T. J. LONGDEN.

BRAKE MECHANISM FOR LOOM LET-OFFS.

APPLICATION FILED JAN. 21, 1911.

1,153,636.

Patented Sept. 14, 1915.

2 SHEETS—SHEET 1.

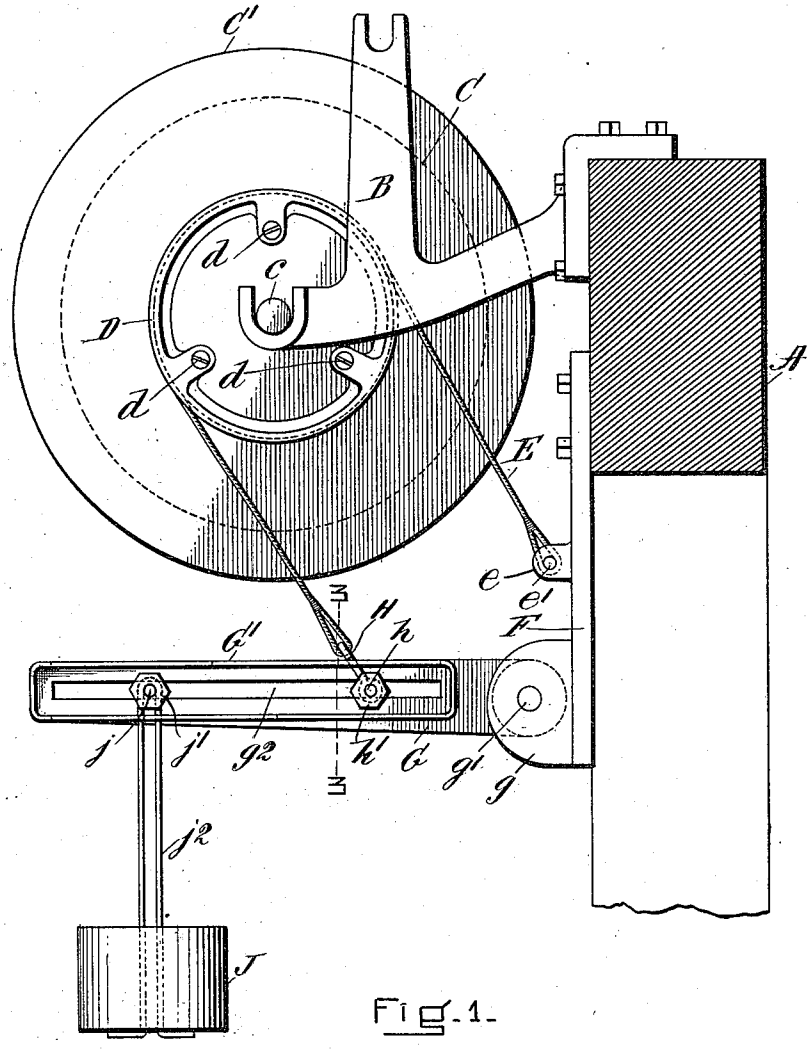


Fig. 1.

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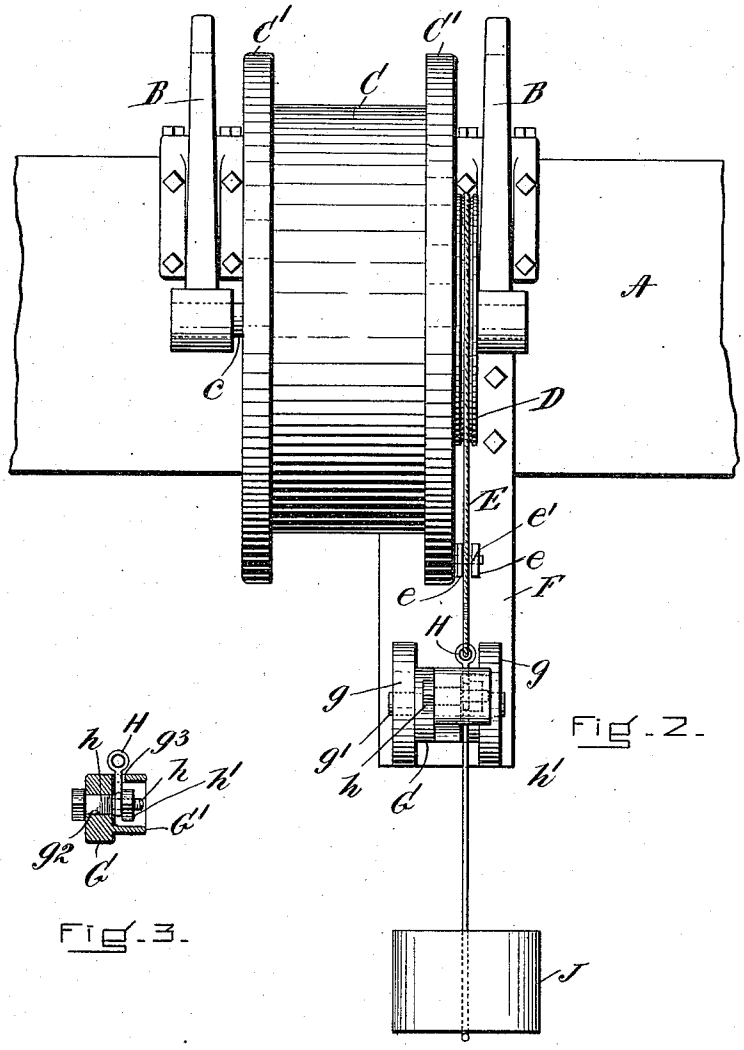


Fig. 2.

Fig. 3.

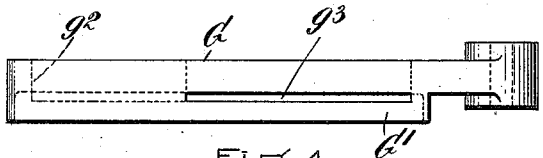


Fig. 4.

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UNITED STATES PATENT OFFICE.

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BRAKE MECHANISM FOR LOOM LET-OFFS.

1,153,636. Specification of Letters Patent. Patented Sept. 14, 1915.

Application filed January 21, 1911. Serial No. 603,824.

To all whom it may concern:

Be it known that I, THOMAS J. LONGDEN, of Chelsea, in the county of Suffolk and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Brake Mechanism for Loom Let-Offs, of which the following is a specification.

The problem of providing a proper let off for the beam of a loom for weaving elastic webs has proved troublesome of solution because of the elastic character of the rubber threads which form the warp. In weaving such webs the rubber warps are always under some tension, usually enough to stretch them about three times their length, but as they are very fine, it takes but little tension to accomplish this. The tension should at all times be substantially constant as irregularities in the tension of the elastic warp make irregularities in the woven fabric. If too much tension is applied the capacity of the finished web to yield is too little because the rubber threads have been stretched too much in the weaving operation, while if there is too little tension the capacity of the web to yield is entirely too great and it scarcely fulfils the purpose required of it, for example, in a suspender, of maintaining the trousers at a proper height and at the same time allowing a slight yield to conform to the movements of the wearer when necessity requires. Moreover in this latter case there is considerable waste of elastic thread which at the present price of rubber is a serious matter. Heretofore in looms of this kind the rubber has been wound on a beam the movements of which are restrained as in an ordinary loom in which the warp is not elastic, that is to say, tension is applied at what may be termed the long end of the lever so that it acts through considerable leverage and it is difficult under these circumstances to secure a tension of sufficient delicacy of adjustment for the purpose required. In such looms the tension has ordinarily been applied by means of a tension wheel as large or larger than the beam itself over which a weight is hung by means of a strap. The tension wheel therefore being as large or larger than the beam forms the long end of the lever and the strap itself, being of considerable width and bearing on such a wheel, gives considerable friction which cannot readily be reduced to the small amount required in the weaving of webbing made up of very fine elastic threads. In ordinary weaving this is a matter of no importance because the sole purpose of the let off mechanism is to restrain the beam from being moved too fast by the draft of the woven material and the warp is sufficiently firm (being inelastic) to withstand any ordinary strain. Moreover the beam is of considerable width and the tension is being constantly adjusted as the beam is emptied. In cases where the tension is applied to a tension wheel smaller than the beam, the tension wheel has been gripped by the tension device so as to insure sufficient friction and tension. In the case of web weaving, however, the warp is not only elastic, but is made up of very fine elastic threads which must always have a slight pull upon them which shall stretch them say approximately three times their length and yet at the same time cause the beam to yield as the warp is woven into the fabric.

To secure the necessary delicacy of tension I have invented a mechanism in which the leverage of the weight or other control on the beam is reduced by reason of the fact that the tension wheel is of considerably less diameter than the beam and its movement is adjustably controlled by a band of smaller area of contact upon the wheel, which area is adjustable, said band being made taut by a weight capable in itself and by virtue of its means of application of delicate adjustment. As a result my tension device has given an increased product and after being once adjusted for a given run requires no further adjustment until a warp of different sized threads is used.

My invention will be understood by reference to the drawings in which—

Figure 1 is a side elevation of a beam tension embodying my invention, Fig. 2 being a front view thereof. Fig. 3 is a section on line 3—3 of Fig. 1, and Fig. 4 is a plan of the weighted lever.

A is the back girt of the loom which is of the usual character.

B is a bracket attached to the back girt. There are two of these brackets B, one on each side of the beam, which is marked C, each bracket being provided with a journal to hold the end of the shaft *c* by which the beam is supported and with which it rotates. It will be noted that the beam C is of considerable diameter and is provided with flanges C^1, C^1.

D is a tension wheel which is attached to the beam, concentric with it, by means of screws *d*. As shown, this tension wheel comprises merely a tire or rim which is grooved to receive the belt E. To provide means for the attachment and regulation of the tension of this belt E I provide a bracket or hanger F which is also attached to the girt and carries ears *e* to hold a pin e^1 which passes through a loop in one end of the belt E. The bracket F also carries ears *g* in which is pivoted by the pin g^1 a lever G. This lever G is slotted, preferably as shown, at g^2 and in this slot runs a pin *h* carrying an eye H to which is attached the other end of the belt E. In Fig. 3 the eye H is shown as passing up through a slot g^3 in the lever G and the slot g^2 is shown as surrounded by a flange G^1. The pin *h* is headed at one end and is threaded at the other end and is held in place by the nut h^1 which lies within the flange G^1 so that it can only be turned by a key.

J is a weight which is hung over a pin *j*, also sliding in the slot g^2 and adjustably attached thereto by means of a nut j^1, the weight being provided with a loop shaped rod j^2 which hangs on the pin *j* and passes down through a slot g^4 in the lever G. The nut j^1 also lies within the flange G^1 so that it cannot be conveniently meddled with. In other words, the flange G^1 surrounding the slot g^2, at a little distance, provides a groove which is wider than said slot, and in which groove the nuts h^1 and j^1 are housed so that they cannot be turned, to change the adjustments of the pins *h* and *j* excepting by a key or special tool or socket wrench, in contradistinction to an ordinary wrench.

In practice I prefer to use for the belt E what is known as a cable wire of about $\frac{1}{8}''$ in diameter and I prefer in the first instance to arrange this belt with relation to the other parts of the mechanism substantially as shown in the drawings, that is, with its two ends attached one to the bracket F and the other to the lever G in such manner that it will bear upon approximately a half of the tension wheel D. By this means sufficient tension is given to the wheel to allow the woven fabric to stretch the rubber warp somewhat in drawing it off from the beam and yet not stretch it too much. The amount of tension required is found by measurement to vary from say $3\frac{1}{2}$ lbs. to say $1\frac{3}{4}$ lbs., and the desired tension can easily be secured, according to the elasticity of the threads, by adjusting the position of the pin *h* along the lever G, so as to vary the amount of pull on the brake band E, and also by slidingly adjusting the position of the pin *j* along the lever G, so as to vary the leverage pull of the weight J. Thus a great variety of adjustments may be secured. The weight should be approximately about $2\frac{1}{2}$ lbs. for the best results where the construction is as shown in the drawings. By means of such a device as this it is possible to gain $\frac{1}{8}''$ of rubber on each three inches of web and make a product which is superior to that now on the market.

In distinction from the tension of the ordinary let off above referred to where the tension wheel is as large or larger in diameter than the diameter of the beam, in my case the radius of the beam is the long arm of a lever and the tension is applied to the short arm represented by the radius of the tension wheel. Moreover the tension itself may be regulated first by moving the bolt *h* so as to vary the leverage pull on the brake band E, and second, by altering the position of the weight J relative to the lever G. By these means the tension can be adjusted so as to be just sufficient to hold the beam from moving against the draft of the loom, that draft representing say from $3\frac{1}{2}$ to $1\frac{3}{4}$ lbs. depending upon the size of rubber thread which is being woven. Any draft beyond that amount will cause the beam to give off rubber thread until the pull is reduced to the standard amount when the beam stops. In fact the tension is so delicate that the beam is constantly yielding though so slowly that its movement is scarcely visible. The amount of stretch or elongation which it is desirable to give the rubber is somewhat over three times its length, that is, three inches of web can be made with slightly less than $\frac{1}{8}''$ of rubber. For satisfactory results, however, this relation must be maintained throughout the entire length of the web without constantly adjusting the parts.

With the mechanism above described the desired result is easily secured—as when the adjustment is well made it need not be changed during a run. As a rule only sixty yards of rubber are wound on a beam at a time, and as it is drawn off there is a slight change in leverage, so slight, however, as to be immaterial. In the ordinary loom with warps of cotton, wool or the like the tension increases as the beam is emptied and constant adjustment is required. The amount of tension may be measured by the amount of slack or stretch which it is desirable that the rubber may have.

While this invention is especially applicable to web looms it is also applicable to braiders.

What I claim as my invention is:—

1. The combination with a suitable support, of a let-off comprising a rotary element mounted on said support, a friction wheel of less diameter than said rotary element and mounted thereon, a bracket mounted on said support, a belt passing partly around said friction wheel and one end of which is attached to said bracket, a lever pivotally attached to said bracket and provided with a slot, a fixed but adjustable pin adapted, when

loosened, to slide in said slot and to which slidingly adjustable pin the other end of said belt is attached, and a weight adjustably connected with said lever beyond the sliding point of attachment of said belt to said lever afforded by said pin and slot.

2. The combination with a suitable support, of a let-off comprising a rotary element mounted on said support, a friction wheel of less diameter than said rotary element and mounted thereon, a bracket mounted on said support, a belt passing partly around said friction wheel and one end of which is attached to said bracket, a lever pivotally attached to said bracket and provided with a slot, a flange on said lever, at a distance from said slot, thus providing a groove, a pin or bolt to which the other end of said belt is attached and which pin or bolt is located in said slot so as to be slidingly adjustable therein, a second pin or bolt slidingly adjustable in said slot, a weight suspended from said last-named pin or bolt, and securing nuts on said pins or bolts and which are housed in said groove so that they can be turned only by a special key or wrench.

THOMAS J. LONGDEN.

Witnesses:
GEO. O. G. COALE,
M. E. FLAHERTY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."