

(No Model.)

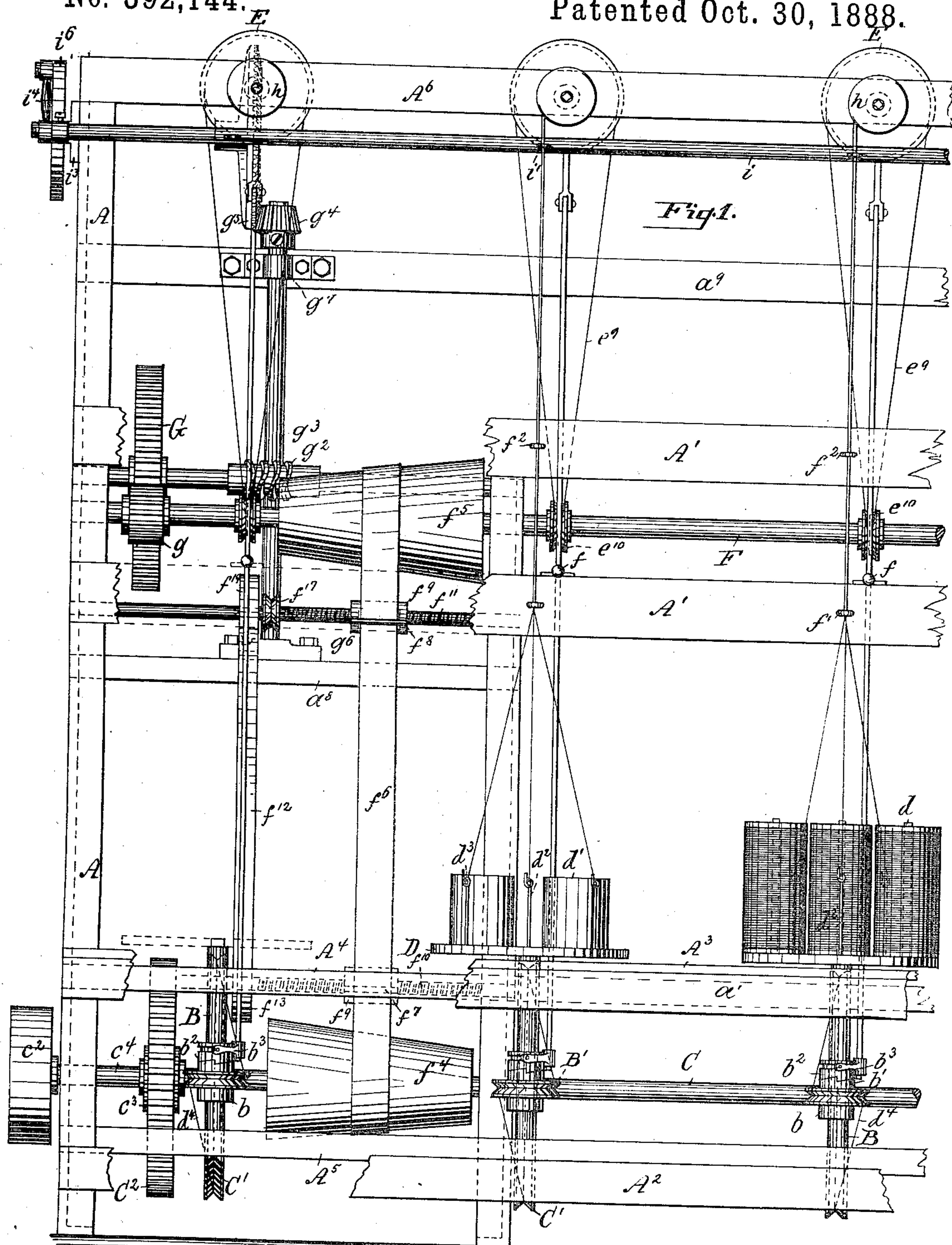
3 Sheets—Sheet 1.

H. BORMANN.

MACHINE FOR MAKING SEWING THREAD OR CORD.

No. 392,144.

Patented Oct. 30, 1888.



WITNESSES:

Thomas M. Smith.

Benj. Holmes.

INVENTOR:

Hermann Bonmann,
By J. Walter Douglass.
Atty.

(No Model.)

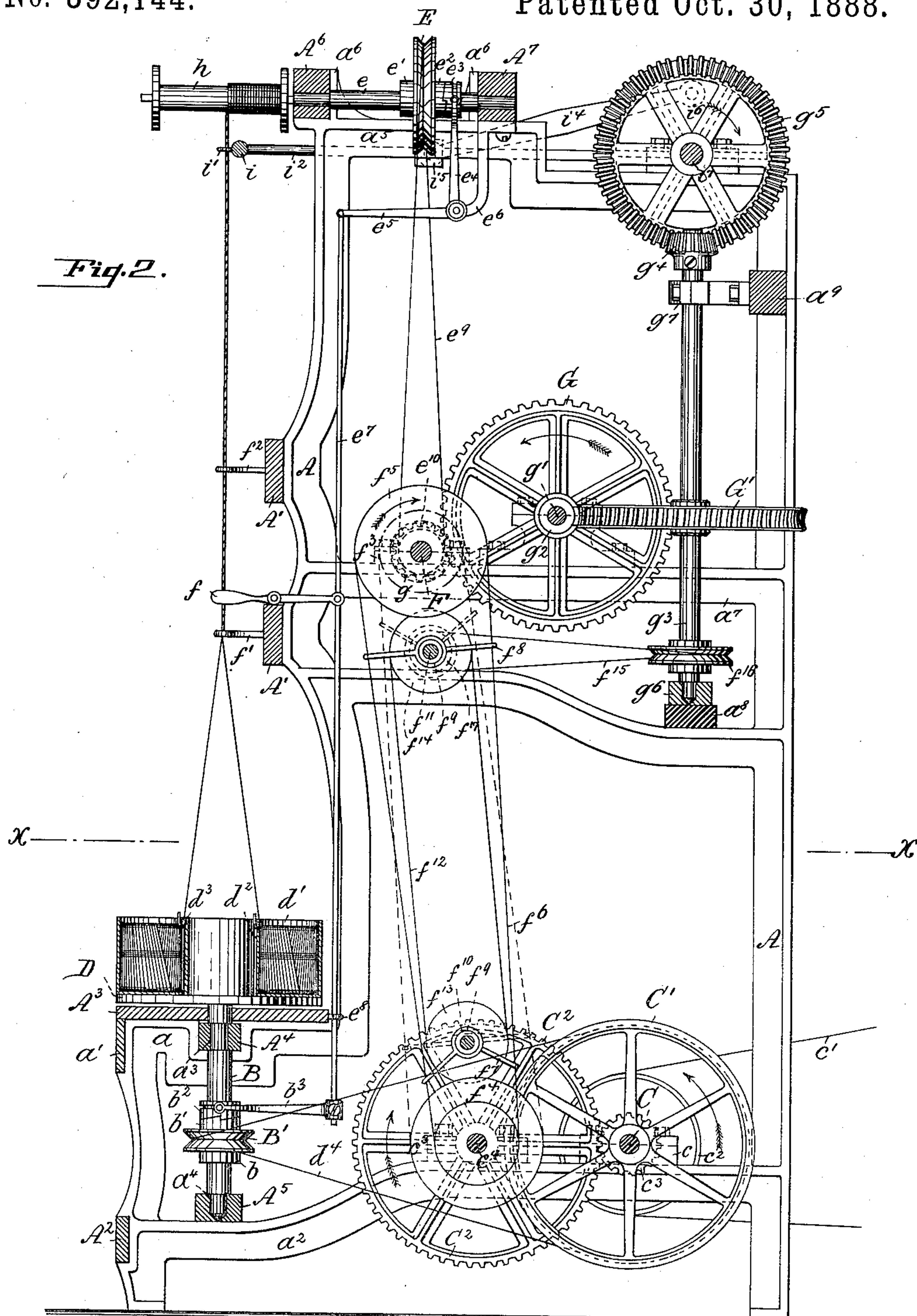
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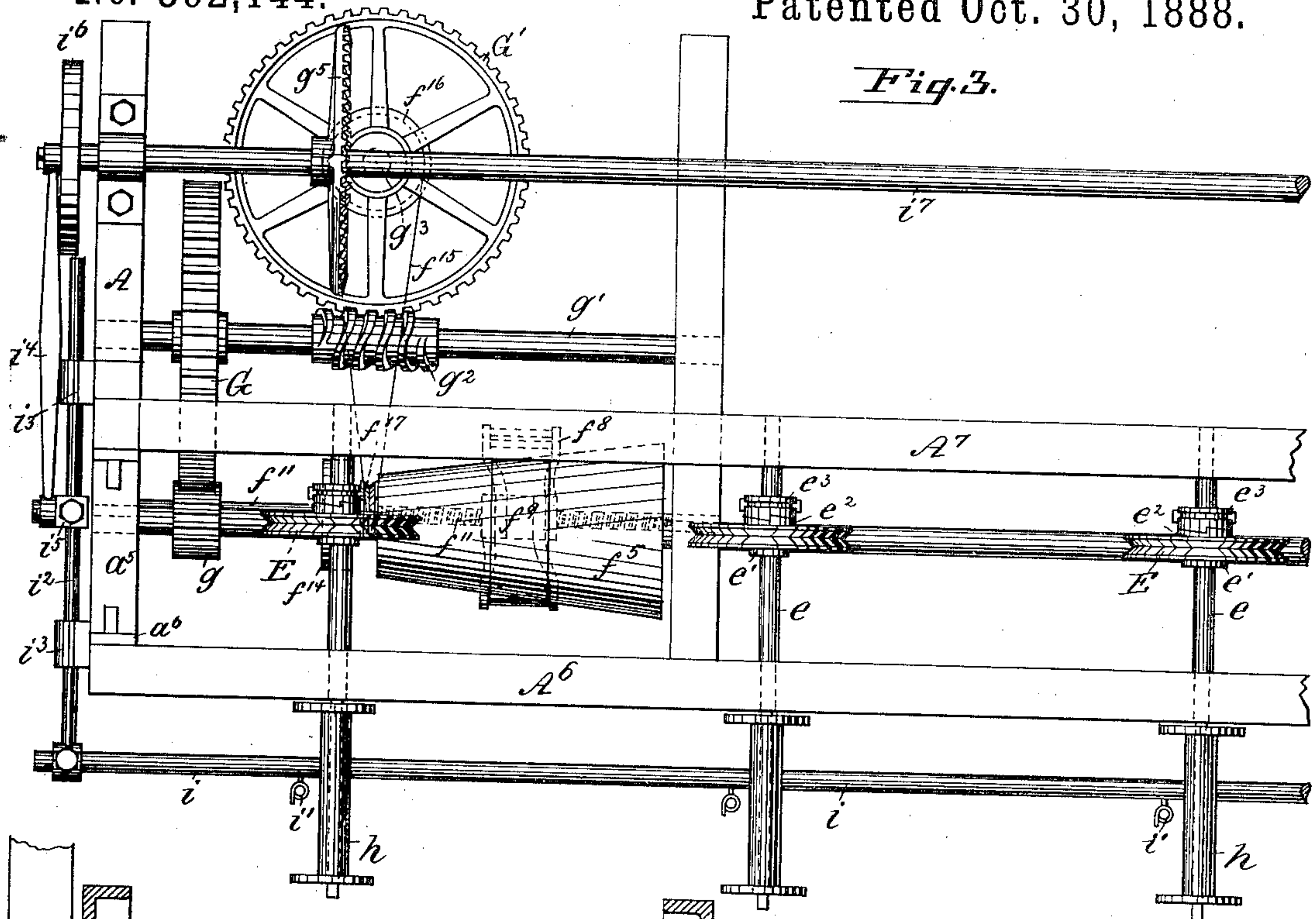


Fig. 3.

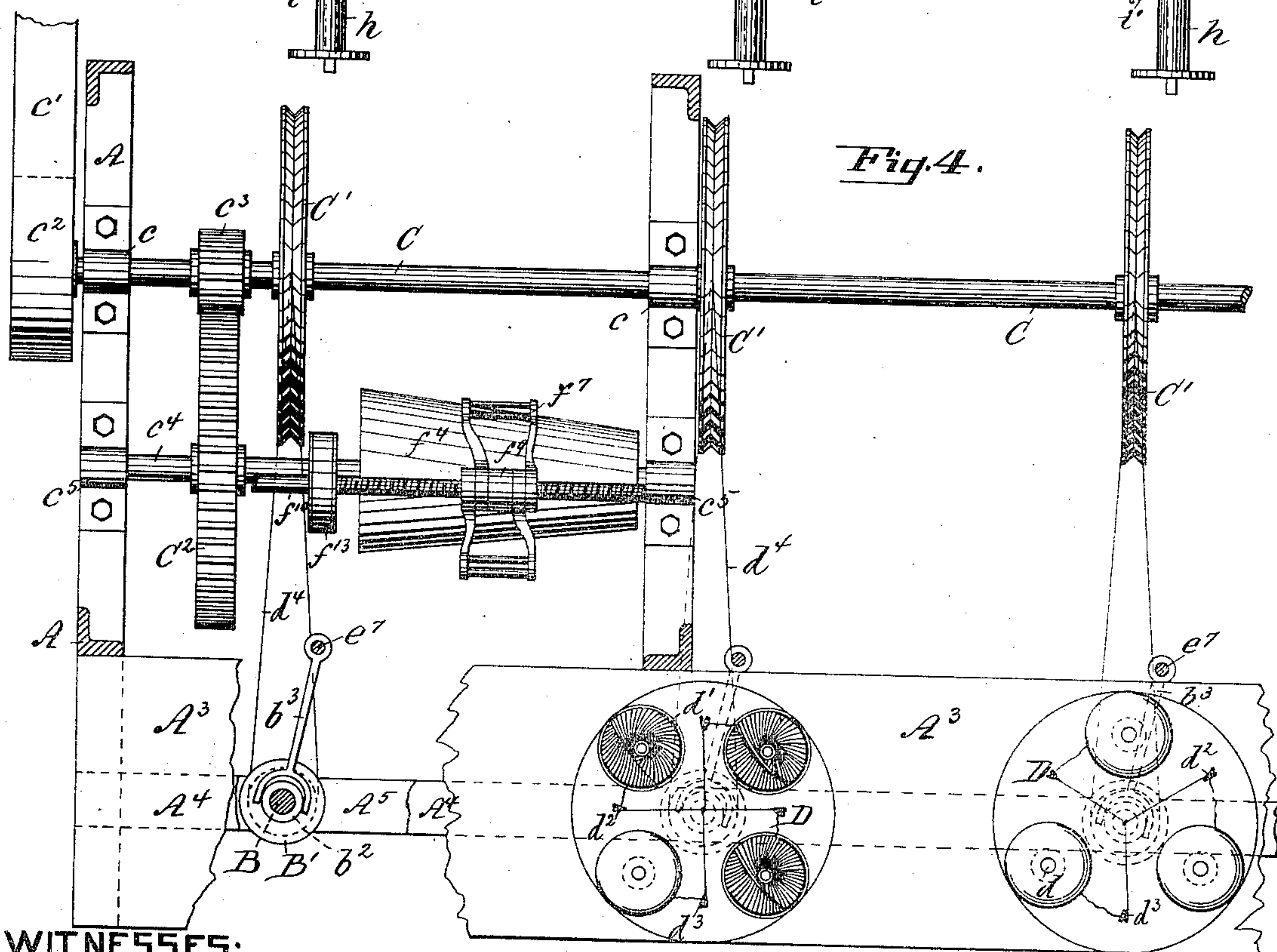


Fig. 4.

WITNESSES:

Thomas M. Smith.

Benj. H. Smith -

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By J. Walter Douglas.

[Signature]

UNITED STATES PATENT OFFICE.

HERMANN BORMANN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
J. WALTER DOUGLASS, OF SAME PLACE.

MACHINE FOR MAKING SEWING THREAD OR CORD.

SPECIFICATION forming part of Letters Patent No. 392,144, dated October 30, 1888.

Application filed December 6, 1887. Serial No. 257,091. (No model.)

To all whom it may concern:

Be it known that I, HERMANN BORMANN, a subject of the Emperor of Germany, but now residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Making Sewing Thread or Cord, of which the following is a specification.

My invention has for its object to provide a machine of comparatively simple construction for making sewing thread or cord composed of two or more strands of flax or other vegetable or animal material and one or more metallic wire or wires intertwisted together and laying or twisting two or more of said strands in the opposite or same direction to that in which the wire or wires is or are intertwisted with the fibrous vegetable or animal material to form a two or more ply perfectly-pliable sewing thread or cord for various purposes.

Previous to my invention the twisting with fibrous material of a wire or wires has been conducted on an ordinary rope-walk, which to a greater or less extent was objectionable, because of the slowness of its production and the want of uniformity in the twist thereof; but one of the chief difficulties encountered has been the breaking short or flying off of the wire in the twisting operation; but these objectionable features I have overcome and have designed a machine in which for the first time, as far as I am aware, it is rendered possible to intertwist a wire or wires of one nature with fibrous vegetable or animal material of an entirely different nature, and thereby producing a perfectly-pliable thread or cord for sewing boots or shoes and capable of being used for shoe-strings, fishing-lines, and many other purposes.

The nature and characteristic features of my improved machine for the production of the thread or cord will be fully understood by reference to the accompanying drawings, forming part hereof, and in which—

Figure 1 is a front elevation of my improved twisting apparatus, parts being broken away. Fig. 2 is a vertical cross-section thereof. Fig. 3 is a top view, and Fig. 4 is a horizontal section on the line $x x$ of Fig. 2.

It is customary in such type of machinery to provide several sets of twisting mechanisms in a single frame, and as each is a duplicate of the others in construction and operation I have therefore in Fig. 1 only shown three sets of such mechanisms; but it will nevertheless be understood that any desired number may be provided for increasing the production of the improved cord or thread of whatever given ply may be desired—as, for example, one, two, three, or more ply.

Referring to the accompanying drawings for a further description of the invention, A represents the standards or supporting-frames, of stout material, set at suitable distances apart, and connected with each other by means of upper and lower longitudinal bars or rails, A^1 and A^2 . The lower portion of each standard A projects outward, forming a support, a , for the reception of the table A^3 , with its projecting flange a' . Each support a is provided with a recess for the reception of the longitudinal bar A^4 , and a similar longitudinal bar, A^5 , is secured to and supported on the lower transverse frame, a^2 , of the standard A. The longitudinal bar A^4 is provided at suitable distances apart with apertures a^3 , forming journal-bearings for the spindles B, and the longitudinal bar A^5 is provided with sockets a^4 for receiving the lower extremities of the spindles B. A hub, b , is rigidly secured to each spindle B, for holding in position a V-shaped groove-pulley, B' , loosely mounted on each spindle.

Formed integral with or secured to the pulley B' is a hub or collar, b' , with a notched upper surface for engaging a clutch, b^2 , feathered to the spindle B and operated by a bifurcated horizontal arm, b^3 . The upper extremity of each spindle has secured to it a circular creel or flier, D, carrying as many spool holders or spindles d or cups d' as there are strands of fibrous material and wire or wires to be intertwisted together, and in each creel or flier D, at suitable distances apart and concentric therewith, are guide and tension spindles or posts d^2 , provided with eyes d^3 in their upper extremities.

With the upper transverse bar or frame, a^5 , of each standard A are formed brackets a^6 for supporting the longitudinal beams A^6 and A^7 ,

and in these beams, at suitable distances apart, are formed bearings for receiving each horizontal shaft e , on which is rigidly secured a hub or collar, e' , for holding in position a grooved pulley, E , loosely mounted on said shaft.

Formed integral with or secured to the pulley E is a collar or hub, e' , having a notched outer surface for engaging a clutch, e^3 , feathered to the horizontal shaft e . This clutch e^3 is operated by the bifurcated arm e^4 of a bell-crank lever, e^5 , pivoted at its inner extremity to a bracket, e^6 , secured to the longitudinal beam or bar A^7 . The forward extremity of the bell-crank lever e^5 is pivoted to a vertical rod, e^7 , suitably attached to one extremity of the bifurcated horizontal arm b^3 of the clutch b^2 , which is feathered to the spindle B . The vertical rod e^7 passes through a guide or eye, e^8 , secured to the inner edge of the table A^3 , which serves to guide and insure regularity in the vertical movement thereof. Centrally to this rod e^7 is pivoted a horizontal hand-lever, f , held in bearings provided therefor in the frame A' , attached to the front of the machine, for engaging and disengaging the clutches b^2 and e^3 . Secured in the face of this frame A' is a guide, f' , having an eye, and to a similar frame, A' , attached to the front of the machine a short distance above the former frame, is a guide, f'' , having an eye. Both of these guides serve to direct the cord or thread from the creel or flier to the spool in a vertical course, to be presently fully described.

The outer portion of each shaft e is preferably formed square to accommodate the spool h and hold the same rigidly in position thereon. In the drawings are shown only a single series of fliers and mechanism for twisting the cord or thread and automatically laying up the cord or thread onto spools; but it is obvious that with but slight modification of the frame-work the mechanism for operating the machine might be arranged so that two rows of spindles, fliers, and spools could be operated from the same driving-shaft and each flier or creel run independently of the others, as hereinafter fully explained.

The main shaft C of the machine is held in journal-boxes c , mounted on the transverse bars a^2 of the standards A . This shaft receives its motion from any suitable source by means of the belt c' and pulley c^2 , as shown in Fig. 2. On the main driving-shaft C are rigidly mounted as many grooved pulleys C' as there are spindles to be driven. Motion is imparted to the creel or flier D by means of the belt d' , passing around the grooved pulley C' of the shaft C and the smaller pulley, B' , of the spindle B .

A spool, h , is mounted on the shaft e , and motion is imparted thereto by means of a belt, e'' , passing around a grooved pulley, E , and around a similar but smaller grooved pulley, e''' , mounted on the counter-shaft F , held in journal-boxes f^3 , supported on the transverse bars a^7 of each standard A . This shaft F has

rotary motion communicated to it from the main driving-shaft C by means of a pinion, c^4 , which meshes with a gear-wheel, C^2 , mounted on an intermediate shaft, c' , held in journal-boxes c^5 , which are supported on the transverse bars a^2 of the standards A . To the intermediate shaft, c' , is secured a cone-shaped pulley, f^4 . Motion is imparted to the counter-shaft F , provided with a similar cone-shaped pulley, f^5 , by means of a belt, f^6 , passing around said cone-shaped pulleys f^4 and f^5 . These cone-shaped pulleys are employed to insure an even or uniform twist throughout of the cord or thread laid up or wound automatically upon the spool or bobbin h —that is to say, as the speed of the flier or creel D is at all times a uniform one, and as the core of the spool h is constantly increasing in diameter, it therefore becomes necessary to be able to decrease the speed of each spool, because unless decreased the cord or thread being laid up onto the spools from the respective fliers or creels D would be apt to have more twist in one portion than in another; but this is entirely overcome by the use and arrangement of the cone-shaped pulleys operating in the manner to be described.

The belt f^6 is shifted on the cone-shaped pulleys f^4 and f^5 by means of guides f^7 and f^8 , mounted on worm-nuts f^9 . These worm-nuts are actuated by worms f^{10} and f^{11} , journaled in bearings provided to receive them in the transverse bars a^2 of the standard A . These worms f^{10} and f^{11} have motion imparted to them from the shaft g^3 by means of the belt f^{15} , which passes around the pulley f^{16} , mounted on the shaft g^3 , and also around the pulley f^{17} , rigidly secured to the worm f^{11} . To revolve both worms simultaneously, two pulleys, f^{13} and f^{14} , similar in diameter, are rigidly secured to the worms f^{10} and f^{11} , around which pulleys a belt, f^{12} , passes, as clearly illustrated in Figs. 1 and 2.

To automatically lay up the cord or thread onto the spool h , mounted on the shaft e , a longitudinal U-shaped rod, i , is provided, extending the entire length of the machine, having as many eyes or guides i' secured thereto as there are fliers or creels D . This rod i at each end is formed integral with a horizontal sliding rod, i^2 , moving freely in bearings i^3 , suitably secured to the upper transverse frames, a^5 , of the standards A , as shown in Fig. 3. These rods i and i^2 are moved back and forth by connecting-rods i^4 , pivoted to hubs or collars i^5 , mounted on the horizontal sliding rods i^2 , and to a crank-disk, i^6 , which is rigidly secured to the shaft i^7 . Motion is imparted to this shaft from the counter-shaft F through the intervention of the pinion g , which is mounted on said counter-shaft F . This pinion meshes with the gear-wheel G , mounted on an intermediate shaft, g' , carrying a worm, g^2 , which engages with a worm-wheel, G' , secured to a vertical shaft, g^3 . The shaft g^3 has on its upper extremity a beveled pinion, g^4 , which meshes with a beveled wheel, g^5 , mounted on

the shaft i' , as clearly shown in Fig. 2. The vertical shaft g^3 at its lower extremity is journaled in a box, g^6 , which is mounted on the cross-beam a^8 of the standard A, and near the upper extremity of this shaft, for holding it in proper vertical position, is a journal-box, g^7 , secured to the cross-beam a^8 , attached to the standards A.

The mode of operation of my improved machine may be explained in the following manner: The fibrous vegetable or animal material, if in balls, is placed in the cups d' , or, if wound upon bobbins, mounted on spindles or holders d , and the spools of wire likewise placed on one or more of the holders d , mounted on the circular creel or flier D, as shown in Figs. 1 and 2. The several strands are led upward through the eyes d^3 in order to insure a proper tension and a regulated delivery of the strands of fibrous vegetable or animal material, and metallic wires to be intertwisted together through the eyes or guides f' , f^2 , and i' and the ends fastened to the spool h in any suitable manner. Motion is now communicated to the main driving-shaft C, which causes each flier or creel to be actuated for twisting or intertwisting the several strands of fibrous material and wire or wires uniformly into a cord, while the spooling mechanism, before described, is automatically laying up the cord or thread evenly onto each bobbin or spool h .

If from any cause one of the strands of fibrous material or the wire or wires should break down while the machine is in full operation, the flier D and also the bobbin or spool h may be readily and quickly stopped by simply depressing the lever f , which will cause the vertical rod e^7 to be raised and the bell-crank lever e^6 and horizontal arm b^3 actuated thereby to release the pulleys B' and E from their respective clutches b^2 and e^3 , feathered to and sliding on the shaft e and spindle B, and leaving the same at a standstill, while the pulleys continue to revolve. After the damage has been repaired the flier D and spool h may again be started up by simply elevating the hand-lever f , thereby causing the clutches b^2 and e^3 to again engage the pulleys B' and E on the spindle B and shaft e , and the operation resumed until the spools are filled in the manner hereinbefore fully described for producing what is termed a "single-ply" thread or cord.

To produce a thread or cord of more than a single ply—for example, a "three-ply" thread or cord—three of the spools h , filled with the cord or thread having the wire or wires combined therewith, may be removed from the shaft e and mounted on the holders d of the flier or creel D, and the three-wired strands passed around the eyes d^3 of the guides d^2 in the creel or flier D the requisite number of times to attain a proper tension, and these strands passed thence upward through the guides f' , f^2 , and i' to the spool h , firmly held on the shaft e . The machine is then started up, laying up the three-wired fibrous strands in the same direction in which the single strands hav-

ing the wire intertwisted therewith are formed; but I have found that the best results are obtained by twisting the three-ply cord in the opposite direction to that in which the single strands are laid up, which can be readily accomplished by simply changing the position of the belt d^4 , passing around the grooved pulleys C' and B', as shown, for instance, in Figs. 1 and 2, to the position illustrated in Fig. 1 to the right, in which three spools of cord or thread are shown mounted on a creel or flier, D. By this change of the belt d^4 a reversal in the movement of the twisting mechanism of the machine will be insured for the accomplishment of the purpose desired in a most satisfactory manner.

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a vertical spindle journaled to the machine-frame, a grooved pulley with a notched hub mounted on said spindle, a main driving-shaft with a pulley mounted thereon, and a belt traveling around the same to cause motion to be imparted to said shaft, a grooved pulley mounted on said shaft, and a belt for imparting motion to said spindle, of a horizontally-located shaft journaled to the machine-frame and adapted to receive and rotate a spool, a grooved pulley with a notched hub mounted on said shaft, a counter-shaft journaled to the machine-frame and carrying a pulley, a belt traveling around said pulley and the pulley mounted on the counter-shaft, means, as described, having motion imparted thereto from said driving-shaft, clutches, and means, as described, for engaging and disengaging said clutches with and from the hubs of said grooved pulleys, substantially as and for the purpose set forth.

2. The combination, with a vertical spindle journaled to the machine-frame and carrying a creel or flier provided with devices for supporting material to be twisted and regulating the tension of the same therefrom, a pulley mounted on said spindle and formed with a notched hub, a horizontal shaft journaled to the top of the machine-frame and adapted to receive and rotate a spool, and a pulley mounted on said shaft and formed with a notched hub, of the clutches b^2 and e^3 , the bifurcated arms b^3 and e^4 , the bell-crank lever e^5 , the eye e^8 , the vertical rod e^7 , attached to said arm and lever and sliding up and down through said eye, and the lever f , attached to said vertical rod, substantially as and for the purposes set forth.

3. The combination, with a spindle journaled to the machine-frame and a creel mounted thereon, of a pulley attached to said spindle, a driving-shaft journaled to the machine-frame and carrying pulleys, belts traveling around the pulleys attached to said shaft and spindle and rotating said creel, a shaft journaled to the top of the machine-frame and adapted to receive and rotate a spool, a pulley mounted on said shaft, a counter-shaft and a pulley attached thereto, and a belt traveling

around said pulleys, intermediate gearing, pulleys and belts, a longitudinal rod provided with eyes, and means connected with said rod and gearing for reciprocating said rod, whereby the finished product may be uniformly laid up, substantially as described.

4. The combination, in a twisting-machine, with a vertical spindle journaled to the machine-frame and a creel or flier mounted thereon, a grooved pulley attached to said spindle, a driving-shaft with pulleys mounted thereon, and belts traveling around the same and imparting motion to said creel or flier, of a horizontally-located shaft journaled to the machine-frame and adapted to receive a spool, a grooved pulley attached to said shaft, a counter-shaft journaled to the machine-frame,

and with a pulley mounted thereon, a belt traveling around said pulleys, intermediate mechanism consisting of gearing, pulleys, and belts; a U-shaped oscillating rod with eyes, means connected with said mechanism for actuating said rod, and guides in the front of the machine-frame for directing the material in a straight course, whereby the finished product may be uniformly laid up onto a spool, substantially as described.

In witness whereof I have hereunto set my signature in the presence of two subscribing witnesses.

HERMANN BORMANN.

Witnesses:

GEO. W. REED,

THOS. M. SMITH.