R. S. MATTESON.

MOVEMENT ADJUSTING DEVICE FOR TRAVERSE MOTION MECHANISMS FOR WINDING MACHINES.

APPLICATION FILED OCT. 14, 1909.

953,388. Patented Mar. 29, 1910.

3 SHEETS—SHEET 1.

FIG. 8.

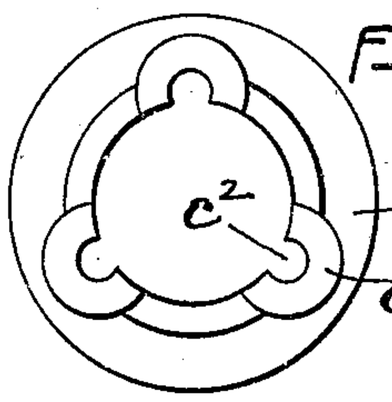

FIG. 2.

FIG. 1.

FIG. 10.

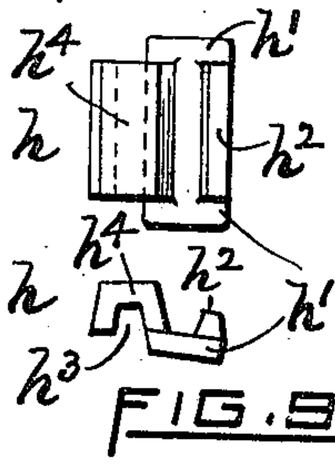

FIG. 9.

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3 SHEETS—SHEET 2.

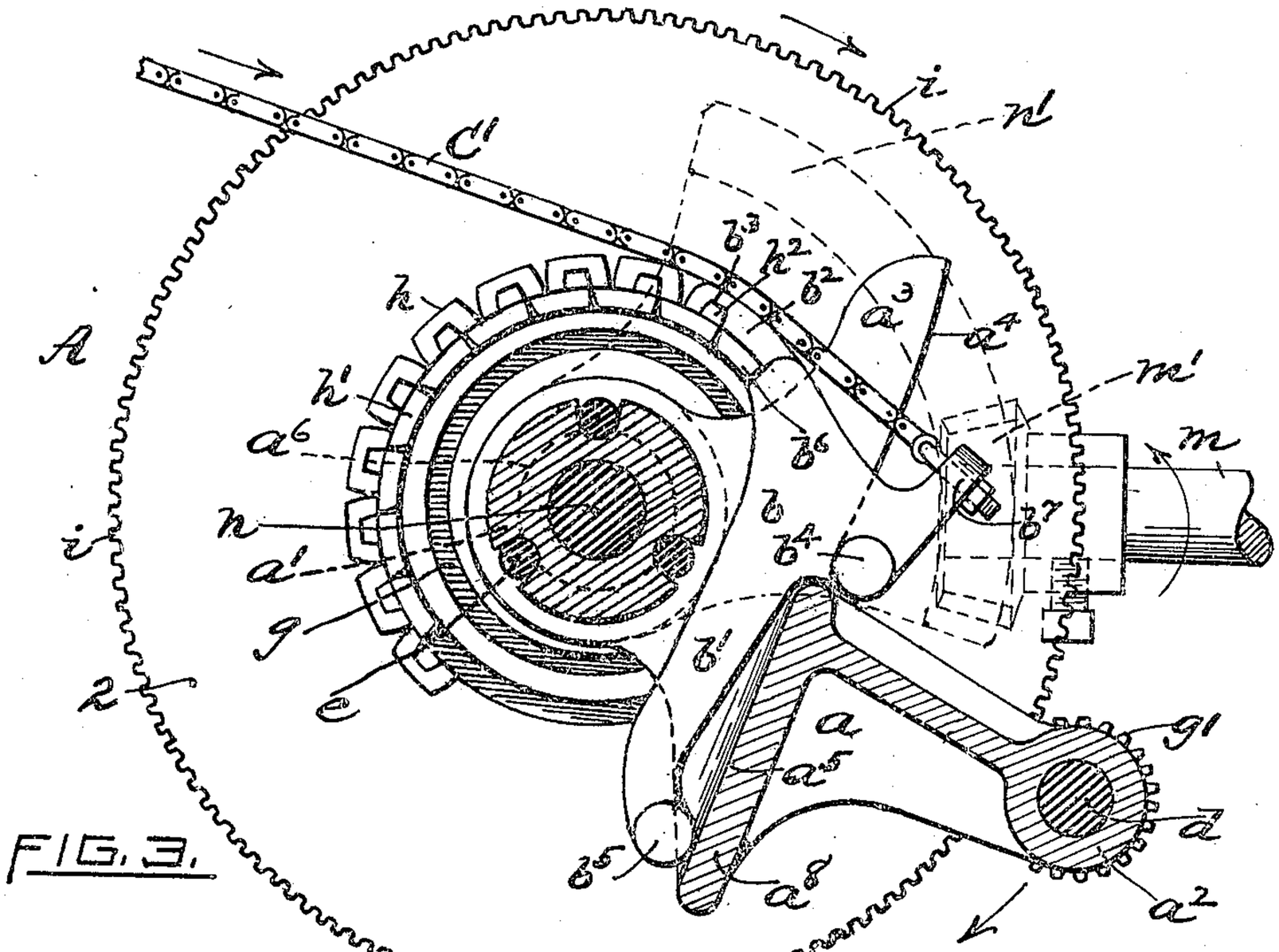

FIG. 3.

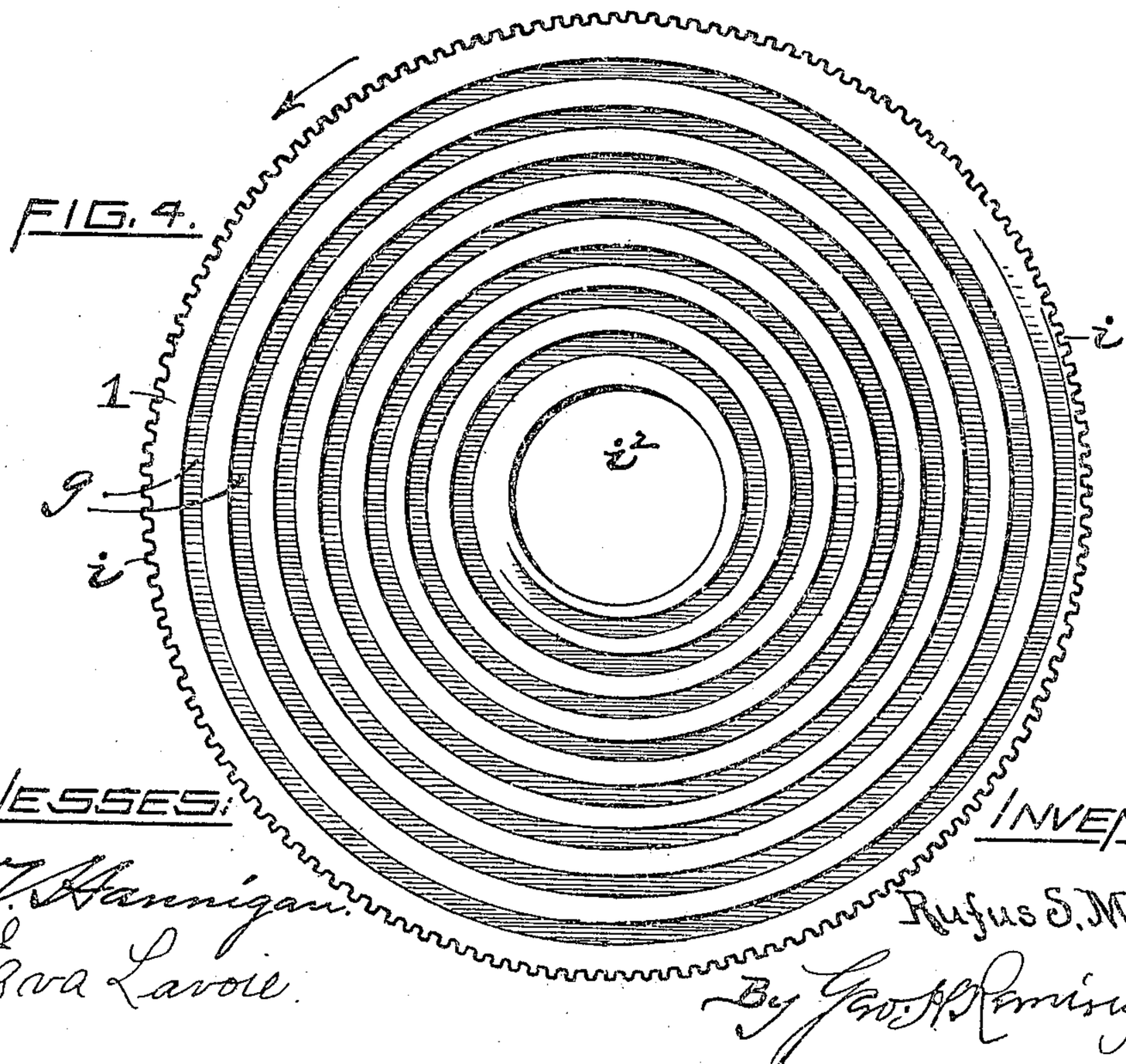

FIG. 4.

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3 SHEETS—SHEET 3.

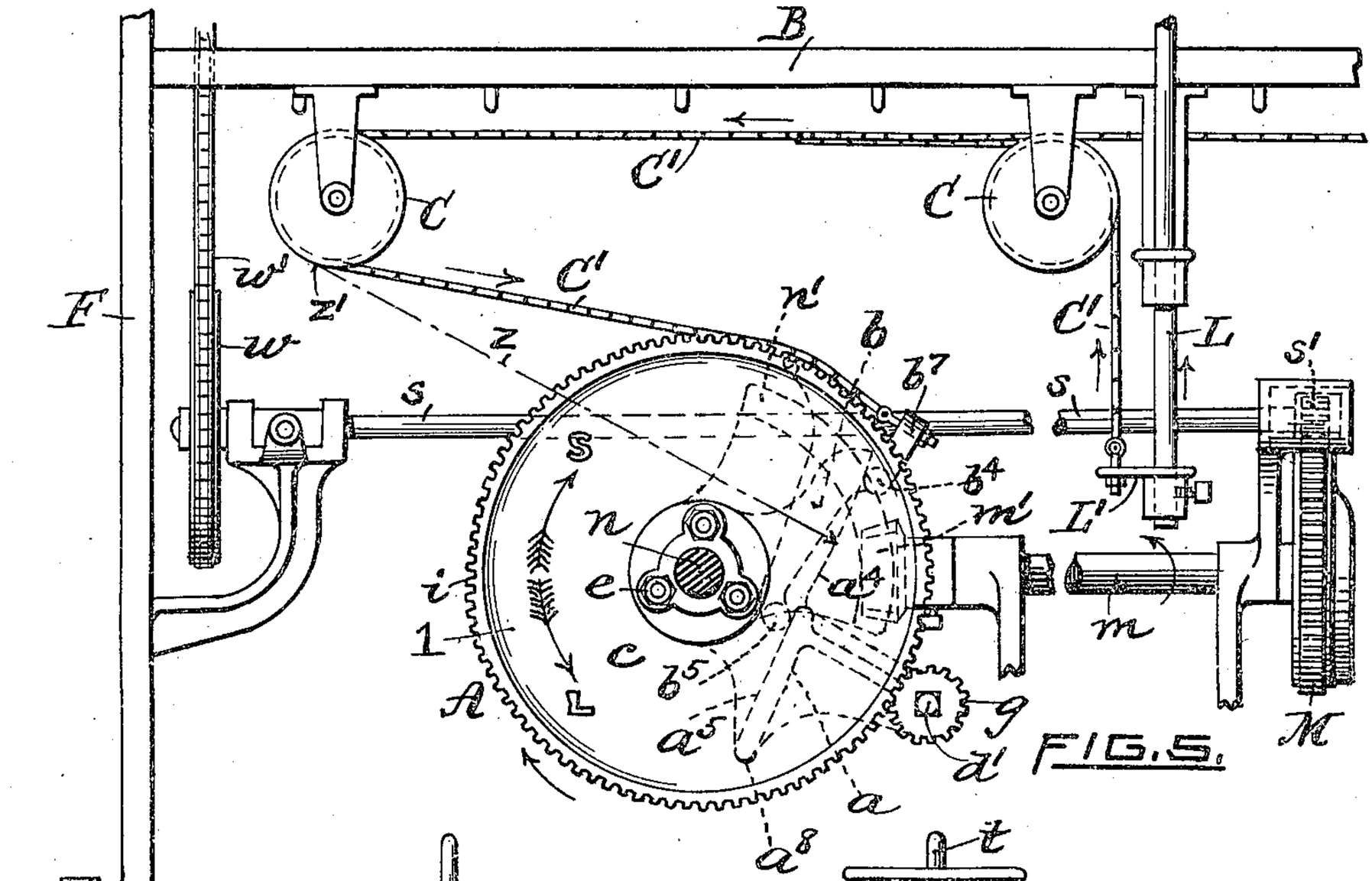


FIG. 5.

FIG. 7.

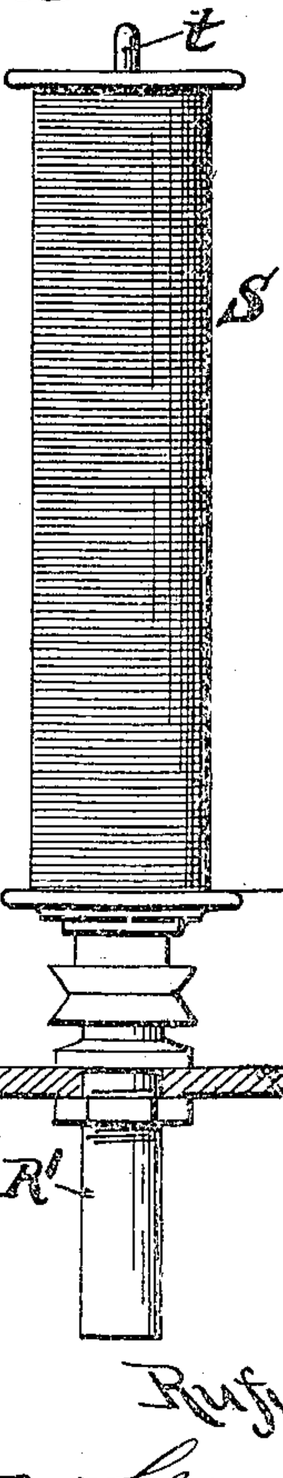
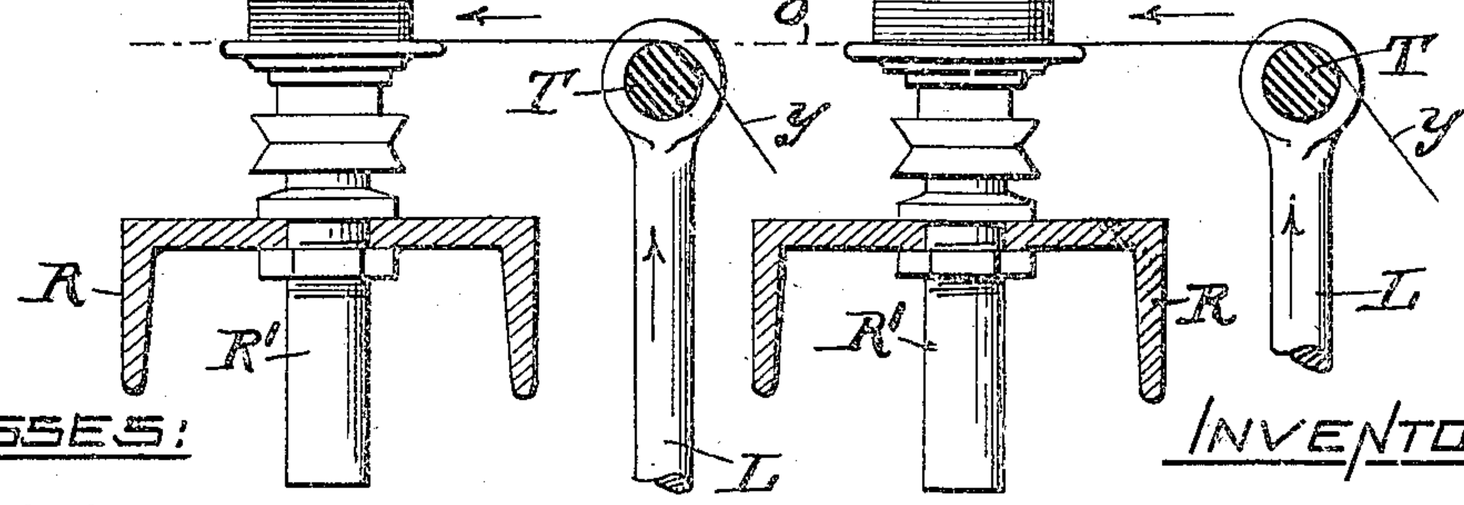


FIG. 6.



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UNITED STATES PATENT OFFICE.

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MOVEMENT-ADJUSTING DEVICE FOR TRAVERSE-MOTION MECHANISMS FOR WINDING-MACHINES.

953,388. Specification of Letters Patent. Patented Mar. 29, 1910.

Application filed October 14, 1909. Serial No. 522,627.

To all whom it may concern:

Be it known that I, RUFUS S. MATTESON, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Movement-Adjusting Devices for Traverse-Motion Mechanism for Winding-Machines, of which the following is a specification.

This invention relates to improvements in movement-adjusting devices for traverse-motion mechanisms for spoolers, skein-winders and kindred textile machines, and it consists in certain novel features of construction and arrangement, all as more fully hereinafter set forth and claimed.

In traverse-motion mechanisms of the class referred to and as usually devised and constructed, any material adjustments or variations in the traverse movement can be effected only while the spooler or analogous machine equipped with such traverse-motion device is temporarily stopped and inoperative a comparatively long time.

In the usual traverse-motion devices the zero position or base line from which the traverse movements are computed or determined is measured from the center or mid-length of the spool, and since the bottom of all the spools (irrespective of their length) are in horizontal alinement when normally mounted on the spindles, it is obvious that the position of the said base line will be changed accordingly. In other words, the base line is variable.

There are other objections or disadvantages to such former devices, for example, any change or adjustment of the traverse-mechanism involves the stopping of the machine, as just stated, thereby correspondingly reducing the work or output and causing the loss of the attendant's services for the time being; and a skilled operator or mechanic is necessarily required whenever variations in the traverse-movements are to be made.

Among the objects sought to be attained by the present invention may be mentioned the following: To produce a simple and comparatively inexpensive movement-adjusting means for traverse-motion devices capable of being easily, positively, quickly and accurately adjusted at will by the attendant or operator in charge, and without stopping the machine. The improved device is constructed, arranged and adapted to be readily substituted in lieu of certain parts of traverse-motion mechanisms as usually employed in spoolers, &c. That is to say, the device is capable of being operatively connected with the usual mangle, driving mechanism, lifting-rods and dogs, the flexible connections, traverse-rail and thread or yarn-guides.

In the accompanying three sheets of drawings, illustrating a traverse-motion device embodying the improvement forming the subject of this application for patent, Figure 1 represents a front elevation of the device in partion section, (corresponding with line 1 1 of Fig. 2) the parts being shown as positioned to effect the maximum vertical movement of the traverse-rail. Fig. 2 is a corresponding transverse or plane sectional view, taken on line 2 2 of Fig. 1. Fig. 3 is a front view similar to Fig. 1, but showing the parts positioned to correspond with the minimum vertical movement of the traverse-rail. The said two positions in connection with the segment-gear, &c., correspond with the zero or lowermost position of the traverse-rail. Fig. 4 is a back view, showing the working face of the front disk-gear or scroll-plate, detached. Fig. 5 is a front side elevation, in reduced scale, showing a portion of a spooler and the improved traverse-motion device connected or associated with the mangle, driving means, lifting-rods, &c. Figs. 6 and 7 represent transverse sectional views, in partial elevation and enlarged scale, showing respectively long and short spools and also showing the relation of the traverse-rod thereto, corresponding with the positions represented in Figs. 1 and 3. Fig. 8 represents an end view of one of the clamping collars. Fig. 9 shows an end view of one of the links of the short, flexible connection or chain adapted to engage the spiral grooves of the oppositely disposed scroll-plates; and Fig. 10 is a corresponding top plan view of it.

It may be stated in advance that the present invention or adjusting means is adapted to be successfully employed in spooling and winding machines as usually constructed and arranged, since it is capable of being substituted in place of the corresponding ad-

justing mechanisms of such former traverse-motion mechanisms as are actuated by a rotary-reciprocating member or "mangle"; in turn driven by a continuously revoluble pinion-carrying shaft. It may also be added that the device actuates and controls the lifting-rods, which carry the traverse-rail, through the medium of intermediate connections in a well-known way.

Fig. 5 shows a portion of a machine of the type referred to. In lieu of the usual traverse-motion mechanism, the drawing represents a traverse-motion device, A, embodying my invention or improvement, as being substituted therefor. In said figure are indicated some of the parts or elements as usually devised and employed, viz.:—the end frame F, horizontal tie member B, revolubly mounted wheels C carrying flexible connections C^1, the mangle M secured to an end of the horizontal shaft m, a tiltingly mounted, continuously revoluble shaft s, having a pinion s^1 (shown dotted) for actuating the mangle, and a sprocket or analogous wheel w secured to the front end of the shaft s adapted to be driven continuously in one direction by a traveling chain w^1 from any suitable or convenient source of power. The traverse-rail T is supported and carried by vertically guided lifting-rods L, each having a dog, L^1, adjustably secured to its lower end, to which is attached a connection, C^1, all substantially as usual, and as indicated in Figs. 5, 6, and 7.

The improved traverse-motion device A is secured to a suitably supported short transverse shaft, n; motion being transmitted to it by a small bevel-gear, m^1, fixed to the forward end of said mangle-shaft m, meshing into a toothed quadrant, n^1, fastened to shaft n. As thus arranged, the latter is adapted to be slowly actuated in a rotary-reciprocating manner, substantially as usual.

The improved traverse-motion device proper, A, embodies in its construction a pair of laterally separated, disk-like gears, 1 and 2, each having its inner face provided with a spirally formed continuous rib and groove, extending outward from the center portion; a main frame or casting member a disposed between and supporting the disks upon its hub; an interposed live fulcrum member, b, capable of independent movement in a vertical plane and being in continuous engagement with the spiral grooves and frame and attached to said mounted connection C^1, in turn attached to a dog, L^1, of the lifting-rod L; manually controlled means arranged to coöperate with said gears for changing the position of the fulcrum member, nearer to or farther from the gears' center, so as to vary the traverse movement accordingly, and means for clamping the gears to the frame a after the adjustment has been effected, whereby all the parts of the device are adapted to rotate together bodily in a circular arc, as determined by the said usual mangle M, gear m^1 and its companion member or quadrant, n^1. The said frame or casting a is provided with a pair of oppositely formed thin sides or wings, a^3, integral with the center hub a^1 and an outer extension, a^2, the latter forming a bearing for a short, horizontal shaft d. A pinion-gear, g^1, is secured to each end of the shaft, and being in continuous engagement with the teeth of the corresponding disk-gear. The front end, d^1, of shaft d is adapted to receive a crank, k, thereby providing means whereby the disk-gears 1 and 2 may be readily rotated simultaneously in either direction, as desired, and as clearly shown in Figs. 1 and 2. The said hub part, a^1, is bored to receive and is adjustably secured to the suitably mounted and supported, horizontal shaft n; the latter being actuated in a rotary-reciprocating manner by the mangle M, &c., substantially as hereinbefore stated. Each outer face or edge, a^4, of the upper portion of said wings has the form of a true circular arc described say from a center z^1 and a radius z tangent to said wheel C. See Fig. 5. The lower portion of the wings of the frame terminate outwardly in the short, transverse tie, a^8; its inner surface, a^5, being disposed with respect to said edges a^4 and adapted to constitute a bearing for the said fulcrum member b, soon to be described. Each of the said disk-gears, 1 and 2, has a plane face provided with a continuous rib and groove, g, arranged in the form of a spiral, the pitch or distance radially between the convolutions being preferably made uniform, substantially as shown in Fig. 4, which represents the rear face of the front gear 1. The spiral rib and groove of the adjacent front face of the back or companion gear, 2, are arranged to register or coincide with those of gear 1. In other words, one gear has a left-hand and the other a right-hand spiral groove. It may be stated that for the sake of greater clearness in the drawings, the major portion of the spiral ribs and grooves are omitted from Figs. 1 and 3. Fig. 4, however, represents the front gear 1, in which the spiral members are shown in full.

The movable fulcrum member b is or may be made of cast metal; it has a downward extending arm or shank, b^1, the same when in use being located between the wings a^3 of the frame member, and terminates in the end part, b^5, adapted to bear against the said inner surface a^5. The upper portion of the member b is provided with a pair of oppositely disposed front lugs, b^4, in frictional contact with the respective curved edges a^4. The length of each of the surfaces a^4, a^5, exceeds the vertical movement

of the member *b*, as in adjusting it from the position indicated in Fig. 3 (corresponding with the minimum traverse-movement) to that represented in Fig. 1 (corresponding with the maximum traverse-movement).

The fulcrum member has a curved rearward extension, b^2, at its upper end, provided with oppositely disposed lateral lugs, b^6, slidably fitted in the grooves *g* of the respective gears. Said portion b^2 is provided on its underside with a transverse notch, b^3, adapted to be coupled or attached to a jointed or bendable element engageable with and capable of automatically flexing to conform to said grooves *g*.

The member *b* has an ear, b^7, to which is attached an end of the said usual connection, C^1, the latter in this case normally bearing upon the said curved part, b^2, and extending therefrom to and around the supporting wheel C. See also Fig. 5.

The bendable element above referred to as being attached to the fulcrum member *b* is represented in the drawings as consisting of a plurality of interchangeable, interlocking links, *h*, of peculiar construction, arranged to form a short chain. Each link, shown in detail in Figs. 9 and 10, comprises a substantially flat base part, h^1, having a relatively short tooth, h^2, on its upper side at one end, and at the opposite end an overhanging bent extension, h^4, having a recess, h^3, formed on its underside, adapted when in use to interlock with the tooth of the adjacent link. The length of the link is the same or slightly less than the transverse distance between the disks at the bottom of the spiral grooves, into which latter the ends are slidably fitted; the length of the tooth and also that of said part h^4 is such that the chain is capable of being moved freely between the adjacent faces of the spiral ribs while adjustments are being made.

In order to readily position or adjust the parts of the device so as to vary the vertical movements of the traverse-rail as desired, or to correspond with the length of spools on which thread or yarn is to be wound, a flanged clamping-collar, *c*, is movably fitted on each end portion, a^6, of the hub of the frame member *a*. Each collar has a plurality of bosses, c^1, having longitudinally extending holes, c^2, registering with corresponding holes formed in the said hub, adapted to receive therethrough the long bolts *e*. See Figs. 1, 2 and 8. As thus arranged, the act of tightening the bolts causes the two disk-gears to be frictionally clamped between the faces of the respective collars and the adjacent faces of the center flanges of the wings a^3 and also to the bendable member *h*. And since the casting *a* itself is secured to the rock-shaft *n* by set-screws (Fig. 2), it is obvious that the device as a whole will then be capable of movement bodily as a unit by and in unison with the shaft. Upon loosening the bolts *e* and applying the crank to the shaft *d* the disks may be readily turned in either direction to vary the position of the fulcrum *b* up or down, as desired, which action at the same time correspondingly moves the chain connection *h* in the spiral grooves *g* farther from or nearer to the center of the shaft *n*. After the adjustment has been effected the bolts are retightened, the device then being in condition for normal operation again. The front gear 1 (Fig. 5) may have permanent arrows, designated "S" and "L", for indicating the direction the disk-gears are to be turned in positioning the fulcrum *b* and chain *h*. "S" corresponds with the short and "L" with the long traverse-movement. The said act of re-tightening the bolts after adjustment is not strictly necessary but is done to prevent the disks from being accidentally turned axially a short distance, as might possibly happen, such movement obviously acting to correspondingly alter the fulcrum's position and arc travel.

In Figs. 6 and 7 are represented, respectively, long and short spools, S, S^1, carried on revoluble spindles *t* mounted in suitable spindle-supports, R^1, secured in the spindle-rails R, substantially as usual. The vertical lifting-rods L (one only being shown) carrying the horizontal traverse-rail T, are represented as being in the lowermost position, or at the zero or base line *o*, the latter being coincident with the lower end of the spool's barrel. The line *y* indicates the thread as it would appear upon being delivered, say from supply-bobbins (not shown) below.

The shaft *s* rotates in one direction only; some of the other parts, including shafts *m* and *n*, are adapted to move in either direction, or in a rotary-reciprocating manner; while still other parts, as for example, the lifting-rods which carry the traverse-rail, have a reciprocating-rectilinear movement. Practically all the figures represent the quadrant-gear n^1 as being in the elevated or upward position, as determined by the corresponding position of the mangle. Now, upon starting the machine, the action of the mangle will slowly rotate the shaft *m* and gear m^1 less than a complete revolution in the direction indicated, thereby causing the improved traverse-motion device A to swing bodily in the arrow direction or toward the right through a circular arc having a length corresponding with the relative sizes of the pinion m^1 and quadrant n^1. Said movement at the same time also causes the connections C^1, attached to said device and the dogs L^1, to elevate the lifting-rods L and traverse-rail T (see arrows) from the normal lower or base position *o* to the upper end of the spool's barrel. The degree or

extent of this advance vertical movement is limited or determined by the previously adjusted position of the fulcrum member *b* with relation to its points of contact with the surfaces a^4, a^5 of the main member *a*. When positioned substantially as represented in Fig. 1 the traverse-movement corresponds with the length of the longer spool S, Fig. 6, while Fig. 3 shows the fulcrum &c. positioned to correspond with the shorter spool S^1. Obviously, the improved adjusting device is adapted to be readily changed to effect other lengths of traverse-movements by simply varying the position of the member *b* and its attached connection *h*, as hereinbefore described. Upon the return or reverse movement of the mangle the device will be actuated in a direction contrary to that indicated by the arrows until the parts are again in the first or normal positions; the operations described being repeated in a uniformly intermittent manner. It may be added that the degree of arc-movement, forward and back, of the device A is practically invariable, since it derives its motions from the usual mangle mechanism.

The normal relation and position of the various parts of the traverse-motion device provided with my improved movement-adjusting means are substantially as represented in Fig. 5 of the drawings, wherein the center z^1 of the radius *z* for describing the arc-shaped portion of the said edges a^4 is located tangentially of the guide-wheel C, the arrangement being such that the fulcrum member, *b*, attached to the usual flexible connection C^1 and passing over said wheel to the lifting-rods L, is capable of movement outwardly from the lowermost position (represented in Fig. 3 and corresponding, say with the shorter traverse travel of the rail T) to the opposite extreme position, shown in Fig. 1, without imparting movement to the said traverse-rail from its bottom or zero position *o*, indicated in Figs. 6 and 7. And since the outer periphery of the chain *h* or bendable element attached to the member *b* presents a substantially true curved surface on which the connection C^1 is supported the latter will at all times lie tangentially of the wheel and said peripheral surface during the angular movements, forward and back, imparted to the device by the mangle; the length of the resulting traverse-movements, up and down, of the rail T being true and uniform and corresponding with the adjusted position of the fulcrum member with respect to the said edges of the frame *a*.

I prefer to arrange the quadrant-gear n^1 so that it will be in the normally elevated position, substantially as represented in the drawings, when the mangle is on the "dead center", so that the immediately following rotary movement of the mangle will, through the intervening mechanism, cause the device A to rotate as a unit in the arrow-direction, thereby, through the medium of the connection C^1, etc., moving the traverse-rail T upward from the base line to the previously determined stroke-limit, at which instant the mangle again passes its "dead center", and is then rotated contrary to its former direction, thereby correspondingly reversing the device's movements and returning the rail downward to its base line *o* again; thus completing a double-reciprocation of the rail, the result being to lay two courses of the yarn uniformly throughout the length of the barrel of the revolving spools.

My improved variable adjusting means for traverse-motion devices for winding-machines is well adapted to be advantageously substituted in lieu of those employed in traverse mechanisms as usually constructed, and in which the winding-machine is provided or equipped with a traverse-rail, lifting-rods, and connections disposed with relation to the traverse-rail and traverse-motion device, and means for actuating the latter in a rotary reciprocatory manner. Or, in other words, in a winding-machine equipped as just stated my improved adjusting or movement-changing device is constructed and adapted so as to be readily substituted bodily for the old travel-changing device and also arranged to be driven in a rotary-reciprocating manner by the old actuating means, and being further adapted to be connected in the usual way to the said lifting-rods so as to actuate the traverse-rails.

I claim as my invention and desire to secure by United States Letters Patent:—

1. In a winding-machine, the combination with a horizontally disposed vertically movable traverse-rail whose lowermost position is co-incident with a zero or base line alining with the lower ends of mounted yarn-receiving spools or bobbins, of a supporting element, a frame member of a traverse-motion device mounted in the latter, means for actuating said frame in a rotary-reciprocatory manner through a predetermined degree of normal arc movement, a fulcrum element engaging said frame, means for moving or adjusting the fulcrum with relation to the latter's axis so as to vary the length of the fulcrum's arc travel independently of that of the frame, and supporting means intervening between and connected with said fulcrum and traverse-rail members for imparting rectilinear-reciprocating movements to the latter corresponding with the length of the fulcrum's arc movement.

2. In a winding-machine, the combination with guided lifting-rods and a traverse-rail carried thereby, of a swinging frame or casting member constituting an element of a

traverse-motion device, a support for the frame, means for normally actuating the latter in a rotary-reciprocating manner, a revoluble disk member mounted concentrically of and arranged to be detachably secured to said casting having a spiral groove formed in its plane face, a live fulcrum or movement-adjusting element having members in continuous engagement with said casting and grooved disk, a suitably supported longitudinally movable flexible connection attached to said fulcrum member and lifting-rods, and means adapted for rotating said disk independently of the frame's normal movements so as to change the position of the fulcrum member with relation to the axis of said casting, thereby correspondingly varying the length of the circular arc movements of the fulcrum.

3. In traverse-motion mechanisms for spoolers and kindred winding-machines, a movement-adjusting device combining a frame member adapted to be actuated in a rotary-reciprocating manner, a supporting element therefor, a rotatively mounted disk or plate located contiguous to and concentrically of said frame's axis provided with a spiral groove, an adjustable fulcrum element connected with said frame and disk members, means for detachably securing the frame and disk members together whereby, when in use, they are adapted to swing bodily as a unit on a common axis, and means for positionally changing the relation of said fulcrum element with respect to the other members so as to vary the length of its circular arc movement without changing the degree of normal angular movements of the device.

4. In a movement-adjusting device of the character described, the combination of a pivotally mounted frame member having a working face or edge disposed in a plane perpendicular to the axis of rotation, a supporting element for said frame, means for actuating the latter in a rotary-reciprocatory manner, a fulcrum element supported by the frame and being in continuous engagement with its said working face, and means cooperating with the frame and fulcrum elements for changing or adjusting the position of the fulcrum longitudinally of said face part of the frame, for the purpose hereinbefore set forth.

5. In a movement-adjusting device of the character described, the combination of a pivotally mounted frame or casting member, a supporting element therefor, means for imparting rotary-reciprocating movements to the frame, a guided adjustable fulcrum element detachably secured to and being in normally continuous operative engagement with said frame member, and means adapted for varying the position of the fulcrum, nearer to or farther from the axis of rotation, said frame and fulcrum members being constructed and arranged whereby, when in use, the fulcrum, when operatively connected to a traverse-rail, is adapted to be moved up and down from one extreme position to the other extreme without imparting appreciable movement to the rail.

6. In a movement-adjusting device of the character described, the combination with a pair of oppositely located revoluble disk members having spiral grooves formed in their adjacent plane faces, a pivotally mounted frame or casting disposed between said disks, and a supporting element for the frame, of an adjustable fulcrum member positioned with respect to and operatively engageable with the frame, a bendable member attached to the fulcrum and engaging the grooves of said disks, and means for detachably securing the disks, frame, and fulcrum members together, whereby they are adapted to swing bodily on a common axis as a unit.

7. In a movement-adjusting device of the character described, the combination of a pivotally mounted frame member provided with an extension, a supporting element for the frame, means for imparting rotary-reciprocating movements to the latter, a manually revoluble pinion-gear mounted in said extension, a disk-gear revolubly mounted on the frame's axis and meshing into said pinion having a spiral groove formed in its flat or plane face, an adjustable fulcrum element capable of independent movement disposed with relation to and operatively engageable with said frame and disk-gear, a bendable connection-supporter or guide attached to the fulcrum member and being in engagement with the grooved part of said gear, a flexible connection secured to the fulcrum and normally resting on said supporter adapted when in use to be indirectly connected to a traverse-rail, and means for detachably securing the gear, frame, and fulcrum members together.

8. In a movement-adjusting device of the character described, the combination of a pair of oppositely disposed revolubly mounted disks provided with spiral grooves, means for supporting the disks, an adjustably mounted fulcrum element located between the grooved portions of said disks, a bendable element attached to the fulcrum movably mounted in and adapted to conform to said grooves, and means for detachably securing or clamping said bendable member to the disks, constructed whereby upon rotating the device the said disk, fulcrum, and bendable members are correspondingly actuated as a unit.

9. In traverse-motion mechanism for spooling and winding-machines, the combination of a supported horizontally disposed traverse-rail, a live fulcrum member, means

for imparting substantially uniform rotary-reciprocatory angular movements to said fulcrum, means connected with the traverse-rail and with the fulcrum for converting the said movements of the latter so as to actuate the traverse-rail bodily and vertically in a reciprocatory-rectilinear manner, a spirally grooved disk disposed with relation to and capable of being rotated independently of the fulcrum element, and means coöperating with the fulcrum and disk members for adjusting the position of the fulcrum in or out with respect to the axis of rotation so as to vary the length of arc movement of the fulcrum, thereby correspondingly varying the vertical movements of the traverse-rail.

In testimony whereof I have affixed my signature in presence of two witnesses.

RUFUS S. MATTESON.

Witnesses:

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CHARLES W. BOARDMAN.