

(No Model.)

3 Sheets—Sheet 1.

E. H. GRAHAM.

POSITIVE SHUTTLE MOTION FOR LOOMS.

No. 503,956.

Patented Aug. 29, 1893.

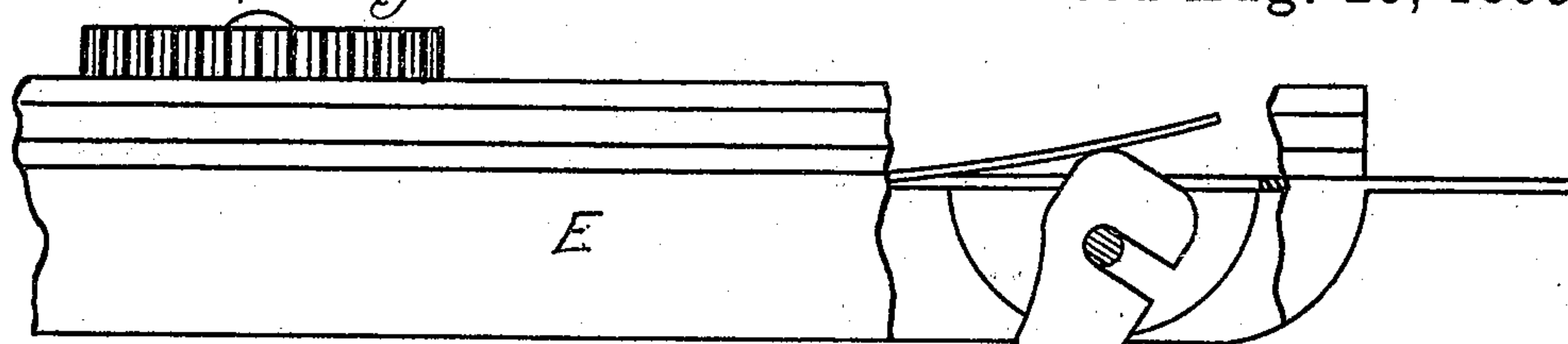
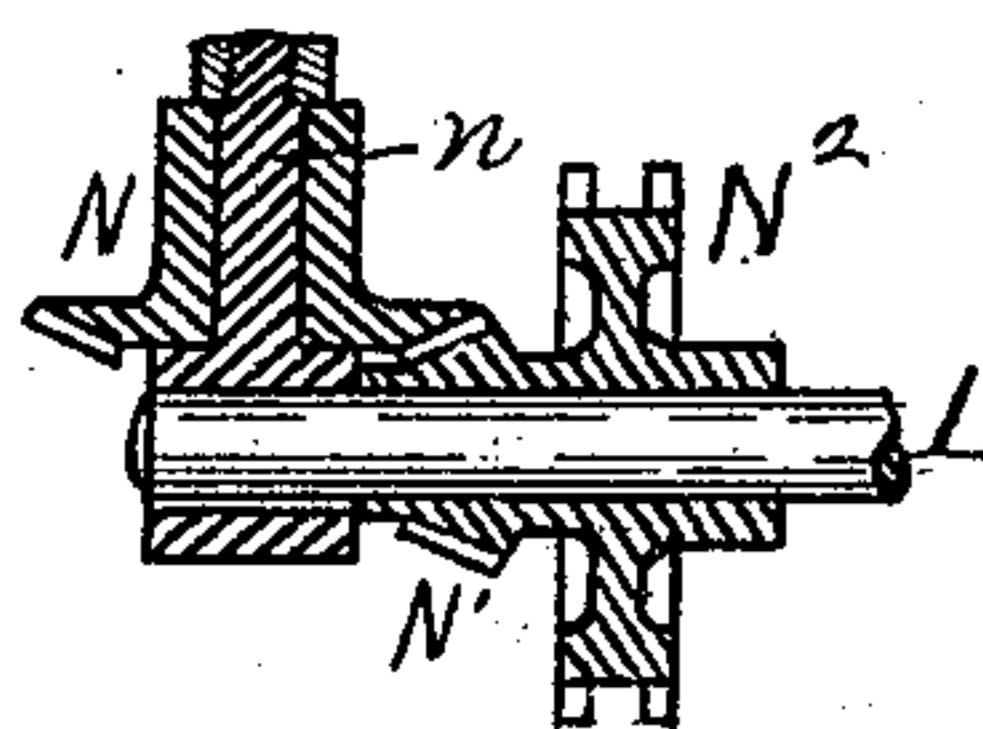


Fig. 5.



Fi g. 6.

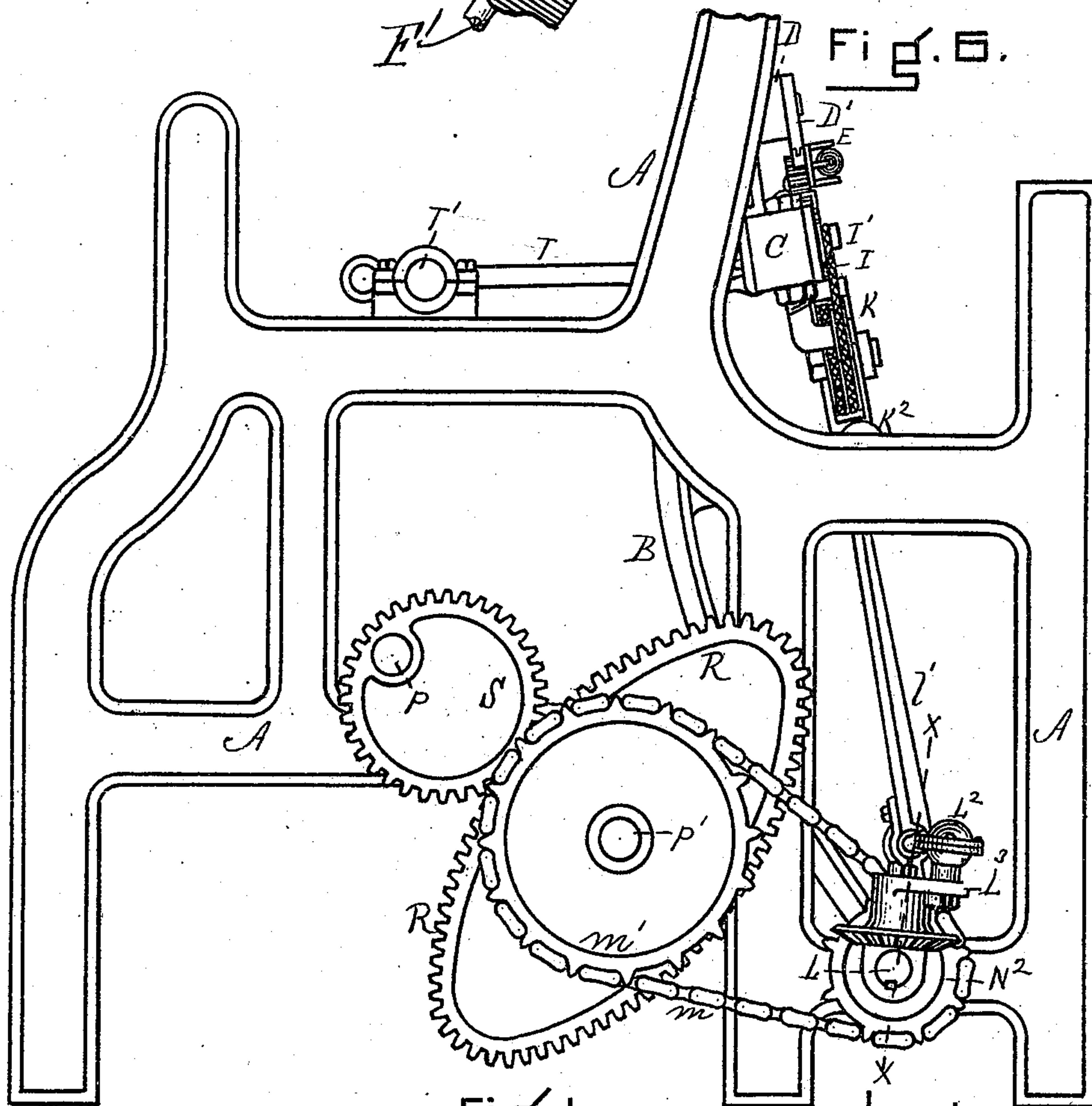


Fig. 1.

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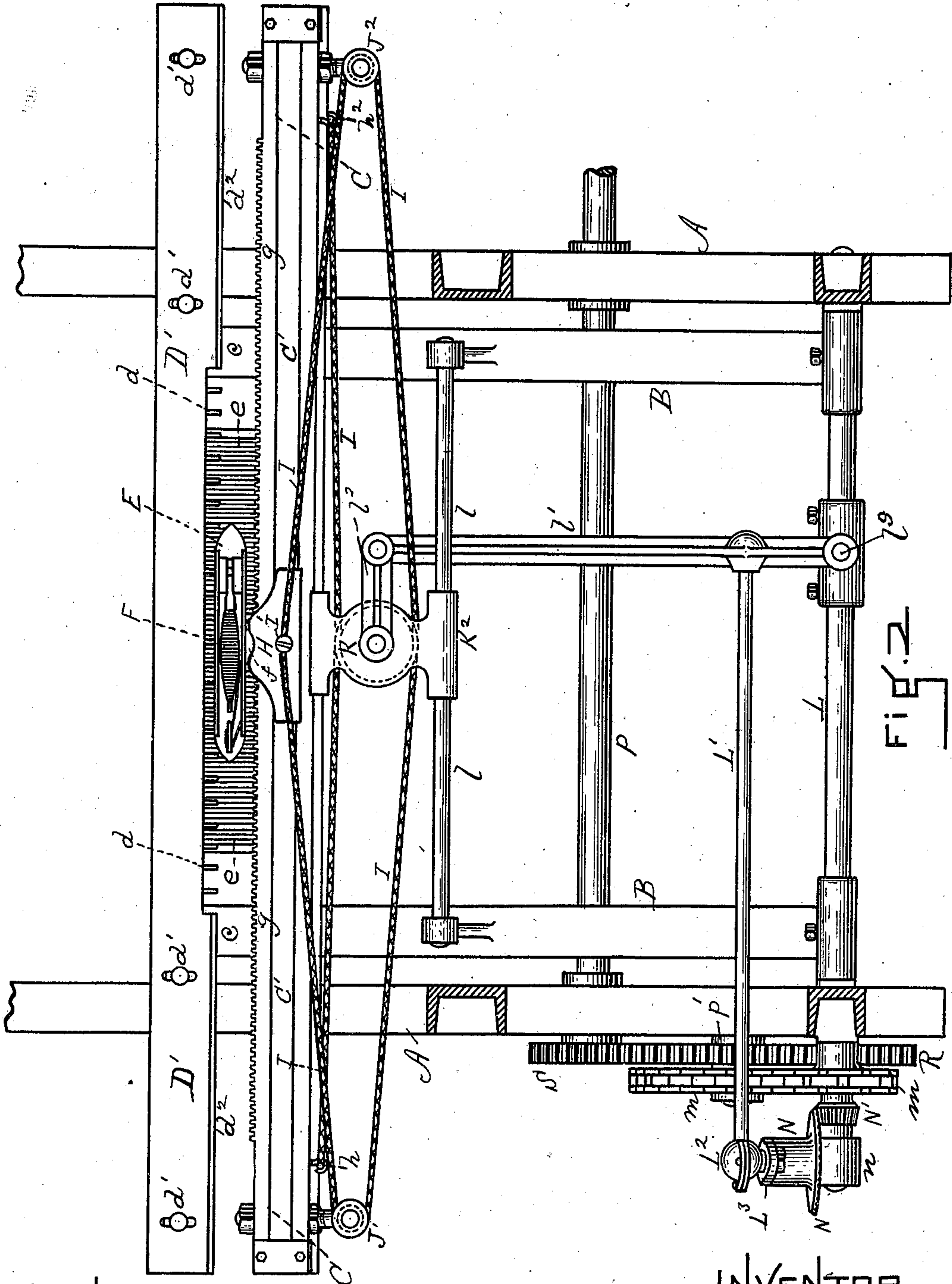


FIG. 2.

WITNESSES

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(No Model.)

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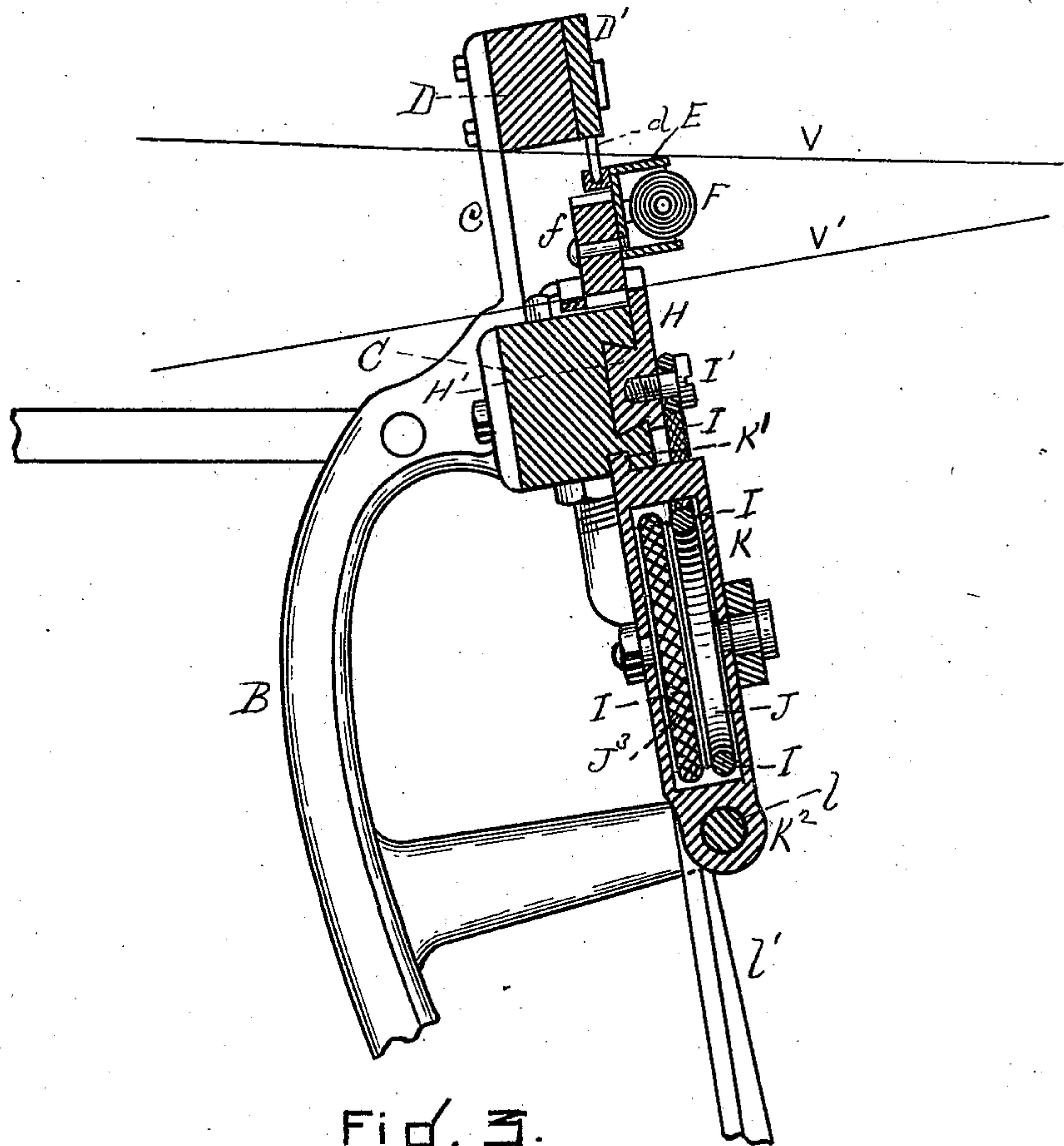


Fig. 3.

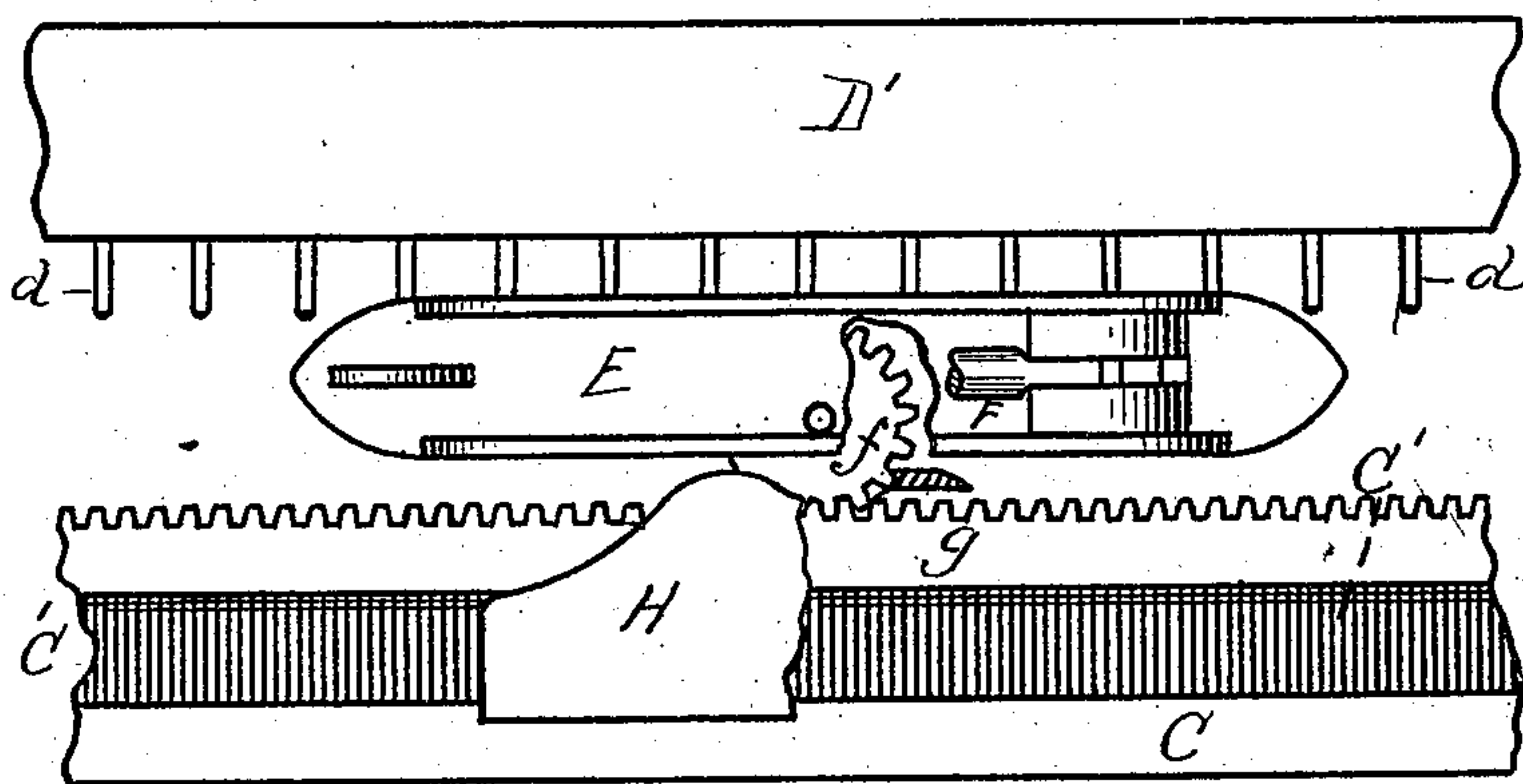


Fig. 4.

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UNITED STATES PATENT OFFICE.

EDMUND H. GRAHAM, OF BIDDEFORD, MAINE, ASSIGNOR OF ONE-HALF TO
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POSITIVE SHUTTLE-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 503,956, dated August 29, 1893.

Application filed February 3, 1893. Serial No. 460,828. (No model.)

To all whom it may concern:

Be it known that I, EDMUND H. GRAHAM, a citizen of the United States, residing at Biddeford, in the county of York and State of Maine, have invented new and useful Improvements in Positive Shuttle-Motions for Looms, of which the following is a specification.

This invention relates to positive shuttle-motions for looms; and it is intended to be an improvement upon the invention illustrated and described in the Letters Patent of the United States No. 474,555, granted to me May 10, 1892.

My present invention has for its principal object to perfect and render more efficient and practical the positive motion of the shuttle and the mechanism for producing the same, and it consists in the novel construction, arrangement and combinations of parts hereinafter described, reference being had to the accompanying drawings, in which—

Figure 1 is an end elevation of parts of a loom which relate to and embody my invention. Fig. 2 is a front elevation, portions of the frame being shown in section. Fig. 3 is an enlarged sectional view, taken vertically and centrally, with the parts in the position shown in Fig. 2. Fig. 4 is an enlarged detail in elevation, showing the shuttle, carrier, &c., portions being represented as broken out. Fig. 5 is an enlarged detail in plan of the shuttle, a part having been broken out to show the method of supporting the cop-spindle. Fig. 6 is a sectional detail on line x , Fig. 1.

Similar letters of reference indicate like parts.

A represents the frame of the loom, B the lay-swords, and C the lay proper or lower rail of the lay.

D is the upper rail supported by the extensions or standards c (Figs. 2 and 3).

e is the reed secured in its usual position, the threads of the warp running between the rails C and D and through said reed.

E is the shuttle which runs between the two rails and is guided at its top by a row of pins d which project downward from the under side of a guide-bar D' adjustably secured at d' to the upper rail. The pins d are replaced

at the ends of the lay by tongues d^2 which are secured to the lower edge of the guide-bar D' in a line with the pins, and both pins and tongues enter a groove (Fig. 3) in the upper side of the shuttle as it moves along. The shuttle is not mounted on rolls, as shown in the patent above referred to, but is provided centrally with a pinion f whose arbor is supported by the shuttle (Figs. 4 and 5), said pinion being in engagement with the rack g secured to the lower rail C. Thus the shuttle is driven from the center without the use of rolls, adding to its simplicity, efficiency, and ease of running.

F is the cop in position on the shuttle-spindle F' .

H is the traveler which imparts motion to the shuttle by means of a central depression or hole in its upper side into which space the pinion f extends, so that as the traveler moves, it pushes the shuttle with it by means of the pinion which extends into the said cavity. The traveler is provided with a dovetailed projection H' sliding in a corresponding groove C' in the lower rail. Secured centrally to the face of the traveler is a screw or pin I' , sufficient of whose shank is left exposed to allow the rope I to be secured thereto. This rope has one end secured to the hook h projecting from the lay, and it extends from said hook around the pulley J in the block K, thence to and around the pulley J' supported by the lay, thence to the traveler to which it is secured as above mentioned by the screw I' , thence to and around the pulley J^2 supported by the lay, thence to and around the pulley J^3 in the block K, and thence to the hook h^2 to which its opposite end is secured. See Figs. 2 and 3. The block K slides horizontally by means of the rib K' in a suitable groove in the under side of the lower rail C, and, by means of its perforated lower extension K^2 on a horizontal rod l supported by the lay-swords B. The lower ends of the lay-swords are fast on the rocker-shaft L, and pivotally secured by means of a stud l^9 to the same shaft is the lower end of the swinging lever l' whose upper end is connected to the sliding block K by a link l^2 . A horizontal connecting rod L' connects by means of a

ball and socket swivel the lever L' with the ball and socket joint L^2 on the crank L^3 (Figs. 1 and 2) integral with the bevel gear N on the post n extending from and surrounding the shaft L , said gear N (Figs. 1, 2, and 6) engaging with the bevel gear N' loose on the rocker-shaft L .

Integral with the bevel gear N' is the sprocket wheel N^2 loose on the same shaft L and connected by the chain m with the sprocket wheel m' fast on the stud P' having its bearings in the frame. Fast on the same stud is the elliptical gear R which is in engagement with the eccentric gear S fast on the driving shaft P . As the lay, lay-swords, &c., are vibrated together by the crank T on the crank-shaft T' (Fig. 1), the traveler, carrying the shuttle, is moved back and forth by the cord I twice with each movement back and forth of the sliding block K , which is actuated by the link l^2 , lever l' , connecting rod L' , crank L^3 , bevel gears, sprocket wheels, and elliptic and eccentric gears. The elliptical gear serves to slacken or suspend the motion of the traveler at the ends of the stroke and reverse it gradually so as to enable the loom to run with greater speed.

It will readily be seen that the shuttle is practically supported, steadied, and held in its relative position at three points, viz., centrally on its under side by the pinion f , and at its two upper corners by the guide pins d and guides d^2 , these three points being the only three points of its support. The threads $V V'$ pass between the pins d and between the teeth of the rack g .

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

1. In a positive shuttle motion for looms, the combination of the shuttle supported and steadied at three points only, a pinion supporting it at one point said pinion being located at the center of the under side of said shuttle, the lower rail, a rack on the lower rail engaging said pinion, the upper rail, guides and guide-pins supporting and steadying the shuttle at two points on its upper side, said guides and pins being secured to the upper rail, and a traveler having a depression in which the said pinion rests where-

by the shuttle is driven without the use of rolls, substantially as set forth.

2. In a positive shuttle motion for looms, the combination of the shuttle provided with a longitudinal groove on its upper side, the pinion f having its bearings in said shuttle centrally near the under side, the lower rail, the rack g on the lower rail engaging said pinion, the traveler or carrier carrying the shuttle, the upper rail, the guide-bar D' secured to the upper rail, and guide-pins d extending downward from said guide-bar, substantially as described.

3. In a positive shuttle motion for looms, the combination of a pair of rails between which the warp extends a guide for the shuttle secured to the upper rail, a shuttle reciprocated between said rails, a pinion secured centrally to said shuttle a rack secured to the lower rail, and a traveler provided on its upper side with a recess or concavity fitting said pinion whereby horizontal motion is imparted thereto and thence to the shuttle, substantially as set forth.

4. The combination of the lay, the lower rail, the carrier or traveler H sliding in the lower rail, the sliding block K sliding in a groove in the lower rail and on a horizontal rod supported by the lay swords, pulleys $J J^3$ in said block, pulleys $J' J^2$ supported by the lay at opposite ends thereof, a cord fastened to the traveler and passing around said pulleys and with its ends secured to the lower rail, link l^2 connecting the block and the lever l' , lever l' pivotally secured to said link and the rocker shaft L , crank L^3 , connecting rod L' having ball and socket connections with the lever l' and crank L^3 , the bevel gear N integral with the crank and loose on the post n , bevel gear N' loose on the rocker shaft and engaging with the gear N , sprocket wheel N^2 integral with the gear N' , stud P' , and elliptical gear R and eccentric gear S in engagement with the elliptical gear and fast on said stud P' , substantially as described.

EDMUND H. GRAHAM.

Witnesses:

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S. F. SHAW.