

(No Model.)

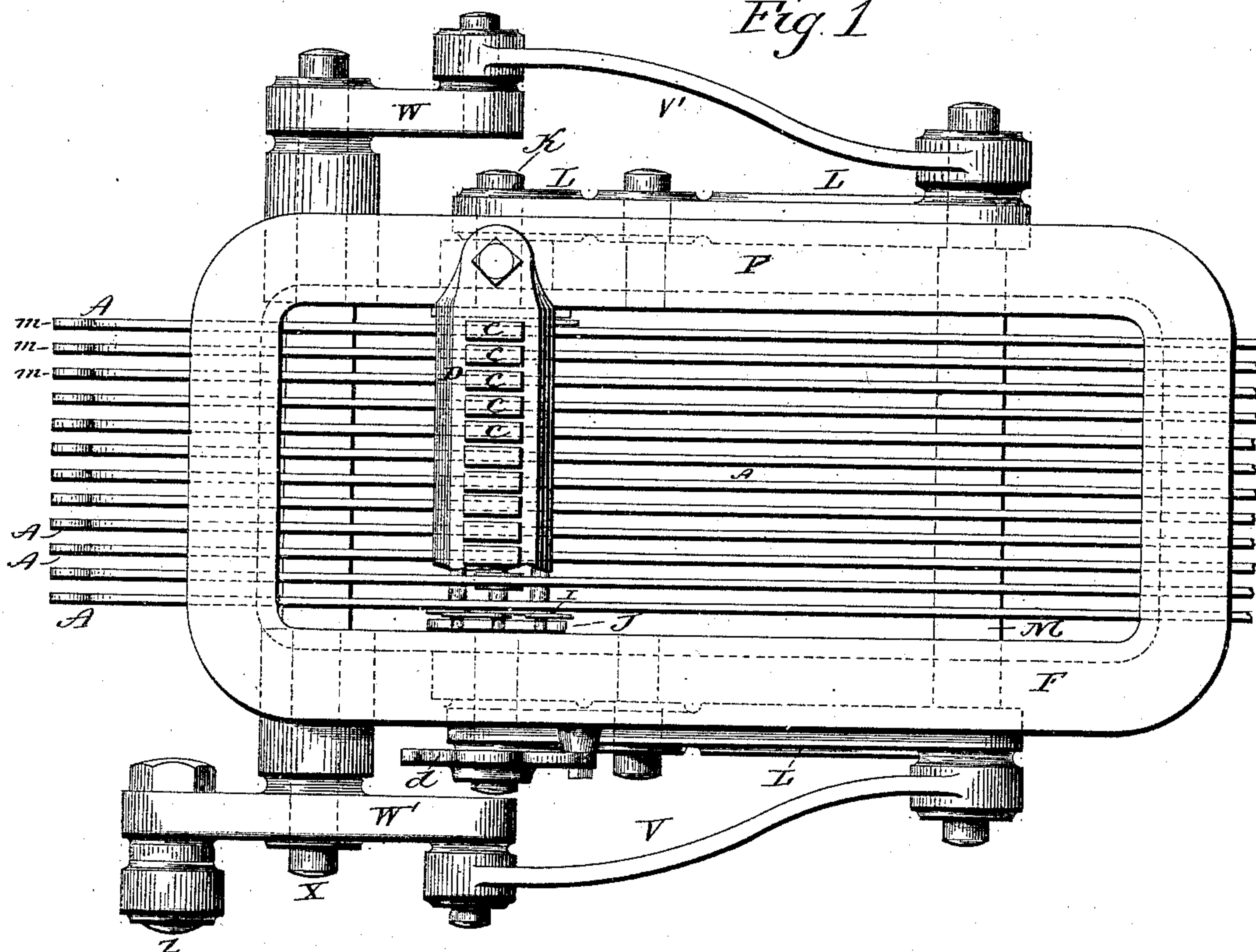
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C. W. WOLFF.  
SHEDDING MECHANISM FOR LOOMS.

No. 445,791.

Patented Feb. 3, 1891.

*Fig 1*



*Fig. 2.*

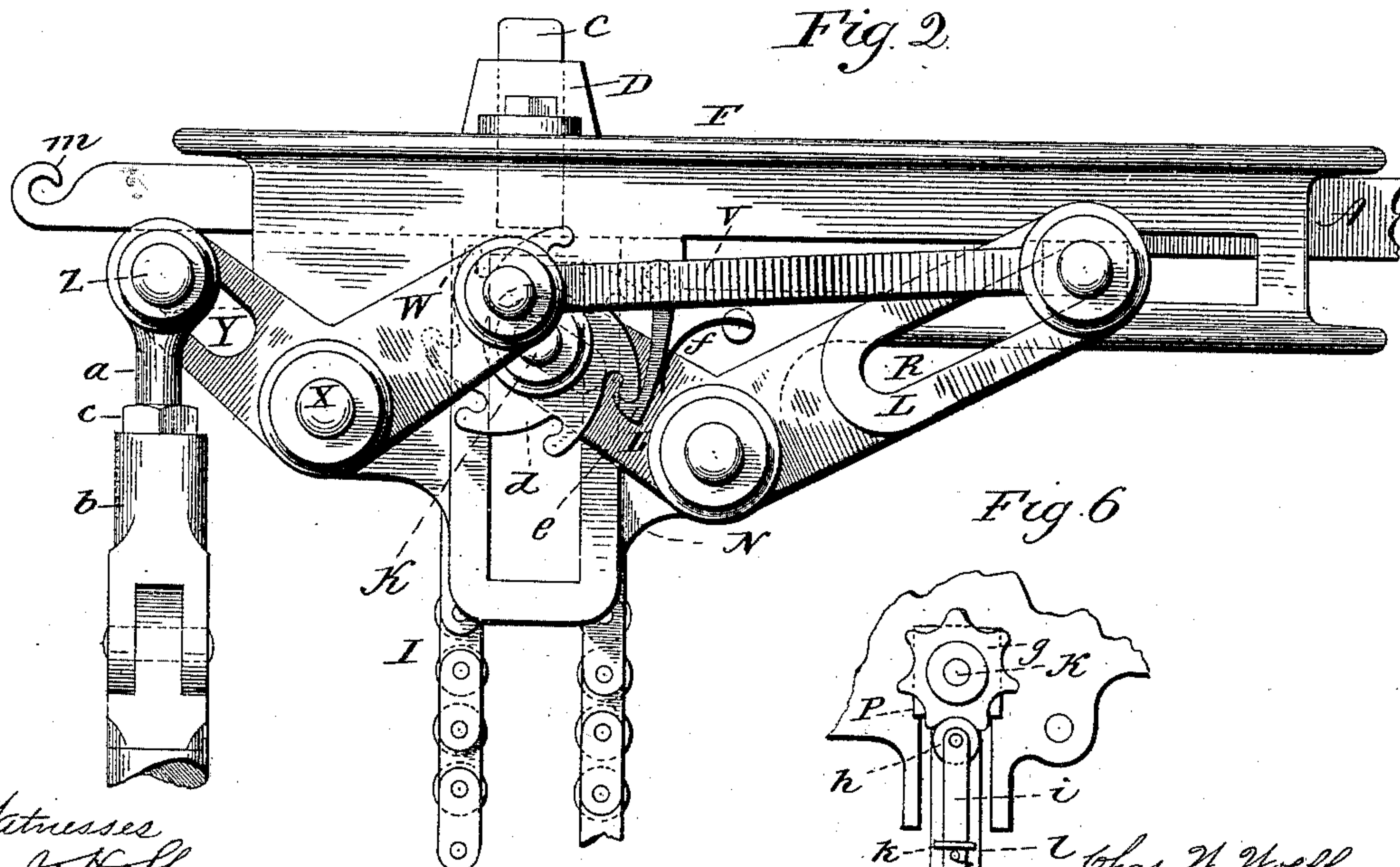
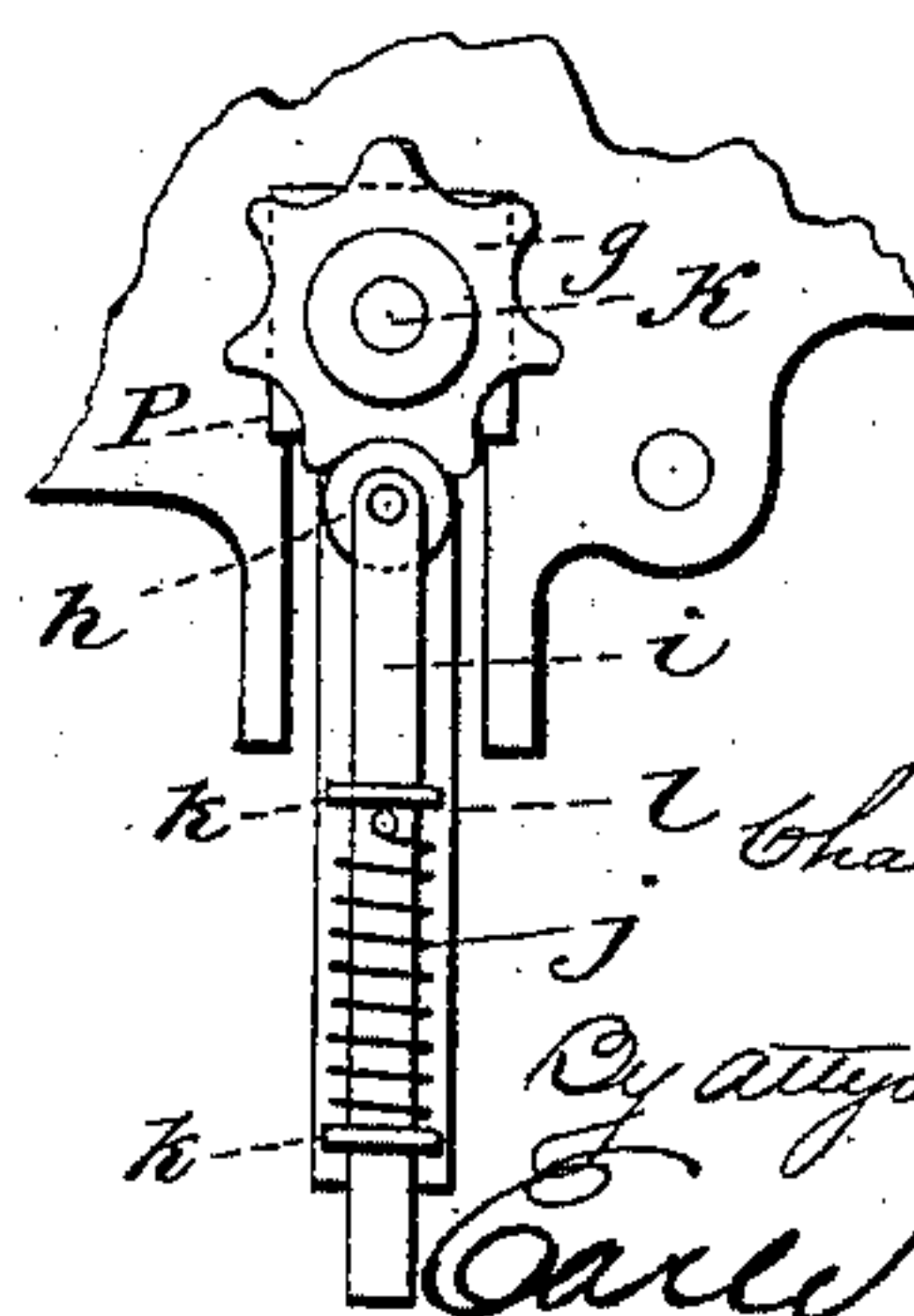


Fig. 6



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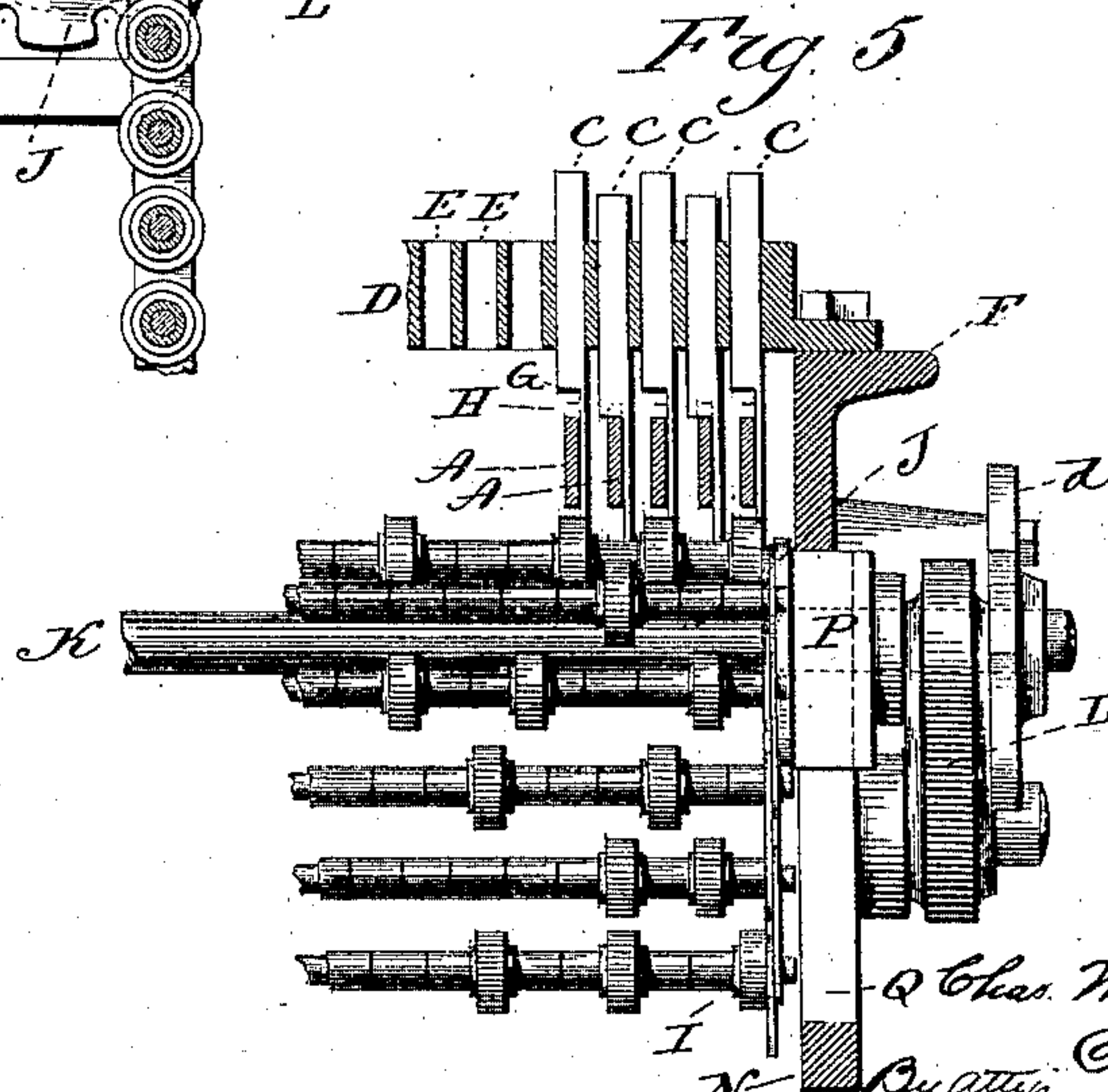
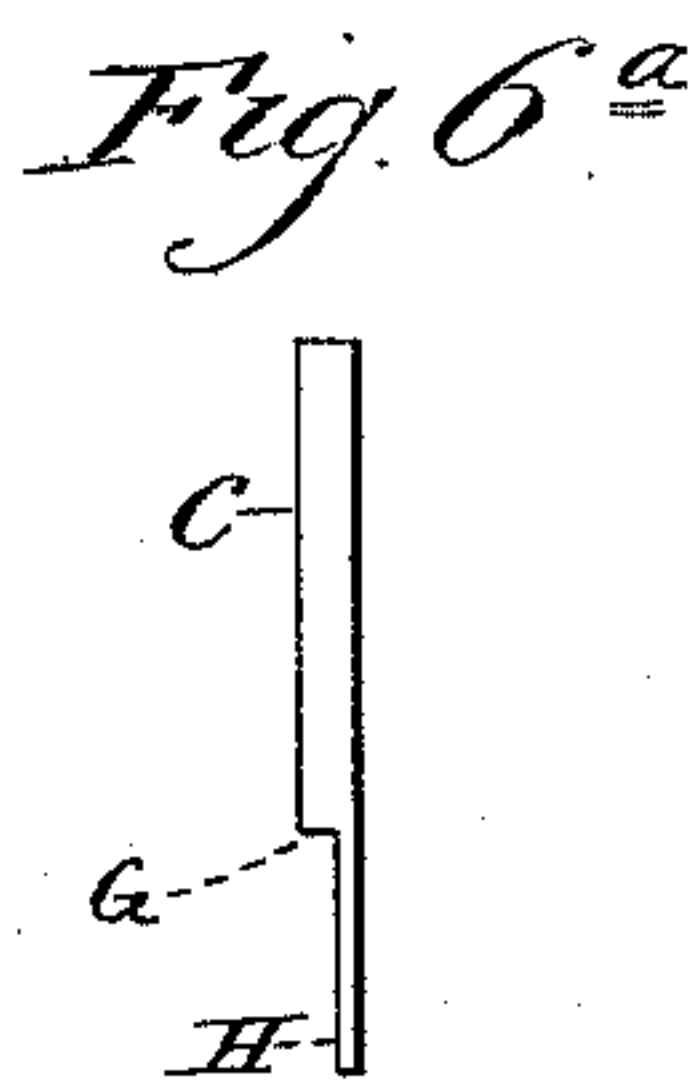
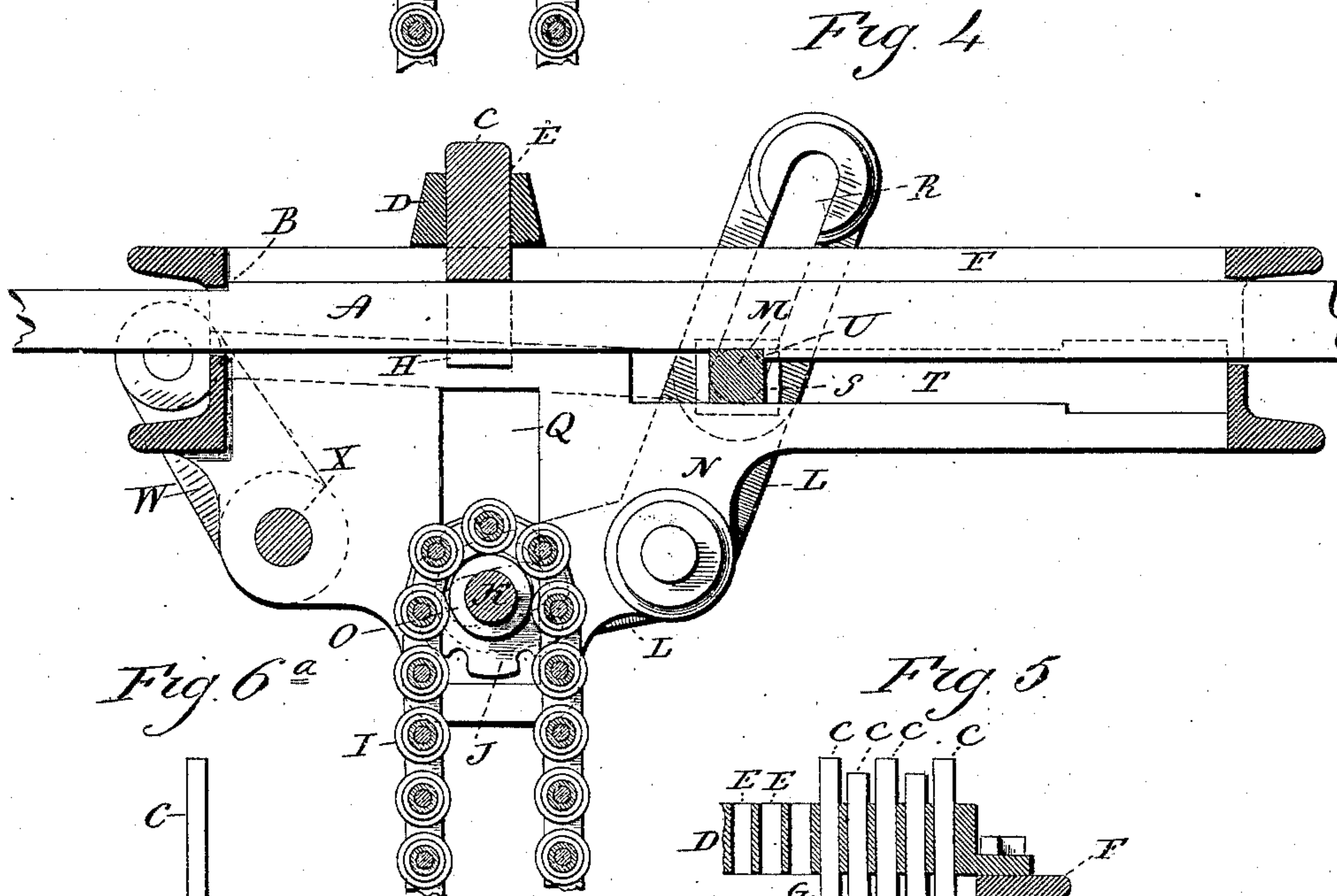
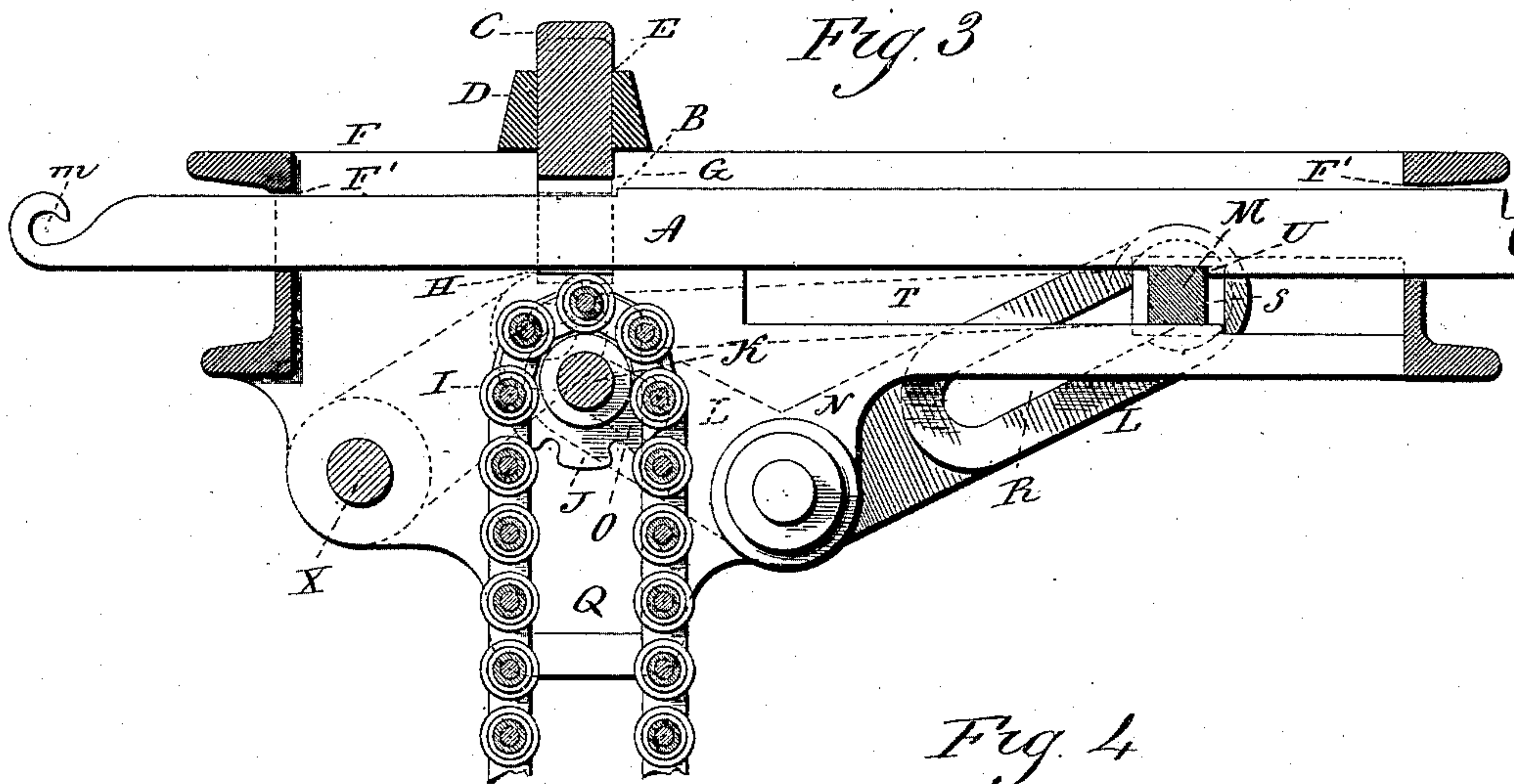
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# UNITED STATES PATENT OFFICE.

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## SHEDDING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 445,791, dated February 3, 1891.

Application filed December 24, 1889. Serial No. 334,851. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES W. WOLFF, of Ansonia, in the county of New Haven and State of Connecticut, have invented new Improvements in Shedding Mechanism for Looms; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, which said drawings constitute part of this specification, and represent, in—

Figure 1, a plan view of one form which a shedding mechanism embodying my invention may assume. Fig. 2 is a view thereof in side elevation. Fig. 3 is a view thereof in vertical longitudinal section, showing the pattern-chain lifted for changing the pattern. Fig. 4 is a similar view showing the chain depressed and the knife-bar moved inward. Fig. 5 is a detached broken view, partly in front elevation and partly in vertical transverse section, showing the gravity-locks in their relations to the jacks and the pattern-chain. Fig. 6 is a detached broken view showing the lock for the chain-shaft, and Fig. 6<sup>a</sup> is a detached edge view of one of the gravity-locks.

My invention relates to an improvement in shedding mechanisms for looms, the object being to simplify them, to reduce the friction of their operation, and to increase their capacity for work over the construction now in use.

With these objects in view my invention consists in a shedding mechanism the jacks whereof are confined to horizontal movement, in a construction whereby the change in the pattern is made when the said mechanism is open, in novel means for driving the pattern-changing mechanism from the knife-bar, and in certain details of construction, as will be hereinafter described, and pointed out in the claims.

Under my invention the jacks A are provided upon their upper edges and toward their forward ends with shoulders B, which are correspondingly located in all of the jacks. The said shoulders normally engage with gravity-locks C, of which there is one for each jack. These locks are mounted in series above the jacks in a cross-piece D, in which

they are free to have independent vertical reciprocation. As herein shown, they are located in independent openings E, formed in the said cross-piece. I may, however, place them side by side in contact with each other in a long slot formed in the cross-piece. The ends of the said cross-piece are bolted to the frame F, in which the jacks are mounted, and which may be of any approved construction, and adapted in any suitable manner for attachment to the loom, which is not shown herein. Each end of the said frame is provided with a horizontal series of vertically-elongated slots or gates F', to receive the ends of the jacks, which they confine to horizontal movement. Each of the said gravity-locks C is provided with a locking-shoulder G for engagement by the shoulder B of the jack A, corresponding to it, and with an unlocking-leg H, extending below the lower edge of the jack and made long enough to permit the raising of the lock through it for clearing the shoulder of the lock C from that of the jack. The legs of the locks are for this purpose engaged by the disks of the pattern-chain I, which in itself is of known construction, and does not therefore need detailed description, more than to note that the disks are arranged continuously and not with a space between each transverse series, as is usually done. It is mounted upon and rotated by notched chain-wheels J, secured to the chain-shaft K, which is raised and lowered every time the pattern is changed by means of two bell-crank levers L L, connected with the knife-bar M, and vertically fulcrumed upon extensions N N, depending from the frame upon opposite sides thereof. As herein shown, the said levers are fulcrumed upon the outer faces of the said extensions; but they may be located upon the inner faces thereof. The inner and shorter arms of the said levers are provided with elongated slots O O, through which the chain-shaft is passed, and which by being elongated permit the same to be confined to vertical movement, in which it is guided by bearings P P, mounted upon the ends of the shaft and respectively located in vertical slots Q Q, formed in the said extensions of the frame. Under this construction the pattern-chain I is lifted against the projecting



ends of the legs II of the gravity-locks C to change the pattern when the knife-bar is at its outstroke, and therefore when the shedding mechanism is open, so that the pattern is changed when the mechanism is in that adjustment, as will be fully described later on. The outer and longer ends of the bell-crank levers L L are provided with elongated slots R R, through which the knife-bar M passes, and which by virtue of their elongation permit the same to be confined to horizontal movement, in which it is guided by bearings S S, secured to its ends and located in long horizontal slots T T, formed in opposite sides of the frame. The said knife-bar is of ordinary construction and engages with shoulders U, formed upon the under edges and near the rear ends of the jacks A and aligning when the same are in their normal positions. It may be stated here that the shoulders U and B of the jacks are spaced relatively to each other, so that the latter will just clear the shoulders G of the gravity-locks when the same are lifted by the pattern-chain for changing the pattern, which is done, as before mentioned, when the knife-bar is at the limit of its outstroke, at which time the shoulders U of all of the jacks will be engaged with it under the strain of the harnesses connected with them, whereby, and owing to the clearance provided for, as above stated, the wear between the jacks and the gravity-locks and the power required to operate the latter is reduced to the minimum.

Power is communicated to the knife-bar by means of the pitmen V and V', secured to its opposite ends and respectively connected with a crank W and a bell-crank lever W', both mounted upon an oscillating shaft X, having bearings in the inner end of the frame F, as shown. The free end of the bell-crank lever W' has an elongated slot Y formed in it to receive, and elongated for the adjustment of, a stud Z, which also passes through the eye of an eyebolt a, the threaded lower end whereof is entered into the upper member of a jointed actuating-rod b and locked in place by a check-nut c, the opposite end of the said rod being connected with a crank, (not shown,) but making one revolution to two revolutions of the loom. By shifting the stud Z in the slot Y the stroke of the knife-bar may be lengthened or shortened, as desired. I may here state that I do not limit myself to these particular power-connections with the knife-bar, as they may be replaced by a variety of other mechanisms for the purpose.

The chain-shaft is intermittently rotated for the purpose of successively presenting the disks of the pattern-chain to the gravity-locks by means of a toothed wheel d, rigidly secured to one of its ends, and a hook e, pivoted to the frame F, in position to engage with the teeth of the said wheel when the same is lifted with the shaft, so that when the shaft is depressed the hook, being locked

into a tooth of the wheel, will force the same to turn, whereby the shaft is turned also. Then when the shaft and wheel are lifted again the latter will be re-engaged with the hook, and so on. A spring f, bearing upon the hook, holds it in position for engagement with the teeth of the wheel. The chain-shaft is locked against rotation on its upward movement, when the pattern-chain does its work, by means of a locking-wheel g, rigidly attached to the opposite end of the shaft and having its periphery notched to receive a roller h, journaled in the upper end of a carrier i, which is pressed toward the wheel by a spring j encircling it, and mounted in guides k k, secured to an arm l, depending from the adjacent bearing P of the shaft, which when rotated forces the roller to retire, but only to spring back into the next notch in the locking-wheel. The forward ends of the jacks are provided with eyes m, through which they are connected, in any approved manner, with the loom-harnesses, which exert a constant effort to pull the jacks against the shoulders of the knife-bar and gravity-locks.

By forming shoulders in the upper edges of the jacks and using gravity-locks, as described, I am enabled to release the jacks for changing the pattern without moving them laterally, without imposing any strain upon them, and with the use of very little power, the locks being small and returning to their locking positions solely by the action of gravity.

By providing for the changing of the pattern when the shedding mechanism is open, and therefore when the knife-bar is at the limit of its outward movement, instead of when the said mechanism is closed and when the knife-bar is at the limit of its instroke, as has heretofore been done, I am enabled to run a loom provided with my improved attachment with twice the rapidity of looms having their shedding mechanisms arranged to change the pattern when they are closed, for the reason that the pattern being changed when the knife-bar is at the limit of its outstroke the back pick of the loom may then be made at the same time the pattern is being changed instead of making it during a separate movement of the attachment as has heretofore been required in prior looms which have been constructed to make alternate movements for the back and face picks. Under my improvement I make both the back and the face picks in the same movement of the attachment, and this, as has been explained, by changing the pattern and making the back pick at the same time. Therefore by making two picks during every movement of the attachment, instead of one pick as in prior attachments, I am enabled to do twice as much work as could be done heretofore, and this without running the attachment any faster, although, of course, the loom proper must be speeded to run twice as fast as usual to keep up with the attach-



ment, which makes but one movement to two of the loom. There is, however, no difficulty in speeding up the loom, although, as is well known, the speed of the attachment is limited by the time demanded by the lingoes for their descent. Under my improvement, therefore, the pattern-disks, as before mentioned, are continuous and not alternate with blanks as heretofore, and this arrangement will be followed in any form of pattern-changing mechanism that I may employ. It will be clear, also, from the foregoing that the attachment makes but one movement to two of the loom proper.

The sheds in the warp-threads for the insertion of the "back" picks are formed by shedding mechanism independent from that of my attachment and of any approved construction.

The two mechanisms co-operate as follows: The knife-bar being at the limit of its outstroke, the shedding mechanism of the loom proper manipulates the back warps to form the shed for the back pick, which is made when the pattern is being changed. Then when the knife-bar moves inward those jacks whose locks have been lifted and disengaged from them by the pattern-disks will move inward and permit a portion of the face warps to be depressed to the plane of the back warps, and thus form the shed for the "face" pick, which is then made. After this the knife-bar moves outward again and pulls back the jacks that have just moved inward, and when they have all been moved back to the limit of their outward movement the pattern is changed again, and so on.

It may be well to explain that the term "open" has been used to describe that condition of the shedding mechanism when the knife-bar thereof is at the limit of its outstroke, and therefore when all of the harnesses connected with the said mechanism are lifted to raise the face warps to permit the back pick to be made, and, on the other hand, the term "closed" has been used to designate the adjustment of parts obtaining in the mechanism when the knife-bar is at the limit of the instroke and some of the harnesses, according to the pattern, are depressed with their face warps to permit the face pick to be made over the same. Again the term "back pick" has been used to designate the action of the shuttle in putting the filling-threads into the back of the fabric being woven, while the term "face pick" is used to describe the action of the shuttle which puts the filling into the figured face of the fabric.

My improved shedding mechanism was primarily designed to be applied to looms for weaving narrow fabrics, such as suspenders, webbing having a figured face and a plain back, although not limited to the production of narrow fabrics. I would also call attention to my driving of the chain-shaft from the knife-bar and the connection of those parts, whereby it becomes easy to time the

operations of the several parts of the apparatus.

My improved mechanism is very simple of its class, and not only of construction, but also of comprehension and adjustment, so that it may be operated and set by comparatively unskilled labor.

It is apparent that in practice I may make some changes from the construction herein shown and described. Thus, although I have herein shown my invention as applied to a shedding mechanism employing a pattern-chain, I may, if desired, use it in a mechanism employing pattern-cards or any other form of pattern-changing mechanism.

Some changes I have pointed out in the foregoing description. I would therefore have it understood that I do not limit myself to the construction herein detailed, but hold myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of my invention.

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

1. In a shedding mechanism for looms, the combination, with jacks, of a frame adapted to receive the ends thereof and confine them to longitudinal reciprocation, a cross-piece extending transversely over the jacks, gravity-locks mounted in the said cross-piece for independent endwise vertical reciprocation therein and resting upon the upper edges of the said jacks, each of the said locks having a locking-shoulder which is engaged by the upper edge of its jack and an unlocking-leg which depends below the lower edge thereof, pattern mechanism adapted to co-operate with the legs of the locks to lift the same, means for lifting the said mechanism against the legs of the locks, a horizontally-reciprocating knife-bar adapted to engage with the lower edges of the jacks, and means for reciprocating the knife-bar, connected with means for lifting the pattern mechanism, substantially as described.

2. In a shedding mechanism for looms, the combination, with jacks, of a frame constructed to confine them to horizontal reciprocation, a series of gravity-locks, constructed and mounted for independent endwise vertical reciprocation and supported upon the upper edges of the jacks, each of the said locks having a locking-shoulder which is engaged by the upper edge of its jack and an unlocking-leg which depends below the lower edge thereof, pattern mechanism adapted to co-operate with the legs of the locks to lift the same, a horizontally-reciprocating knife-bar to engage with the lower edges of the jacks, and levers connecting the knife-bar and pattern mechanism and constructed to lift the latter against the unlocking-legs of the locks, which are thus raised to permit the jacks to move forward when the knife-bar is at the limit of its outstroke, substantially as described.



3. In a shedding mechanism for looms, the combination, with jacks, each having a shoulder upon its upper and its lower edge, of a series of gravity-locks constructed and mounted  
 5 for independent endwise vertical reciprocation, supported upon the upper edges of the jacks and respectively engaged by the shoulders upon the said edges thereof, pattern mechanism located below the jacks and raised to  
 10 lift the locks to permit the jacks to move forward, a horizontally-reciprocating knife-bar adapted to engage with the shoulders upon the lower faces of the jacks, and means for lifting the pattern mechanism to raise the  
 15 locks when the bar is at the limit of its outstroke, the shoulders on the jacks being relatively arranged so that when the bar is engaged with the shoulders upon their lower edges and at the limit of its outstroke the  
 20 shoulders upon their upper edges will be clear of the locks, which are thus left free to be raised, substantially as described.

4. In a shedding mechanism for looms, the combination, with a chain-shaft and a knife-  
 25 bar, of bell-crank levers connecting the said chain-shaft and knife-bar, and having slotted ends through which the same pass to permit the former to have a vertical movement and the latter to have a horizontal movement,  
 30 substantially as described.

5. In a shedding mechanism for looms, the combination, with jacks, of a frame receiving their ends and confining them to horizontal  
 35 movement, locks located above the jacks, a pattern-chain having continuous disks, a horizontal knife-bar, and levers connecting the chain and bar so that the former will be lifted to co-operate with the locks in chang-

ing the pattern when the bar is at the limit of its outstroke, whereby a back and a face  
 40 pick may be made in the same revolution of the attachment, and means for actuating the knife-bar, substantially as described.

6. In a shedding mechanism for looms, the combination, with jacks, of a frame receiving  
 45 the ends of the jacks and confining them to horizontal movement, gravity-locks located above the jacks, a horizontal knife-bar mounted in the frame below the jacks, a chain-shaft moving in vertical slots formed in the frame,  
 50 bell-crank levers connecting the knife-bar and chain-shaft, and power-connections applied to the knife-bar for operating the same and the chain-shaft, substantially as described.  
 55

7. In a shedding mechanism for looms, the combination, with jacks, of a frame receiving  
 the ends of the same and confining them to a horizontal movement, gravity-locks located  
 60 above the jacks, a horizontally-reciprocable knife-bar, a vertically-reciprocable chain-shaft, a pattern-chain running over the same and lifted thereby to lift the locks, slotted bell-crank levers connecting the knife-  
 65 bar and chain-shaft, a rock-shaft journaled in the frame, a bell-crank lever mounted on each end thereof, a pitman connecting each of the said levers with the knife-bar, and an actuating-rod connected with one of the bell-  
 70 crank levers last mentioned, substantially as described.

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Witnesses:

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