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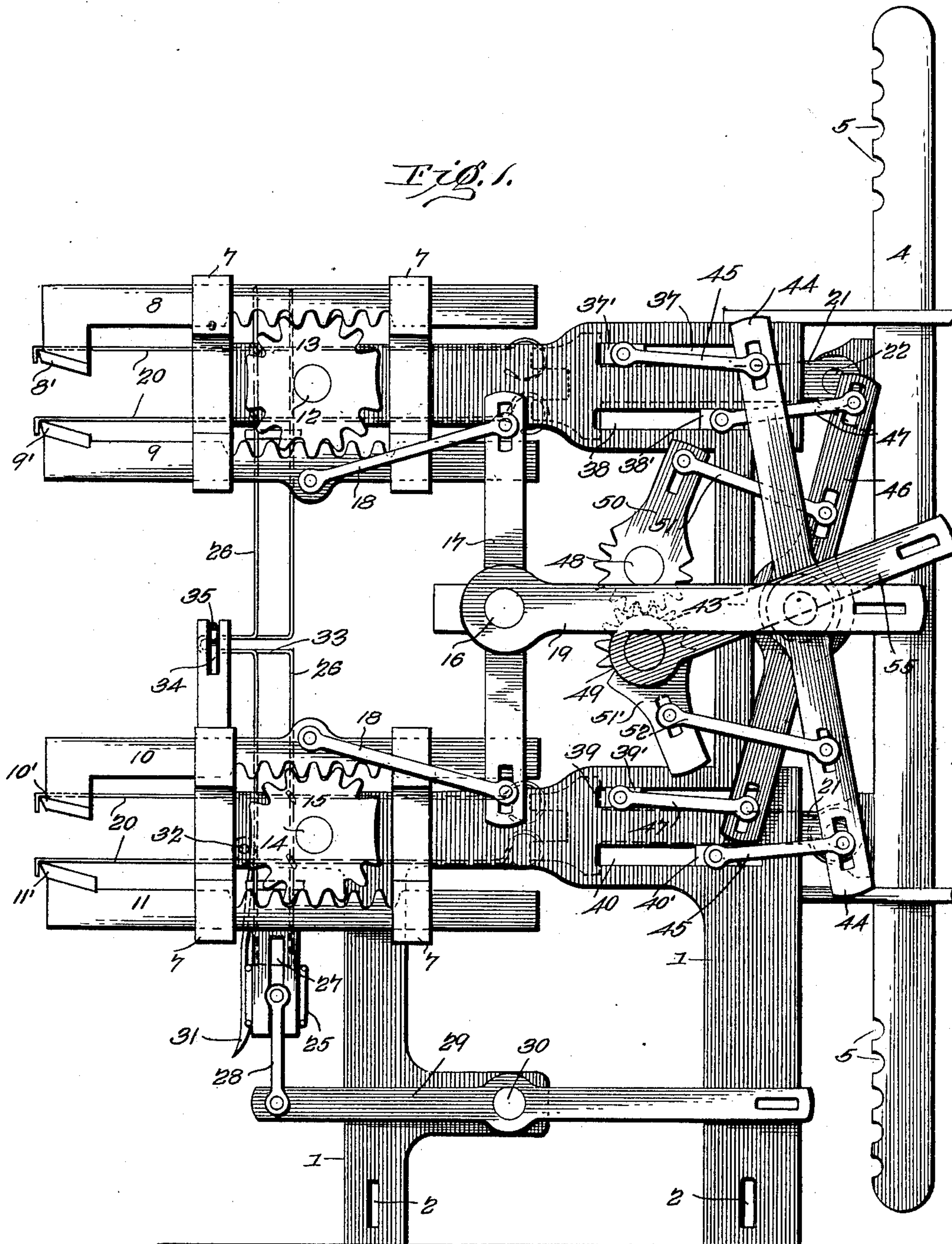
Patented Oct. 14, 1902.

A. C. FISCHER.  
SHEDDING MECHANISM FOR LOOMS.

(Application filed Oct. 5, 1901.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses  
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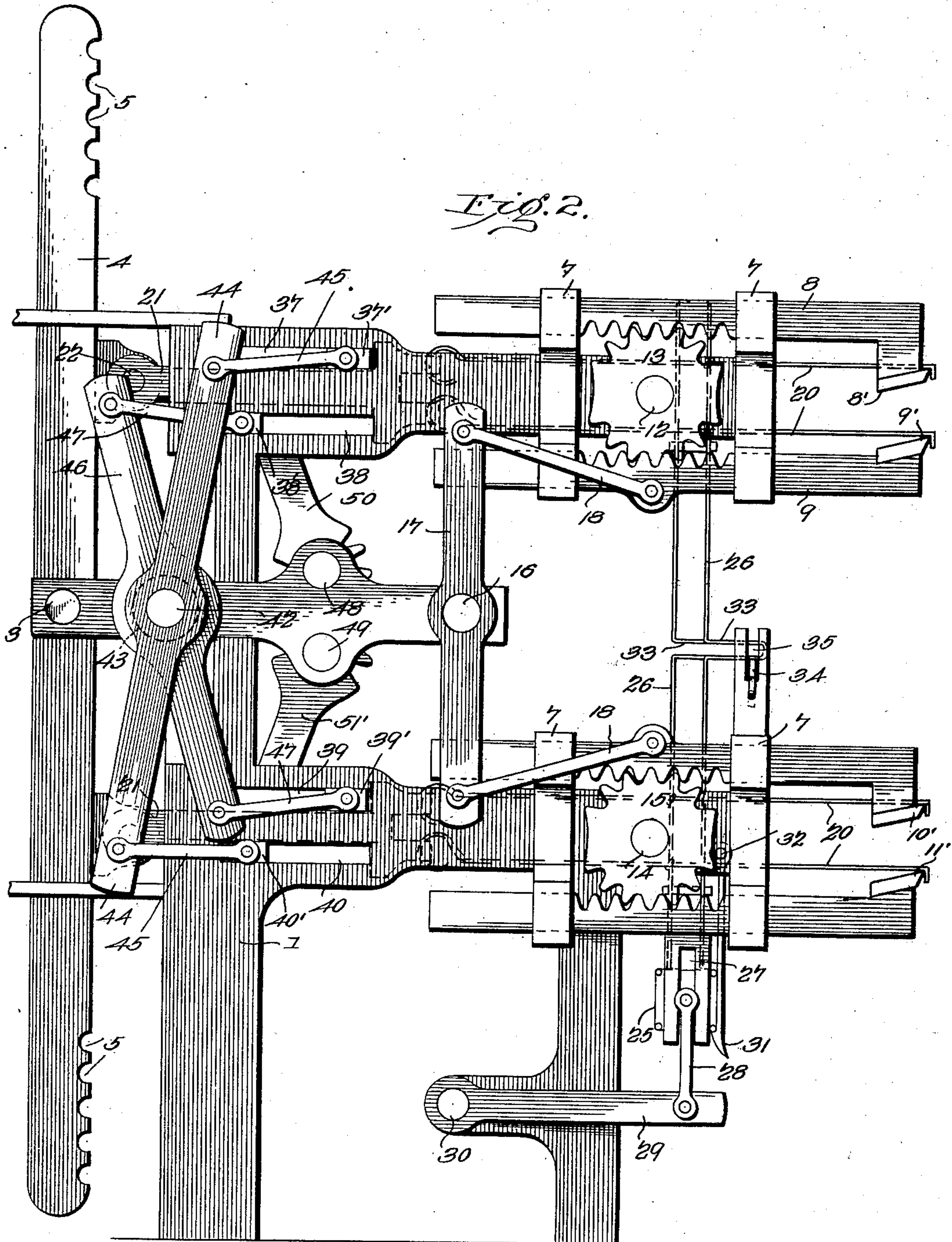
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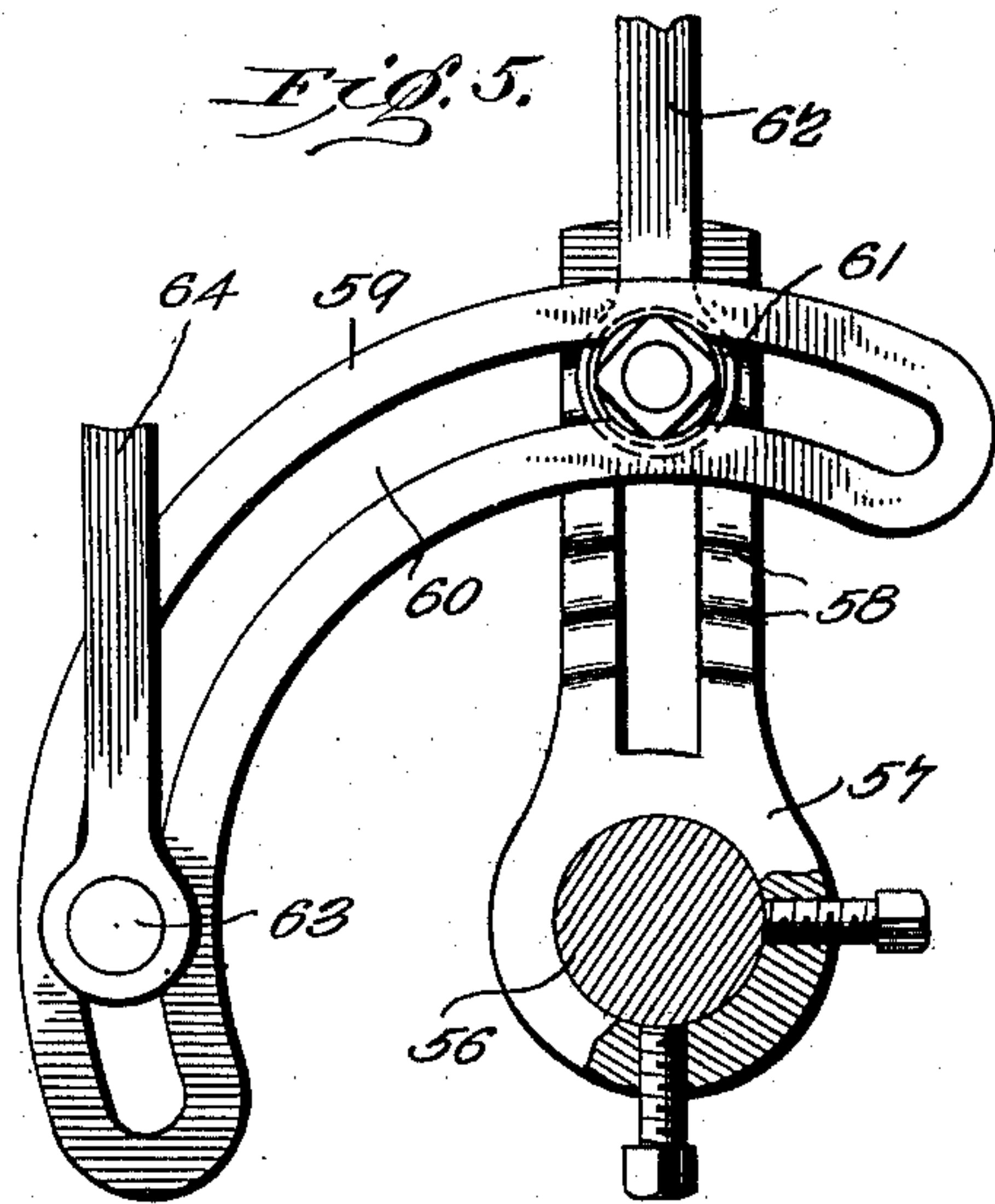
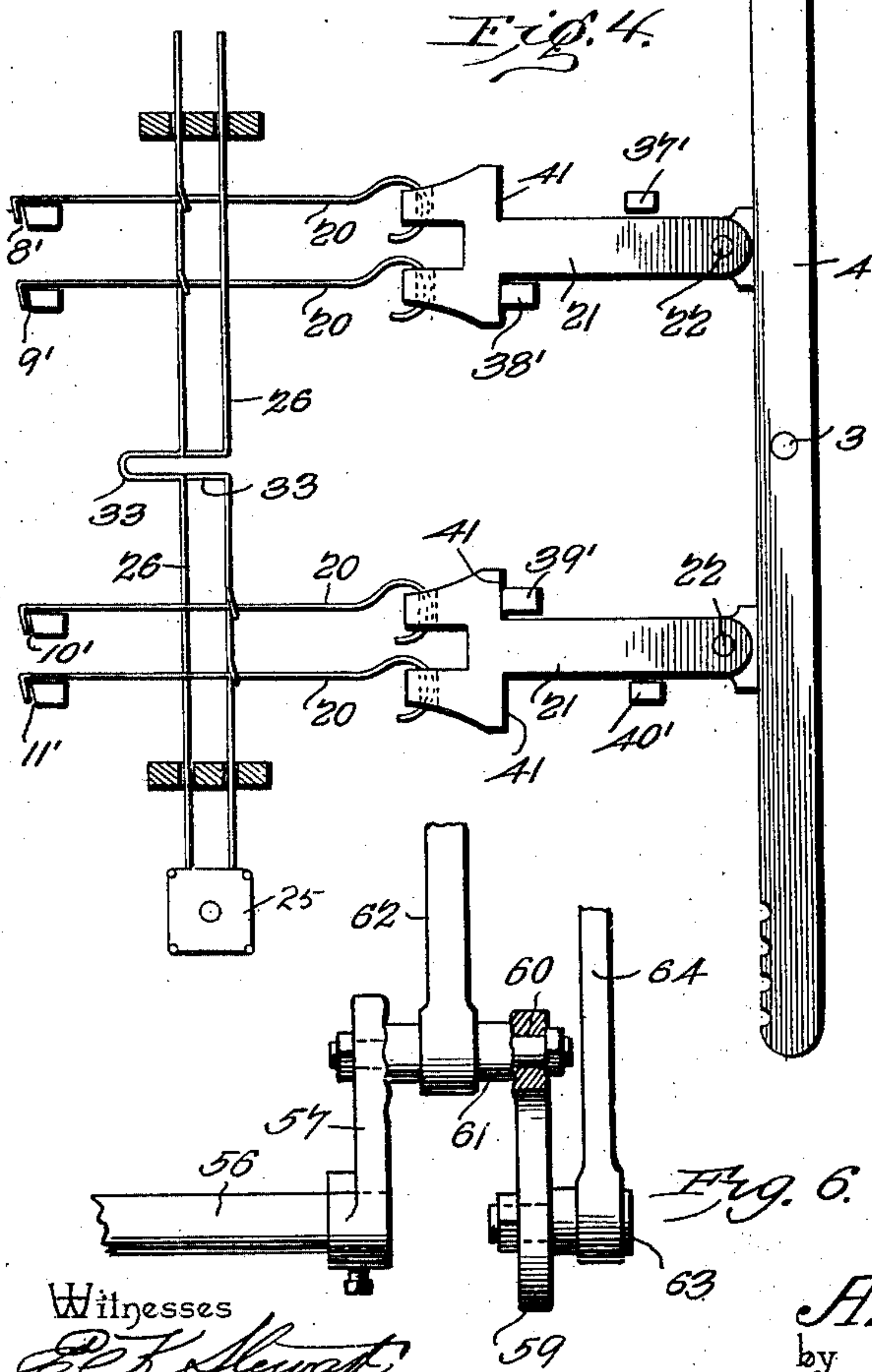
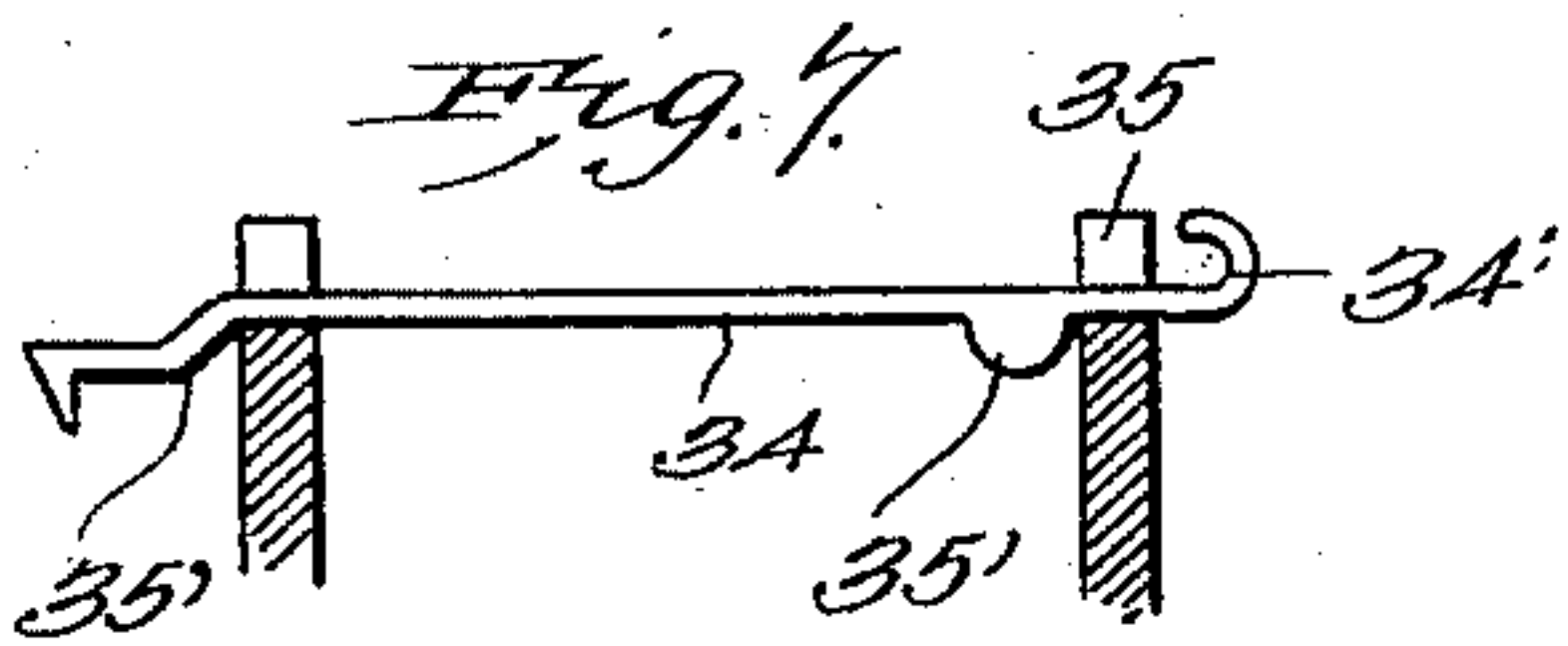
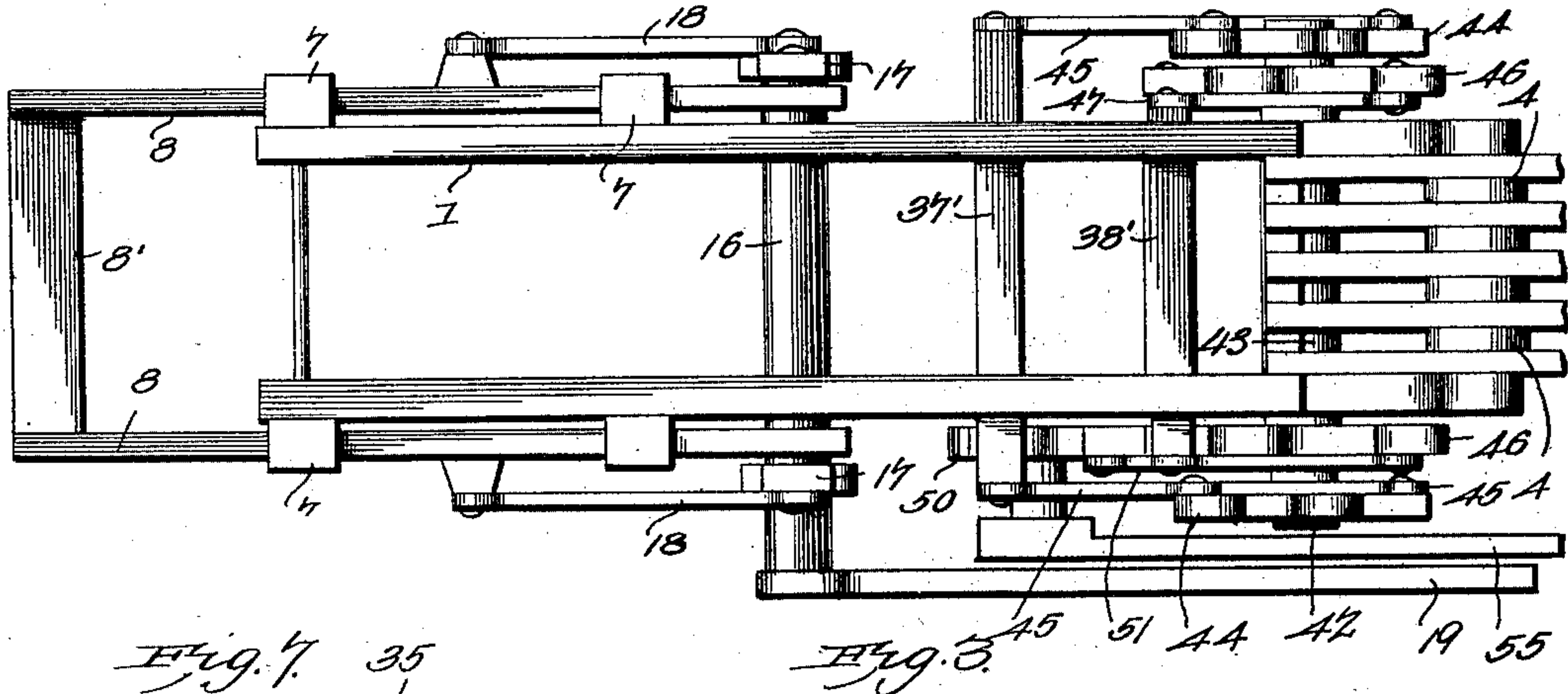
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3 Sheets—Sheet 3.



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# UNITED STATES PATENT OFFICE.

ARTHUR C. FISCHER, OF SOUTH BETHLEHEM, PENNSYLVANIA.

## SHEDDING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 711,391, dated October 14, 1902.

Application filed October 5, 1901. Serial No. 77,718. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR C. FISCHER, a citizen of the United States, residing at South Bethlehem, in the county of Northampton and State of Pennsylvania, have invented a new and useful Shedding Mechanism for Looms, of which the following is a specification.

My invention relates to certain improvements in looms, and particularly that portion of the mechanism employed to raise and lower the harness.

The principal object of the invention is to construct an improved shedding mechanism of simple character in which the work will be divided in order to reduce strains on any one part of the mechanism, insuring an easy and noiseless operation and at the same time effecting positive movements of the various parts.

With this and other objects in view the invention consists in the novel construction and combination of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a side elevation of a shedding mechanism constructed in accordance with my invention. Fig. 2 is a similar view looking from the opposite side of the machine. Fig. 3 is a plan view of the device. Fig. 4 is a sectional elevation in the nature of the diagram illustrating the operation of a portion of the mechanism. Fig. 5 is an end elevation of the crank mechanism which I employ for connecting the device to the loom. Fig. 6 is a sectional elevation of the same. Fig. 7 is a detail view of the hook-lifting bar.

The various parts of the mechanism are supported in a frame 1, having at its lower portion suitable openings or slots 2 for connecting it by bolts to the loom-frame, the device being secured in the usual position and receiving its motion from the crank or other shaft of the loom.

Extending transversely of the frame is a fixed shaft 3, forming a fulcrum for a series of double-ended harness-jacks 4, having at their upper and lower ends suitable recesses 5 for connection by cords or wire to the up-

per and lower portions of the harness. The jacks are of course equal in number to the number of heddles, one jack being connected to each heddle.

In suitable bearings 7, arranged on opposite sides of the machine, are a series of rack-bars 8, 9, 10, and 11, a similar set of bars being arranged on each side of the machine and the similar bars being connected, respectively, by the knives 8', 9', 10', and 11'. Arranged centrally between the rack-bars 8 and 9 on each side of the machine is a fixed stud 12, carrying a pinion 13, intermeshing with the teeth of both of the racks, and in similar manner a stud 14 is provided on each side of the machine between the racks 10 and 11, and said stud 14 forms a bearing for a pinion 15, intermeshing with the teeth of the rack-bars 10 and 11. Extending transversely of the frame and adapted to suitable bearings therein is a rock-shaft 16, to which are secured levers 17, one on each side of the machine, and the opposite ends of said levers are connected by rods 18 to the rack-bars 9 and 10. The connection between the levers 17 and rods 18 is slotted in order to permit of the necessary adjustment for regulating the degree of movement imparted to the rack-bars.

The levers 17 are oscillated by means of a lever 19, secured to the rock-shaft 16 at one side of the machine and having its outer end connected by a suitable pitman to the cam-shaft of the loom, the lever being oscillated at each pick and imparting to the rack-bars a reciprocatory movement, the bars 8 and 10 moving simultaneously in one direction, and the bars 9 and 11 receiving simultaneous movement in the opposite direction.

The knives carried by the various rack-bars are adapted to engage on two sets of hooks 20, one set being arranged above and the other below the pivot-point of the jack-levers. Each set comprises a pair of hooks the rear ends of which engage in suitable openings in a hook-bar 21, the latter being pivotally connected at 22 to the jack-levers.

The fulcrum-point of the jacks is about midway of the vertical distance between the pinions 13 and 15, and the connections between the hooks and jacks are such that the jacks will receive the same movement in both di-



rections, the harness being raised to form the upper portion of the shed or lowered to form the lower portion of the shed and the movement in each case being to the same distance from the central line of the shed.

The selecting mechanism is of the usual type, comprising a cylinder 25, adapted to receive the usual perforated pattern-cards, the cylinder operating on needles 26, extending in vertical line and having suitable eyes for the reception of the hooks 20. The shaft of the cylinder 25 is guided in vertical slots 27 at opposite sides of the frame and is connected by a link 28 to a lever 29, mounted on a rock-shaft 30 and adapted to be operated from the cam-shaft of the loom at each pick. The cylinder is turned by a hook 31, pivoted at 32 to the frame and operating in the usual manner.

Each needle 26 is provided about midway of its length with an outwardly-bent loop 33, which extends over a transverse bar 34, adapted to suitable guiding-slots 35 in the opposite sides of the frame. This bar is provided with an engaging hook or handle 34', by which it may be shifted longitudinally, and on the under surface of the bar are cam-faces 35', which when the bar is moved by pulling on the hook will engage with the lower walls of the slots 35, elevating the bar and raising all of the needles from operative contact with the card-cylinder and causing the elevation of all of the hooks 20 to a point above the knives.

After each pick the shed is closed and the harness-jacks are moved to a mid or vertical position in readiness to be again moved in the same or in an opposite direction, as may be dictated by the pattern. To accomplish this, I employ the following mechanism:

In the opposite sides of the frame are horizontally-disposed slots 37, 38, 39, and 40, and guided in these slots are transversely-disposed closing-bars 37', 38', 39', and 40'. These bars are adapted to engage with vertically-arranged shoulders 41, formed on the hook-bars 31, and are moved immediately after each pick in the direction of the rack-bars in order to return to the mid-position any previously-moved harness-jack. Extending transversely of the machine are two concentric shafts 42 and 43, the inner shaft 42 being provided at each side of the machine with a rock-lever 44, connected by suitable links 45 to the ends of the closing-bars 37' and 40'. On the tubular shaft 43 at each side of the machine are secured rocking levers 46, connected by links 47 to the closing-bars 38' and 39', all of the connections between the rock-levers and links being slotted for purposes of adjustment.

In the frame of the machine are journaled two shafts 48 and 49, to one of which is secured an arm 50, the outer end of which is connected by a rod 51 to the rocking lever 46. On the shaft 49 is secured a similar arm 51', connected by a rod 52 to the rocking le-

ver 44, and all of these connections are slotted, so that the degree of motion imparted may be accurately adjusted. The arms 50 and 51' are each provided with segmental racks arranged on lines concentric with the centers of their respective carrying-shafts, the teeth of such racks intermeshing, as shown. On the shaft 49 is secured a lever 55, the outer end of which is connected to the cam-shaft of the loom and receives motion therefrom immediately after each pick.

The operation of the mechanism is as follows: The hooks in engagement with the knives 8' and 10' will make the shedding for the first pick and the hooks in engagement with the knives 9' and 11' will make the shedding for the second pick. When the knife 8' is engaging any of the hooks, the hooks adapted to coact with the knives 10' and 11' must be raised out of engagement with said knives. When the parts are in the position illustrated in Figs. 1 and 4, with the harness-jacks in vertical lines, the heddles are in mid-position and the shed is closed. The pattern-cylinder has been operated and the proper needles have been raised to elevate such of the hooks 20 as are not to be operated on from the path of the various knives. Motion being imparted to the lever 19 in a downward direction, the rack-bars 9 and 11 are drawn inwardly and the mating rack-bars 8 and 10 are forced in an outward direction, such of the hooks 20 as may be engaged with the knives 8' and 10' being drawn out with said knives, the movement of the upper hooks drawing one or more of the harness-jacks to the rear and elevating the attached heddle or heddles. Outward movement of the lower hooks results in a lowering of the heddles to which they are connected. During the movement of the knives the bars 37', 38', 39', and 40' will move to a position midway of the length of their respective slots, this being the limit of outward movement of the shoulder 41. The shed being thus open, a pick is made and the closing bars are operated to force the hook-bars outwardly or in the direction of the needles and effect the return of all of the harness-jacks to the initial position, the shed being again closed. During this operation the card-cylinder has been turned to the extent of one-fourth of a revolution and has been raised to select the proper hooks for the next shifting of the shed.

In order to provide for the proper timing of the movements of levers 19 and 55, I employ the mechanism illustrated in Fig. 5. In this figure 56 represents the cam-shaft of the loom. To the shaft 56 is secured a crank-arm 57, one face of which is provided with a series of arcuate grooves 58, and the crank being longitudinally slotted and adapted for the reception and support of a crank-pin 61, to which is connected the lower end of a pitman 62, extending to the lever 19. To the outer end of the crank-pin 61 is secured a



segment 59, having a segmental slot 60, the adjacent faces of the segment and the end of the crank-pin being slotted or grooved in order to provide for the proper locking of the two in an adjusted position. Adjustably secured in the slot 60 is a pin 63, from which extends a pitman 64 to the outer end of the lever 55. All of the parts are thus adjustably connected to permit the proper timing of the movements of the two levers.

While the construction herein described and illustrated is the preferred form of the device, it is obvious that many changes in the form, proportions, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of my invention.

Having thus described my invention, what I claim is—

1. In a shedding mechanism, the combination with the pivoted jack-levers, of two sets of hooks, one arranged above and the other below the pivot-point of the jack-levers and each set comprising a pair of hooks, means for connecting the hooks to the jack-levers, knives for engaging one of the upper and one of the lower pairs of hooks at each operation, mechanism for reciprocating said knives, a pattern mechanism for moving selected hooks from the path of travel of the knives, and an auxiliary mechanism for returning the jack-levers to a mid-position after each pick.

2. In a shedding mechanism, the combination with the pivoted jack-levers, of two sets of hooks, one arranged above and the other below the pivot-point of the jack-levers, each set comprising a pair of hooks, and each of such pairs having a single connection with a jack-lever, means for engaging and moving the hooks to effect a corresponding movement of the jack-levers to which they are connected, a pattern mechanism for moving selected hooks from the path of travel of said engaging means, and an auxiliary mechanism for returning the jack-levers to a mid-position after each operation.

3. In a shedding mechanism, the combination with the pivoted jack-levers, of two sets of hooks, one arranged above and the other below the pivot-point of the jack-levers, and each set comprising a pair of hooks, mating hooks of each pair having a single connection with the jack-levers, means for simultaneously engaging and moving one of the upper and one of the lower pairs of hooks, a pattern mechanism for moving selected hooks to inoperative position, and an auxiliary mechanism for returning the jack-levers to a mid-position after each operation.

4. In a shedding mechanism, the combination with the pivoted jack-levers, of two sets of hooks, one arranged above and the other below the pivot-point of the jack-levers, and each set comprising a pair of hooks, a hook-bar connecting each pair of hooks to a jack-

lever, knives arranged in pairs for operating on the hooks, means for simultaneously operating said knives to engage one of the upper and one of the lower pairs of hooks, a pattern mechanism for moving selected hooks to inoperative position, and an auxiliary mechanism for returning the jack-levers to a mid-position after each operation.

5. In a shedding mechanism, the combination with the jack-levers pivoted intermediate of their length, of hooks arranged in upper and lower pairs, a hook-bar connecting each pair to a jack-lever, knives for engaging with and moving said hooks, vertically-disposed wires or needles, each connected to the hooks of a pair, a card-cylinder and cards for operating on said wires or needles, and means for returning the jack-levers to a mid-position after each operation.

6. In a shedding mechanism, the combination with the pivoted jack-lever, of an operating mechanism connected to the jack-lever at each side of its pivotal center, said mechanism comprising upper and lower pairs of hooks, a single hook-bar connecting each pair to the levers, knives for operating on said hooks, rack-bars arranged on each side of the machine and carrying said knives, pinions intermeshing with said rack-bars, mechanism for imparting a reciprocating movement to one of said rack-bars, and pattern mechanism operatively connected to said hooks, substantially as specified.

7. In a shedding mechanism, the combination with the jack-levers pivoted intermediate of their length, of operating mechanism connected to each side of the pivotal centers of the levers and each mechanism comprising a pair of rack-bars guided on the frame, a pinion mounted between and intermeshing with said bars, a rock-lever, a shaft carrying the same, an operating-lever secured to said shaft, rods or links connecting the opposite links of said lever to one of the rack-bars of each set, knives carried by the rack-bars, hooks adapted to be engaged by said knives, and hook-bars connecting said hooks to the jack-levers, substantially as specified.

8. In a shedding mechanism, the combination with the jack-levers, of a series of hooks operatively connected to said levers, knives adapted to engage with and move said hooks, a series of needles connected to said hooks, a card-cylinder and cards adapted to engage the lower ends of said hooks, each needle having a laterally-extended loop portion, and a bar adapted to engage with all of said loop portions, said bar being adjustable to effect a vertical movement of the hooks from the path of travel of the knives.

9. In a shedding mechanism, the combination with the jack-levers pivoted intermediate of their length, of the hooks, hook-bars connecting the same to said levers, a series of transversely-disposed closing-bars guided in



the frame and adapted to engage with the  
hook-bars, a pair of rock-levers, shafts carry-  
ing the same, links connecting the levers and  
the bars, a pair of transversely-disposed par-  
5   allel shafts, arms secured thereto and con-  
nected to the respective rock-levers, segmen-  
tal racks formed on said arms and arranged  
on curves having their centers coincident  
with the centers of the respective shafts, and

means for imparting movement to one of said 10  
arms, substantially as specified.

In testimony that I claim the foregoing as  
my own I have hereto affixed my signature in  
the presence of two witnesses.

ARTHUR C. FISCHER.

Witnesses:

RICHARD FISCHER,  
MAX FISCHER.