W. M. CONRAD & K. G. LIST.

TENSION FOR ROTARY THREAD BEAMS.

APPLICATION FILED JAN. 25, 1910.

989,123.

Patented Apr. 11, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

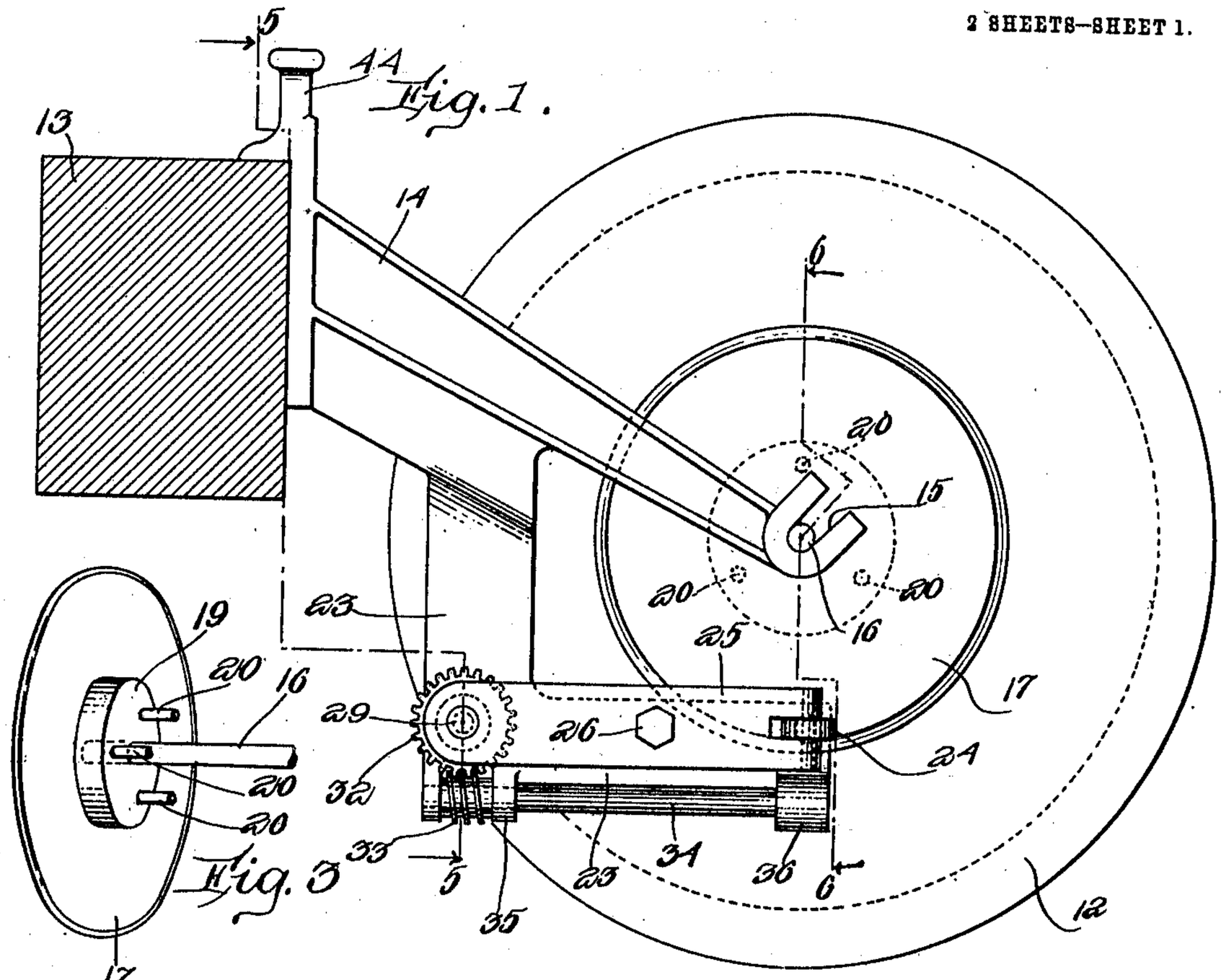

Fig. 3

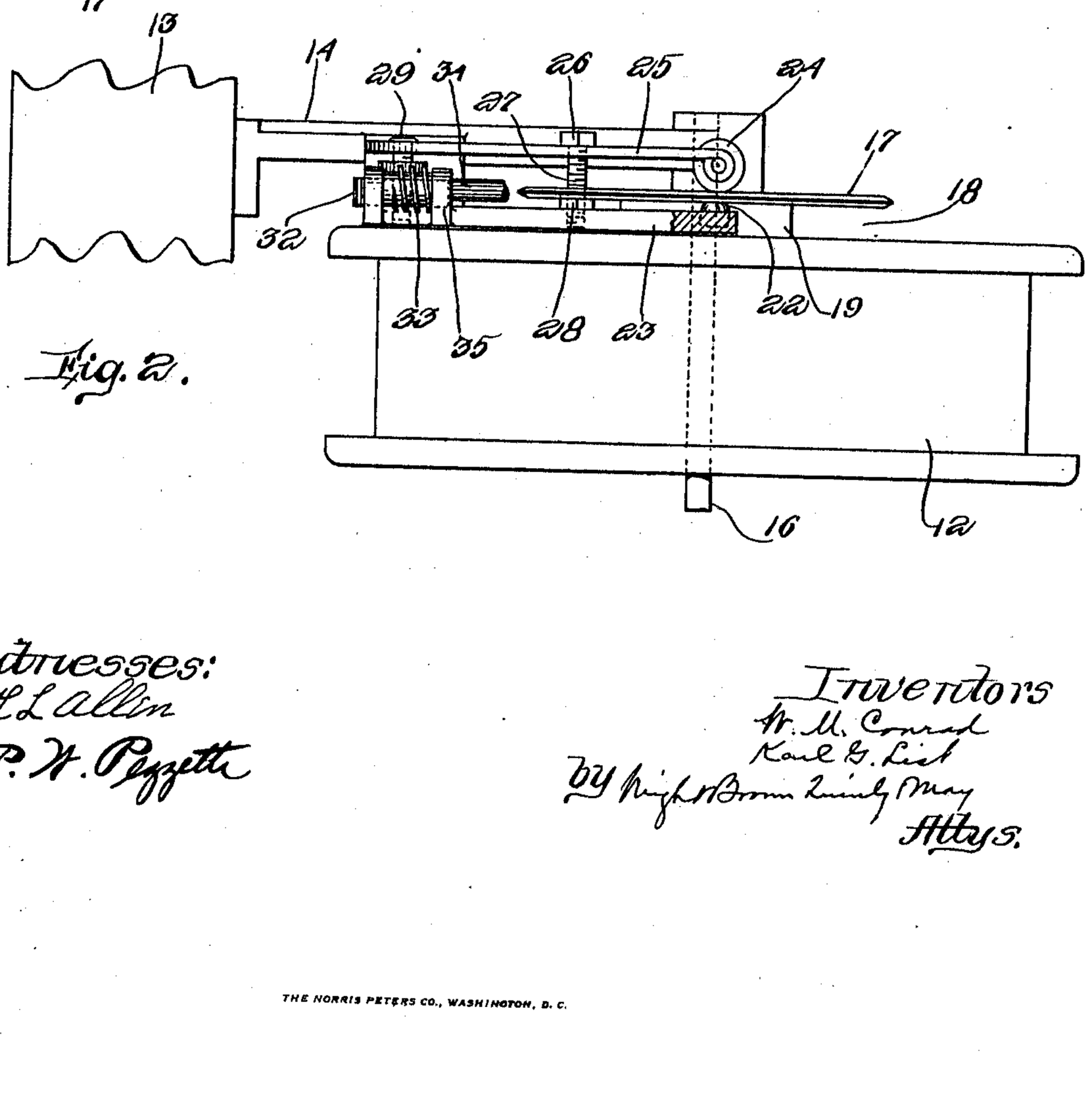

Fig. 2.

Witnesses:
H. L. Allen
P. H. Pezzetti

Inventors
W. M. Conrad
Karl G. List
By Wright Brown Quinby & May
Attys.

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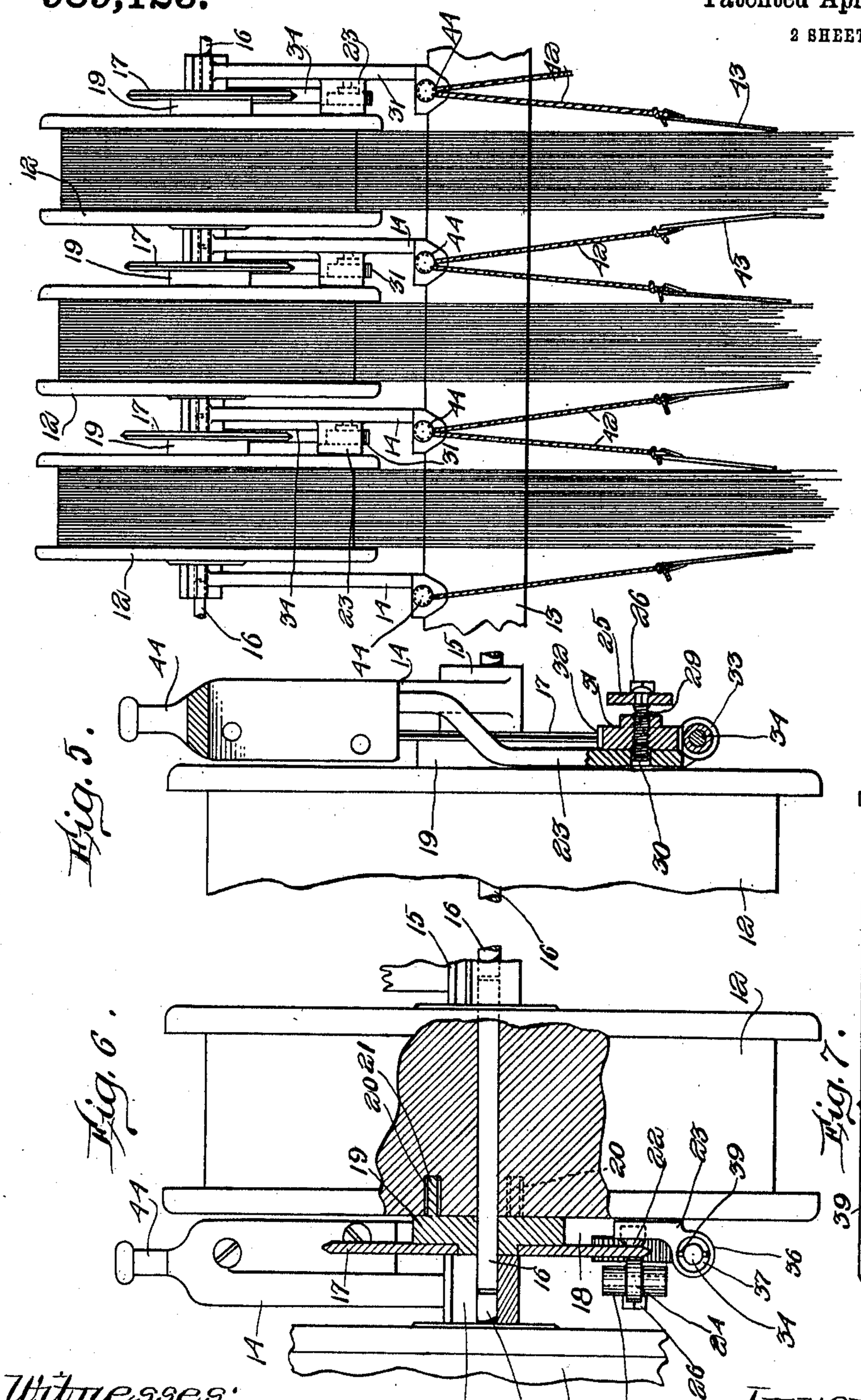

Fig. 1.

Fig. 5.

Fig. 6.

Fig. 7.

Witnesses:
H. L. Allin
P. W. Pezzetti

Inventors:
W. M. Conrad
Karl G. List
By Wright Brown Quinby & May
Attys.

UNITED STATES PATENT OFFICE.

WARREN M. CONRAD AND KARL G. LIST, OF CHELSEA, MASSACHUSETTS.

TENSION FOR ROTARY THREAD-BEAMS.

989,123. Specification of Letters Patent. **Patented Apr. 11, 1911.**

Application filed January 25, 1910. Serial No. 539,967.

To all whom it may concern:

Be it known that we, WARREN M. CONRAD and KARL G. LIST, of Chelsea, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Tensions for Rotary Thread-Beams, etc., of which the following is a specification.

This invention relates to rotary bodies such as the rotary beams used in elastic fabric looms, for storing and giving out the elastic threads which are interwoven with the textile warp and weft threads in forming elastic webbing and other elastic fabrics. The elastic threads are made of an expensive quality of rubber and are stretched or held under tension during the weaving operation, so that the textile fabric with which they are interwoven will be contracted lengthwise when relieved from tension. It is very important that the stretch or tension of the rubber threads be capable of accurate adjustment so that any desired predetermined tension may be imparted to the threads. It is also very important that the predetermined tension be maintained without possibility of variation. Failure to properly adjust the tension or to maintain the proper tension throughout the entire weaving operation may easily result in a serious loss of rubber, the cost of which is rapidly increasing. The tension devices in common use are open to the following objections: first, they are not durable; secondly, they are not uniform in their action; thirdly, they require readjustment after each removal and replacement of the beam; and fourthly, they may be easily tampered with by the weaver, who for his own convenience and without regard to economy in the consumption of rubber, is liable to vary the tension of the rubber from the predetermined standard established by the superintendent.

Our invention has for its object to produce a tension device for the above mentioned and other purposes, which shall be free from the above noted objections.

The invention consists in the improvements which we will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification,—Figure 1 represents a side elevation of an elastic thread beam, and a hanger supporting the same, said beam and hanger being provided with a tension device embodying our invention, said figure showing in section a part of the loom frame. Fig. 2 represents a bottom plan view of the parts shown in Fig. 1. Fig. 3 represents a perspective view of the friction disk shown in Figs. 1 and 2. Fig. 4 represents a top plan view of a series of drums, supports and tension device embodying our invention. Fig. 5 represents a section on line 5—5 of Fig. 1, looking toward the right. Fig. 6 represents a section on line 6—6 of Fig. 1, looking toward the left. Fig. 7 represents a fragmentary view showing a portion of the tension mechanism and the key employed for adjusting the tension.

The same reference characters indicate the same parts in all the figures.

In the drawings,—12 represents a circular rotary body which, in this embodiment of our invention, is the beam on which elastic rubber threads are stored, a series of said beams being supported side by side on the frame member 13 of an elastic fabric loom, a series of hangers 14 being attached to the said frame member and provided with open bearings 15 in which the shaft 16 of adjacent beams 12 are journaled. The rubber threads, which are wound upon the beam 12, are conducted from thence through the loom, and are interwoven with the textile warp and weft threads of the fabric by the mechanism of the loom in the usual way.

In carrying out our invention, we provide each beam 12 with a friction disk 17 and the accompanying hanger with opposed pressure members arranged to bear upon opposite sides of the disk and retard or resist the rotation of the disk to any extent desired, the disk being engaged with the beam so that it rotates therewith, and its periphery being concentric with the axis of the beam.

The disk, which is preferably of hardened steel, has its marginal portion separated from the adjacent side or end of the beam by an open space 18 (Figs. 2 and 6), the disk as here shown being affixed to a hub 19 which is centrally apertured to receive the beam shaft 16, and is provided with studs 20 entering sockets 21 formed for their reception in the beam. Provision is thus made for detachably engaging the disk with the beam and maintaining its marginal

portion separated from the beam, the shaft and the hub and disk thereon being separable from the beam as indicated by Fig. 3.

The pressure members carried by the hanger 14 comprise in this embodiment of our invention, a frictional inner member 22 which is preferably a plug-shaped piece of vulcanized fiber or other suitable material inserted in a socket formed for its reception in an arm 23 formed on or attached to the hanger 14, and an outer member 24 which, as here shown, is an anti-frictional roll having trunnions which are journaled in bearings formed on one end of a lever 25 adjustably mounted on the arm 23.

The members 22 and 24 are opposed to each other and bear on opposite sides of the disk 17 near its periphery. Said members coöperate in maintaining a frictional drag on the disk 17, the anti-frictional member 24 pressing the disk against the frictional member 22. Means are employed for varying the pressure and therefore the resistance to the rotation of the disk and beam, the preferred embodiment of said means being the lever 25 and the means hereinafter described coöperating therewith. The outer end of the lever 25 is capable of a limited movement toward and from the disk 17, said lever being engaged centrally and adapted to tip upon a fulcrum 26 formed by the head of a screw 27 which is inserted in the arm 23, and passes through an orifice in the lever 25, said fulcrum being adjustable by reason of the screw thread engagement between the screw 27 and arm 23, and maintained at any desired adjustment by a lock nut 28. The inner end portion of the lever 25 is engaged with the outer end of a screw threaded stud 29, the inner end of which is movable in a guide socket 30 (Fig. 5) formed in the arm 23.

31 represents a nut which is engaged with the screw thread of the stud 29 between the lever 25 and the arm 23, and is adapted to be rotated in either direction to impart endwise movement to the stud 29, a movement of said stud 29 in one direction causing the lever 25 to move in the direction required to press the pressure member 24 against the outer side of the disk, and thus increase the pressure of the inner side of the disk against the friction member 22. A movement of the stud 29 in the opposite direction will cause a movement of the lever 25 in the direction required to decrease the pressure of the disk against the friction member. The nut 31 has a circular perimeter which is provided with gear teeth 32 formed to mesh with a worm gear 33 on a shaft 34 which is journaled in bearings 35, 36 on the arm 23. The rotation of the shaft 34 imparts rotary movement to the nut 31, and through the latter to the stud 29 and lever 25 with the results above indicated.

We have found that the above described friction device is capable of being readily adjusted to impart any desired tension to rubber threads extending from the beam 12 through the loom, and that when the desired adjustment has been once effected, there is no liability of accidental change in the same. Provision is preferably made for preventing the adjustment of the tension by unauthorized persons. To this end, the bearing 36 is recessed to form a cavity 37 surrounding the outer end of the shaft 34, and adapted to receive the tubular inner end of an operating screw 38, the shaft 34 being provided within said socket with pins 39 constituting coupling members, while the tubular portion of the key 38 is provided with slots 40 constituting complemental coupling members which enable the key to be engaged with the shaft and rotate the latter. Owing to the fact that the coupling members 39 are within the recess 37, a weaver will be unable, without considerable difficulty, to adjust the pressure of the members 22 and 24 on the friction disk, this adjustment being effected by the superintendent or other authorized person having possession of the key 38. The relative arrangement of the pressure members 22 and 24 and the open bearing 15 of the hanger is such that the friction disk is withdrawn from between the pressure members by the removal of the beam from its operative position, the disk being inserted between the pressure members by the operation of returning the beam to its operative position; consequently, it is not necessary to readjust the tension after removing and replacing the beam.

44 represents a stud or post formed on the hanger 14, and projecting above the frame member 13, the posts of the several hangers being adapted to engage the usual cords or strings 42 which are engaged with the edge wires 43 employed to support the weft threads during the operation of weaving an elastic fabric.

We do not limit ourselves to the employment of our improved tension mechanism in connection with the elastic thread or rubber beams of an elastic fabric loom, the invention being capable of application to rotary bodies of any kind requiring a uniform and adjustable frictional drag or tension.

We claim:

1. A tension device comprising a friction disk detachably secured to and rotatable with a rotary body, fixed means for removably supporting said body, two opposed pressure members carried by said supporting means and adapted to bear on opposite sides of the disk and bearing a fixed relation thereto, one of said members being immovably secured to the supporting means and constituting a fixed guide for the insertion of the disk between said members and the other member

being movable toward and from the fixed member to vary the pressure of the members on the disk, and means for adjusting said movable member.

2. A tension device comprising a friction disk detachably secured to and rotatable with a rotary body, a fixed support having means for removably supporting the rotary body and disk, a fixed pressure member rigidly secured to said support and bearing on one side of the disk, said fixed member being adapted to guide the disk to its operative position, a lever fulcrumed on said support and provided at its outer end with a pressure member bearing on the opposite side of the disk, said fixed and movable pressure members bearing a fixed relation to said disk, and means for adjusting said lever to vary the pressure of said members on the disk.

3. A tension device comprising a friction disk adapted to rotate with a rotary body, a support adjacent to said disk having a pressure member bearing on one side of the disk, a lever carried by said support and provided at its outer end with a pressure member bearing on the opposite side of the disk, the lever being movable toward and from the disk, an adjusting shaft journaled in bearings on said support, and means actuated by the rotation of said shaft for adjusting said lever and the pressure member carried thereby to vary the pressure of said members on the disk.

4. A tension device comprising a friction disk adapted to rotate with a rotary body, a support adjacent to said disk having a pressure member bearing on one side of the disk, a lever carried by said support and provided at its outer end with a pressure member bearing on the opposite side of the disk, the support being provided with a fulcrum on which the lever is movable, an adjusting shaft journaled in bearings on said support, and having a worm, a screw threaded stud engaged with the inner end portion of the lever, and a nut engaged with said stud and having peripheral gear teeth meshing with the worm, the rotation of said nut causing an endwise movement of the stud and a swinging movement of the lever on its fulcrum.

5. A tension device comprising a friction disk adapted to rotate with a rotary body, a support adjacent to said disk having a pressure member bearing on one side of the disk, a lever carried by said support and provided at its outer end with a pressure member bearing on the opposite side of the disk, the lever being movable toward and from the disk, an adjusting shaft journaled in bearings on said support, and means actuated by the rotation of said shaft for adjusting said lever and the pressure member carried thereby to vary the pressure of said members on the disk, the shaft being provided with a recessed clutch member adapted to engage a complemental clutch member on an operating key.

6. In combination, a rotary storing reel or beam having a shaft, a friction disk engaged with one of the heads of the reel, the marginal portion of the disk being separated from the said head by an open space, supports for said reel having open bearings adapted to receive said shaft, and opposed pressure members, one fixed and the other movable, carried by one of said supports and bearing on opposite sides of the disk, and means for adjusting said movable pressure members to vary the pressure of the members on the disk, the reel and disk being removably engaged respectively with the supports and the pressure members, and the arrangement being such that the installation of the reel in its operative position and its removal therefrom engages the disk with and separates it from the pressure members without change in the adjustment of the pressure members.

7. In combination, a rotary storing reel or beam having a central orifice, a shaft removably insertible in said orifice, a friction disk having a hub projecting from one side of the disk and separating the disk from the adjacent side of the reel, the hub being mounted on said shaft, and the hub and reel being provided respectively with studs and sockets whereby the disk is separably engaged with the reel and caused to rotate therewith, supports for said reel, and opposed pressure members carried by one of the supports and bearing on opposite sides of the disk, said pressure members bearing a fixed relation to said disk.

8. In combination, a series of rotary reels or beams having shafts, a series of supports or hangers, each having an elongated open bearing adapted to receive alined trunnions on two adjacent reels, and friction disks engaged with said reels and having their marginal portions separated from the adjacent sides of the reels, each support being provided with two opposed pressure members bearing on opposite sides of one of the disks, and with means for adjusting said members to vary their pressure on the disks, the relative arrangement of the bearings, friction disks, and pressure members being such that the shafts and the friction disks are simultaneously engageable with and removable from the bearings and the pressure members respectively, without change in the adjustment of the pressure members.

9. A hanger having an open bearing for a reel or beam shaft, an arm projecting below said bearing, opposed pressure members carried by said arm and adapted to bear on opposite sides of a friction disk en-

gaged with said reel or beam, means being provided for adjusting the pressure members to vary their pressure on the disk, said pressure members bearing a fixed relation to said disk, and a stud projecting above said bearing and adapted to engage an edge-wire-confining cord.

10. A tension device comprising a flat-sided friction disk adapted to be engaged with a rotary body to rotate therewith, fixed supporting means having provisions for removably supporting said body and disk, a frictional pressure member affixed to said supporting means and adapted to guide the disk to its operative position in rubbing contact with one side of said disk, said pressure member bearing a fixed relation to said disk, and means for varying the pressure of the disk on said member.

In testimony whereof we have affixed our signatures, in presence of two witnesses.

WARREN M. CONRAD.
KARL G. LIST.

Witnesses:
C. F. BROWN,
P. W. PEZZETTI.