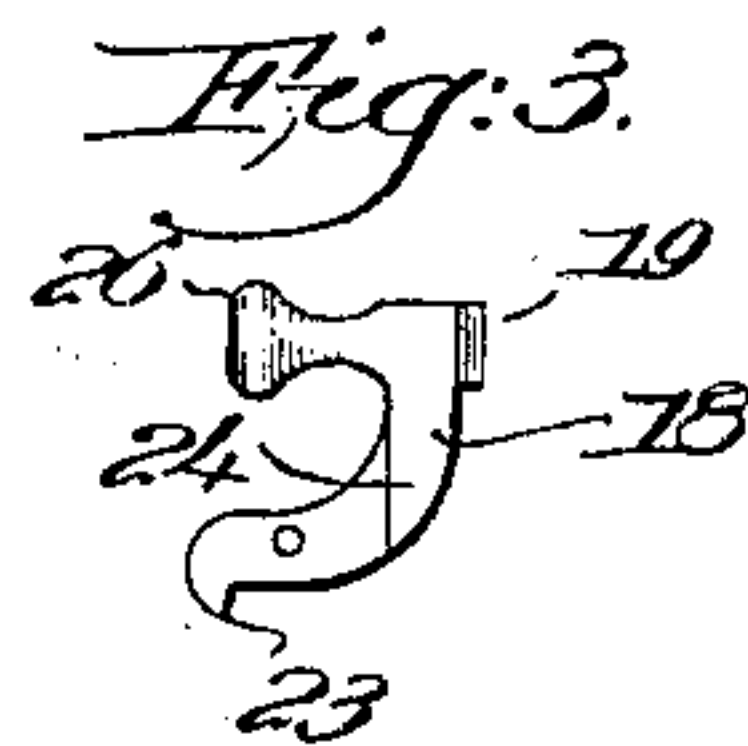
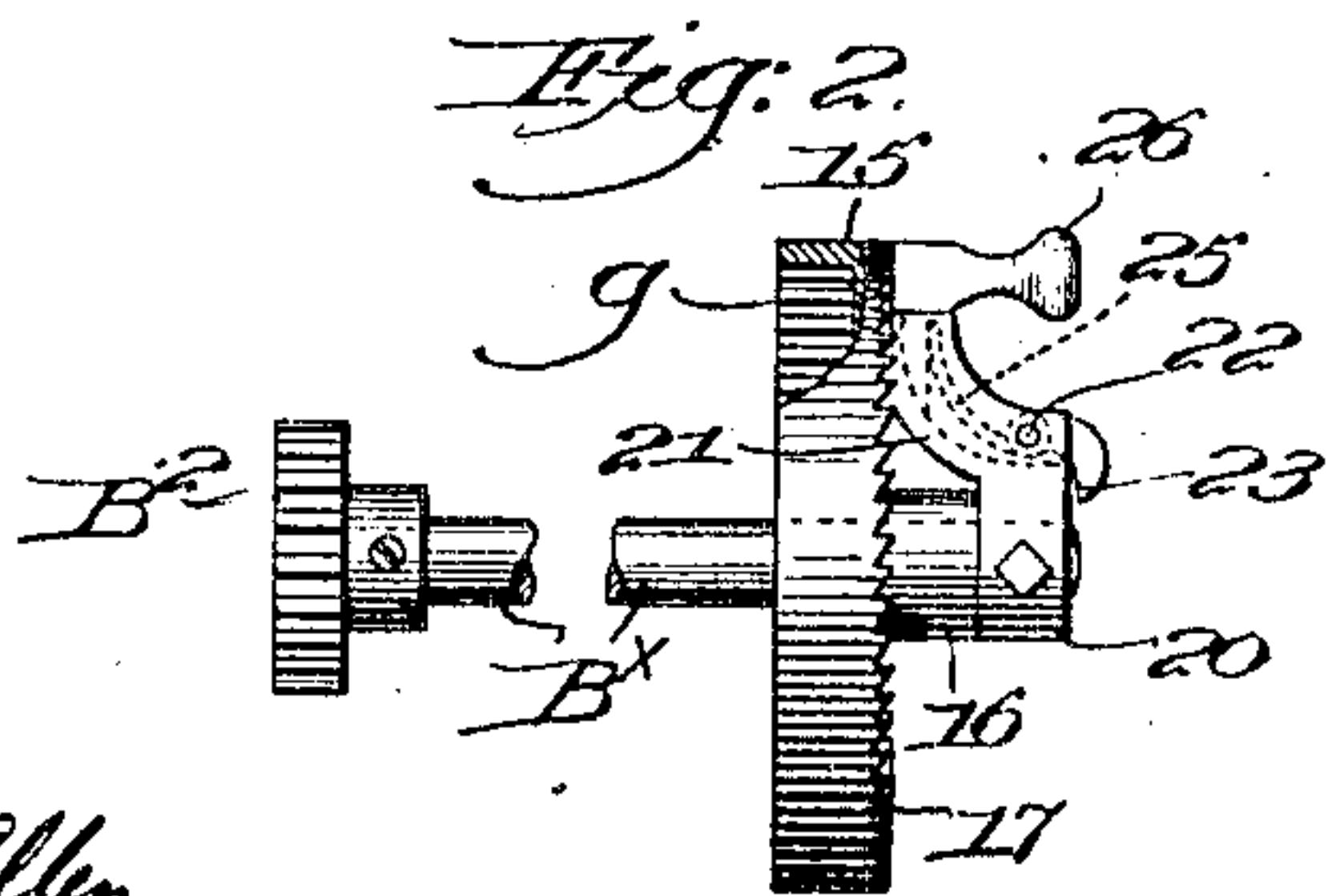
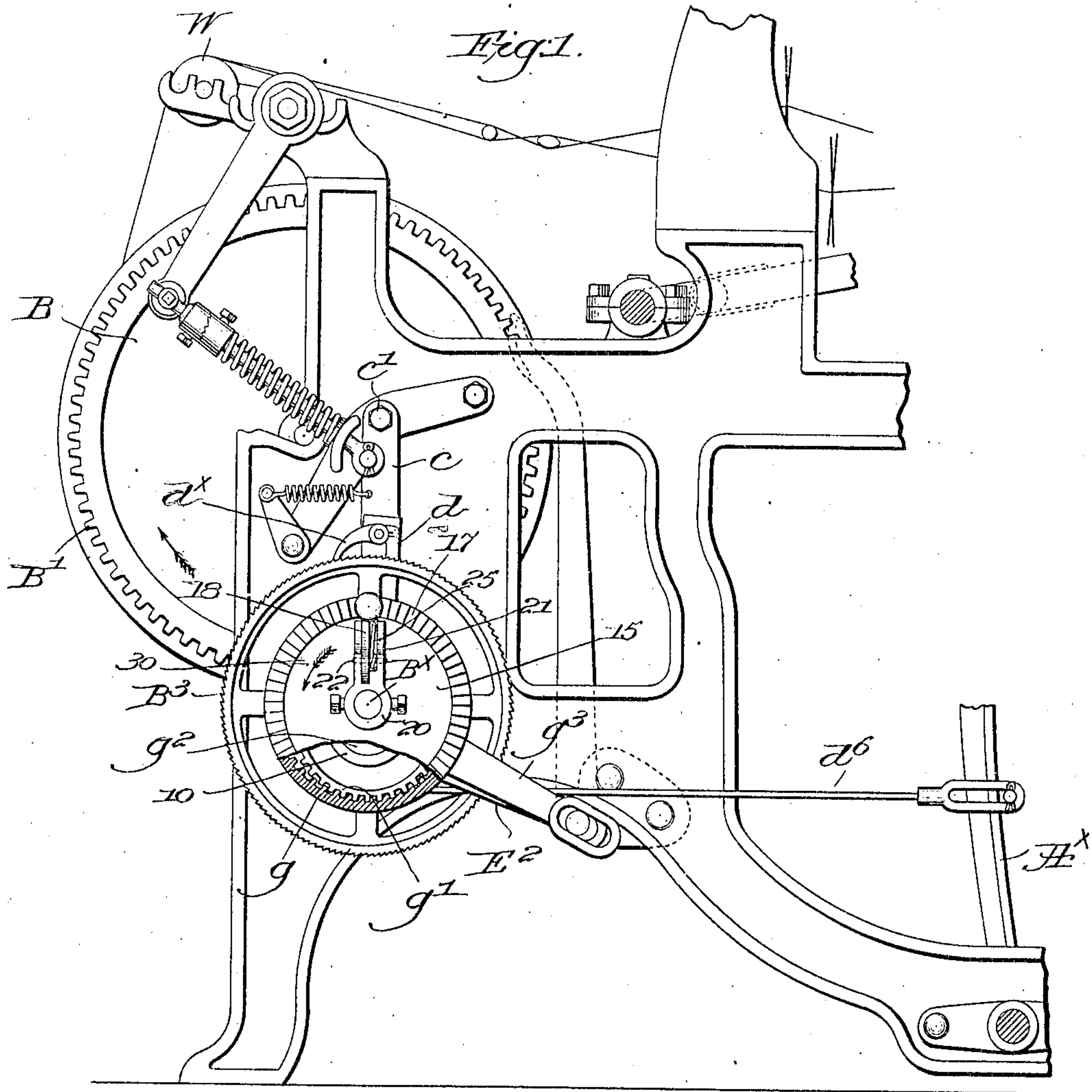


No. 843,181.

PATENTED FEB. 5, 1907.

C. F. ROPER.
LET-OFF MECHANISM FOR LOOMS.
APPLICATION FILED MAR. 15, 1906.



Witnesses,
Edward H. Allen
Thomas J. Drummond

Inventor:
Charles F. Roper;
by Leroy Gregory,
attys.

UNITED STATES PATENT OFFICE.

CHARLES F. ROPER, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO DRAPER COMPANY, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

LET-OFF MECHANISM FOR LOOMS.

No. 843,181.

Specification of Letters Patent.

Patented Feb. 5, 1907.

Application filed March 15, 1906. Serial No. 306,111.

To all whom it may concern:

Be it known that I, CHARLES F. ROPER, a citizen of the United States, and a resident of Hopedale, in the county of Worcester and State of Massachusetts, have invented an Improvement in Let-Off Mechanism for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to let-off mechanism for looms; and it has for its object the production of simple means whereby the warp-beam can be instantly released from the control of the let-off-actuating means and turned independently thereof.

It is sometimes necessary for the weaver to turn the warp-beam in one or the other direction, and it is desirable that this may be effected rapidly and easily with a minimum change or temporary alteration in the let-off mechanism as a whole.

My invention is particularly designed for use in connection with let-off mechanism of the character forming the subject-matter of United States Patent No. 744,941, granted to me November 24, 1903, such let-off mechanism being highly satisfactory, but having no means whereby the warp-beam can be readily let back or turned independently of the actuating instrumentality.

In accordance with my present invention I have provided let-off mechanism of the type referred to with a coupling device which normally connects the speed-reducing gearing and the shaft intermediate the latter and the warp-beam, release of the coupling permitting the warp-beam to be turned independently of such gearing and the actuating means therefor.

The various novel features of my invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a side elevation of a portion of a loom provided with let-off mechanism such as is shown in the patent referred to and partly broken out, one embodiment of my present invention being applied thereto. Fig. 2 is a detail showing the transmitting or pinion shaft, one member of the speed-reducing gearing, and the coupling between it and the shaft; and Fig. 3 is a separate detail view of the dog forming a part of the coupling.

Referring to Fig. 1, the whip-roll W, warp-beam B, having an attached large gear B' in mesh with the pinion B², (see Fig. 2,) fast on the transmitting or pinion shaft B^x, the compound pawl-carrier c d, the part c being fulcrumed at c', the primary actuating member or ratchet B³, loosely mounted on said shaft, and the let-off pawl d^x on the pawl-carrier and coöperating with and advancing the ratchet step by step, may be and are all as in my patent referred to and operate as therein set forth. The feed-stroke of the pawl d^x is effected by or through the link d⁶, actuated by the lay-sword A^x on the forward beat of the lay.

The hub 10 of the external gear g' is loosely mounted on an eccentric g², secured to the ratchet B³, the arm g³ preventing rotation of the gear, which forms one member of speed-reducing gearing, the other member consisting of an annular internal gear g, meshing with the gear g', but having a greater number of teeth, the internal gear being secured to or forming a part of a disk 15, the hub 16 of which (see Fig. 2) is loosely mounted on the shaft B^x, said parts being all as in my said patent, except that therein the gear g is fixed on the shaft.

The disk 15 has on its outer face an annularly-arranged series of ratchet-teeth 17, in the present embodiment of my invention said ratchet-teeth forming part of a coupling, the other part or member being shown as a dog 18, having a tooth 19 to normally engage one of the ratchet-teeth 17. A hub 20 is fixedly secured on the pinion-shaft adjacent the disk-hub 16 and is provided with a radial longitudinally-slotted arm 21, the dog 18 being fulcrumed in the slotted end of the arm at 22. The dog has a tail 23, and adjacent the tooth 19 the dog is thickened, presenting a shoulder 24, against which bears one end of a spring 25, coiled about the fulcrum-pin 22 (see Fig. 1) and having its other end bearing against the arm 21.

The winding of the spring is such as to normally press the tooth of the dog into coöperation with a tooth of the series 17, and thereby the disk 15 and gear g thereon are coupled to the shaft B^x to rotate therewith as a unit in the direction of arrow 30, Fig. 1.

The straight faces of the teeth 17 follow the inclined faces in the normal rotation of the disk 15, (see Fig. 2,) which is indicated

by arrow 30, Fig. 1, the step-by-step advance of the ratchet B^3 being in the same direction, and the pull of the warp acts through the beam-gear B' and pinion B^2 to turn the shaft B^x in the same direction, so that the tooth 19 of the coupling-dog is pressed against the straight face of the ratchet-tooth 17 next ahead of it.

The speed-reducing gearing between the ratchet B^3 and the pinion-shaft B^x causes the rotation of the latter to be at a slower speed than that of the said ratchet, and so long as the shaft and the disk 15 are coupled as described the let-off rotation of the warp-beam is positively and accurately controlled.

The dog 18 is preferably provided with a handle 26, and when the operative wishes to turn the beam independently of the actuating means he grasps the said handle and swings the dog outward on its fulcrum against the spring 25, disengaging the dog-tooth 19 from the ratchet-teeth 17, and immediately the shaft B^x is released from the let-off-actuating means and the beam can be turned independently thereof. Such movement of the beam is effected through the shaft B^x , which the operative turns in the desired direction to the proper extent, using the dog and its supporting-arm 21 as a species of crank-handle. The toe 23 prevents undue outward or releasing movement of the dog by engaging the adjacent part of the hub 20. As soon as the operative releases the dog the spring 25 causes its reengagement with the ratchet-teeth 17 and the coupling is again operative. When the normal operation of the let-off mechanism is to be resumed, the operative turns the beam to tighten up the warps either by a direct grasp of the warp-beam, in which case the dog clicks over the teeth 17 to the point at which the warp is properly tightened, or the beam can be restored to the control of the actuating pawl and ratchet by grasping the handle 26 of the dog and turning the shaft B^x oppositely to arrow 30, Fig. 1, until the warp slack is taken up, the dog upon its release immediately engaging with a tooth 17 and coupling together the pinion-shaft and the gear g . The manipulation of the coupling to release the warp-beam is thus accomplished without requiring the operative to handle greasy gears or other parts of the mechanism, and the resetting of the beam by a direct grasp thereof, as just referred to, is sometimes very convenient, as the operative can observe the warp as the beam is turned to tighten it.

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

1. In let-off mechanism for looms, a warp-beam having an attached gear, a pinion in mesh therewith, a pinion-shaft, a ratchet loose thereon, speed-reducing gearing inter-

mediate the ratchet and the shaft, one member of said gearing being mounted loosely and eccentrically on the ratchet, and a coupling to normally effect rotation of the other member of the gearing and the shaft in unison, release of the coupling permitting the warp-beam and pinion-shaft to be turned independently of the said gearing.

2. In let-off mechanism for looms, a warp-beam, a shaft having a ratchet loose thereon, means between the shaft and warp-beam to control rotation of the latter, speed-reducing gearing intermediate the ratchet and shaft and comprising an external, non-rotatable gear mounted loosely and eccentrically on the ratchet, and an annular internal-gear in mesh therewith and loose on the shaft, and a coupling to connect said internal gear and the shaft to rotate together, release of the coupling permitting the warp-beam to be turned independently of the gearing and ratchet.

3. In let-off mechanism for looms, a warp-beam, an actuating-ratchet, connections between it and the warp-beam to control rotation of the latter, and including a shaft and speed-reducing gearing, one member of said gearing being driven by the ratchet and the other member being loosely mounted on the shaft, and a coupling between said member and the shaft consisting of a ratchet on one and a cooperating outwardly-swinging dog pivotally mounted on the other, to normally effect rotation of the shaft with said gearing, disengagement of the coupling-dog and ratchet, by an outward swing of the dog on its pivot releasing the shaft and permitting the warp-beam to be turned independently, the dog then serving as a handle to turn the shaft.

4. In let-off mechanism for looms, in combination, a warp-beam having an attached gear, a shaft having a pinion in mesh therewith, actuating means, speed-reducing gearing between it and the shaft, comprising a gear driven by said actuating means, and a meshing gear loose on the shaft, an external ratchet on said meshing gear, the ratchet-teeth having straight and inclined faces, and a cooperating dog mounted on the shaft, to normally engage the straight face of a ratchet-tooth and effect rotation of the shaft and gear as a unit, disengagement of the dog and ratchet releasing the warp-beam from control of the actuating means.

5. In let-off mechanism for looms, a warp-beam, a shaft having a ratchet loose thereon, means between the shaft and warp-beam to control rotation of the latter, speed-reducing gearing intermediate the ratchet and shaft and comprising an external, non-rotatable gear mounted loosely and eccentrically on the ratchet and an annular internal gear in mesh therewith and loose on the shaft, an annular series of ratchet-teeth on said loose gear, a

radial arm fixedly mounted on the shaft adjacent said ratchet-teeth, and a spring-controlled dog mounted on the arm and normally engaging with one of the ratchet-teeth to effect rotation of the shaft and the loose gear together, retraction of the dog releasing the shaft and permitting the warp-beam to be rotated independently of the gearing.

6. In let-off mechanism for looms, in combination, a warp-beam having an attached gear, a shaft having a pinion in mesh therewith, an actuating-ratchet loose on the shaft, speed-reducing gearing intermediate said ratchet and shaft to govern rotation of the latter, and comprising a non-rotatable external gear mounted loosely and eccentrically on the said ratchet and an annular internal gear in mesh therewith, a disk on which the internal gear is fixed, loose on the pinion-shaft, an annular series of ratchet-teeth on the outer face of the disk, a cooperating dog, and a supporting-arm for the dog fixedly mounted on the shaft, normal engagement of

the dog with a ratchet-tooth coupling the disk and shaft together, to effect rotation thereof in unison.

7. In let-off mechanism for looms, in combination, a warp-beam having an attached gear, a shaft having a pinion fast thereon in mesh with the gear, a ratchet loosely mounted on the said shaft, speed-reducing gearing operated by the ratchet and including a gear loose on the shaft, and a coupling to normally connect said gear and shaft to rotate in unison, the coupling including a manually-released member serving, when released, as a handle to turn the shaft and thereby rotate the warp-beam independently of the ratchet and the speed-reducing gearing.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES F. ROPER.

Witnesses:

GEORGE OTIS DRAPER,
ERNEST W. WOOD.