(No Model.) 3 Sheets—Sheet 1.

S. M. GREEN.

MACHINE FOR WINDING BOBBINS.

No. 582,123. Patented May 4, 1897.

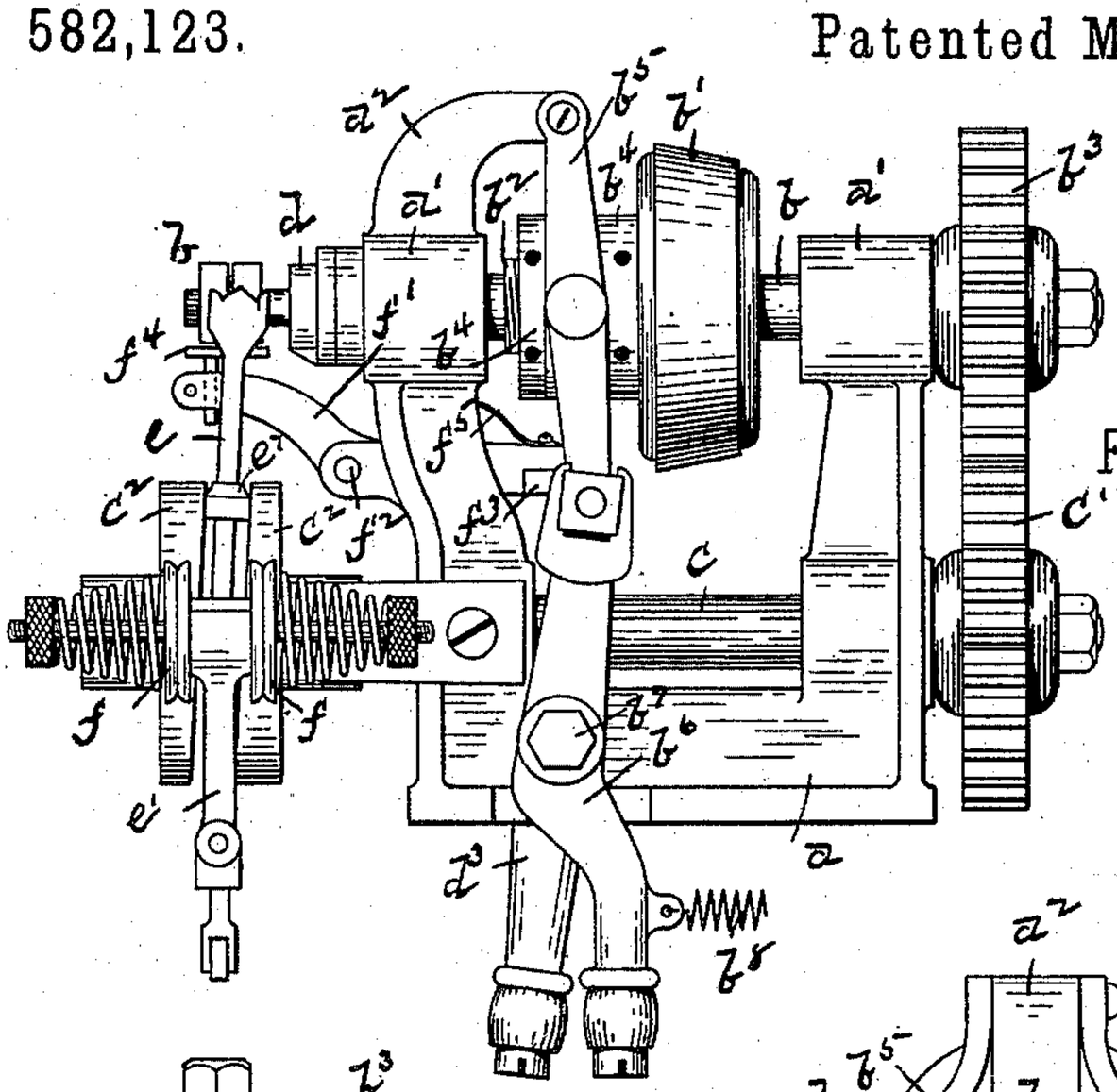

Fig 2.

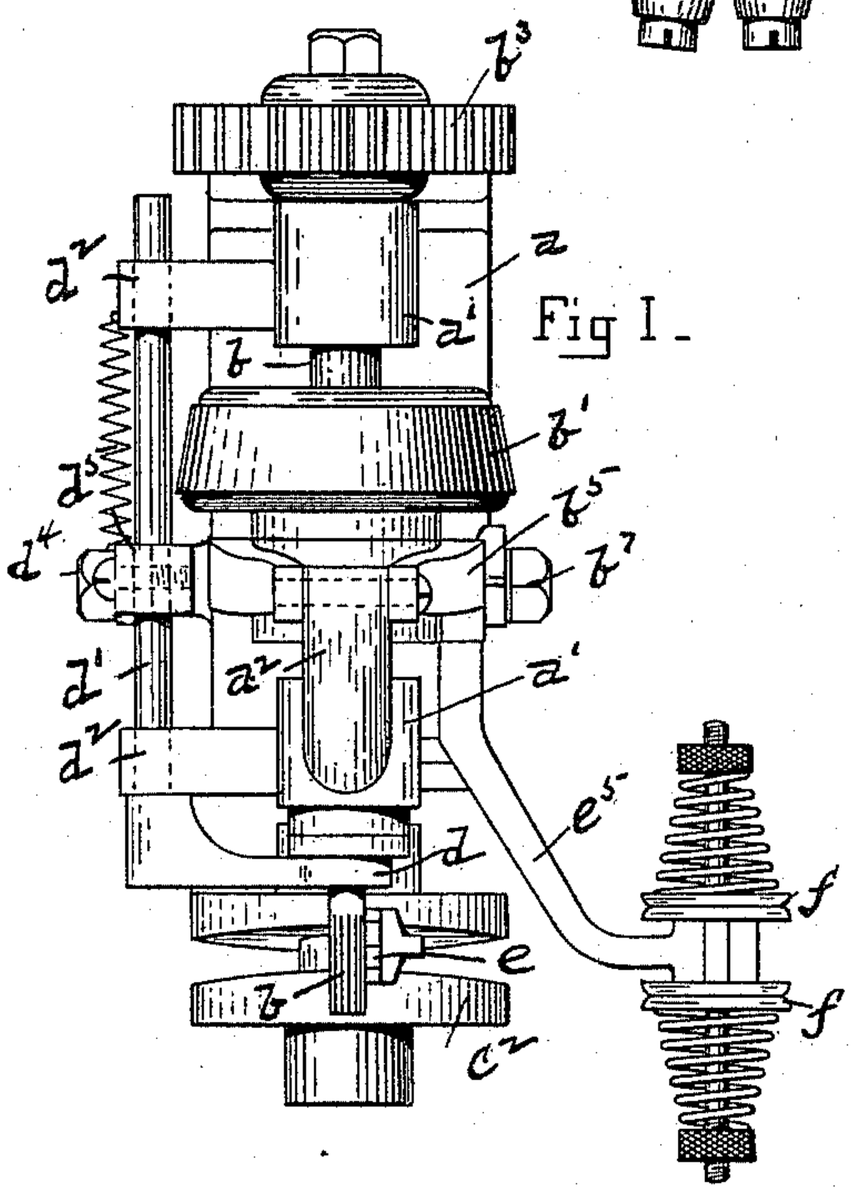

Fig 1.

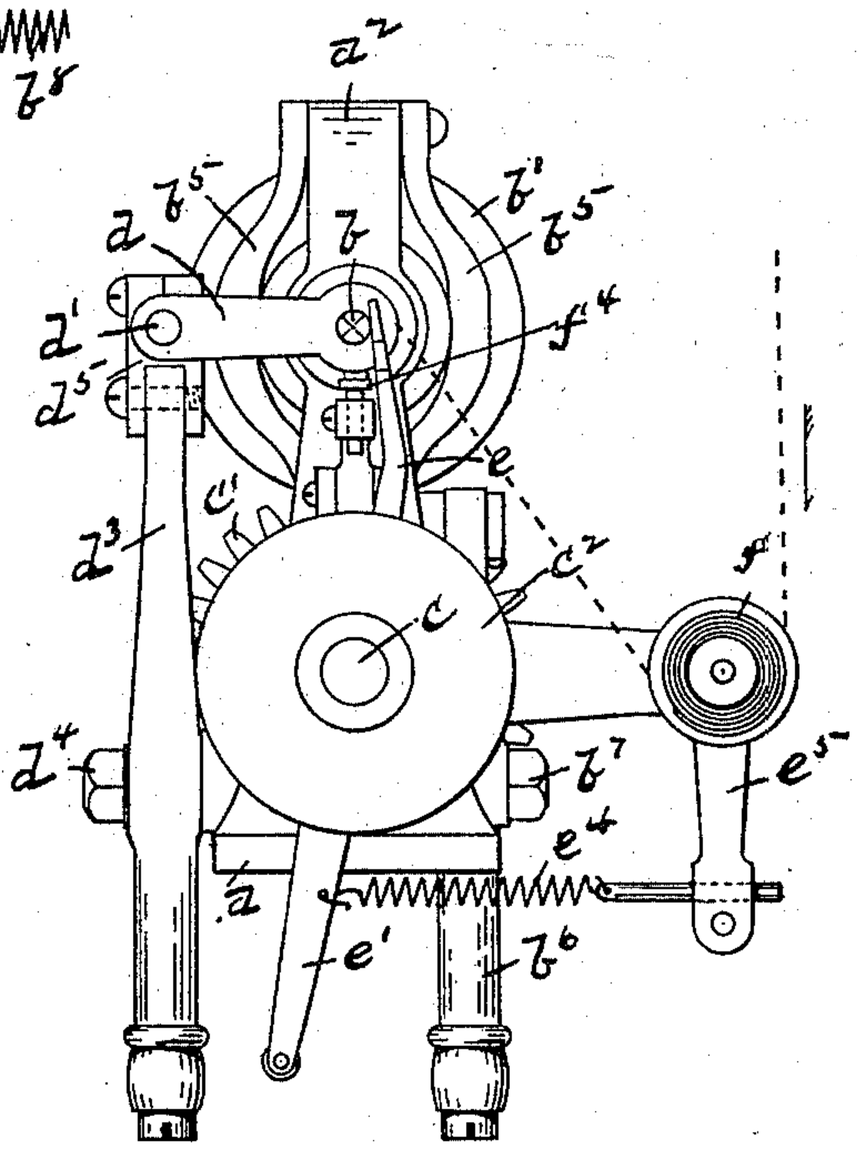

Fig 3.

Witnesses:
F. W. Rice.
J. E. Chapman

Inventor.
S. M. Green
per Wm. F. Chapman
Attorney.

(No Model.)

3 Sheets—Sheet 2.

S. M. GREEN.

MACHINE FOR WINDING BOBBINS.

No. 582,123. Patented May 4, 1897.

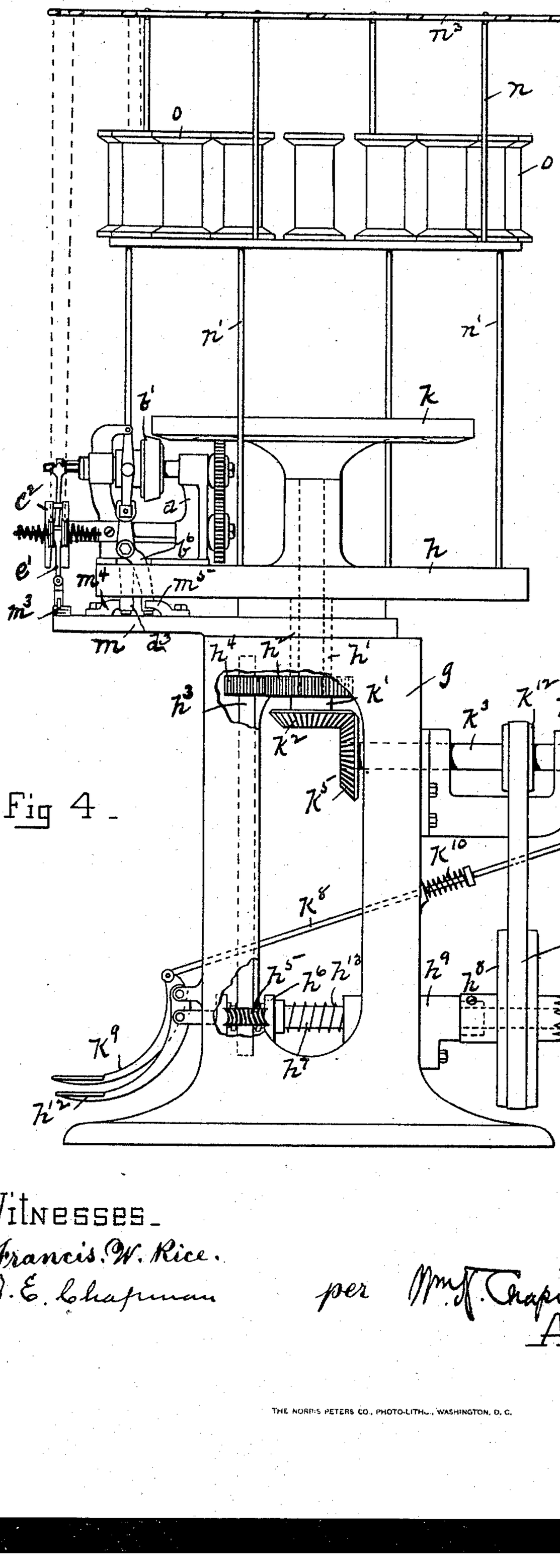

Fig 4.

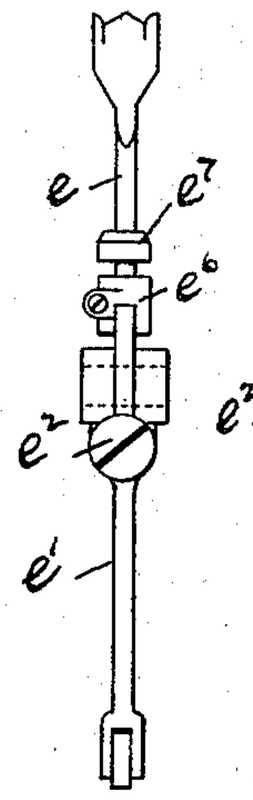

Fig 5.

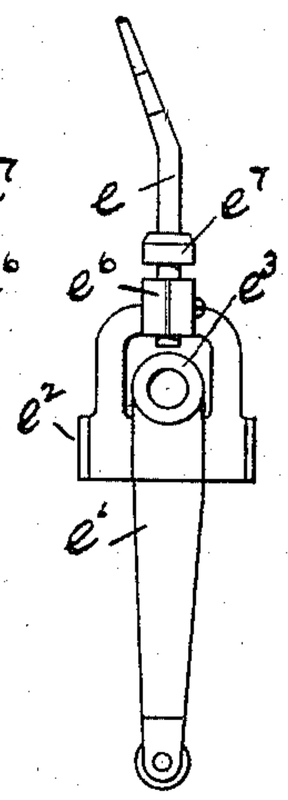

Fig 6.

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(No Model.) 3 Sheets—Sheet 3.

S. M. GREEN.

MACHINE FOR WINDING BOBBINS.

No. 582,123. Patented May 4, 1897.

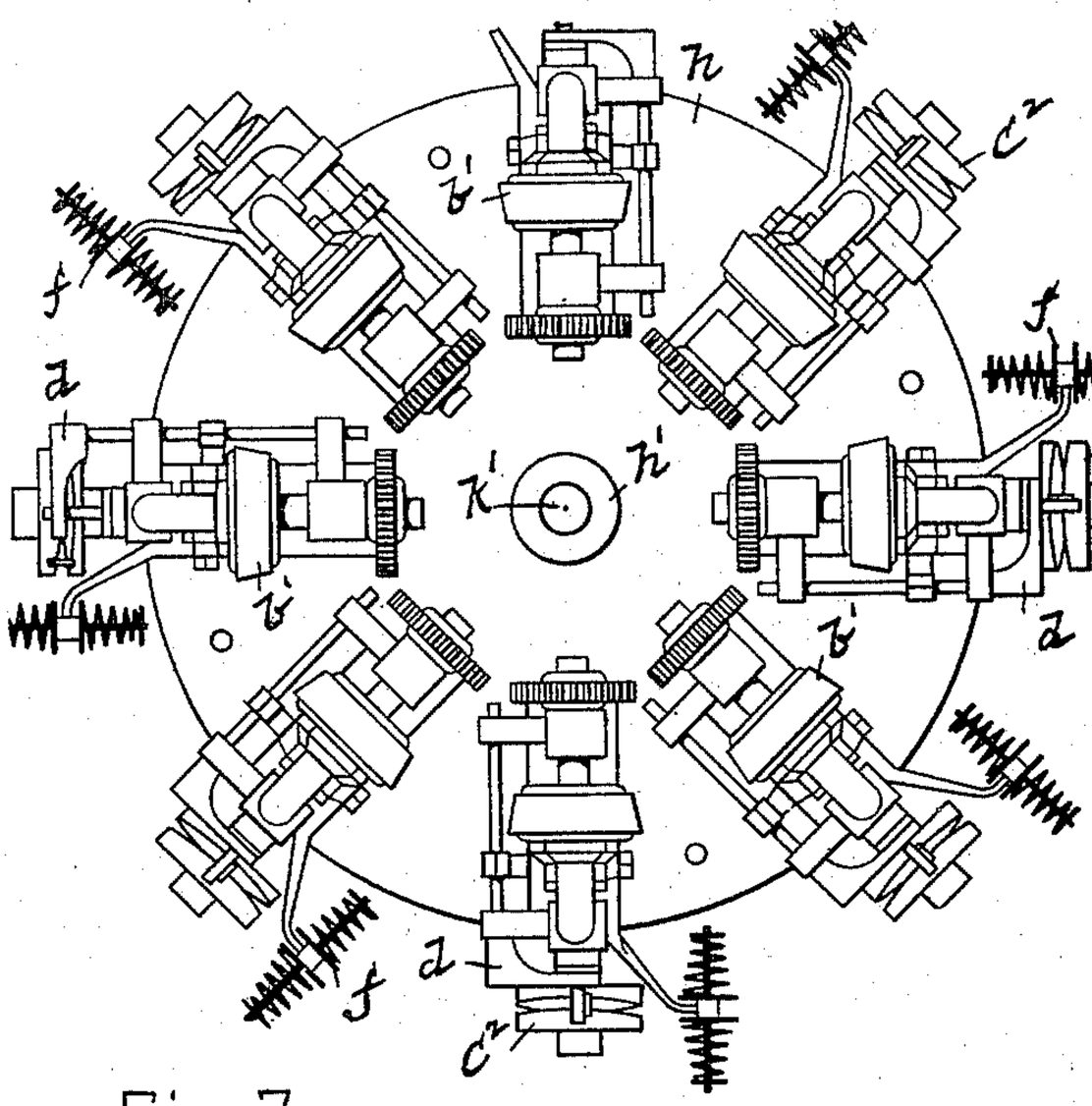

Fig 7.

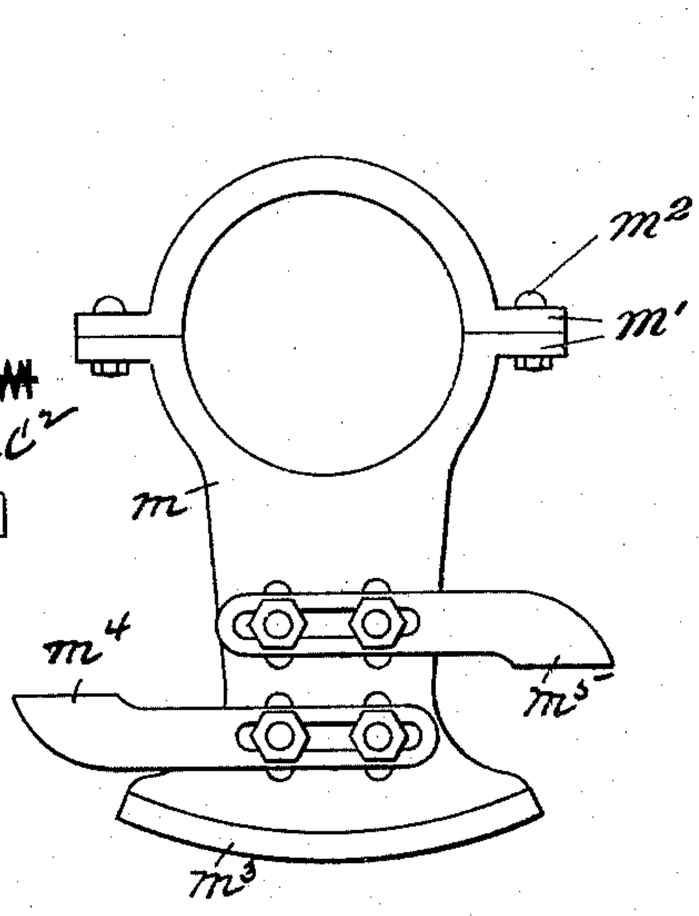

Fig 8.

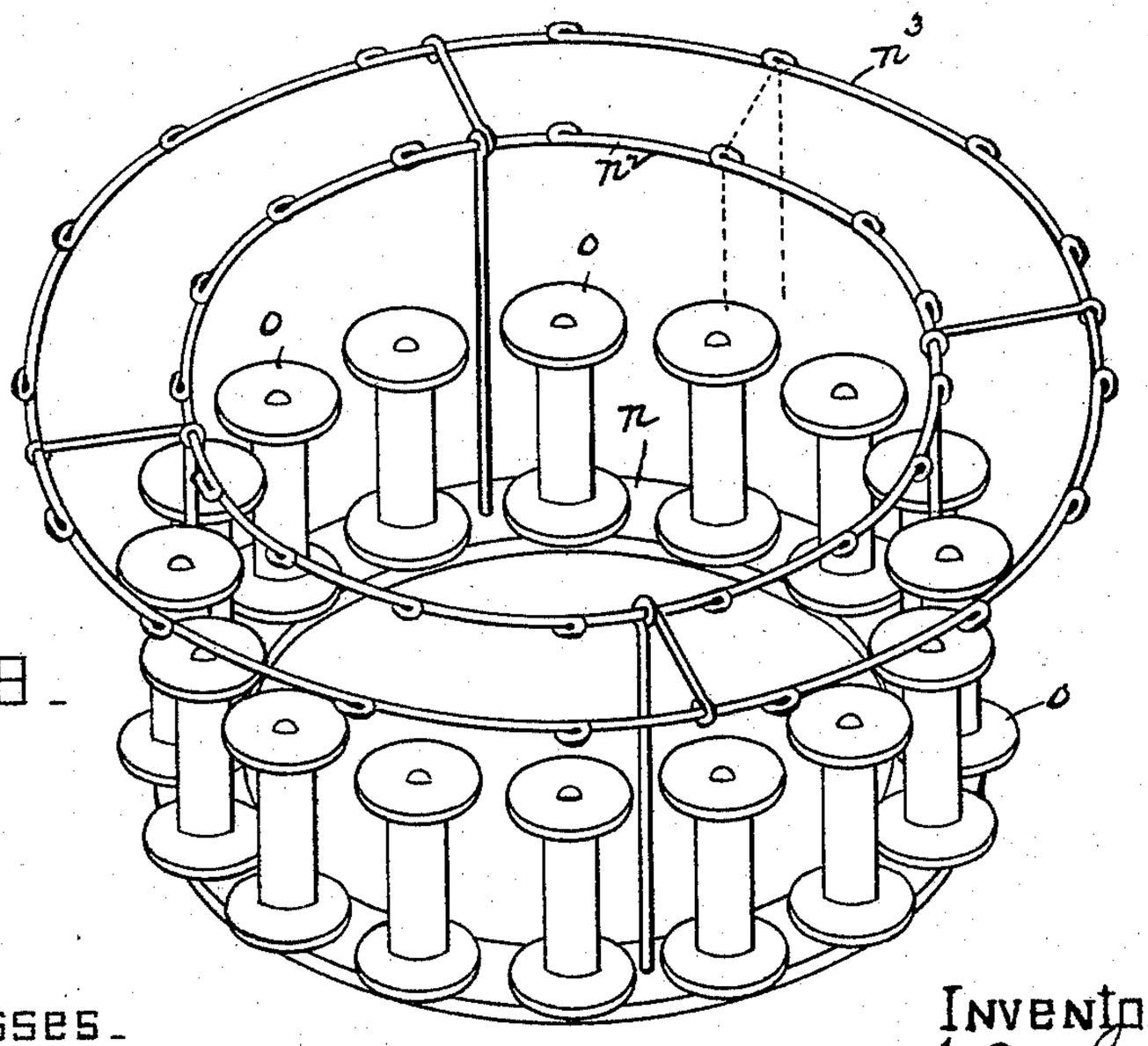

Fig 9.

Witnesses.
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UNITED STATES PATENT OFFICE.

SAMUEL M. GREEN, OF HOLYOKE, MASSACHUSETTS, ASSIGNOR TO THE MERRICK THREAD COMPANY, OF SAME PLACE.

MACHINE FOR WINDING BOBBINS.

SPECIFICATION forming part of Letters Patent No. 582,123, dated May 4, 1897.

Application filed June 20, 1893. Serial No. 478,291. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL M. GREEN, a citizen of the United States, residing at Holyoke, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Machines for Winding Bobbins, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

My invention relates to machines for winding the bobbins used in sewing-machine shuttles of the Singer or Wheeler & Wilson type—that is to say, bobbins of a disk shape composed of thread closely wound upon a central tube of paper or other suitable material and which are placed upon the market in condition to be at once placed within a shuttle.

The object of my invention is to provide a machine for winding such bobbins which will greatly expedite the operation and will enable a single operator to do as much work in a given time as has heretofore been performed by several operators, thereby effecting a material saving in the cost of winding the bobbins.

To this end my invention consists in the machine constructed and operating as hereinafter fully described, and particularly pointed out in the claims.

In the practice of my invention I mount upon a revolving table a plurality of bobbin-winding mechanisms adapted to be brought successively before the operator stationed at one side of said table and provide a driving medium common to all of said mechanisms, whereby they are driven to wind the bobbins. I also provide means whereby each of said mechanisms is automatically disconnected from the driving medium when its bobbins have reached the desired diameter and whereby said completed bobbins are forced off from the winding-arbors, thus leaving the latter free for the starting of new bobbins.

In the accompanying drawings, in which like letters designate like parts in the several views, Figures 1, 2, and 3 are respectively a plan view, a side elevation, and an end view of one of the individual winding mechanisms. Fig. 4 is a side elevation of the entire machine, but one of said individual mechanisms being shown upon the table, however, for the sake of clearness. Figs. 5 and 6 are front and side views of the thread-guide. Fig. 7 is a plan view of the table, having mounted thereon eight winding mechanisms. Fig. 8 is a plan view of the stationary cam-plate. Fig. 9 is a perspective view of the creel, adapted to carry sixteen spools of thread to supply the mechanisms shown in Fig. 7.

Referring particularly to Figs. 1, 2, and 3, each of the individual winding mechanisms is provided with a frame a, having at its upper end bearings a', in which is supported the winding-arbor b, and provided near its lower end with bearings in which is supported a cam-shaft c, which is parallel with and in the same vertical plane with said arbor. Upon arbor b, between the bearings a', is mounted a beveled friction-pulley b', having an exteriorly-threaded hub b^2, which is keyed to the arbor to permit said pulley to have a limited movement longitudinally of the latter without impairing its rotational engagement therewith, and a gear b^3 at one end of the arbor meshes with a similar gear c' on shaft c, thereby transmitting motion from the former to the latter. Upon the hub of said pulley b' are located two spanner-nuts b^4, which nuts engage the center of a yoke b^5, pivoted at its upper end to a bracket a^2 of the frame and having a pivotal connection at its lower end with the upper end of a lever b^6, said lever being pivoted at b^7 to the frame and carrying an antifriction-roll at its lower end, whereby movement of said lever about its pivotal center will be transmitted through said yoke to the friction-pulley, moving the latter longitudinally of the arbor b. The adjustability of the nuts b^4 upon the hub of the pulley enables the starting-point of the pulley in such movement to be accurately predetermined.

The end of arbor b opposite to that at which gear b^3 is located forms the support for the bobbins while being wound, there being preferably two bobbins wound at the same time, as will be presently described. Surrounding the arbor adjacent to said end is an ejector d for forcing the wound bobbins off from the arbor, said ejector being carried at the end of a rod d', having a limited endwise movement within bearings d^2 on the frame and to

which movement is transmitted by a lever d^3, pivoted at d^4 to the frame and carrying an antifriction-roll at its lower end, said lever at its upper end having a pivotal connection with a block d^5, adjustably secured to said rod.

The thread-guide (shown detached in Figs. 5 and 6) is composed of two members e e', pivotally connected together at e^2 in such manner as to permit the upper member e to have a lateral swinging movement upon the lower member, and the lower member terminates at its upper end in a collar e^3, which embraces the cam-shaft c, whereby the entire guide is permitted to have a swinging movement about said shaft as a center and in a plane at a right angle to that of the independent movement of said upper member. The lower member e' carries at its lower end an antifriction-roll, and a spring e^4, connected at one end to said member and its opposite end to a bracket e^5, projecting from the frame, normally presses the upper end of the guide toward the arbor b. The upper member of the guide is preferably made in two parts and connected together by the split hub e^6 and binding-screw, as shown, to permit vertical adjustment of the upper part, and said member carries the beveled collar e^7, which is engaged upon its opposite sides by the two-part cam c^2, by which a positive vibratory movement is imparted to the upper member for the purpose of laying the thread evenly upon the bobbins. At its upper end the thread-guide is provided with the usual notches to receive the thread.

Disk tension devices of the usual form (designated by the letter f) are supported upon the bracket e^5 for producing the proper degree of tension upon the threads. The friction-pulley b' is thrown into operative engagement with its driving medium, presently to be described, by being moved toward the right in Fig. 2 and is disengaged from said medium by being moved toward the left, the movement thereof in the latter direction being produced by a spring b^8, connected at one end to lever b^6 and at its opposite end to the frame. For the purpose of automatically disconnecting said pulley from its driving medium and stopping the movement of the arbor when a bobbin reaches the desired diameter—in other words, becomes filled with thread—I provide a stop-motion device consisting of a lever f', pivoted at f^2 to a lug projecting from the frame, said lever carrying at one end a notched steel block f^3, adapted to engage the pivot-pin which connects lever b^6 with yoke b^5, which pin may, if desired, be provided with an antifriction-roll and thereby normally retain the pulley b' in its extreme position to the right in opposition to the stress of spring b^8. At its opposite end said lever f' is provided with a split socket and set-screw, into which socket projects the stem of a pad f^4, adapted to bear against the under side of the bobbin or bobbins being wound, said pad being thereby rendered vertically adjustable upon the lever. The increasing diameter of the bobbin gradually depresses said pad and the lever until the bobbin reaches the desired diameter, at which time the opposite end of the lever is raised sufficiently to release the lever b^6 and permit spring b^8 to disconnect pulley b' from its driving medium, the precise diameter which the bobbin must have in order to thus stop the winding-arbor being predetermined by the adjustment of said pad f^4. A spring f^5 on the lever f' and bearing against the frame serves to normally keep said lever interlocked with lever b^6.

Referring now to Figs. 4 and 7, the letter g designates the main frame of the machine, which is provided at its upper end with suitable bearings, in which are located a vertically-disposed tubular shaft h', carrying at its upper end a circular table h and at its lower end a spur-gear h^2, and a second vertical shaft k', which passes through said tubular shaft and carries at its upper end a circular disk k and at its lower end a bevel-gear k^2, whereby said table and disk are adapted to revolve in a horizontal plane independently of each other. Motion is transmitted to said disk by a horizontal shaft k^3, having its bearings in a bracket k^4, projecting from the frame g and carrying at its inner end a bevel-gear k^5, which meshes with the gear k^2. At its outer end said shaft k^3 is connected by the ordinary form of friction-clutch with a band-pulley k^6, by which motion is transmitted to said shaft by belt from a counter-shaft, a clutch-lever k^7, rod k^8, treadle k^9, and spring k^{10}, enabling the operator to connect and disconnect said friction-clutch by foot-pressure in a manner which will be obvious from the drawings. Motion is transmitted to the table h through a vertical shaft h^3, carrying at its upper end a spur-gear h^4, which meshes with the gear h^2, and at its lower end a worm-gear h^5, which engages a worm on a sleeve h^6, carried by a horizontal shaft h^7. The shaft h^7 is capable of receiving a slight endwise movement through said sleeve and through a band-pulley h^8, turning on a projecting hub h^9 of the frame to engage a toothed clutch-head h^{10} at its outer end with and disengage it from the toothed hub of said band-pulley h^8, a treadle h^{12} serving to move said shaft in one direction and a spring h^{13} moving it in the opposite direction. A belt connects the band-pulley h^8 with a similar pulley k^{12} on shaft k^3.

It will be obvious from the foregoing description and an inspection of Fig. 4 that a greatly-retarded motion will be transmitted to table h from shaft k^3 by the means described, and that the operator can at any time stop the movement of said table by pressing upon treadle h^{12} without interrupting the movement of the disk k.

A plurality of the winding mechanisms shown in Figs. 1, 2, and 3 are mounted upon the table h, with their winding-arbors occupying a radial position relatively thereto and

in such position that their friction-pulleys b, will, in their operative position, engage the beveled under side of the disk k, said disk thus forming the driving medium common to all of said mechanisms. The table herein shown is adapted to carry eight of said individual winding mechanisms, as shown in Fig. 7, but one of the same being shown in Fig. 4 for greater clearness. When thus mounted upon the table, the lower ends of the levers b^6 d^3 and thread-guides of said mechanisms project below the plane of the table, the latter being suitably slotted to receive said levers. To automatically actuate said levers and thread-guides at one point in the revolution of the table, I provide a cam-plate m, (shown detached in Fig. 8,) which embraces a circular hub at the upper end of frame g, and is rendered capable of adjustment about said hub as a center by the ears m' and screws m^2 in an obvious manner, upon which plate are located cams, as follows: At its extreme outer end is the cam m^3, having a curved upper surface, the office of which is to successively engage the lower ends of the thread-guides and rock said guides in such manner as to cause their upper ends to clear the bobbins at the instant at which the bobbins are forced off from their arbors by the ejectors d. Adjustably secured to the upper side of said cam-plate by means of their slotted shanks are two cam-blocks m^4 m^5, facing in opposite directions, the function of the cam m^4 being to engage the lower ends of the levers d^3, and by moving them inwardly cause the ejectors d to force the wound bobbins from their arbors, the ejectors being returned to their normal positions by springs d^6, (see Fig. 1,) and the function of cam m^5 being to engage the lower ends of the levers b^6, and by moving them outwardly return the friction-pulleys b' to their position of engagement with disk k and permit the levers f' to lock them in such position. By adjusting the cam-plate about its pivotal center the precise point in the revolution of table h at which these operations will occur can be determined at will.

A creel n (shown detached in Fig. 9) is supported upon the table h by means of standards n', said creel comprising a ring provided with posts to receive the supply-spools o, a wire ring n^2, provided with thread-eyes located directly above the spools o, and a similar ring n^3, of greater diameter, provided with thread-eyes located in substantially the vertical plane of the tension devices f. The thread is led from the spools o through the eyes on ring n^2, thence through the eyes on ring n^3, and from thence about the tension devices to the winding-arbors of the several winding mechanisms.

In the operation of the machine thus described the operator occupies a position in front of the cam-plate m, and as each winding mechanism is brought before her by the revolution of table h she places upon the winding-arbor thereof the two paper or other tubes which form the centers of the bobbins and gives one turn of the two threads projecting from the tension devices about the arbor, or otherwise fastens the ends thereof, which can readily be done while said winding mechanism is passing from the plane of cam m^4 to that of cam m^5. As said mechanism passes the latter cam its pulley b' is thrown into engagement with the disk k, as before described, and the winding of the bobbins begins, the thread being evenly laid by the action of the thread-guide, as before stated. The winding movement continues until the bobbins have reached the proper diameter, when the stop-motion described causes the arbor to cease its movement, and the continued movement of the table brings the mechanism again to the cam-plate and the thread-guide is retracted and the bobbins are ejected, as before described, whereupon the operator immediately starts two more bobbins upon the arbor and the operation goes on as before. All of the winding mechanisms except the one which is passing over the cam-plate are thus caused to perform their winding operation simultaneously and the machine is given a very great capacity for supplying wound bobbins, the single operator being thus enabled to do the same work that has heretofore required the services of several. The operator can at any time stop the movement of table h or of the entire machine by pressing the proper treadle, the winding mechanisms continuing their winding movement in the former case because of the continued movement of the disk k. The under side of the disk k and the peripheries of the pulleys b' will preferably be faced with leather or other friction-producing material. By reference to Fig. 2 it will be observed that the under side of the ejector d is beveled from its outer face, the object of which construction is to cause it to depress the pad f^4 and cause the stoppage of the arbor when moved outwardly to eject the bobbins in case the bobbins themselves should for any reason fail to sufficiently depress said pad to secure such result.

The machine herein described, besides greatly expediting and cheapening the operation of winding sewing-machine bobbins, secures perfect uniformity in the size and shape of the bobbins themselves, thereby enhancing their mercantile valve.

It is obvious that various modifications in the details of construction herein described can be made within the spirit of my invention.

Inasmuch as the pitch of the gears b^3 c' determines the action of the thread-guide relatively to the movement of the winding-arbor, I provide different pairs of said gears having varying pitches to correspond with different sizes of thread, so that the even laying of the thread on the bobbin is assured under all circumstances.

Having thus fully described my invention,

what I claim, and desire to secure by Letters Patent, is—

1. In a machine for winding bobbins, a horizontally-disposed revolving table, a plurality of bobbin-winding mechanisms mounted upon said table each of which comprises a winding-arbor and thread-guiding devices, a single driving medium for simultaneously revolving the arbors of said winding mechanisms, and means substantially as described for automatically stopping the movement of each arbor upon the completion of the bobbin being wound thereon, combined and operating substantially as set forth.

2. In a machine for winding bobbins, a revolving table, a plurality of bobbin-winding mechanisms mounted thereon each of which comprises a winding-arbor and thread-guiding devices, a driving medium adapted to simultaneously revolve the arbors of all of said mechanisms, and means substantially as described for automatically stopping the movement of each arbor upon the completion of the bobbin being wound thereon and for ejecting said bobbin from the arbor, combined and operating substantially in the manner set forth.

3. In a machine for winding bobbins, the combination with a revolving table, of a plurality of bobbin-winding mechanisms mounted upon said table each of which comprises a winding-arbor and thread guiding and controlling devices, a driving medium for revolving the arbors of said mechanisms simultaneously, stop-motion devices substantially as described for automatically disconnecting each arbor from said driving medium upon the completion of the bobbin being wound thereon, and means substantially as described dependent upon the revolving movement of said table for automatically ejecting the completed bobbins from said arbors and again restoring the connection between the arbors and said driving medium, substantially as set forth.

4. In a machine for winding bobbins, the combination with a revolving table, of a plurality of bobbin-winding mechanisms mounted upon said table each of which comprises a winding-arbor carrying a friction-pulley and suitable thread guiding and controlling devices, an independently-revolving disk located above said table and adapted to frictionally engage the pulleys of said winding mechanisms, whereby the arbors of the latter are given a simultaneous and uniform revolving movement, and means for automatically disconnecting said winding mechanisms from said revolving disk independently of each other, substantially as set forth.

5. In a machine for winding bobbins, the combination with a revolving table and a revolving disk located above said table, of a plurality of bobbin-winding mechanisms mounted upon said table, each of said mechanisms comprising an arbor and a friction-pulley longitudinally movable upon said arbor whereby it is adapted to be moved into and out of frictional engagement with said revolving disk, and having a stop-motion mechanism dependent upon the diameter of the bobbin being wound for automatically disconnecting said pulley from said disk upon the completion of the bobbin, substantially as described.

6. In a machine for winding bobbins, a revolving table, a plurality of bobbin-winding mechanisms mounted upon said table each of which comprises an arbor, an ejector for removing a completed bobbin from said arbor, and a lever and spring for actuating said ejector in opposite directions, a driving medium substantially as described for simultaneously revolving the arbors of said winding mechanisms, and a stationary cam adapted to be brought successively into contact with the ejector-levers of said mechanisms by the revolving movement of said table, and to thereby cause the ejectors to remove the completed bobbins from the arbors, combined and operating substantially as set forth.

7. In a machine for winding bobbins, the combination with the revolving table, and the plurality of winding mechanisms mounted thereon each of which is provided with a bobbin-ejector and a vibrating and swinging thread-guide substantially as described, of two stationary cams adapted to be brought into contact with said thread-guides and said bobbin-ejectors respectively by the revolving movement of the table, the former being retracted to clear the bobbin and the latter being actuated to eject the bobbin, substantially as described.

8. In a machine for winding bobbins, the combination with an arbor having mounted thereon a friction-pulley which is movable longitudinally thereof, of a lever operatively connected with said pulley, a stop-motion lever adapted to engage said first-mentioned lever and normally retain it and the pulley in one of the extreme positions of the latter, a pad carried by said stop-motion lever which bears against the periphery of a bobbin wound upon said arbor, and means substantially as described for adjusting said pad to different heights upon said lever, substantially as and for the purpose set forth.

9. In a machine for winding bobbins, a main frame, as *g*, having mounted thereon a revolving table, a plurality of bobbin-winding mechanisms mounted upon said table, each of which is provided with an ejector-lever, as d^3, a clutch-lever, as b^6, and a thread-guide, as *e e'*, which project below the horizontal plane of said table, and the stationary cam-plate *m* adjustably secured to said frame below said table, said plate carrying the cams m^3 m^4 m^5, combined and operating substantially as and for the purpose described.

10. The combination with frame *g*, of the vertically-disposed shafts *h'* and *k'* journaled on said frame and carrying the table *h* and disk *k* respectively, horizontal shafts h^7 and

k^3 operatively connected with said shafts h' k' respectively for imparting a revolving movement thereto, treadle-operated clutch devices connected with each of said shafts h^7 k^3 for governing the motion thereof, and a plurality of bobbin-winding mechanisms mounted upon said table, the winding-arbors whereof are driven by frictional contact with said disk k, substantially as set forth.

SAMUEL M. GREEN.

Witnesses:
W. H. CHAPMAN,
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