

No. 777,845.

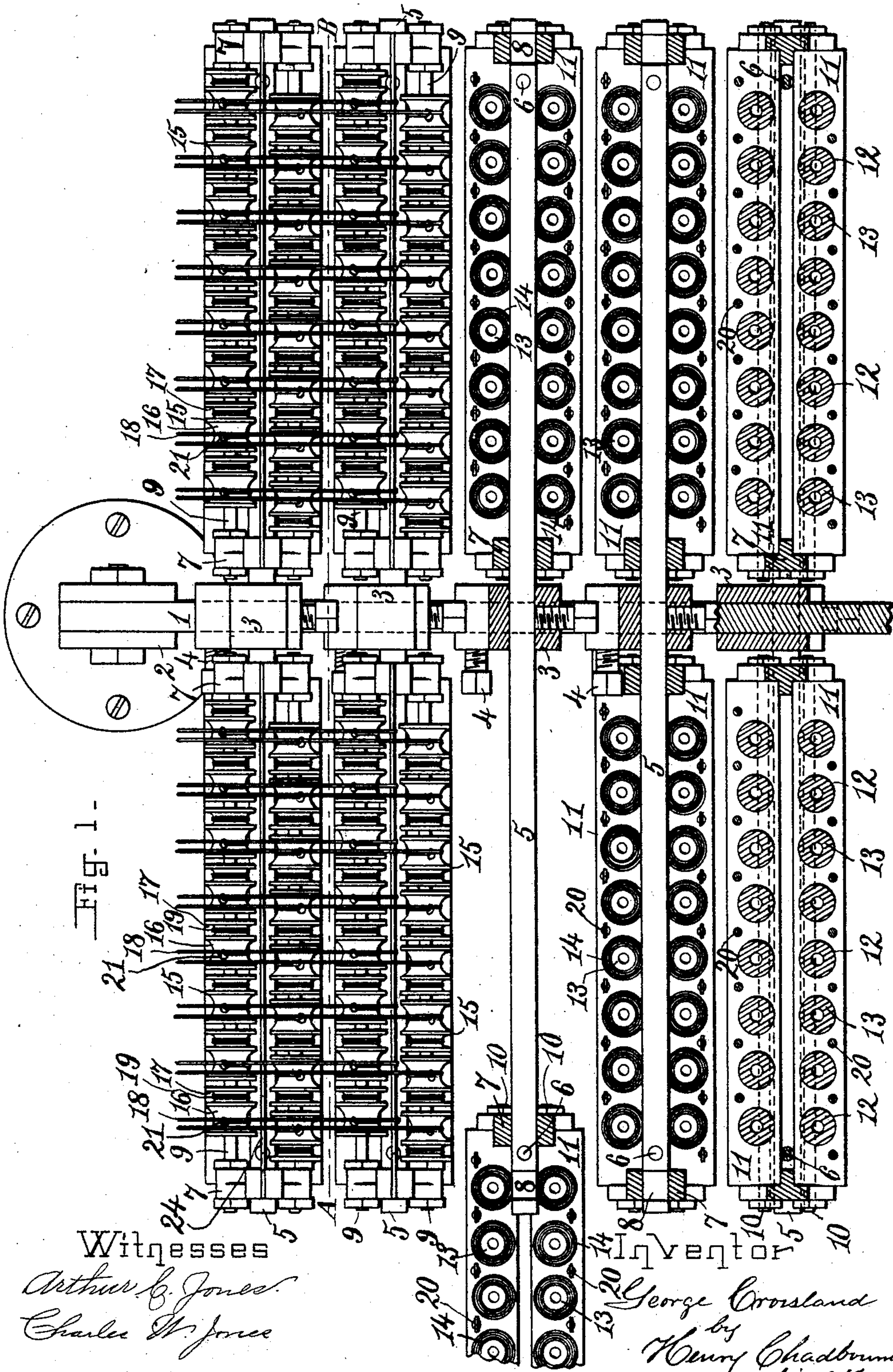
PATENTED DEC. 20, 1904.

G. CROSSLAND.
WARP CREEL.

APPLICATION FILED APR. 7, 1900.

NO MODEL.

3 SHEETS—SHEET 1.



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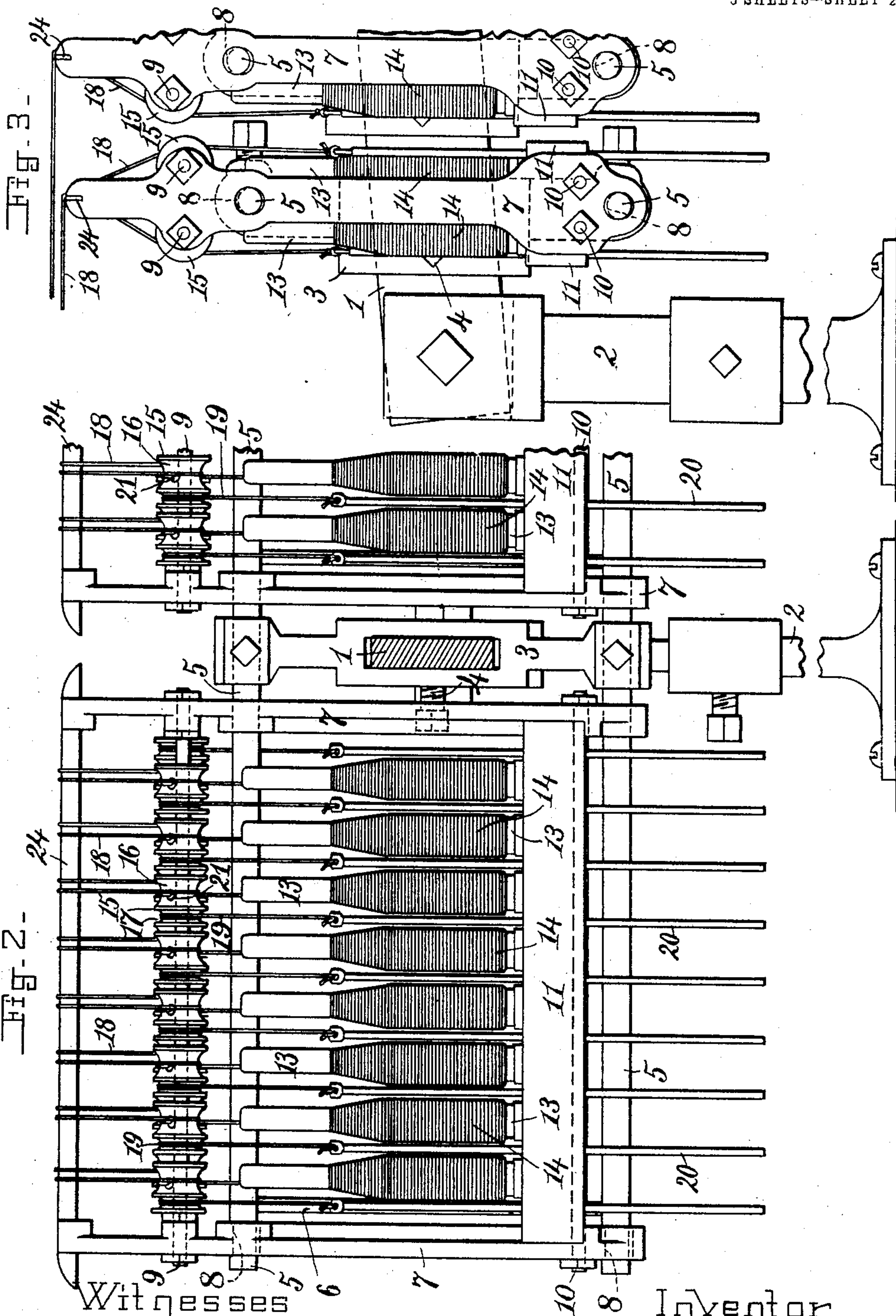
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Witnesses
Arthur C. Jones.
Charles H. Jones

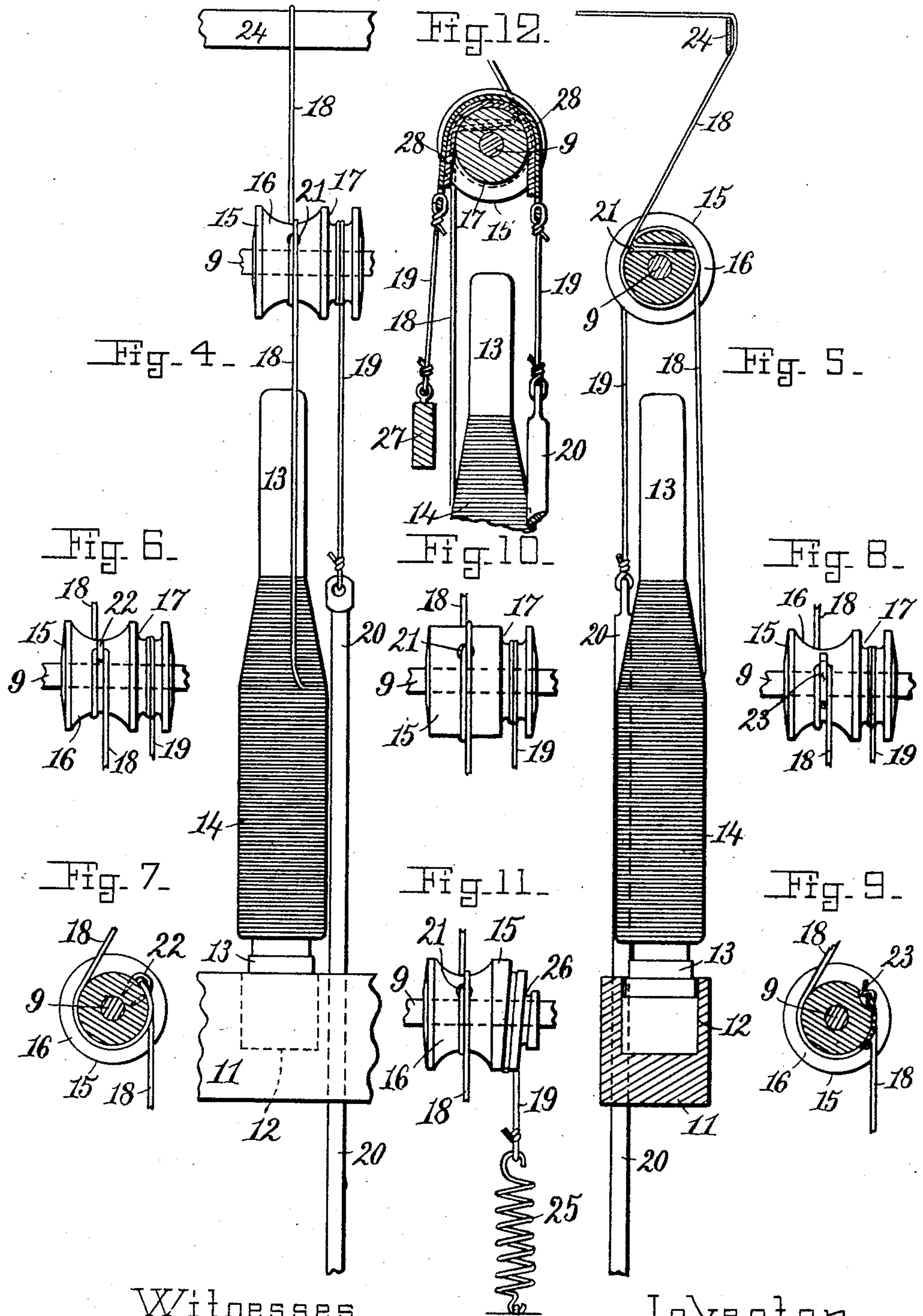
Inventor
George Crossland
by
Henry Chadbourne
his atty.

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UNITED STATES PATENT OFFICE.

GEORGE CROSSLAND, OF WATERTOWN, MASSACHUSETTS.

WARP-CREEL.

SPECIFICATION forming part of Letters Patent No. 777,845, dated December 20, 1904.

Application filed April 7, 1900. Serial No. 12,020.

To all whom it may concern:

Be it known that I, GEORGE CROSSLAND, of Watertown, in the county of Middlesex and State of Massachusetts, have invented certain
5 new and useful Improvements in Warp-Creels, of which the following is a specification.

This invention relates to improvements in weaving-creels for a loom or other textile machine used to hold the bobbins from which
10 the threads or cords are supplied to form the warp of the fabric being woven.

It has for its objects to provide a construction which will be compact, simple, easy to inspect and to repair the threads or to renew
15 a bobbin when exhausted, and whereby a constant and uniform tension will be applied to each of the threads of the warp, but whereby the tension on each thread is entirely independent of any of the other threads.

The invention consists of the novel constructions, arrangements, and combinations of parts which will be fully described hereinafter and set forth in the claims, and it is carried out
20 substantially as illustrated on the accompanying drawings, forming an essential part of this specification, and whereon—

Figure 1 represents a sectional plan view of a sufficient portion of a weaving-creel made in accordance with my invention to illustrate
30 its construction and showing various parts of the creel in horizontal sections through said parts at various heights. Fig. 2 represents a cross-section on the line A B in Fig. 1. Fig. 3 represents a side elevation of such a portion of the creel as will show its construction,
35 the remaining portion being substantially a duplication of that shown in said Fig. 3. Figs. 4 and 5 represent detailed views of a single bobbin and the parts of the creel which are used or controlled by said bobbin. Figs. 6,
40 7, 8, 9, 10, and 11 represent side elevations and cross-sections of modified forms of the spool used in the tension-producing mechanism, Fig. 11 also representing my device when using springs to produce the desired tension of the warp-threads. Fig. 12 represents a detailed view of a modified form of that part of my invention whereby a tension is produced upon the warp-threads.

Like characters of reference refer to like
50 parts wherever they occur on the different parts of the drawings.

The creel consists of a rod or bar 1, supported at each end upon a suitable standard 2, which is preferably made adjustable in height
55 in any common and well-known manner, the bar being preferably detachably attached to said standards in any suitable manner. On the drawings I have shown but one end of the bar 1 and but one of the standards which
60 support it.

Upon the bar 1 are adjustably mounted a series of blocks 3 3, which are held in their adjusted positions by means of set-screws 4 4 or by equivalent and well-known means. Any
65 number of blocks 3 3 are placed side by side upon the bar 1, according to the number of different threads which are desired to be used in the warp of the fabric to be woven, as will be understood by a further description of the
70 device. The blocks 3 3 are arranged to hang vertically on said bar and are each provided with a rod or bar 5 5 at the top and bottom of said block, which rods extend through said block and are preferably arranged one di-
75 rectly above the other, and so that they project at right angles to the bar 1, substantially as shown in Fig. 1. It will thus be seen that there is a pair of rods 5 5 attached to each block 3. Each pair of rods is held parallel
80 by stays or braces 6 6, extending between the rods near their ends and riveted or otherwise attached thereto. Thus there is a series of pairs of rods 5 5 projecting on each side of the bar 1.

It will be understood that the blocks 3 might be dispensed with and the rods 5 be inserted through the bar 1, which would slightly be increased in depth to contain said rods; but I prefer to use the blocks, as they are easily
90 placed upon the bar 1 or removed therefrom, as desired.

The bar 1 is intended to be arranged so as to extend backward from the loom at right angles to the line of the harness or heddles of
95 the loom, and consequently the rods 5 5 will be parallel to said harness or heddles.

Upon each pair of rods 5 5, and preferably

on opposite sides of the bar 1, I mount what I term a "drawer," which is constructed as follows, (and I shall describe but one of said drawers herein, there being preferably double as many drawers in the creel as there are blocks 3 on the bar 1, each drawer being a duplicate of the others:)

Two end frames 7 7 are mounted upon the pair of rods 5 5 on one side of the bar 1, they being provided with perforations through which the rods pass. One of the frames 7 is located against or very near the block 3, and I term it the "inner" end frame, while the other frame 7 is located upon the outer ends of the rods 5, outside of the brace 6, it being held upon said rods by means of notches or recesses 8, cut in the upper surface of the rods and into which the outer frame drops, or they may be retained in any other suitable and well-known manner. The end frames are held at a given distance from each other and are coupled together in that position by means of the upper stay-rods 9 9 and the lower stay-rods 10 10, substantially as shown in Figs. 2 and 3. Two bobbin racks or supports 11 11 extend between the end frames, near the lower ends of the frames, which racks are provided upon their upper surfaces with a series of recesses 12 12 to receive the lower ends of the spindles 13 13 of the bobbins which supply the warp-threads and which are thus supported in a vertical position by said racks. Upon the spindles 13 13 are placed the cops 14 14 of the bobbin, as usual. The bobbins are thus arranged in two parallel rows upon the drawer of the creel, and consequently occupy as little space as possible.

Upon the upper stay-rods 9 9 are loosely mounted the tension-spools 15 15, the number of spools on each rod being governed by the number of bobbins on the rack 11, which is directly under that rod, there being a tension-spool on the rod for each bobbin on the rack. Each of the tension-spools is preferably provided with two annular grooves 16 and 17, substantially as shown in Fig. 4, the former being to receive the warp-thread 18 in its path from the bobbin to the loom, while the latter is to receive the thread or cord 19, attached at one end to the spool and having a weight or lingo 20 attached to its opposite end. It is not essential that the spools should have the groove 16 for the warp-thread, as said thread is attached at each end and to the spool, as hereinafter set forth, and does not necessarily require a guiding-groove to hold it upon the spool, and I have shown a spool without the groove 16 in Fig. 10 of the drawings; but the use of the guiding-groove is deemed to be preferable. The weight 20 is preferably made in the form of a wire or rod for the purpose of economy in the space required for the same, and it is guided in its movement hereinafter described by passing it through a perforation in the bobbin-rack 11.

From the above it will be seen that there is a tension-spool with an attached weight for each and every bobbin used on the creel.

Each of the tension-spools is provided with an eye 21, which is located in the groove 16 when said groove is used, and the warp-thread passes through said eye. This eye performs a very important element in the production of the tension on the warp-threads carried on the tension-spool. The eye 21 may be constructed in various ways, and I have shown some of the different constructions on the drawings, the preferred form being clearly illustrated in Figs. 4 and 5, and it consists of a transversed perforation through the spool in a plane with the grooves 16. In Figs. 6 and 7 the eye has been shown as a screw-eye or staple 22, driven into the tension-spool within the groove 16. In Figs. 8 and 9 the eye has been shown as a spring 23, placed within the groove 16 and under which the warp-thread passes, this spring in itself acting to cause a tension on the warp-thread independent to that produced by the weight, as hereinafter described, and which will act to reduce the necessary turns of the warp-thread 18 upon the spool in order to obtain the desired tension on said thread, as the tension of the spring will act to produce the friction on the thread 18 which would otherwise be produced by additional turns of said thread on the spool hereinafter to be fully described.

The end frames of the drawer are provided at their upper ends with a guide 24, which extends between said frames and over which the warp-threads are carried from the tension-spools in their course to the loom. This guide is preferably made in the form of a thin strip of metal, as shown on the drawings.

The operation of threading a warp-thread on my improved creel is substantially as follows: The bobbin containing the desired thread is placed in one of the recesses 12 on the bobbin-rack 11. The tension-spool, which is directly above the bobbin, is then rotated on the rod 9, causing the attached cord 19 to be wound upon the spool within the groove 17 and the weight 20 to be raised and to move upward in its bearing in the rack 11. The tension-spool is rotated in this manner until the desired amount of the cord 19 has been wound and the weight raised sufficiently. The tension-spool is then held in this position and the end of the warp-thread is threaded through the eye 21 of the spool in such a direction that the influence of the weight upon the spool will rotate the spool and at once begin to wind the warp-thread upon the spool within the groove in the same direction from both ends of the eye 21. The spool is then released and the influence of the weight causes the warp-thread to be wound upon the spool, as above described, until the weight has entirely unwound the cord 19 from the spool. The end of the

warp-thread is then carried over the guide 24 to the loom and is drawn until the desired tension is on the thread, which tension will be the influence of the weight upon the spool.

5 The drawing of the thread 18 forward will tend to unwind it at both ends from the spool and at the same time will tend to wind the thread 19 upon the spool, so as to raise the weight.

10 The operation of letting off the thread 18 through this tension device as it is used by the loom is as follows: The thread 18 is unwound from the spool and the weight is raised thereby as the thread is used by the loom and
15 in a manner as above described until the turns of the thread 18 in the groove 16 have been reduced, so that the friction of the remaining turns, in addition to the friction of the thread in the eye 21, will equal the influence of the
20 weight upon the spool, tending to turn the spool in an oppositedirection. If more thread is used, it will tend to reduce the friction of said thread on the spool and in the eye 21, and as the influence of the weight on the spool re-
25 mains uniform it will be seen that this influence of the weight will finally overcome the friction of the thread and will cause the spool to rotate in the opposite direction, allowing the thread 18 to slip upon the surface of the
30 groove 16 and through the eye 21, thus drawing thread from the bobbin and through the tension-spool. By this means it will be seen that after the loom has drawn the thread 18 from the tension-spool until the resistance due
35 to the friction of the thread on the tension-spool and in the eye is equal to the influence of the weight on said spool the thread 18 will be continually drawn through the tension-spool as used and with a uniform tension there-
40 on equal to the influence of the weight on the tension-spool. This lessens the liability of breakage of the thread 18 and causes the weaving of more perfect fabric than is the case when the tension on the warp-thread is
45 not uniform and even.

In order to prevent the warp-threads from one of the drawers of the creel from coming into contact with those from the next drawer in the series of drawers, I prefer to arrange
50 the supporting-bar 1 so that it will incline slightly, substantially as shown in Fig. 3, the lowest end of the bar being nearest to the loom, and by this means the warp-threads from the guides 24 of each drawer of bobbins are sep-
55 arated more than they would be if the bar 1 were level.

In order to make it easy to inspect and to repair or replace any of the warp-threads supplied from the bobbins carried on the bobbin-
60 drawers, I have so constructed these bobbin-drawers that any one may be drawn out side-wise from the creel to the position as shown in Fig. 1. This I accomplish by mounting the end frames 7 upon the rods 5 so that they
65 can move longitudinally on said rods and

having the outer end frame detachably held upon said rods within the notches 8 when the drawer is in working position. The inner end frame 7 is prevented from being drawn en-
tirely from the rod 5 by means of the stay- 70 rod or brace 6. By drawing the drawer to one side in this manner I am able to inspect the bobbins on either rack 11 of the drawer and can easily replace or repair any needing it.

It will be seen that my improved creel is 75 very compact, easily kept in order and repaired, and causes the warp-threads to be drawn to the loom with a uniform tension thereon.

My improved creel is applicable to any loom 80 requiring an individual, independent, differential let-off device for each of the threads of the warp used, and it is particularly adapted to looms using a series of varied-colored warps and for weaving figured pile fabrics; but it 85 may be used on looms having a single-colored warp.

Thus far I have described my tension de- vice as being controlled by the influence of weights or lingoes 20; but it will be under- 90 stood that I may use springs in the place of the weights, and a detailed view of such a construction has been shown in Fig. 11. In Fig. 11 the spring 25 has one end attached to the cord 19 and the other end attached to some 95 stationary part of the machine—as, for instance, to the racks 11. The tension-spool is preferably provided with the helical groove 26 for the cord 19, arranged with a decreasing radius to come into contact with the cord 100 19 as said cord is wound upon the spool, so as to decrease the leverage as the power of the spring increases by being extended.

In Fig. 12 I have illustrated another method of producing a friction on the tension-spools 105 tending to cause a tension on the warp-threads carried by the spools, which consists of attaching the cord 19 at one end to the bar 27 or to other stationary parts of the machine, the opposite end of the cord being attached 110 to a weight 20 or to a spring, as desired. A friction-shoe 28, consisting of a strap or band lined with suitable friction-producing material, is introduced within the cord 19, so that said shoe engages the tension-spool and the 115 friction material on the shoe produces the desired friction on the spool, and thereby creates the tension on the warp-thread carried by the spool.

When threading a tension device, as illus- 120 trated in Fig. 11, the warp-thread is threaded through the eye in the spool and the spool is turned by hand until the desired number of turns of the warp-thread has been placed upon the spool.

This my improved tension device for warp- 125 threads is applicable to creels of other constructions than that shown on the drawings, and I do not wish to confine myself to its use in connection with any particular arrangement 130

of the bobbins on the creel or construction of the creel itself.

I wish it to be understood that I do not confine myself to the particular construction of the bobbin-drawers as shown on the drawings and described herein, as their construction may be changed within the scope of mechanical skill without departing from the spirit of my invention.

10 Having thus fully described the nature, construction, and operation of this my invention, I wish to secure by Letters Patent and claim—

1. In a warp-creel, a bobbin, a loosely-rotating tension-spool upon which the bobbin-thread is wound, an eye within the plane of that portion of the tension-spool upon which the bobbin-thread is wound and through which the bobbin-thread passes, and a yielding tension-producing device tending to rotate the 20 spool in a direction opposite to the direction of the rotation of the spool when thread is drawn from the bobbin and over said spool, the eye forming a bight in the bobbin-thread and the thread on both sides of the bight 25 therein wound in the same direction upon the spool, whereby a uniform yielding tension is applied to the thread drawn.

2. In a warp-creel, a series of bobbins, a series of loosely-rotating tension-spools one for 30 each bobbin in the series of bobbins and upon which the bobbin-thread is wound, an eye in each spool of the series of spools said eye located within the plane of that portion of the spool upon which the bobbin-thread is wound 35 and through which eye the bobbin-thread passes, and a series of independent yielding tension-producing devices tending to rotate each spool independent of the others and in a direction opposite to the direction of the rotation 40 of the spool when thread is drawn from the bobbin and over that spool, the eye on the spool forming a bight in the bobbin-thread wound on that spool and the thread on both sides of the bight therein wound in the same direction 45 upon the spool, whereby an independent tension is produced upon the thread upon each tension-spool and which tension is constantly the same when thread is drawn over the spool.

3. In a warp-creel, a series of bobbins, a series of loosely-rotating tension-spools one for 50 each bobbin in the series of bobbins and upon which the bobbin-thread is wound, an eye in each spool of the series of spools said eye located within the plane of that portion of the spool upon which the bobbin-thread is wound 55 and through which eye the bobbin-thread passes, a groove on each spool of the series of spools, a cord attached to each spool and wound within the groove therein, and a series of weights one attached to each cord exerting an independent influence on its attached spool tending to rotate its spool independent

of the other spools in a direction opposite to the direction of the rotation of the spool when the bobbin-thread is drawn from the 65 bobbin and over said spool, the eye on the spool forming a bight in the bobbin-thread which passes through it and the thread on both sides of the bight therein wound in the same direction upon the spool, whereby an independent tension is produced upon the 70 thread upon each tension-spool and which tension is constantly the same when thread is drawn over the spool.

4. In a warp-creel, a support, a series of 75 parallel rods projecting sidewise from said support, a series of bobbin-drawers on said rods movable longitudinally thereon each drawer consisting of a framework, a bobbin-rack, a series of bobbins carried by said rack, 80 a series of tension-producing devices for the threads supplied from said bobbins, and a guide for said threads, whereby each bobbin-drawer may be drawn to one side on said rods, 85 for the purpose set forth.

5. In a warp-creel, a support, parallel rods projecting sidewise from said support, a series of bobbin-drawers movable longitudinally thereon, and notches on the parallel rods 90 to receive the framework of the bobbin-drawers to hold said drawers in position on the rods, for the purpose set forth.

6. In a warp-creel, a support, parallel rods in pairs carried by said support, combined with a longitudinally-movable bobbin-drawer 95 mounted on each pair of projecting rods, each drawer consisting of two end frames, stay-rods to couple said frames together at a distance from each other, two bobbin-racks between the end frames, a series of bobbins on 100 each rack, a series of tension-spools on the stay-rods one spool for each bobbin on the rack to receive the thread from said bobbin, means causing each spool to produce tension on the thread carried thereby, and a guide- 105 strip to guide the thread from the tension-spools, for the purpose set forth.

7. In a warp-creel, a support, a series of parallel rods in pairs projecting sidewise from said supports, a bobbin-drawer consisting in 110 part of end frames mounted on said rods and movable longitudinally thereon, and a brace between each pair of the parallel rods near the end of said rods to retain them in their proper relative positions and to form a stop 115 to prevent the complete withdrawal of the bobbin-drawer from said rods, for the purpose set forth.

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

GEORGE CROSSLAND.

Witnesses:

HENRY CHADBURN,
HENRY J. BAILEY.