

No. 637,438.

Patented Nov. 21, 1899.

F. A. WHITMORE.  
THREAD WINDING MACHINE.

(Application filed June 21, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

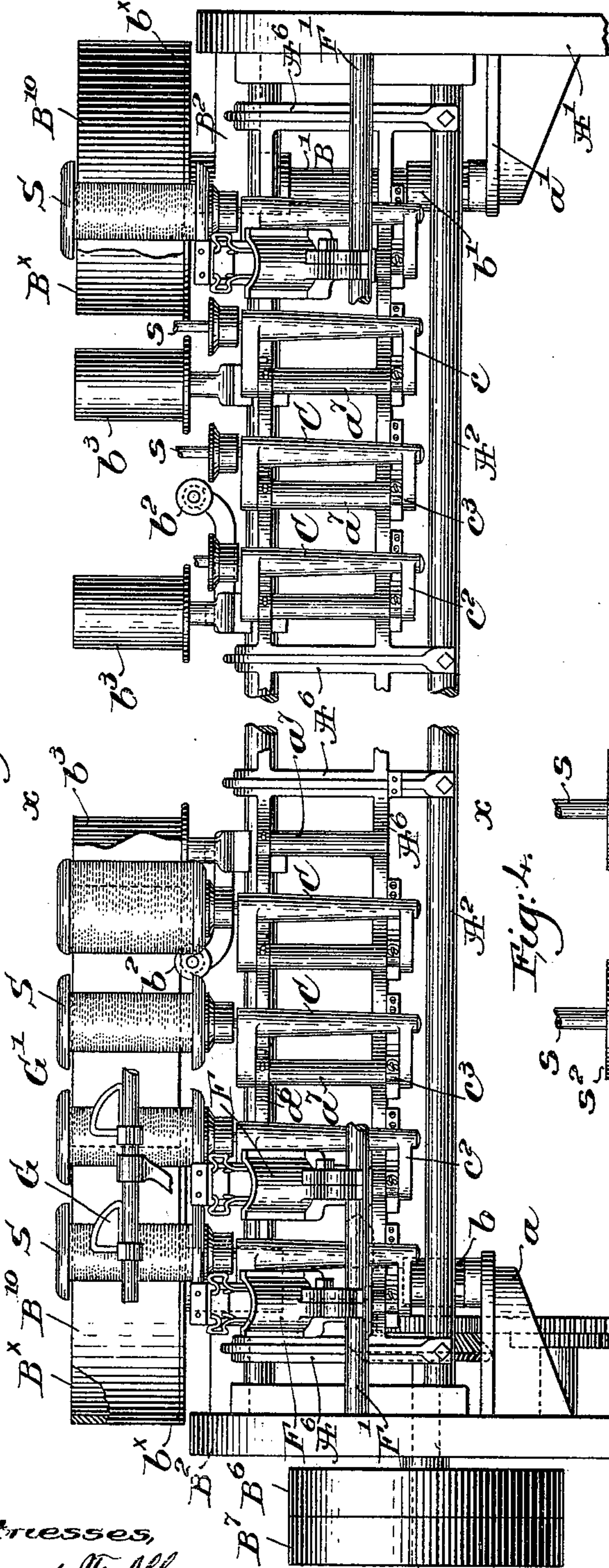


Fig. 4.

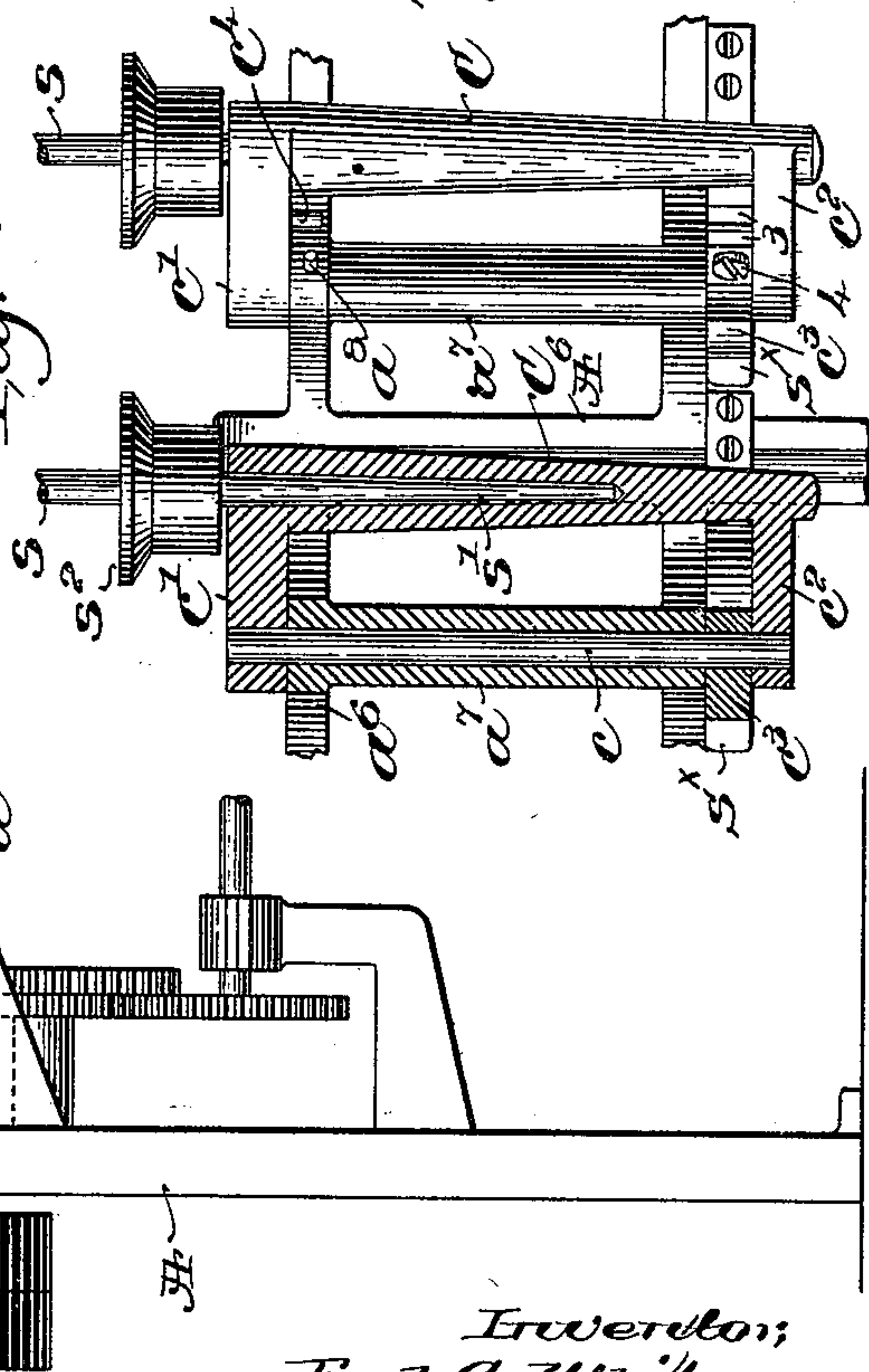
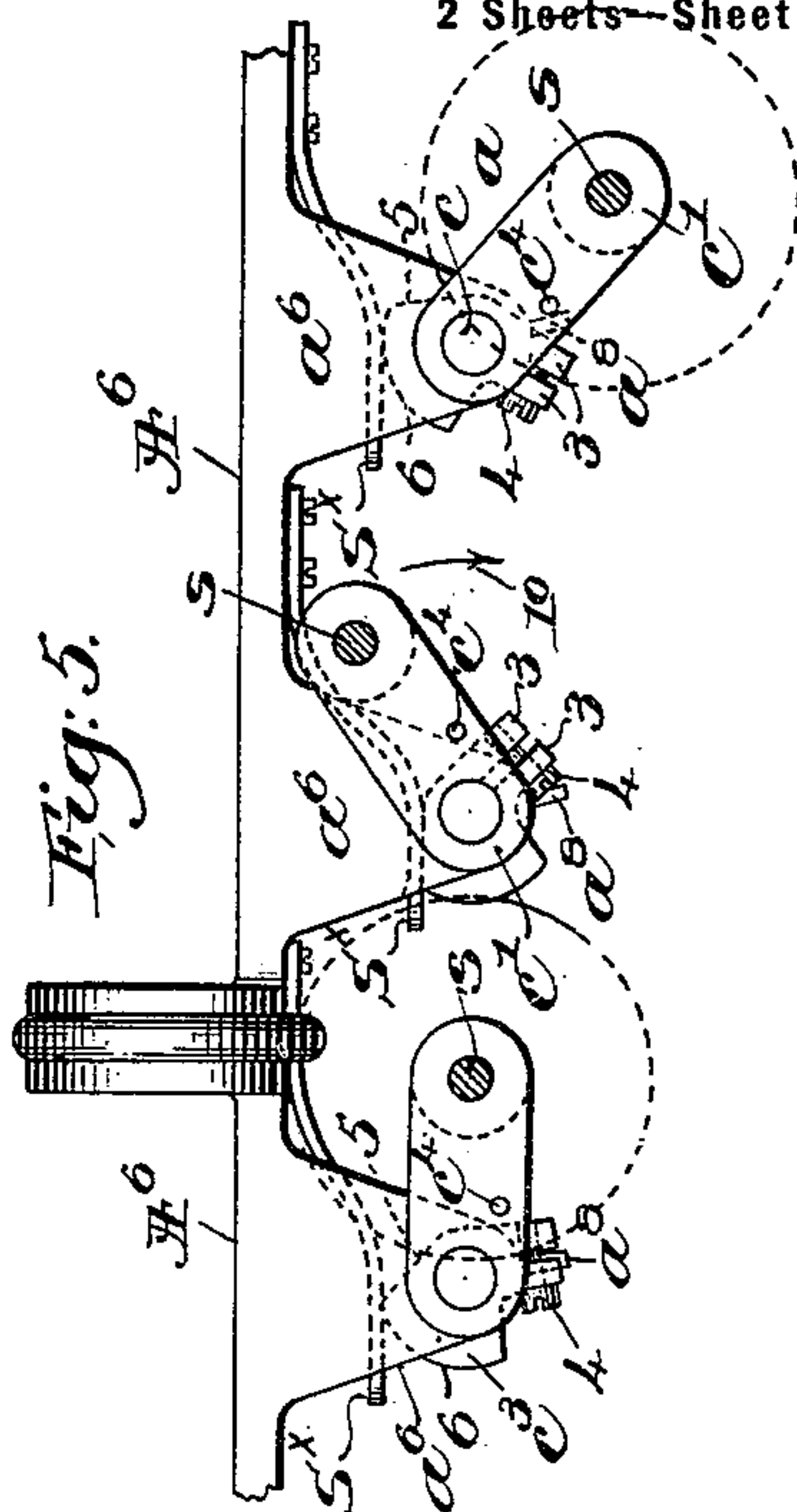


Fig. 5.



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In Witness Whereof,  
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2 Sheets—Sheet 2.

Fig. 2.

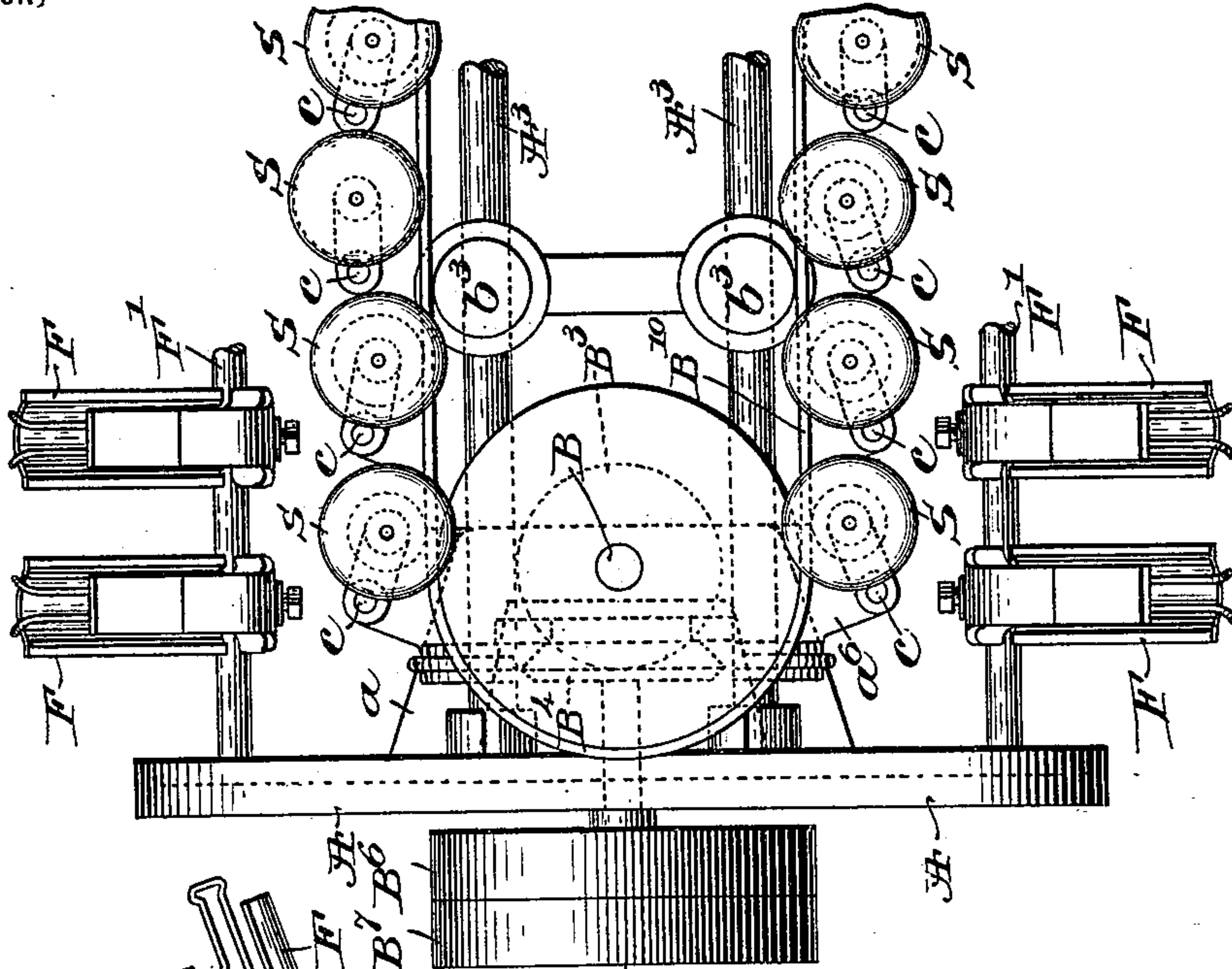
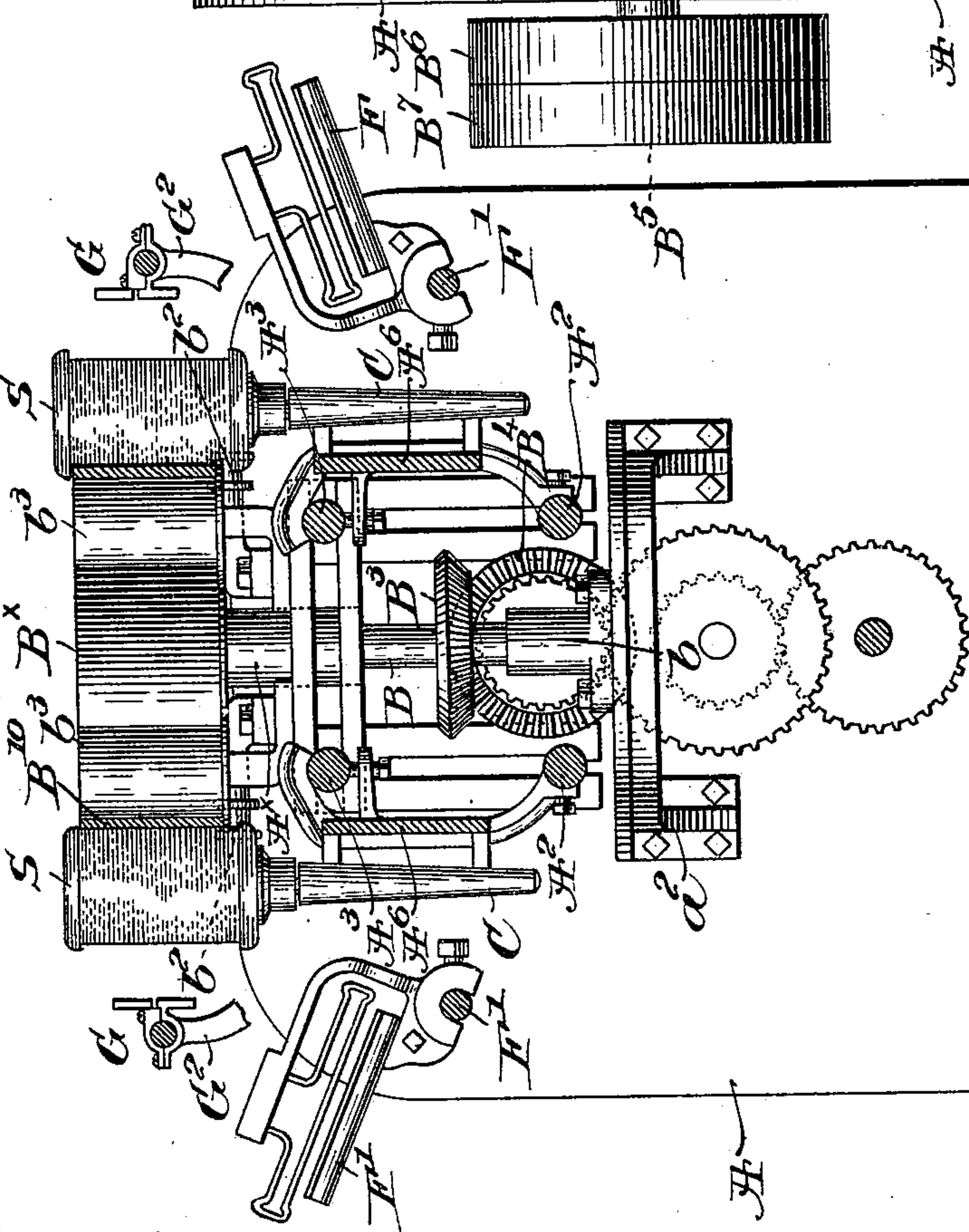


Fig. 3.



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# UNITED STATES PATENT OFFICE.

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## THREAD-WINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 637,438, dated November 21, 1899.

Application filed June 21, 1899. Serial No. 721,294. (No model.)

*To all whom it may concern:*

Be it known that I, FRED A. WHITMORE, of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Thread-Winding Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and numerals on the drawings representing like parts.

This invention relates to machines for winding thread or yarn from cops or bobbins onto spools or similar devices.

In the apparatus embodying my present invention the construction is simplified, the weight reduced, and the noise and jarring incident to winding-machines in general use will be obviated.

Various novel features of the invention will be hereinafter described, and particularly pointed out in the following claim.

Figure 1, in front elevation, centrally broken out, shows a sufficient portion of a thread-winding machine embodying this invention to be understood, both ends of the apparatus being shown and the traverse mechanism being omitted in greater part. Fig. 2 is a top or plan view of the left-hand end of the apparatus shown in Fig. 1. Fig. 3 is a transverse sectional view of the apparatus, taken on the line  $x\ x$ , Fig. 1, looking toward the left. Fig. 4 represents, on an enlarged scale, two of the spool-carriers, one being shown in elevation and the other in section. Fig. 5 is an enlarged detail in plan of several of the spool-carriers and their support, showing the different positions assumed by the carriers during the winding operation, the spool-supporting spindle being shown in one.

Referring to Figs. 1, 2, and 3, the upright end frames  $A\ A'$  are rigidly connected together by suitable cross-girths  $A^2\ A^3$ , (see Fig. 3,) and said end frames are herein shown as provided on their inner faces with rigidly-attached brackets  $a\ a'$ , respectively supporting end thrust-bearings  $b\ b'$  for upright shafts  $B\ B'$ , said shafts having attached to their upper ends like suitable drums or belt-pulleys  $B^x$ , one of said drums being herein shown as preferably provided at its lower edge with a laterally-extended lip or flange  $b^x$ , and the drum-shafts extend through like upper bear-

ings  $B^2$ , Fig. 1, attached to the two end frames of the machine.

The shaft  $B$  has secured thereto a bevel-gear  $B^3$ , (best shown in Fig. 3,) in mesh with a similar gear fast on a driving-shaft  $B^5$ , Figs. 1 and 2, provided with usual fast and loose pulleys  $B^6\ B^7$ , motion being transmitted to the shaft by a belt from any suitable source of power (not shown) to thereby positively rotate the drum  $B^x$ .

An endless belt  $B^{10}$ , of leather, canvas, rubber, or other suitable flexible material, is stretched around the two drums and forms the actuator, by or through surface contact with which the several spools are rotated to wind the thread or yarn thereupon, the word "thread" herein being intended to cover any fibrous material in thread-like or filamentous form. Inasmuch as the machine is quite long the belt  $B^{10}$  is prevented from sagging by edge guides, (shown as grooved or flanged rolls  $b^2$ ), suitably mounted on transverse connecting-bars  $A^x$ , which serve to stiffen and strengthen the cross-girths, the lower edge of the flexible actuator or belt resting on and traveling over said guides. Upright and rotatable band-supports  $b^3$  are also provided at convenient distances apart to support the belt at its inner face, the axes of the support  $b^3$  being parallel to the drum-axes.

Referring to Figs. 1 and 4, ladder-like frames  $A^6$  are bolted at each side of the machine on the cross-girths  $A^2\ A^3$ , said frames having outwardly-projecting ears  $a^6$ , connected by tubular upright portions  $a^7$ , said ears and parts  $a^7$  being preferably formed as integral parts of the casting  $A^6$ , the parts  $a^7$  being thereafter drilled to provide bearings for pivot-pins  $c$  of the spool-carriers, herein shown as yoke-shaped members  $C$ , the yoke-arms  $c'\ c^2$  extending above and below the tubular bearings  $a^7$ , as clearly shown in Figs. 1 and 3, and centered therein by pivot-pins  $c$  driven tightly in it. Between the lower arms  $c^2$  and the adjacent end of the bearing a cam  $c^3$  is secured to each pivot-pin, the said cam, as shown in Fig. 5, being split to leave ears 3, threaded to receive a clamping-bolt 4, so that by tightening up the bolt the ears will be drawn together and the cam securely clamped upon the pivot-pin, the carriers being thus adapted to swing outwardly on the vertically-arranged



fulera *c*. Each carrier *C* is bored longitudinally to receive the lower end *s'* of a spool-spindles, on which the spool *S*, of suitable construction, is removably mounted, the spool-  
 5 spindle having an extended base *s*<sup>2</sup>, on which the bottom of the spool rests. Adjacent each carrier a suitable spring, herein shown as a leaf-spring *S*<sup>x</sup>, is rigidly attached at one end to the carrier-support *A*<sup>6</sup>, the free end of the  
 10 spring bearing against the edge of the cam *c*<sup>3</sup> of the adjacent carrier, said cam being of substantially segmental shape, with a flattened portion or side 5, Fig. 5, and a curved portion 6.  
 15 Referring to Fig. 5, the left-hand carrier is shown in the position it would assume when the winding of the thread upon a spool is about to begin, the free end of the spring then resting against the flat face 5 of the cam and  
 20 maintaining the spool-carrier pressed inward to thereby bring the cylindrical portion of the spool, or, it may be, the thread wound thereupon, in contact with the surface of the actuator *B*<sup>10</sup>. The travel of the actuator op-  
 25 erates, as will be manifest, to rotate a spool maintained in such position, and as the thread is wound thereupon the diameter of the wound mass gradually increases, and as it increases the carrier will be swung on its pivot in the  
 30 direction of the arrow 10, Fig. 5, the spring being gradually compressed until about the position shown at the left-hand side of Fig. 5 is attained. This gradual augmentation of pressure as the wound mass increases in di-  
 35 ameter on the spool is very effective in serving to lay the thread hard and firmly, thus increasing the amount of yarn on a spool of a given diameter, a most important feature. It will be noticed that the point of the cam  
 40 formed by the junction of the two edges 5 and 6 is borne against the spring of the left-hand carrier, Fig. 5, and at such time the wound mass of thread has attained nearly its desired diameter, or, in other words, nearly the re-  
 45 quisite quantity of thread has been wound thereupon. When the corner of the cam has passed dead-center, as it were, by a slight additional quantity of thread on the spool, then the spring will act on the curved face 6 of the  
 50 cam to quickly throw the carrier into the position shown at the right-hand side of Fig. 5, completely removing the spool and its thread mass from contact with the actuator, so that rotation of the spool will be automatically  
 55 stopped.

By angularly adjusting the cam on the pivot-pin *c* the point at which the carrier will be automatically thrown out, as described, can be varied to thereby vary the quantity of  
 60 thread to be wound.

The outward movement of the carrier is limited by a stop-lock *a*<sup>8</sup> in the bearing *a*<sup>7</sup>, lo-

cated in the path of and to engage a pin *c*<sup>4</sup> on the carrier, herein shown as depending from the upper arm *c'* thereof.

It will be manifest that the spools are arranged, as herein shown, in two parallel series at the front and back of the machine, with the endless traveling actuator *B*<sup>10</sup> mounted between them.

The thread is delivered to the several spools and traversed thereupon by any suitable traverse mechanism. The thread or yarn guides *G*, their supporting bar or rail *G'*, and the arms *G*<sup>2</sup>, connected therewith, are all of usual construction and form a part of the traverse mechanism, the remainder of which is not illustrated herein, it forming no part of this invention and only tending to confuse the drawings.

Any suitable or usual bobbin or cop holders *F* are provided, supported upon cross-rods *F'*, extended between the end frames at the front and back of the machine in a manner usual in thread-winding machines.

When a spool has been doffed, the attendant places a fresh spool on the spindle and pushes the carrier inward until the corner of the cam has passed dead-center, whereupon the controlling-spring *S*<sup>x</sup> will operate to move the carrier and the fresh spool into winding position.

By the construction herein shown the production of the machine is largely increased, and the weight of the machine is materially reduced, as the heavy winding-drums are entirely dispensed with, and in lieu thereof a light flexible belt or band is employed. Not only is the weight thus reduced and the construction simplified, but the jarring and vibration common to winding-machines as now commonly constructed are practically done away with, as the actuator or belt herein runs smoothly and easily and its drums produce a minimum of vibration.

Having described this invention, what is claimed as new, and desired to be secured by Letters Patent, is—

In a thread-winding machine, a continuously-moving, flexible actuator, a plurality of spool-carriers mounted to rock on pivots adjacent the actuator, a cam on each carrier, a fixed spring to coöperate with the cam and to normally press the free end of the carrier toward the actuator with a force increasing proportionally to the increase in the wound mass, and thread-traversing mechanism.

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

FRED A. WHITMORE.

Witnesses:

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 GEO. OTIS DRAPER.