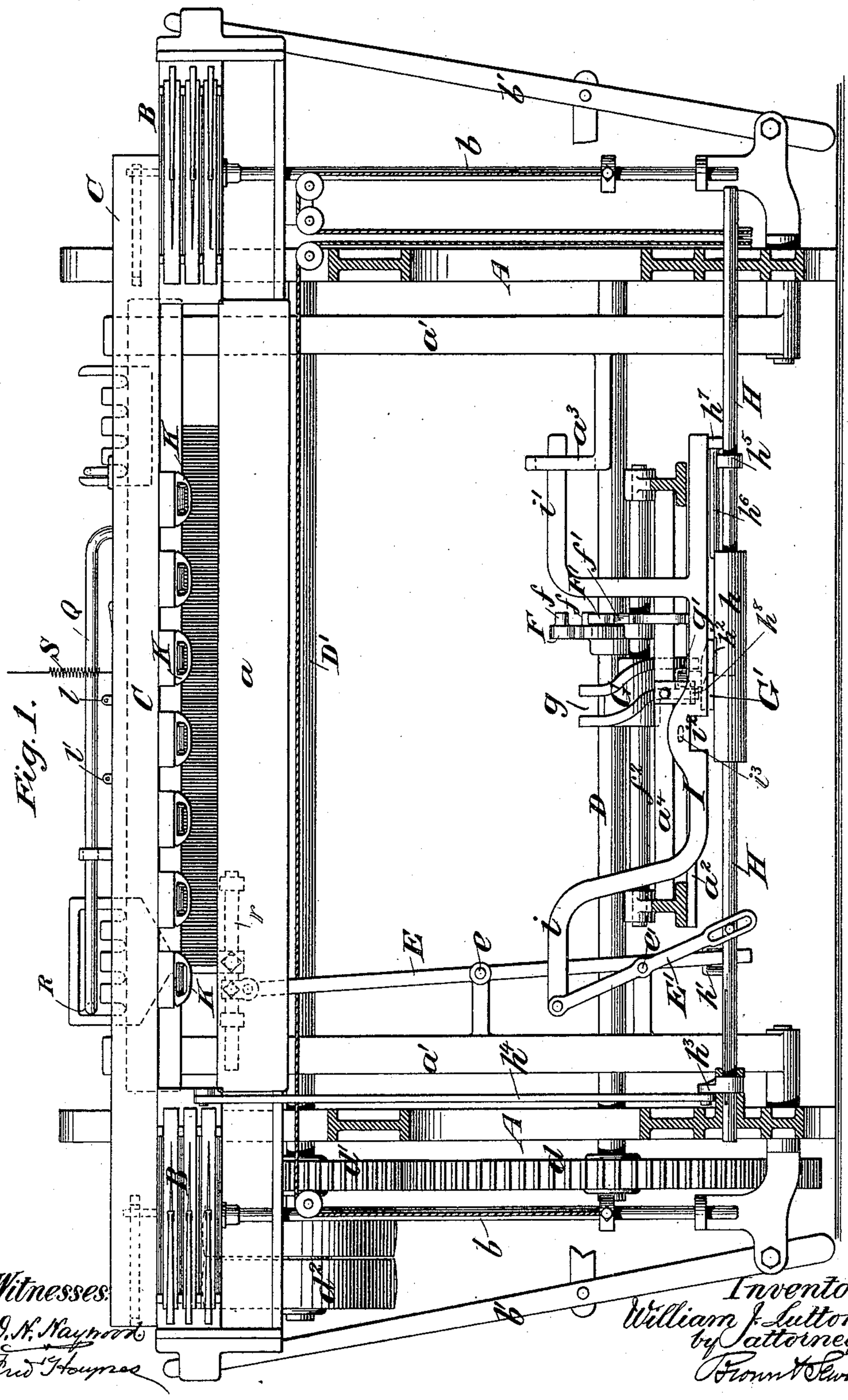
(No Model.) 4 Sheets—Sheet 1.

W. J. LUTTON.

SWIVEL LOOM.

No. 467,262. Patented Jan. 19, 1892.

Fig. 1.



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Fred'k Haynes

Inventor:
William J. Lutton
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Brown & Seward

No Model.)

4 Sheets—Sheet 2.

W. J. LUTTON.

SWIVEL LOOM.

No. 467,262. Patented Jan. 19, 1892.

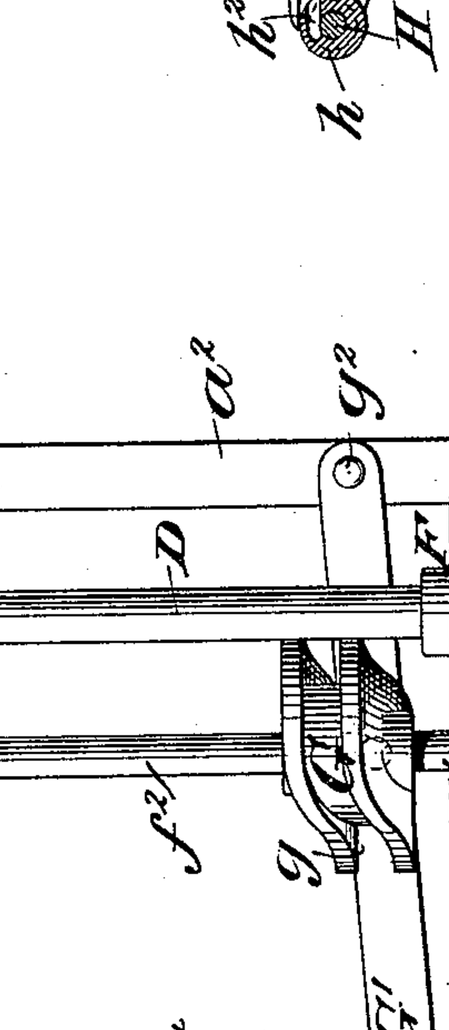

Fig. 4.

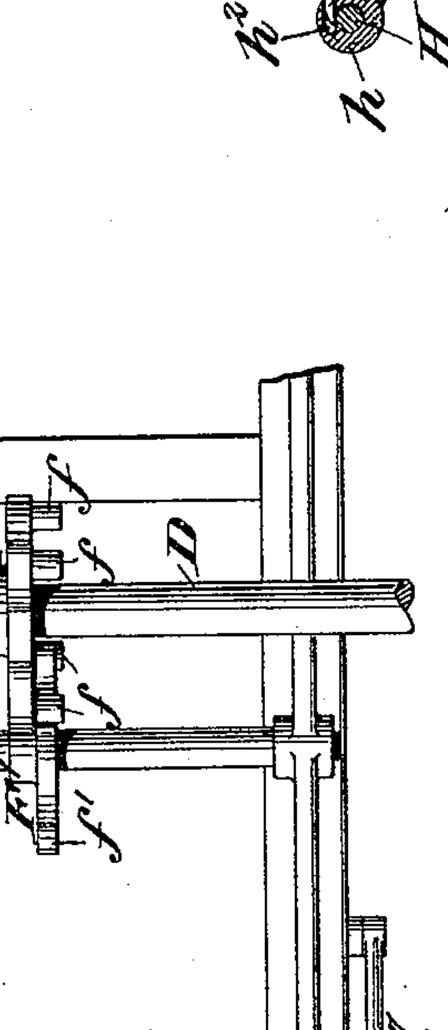

Fig. 5.

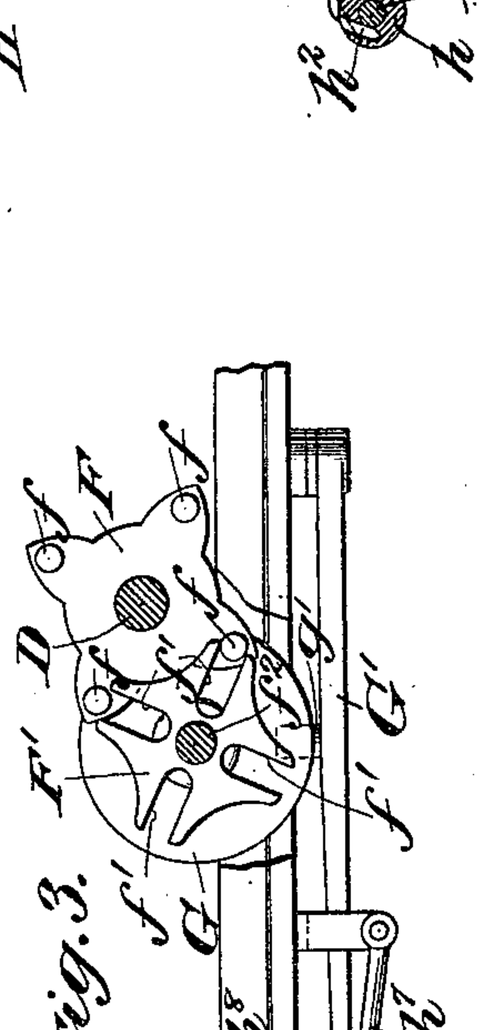

Fig. 6.

Fig. 2.

Fig. 3.

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(No Model.) 4 Sheets—Sheet 3.

W. J. LUTTON.

SWIVEL LOOM.

No. 467,262. Patented Jan. 19, 1892.

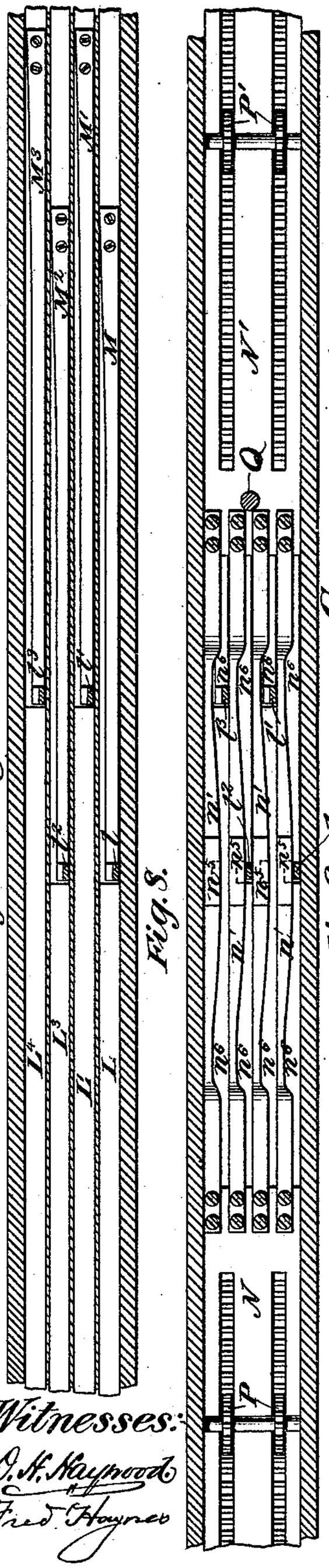

Fig. 7.

Fig. 8.

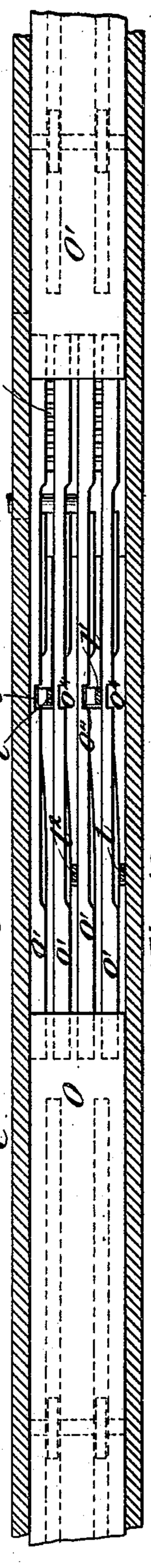

Fig. 9.

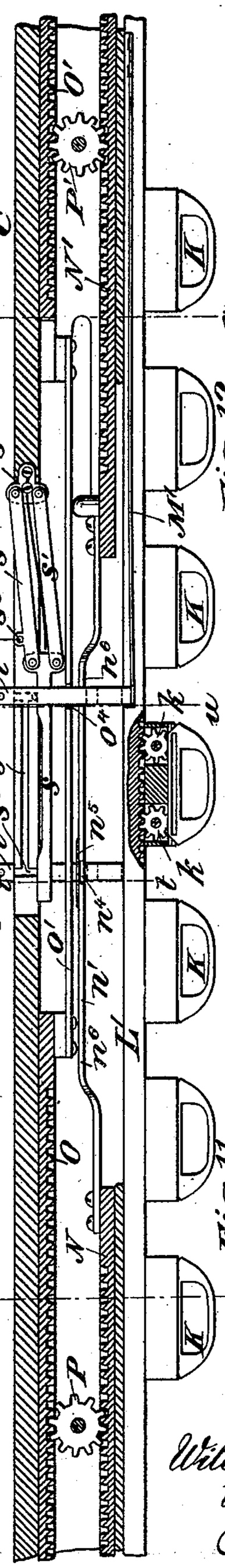

Fig. 10.

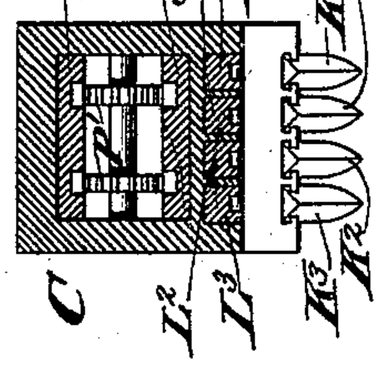

Fig. 12.

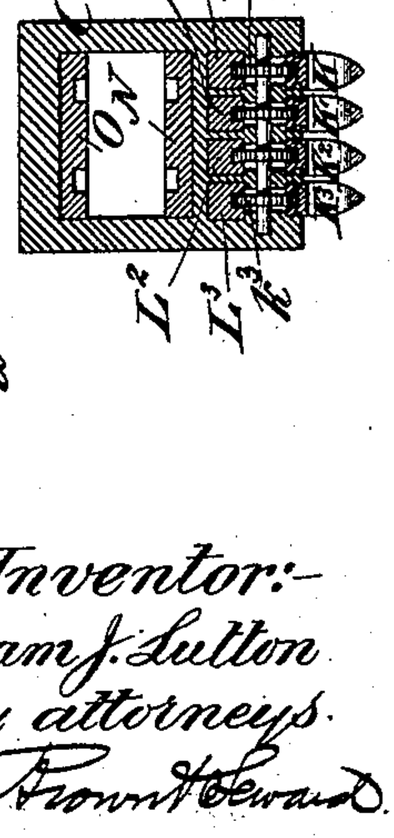

Fig. 11.

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(No Model.) 4 Sheets—Sheet 4.

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SWIVEL LOOM.

No. 467,262. Patented Jan. 19, 1892.

Fig. 14.

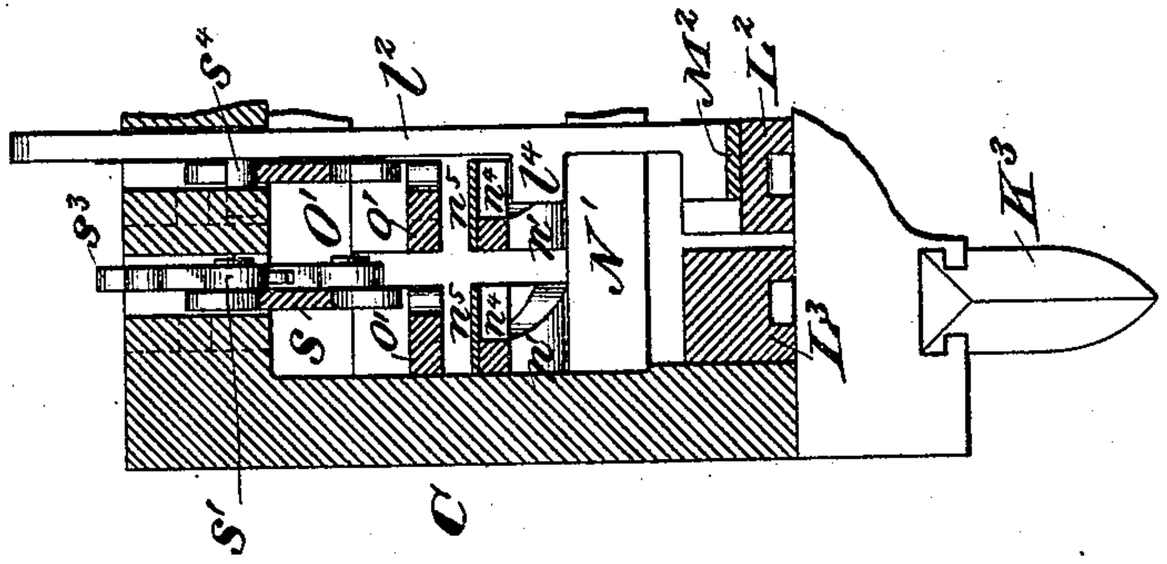
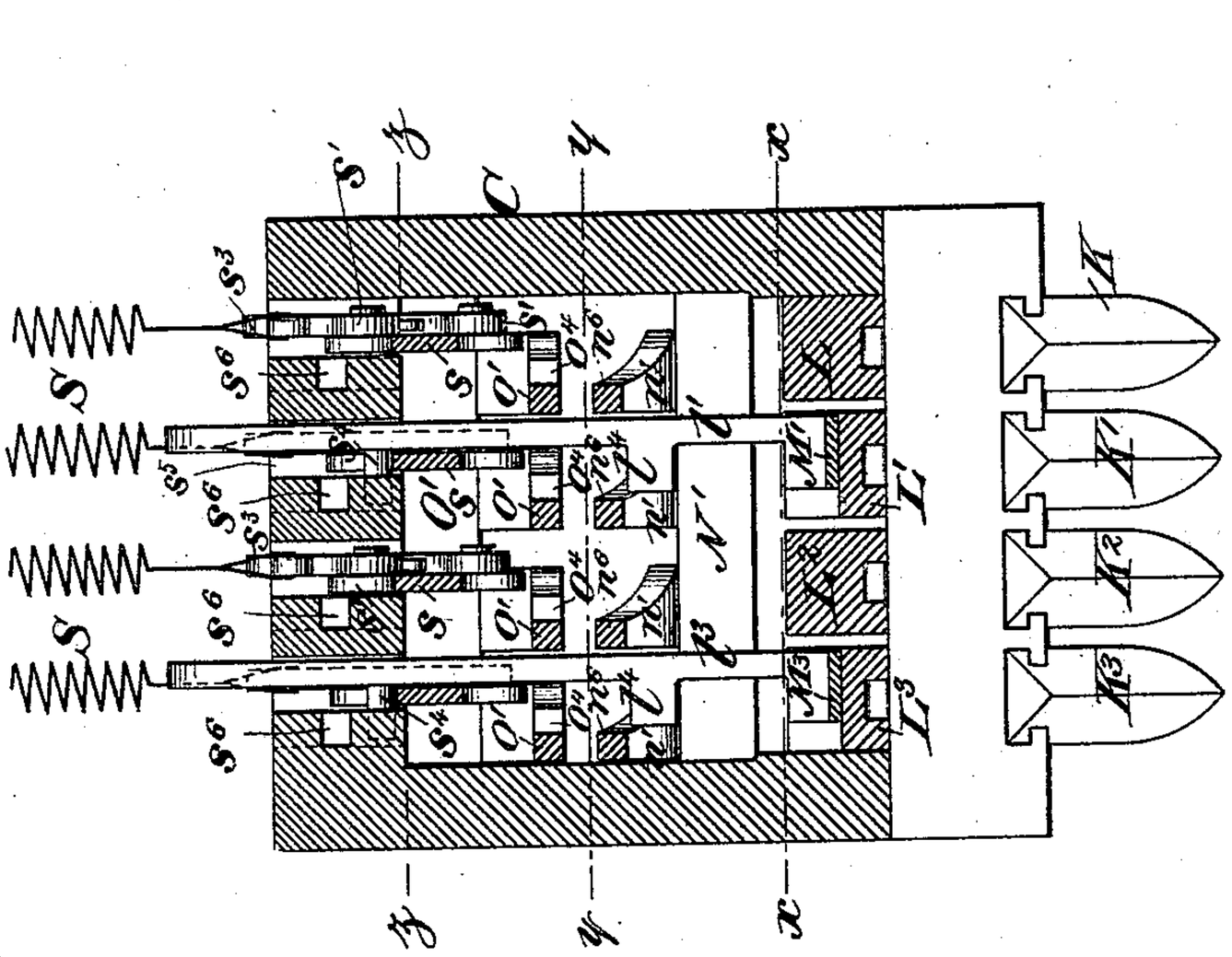


Fig. 13.



Witnesses:-
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Fred'k Haynes

Inventor:-
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UNITED STATES PATENT OFFICE.

WILLIAM J. LUTTON, OF PATERSON, NEW JERSEY.

SWIVEL-LOOM.

SPECIFICATION forming part of Letters Patent No. 467,262, dated January 19, 1892.

Application filed June 24, 1891. Serial No. 397,344. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. LUTTON, of Paterson, in the county of Passiac and State of New Jersey, have invented a new and useful Improvement in Swivel-Looms, of which the following is a specification.

My invention relates to an improvement in swivel-looms, in which provision is made for operating the swivel-shuttles at the moment the vibrating lever which communicates motion to the swivel-shuttle-operating mechanism carried by the swivel-shuttle-supporting beam reaches either end of its stroke.

The improvement is particularly adapted to use in connection with looms of the drop-box type, in which the swivel-shuttle beam is allowed to fall to bring the swivel-shuttles into position for use at the same time that the drop-boxes are lowered to throw the shuttles therein out of use, and is an improvement upon the general structure shown and described in my patent, No. 460,477, granted September 28, 1891.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 is a view of the loom in front elevation, partly in section. Fig. 2 is a partial plan view of the swivel-shuttle-actuating mechanism and its connection with the main shaft. Fig. 3 is a view of the same in side elevation, partly in section. Figs. 4, 5, and 6 are views in side elevation, partly in section, showing the three positions which the vibrating operating-lever may assume with respect to the parts intended to be operated thereby. Fig. 7 is a partial horizontal section through the swivel-shuttle beam, taken on line $x\,x$ of Fig. 13. Fig. 8 is a similar view taken on line $y\,y$ of Fig. 13. Fig. 9 is a similar view taken on line $z\,z$ of Fig. 13. Fig. 10 is a partial vertical longitudinal section of the swivel-shuttle beam. Fig. 11 is a transverse section through the swivel-shuttle beam, taken on line $w\,w$ of Fig. 10. Fig. 12 is a similar view taken on line $v\,v$ of Fig. 10. Fig. 13 is an enlarged transverse section through the swivel-shuttle beam, taken on line $u\,u$ of Fig. 10; and Fig. 14 is a partial enlarged transverse section through the swivel-shuttle beam, taken on line $t\,t$ of Fig. 10.

A represents the loom-frame; a, the lay-sole; a', the lay-swords; B, the drop-boxes; b, the drop-box supports; b', the picker-staffs, and C the swivel-shuttle beam, supported in longitudinal adjustment at its opposite ends upon the drop-boxes B.

The cam-shaft is denoted by D and is provided with a drive-wheel d, engaged by a drive-pinion d' upon a shaft D′, the latter carrying a drive-pulley d^2, to which power is applied from any suitable source.

The mechanism carried by the swivel-shuttle beam for imparting motion directly to the swivel-shuttles is connected with the actuating mechanism supported in the loom-frame and under the control of the dropping of the shuttle-boxes to throw it into and out of connection with the drive-shaft D by a lever E, pivotally secured to one of the lay-swords at e and having its upper end connected with the mechanism carried by the swivel-shuttle beam and its lower end engaged with the actuating mechanism driven by shaft D.

My invention contemplates the prompt swinging of the lever E, no matter at which end of its stroke it be when the shuttle-boxes drop, and the movement of the swivel-shuttles in the right direction, no matter at which end of their strokes they may have been left.

The shaft D has fixed thereon a wheel F, provided with pins or studs f, projecting laterally therefrom at intervals along its margin. In the present instance four such pins are shown at equal distances apart, adapted to engage the radial slots f' in a wheel F′ of the "cross-of-honor" type and thereby impart to the said wheel F′ and to the shaft f^2, on which it is fixed, a continuous variable rotary movement. The shaft f^2 has fixed thereon a cam-wheel G, provided with a cam-groove g in its periphery adapted to receive the stud g' on the laterally-vibrating lever G′, the latter being pivotally secured at one end, as at g^2, to a cross-piece a^2, and its free end reaching forwardly and resting on the surface of an enlarged portion h of a longitudinally sliding and rocking shaft H, mounted in suitable bearings in the frame A. The shaft H is provided with a loop h' adapted to receive the lower end of the lever E hereinbefore referred to, and to cause it to vibrate together with the longitudinal movement of the shaft H, and at the same time permit said shaft to rock without disturbing its connection with the lever. The enlarged portion h of said shaft H is pro-

vided with a pocket h^2, adapted to receive the free end of the vibrating lever G′ when the latter is at one limit of its stroke at the time the shaft H is rocked, and thereby form a connection between the said shaft H and vibrating lever G′ to cause the said shaft H to be slid longitudinally by the vibratory movement of the lever. The shaft H is also provided with a crank h^3, connected by a rod h^4 with the drop-box frame, so that as the drop-boxes fall the shaft H will be rocked. If then it happens that the vibrating lever G′ be at the limit of its stroke to correspond with the pocket h^2 in the enlarged portion h of the shaft H at the moment the drop-boxes fall, there will be a prompt engagement of the lever G′ with the shaft H by the entrance of its end into the pocket h^2, so that the said shaft, and hence the lever E and hence the swivel-shuttle mechanism connected with the lever E, will be promptly actuated. Such a position of the parts is represented in Figs. 1 and 2. If, however, it shall happen that the drop-boxes fall when the vibrating lever G′ is at the opposite end of its stroke, the rocking of the arm H would no longer engage the end of the lever G′ within the pocket h^2. In order, however, to secure an engagement with the lever G′, which shall still slide the shaft H in the same direction as it would have been slid had the lever G′ engaged therewith at the opposite end of its stroke, I provide the following mechanism: An operating-lever E′ is pivotally secured at e' to one of the lay-swords a' and has a pin-and-slot engagement at its lower end with the shaft H. To its upper end is pivoted the upwardly-curved end i of a bar I, the body of which is intended to rest in proximity to the upper face of the vibrating lever G′. An upwardly-bent arm i' at the free end of the bar I has a vertically-movable engagement in a bracket a^3, fixed to the lay-sword a' and serving as a guide for the free end of the said bar. A notch i^2, formed in the under side of the bar I, is adapted to receive the free end of the vibrating lever G′ when the said bar is allowed to drop at the moment the lever G′ is opposite the said notch. The bar I is held normally suspended by means of an arm h^5, fixed to the shaft H, which extends under a projection h^6, extending laterally from an auxiliary swinging arm h^7, intermediate of the ends of the latter, the free end of the arm h^7 forming a support for the bar I. From this it follows that when the shaft H is rocked by the dropping of the shuttle-boxes the arm h^5 will be rocked downwardly into the position as shown, for example, in dotted lines, Fig. 5, and if at this moment the vibrating lever G′ be opposite the notch i^2 the latter will receive the said vibrating lever and the bar I will thereby be moved longitudinally, together with the lever G′, and such movement of the bar I will, through the connection of said bar with the shaft H, move the shaft H in an opposite direction from that in which the bar I moves. If therefore the vibrating lever G′ be at the opposite end of its stroke from the pocket h^2 when the boxes fall, it will be engaged with the bar I and the shaft H will be thereby moved in the same direction as it would have been had the lever G′ engaged with the pocket h^2 at the opposite end of its stroke. When the lever G′ is engaged in the pocket h^2, the bar I will rest on the upper face of the lever G′. To prevent the bar I from dropping into position to engage the lever G′ as the latter moves past the notch i^2, I provide a guard h^8, fixed to a cross-bar h^4 and in position to receive a projection i^3 on the back of the bar I and prevent it from dropping while the lever G′ is passing the notch.

The three positions which the lever G′ and the bar I may assume with respect to the shaft H and to each other are represented in detail in Figs. 4, 5, and 6, the position in Fig. 4 being that in which the bar I is dropped into engagement with the vibrating lever G′, and the latter being at the opposite end of its stroke from the pocket h^2 will ride on the periphery of the enlarged portion h of the shaft H, the projection i^3 on the bar I being brought sufficiently low to pass underneath the guard h^8. The position shown in Fig. 5 is that in which the lever G′ is engaged with the pocket h^2 in the shaft H, the bar I being now held upon the upper face of the lever G′ and the projection i^3 being in position to engage the upper side of the guard h^8 when the lever G′ passes the notch in the bar I. The position shown in Fig. 6 is that in which the swivel-shuttle mechanism is out of action, the shaft H being in the position which it assumes before the drop-boxes are let fall, the bar I being held supported by the arms h^5 and h^7, as hereinbefore set forth.

From the above it follows that if the lever E occupy the position represented in Fig. 1 it will be operated in a direction to throw its lower end to the left and its upper end to the right, no matter at which end of the stroke of the vibrating lever G′ the drop-boxes be let fall, and if the said lever E were in the opposite position from that shown in Fig. 1, with its lower end to the left and its upper end to the right, it would be thrown in the opposite direction at the moment of the fall of the drop-boxes at either end of the stroke of the vibrating lever G′.

The swivel-shuttles are represented by K K′ K^2 K^3. In the present instance I have shown a bank of four longitudinal series, the shuttles in one of the longitudinal series being represented by K and those in each of the other series by K′ K^2 K^3, respectively. They are operated by means of pinions k k', &c., engaged with rack-bars L L′, &c., each longitudinal series being provided with its own independent rack-bar for operating that series. Each of said rack-bars has its own independent uprising standard l l', &c., connected at its lower end with the bar, preferably by means of a bar-spring M M′, &c., the spring

being fixed at one end to the rack-bar and the standard being secured to the free end of the spring, the tension of the spring tending at all times to hold the standard depressed.

Located within the swivel-shuttle beam and above the bank of shuttle-driving rack-bars L L′, &c., are located a pair of lower rack-bar sections N and N′ and a pair of upper rack-bar sections O and O′. The upper and lower sections N O and N′ O′ are spaced from each other and are adapted to engage the teeth on opposite sides of pinions P P′, mounted upon axles secured to the swivel-shuttle beam. The rack-sections N N′ are connected by four bridge-pieces n' n', &c., and the upper sections O O′ are connected by four bridge-pieces, o' o', &c. The four connecting bridge-pieces of the upper and lower rack-sections are intended to correspond to the four independent rack-bars in engagement with the four longitudinal series of swivel-shuttles. The standards l l', &c., connected with the independent rack-bar sections, extend upwardly through the swivel-shuttle beam in proximity to the edges of the bridge-pieces n' n', &c., and o' o', &c., and said standards are provided with projections l^4, extending laterally therefrom and adapted to engage within notches or recesses n^4 and o^4, formed, respectively, in the edges of the bridge-pieces of the lower and upper rack-sections. The notches n^4 in the lower bridge-pieces are covered by thin plates n^5, so that when the standards l l', &c., are elevated to bring the projection l^4 into one of the notches n^4 in the lower bridge-pieces it will be prevented from passing on through said notch and will be held by said plate in engagement with said lower bridge-pieces. The lower bridge-pieces n' n', &c., are narrowed at points n^6, (see Fig. 8,) so that when such narrowed portion is opposite one of the uprising standards l the projection l^4 on said standard will pass freely beyond the lower bridge-piece and into engagement with the notch o^4 in one of the upper bridge-pieces. One of the upper or lower rack-sections—in the present instance, the lower rack-section—N′ is connected by an arm Q with the notched loop R, fixed to the sliding bar r, engaged with the upper end of the lever E so that when the swivel-shuttles are dropped the said lever will be connected with the lower rack-section N′, and will cause it to move in one direction or the other, according as the lever E is moved in one direction or the other. The longitudinal movement of the rack-section N′ and the section N, connected thereto by the bridge-pieces n' n', &c., will cause a simultaneous movement of the upper rack-sections O O′ in the opposite direction, because of the intermediate pinions P P′, and hence any one of the independent rack-bars L L′, &c., which shall at such time be connected by its standards l l', &c., with either the upper or lower rack-sections will be caused to move in the direction in which said sections are moving, and motion will thereby be imparted to the swivel-shuttles in an opposite direction thereto.

Whether one or more of the longitudinal series of swivel-shuttles shall be brought into operation at any one time may be determined by the pattern in the well-known "Jacquard" mechanism, not shown herein, but arranged to lift upwardly upon any one or more of the standards l l', as may be desired. The connection of the Jacquard mechanism with the standards l l', &c., may be direct, and to this end the upper ends of the said standards are provided with perforations for the attachment thereto of connecting-springs S. I prefer, however, to employ a parallel motion—such, for example, as that shown in Fig. 10, in which a horizontal finger s is connected by a pair of parallel bars s' with a support s^2, fixed to the beam, the upper bar s' being provided with an eye s^3 for the attachment thereto of the spring S. The standards l l', &c., are each provided with a laterally-projecting pin s^4, (see Fig. 13,) adapted to rest on the finger s, and thereby cause the standards to rise with the lifting of the finger. The pin s^4 is adapted to enter a vertical groove s^5, which communicates with a horizontal groove s^6, in which the pin s^4, when the standard is elevated to bring its projection into engagement with the lower bridge-pieces n' n', &c., rides throughout the longitudinal movement of the rack-bar, said groove s^5 terminating in a mouth at the top of the beam to allow the pin to ride along the top edge of the beam when the said standard has been elevated to bring its projection into engagement with the edge of the upper bridge-pieces o' o', &c. The variation in the amount of upward movement of the standard to engage the lower or upper bridge under the uniform lift by the Jacquard mechanism is accounted for by the spring connections S.

If the shuttles in any one of the longitudinal series rest at the left-hand ends of their strokes, their operating rack-bar will be at the right-hand end of its stroke. If at this time the lower rack-section be in the position indicated in Fig. 10, where the next stroke will be from left to right, the uprising standard l' of the rack-bar to operate that series of shuttles will be in position, when lifted, to pass the lower bridge-piece and engage with the upper bridge-piece, so that the movement of the lower rack-section to the right and the consequent movement of the upper rack-sections to the left will move said rack-bar having the standards l' to the left and the several shuttles of that series to the right. If at the same time the standard l^2 be lifted, it will be in position for its projection to engage the notch in the lower bridge-piece, and it and its rack-bar connected therewith will be moved, together with said lower rack-sections, to the right, and the shuttles of that series will be consequently moved to the left. From this it follows that at whichever end of their stroke the shuttles of any series be left,

they will when brought into action be forced in the right direction because of their connection with either the upper or lower set of racks, as the case may be.

What I claim is—

1. The combination, with the swivel-shuttle beam or support and swivel-shuttle-operating mechanism carried thereby, of the drive-shaft, a reciprocating part under the control of the drive-shaft, intermediate means for transmitting motion to the swivel-shuttle-operating mechanism, and means for converting the movements of the said reciprocating part in opposite directions into a movement of the said transmitting means in one direction, substantially as set forth.

2. The combination, with the swivel-shuttle beam or support, the swivel-shuttle-operating mechanism carried thereby, the lever for transmitting motion to said operating mechanism, a horizontally-movable and rocking shaft engaged with said lever, and means for operating the rocking shaft, of the drive-shaft, a vibrating lever actuated by the drive-shaft and adapted to engage the said longitudinally-movable and rocking shaft when the latter is rocked at the moment the vibrating lever is at one end of its stroke, and a bar connected with the above-named shaft so as to move it in the opposite direction from that in which the bar itself is moved, the said bar being adapted to engage the vibrating lever at the opposite end of its stroke from that at which it engages the said shaft, substantially as set forth.

3. In combination, a longitudinally-movable and rocking shaft, means for operating the rocking shaft, a vibrating lever, means for imparting to the lever a continuous variable movement, a bar having a longitudinal movement lengthwise of the said shaft, a lever for transmitting the movement of the shaft, a lever having one arm connected with the shaft and its opposite arm with the bar, and means for engaging the vibrating lever with the shaft at one end of its stroke and with the bar at the opposite end of its stroke, substantially as set forth.

4. In combination, the longitudinally-movable and rocking shaft, a connection between the shaft and the drop-shuttle box-frame for rocking the shaft, a bar having a movement lengthwise of the shaft, arms under the control of the said shaft for supporting the bar, a vibrating lever for engaging either the shaft or bar, means for operating the vibrating lever, a guard for preventing the engagement of the bar with the lever when the latter is engaged with the shaft, the motion-transmitting lever, and the connections between said transmitting-lever and the shaft and bar, substantially as set forth.

5. The combination, with the longitudinally-movable and rocking shaft provided with a pocket extending transversely thereto, means for operating the rocking shaft, the bar, and a rocking lever connecting the bar with the said shaft, of the vibrating lever adapted to engage the pocket in the shaft when at one end of its stroke and the recess in the bar when at the opposite end of the stroke, and means for operating the vibrating lever, substantially as set forth.

6. The combination, with the rack-bar and pinions for operating the swivel-shuttles, upper and lower rack-sections having movements independent of the said swivel-shuttle-operating rack-bar, and pinions connecting the upper and lower rack-sections, of means for throwing the swivel-shuttle-operating rack-bar into engagement with either the upper or lower rack-sections, and means for imparting motion to the rack-sections, substantially as set forth.

7. The combination, with a bank of swivel-shuttle-operating rack-bars and pinions having independent movements, of upper and lower rack-sections having movements independent of the said bank of rack-bars, pinions in gear with both said upper and lower rack-sections, means for imparting motion to said rack-sections, and means for connecting any one or more of the rack-bars in said bank with either the upper or lower of said rack-sections, substantially as set forth.

8. The combination, with a rack-bar and pinions for operating the swivel-shuttles, of two movable bars, means for connecting the bars together so that the movement of one in one direction will move the other in the opposite direction, means for imparting motion to the said connected bars, and means for connecting the said rack-bar with either one of said connected bars, substantially as set forth.

9. The combination, with the bank of independent swivel-shuttle-operating rack-bars and pinions, the upper and lower pairs of movable sections, a series of bridge-pieces corresponding to the independent swivel-shuttle rack-bars and connecting the members of each pair of movable sections, and means for connecting the upper and lower sections, so that the movement of the one in one direction will move the other in the opposite direction, of uprising standards secured to the independent rack-bars, and means for engaging the standards with either the upper or lower bridge-piece when the standard is raised, substantially as set forth.

10. The combination, with the standards for locking the rack-bars to the operating-sections, of a finger or bar adapted to engage the standard, and parallel bars pivotally connecting the finger or bar with its support, whereby the standard is lifted in a direct line and left free to move with its rack-bar, substantially as set forth.

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