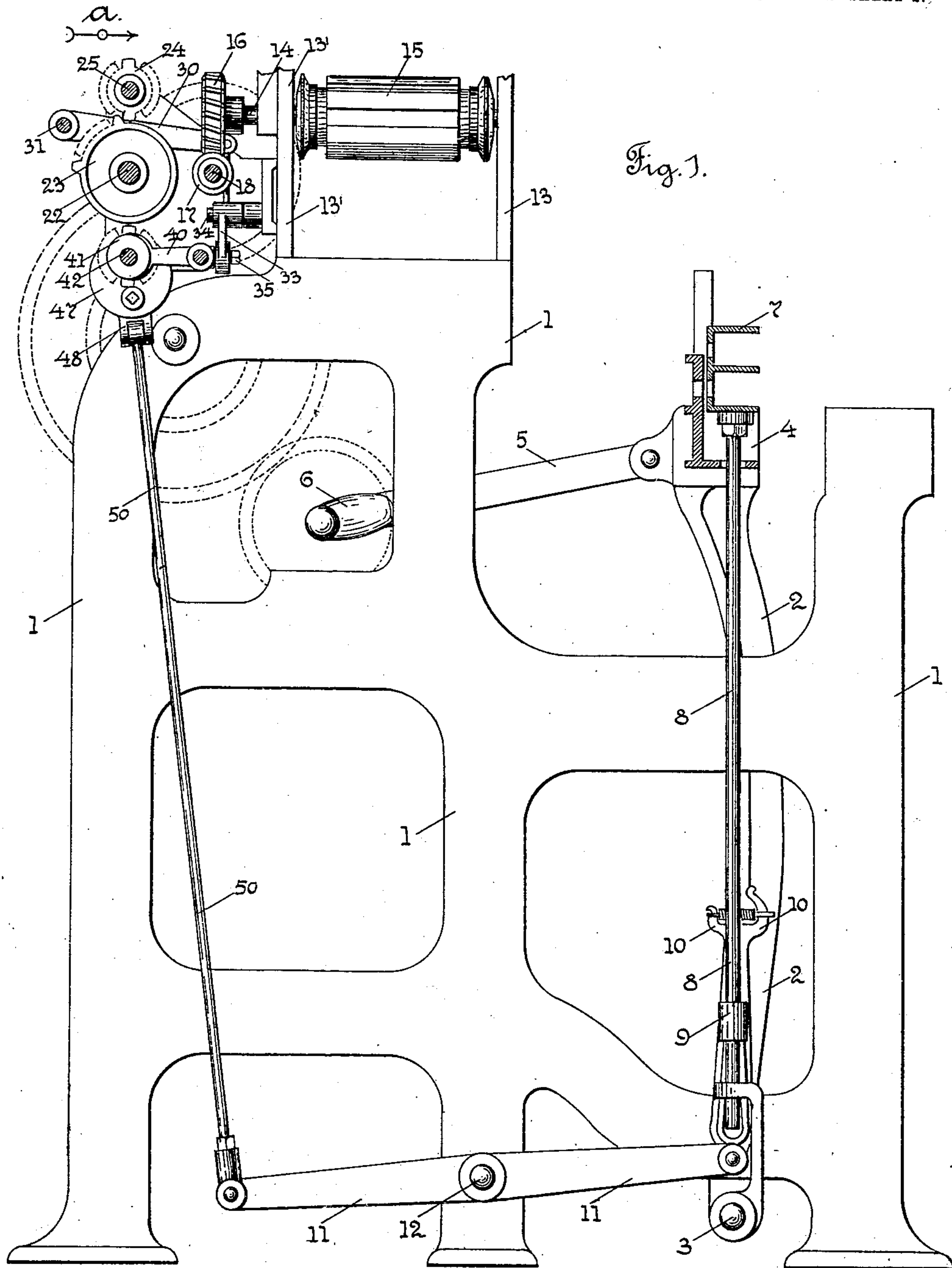


J. M. MARCO.
 LOOM SHUTTLE BOX MOTION.
 APPLICATION FILED JULY 12, 1906.

914,739.

Patented Mar. 9, 1909.

3 SHEETS—SHEET 1.



Witnesses
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 M. H. Hase.

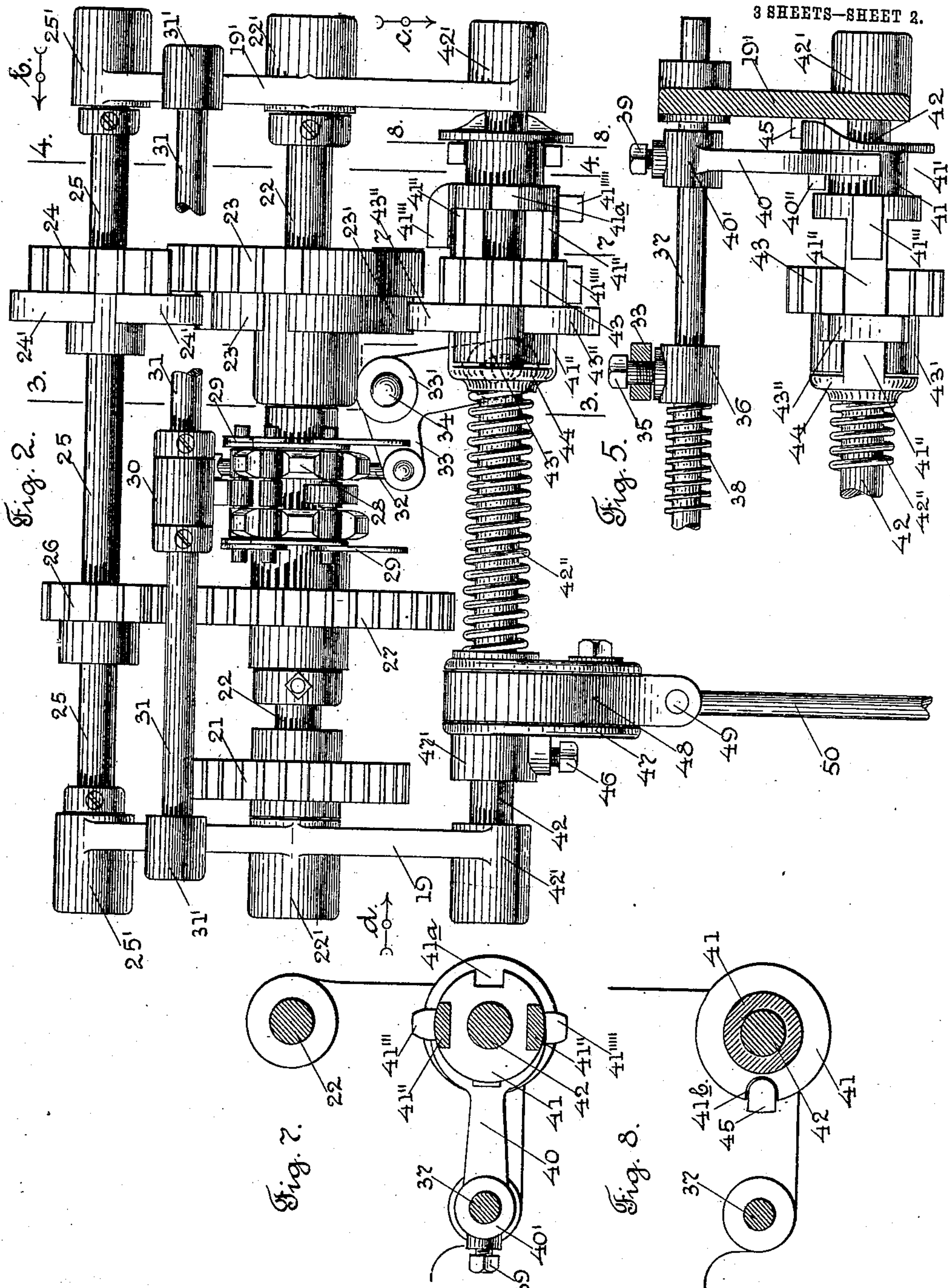
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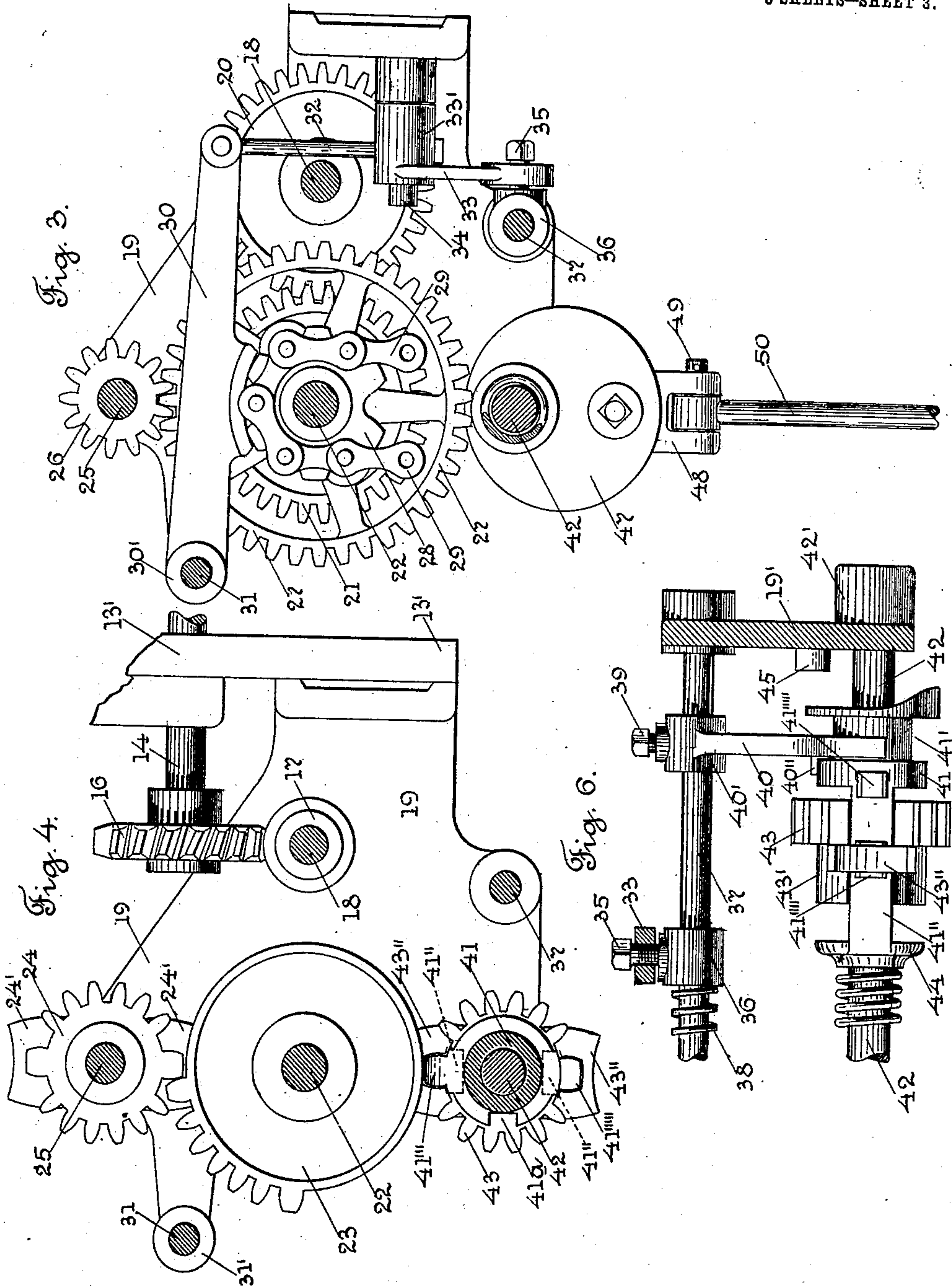
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

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LOOM WORKS, A CORPORATION OF MASSACHUSETTS.

LOOM SHUTTLE-BOX MOTION.

No. 914,739.

Specification of Letters Patent.

Patented March 9, 1909.

Application filed July 12, 1906. Serial No. 325,749.

To all whom it may concern:

Be it known that I, JOHN M. MARCO, 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 Loom Shuttle-Box Motions, of which the following is a specification.

My invention relates to shuttle box motion for looms, and particularly to that class of shuttle box motions shown and described in U. S. Letters Patent, No. 364,697, in which a driven master wheel or gear operates one or more mutilated pinions through sliding teeth, the movement of which is controlled by a pattern surface. The rotation of the mutilated pinion or pinions raises and lowers the shuttle boxes in the well known way.

The object of my invention is to combine with the shed forming pattern mechanism of a loom, located on the head or the upper part of the loom, and preferably to combine with a dobby mechanism, a shuttle box motion of the class referred to, located adjacent the shed forming pattern mechanism, and in substantially the same horizontal plane as the head of the loom, and having the master wheel or gear operated by the driving mechanism of the shed forming pattern mechanism, to operate through a mutilated pinion a shaft carrying an eccentric or crank, connected with and adapted to raise and lower the shuttle boxes, according to the indications of the pattern surface which controls the movement of the sliding teeth of the mutilated pinion, and also to provide means for positively holding the sliding teeth in alignment with the master gear, during each half rotation of the driven mutilated pinion, so that the teeth of the master gear and the driven pinion cannot get out of time.

My invention consists in certain novel features of construction of my improvements as will be hereinafter fully described.

I have only shown in the drawings detached parts of a loom, and in this instance parts of a dobby mechanism as the shed forming pattern mechanism, and a shuttle box motion of the class referred to, combined therewith, and located adjacent thereto, and connections therefrom to the drop shuttle boxes, two in number, sufficient to enable those skilled in the art to understand the

construction and operation of my improvements.

Referring to the drawings:—Figure 1 is an end and partial sectional view of a loom frame, and two drop shuttle boxes, a dobby cylinder, and a shuttle box motion, and connections therefrom to the shuttle boxes. Fig. 2 shows, on an enlarged scale, the shuttle box motion, looking in the direction of arrow *a*, Fig. 1. Fig. 3 is a section, on line 3, 3, Fig. 2, looking in the direction of arrow *b*, same figure. Fig. 4 is a section, on line 4, 4, Fig. 2, looking in the direction of arrow *b*, same figure. Fig. 5 is a detached sectional view, on line 5, 5, Fig. 2, looking in the direction of arrow *c*, same figure. Fig. 6 corresponds to Fig. 5, but shows some of the parts in a different position. Fig. 7 is a section, on line 7, 7, Fig. 2, looking in the direction of arrow *d*, same figure, and, Fig. 8 is a section, on line 8, 8, Fig. 2, looking in the direction of arrow *d*, same figure.

In the accompanying drawings, 1 is the loom side or end frame, 2 is the lay-sword, pivotally mounted at 3, 4 is the lay, 5 the crank connector to the crank shaft 6. The drop shuttle boxes 7, in this instance two in number, are supported on the upper end of a vertically moving rod 8, which is guided at its lower end, and has secured thereto a collar 9, carrying a stud, not shown, connected with the give-way mechanism 10, in the ordinary way, which mechanism is pivotally attached at its lower end to the shuttle box lever 11, fulcrumed at 12 to the loom side. On the upper end of the loom side or frame 1 are in this instance dobby frames or stands 13, and 13', having bearings for the shaft 14, on which is fast the dobby harness pattern chain cylinder 15 of the dobby, forming in this instance the shed forming mechanism. On the outer end of the shaft 14 is fast a worm gear 16, which meshes with and is driven by a worm 17, fast on a worm shaft 18. The worm shaft 18 is driven in the ordinary way from the crank shaft 6, through intermediate gears, shown by broken lines in Fig. 1. Secured to the dobby frame 13', are stands 19, and 19', see Fig. 2, on which are supported the several parts of the box motion. The worm shaft 18, see Fig. 3, has fast thereon a gear 20, which meshes with and drives a gear 21 fast on a shaft 22

mounted in suitable bearings 22' on the stands 19, and 19', see Fig. 2. On the shaft 22 is fast a mutilated gear 23, having teeth on only a portion of its periphery, and termed a master gear, see Patent No. 364,697, above referred to. The master gear 23 has a continuous rotary motion, and meshes with and operates a mutilated pinion 24, fast on a shaft 25 which is mounted in suitable bearings 25' on the stands 19 and 19', see Fig. 2. A pinion 26 is also fast on the shaft 25, and meshes with and drives a gear 27, which is connected with the box pattern chain cylinder 28, which is loosely mounted on the shaft 22, and carries the box pattern chain 29, made up of links and bars, carrying rolls and tubes, in the ordinary way, and shown in Fig. 2.

Extending over the pattern chain 29 is the indicating lever 30, see Fig. 3, the hub 30' of which is pivotally mounted on a transverse rod 31 secured in bearings 31' on the stands 19 and 19', see Fig. 2. The indicating lever 30 is connected by a link 32 with one arm of an angle or bell crank lever 33, having its hub 33' pivotally mounted on a stationary stud 34. The other arm of the angle or bell crank lever 33 has a slot therein, shown by broken lines in Fig. 2, to receive a set screw 35, see Figs. 5 and 6, on a collar 36 fast on a longitudinally moving rod 37, which is mounted in bearings on the stands 19 and 19'. A helically coiled expansion spring 38 encircles the longitudinally moving rod 37, and bears at one end against the collar 36, and at its other end against a stationary part of the frame, and acts to yieldingly hold said rod 37, against the movement of the angle or bell crank lever 33, and to return said rod to its normal position. Fast on the longitudinally moving rod 37 is secured, in this instance by a set screw 39, the hub 40' of a lever 40 which has a yoke shaped end, to engage an annular groove 41' in the hub 41, splined on and movable in the direction of the length of the shaft 42, mounted in suitable bearings 42' on the stands 19 and 19', see Fig. 2. The hub 41 has extending out therefrom, and parallel to the shaft 42, two arms 41'', which extend loosely in recesses in the periphery of the mutilated pinion 43 fast on the shaft 42. The arms 41'' may be attached at their inner ends to a disk or collar 44, loose on the shaft 42. A helically coiled expansion spring 42'' encircles the shaft 42, and bears at one end against the collar or disk 44, and at its other end against a stationary part, and acts to yieldingly hold the hub or clutch member 41 in its outward and inoperative position. The hub 41 has a notch 41^a in its inner end, see Fig. 7, to receive a projection 40'' on the lever 40, as shown in Figs. 5 and 6, which acts as a lock, for holding and locking the sliding

hub in position after a partial rotation thereof. The hub 41 has a cam surface on its outer end, and a notch 41^b therein, to receive a projection 45 on the stand 19', see Fig. 8, which acts to lock or hold said hub, as shown in Fig. 5, when it is shifted in the opposite direction. One of the arms 41'' has a projection 41''' thereon, forming a tooth, to be moved into and out of alinement with the teeth on the master gear 23, and the other arm 41'' has a projection or tooth 41'''' thereon, out of alinement with the tooth 41''', and adapted to be moved into and out of alinement with the teeth on the master gear 23, and cause the revolution of the pinion 43 and the shaft 42, in the usual and well known way, and as fully described in Patent, No. 364,697. A second projection 41''''' on the same arm 41'' as the tooth 41''', forms a second tooth, which is so shaped and located, relatively to the tooth 41''', that it will come into the path of the teeth of the master gear 23, when the tooth 41''' is in the path of said gear 23, and tooth 41'''' is out of the path of said gear 23, so that it is impossible to get the master gear 23 and the driven pinion 43 out of time. The hub 43' see Fig. 6 of the mutilated pinion 43, has thereon two oppositely extending projections 43'', see Fig. 4, which engage curved portions 23' on the master gear 23, see Fig. 2, and form dwell portions to hold the mutilated pinion 43, after each partial revolution thereof. The mutilated pinion 24 also has projections 24' thereon, to engage the projections 23' on the master gear 23, and form dwell portions to hold the pinion 24 after each partial revolution thereof. On the shaft 42 is secured, by a set screw 46, in this instance the hub 47' of an eccentric 47, around which extends a ring 48, to which is pivotally attached, by a stud 49, the upper end of the connector or rod 50 to the shuttle box lever 11.

From the above description in connection with the drawings, the operation of the box motion will be readily understood by those skilled in the art.

When a blank on the pattern chain comes under the lever 30, the shaft 37 is shifted longitudinally to the right, Fig. 6, through the spring 38, and causes the projection 41'''' to come in the path of the teeth of the master gear 23, as shown in Fig. 2, and the rotation of the shaft 42 is caused by the combination of the sliding teeth on the hub 41, with the mutilated pinion 43, which combination causes the operation of the shaft 42 by the master gear 23, which has a continuous rotary movement communicated to it from some driven part of the loom. This causes a partial rotation of the hub 41, and the cam surface on the outer end of said hub engaging the projection 45, acts to hold the tooth

41''' in operative connection with the master gear 23 until the notch 41^b in the cam surface comes into position to receive the stop 45.

When a ball on the pattern chain comes under the lever 30, the tooth 41''' is moved into operative position for the master gear 23, through the bell crank lever 33 moving the rod 37 and lever 40. When the tooth 41''' is in operative position, the tooth 41'''' will be in a position to be operated by the teeth of the master gear 23, when the hub 41 has been rotated through half its circumference, and the tooth 41'''' will remain in this operative position until the projection or stop 40'' on the lever 40 enters the notch 41^a in the inner end of the hub 41. The teeth 41'''' and 41'''' on one arm 41'' are for the same purpose as the cam surface on the outer end of the hub 41, and serve to hold the mutilated pinion 43 in operative connection with the master gear 23 at all times, until it has fully finished its half rotations.

It will be understood that the details of construction of my improvements may be varied if desired. I prefer to use a dobby, but a fancy head of the Knowles class may be used as the shed forming pattern mechanism, and more than two shuttle boxes may be used.

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

1. A drop shuttle box motion of the class described, having a sliding hub with a cam shaped surface on one end, to engage a stationary projection, and a notch on said end to receive said projection, and said hub carrying projections forming sliding teeth, arranged opposite each other, and out of line with each other, and also having a second projection in line with one of the sliding teeth, and said hub having a notch in its other end to receive a projection on the lever which moves said hub, and said lever.

2. In a drop shuttle box motion located adjacent to the shed forming pattern mechanism, the combination with a rotatable master gear having teeth on a part of its periphery, of two mutilated pinions, one mutilated pinion driven by said master gear, and connections from said mutilated pinion to the shuttle boxes, and a second mutilated pinion also driven by said master gear, and connections from said second mutilated pinion to the box pattern chain, to drive said box pattern chain from said second mutilated pinion.

3. A drop shuttle box motion located adjacent to the shed forming pattern mechanism, comprising a mutilated master gear operated by the driving mechanism of the shed forming pattern mechanism, a pattern chain, connections intermediate said master gear and said pattern chain to rotate said chain, and

an indicator lever for said pattern chain, and connections intermediate said master gear and the shuttle boxes, said connections operated through the movement of a pattern indicator lever of the box pattern chain.

4. A drop shuttle box motion, located adjacent the shed forming pattern mechanism, and comprising a mutilated master gear, operated by the driving mechanism of the shed forming pattern mechanism, a pattern chain, connections intermediate said master gear and said pattern chain to rotate said chain, an indicator lever for said pattern chain, connections from said lever to a sliding hub, and said hub having a cam surface on one end to engage a stationary projection, and having a notch or recess to receive said projection.

5. A drop shuttle box motion, located adjacent the shed forming pattern mechanism, and comprising a mutilated master gear, operated by the driving mechanism of the shed forming pattern mechanism, a pattern chain, connections intermediate said master gear and said pattern chain to rotate said chain, an indicator lever for said pattern chain, connections from said lever to a sliding hub, and said hub having projections thereon forming sliding teeth to be moved into and out of position in a mutilated pinion, and said mutilated pinion, and said sliding teeth to be engaged by said master gear and cause the rotation of said mutilated pinion, and the rotation of an eccentric to raise and lower the shuttle boxes, and means for locking said hub in its two extreme rotative positions.

6. In a loom, the combination with the shed forming pattern mechanism, of a shuttle box motion located adjacent the shed forming pattern mechanism, and comprising a mutilated master gear, operated by the driving mechanism of the shed forming pattern mechanism, a pattern chain, connections intermediate said master gear and said pattern chain to rotate said chain, an indicator lever for said pattern chain, connections from said lever to a sliding hub, and said hub having projections thereon forming sliding teeth to be moved into and out of position in a mutilated pinion, and said mutilated pinion, and said teeth to be engaged by said master gear and cause the rotation of said mutilated pinion, and the rotation of an eccentric to raise and lower the shuttle boxes, and said eccentric and means for locking said hub in its two extreme rotative positions.

7. In a loom, the combination with a dobby by pattern chain cylinder, and mechanism for rotating the same, of a drop shuttle box motion located adjacent the shed forming pattern mechanism, and comprising a mutilated master gear, operated by the driving mechanism of the shed forming pattern mechanism, a pattern chain, connections intermediate said master gear and said pattern

chain to rotate said chain, an indicator lever
for said pattern chain, connections from said
lever to a sliding hub, and said hub having
projections thereon forming sliding teeth to
5 be moved into and out of position in a mutilated pinion, and said mutilated pinion, and
said teeth to be engaged by said master gear
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ion, and the rotation of an eccentric to raise
and lower the shuttle boxes, and said eccen- 10
tric and means for locking said hub in its two
extreme rotative positions.

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Witnesses:

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