No. 869,604. PATENTED OCT. 29, 1907.

S. W. WARDWELL.

WINDING DEVICE.

APPLICATION FILED DEC. 18, 1902.

3 SHEETS—SHEET 1.

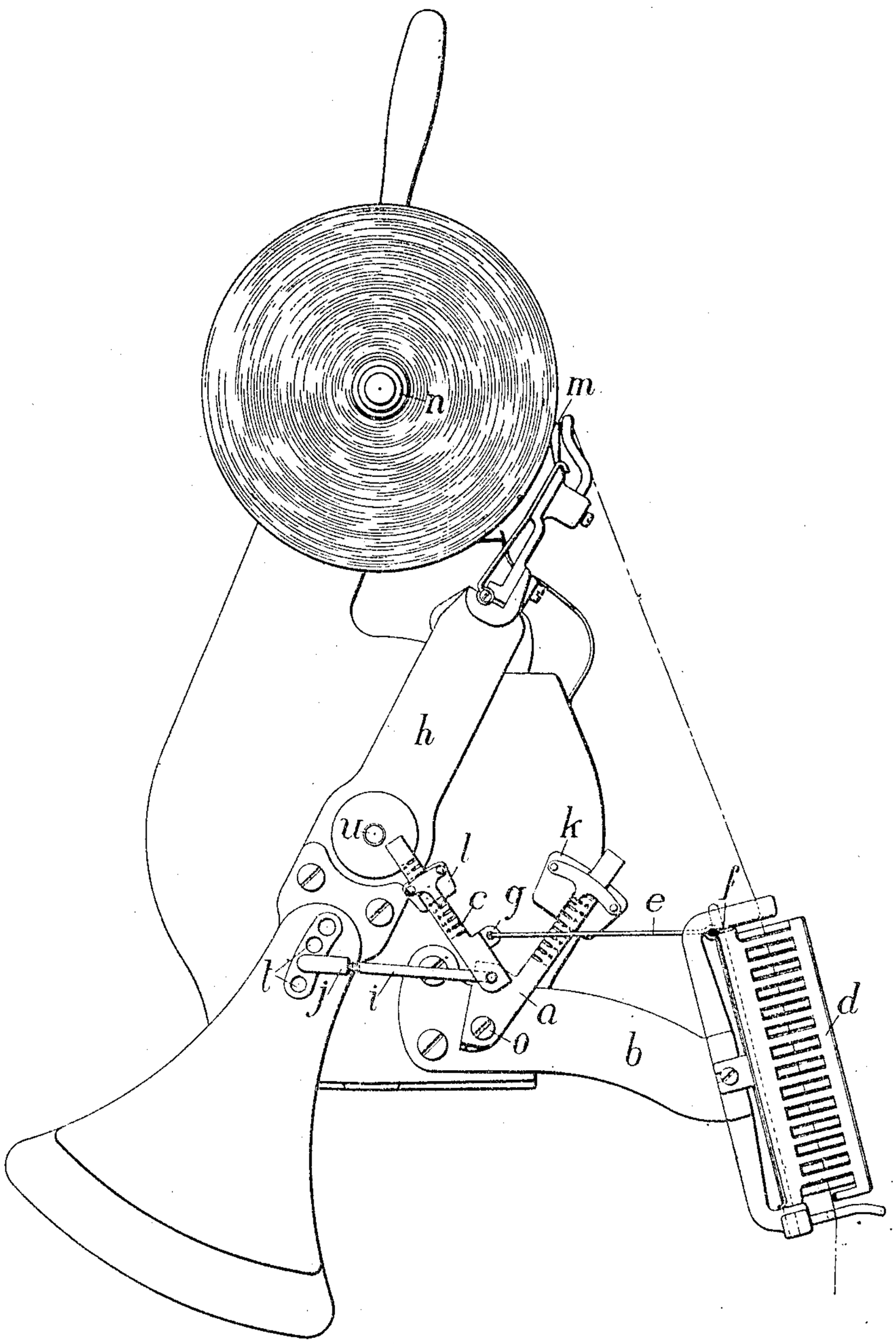

Fig. 1.

WITNESSES.

H. M. Gillman, Jr.

Edwin Cruse

INVENTOR

Simon W. Wardwell

BY

Foster Freeman

ATTORNEYS

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3 SHEETS—SHEET 2.

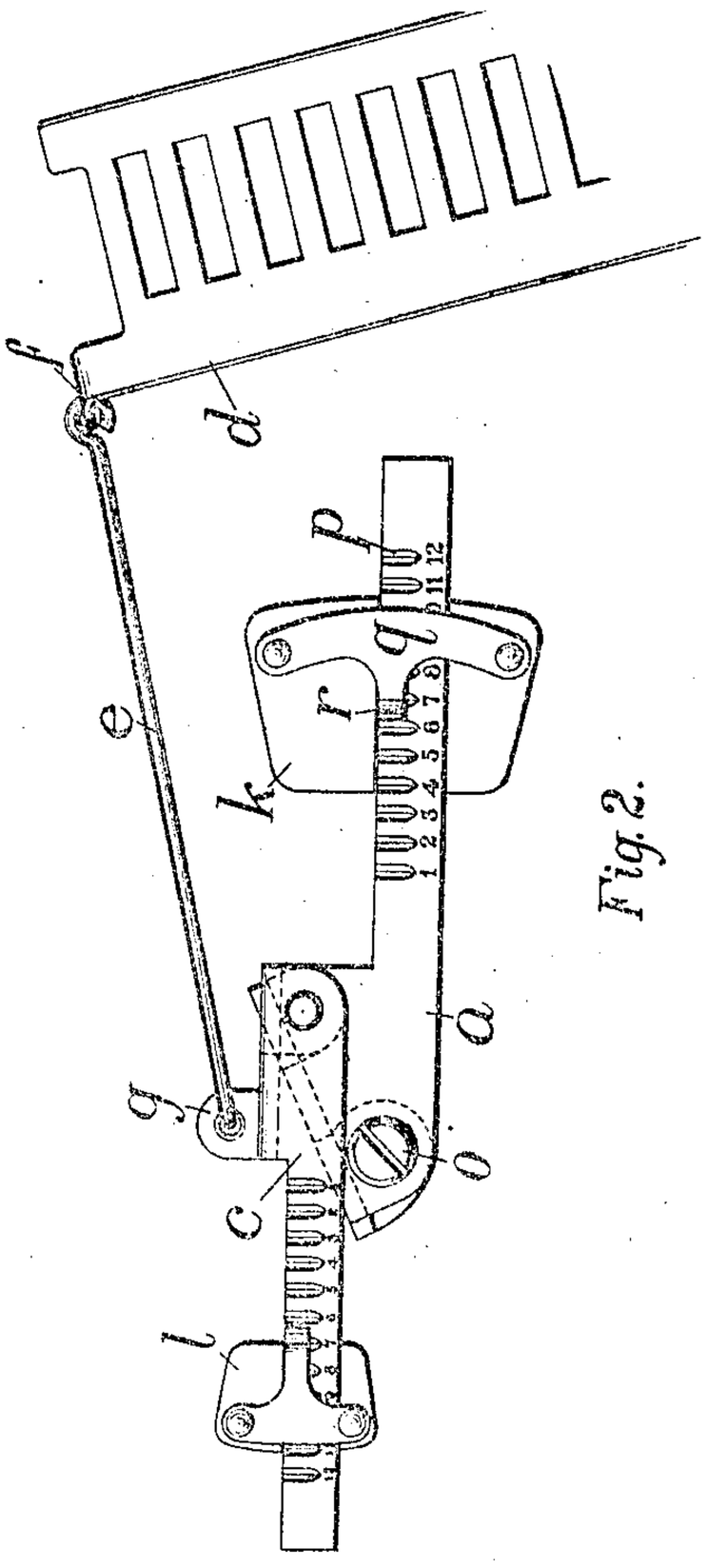

Fig. 2.

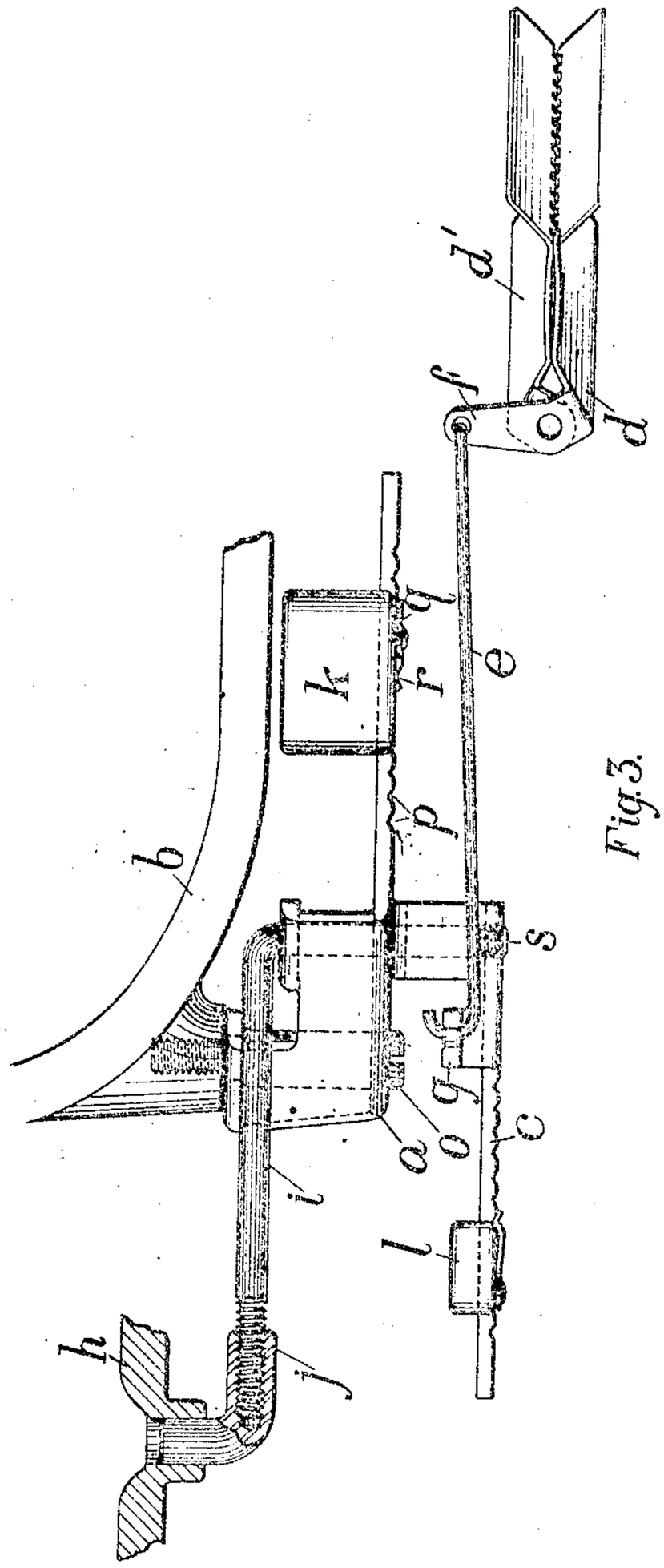

Fig. 3.

WITNESSES.

H. M. Gillman Jr.

Edwin Cruse

INVENTOR

Lemon W. Wardwell

BY

Foster Freeman

ATTORNEYS

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3 SHEETS—SHEET 3.

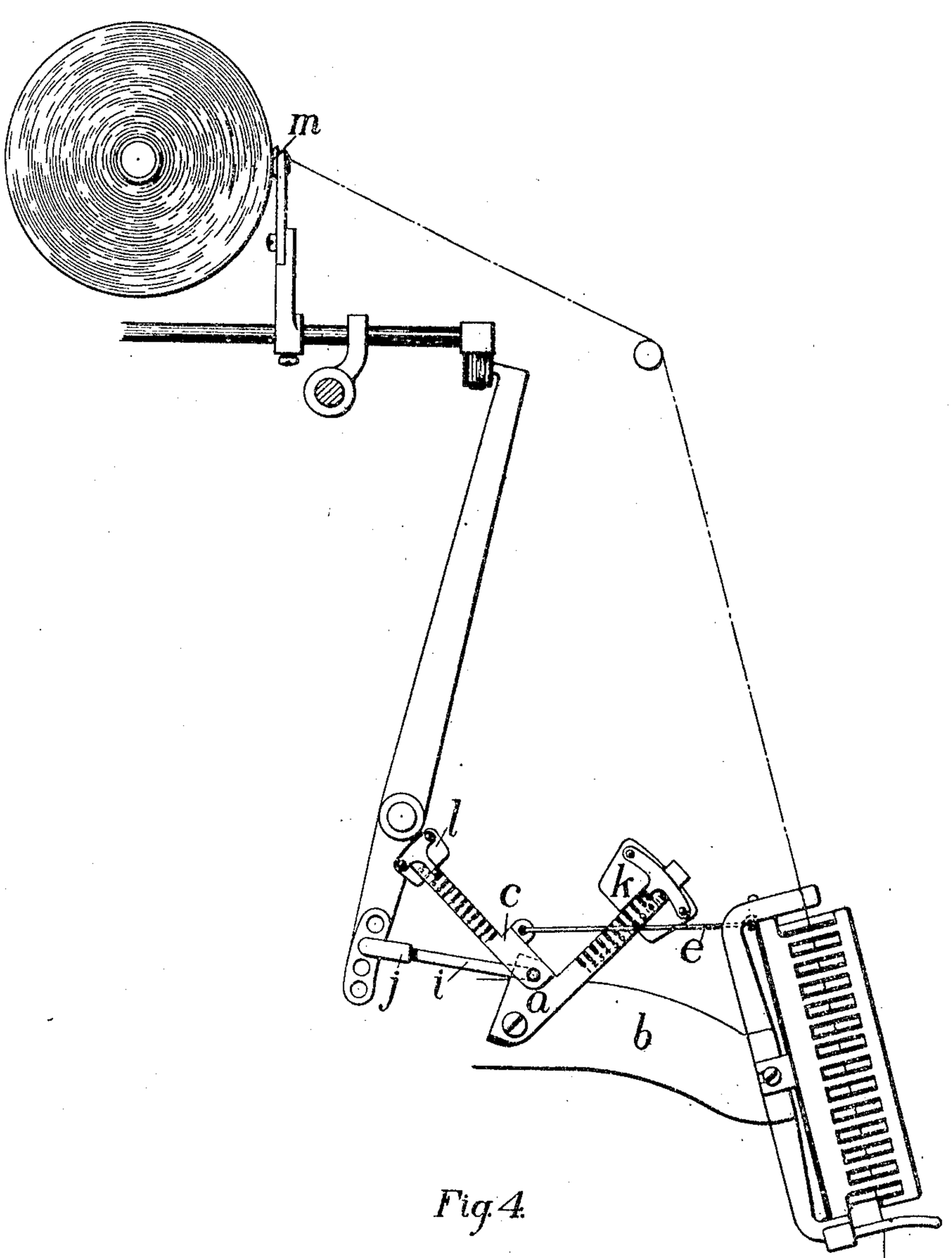

Fig. 4.

WITNESSES.
H. M. Gillman, Jr.
Edwin Cruse

INVENTOR
Lemon W. Wardwell
BY
Foster Freeman
ATTORNEYS

UNITED STATES PATENT OFFICE.

SIMON W. WARDWELL, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE COMMONWEALTH TRUST COMPANY, TRUSTEE, A CORPORATION OF MASSACHUSETTS.

WINDING DEVICE.

No. 868,604. Specification of Letters Patent. Patented Oct. 29, 1907.

Application filed December 18, 1903. Serial No. 135,768.

To all whom it may concern:

Be it known that I, SIMON W. WARDWELL, a citizen of the United States, residing at Providence, county of Providence, and State of Rhode Island, have invented new and useful Improvements in Winding Devices, of which the following is a specification.

My invention relates to devices for controlling the delivery of yarns and other materials in winding.

The purpose of my invention is to automatically vary both the tension under which the yarn is wound and the guide pressure with which the yarn is deposited on the package.

In the accompanying drawings, Figure 1 is a side view of a winding machine with my invention applied, showing the relation of its component members when the package wound has attained a material diameter. Fig. 2 shows a side elevation of my invention. Fig. 3 shows a plan view. Fig. 4 shows my invention as applied to a machine of different type from that shown in Fig. 1.

My invention is shown in Figs. 1 to 3 applied to a machine of usual structure, in which the traversing thread guide is reciprocated on a swinging frame whereby it is maintained in contact with the surface of the package wound at all times during the winding, through the action of properly disposed weights.

My invention is a device which, connected with the thread guide or other machine part having movement effected or affected by the increasing diameter of the package wound, acts concurrently to both press the guide against the package and tension the yarn, and to automatically vary the degree of both pressure and tension.

While the tension device may be of any suitable character, I prefer the construction shown, in which a suitable bracket supports two opposed tension members formed with alternating parallel bars, one member d' fixed and the other d hinged to swing toward the fixed member. The movable member is operated by means hereinafter described to press upon the thread as it passes between the two members, crossing their bars, to sinuate its course and thereby apply tension.

My control device comprises the arm a, hinged to some fixed portion of the machine, as the tension bracket b, and a second arm c which is connected with the movable tension member d by the rod e, which rod is formed at one end with an eye that engages the arm f of the movable tension member, and at the other end, with an eye which engages the lug g of the arm c. The arm a is connected with the swinging frame h, in which the thread guide reciprocates, by the rod i and adjustable connection j. On the arm a is a weight k, and on the arm c is a weight l, each weight adjustable in position on its arm. Referring to the drawings, the tendency of the weight k is to turn the arm a clockwise, and act through the rod i and adjustable connection j to swing the frame h and press the reciprocating guide m toward the winding spindle. The action of the weight l is to turn the arm c in the reverse direction and, through the rod e, press the movable tension member upon the yarn.

It is obvious that the relative positions of the arms a and c will vary with the position of the swinging frame h. When the winding of a package is commenced, the guide m bears directly on the tube or on the winding spindle n, and the arms a and c are in a substantially horizontal position as shown in Fig. 2, in which position the maximum effect is produced by the weights k and l upon the swinging frame h and the swinging tension member d. As the reciprocating guide m is shifted with the increasing diameter of the package wound, the arms a and c are concurrently turned up, decreasing the leverage with which their respective weights k and l act, and diminishing their effect on the guide pressure and yarn tension.

The maximum admissible degree of tension or pressure for a given yarn is adjusted by varying the location of the weights k and l on their respective arms as required.

Referring more particularly to the details of structure employed, the arm a is mounted on a stud or screw pin o and is formed with notches or indentations p along one edge, which indentations are preferably numbered for ready reference in making adjustments. The weight k may be of any desired form, channeled to receive the arm a and secured thereto by the spring q. This spring q is formed with a projection r that engages the indentations p to secure the weight k in desired position. The weight l is similarly secured to the arm c.

The arm c is mounted directly on the end of the rod i and thereby hinged to the arm a, for the end of the rod i is formed at right angles to its body, to engage the arm a and connect it with the swinging frame h. This right angled end s of the rod i is made of sufficient length to project through the arm a and its extremity is screw threaded. This screw threaded extremity engages a tapped hole in the arm c, the said engagement being such as to permit the arm c to turn freely. The arm c therefore serves to secure the rod i in its place, as well as to act on the tensions; and the rod i serves as a mounting for the arm c as well as for a connection between the swinging frame h and the arm a. The adjustable connection j is preferably a piece of wire or rod of L-form, one arm of which is adapted to engage one of the holes t in the swinging frame h and the other arm internally screw threaded to receive the screw threaded end of the rod i.

By means of the holes *t*, the degree of variation in tension and pressure for a given diameter of package can be adjusted. If, for example, only a relatively slight variation is required, connection would be made with the uppermost hole, and as this is nearest the axis *u* on which the frame *h* swings, there will be imparted to the arms *a* and *c* a minimum movement during the winding of a package. If, on the contrary, a maximum degree of variation is demanded, connection would be made with the lowermost of the holes *t*, which being farthest removed from the axis of turning of the frame *h*, would cause the greatest movement of the arms *a* and *c*.

It is obvious that other forms of structure can be made embodying the same inventional principles. I have shown the parts made from steel stampings, but it is obvious that other materials could be employed, as castings; that the weights *k* and *l* could be secured in position by set screws and that other modes of attachment and of connection for the device itself might be employed.

I have shown my invention preferably connected with a winding machine in which the guide swings to and from the winding spindle, but in Fig. 4 is shown means for employing the same device with a machine in which the guide moves to and from the winding spindle with rectilinear movement. The device is equally adaptable to a machine in which the converse structure is employed—where the guide is stationary and the package moves, relative to the guide.

Therefore, without limiting myself to the precise structure disclosed, I claim:

1. The combination with a winding spindle and reciprocating guide, of co-acting swinging arms, and weights on said arms arranged to resist the separation of said winding spindle and guide with a decreasing resistance.

2. The combination with a tension device, a reciprocating guide, and a spindle on which the package is wound, of connected pivoted arms, weights on said arms, and connections between the arms and the guide and tension device whereby the weights cause pressure between the guide and the package wound and action of the tension device, said parts arranged to secure a varying degree of pressure and tension with the varying diameter of the package.

3. The combination of a yarn controlling device with a machine having a moving member and a tension device, said controlling device having two separate co-acting pivoted arms, weights on said arms, means for connecting one arm with the tension device, and means for connecting the other arm with the moving machine member, whereby the relative positions of the two arms shall be varied for the purpose described.

4. The combination with a winding spindle, a reciprocating guide and a tension device, of a device connecting the guide with the tension device and comprising an arm, a weight on the arm, connections whereby a separation of the guide and winding spindle causes the arm to be shifted to decrease the pressure of the weight, a second arm hinged to the first, a weight on said second arm, and a connection between the latter and the tension device, substantially as described.

5. The combination with a tension device of a yarn controller having the arm *a*, weight *k*, pin *o*, the arm *c* mounted on the arm *a*, weight *l*, and the rod *i* formed at one end to constitute a bearing for the arm *c* and having a screw threaded portion to mutually secure the arm *c* and the rod *i*, the adjustable connection *j* on the rod *i*, and the rod *e* to connect the arm *c* with the tension device.

6. The combination in a yarn controller of coacting arms, weights adjustable on said arms and connections whereby the effects of said weights are automatically varied.

7. The combination in a yarn controller of an arm *a*, having graduating notches *p*, a weight *k* slidably mounted thereon, and a spring *q* to secure the weight to the arm, having a projection *r* to engage said notches, a second arm *c* hinged to the arm *a*, a weight *l* mounted thereon in the same manner as the weight *k* is mounted on the arm *a*, and connections whereby the relative positions of the arms are varied to vary the effects of the weights *k* and *l*.

8. The combination with a winding spindle on which a package is wound, a reciprocating guide to lay the yarn on the spindle, and adapted to press at all times against the package, a frame carrying the guide having holes *t* formed therein, and a tension device, of a device interposed between the frame and the tension device to automatically control the guide pressure and tension action, and a connection between the said frame and controlling device adapted to engage the said holes *t*.

9. The combination with a tension device and a movable frame of a mechanism interposed between the tension device and frame comprising a shiftable arm *a*, a rod *i* attached to the arm and an adjustable connection *j* to engage the frame, a second arm *c* attached to the arm *a* and secured thereto by the rod *i* aforesaid, a rod *e* connecting the arm *c* with the tension device and weights adjustably mounted on the arms, substantially as described.

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

SIMON W. WARDWELL.

Witnesses:
CHARLES A. EDDY,
THOMAS M. CHILDS.