No. 753,899. PATENTED MAR. 8, 1904.

J. T. MEATS.

FRICTION LET-OFF MECHANISM FOR LOOMS.

APPLICATION FILED SEPT. 5, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig: 1.

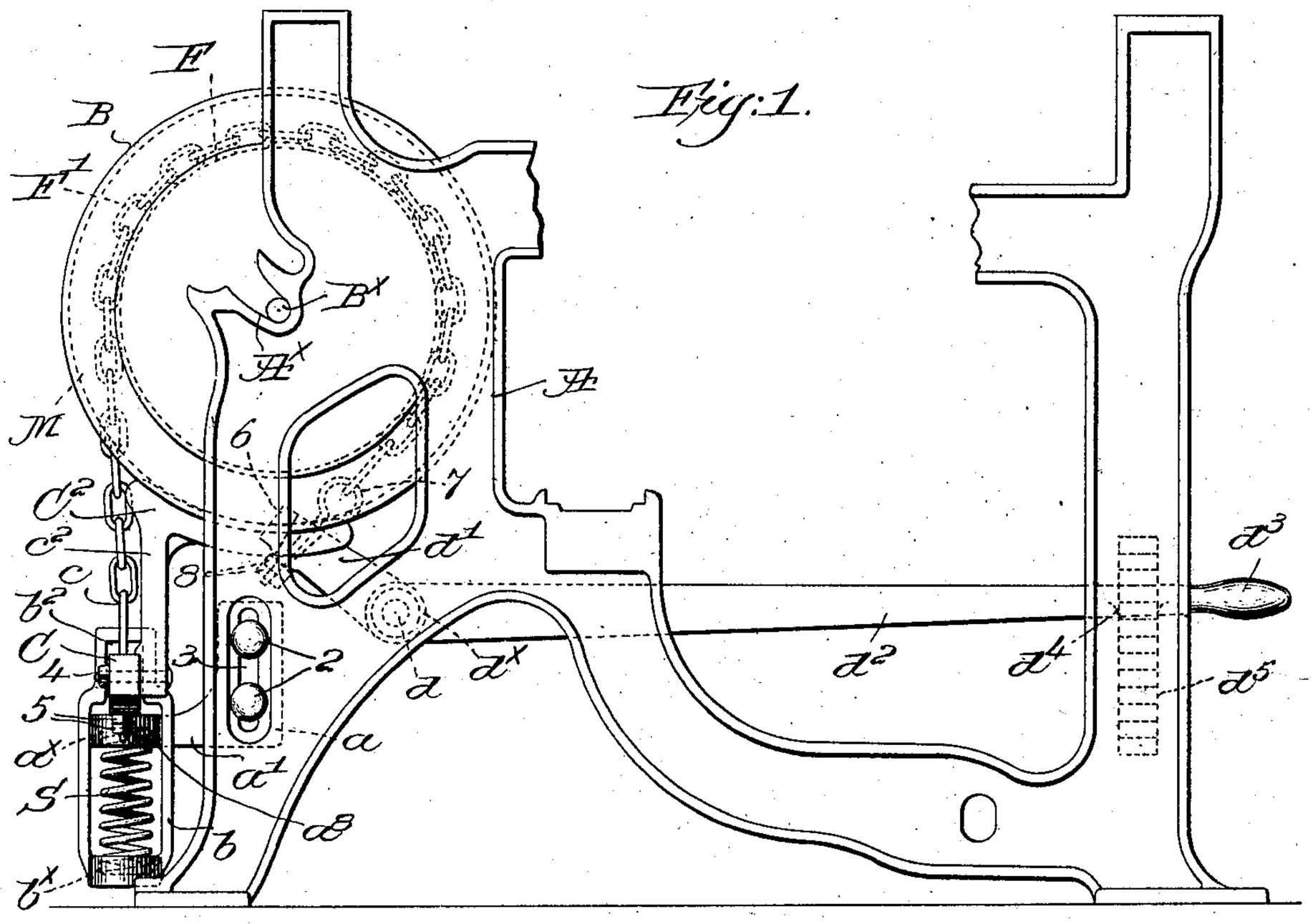
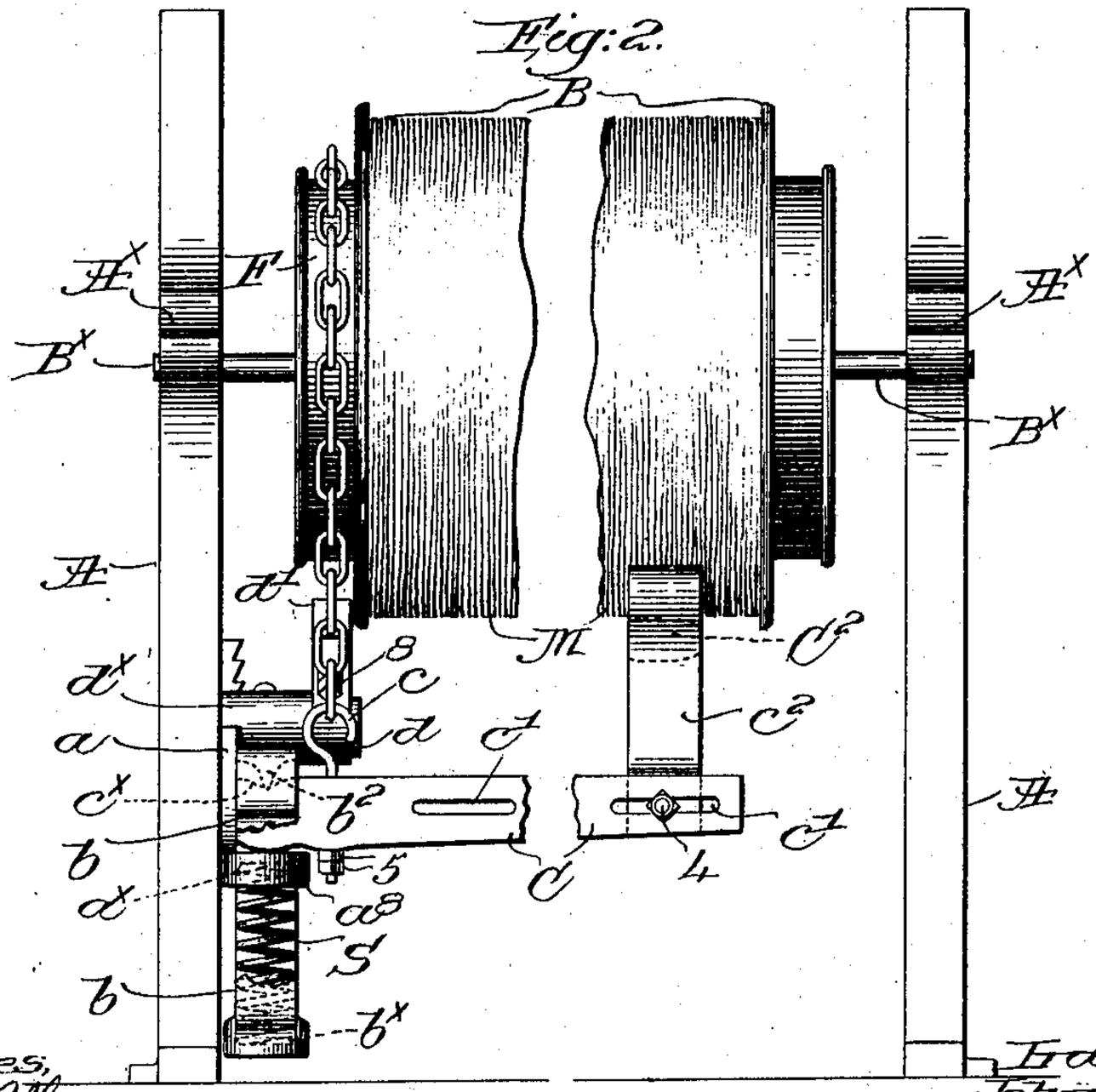


Fig: 2.



Witnesses,
Edward F. Allen
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Inventor;
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NO MODEL. 2 SHEETS—SHEET 2.

Fig: 3.

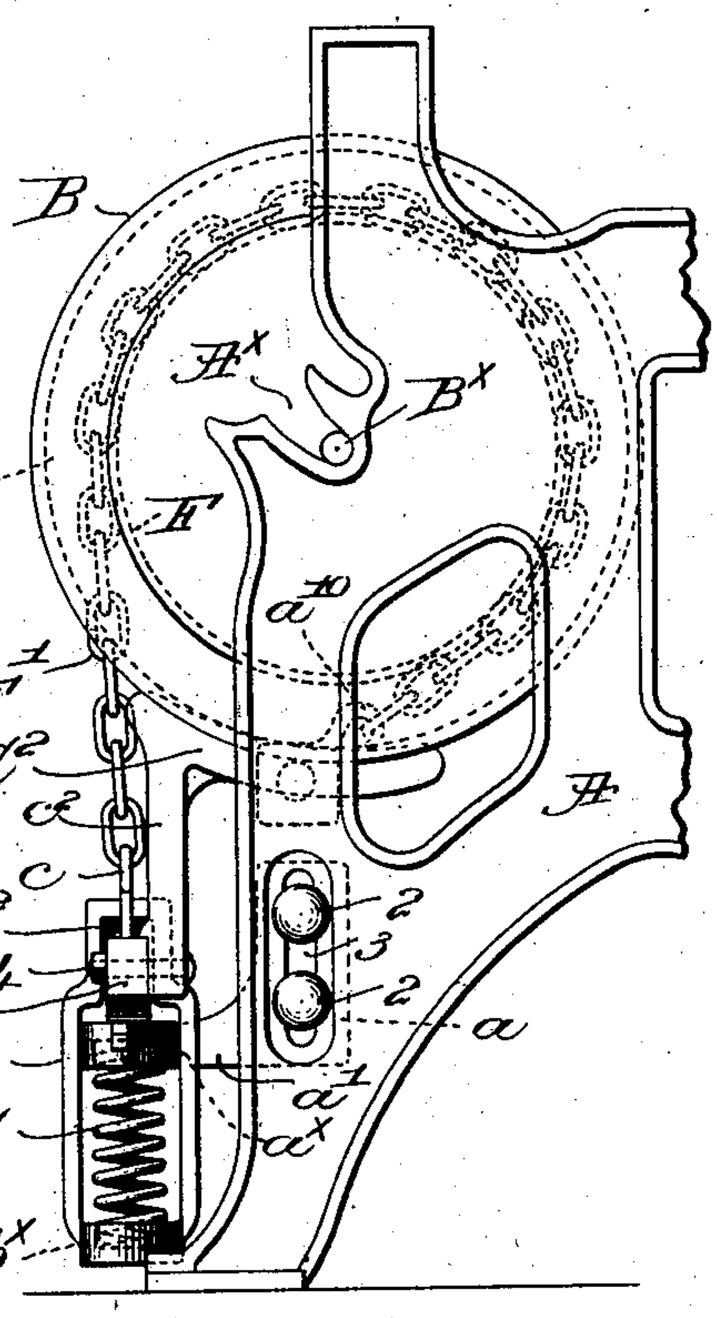

Fig: 6.

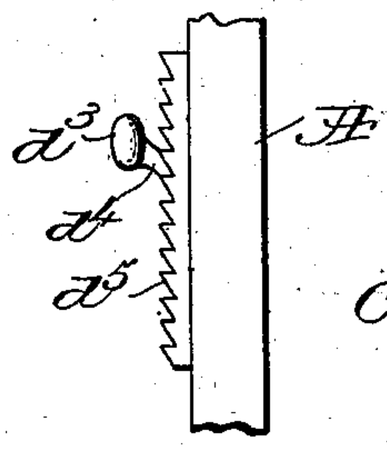

Fig: 5.

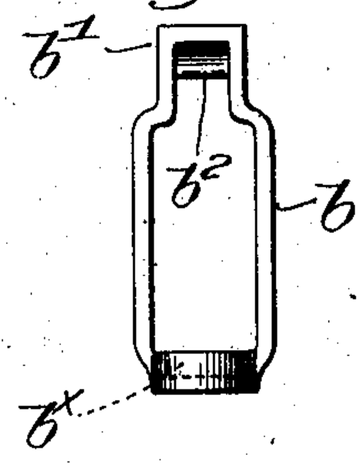

Fig: 7.

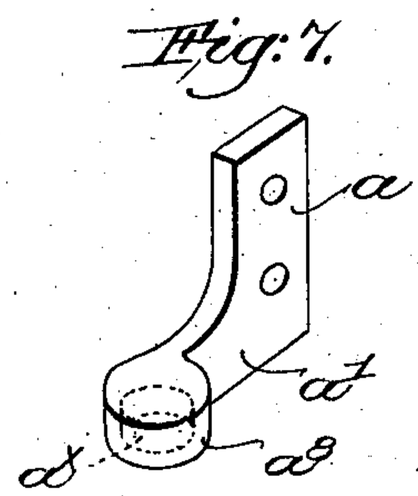

Fig: 4.

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No. 753,899. Patented March 8, 1904.

UNITED STATES PATENT OFFICE.

JOHN T. MEATS, OF TAUNTON, MASSACHUSETTS, ASSIGNOR TO MASON MACHINE WORKS, OF TAUNTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

FRICTION LET-OFF MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 753,899, dated March 8, 1904.

Application filed September 5, 1903. Serial No. 172,129. (No model.)

To all whom it may concern:

Be it known that I, JOHN T. MEATS, a citizen of the United States, and a resident of Taunton, county of Bristol, State of Massachusetts, have invented an Improvement in Friction Let-Off Mechanism for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention has for its object the production of novel, effective, and conveniently-controlled friction let-off mechanism for looms, the desirable features of the friction let-off being combined with certain features of great value and which, so far as I am aware, have never heretofore been employed in such connection.

The use of the plain friction let-off, as distinguished from the purely automatic type of let-off, has very largely increased of late years, chiefly because of its ready adaptability to the various kinds of fancy weaving. So far as I am aware, however, no attempt has been made to practically combine in a friction let-off a pressure regulating or controlling spring instead of a dead-weight and means to vary the tension of the spring readily and conveniently, manually or automatically, or both, as may be desired, while the spring retains its full control of the friction let-off.

In my present invention the preferably-flexible member, which coöperates with an annular brake member rotatable with the warp-beam, is operatively connected with a pressure-regulating spring, and I have provided novel means for varying the tension of the latter, so that the yarn will be let off properly in accordance with the character of the work. In one embodiment of my present invention the tension of the spring can be varied manually from the front of the loom, so that the weaver does not have to get in behind the warp-beam, and the spring tension can also be varied automatically in accordance with the diameter of the yarn mass on the beam.

As will appear more fully hereinafter, the invention may be modified in various particulars while still retaining certain salient features of novelty, utility, and efficiency.

The 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 and a friction let-off mechanism therefor with one embodiment of my present invention applied thereto. Fig. 2 is a rear elevation, centrally broken out, of the apparatus shown in Fig. 1. Fig. 3 is a side elevation of a modification to be referred to. Fig. 4 is a similar view of yet another modification of my invention. Fig. 5 is a detached detail of the stirrup for the tension-spring. Fig. 6 is a detail of a locking device to be described, and Fig. 7 is a perspective view of the stand for the spring.

In Figs. 1 to 4, inclusive, the loom-frame A, having suitable bearings $A^{\times}$ for the journals $B^{\times}$ of the warp-beam B, and the annular brake member or friction-disk F, rotatable with the beam, may be and are all of substantially well-known construction, a suitable friction or brake member F′, herein shown as a chain, cooperating with the member F and by the pressure or drag exerted on the latter determining the tension to which the warp is subjected by the let-off mechanism, While I have shown the friction member F′ as a chain, it will be manifest that a belt, strap, rope, band, or any other suitable means may be used in lieu of the chain so long as the desired function is effected.

The mechanism shown in Figs. 1 and 2 is arranged for varying the tension of the pressure-regulating spring automatically and manually. A stand *a* is secured to the loom side below the warp-beam by bolts 2, extended through a vertical slot 3, Fig. 1, said stand having a rearwardly-extended foot *a*′, provided with a lateral enlargement a^{8}, having in its under side a cup-like socket or depression $a^{\times}$, in which is seated the upper end of a pressure regulating or controlling spring S. By loosening the bolts 2 the stand *a* may be adjusted vertically as may be necessary. The lower end of the spring is seated in a socket or seat $b^{\times}$ in a stirrup *b*, (shown separately in Fig. 5,)

the upper end or head of said stirrup being therein shown as contracted, as at b', and provided with a transverse downturned fulcrum-bar b^2, oppositely beveled to present a blade-like edge. The enlargemeut a^8 extends into the stirrup directly above the seat $b^\times$. A lever C is fulcrumed on the fulcrum-bar b^2 and extends transversely of the loom below the warp-beam, as shown in Fig. 2, the top of the lever near one end being shown therein as having a slight depression or concaved seat $c^\times$ to receive the fulcrum b^2. The friction member F′ is attached at one end to said lever by a suitable hook c, and, as shown in Fig. 2, the lever is provided with a series of longitudinal slots c'. A cradle C^2, concaved to bear against the periphery of the yarn mass M on the beam, has a depending foot c^2, adapted to be secured to the lever C by a clamping-bolt 4, which is extended through any one of the slots c'. This cradle is by the means described adjustably secured on the controlling-lever C at exactly the proper distance from the point of attachment c of the member F′ (with relation to the fulcrum b^2) as will cause the tension of the spring S to decrease at a rate in accordance with the diminution of the diameter of the yarn mass M as the cloth is woven, thereby maintaining a uniform tension upon the warp during the weaving operation. It will be manifest that the nearer the cradle is set to the fulcrum the quicker will be the rate of decrease of the spring tension for a given diminution in the diameter of the yarn mass, the rate of decrease being slower as the cradle is set nearer the free end of the lever. As the other end of the friction member F′ is held fast, different means being herein shown therefor, it will be manifest that the device just described provides for automatic regulation of the spring tension, and that the pressure exerted by the friction member F′ upon its coöperating member F is governed by the spring, instead of by a dead-weight, as is now common practice. Permanent adjustment can be made in the first instance by adjusting the stand a as described, and also, if desired, by the check-nuts 5 on the threaded shank of hook c.

In respect to the mechanism so far described the construction is the same in Fig. 3, but therein the opposite end of the friction member F′ is held by a hook a^{10}, non-adjustably secured to the loom side, so that beyond the automatic variation of the tension of the pressure-regulating spring S the only adjustment is by or through the stand a and the hook c. It is very desirable, however, to provide for a quick and readily-effected change in the tension at any time the weaver may find it advisable, and in Figs. 1 and 2 I have shown means for so doing. A stud d, mounted on the loom side and extended inward, receives upon it the hub $d^\times$ of a lever d' d^2, its shorter arm d' being located below the annular friction or brake member F and having a tapered hole 6 (see dotted lines, Fig. 1) to receive the shank of a hook 7, to which the adjacent end of the friction member F′ is secured. Check-nuts 8 on the shank of the hook connect the latter with the lever and also provide for an adjustment, if desired. The long arm d^2 of the lever is laterally offset from arm d' and extends to the front of the loom, having a handle d^3 and a tooth or pawl d^4, the latter being adapted to coöperate with a ratchet-bar d^5, mounted on the loom side. (See Figs. 1, 2, and 6.) The tension of the spring S, acting through the friction member F′, tends to depress the front end of the lever d' d^2, and this tendency is resisted by the coöperation of the pawl-and-ratchet bar, which latter constitutes a lock to retain the lever in desired angular position. Now should the weaver desire to quickly change the tension of the spring he raises or lowers the handle d^3, as the case may be, to increase or decrease the tension, respectively, and thereby without leaving the front of the loom alters the pressure of the friction device and correspondingly changes the tension upon the warp due to the let-off mechanism. Thus the apparatus shown in Figs. 1 and 2 is constructed and arranged to vary the spring-controlled pressure of the friction device both manually and automatically, and when manual variation is required it is effected without requiring the weaver to move from the front of the loom.

In some cases it is unnecessary to provide for the automatic variation of the tension of the pressure-regulating spring, while it is very desirable that manual variation thereof may be effected in a ready and rapid manner. The construction shown in Fig. 4 is arranged for such purpose and will now be described. The front end of the friction member F′ is attached to a hook 15, fixedly secured to the loom side, and the rear end of said member F′ is connected by a hook g with a lever G. The hook-shank passes loosely through a hole in the latter and is secured by suitable check-nuts g'. A stand a^{30}, having an extension a^{31}, provided with a spring-seat a^{32}, is secured to the loom side by clamping-bolts 40, extended through a vertical slot 42 (see dotted lines, Fig. 4) in the loom side, so that the stand may be adjusted vertically. The upper end of a pressure-regulating spring $S^\times$ is seated in the seat a^{32}, the lower end of the spring entering a seat $b^\times$ in the stirrup b, the latter being just as has been hereinbefore described, its fulcrum-bar or knife-edge b^2 engaging a concavity $g^\times$ in the top of the lever near its rear end. The lever is extended forward and is provided with a handle g^3 at the front of the loom, a pawl or tooth g^4 on the lever coöperating with a ratchet-bar g^5 to hold the lever in adjusted angular position. By moving the handle g^3 up or down the stirrup will be raised or lowered to either increase or decrease the tension of the spring $S^\times$, as de-

sired, such variation in tension being accomplished by the weaver from the front of the loom.

By a comparison of Figs. 1 and 4 it will be seen that the manual change in the tension of the pressure-regulating spring is in both instances effected from the front of the loom, but that any change of pressure in the structure shown in Fig. 4 is effected wholly at the volition of the weaver.

My invention is not restricted to the precise construction and arrangement herein shown and described, as the same may be varied or rearranged in various details by those skilled in the art without departing from 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 loom, a warp-beam, and friction let-off mechanism therefor including an annular brake member rotatable with the beam, a co-operating flexible member fixedly held at one end, and pressure-regulating means comprising a spring operatively connected with the other end of said flexible member, a lever to vary the tension of the spring, and a device to govern the angular position of said lever.

2. In a loom, a warp-beam, and friction let-off mechanism therefor including an annular brake member rotatable with the beam, a co-operating flexible member, pressure-regulating means comprising a spring operatively connected with one end of said flexible member, and a lever to vary automatically the tension of the spring in accordance with the diameter of the yarn mass on the beam, combined with a positively-acting holding device for and to fixedly position the other end of the said flexible member.

3. In a loom, a warp-beam, and friction let-off mechanism therefor including an annular brake member rotatable with the beam, a co-operating flexible member, pressure-regulating means comprising a spring operatively connected with one end of said flexible member, and a lever to vary automatically the tension of the spring in accordance with the diameter of the yarn mass on the beam, and a manually-adjustable holding device for the other end of the said flexible brake member.

4. In a loom, a warp-beam, and friction let-off mechanism therefor including an annular brake member rotatable with the beam, a co-operating flexible member, pressure-regulating means comprising a spring operatively connected with one end of said flexible member, and a lever to vary automatically the tension of the spring in accordance with the diameter of the yarn mass on the beam, a holding-lever operatively connected with the other end of said flexible member and manually adjustable from the front of the loom, and a lock to hold said lever in adjusted position.

5. In a loom, a warp-beam, and friction let-off mechanism therefor including an annular brake member rotatable with the beam, a co-operating friction member fixedly held at one end, a pressure-regulating spring operatively connected with the other end of said member, and means to vary the tension of the spring, said means including a lever manually adjustable from the front of the loom, and a lock to hold said lever in adjusted position.

6. In a loom, a warp-beam, and friction let-off mechanism therefor including an annular brake member rotatable with the beam, a co-operating flexible member, and pressure-regulating means including a lever operatively connected with said flexible member, a spring-controlled fulcrum for the lever, and a device to govern the angular position of the latter and thereby vary the tension of the spring while the latter maintains its control of said flexible member.

7. In a loom, a warp-beam, and friction let-off mechanism therefor including an annular brake member rotatable with the beam, a co-operating flexible member, and pressure-regulating means including a lever operatively connected with said flexible member, a spring-controlled fulcrum for the lever, and a device to govern automatically the angular position of said lever in accordance with the diameter of the yarn mass on the beam.

8. In a loom, a warp-beam, and friction let-off mechanism therefor including an annular member rotatable with the beam, a coöperating friction member, a pressure-regulating spring, a fixed seat for one end thereof, a stirrup in which its other end is seated, a lever extended through the stirrup and fulcrumed thereon above said fixed seat and connected with one end of the second friction member, and means to coöperate with the free end of and retain said lever in adjusted angular position, angular movement of the lever varying the tension of the spring.

9. In a loom, a warp-beam, and friction let-off mechanism therefor including an annular member rotatable with the beam, a coöperating flexible friction member held at one end, a lever connected with the other end of said flexible member, a stirrup having a fulcrum for the lever, and a spring-seat, a fixedly-mounted spring-seat extended into the stirrup, a spring interposed between the two seats, and means to govern the angular position of the lever, the stirrup coöperating therewith between its connection with the flexible friction member and its opposite end.

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

JOHN T. MEATS.

Witnesses:

JOHN C. EDWARDS,

EDITH M. STODDARD.