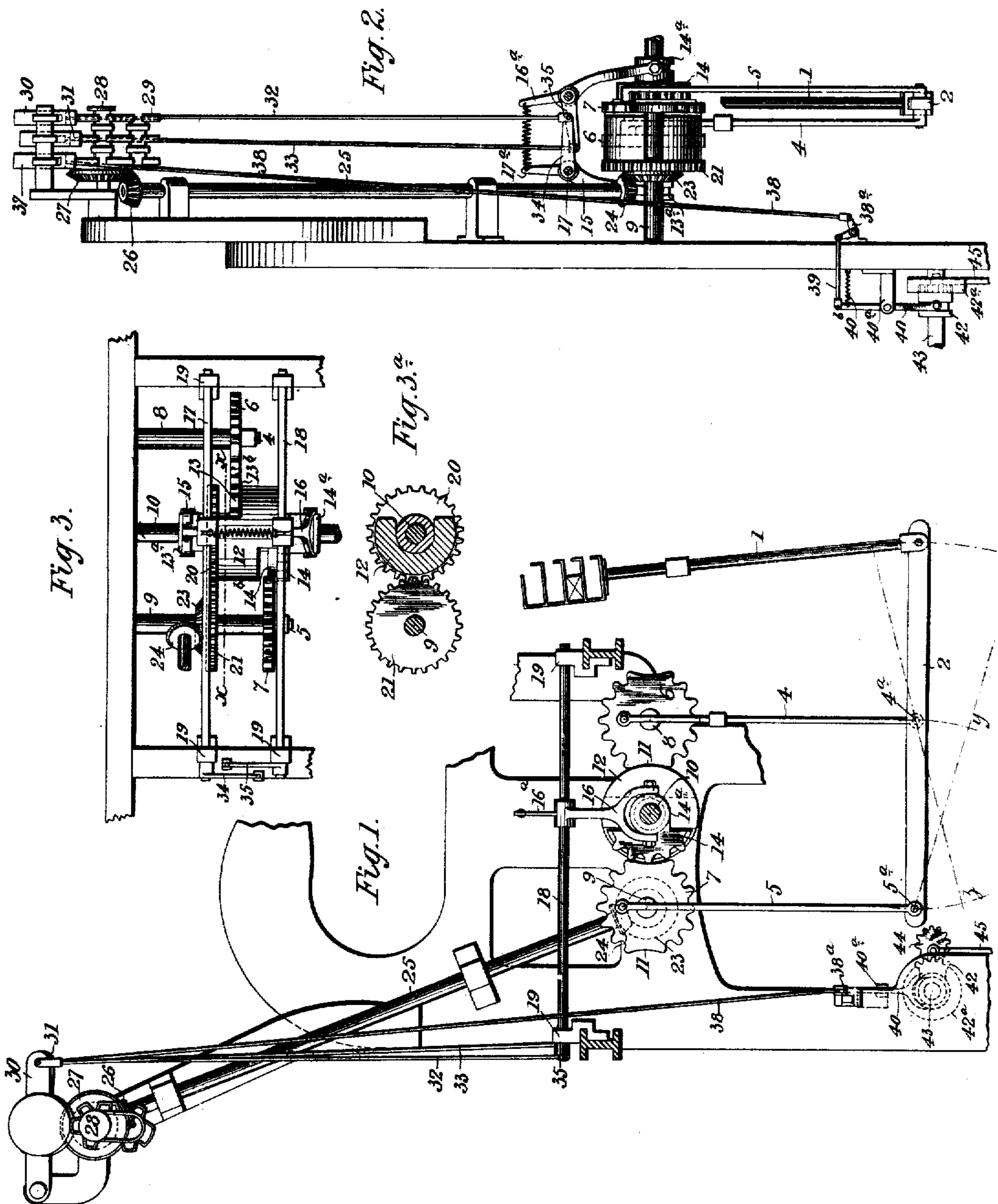


3 Sheets—Sheet 1.

MECHANISM FOR OPERATING THE SHUTTLE BOXES AND PICKING  
MECHANISM OF LOOMS.

Patented Jan. 26, 1892.



Witnesses.  
 Walter Malden  
 James McLean

Inventor:  
Frank Leeming  
by Ellis Spear  
Atty.

(No Model.)

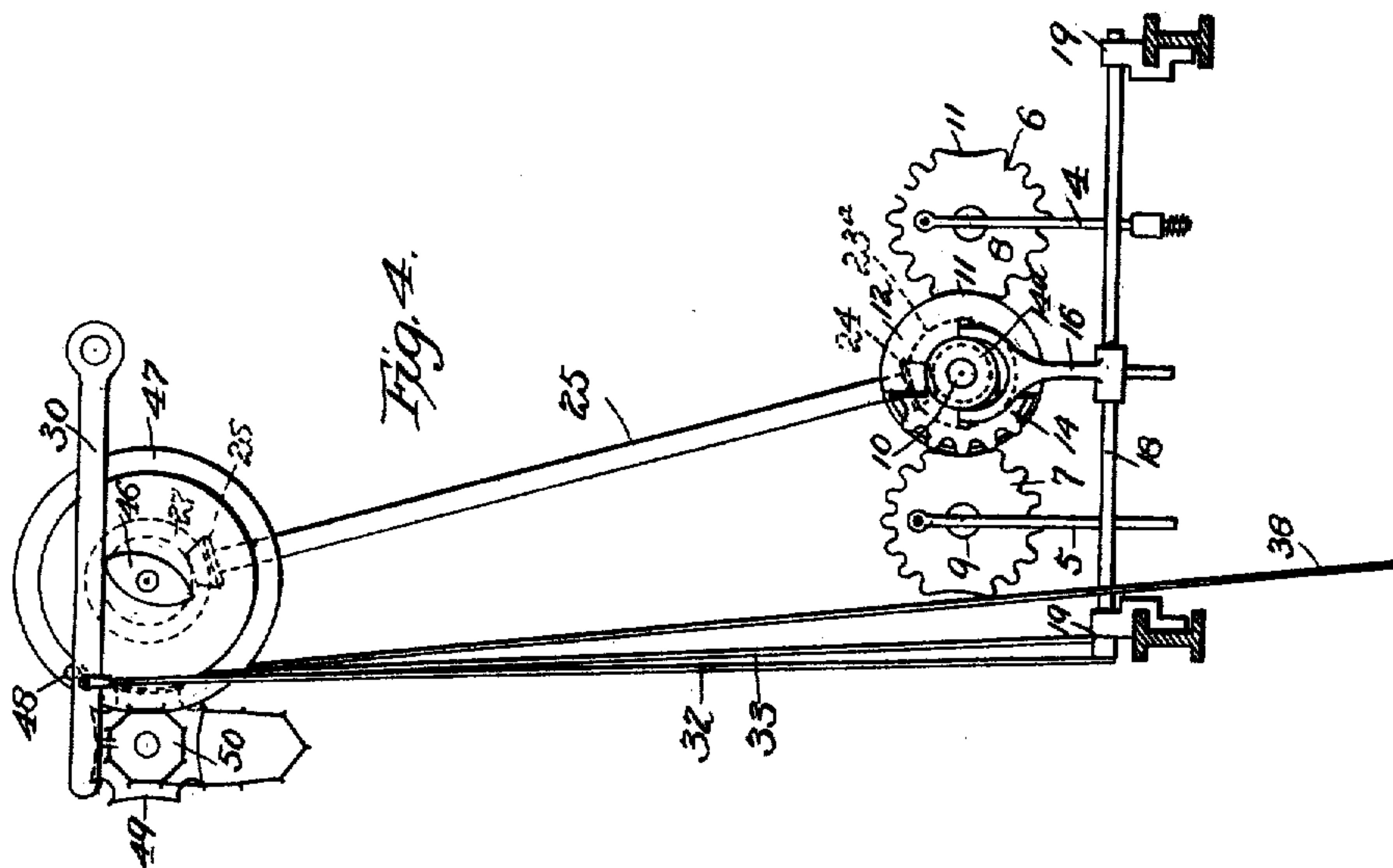
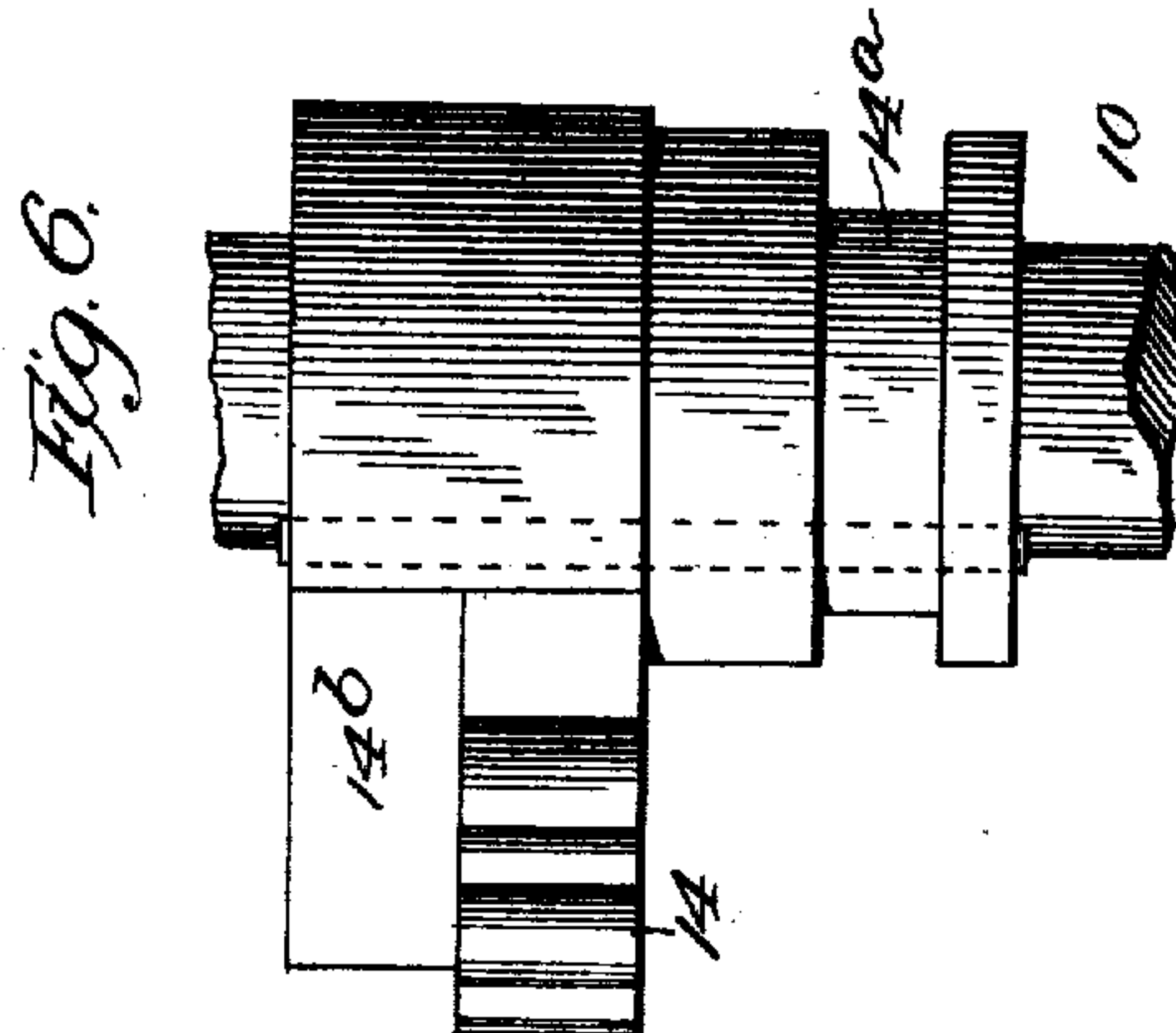
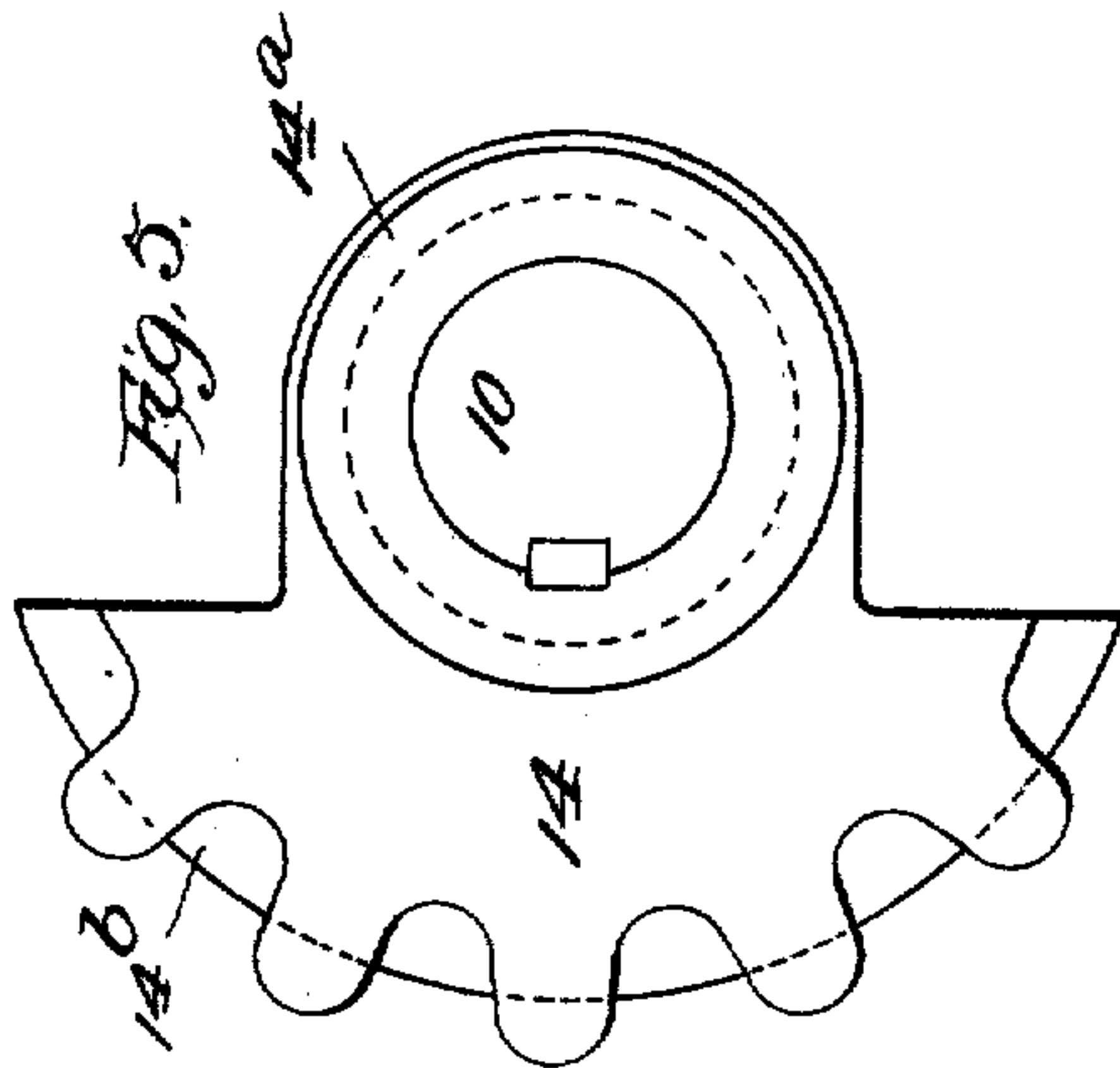
3 Sheets—Sheet 2.

F. LEEMING.

MECHANISM FOR OPERATING THE SHUTTLE BOXES AND PICKING  
MECHANISM OF LOOMS.

No. 467,753.

Patented Jan. 26, 1892.



Attest  
Miller Middleton  
J. L. Middleton

Inventor  
Frank Leeming  
by Ellis Spear  
ATTY.

(No Model.)

3 Sheets—Sheet 3.

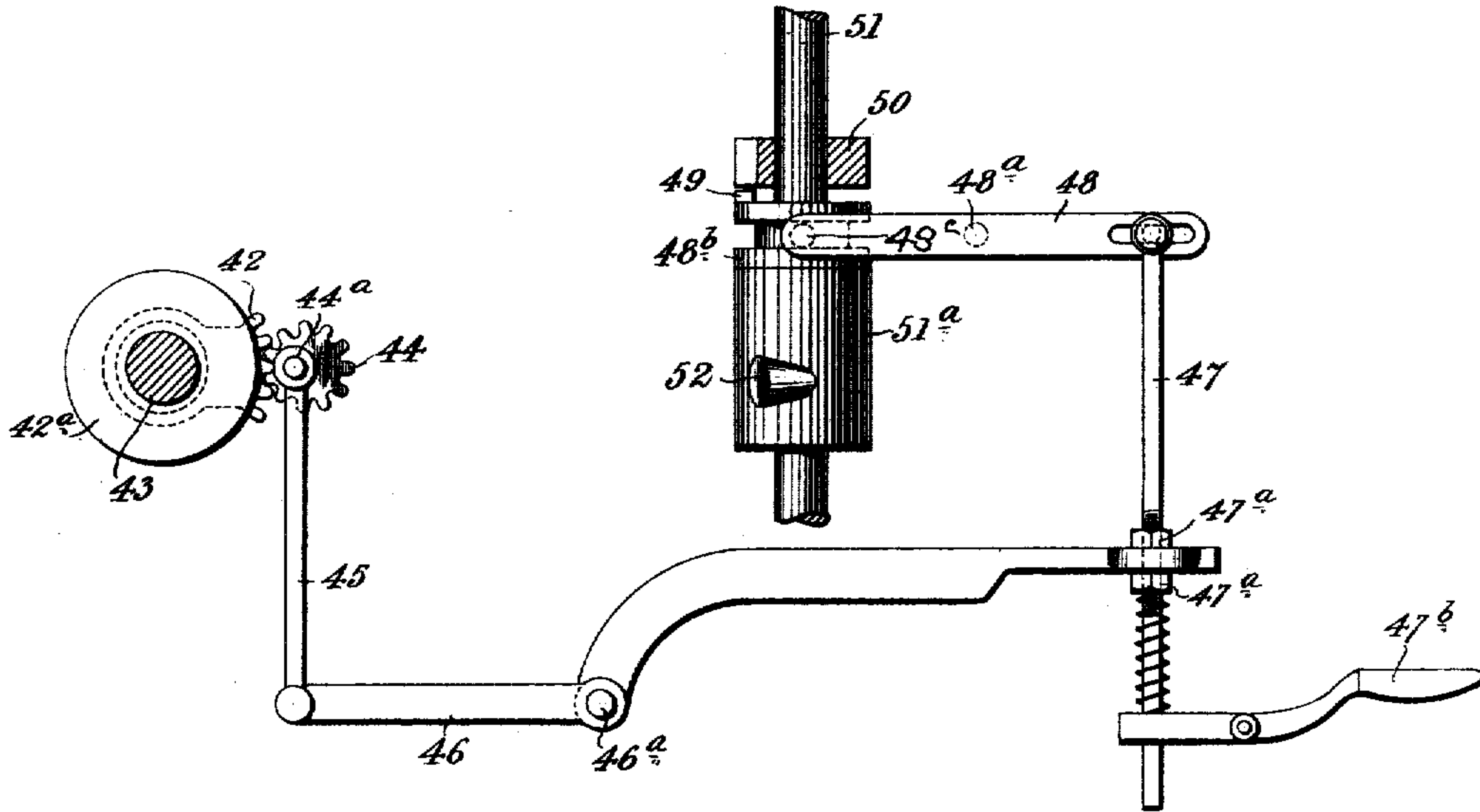
F. LEEMING.

MECHANISM FOR OPERATING THE SHUTTLE BOXES AND PICKING  
MECHANISM OF LOOMS.

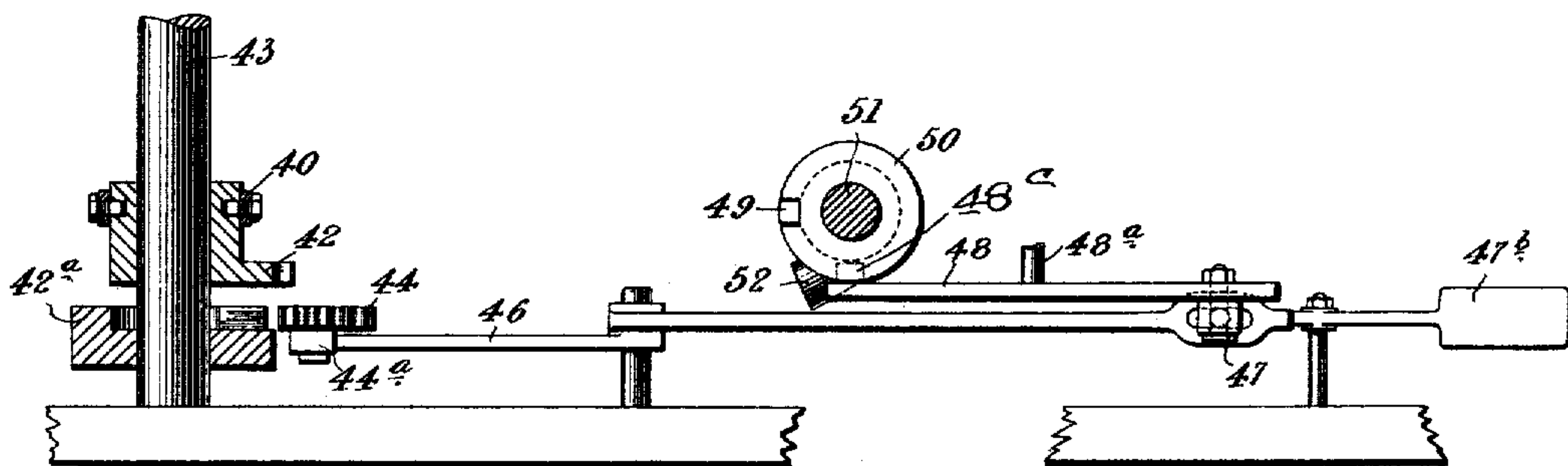
No. 467,753.

Patented Jan. 26, 1892.

*Fig. 7.*



*Fig. 8.*



Witnesses.  
*Walter Donaldson*  
*James McPherson*

Inventor.  
*Frank Leeming*  
by *Wm. L. L. L.*  
Atty.



# UNITED STATES PATENT OFFICE.

FRANK LEEMING, OF BRADFORD, ENGLAND.

MECHANISM FOR OPERATING THE SHUTTLE-BOXES AND PICKING MECHANISM OF LOOMS.

SPECIFICATION forming part of Letters Patent No. 467,753, dated January 26, 1892.

Application filed October 14, 1890. Serial No. 368,066. (No model.) Patented in England December 9, 1886, No. 16,110.

*To all whom it may concern:*

Be it known that I, FRANK LEEMING, a subject of Her Majesty the Queen of Great Britain, residing at Bradford, in the county of York, England, have invented a certain new and useful Improvement in Mechanism for Operating the Shuttle-Boxes and Picking Mechanism of Looms, (for which I have obtained Letter Patents in Great Britain under date of December 9, 1886, No. 16,110,) of which the following is a specification.

My invention relates to an improvement in apparatus for operating the rising and falling shuttle-boxes and controlling the picking motion of looms for weaving.

To clearly explain the nature of my invention, I will describe it in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of a portion of a loom with my improved apparatus applied thereto. Fig. 2 is an end view thereof. Fig. 3 is a plan of a portion thereof. Fig. 3<sup>a</sup> is a section on the line *x x* of Fig. 3. Fig. 4 is a side elevation of a portion of my apparatus when sheet-cards are employed in lieu of links and pins. Fig. 5 is an end view, on an enlarged scale, of one of the segment-wheels I employ. Fig. 6 is a plan of the same. Fig. 7 is a side elevation showing the means for operating the picking-shaft, and Fig. 8 is a plan view thereof.

The usual shuttle-boxes and their rod 1 are mounted upon the outer end of the main or shuttle-box lever 2, which is hung upon vertical rods 4 5, attached to crank-pins secured, respectively, to the faces of two star-wheels 6 7, carried by studs 8 9, secured to the framing of the loom, one on each side of and in line with the center of the crank-shaft 10. These two star-wheels 6 7 are cut away at the parts 11, as shown, said parts enabling them to lock upon a barrel 12 on the crank-shaft 10. This barrel is fast on the shaft 10 and rotates with it. It is cut away, as shown, at both ends, and in these cut-away portions are located two movable segment-wheels 13 14, the latter being shown in Figs. 5 and 6, secured on a keyway on the shaft 10 and capable of a sliding movement thereon. Collars 13<sup>a</sup> 14<sup>a</sup> form part of these segment-wheels and serve to receive clutch-forks 15 16, which are mounted above the barrel on the shafts

17 18, carried by blocks 19, secured to cross-beams of the framing. The segments have also plain portions 13<sup>b</sup> 14<sup>b</sup> formed with the same. The barrel 12 has also teeth 20, Figs. 3 and 3<sup>a</sup>, on its rim on one end of the same, which engage with the teeth of a star-wheel 21, loose upon the stud 9 of the star-wheel 7. This wheel 21 has secured thereto a bevel-wheel 23, which drives a bevel-wheel 24, attached to a shaft 25, a bevel-wheel 26 on the other end of which operates through bevel-wheel 27 the chain-barrel 28 and indicating or pattern chain 29.

The indicating-levers 30 31, resting upon the pattern-chain, are connected by rods 32 33 with arms 34 35, secured to the shafts 17 18. In this way a rocking motion is imparted to the shafts 17 18, which will operate the clutch-forks and draw out or push in the segment-wheels 13 14, according to the arrangement of the pattern-chain 29. The clutch-forks 15 16 are provided with arms 16<sup>a</sup> 17<sup>a</sup>, which are connected by a spiral spring 36, the action of which is to draw the arms 16<sup>a</sup> 17<sup>a</sup> together and to keep the segment-wheels 13 14 normally out of gear. A third lever 37, resting on the pattern-chain, is connected by a rod 38 through a bell-crank lever 38<sup>a</sup> with an arm 39, attached to the arm of a clutch-fork 40, which fork is pivoted to a bracket 40<sup>a</sup>, attached to the framing. A spring 40<sup>b</sup> serves to keep the clutch normally out of gear. This fork 40 is connected to a segment-wheel 42, Figs. 1, 2, 7, and 8, which is loose upon a shaft 43, upon which is secured a clutch-block 42<sup>a</sup>. When the rod 38 is drawn up into the position shown in Fig. 2, the segment-wheel 42 locks in the recess of the clutch-block 42<sup>a</sup> and is caused to revolve therewith, so that its teeth engage with the teeth of the spur-wheel 44. This spur-wheel carries an eccentric-pin 44<sup>a</sup>, to which is attached a rod 45, and this, when lifted by the eccentric-pin, will raise one end of the cranked lever 46, which is pivoted at 46<sup>a</sup>, and rock it, thus depressing the other end, and through the nuts 47<sup>a</sup> lowering the rod 47, which will rock the pivoted lever 48 on its stud 48<sup>a</sup> and cause the clutch-pin 48<sup>b</sup> at the end of the same to lift the clutch portion 48<sup>b</sup>, so that its pin 49 is brought into engagement with the block 50, which is fast upon the picking-shaft 51, which



shaft, being then in gear with the body 51<sup>a</sup> of the clutch, can be operated by the picking-tappet acting on the cone or runner 52 in the ordinary manner. The rod 47 is provided  
5 with a treadle 47<sup>b</sup>, so that it may be operated by foot.

The operation of the means for lifting the shuttle-box rod is as follows: As the barrel 12 revolves, one of the segment-wheels—say  
10 13—is pushed by the clutch 15 into the barrel into the position shown in Fig. 3, so that the latter forms a barrel with teeth on a part of its circumference, the teeth of this segment-wheel being thus brought into contact with  
15 the star-wheel 6 when the latter is turned half a revolution and lowers through its crank-pin the rod 4 and lever 2, which pivots or has its fulcrum at the point 5<sup>a</sup>, thus lowering the shuttle-boxes by means of their rod 1.  
20 At the next revolution of the barrel 12 the segment 13 may be so operated by the clutch-fork 15 as to be drawn out of gear with the star-wheel 6, while the segment 14 may be pushed from the position shown in Fig. 3 into the barrel, when it will engage with the teeth of the  
25 star-wheel 7, turning that half a revolution, and thus lowering the rod 5, which will cause the lever 2 to pivot or have its fulcrum at the point 4<sup>a</sup>, which may be either in the position  
30 marked *y*, Fig. 1, or in the position shown in full lines. In a similar manner when the rod 5 is down the point 5<sup>a</sup> will be in the position marked *z*. In this way the fulcrum-points of the lever 2 will vary between 5<sup>a</sup> and *z* and 4<sup>a</sup>  
35 and *y*, so that varying lifts will be given to the rod 1 and its shuttle-boxes. The plain portions 13<sup>b</sup> 14<sup>b</sup> of the segments act as locking-pieces against the cut-away parts 11 of the star-wheels when the segments are out in  
40 the same way as does the plain surface of the barrel, the surfaces 13<sup>b</sup> 14<sup>b</sup> then forming practically a portion of the plain barrel 12. These surfaces are of slightly less radius than the radius of the surface of the barrel, so as to  
45 permit the segments to slide into place. The surfaces are, however, practically flush, the difference in radius being so slight as will not affect the locking of the segment with the cut-away part of the star-wheels.

50 When in place of the pattern-chain sheet-cards are employed, I arrange my invention as shown in Fig. 4, in which case the indicating-levers (30 being the only one shown) rest

upon a cam 46, attached to the plate peg-wheel 47, which at each revolution turns by 55 means of peg 48 the star-wheel 49, on the axis of which is secured the card-cylinder 50. The indicating-levers are connected to the shafts 17 18 by the rods 32 33, as before described, (which shafts in this instance are beneath the  
60 barrel 12, so that the clutch-forks are reversed,) the plate peg-wheel 47 being driven by the bevel-gears 26 27 by means of the shaft 25, which is driven by its bevel-wheel 24, the latter in this case gearing with a bevel-wheel  
65 23<sup>a</sup>, secured on the main crank-shaft 10, so that the shaft 25 is driven direct. The teeth 20 on barrel 12 and the star-wheel 21 on stud 9 are in this case dispensed with.

What I claim is—

70 1. The combination, with the main crank-shaft of a loom, of a barrel thereon having cut-away portions, toothed segments sliding on said shaft, adapted to form part of the barrel, clutch-forks controlling said segments, 75 the pattern mechanism, connections to the clutch-forks, means for driving said pattern mechanism, star-wheels having cut-away portions, with the teeth of which star-wheels the toothed segments engage, and rods operated  
80 by said star-wheels for lifting the shuttle-box lever and varying the movement of the same, substantially as described.

2. The combination, with the main crank-shaft of a loom, of a barrel thereon having 85 cut-away portions, toothed segments sliding on said shaft, means for operating said segments, the pattern mechanism controlling said means, means for driving said pattern mechanism, star-wheels operated by the seg- 90 ments, rods operated by same for lifting the shuttle-box lever, an indicating-lever, a rod connected therewith and operated by the pattern mechanism, a clutch-fork connected to said rod, a segment-wheel controlled by said 95 clutch, a star-wheel operated thereby, and the picking mechanism controlled by the said star-wheel, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing 100 witnesses.

FRANK LEEMING.

Witnesses:

J. BRIERLEY HOWARD,  
CHARLES AINLEY.