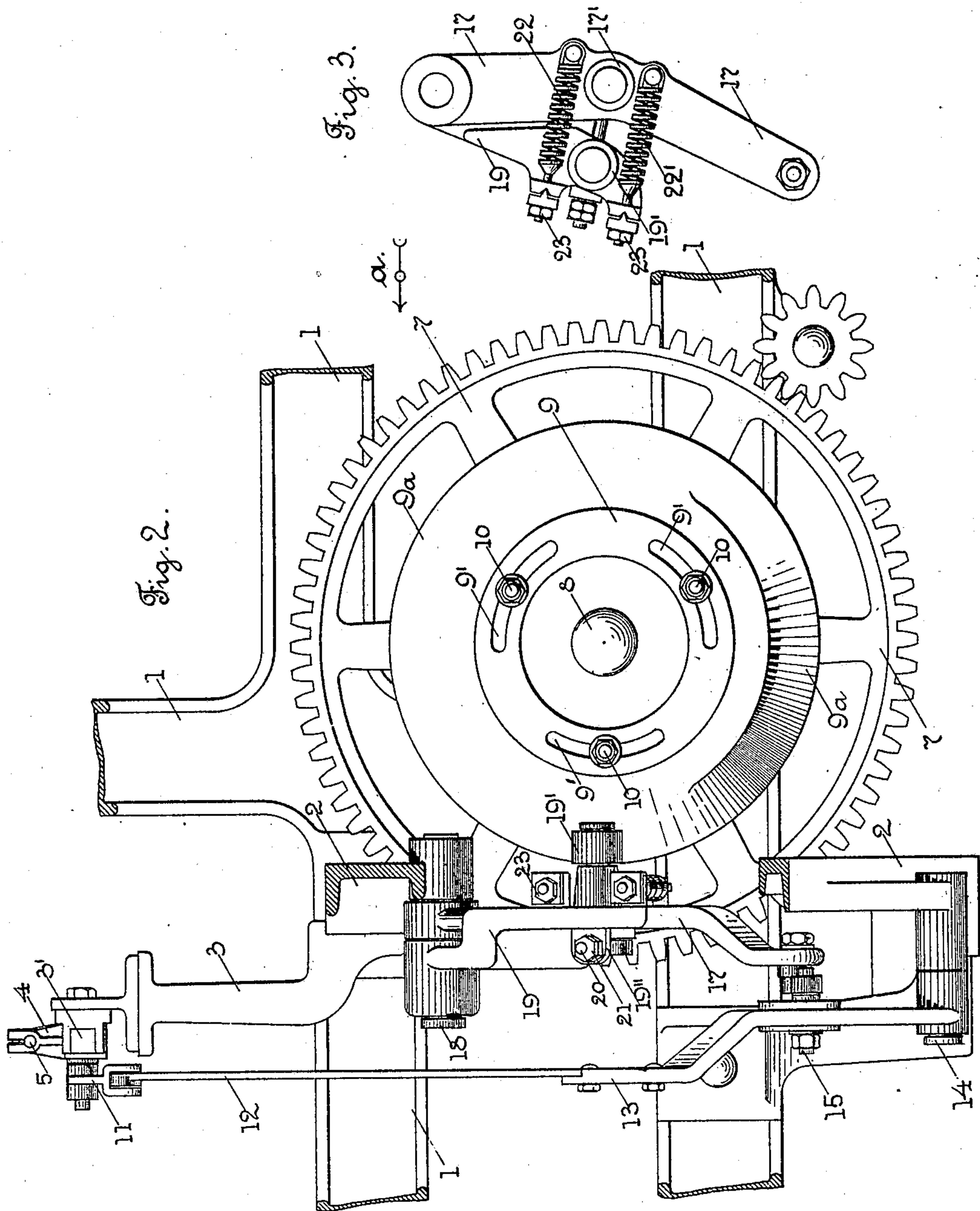
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M. Bredt.  
W. H. H. H.

Inventor  
F. A. Whitmore.  
By John L. Dewey.  
Attorney.



# UNITED STATES PATENT OFFICE.

FRED A. WHITMORE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO  
CROMPTON & KNOWLES LOOM WORKS, A CORPORATION OF MASSACHUSETTS.

## NEEDLE-MOTION FOR PILE-FABRIC LOOMS.

No. 837,019.

Specification of Letters Patent.

Patented Nov. 27, 1906.

Application filed January 4, 1905. Serial No. 239,588.

*To all whom it may concern:*

Be it known that I, FRED A. WHITMORE, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Needle-Motions for Pile-Fabric Looms, of which the following is a specification.

My invention relates to a needle-motion for pile-fabric looms, and particularly to the class of needle-motions shown and described in United States Letters Patent No. 740,903, in which the needle which carries the weft or filling thread is inserted and withdrawn from one side of the loom. In this class of needle-motions it is very desirable that the needle carrying the weft or filling thread should be inserted and withdrawn very rapidly and with a quick movement, so as to allow the loom to run at considerable speed and produce more of the fabric. It is also desirable to have the needle-motion or the mechanism for operating the needle of simple construction and with few parts and to have the needle-lever operated directly from some driven part of the loom.

The object of my improvements is to provide an improved needle-motion of the class referred to of simple construction and operation.

In my improvements I use a driven rotary cam having an irregular cam-surface of the desired conformation on its periphery. The axis of rotation of said cam is at right angles to the fulcrum of the swinging needle-lever, and said cam is preferably adjustably connected with a driven gear and located close to the loom side or frame.

The fulcrumed or swinging needle-lever is directly connected with the operating-cam through a connector and a cam-lever, so that the motion of said cam is communicated directly to said needle-lever and through a connector to the needle-carriage and needle, thus obtaining a very accurate and positive movement of the needle.

I have only shown in the drawings a detached portion of a loom-frame and a needle-motion embodying my improvements combined therewith sufficient to enable those skilled in the art to understand the construction and operation of the same.

Referring to the drawings, Figure 1 is a sectional front view of the needle-motion embodying my improvements looking in the direction of arrow *a*, Fig. 2. Fig. 2 is an end view of the parts shown in Fig. 1 looking in the direction of arrow *b*, same figure; and Fig. 3 shows the opposite side of the cam-levers shown in Fig. 1 detached.

In the accompanying drawings, 1 is a portion of the loom side or frame.

2 is a stand bolted to the loom side or frame.

3 is the needle-rail bracket or stand, secured in this instance to the stand 2 and having secured at its upper end a needle-rail 3' for the needle-carriage 4, to which is secured the outer end of the needle 5. The inner end of the needle 5, which inserts the weft or filling thread in the ordinary way, is in this instance supported on a needle-guide roll 6.

7 is a driven gear operated from some driven part of a loom on a shaft 8, mounted in suitable bearings. The operating-cam 9 of the needle-motion is preferably adjustably secured to the outer face of the gear 7 through slots 9' in said cam and bolts 10. (See Fig. 2.) The cam 9 has in this instance an annular flange or projection 9<sup>a</sup> on its periphery forming the cam-surface, and said cam is preferably located close to the loom-frame 1.

The needle 5 is caused to be inserted and withdrawn from the shed by the rotation of the cam 9 through direct connections intermediate the cam and the fulcrumed needle-lever, which connections are preferably constructed and arranged as shown in the drawings.

A link or connector 11 pivotally connects the needle-carriage 4 with the needle-lever 12. The needle-lever 12 at its lower end is in this instance secured to the arm or shoe 13, fulcrumed on a stud 14. The shoe 13 has an elongated slot 13' therein, in which is adjustably secured a stud 15 on the connector 16, which has in this instance a buckle 16'. The other end of the connector 16 is pivotally connected to the lower end of the driving-cam lever 17, which in this instance is fulcrumed on a stud 18 and carries a roll 17', (see Fig. 3,) which travels on one edge or side of the cam-



surface 9<sup>a</sup>. 19 is the following-cam lever, which is also fulcrumed on the stud 18 and carries a roll 19' to travel on the opposite side or edge of the cam-surface 9<sup>a</sup> from the roll 17'.

5 An adjusting-screw 20, pivotally secured at one end to the lever 17 and extending through an ear 19'' on the lever 19 and provided with nuts 21, holds the two levers 17 and 19 in their proper relative position. On the  
10 opposite side of the levers 17 and 19 from the adjusting-screw 20 are in this instance two tightly-coiled springs 22 and 22', which are attached at one end to the lever 17 and at the  
15 other end, through nuts 23 on the threaded end of the extensions of said springs, to the lever 19. The springs 22 and 22' act to hold the levers in slightly-yielding engagement with the cam-surface 9<sup>a</sup>.

The parts or members 17 and 19 constitute  
20 a two-part lever each member of which carries a truck or roll held in yielding contact with one side of the peripheral flange-cam 9<sup>a</sup> by the springs 22 and 22', as just stated, while the adjusting screw or rod 20 serves to posi-  
25 tively but adjustably connect said members so as to limit their yielding movements away from each other permitted by said springs, thus insuring smooth and steady movements of the needle-carriage-operating mechanism  
30 comprising two connected levers swinging in parallel planes and also in the general plane of movement of the needle-carriage.

The operation of my improvements will be readily understood by those skilled in the art.  
35 The revolution of the cam 9 will, through cam-levers 17 and 19, connector 16, shoe 13, needle-lever 12, link 11, and needle-carriage 4, communicate a reciprocating motion to said needle-carriage and the needle 5 to cause it  
40 to be inserted and withdrawn from the shed at regular intervals. The shape of the cam-surface 9<sup>a</sup> on the periphery of the cam 9 is such that a very easy and rapid motion is given to the needle-carriage 4 through the in-  
45 termediate connections to insert and withdraw the needle. A partial rotation of the cam 9 will operate the needle-motion to insert and withdraw the needle. The driving-cam lever 17 and the following-cam lever 19, each  
50 carrying a roll, one on one side and one on the other of the cam-surface 9<sup>a</sup> and held in yielding engagement with said surface to overcome any irregularity or unevenness therein, will communicate the irregular con-  
55 formation of the cam-surface, through the connector 16, directly to the needle-lever 12 to move the needle 5 into and out of the shed in exact unison with the revolution of the cam, thus obtaining a very accurate and posi-  
60 tive and also a rapid movement of the needle, according to the speed of the driven cam.

The advantages of my improvements will be readily understood by those skilled in the art. By having the cam-surface on the pe-

riphery of the cam the movement of the cam-lever is always in a direction parallel to the axis of the cam and at an equal distance from the axis of the cam, which is not the case when the cam-surface is on one side or face of the cam, as in that case the movement of the cam-lever is at right angles to the axis of the cam and is moved toward and away from said axis. In my construction I obtain a quicker movement of the needle.

It will be understood that the details of construction of my improvements may be varied, if desired. They may be adapted to be used on any looms in which a needle is used to put in the wefts or filling-threads. I prefer to arrange the cam-levers operated by the cam at one side of the periphery of the cam, as shown in the drawings; but they may be arranged directly above or below the cam, if preferred, and extend in a substantially horizontal plane instead of a vertical plane. The cam-surface may be an annular groove in the periphery of the cam instead of an annular projection thereon, if preferred, in which case only one cam-lever will be used.

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

1. In a needle-motion for looms, the combination with a sliding needle-carriage and a needle attached to said carriage, of a peripheral flange-cam, and two connected levers, one of said levers being operatively engaged by said cam and the other being connected with said needle-carriage to operate the latter.

2. In a needle-motion for looms, the combination with a sliding needle-carriage and a needle attached thereto, of a peripheral flange-cam, two connected levers mounted to swing in parallel planes and in the general plane of movement of said carriage.

3. In a needle-motion for looms, the combination with a sliding needle-carriage and a needle attached thereto, of a peripheral flange-cam, two connected levers mounted to swing in parallel planes and in the general plane of movement of said carriage, and a guide-roll for the said needle.

4. In a needle-motion for looms, the combination with a sliding needle-carriage and a needle attached thereto, of a cam having a peripheral cam-flange, and two connected levers, one of said levers comprising two spring-connected parts or members each provided with a truck or roll held in yielding engagement with a side of the said cam-flange by the spring connections, and the other of said levers being connected with said needle-carriage.

5. In a needle-motion for looms, the combination with a sliding needle-carriage and a needle attached thereto, of a cam having a peripheral cam-flange, and two connected le-

vers mounted to swing in parallel planes, one of said levers comprising two spring-connected parts or members each provided with a truck or roll held in yielding engagement with a side of the said cam-flange by the spring connections, said parts or members being also joined by a positive but adjustable connector which limits their yielding movements from each other, and the other of said levers being connected with said needle-carriage.

FRED A. WHITMORE.

Witnesses:

W. B. PHELPS,

ROBT. G. FOSTER.