No. 870,644. PATENTED NOV. 12, 1907.

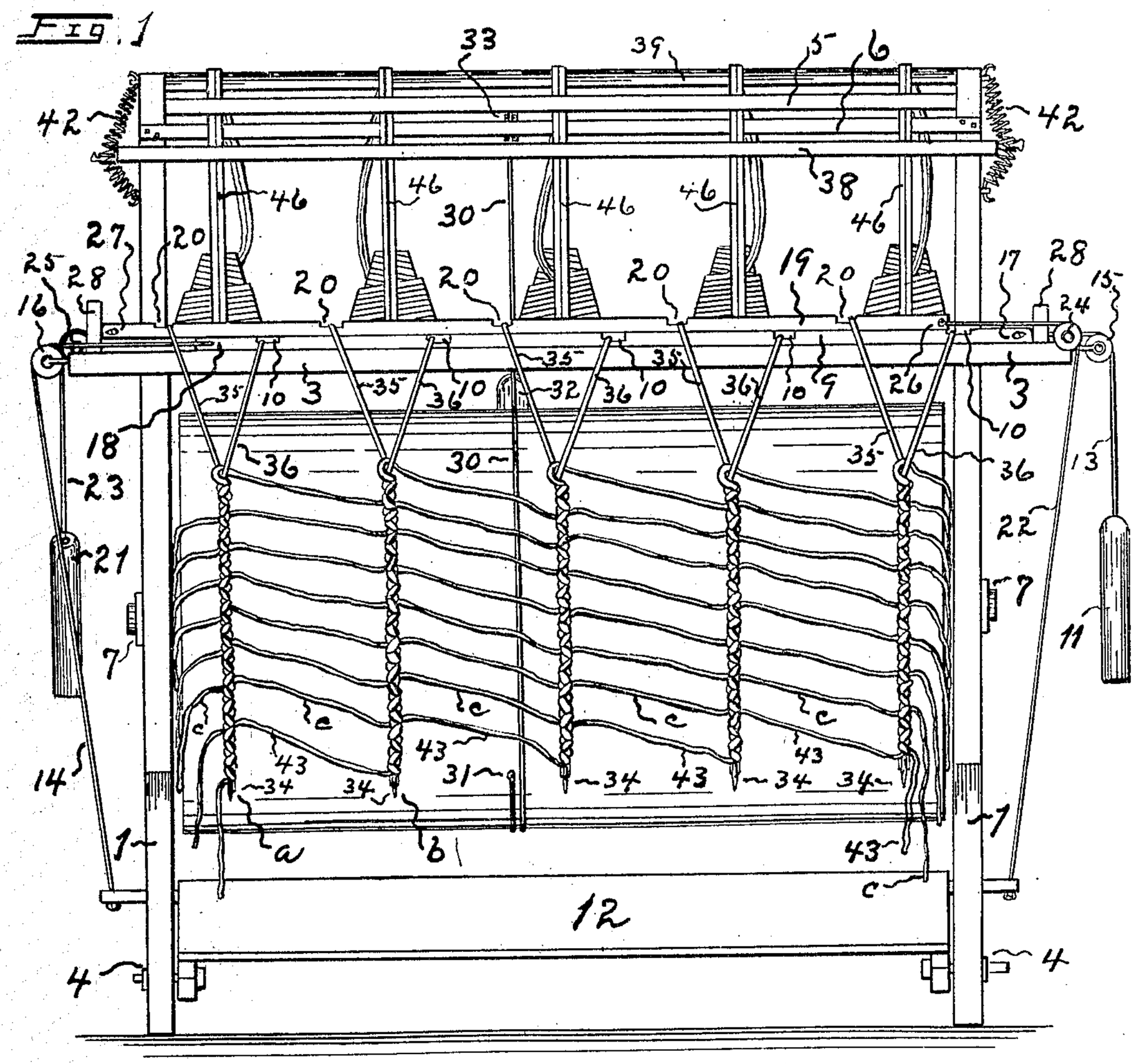
H. T. RICHMOND.

NET MAKING MACHINE.

APPLICATION FILED OCT. 29, 1906.

3 SHEETS—SHEET 1.

Fig. 1



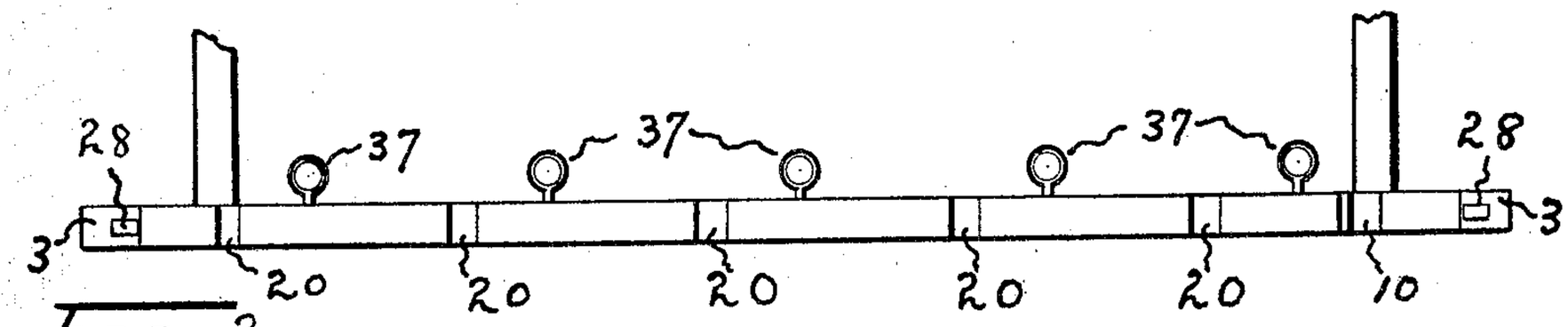


Fig. 2.

Witnesses Arthur Sturges.
R. E. Menthal,

Henry T. Richmond, Inventor,
By Hiram A. Sturges.
Attorney

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3 SHEETS—SHEET 2.

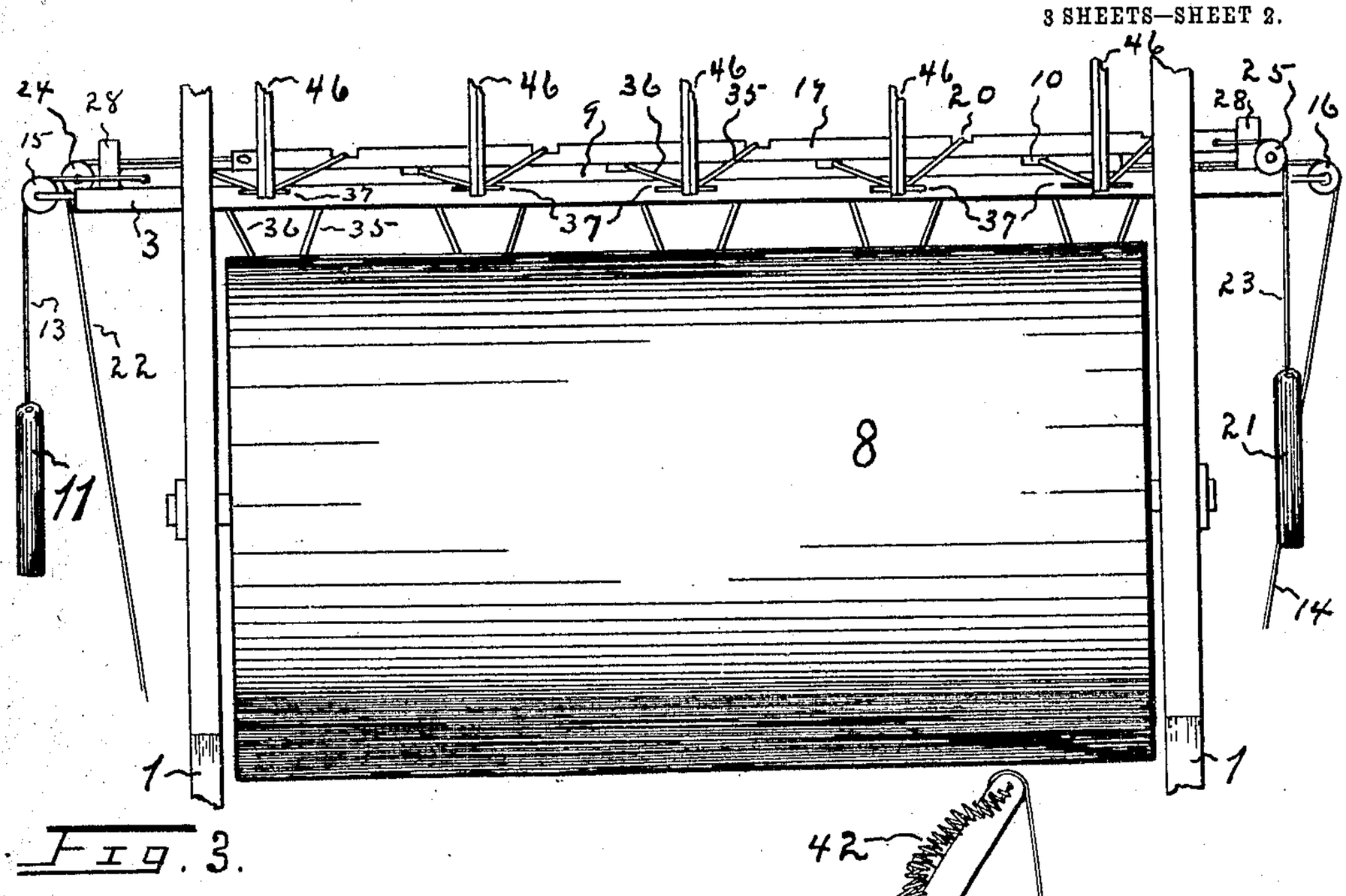

Fig. 3.

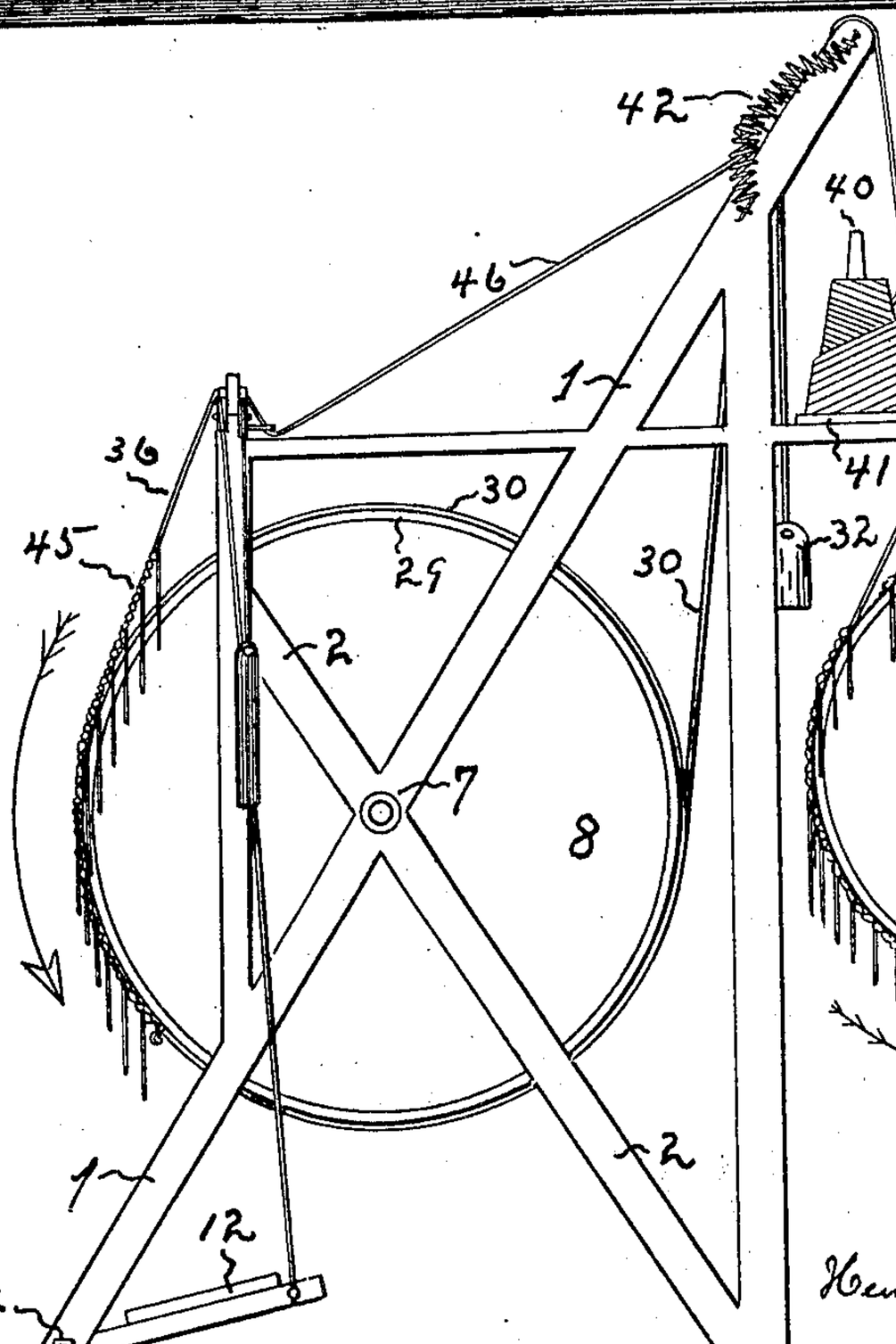

Fig. 4.

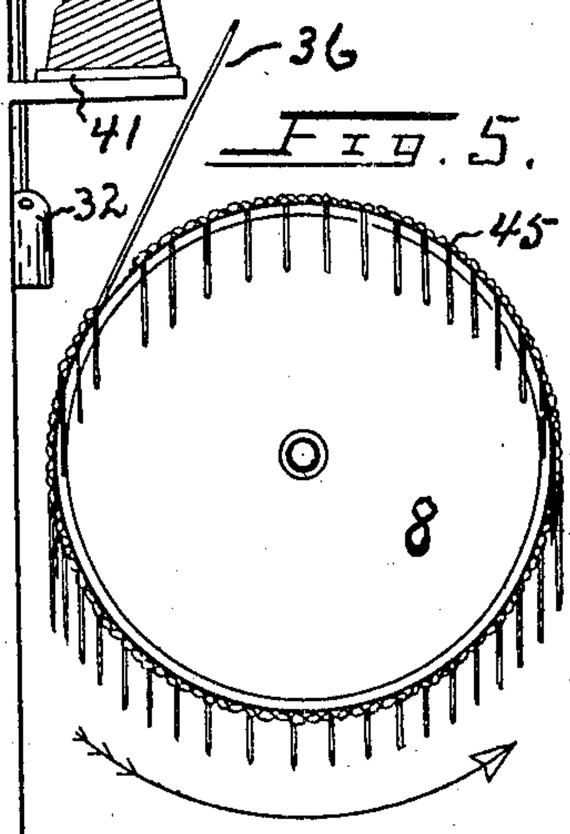

Fig. 5.

Witnesses

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3 SHEETS—SHEET 3.

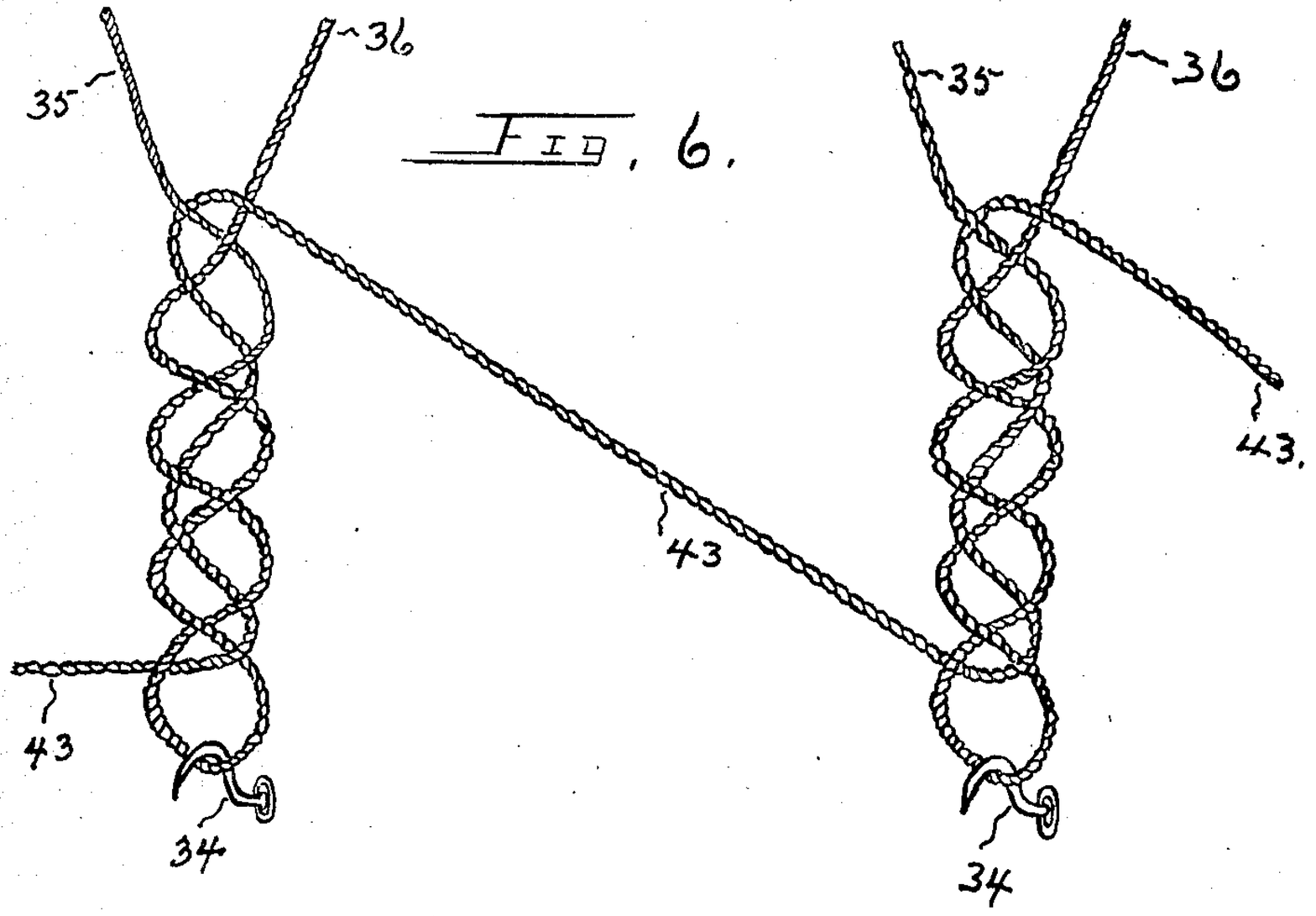

Fig. 6.

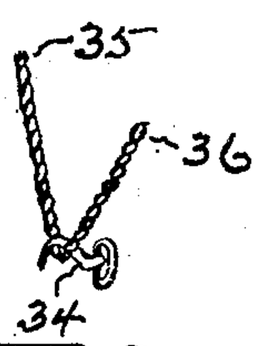

Fig. 7.

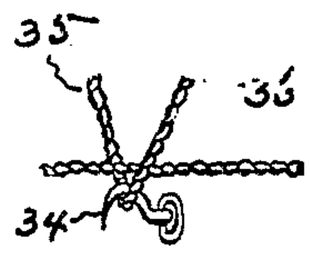

Fig. 8.

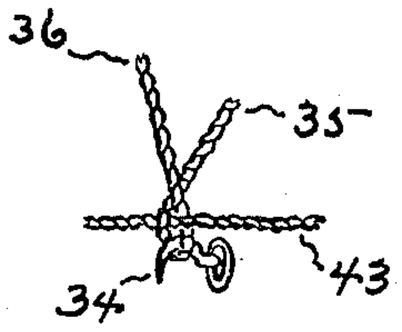

Fig. 9.

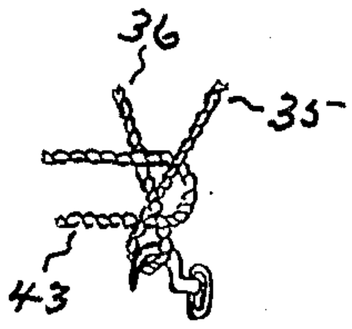

Fig. 10.

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UNITED STATES PATENT OFFICE.

HENRY T. RICHMOND, OF MALVERN, IOWA.

NET-MAKING MACHINE.

No. 870,644. Specification of Letters Patent. Patented Nov. 12, 1907.

Application filed October 29, 1906. Serial No. 340,944.

To all whom it may concern:

Be it known that HENRY T. RICHMOND, a citizen of the United States, residing at Malvern, in the county of Mills and State of Iowa, has invented certain new and useful Improvements in Net-Making Machines, of which the following is a specification.

This invention relates to improvements in net making machines and has for its primary object the presentation of a means for furnishing a movement, a spacing and a tension of the warps; also a means for holding the transverse strands in a convenient position for manually performing a braiding or twisting operation, and has reference to the employment of a rotating table for carrying the net while in process of braiding. The invention also has reference to the use of recessed shifting bars found to be of advantage in braiding. With these and other objects in view the invention presents a novel construction and arrangement of parts as described herein, and as illustrated by the drawings, wherein:

Figure 1 represents a vertical front view of the machine. Fig. 2 represents a plan-view of the shifting bars and a broken away part of the frame. Fig. 3 is a vertical rear elevation of the rotating table and shifting bars showing broken away parts. Fig. 4 is a vertical side view of the invention. Fig. 5 is a somewhat reduced view of the end of the revoluble table. Fig. 6 is a detail of the fabric produced, illustrating the manner of forming the strands into braids and meshes. Figs. 7, 8, 9 and 10 are details relating to Fig. 6.

For the purpose of properly sustaining the parts of the machine in operative position I find it to be of advantage to construct a frame having similarly formed ends, each end having the cross pieces 1 and 2 rigidly held together and sustained in a vertical position by means of the horizontal supporting-plate 3, the treadle connection 4, the tension bars 5 and 6 and other parts; and at the intersection of cross pieces 1 and 2, at 7, I mount the revoluble table 8.

Upon the upper surface of supporting plate 3 is seated the shifting-bar 9 having recesses 10 formed transversely therein and adapted to have a horizontal sliding movement under operation of weight 11 in one direction, and a movement in the opposite direction under operation of treadle 12, for these purposes employing any convenient means as, flexible members or cords 13 and 14 passing over pulleys 15 and 16 respectively, and secured at 17 and 18 at the ends of the shifting-bar; and I employ a second shifting-bar 19 and seat it upon the lower shifting-bar 9 and provide the transverse recesses 20 formed thereon; this shifting bar is adapted to have a sliding movement upon bar 9 under operation of treadle 12 and the weight 21 connected with these parts as by means of cords 22 and 23 passing over pulleys 24 and 25 respectively, these cords being secured upon the ends of this shifting-bar at 26 and 27 respectively, and near the ends of plate 3 are secured stop-lugs 28. As thus constructed bars 9 and 19 are adapted to have a simultaneous movement in opposite directions under operation of treadle 12, as is apparent, and it will be understood that a downward movement of the treadle will cause one end of bar 9 and the opposite end of bar 19 to make contact with lugs 28, and upon release of the treadle these bars will have a reverse movement under operation of weights 11 and 21 until the lugs are engaged by the opposite ends of the shifting-bars; and a movement of the shifting bars is under control of the operator, who works in front of the machine and manipulates the treadle, while braiding the net hereafter described.

The revoluble table is preferably constructed as a cylinder, having the outer surface 29 (Fig. 4) and I provide a resilient means for causing the cylinder to have a normal tendency for circular movement in a direction shown by the arrow (Fig. 4); this could be accomplished by a variety of means, the means shown herein being a flexible member or cord 30 (Figs. 1 and 3.) wound around the table, and having one of its ends secured stationary as at 31 (Fig. 1.) upon the table, the opposite end being secured to the weight 32 and supported by pulley 33.

Upon the surface of the revoluble table 8, secured thereon in alinement, is a series of hooks 34 and over each of these hooks is passed a pair of warps, as warp-members 35 and 36; these warps pass upwardly from hooks 34 one of each of said pairs of warps traversing recesses 10 of shifting-bar 9; each of the other warps traverses one of the recesses 20 of shifting-bar 19, after which they pass downwardly through rings 37 (Figs. 2—3) secured upon supporting plate 3; from rings 37 warps 35 and 36 pass upward as pairs 46, and pass beneath tension bar 38, and transversely pass tension bars 5, 6 and 39 in alternation to their seating on spindles 40, (Fig. 4) where they are conveniently wound as supply-balls, these balls resting upon shelf 41. It will be understood from the description that warps 35 and 36 are employed as a series of pairs and that they have friction contact with rings 37, and with the tension bars for the purpose of being held in a convenient operative position and so that they may have an equal tension, the degree of tension being sufficient to overcome the operation of weight 32; and for this purpose I employ the spiral spring 42 which adds to the degree of compression of bars 6 and 38. Other means may be employed however for producing tension for the pairs or warps, and I do not limit this invention to the particular means shown.

As described, the revoluble table is a very convenient method for supporting the work while braiding the net, and I construct the table of ample size so that by the time the table has performed one revolution a complete net has been formed; and by use of the devices thus described a net may be very quickly braid-

ed, the process being as follows: Warps 35 and 36 being positioned on hook 34 already described, or as upon hook *a*, Fig. 1, and as clearly shown in Fig. 7, the strand 43 is placed transversely therebetween as shown in Fig. 8, at which time the operator presses the treadle downward, which movement as already explained will cause the shifting-bars to move in opposite directions, and will cause warps 35 and 36 to pass each other and will also cause strand 43 to be inclosed, as clearly shown in Fig. 9; the operator then passes the free end of the strand between warps 35 and 36 as shown in Fig. 10, and by reversing the movement of the treadle, weights 11 and 21 will actuate the shifting-bars in opposite directions, and will cause strand 43 to be again inclosed as shown in Fig. 6; and this process may be continued, to cause a braid of any desired length, as is obvious; and as clearly shown by Fig. 6, the strand will be braided with the warps. I find it convenient however, to continue this braiding upon the warps but a limited distance, and after the strand has been braided in the manner described and as shown by Fig. 6, it is carried in a substantially transverse or sidewise direction to the next pair of warps secured upon an adjacent hook, as upon hook *b*, Fig. 1, where the process is repeated in this manner until the strand has been braided upon, and thereby secured to, each of the warps of each pair; afterwards another lash or strand is introduced, as strand *c* of Fig. 1, and is treated in the same manner as strand 43; and successive strands are introduced in the manner described, and as is obvious, the braiding of the net by use of these devices consists of the repeated and manual passage of the strand horizontally between warps 35 and 36, and then the repeated passage of the strand in a reversed direction, and operating the treadle at each horizontal movement, and then passing the strand to the adjacent pair of the series of pairs of warps, to perform braiding of the strand with the warps.

Having quite fully explained operation of devices while enumerating the several parts, further description is not needed, except to more clearly point out operation of the rotatable table, and the means for causing its rotation. At each upward movement of the treadle, this table rotates somewhat forward in the direction indicated by the arrow in Fig. 4, caused by operation of weight 32 in part, and in part by the release of the treadle. This forward rotation of the table is certain in operation, for weight 32 is suspended at the rear of the machine by cord 30 (Fig. 4.), this cord passing over pulley 33 (Fig. 1.) near the upper part of the frame and thence passing beneath table 8 (Fig. 4.), after which said cord encircles the table as clearly shown in Fig. 4 and is secured at 31 upon the curved surface of the table as shown in Fig. 1. It will be noted by reference to Fig. 4, that cord 30 encircles the table by passing in a direction opposite to that indicated by the arrow, and weight 32 has a sufficient gravity to overcome all resistance opposed to a rotatable movement of the table; the rear surface of the table, therefore has an upward rotatable movement. It will be understood that a downward rock-movement of treadle 12 causes an unwinding of the warps from spindles 40 and overcomes the resistance of the tension-bars 38, 5, 6 and 39 to the passage of the warps, and overcomes all friction to the passage of the warps through rings 37 or recesses 10 and 20; this operation is certain on account of the movement of shifting-bars 9 and 19 from the downward swing of the treadle; as soon as the treadle has an upward swing, table 8 is free to have a limited rotatable movement under control of weight 32. The use of the rotatable table as shown has proven to be of utility, as the operator at all times has the net in a convenient position until it is completely formed. In braiding a net, one strand is completely braided, after which new strands are successively introduced until a complete revolution is made of table 8, and the net 45 finished.

What I claim as my invention is;—

1. A machine for the purpose described, comprising a pair of recessed shifting-bars disposed adjacent and parallel with reference to each other; a revoluble table having an outer surface disposed parallel with and adjacent to said shifting-bars, and means to cause a longitudinal movement of said recessed shifting bars.

2. A machine for the purpose described, comprising a pair of shifting-bars disposed adjacent and parallel with reference to each other; a revoluble table having an outer surface disposed parallel with and adjacent to said shifting-bars, and means to cause a simultaneous longitudinal movement of said shifting-bars.

3. A machine as described comprising a pair of shifting-bars, mounted upon a suitable frame and disposed adjacent and parallel with reference to each other; an operating table formed as a cylinder and mounted upon said frame and having a surface disposed parallel with and adjacent to said shifting-bars; means to cause a revoluble movement of the operating table and means to cause a simultaneous longitudinal movement of said shifting-bars in directions opposite to each other.

4. A machine for the purpose described, comprising a pair of adjacently disposed recessed shifting-bars; a revoluble table having an outer surface disposed adjacent to said shifting bars; and means to cause a longitudinal movement of said adjacently-disposed shifting-bars in directions opposite to each other.

In testimony whereof he has affixed his signature in presence of two witnesses.

HENRY T. RICHMOND.

Witnesses:
O. J. DAVIS,
WM. VAN DOREN.