

(No Model.)

3 Sheets—Sheet 1.

E. E. SIBLEY.
CIRCULAR KNITTING MACHINE.

No. 430,593.

Patented June 17, 1890.

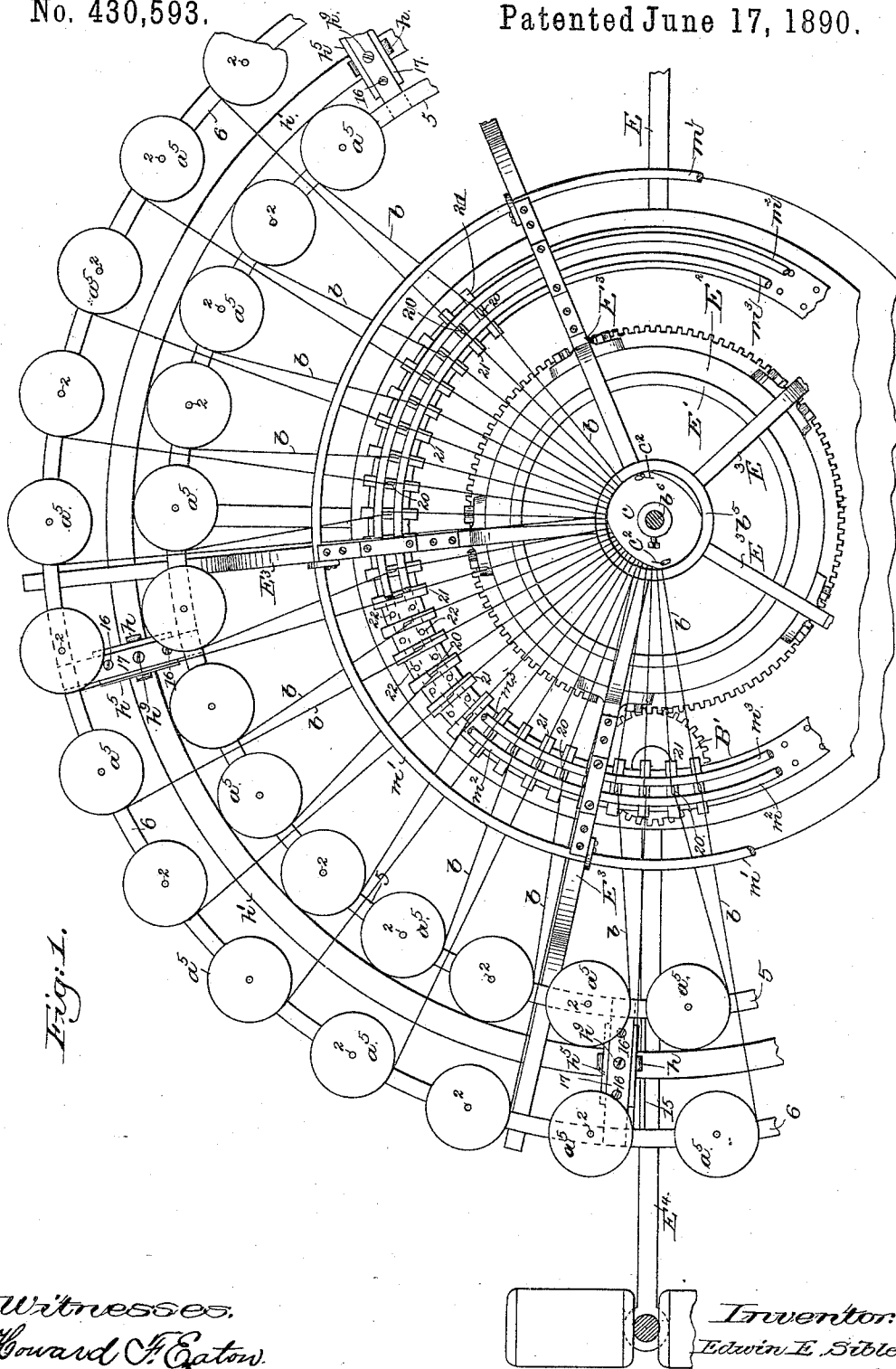


Fig. 1.

Witnesses.
Howard F. Eaton.
Meredith L. Emery.

Inventor:
Edwin E. Sibley
by *Lundy & Gregory*
Attys

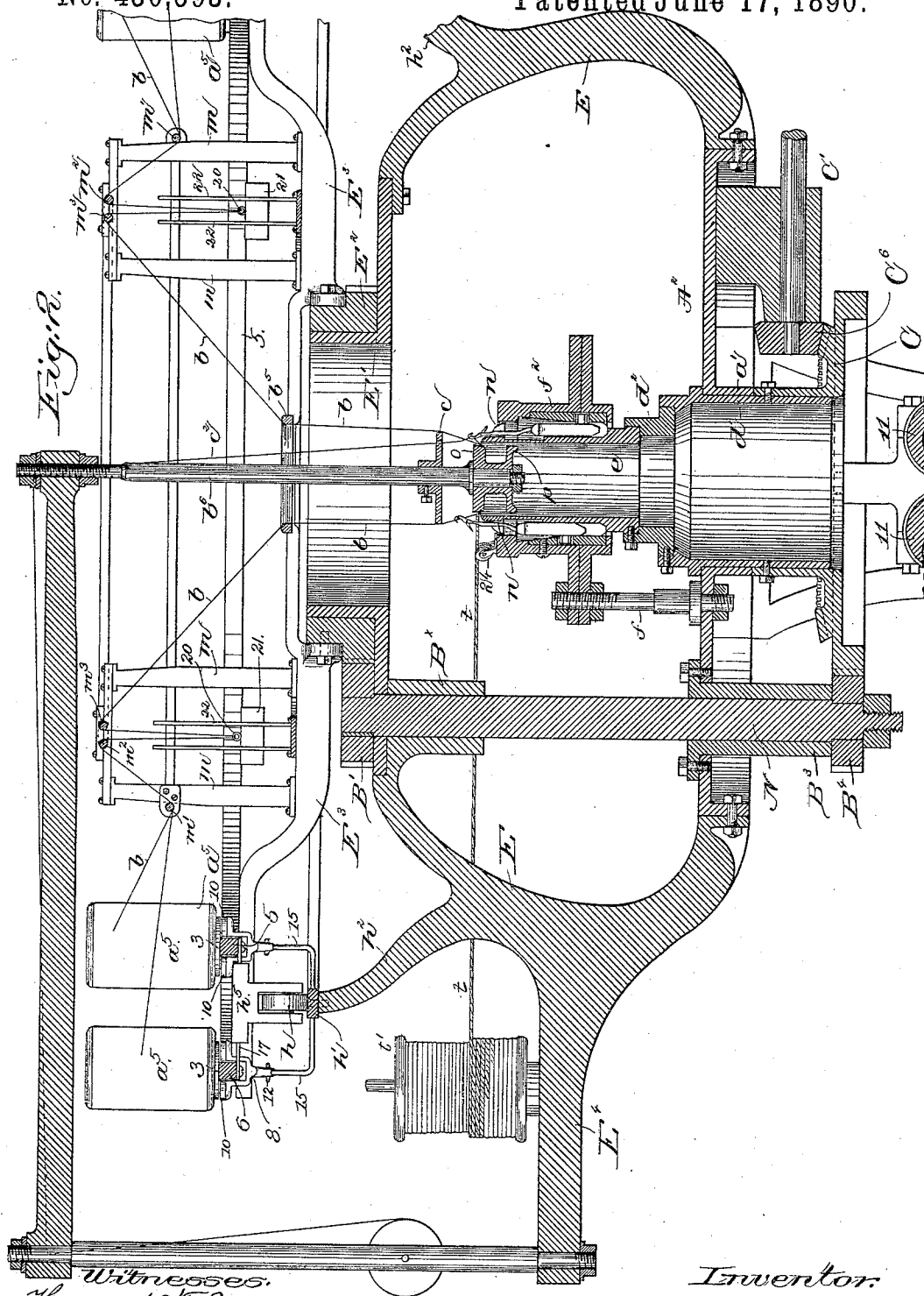
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(No Model.)

3 Sheets—Sheet 3.

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Fig: 3.

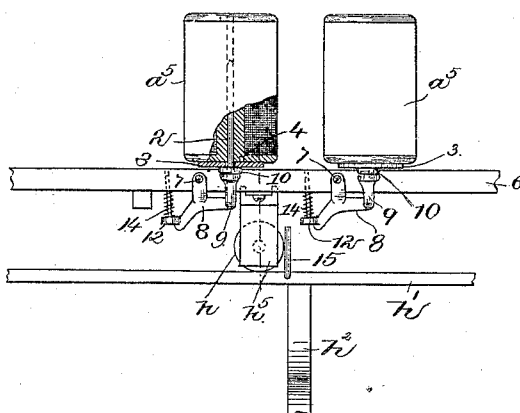


Fig: 4.

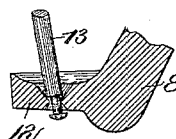


Fig: 5.

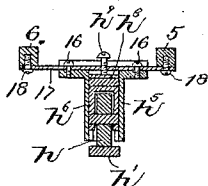
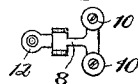


Fig: 6.



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UNITED STATES PATENT OFFICE.

EDWIN E. SIBLEY, OF CHELSEA, MASSACHUSETTS, ASSIGNOR TO THE AMERICAN FIRE HOSE MANUFACTURING COMPANY, OF SAME PLACE.

CIRCULAR-KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 430,593, dated June 17, 1890.

Application filed June 11, 1889. Serial No. 313,849. (No model.)

To all whom it may concern:

Be it known that I, EDWIN E. SIBLEY, of Chelsea, county of Suffolk, State of Massachusetts, have invented an Improvement in Circular-Knitting Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

10 This invention is intended as an improvement upon that class of knitting-machines shown in United States Patent No. 246,288, dated August 30, 1881. In the machine described in the patent referred to the warp-holding frame was connected to a hollow-necked gear mounted to rotate about a curb located below the top of the needle-cylinder, the said frame extending a considerable distance above the top of the needle-cylinder. In practice the rotation of this frame about the needle-cylinder and between the needle-cylinder and the operator has been found not only dangerous, as it rotates at high speed and is quite heavy, but also the continued movement of the arms of the frame past the attendant affects the vision of the attendant, and hence the knitting is not properly watched, as it should be at each course. To obviate this difficulty and at the same time simplify the construction of the machine and render the operation of the same more steady and uniform, I have arranged the warp-carrying spools upon a turn-table provided with a ring-gear, which is adapted to rotate about an open-centered bearing supported by fixed arms, the said bearing being located, however, above the top of the needle-cylinder, and centrally with relation to the said bearing I have provided a warp-guide, which is arranged to direct the warps down through the open center of the said bearing to the needles, substantially as will be described. By dispensing with the rotary frame of the machine described in the patent referred to it is possible to lead the filling-thread directly to the knitting-point, instead of up through the hollow gear from below, as in the patent referred to, the introduction of the filling-thread into the machine described in the said patent requiring considerable time and the exercise of care.

My invention consists in the combination, with a cam-cylinder, a needle-cylinder, a series of needles, a turn-table to carry a series of warp-threads, and a ring-gear connected to the center of said turn-table, of an open-centered bearing for the said ring located above the top of the needle-cylinder, means to rotate the said turn-table, and a warp-guide arranged centrally with relation to the said open-centered bearing to direct the warps down through the said bearing to the needles, substantially as will be described.

Other features of my invention will be hereinafter described, and pointed out in the claims at the end of the specification.

I have also combined, with a circular-knitting machine using a knitting-thread, warp-threads, and a filling-thread, a size-gage, which is located at the top of the needle-cylinder and in such position with relation to the needles and the guide which presents the filling-thread that the said size-gage supports the warp-threads in a circle close together side by side at the point where the filling-thread is laid upon them, the said size-gage being located in line with the end of the needle-cylinder to support the warp-threads at the point where the filling is laid against the warp-threads, and also preventing any tendency of the filling-thread due to the tension upon it of reducing the diameter of the tube being knitted. Preferably the said gage will be tapered slightly or made smaller toward its lower end.

Figure 1 on the drawings is a partial plan of a knitting-machine embodying my invention. Fig. 2 is a partial vertical section of a knitting-machine embodying my invention. Fig. 3 is a detail to be referred to, it being made chiefly to show part of the turn-table, warp-spools thereon, and a let-off for the spools. Fig. 4 is an enlarged detail of part of Fig. 3. Fig. 5 is a detail to be referred to, and Fig. 6 is a top view or plan of the let-off device.

The table A^2 , the needle-cylinder e , the reducing-collar d^2 , the needle-cylinder bearing d' , the stationary bushing a' , the bevel-gear C , connected to the needle-cylinder bearing d' , the small bevel-gear C^6 , the shaft C' , the

take-up rolls 11, the cylindrical shell f^2 , within which is placed the usual knitting-cams, the posts f to support the said shell, the needles n , the stationary warp-throwing cam c , the warp-guide or gaging-ring b^5 , down through which are extended the warp-threads b , the spools a^5 , carrying the warp-threads, the knitting-thread c^2 , extended through a hole (shown in Fig. 1) in the cam c , which thus acts, also, as a guide for the said knitting-thread, the spindle b^6 , and the gear B^4 are and may be all substantially as in the patent referred to, wherein like devices have been marked by like letters, and so need not be herein further described.

Herein I have shown a series of arms, as E , which are suitably bolted to the table, the said arms thus forming the stationary part of the frame-work. These arms are herein represented as being extended upwardly to a point above the top of the needle-cylinder, where they serve to support a hollow cylindrical or open-centered bearing E' , which serves as a support for the ring-gear E^2 , to which is attached the under side of the turn-table E^3 , upon which are mounted, upon suitable spindles, the warp-holding spools a^5 .

I have herein shown the turn-table as provided with wheels, as h , any number of which may be used, if desired, the said wheels, if used, running upon a suitable track, as h' , mounted upon an extension h^2 of the rigid arms E . The warp-spools a^5 , referred to as shown best in Figs. 2 and 3, are set upon suitable spindles 2, having upon them loose washers 3, preferably of metal, the said washers having, as shown at the left of Fig. 3, a suitable pin, as 4, to enter a notch or hole in the spool.

The turn-table consists, essentially, of a series of radial arms extended from the gear E^2 , referred to, and a series of rings, as 5 6, which hold the said spindles and enable the warp-spools to be arranged close together in circles. As herein represented, the rings 5 6 have suitably pivoted to them at 7 a series of let-offs, each let-off, as herein shown, being composed of an elbow-lever 8, having at one end upwardly-projecting lugs, as 9, provided at their upper ends with suitable friction devices, as 10, preferably blocks of india-rubber or felt, leather, or equivalent material. The opposite end of each lever is provided with an ear, as 12, upon which rests a rod 13, the connection between the rod and ear being a loose one, so that the rod moves up and down with the end of the lever to which it is joined. The rod 13 is surrounded above the ear 12 by a spiral or other suitable spring 14, the upper end of which is shown as coming against the ring 6, into a hole in which the upper end of the rod 13 enters, the construction being such that the spring acting upon the let-off normally keeps its friction-surfaces pressed against a friction disk or washer 3; but this friction is released at intervals by the said let-offs coming in contact with a stop,

as 15, fixed to the track h' , thus permitting the warp-spools to turn and give off warp during the rotation of the turn-table. I have shown the turn-table as provided at intervals with small blocks, as h^5 , which are attached by screws 16 to a cross-piece 17, attached by screws 18 to the under sides of the rings 5 6. The said blocks h^5 receive within them carriages h^6 , which support the axles of anti-friction wheels h , which run upon the track h' , and I have shown (see Fig. 5) a rubber block, as h^8 , interposed between the carriage and the cross-bar 17, a screw h^9 keeping the block in place, the said block lessening the jar of the rolls traveling on the track. The turn-table referred to has erected upon it stands m , which support a series of rings, as m' m^2 m^3 , and the warp-threads b , on their way from the warp-spools, pass under the ring m' , over the ring m^2 , thence down through an eye 20 of a dead-weight 21, and thence up over the ring m^3 , and down through the warp-guide or gaging-ring b^5 to the needles.

To prevent lateral swaying of the dead-weights 21, which hang upon the warp-threads, so that their tension as they go to the needles is uniform, as provided for in United States Patent No. 386,273, issued to me on the 17th day of July, 1888, I have erected upon the turn-table a series of guides, as 22, between which the said weights are placed to travel up and down.

From the foregoing description it will be understood that the space about the needle-cylinder and where the knitting is taking place is entirely free to be inspected by the attendant, and such space is not occupied by the warp-carrying frames, as in the patent referred to. Elevating the turn-table and the ring E^2 and its circular hollow bearing above the top of the needle-cylinder makes it possible to locate the spool or bobbin t' , containing the filling-thread t , upon a stationary part of the frame, as E^4 , and take the same in a substantially horizontal line to the thread-guide 24, over which the filling-thread passes on its way to the warp-thread with which it is to be associated. In practice this filling-thread will be subjected to the action of a proper tension device.

The lower end of the stationary rod b^6 is provided at the top of the needle-cylinder with a size-gage, it being located in a line with the guide, about which the filling passes on its way to be laid against the warps and back of the knitting-needles, as in the patents referred to. The addition of this size-gage to the rod referred to and its location, as described, enables the size-gage to occupy a position in the tube being knitted just at the point where the filling-thread is being laid into the tube. This size-gage acts to keep the interior of the tube at the desired diameter and prevent the filling-thread, by reason of tension thereon, from contracting the diameter of the tube being knitted. Lower down upon the said rod b^6 there is attached

a friction-wheel p , which in function and operation is substantially the same as that indicated by like letter in the patent, No. 246,288, referred to. Herein the shaft N , to the lower
 5 end of which is secured the pinion B^4 referred to, is extended up through suitable bearings, as B^3 and B^2 , to a point opposite the gear E^2 , where it is provided with a toothed gear B' , which engages and rotates the gear E^2 , at-
 10 tached to the turn-table and before described.

In the patent, No. 386,273, referred to, wherein the warp-threads are subjected to the action of a dead-weight, the devices carrying
 15 the warp-spools were stationary, and the dead-weights had only a vertical movement; but herein the warp-threads rotate with the needle-cylinder, as in Patent No. 246,288, and hence to enable me to use the dead-weights,
 20 which are of great advantage in the production of strong hose, I have had to provide the turn-table with the weight-guides, in order that they may not sway or swing laterally against each other in the rotation of the turn-
 25 table.

I have shown the frame-work as provided with the track, and the turn-table as provided with wheels to run on the track; but the said track and wheels may be omitted, if desired,
 30 but when the weights are used it is preferred to retain the track and wheels on the turn-table.

Prior to my invention I am also aware that arms connected to the outer side of a cam-
 35 cylinder have been extended upwardly outside of a needle-cylinder to a considerable distance above the upper ends of the needles, and that the said arms have served as supports for a hub, which hub at a point below
 40 the upper ends of the said supports has received upon it a gear, which supports a series of bobbins carrying warp-threads, the said warp-threads being carried upwardly over and then down over a series of wires,
 45 and being led through a series of holes made in the said gear, the said warp-threads being passed entirely outside of the hub supporting the said gear. In a machine of the class referred to, should woolen threads be used to
 50 make a woolen fabric, which is scoured after knitting, the oil which comes upon the warp-threads (for in practice the said gear must be oiled in order to rotate on the hub) would not do harm; but when weaving hose composed
 55 of cotton, which is usually white or light brown, any oil upon the warp-threads not only destroys the salability of the hose, but also passes from the cotton to the rubber of the hose, thus rotting the rubber. In my invention the warp-threads are passed down through the open-centered bearing on which the gear carrying the turn-table rotates, and it is impossible for the warp to come in contact with any oil; but in a knitting-machine
 60 wherein the hub is supported by arms extended upwardly outside of the turn-table and then down through it it would be impos-

sible to pass the warp-threads through the center of the hub, because of the obstruction which they would meet in the shape of the
 70 supports for the hub.

I claim—

1. A knitting-machine containing the following instrumentalities, viz: a cam-cylinder, a needle-cylinder, a series of needles, a turn-
 75 table to carry a series of warp-threads, a ring-gear connected to the center of the said turn-table, an open-centered bearing for the said ring located above the top of the needle-cylinder, means to rotate the said turn-table, and a
 80 warp-guide arranged centrally with relation to the said open-centered bearing to direct the warps down through the open center of the said bearing to the needles, substantially as described. 85

2. The combination, with a cam-cylinder, a needle-cylinder, a series of needles, a turn-table to carry a series of warp-threads, and a ring-gear attached to the center of the said turn-table, of a bearing for the said ring-gear
 90 located above the top of the needle-cylinder and having an open center for the passage of the warp-threads, a warp-guide, means to rotate the said turn-table, and stationary sup-
 95 ports E for the said bearing, substantially as described.

3. The cam-cylinder, the needle-cylinder, a series of needles, a turn-table to carry a series of warp-threads, a ring connected to the center of the said turn-table, an open-centered
 100 bearing for the said ring located above the top of the needle-cylinder, means to rotate the said turn-table, and a warp-guide arranged centrally with relation to the open-centered bearing to direct the warps down through the
 105 open center of the said bearing to the needles, combined with warp-tension mechanism carried by the said turn-table, to operate substantially as described.

4. The combination, with the needle-cylinder, cam-cylinder, a series of needles, and a turn-table adapted to carry a series of warp-spools, and means to support and rotate the said turn-table, of a series of guides mounted upon the said turn-table and a series of
 115 weights co-operating with the said guides and acting upon the warp-threads, substantially as described.

5. In a knitting-machine, the following instrumentalities, viz: a cam-cylinder, a needle-
 120 cylinder, a series of needles therein, a turn-table to carry a series of warp-threads, a ring attached to the center of the said turn-table, an open-centered bearing for the said ring located above the top of the needle-cylinder,
 125 means to rotate the said turn-table, and a warp-guide arranged centrally with relation to the said open-centered bearing to direct the warps down through the open center of the said bearing to the needles, of a guide for
 130 a filling-thread, a size-gage, and means to support it, the said size-gage being located in line with the end of the needle-cylinder to thereby support the warp-threads at the point where

the filling is laid against the warp-threads, to operate substantially as shown and described.

5 6. The knitting-machine cylinder, the cam-cylinder, a series of needles, a turn-table adapted to carry a series of warp-spools containing warp-threads, and tension mechanism for the said warp-threads, combined with a series of let-off devices and means to actuate

them intermittingly to release for an instant, 10 the warp-spool, substantially as described.

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

EDWIN E. SIBLEY.

Witnesses:

GEO. W. GREGORY,
B. DEWAR.