

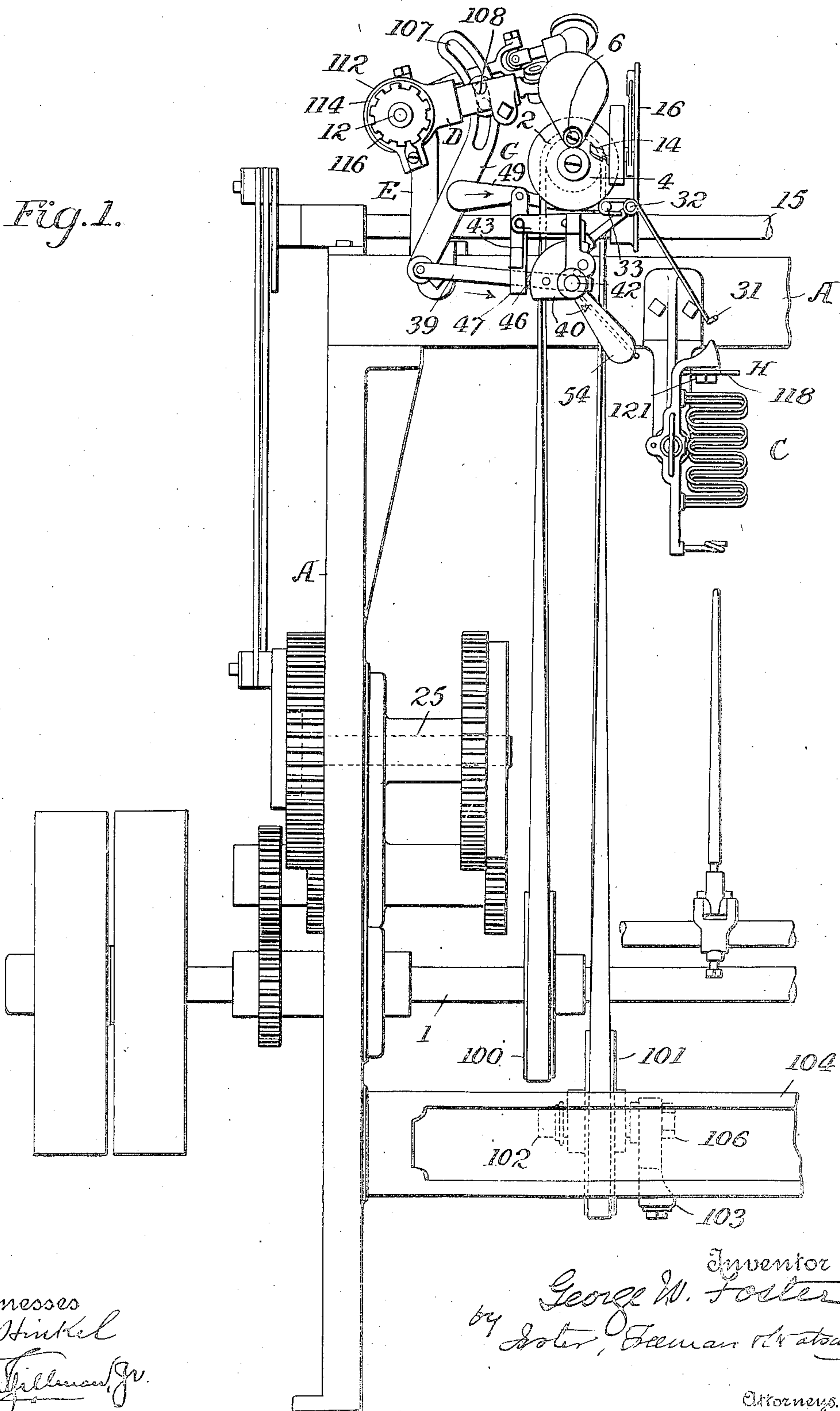
No. 813,372.

PATENTED FEB. 20, 1906.

G. W. FOSTER.
THREAD WINDING MACHINE.

APPLICATION FILED MAR. 11, 1905.

4 SHEETS—SHEET 1.



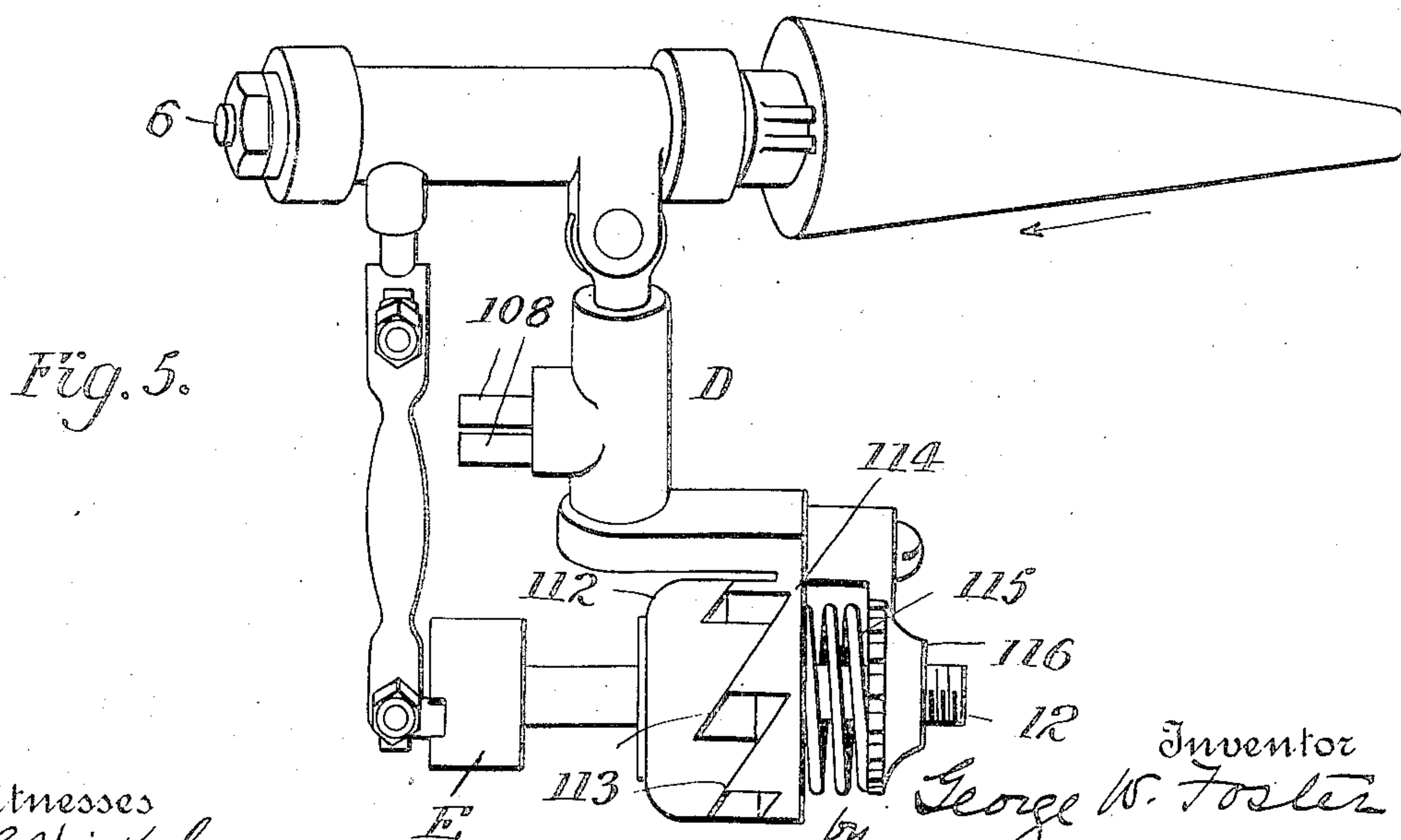
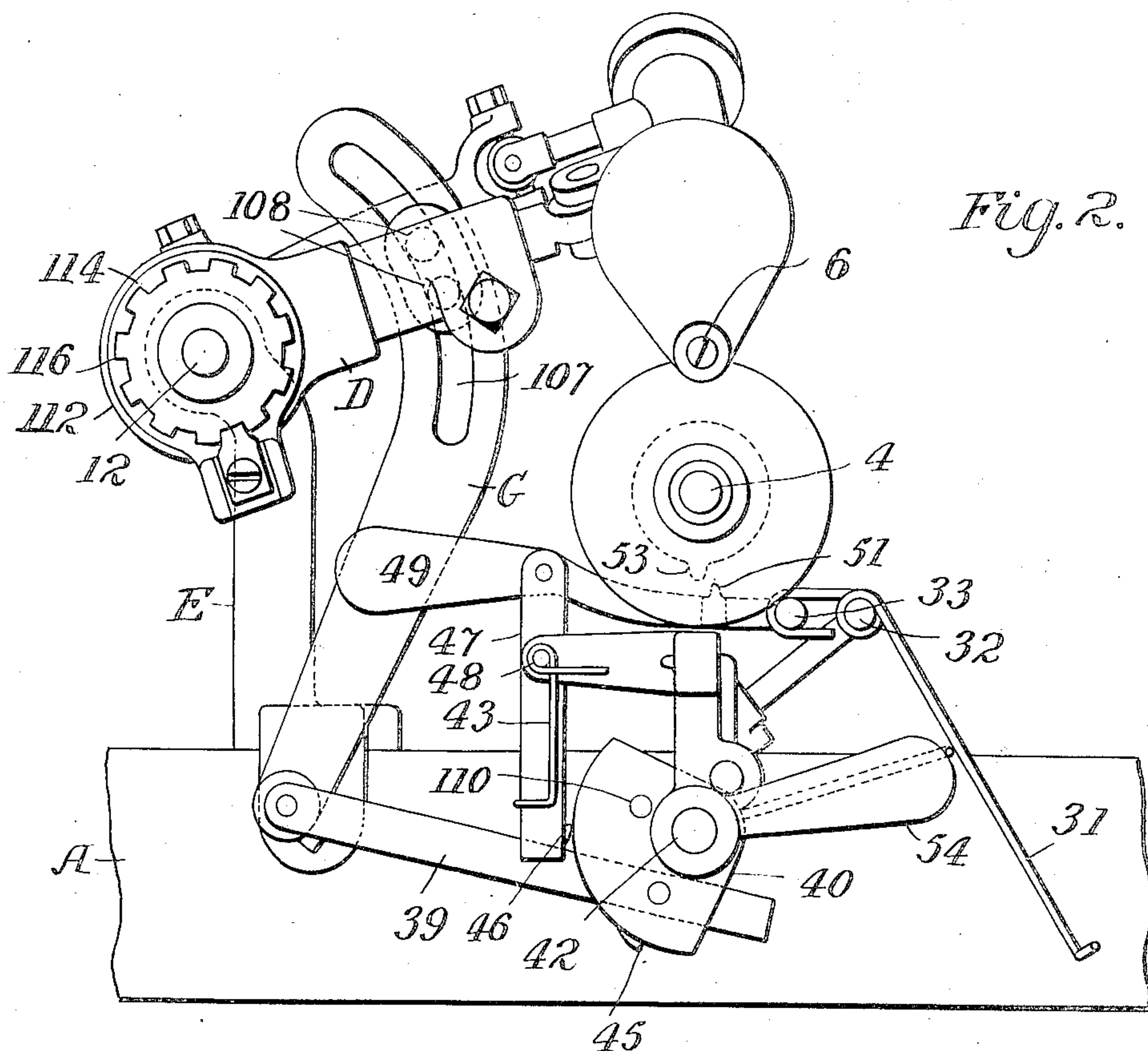
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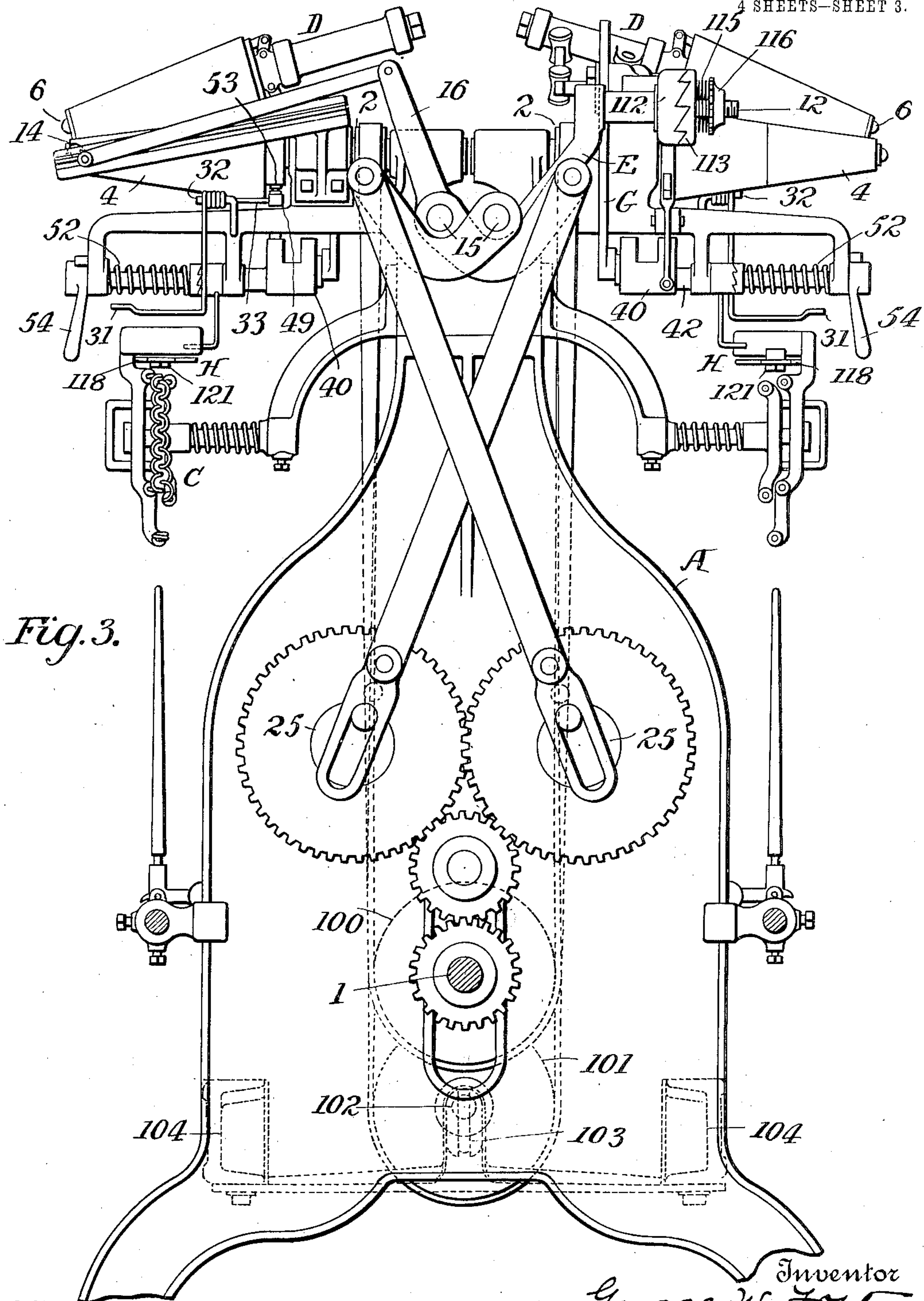
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4 SHEETS—SHEET 4.

Fig. 4.

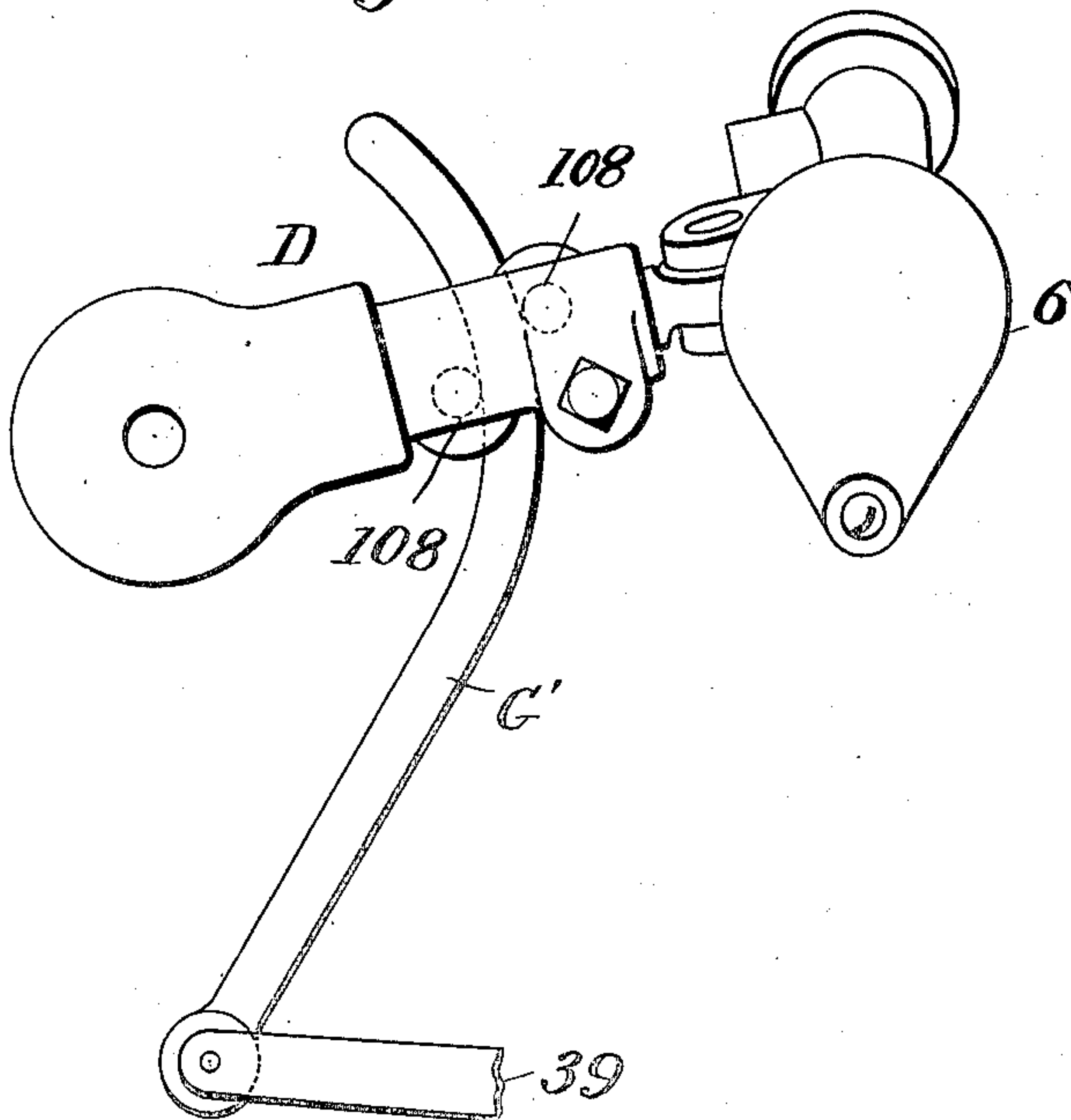


Fig. 6.

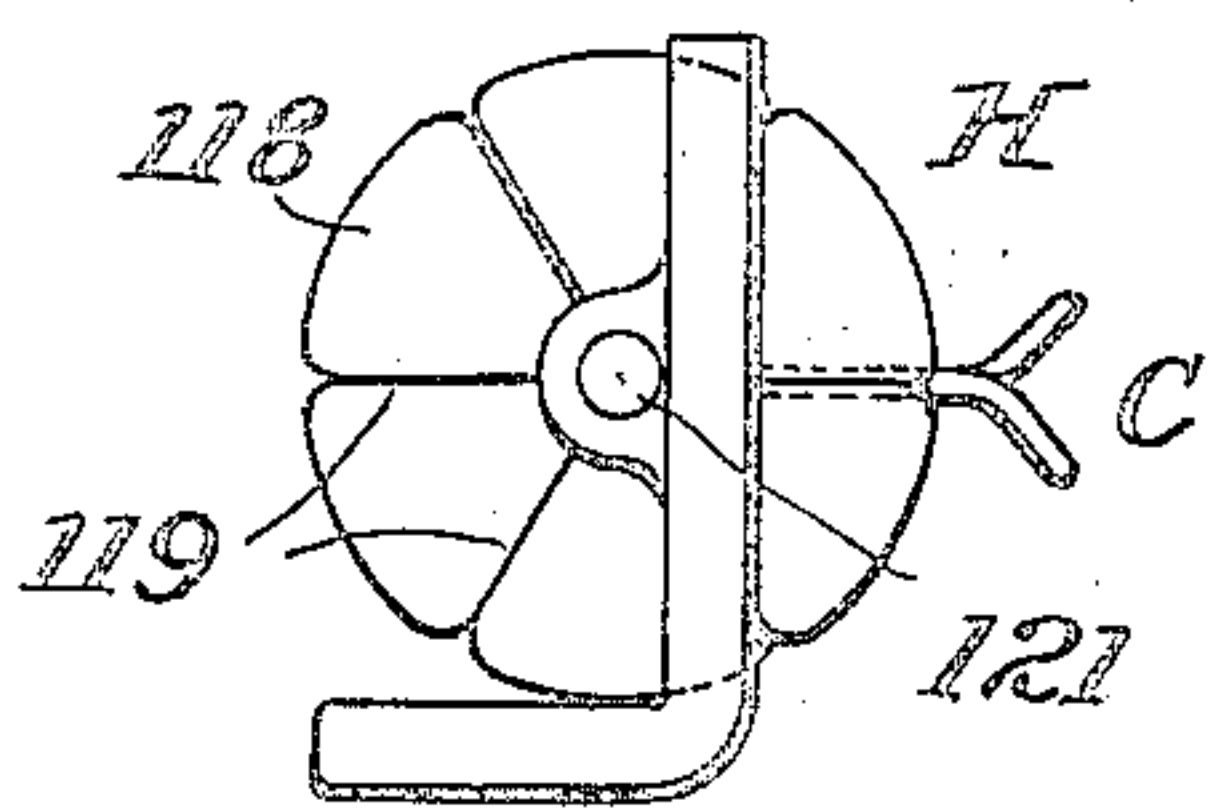
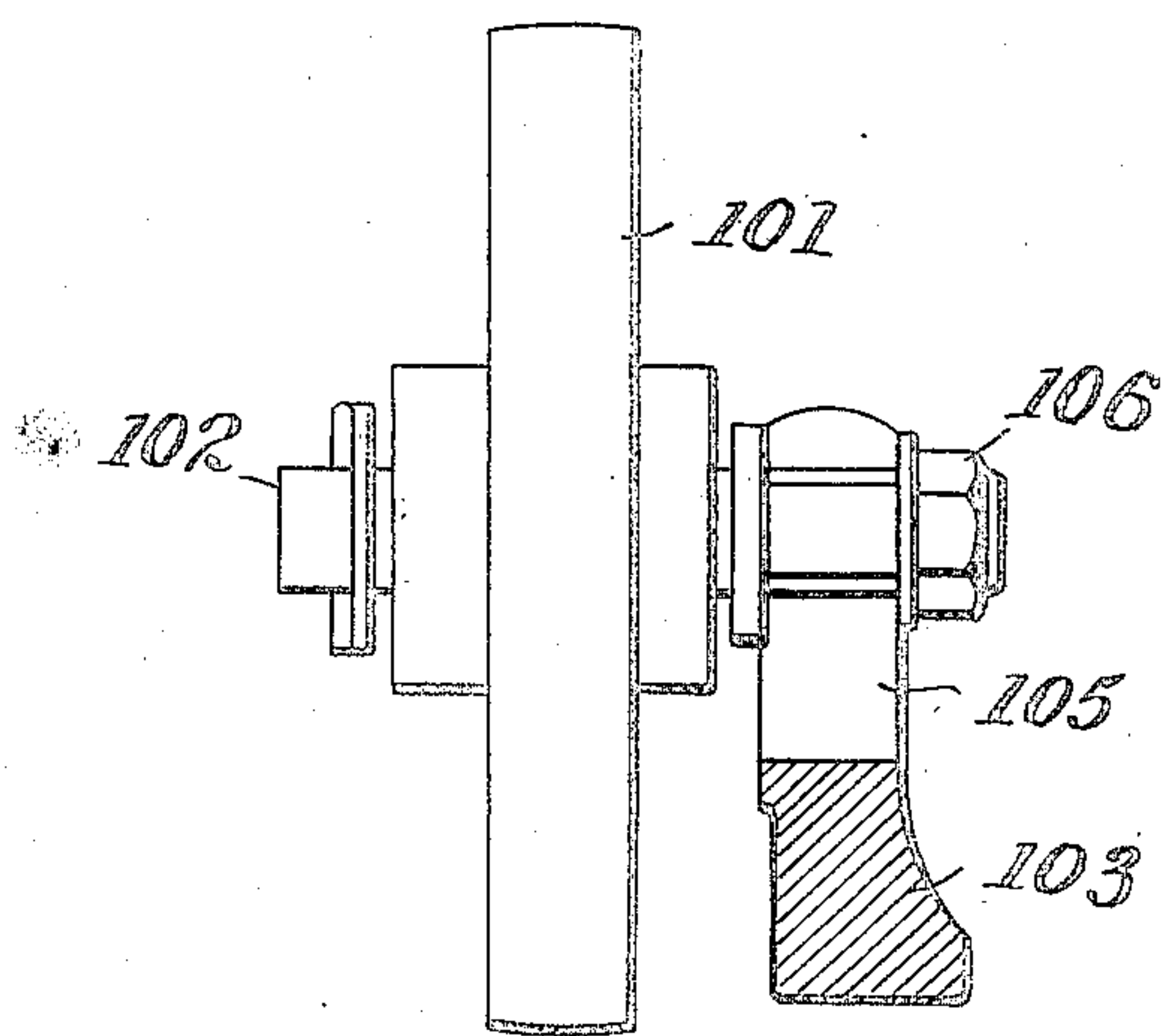


Fig. 7.



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UNITED STATES PATENT OFFICE.

GEORGE W. FOSTER, OF PAWTUCKET, RHODE ISLAND.

THREAD-WINDING MACHINE.

No. 813,372.

Specification of Letters Patent.

Patented Feb. 20, 1906.

Application filed March 11, 1905. Serial No. 249,606.

To all whom it may concern:

Be it known that I, GEORGE W. FOSTER, a citizen of the United States, residing at Pawtucket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Thread-Winding Machines, of which the following is a specification.

My invention relates to machines for winding yarn or threads or other material; and it consists in certain details of construction fully set forth hereinafter and illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal elevation of sufficient of a double-bank winding-machine to illustrate my improvement. Fig. 2 is an enlarged view showing the winding devices in a different position from that shown in Fig. 1. Fig. 3 is an end elevation of the machine. Fig. 4 is a view showing a modification of the stop-motion devices. Fig. 5 is a plan of the spindle frame and support, illustrating the means of imparting a longitudinal movement thereto; Fig. 6, a plan of the slub-catcher; Fig. 7, a detached view of a pulley-support.

In the construction shown the frame A supports two sets of winding apparatus, in each of which a frame D, pivoted to a stud 12 on a standard E on the main frame A, supports the spindle 6 of the cone, and the guide 14 is reciprocated by the vibration of an arm 16 on a rock-shaft 15 to lay the thread in crossed helices in each layer. The shafts 15 are rocked through the medium of devices driven from shafts 25 25, both driven from the main driving-shaft 1 in a manner not necessary to be particularly described, as it forms no part of this invention and is fully set forth in my Patents Nos. 789,601 and 789,602, dated May 9, 1905, for winding-machines.

Each spindle 6 is above a driving-roll 4 upon a shaft turning in bearings of the main frame and carrying a pulley 2, and an endless belt passes over both the opposite pulleys 2 2 and is carried downward in two loops, one passing around a pulley 100 on the shaft 1 and the other around a pulley 101 upon a stud 102, carried by a bracket 103, bolted to the stringers 104 of the main frame. The stud 102 extends through a slot 105 in the bracket 103 and is adjustable therein and secured by a nut 106 or otherwise. This permits a more ready adjustment of one of each pair of pulleys, so as to take up the slack in the belt more readily than if both pulleys

were upon the shaft 1, as in the construction of my aforesaid application. To lift the package from the driving-roll 4 upon the breaking of a thread, while allowing the frame D to gradually swing upward without interference as the package increases in size, I provide an arm G with a slot 107, which is curved to correspond to a circle of which the axis of the stud 12, around which the frame D swings, is the center, said slot receiving two lugs 108 108, projecting from the frame D, so that the said frame may swing in the normal operations independently of the arm G. When, however, a thread breaks, the arm G is swung so as to bite against the lugs 108 and bind the same in the slot, when the frame D will swing upward under the movement of the arm. A single square stud might of course be substituted for the separated studs 108.

Any desired means may be employed for swinging the arm G on the breaking of the thread. In the construction shown the lower end of the arm G is pivoted to a bar or blade 39, which in turn is pivoted to one side of a block or disk 40 on a rock-shaft 42, which is turned in one direction by a spring 52, the latter being put under tension when the shaft 42 is carried to the position shown in Fig. 1, which may be done by means of a handle 54. This also brings a stud 110 at the side of the block 40 to bear on the inner end of the blade 39 and holds it in position to support the arm G in its normal position. The block 40 and its shaft are held in place by the engagement of teeth 45 46, the former on the edge of the block 40 and the latter on an arm 47, pivoted at 48 to a bracket of the frame. A spring 43 carries the arm 47 toward the block 40.

On the upper end of the arm 47 is pivoted a bar 49, provided with a lug 51, and a stud 33 at one end of this arm is engaged by a loop of the stop-motion wire 31, swinging upon the stud 32 and receiving the thread which passes upward from the tension device C, and so long as the thread is unbroken the parts are maintained in the position shown in Fig. 1. When, however, a thread breaks, the long end of the wire 31 swings inward and lifts the end of the bar 49, so that the lug 51 thereof will be in the path of a lug 53 on an enlargement of the shaft of the roll 4, when the bar 49 will be thrown in the direction of its arrow, swinging outward the lower end of the bar or lever 47, when the lug 46 will escape from the lug 45, and the spring 52 will

swing the shaft 42 in the direction of its arrow and carry the blade 39 in the direction of its arrow, thereby swinging the arm G so as to bind on the lugs 108 and lift the frame D 5 and carry the package away from the driving-roll. The parts will then be in the position shown in Fig. 2.

When the broken end has been pieced, the operator swings the handle 54 so as to bring 10 the parts to the position shown in Fig. 1, when the operations may be resumed.

It will be seen that so long as the parts are in the position shown in Fig. 1 the frame D can swing freely upward as the cop is built 15 up, increasing in diameter, and therefore any vibratory motion of the cone-spindle and its support resulting from any unevenness of the cone or other cause will have no effect upon the devices which serve to lift the frame 20 D in case of the breakage of a thread; but in the latter event the arm G is at once gripped with the frame D, so that the latter is carried upward by the movement of the arm.

It will be seen that instead of engaging 25 means consisting of the edges of the curved slot and one or more lugs 108 the frame itself may have projections adapted to receive between them the curved end of the rod G', as shown in Fig. 4, and I therefore do not limit 30 myself to any special engaging means between the frame and the arm that will permit the frame normally to swing independent of the arm, but cause the two to clamp or bite together when the arm is moved on the 35 breaking of a thread.

It is desirable as successive layers are laid upon the core in forming the conical package that each succeeding layer shall be deposited slightly farther onward toward the point 40 than the preceding layer in order that the base of the cop may be rounded, which insures a better delivery of the thread or yarn. To secure this result, I provide means whereby as the frame D swings upward it is also carried inward—that is, in a direction away 45 from the point of the cone. This is effected by fastening on the stud 12, to which the frame D is pivoted, a boss or enlargement 112, having one or more inclined faces 113, adapted to the corresponding inclined faces 50 of a boss 114 on the frame D, the said boss 114 turning on the stud 12 and being pressed toward the boss 112 by a spring 115, which may be put under any desired tension by 55 means of a nut 116, adjustable on the threaded end of the stud 12.

It will be seen that as the package increases in size and the outer end of the frame D swings upward the whole frame will be carried in the direction of its arrow, Fig. 5, by 60 the movement of the boss 114 on the boss 112. It will also be seen that as the cop increases in size the frictional resistance of the movement of one boss upon the other under 65 the pressure of the spring 116 will be de-

creased as the tension upon the said spring is relieved.

With the tension device C, which may be of any suitable character, is combined a slub-catcher H, and this is adapted to different 70 sizes of yarns or threads by forming it in the shape of a disk 118, with a series of radial slots 119 of different widths, the said disk being bolted by a bolt 121 to the bracket of the tension device, but so that it may be 75 turned to bring either of the slots in position to coincide with the path of the thread passing from the tension device.

I have not attempted to describe all the details necessary to the operative winder, inas- 80 much as these may be varied to a great extent while embodying the features above described and as the particular details illustrated are particularly set forth in my afore- 85 said patents.

Without limiting myself to the precise construction and operation of the parts shown, I claim—

1. In a winding-machine having two sets 90 of driving-rolls with shafts provided with pulleys, and an endless belt passing over both pulleys, the combination with the said parts, of a shaft 1 having a pulley receiving one loop of the belt, a bracket supporting an adjust- 95 able stud, and a pulley turning upon said stud and receiving the other loop of the belt, substantially as set forth.

2. The combination in a winding-machine, with the two roll-shafts, pulleys and endless looped belt, of a driving-shaft supporting a 100 pulley beneath which one loop of said belt passes, a second pulley beneath which another loop of the belt passes, and a bracket bolted to the frame of the machine and provided with an adjustable stud upon which the 105 second pulley turns, substantially as set forth.

3. The combination with the driving-roll of a winder, of a swinging frame, a spindle carried thereby, a pivoted arm having a 110 curved slot arranged to receive a projection of the frame, a stop device connected with the arm to shift the fulcrum of the latter and to bite the said projection in said slot and lift the frame when the stop device is moved on 115 the breaking of a thread, substantially as set forth.

4. The combination with the swinging frame and spindle of a winding device, of a pivoted arm, a stop-motion device, means for 120 swinging the arm from said stop-motion device to shift the fulcrum thereof when the thread breaks, and engaging means between the arm and frame arranged to permit the independent movement of the frame when 125 the thread is unbroken, but to engage the two parts when the arm is swung on the breaking of a thread, substantially as set forth.

5. The combination with the frame D, its 130

actuating-arm, block 40, and bar 39, of a stud 110 upon the block, substantially as and for the purpose set forth.

5 6. The combination with the frame D and support E, of coinciding inclined faces on the frame and support arranged to insure a longitudinal movement of the frame as it moves upward, substantially as described.

10 7. The combination with the frame D, support E and inclined faces upon the frame bearing upon part of said support to insure a longitudinal movement of the frame as it swings upward, of a spring bearing upon the frame and arranged to secure a reduced frictional resistance as the frame swings upward, 15 substantially as set forth.

8. The combination with the drive-roll and cop-spindle of a winding-machine, of a pivoted frame carrying said spindle, and means

for moving said frame longitudinally to lay 20 each layer of thread in advance, toward one end of the cop, of the preceding layer, substantially as set forth.

9. The combination with the spindle of a winding-machine, of means for laying the 25 thread thereon in crossed helices extending the length of the cop in each layer, and means for shifting said spindle to lay each layer of thread farther toward one end of the cop than the preceding layer, substantially 30 as set forth.

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

GEORGE W. FOSTER.

Witnesses:

EDITH THATCHER RACE,

WILLIAM H. THORNLEY, Jr.