

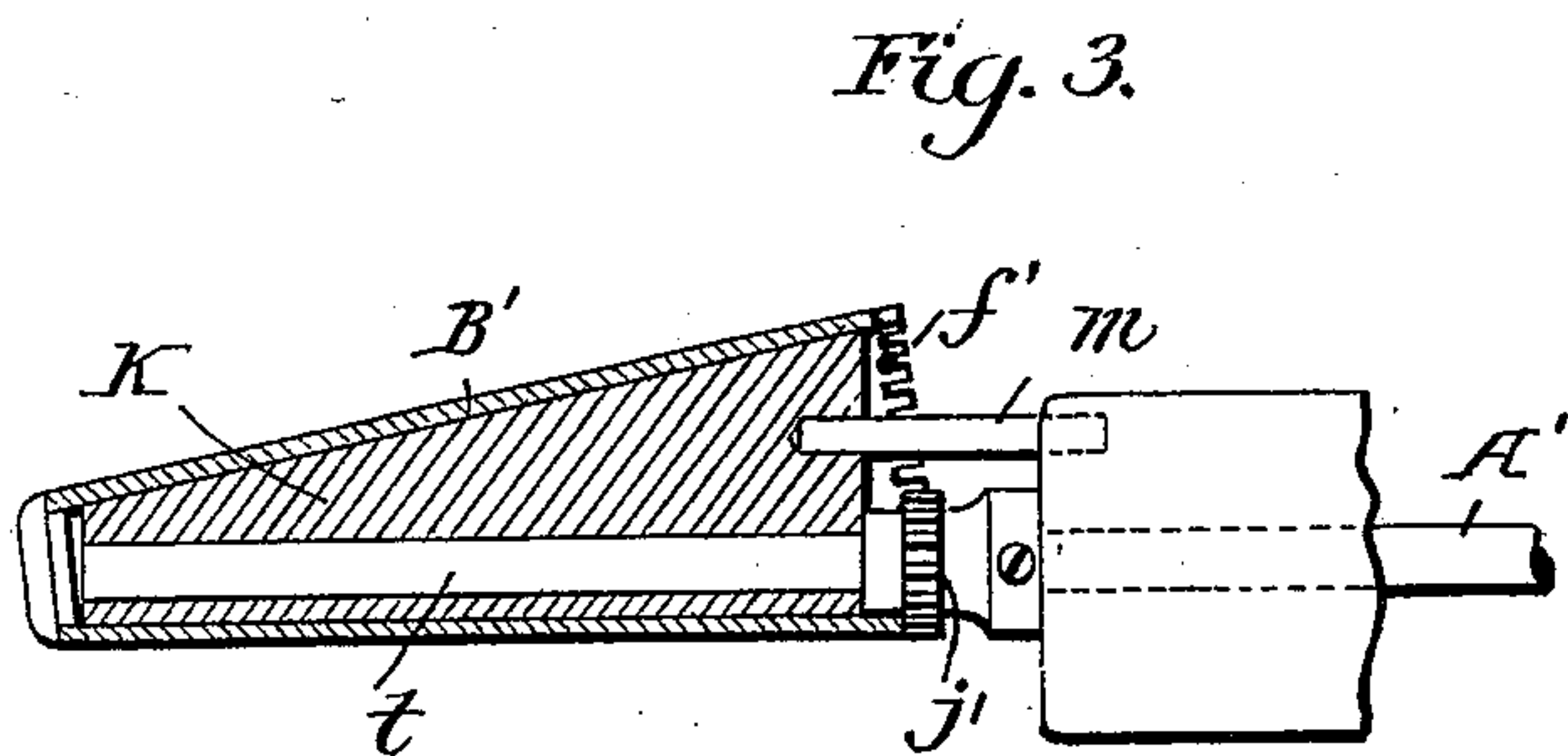
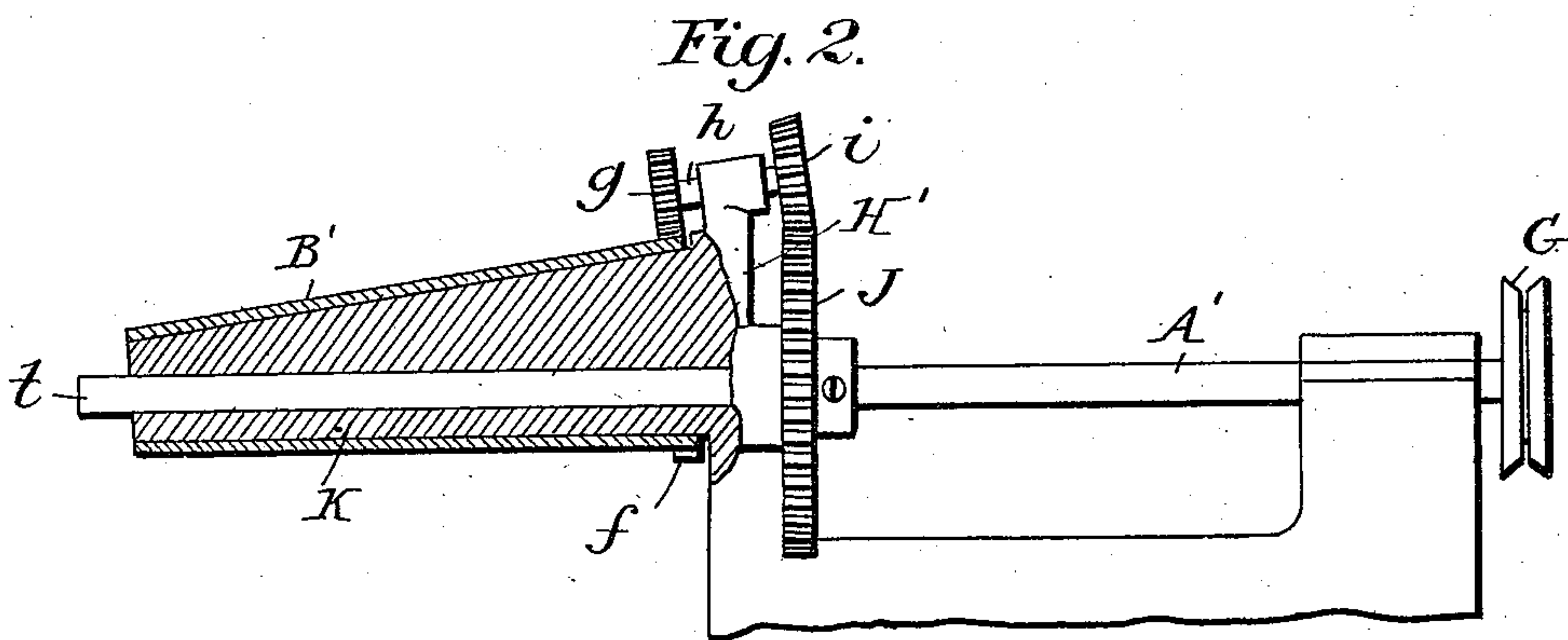
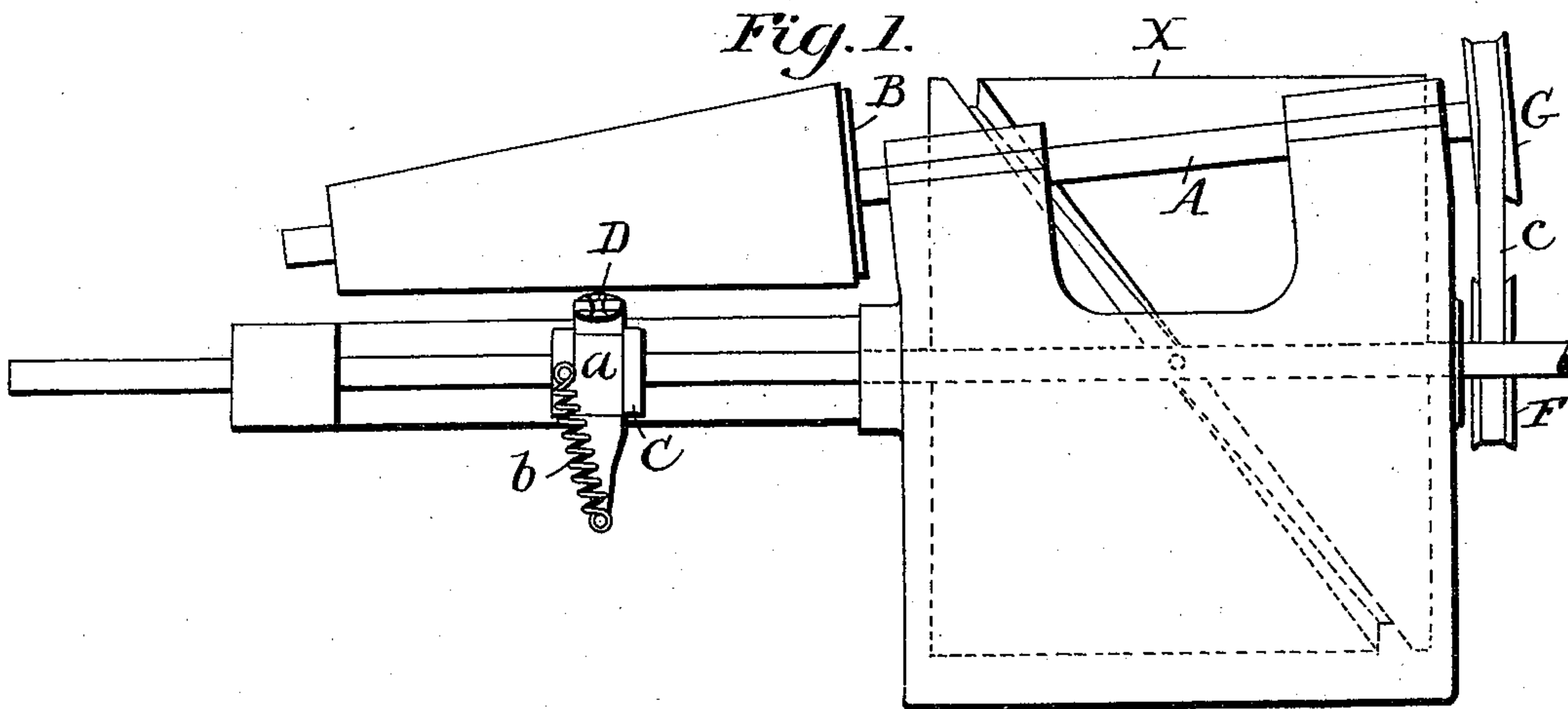
(No Model.)

4 Sheets—Sheet 1.

S. W. WARDWELL, Jr.
COP WINDING MACHINE.

No. 562,263.

Patented June 16, 1896.



Witnesses
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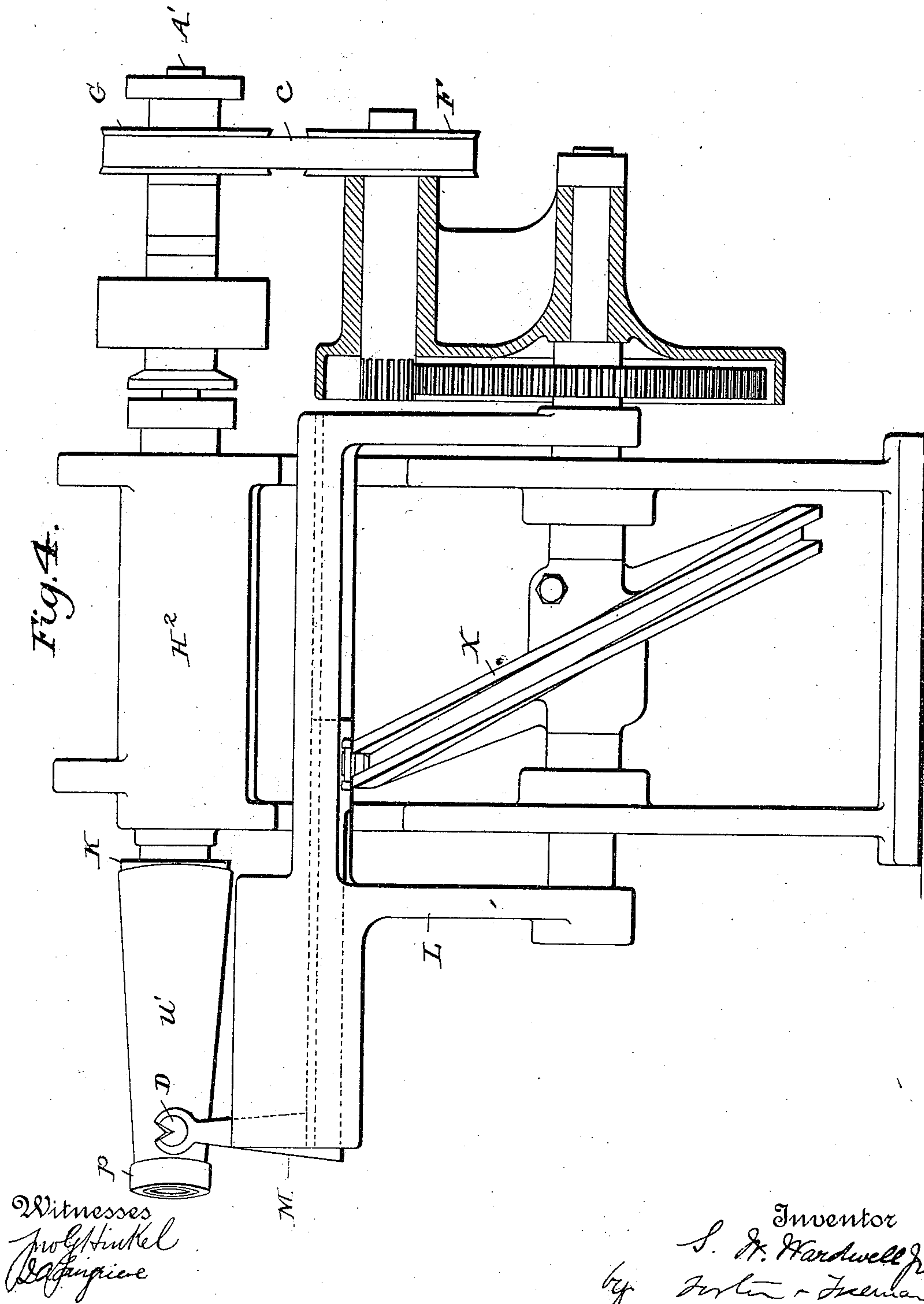
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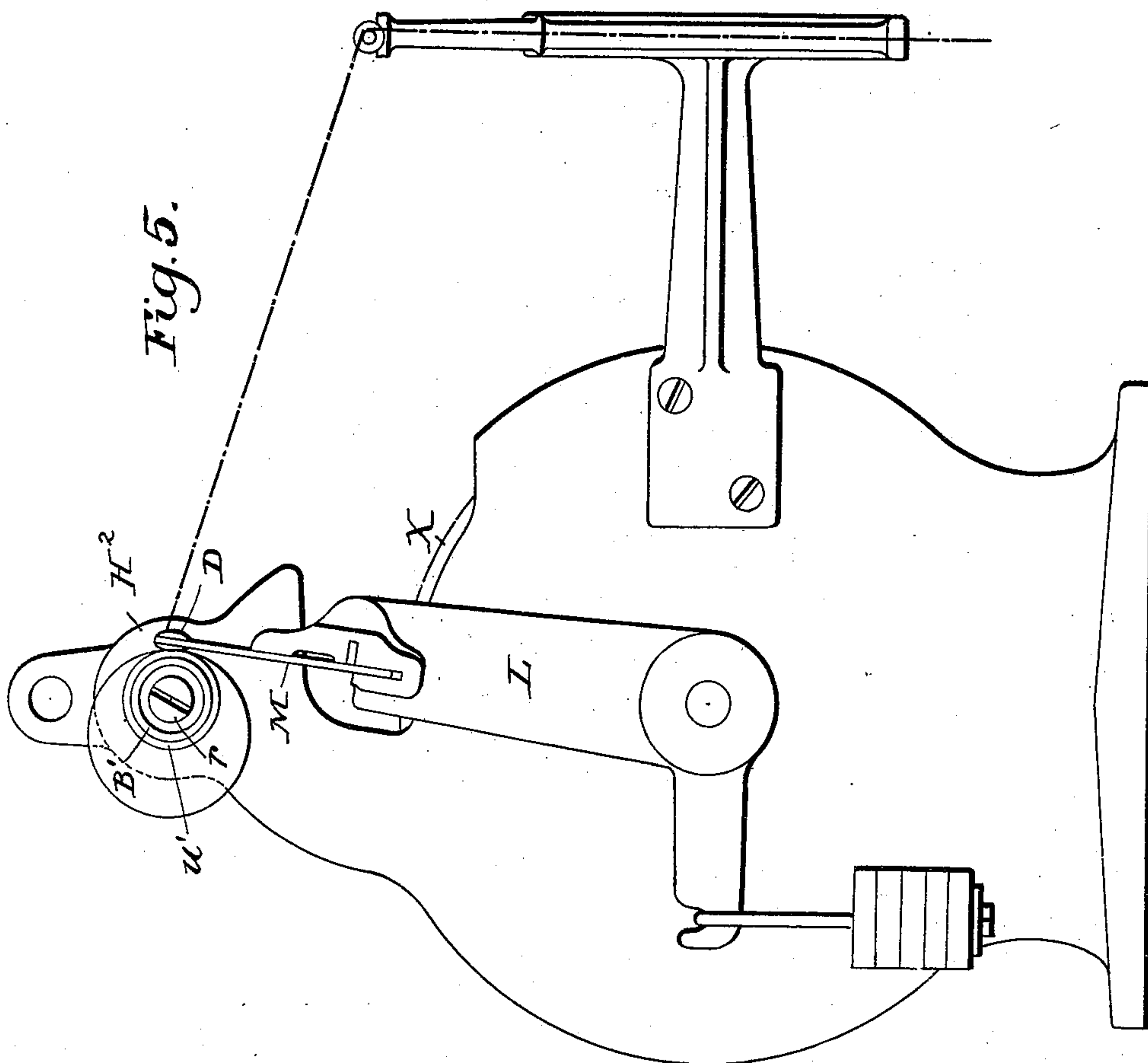
(No Model.)

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(No Model.)

4 Sheets—Sheet 4.

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Fig. 6.

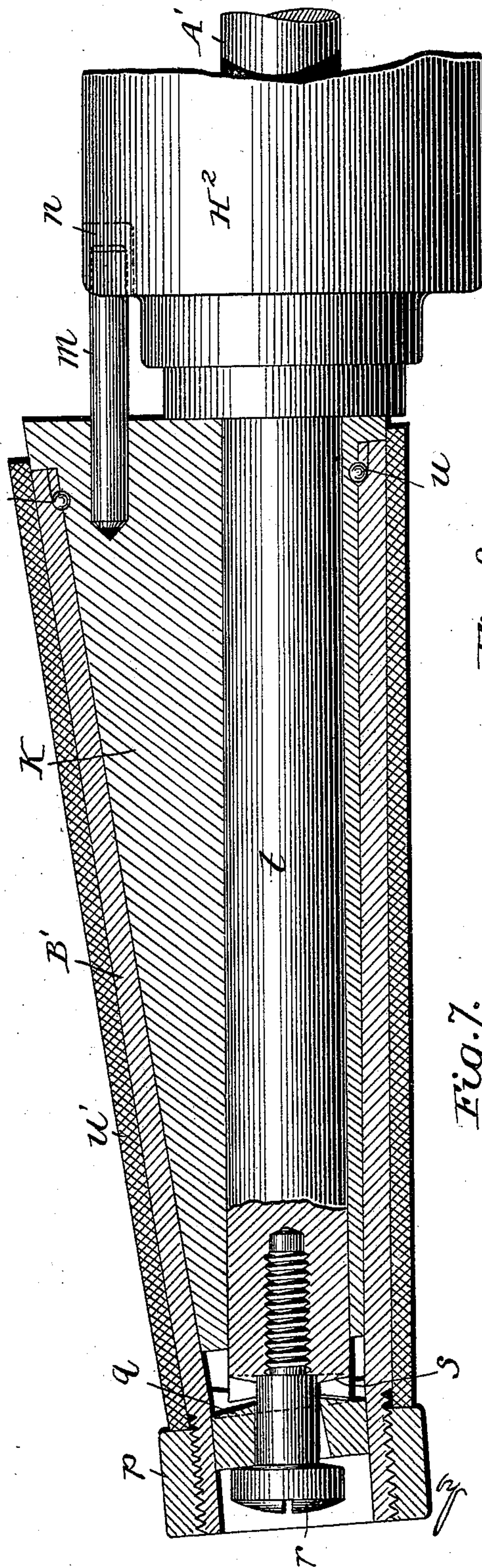


Fig. 8.

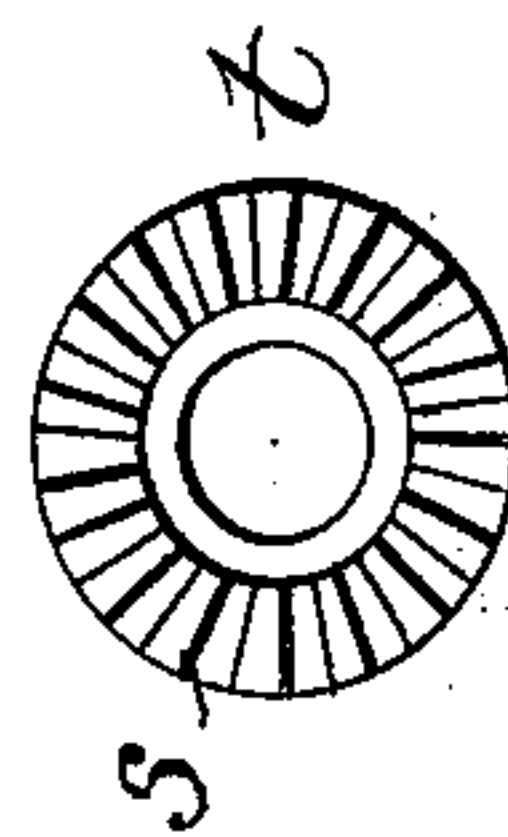
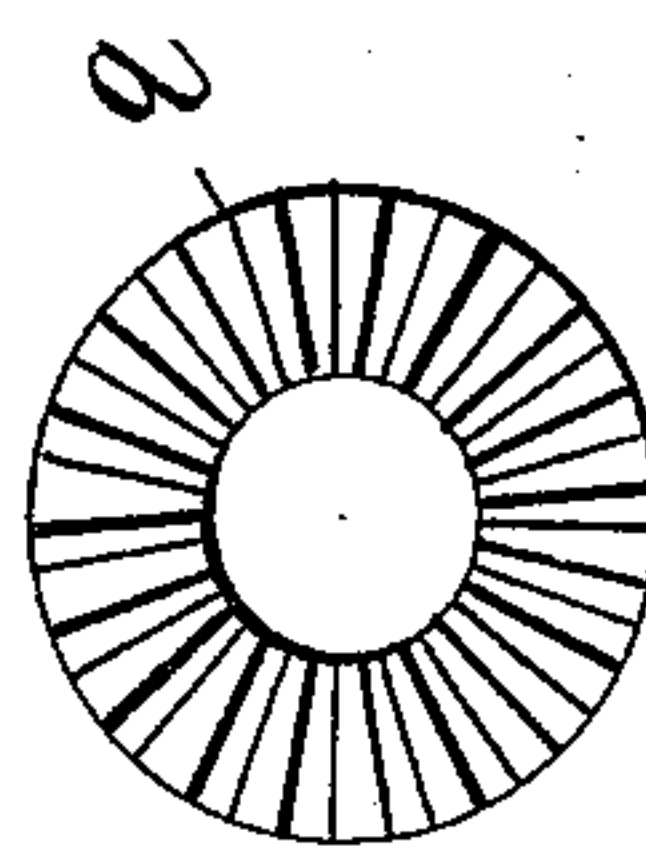


Fig. 7.



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UNITED STATES PATENT OFFICE.

SIMON W. WARDWELL, JR., OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE
UNIVERSAL WINDING COMPANY, OF PORTLAND, MAINE.

COP-WINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 562,263, dated June 16, 1896.

Application filed November 4, 1895. Serial No. 567,894. (No model.)

To all whom it may concern:

Be it known that I, SIMON W. WARDWELL, Jr., a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Cop-Winding Machines, of which the following is a specification.

It is considered advantageous for many purposes, and especially for those in which use is made of cotton yarns, to employ cops of yarn of a conical shape. It is more difficult and expensive to wind such cops in the ordinary manner because of their unequal size at the opposite ends, of the necessity, in some cases, of having solid conical blocks for winding the thread upon, and the ordinary modes of winding such cops are apt to result in laying the thread irregularly, so that the cop is not of a uniform character throughout.

The objects of my invention are to wind such cops with the same facility as the ordinary cylindrical cops, to adapt my improved means of winding to existing machines without material alteration thereof or preventing their use for winding cylinder-cops and to enable me in winding tapering or conical cops to make use of the mode of winding set forth in my Letters Patent Nos. 480,158 and 486,745. To this end I make use of the means of winding set forth hereinafter and illustrated in the accompanying drawings, in which—

Figure 1 is a plan view illustrating one form of winding mechanism embodying my invention; Figs. 2 and 3, detached part sectional views of sufficient of other forms of mechanism to illustrate my invention. Fig. 4 is a side view of a winding-machine embodying some of the features as that set forth in Fig. 2, but a preferred construction. Fig. 5 is an end view of the machine shown in Fig. 3. Fig. 6 is an enlarged longitudinal section of the cop-holder on the spindle. Fig. 7 is a face view of the gear attached to the holder. Fig. 8 is a face view of the gear on the end of the spindle.

In the arrangement illustrated in Fig. 1, A is the winding-shaft, which, as shown, is adapted to receive a conical holder B, which may be removed when the machine is to be used for winding cylindrical cops, and which

machine is provided with a reciprocating carriage C, driven by a cam X, (dotted lines.) The carriage supports a block a, to which is connected a thread-guide D, having its eye so arranged as to be opposite that point of the guide which is maintained in contact with the cop by means of a spring b, which tends to carry the guide against the face of the cop while permitting it to move outward as the cop increases in size. The spindle or shaft A is driven positively from the cam-shaft to turn always the same number of revolutions to each traverse of the guide through the medium of grooved wheels F G and a belt c, the wheel G being an expansion-wheel, so as to secure a variation in the relative movements of the holder and guide, and so as to vary the extent of this variation.

The particular arrangement of driving-cams and grooved wheels and means for varying the relative action of the winding-spindle and guide need not here be more fully set forth, as they are explained in detail in Letters Patent No. 536,672, granted to me April 2, 1895. Instead, however, of the shaft A being parallel to the path of the reciprocating guide D, it is arranged at such an angle thereto as to bring one side of the holder B parallel to the path of the guide. By arranging the holder B so that at one side it is always parallel to the path of the reciprocating guide the thread may be wound upon the conical bobbin placed upon the holder in the same manner as it could be wound upon a cylindrical tube or bobbin, while a positive motion is imparted to the holder and bobbin, so that it is possible to wind with much greater rapidity than when the bobbin is not positively rotated and driven from a shaft, while the thread is laid with much greater regularity and uniformity, and the bobbin is more compact, regular, more sightly in appearance, and less likely to be broken down in handling. It will also be seen that by the arrangement described I am enabled to so actuate the spindle in respect to the guide as to secure the peculiar arrangement and lay of the thread or yarn as specified in my before-mentioned Letters Patent.

The arrangement illustrated in Fig. 1 would necessitate a special construction of machine, and as it is desirable in many instances to

adapt my improvement to machines already in use I have provided means whereby in such machines the conical holder may be arranged with one side parallel to the path of the guide, and yet be positively driven from the ordinary winding-shaft, which is also parallel to the path of the guide in existing machines. In such case I provide a hollow conical holder B', Figs. 2 to 6, which I arrange upon a conical support K, which is suitably secured to the frame H' of the machine, the winding end or spindle *t* of the shaft A' extending through an opening in the support K, which is parallel to one side of the support, the latter being arranged so that the said side is also parallel to the path of the guide. The holder B' is placed upon the support K and is provided at the larger end with an annular rack *f*, for engaging the pinion *g* upon a spindle *h*, turning in a bearing of the frame H', and having a pinion *i*, engaging a toothed pinion J upon the shaft A'. As the shaft A' revolves it turns the holder B' through the intermediate gears, thereby rotating it positively in relation to and in unison with the movements of the reciprocating guide B, and obtaining the same result as shown in Fig. 1, except that the support K and conical holder may be removed whenever it is desired to wind a cylindrical cop. In Fig. 3 a gear-wheel *j'*, connected detachably to the spindle *t* by a set-screw, engages a gear *f'* at the end of the holder, which is prevented from turning by a pin *m*.

In the construction shown in the remaining figures of the drawings, the frame H², cam X, shaft A', expansion wheel or pulley G, pulley F, belt C, swinging frame L, supporting a reciprocating bracket M, to which the guide D is secured, are all substantially such as set forth in my aforesaid patent, No. 536,672, and operate in like manner and need not here be particularly described.

The support K is recessed to receive the end or spindle *t* of the shaft A', and also to receive the pin *m*, which extends into a socket *n* in the frame H², so that when the support is placed upon the spindle A' and the pin *m* is put in place it prevents any turning of the support. The holder B' is fitted to and will turn upon the support as in the construction shown in Figs. 2 and 3, and where it is necessary to reduce friction, antifriction-balls *u* may be properly inserted between the support and holder to which the conical tube or bobbin *u'* may be applied, and held in place by a nut *p*, screwing onto the small threaded end of the holder.

The holder is driven from the shaft A' through the medium of an annular bevel-gear *q*, fitted in and secured to the holder near the small end and meshing with teeth or an annular rack *s*, at the end of the spindle *t*, the parts being held in place by a bolt *r*, passing freely through an enlarged opening in the gear *q*, and into the end of the spindle. As the shaft rotates it drives the gear *q*, and

with it the holder B' and the cop-tube *u'*, upon which the thread is wound.

As in the construction shown in Fig. 2, the support K is so adjusted on the shaft A' that one side is parallel to the path of the guide, so that while the conical holder is rotated positively to wind the thread thereon, and while its axis is at an angle to the path of the guide, it turns in fixed bearings and the guide in traversing the face of the cop acts the same as in winding a cylindrical cop.

It will also be seen that in connection with the devices for securing a variation in the relative movements of the guide and holder a conical cop may be wound in the manner set forth in my aforesaid patents, Nos. 480,158 and 486,745, and further that the extent of the variation may be changed as necessary from time to time. It will also be evident that where cops are to be wound of different tapers, each machine may be provided with supports K, corresponding to the different sizes of cones and adapted to be changed one for the other, or to be entirely removed when a machine is to be used for winding cylindrical cops.

Without limiting myself to the precise construction and arrangement of parts shown and described, I claim as my invention—

1. The combination in a winding-machine of a carriage, guides therefor, and means for reciprocating the carriage in said guides, a thread-guide carried by said carriage, means for maintaining the guide in constant contact with the cop, and a conical cop-holder arranged with its axis in a fixed position at an angle to the path of the said carriage, and with one side parallel to said path, and means for positively rotating said holder to insure constantly the same number of revolutions of the holder to each reciprocation of the guide, substantially as described.

2. The combination in a winding-machine of a thread-guide, means for reciprocating the same, and a support for the guide arranged to permit the guide to move outward during the winding of a cop, a stationary support for a cop-holder, and a conical cop-holder revolving on said support with one side always parallel to the path of the guide, and means for positively rotating the holder, substantially as set forth.

3. The combination in a winding-machine, of a guide, and means for reciprocating the same, a stationary support for a cop-holder, a cop-holder with one side parallel to the path of the guide, and means for rotating the same upon the support, and means for securing a variation in the relative movements of the holder and guide, substantially as set forth.

4. The combination in a winding-machine, of a winding-shaft, a thread-guide and means for reciprocating the same in a line parallel to the axis of the winding-shaft, a conical holder for a conical cop-tube, a stationary

support for the holder arranged to support the holder with one side parallel with the path of the guide, and means for positively rotating the holder upon its support, substantially as set forth.

5 5. The combination with the winding-shaft and reciprocating thread-guide of a winding-machine, of a conical holder, a stationary support for the said conical holder adapted
10 to be connected to and detached from the frame, and to support the holder with one side parallel to the path of the guide and means for turning the holder upon the support, substantially as set forth.

15 6. The combination in a winding-machine

of a shaft terminating in a spindle having teeth at the outer end, a support K connected detachably with the frame of the machine, a conical holder turning upon said support, and a gear connected with the holder engaging the teeth at the end of the shaft, substantially as set forth.

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

SIMON W. WARDWELL, JR.

Witnesses:

CHARLES E. FOSTER,
I. A. FAIRGRIEVE.