No. 631,430. Patented Aug. 22, 1899.

C. F. PERHAM.

LET-OFF MECHANISM FOR LOOMS.

(No Model.) (Application filed Oct. 17, 1896.) 2 Sheets—Sheet 1.

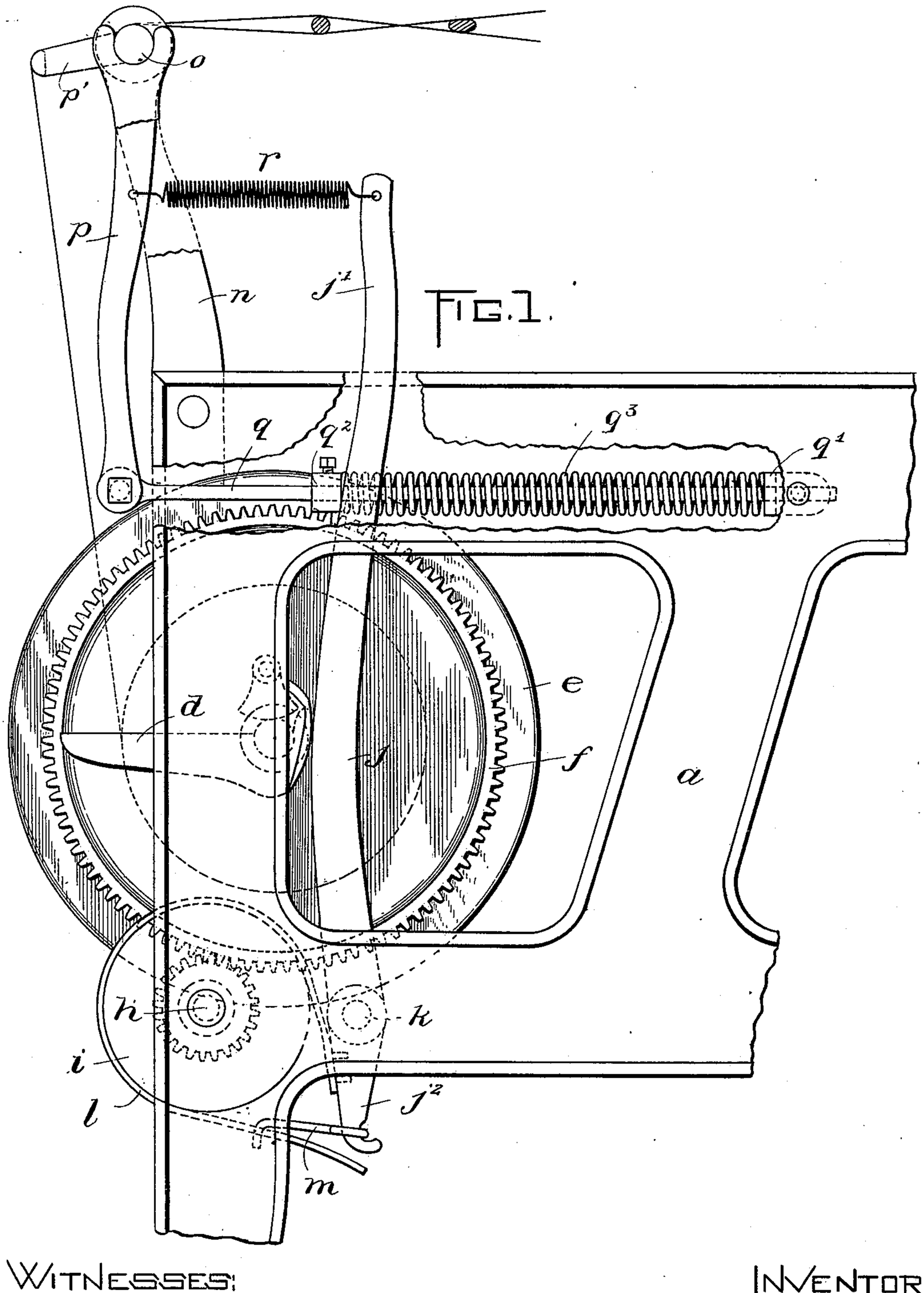

FIG. 1.

WITNESSES:
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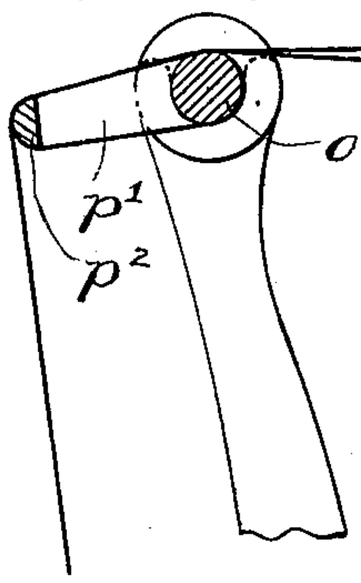

FIG. 3.

FIG. 4.

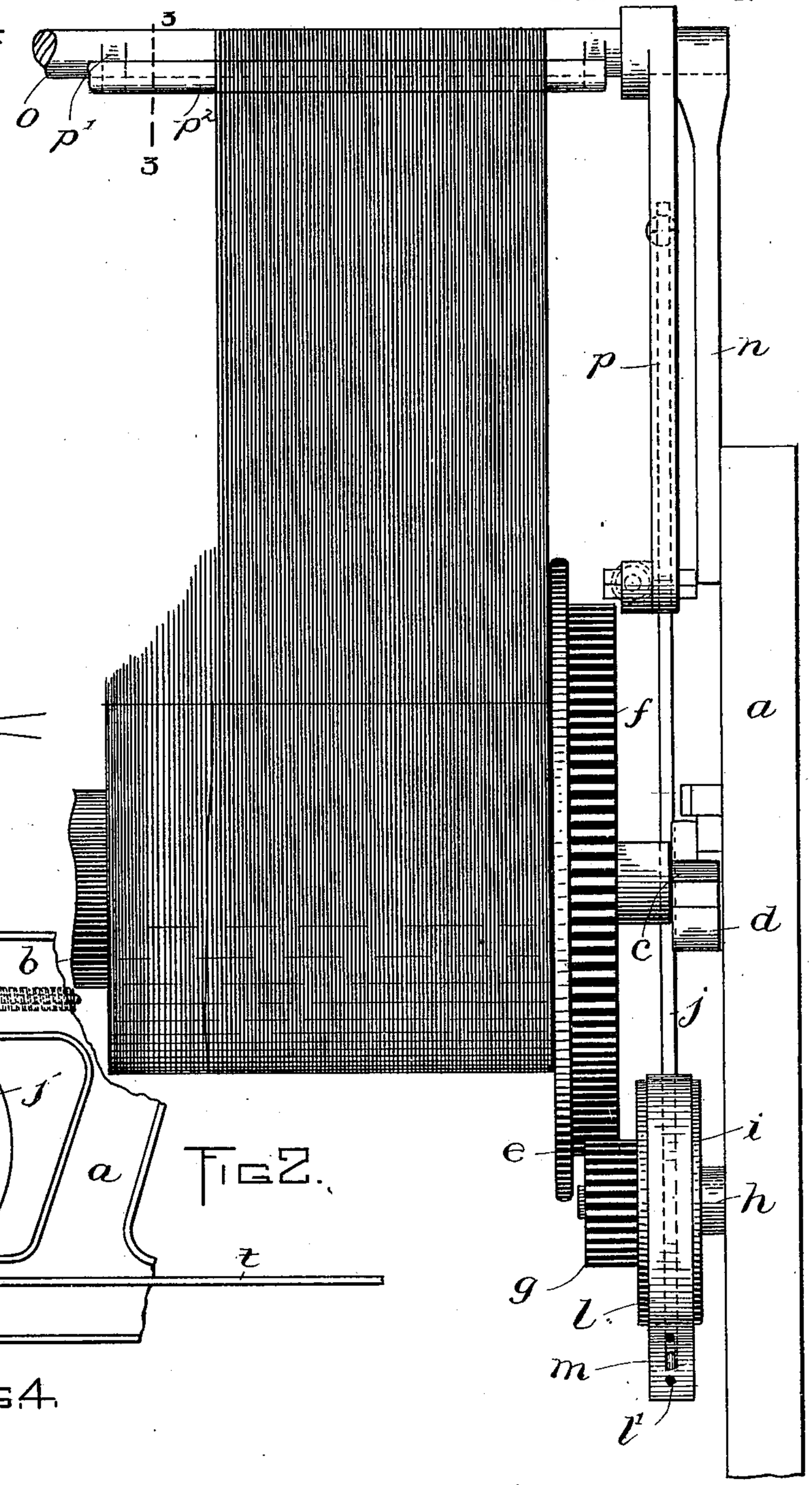

FIG. 2.

WITNESSES:
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UNITED STATES PATENT OFFICE.

CHARLES F. PERHAM, OF LOWELL, MASSACHUSETTS.

LET-OFF MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 631,430, dated August 22, 1899.

Application filed October 17, 1896. Serial No. 609,187. (No model.)

To all whom it may concern:

Be it known that I, CHARLES FOSTER PERHAM, of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Let-Off Mechanism for Looms, of which the following is a specification.

This invention has relation to let-off mechanism for the warp-beams of looms.

The object of the present invention is to provide a device of the character specified to maintain the same degree of tension upon the warp-threads irrespective of the diameter of the layers on the beam. It frequently happens that the tension upon the warp-threads increases in proportion as the threads unwind from the warp-beam, the brake mechanism operating with a constant pressure to retard the movements of the said beam, which latter rotates at a regular rate of speed, and therefore the picks vary and the cloth is uneven and of practically small value. Hence the invention consists in a let-off mechanism for looms in which the pressure of the brake mechanism varies with the thickness or diameter of the layers of the threads upon the beam, being greatest when the layers are thickest and least when the threads are almost expended, so that the rotation of the warp-beam is varied in accordance with the depth of the layers thereon and the same amount of thread is let off at all times, all as I shall now proceed to describe in detail and then point out in the claims.

Reference is to be had to the accompanying drawings, and to the letters marked thereon, forming a part of this specification, the same letters designating the same parts or features, as the case may be, wherever they occur.

Of the drawings, Figure 1 represents in side elevation a portion of a loom having its warp-beam equipped with my improved let-off mechanism. Fig. 2 is a rear end elevation of the same. Fig. 3 is a section on the line 3 3 of Fig. 2. Fig. 4 shows additional means for locking the warp-beam against rotation when the reeds of the lay-beam are in engagement with the cloth.

My invention is applicable to looms of any class or pattern and is not limited to the details of construction illustrated upon the drawings and which I shall now proceed to describe, since it is capable of being expressed or embodied in other forms and in many different ways. I have shown it as being applied to a loom having the frame *a* and the warp-beam *b*, with journals *c* mounted in bearings *d* on the frame. The warp roll or beam has at its ends flanges *e* and is provided with a gear-wheel *f*, meshing with a pinion *g* on a stud-shaft *h*, journaled in the frame. The said stud-shaft *h* is equipped with a friction or brake wheel *i*, with which my improved brake mechanism is adapted to coact in retarding the rotation of the warp-beam as the warp-threads are being drawn therefrom and the work upon the loom progresses. *j* is a long lever pivoted at *k* to the frame and having its upper end *j'* extending above the framework of the machine. One end of the strap *l* passes around the rim of the brake-wheel *i* and is secured to the lower end j^2 of the lever *j* slightly below the pivot *k*, while its other end is secured to the extreme lower end of the lever *j* by a link *m*, having a hooked end adapted to take in any one of several holes *l'* in the strap *l*. If the upper end *j'* of the lever *j* is moved to the right, the strap *l* is freed from frictional engagement with the brake-wheel, and if moved to the left the friction of the strap against the wheel is increased.

Upon supports *n*, extending up from the frame *a*, is mounted a shaft *o*, having a depending arm *p* and laterally and rearwardly projecting arms *p*, connected by a bar p^2, constituting a feeler. The lower end of the arm *p* is pivoted to rod *q*, passing loosely through an eye *q'* on a bracket secured to the frame, said rod being provided with an adjustable collar q^2, and between it and the eye *q'* and around the rod *q* is placed a pressure-spring q^3. The upper end *j'* of the lever *j* is connected to the arm *p'* at a distance from the shaft *o* of about one-third of its length by a contractile or tension spring *r*. The warp-threads which have been previously wound upon the warp-beam pass over the bar p^2 of the feeler and from thence to the heddles and other parts of the loom. The springs are adjusted until the parts are in normal position and the brake-strap locks the brake-wheel

against movement. Then the warp-threads, under the tension of the cloth-roll and the take-up devices, draw upon the feeler with sufficient pressure to throw the lower end of the arm p to the right against the pressure of the spring q^3, and thereby allow the upper end of the lever j' to move to the right far enough to decrease the frictional engagement of the brake mechanism, so that the warp-beam can slowly rotate and the threads can be drawn from it. When the beam is first put on the loom, the layers of thread are so deep that the threads pass from it over the feeler at an angle greater than a right angle to the latter, where they exercise their least stress or force upon it and their greatest stress upon the brake, and as they are gradually reeled off the diameter of the layers becomes less and less and the pressure upon the feeler is correspondingly increased as the threads approach a right angle to it. Therefore it will be seen that the friction of the strap and brake-wheel is greatest when the leverage of the threads upon the warp-beam is greatest and least when the diameter of the layers of thread upon the warp-beam is diminished, and consequently their leverage upon the beam is decreased.

The yielding connection r between the brake-lever j and the feeler-arm p is an important factor in maintaining an even pressure upon the warp. By employing a spring to connect those parts the frictional engagement of the strap with the brake-wheel may be varied as required, which would not be the case were the lever j and arm p connected by a rod or other unyielding connection. The tension of the spring increases or decreases according to the position of the arm p without actually disengaging the strap from the brake-wheel, so that the tension on the warp is correspondingly unvaried. In this way a relatively long movement of the arm p toward the lever j, which would, if the connection r were not a spring, totally release the brake-wheel, merely relieves the frictional engagement to the required extent. The said spring is relatively light, and the brake-lever is sufficiently long to exert a powerful leverage in drawing the strap about the wheel. The main pressure of the warp is borne and resisted by the spring q^3, which is sufficient to normally counterbalance the spring r also. It is evident from this explanation that when the tension of the warp is sufficient to compress the spring q^3 the movement of the feeler-arm changes the tension of the spring r and causes the lever j to release the brake-wheel sufficiently to relieve the tension on the warp.

In addition to these features I provide means for locking the warp-beam against rotation when the lay strikes the cloth, as shown in Fig. 4, to which reference may now be had. When the reeds of the lay strike the cloth, they increase the tension on the warp-threads, and consequently partially rotate the warp-beam, so that at the next pick the warp-threads are loose and an irregular and uneven fabric is the result. Hence I employ a locking-lever s, fulcrumed at s' on the frame a and having a projection s^2 at its upper end to extend behind the arm p. The lower end of the lever is connected by a link t with the lay-operating sword, (not shown,) so that each time the lay is thrown forward the upper end of the lever is thrust rearward until the projection s^2 engages the lever p and prevents it from yielding under the increased tension of the warp-threads, and consequently the brake mechanism remains locked to the brake-wheel and the warp-beam is prevented from unwinding. When the lay is in its inoperative position, the projection s^2 is withdrawn from the lever p and the latter is free to move, as before described.

I claim—

1. In combination, a warp-beam under constant tension from the warp, a friction-brake mechanism for checking the rotation thereof, a pivoted feeler connected yieldingly with the brake mechanism and having a portion arranged with such relation to the warp-beam that when the beam is full the warp is at an angle to the feeler greater than a right angle, and the angle decreases as the warp is unwound.

2. In combination, a warp-beam under constant tension from the warp, a friction-brake mechanism for checking the rotation thereof, a spring-held feeler pivoted above the warp-beam and connected yieldingly to the brake mechanism, said feeler having a portion over which the warp passes arranged with such relation to the warp-beam that when the beam is full the warp between the feeler and the beam is at an angle to the feeler greater than a right angle and the angle decreases as the warp is unwound.

3 In a loom, the combination with the warp-beam, and a friction-brake for the beam, of a lever for operating the brake, a laterally-extending feeler journaled in supports, and in the path of the warp-threads, said feeler being arranged above the warp-beam, and having a depending arm, a spring connection between the said arm and the said lever, and a spring bearing against said arm against the stress of the spring connection.

4. In combination with a warp-beam, and a friction-brake therefor, of a lever for operating the brake, a feeler journaled in the path of the warp-threads, having a depending arm, yielding connections between the arm and the said lever, and means coacting with the lay for engaging the said depending arm and holding it against motion.

5. In combination with a warp-beam, and a friction-brake therefor, of a lever for operating the brake, a feeler journaled in the path of the warp-threads, having a depending arm, yielding connections between the arm and the said lever, and a pivoted lever connected with the lay and arranged to intermittingly

engage the depending arm, for the purpose described.

6. In a loom in combination, a warp-beam, a brake mechanism therefor, an upwardly-projecting lever for operating the brake-strap, a feeler pivoted above the warp-beam and arranged to move in accordance with the varying tension of the warp, and having a rigid downwardly-projecting arm, a contractile spring connecting the end of the brake-lever with the feeler-arm, and a tension-spring connected to the end of said arm and arranged to act against the first said spring.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 28th day of September, A. D. 1896.

CHARLES F. PERHAM.

Witnesses:
HORACE BROWN,
A. D. HARRISON.