

No. 755,861.

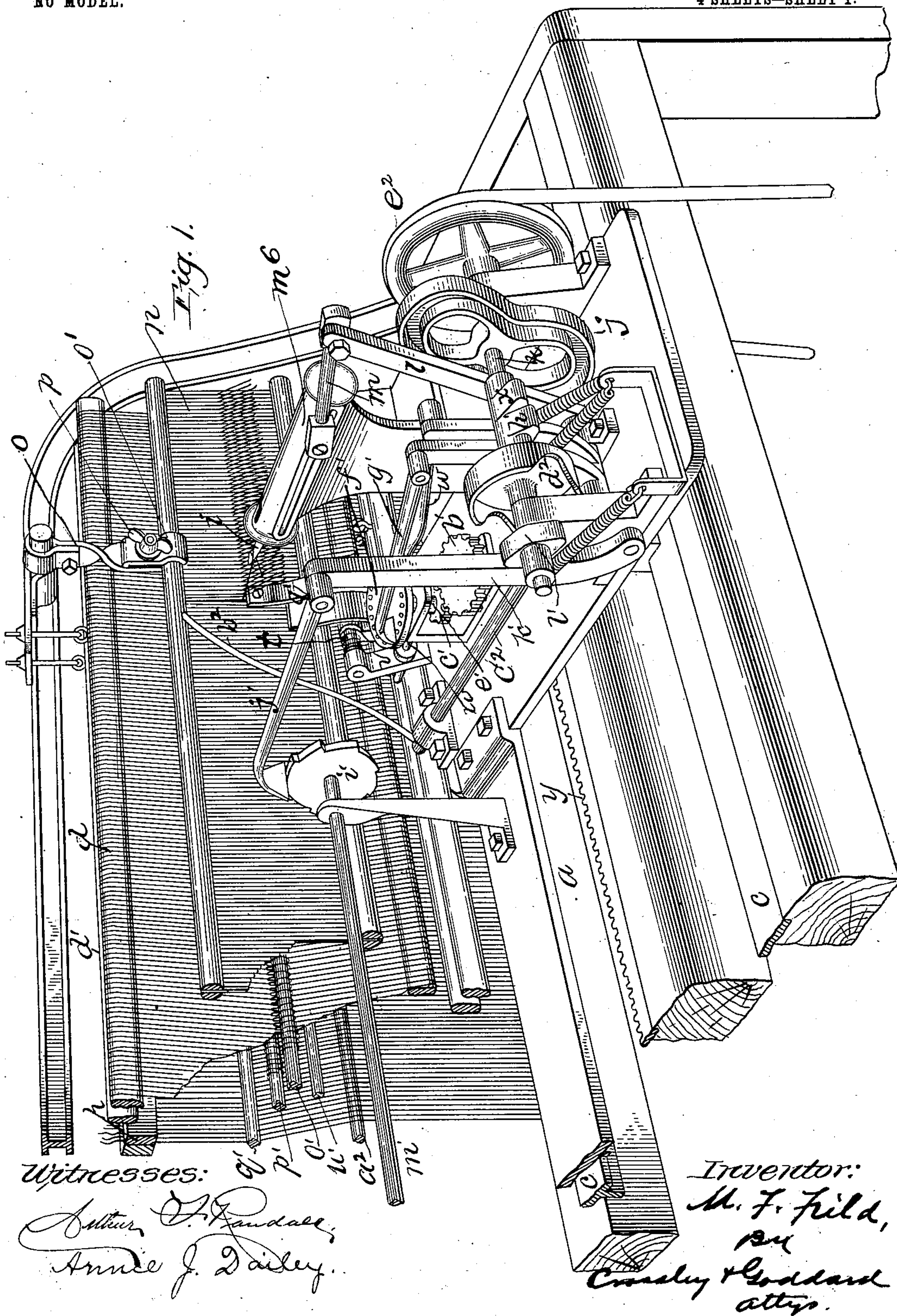
PATENTED MAR. 29, 1904.

M. F. FIELD.
WARP DRAWING MACHINE.

APPLICATION FILED MAR. 25, 1898.

NO MODEL.

4 SHEETS—SHEET 1.



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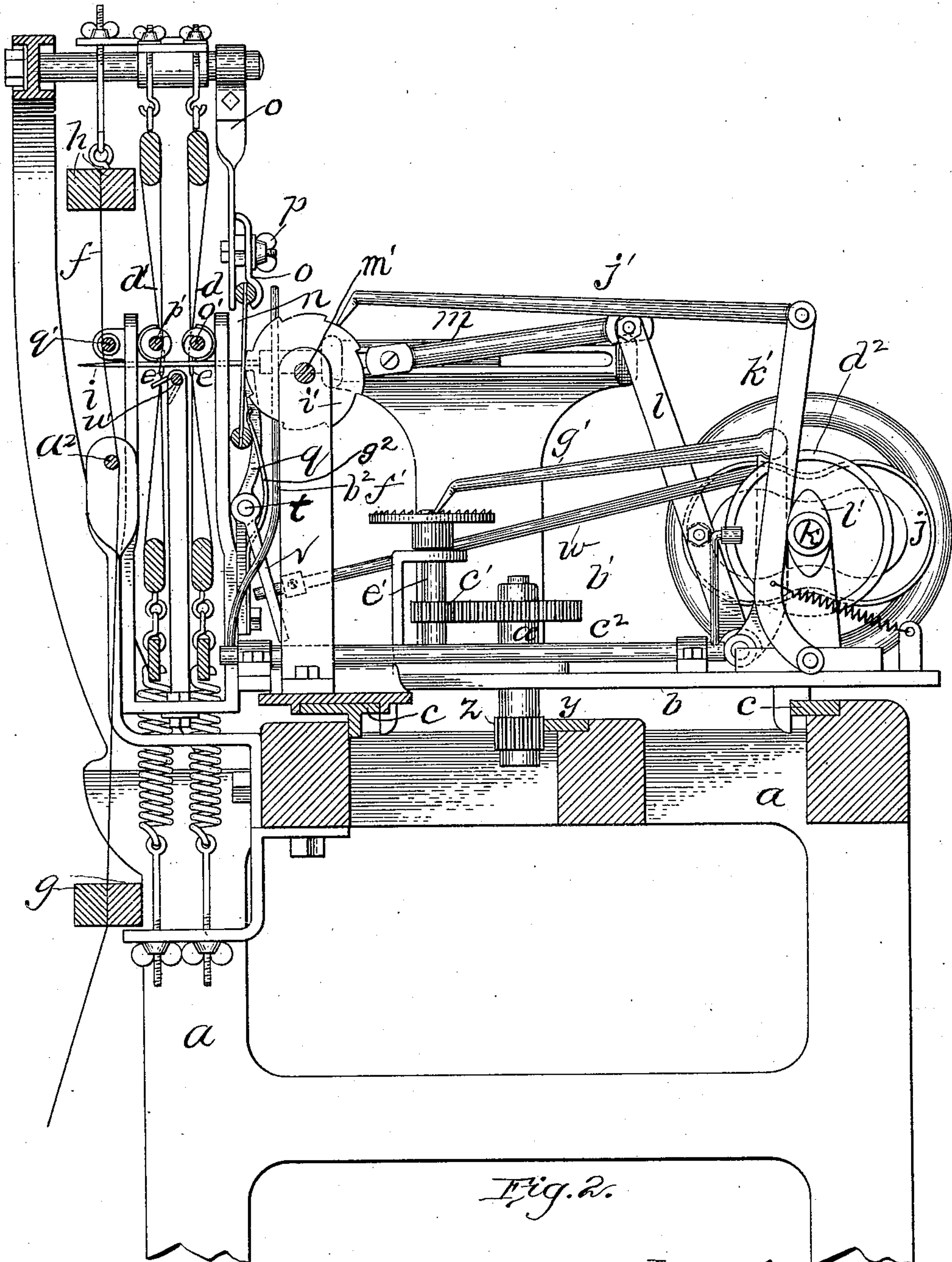


Fig. 2.

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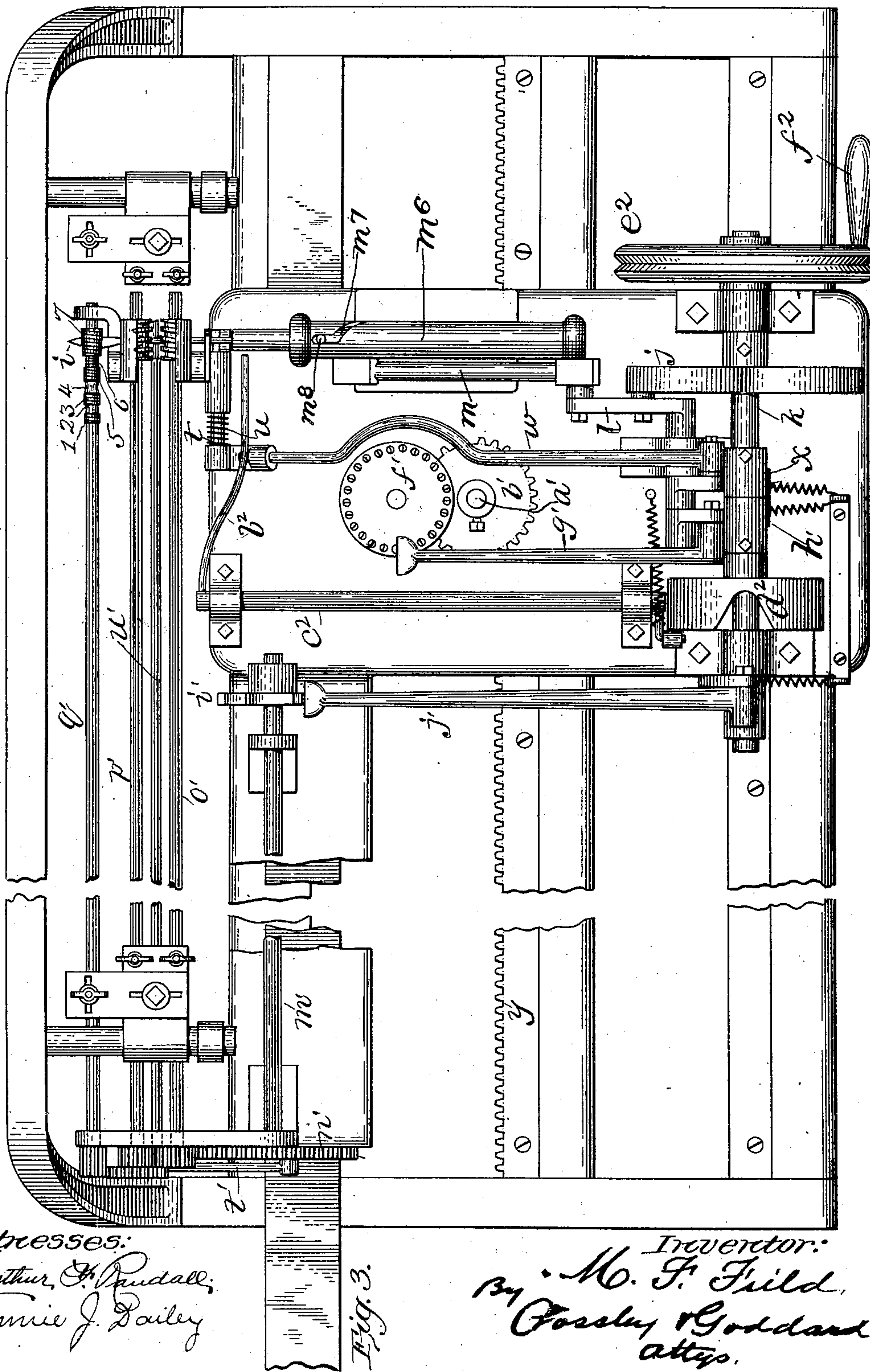
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4 SHEETS—SHEET 3.



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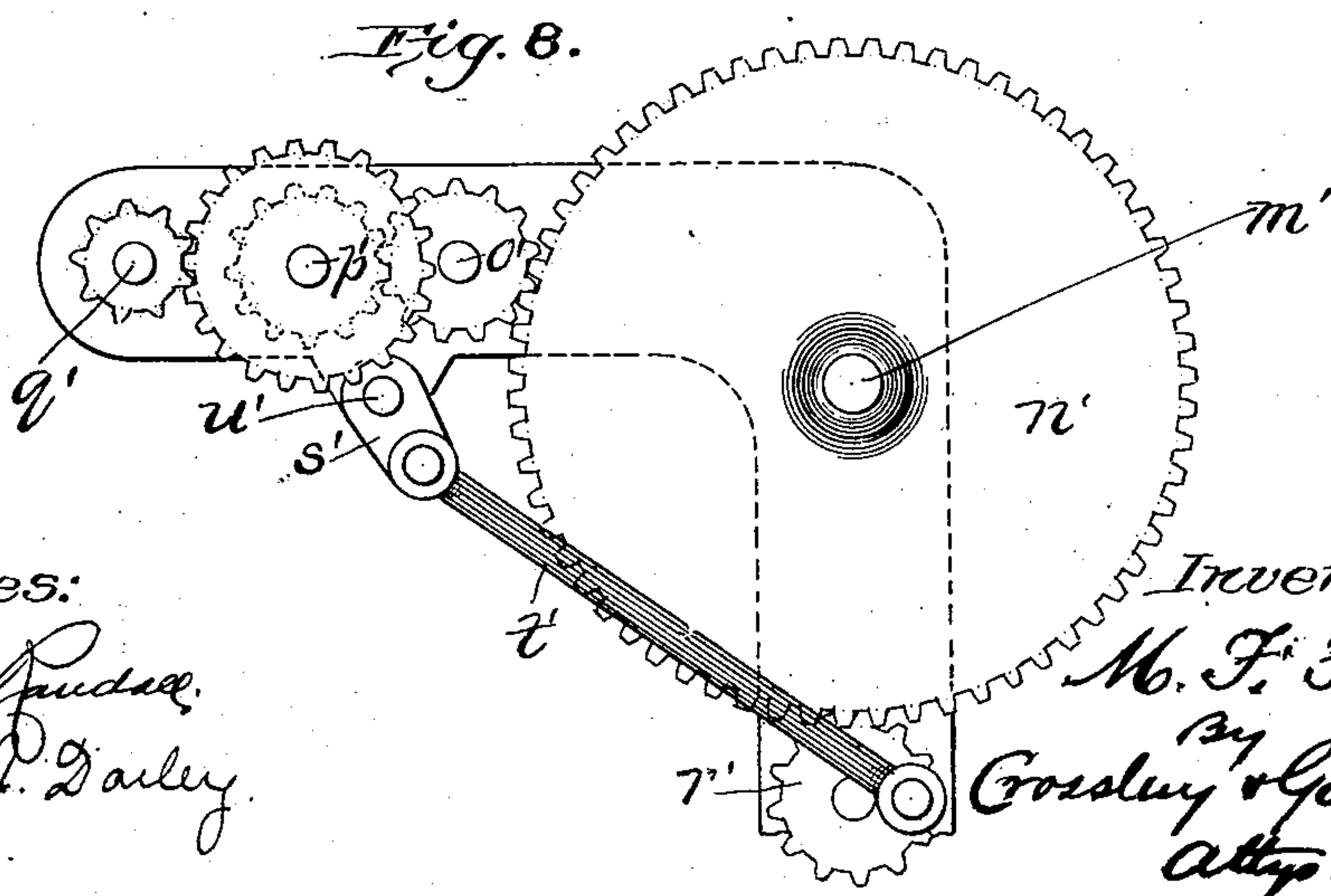
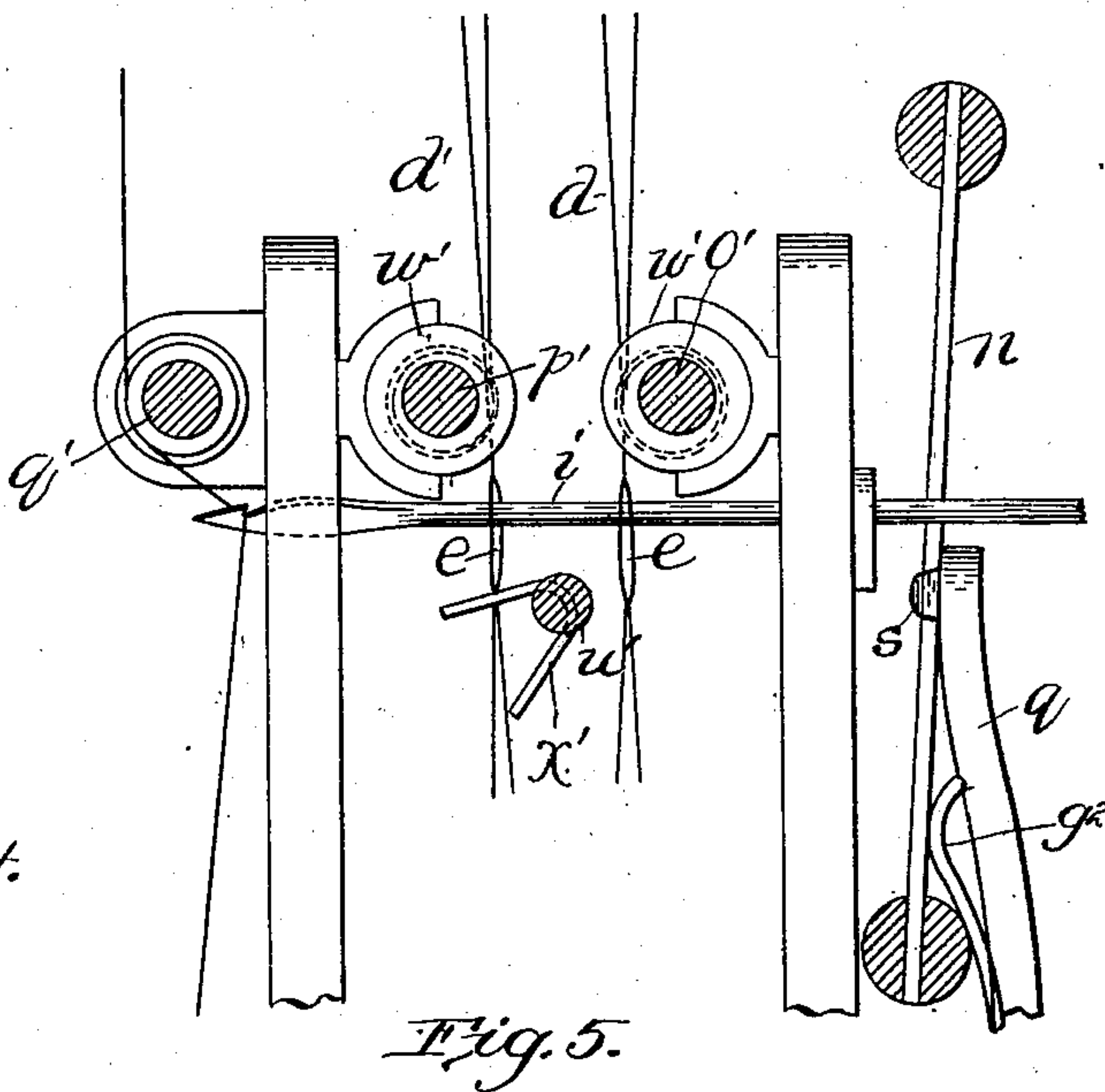
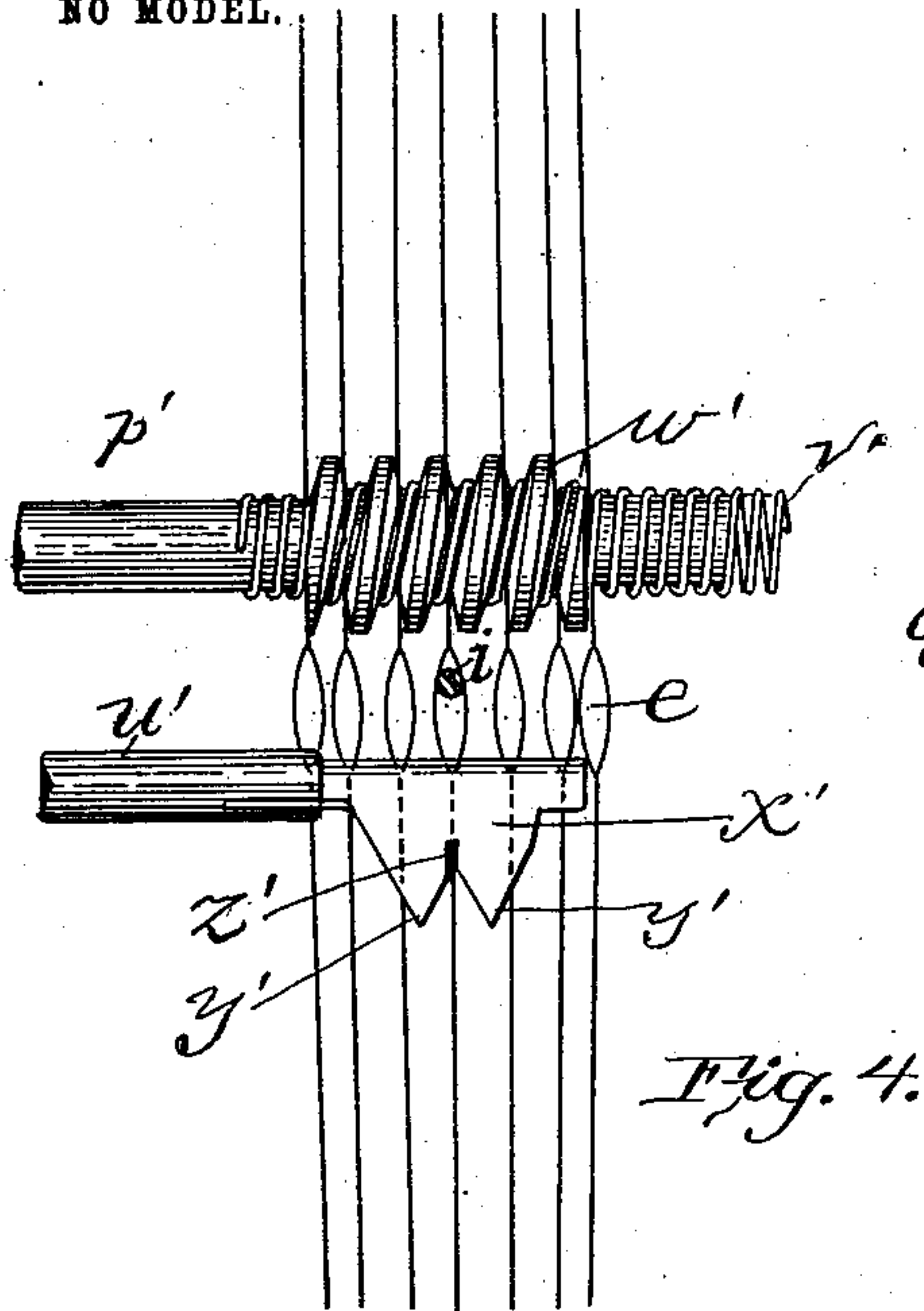
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NO MODEL.

4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

MILLARD F. FIELD, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO JOHN CLARKE, TRUSTEE, OF BOSTON, MASSACHUSETTS.

WARP-DRAWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 755,861, dated March 29, 1904.

Application filed March 25, 1898. Serial No. 675,100. (No model.)

To all whom it may concern:

Be it known that I, MILLARD F. FIELD, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Warp-Drawing Machines, of which the following is a description sufficiently full, clear, and exact to enable those skilled in the art to which it appertains or with which it is most nearly connected to make and use the same.

This invention has relation to warp-drawing machines generally; and it has for its particular object the provision of improvements upon the machine shown and described in Letters Patent of the United States Nos. 600,670 and 600,669, and respectively dated March 15, 1898, and granted to secure my invention of improvements in warp-drawing machines.

The present invention consists, first, of improved means for supporting the reed in such manner that the opener of the dents—that is, the means for spreading apart and widening the space between two splits—may be made to operate with certainty and without a “skip;” second, of improved means for spreading the splits or, in other words, opening the dents, so that the drawing-in hook or needle may surely pass through the same at the right point, which split-spreading means are simple in construction, certain in operation, and capable of arrangement in the machine without being in the way of or in any appreciable degree detrimentally affecting the employment or compact arrangement of other improvements; third, of improved means for aiding in positioning and holding in place the harness-eyes as the drawing-in hook or needle is automatically reciprocated to catch and draw in a warp-thread, which means are simple in construction, readily applied and operated, and efficient in the highest degree; fourth, in other improvements incidental to the foregoing, as will hereinafter more fully appear.

Reference is to be had to the annexed drawings, and to the letters of reference marked thereon, forming a part of this specification. The same letters designate the same parts or

features of the machine throughout the drawings.

Of the annexed drawings, which fully illustrate the invention, Figure 1 is a perspective view of the right-hand end portion of a machine embodying my improvements with the carriage shown as at the said end after the drawing in of the warp-threads has been commenced. Fig. 2 is a sectional end view. Fig. 3 is a plan view, some parts being for the sake of clearness omitted and some shown as broken out. Fig. 4 is a vertical sectional front view; and Fig. 5 is a vertical sectional end view showing the manner of controlling the harness and their eyes, the warp-threads and reed, and the way in which the warp-threads are caught and drawn in. Fig. 6 is a diagrammatic end view of certain gearing for operating-rods in the process of spacing and positioning the harness and their eyes and the warp-threads.

a designates the frame of the machine, upon which is mounted a carriage *b*, adapted to travel from one end of the machine to the other on the rails *c c*.

d designates the front and *d'* the rear harness of a set of two, which are properly supported by the frame, their connection with the latter vertically being preferably by means or through the medium of springs in order that they may not be held too rigidly for most efficient operation thereon.

e designates the harness-eyes.

f designates the warp-threads, which may be supposed to extend up from the warp-beam (not shown) between the bars *g* of the lower thread-clamp, which hold the threads securely, and up through the upper clamp, consisting of the bars *h*, which hold the ends of the threads with relatively less force than the lower clamp, so that when the reciprocating hook *i* catches a thread it may draw the end from between the bars *h* and through the harness-eyes and reed, while the said thread will not be liable to slip between the clamp-bars *g*.

The hook *i* is reciprocated in its bearings in the sleeve *m* by means of a substantially 8-shaped cam *j* on the cam-shaft *k*, which cam

acts upon a lever l , pivoted at its lower end on the carriage and connected with the base of the hook through the medium of the link m . The hook i is given a quarter-turn in its bearings near the completion of its forward stroke as it is reciprocated by means of the spiral portion m^7 of the guiding-slot in the sleeve m^6 , into which a pin or screw m^8 extends. The quarter-turn is given to the hook just before it reaches the end of its forward stroke, so that it may the more readily and certainly catch the warp-thread presented and draw it in. This feature of the machine, however, forms no part of my present invention.

n designates the reed, which is supported in yielding bearings or is held loosely longitudinally on the frame for a purpose to be hereinafter explained. The loose bearing, as herein exemplified, consists of hangers o , provided with clamps o' at their lower ends, which engage the upper rib of the reed. These clamps are made to bear upon the reed with greater or less force by means of bolts and thumb-nuts p , screwed thereon, as shown in Figs. 1 and 2. The chief point to be secured in this construction is to hold the reed so that it may yield longitudinally when it is necessary that it should do so. In order to enable the hook i more readily and certainly to pass through the proper dents or spaces between the splits of the reed, I have provided means for spreading the splits apart, and thus open the dents successively for the passage of the hook, which consists of a lever or arm q , provided at its upper end with a wedge-shaped dog s , (see Fig. 5,) which is adapted to enter between the splits of the reed and press them more widely apart. The said lever q is secured to a rock-shaft t , journaled in suitable bearings on the machine, (see Figs. 1 and 2,) and coiled about the said rock-shaft is a spring u , Fig. 3, so connected with the rock-shaft and a stationary part of the carriage as to operate with a tendency to press the upper end of the lever q , provided with the dog s , toward the reed and the dog between the splits.

A tailpiece v of the lever q extends down from the rock-shaft t and is adapted to be operated upon by a push-rod w , actuated by a cam x on the cam-shaft k , so that when said push-rod w is moved inward it will bear against the tailpiece v of the lever q and move the said lever upon the rock-shaft t against the tension of the spring u and disengage the dog s from the splits of the reed, after which the carriage will be shogged or moved forward a step and the push-rod w will move back and allow the spring u to press the dog s into the next succeeding dent of the reed and spread the splits on its opposite sides more widely apart. A spring q^2 (see Figs. 2 and 5) is connected with the frame and made to bear upon the reed with sufficient stress to frictionally maintain it in the position to which it may happen to

be moved by the action of the dog s on the reed-dents in opening or spreading the same.

It may now be explained that if the splits of the reed should not be set with regularity in the reed-frame—that is to say, if the splits should slightly vary in number for a given distance at one portion of the reed from that at another portion—the yielding character of the supports for the reed will allow it to give or yield longitudinally, so that the dog s may enter the next succeeding and proper dent with certainty and without liability of striking on any one of the splits or breaking or damaging anything in connection therewith.

y is a rack-bar on the frame which is engaged by a pinion z on a shaft a' , on the upper end of which is a gear-wheel b' , which engages a pinion c' on the lower end of a shaft e' , on the upper end of which shaft e' is a ratchet-like disk f' , engaged by a pawl g' , which is actuated by a cam h' on the cam-shaft k , so that as the cam-shaft k is operated the ratchet-disk may be actuated step by step to a predetermined extent and from it, through the gearing before described, move the carriage along on its rails on the frame coördinately with the operation of the hook i and dent-opening dog s .

i' is a ratchet-wheel on a shaft m' , supported by the carriage, which ratchet-wheel is adapted to be operated by a pawl-arm j' , pivoted at its outer end upon the upper end of a lever k' , which lever is pivoted at its lower end to the carriage, the said lever being operated upon by a cam l' (see Figs. 1 and 2) on the cam-shaft. At each revolution of the cam-shaft k the ratchet-wheel i' will be operated twice, since the cam l' is double, similar to the cam j .

The turning of the ratchet-wheel i' operates the shaft m' , which at its outer end is provided with a gear n' , (see Figs. 3 and 6,) the said gear n' operating the screw-rods $o' p' q'$ coördinately through a train of gearing, which will be clearly understood without further description by an inspection of what is shown in Fig. 6.

A spur-gear r' is arranged so as to mesh with the gear n' , and a crank s' is connected with the said spur-gear through the medium of a pitman or link t' , so that as the spur-gear r' is revolved the crank s' will be actuated to rock the rod u' , to which the said crank is secured.

v' designates helical coils of wire of a length sufficient to extend the width of the lease or series of warps, and between each two helices of each coil one or both of the cords constituting the harness-eye support is laid, and then a cord p^2 is drawn through the coil to keep the harness-eye supports temporarily in place therein until the rods o' and p' are inserted. (See Figs. 4 and 5.)

When it is proposed to draw in a warp, the

rods o' p' will be passed into the helical coil in place of the coils before mentioned, the said rods being provided on their inner ends with grooved short screws w' of relatively high pitch, (see Fig. 4,) which are adapted to engage the coils and harness-eye supports as the rods are intermittently turned and successively space the harness-eyes, beginning at one end and traversing their whole length co-ordinately with the movement of the carriage and other parts, acting in harmonious or orderly connection therewith. The bottoms of the grooves of the threads of the screws w' are narrow, so that one of the cords of the harness-eye supports (if both cords are engaged by the screw) will fall behind the other or stand in a relationship radial to the screw, thus causing the harness-eye e to face the hook i as their supporting-cords, or "heddles," as they are commonly called, are spread or spaced and brought into the line of movement of the said hook.

To assist in causing the harness-eyes to face the hook or needle with certainty, I provide what for the purpose of this specification I term a "flipper" x' , secured to the inner end of the rod u' , which flipper, as herein shown, consists of a plate provided with two points y' y' at its outer end, which are adapted to pass upon each side of the supports of a given harness-eye and hold said supports securely between them. The flipper is provided between the two points y' y' with a narrow slot z' , into which the harness-eye supports pass one behind the other when both are engaged, so that the grooves of the threads of the screws w' hold the heddles at one side of their eyes and the flipper holds them at the other, insuring the maintenance of the eyes in a position facing the hook or needle i . The flipper being secured on the shaft u' , which is rocked to and fro, will successively engage first a heddle of the harness d and then a heddle of the harness d' , and to facilitate the work and in order to rock the shaft to a minimum extent I may make the flipper double—that is, with two pairs of points—as shown in Fig. 5, so that one may engage the heddles of one harness and the other the heddles of the other harness, though it will be apparent that the flipper may be made single and a greater rocking movement imparted to it, so that it will engage a heddle of one harness and then a heddle of the other. Upon starting to draw in a warp the screw-threaded part of the rod q' at the right of the machine will project beyond the warp-threads which bear against the remainder of said rod. As the machine is operated the rod q' will be intermittently rotated and moved step by step from right to left as the machine is shown in Figs. 1 and 3. As this is done the stretched warp-threads will be selected by the screw-threaded surface 7 and separated and placed in a position so as to be

successively caught with certainty by the reciprocating hook or needle i .

When a warp-thread is drawn in, the end may be knocked off or stripped from the hook by the finger b^2 , extending from the inner end of a rock-rod c^2 , actuated by a cam d^2 .

Having thus explained the nature of the invention and described a way of constructing and using the same, though without attempting to set forth all of the forms in which it may be made or all of the modes of its use, it is declared that what is claimed is—

1. A warp-drawing machine comprising in its construction a supporting-frame, means connected with the frame for supporting the reed loosely or yieldingly in a longitudinal direction, and a spring bearing against the reed to frictionally hold it in any place to which it may be moved within the limits of its loose bearings.

2. A warp-drawing machine comprising in its construction a supporting-frame, means connected with the frame for supporting the reed loosely or yieldingly in a longitudinal direction, a spring-pressed lever provided with a wedge-shaped dog for entering between the splits of the reed to spread the same, and a spring bearing against the reed to frictionally hold it in any position to which it may be moved by the action of the dog thereon.

3. A warp-drawing machine comprising in its construction a supporting-frame, means connected with the frame for supporting the reed loosely or yieldingly in a longitudinal direction, combined with a reed-dent opener or spreader, and means acting upon the reed to frictionally hold it in the position longitudinally to which it may be moved by the reed-dent opener.

4. In a warp-drawing machine provided with two or more loom-harnesses and their contained warp-thread eyes, a flipper which engages the heddles of the harnesses successively and upon both sides, and is supported in proximity thereto with the length of the flipper and its support parallel to the plane of the heddles and the line of eyes supported thereby, and mechanism to intermittently move the flipper into contact with the heddles.

5. In a warp-drawing machine, a two-membered flipper to engage successively the respective-heddles upon opposite sides thereof simultaneously and thus control the position thereof and the eyes supported thereby, means for actuating the flipper, and independent means to separate the heddles and present them successively to the action of the flipper.

6. A warp-drawing machine comprising in its construction a flipper to engage and control the position of the heddles, said flipper being arranged between the harnesses, and means for operating the flipper intermittently to alternately engage the successive heddles of the

harnesses, combined with means for spreading the heddles and presenting them successively to the action of the flipper.

7. A warp-drawing machine comprising in its construction a flipper consisting of a plate having points or projections, with sloping sides and a narrow slot between the points which is adapted to engage and hold the harness-eye supports during the passage of the drawing-in needle through the eye.

8. A warp-drawing machine comprising in its construction a flipper provided with points adapted to pass between the heddles, and having a slot between its said points to receive the cords of the harness-eye supports, one in advance of the other, to hold the eye in the line of movement of the drawing-in hook, combined with the hook and means for operating it.

9. In a warp-drawing machine, a normally contracted extensible spreader connected sin-

gly and consecutively with the harness-eye supports, means for acting upon the spreader to extend the same and space and position the harness-eyes, in combination with a screw which acts directly upon the warp-threads to select and separate them independently of other mechanism, independent intermittently-operating means coöperating with the harness spreader and spacer to insure the desired position of the harness-eyes, and a reciprocating hook to pass through the adjusted harness-eyes and draw in a warp-thread.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 23d day of March, A. D. 1898.

MILLARD F. FIELD.

Witnesses:

ARTHUR W. CROSSLEY,
ANNIE J. DAILEY.