No. 815,951. PATENTED MAR. 27, 1906.

N. FOERSTER, D. J. CAREY & W. A. FOSTER.

WEFT REPLENISHING LOOM.

APPLICATION FILED OCT. 15, 1903. RENEWED AUG. 29, 1905.

3 SHEETS—SHEET 1.

FIG. 2.

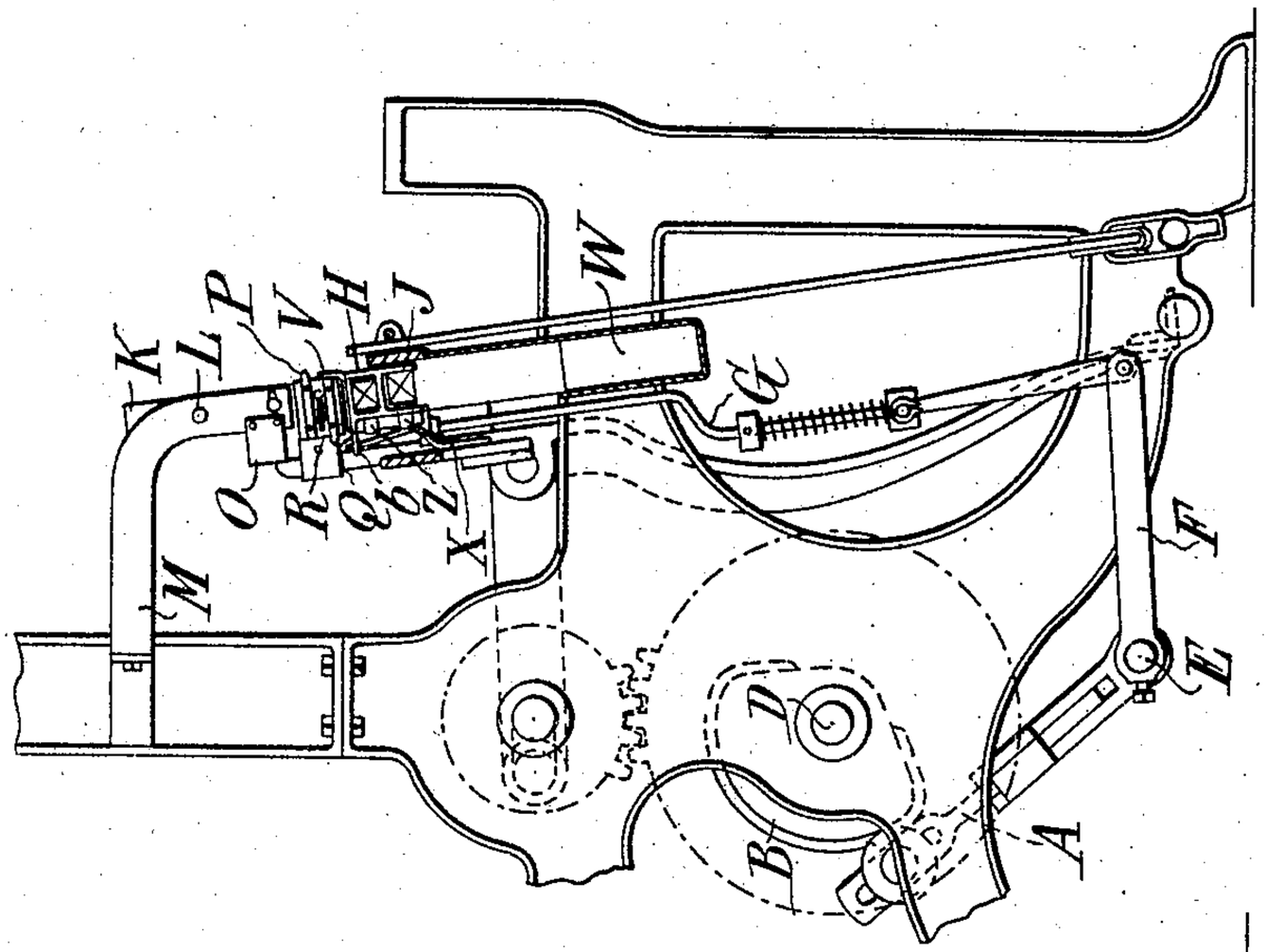
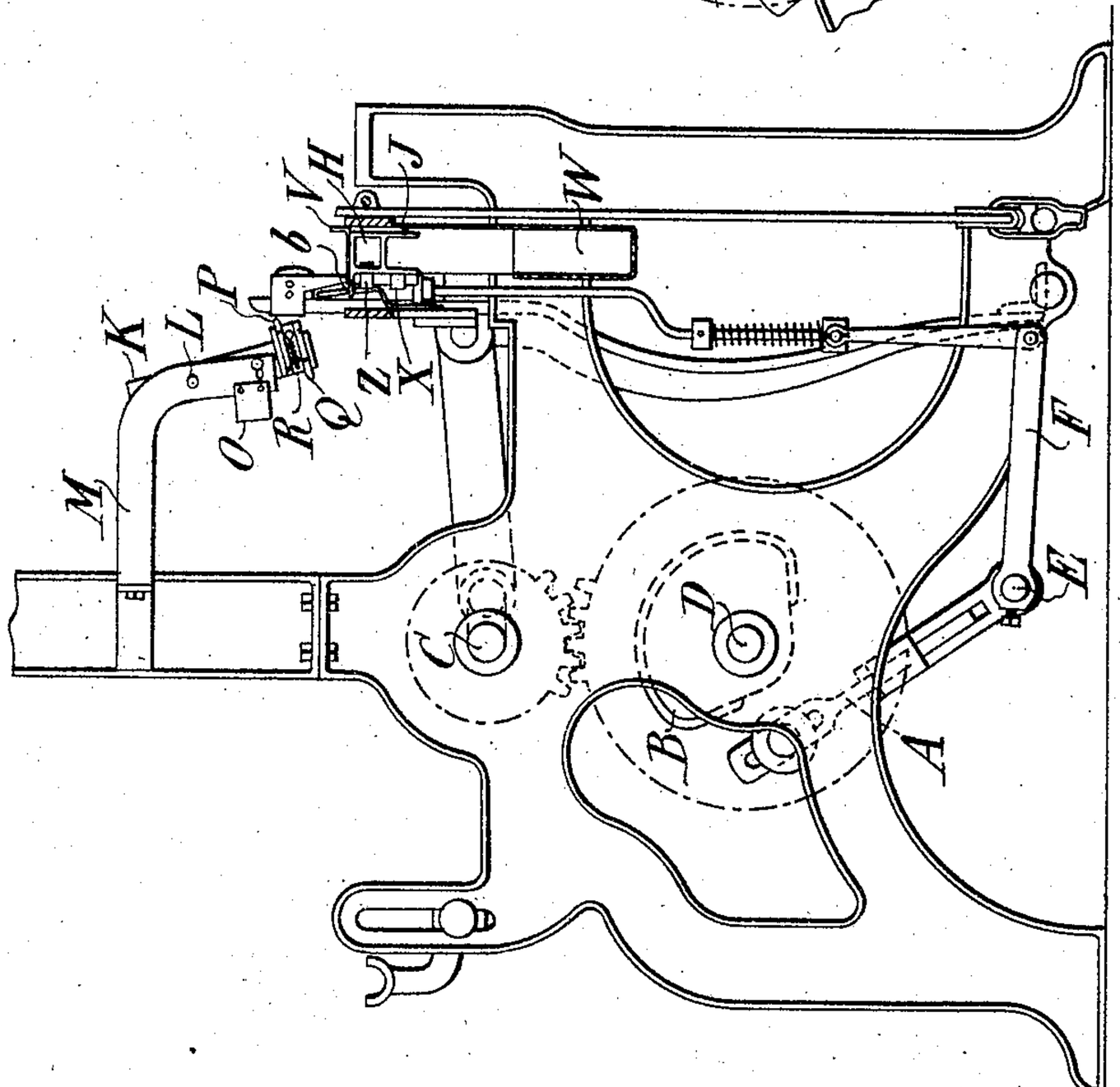


FIG. 1.



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3 SHEETS—SHEET 2.

FIG. 3.

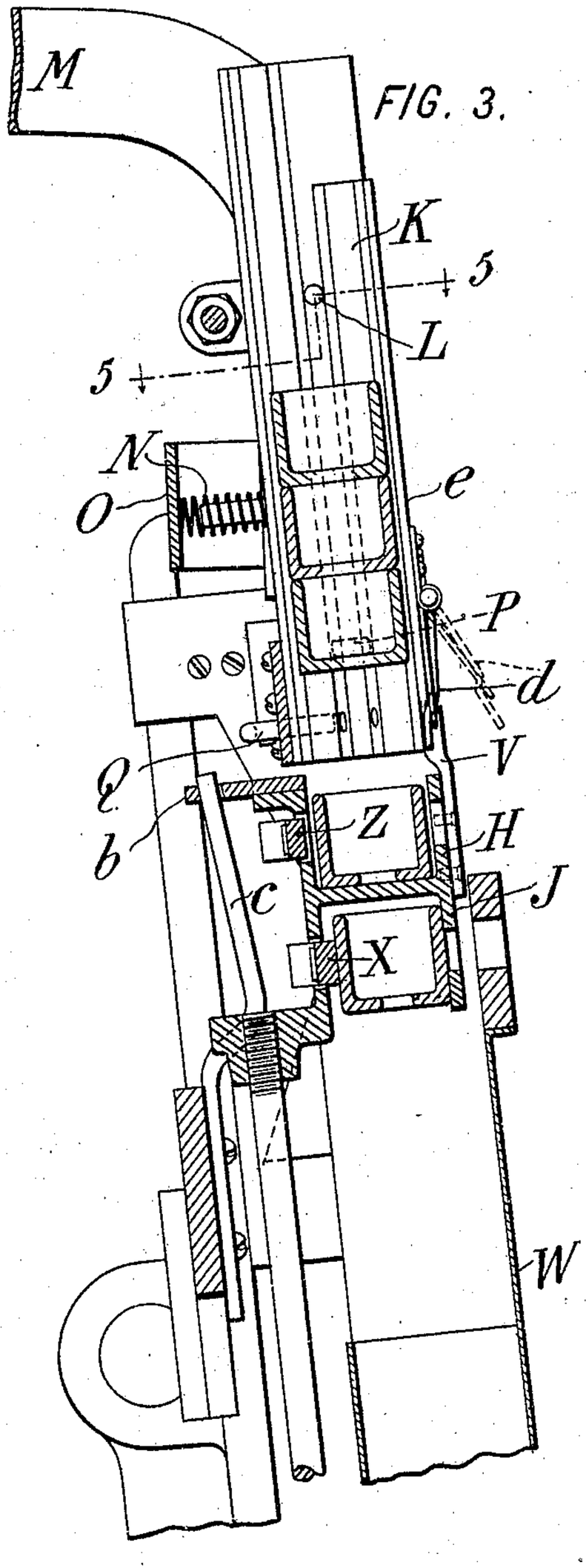


FIG. 4.

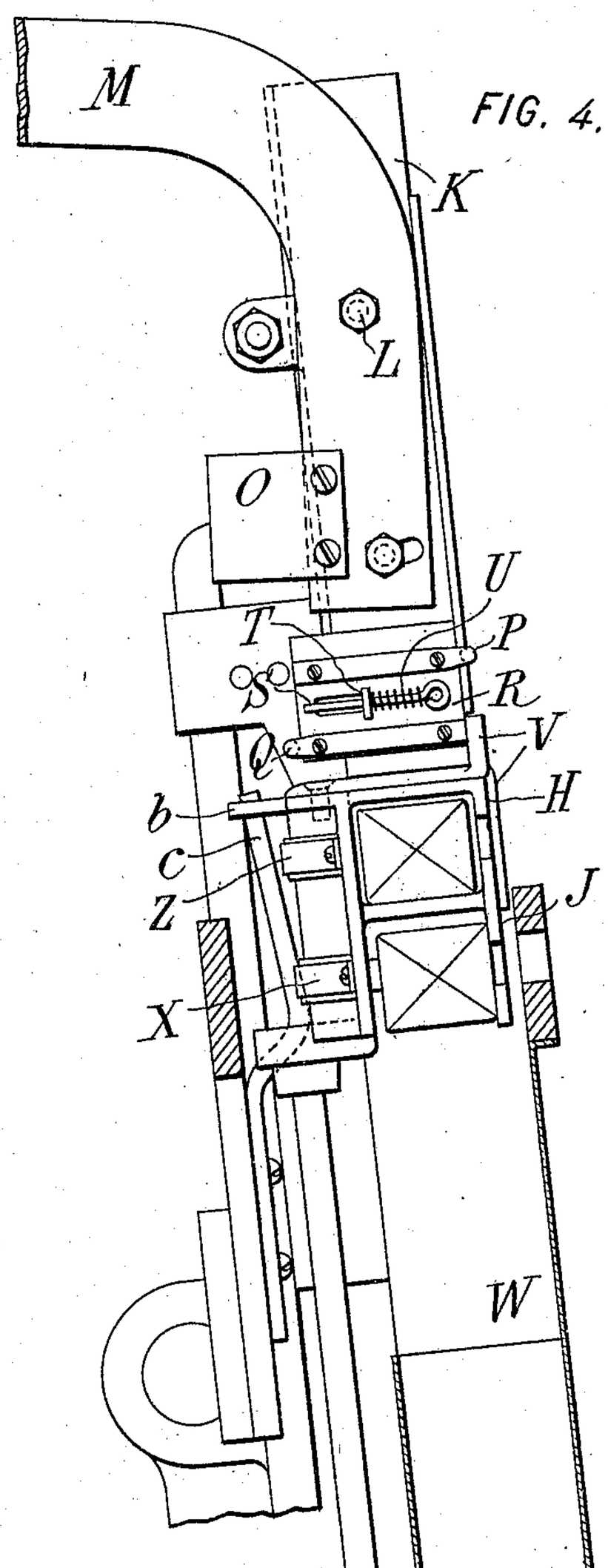
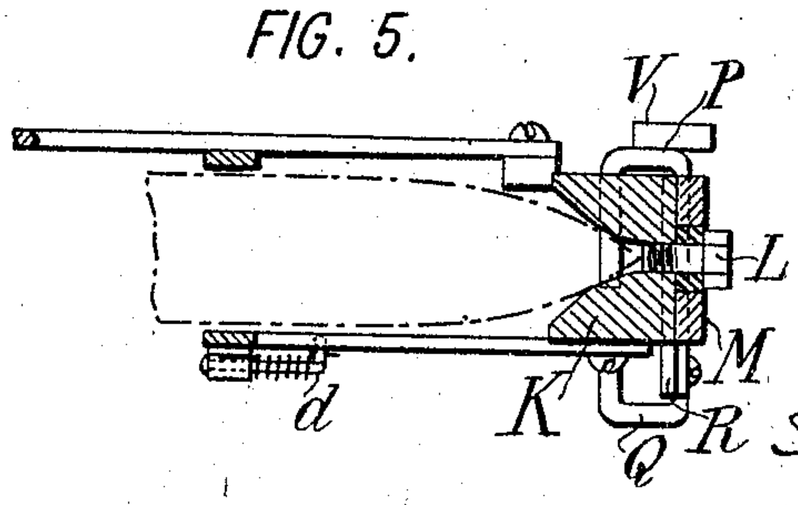


FIG. 5.



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3 SHEETS—SHEET 3.

FIG. 6.

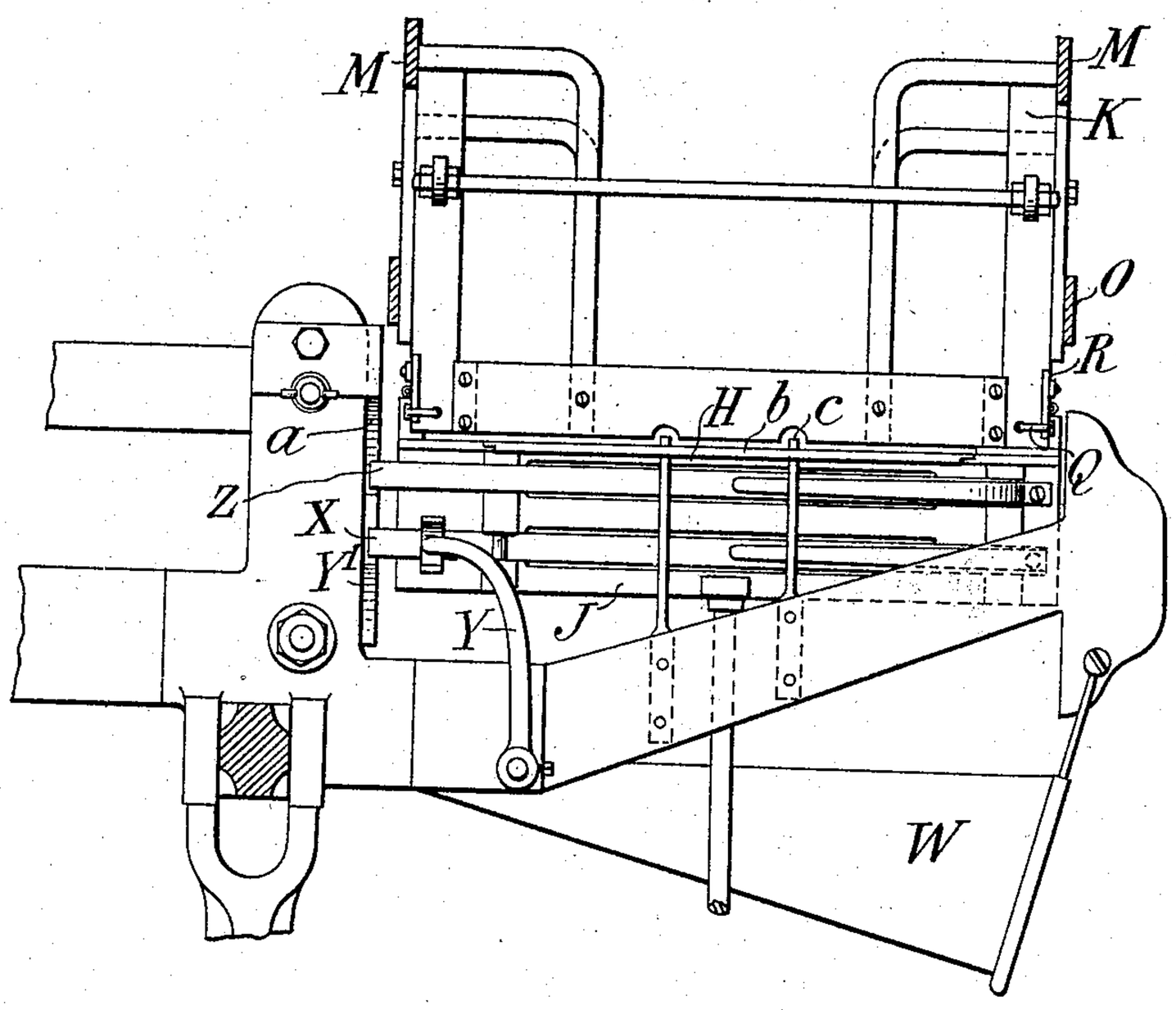
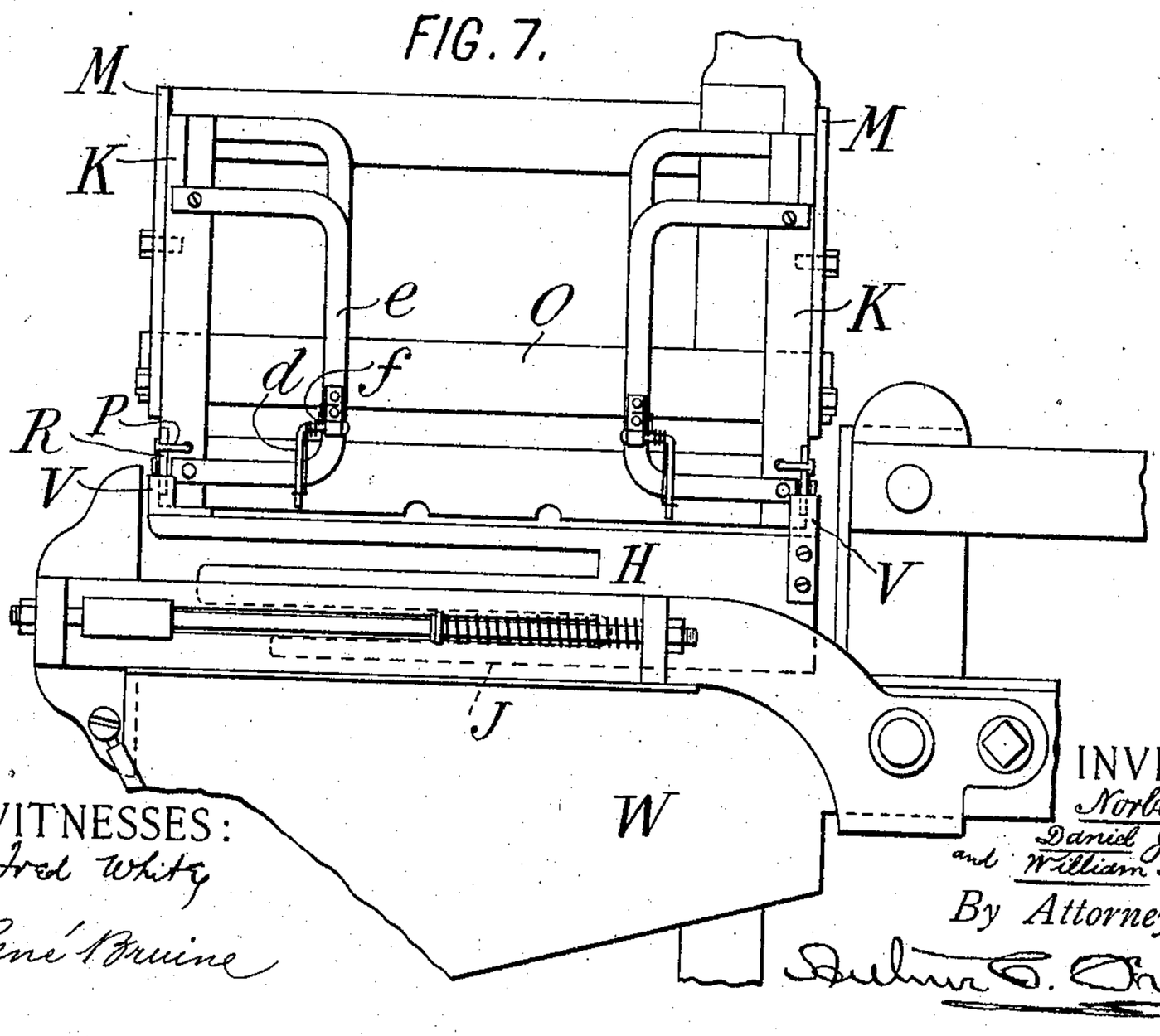


FIG. 7.



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UNITED STATES PATENT OFFICE.

NORBERT FOERSTER, DANIEL JOSEPH CAREY, AND WILLIAM ASTON FOSTER, OF NEW YORK, N. Y.; SAID CAREY ASSIGNOR TO AMERICAN TEXTILE SPECIALTY MACHINERY COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

WEFT-REPLENISHING LOOM.

No. 815,951. Specification of Letters Patent. Patented March 27, 1906.

Application filed October 15, 1903. Renewed August 29, 1905. Serial No. 276,325.

To all whom it may concern:

Be it known that we, NORBERT FOERSTER, DANIEL JOSEPH CAREY, and WILLIAM ASTON FOSTER, citizens of the United States, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Automatic Weft-Replenishing Looms, of which the following is a specification.

This invention aims to provide a mechanism for automatically replenishing the filling or weft.

The specific mechanism shown supplies a new filled shuttle and discharges the old shuttle; but there are mechanisms known which merely insert new filling in the same shuttle, and the invention in its broadest aspect is applicable to any such system or to any other system for replenishing the weft.

The invention provides a mechanism for this purpose having a magazine carried upon a stationary part of the loom and which magazine itself is stationary during normal running, so that shuttles can be easily supplied to the magazine and so as to avoid the addition to the weight of the lay which occurs in those mechanisms in which the magazine is carried upon the lay.

Various other points of advantage are referred to in detail hereinafter.

The accompanying drawings illustrate an embodiment of the invention.

Figures 1 and 2 are side elevations of the loom, showing the lay in the forward and rearward positions, respectively, and illustrating the transfer of a shuttle from the magazine. Figs. 3 and 4 are respectively a transverse section and end elevation of the magazine and movable shuttle-box in the position of transferring a shuttle, the scale being much enlarged as compared with Figs. 1 and 2. Fig. 5 is a section approximately on the line 5 5 of Fig. 3. Figs. 6 and 7 are respectively rear and front elevations of the magazine and movable shuttle-box, the scale being half that of Figs. 3 and 4.

The means for setting the weft-replenishing mechanism in operation may be of any suitable type. For example, the ordinary weft-fork, or any one of the numerous detecting mechanisms which are actuated when the thread is exhausted or nearly exhausted in the shuttle, may be used. Such mechanism is not illustrated in the present case; but a specific example thereof may be seen in the application for patent of Foerster and Carey, filed June 16, 1903, Serial No. 161,668. In the mechanism of said application a shuttle-detector, when there is only a little more than one shoot of weft left in the shuttle, swings the end of an arm, such as A, into the path of a cam B, on the beating-up movement of the lay. The parts are then in the position of Fig. 1, with the shuttle at the opposite side of the machine from that shown. As the lay swings back the lay-shaft C makes a half-revolution and the cam-shaft D makes a quarter-revolution, engaging the end of the arm A and turning to the position of Fig. 2. The engagement of the cam B with the end of the arm A rocks the shaft E and swings the arm F and the rod G upward. In the position of Fig. 2 a new shuttle is transferred from the magazine to the running shuttle-box and the old shuttle is discharged, as hereinafter described in detail. During the next beat-up of the lay the cam-shaft makes a half-revolution and the end of the arm A escapes from the cam B and moves out of the plane of the latter, the half-revolution of the cam B first lowering the rod G, so as to restore the running shuttle-box to its normal position. The length of time during which the lay remains in the backward position of Fig. 2 is so very slight, especially in high-speed looms, that it is practically necessary to effect the transfer of the shuttle while the lay is moving. For this reason in the loom of the Foerster and Carey application above referred to and in other looms the magazine is mounted upon or carried with the lay. This also is objectionable, because when the lay is reciprocating at a high speed the operator cannot put the shuttles carefully into the magazine.

According to this invention the new supply of weft—that is to say, the filled shuttle in the machine illustrated—is transferred to the lay in the rearward position of the latter, but from a magazine supported independently thereof. Preferably the magazine is carried by a stationary part of the loom and partakes of the movement of the lay for only so much time as is necessary to effect the transfer. It is of advantage that the rate of move-

ment of the lay at this point with its crank in the extreme rearward position is comparatively slow.

The movable shuttle-box, as illustrated, consists of two compartments or boxes H and J, the former of which is the running shuttle-box, or the box which receives the shuttle during the normal running of the lay. The box J is an auxiliary box, which only comes into use in the discharging of the old shuttle. The magazine comprises a pair of end pieces K, having the V-shaped inner faces shown and suitably braced together and is pivoted at L upon a fixed part of the frame, such as the arms M, projecting from the upright side of the frame. The lower end of the magazine is held in a forwardly-projecting position by a spring N, reacting against a bar O, attached at the rear of the fixed arms M. At the lower end of each of the side pieces K of the magazine is a transferring device or an escapement, comprising a pair of horizontal rods P and Q, which alternately project across the grooves in the members K, so as to engage and support the ends of the shuttle, as shown in Fig. 5. The rods P and Q extend around to the outside of the members K and are mounted upon the same plate R, arranged to slide in a groove formed in the outside of the member K. A pin S, pivotally carried upon the plate R, projects through an eye T, carried on the member K, and a spring U holds the plate R normally in an advanced position, so that the rod P is withdrawn from the groove and the rod Q extends across the groove and supports the lowest shuttle and all those above it.

The front of the shuttle-box H is provided with a pair of upwardly-projecting fingers V, which in the position shown in Fig. 2 engage the plate R upon the backward movement of the lay and shift the pins Q and P backward, so that the pins Q are withdrawn and drop the lowest shuttle while the pins P are projected across the grooves in the members K and hold up the second shuttle. Upon the forward beat of the lay the springs U restore the pins P and Q to their original positions, with the column of shuttles resting on the pins Q ready for the next operation. Only a part of the movement of the lay is utilized in releasing the shuttle, as thus described. The continued movement of the lay swings the magazine against the force of the springs N, so that it moves through a short distance in engagement with the lay backward and forward, during which movement the lowest shuttle released has time to drop into the upper or running shuttle. The boxes H J have been lifted, so that the auxiliary box J is at an elevation corresponding to the normal elevation of the running shuttle-box H. Consequently the shuttle from the other side of the loom is shot into the box J.

A chute W is arranged below the auxiliary box J, and the latter is entirely open at the bottom. In order that the action of the loom shall be regular in every respect during the transfer, the auxiliary box J is provided with the usual swell X for coöperation with the belt-shifting mechanism through the usual lever Y and also for the purpose of holding the shuttle securely in the box until the beating-up movement of the lay has been accomplished. However, in order that when the boxes H and J are lowered to the normal running position the exhausted shuttle may be discharged the free end of the swell X is arranged to ride up on a cam Y′, fixed upon the back of the lay. The running shuttle-box H is also provided with a swell Z of the usual or any suitable type, and its free end is arranged to ride up on a cam *a* when the shuttle-boxes are raised, thus drawing out the swell Z, so as to permit the free entrance from the shuttle into the box. The cams Y′ and *a* are not in themselves new; but the combination of the cam Y′ with the open-bottomed auxiliary box is new and provides a very simple and reliable construction for the purpose described.

The running shuttle-box H is provided also with a cover-plate *b*, which in the lowered position of the box projects partly over the top of the same, so as to prevent the shuttles jumping up out of the box. In order to withdraw this cover-plate *b* to permit the transfer of a new shuttle into the box, the outer edge of the plate is apertured, and inclined rods *c*, carried upon a fixed part of the lay, pass through the apertures and act as cams to move the plate outward as the box is raised and inward as it is lowered.

To permit the use of a magazine having a very slight movement in high-speed looms of which the lay moves a considerable distance in the time that it would require for a shuttle to drop into the running-box, we may provide a mechanism which engages the shuttle and prevents its jumping out of the shuttle-box, even though the latter swings away from the magazine before the shuttle has dropped the entire distance. Such mechanism may be, as illustrated, in the form of fingers *d*, pivotally mounted upon wings *e* upon the front of the magazine and pressed downward by springs *f*. Supposing the shuttle to be only half-way between its position in the bottom of the magazine and its position in the running-box H, when the lay has swung so far outward as to be about to separate from its registering position with the magazine, it is readily understood that the fingers *d* will prevent the shuttle from jumping up and will gradually force it down into the shuttle-box as the lay continues to swing.

Though we have described with great particularity of detail an embodiment of the invention, yet it is to be understood that the invention is not limited to the particular mechanism disclosed.

Various modifications may be made in the details and in the arrangement and combination of the parts by those skilled in the art without departure from the invention.

What we claim is—

1. In an automatic weft-replenishing mechanism for looms, the combination of a magazine for carrying full shuttles and supported independently of the lay, a transferring device carried by said magazine, a shuttle-box displaceable from its running position to a position for receiving a shuttle directly from said magazine, said transferring device normally disengaged from the box and being in position to be engaged and operated by the box when the latter is displaced from its running position.

2. In an automatic weft-replenishing mechanism for looms, the combination of a fixed support and a magazine movably mounted therein and normally unconnected with the lay, a spring pressing said magazine yieldingly forward, a shuttle-box carried by the lay and displaceable from its running position to a position for receiving a shuttle from said magazine, and adapted in such position to directly engage said magazine and press it backward, whereby said shuttle-box and spring cause the magazine to partake of a part of the movement of the lay in each direction during the transfer of the shuttle.

3. In an automatic weft-replenishing mechanism for looms, in combination, a movable magazine, a spring pressing said magazine yieldingly forward, an escapement at the lower end of said magazine, a spring pressing said escapement yieldingly forward relatively to said magazine, a shuttle-box carried by the lay and normally swinging below said magazine and escapement and adapted to be raised when the thread is exhausted to a position to engage said escapement and press the same back against said magazine, the further movement of the shuttle-box carrying the magazine with it to the end of its stroke and the magazine-spring carrying the magazine with the shuttle-box during the beginning of its reverse stroke.

4. In an automatic weft-replenishing mechanism for looms, in combination, a magazine pivotally supported near its upper end, a spring pressing said magazine yieldingly forward, a sliding escapement at the lower end of said magazine and pressed yieldingly forward relatively to said magazine, a shuttle-box carried by the lay and normally swinging below said magazine and escapement and adapted to be raised when the thread is exhausted to a position to engage said escapement and press the same back against said magazine, the further movement of the shuttle-box carrying the magazine with it to the end of its stroke and the magazine-spring carrying the magazine with the shuttle-box during the beginning of its reverse stroke.

5. In an automatic weft-replenishing mechanism for looms, the combination of an auxiliary box for receiving the exhausted shuttle, said box being open at the bottom and having a swell for holding a shuttle as it is shot therein, and means for subsequently withdrawing said swell and thus dropping said shuttle through the open bottom of the box.

6. In an automatic weft-replenishing mechanism for looms, the combination of a magazine supported independently of the lay, means for moving the shuttle-box into register with said magazine and transferring a new weft-supply thereto, and means carried by said magazine for engaging and holding the new weft-supply in the box as the latter moves out of register with the magazine.

7. In an automatic weft-replenishing mechanism for looms, the combination of a magazine supported independently of the lay, means for moving the shuttle-box into register with said magazine and transferring a new weft-supply thereto, and a finger *d* pivotally carried at the front of the magazine for forcing and holding the new weft-supply in the box as the latter moves out of register with the magazine.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

NORBERT FOERSTER.
DANIEL JOSEPH CAREY.
WILLIAM ASTON FOSTER.

Witnesses
FRANK G. SWARTWOUT
WILFRED E. WILES.