(No Model.) 3 Sheets—Sheet 1.

G. B. LUKENS.

MECHANISM FOR SPINNING DIRECT FROM THE CARDING MACHINE.

No. 302,750. Patented July 29, 1884.

FIG. 1

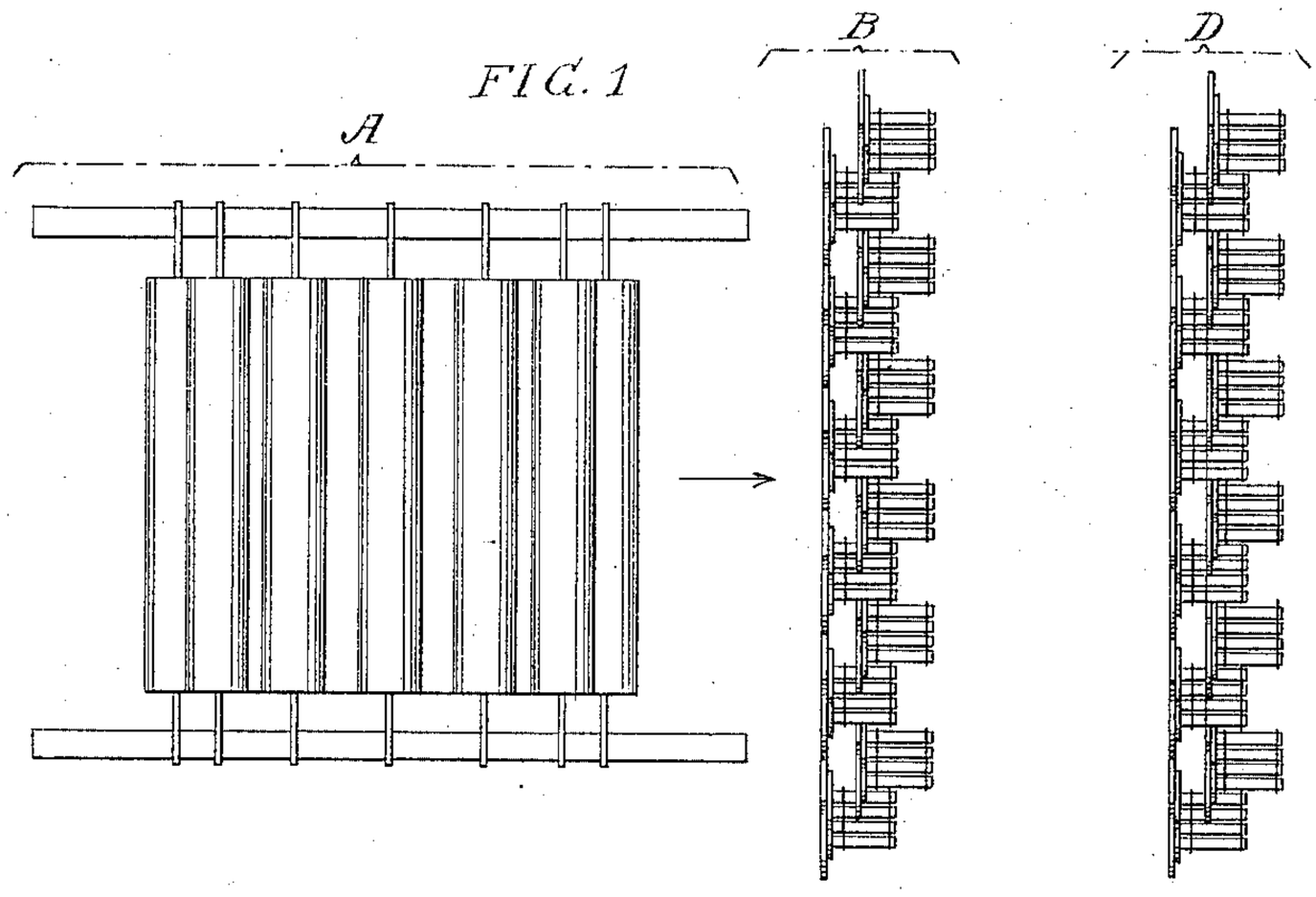


FIG. 2

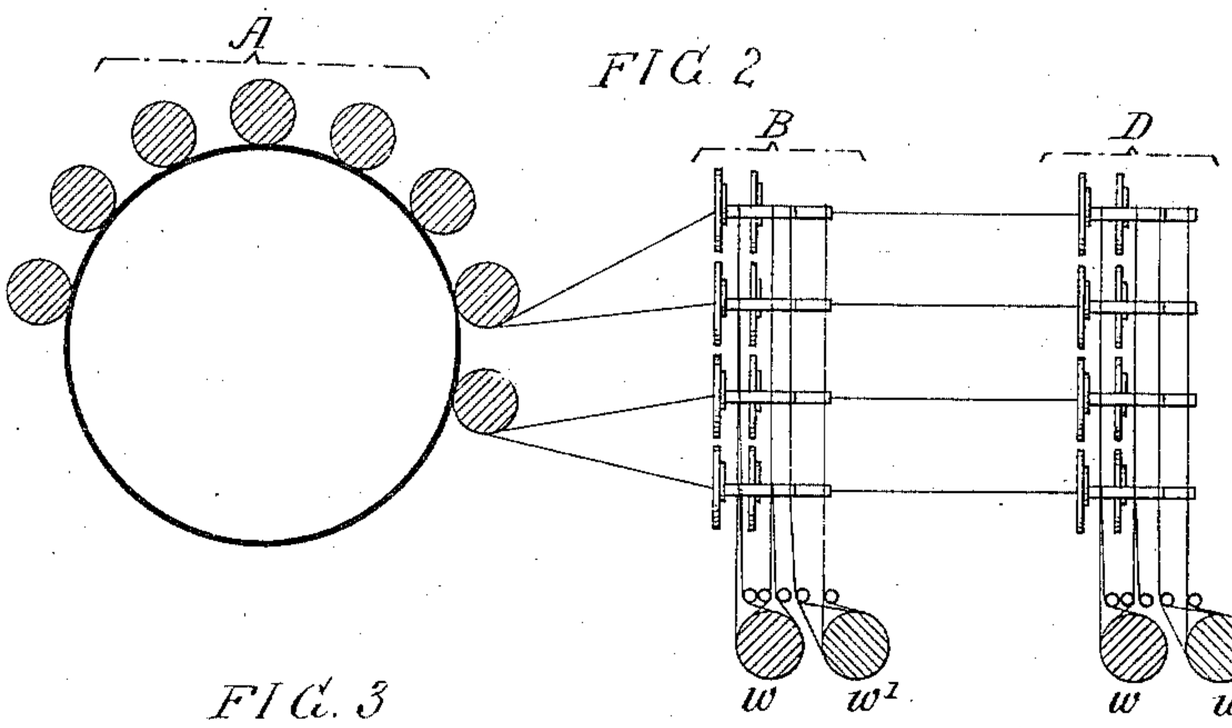


FIG. 3

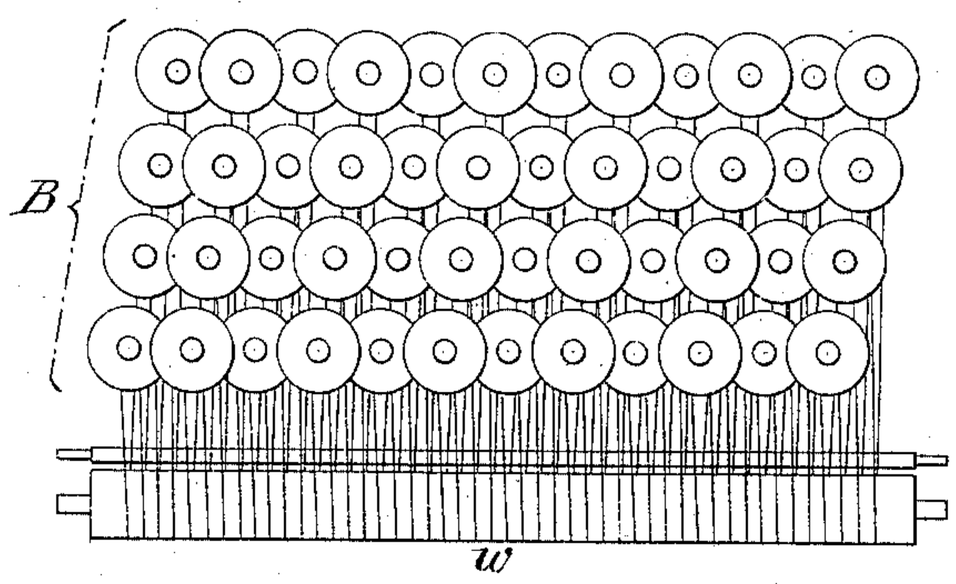
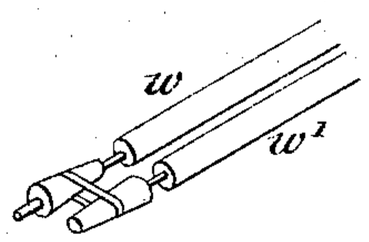


FIG. 4



WITNESSES:

James J Dobin

Harry L. Ashenfelter.

INVENTOR:

George B. Lukens

by his Attys.

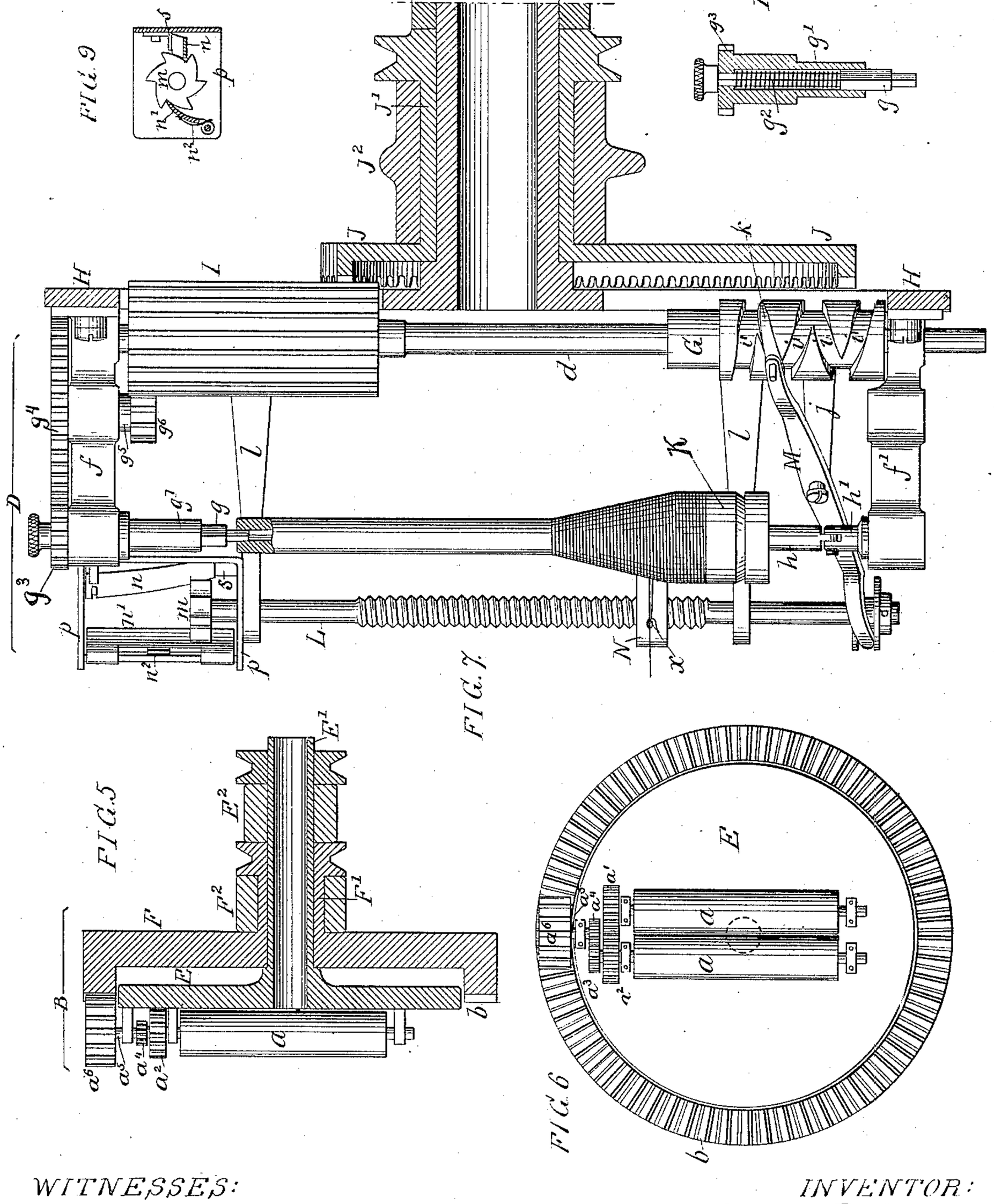
Howson and Sons

(No Model.) 3 Sheets—Sheet 2.

G. B. LUKENS.

MECHANISM FOR SPINNING DIRECT FROM THE CARDING MACHINE.

No. 302,750. Patented July 29, 1884.



(No Model.)

3 Sheets—Sheet 3.

G. B. LUKENS.

MECHANISM FOR SPINNING DIRECT FROM THE CARDING MACHINE.

No. 302,750. Patented July 29, 1884.

FIG. 10.

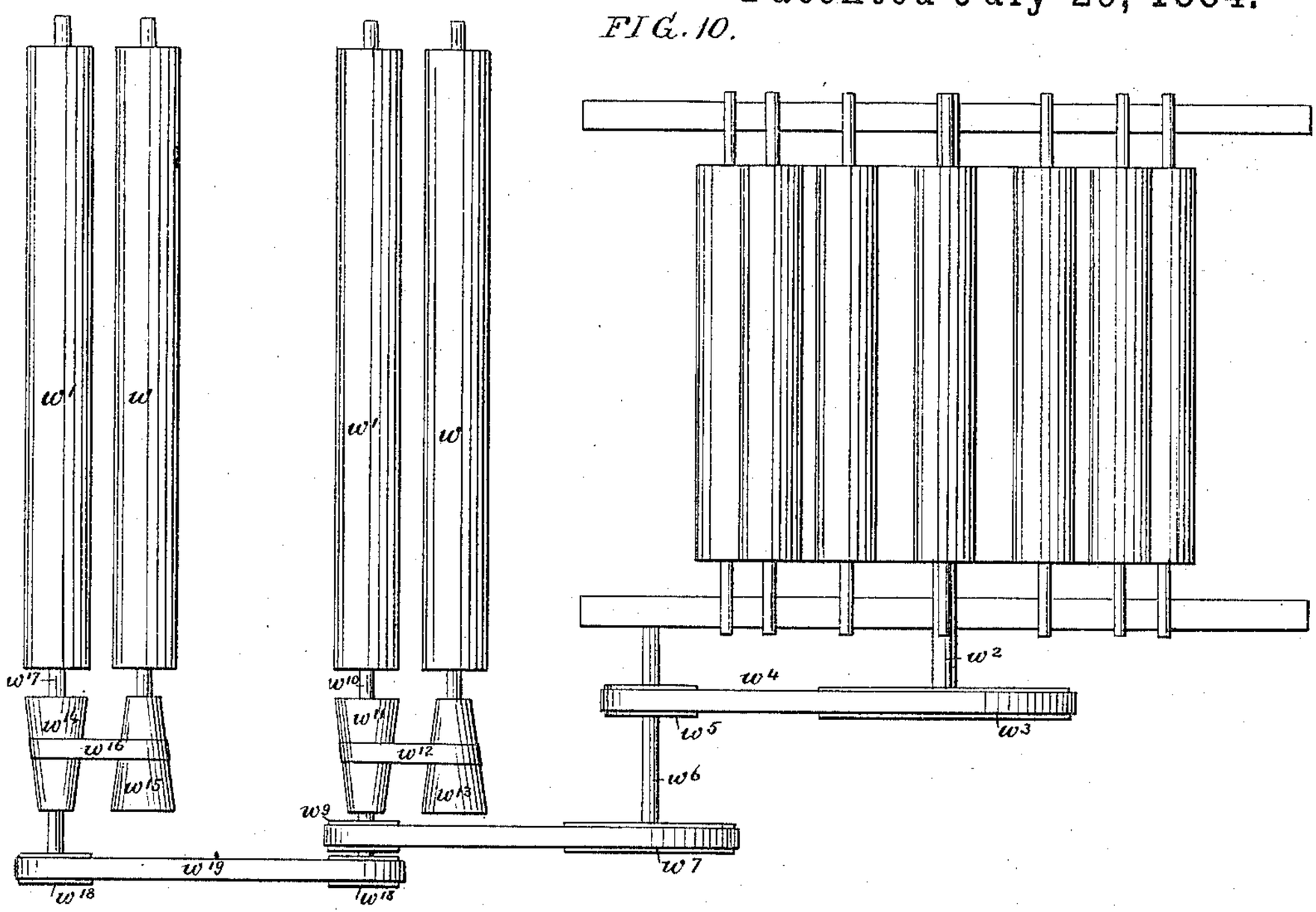


FIG. 11

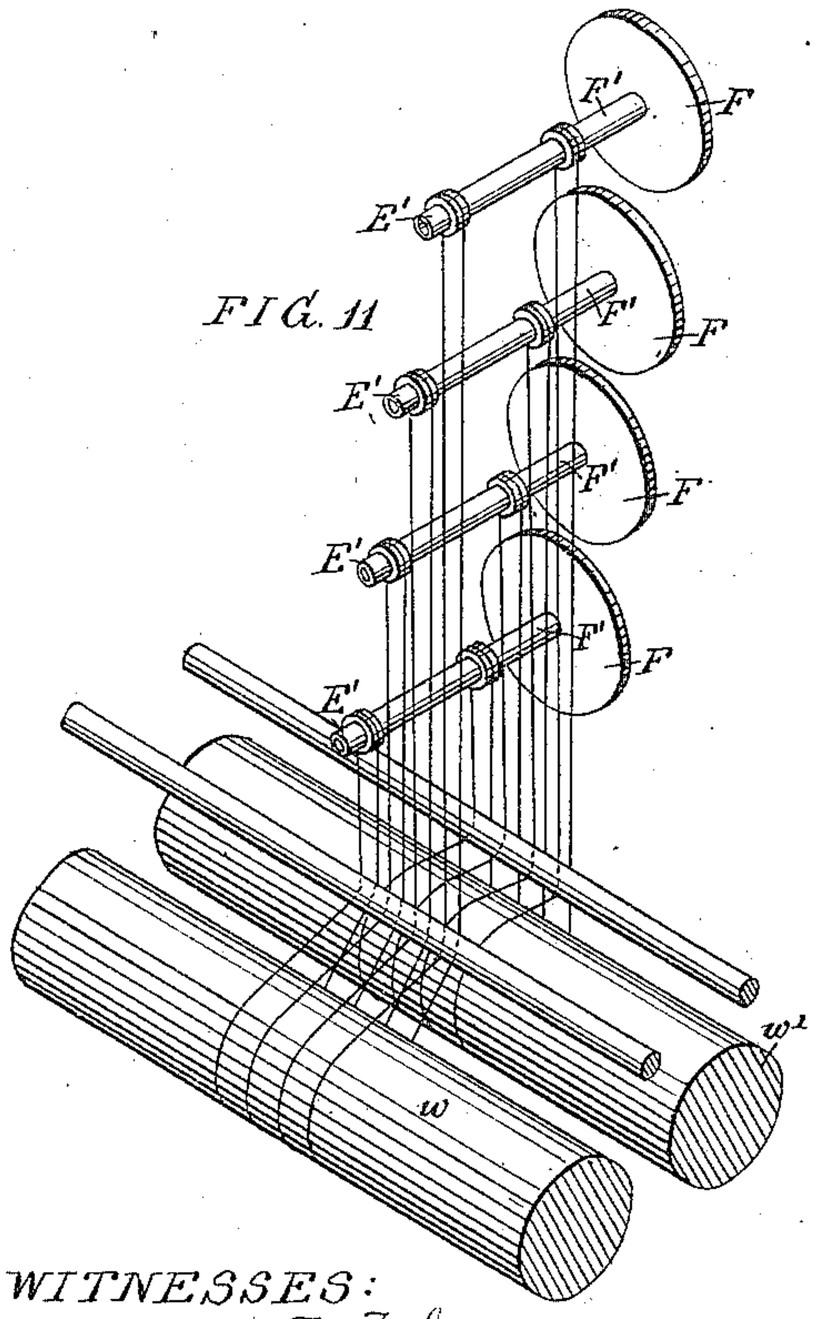
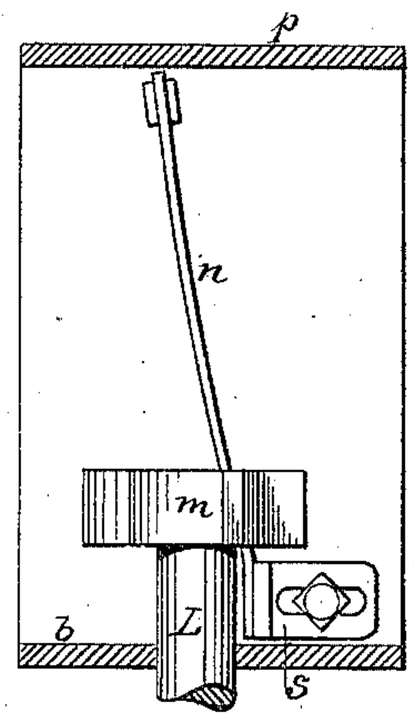


FIG. 12



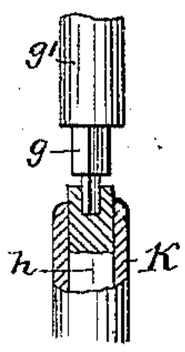


FIG. 13.

WITNESSES:
James J. Tobin
David S. Williams

INVENTOR:
George B. Lukens
by his Attys.
Howson & Sons

UNITED STATES PATENT OFFICE.

GEORGE B. LUKENS, OF CAMDEN, NEW JERSEY.

MECHANISM FOR SPINNING DIRECT FROM THE CARDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 302,750, dated July 29, 1884.

Application filed March 16, 1883. (No model.)

To all whom it may concern:

Be it known that I, GEORGE B. LUKENS, a citizen of the United States, and a resident of Camden, New Jersey, have invented certain Improvements in Mechanism for Spinning Yarn Direct from the Carding-Machine, of which the following is a specification.

My invention consists of certain improvements in apparatus for continuously spinning into yarn and winding onto bobbins the strands or narrow webs delivered by the ring-doffers of a condenser carding-machine, these improvements being too fully described hereinafter to need preliminary explanation.

In the accompanying drawings, Figure 1, Sheet 1, is a diagram showing in plan the arrangement of my improved spinning and winding apparatus in respect to a carding-machine; Fig. 2, a side view of the same, partly in section; Fig. 3, a face view of the drawing and twisting devices looking in the direction of the arrow, Fig. 1; Fig. 4, a perspective diagram showing one of the details of the driving mechanism; Fig. 5, Sheet 2, a longitudinal section, partly in elevation, of the twisting and drawing mechanism; Fig. 6, a face view of the same; Fig. 7, a view, partly in section and partly in elevation, of the spinning and winding mechanism, and Figs. 8 and 9 detached views of parts of the latter. Figs. 10 and 11, Sheet 3, are views on a larger scale than Figs. 1, 2, 3, and 4, to show the driving-gear more clearly. Fig. 12 is a view of part of Fig. 7 on a larger scale than that figure, and Fig. 13 a view showing a modification of part of the invention.

In Figs. 1 and 2, A represents a condenser carding-machine; B, a set of twisting and drawing devices, and D a set of winding and spinning devices, the latter being in the rear of the drawing devices, which are directly in the rear of the carding-machine. Each set comprises as many devices as there are ends delivered by the doffers of the carding-machine, there being in the present instance forty-eight in each set. Each device of the set B controls one of the narrow webs delivered by the doffers, and from said device the sliver passes to one of the devices of the set D, by which it is spun and wound upon a bobbin. Each drawing device of the set B consists of two disks, E and F, the former being carried by a hollow shaft, E′, adapted to a bearing on a bar, E^2, and the disk F forming part of a sleeve, F′, surrounding the hollow shaft E′ and adapted to a bearing in a bar, F^2. (See Fig. 5.) On the disk E are bearings for the shafts of a pair of drawing-rollers, *a*, which are geared together by spur-wheels a' a^2, the shaft of the latter having a spur-wheel, a^3, which gears into a wheel, a^4, on a short shaft, a^5, a pinion, a^6, on which gears into a crown-wheel, *b*, on the disk F. Both disks E and F are rotated in the same direction, but the disk E is driven at a somewhat higher rate of speed than the disk F, so that, owing to the crown-wheel *b* and the gearing used in connection therewith, the drawing-rolls *a* are driven at a speed proportionate to the difference between the speeds of the disks. The devices of the set B thus serve to twist and draw the strands or narrow webs delivered by the doffers of the carding-machine. The twist, however, is a false twist, which is lost when the yarn or strand leaves the rollers *a*, the true twist being imparted by the devices of the set D. Each of the latter comprises a disk, H, carrying the bobbin and thread-guiding devices, and an eccentric crown-wheel, J, whereby the bobbin and thread-guiding devices are actuated.

The disk H forms part of a hollow shaft, H′, adapted to a bearing in a bar, H^2, and the crown-wheel J forms part of a sleeve, J′, surrounding the hollow shaft H′, and adapted to a bearing in a bar, J^2. (See Fig. 7.) The disk H has bearings for a shaft, *d*, on which is an elongated pinion, I, gearing into the eccentric crown-wheel J. Both the disk H and wheel J are rotated in the same direction but at different speeds, and the speed of the shaft *d* is governed partly by this difference in the speed of the disk H and wheel J and partly by the eccentric shape of the latter. A bracket, *f*, on the disk H has in it a bearing for a sleeve, g', carrying a short spindle, *g*, which engages with the upper end of the bobbin K and serves to rotate the latter, the bobbin being carried by a spindle, *h*, which is pivoted to a stud, h', adapted to turn in a bracket, f', on the disk H. The sleeve g' is driven by spur-gearing, described hereinafter, from the pinion I, and

the spindle *g* has its bearing in said sleeve *g'*, the opening being preferably squared and the spindle being free to move longitudinally within the sleeve under control of the spring g^2, as shown in Fig. 8, so that the end of the bobbin can be freed from the control of the driving-spindle when it is desired to remove the bobbin, the supporting-spindle *h* being thrown to one side to permit such removal and the application of a fresh bobbin, which is then adjusted so that the driving-spindle *g* can be thrust into the upper end of the same. The driving-spindle is squared or otherwise constructed so as to turn with the sleeve *g'* and engage with and drive the upper end of the bobbin or the upper end of the supporting-spindle, when the latter is allowed to project above the bobbin, as shown in Fig. 13, and the sleeve *g'* has a pinion, g^3, which gears into a spur-wheel, g^4, the latter being carried by a shaft, g^5, a spur-wheel, g^6, on which gears into the elongated pinion I.

On the shaft *d* is a drum, G, in which are cut intersecting threads *i i'*, the former being right handed and the latter left handed, and to an arm, *j*, on the disk H is hung a lever, M, one arm of which carries a pivoted shoe, *k*, adapted to the threads of the drum G, the opposite arm of the lever being forked for adaptation to a grooved disk on the traverse-bar L, which is free to turn and slide in arms *l* on the disk H. The traverse-bar L is threaded throughout the greater portion of its length, and to this threaded portion of the bar is adapted a block, N, which carries the thread-guiding eye *x*.

To the upper end of the traverse-bar L is secured a ratchet-wheel, *m*, and to a frame, *p*, carried by the arm *l*, is secured an inclined pawl, *n*, and a rod to which is pivoted a pawl, *n'*, both pawls being adapted to engage with the teeth of the ratchet-wheel, and the pawl *n'* being acted upon by a spring, n^2. (See Fig. 9.) As the shaft *d* is rotated a reciprocating movement is imparted to the traverse-bar L, and the yarn passing through the guide-eye *x* is properly directed to the bobbin. The block N moves with the traverse bar, but it has also a movement on said traverse-bar due to the screw-thread of the latter, there being a partial rotation of the bar on each reciprocation of the same, owing to the action of the pawl *n* on the ratchet-wheel *m*, and in consequence the block N is gradually moved upon the traverse-bar, so as to direct the yarn properly to the bobbin as the latter is gradually filled. The turning of the ratchet-wheel *m* is effected by the pawl *n* on the upward movement of the traverse-bar, backward movement of the ratchet-wheel being prevented by the pawl *n'*, so that on the reverse movement of the traverse-bar the pawl *n* is compelled to yield, the lower end of the same being free for this purpose, and the pawl possessing such elasticity that it will resume its former inclined position when free from the control of said ratchet-wheel.

The angle of the pawl *n* may be varied by adjusting a stop, *s*, Figs. 9 and 12, against which the free end of the pawl bears, so that I am enabled to regulate the extent to which the ratchet-wheel and traverse-bar will be turned on each reciprocation of the said bar, different grades of yarn requiring a corresponding variation in the movement of the block N.

The object of using the eccentric crown-wheel J is to impart a differental speed to the bobbin to compensate for the varying diameter of the body of yarn wound thereon, the speed of the bobbin gradually increasing as the yarn is wound from the base to the point of the cone, and gradually diminishing as the yarn is carried from the point to the base of the cone.

The system of belts and pulleys for driving the various shafts and sleeves of the twisting and drawing and spinning devices is shown in Figs. 2, 3, 4, 10, and 11. Each set of devices is driven by means of a pair of transverse drums, *w w'*, the shafts E' and H' being driven from the drums *w*, and the sleeves F' and J' from the drums *w'*, by means of belts, which are properly guided by means of interposed shafts or pulleys, as shown in Figs. 2 and 11. In order to regulate with nicety the speed of the drums *w w'*, and consequently of the shafts and sleeves in respect to each other, the drums are driven from the carding-machine by means of the arrangement shown in Fig. 10, in which w^2 represents the main shaft of the machine around a pulley, w^3, on which passes a belt, w^4, which also passes round a pulley, w^5, on a shaft, w^6, another pulley, w^7, on which is connected by a belt, w^8, with a pulley, w^9, on the spindle w^{10} of the drum *w'* of the drawing device. This spindle has a cone-pulley, w^{11}, which is connected by a belt, w^{12}, with a cone-pulley, w^{13}, on the spindle of the drum *w*, so that by properly adjusting the belt w^{12} the relative speeds of the two drums can be readily governed. The spindles of the drums *w w'* of the winding devices have like cone-pulleys w^{14} and w^{15} connected by a belt, w^{16}, and the spindle w^{17} of the drum *w'* is driven from the spindle w^{10} by pulleys w^{18} and a belt, w^{19}. Other means of driving the shafts and sleeves may, however, be adopted without departing from my invention, and a skeleton frame-work or arms on a shaft may, if desired, be used in place of the disks E, F, and H, the term "disks," as used herein, being held to include any such modifications.

I claim as my invention—

1. The combination, with a carding-machine, of a series of drawing devices, B, located in the rear of said machine, and each comprising a hollow shaft having a disk carrying drawing-rollers, a sleeve with a crown-wheel geared to the shafts of said rollers, and mechanism for rotating said shaft and sleeve, and a series of

spinning and winding devices, D, located in the rear of the drawing devices B, and each comprising a shaft, means adapted for supporting a bobbin with its axis at right angles to that of the shaft, a thread-guide, and mechanism for rotating said shaft and bobbin and reciprocating the thread-guide, as set forth.

2. The combination of the bobbin-driving spindle, the shaft *d*, having a pinion, I, gearing connecting the spindle and shaft, the carrier H, the eccentric crown-wheel J, and mechanism whereby said carrier and crown-wheel are rotated in the same direction but at different speeds, as set forth.

3. The combination of the block N, having the guide-eye *x*, the threaded traverse-bar L, having a ratchet-wheel, *m*, the longitudinal spring-plate *n*, and pawl *n'*, and mechanism for reciprocating the traverse-bar L, whereby on each reciprocation thereof a movement of partial rotation is imparted to said bar, as set forth.

4. The combination of the block N, having the guide-eye *x*, with the threaded traverse-bar L, having a ratchet-wheel, *m*, the longitudinal spring-plate *n*, and pawl *n'*, the adjustable stop *s*, against which the free end of said plate *n* bears, means for supporting said stop *s*, and mechanism for reciprocating the bar L, as set forth.

5. The combination of the carrier H, the brackets *f f'*, the bobbin-driving spindle *g*, capable of being retracted, the stud *h'*, the bobbin-supporting spindle *h*, pivoted to said stud, and means for rotating said spindle *g*, as set forth.

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

GEORGE B. LUKENS.

Witnesses:
HARRY L. ASHENFELTER,
HENRY HOWSON, Jr.