

(No Model.)

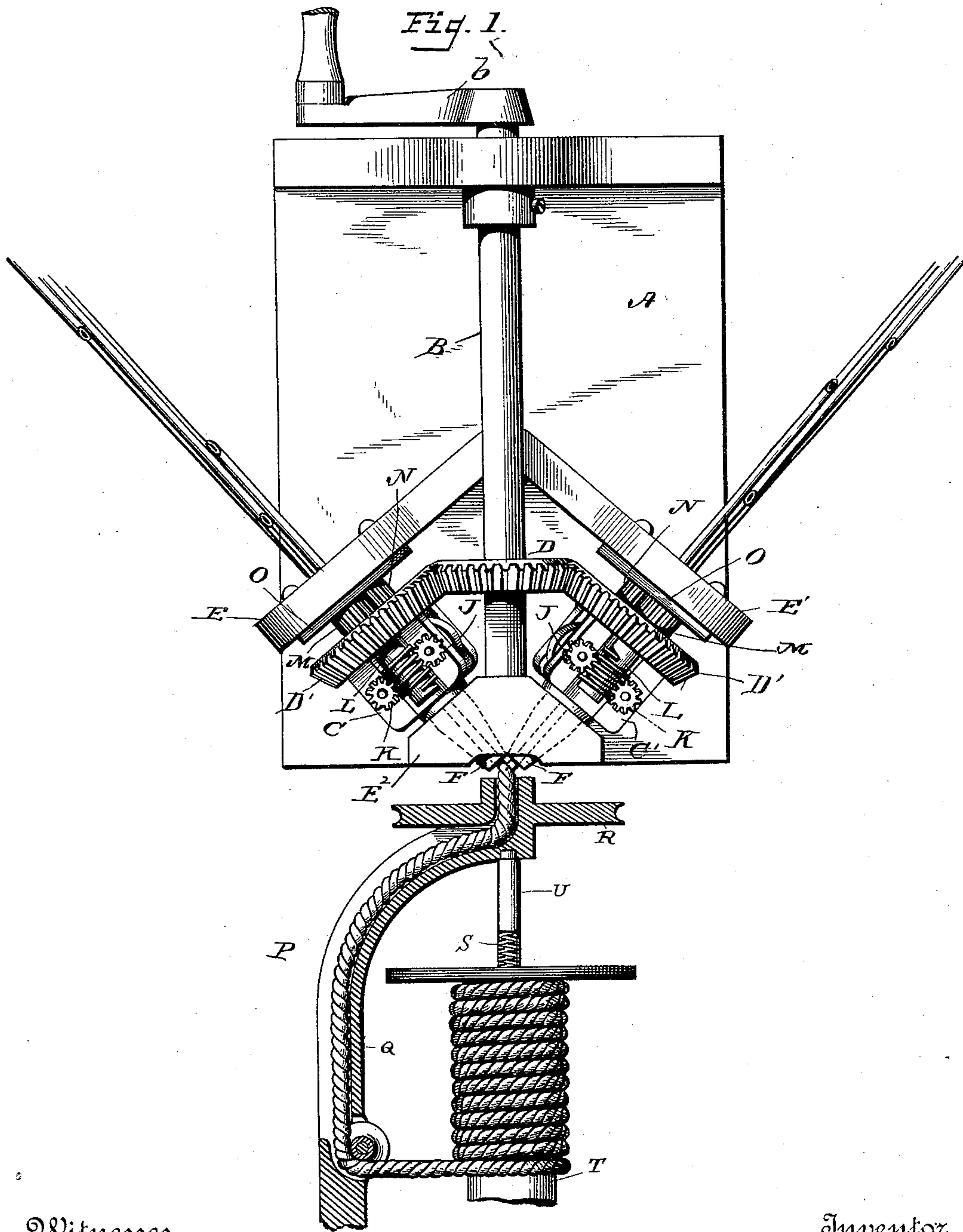
2 Sheets—Sheet 1.

G. H. ELLIS.

MACHINE FOR MAKING TWINE FROM STRAW, FLAX, HEMP, &c.

No. 433,856.

Patented Aug. 5, 1890.



Witnesses

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Inventor

George H. Ellis

By his Attorneys

torneys
R. & A. Lacey

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Fig. 2.

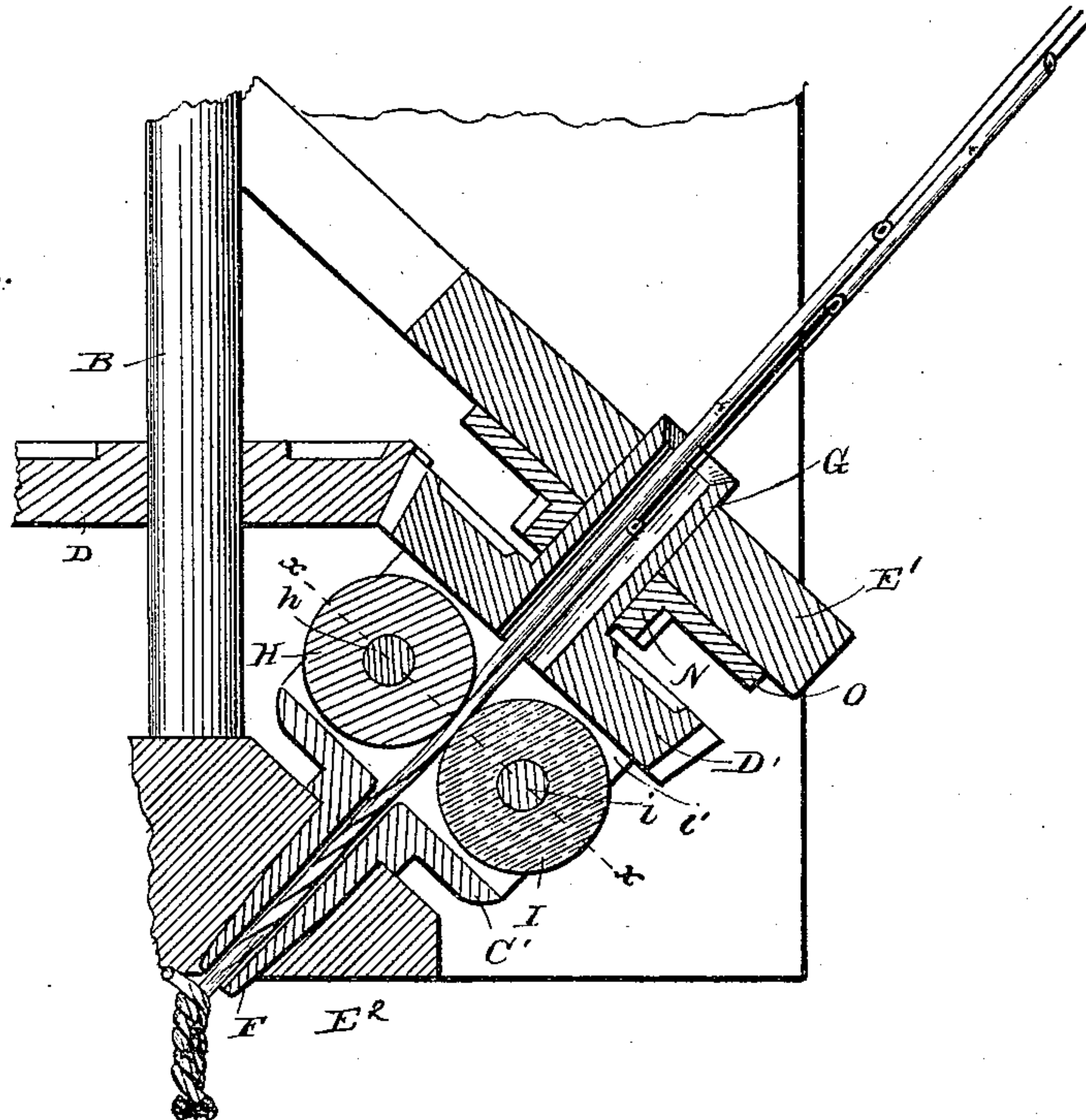


Fig. 3.

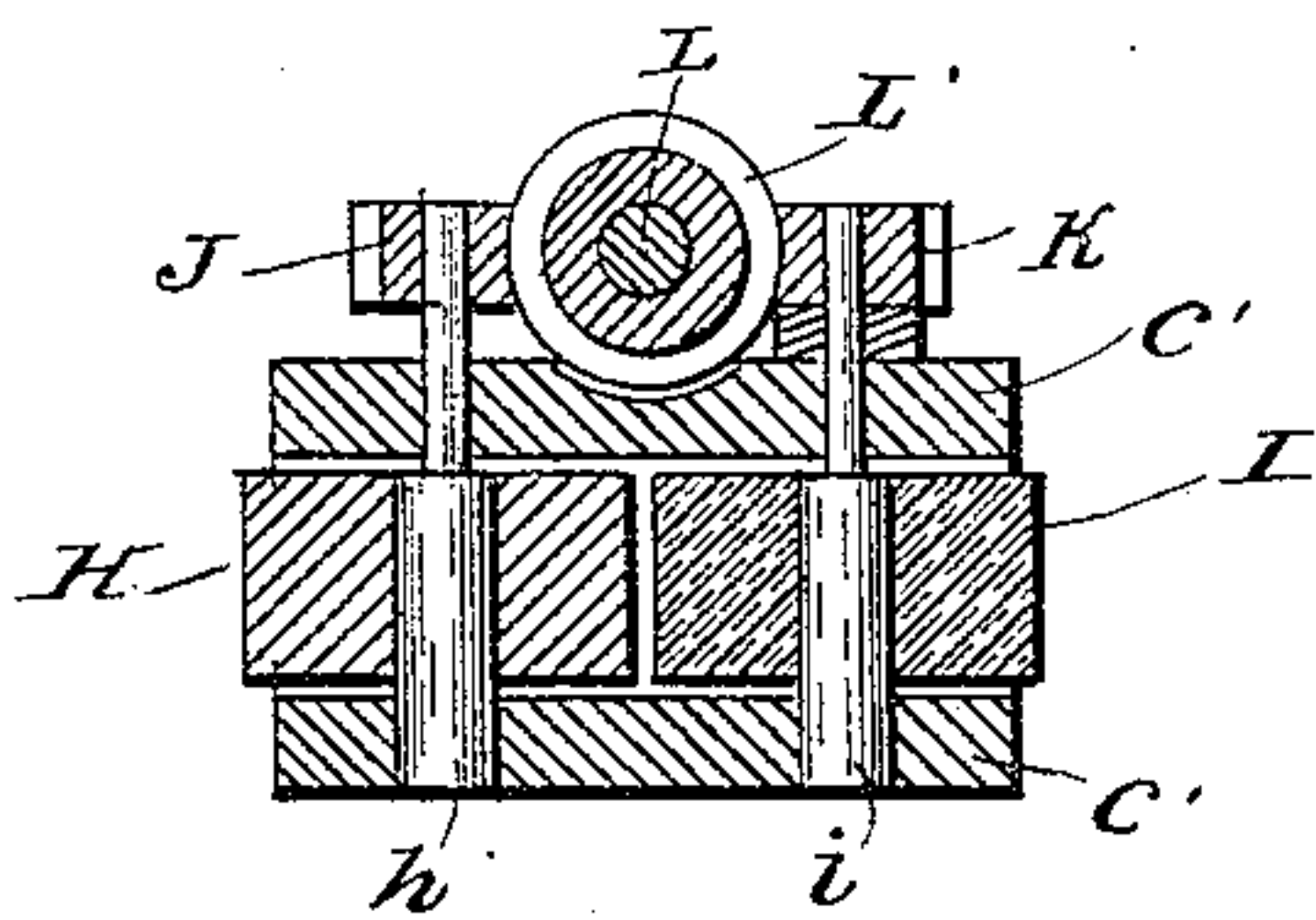
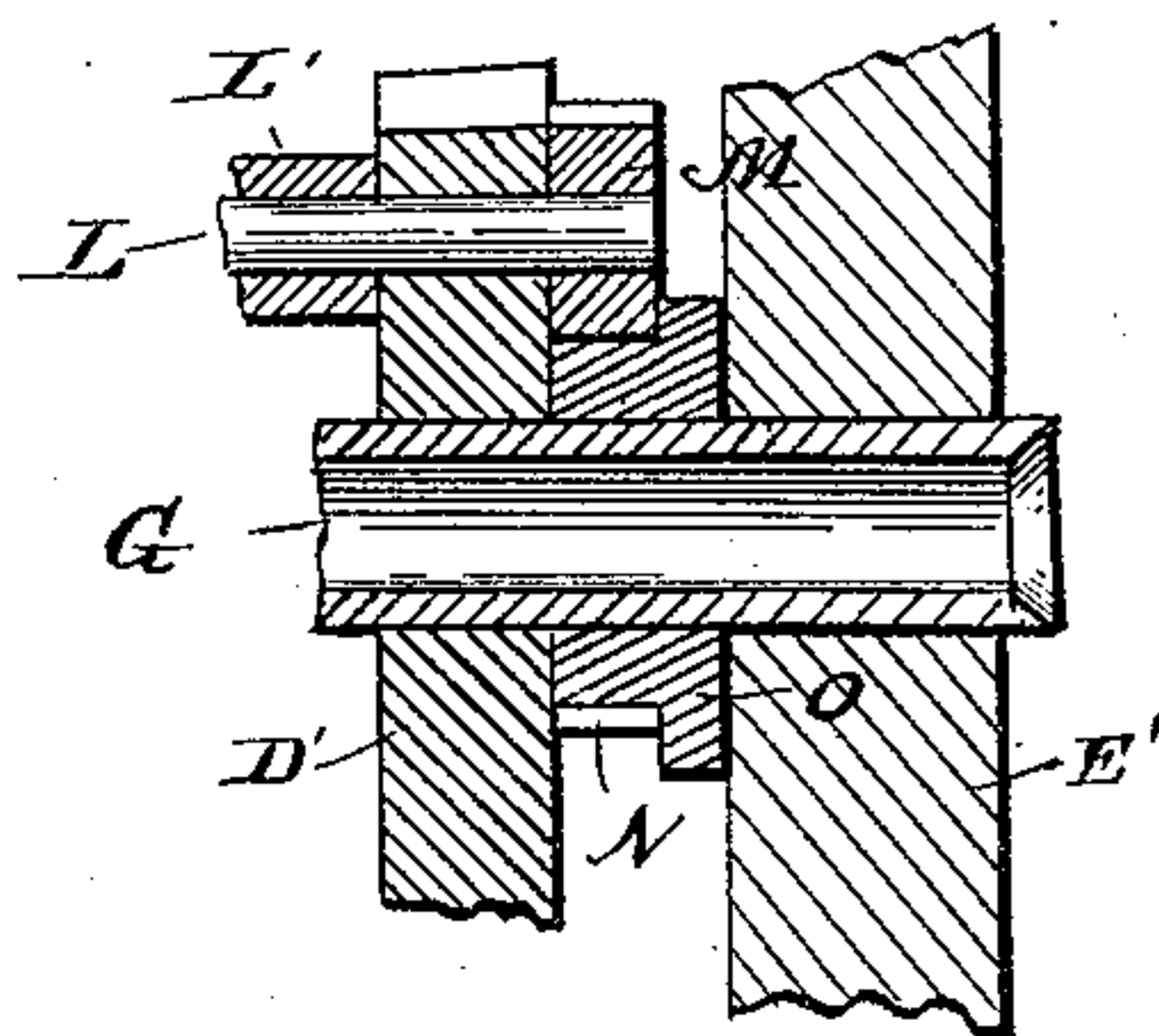


Fig. 4.



ATTEST.

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UNITED STATES PATENT OFFICE.

GEORGE H. ELLIS, OF SAUK CENTRE, MINNESOTA, ASSIGNOR OF ONE-HALF TO HENRY KELLER.

MACHINE FOR MAKING TWINE FROM STRAW, FLAX, HEMP, &c.

SPECIFICATION forming part of Letters Patent No. 433,856, dated August 5, 1890.

Application filed March 24, 1890. Serial No. 345,172. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. ELLIS, a citizen of the United States, residing at Sauk Centre, in the county of Stearns and State of Minnesota, have invented certain new and useful Improvements in Machines for Making Twine from Straw, Flax, Hemp, &c., and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention aims to provide a twine made wholly and entirely from straw, and which will for all practical purposes be of uniform thickness and strength throughout its entire length, and which will be strong, smooth, and pliable, not liable to break when passing through the various tension devices, guides, and knotter mechanism of the modern binder, and which will pass readily through the eye of the binder-needle without bunching or stripping, and which can be tied in any ordinary knot by any harvester-knotter mechanism.

The chief purpose and object of the invention is to devise a mechanism for constructing the twine by machinery that will be simple, cheap, and efficient, and will perform the work in a rapid and convenient manner. The principal objection obtaining against straw rope or twine as heretofore constructed is its unequal thickness or roughness, the latter causing it to bunch or strip in the eye of the binding-needle, and the first-mentioned objection causing it to break when passing through the several guides and tension devices. When wrapped by a thread or strand, as has been proposed, the cost of production is so great as to practically keep it off the market, and the said straw or thread is liable to break and bunch up in the eye of the binding-needle and cause delay and vexation in readjusting the twine.

The salient feature of the present invention is the mechanism for carrying into effect the method which is claimed in the application filed by me March 20, 1890, Serial No.

344,652, and which consists of a series of rotatory strand-forming twisting-heads having converging axes, each twisting-head having motion on its axis only, and the delivery portions of such heads being disposed in close proximity to each other, and a rotatory twister arranged to twist together the strands immediately upon quitting the delivery portions of the twisting-heads.

A further feature of the invention is the holding of the strand under compression during the process of twisting together the straws which comprise the said strand. To effect this end I provide a tube, which I will designate as a "spinning-tube," in which the straws to form the respective strands are confined while being twisted together. This tube must have a bore equal to the size of the completed strand, so as to compress the straws while twisting, thereby making the completed strand of uniform thickness. Obviously for different sizes of strands spinning-tubes of different-sized bores must be provided. These spinning-tubes may be separate from the twisting-heads, or may form a part of the twisting-head frame, as required. Two or more single strands may be twisted together to form a twine of two, three, or as many plies as desired. Owing to the tendency of the straws which compose a strand to fly apart, it has been found necessary to twist the strands together as close as possible to the exit ends of the spinning-tubes, or delivery portions of the twisting-heads; hence it has been determined by practical demonstration that the said exit ends or delivery portions of the twisting-heads must be brought as close together as possible and that the strands must be grasped and twisted together as close as possible to the ends of the spinning-tubes or delivery portions of the twisting-heads.

To carry out the invention in a simple, convenient, and practical manner, I have devised the mechanism which hereinafter will be more fully described, and which is shown in the accompanying drawings, in which—

Figure 1 is a plan view, parts being broken away, of a machine of my construction embodying my invention. Fig. 2 is a horizontal section, on an enlarged scale, of a single twisting-head, showing the means for operating it. Fig. 3 is a section on the line X X of Fig. 2, looking to the left. Fig. 4 is a detail section showing the means for operating the feed-rollers.

10 A represents a frame or support for the operating parts of the machine.

B is a shaft, which is driven by any suitable power, as by crank *b*.

C C' represent two rotatory strand-forming twisting-heads, which are geared with shaft B, preferably by means of the miter-wheels D and D', the miter-wheel D' forming part of the twisting-head frames. These twisting-heads are arranged so that their axes converge, the angle between them being sufficient to effect the best results and prevent interference of the one with the other and with the shaft B, an angle of about forty-five degrees to the medial line being found to give the best results. These rotatory twisting-heads C and C' are journaled at their ends in the bearing-blocks E, E', and E² in any suitable manner, preferably by the tubes F and G, and have motion on their axes only.

30 H and I are two feed-rollers, which are secured on the shafts *h* and *i*, that are journaled in the sides of the twisted frame. One end of each of the shafts *h* and *i* is reduced and passes through one side of the frame. 35 The projecting ends of the shafts are provided with the pinions J and K, which are in gear with the worm-shaft L, the latter being journaled in the gear-wheel D' and provided on its exterior end with the pinion M, which meshes with the pinion N on the plate O, which is secured to the bearing E or E'. The feed-roller I is preferably of compressible material—such as rubber—to permit the passage of the straws between it and the roller H.

45 The tube F is of a bore corresponding with the diameter of the strand or twine to be formed, and is of sufficient length to effect a twisting in of the ends of the straws, the twisting being done between the exit end of the said tube and the rollers H and I, as shown in Fig. 2. This tube serves to compress the straws and hold them in close relation during the process of twisting.

The operation of the machine is as follows: 55 The straws are fed to the rotatory strand-forming twisting-heads one or two at a time in such a manner that the ends of one straw or set of straws will overlap the end or ends of the other straw or straws, as shown in Fig. 60 1, so that when the straws are twisted together they will form a continuous strand, the twisting of the straws being effected by operating shaft B, which, through the gearing D and D', revolves the strand-forming twisting-

heads C and C' on their axes only, the rollers 65 H and I being operated through means of the gearing J, K, L, M, and N. As the strands emerge from the spinning-tubes or delivery portions of the strand-forming twisting-heads, they are grasped by a suitable rotatory twister, as P, which twists them together immediately upon being freed from the confinement of the delivery-tubes. Inasmuch as various means may be devised for twisting the strands together, for the sake of simplicity I have 75 shown a flier P, which is of well-known construction and operation, and comprises the frame Q and the driving-wheel R, the spindle U, formed with the double screw-threads S, and the receiving-spool T. 80

I do not limit the use of my invention to straw alone, but I use the crude material of other vegetable growths—such as flax-stalks, hemp, &c. While I have used the word "straw" alone in most instances throughout 85 the foregoing description, I have used it in a generic sense to cover any kind of vegetable growths when taken in their crude state and being capable of manufacture into twine.

Having thus described my invention, what I 90 claim, and desire to secure by Letters Patent, is—

1. The combination, with a series of rotatory strand-forming twisting-heads having converging axes, each twisting-head having 95 motion on its axis only and the delivery portions of such heads being disposed in close proximity to each other, of a rotatory twister arranged to twist together the strands immediately upon quitting the delivery portions 100 of the twisting-heads, substantially as described.

2. The combination, with a series of rotatory strand-forming twisting-heads having converging axes, each twisting-head having 105 motion on its axis only and the delivery portions of such heads being disposed in close proximity to each other, of a rotatory twister arranged to twist together the strands immediately upon being freed from the confinement of the delivery portions of the twisting-heads, substantially as described. 110

3. The combination, with a converging series of rotatory strand-forming twisting-heads having their axes each arranged at any angle 115 of approximately forty-five degrees to a medial line, each having motion on its axis only and each having a spinning-tube of exactly the diameter of the strand to be produced, of a rotatory twister arranged to twist together 120 the strands immediately upon being freed from the confinement of the delivery-tubes of the twisting-heads, substantially as described.

4. The combination, with the converging series of rotatory strand-forming twisting-heads, each having motion on its axis only 125 and being provided with a pair of feed-rolls

and with a delivery-tube of exactly the diameter of the strand to be produced, of a rotatory twister arranged to twist together the strands immediately upon being freed from
5 the confinement of the delivery-tubes of the twisting-heads, and means for rotating the twister-heads upon their axes and turning the feed-rolls, substantially as described.

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

GEORGE H. ELLIS.

Witnesses:

C. M. SPRAGUE,
JOS. O. ESTREM.