

No. 858,138.

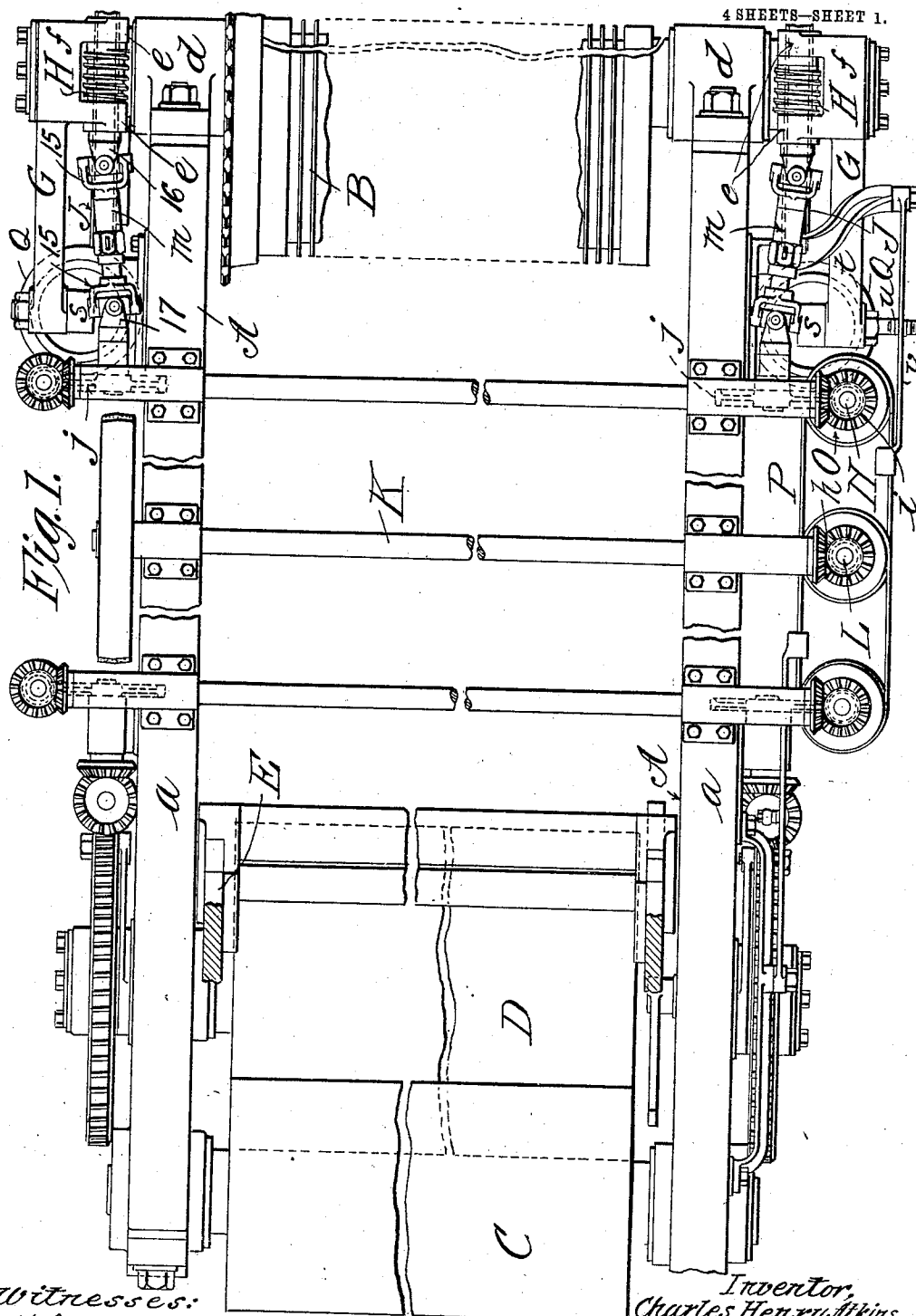
PATENTED JUNE 25, 1907.

C. H. ATKINS.

WARP LET-OFF MECHANISM FOR LOOMS.

APPLIOATION FILED JULY 16, 1906.

4 SHEETS—SHEET 1.



Witnesses:

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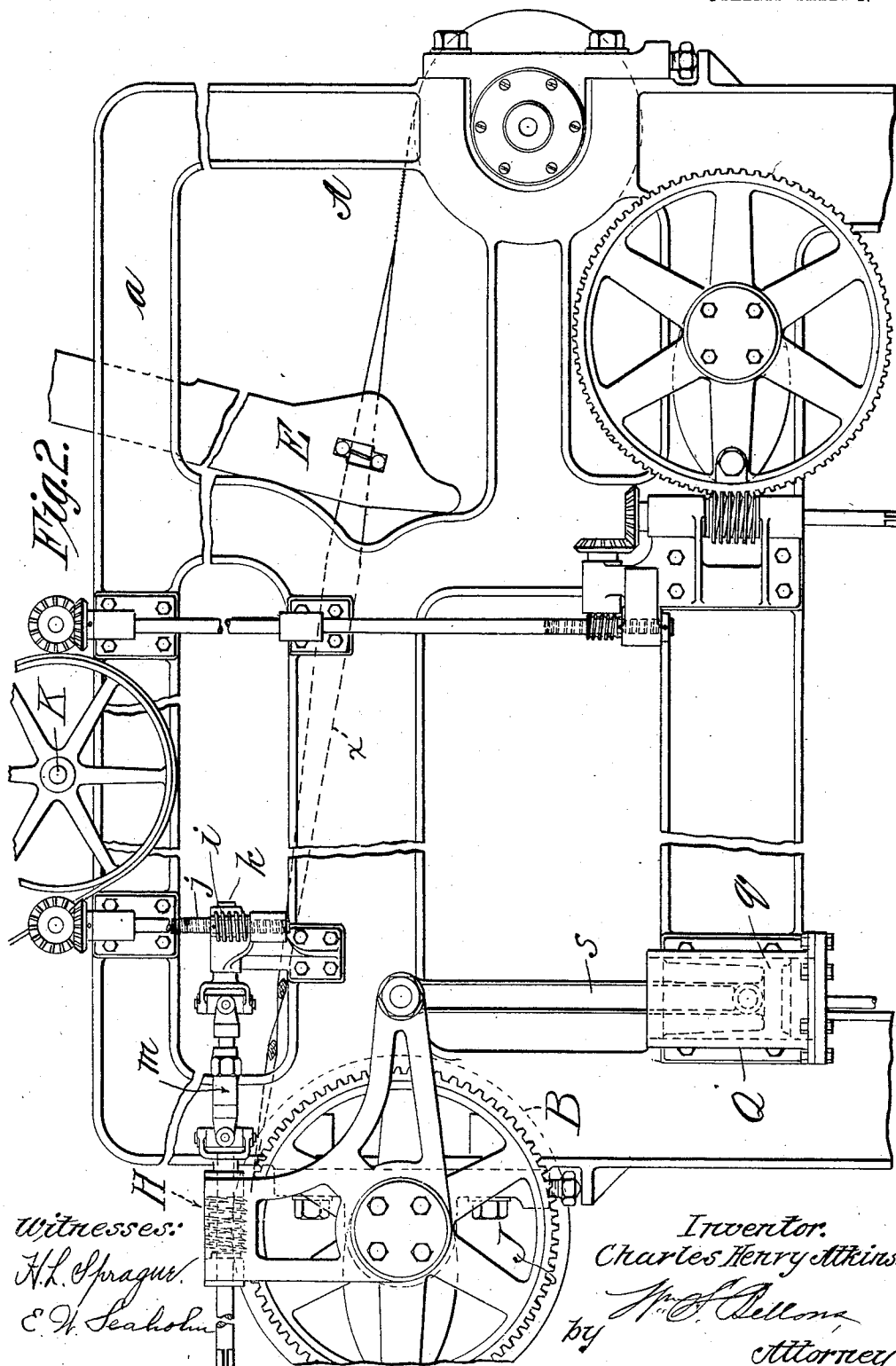
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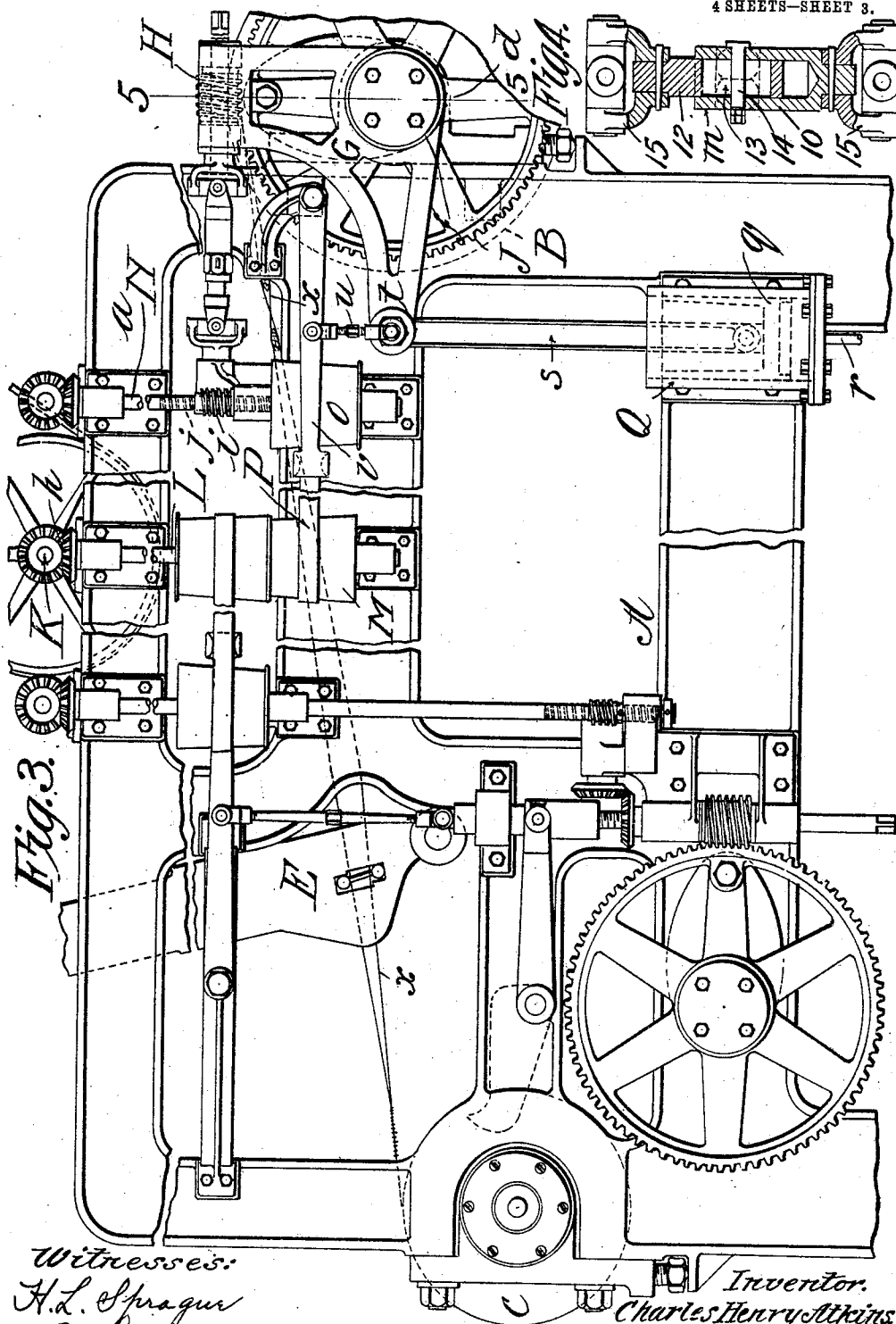


Fig. 3.

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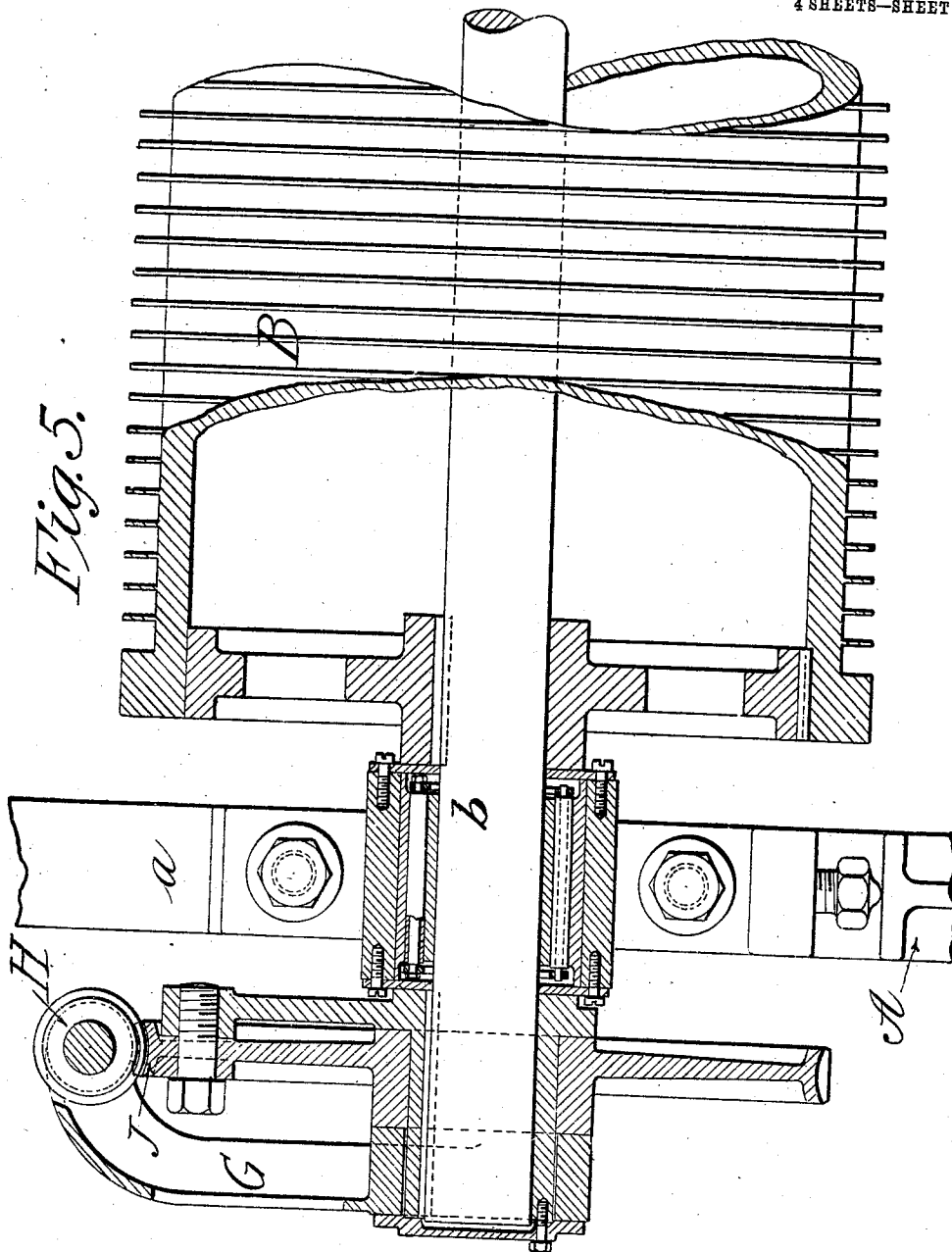
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Witnesses:
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UNITED STATES PATENT OFFICE.

CHARLES HENRY ATKINS, OF SPRINGFIELD, MASSACHUSETTS.

WARP-LET-OFF MECHANISM FOR LOOMS.

No. 858,138.

Specification of Letters Patent.

Patented June 25, 1907.

Application filed July 16, 1906. Serial No. 326,379.

To all whom it may concern:

Be it known that I, CHARLES HENRY ATKINS, a citizen of the United States of America, and a resident of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Warp-Let-Off Mechanism for Looms, of which the following is a full, clear, and exact description.

This invention relates to improvements in the warp let-off motion of a loom, and while the same is applicable on a loom for weaving textile fabric of any character, it is most especially available for employment on a loom for weaving fine wire cloth, such, for instance, as is suitable for use in Fourdrinier paper machines.

A principal object of the invention is to provide a mechanism, in combination with the warp beam, which imparts a regular and continuous rotative let-off or feed motion for the warps with the capability of permitting a further yielding let-off motion under the strain of tensioning force brought against the warps when the cloth is beat up by the lay, and having also capability of a slight reversed or taking-up rotational movement whereby the warp wires will at no time be unduly slackened. And another object is to provide controlling or regulating means for the mechanism which imparts the positive movement to the feeding element of the let-off motion whereby the feeding element may automatically have slightly accelerated or retarded motions according as any tendency may be established during the running of the loom for a too slow or greatly tensioned let-off, or the reverse.

Other objects are to provide a let-off motion for the loom which is of a comparatively simple character, constructed on approved mechanical principles, durable, and without liability of becoming deranged after protracted use.

The mechanism of this invention includes a warp beam journaled for an unwinding let-off, a support, provided with a feeding element in connection with the warp beam, said support being mounted for an oscillatory movement, and relatively to which the warp beam is capable of independent rotative movement, and said support, through the means of said feeding element, having an engagement with the warp beam whereby both

have partial revoluble movements together, means for imparting suitable motion to said feeding element whereby the warp beam is turned independently of said oscillatory support, and the means of elastic resistance against which the warp beam and said support have their revoluble movements in one direction, and by which a return movement is imparted to the beam and support; and the mechanism furthermore includes provisions whereby it is possible to impart variably speeded motion to said feeding element, and the said oscillatory support has a controlling connection with the variable speed imparting means for the warp beam feeding element. And the invention consists in certain particular combinations and arrangements of parts as hereinafter described in conjunction with the accompanying drawings, and set forth in the claims.

In the accompanying drawings,—Figure 1 is a plan view of a loom frame and the warp let-off and the cloth take-up motion thereon. Figs. 2 and 3 are side elevations as seen at opposite sides of the loom. Fig. 4 is a sectional view through a telescopic and universally jointed shaft forming part of the driving connection for the feeding element of the warp beam let-off. Fig. 5 is a vertical sectional view of a portion of the mechanism on a larger scale, taken on the line 5—5, Fig. 3. Similar characters of reference indicate corresponding parts in all of the views.

In the drawings,—A represents the loom frame of which *a a* are the loom sides.

B represents the warp beam having end journals *b* fitting in and extending through and beyond bearings *d* which are provided on the loom sides at the opposite rear portions thereof.

C represents the breast roll, and D the cloth beam,—E representing the lay and *x* the warp wires.

In the accompanying drawings, illustration is made in a general way of a new cloth take-up mechanism invented by me, and which forms the subject of a separate application for Letters Patent of the United States, filed July 16, 1906 Serial No. 326,380, and no further reference or description to the take-up mechanism will be herein contained.

The parts and appliances contained in the present invention are duplicated at opposite sides of the loom, and operable in rela-

tion to both ends of the warp beam in identically the same manner and in unison.

G represents an oscillatory support for a worm H which is the element for imparting a feeding or let-off motion to the warp beam.

The said support G is of a general triangular form, and has a hub *f* loosely fitting about the end journal of the warp beam, and relatively to which the beam may have independent rotative movement. The warp beam has at each end outside of the loom sides and affixed thereon, a comparatively large worm wheel J into which meshes the worm H which is journaled for rotation and held against endwise movement between the separated portions *e e* at the upwardly extended portion of the oscillatory support G. The said oscillatory support by means of the said feeding element (the worm H) being in engagement with the warp beam by meshing in the warp beam worm wheel J is so interlocked with the warp beam that both have their partial revoluble movements together, and the warp beam may have its rotative movement independently of the oscillatory support only from the positive rotation on its own axis of the worm H.

K represents a horizontally journaled driving shaft, which by bevel gearing, indicated at *h*, drives a vertically journaled shaft L, on which is affixed a cone pulley M, the taper of which is upward; and on another vertical shaft N is affixed another cone pulley O, the taper of which is downward; and between and around these cone pulleys a belt P runs. The said vertical shaft above the cone pulley O is provided with a worm *i* with which meshes a worm wheel *j* which is carried on a short horizontal shaft *k* approximately in axial alinement with the warp beam feeding worm H, and connected therewith by telescopic and universally jointed shaft *m*, seen in full lines in Figs. 1, 2 and 3, and in section in Fig. 4. This telescopic shaft comprises sections 10, and 12, the one 12 fitting and playing within the cylindrical hole therefor in the section 10, and by having the slot 13 through which is passed the flat key 14,—the key being carried by the section 10,—the one section may have its movement endwise relatively to the other, while both sections necessarily rotate in unison.

15, 15 represent the yokes of the telescopic and universally jointed shaft, jointed or shackled to corresponding yokes 16 and 17 on the shaft or arbor of the worm H and on the aforementioned worm wheel carrying shaft *k*. Thus, it will be seen that the connection for imparting the rotational movement to the warp beam feeding worm H will not interfere with, or be interfered with by, any oscillatory movements which the oscillatory support G,—on which the worm H is mounted,—may have.

Q represents an air cylinder having a piston *q* tightly fitting therein,—*r* representing an air inlet pipe for conducting air under a given regulated and uniform compression into the air cylinder below the piston. The piston *q* is, by rod *s*, connected with the approximately horizontally extending portion *t* of the oscillatory support G, and the extremity of said portion *t* of the support is, by the longitudinally adjustable rod or link *u*, connected with the shifter *v* which engages and controls the position of the belt running between and around the cone pulleys M and O.

As apparent the above described mechanism is operable for a constant, very slow and gradual warp let-off rotative movement to the warp beam,—the speed reducing connections from the shaft K down to the worm H being such that the rotative movement of the warp beam, while actual, is almost imperceptible, and the transmission connection for imparting the warp unwinding movement to the warp beam are as nearly as possible for acquiring a warp let-off the same as the cloth take-up; but in the most approved manner of weaving, especially fine wire cloth, where the lay has its battening blows as impelled by an elastic motor fluid, there is not an absolute uniformity in the speed and progress of the cloth take-up beam. It is to be, therefore, understood that at each time the lay beats up a tensioning strain is imposed on all of the warp wires with the result that this mechanism permits a slight rotative movement of the warp beam additional to, and independent of, its regular let-off as acquired through the rotation of the worm H, and the oscillatory support with the worm H and the warp beam have slight revoluble movements all in unison to relieve the strain on the warps, such movement being against the resistance of the elastic fluid in the cylinder Q which is reactive to immediately, when the blow has been struck by the lay in beating up, rotatively return the warp beam, oscillatory support, and the worm H, practically to their normal relations, and preventing undue slackening of the warps.

The tension on the warps will be controlled by the pressure of the air in the cylinder Q, the same controlling the position of the oscillatory support G which in turn controls the position of the belt shifter so that the belt will be positioned in relation to the cone pulleys for the driving of the warp beam feed worm H at the rate required for regulating the let-off with proper regard to the warp tension.

The pressure in the cylinder Q may be maintained always at a uniform pressure by supplying compressed air into the cylinder or an air reservoir at somewhat above the required normal pressure, and relieving the excess of pressure by a blow off opening leading

from the cylinder below the piston or from the air reservoir.

I claim:—

1. A warp beam journaled for an unwinding warp let off, a support provided with a feeding element in connection with the warp-beam, mounted for a swinging movement and relatively to which the warp beam has an independent movement, and said support, by means of said feeding element having an engagement with the warp beam whereby both have partial revoluble movements together, means for imparting a feeding motion to said feeding element, and means of elastic resistance against which the warp beam and said support have their revoluble movements in one direction, and by which a return movement is imparted thereto.

2. A warp beam journaled for an unwinding warp let off, a support provided with a feeding element in connection with the warp-beam, mounted for a swinging movement and relatively to which the warp beam has an independent movement, and said support, by means of said feeding element having an engagement with the warp beam whereby both have partial revoluble movements together, means for imparting a variable feeding motion to said feeding element, means of elastic resistance against which the warp beam and said support have their revoluble movements in one direction, and by which a return movement is imparted thereto, said swinging support having a controlling connection with the said variable speed imparting means for the warp beam feeding element.

3. A warp-beam journaled for rotative movement, and having a worm-wheel thereon, a support mounted for an oscillatory movement, and relatively to which the warp beam has an independent movement, and having, mounted thereon, a worm in engagement with the warp-beam worm-wheel, means for imparting a rotative motion to said worm, a cylinder for containing an elastic fluid, a piston movable in said cylinder against, and to be retracted by such elastic fluid, and a connection between said piston and said oscillatory worm carrying support.

4. A warp-beam journaled for rotative movement and having a worm-wheel thereon, a support mounted for an oscillatory movement, and relatively to which the warp-beam has an independent movement, and having, mounted thereon, a worm in engagement with the warp-beam worm-wheel, a shaft having a driving connection with said worm wheel and having a cone pulley thereon, a belt having a running engagement around said cone pulley and means for driving such belt, and a shifter for said belt, a connection between said oscillatory worm carrying support and said belt shifter, a cylinder for containing an elastic fluid, a piston

movable in said cylinder against, and to be retracted by, said elastic fluid and a connection between said piston and said oscillatory worm carrying support.

5. A warp beam journaled for rotative movement and having a worm wheel thereon, a support mounted for an oscillatory movement, and relatively to which the warp beam has an independent movement, and having, mounted thereon, a worm in engagement with the warp beam worm wheel, a shaft having a cone pulley thereon, a belt having a running engagement around said cone pulley and means for driving said belt, a shifter for said belt, a connection between said worm carrying support and said shifter, and said cone-pulley carrying-shaft having a worm thereon, and a shaft having a worm-wheel in mesh with said shaft-carried worm, a shaft comprising telescopic sections constrained to rotate in unison, and universal-joint-connected to said worm wheel shaft and to the worm on said oscillatory support.

6. A warp beam journaled for rotative movement and having a worm wheel thereon, a support mounted for an oscillatory movement, and relatively to which the warp beam has an independent movement, and having, mounted thereon, a worm in engagement with the warp beam worm wheel, a shaft having a cone pulley thereon, a belt having a running engagement around said cone pulley and means for driving said belt, a shifter for said belt, a connection between said worm carrying support and said shifter, and said cone-pulley carrying-shaft having a worm-wheel in mesh with said shaft-carried worm, a shaft comprising telescopic sections constrained to rotate in unison, and universal-joint-connected to said worm wheel shaft and to the worm on said oscillatory support, a cylinder for containing an elastic fluid, a piston movable in said cylinder against and to be retracted by said elastic fluid and a connection between said piston and said oscillatory worm carrying support.

7. In a let-off mechanism for a loom, in combination, a warp beam journaled for rotative movement and having affixed thereto a worm wheel, a worm carrying support mounted for oscillation concentrically with the warp beam axis and having a worm mounted for rotation thereon and in mesh with the warp beam worm wheel, a shaft having a cone pulley thereon, and means for rotating it, another shaft having a reversely tapered cone pulley, having a worm thereon, a belt running around both said cone pulleys and a shifter for said belt, a shaft having a worm wheel in mesh with said worm on the one of the cone pulley carrying shafts, a shaft universal-joint-connected to the last named worm wheel carrying shaft and to the worm on said oscillatory support, and

comprising telescopic sections constrained
for rotation in unison, a connection between
said oscillatory support and said belt shifter,
a cylinder, for containing an elastic fluid,
5 having a piston therein, and a connection
between said piston and said oscillatory sup-
port.

Signed by me at Springfield, Mass., in
presence of two subscribing witnesses.

CHARLES HENRY ATKINS.

Witnesses:

WM. S. BELLOWS,
G. R. DRISCOLL.