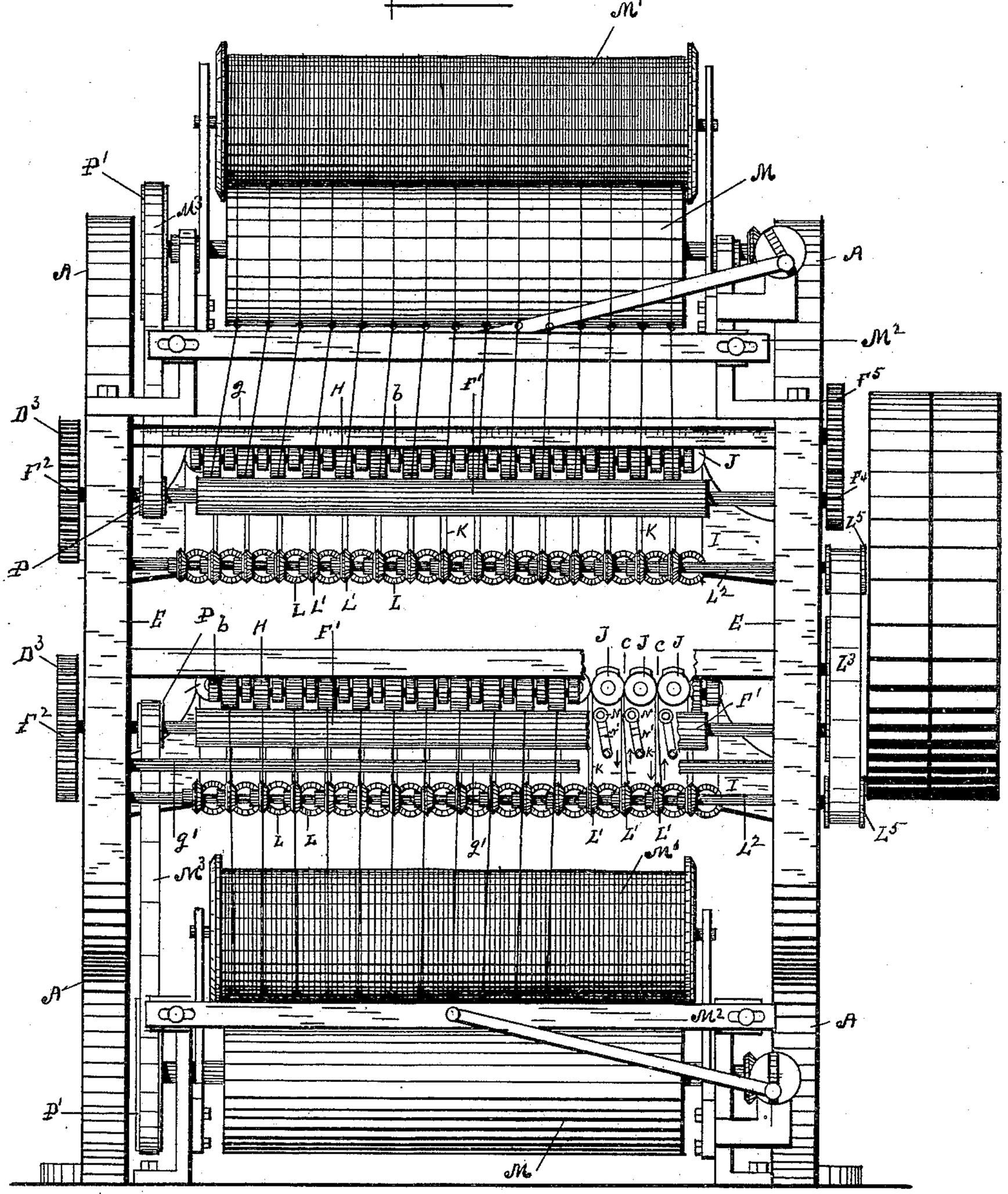
(No Model.) 4 Sheets—Sheet 1.

G. LAYNG.

CONDENSING MECHANISM FOR CARDING ENGINES.

No. 409,211. Patented Aug. 20, 1889.

FIG. 1.



Witnesses.

Rufus B. Fowler,
H. M. Fowler

Inventor.

George Layng

(No Model.) 4 Sheets—Sheet 2.

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CONDENSING MECHANISM FOR CARDING ENGINES.

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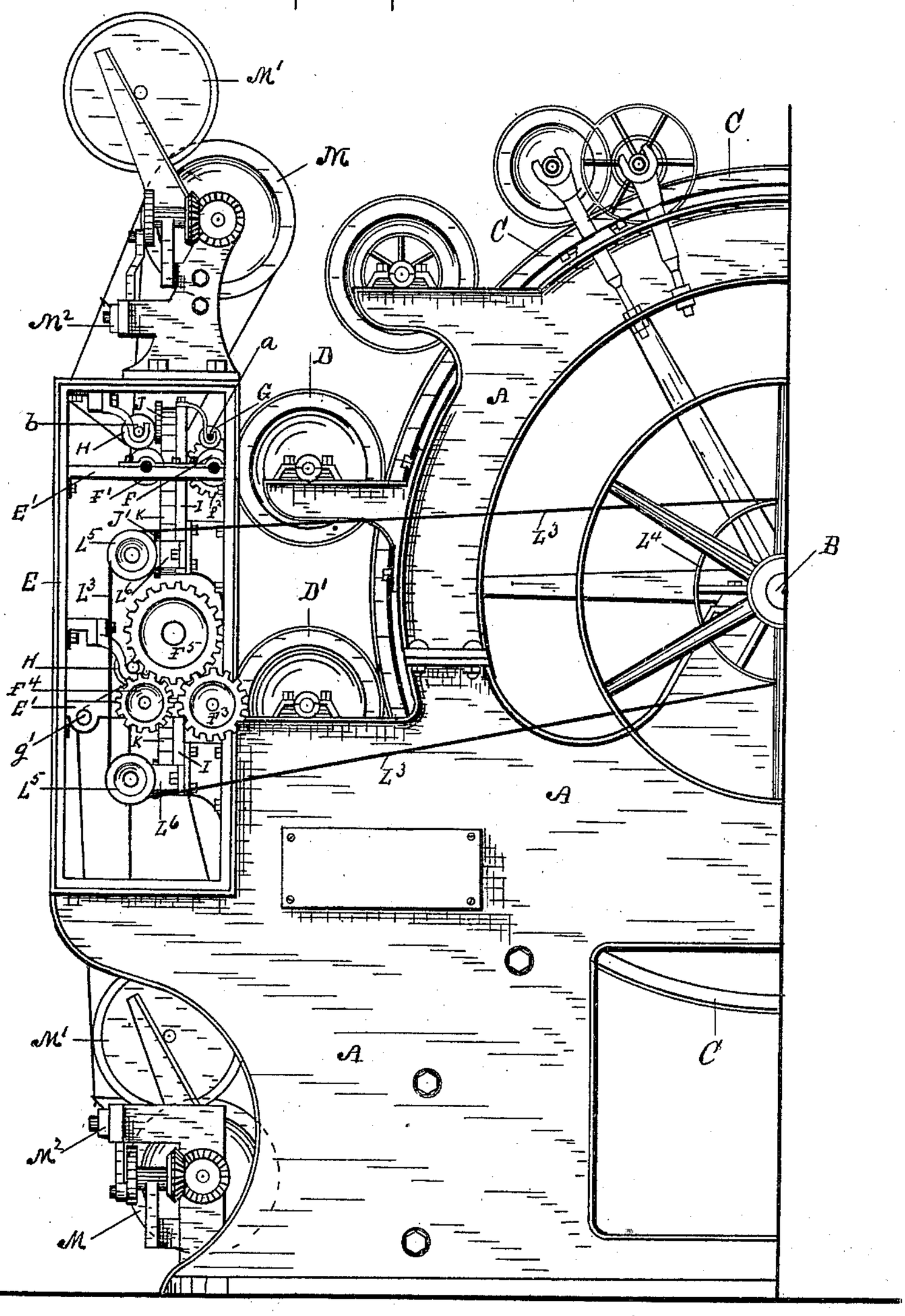
FIG. 2.



Witnesses—

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(No Model.) 4 Sheets—Sheet 3.

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CONDENSING MECHANISM FOR CARDING ENGINES.

No. 409,211. Patented Aug. 20, 1889.

FIG. 3.

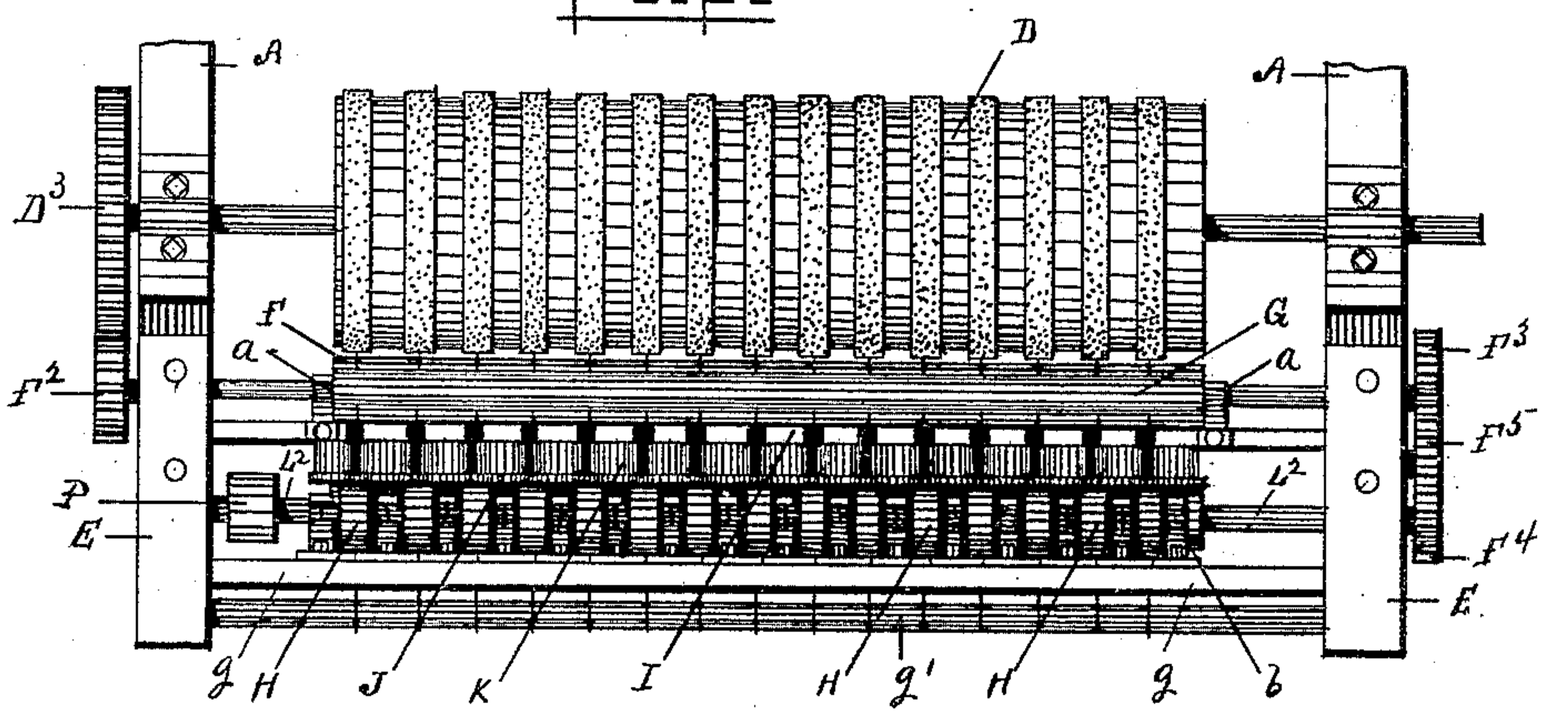


FIG. 6.

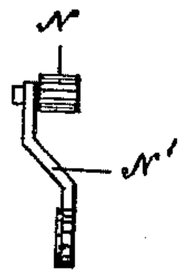


FIG. 7.

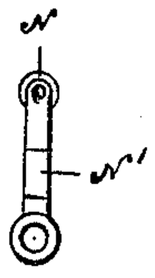
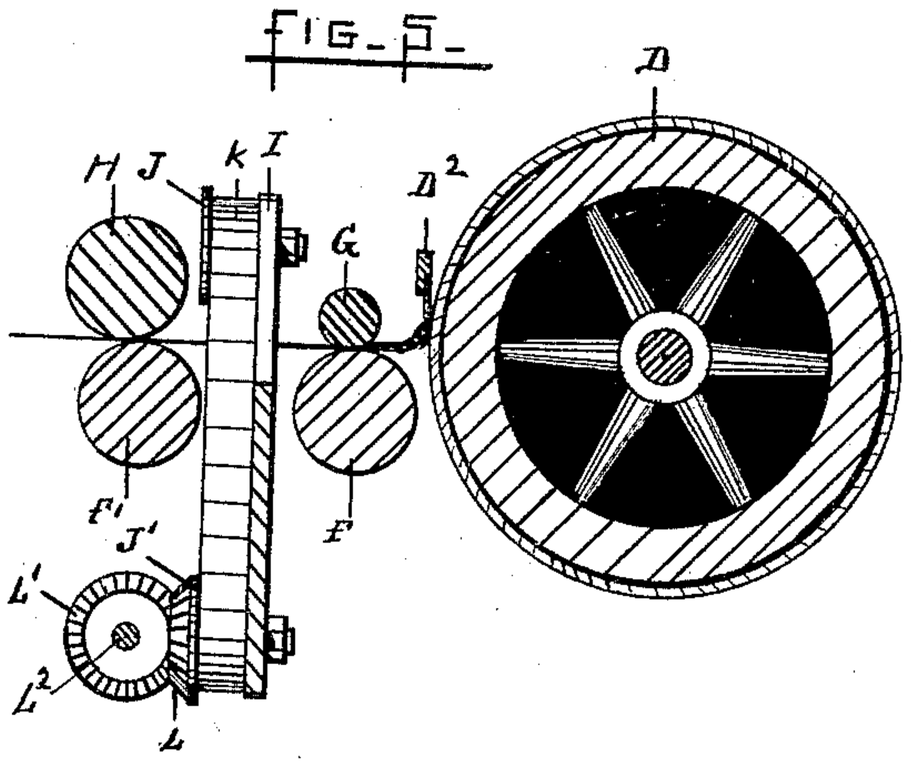


FIG. 5.



Witnesses—

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George Layng

(No Model.) 4 Sheets—Sheet 4.

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CONDENSING MECHANISM FOR CARDING ENGINES.

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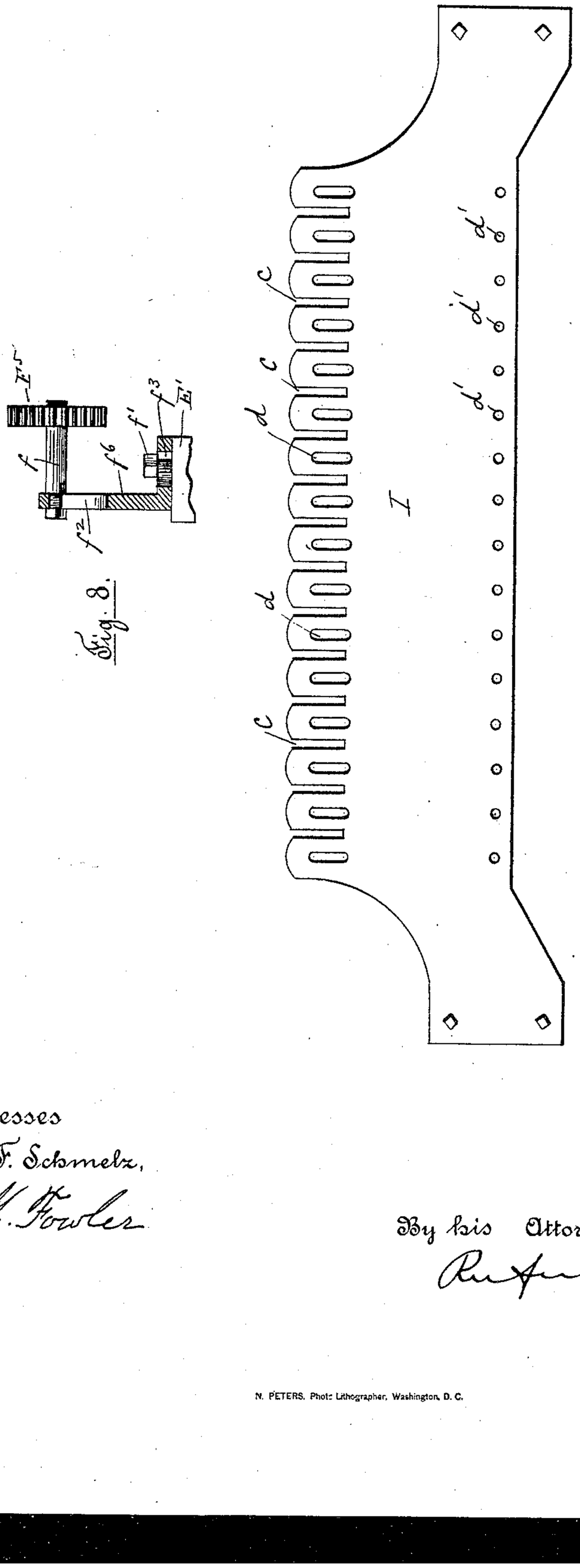

Fig. 3. Fig. 4.

Witnesses
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Inventor
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By his Attorney
Richard B. Fowler

UNITED STATES PATENT OFFICE.

GEORGE LAYNG, OF WORCESTER, MASSACHUSETTS.

CONDENSING MECHANISM FOR CARDING-ENGINES.

SPECIFICATION forming part of Letters Patent No. 409,211, dated August 20, 1889.

Application filed June 15, 1886. Serial No. 205,286. (No model.)

To all whom it may concern:

Be it known that I, GEORGE LAYNG, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Condensing Mechanism for Carding-Engines, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation of a carding-engine, showing such parts as embody my present invention. Fig. 2 is a side elevation of a portion of a "finisher-card," the gear-wheels by which the upper pair of drawing-rolls are connected having been omitted. Fig. 3 is a top view of the condenser, shown in elevation in Figs. 1 and 2 and with the upper winding mechanism omitted. Fig. 4 is a detached view of one of the transverse plates supporting the twisting mechanism. Fig. 5 is a sectional view, on a larger, scale of the operating parts employed in drawing and twisting the sliver or roping, with the supporting frame-work omitted. Figs. 6 and 7 are views of the roll-carrying lever by which I adjust the pressure upon the sliver during the operation of twisting, and Fig. 8 represents the stand supporting the intermediate gear connecting the drawing-rolls.

Similar letters refer to similar parts in the several views.

My invention relates to that part of a carding-engine known as the "condenser," in which the sliver or roping which has passed the successive carding operations is slightly drawn and twisted preparatory to spinning; and my invention consists in providing a series of belts placed between the slivers or ropings and at an angle thereto with the opposing surfaces of each pair of belts acting upon the slivers to twist the same; in the combination, with twisting mechanism, as described, of a pair of drawing-rolls by which the slivers are drawn and also held from rotation; in providing means for adjusting the pressure of the twisting-belts upon each individual sliver, and in certain details of construction and arrangement of the operating parts, as hereinafter described, and set forth in the claims.

In the accompanying drawings, A denotes the frame, B the main shaft, C the main cylinder, and D D′ the upper and lower doffers, from which the slivers or ropings are taken by reciprocating combs D^2. (Shown in section in Fig. 5, but omitted from the other views to avoid confusion.

Instead of a reciprocating comb other known devices—such as a wipe-roll or a rotating comb—may be employed.

The operation of carding and of forming a continuous roping or sliver upon what is known as a "finisher-card" is well known and requires no extended description.

The mechanism forming the condenser, and which embodies my present invention, is supported in the rectangular frame E, attached to the main frame-work A. In front of each of the doffers I place the rolls F F′, journaled in suitable bearings in the frame-work and in proper position to receive the sliver from the rings of the doffers. The rolls F F′ may be plain, or fluted, or covered, as the character of the work may require. Above the roll F, I place the weighted roll G, held in open bearings *a a*, Figs. 2 and 3, and above the roll F′, I place a series of short weighted rolls H, similarly held in the open or hooked bearings *b*, each sliver having a separate roll. The rolls F are rotated by the doffers D D′ through gears D^3 and F^2, Fig. 3, and the roll F′ is rotated by the roll F through the gears F^3 and F^4 and the intermediate gear F^5, which is supported upon a stand F^6, Fig. 8, attached to the cross-bar E′, the rolls F and F′ being of different circumferential speed. The intermediate gear F^5 is held upon a stud *f*, which is held in a slot f^2 in the stand F^6, allowing the stud *f* to be adjusted in the slot, and the stand F^6 is likewise held on the cross-bar E′ by a bolt *f′*, which passes through a slot f^3 in the stand, allowing the stand to be adjusted on the cross-bar, and thereby allowing the size of the gears F^3 and F^4 to be changed and the relative speed of the drawing-rolls varied.

Connected to the frame E and extending transversely across the machine and between the rolls F F′ are plates I, one of which is shown in Fig. 4. Slits *c* are formed in the upper edges of the plates I to allow the slivers to pass from the roll F to the roll F′, and studs held in plates I at *d d′* carry small flange-pulleys J J′, upon which the belts K are placed in proper position to bring each

sliver between the outer and opposing surfaces of each adjacent pair of belts. To the lower flange-pulleys J, I attach the bevel-gears L, each engaged by a bevel-gear L′ on the shafts L^2, driven from the pulley L^4 on the main shaft through the flanged pulleys L^5 on the shafts L^2. The shafts L^2 are conveniently supported by arms L^6, Fig. 2, attached to the transverse plates I. A rapid motion is thus imparted to the belts K in the direction of the arrows in Fig. 1, where a portion of the machine is omitted in order to disclose the construction of the twisting device. Upon the slack side of each belt, in contact with a sliver, I place a roll N, held on the free arm of a lever N′, pivoted to the plate I by a bolt and nut or a screw by which it may be adjusted and tightened, thereby regulating the pressure of the roll N against the belt and consequently the pressure of the belt upon the sliver. The opposing surfaces of the belts in contact with the sliver move in opposite directions, as shown by the arrows in Fig. 1, thereby providing a rolling motion upon the sliver, which, being held by the roll F and its weighted roll G, becomes twisted, the amount of twist being determined by the relative speed of the belts and that of the sliver between them. The upper holes *d* in the plates I, Fig. 4, are elongated vertically to allow the belts to be tightened.

From the front drawing-roll F′ the slivers pass over the bar *g* to the winding mechanism placed upon the top of the rectangular frame E, and consisting of the rotating drum M, upon which the section-spool M′ rests, and the guide-bar M^2, having a traversing motion to lay the slivers evenly upon the section-spool. The lower slivers pass over the bar *g′* to a similar winding mechanism placed beneath the drawing and twisting mechanism just described, and which in the present instance is attached to the floor. The winding-drums are each rotated by a belt M^3 from the pulley P on the shaft of the front drawing-roll F′, the relative size of the pulley P and of the pulley P′ on the drum M corresponding with the relative diameters of the drum M and roll F′.

The winding mechanism is substantially like that in ordinary use; but it is customary to place the winding mechanism directly in front of the condenser to which the slivers are led in a straight line.

In my improved machine the winding mechanism is placed above and below the condenser and the direction of the slivers is changed by means of the bars *g* and *g′*, thus rendering the machine more compact and occupying less floor space and permitting free access to the condenser in order to piece broken ends or adjust the operating parts.

Heretofore the operation of condensing the sliver or roping as it is taken from the rings of the doffer has usually been performed by passing the sliver between a series of leather-covered rotating rolls, to which a longitudinal reciprocating motion is given; or the sliver has been passed through a rotating tube between drawing-rolls or between belts running in the same direction as the sliver and having a lateral reciprocating motion.

In my improved machine I employ a pair of belts for each sliver, thereby securing an independent action of the belts upon each strand and enabling the pressure exerted upon each strand to be adjusted, as desired, and I also move the surfaces of the twisting-belts at right angles to the axes of the drawing-rolls by which the strands of roping are held from rotation.

The mechanism for drawing and twisting the slivers from the upper and lower doffers D and D′ is substantially the same, and therefore any description of one will apply to the other. I have shown and described but one series of twisting-belts K and two pairs of drawing-rolls F and F′; but I do not confine myself to the use of but a single series of belts, for additional pairs of rolls may be employed and the slivers may be subjected to successive operations of twisting between each pair of rolls in case the character of the work requires. Such use of additional rolls and belts would obviously come within the scope of my present invention. Neither do I confine myself to the specific method, as shown, of actuating the belts, as other well-known methods will readily be suggested to those familiar with this class of machinery.

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with doffing mechanism by which several slivers or independent strands of roping are delivered in a common horizontal plane, of short belts arranged in a vertical plane, a belt being placed between each pair of contiguous strands of roping and each belt being driven through connected operating mechanism, substantially as described, and tightening devices applied to each of said belts, substantially as described, by which the pressure upon each of the strands of roping is varied, substantially as described.

2. The combination, with doffing mechanism by which slivers or independent strands of roping are delivered, of a roll over which said slivers pass, a weighted roll resting upon said slivers, a series of short independently-moving belts placed at right angles to said slivers as they are delivered from said rolls, and a series of pulleys arranged in pairs for supporting said belts, with the opposing surfaces of each pair of belts in contact with the slivers which pass between the belts and connected operating mechanism, substantially as described.

3. The combination, with the doffing mechanism by which slivers or independent strands of roping are delivered, of the roll F, weighted roll G, the roll F′, and weighted roll H, a series of short independently-moving belts placed between the rolls F and F′ and at right

angles to the slivers as they pass from the rolls F G to the rolls F′ H, and a series of pulleys arranged in pairs for supporting said belts, with the oppositely-moving surfaces of each pair of belts in contact with said slivers, and connected actuating mechanism by which said belts are operated, substantially as described.

4. The combination, with the doffing mechanism by which slivers or independent strands of roping are delivered, of the rolls F and F′, of different circumferential speed, weighted rolls G and H, by which the slivers are held upon the rolls F and F′, a series of short independently-moving belts placed between the rolls F F′ and at right angles with the slivers as they pass from roll F to roll F′, a series of pulleys arranged in pairs for supporting the belts with their oppositely-moving surfaces in contact with the slivers, and connected actuating mechanism by which said belts are operated, substantially as described.

5. In the condenser of a carding-engine, the combination, with a doffing-cylinder, of a series of flanged pulleys arranged in pairs and carrying belts placed at an angle with the slivers from the doffing-cylinder, a series of bevel gear-wheels attached to one of the flanged pulleys in each pair of pulleys, and a series of actuating bevel-gears engaging the bevel-gears attached to said pulleys, as described.

6. In the condenser of a carding-engine, the transverse slotted plate I, and a series of flanged pulleys held by said plate and carrying continuously-moving belts in contact with the sliver, and connected actuating mechanism by which said belts are operated, all combined as described.

7. The combination, with doffing mechanism by which slivers or independent strands of roping are delivered, of the rolls F and F′, weighted rolls G and H, a series of short belts placed between the rolls F and F′ at right angles to the axes of said rolls and also at right angles with said slivers, connected operating mechanism by which said belts are driven, and tightening devices by which said belts are independently tightened and the pressure varied upon each individual strand or sliver, substantially as described.

8. The combination of the transverse plate I, a series of pulleys supported upon said plate and carrying short independently-moving belts driven by connected mechanism, substantially as described, and placed at right angles to the slivers, which pass between them, levers pivoted upon said plate, and a friction-roll carried upon the free end of said levers and bearing upon the slack and inner side of said belts, whereby they are pressed against the slivers, substantially as described.

9. The combination, with doffing mechanism by which a series of slivers or independent strands of roping are delivered, of the rolls F and F′, weighted rolls G and H, belts K, placed between said rolls and at right angles with their axes and also at right angles with said strands or slivers, said belts being driven through connected mechanism, substantially as described, and the bars *g g′*, by which the slivers, as they are delivered from the rolls F′ and H, are deflected to the winding mechanism, substantially as described.

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Witnesses:
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